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(3947-48-49-50) (3947-48-49-50-51-52)
Diag. Ch. 1206-2 (Diag. Ch. 1207-2)

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

Type of Survey *Hydrographic*
Field No. _____ Office No. _____

LOCALITY
State *Massachusetts*
General locality *Cape Ann*
Locality *Spout of Jeffrey's
Ledge*
1946
CHIEF OF PARTY
M. H. Heck

LIBRARY & ARCHIVES
DATE _____



3947-48-49-50-51-52

Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

State:

11-5613

DESCRIPTIVE REPORT.

Sheet No. Hyd 3947

LOCALITY:

3950

3951

3952

191

CHIEF OF PARTY:

3947
3948
3949
3950
3951
3952

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. 3947

State Massachusetts

General locality coast of Massachusetts

Locality Cape Ann to Jeffrey's Ledge

Chief of party N. H. Heck

Surveyed by Wire Drag Party No. 1

Date of survey Aug 15 to Sept 18, 1916

Scale 1 to 80,000

Soundings in Fathoms

Plane of reference Mean Low Water

Protracted by H.R.B. Soundings in pencil by L.D.G.

Inked by R.L.J. Verified by R.L.J.

Records accompanying sheet (check those forwarded):

Tracing by R.L.J.

Des. report, Tide books, Marigrams, Boat sheets,
For records see Statistic Sheet

Sounding books, Wire-drag books, Photographs.

Data from other sources affecting sheet

* Descriptive Report same for Sheets 1.2.3.4.5a. and 5b.

Remarks:

*6142300
23*

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. 3948

State Massachusetts

General locality Boston Bay.

Locality Halfway Rock to Cape Ann.

Chief of party N. H. Heck

Surveyed by Wire Drag Party no. 1.

Date of survey May 27 to Nov. 10, 1916.

Scale 1 / 2500

Soundings in feet, underscored deep soundings in fathoms.

Plane of reference Mean Low Water.
Witherspoon

Protracted by Harsch, Soundings in pencil by Bennett
Bennett Barker

Inked by same as R.L.D. Verified by R.L.D.
Tracing by R.L.D.

Records accompanying sheet (check those forwarded):

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

1 Sounding books, 4 Wire-drag books, 2 Photographs.

Data from other sources affecting sheet

* Same report for all sheets of this season

Remarks:

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. 3949

State . . . Massachusetts

General locality . . . Coast of Massachusetts, Cape Ann

Locality . . . Sandy Bay ~~to~~ ^{and Approaches}

Chief of party . . . N. H. Heck

Surveyed by . . . Wire Drag Party No. 1

Date of survey . . . Aug 28 to Sept 25, 1916.

Scale . . . 1 to 25,000

Soundings in . . . feet

Plane of reference . . . Mean Low Water

Protracted by H.R.B. Soundings in pencil by H.R.B.

Inked by Verified by

Records accompanying sheet (check those forwarded):

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

1 Sounding books, 1 Wire-drag books, _____ Photographs.

Data from other sources affecting sheet

* Same descriptive report for sheets 1,2,3,4,5a,and5b.

Remarks:

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. 3950.

State . . . Massachusetts

General locality . . . Gloucester Harbor and East Coast of Cape Ann
~~and Sandy Bay~~

Locality . . . Cape Ann

Chief of party . . . N. H. Heck

Surveyed by . . . N. H. Heck, Wire Drag Party No. 1.

Date of survey . . . July 27 to Sept 28, 1916

Scale . . . 1 to 10,000

Soundings in . . . feet

Plane of reference . . . Mean Low Water

Protracted by Bennett
Bartlett and N.H.H. Soundings in pencil by H. R. Bartlett

Inked by R. L. Johnston . . . Verified by R. L. Johnston . . .

Records accompanying sheet (check those forwarded): Tracing by R.L.J.

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

1 Sounding books, 4 Wire-drag books, _____ Photographs.

Data from other sources affecting sheet

* Descriptive report same for all sheets.

Remarks:

S. T. B.

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. 3951

State . . . Massachusetts

General locality . . . Boston Bay

Locality . . . Boston L. V. to Halfway Rock

Chief of party . . . N. A. Heck

Surveyed by . . . Wire drag Party no. 1

Date of survey . . . May 19 - Oct 18, 1916

Scale . . . 1/25,000

Soundings in . . . Fathoms also drag depths

Plane of reference . . . Mean Low Water

Protracted by Hess, Ryan, Bennett, Wilkeson, Barber Soundings in pencil by same

Inked by Heck, Bennett, Wilkeson, Barber Verified by ~~H. A. Heck~~ R. L. Johnston

Records accompanying sheet (check those forwarded):
Tracing by R. L. Johnston

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

_____ Sounding books, 1 _____ Wire-drag books, 3 _____ Photographs.

Data from other sources affecting sheet

Remarks:
* One descriptive report for all sheets.

DEPARTMENT OF COMMERCE

One Boat Sheet which refers to Hydrographic Sheets Nos. 3948, 3949, 3950,
is placed in Tube No. 3948.

DEPARTMENT OF COMMERCE

One Boat Sheet which refers to Hydrographic Sheets Nos. 3948, 3949, 3950,
is placed in Tube No. 3948.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

Washington, *July 6*, 1917

Respectfully referred to *L. Y. G.*,

Please attach the
accompanying sheets to
the sounding records of
hyd. sheet 3948

Day	Date	<i>E.L.</i> Angles comp.	Distances entered	" checked	Length of upright entered	" " checked	Correction entered	" checked	Drag depth entered	" " checked	Reducers entered	" checked	Effective depth entered	" checked	Eff. Depth diag. entered	" " checked	Positions plotted	Drag strip traced	Tracing checked	Area subdivided	Subdivision checked	Transferred and inked	Compared with chart.	Soundings Plotted	Reduced
A	May 27	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	June 14	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C	19	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D	26	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E	July 7	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
F	8	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
G	12	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
H	13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
I	17	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
J	19	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
K	28	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
L	29	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
M	31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
N	August 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
O	2	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
P	7	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Q	14	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
R		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
S		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
T		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
U		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
V		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
W		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
X																									

Exc
sets
etc
etc

DESCRIPTIVE REPORT- Wire Drag Party No. 1.

Boston Light Vessel to Cape Ann and part of Jeffreys Ledge
Massachusetts, Sheets 1,2,3,4,5a,5b.

All area outside of the 10 fathom curve was proved to be free from obstruction except for two wrecks shown on sheet 1 at 2 A and 1 K respectively. The depth on the former was not determined as there was no opportunity to return. A drag set 32 feet passed over it while 49 feet caught it. On much of this work there was considerable difficulty in getting positions of sufficient accuracy because so much of it was done in hazy or foggy weather or was so far from shore that signals were difficult to see even in good weather/ This is especially true in the end launch lines, as the custom was to place the end launch on the offshore end, as the controlling and overlapping launch was in this way reasonably sure of a fix. The lines as plotted on the sheet are the best interpretation of the data obtained. It should be realized that these positions while often not entirely satisfactory were the best ~~alternative~~ obtainable with the only alternative the discontinuation of dragging. Also in practically every case the overlap was made sufficient to eliminate doubt and in all cases of uncertainty the doubtful area was dragged again.

Note on sheet 1 that the area erroneously dragged to 38 feet on O day was dragged again on P and T days.
The only area missed on this sheet was in the vicinity of the Dumping Ground Buoys.

Sheet 2. The deep drag work on this sheet is completed and most cases a greater depth than required was obtained. Numerous soundings were obtained to supplement the rather scanty number on the chart

Sheet 3. The same remarks apply as to sheet 2 except that some of the work in the region south and westward of Eastern Point Lighthouse was especially difficult to locate as it was done when for intervals of half an hour or more the land was invisible. Positions of yacht club buoys and section flags were utilized and on M day on which the land was invisible for most of the line the position of the end of the line was strengthened by noting the time of the round trip run from the position of the guiding launch to one of the section buoys whose position was known.

Sheet 5 A. This sheet was barely started. There is only one note of importance in regard to the work with the drag set at full depth. In the north approach to Sandy Bay a report was received that the sea "tops up" at one point off Halibut Point in heavy weather apparently indicating a shoal. The area indicated was both dragged and sounded. The drag did not catch and the least sounding obtained was 61 feet with quite variable rocky bottom. Note: On chart 109 a $3\frac{1}{4}$ fathom sounding appears in this vicinity though it does not appear on any of the overlapping charts and is non-existent. I have previously reported this but repeat it for the sake of completeness.

Sheet 5 B. This work presents no complications except in the matter of locations. As much of it was well offshore and off the tip of Cape Ann with a limited choice of signals and a narrow stretch of coast in sight, there are many doubtful positions especially on the end launch. However the lines on the sheet represent the best available information. The overlapping of the edge of the bank (Jeffreys Ledge) was secured by soundings taken in the M tender. Additional soundings were taken over a portion of the bank to supplement those on the charts.

Offshore currents. The observations did not extend far enough offshore to cover most of the region of offshore work, so some remarks as to the general conditions noted in the course of the dragging may be of value. West of the meridian of Halfway Rock the tide sets west on the flood and east on the ebb as normal for Boston Bay. Between the meridian of Halfway Rock and that of Thachers Id

the tidal currents are moderate in amount and nearly always in the direction of the prevailing winds. In some places southward of Manchester the currents are almost negligible in calm weather. To the northeastward of Cape Ann the currents are quite strong, often reaching a knot, or more. Their direction is very uncertain being largely dependent on the direction of the wind. In many places on the part of Jeffreys Ledge dragged there are moderate tide rips at the strength of the tide.

Inside the 10 fathom curve.

A phenomenal number of soundings were obtained which were either uncharted or of considerably less depth than charted. It is not practicable to discuss these in detail and it seems more important to discuss the different channels with the effect upon them of the shoals discovered. The method adopted this season of obtaining the sun angle as a check proved of the greatest value and very few soundings are doubtful in position. The percentage of such doubtful positions is far lower than in any preceding season.

Westward of Salem Harbor Approach. No shoals of importance were found. Less depth than charted was found on the shoal inside the Bell Buoy off Swampscott. There are two places inside the bell buoy which break in a heavy swell and small boats should not pass inside the buoy under such conditions.

South approach to Salem harbor between Marblehead Neck and Southeast Breakers.

There is probably nowhere on the coast that the bottom is more broken and irregular with sharp projections. The most notable shoals are the 17 foot shoal eastward of Tinkers Island; (It is interesting to note that there were reports from several fishermen that less depth existed here- one gave a depth of 9 feet. Accordingly especial care was used, and it was proved beyond all doubt that 17 feet is the least depth.)

The group outside of Tom Moores Rock Spindle which reduce the safe depth to be taken to westward of Volunteer Rock buoy to 12 feet at Mean Low Water. The 15 foot shoal between Marblehead Rock and Cat Island requires careful navigation by vessels of greater draft. It is possible to take 20 feet safely between Cat Island and Mar-

blehead Neck but this requires great care and should not be attempted by a stranger.

With careful navigation 23 feet can be taken between Satan Rock and Cat Island though this depth will pass close to bottom north of Cat Island. No attempt should be made to take more than 17 feet between Satan Rock and Gooseberry Ledge and this entire area should be avoided in strong southerly breezes. The area east of Gooseberry Ledge has already been abandoned for purposes of navigation and the buoys removed as a result of the wire drag results so that it is useless to discuss it.

Attention is called to the excellent channel, which is partly protected which is nearly straight from Marblehead Harbor to the Main Ship Channel north of Bakers Island. This is safe for 20 feet if care is used- and makes a valuable inside short cut.

Main Ship Channel and approaches from southeast.

With the whistle buoy off Newcombs Ledge in its present position deep draft vessels are guarded from danger either from the southern extension of Newcombs Ledge which was found and from the uncharted $3\frac{3}{4}$ fathom shoal to the eastward, though care must be taken to round the latter in approaching Main Ship Channel from the South
-18
The group of 16 foot spots northeastward of Middle breakers must also be given a safe berth. Otherwise the approach is entirely safe. The moving of Gales Ledge buoy from the 5 foot shoals to the 17 feet shoal found by the wire drag adequately protects the eastern approach.

The Main ship channel was found to be safe for vessels drawing not more than 35 feet but it is quite narrow, and such a depth is safe only on the entrance range which however is very easy to hold in even moderately clear weather. It is doubtful whether this channel should be used as formerly by the large battleships except in emergency as the slightest deviation from the course may prove serious. it should be noted that the wire drag work was carefully supplemented by soundings to determine the exact edge of the rocky ridge which rises abruptly from the

muddy bottom of the channel, which work was done under the immediate supervision of the Chief of Party.

Anchorage and Salem Inner Harbor.

The anchorage north of Eagle Bar customarily used by battleships was found to be most excellent, both free from obstruction and good holding ground.

The rocky ridge northeast of Spar 5 is not sufficiently shoal to interfere with many of the vessels entering. The 24 and 25 foot sounding east of the HS buoy are on a muddy bank as is evidenced by the passing of a drag drawing 26 feet over it on H day. No rock was found though a tender sounded over it to find the character of the bottom. Unfortunately the condition at the close of the season and the investigation of Beverly inner harbor made it impracticable to drag the area south of the HS buoy and vessels should pass to northward. At low tide no greater depth than 18 feet should be taken past this buoy. The area eastward of Salem Neck is a favorite harbor of refuge for barges and in practically constant use. Several rocks with depth from 15 to 19 feet were found in this area. Salem Harbor itself was found to have several places with less depth than charted but no important changes were found.

Beverly Harbor.

This harbor in constant use by 5000~~0~~ ton vessels with draft of 24 feet was examined with care in so far as time, weather conditions and the excessively strong currents permitted. The only conclusion is that this channel is not safe for the class of vessels using it and it should be improved. The necessary information is available for the use of the U. S. Engineers in case such improvement is undertaken.

In the incomplete state of inking of the sheet of Salem Harbor at the date of preparation of this report it is not practicable to discuss discrepancies and details of the plotting.

Current observations made by a sub-party give valuable new information as to this region.

Gales Ledge

Salom to Gloucester. This region has the almost unprecedented feature in wire drag results, that in spite of several charted shoals no less depths of importance were found. It is probable that in the original survey the shoals were pointed out by local fishermen and owing to their small extent the least water was readily found.

Between Kettle Island and Eastern Point the conditions are different. An extensive shoal area southward of Normans Weg was developed though the least depth, 23 feet is ample for all vessels which should approach so close to shore.

Gloucester Harbor Sheet 4.

This area was well charted before, though numerous anchors and similar obstructions were found. A large boulder with a least depth of 20 feet was found in channel off Ten pound Island which has been struck by fishing vessels at extreme low tides. The effective depth between the breakwater and Round Rock Shoal was found to be only 19 feet and vessels drawing more than 17 feet should use the western channel.

Eastern Point to Thachers Island. Sheet 4.

This area was found to have quite ragged bottom from Bass Rocks (Next point east of Brace Cove) to Milk Id. , though there is no very shoal area. Off Milk Island there are depths as small as 25 feet. Inside the Londoner the depth was found to be much less than charted and vessels should not pass either inside or too close outside the Londoner.

Thachers Island to Galibut Point. Sheet 4.

Two shoals with 24 and 25 feet were found to the north of Thachers of no particular importance except to keep deep draft vessels further offshore.

Sandy Bay , south approach

The depths between the end of the breakwater and Straitsmouth Island were found to permit a safe entrance draft of not more than 20 feet. , Sandy Bay itself was found to be free from obstruction.

1/40 rods

7.

Note. Throughout all the wire drag records the 1/40 rule has been applied. This is that if the difference between adjacent uprights is more than 1/40 the distance between them, the less depth is considered to extend to the next upright beyond the deeper one.

Note for draftsman revising sheets.

On date of leaving office, April 10, sheet 1 was completed, sheet 2 was finished, though the comparison with the chart was necessarily somewhat hasty. Sheet 4 was partly plotted and inked and ~~all~~ the dragged strip ^{not} ~~or~~ tracings were subdivided and checked, Sheet 4 was in the same condition, except that tracings had been subdivided and checked. No inking had been done on sheets 5 a and 5 b.

The unfinished work is simple in character, and though it would have been preferable to have the field party do it, there should be no difficulty.

3947
SHEET(5b) COAST OF MASSACHUSETTS.

The following days work which were plotted on Sheet(5b)^{3947.} are found in the records and statistics sheets , as follows:

Sheet 3 records and statistics (Hyd. 3948.)
August 15 S day Vol 3
Sept 13 W 3

Sheet 5a records and statistics
Aug 28 A 1
Sept 11 B
12 C
18 D

There are no independent records for this sheet which was prepared after the close of the seasons work in the office. The dragged area extended away outside the limits of either Sheet 3 or Sheet 5a, so a new sheet on a larger scale was necessary.

Hyd. Sheet (3) 3948.

Date 1916	Day	Vol	Angles	Miles	Drag Length	Soundings Nos.	Angles.
May 27	A	1	136	4.0	5000	0	0
June 14	B		60	3.2	9300	0	0
19	C		38	3.3	9600	0	0
26	D		156	6.8	6000	0	0
July 7	E		159	3.6	5000	5	9
8	F		123	6.3	11,800	0	0
12	G		288	6.5	4000	4	7
13	H		141	3.3	3600	6	9
17	J	2	121	4.3	6000	0	0
19	K		196	4.8	12000	7	16
28	L		91	6.2	5000	7	14
29	M		68	6.4	4500	3	10
31	N		89	1.4	3500	7	14
August 1	O		140	8.0	11900	8	16*
2	P		140	7.2	11800	24	52*
9	Q		4	2.6	8000	0	0
14	R	3	190	3.5	2800	0	0
15	S		168	6.4	14800	56	112*
16	T		249	5.6	9000	0	0
17	U		164	2.8	4000	0	0
29	V		224	7.0	14000	0	0
Sept. 13	W		203	5.5	10200	0	0
Oct. 3	X		119	4.5	7500	2	3
Nov. 6	Y		168	3.8	2800	0	0
10	Z		102	1.6	1600	0	0
			3445	99.7		129	262

Soundings obtained by tender, not found with wire drag

3949.
SHEET (5a.) COAST OF MASSACHUSETTS.

Date 1916	Day	Vol	Angles	Length of Drag	Miles	Soundings No.	Angles.
Aug 28	A	1	150	14,800	5.0	0	0
Sept 11	B		168	12,000	4.0	0	0
12	C		98	14,300	7.0	0	0
18	D		154	9,600	4.0	0	0
21	E		168	3,200	3.2	7	16
25	F		138	5,000	2.9	3	9
			<u>878</u>	<u>8,150</u>	<u>26.1</u>	<u>10</u>	<u>25</u>

Sheet (4) ³⁹⁵⁰ Coast of Mass

Date	Day	Vel	Angles	Miles	Drag Length	Soundings	
						Nos.	Angles
July 27	A	1	116	1.5	2000	7	14
31	B		193	.8	3500	7	14
August 4	C		135	3.8	4500	3	6
10	D		89	1.0	900	16	48
11	E		115	1.7	1200	16	50
12	F		168	2.9	2400	8	18
18	G		112	2.3	3900	7	12
19	H		75	1.9	4000	8	18
21	J	2	155	2.6	4000	15	45
22	K		192	3.3	4000	15	27
24	L		72	1.0	1500	7	22
25	M		78	1.0	4000	13	30
26	N		210	3.8	4000	5	10
30	O		84	1.8	4800	10	17
31	P		61	0.4	900	20	49
Sept 1	Q	2-3	246	1.2	1200	14	27
5	R	3	61	1.0	2000	4	12
9	S		246	2.7	900	7	15
14	T		288	3.4	1200	7	15
19	U		144	2.5	(3000)	9	26
25	V		4	0.2	900	1	3
27	W		234	3.1	2000	15	35
28	X		234	1.0	600	7	21
			<u>3342</u>	<u>44.9</u>		<u>221</u>	<u>524</u>

Hyd. 3957.

STATISTICS OF WIRE DRAG WORK- PARTY NO. 1.

Coast of New England-Massachusetts- Boston Light Vessel to Halfway Rock.

Date 1916	Day	Vol.	Angles	Miles	Drag Length	Soundings	
						Number	Angles
May 19	A	1	240	1.5	3200	6	27
20	B		77	1.5	3200	6	22
22	C		132	2.8	3200	1	4
23	D		24	0.5	3200	3	6
24	E		308	4.0	3200	8	12
25	F		272	5.3	4000	2	9
29	G		12	0.5	1600	3	6
June 1	H		102	1.9	2800	4	9
6	J	2	192	8.8	8000	0	0
13	K		162	7.1	9300	1	4
14	L		132	5.4	9300	0	0
19	M		102	3.8	9600	0	0
21	N		192	5.7	9500	0	0
23	O		180	7.1	9300	0	0
29	P		150	6.0	10700	0	0
30	Q		144	5.8	12100	0	0
			2421	70.7		34	99
July 8	R		198	8.1	8000	0	0
15	S		116	3.6	11700	0	0
Oct. 18	T		182	5.2	5000	0	0
			496	16.9		0	0
Season's totals			2917	87.6		34	99

SUMMARY

No. of miles 87.6
 No of soundings 34
 No of angles 3016
 No. of square miles

Tides from automatic tide gauges at Nutt Id., ^{Mass} and Portland me

STATISTICS OF WIRE DRAG WORK PARTY NO. L

SHEET NO. (2) 3952.

Coast of New England - Massachusetts. Salem and Beverly Harbors with approaches.
Soundings

Date 1916	Day	Vol	Angles	Miles	Drag Length	Nos	Angles	
May 26	A	1	250	4.2	1600	19	40	
31	B		210	3.0	2800	15	48	
June 1	C		88	1.3	2800	18	30	
2	D		176	2.8	2400	6	16	
5	E		180	3.0	4000	7	15	
7	F	1&2	262	4.2	4000	12	15	
12	G	2	210	3.8	4000	6	9	
15	H		282	5.4	1600	19	42	
20	J		74	1.5	1600	5	15	
24	K		222	3.0	4000	11	33	
27	L		144	1.8	1200	36	55	
28	M	3	174	3.1	1200	24	50	
July 1	N		72	0.8	1200	16	44	
11	O		192	3.4	3200	10	22	
Oct. 4	P		144	2.0	2800	13	27	
5	Q		168	2.4	2000	12	29	
7	R		168	1.8	3200	12	23	
9	S		330	4.2	2400	23	40	
12	T	4	156	2.3	2400	5	12	
16	U		252	2.7	2400	11	24	
20	V		42	0.7	2000-1600	9	15	
23	W		180	1.9	1900	13	21	
24	X		132	1.1	1200	36	51	
25	Y		126	2.1	1600	6	9	
27	Z		424	4.5	2400	11	21	
28	A'	5	188	2.4	2000	9	21	
Nov. 1	B'		276	2.7	1200	31	51	
2	C'		198	3.2	900	8	16	
3	D'		42	0.7	3200	3	5	
4	E'		192	1.9	2400	13	27	
6	F'		72	1.0	2400	4	9	
7	G'		32	0.1	200	9	24	
8	H'		294	3.2	900-2400	19	34	
13	J'	5&6	112	1.5	1200	4	9	
			6020	83.9			446	85.8

VEC
May 9, 1917

HYDROGRAPHIC SHEET 3947.

Coast of Massachusetts, by party of Assistant
N. H. Heck in 1916.

3947-52

TIDES.

	Portland, Maine. Feet.
Mean low water, or plane of reference on staff	8.7
Mean range of tide	8.9

VEC
May 9, 1917

HYDROGRAPHIC SHEET 3948.

Coast of Massachusetts, by party of Assistant
N. H. Heck in 1916.

TIDES.

	Portland, Maine. Feet.
Mean low water, or plane of reference on staff	8.7
Mean range of tide	8.9

VEC
May 9, 1917

HYDROGRAPHIC SHEET 3949.

Coast of Massachusetts, by party of Assistant
N. H. Heck in 1916.

TIDES.

	Portland, Maine. Feet.
Mean low water, or plane of reference on staff	8.7
Mean range of tide	8.9

VEC
May 2, 1917

P.S.
RTZ
HCS

HYDROGRAPHIC SHEET 3950.

Gloucester Harbor, Massachusetts, by Assistant N.H.

Heck in 1916.

✓ FIELD RECORDS (H) 20

TIDES.

CHARTS (H)

	Portland, Maine Feet.
Mean low water, or plane on reference on staff	8.7
Mean range of tide	8.9

VEC
May 2, 1917

P.S.
RZ
HCY

HYDROGRAPHIC SHEET 3951.

Coast of Massachusetts, by party of Assistant N.H.
Heck in 1916.

✓ FIELD RECORDS (H) W

TIDES.

PTS (H)

	Portland, Maine Feet.
Mean low water, or plane of reference on staff	8.7
Mean range of tide	8.9

P.S.
B.F.P.
H.C.

HYDROGRAPHIC SHEET 3952.

Coast of Massachusetts, by party of Assistant N. H.
Heck in 1916.

✓ FIELD RECORDS (H) 20

TIDES.

CHARTS (H)

	Portland, Maine Feet.
Mean low water, or plane of reference on staff	8.7
Mean range of tide	8.9

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON

March 3, 1922.

FIELD RECORDS SECTION.
HYD. 3947.

This sheet on a scale of one to eighty thousand, shows the off shore work. A wide drag was used on all this work and the entire area is dragged to an effective depth of 52 feet or greater. Only one split occurs and a liberal plotting would show this covered. Overlapps are sufficiently wide. "C" day was very hard to plot on account of extremely weak fixes. Excepting pos. 1^c and pos. 2^c, no other fix will plot in the position shown but the day as plotted is undoubtedly the best result which can be obtained from the angles furnished. The area actually covered was probably much larger than shown. The soundings shown in pencil on this sheet have all been plotted on Hyd. 3948 which is on a larger scale and should be taken from that sheet.

R. L. Johnston

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON
FIELD RECORDS SECTION.
HYD. 3948.

This sheet was partially protracted, plotted and inked by different members of the field party but was not completed.

The work which was plotted and inked on the sheet has been verified and corrected, while the uncompleted work was plotted and inked and the sheet brought up to date.

On parts of L day and M day the signals were shut out by fog and mist and portions of these days were run by a sort of dead reckoning, using time and course and an occasional fix when it was possible and utilizing the position of yacht club buoys and section flags. (Q day was also run entirely in this manner.) A very careful plotting was made of these days which were not finally inked until they had been examined and approved by Captain Heck. The overlaps on these days are especially large and would more than cover any variation in course. The first part of C day was plotted incorrectly by using "Tom Moores Rk Bn" instead of "Marblehead Rk Bn". Captain Heck is positive that "Tom Moores Rk Bn" was never used on this work, therefore this part of C day was replotted and corrected on the sheet.

Some of the soundings plotted on Hyd. 3947, by the field party, were protracted and inked on this sheet because it is on a larger scale and allows the plotting of all the soundings without crowding. The signals were verified from the geographic positions in the field computations and the names inked on the sheet.

R. L. Johnston

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON

FIELD RECORDS SECTION.
HYD. 3950.

This area is one of the most difficult to cover with the wire drag and the work was very difficult to plot owing to numerous complications. Close in shore it was necessary to carry 3 or 4 effective depths on the drag most of the time and these depths were being constantly changed to conform with the depth and character of the ground being approached.

There are numerous places on the sheet where an effective depth of one and sometimes two feet greater was passed over the shoals. Captain Heck thinks that these instances are all right, that the drag actually "bumped over!" However the fact that the 26 ft. shoal, $\frac{1}{2}$ mi. S. W. of Δ "Lon" and $\frac{1}{2}$ mi. south of Δ Ann was passed by an effective depth of 32 feet needs some explanation. ("M" day dream wrong. Revised: pos. 14; See pos. 5 "N" drag vol., pos. 2 "N" Tender Volume)

Just why there was a gap left in the work off Cape Ann, is not clear.

Splits and areas missed by the drag are clearly indicated on the tracing. (Where's the A&D sheet?)

S. Rose

The 12 and 18 ft. spots in Gloucester Harbor, shown on Hyd. 2311^a, might have been verified by the drag. Both places were just outside the limits of the drag work.

R. L. Johnston

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON
FIELD RECORDS SECTION.
HYD. 3951.

This sheet was plotted and inked by various members of the field party and verified and corrected in the office.

The protracting on the upper half of the sheet is very good, but on the lower part, particularly on work so far from the signals that they could not be reached with the extension arms of the protractor, the protracting is very approximate.

On (c) day, a large section of the drag was set at 38 feet instead of 58 feet, through an oversight, and apparently was not discovered until after the entire day was run. The area covered by the drag at this depth, was re-dragged to a greater depth so that this entire locality has been covered to an effective depth of fifty feet or greater.

On the obstruction shown at pos. 2^a and pos. 3^f, no sounding was obtained, they may be masts of derelicts or wrecks.

This sheet has been applied to the charts.

R. L. Johnston

Hyd = 3952

The work on this sheet is limited to Salem Harbor Approaches, Coast of Mass. The sheet was plotted in the field, verified, and corrected in the office.

In several instances, e.g. 1H', 2H', 2J' and others, soundings were reduced arbitrarily 3-4 feet and supplemented with a remark "deduced from drag depth". In other words, on striking with the drag set at a certain depth, the least water found exceeded that located by the drag by 3-4 feet. In some cases the safe depth was evidently decided upon by passing the shoal with a drag set at a slightly lesser depth than the one used in locating the shoal, but in other instances these obstructions have not been tested by the drag and it is doubtful whether the depth determined in the above manner can be considered conclusive or safe.

There is an 18' sounding shown on the smooth sheet marked 11J'. Could not trace the origin of this sounding. (Approx. location $42^{\circ}31'20''$ and $70^{\circ}52'15''$)

Positions 47H, 17K, 12-13R were plotted wrong. When replotted splits are exposed.

Considerable ~~amount~~ ^{number} of inaccuracies in plotting could be traced to poor recording.

The work of verification to be complete requires

A

a careful comparison with the chart, previous surveys and other sources as indicated on the standard. The corrections to be applied to the drawing will be performed by Mr. R. L. Johnston on completion of the entire series of drag sheets comprising the season's work in the above locality.

J. B. Shklean

July 7-1917