5068

Diag. Cht. Nos. 6002-2 & 6102-1

Form 504
Ed. June, 1928

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

R. S. Patton, *Director*

State: Washington

DESCRIPTIVE REPORT

~~*Topographic*~~
Hydrographic

Sheet No. 5068
Field #41

LOCALITY

Destruction I.

Cape Elizabeth to Hoh Head

1930

CHIEF OF PARTY

K. T. Adams

U. S. GOVERNMENT PRINTING OFFICE: 1930

5068

Form 537
Ed. Sept., 1929

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

REG. NO. 5068

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. 41

REGISTER NO. 5068

State Washington

General locality ~~Washington Coast~~ Destruction I.

Locality ~~Off~~ Cape Elizabeth ~~& Destruction Island~~ to Hoh Head

Scale 1:40,000 Date of survey June-July, 19 30

Vessel U.S.C. & G.S.S. GUIDE.

Chief of Party K. T. Adams

Surveyed by K. T. Adams

Protracted by Henry J. Healy

Soundings penciled by Henry J. Healy.

Soundings in fathoms ~~feet~~

Plane of reference M.L.L.W

Subdivision of wire dragged areas by

Inked by J. H. Torrey

Verified by J. O. T.

Instructions dated April 16, 19 30

Remarks:

U. S. GOVERNMENT PRINTING OFFICE: 1929

DESCRIPTIVE REPORT
to accompany
HYDROGRAPHIC SHEET No.41
Washington Coast

INSTRUCTIONS: The hydrography on this sheet was done in compliance with your instructions dated April 16, 1930, for Project No. 59.

SURVEY METHODS: All work on this sheet was done by the Steamer GUIDE; hand lead soundings being carried out to the fifteen fathom curve, outside of which depth the Fathometer was used. The usual ship's personnel was engaged in this work.

All control on this sheet was visual three-point fix control, on natural objects and signals, constructed over triangulation stations located by a previous party during the season of 1929.

When the Fathometer was used the ship was run at standard speed, soundings on the average being taken once a minute.

DISCREPANCIES: It will be noted in the area of hand lead work that there is a tendency toward alternate lines being too deep. This discrepancy was caused by a fairly strong, constant southerly current and in spite of all our efforts to get correct soundings, the soundings when running north into the current would always be too deep, no matter how slowly the vessel was run. I therefore advise that the soundings on lines run in a southerly direction be used as indicating the correct depth, the lines run in a northerly direction being considered merely as evidence that no shoal spots existed.

SHOALS: One shoal spot was found within the limits of this sheet, about one mile west-south-west of Destruction Island, the least depth on which is not dangerous. However, the interesting fact regarding this shoal is that it was discovered after the area in that vicinity had been surveyed by hand lead and nothing found. Furthermore, this shoal was discovered by means of the Fathometer while the ship was drifting, just outside of the hydrophone located in that vicinity. Even after the existance of this shoal was known and a very close location of it was known it could not again be found by hand lead but had to be re-discovered by means of the Fathometer, after which hand lead soundings were obtained to give the least depth.

The above description of the finding of this shoal is given in detail as evidence of the possibility of other shoal spots in this area not found by hand lead sounding no matter how close the spacing of lines. It therefor becomes questionable to my mind as to whether or not the Fathometer, when functioning properly, is not a safer method of inshore hydrography than the hand lead.

ANCHORAGES: During the season this vessel anchored anywhere within this area inside the fifteen fathom curve. However, it is apparent that the only partly protected anchorage within the limits of this sheet is inshore from Destruction Island. During the season this vessel anchored many, many times about two-thirds of a mile east by south of Destruction Island Lighthouse, and reasonably good protection is obtainable here from prevailing north-westerly winds. During the fishing season many fishing boats anchor here nightly, at times during the season as many as up to one hundred making their anchorage here. Of course, during southerly or southwesterly weather the anchorage is useless and one must leave before the weather from such directions becomes bad.

BOAT SHEET: As a part of the records accompanying this sheet the boat sheet will be found of great help to the verifier and your attention is called to the following details appearing on same:

First;- All hand lead soundings are shown in green ink so as to distinguish them from the fathometer soudings shown in black ink.

Second;- All vertical casts taken with the ship stopped, whether taken by hand lead or by wire and the machine, are shown in green ink with the depth enclosed in a circle.

VELOCITY TESTS: On the smooth sheet will be found some positions for which test bombs were fired for the determination of velocity. These positions are indicated by a small triangle drawn in purple ink.

K. T. Adams

K. T. Adams,
Commanding,
Steamer GUIDE.

KTA/h

INDEX CORRECTIONS
Sheet No. 41.

June 3 to 15th	0.2 fms.
" 17 to 27th	0.3 fms.
" 27 to July 9th	0.0 fms.
July 9 to 16th	-0.1 fms.
July 17 to 30th	0.1 fms.
July 31 to Aug.27	0.2 fms.
Sept.2 to 4th	-0.2 fms.
Sept.5 to 9th	0.1 fms.
Sept.10 to 29th	-0.2 fms.
Oct. 4 to 11th	0.0 fms.

VELOCITY CORRECTIONS
Sheet No. 41

DEPTH	REDUCER
- - 12.0 fms.	0.0 fms.
12.0 - 25.0 fms.	-0.1 fms.
25.0 - 33.0 fms.	-0.2 fms.
33.0 - 42.0 fms.	-0.3 fms.

SHEET NO. 41.
Statistics.

Day	Sta. Mi.	H. LD.	R.L.	V.C.	Position	Volume
A	38.0	252	40		100	I
B	12.5	107			29	I
C-	67.2	660	5		176	I
D	102.9	415	330	5	197	I & II
E	28.0		217		67	II
F	92.1	561	235		226	II
G	63.9	621	14		167	II & III
H	80.0	95	394	2	139	III
J	28.8	273			73	III
K	115.7	254	157		220	III&IV
L	49.2	601			151	IV
M	111.6	275	502		210	IV & V
N	44.5	341			123	V
P	26.6		141		41	V
Q	63.2	479	123		160	V & VI
R	17.3		94	2	32	VI
S	21.9	65	87		54	VI
T	36.6	125	132		78	VI
U	85.3	182	372		146	VI & VII
V	13.9	155		1	46	VII
W	7.0		40	2	21	VII
X	5.5	54			18	VII
Z	39.8		163	3	51	VII
AA	29.0		152	2	42	VII
TOTAL	1178.3	5,515	3,198	17	2,567	

VERIFICATION REPORT
to accompany
HYDROGRAPHIC SHEET No. 41
Washington Coast
1930

This will certify that I have examined the complete smooth sheet and records accompanying same and hereby approve them.

The field work was done under my direct supervision, all of it being done by the Steamer GUIDE, from which I was never absent during the field work.

K. T. Adams

K. T. Adams,
Commading,
Steamer GUIDE.

KTA.h

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

AND REFER TO No. 82-DRM

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

WASHINGTON

SECTION OF FIELD RECORDS

Review of Hydrographic Sheet No. 5068

Cape Elizabeth to Hoh Head, Washington

Surveyed in 1930

Instructions dated April 16, 1930 (GUIDE)

Fathometer and hand lead soundings

Chief of Party, K. T. Adams

Surveyed by K.T.A.

Protracted and soundings plotted by H. J. Healy.

Verified and inked by J. D. Torrey.

1. Records: The records conform to the requirements of the Hydrographic Manual.

2. Specific instructions: The plan and extent of the development are in accordance with the instructions. Two depths of 11 fathoms (hand lead) on a line of 14 fathoms in lat. 47°40', long.124°31' should have been further examined. (See supplementary notes by A. L. Shalowitz)

3. Soundings: The Chief of Party calls attention to the effect of the strong southerly current on the hand lead soundings. Parts of the lines run on C, G, J, L and M days appear too deep, and should not be used for charting purposes. (See supplementary notes attached.)

   On S day beginning lat.47°32', long.124°30' the fathometer depths on positions 1 to 11 appear too shoal, a line of 14 fathom soundings plotting between lines of 16 and 17 fathoms; this is also indicated by a crossing of another fathometer line of 16 and 17 fathoms and an area of hand lead work at 15 fathoms, all in fairly even bottom. (This line has been omitted from the sheet. It is clearly erroneous. A.L.S.)

4. Curves: The irregularities noted in paragraph 3 do not affect the depth curves usually used on the charts, but intermediate curves between 12 and 16 fathoms would be somewhat uncertain.

5. Junctions and overlapping surveys:

The junctions with the contemporary survey sheets on the east, north and west are satisfactory.

This sheet (H. 5068) overlaps H. 4729 (surveyed in 1927) to the southward. There are differences of 1 to 2 fathoms near the 20 fathom curve; otherwise the agreement is good. The sheet also overlaps H. 4735, survey of 1927 at the southwest corner. One line of the latter shows too deep by from 1 to 4 fathoms; otherwise the agreement is fair. The junction with H. 4716 is very good.

A comparison was made with H. 2201, 2202 and 2203a, surveys of 1894 and 1898. The 30 fathom curve is about ~~400~~ 599 meters farther offshore on the new survey; the 20 fathom and the 15 fathom curves are about the same distance offshore as on the older survey but are more regular; while the 10 fathom curve is more irregular on the newer survey, partly due to the fact that the older survey was plotted to fractions of a fathom. Both surveys used the hand lead to about the 15 fathom depth and the greatest differences occur in areas of this depth approximately 4 miles southwestward and 4 miles northwestward of Destruction Island. Most of the discrepancy is probably due to varying allowances for currents as there is no evidence of change of bottom and both surveys used three point fixes.

6. Shoal: A very small 5 4/6 fathom shoal lying almost one mile S.S.W. of Destruction Island was found by the new survey and is the only danger on this sheet. (See supplementary notes by A.L.S.)

7. Recommendation:

As the new survey shows a much closer development of the area under consideration it is recommended that within its limits it supersede all old surveys for charting purposes.

8. Reviewed by R. J. Christman, April 1932.

Inspected by A. L. Shalowitz. (See supplemental notes attached.)

While these results seem to be a further substantiation of the bottom theory of sound propagation, it should be borne in mind that when these tests were made the importance of having complete physical data between bomb and hydrophone was not yet realized, hence in the computations of theoretical velocities certain approximations and assumptions regarding temperatures had to be resorted to. It must not be inferred, however, that such assumptions were arbitrary and made with a view to effecting an agreement between measured velocities and theoretical bottom velocities. It can be seen from the attached computations that in all cases the selection of temperature values was based upon reason and bore some definite relation to the time when the experiments were made.

(b) Temperature - It is worthy of note, in connection with velocity of sound that temperatures taken offshore cannot always be used for bottom temperatures inshore. For example, on June 25, 1930 a bottom temperature of 7.6° was obtained inshore in a depth of 18 fathoms. This was practically verified by a bottom temperature of 7.3° obtained 4 days later in a depth of 20 fathoms, and yet on June 26 serial temperatures taken 25 miles offshore yielded a temperature of 9,9° (interpolated) at a depth of 18 fms. Also on July 8 a temperature of 7.6° was obtained inshore in 10 fms. and a few hours later in a depth of 38 fms., 10 miles farther offshore, the bottom temperature was 7.75° which would indicate a warmer condition offshore than in similar depths inshore.

These observations are noted here in order to emphasize the importance of knowing the actual temperatures through which the sound passes, not only for the purpose of accurately comparing theoretical with experimental values, but also for the purpose of determining a correct theoretical value when experimental values are not obtainable.

Group 178-179 K (H. 5068) - June 17, 1930, Adams - Washington Coast

To KVD - 24.77 seconds

Test in 24 fms.

Sound passes through 22 fms. for .2 distance
17 fms. for .34 "
14 fms. for .46 "

Temp. at 22 fms. = 7.7° (From temp. taken at bomb positions same day)
17 fms. = 7.7) Based on temp. taken June 19, 10 miles north
14 fms. = 7.6) of bomb positions and in range with hyd. at depth of 15 fms.

Temp. at surface = 10.2° (mean of June 17 and 19)
Salinity = 33.2 (from temp. and salinity data taken during season)

Bottom Velocity

Velocity at 7.7° = 1476.5 (22 fms.)
7.7 = 1476.4 (17 fms.)
7.6 = 1475.9

Mean = 1476.2

Surface Velocity

Velocity at 10.2° = 1486.4

If we assume a temp. curve based on surface and bottom temps. on June 17 and guided by curve obtained from serial temps. at other points the following temps. would be obtained:

Temp. at 22 fms. = 7.7°
17 fms. = 8.4
14 fms. = 8.9
The mean theoretical bottom velocity in such case would be 1479.4.

Experimental velocity = 1476.2 / 1476.3 = 1476.2 mean

The indications are that the lower value for the bottom velocity is correct for a temp. taken inshore in 10 fms. on July 8 (pos. 30 U) gives a value of 7.6°.

Computed by A.L.S.

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

AND REFER TO NO.

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

WASHINGTON

SUPPLEMENTAL NOTES ON H. 5068

By A. L. Shalowitz

1. Referring to Paragraph 2 of review, Specific instructions.

The need for further development on the 11 fathom hand lead indication is borne out by the party's experience with the 5 4/6 fathom shoal about 3/4 mile to the eastward (see Descriptive Report, page 1 - Shoals.) The condition here and the condition in the vicinity of the 5 4/6 fathom shoal recalls to mind the survey in the vicinity of Courtis Shoal off the California coast (H. 4965) where in a similar type bottom a depth of 35 feet was found and yet where the overlapping fathometer sheet (H. 4852) with lines spaced 300 meters apart straddled the shoal and the only indication obtained was 15 fathoms in general depths of 16 to 18 fathoms. The same question is raised here as was raised in the review of H. 4965 (paragraph 6,a) namely: whether on a coast of this character, 300 meter lines are sufficient. Certainly in the immediate vicinity of such topographic features as Destruction Island for a distance along the axis to the 20 fathom curve, a departure in favor of closer spacing would surely be desirable.

2. Referring to Paragraph 3 of review, Soundings.

A careful study has been made by the writer of the entire sheet in relation to those hand lead lines run in a northerly direction, that is, against a strong, constant southerly current (see Descriptive Report, page 1, Discrepancies) and the conclusion was reached that only those lines should be omitted from charting that showed a general consistent difference of more than one fathom from adjacent lines run in the opposite direction or with the current. The reason for this conclusion was that differences amounting to as much as one fathom were also noted on adjacent fathometer lines where no question of current was involved, and hand lead lines run with the current also showed occasional differences of one fathom. Furthermore, it was not always the lines run in a northerly direction that were too deep, showing that some of the discrepancies may be due to causes other than the current. The lines thus affected are 78 - 94 L and 57 - 78 M. These have been omitted from the sheet. No gaps in the work are occasioned thereby and the remaining lines are quite sufficient for charting purposes.

3. Referring to paragraph 6 of review, Shoal.

The least depth obtained here with the hand lead was 7 fathoms but the record says that a least sounding of 6 fathoms was obtained with the fathometer. While such depths are well below the depths considered reliable for the electric oscillator type of fathometer, the fact that between positions 41 and 42 V an 8 fathom fathometer sounding was checked by a 7 fm. 5 ft. hand lead sounding at 45 V and that an 8 fm. fathometer sounding at 43 V was checked by an 8 fm. hand lead sounding at pos. 44 V would seem to indicate that the fathometer was operating unusually well. It was for this reason that it was considered advisable to use the 6 fm. fathometer sounding at position 46 V in place of the 7 fathom hand lead sounding at the same position. As it was uncertain what the base line distance on the GUIDE is and whether a uniform or non-uniform scale was used, the only corrections applied to the fathometer sounding were those of velocity, index and tide. The result is a depth of 5 4/6 fathoms.

4. Referring to paragraph 7 of review - Recommendations.

The recommendation regarding the new survey superseding the old work for charting purposes is approved for the reason stated, and also for the reason that the old sheets contain only an approximate North American datum and for the further reason that no critical depths are involved. The charted 19 fathom sounding in lat.47°21'.8, long.124°30'.6 is from H. 2201 (pos. 21-22C', 1898 work) and although not questioned in the record, its existence is doubtful and has the appearance of a 10 fm. error having been made in the reading of the sounding machine. Furthermore, the bottom is fairly uniform here and the new survey (H. 5068) shows 28 fathoms on a fathometer line running almost directly over the 19. Any such depth would have surely been indicated on the fathometer. It is therefore recommended that it be omitted from the charts.

5. Miscellaneous items

(a) Velocity of Sound - Two groups of tests were made on this sheet to determine the velocity of sound for R.A.R. purposes, one group on June 17 and the other on June 25. (A tabulation of these results will be found attached to the descriptive report for H. 5114). These two groups were studied by the writer from the standpoint of theoretical values and it was found that the determinations made on June 17 yielded a mean experimental value of 1476.2 meters per second as against a mean theoretical bottom velocity of 1476.2 meters per second. The theoretical surface velocity in this case was 1486.4 m.p.s. The tests made on June 25 gave a mean experimental velocity of 1478.6 m.p.s. as compared with a mean theoretical bottom velocity of 1480.1 m.p.s. The theoretical surface velocity in this case was 1495.7 m.p.s.

Group 4, 5, 6 (June 25, 1930) - H. 5068 - Adams - Washington Coast

To KVD - 19.88 seconds

Test in 10 and 14 fms.

Sound passes through mean of 12 fms.

Temp. at 12 fms. obtained as follows:

A temp. of 7.6° was obtained on June 27 at 18 fms. (pos. 161 Q) about 4 miles south of bomb positions. This was verified by a temp. of 7.3° obtained 4 days later in 20 fms. about same distance offshore but about 20 miles to the northward. By plotting the curves for the various serial temps. (7 in number) taken during season it was found that the temp. at 12 fms. averages 1.1° higher than the temps. at 18 fms. This value was therefore applied to 7.6° and 8.7° obtained for the value at 12 fms.

Surface temp. = 13.0° (From serial temp. June 26 taken offshore)
= 13.4 (From temp. of July 1, taken inshore)
Mean surf.temp.= 13.2

Salinity = 33.2 (from data taken during season - Report on temps. and salinities)

Bottom Velocity	Surface Velocity
Velocity at 8.7° = 1480.1	Velocity at 13.2° = 1495.7

Experimental velocity = 1478.3) 1479.1) 1478.5) = 1478.6 mean

If more exact temperature data were available it is quite likely a lower bottom velocity would be obtained, since a temp. taken in 10 fms. on July 8 (pos. 30 U) and close to point where tests were made gave a value of 7.6°.

Computed by A.L.S.

Approved
A. M. Sobieralski
F. S. Borden

(FOR FILES OF FIELD RECORDS SECTION)

3

March 4, 1931

Division of Hydrography and Topography:

Division of Charts:

Tide Reducers are approved in
7 volumes of sounding records for

HYDROGRAPHIC SHEET 5068

Locality Cape Elizabeth to Hoh Head, Washington Coast

Chief of Party: K. T. Adams in 1930
Plane of reference is mean lower low water, reading
1.2 ft. on tide staff at Destruction Island
17.2 ft. below B. M. 1 (1930)

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.

RCW

Chief, Division of Tides and Currents.

March 4, 1931

Division of Hydrography and Topography:

Division of Charts:

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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.

Paul P. Whitney

Chief, Division of Tides and Currents.