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Diag. Cht. No. 1236-1

Form 504

U. S. COAST AND GEODETIC SURVEY
DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey *Hydrographic*
Field No. Office No. *4312^a_b*

LOCALITY

State *North Carolina*
General locality *Cape Fear*
Locality *Federal Point to
Oak Island*

1923

CHIEF OF PARTY

A. M. Sobieralski

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DESCRIPTIVE REPORT

to accompany

HYDROGRAPHIC SHEET 21.

Season 1923.

U.S.S. LYDONIA

A.M. Sobieralski, Commanding.

INTRODUCTION.

The hydrography on this sheet was begun on July 24, 1923. On that date the motor-sailer left the ship, while the latter was on her working grounds off Carolina Beach, to work southward from the northern limit. A choppy sea was running and signals were poor, so after running several lines with poor success, the launch returned to the ship. Another attempt was made on July 26, 1923. Threatening weather, however, made it advisable for the ship to recall the launch, shortly after the latter had begun sounding. These two unsuccessful attempts to work from the ship made it evident that the launch work could not be accomplished in this manner very satisfactorily. It handicapped the ship in her own work by forcing her to remain in that locality, and time was lost in dropping and picking up the launch. So no further launch work was done until August 7. On August 6, 1923, while the ship was cleaning boilers at Wilmington, the launch left that place for Southport, situated at the mouth of the Cape Fear River. Quarters were secured here for the officers and men and a berth for the launch. This place was then used as headquarters for the remainder of the work on Sheet 21, and for all of the work on sheet 22. The officer in charge of the launch work consulted the commanding officer on days when the LYDONIA was passing in on its way to Wilmington, or when anchored off Southport on Sundays. In the meantime it operated independent of the ship. Work was practically completed on September 24. On October 1 hydrography was begun on Sheet 22. This sheet is a continuation of the work on Sheet 21. On October 17, the launch party returned to the ship. The development of a few creeks on the inside was left to the party of the Launch MIKAWA, as they were making a topographic survey in the vicinity of these creeks and it was thought that the completion of the work could be accomplished most economically by them.

ORGANIZATION.

For the week beginning August 7, the party was composed of three officers and four men. Lieut. (j.g.) C.D. Meaney was in charge and

Deck Officers George L. Anderson and Edward M. Denbo were used for left angle and recording. On August 14, Lieut. (J.G.) R. F. A. Studds was placed in charge of the work and Deck Officer Edward M. Denbo assisted with left angle. One of the ship's writers was used for recording. Three of the remaining men were taught to sound and steer carefully, and the fourth man was used as engineer. These last four men had ratings of Seamen, A.B. The three men trained as leadsmen would stand one hour watches sounding, hauling in the lead and steering. It was the duty of the man hauling the lead to arm it and check the soundings of the leadsmen. This frequent change kept the men from tiring and becoming slovenly in the execution of their duties.

COST, ETC.

The total cost of the party for the time they were engaged in work on this sheet, including salaries, board and lodging, fuel, small repairs, etc., was approximately \$1310. The total number of soundings taken were 16,850. So neglecting the overhead of the ship and the depreciation of the launch and engine, this would make the cost of a sounding approximately 8¢ for this sheet. Working hours were more or less governed by the meal times of the men. As a general thing, the party would report at work at 7:30 A.M. and be ready to get underway immediately after checking the leadline. The day's sounding was ended at such a time as would enable the men to leave the launch secured for the night at Southport at 6:00 P.M. There was necessarily, considerable running to and from working grounds; this total being 530 miles, while the number of miles of sounding was 487.5.

LAUNCH.

The launch used in this work was a 24' motor-sailer with a 2 cylinder 2 cycle Navy Standard engine. The boat proved to be sturdy and seaworthy, but she was not especially well rigged for use as a sounding launch. A canopy completely covered the launch with two ports on each side fitted with flaps and a flap aft. The plotting table was placed in the forward part of the boat. The sounding chair was rigged up about 6' from the stern. It was necessary for the officers taking right and left angles to use the ports on the port side. At nearly all times, therefore, except when running parallel to shore, one of them would be in the way of the other. As they had to stand on the seat to see over the canopy, it was quite difficult to retain one's footing if there was much sea running. Gases from the engine collected in the forward part of the boat and the officer plotting was forced to inhale these gases continually. In the beginning of the work an attempt was made to throttle the engine down to sounding speed. It was found necessary in doing this, to open the needle valve on the carbureter quite a bit. This, of course, allowed too rich a mixture in the cylinders, the spark plugs soon became fouled and the engine would begin to miss firing. To remedy this, the engine was allowed to run at full speed and the speed of the launch reduced by towing a drag. A number of the working parts of the engine were worn considerably and this fact combined with the engine operating at full speed made so much noise that everyone was forced to shout to make themselves heard.

The engine itself gave a good deal of trouble, due to it being well worn.

Sounding was prevented on 3 days and hindered on 8 days out of a total of 40 working days by the engine not working properly. The cooling system and the ignition system gave the most trouble. A battery and coil was used to help in starting and for emergency ignition but did not seem to lessen the difficulty in starting. An improvement in the rig of the launch would be to have a hinged awning frame in the bow so that it could be kept raised ordinarily and lowered if the sea was choppy. The rest of the canopy should be so secured that it could be furled. The launch at present has so much canvas that she makes considerable leeway. A solid bulkhead should be built amidships with a small port for giving instructions to the engineer. The sounding chair if placed about amidships would allow the recorder to be close to both the leadsman and the officer in charge. The latter could also hear the soundings more plainly than at present. A small wheel fitted to the top of the awning frame aft and a box slung from metal straps directly beneath it for housing the compass would enable the helmsman to steer closer courses and also keep a lookout ahead. At present he simply uses the tiller with the compass fitted on the thwart just forward of the stern. The maximum speed of the launch is from 5 to $5\frac{1}{2}$ knots. This was reduced to $3\frac{1}{2}$ and 4 knots for sounding. A head wind or sea makes a considerable difference in her speed. Her consumption of gasoline is about $2\frac{1}{2}$ miles to a gallon.

LEADLINE.

The leadline used was made of 1" woven tiller rope with a phosphor-bronze wire center. It is a trifle stiffer than the sashcord and is perhaps a bit harder on the leadsman's hands; not enough, however, so that it was noticeable after the line had been worked a little. It held its length excellently, the greatest correction being 0.2' in 7 fathoms. On only two occasions the line broke. At both times it broke close to the toggle where the leadsman held it. A 9 pound lead was used. This gave good soundings in depths up to 7 fathoms with a speed of 4 knots.

WEATHER.

The shape of the coast in the locality of this work was such that with average weather a protected area could always be had. According to pilots of Southport, the seasonal breezes are as follows: Spring, southerly; Summer, southerly; Fall, northerly; winter northeasterly. It was found that during the summer months, the breezes tended more towards the southwest rather than the south. Therefore when southerly weather made it too choppy to work to the westward of Frying Pan Shoals, fairly smooth waters could be found to the northward; and vice versa, work could be done in the vicinity of the Cape Fear River entrance when weather prevented it north of the shoals. Smooth weather had to be had to work on the Frying Pan Shoals. Out of a total of 40 working days none were totally prevented by weather and work was hindered on 19 days. A northeast gale in the latter part of September, lasting for about a week prevented any work outside, but this time was utilized by building signals for Sheet 22. Southwesterly weather makes the sea break on the shoal just to the East of the channel entering Cape Fear River. North of Cape Fear the sea becomes choppy with even a gentle northeast breeze.

CONTROL, SYSTEM OF LINES, ETC.

The method of locating soundings was by sextant fixes to objects on

shore and buoys planted off shore; the latter located by sextant fixes from shore objects. All of the signals, including a description of how they were located and marked and whether permanent or temporary are given in a list which accompanies this report. The small signals were built and located by the topographic party of the Launch MIKAWA. Spounding lines, in general, were run at approximately right angles to the trend of the shore. They were spaced 200 meters apart. Developments were made by a system of parallel lines, sometimes spacing them as close as 50 meters apart. An attempt was made to develop the inner portion of the Frying Pan Shoals, that is between the Cape Fear Swash Channel and the Beach, by this same system of lines. On account of strong currents, changing courses to avoid breakers, and difficulty in picking a range to steer by, this could not well be done. The area, however, was well covered, altho, probably not by the least possible number of lines. South of Swash Channel, on the Frying Pan Shoals, lines were spaced a quarter of a mile apart, and run at right angles to the general direction of the shoal. A single cross line was run at right angles to the sounding lines for a check and to discover any discrepancies in the work. It was found that "a" day did not check well and so the work on this day was rerun. A note explaining this in full is given in the sounding record at the end of "a" day. Otherwise the cross line agrees very well with the soundings previously taken. All of the launch work joins and overlaps slightly the work of the LYDONIA or the MIKAWA. A few lines were run in the area covered by the MIKAWA across the shoalest part of the Frying Pan Shoal as the Mikawa left a slight gap where the shoal was breaking. These were spaced a third of a mile apart. The scale of this sheet is 1/20,000.

TIDES.

It was necessary to write this report in advance of the plotting of the smooth sheet, so not much information can be given at this time regarding tides. Soundings were reduced from predicted tides and plotted on the boat sheet for field inspection. An automatic tide gauge has been established at Fort Caswell. Tide staffs were erected at Corncake Inlet and Bald Head. In the sounding records, notes have been entered to use Corncake Inlet tide staff for soundings north of a line east of Cape Fear Light House and to use Fort Caswell automatic tide gauge for the remainder. After the results of simultaneous observations have been studied this may have to be changed.

GENERAL.

Altho soundings have been made before in the area covered by this sheet, this present work was really more in the nature of a resurvey than a revision. A number of shoals indicated on the chart were developed, notably one just to the east of Cape Fear Light House. 22 feet is shown as the shoalest sounding on the chart while 17 feet was discovered by the launch. Some changes were found on the inshore portion of the Frying Pan Shoals, especially in the Swash Channel. Army Engineers data was gathered and their work was not duplicated; altho a few lines were run across the Middle Ground shoal at the mouth of the Cape Fear River, because the Engineers' survey was three years old. All of the wrecks shown on the chart were searched for. Some work was done on the inside, but this has been left to the party of the Launch MIKAWA to complete. The work was carried to the western limit of the sheet, off Oak

Island, and sheet 22 was then used to carry the work further to the westward.

DETAIL.

The 2 foot sounding shown on the chart as lying about a quarter of a mile off shore in approximate Latitude $33^{\circ} 58'$ and Longitude $77^{\circ} 54'$ was not found. Inshore from this point, at the extreme inner end of the sounding lines, bowlders could be seen on bottom. The leadsman, however, did not strike any of them. The wreck as charted in this locality was not found. A ridge running north-eastward within the launch limits, was developed in this vicinity and another to the eastward, within the ship limits, was also developed.

A close development of SHEEPHEAD ROCK was made. No search was made for the least depth. The shoalest depth found was 10 feet.

NEW INLET appears to be closing up. The topographic party can probably give more information regarding this inlet than the hydrographic party, as the launch could not approach it closely on account of breakers. No channel was visible.

CORNCAKE INLET was left to the party of the launch MIKAWA to develop. Some lines were run thru the inlet and also in the various sloughs by Lieut. (j.g.) D.D.Meaney, during the week he was in charge of the launch work. As most of his report concerns this work, it is thought best to insert it here.

Report of Lieut. (j.g.) C.D.Meaney.

During the progress of work on Sheet 21 from August 6 to August 13, reconnaissance lines of sounding were run in two channels between Corncake Inlet and deep water in the Cape Fear River off Southport. Also lines were run at two hundred meter intervals on the outside coast from Latitude $33^{\circ} 50.5'$ to $33^{\circ} 53.5'$. One line of soundings was carried from outside Corncake Inlet to the Cape Fear River $1/3$ mile SW of the National Quarantine Dock. Part of this passage is not described in the Coast Pilot and is not marked on the chart. Soundings taken entering Corncake Inlet agreed with the Coast Pilot. From this line of soundings supplemented by additional observations and soundings the following notes are written to describe the channel from Corncake Inlet to the Cape Fear River by this channel:

In entering Corncake Inlet, breakers are the best guide. When about three quarters of a mile SE of Corncake Inlet and with the north point of the south spit on range with the ruins of an old brick lighthouse on the west bank of the Cape Fear River, head for the center of the Inlet, gradually opening the range from the north. After passing the breakers on the north side of the channel head for the north spit. Follow the ~~north bank~~ south bank of the north spit at a distance of 75 meters until about S of the west point of the spit. Then run southward and southwesterly following the inside shore at a distance of 80 to 100 meters for $\frac{3}{4}$ of a mile. From here, follow a slough which winds in a SW'ly direction to a position about 80 meters north of a stake, marking a shoal bare at $\frac{1}{4}$ tide. There is about $1\frac{1}{2}$ feet of water at low tide in this slough. It controls the draft of a boat that can pass. The slough then follows a winding course in a general NW'ly direction to a channel with marsh grass on either side. Follow this passage and keep to the west and

middle of the channel, which winds a mile to a junction with Muddy Slough. The channel from there follows a westerly and northwesterly direction between marsh grass islands. On coming into the open river, head in a WNW'y direction with the Southport water tank on the port bow until deep water is reached. The passage is used only at half tide or better.

The other passage sounded followed the same courses to its junction with Muddy Slough. At this point the channel runs in a S'yly and SW'yly direction, following the south shore at 80 to 100 meters for about a mile to a junction with another channel from Corncake Inlet described in the Coast Pilot, from where it follows the courses described in the Coast Pilot. The muddy slough channel is the deeper passage. The above notes cover only reconnaissance lines which may be supplemented by sounding later in the season.

The soundings which were taken between Latitude $33^{\circ} 50.5'$ to $33^{\circ} 53.5'$ corresponded with soundings on Chart #424. The beach along this section of the coast is steep.

These creeks described by Lieut. Meaney were used by the launch party later in the season to reach the work to the northward. Only those boats engaged in fishing along the coast were seen making use of these sloughs. These boats were flat-bottomed and drew about $2\frac{1}{2}$ or 3 feet. A northeast breeze of almost any intensity makes the Corncake Inlet Bar impassable. There is danger, in entering the channel, on an ebb tide, of being set on the shoal making out from the north spit. Both the ebb and flood current is very strong in the inlet.

CAPE FEAR SWASH CHANNEL, which lies about one mile south of Cape Fear Light House, was developed, altho as previously stated, guide lines could not well be followed, on account of currents and necessary changes of courses to avoid breakers. A least depth of 10 feet, as determined from predicted tide corrections was found. From the present position of the buoys the channel on the western end has apparently shifted to the northward. The channel is marked by three red nun buoys as entering the channel from the eastward. Buoy N6 should, in its present position be left on the port hand approaching Cape Fear River. The rest of the channel has apparently not shifted enough to change the position of the buoys. Fishing boats have been observed to use Buoy N6 as a black can buoy. Information concerning its erroneous position was given to several fishermen in Southport, altho with any choppy sea, or even in a smooth sea at low tide, shoal water can be seen in the channel as marked at present between Buoys N4 and N6.

There are five spots on FRYING PAN SHOAL, lying from two to three miles off shore, which bare themselves at low water. These were cut in by three anchorages of the launch. A wreck, described by men blue-fishing on the shoal as lying in Latitude $33^{\circ} 48'$ and Longitude $77^{\circ} 57' 30''$, was searched for but could not be found. It is said to project about 6" out of water at low tide. With a smooth sea, at high water, no breakers could be seen from the launch south of Latitude $33^{\circ} 48'$.

The two wrecks charted as lying on BALD HEAD SHOAL were searched for. One, the "Ella", shows plainly at low water. Its position is given in an angle book which accompanies the records of this sheet. Caution should be used in

approaching this wreck as a submerged portion of it juts out considerably from the part visible at low water. The other wreck could not be found.

Three blue prints, obtained from the Army Engineers, accompanies the records of this sheet. They show a recent survey of the channel and Ocean Bar entering Cape Fear River, and a survey in 1920 of the Middle Ground Shoal, with a position of the proposed jetty and proposed new channel. Mr. J. C. Rudolph, Senior Engineer, who made the survey, was consulted with in order to obtain an idea of his methods. The following is his description:

A transit was set up at Bald Head Light House and stakes set along the shoreline at Bald Head for every 1° angle turned off on the transit. The position of these stakes was determined. Along the channel stakes were set for every 30' angle of the transit. In sounding a man would hold a target on each stake and the sounding line run on the range of this target and the light house. Transits set up at the light house and at triangulation station "R" would observe an angle to the launch at every minute. Soundings were taken from the launch every 20" using a 35' pole, graduated to tenths of feet. On the even minute a flag was raised from the boat as a signal for the transitmen to take their angles. Tides were observed at Bald Head for this work and an allowance of 0.2' was made for the tide at the outer end of the line; that is, 0.2' less on an ebb tide and 0.2' more on a flood tide. Mr. Rudolph claimed there was half an hour's difference in the time of tide at Bald Head and at Fort Caswell.

The middle ground shoal is gradually working southward and tending to obstruct the main channel. For this reason it is intended to cut there a new channel which is approximately on a range with the front beacon of the present Bald Head Range and the rear beacon of the present New Channel Range. It is also proposed to build a jetty east of this channel. The position of both of these is shown on one of the blue prints which accompanies this sheet.

WESTERN BAR CHANNEL remains about the same as shown on the chart. This channel is used quite extensively by the shrimping and fishing boats going in and out of Cape Fear River.

Two wrecks, charted as lying just off Oak Island, one close to the beach and one about $\frac{1}{4}$ mile off, in approximate Longitude 78° 04', have been removed by dynamite, according to Captain Willis of the Oak Island Coast Guard Station.

A development was made of the area just north of the entrance buoy, where an 18' spot had been reported. This shoal does not exist.

FORT CASWELL, lying on the west side of the Cape Fear River entrance, is a government reservation. At present there is a small detail of soldiers there. Vessels coming into Cape Fear River to avoid weather sometime anchor northeast of the fort on the edge of the channel.

SOUTHPORT is a small town, with a population of about 1600, on the north side of the river about three miles from the entrance. The main industry is shrimping and fishing. Most of the pilots for the Cape Fear River reside here. Southport has communication with Wilmington by steamboat and railroad. Supplies in limited quantities, gasoline and fresh water can be obtained. Fuel oil and

coal can be had at the railroad dock if ordered in advance thru the railroad. No supply is kept on hand. There is sufficient water at this dock for a vessel of 24' draft. There is a small drydock able to accommodate a boat of 10 tons and 48' in length. The services of a ship's carpenter and machinist can be had. There is no harbor master here and therefore no harbor rules. There is a quarantine station and marine doctor at Southport, but no hospital.

The following further information and notes on Coast Pilot were furnished by the manager of the Pilot's Association of Southport:

A small area in Latitude 33° 50' and Longitude 78° 05' has been reported as having a rocky bottom. Boats engaged in shrimping have torn their nets here.

The dumping grounds for the dredge is 1 mile WNW and $\frac{1}{2}$ mile NW $\frac{1}{2}$ N from the lighted entrance buoy.

The pilots have a tower in Southport from which they sight all vessels approaching Cape Fear River. All vessels are met. The pilot boat will board a vessel in a radius of 8 miles from the entrance buoy. The usual anchorage for a vessel awaiting a pilot or tug is one mile SKW from the buoy.

The bar breaks only in very heavy weather. The maximum width of channel is 400'. 27' is the least depth at low water in the channel to Southport. A vessel of 27' draft can make Wilmington at high water and 25 $\frac{1}{2}$ ' at low water. 4' draft can be carried for 67 miles above Wilmington in the Northwest River and 19' for 5 miles. In the Northeast River a draft of 16' can be carried for 7 miles above Wilmington. In the Elizabeth River, which lies about $1\frac{1}{2}$ miles west of Southport, a boat of 7' draft can reach the Fish Factories and 2 $\frac{1}{2}$ to 3 feet can be carried for 25 miles above Southport. The River is well marked with day beacons up to the factories.

The rainy months, in this locality, are April and November. Fogs usually occur in May and December. Gales begin as a rule about the first of August, blowing from the northeast and hauling to the eastward, dying out in the southwest. On only one occasion, that can be remembered, has ice been seen in the Cape Fear River to any great extent.

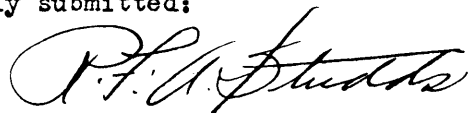
The bar and entrance channel have sand and mud bottom. There is clay bottom off Southport. In the past two years there has been no change in the River channel.

Freshets cause as much as a 7' rise in the river at Wilmington, but have no effect at Southport.

The majority of wrecks occurring in the vicinity of Cape Fear are caused by thick weather. The best place to beach a ship in an emergency would of course depend on the direction of the wind. Other things being equal, however, Oak Island is probably the better place.

There is a cable running from Southport to Fort Caswell along the shoal water on the west side of the channel. Another cable runs directly across the channel from Fort Caswell to Bald Head. These are the only forbidden anchorages.

Respectfully submitted:



Jr. H & G Eng'r.,
U.S.C. & G. Survey.

SIGNALS FOR HYDROGRAPHIC SHEET 21.

SIGNALS	HYDROGRAPHIC NAME	HOW LOCATED	HOW MARKED
Tall hydrographic signal	Ant	Triangulation (1923)	Standard mark.
Small hydrographic "	Elf	Topography	None.
" " "	May	"	None.
Flag pole at Fort Fisher	Tore	Triangulation (1923)	Natural object.
Flag pole on top of yellow house	Yel	Topography	" "
Small hydrographic signal	Cat	"	None.
" " "	But	"	None.
" " "	Art	"	None.
" " "	Bad	Triangulation (1923)	None.
Tall " "	Corn	" "	Standard mark.
Flag pole by fish shack shack	Pol	" "	Natural object.
Small hydrographic signal	Doe	Topography	
Signal on top of fish shack	Shack	"	
Small hydrographic signal	Dot	Triangulation (1923)	
" " "	Dell	" "	
" " "	Dog	" "	
" " "	Eat	" "	
" " "	Fat	" "	
" " "	Fog	" "	
Cape Fear Light House	Fear	" "	Natural object.
Small hydrographic signal	Gin	Topography	
" " "	Hek	"	
Boat house, live saving station	Ill	"	Natural object.
Cupola #194 on coast guard "	Will	Triangulation (1923)	" "
" on life saving station	Cup	Topography	" "
Flag staff, " " "	Age	"	" "

SIGNALS FOR HYDROGRAPHIC SHEET 21.

Bald Head light house	Bald	Triangulation (1923)	Natural object.
Water tank at Quarantine station	Quar	" "	" "
Southport water tank	Sot	" "	" "
Iron water tank at Fort Caswell	Iron	" "	" "
Wooden " " " " "	Wood	" "	" "
Yellow tower	Tow	Hydrography	" "
Red nun buoys	N2, N4, N6	" "	" "
Small barrel hydrography buoy	Nit	" "	" "
Small hydrographic signal	May	Topography	None.

NOTE: Signals located by topography are shown on the topographic sheet of the launch Mikawe.
 Signals located by hydrography are given in an angle record which accompanies the records of this sheet.

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

LANDMARKS FOR CHARTS

Wilmington, N.C.,

October 20, 1923.

Director,

~~Supervisor~~, U. S. COAST AND GEODETIC SURVEY:

The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

A. M. Sobieralski,

Chief of Party.

DESCRIPTION.	POSITION.					Method of determination.	Charts affected.	
	Latitude.		Longitude.		Datum.			
	'	D. M. meters.	'	D. P. meters.				
Tank, (Ft. Caswell iron tank)	33	53	1100.2	78 00	1535.6	U.S.	Triang.	150,424
Tank, (Ft. Caswell wood w. tank)	33	53	917.5	78 01	755.7	U.S.	Triang.	150,424
Tank, (Southport Water tank)	33	55	532.6	78 01	326.1	U.S.	Triang.	150,424
Tank, (U.S. Quarantine Station)	33	55	499.2	77 59	1206.4	U.S.	Triang.	150,424
Wreck, ("Ella" partially submerged)	33	51	551.0	78 00	930	U.S.	Hyd. Sm. Sheet.	"
The following should be removed from chart:								
All wrecks on outside coasts except the one listed above.								
"Cup" charted at present at the U.S. Quarantine Station.								

A list of objects which are of sufficient prominence for use on the charts, together with a description of the same, must be furnished in a special report on this form, and a copy of such report must be attached by the Chief of Party to his descriptive report. The selection, determination, and description of these points are of primary importance.

The description of each object should be short, but such as will identify it; for example, standpipe, water tower, church spire, tank, tall stack, red chimney, radio mast, etc. Generally, flagstaves and like objects are not sufficiently permanent to chart.

HYDROGRAPHIC STATISTICS.

BOAT: Motor-sailer.

SHEET NO. 1

DATE	DAY	VOL.	MILES	SOUNDINGS	POSITIONS	ANGLES
<u>1923</u>						
July	24	a	1	3.5	143	23 46
"	26	b	1	0.7	20	4 8
Aug.	7	c	1	18.0	586	104 208
"	8	d	1&2	20.4	1046	136 272
"	9	e	2	24.2	947	156 310
"	11	f	2	23.6	663	114 224
"	13	g	2&3	3.7	233	67 133
Aug.	14	h	3	28.8	1327	176 351
"	15	j	3&4	19.6	716	102 205
"	16	k	4	21.0	660	105 210
"	18	l	4	14.1	503	81 162
"	22	m	4	1.2	101	11 22
"	23	n	5	14.1	451	71 142
"	24	p	5	6.6	192	34 68
"	28	q	5	16.1	553	105 210
"	29	r	5&6	5.2	173	37 73
"	30	s	6	27.0	684	173 346
"	31	t	6	2.4	96	17 34
Sept	4	u	6	17.3	591	94 188
"	5	v	7	23.3	699	132 263
"	7	w	7	10.2	379	69 138
"	8	x	7&8	19.6	725	127 254
"	10	y	8	1.1	97	16 32
"	11	z	8	21.3	814	130 260
"	12	aa	8	21.8	657	131 262
"	13	bb	8&9	22.5	594	138 276
"	14	cc	9	8.1	321	57 114
"	15	dd	9	2.0	64	13 26
"	18	ee	9&10	29.7	972	196 392
"	19	ff	10	12.1	380	86 171
"	20	gg	10	12.1	354	87 174
"	21	hh	10	16.2	459	96 192
"	22	jj	10	0.7	20	7 14
"	24	kk	11	17.8	154	40 80
Oct.	3	ll	11	9.5	286	63 126
"	4	mm	11	0.8	29	6 12
"	15	nn	11	1.8	57	13 26
"	16	pp	11	1.5	51	11 22
-----			499.6	-----		
TOTALS:				16797	3028	6046

TIDAL-SHEET
to
accompany

HYDROGRAPHIC SHEET No. 21

Locality of gage, - - - - - Fort Caswell
Type of gage, - - - - - Automatic
Reading of gage for M.L.W., - - - - - 5.0 ft.
Highest tide observed, - - - - - June 27, 1923.
7.00 P.M.

Gage readings, - - - - - 10.8

Lowest tide observed, - - - - - Oct. 12, 1923.
3.00.A.M.
Oct. 13, 1923.
4.00.A.M.

Gage readings, - - - - - 4.0

Note: Gage readings increased 1/10 of range for tide
reducers.

Time: 20 minutes earlier for all work to westward of
a line extended to the eastward of Cape Fear
Light House, and outside of the mouth of the
Cape Fear River.

TIDAL-SHEET
to
accompany
HYDROGRAPHIC SHEET No. 21

Locality of gage, - - - - - Fort Caswell
Type of gage, - - - - - Automatic
Reading of gage for M.L.W., - - - - - 5.0 ft.
Highest tide observed, - - - - - June 27, 1923.
7.00 A.M.

Gage reading, - - - - - -10.8
Lowest tide observed, - - - - - Oct. 12, 1923.
3.00 A.M.
Oct. 13, 1923.
4.00 A.M.
Gage reading, - - - - - 4.00

Note: Use the reading direct from gage for work
inside of river and extending eastward
through S1ue to about 77°58'25"

WASHINGTON

June 25, 1924.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4312^a

Cape Fear, North Carolina

Surveyed in 1923

Instructions dated May 7, 1923.

Chief of Party, A. M. Sobieralski.

Surveyed by C. D. Meaney and R. F. A. Studds.

Protracted by E. H. Bernstein and A. M. Sobieralski.

Soundings plotted by H. J. Petersen and E. M. Denbo.

Verified and inked by F. M. Albert.

1. The records conform to the requirements of the General Instructions. The descriptive report is unusually comprehensive.
2. The plan and character of development conform to the requirements of the General Instructions.
3. The plan and extent of development satisfy the specific instructions, except that the distance between sounding lines is only one-half that specified. The irregular bottom, however, seems to have justified this departure from the instructions.
4. The sounding line crossings are adequate and the usual depth curves can be drawn.
5. The field plotting was completed to the extent prescribed in the General Instructions. The protracting was well done, but the plotting of soundings was defective. See draftsman's report for details. Attention is particularly called to the following defects:
 - Soundings plotted to tenths of feet.
 - No attempt made to plot shoaler sounding at crossings.
 - More soundings plotted than contained in the record.
 - Soft pencil used which caused work to be illegible in places, necessitating replotting in the office.

6. The junctions with adjoining sheets are satisfactory.
7. No further surveying is required within the limits of the sheet.
8. The character and scope of the field drafting is excellent, the protracting good and the plotting of soundings poor.
9. Reviewed by E. P. Ellis, June, 1924.

Draftsman's report on Verifying and Inking H. 4312^a. Scale, 1/20,000.

The field drafting on this sheet could have been improved in several features. First, the soundings should have been plotted in whole feet instead of feet and decimals. Second, a pencil hard enough to prevent smudging should have been used. Third, a closer adherence to recorded soundings should have been observed. Often additional soundings between positions were plotted which were not in the record. The shoal area and channel south of Cape Fear was so illegible that the soundings had to be erased and replotted. In no case was a sounding erased and replaced by a shoaler sounding where lines crossed. The first one down stayed down.

When the sheet was received in the office it lacked the area covered by surveys of Capt. Raynor. As the scale of the sheet was too small to do justice to the detail of the survey and since the work overlapped that already plotted it was decided to make a 1/10,000 sheet covering the interior waters near Cape Fear including Buzzards Bay. Even on the enlarged scale the soundings are quite close since they were taken as frequently as five seconds apart. This scale also shows the Muddy Slue channel much better.

The records were well kept and the area closely developed. The depth curves could be completely drawn.

The protracting in general was good but in one case a series of positions was incorrectly protracted due to using wrong signals. In another case the number of two lines was reversed necessitating a change of both positions and soundings. Where a fix was weak a slight consistent shift in positions was found in verifying, but no change made as this shift could easily be caused by distortion of the paper. The soundings of 80 - 82 q were not inked as they appear to be too deep. For the same reason pos. 1 - 2 f was not inked.

The sounding of 3 feet in lat. 33°52'.6 and long. 78°02'.5 is retained, though not verified by later soundings, because it was checked at the time it was taken.

F. M. Albert
F. M. Albert, Draftsman
Section of Field Records

June 18, 1924.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

The finished Hydrographic Sheet is to be accompanied by the following title sheet, filled in as completely as possible, when the sheet is forwarded to the Office.

U. S. Coast and Geodetic Survey.

Register No. ²¹ 4312^a

State NORTH CAROLINA

General locality CAPE FEAR

Locality FEDERAL POINT to OAK ISLAND

Chief of party . A.M. SOBIERALSKI

Surveyed by . . LIEUTS. (j.g.) C.D. MEANEY & R.F.A. STUDDS

Date of survey . AUGUST . & . SEPTEMBER, 1923.

Scale 1/20,000

Soundings in . . FEET

Plane of reference MEAN LOW WATER

Protracted by E.H. Bernstein Soundings in pencil by E.M. Denbo
A.M. Sobieralski
Inked by F.M. Albert Verified by F.M.A

Records accompanying sheet (check those forwarded):

Des. report, Tide books, Marigrams, Boat sheets,
angle
 Sounding books, Wire-drag books, Photographs.

Data from other sources affecting sheet ~~None blue prints of~~
~~any engineers~~; list of positions; Landmarks for charts.

Remarks:

4312 b

(Supplementary)

Form 504
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

State: North Carolina

11-5613

SUPPLEMENTARY
DESCRIPTIVE REPORT.

Hydrograph Sheet No. 21 4312

LOCALITY:

Atlantic Coast, North Carolina

Corncake Inlet, Cape Fear

River.

Launch MIKAWA

1923

CHIEF OF PARTY:

Leroy P. Raynor

4312

POST-OFFICE ADDRESS:

U.S. Coast and Geodetic Survey, Washington D.C.

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

January 3, 1924

JAN 3 11 50 AM '24

OFFICE
LIBRARY
MAGNET OR

CHARTS (3)

To: The Director.
From: Lieut. Leroy P. Raynor.
Subject: Sounding Records, MIKA WE Hydrographic Sheet No. 21.

Three sounding records, covering the work of the MIKANE on Hydrographic Sheet No. 21 were sent to you with the usual transmitting letter on January 3, 1924.

Soundings have been reduced and checked, but no work has been done on the smooth sheet, which is in the possession of the Commander of the LYDONIA. The positions and soundings should be plotted in the office when the sheet arrives.

Respectfully,

Leroy P Raynor

Lieut. U.S. Coast. & Geodetic Survey

REPORT, AUTHORITY, PARTY, DATES, LOCALITY.

This report covers the work done by the party on the Launch MIKAWA, to develop a channel between Cape Fear River and Corncake Inlet, North Carolina. Authority for the work is contained in the INSTRUCTIONS issued to the Commanding Officer of the U. S. LYDONIA, under date of May 7, 1923; and its performance was assigned by him to the Party on the MIKAWA. The personnel doing the work consisted of Lieut. L. P. Raynor, in charge, taking right angle and plotting; R. C. Rowse, D.O., left angle, 1 Leadsman (Foremanhand, MIKAWA), 1 Coxwain and Engineerunner (Hand, MIKAWA), 1 Recorder (Ass't Writer, LYDONIA). The work was started on October 18, and finished October 26, 1923.

The work includes sounding out the channel over Corncake Inlet Bar and entrance, work in Buzzards Bay, Still Creek, The Thorofare the Creek between Still Creek and the Thorofare, and also Muddy Slue from one end at Buzzards Bay out to deep water in the Cape Fear River, ending with a line running northwestward from Smith Island Front Range Beacon. The scale is that of sheet No. 21 which is 1:20,000.

redrawn on 1/10,000

CONTROL, METHODS.

The usual method of observing two angles between three fixed objects on shore for the control of the position of the boat, was used. Numerous objects in this vicinity were already located

by triangulation, and these supplemented by a few points located by the topographic party proved sufficient. The control for the tide reducers was furnished by the Automatic Tide Gauge maintained at Fort Caswell and by readings taken at the staff at Conncake Inlet while the work was in progress.

The work was all done from a dinghy furnished by the LYDONIA. This was fitted in the bow with a spray hood made by the Foreman-hand of the MIKAWA, and under which the sheet was kept to protect it from water splashed by the leadline or the waves. Power was furnished by an old small portable Evinrude motor, fastened to the stern, and which proved quite satisfactory and efficient. Soundings were taken every ten seconds, except in the development of the narrow slues, when it became necessary to take them every five seconds. A handlead line with a 9 lb. lead was used and the soundings read in feet and tenths, the latter being estimated. In accordance with the General Instructions, the leadline was checked at the beginning and end of day, and found to remain with about a constant correction. The soundings were all made by Ralph Skau, foreman hand, the MIKAWA who did most excellent work in a crowded boat and in depths up to twenty feet.

As there ~~there~~ were strong currents in nearly all of the area covered, it was decided to select several prominent objects in the background, and to use them as rear ranges over certain selected portions of the work. For a front range; anything on the nearby

shore, that happened to be in range with the rear object when the line was started; was used. This meant that the one running the engine had both to steer the range and run the Evinrude, and while at first, some little difficulty was experienced, a little practise soon got things running nicely. In the Creeks and Slues, due to the high grass, it was not possible to see any ranges and the lines were run from bank to bank at right angles to the shore. The dinghy, with the party of five men was pretty well crowded, but it is believed, that for the work in question and similar work, that this method is quite a good one if some one can be found who can run an outboard motor and keep it in condition.

Spacing
of
Lines

Sounding lines were spaced 200 meters in Buzzards Bay, 150 meters in the Slues, and 40 to 50 meters where the development apparently warranted. One or two more lines would have been run in the channel leading into Corncake Inlet, but for the fact that the boat was capsized in the breakers on one of the lines and the engine, thereby, put out of order for the day. Later, rough weather prevented further work there.

GENERAL REMARKS, CHANGES OBSERVED.

Although from information gathered from pilots and others at Southport, it was learned that boats drawing five feet could find a channel from Corncake Inlet to the Cape Fear River, at high tide, and one fishboat drawing between four and five feet was observed to go through at extreme high water; it is believed that strangers should never attempt ^{to do so,} unless accompanied by someone

with recent local knowledge. Even then, due to the shifting nature of the bottom around Corncake Inlet, some difficulty may be experienced. Boats drawing over three feet will find it much better to go around Cape Fear and through Cape Fear Slue, where a depth of about nine feet at low water may be obtained.

Change
noted.

A specific change which was observed by the party on the MIKAWA may be noted. In May, while the Launch was anchored inside the Inlet, there was a sand bar, bare at low water about 700 meters south by west of Δ Pol. There was at that time water all around the shoal, with the deepest water into Buzzards Bay, between the shoal and the shoreline to the south. However, when the survey was made in October, it was found that at low water, the bar was practically bare all the way to the shore and that the most water was to be found to the north instead of to the south.

DETAILED DESCRIPTION, CORNCAKE BAR, SHOALS, SUGGESTED ROUTE.

Corncake
Bar

With care, the bar at Corncake Inlet should be easily crossed by boats drawing not over five feet, as it was used at several times during the season from May to October, by the MIKAWA when she was drawing a scant five feet, aft. It was usually crossed at about half tide and with a rising tide. A leadsman was stationed in the chains on each side and the least sounding usually gotten would reduce to 4.5 or 5 ft at low water. The deepest water for entering is found close south of the breakers running over the sand bar that extends out from the northern shore. At low water this bar is bare almost out to deep water at the end.

This bar appeared to be somewhat further south in October than in May, although no observations were made to determine how much it had moved. The change, if any, is presumably due to the change of the prevailing winds from southwest, to north or northeast. It may also be worth while to note, that if one approaches the Inlet from the south, that there is another apparent entrance free from breakers, which however, will be found to lead to a dead end. To avoid this one, it was noted that Price Creek Bug Light, was just open on the point of land on the southern side of the entrance and bears about 304 (true) when one is opposite the correct entrance.

Anchorage
in
Corncake
Inlet

While working the topography in this vicinity the MIKAWA was moored near the fish shack on the inside and about $\frac{1}{4}$ mile north of the entrance. It was found by experience that there was not enough room to swing at one anchor, and on account of the current which runs up to about 2 knots (by rough measurements), in this place, it was necessary to put out two anchors and drive two stakes on shore and moor with two lines led forward and two led aft. A shorter boat might swing at one anchor without any trouble.

Suggested
Route
Corncake
Inlet to
Cape Fear
River.

From a study of the boat sheet the following route is suggested for going from Corncake Inlet to Cape Fear River and for boats drawing not over 3.0 feet. For entering Corncake Inlet the breakers are the best guide. The note in the previous paragraph may also be of some help. After successfully entering the

Inlet and getting by the shoal lying 700 meters south by west of Δ Pol; one should follow the southern shore closely until the junction of the marsh with the sandy shore. Then steer a general southwesterly course gradually working to about 50 meters from the islands on the eastern entrance to Still Creek; then turn up Still Creek, following about the center of the Creek until at the entrance of Muddy Slue where the best water is apparently near the east bank of Still Creek. / The route up Still Creek is suggested as it appears a little easier of navigation than the other creeks, although Muddy Slue was used several times by the motor-sailer of the LYDONIA, and one fish boat drawing between 4 and 5 feet was seen to go through the Creek just south of Still Creek on an extreme tide, and several shrimp boats drawing between 3 and 4 feet were seen trying to go through. Therefore, but evidently experienced some difficulty, as they got stuck several times. At the entrance to the Creek just south of Still Creek and at Muddy Slue there appears to be a muddy bar over which there is very little water at low tide. From the mouth of Still Creek keep about 1/3 the way over from the south shore of Muddy Slue and follow out to deep water in the River on the following courses and ranges which have been tried out by the MIKANE. From a point on the previous course where the Quarantine Station tank is tangent to the west end of the island at the north and west end of Muddy Slue, keep a little north of the range New Channel Range front beacon on Smith Island Range rear beacon, gradually easing toward this range until right on it, when the Quarantine tank is seen midway between Striking Island and

the first island mentioned. Steer this course until the Quarrantine tank is tangent to the east side of Striking Island, when one should head for the left leg of the iron tank on Fort Caswell and on the course of about 261 (true). This leg of the tank will be seen just over the southeast gable of a large shed at Fort Caswell. Follow this course until Smith Island Range front beacon (red structure), appears about half way between Fort Caswell Range front beacon and Bald Head Light, when steer for the Smith Island Range front beacon until the Smith Island Range rear beacon is abeam then head for the New Channel Range front beacon or to buoy No. 7 for about $\frac{1}{4}$ mile, when one can then enter the main ship channel.

Anchorage
in
Muddy
Slue

The above courses are given in detail since by following them, boats drawing a little over 5 feet can find a well protected anchorage leading from the main ship channel, and in Muddy Slue 150 meters east of the range Quarrantine Tank and the west tangent of the island at the north and western entrance to Muddy Slue. Nine to ten feet of water at low water, with muddy bottom, and good holding ground may be found at this point. Inasmuch as the Cape Fear River in a storm, becomes quite rough and uncomfortable when one is anchored either in the stream, or at the wharfs, this anchorage is suggested as a good one if it is needed. It can be entered easily at high or half tide and by following the directions given, can be entered at about 1 foot above low water by baats drawing about 5 feet, as the bar at the entrance is very narrow and consequently there is little danger from grounding.

Shoals

At the entrance to the channel leading up Muddy Slue and extending from about 400 meters NW X W of Smith Island Range rear beacon, is a narrow bar apparently extending clear across this channel. Although from a plotting of the soundings on the boat sheet, a narrow channel with about 3 feet at low water is indicated, numerous crossings by the MIKAWA under soundings serve to show that there is such a bar about 40 meters wide and with a least depth of about 4.5 feet at low water. About 500 meters S. E. of Striking Island is a shoal bare at low water which can be avoided by following the courses given in the preceeding paragraphs. The controlling depth for going through from Corncake Inlet to the Cape Fear River is encountered near the shifting shoal lying about 700 meter south by west of Pol, and about which mention has been made previously.

Wrecks

Lying about 500 meters south of Striking Island and about 200 meters apart are two wrecks covered at high water and which were located by the party from the LYDONIA.

To : The Director, Coast and Geodetic Survey

Leroy Phagnot
Chief of Party,
Launch MIKAWA

4312^b

Table of Statistics Sheet No. (21)

CAPE FEAR RIVER TO CORNCAKE INLET

Date, 1923	Letter	Volume	Positions	Soundings	Miles	Boat
October 18	a	1	92	1121	15.0	Dinghy
" 19	b	1	58	644	7.5	"
" 20	c	2	24	194	3.3	"
" 23	d	2	26	220	1.5	"
" 24	e	2	26	201	0.5	"
" 25	f	2	76	492	4.0	"
" 26	g	2-3	138	1203	16.0	"
" 29	h	3	<u>32</u>	<u>290</u>	<u>2.2</u>	"
Totals 8 days			472	4365	50.0	
Aug. 8	d	1&2	136	1046	20.4	Motor Sailer
" 9	121-156 e	2	36	259	5.3	"
" 13	g	2&3	67	233	3.7	"
" 18	45-81 l	4	37	205	6.0	"
" 22	m	4	11	101	1.6	"
" 28	1-17 q	5	17	99	2.8	"
Sept. 10	y	8	16	97	1.1	"
Oct. 3	10-11 z	11	<u>2</u>	<u>7</u>	<u>0.1</u>	"
Totals 8 days			322	2047	41.0	
Totals for sheet			794	6412	91.0	

Report on Inking and Verifying H. 4312[±] (1/10,000)

This sheet is an enlargement from 1/20,000 scale of the shoal area and channels from ^{partly of the} Corncake Inlet to Cape Fear River. The surveying was done by the Mikawé, L. P. Raynor in Charge and by Motor Sailer, C. D. Maney and R. F. A. Studds in Charge. When the 1/20,000 scale sheet was received in the office it had only the work by the latter launch plotted. It was evident that to plot the work by the Mikawé's, which overlapped and covered that of the Motor Sailer would obscure the detail of both launches. Therefore the area was plotted on 1/10,000 scale. Even on this scale some soundings had to be omitted (since they were taken as frequently as 5 seconds between soundings)

All the work on this sheet was done in the office and the shoreline was enlarged from the contemporary topographic sheet. The protracting and plotting of soundings were well done. The records were complete and well kept.

The soundings from position 5 to 9 d (Motor Sailer) were not inked because they disagreed with adjacent soundings. For the same reason soundings from 123 to 125 e (Motor Sailer) were not inked. The area in both cases are sufficiently covered by other works. The soundings from 13 to 22 g (Motor Sailer) are probably out of position* and this part of the work is to be resurveyed very soon.

F. M. Albert, Draftsman
Section of Field Records

July 11, 1924.

* The resurvey indicates that 13 to 22 g (Motor Sailer) is O.K. and they therefore have been inked.

Apr. 20, 1925

34.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

WASHINGTON

July 17, 1924.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4312^b

Cape Fear River to Corncake Inlet, N.C.

Surveyed in 1923

Instructions dated May 7, 1923.

Chief of Party, A. M. Sobieralski and L. P. Raynor.

Surveyed by L. P. Raynor, C. D. Meaney and R.F.A. Studds.

Protracted and soundings plotted by J. C. MacNab .

Verified and inked by F. M. Albert.

1. The records conform to the requirements of the General Instructions except that bottom characteristics were omitted on many pages.
2. The plan and character of development conform to the requirements of the General Instructions.
3. The plan and extent of development satisfy the specific instructions.
4. This survey as laid out by the field party was partially plotted on H. 4312a, scale 1/20,000. As it was evident that this scale was too small, all of the work was plotted in the office on a new 1/10,000 scale sheet.
5. The junctions with adjoining sheets are satisfactory.
6. Owing to the radical change that appears to have occurred in the depths on the spit north of signal Doe, and also an apparently erroneous line of zero soundings across the channel west of signal Doe, additional surveying has been requested of these areas. No further surveying is required within the area of the sheet.
7. The character and scope of the surveying are excellent.
8. Reviewed by E. P. Ellis, July, 1924.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in
14 volumes of sounding records for

HYDROGRAPHIC SHEET 4312

Locality: Off Cape Fear, North Carolina.

Chief of Party: A.M. Sobieralski and L. P. Raynor in 1923

Plane of reference is mean low water reading

3.2 ft. on tide staff at Corneake Inlet

4.6 " " " " " "

4.1 " " " " " "

5.0 " " automatic gauge at Fort Caswell

For reduction of soundings, 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 each 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.

Chief, Division of Tides and Currents.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

The finished Hydrographic Sheet is to be accompanied by the following title sheet, filled in as completely as possible, when the sheet is forwarded to the Office.

U. S. Coast and Geodetic Survey.

Register No. 4312^b

State North Carolina

General locality Cape Fear

Locality Cape Fear River to Cornsake Inlet and Buzzard Bay

Chief of party A. M. Sobieralski
L. P. Raynor

Surveyed by L. P. Raynor, C. D. Meoney, R. F. A. Studds

Date of survey Aug. 8 to Oct. 29, 1923

Scale 1/10,000

Soundings in feet

Plane of reference M.L.W.

Protracted by J. C. MacLach Soundings in pencil by J. C. M.

Inked by F. M. Albert Verified by F. M. A.

Records accompanying sheet (check those forwarded):

Des. report, Tide books, _____ Marigrams, 2 Boat sheets,

10 Sounding books, _____ Wire-drag books, _____ Photographs.

Data from other sources affecting sheet _____

Remarks: