

# 6939

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

## DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic

Field No. Navy 101 ..... Office No. H-6939

### LOCALITY

State ..... *Aleutian Islands*  
~~Alaska~~

General locality ~~Attu I., Aleutian Islands~~

Locality *Approaches to Massacre Bay*

1943

### CHIEF OF PARTY

W. M. Scaife, Comdr., USN  
G. C. Mattison, Comdr., USC&GS

### LIBRARY & ARCHIVES

DATE .....

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

REG. NO.

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. \_\_\_\_\_

REGISTER NO. H-6939

State Alutian Islands  
Alaska

General locality Alutian Islands - Attu Island

Locality Massacre Bay

Scale 1:20,000 Date of survey May to November, 1943

Vessel HYDROGRAPHER EXPLORER

Chief of Party W. M. Scaife G. C. Mattison

Surveyed by Ship's Officers

Protracted by P. M. Fisher

Soundings penciled by P. M. Fisher

Soundings in fathoms ~~XGT~~ Fathoms

Plane of reference MLW

Subdivision of wire dragged areas by \_\_\_\_\_

Inked by R.H. Carstens

Verified by R.H. Carstens

Instructions dated HYDROGRAPHER under Navy instructions  
EXPLORER under instructions from Liaison Officer

Remarks: Completion of records, smooth sheet, plotting  
and report by the Seattle Processing Office.

6939

H-6939

Preliminary Statement for Descriptive Report

It is unfortunate that there was no descriptive report rendered by Commander Scaife for hydrographic sheets H-6939 and H-6940, as these surveys were made under very interesting and difficult conditions.

Concerning the survey of Massacre Bay, the following facts were learned from conversation with officers on the EXPLORER and SURVEYOR, and from officers of the Merchant Marine who were on transports at the time of the landing on Attu:

(1) The HYDROGRAPHER, under command of Commander W. M. Scaife, was one of the first vessels to enter Massacre Bay prior to the landing of troops. The first recorded work was on May 12th, just one day after the American forces first landed on Attu Island.

(2) Numerous buoys marking channels and shoals were established by the party on the HYDROGRAPHER, and transports were piloted to anchorages in Massacre Bay by them.

(3) In addition to these duties, the HYDROGRAPHER was ordered by the Senior Naval Officer present to make many detached surveys for military purposes, and tracings of the day's work were usually prepared and submitted to the Sr. Naval Officer, sometimes between ten o'clock and midnight the day they were accomplished.

The party was handicapped by the lack of experienced survey officers and personnel. With the exception of Comdr. Scaife, and Lieuts. Laskowski, Wardwell, and Clark, all the other officers were inexperienced and lacked an engineering background.

It is not surprising that the records of the survey were not submitted in as complete a form as is customary with survey units. However, it is surprising that under the conditions existing these records could be interpreted and that the final result as shown on hydrographic sheets H-6939<sup>(1943)</sup> and H-6940<sup>(1943)</sup> gave such a complete hydrographic survey of the area.

The difficulties overcome in the processing of these sheets are brought out in detail in the attached report prepared by Mr. E. E. Smith, and Mr. Paul W. Fisher

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(1) All of the numerous hydrographic signals used had to be plotted from sextant angles taken from triangulation and other stations. This necessitated considerable work. Those signals located on sheet H-6940, scale 1:10,000, were transferred to H-6939, scale 1:20,000, by D.M.'s and D.P.'s. There was in all cases a check on the location of each signal, namely, three cuts or more, or cuts and a three point location at the station. All these stations were located and carefully checked before any plotting of the hydrography was accomplished.

(2) The fathograms were quite mixed up. Soundings on several sheets were shown on one fathogram. The location of the fathogram pertaining to each day's work in many cases took considerable time. In a few cases, no fathogram could be found.

(3) In most cases, only soundings on the positions were recorded in the sounding volumes, and often there were as many as ten positions in sequence which were not marked on the fathogram. This made the scanning and checking of intermediate soundings, entered in the records by this office, very difficult.

In Mr. Smith's report, the sounding volumes are listed in order according to their consecutive Navy numbers. These volumes have been divided and re-numbered consecutively for each of the two hydrographic sheets. The file numbers are shown inscribed in circles on pages 20 to 24, (Index of Sounding Volumes), of the report.

The sheets show the completeness of the survey as executed by the field party. I feel that Mr. Sular, who plotted sheet H-6940, and Mr. Fisher, who plotted sheet H-6939, deserve a great deal of credit for the care, speed, and interest shown by them in completing these sheets. Tracings of all the soundings shown on the smooth sheets were made and forwarded to the field, as additional field work is needed on both sheets.

No comment on the completion of these sheets would be complete without the mention of the interest and care exercised by Mr. Smith in arranging these records, and in his scanning of many fathograms and supervising similar work done by Miss Nechaj, Ensign Dörner, and Lieut. Jones.

It is hoped that the methods followed in handling the records will simplify the verification of these sheets.

*F. H. Hardy*  
F. H. Hardy  
Officer in Charge,  
Seattle Processing Office.

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DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

REG. NO.

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. ....

REGISTER NO. **H-6939**

State Alaska

General locality Alutian Islands - Attu Island

Locality Massacre Bay

Scale 1:20,000 Date of survey May to November, 1943

Vessel HYDROGRAPHER EXPLORER

Chief of Party W. M. Scaife G. G. Mattison

Surveyed by Ship's Officers

Protracted by P. M. Fisher

Soundings penciled by P. M. Fisher

Soundings in fathoms ~~XXX~~ Fathoms

Plane of reference MLW

Subdivision of wire dragged areas by .....

Inked by .....

Verified by .....

Instructions dated HYDROGRAPHER under Navy instructions  
~~EXPLORER under instructions from Liaison Officer~~

Remarks: Completion of records, smooth sheet, plotting  
and report by the Seattle Processing Office.

H-6939 (101)

Aleutian Islands

Attu Island

Massacre Bay

Scale 1:20,000

Surveyed chiefly by the party of the HYDROGRAPHER,  
W. M. Scaife, Comdg., May to August, 1943. About  
10% is by the party of the EXPLORER, G. C. Mattison,  
Comdg., August to November, 1943.

FIELD NOTES - ADDITIONAL WORK  
ON HYDROGRAPHER'S ATTU SHEETS

LAUNCH NO. 2

GENERAL:

All work by launch No. 2 was to supplement that of the U.S.S. HYDROGRAPHER'S launches in the Massacre Bay area. These spots had been indicated by the Commanding Officer of the U.S.S. HYDROGRAPHER. ✓

Standard launch hydrographic methods were used, sextant control based on signals built and located by the U.S.S. HYDROGRAPHER. ✓  
An ~~Dorsey~~ 808 was used for the sounding, the foot scale being employed where previously used on these sheets.

SHEET 102-2:

"a" Day, soundings in feet, development of shoals in vicinity of Army piers. A least depth of 9 feet was obtained by fathometer, least obtained by handlead was 19 feet. Numerous lines in the area showed depths on the fathogram, a fine tip of 9 to 15 feet in crossing this point. Two and one-half hours were spent on this shoal, sounding with fathometer and handlead, and also sounding with skiff and handlead. O<sub>2</sub> H6940 (1943)

Another shoal was verified east of the piers, kelp from this shoal to signal MASS, no further development warranted. Least depth found was 11 feet.

SHEET 107: H-6940 (1943)

"b" Day, soundings in feet, development of shoal indication near submarine net. Previous depths were verified and a least depth of 60 feet was found.

SHEET 101-1:

"c" Day, soundings in feet, additional soundings in cove between Navy pier and Casco Cove. ← H6940 (1943)

SHEET 104-1:

"d" Day, soundings in fathoms, development of shoals at entrance to channel and adjacent to approach. Least depth near channel was 12 fathoms, least on approach was 10-<sup>3</sup>/<sub>4</sub> fathoms. On "e" and "f" Days the area between the channel and Signal CENT was covered. ✓



~~SECRET~~

The development of this area is not complete. Numerous shoal indications were found, shoalest found being 4-<sup>1</sup>/<sub>2</sub> fathoms, about one half mile north of CENT; area is foul and should be avoided. The cargo boom on the sunken DELLWOOD was located. This boom showed about 10 feet above water. Tops of the vessels mast were visible beneath the surface.

Respectfully submitted,

*Max G. Ricketts*  
Max G. Ricketts,  
Lieutenant, C. & G.S.

APPROVED AND FORWARDED:

*G. C. Mattison*  
G. C. Mattison,  
Commanding Officer,  
U.S.C. & G.S.S. EXPLORER

H-6939

Seattle Processing Office Notes

The greater part of this survey was executed by the U.S.S. HYDROGRAPHER, Commander W. M. Scaife, commanding. Additional work was performed by Launches No's. 1 and 2 of the U.S.C. & G.S.S. EXPLORER, G. C. Mattison, commanding.

Survey Methods-

Triangulation in this area was executed for the Navy by the U.S.S. HYDROGRAPHER. All other control stations were located by sextant angles from points ashore, recorded in Vol. #17 for sheet H-6940. All signals used on H-6940 (1:10,000) were scaled and transferred to H-6939. The remainder were plotted direct on H-6939.

Boat sheets are constructed on Scaife's 1943 datum. The smooth sheet is constructed on U. S. Navy Attu 1934 datum.

Three point fixes were used to control all hydrography. Soundings were obtained by Navy echo sounding devices in the HYDROGRAPHER's work, and by 808 A depth recorder in the EXPLORER's work.

Dangers-

See detailed list of rocks, breakers, etc.

Channels-

The East Channel entrance to Massacre Bay is plotted on this sheet. Development in this area was so close that it was impossible to show it all on the smooth sheet. Three overlay tracings were prepared covering j, k, l, m, q, r, and s days' work. The positions for this work are all dotted on the smooth sheet, but many of them could not be numbered for lack of space. All shoal soundings were transferred from the overlay tracings to the smooth sheet. The remainder of the hydrography in the East Channel was plotted directly on the smooth sheet. The channel was later wire dragged to an effective depth of 47 feet, by the party on the EXPLORER.

*the positions used were numbered on verification*

*on H-6941 (1942)*

Datum-

When the HYDROGRAPHER was ready to begin triangulation, no geographic position was available for a starting point. On inspection of available sheets, the following position was assumed for the position of station RIK:

Latitude        52° 50' 41.022 N  
Longitude       173 26 30.348 E

The triangulation was extended by Norman E. Sclar of the Army Engineers north from Massacre Bay to Chichagof Harbor. An approximate recovery was made of the observation pier, Chichagof Harbor, U.S.S. GANNET, 1934, the new station being called CHIC - U.S.E.D. 1943.

	Lat. N	Long. E
CHIC (Assumed datum 1943)	52° 56' 18.318	173° 14' 27.740
Ob. Pier (GANNET 1934 datum)	<u>52 55 48.25</u>	<u>173 14 24.36</u>
Correction from Sclar and Scaife 1943 to Navy 1934-	— 30"068	— 3"380

This neglects a difference in recovery of possibly a meter.  
The datum notation on the sheet is "U.S. Navy - Attu - 1934 Approximate."

Control-

The basic control is the 1943 triangulation starting from a measured base north of the head of Massacre Bay, corrected for datum as previously explained. Other signals are from Topographic Sheet 305676-105 and supporting book of cuts, Vol. 17. *filed with H-6940(1943)*

Topographic Sheet 305676-105- <sup>T-6960(1943)</sup>

This is on brown boat sheet paper.

The signals on this sheet are located by sextant angles which were recorded in a sounding record. Triangulation stations were used as bases and signals located from them were used as angle points. Many cuts were taken to rocks and tangents. It is not known how the shoreline was put on the sheet. Signals are so frequent that shoreline could be well sketched from inspection, supplemented by information from the many aerial photographs available, and the sextant cuts. Also, sextant fixes were taken at points along the shoreline.

Part of the topography was plotted also on scale 1:10,000 on boat sheet 305676-107 (H-6940)<sup>(1943)</sup>

All cuts to signals were replotted on the smooth hydrographic sheets, H-6939 and H-6940. The good intersections obtained show that the angles were carefully observed and accurately recorded. The smooth plotting was carefully checked. There are differences from the field plotting of sheet 305676-105, but the smooth sheet plotting was held.

Signal Fun- No record was found for locating this signal other than the topographic sheet. It was transferred by distances from neighboring signals making some adjustment for differences between smooth sheet and topographic sheet in the positions of the signals so used.

Shoreline was transferred to smooth sheets H-6939 and H-6940 by adjusting from signal to signal along shore.

The book containing cuts is filed with the sounding records of H-6940 as Volume #17.

Boat Sheets-

The boat sheets overlap in such ways that a clean division could not be made between them for registry and smooth plotting. It was decided to divide the area between the 1:10,000 sheet and the 1:20,000 sheet approximately on the line from Alexai Point to Murder Point. The tabulation below shows the various boat sheets and the registered sheets with which they are concerned. Where the boat sheet shows work of two or more registry numbers, it has been numbered for the one it chiefly concerns.

Massacre Bay Boat Sheet Field #	Boat sheet work plotted on Smooth sheets as shown below-			Registry Number assigned to boat sheet
	1:20,000 H-6939 sounding	1:10,000 H-6940 sounding	1:20,000 H-6941 wire drag	
101	x	x		H-6939
102-1		x		H-6940
102-2		x		H-6940
103	x	x		H-6939
104	x			H-6939
104-1	x		x	H-6939
104 W.D.	x		x	H-6941
107	x	x	x	H-6940

Fathograms - Ship HYDROGRAPHER:

In general, the party on the HYDROGRAPHER entered soundings in the volumes at positions only. In some books they maintained sounding entries at thirty second intervals.

The fathograms have been scanned in this office and the soundings entered for the usual intervals, all high points on the profile being entered at its proper time.

There are frequent long intervals on the fathograms with no positions indicated - 6, 8, or 10 positions skipped. These spaces were divided in proportion to time intervals between positions and scanned.

Index Correction-

In the report submitted by the party on the HYDROGRAPHER for the Koroivin Bay sheet, Atka Island, H-6845, <sup>(1943)</sup> there are the following paragraphs:

"Ship soundings were obtained with a standard Navy NJ-3 or NMB-2 fathometer. The sounding records indicated which was being used. Both fathometers were calibrated for a velocity of 4800 feet per second. The NJ-3 fathometer is designed to give the depth below the oscillators. A constant correction of plus 2 fathoms was added to all NJ-3 soundings on the boat sheet. The NMB-2 fathometer was adjusted to give approximate true depths and no correction to NMB-2 soundings was applied on the boat sheet. Comparisons between wire soundings (vertical casts) and each fathometer are recorded in the sounding records.

Launch soundings were obtained with a standard Navy NK-1 fathometer which is similar to a Submarine Signal Co. 808 fathometer. The fathometers were set to give true depths by bar checks and lead line soundings on the bottom."

Since there are no reports from the HYDROGRAPHER concerning the sheets west of Atka, it is inferred that the statements concerning fathometers at Atka continued through the season. However, the type of sounding apparatus used is not always stated in the sounding record, and it is presumed that the same instrument was used on the different days in a book. In processing the sheet, the continuity of fathograms from book to book has been used as evidence of the continued use of the same fathometer, and the boat sheet plotting at two fathoms deeper than recorded soundings has been used as corroborative evidence of the use of the NJ-3.

There is no description of the NMB-2 fathometer in any of the HYDROGRAPHER's records. Apparently it was rarely used for recorded soundings. It is believed that whenever it was used, entries were made in the records.

Unsurveyed Areas-

There are several areas within the outer limits of this sheet which were unsurveyed in 1943. These have been recommended to field parties for completion in 1944, as well as areas needing further development and investigation.

Shoreline-

The shoreline in the vicinity of Murder Point and Alexai Point was transferred from the topographic sheet Field No. 105. <sup>1-64 82 (1943)</sup> Offlying rocks and reefs were replotted on the smooth sheet as discrepancies were noted in the positions of signals on the topo sheet.

Depth Curves-

Since a large percentage of the soundings on this sheet are between 20 and 50 fathoms, the 30 fm. and 40 fm. curves have been penciled in to better show the submarine relief.

Dangers - Rocks, reefs, and breakers-

Offlying rocks and reefs have been located by plotting cuts taken by hydrographic parties and also replotting sextant cuts taken from points ashore which are recorded in Vol. #17 of sheet H-6940. <sup>1943</sup> These were plotted by the field party on topo sheet Field No. 105. <sup>r-6960</sup>

Where identifying numbers were given to dangers on topo sheet 105, <sup>T-6960</sup> these numbers have been retained on smooth sheet H-6939. <sup>1943</sup> Additional dangers have been assigned letters of the alphabet by the smooth plotter to aid identification in the record. 83

Explanatory notes on breakers, etc., are listed below.

Reef #1		On sheet H-6940.
Reef #2		" " "
Reef #3		" " "
Reef #4		" " " . Also replotted on H-6939.
Reef #5	52° 47.6 173 14.5	Plotted from tangent cuts in topo record. <sup>Vol. 17 H-6940</sup>
Rock #6		Hydro signal FAR plotted on H-6940 and transferred.

Rock #7	52 <sup>0</sup> 48:26 ✓ 173 14.00	Located by cuts in topo record, not mentioned in hydrographic records. Rock awash 50 meters south
Rock #8	52 48:05 ✓ 173 14.34	Located by cuts in topo record, also noted by hydro party. ✓
Rocks #9	52 46.61 ✓ 173 16.91	2 H.W. rocks located by topo cuts. Topo sheet 105 shows rock awash 30 meters south of these rocks, but smooth plotter could find no recorded cuts to it. * inked from T-6160 ✓
Rock #10		Lone rock at triangulation station MED. ✓
Reefs #11		At <del>ts.</del> <sup>△</sup> CENT. Outline of reefs plotted from topo cuts. ✓
Reef #12		On sheet H-6940. ✓
Reef #13		" " " ✓
Rock #14		Believed to be erroneously plotted on topo sheet, see report for H-6940, last item under Shoals and Rocks, Page #18. ✓ <span style="float: right;">On H-6940</span>
Reef #15	52 48.1 173 18.0	Transferred from topo sheet 105. T-6960 ✓
Reef #16	52 48.7 173 20.0	Transferred from topo sheet. T-6960 ✓

The U.S.S. HYDROGRAPHER's Launch No. 2 spent "x" day, July 22, 1943, locating rocks and breakers in the vicinity of ~~ts.~~ MED. Smooth plotter had difficulty in plotting this work, partly because no regular system of lines was run, and partly because of discrepancies in plotting control stations on boat sheet. This entire area has been recommended for further investigation to the 1944 field parties. ✓

Breaker "A"	52 <sup>0</sup> 47:21 ✓ 173 16.57	Located by cuts from topo, record and by hydro party. ✓ <span style="float: right;">Vol 17</span>
Rk. Awash "B"	52 46.63 ✓ 173 16.97	Located by hydro party. Cut at Pos. 12x does not check rock "B", but does pass through Rocks #9. ✓ <span style="float: right;">Good location from other cuts</span>
Breaker "C"	52 46.76 ✓ 173 17.06	A cut is recorded on Pos. 16x to Breaker #3, which breaker is not mentioned again by number. Boat sheet shows another cut from Pos. 47x, but there is none in the record, and no other authority for this breaker can be found. It has been plotted on smooth sheet on distance and direction from Pos. 16x, per boat sheet. ✓ <span style="float: right;">So inked Possible cut from BAG</span>



Breaker "D"	52 <sup>0</sup> 46.87 ✓ 173 17.32	Located by hydro party - a poor intersection of cuts.
Breaker "E"	52 47.13 ✓ 173 17.62	Cuts to a breaker are recorded on Pos. 23, 24, and 25x. These are presumed to be to the same rock, and boat sheet shows cuts from Pos. 23 and 25 intersecting with a 3d cut of unknown origin. However, boat sheet plotting of Pos. 25x is in error, and smooth plotting of these 3 cuts fails to give an intersection. Cut from Pos. 24 passes through Breaker "D". There is undoubtedly such a rock as Breaker "E" in this area, judging by depths and kelp notations, although launch circled the area between Pos. 57x and 66x without mentioning any rocks in record. Breaker "E" has been plotted on smooth sheet on distance and direction from Pos. 23x per boat sheet. <i>So inked</i>
Rk. Awash "F"	52 46.35 ✓ 173 17.06	Located by hydro party. Fair intersection of cuts.
Rk. Awash "H"	52 46.50 ✓ 173 17.60	Located by hydro party. A poor intersection of cuts. <i>Removed from sheet. On replotting with original signals recorded, position agrees with rock awash 250m S.E. located by Ad. Wk. 1944</i>
Breaker "J"	52 46.45 ✓ 173 17.83	Located by combination of cuts from both of HYDROGRAPHER's launches and from points ashore. Fair intersection of cuts.
Breaker "G"	52 43.62 ✓ 173 15.41	Located by ship hydro party. Outside of area sounded on this sheet. <i>Inked on this sheet</i>
Breakers "K"	52 42.3 ✓ 173 14.8	Approximate location by tangent cuts from considerable distances, both from ship hydro party and from points ashore. <i>Inked on this sheet.</i>
Breaker "L"	52 49.12 ✓ 173 16.46	From topo sheet. Only 2 cuts found to this rock. <i>On H-6940</i>
Rk. Awash "M"	52 48.01 173 13.52	Combination of hydro and topo cuts. See report of H-6940. A breaker is shown on topo sheet 30 meters northeast of this rock; however, smooth plotting of 3 cuts to this breaker gives a slim intersection 60 meters northwest of rock. <i>On H-6940</i>
Rk. Awash "N"	52 48.84 ✓ 173 17.69 <sup>0</sup> <i>58</i>	From topo sheet. Believe this is breaker mentioned by EXPLORER's Launch No. 1 at Pos. 13g. ✓

Breaker "P"	52° 47.25 ✓ 173 13.11	From topo cuts. Good intersection of cuts. ✓ Launch passes close by 2 different times without mentioning any rock. <i>Inked from position of cuts</i>
Breaker "Q"	52 47.73 ✓ 173 13.20	Cut from t.s. BAG and cut and distance from Pos. 118 dd (blue) on sheet H-6940. ✓
Breaker "R"	52 48.82 ✓ 173 13.20	Transferred from topo sheet. Believed to <i>on H-6940</i> be in kelp patch 200 meters SSE. See report for H-6940.
Rk. Awash "S"	52 49.90 ✓ 173 23.70	Combination of hydro and topo cuts. Good ✓ intersection.
Breaker "T"	52 49.90 ✓ 173 23.53	Hydro cuts. Only 2 cuts found for this ✓ rock.
Rk. Awash "U"	52 49.27 ✓ 173 18.52	From topo sheet. T-6960 (1943)
H.W.Rks. "V"	52 49.35 ✓ 173 18.35	" " " " "
H.W.Rk. "W"	52 48.84 ✓ 173 19.04	" " " " "
Rk. Awash "X"	52 48.73 ✓ 173 19.17	" " " " "
Rk. Awash "Z"	52 49.08 ✓ 173 18.72	From hydro records, Pos. 125 p, red. ✓ Note rather indefinite.
Breaker "Y"	52 44.99 ✓ 173 20.71	Intersection of cut from Pos. 101M and cut to "nearby breaker" from t.s. CENT. No such rock on any boat sheet, nor is there any other authority for this rock. Position doubtful. <i>Inked from cuts</i>
Breaker "AA"	52 47.34 ✓ 173 10.89	Located by hydro party. -
Breaker "BB"	52 44.71 ✓ 173 22.80	" " " " " ✓

Rocks, and other offlying features, not mentioned above, in the vicinity ✓  
of Alexai Pt. and Murder Pt. have been transferred from the topo sheet.

Buoys-

Whistle Buoy E. of Chirikof Point - A position of Whistle Buoy was taken by the SURVEYOR. It is recorded in their records for H-6936, (Field No. 161-43) which is to be smooth plotted at 1:100,000 scale; Vol. 2, page 38. Buoy plots in Lat. 52° 47' 90" Long. 173° 52' 51". *Not inked. Not part of present survey.*

Bell Buoys 1, 2, and 3- These buoys are shown on Chart 9128 in a line between Whistle Buoy and entrance to East Channel. They are not mentioned in any of the records for this sheet. Personnel of the EXPLORER stated orally that they were not in place in late 1943, when that vessel left the area.

East Channel Buoys - The various positions of these buoys taken by the U.S.S. HYDROGRAPHER are to be disregarded as the channel has been changed. The positions taken by the EXPLORER, recorded in Vol. 15, H-6939, (1943) are the positions plotted on the smooth sheet.

West Channel Buoys - West Channel Marker, Buoys C-1 and N-2, have been plotted from EXPLORER records. Position of C-1 agrees with that on Chart 9128, but position of N-2 is different. These are noted on Boat Sheet 101 as "proposed buoys."

Wreck of "Dellwood" - A yellow marker buoy is shown at wreck of the S.S. "Dellwood" in Lat. 52° 46' 11" Long. 173° 18' 15". A boom of the ship shows above the surface. *Marker buoy removed June 29, 1944 Boom gone*

Discrepancies-

Lat. & Long.	Positions	Remarks
52° 47' 33" ✓ 173 18.81	16-17j (r) ✓ H. Lch. #2	13 fms. with no indication of shoal on other lines. <i>Line re-plotted - agreement ok.</i>
52 47.36 ✓ 173 10.97	24-25w (r) ✓ H. Lch. #2	7 3/4 fms. described as "ghost" sdg. by scanner. Seems it may be all right as it falls 90 m. E. of sunken rock. <i>Sdg inked.</i>
52 45.94 ✓ 173 19.22	1-2e (g) Ex. Lch. #2 ✓ 3-4b (b) H. Lch. #1	15-15 <sup>6</sup> fms. <i>crossing satisfactory -</i> 17-17 fms.
52 45.8 ✓ 173 19.3	e day (g) ✓ Ex. Lch. #2	Sdgs. between Pos. 31-32e do not agree with adjacent sdgs. between 27-28e. <i>bottom irregular - shoaler depths plotted</i>

Discrepancies (continued)-

Lat. & Long.	Positions	Remarks
52° 47.18 ✓ 173 13.65	8-9a (p) 88-89d (p) Ex. Lch. #2	23 fms. 19 fms. <i>steep slope - shoaler depths plotted</i>
52 44.42 ✓ 173 10.50	126-127 U Hydrog. 53-54 Z (Also next soundings to north where 36 fms. is adjacent to 40 fms.)	39 fms. 33-34 fms. <i>23 &amp; 34 fms. are not on bathogram &amp; were not plotted. Bottom spotty and has shoaler depths in this area.</i>

List of important soundings and least depths on shoals-

Latitude	Longitude	Position	Fathoms	Remarks
52° 43.57 ✓	173° 12.70 ✓	51-52U	13 ✓	Underdeveloped
45.85 ✓	09.40 ✓	101 U	17 ✓	
45.90 ✓	10.21 ✓	43 Z	19 ✓	Surrounded by 25-26 fms.
45.11 ✓	15.87 ✓	125 F	10 <sup>1/4</sup> ✓	not developed
45.98 ✓	16.70 ✓	13-14b (b)	14 ✓	not developed - <i>developed on Add. Wk 1944</i>
45.78 ✓	17.50 ✓	11-12b (b)	13 ✓	" " " " <i>1935</i>
45.91 ✓	18.20 ✓	43-44a (b)	5 1/2 ✓	
45.84 ✓	18.15 ✓	23-24a (b)	9 1/4 ✓	
45.78 ✓	18.28 ✓	40-41a (b)	7 1/2 ✓	also tide rips
45.90 ✓	19.11 ✓	17-18e (g)	7 3/4 ✓	
45.80 ✓	19.31 ✓	27-28e (g)	9 3/4 ✓	
45.65 ✓	19.29 ✓	4-5b (b)	10 3/4 ✓	
45.93 ✓	19.59 ✓	45 M	<del>10 3/4</del>	
45.60 ✓	20.62 ✓	25-26e (g)	<del>4 2/5</del> <sup>4 1/2</sup>	<i>Developed in Add. Wk 1946</i>
45.59 ✓	20.79 ✓	24-25e (g)	7 1/2 ✓	
45.30 ✓	21.78 ✓	87-88 M	13 ✓	

Latitude	Longitude	Position	Fathoms	Remarks
52 <sup>8</sup> 45.124 ✓	173 <sup>0</sup> 29.155 ✓	69 M	7 3/4 ✓	(See Boat Sheet 101. ✓
45.32 ✓	29.94 ✓	68 M	15 ✓	Breakers charted here (Area undeveloped
45.58 ✓	30.48 ✓	67 M	8 1/4 ✓	
46.81 ✓	08.79 ✓	3-4 W	16 ✓	
46.71 ✓	09.13 ✓	14 Z	18 ✓	
46.99 ✓	10.16 ✓	96-97 U	14 ✓	
46.99 ✓	10.88 ✓	1-2 Z	16 ✓	
46.91 ✓	14.60 ✓	26-27d(p) ✓	7 3/4 ✓	
46.56 ✓	15.48 ✓	59-60f(p) ✓	2 1/2 ✓	In kelp. ✓
46.01 ✓	15.31 ✓	44-45a(p) ✓	12 ✓	Undeveloped area. ✓
46.10 ✓	18.49 ✓	5-6a(b) ✓	10 3/4 ✓	At wreck of "Dellwood" <sup>Probably echo from wreck - sdg riot used</sup>
46.60 ✓	18.60 ✓	<sup>18-19a</sup> 7-8a(b) ✓	<sup>7 1/2</sup> <del>8 1/2</del> ✓	on turn Developed on Add wk 1944
46.04 ✓	18.32 ✓	24-25a(b) ✓	13 ✓	
46.59 ✓	19.52 ✓	23-24d(g) ✓	13 ✓	
46.33 ✓	21.14 ✓	36-37d(g) ✓	10 1/4 ✓	
46.90 ✓	23.94 ✓	58-59 T ✓	14 ✓	
47.02 ✓	09.48 ✓	97-98 U ✓	13 ✓	
47.37 ✓	10.32 ✓	58-59w(r) ✓	8 3/4 ✓	
47.18 ✓	10.78 ✓	40-41w(r) ✓	9 1/4 ✓	
47.40 ✓	11.09 ✓	49-50d(p) ✓	7 3/4 ✓	
47.85 ✓	11.35 ✓	29-30a(p) ✓	<del>2 1/2</del> ✓	Omitted - probably kelp <sup>developed on H-6740</sup>
47.51 ✓	12.83 ✓	5-6a(p) ✓	<sup>9/6</sup> <del>1 2/5</del> ✓	kelp
47.41 ✓	13.10 ✓	6-7a(p) ✓	1 ✓	
47.35 ✓	13.24 ✓	7a(p) ✓	<sup>2 2/3</sup> <del>3/2</del> ✓	Kelp
47.32 ✓	14.60 ✓	36-37e(p) ✓	5 1/6 ✓	Developed in Add wk 1946 - no sdg shallower than 5 1/6 shown
47.49 ✓	14.6 <sup>5</sup> ✓	5-6d(p) ✓	<sup>3 2/3</sup> <del>2 2/6</del> ✓	kelp

Latitude	Longitude	Position	Fathoms	Remarks
52° 47.160 ✓	173° 14.74 ✓	5-6d(p)	<del>1 1/2</del> 1 1/2	original reading on kelp
47.95 ✓	14.72 ✓	36-37f(p)	1 <del>1/6</del> 1 1/6	
47.14 ✓	15.48 ✓	19-20e(p)	6 5/6 ✓	
47.23 ✓	15.89 ✓	40-41b(p)	6 4/6 ✓	
48.65 ✓	15.26 ✓	128-129b(p)	9 1/4 ✓	
47.83 ✓	15.29 ✓	118-119b(p)	10 ✓	
47.93 ✓	16.93 ✓	56-57h'(r)	6 5/6 ✓	
47.55 ✓	17.61 ✓	84-85 A	8 1/2 ✓	
47.67 ✓	18.59 ✓	99-100s(r)	8 1/2 ✓	
47.15 ✓	18.72 ✓	150-151s(r)	11 ✓	
47.90 ✓	19.50 ✓	2-3 L	9 3/4 ✓	
47.38 ✓	20.10 ✓	8-9v(r)	7 ✓	
47.50 ✓	20.63 ✓	89-90v(r)	<del>8 3/4</del> 9	Undeveloped ✓
47.90 ✓	21.09 ✓	65-66 A	12 ✓	
47.43 ✓	21.73 ✓	65-66 T	12 ✓	
47.11 ✓	22.20 ✓	84-85 T	10 1/4 ✓	
47.42 ✓	23.40 ✓	16-17 C	17 ✓	
47.82 ✓	30.76 ✓	11-12 S	21 ✓	
48.25 ✓	14.14 ✓	2-3f(p)	<del>2</del> 1/6	kelp
48.06 ✓	14.74 ✓	105-106d(p)	1 <del>1/6</del> 1 1/6	
48.06 ✓	15.60 ✓	117-118b(p)	10 3/4 ✓	
48.97 ✓	16.38 ✓	1-2n (r)	5 5/6 ✓	
48.86 ✓	16.74 ✓	113-114b(p)	<del>4 1/2</del> 4 1/2	in kelp ✓
48.77 ✓	16.72 ✓	42-43s(r)	3 4/6 ✓	
48.77 ✓	16.86 ✓	111-112b(p)	5 ✓	in kelp ✓

Latitude	Longitude	Position	Fathoms	Remarks
52° 48.06	173° 16.60	36-37h' (r)	10 1/2	
48.30	17.99	<sup>73-74</sup> 72-73p (r)	8 4/6	least depth found in kelp patch. Fathogram hard to interpret.
48.05	17.46	39 K (r)	9 1/2	in East Channel
48.18	18.31	109-110g' (r)	<sup>3</sup> 1 1/2	Kelp
48.01	18.10	93 s (r)	2 5/6	
48.36	18.90	135-136g' (r)	8 1/2	
48.40	19.18	141-142g' (r)	<sup>7</sup> 6 5/6	
48.06	19.62	108-109 L	<sup>7 1/2</sup> 6 1/6	Appears that development should have been carried further west.
48.39	20.72	75-76 L	9 3/4	
48.55	21.49	113-114 S	4 2/6	Interpretation of fathogram doubtful - may be kelp shadows.
48.77	29.93	20-21 N	11	Undeveloped <sup>should be given further consideration when adjacent unsurveyed is completed</sup> <sub>Disproved in Add on H-7088</sub>
48.68	31.68	93 L	14	
49.21	19.31	105-106p(r)	4 2/6	Kelp patch
49.36	28.80	62-63B	8 3/4	at edge of unsurveyed area.
49.41	31.24	48-49 S	13	at edge of unsurveyed area.

"Dellwood" Pinnacle-

Charted as 2 1/2 fms. P.A. Lat. 52° 46.09 Long. 173° 17.43

The origin of this location seems to be the unrecorded outs plotted on boat sheet 101. The intersection was pointed out by a field officer in this processing office where the notation was made. The similar notation on sheet 104 was made in the field where it was transferred from sheet 101 to sheet 104.

The position of the rock has been transferred to the smooth sheet from boat sheet 101.

*2 1/2 at position given is disproved by Add. wk. 1946. A 3 1/2 was found 300 m to South.*

Index of Sounding Records

Attu Island                      Massacre Bay

Hydrographic sheets

H-6939                      H-6940

Numbers-

The soundings volumes of work done in Massacre Bay were numbered by the party on the HYDROGRAPHER in the following way:

Boat Sheet #101	Volumes 401 to 406
"    "    106	"    407
"    "    102	"    408 to 422
"    "    103	"    423 to 429
"    "    104	"    429 to 430

Volume 407 is plotted on sheet H-6936. The other volumes are plotted on H-6939<sup>(1932)</sup> and H-6940<sup>(1933)</sup> as shown in this index.

There are also five volumes of the EXPLORER's soundings in Massacre Bay.

Where a book has been plotted on two registered sheets, the division is clearly shown. The book was numbered for filing with the records of the sheet with which it is chiefly concerned.

The number of the fathogram has been entered for each day's work of the HYDROGRAPHER, and cross entries were made on fathograms and sounding books. For certain days of the HYDROGRAPHER's work no fathograms were furnished. The forty two rolls supplied have been thoroughly examined. Forty one rolls are being returned to Washington. One roll, #635, was combined with #636. Fathogram #640 is uncontrolled and is not plottable.

The segregation of the fathograms for filing is shown on the last page of this index.

Copies of this index have been placed in each report, and in Volume 1 for each of sheets H-6939 and H-6940.

The file numbers assigned to the Massacre Bay volumes are shown in circles on the following index.



Index of Records  
Massacre Bay

Vessel		Plotted on H-6939				Plotted on H-6940					
Field :		1:20,000				1:10,000					
S	St #:	Vol. #:	Date	Pos. #	Pages	Fath. #:	Date	Pos. #	Pages	Fath. #:	
	101	401	May 18	4-75A	3-20	641		75-81A	20-22	641	
			18	84-87A	23-24	641		1-16B	25-28	641	
	HYDROGRAPHER	(1)	19	18-81B	29-42	641		81-84B	42	641	
			20	4-127C	44-67	642		1 - 4C	43	642	
			21	1-19D	69-72	642		127-129C	67	642	
			402	May 21	20-93D	4-18	642 to	May 21	94-97D	18	None
		(2)					Pos. 72.				
							None 73-95				
			22	16-51E	24-29	None		22	1-15E	20-24	None
								22	51-75E	29-32	None
								24	1-104F	34-50	603
			24	104-136F	50-57	603			136-140F	57	603
			25	1-16G	59-62	603			22-25H	67-68	603
			June 7	1-22H	63-67	603					
			403	June 8	16-33J	3-7	603	June 9	Tide Gage	7	
		(3)							& B.M.'s		
			10	1-21K	8-12	603					
			25	1-114L	13-35	603 to Pos. 42					
						† 42-97					
						624 98-114					
			26	1-104M	36-56	624					
			28	1-34N	57-63	624					
			July 5	1-22P	66-71	624					
			404	July 8	1-134Q	4-30	624				
		(4)									
			9	1-67R	31-43	637					
			10	1-121S	44-66	637					
			11	1-31T	67-72	637					
			405	July 11	32-89T	4-16	637 to Pos. 75				
							None 75-89				
		(5)	15	1-132U	20-44	638					
			18	1-7V	45-46	638					
			19	1-2V'	47	638					
			24	1-7W	48-50	638					
			25	1-11X	21-54	638					
			26	1-3Y	55	638					
			29	1-62Z	56-71	638					
			406	July 31	1-15A'	4-7	638				
			Aug. 2	1-9B'	8-10	638					
		(6)	3	1-44C'	11-19	638					
H. Lch.	407*		July 25	1-39d	1-10						

\*This work to be plotted on sheet H-6936, scale 1:100,000.

Note: The file numbers assigned to the volumes are shown in circles.

Vessel		Plotted on H-6939, 1:20,000				Plotted on H-6940, 1:10,000			
Sheet	Vol. #	Date	Pos. #	Pages	Path. #	Date	Pos. #	Pages	Path. #
102 H. Lch. #1	408					June 15 ①	1-79a	1-16	M.L. or Wire Sdgs
102 H. Lch. #2	409					May 20 ②	1-103a	6-23	601
						21	1-80b (Re J.)	24-37	602
						22	1-140c	38-61	602
						24	1-64d	62-72	602
	410					May 24	65-92d	3-7	602
						June 11	1-167e	9-36	606
						③ 12	1-88f	37-51	607
						13	1-18g	54-57	607
						15	1-62h	58-71	607
	411					June 15	83-148h	3-14	607
						④ 17	1-96j	15-30	608
						18	1-94k	32-47	608
						19	1-107 l	48-55	608
						20	1-41m	66-72	609
	412	June 21	1-160n	32-59	609	June 20	42-204m	4-31	609
		22	66-74p	71-72	634	⑤ 22	1-65p	60-70	634
	413	June 22	75-154p	3-16	634	June 23	1-20q	17-22	634
		July 8	100-136r	24-30	612				
		⑦ 9	1-169s	31-60	639				
		10	1-67t	61-72	629				
H. Lch. #1	414					June 24	1-224n	3-40	613
						⑦ 25	1-187p	41-72	613
	415					June 25	188-190p	3	613
						⑧ 26	1-150q	4-29	615
						28	1-115r	30-55	615
						July 1	1-97s	56-72	617
	416					July 1	98-115s	5-8	617
						July 2	1-109u	9-27	617
						⑨ 3	1-184w	28-59	618
						4	1-76x	60-72	622
H. Lch. #2	417					July 1	1-78t	3-16	621
						⑥ 2	1-163v	17-43	616
						6	1-27aa	44-48	621
H. Lch. #1	418					July 8	6-213cc	3-38	625
						⑪ 9	1-140dd	39-62	625
						10	1-58ee	63-72	626

Vessel Sheet d #	Plotted on H-6939 1:20,000				Plotted on H-6940 1:10,000				
	Vol. #	Date	Pos. #	Pages	Fath. #	Date	Pos. #	Pages	Fath. #
H. Loh. #1	419					July 4	77-117x	3-9	622
						(10) 5	1-188y	11-42	622
						6	1-25z	43-47	622
						7	1-132bb	48-70	623
						8	1-5cc	72	625
	420					July 10	59-164ee	3-24	626
						(12) 11	1-113ff	25-44	626
						14	1-157gg	45-72	628
	421					July 14	158-164gg	3-4	628
						(13) 15	1-93hh	5-20	628
						28	1-86jj	22-36	633
H. Loh. #2	422				July 28	1-128kk	3-24	not found	
					(14)				
103 H. Loh. #2	423					May 23	1-58b'	7-17	604
						(15) 24	1-98c'	18-34	604
					June 9	1-128d'	35-56	604	
					10	1-95e'	57-72	605	
	424					June 10	96-170e'	3-15	605
						(16) 24	1-168f'	16-45	610
		June 25	64-155g	57-72	611	25	1-63g'	46-56	619
	425	June 25	156g	3	611				
		(8) 26	1-151h	4-30	612				
		28	1-86j	31-45	614	June 28	87-118j'	46-51	614
		July 3	1-116k	53-72	619				
	426	July 3	117-119k	3	619				
		(9) 4	54-78 l	13-17	611	July 4	1-53 l	4-13	611
		5	1-16m	18-20	620	July 5	17-78m	21-38	620
							79-112n'	21-38	622
		7	1-84q	41-55	639				
		8	1-99r	56-72	612				
	427	July 10	68-136t	3-14	629				
		(10) 11	1-126u	15-36	630				
		14	1-152v	37-63	627				
		15	1-49w	64-72	629				
	428	July 15	50-62w	3-5	629				
		(11) 22	1-72x	6-18	630				

Vessel Sheet 1. d #	Plotted on H-6939				Plotted on H-6940				
	Vol. #	Date	Pos. #	Pages	Fath. #	Date	Pos. #	Pages	Fath. #
104 H. Lch. #1	429	July 22 (12)	1-69a	3-14	631				
	430	Aug. 4 (13)	1-31b	4-10	631				
EXPLORER Lch. #2	1	Aug. 25 (14)	1-72d	52-52		Aug. 19	1-20a	3-6	
		26	1-32e	55-64		21	1-59b	8-21	
		23				1-34c	23-30		
Lch. #1	2	Sept. 6 (15)	1-44f (Cuts to channel buoys & net gates in this vol.)	3-19					
	3	Aug. 12 (16)	1-58a	3-24					
		13	1-134b	27-71					
Lch. #1	4	Aug. 17 (17)	1-15c	3-8					
		19	1-123d	10-49					
		21	1-50e	52-67					
Lch. #1	5	Sept. 6 (18)	1-64f	3-24					
		Nov. 1	1-40g	26-38					

Fathograms - HYDROGRAPHER-

The arrangement below shows how the 42 Fathograms received from the HYDROGRAPHER's records are assigned to sheets for filing in the archives.

Fathogram Roll #	H-6939	H-6940	Fathogram Roll #	H-6939	H-6940	H-6936
601		x	621		x	
602		x	622		x	
603	x		623		x	
604		x	624	x		
605		x	625		x	
606		x	626		x	
607		x	627	x		
608		x	628		x	
609		x	629		x	
610		x	630	x		
611	x		631	x		
612	x		632			x
613		x	633		x	
614	x		634	x		
615		x	635	(added to Roll 638)		
616		x	636			x
617		x	637	x		
618		x	638			x
619	x		639	x		
620		x	640	x	(uncontrolled edge.)	
			641	x		
			642	x		

This tabulation is listed here because a number of the rolls contain soundings for two sheets. Fathogram numbers have been shown in the sounding records.

H-6940

TIDES

The Seattle Processing Office received sheets of hourly readings of Massacre Bay tides through the Washington Office. It was not stated whether these readings were from the Automatic Gage at the Navy wharf or the Portable Automatic Gage, but the reducer was entered on each sheet. The staff reading of MLW on a temporary staff through June 19th was 3.8 feet; thereafter, the reading on the permanent staff was 3.7 feet. These corrections were applied to all hourly readings to obtain the reducers for soundings in Massacre Bay and the vicinity of Attu Island.

H-6940

TIDAL NOTE

Massacre Bay, Attu I.

Gage at:

Latitude 52° 50.95

Longitude 173 12.43

Gage at: (approximate location)

Latitude 52° 50.45

Longitude 173 11.65

Geodetic Datum - Navy 1934.

Note: It is not known which gage furnished the data for the high and low water sheets used for reducers to tides.

Echo Correction-

The party on the HYDROGRAPHER did not submit any fathometer corrections to be applied to their soundings. The echo corrections obtained by the EXPLORER's party for use on a Hughes fathometer calibrated for an assumed sound speed of 800 <sup>fathoms</sup> meters per second, the same as the instruments on the HYDROGRAPHER, were applied to the HYDROGRAPHER's soundings. These echo corrections vary from zero at 100 fathoms to plus ten fathoms at 1,000 fathoms depth. Since the corrections are less than one percent of the depth below 1,000 fathoms, no echo corrections have been applied below that depth.



## FATHOMETER CORRECTIONS

for

HUGHES &amp; R. C. A. on ONONDAGA

800 Fms. (1463 Meters) Per Sec.

Used for HYDROGRAPHER'S Records

- - - - -

			<u>Ft.</u>
0	to	30	= 0
30.1	to	100	= -1
101	to	129	= 0
			<u>Fms.</u>
130	to	290	= +1
291	to	420	= +2
421	to	525	= +3
526	to	630	= +4
631	to	699	= +5
700	to	785	= +6
786	to	855	= +7
856	to	920	= +8
921	to	975	= +9
976	to	1030	= +10
1031	to	1080	= +11
1081	to	1135	= +12
1136	to	1180	= +13
1181	to	1220	= +14
1221	to	1265	= +15
1266	to	1305	= +16
1306	to	1345	= +17
1346	to	1385	= +18
1386	to	1420	= +19
1421	to	1450	= +20
1451	to	1485	= +21
1486	to	1520	= +22

List of SignalsH-6939Triangulation Stations

AL	MASS
BAG	MIKE
CENT	NED
CREE	NIP
DOME	NOR
DOT	PIN
FLAG	RAD
FOX	REEF
GAB	RIK
LEX	SUB
LITTLE	TANK
LOAF	WOW
LONE	

Hydrographic Signals

Except where otherwise noted, all angles for locating these signals are recorded in Vol. 17, sheet H-6940.

Ace	Gray	Lan	Rod
Bar	Gull	Lime*	Scar
Big	Gum	Low	Sharp
Black*	Hill*	Mar	Sir
Bye	How	Mat	Son
Can	Hum	Min	Tar
Cas	Item	Mix	Ton
Chi*	Jan	Nix	Top
Cove	Jap	Nug	Ute
Dog	Joe	Off*	Vee
Fall	Kit	Par	Wat
Far	Knob	Pon	Wax
Fin	Lad	Rat	Yam
			Zed

\*Cuts recorded in Vol. 1.

Statistics-

Number of Positions .....3987  
 Stat. Miles of Sounding Lines .....2250 (estimated)  
 Area in Square Statute Miles ..... 70

Respectfully submitted:

*Edgar E. Smith*

Edgar E. Smith  
 Assoc. Cartographic Engineer

*Paul M. Fisher*

Paul M. Fisher  
 Sr. Engineering Draftsman

Approved and Forwarded:

*F. H. Hardy*

F. H. Hardy  
 Officer in Charge,  
 Seattle Processing Office.

Surveys Section (Chart Division)

HYDROGRAPHIC SURVEY NO. **H6939**

Records accompanying survey:

Boat sheets .....; sounding vols. ....; wire drag vols. ....;  
 bomb vols. ....; graphic recorder rolls .....;  
 special reports, etc. ....  
 .....

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

Number of positions on sheet	3987
Number of positions checked	100
Number of positions revised	6
Number of soundings recorded	29000 <i>Approx.</i>
Number of soundings revised (refers to depth only)	74
Number of soundings erroneously spaced	3
Number of signals erroneously plotted or transferred	0
Topographic details	Time ..10 <sup>hr</sup>
Junctions	Time ...2
Verification of soundings from graphic record	Time ..5 <sup>hr</sup>

Verification by *R.H. Carstens* Total time *172<sup>1/2</sup>* Date *Sept. 3, 1944*

Review by *R.H. Carstens* Time *48<sup>hr</sup>* Date *Oct. 10, 1944*  
 Sec. Add'lk

GEOGRAPHIC NAMES

Survey No. **H6929**

Name on Survey	Source									
	A	B	C	D	E	F	G	H	K	
	On Chart No.	On previous survey No.	On U. S. quadrangle Maps	From local information	On local Maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List		
<u>Aleutian Is.</u>										1
<u>Attu I.</u>						USGB				2
<u>Massacre Bay</u>			525730	E		(also location of tide staff)				3
<u>Chirikof Pt.</u>			"			USGB				4
<u>Alexai Pt.</u>			"			"				5
<u>Murder Pt.</u>			"							6
<u>East channel</u>			"							7
<u>West channel</u>			"							8
										9
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by L. HECK on 11/11/44

Remarks

Decisions

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RAC  
NCC

TIDE NOTE FOR HYDROGRAPHIC SHEET

June 17, 1944

~~Division of Hydrography and Topography:~~

✓ Division of Charts: Attention: H. R. EDMONSTON

Plane of reference approved in  
18 volumes of sounding records for

HYDROGRAPHIC SHEET 6939

Locality Aleutian Islands: Attu Island, Alaska.  
Approaches to Massacre Bay

Chief of Party: G. C. Mattison in 1943  
Plane of reference is mean lower low water  
3.7 ft. on tide staff at Massacre Bay  
6.5 ft. below B. M. 1

Height of mean high water above plane of reference is 3.3 feet.

Condition of records satisfactory except as noted below:

*G. R. Green*

Chief, Division of Tides and Currents.

# MEMORANDUM

## IMMEDIATE ATTENTION

SURVEY  
 DESCRIPTIVE REPORT  
 PHOTOSTAT OF

} No. H **H6939**  
 } No. T

{ received  
 { registered  
 { verified  
 { reviewed  
 { approved

This is forwarded in order that your attention may be directed to the matters as indicated below. Please initial in column 3 as an acknowledgement that your attention has been thus directed. The complete original records are available if desired. If you cannot give this your immediate attention, please initial, note, and forward to the next section marked, calling for the records at your convenience.

ROUTE		Initial	Attention called to
20			
22			
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25			
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✓ 82			
✓ 83	Pg 9, 10, 11, 14 to 17 S.B.P.		
88			
90			

RETURN TO

82	
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*Handwritten signature*



DIVISION OF CHARTS

REVIEW SECTION - NAUTICAL CHART BRANCH

REVIEW OF HYDROGRAPHIC SURVEY

REGISTRY NO. 6939 and Add. Wk.

FIELD NO. 101

Aleutian Island; Attu Island; Approaches to Massacre Bay  
Surveyed in Summer, 1943 - 44      Scale 1:20,000  
Instructions: Oral Instructions of Liason Officer

Soundings:

808 Fathometer  
Navy NK-1, NJ-3 and NM-B-2

Control:

Three-point fix on shore signals

Chief of Party - W. M. Scaife; G. C. Mattison and R. D. Horne  
Surveyed by - Ships Officers  
Protracted by - P. M. Fisher and D. H. Benson  
Soundings plotted by - P. M. Fisher and D. H. Benson  
Verified and inked by - R. H. Carstens  
Reviewed by - R. H. Carstens  
Inspected by - H. R. Edmonston, Nov. 7, 1944  
Mar. 5, 1945 (Add. Wk.)

1. Shoreline and Signals

The shoreline and signals originate with T-6960 (1943) and with cuts recorded in the sounding records of the present survey and H-6940 (1943). Signals on T-6960 were located by sextant cuts recorded in vol. 17 of H-6940.

2. Sounding Line Crossings

Satisfactory.

3. Depth Curves and Submarine Relief

The usual depth curves could in general be satisfactorily drawn. The 15-fm. curve was added to more clearly delineate the bottom.

In this area the bottom is marked by numerous shoal and kelp covered pinnacles rising sharply from deeper depths. Because of the steepness and small size of some of the pinnacles it cannot be regarded with certainty that the least depths have been found.

4. Junctions with Contemporary Surveys

A satisfactory junction was made with H-<sup>6940</sup>~~6940~~ (1943) on the north. No other contemporary surveys adjoining this area have been registered at this date.

5. Comparison with Prior Surveys

- A. No prior surveys of the area have been made by this Bureau.
- B. H-6941 (1943) W.D.

Except for small unimportant differences the effective depths from this wire drag survey are in harmony with the soundings of the present survey.

6. Comparison with Chart 9128 (Latest print date 1/16/45)  
Chart 9198 (Latest print date 4/29/44)

A. Hydrography

The charted hydrography originates with advance information of this Bureau's surveys of 1943 shown on various blueprints. Differences in tidal and fathometer corrections, and in the interpretation of the fathograms, cause variations of as much as 3-fm. between the values of boat sheet and smooth sheet soundings. A shift in the position of some of the sounding lines of as much as 200-m. has been brought about in plotting the smooth sheet.

The following discrepancies between the smooth sheet and hydrography charted on Chart 9128 are noted:

- (1) The two sunken rock breaker symbols charted in the vicinity of lat.  $52^{\circ} 47.25'$ , long.  $173^{\circ} 13.1'$  from bps. 37850 and 37470 are probably the same breaker and should be charted from the present smooth sheet as a rock awash.
- (2) The 13-fm. charted in lat.  $52^{\circ} 48.18'$ , long.  $173^{\circ} 16.2'$  from bp. 37372 falls in present depths of about 16-fms. The sounding was not identified on the boat sheet and is probably in error. Later blueprints of the same area do not show this sounding.
- (3) The 5-1/2 fm. charted in lat.  $52^{\circ} 47.9'$ , long.  $173^{\circ} 16.9'$  from bp. 37287 is shown on the boat sheet of the present survey but is not recorded in the sounding volumes. It may originate with unrecorded data taken by the HYDROGRAPHER while cruising in this area. It is recommended that the depth be retained on the chart until further investigation can be accomplished. *5 1/2 verified by Add. W.K. 1946*
- (4) In the vicinity of lat.  $52^{\circ} 47.0'$ , long.  $173^{\circ} 17.0'$  the differences in values of shoal soundings and in the positions of rock awash and breakers arise from differences in interpretation of fathograms and in plotting the rocks.

- (5) The rock charted in lat.  $52^{\circ} 46.55'$ , long.  $173^{\circ} 16.9'$  from bp. 37575 was not located on T-6960 (1943) nor on the boat sheets of the present survey. It is probably an error in compiling the blueprint and should be disregarded.
- (6) The rock awash charted in lat.  $52^{\circ} 48.85'$ , long.  $173^{\circ} 17.7'$  from bp. 37287 was plotted on the boat sheet in error and should be charted at the charted position of the sunken rock symbol 150-m. to the southwest.
- (7) The sunken rock charted in lat.  $52^{\circ} 48.82'$ , long.  $173^{\circ} 17.35'$  from bp. 37287 indicates a breaker whose position is weak. The breaker probably falls on the shoal 250-m. to the southeast. It has been indicated on the smooth sheet by the word breaker in that general area. No mention of the breaker was made on the sounding lines: (Disposition made in item 5A (5) of review of H-6940 Add. Wk. (1944).
- (8) The 2-1/2-fms. charted in lat.  $52^{\circ} 48.0'$ , long.  $173^{\circ} 18.0'$  from bp. 37470 is probably in error. The 2-5/6-fm. on the smooth sheet 120-m. distant is adequate to show the least depth.
- (9) The 10-fms. charted in lat.  $52^{\circ} 48.52'$ , long.  $173^{\circ} 20.25'$  from bp. 37470 is plotted in error on the boat sheet and should be disregarded.
- (10) The 12-fms. charted in lat.  $52^{\circ} 48.35'$ , long.  $173^{\circ} 20.05'$  from bp. 37470 was probably compiled in error on that blueprint. No shoal sounding appears on the boat sheet at that place.
- (11) The 19-fms. charted in lat.  $52^{\circ} 47.15'$ , long.  $173^{\circ} 11.3'$  from bp. 37470 is probably an error in compiling the blueprint and should be disregarded.
- (12) The 1-1/2-fms. charted in lat.  $52^{\circ} 47.8'$ , long.  $173^{\circ} 13.55'$  from bp. 37850 was plotted on the boat sheet in error and should fall 100-m. to the southeast.
- (13) The 3-1/4-fms. charted in lat.  $52^{\circ} 47.15'$ , long.  $173^{\circ} 17.56'$  from bp. 37850 is compiled in error on that blueprint and should be disregarded.
- (14) The 1-3/4-fms. charted in lat.  $52^{\circ} 48.8'$ , long.  $173^{\circ} 20.45'$  from bp. 37470 was compiled in error from that blueprint and should be disregarded.
- (15) The 3-1/2-fms. charted in lat.  $52^{\circ} 49.25'$ , long.  $173^{\circ} 19.3'$  from bp. 37470 is changed to 4-1/6 on final reduction and should be charted from the smooth sheet.

- (16) The 1/2-fm. charted in lat.  $52^{\circ} 48.87'$ , long.  $173^{\circ} 16.8'$  from bp. 37575 is a kelp reading on the fathogram and should be disregarded.
- (17) The rock islets charted in the vicinity of lat.  $52^{\circ} 47.7'$ , long.  $173^{\circ} 14.5'$  from bp. 37575 originate with penciled outlines on the boat sheet. Cuts concerning the reef at this place make no mention of the islets and it is probable that the penciled shapes represent portions of the reef. The shapes should not be charted as islets.
- (18) The sunken rocks charted in the vicinity of lat.  $52^{\circ} 45.4'$ , long.  $173^{\circ} 29.7'$  from chart letter 42 (1944) indicate shoal water of unknown depth. The sunken rock charted in lat.  $52^{\circ} 45.8'$ , long.  $173^{\circ} 26.9'$  is probably out of position and has been removed from Chart 9128. The sunken rock lat.  $52^{\circ} 45.1'$ , long.  $173^{\circ} 21.4'$  from bp. 37470 was reported by Navy patrol vessels. This rock should be retained pending further investigation. Superseded  
by depths  
from N-2018  
Add. Wk. 1946
- (19) The 5-fms. charted in lat.  $52^{\circ} 44.7'$ , long.  $173^{\circ} 22.75'$  and the 10-fm. charted in lat.  $52^{\circ} 43.6'$ , long.  $173^{\circ} 12.9'$  both from bp. 37848 should be retained until these areas have been more completely covered by surveys of this bureau.
- (20) The rock awash charted in lat.  $52^{\circ} 46.55'$ , long.  $173^{\circ} 17.7'$  from bp. 37372 was plotted on the boat sheet in error and actually falls about 250-m. to the southeast.
- (21) The boom of the wreck charted in lat.  $52^{\circ} 46.1'$ , long.  $173^{\circ} 18.45'$  was no longer visible in 1944. The charted note "boom visible" should be deleted.
- (22) The 6-1/4-fms. charted in lat.  $52^{\circ} 48.06'$ , long.  $173^{\circ} 19.6'$  the 1-3/4-fms. charted in lat.  $52^{\circ} 48.15'$ , long.  $173^{\circ} 18.1'$  and the 3-1/4-fms. charted in lat.  $52^{\circ} 47.52'$ , long.  $173^{\circ} 14.87'$  from the present survey before verification and review are probably kelp readings and should be disregarded. Disproved  
by Add. Wk.  
1946

Except for the previously mentioned soundings and sunken rocks to be retained, the charted hydrography should be recompiled from the present survey.

#### B. Aids to Navigation

The survey positions of aids to navigation are in satisfactory agreement with the charted positions and adequately mark the features intended except that the survey position of buoy N-2 in lat.  $52^{\circ} 47.2'$ , long.  $173^{\circ} 12.3'$  differs with the charted position by about 0.65 mile. The charted position originates with bp. 37850 a compilation of advance information of this bureau's field surveys. However no recorded data pertaining to the new position of the buoy was found except a penciled position on a boat sheet. The present survey posi-

tion of the buoy more closely agrees with the position proposed by the U. S. Navy in chart letter 717 (1943) than does the charted position.

7. Condition of Survey

Satisfactory except that the position markings on the fathograms of the NJ-3 fathometer used on the SHIP HYDROGRAPHER were inadequate for accurate scaling of the fathograms. In some cases as many as 8 to 10 positions were left unmarked. The open spaces indicating positions on the fathograms were generally excessively wide for an accurate determination of the position.

The plotting of this survey has been unusually well done by the processing office. The complete supplementary notes added in the sounding records greatly facilitated the verification.

8. Compliance with the Instructions for the Project

Satisfactory except that few bottom characteristics were taken and hand lead investigations were not consistently made on pinnacles where kelp recordings made fathogram soundings uncertain.

9. Additional Field Work Recommended

Considerable additional work is necessary in order to render the present survey a basic survey. In general many of the least found depths on shoals were not drift-sounded and shoaler depths can of course exist. On the other hand a closer line spacing would undoubtedly reveal more irregularity in the vicinity of lat.  $52^{\circ} 46.7'$ , long.  $173^{\circ} 17.9'$ . This area, however, is not considered important because it is fringed by shoals and is therefore an area to be avoided.

A. A number of unsurveyed areas including excessively wide sounding line spacings apparent on inspection of the smooth sheet should be completed. *Completed by Add Wk 1946 and H-7088 (1945)*

B. The small amount of wire drag on H-6941 (1943) W.D. is restricted to channels. This work should be extended to include most of the areas inside the 20-fm. curve.

C. Specific consideration should be given to development of the following:

- (1) 13 fms. in lat.  $52^{\circ} 43.6'$ , long.  $173^{\circ} 12.7'$ . *Accomplished H-7018 Add Wk 1946*
- (2) 5-1/6 fms. in lat.  $52^{\circ} 47.3'$ , long.  $173^{\circ} 14.6'$ . *Developed by Add Wk 1946*
- (3) 12 fms. in lat.  $52^{\circ} 49.07'$ , long.  $173^{\circ} 27.8'$ . *Accomplished H-7088 (1945)*
- (4) 4-4/6 fms. in lat.  $52^{\circ} 45.6'$ , long.  $173^{\circ} 20.6'$ . *Accomplished - Add Wk 1946*
- (5) 5-1/2 fms. charted in lat.  $52^{\circ} 47.9'$ , long.  $173^{\circ} 17.0'$ ,  
(see par. 6A (3) above). *Accomplished - Add Wk 1946*
- (6) Charted sunken rocks in the vicinity of lat.  $52^{\circ} 45.2'$ ,  
long.  $173^{\circ} 21.6'$ ; lat.  $52^{\circ} 45.8'$ , long.  $173^{\circ} 26.9'$ ; and  
lat.  $52^{\circ} 45.4'$ , long.  $173^{\circ} 29.7'$  discussed in par. 6A (18)  
of this review. *Accomplished Add Wk 1946 on H-6939 and H-7018*

*delete -  
see Review  
H-7018*

- (7) 4-2/6 fms. in lat.  $52^{\circ} 48.55'$ , long.  $173^{\circ} 21.5'$  } *Reject 4 1/2 - Considered to be kept. Add. development on H/1088*
- (8) 2-1/2 fms. in lat.  $52^{\circ} 46.1'$ , long.  $173^{\circ} 17.4'$  }
- (9) 3 fms. in lat.  $52^{\circ} 46.17'$ , long.  $173^{\circ} 16.7'$  }
- (10) 2-1/2 fms. in lat.  $52^{\circ} 47.12'$ , long.  $173^{\circ} 15.47'$  } *Accomplished on Add Wk 1946*

Examined and approved:

*Robert W. King*  
Chief, Nautical Chart Branch

*J. B. Borden*  
Chief, Chart Division

*Earl O. Hudson*  
Chief, Section of Hydrography

*Raymond E. Egan*  
Chief, Division of Coastal Surveys

23 September 1946

To: The Director,  
U.S. Coast and Geodetic Survey  
Washington 25, D.C.

Through: Commanding Officer,  
USC&GS EXPLORER

Through: Lt. Comdr. J. Laskowski, USC&GS

Through: Lt. Comdr. W.M. Scaife, USC&GS

From: Lieut. Arthur L. Wardwell, USC&GS  
Lieut. Charles W. Clark, USC&GS  
USC&GS EXPLORER

Subject: 1945 Survey of Massacre Bay, Alaska.

Reference: Review of Hydrographic Survey - Registry No. 6939  
and Add. Wk., dated 14 August 1946.

Having been on the original survey of Massacre Bay we feel that some comments on the survey and the review are in order.

The USS HYDROGRAPHER arrived at Massacre Bay in May 1945 with the task force that invaded the island and captured it from the Japanese. The surveys by the HYDROGRAPHER at Massacre Bay and Shemya Island during the summer of 1945 were made primarily for immediate use of the task force in the invasion of the islands and establishing bases thereon.

When the HYDROGRAPHER arrived at Massacre Bay nothing was known about the bay. It was necessary to make a survey that would serve immediate needs in the shortest possible time. The survey was made under conditions far from ideal. No attempt was made to make a complete basic survey of the bay.

Roughly the procedure in carrying out this survey by the HYDROGRAPHER was as follows: During the first several days soundings were obtained in the inner part of the bay by the ship's launches without control. This was done in order to determine as quickly as possible the locations of any possible dangers that could be found. Dangers thus found were immediately buoyed so ships could stay clear of them. Shoal areas found and buoyed during this period were those at Lat.  $52^{\circ} - 50.4'$ , Long.  $173^{\circ} - 13.5'$  and Lat.  $52^{\circ} - 51.2'$ , Long.  $173^{\circ} - 14.1'$ . A rock not found in time to prevent a ship hitting it is the one at Lat.  $52^{\circ} - 49.0'$ , Long.  $173^{\circ} - 15.5'$ . The SS PERIDA hit this rock on the second day the task force was in the harbor.

After this period of preliminary surveys and as time and opportunity permitted, surveys of the bay were continued in a more orthodox manner. A rough base was measured over and around supplies unloaded on the beach at the head of the bay. Signals were built and sextant triangulation extended from the base line for a preliminary location of signals. Controlled soundings were obtained throughout the important areas of the bay and approaches. Suitable entrance channels were located and buoyed. Reefs, rocks, breakers and shore line were located, but in all cases not well defined, by theodolite or sextant cuts from shore stations and from the ship and launches. Suitable air photos were not available and it was necessary to get some information that could be charted on the numerous reefs and rocks in the bay.

During this time it wasn't known how long the ship would remain at Massacre Bay and to what extent the surveys could be carried. The remaining time was spent in improving and adding to surveys already made. Additional hydrography was done, more information was obtained on rocks and reefs and other dangers. A more accurate base line was measured and triangulation of at least third order accuracy was extended to include all signals.

All this work was done under poor conditions with numerous interruptions inherent in wartime operations and without the best of equipment and experienced personnel except for a few Coast Survey officers.

The survey records were kept primarily for immediate use aboard the ship. They were admittedly far below Coast Survey standards for records. The permanent value, if any, of the records should be considered a by-product of the mission of the ship. When the survey was made it was not known that the Coast Survey would process the records and the survey was made, within limits, in accordance with Hydrographic Office practices.

Time didn't permit the usual refinements necessary for completing a survey such as obtaining bottom samples, drift sounding over unimportant shoals, determining in all cases whether rocks near the surface were awash or perhaps bare at high water and similar information. If a danger was known to exist it was charted as a danger in accordance with the latest information available.

It is thought that the control was in general fairly accurate and a shift of 200 meters in sounding lines mentioned in par. 6A of the reference is not understood.

The cuts referred to in par. 6A (17) of the reference should not be considered as definite. As mentioned previously, dangers such as this were located by theodolite cuts from distant shore stations. An attempt was made to outline the extreme limits of the reefs rather than any individual rocks on the reefs. It is known that on some of the dangers, possibly called reefs in the records, some rock islets do exist.



Par. 7 of the reference mentions some of the inadequacies of the HYDROGRAPHER'S NJ-3 sounding record. The NJ-3 fathometer was obtained to replace an inferior Dorsey No. 3 fathometer and was the best the Navy had available at the time. An attempt was made to have a fix marker installed on the fathometer but a Submarine Signal Co. representative said it could not be done. When using the NJ-3, soundings were read from the dial and recorded in the sounding record. The fathogram was included with the records as a supplement to the recorded soundings. The beginning of the break on the fathogram was at the time of the fix. When the door on the fathometer was opened the stylus arm automatically stopped rotating but the paper kept on moving at the same speed. Consequently the length of the gap in the record had no effect on the time or on the position of the fix on the fathogram.

Completion of an adequate survey of Massacre Bay, inspection and clarification of the records and writing of final reports was not accomplished by the HYDROGRAPHER because the ship was ordered on very short notice to proceed to Adak to join the task force that invaded Kiska. The HYDROGRAPHER proceeded to carry out her wartime missions to the best of the ability of the personnel on board.

Knowing the condition of the HYDROGRAPHER'S records, it is not doubted that the processing office did an admirable job in smooth plotting the survey and in supplementing the records with additional notes as mentioned in par. 7 of the reference. It is also thought that the field work of the HYDROGRAPHER on this and similar surveys was at least above normal criticism in regard to accuracy and adequacy of surveys made. The value of these surveys to the task force is not known to the writers of this letter but it is thought they served their intended purpose.

This letter is not intended as a reflection on any subsequent work in Massacre Bay done by Coast Survey ships and refers only to work done by the HYDROGRAPHER. It is intended to clarify some of the apparent misunderstandings of the work of the HYDROGRAPHER during the war.

Reviews or other official comments by the Washington office on the survey of the inner part of Massacre Bay and on other surveys made by the HYDROGRAPHER in Alaska in 1943 have not been read by the undersigned.

Arthur L Wardwell, Lieut., C&GS

Charles W. Clark, Lieut., C&GS.

Forwarded:

F.L. Gallen  
Comdg. Ship EXPLORER



Applied to chart 9129 W.A.B. 12/4/44  
Applied to chart 9128 (Partial application  
after review)

5-21-45  
M.A.

Applied to chart 9198 after review 2.M.A. 6-19-45

6939

Additional work

Diag'd, bn diag. ch. No. 9198-1

6939

Additional work

Form 504 U. S. COAST AND GEODETIC SURVEY DEPARTMENT OF COMMERCE  <b>DESCRIPTIVE REPORT</b>	
Type of Survey	Hydrographic
Field No.	Office No. H-6939 (1947)
LOCALITY	
State	Alaska
General locality	Near Islands
Locality	Massacre Bay
<u>194 7</u> CHIEF OF PARTY F.B.T. Siems	
LIBRARY & ARCHIVES	
DATE	DEC 1 1947

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

REG. NO. H 6939 Additional work

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

REGISTER No. H 6939

Field No. \_\_\_\_\_

State Alaska

General locality Near Islands

Locality Massacre Bay

Scale 1/20,000 Date of survey Sept. 1947

3 Feb. 1938, Project CS-218 and  
Instructions dated Director's letter No. 222/MEK, S-1-EX, dated 24 March 1947

Vessel EXPLORER

Chief of party F.B.T. Siems

Surveyed by I.R. Rubottom

Soundings taken by fathometer, graphic recorder, ~~and other~~

Protracted by \_\_\_\_\_

Soundings penciled by \_\_\_\_\_

Soundings in fathoms feet at MLLW

REMARKS: Additional development and location of Aids to Navigation.

Report of Aids to Navigation forwarded to U.S. Coast Guard 3 October 1947

(copy attached hereto).

DESCRIPTIVE REPORT

to accompany

Hydrographic Survey H-6939 (1947)

Massacre Bay

1947

Additional Development and Location of Aids to Navigation

Scale 1 : 20,000

USC&GSS EXPLORER

F.B.T. Siems, Commanding

Surveyed by: I.R. Rubottom

- - -

A. PROJECT:

Instructions Project CS-218 dated 3 Feb. 1938; supplemental instructions, 24 March 1947 (Director's letter No. 222/MEK, S-1-EX).

B. SURVEY LIMITS AND DATES:

Locality - Massacre Bay, Attu Island, Alaska. Survey includes development of 8.6-fathom shoal in latitude  $52^{\circ} 45.14'$  N., longitude  $173^{\circ} 15.9'$  E., and location of Aids to Navigation.

Hydrography was executed during the period 15 to 18 September 1947.

C. VESSELS AND EQUIPMENT:

Hydrography was accomplished with EXPLORER's Launch No. 2, equipped with 808 fathometer No. 50. All soundings were read and recorded on the fathom scale.

D. TIDE STATIONS:

Tide reducers were obtained from the portable automatic tide gage at Massacre Bay, Attu Island.

E. SMOOTH SHEET:

~~(To be accomplished by Seattle Processing Office)~~ All records and data have been mailed directly to the Washington Office, for incorporation with original sheet.

F. CONTROL:

Boat sheet H-6939a was used and triangulation stations and topographical natural objects identifiable from this sheet were used for

control of all hydrography.

G. SHORELINE AND TOPOGRAPHY:

No additional shoreline or topographic detail was executed. ✓

H. SOUNDINGS:

All soundings were read and recorded on the fathom scale on the 808 fathometer. ✓

I. CONTROL OF HYDROGRAPHY:

Three-point sextant fixes were used to control all hydrography. ✓

J. ADEQUACY OF SURVEY:

This survey is considered complete and adequate for charting. A closely spaced system of cross lines was run over the shoal to determine the position of the shoalest area. A period of 40 minutes was spent in drifting over the shoalest area and detached positions were taken at times of least depth. Soundings were also taken alongside all aids to navigation. ✓

K. CROSSLINES:

Entire survey consisted of a closely spaced system of cross lines. Discrepancies were negligible.

L. COMPARISON WITH FORMER SURVEYS:

General soundings agreed with previous surveys, but the least depth on the shoal was found to be approximately 2 fathoms less than previously obtained. ✓

M. DANGERS AND SHOALS:

The position of shoal developed on the sheet is latitude  $52^{\circ} 45.1'$  N., longitude  $173^{\circ} 15.95'$  E. ✓

Respectfully submitted



Ira R. Rubottom  
Lt. Comdr., USC&GS

Approved and forwarded:



F.B.T. Siems, Capt. USC&GS  
Commanding Ship EXPLORER

#### TIDAL NOTE

Soundings on Hydrographic Survey H-6939 (1947) were reduced from tide data from portable automatic tide gage No. H-288, located in Massacre Bay, Attu Island. Hourly heights for reduction of soundings were scaled from the marigrams. Plane of reference of M.L.L.W. is 3.5 ft. on the tide staff, reference Director's letter of 24 June 1947, ref. No. 36-MR.

Time meridian used for operation of the tide gage was that of 165° West.



STATISTICS FOR HYDROGRAPHIC SURVEY H-6939 (1947)

USC&GSS EXPLORER

Survey Unit	Vol.	Day Letter	Date 1947	No. of Pos.	Stat. mi. sdg. line	Area: sq. stat. mi. ✓
Launch No. 2	1	a	15 Sept.	52	7.2	$\frac{1}{4}$ sq. mi. ✓
Launch No. 2	1	b	16 Sept.	34	18.0	Location of buoys ✓
Launch No. 2	1	c	17 Sept.	38	9.0	Location of buoys ✓
EXPLORER	1	d	18 Sept.	3	- -	Location of buoys ✓

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VELOCITY CORRECTIONS

From T&S Observations on 20 Sept. 1947

For period 16 July 1947 to end of season

805 Path. Ship & Launch

NMC-2 Path. Deep Scale and NMC Deep Scale 2000-4000 fms.

Corr'n Fms.	Depth - Fms.	Corr'n Fms.	Depth - Fms.	Corr'n Fms.	Depth - Fms.
0.0	0 to 4.0	0	0 to 295	+43	2027 to 2050
-0.2	4.1 14.5	+1	296 428	+44	2051 2075
-0.4	14.6 24.5	+2	429 532	+45	2076 2096
-0.6	24.6 33.5	+3	533 620	+46	2097 2118
-0.8	33.6 42.0	+4	621 700	+47	2119 2139
-1.0	42.1 51.8	+5	701 765	+48	2140 2160
-1.2	51.9 60.1	+6	766 822	+49	2161 2183
-1.4	60.2 69.0	+7	823 884	+50	2184 2211
-1.6	69.1 78.0	+8	885 938	+51	2212 2232
-1.8	78.1 87.0	+9	939 990	+52	2233 2252
-2.0	87.1 95.5	+10	991 1035	+53	2253 2275
-2.2	95.6 101.0	+11	1036 1080	+54	2276 2295
-2.5	101.1 121.6	+12	1081 1124	+55	2291 2315
-3.0	121.7 144.1	+13	1125 1166	+56	2316 2338
-3.5	144.2 166.8	+14	1167 1210	+57	2339 2358
		+15	1211 1250	+58	2359 2375
		+16	1251 1285	+59	2376 2396
		+17	1286 1320	+60	2396 2415
		+18	1321 1357	+61	2416 2435
		+19	1358 1393	+62	2436 2455
		+20	1394 1427	+63	2456 2473
		+21	1428 1460	+64	2474 2492
		+22	1461 1491	+65	2493 2510
		+23	1492 1521	+66	2511 2530
		+24	1522 1553	+67	2531 2550
		+25	1554 1583	+68	2551 2569
		+26	1584 1612	+69	2570 2587
		+27	1613 1640	+70	2588 2605
		+28	1641 1670	+71	2606 2624
		+29	1671 1700	+72	2625 2641
		+30	1701 1723	+73	2642 2660
		+31	1724 1750	+74	2661 2677
		+32	1751 1779	+75	2678 2695
		+33	1780 1805	+76	2696 2712
		+34	1806 1830	+77	2713 2730
		+35	1831 1857	+78	2731 2749
		+36	1858 1880	+79	2750 2765
		+37	1881 1909	+80	2766 2783
		+38	1910 1935	+81	2784 2800
		+39	1936 1957		
		+40	1958 1980		
		+41	1981 2005		
		+42	2006 2026		
NMC-2 Path. Shoal Scale					
100 - 200 fms.					
0.0	0 to 146.5				
+0.5	146.6 295				
+1.0	296 385				
+1.5	386 445				
.0	446 495				
+2.5	496 545				
+3.0	546 590				
+3.5	591 635				
+4.0	636 670				
+4.5	671 710				
+5.0	711 741				
+5.5	741 775				
+6.0	776 822				
NMC Path. Shoal Scale					
100 - 200 fms.					
0.0	0 to 146.5				
+0.5	146.6 200				

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

USCAGSS EXPLORER, c/o 400 Insurance Bldg., Seattle, Wash. MAIL ADDRESS:

TELEGRAPH ADDRESS:

EXPRESS ADDRESS:

3 October 1947.

To: Officer in Charge,  
U.S. Coast Guard Base,  
Ketchikan, Alaska.

Attention: Aids to Navigation Section.

Subject: Aids to Navigation, Massacre Bay.

Enclosures: (A) List of positions of floating aids to navigation, Massacre Bay, as determined C.L. 673 (1947) by USCAGSS EXPLORER, 16 September 1947.  
(B) Overlay tracing Chart CS 9128 (and one print) showing plotted positions of Sp. 42795 buoys.  
(C) Copy of list of recommended Landmarks C.L. 673 (1947) for Charts, Massacre Bay.

1. Enclosure (A) shows positions of floating aids to navigation in Massacre Bay and approaches as determined by sextant fix on objects located by triangulation or topographic methods. Objects used are penciled on enclosure (B). The positions of the buoys were plotted on a hydrographic survey sheet, and the geographic positions and distances and bearings from landmarks were scaled from this sheet.

2. Enclosure (B) shows positions of the buoys as plotted on Chart CS 9128, edition of 6/25/45. In addition to floating aids to navigation, the positions of all mooring buoys were located and are shown on the print in their present positions.

3. Enclosure (C) is a copy of recommended additional Landmarks for Charts in Massacre Bay.

F.B.F. Siams,  
Commanding Officer,  
USCAGSS EXPLORER.

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. H-6939. Ad. Wk.

Records accompanying survey:

Boat sheets .1...; sounding vols. 1.....; wire drag vols. 0.....; bomb vols. 0.....; graphic recorder rolls 3.....; special reports, etc. 0.....

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

Number of positions on sheet ..127..
Number of positions checked ..84..
Number of positions revised .....1.....
Number of soundings revised (refers to depth only) ...2..
Number of soundings erroneously spaced ...3..
Number of signals erroneously plotted or transferred .....
Topographic details Time .....
Junctions Time .....
Verification of soundings from graphic record Time ..2 hrs.
Additional work protracted, & about 70 buoy positions located - Stephen Rose - Time 91 hours
Verification by C.P. Reed Total time 32 hrs. Date 6-24-48
Reviewed by J.F. Jordan Time ....4. Date 6-30-48

DIVISION OF CHARTS

REVIEW SECTION - NAUTICAL CHART BRANCH

REVIEW OF HYDROGRAPHIC SURVEY

REGISTRY NO. H-6939(Ad. Wk.)

FIELD NO. -----

Alaska-Aleutian Islands, Attu Island, Massacre Bay  
Surveyed in September 1947                      Scale 1:20,000  
Project No. CS-218

Soundings:

Control:

808 Fathometer

Visual fixes on shore signals

Chief of Party - F. B. T. Siems  
Surveyed by - I. R. Rubottom  
Protracted by - S. Rose  
Soundings plotted by - S. Rose  
Verified and inked by - C. P. Reed  
Reviewed by - G. F. Jordan, June 30, 1948  
Inspected by - R. H. Carstens

A least depth of 6-2/6 fms. was obtained in the develop-  
ment of a shoal in lat. 52° 45.10', long. 173° 15.91' E.

*Hand correction made 12/10/47*

All navigational buoys in Massacre Bay and vicinity were  
located. A list of geographical positions scaled from  
pencil plottings on the smooth sheet is now filed as  
Chart Letter No. 515 (1948).

2204

TIDE NOTE FOR HYDROGRAPHIC SHEET

~~Division of Hydrography and Topography~~ December 29, 1947

Division of Charts: H. W. Murray

Plane of reference approved in  
1 volumes of sounding records for

HYDROGRAPHIC SHEET 6939 (additional work)

Locality - Massacre Bay, Aleutian Islands, Alaska

Chief of Party: F. B. T. Siems in 1947  
Plane of reference is Mean lower low water, reading  
3.5 ft. on tide staff at Massacre Bay  
6.6 ft. below B. M. 1 (1943)

Height of mean high water above plane of reference is 3.3 feet.

Condition of records satisfactory except as noted below:

E. C. McKay  
*Section*  
Chief, ~~Division of Tides and Currents~~



# 6939

Additional work

# 6939

Additional work

Form 504  
Rev. June 1941  
DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
Supplemental  
**DESCRIPTIVE REPORT**

<del>Air Photographic</del> <del>Plane Table</del> Hydrographic	Additional work Survey No. H-6939 (Field)
---	---

LOCALITY

State Alaska

General locality Aleutian Islands

Locality Massacre Bay, Attu Island

1946

CHIEF OF PARTY

Kenneth G. Crosby

Additional Work - 1946

JAN 6 1947



DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

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.

REGISTER NO. H- 6939 ( Additional work)

Field No. H- 6939

State Alaska

General locality Aleutian Islands

Locality Massacre Bay, Attu Island

Scale 1:20,000 Date of survey Summer 1946

Instructions dated 15 March 1946

Vessel Ship Patton

Chief of party Kenneth G. Crosby

Surveyed by Ships Officers  
Topo from previous surveys

Soundings taken by fathometer, graphic recorder, ~~hand lead,~~ wire

Protracted by D.B. Small

Soundings penciled by D.B. Small

Soundings in and sixths fathoms ~~feet~~ at ~~MLW~~ MLLW

REMARKS: This additional work was plotted in the Washington Office

COPY

DEPARTMENT OF COMMERCE  
U.S. COAST AND GEODETIC SURVEY  
WASHINGTON 25

839-bdh

5 December 1946

To: Supervisor, Northwestern District  
U. S. Coast and Geodetic Survey  
400 Insurance Building  
Seattle 4, Washington

Subject: Additional work, Massacre Bay, Alaska

In response to your request of 26 November, the sounding record data pertaining to additional work on hydrographic surveys No. H-6939 and H-7018 covering the subject locality may be forwarded to this office for plotting on the basic smooth sheets.

(s) J. H. Hawley

Acting Director

SUPPLEMENTAL DESCRIPTIVE REPORT

TO ACCOMPANY SHEET H-6939

PROJECT:

The additional work on Sheet H-6939 was done in accordance with the Director's Letter dated 15 March 1946 (additional Field Work in the Approaches to Massacre Bay).

VESSEL AND EQUIPMENT:

The sounding was done with the Ship PATTON and the Ship EXPLORER's Launch No. 3 operated by personnel from the PATTON

TIDE STATION:

Tide reducers were obtained directly from the standard automatic gage maintained in Massacre Bay.

CONTROL STATIONS:

Those stations appearing on the boat sheet from previous work were used for observing three point sextant fixes.

SOUNDINGS:

Soundings taken with the Ship PATTON were obtained with the Dorsey fathometer, using an 808 Depth Recorder as a check. When soundings were missed with the Dorsey fathometer, the 808 fathometer soundings were recorded. Both instruments are calibrated for 820 fms/sec., and the 808 was made to read identical with the Dorsey. Hence the only corrections to be applied are velocity corrections which are the same for both instruments.

While sounding with the EXPLORER's Launch No. 3, an 808 depth recorder was used. Bar checks were taken morning, noon, and evening at 2, 4, and 6 fathoms. The initial was held at zero on the fathograms throughout. A correction curve was drawn from the mean of the bar checks and the corrections applied direct. The curve was then extended, using values from the velocity correction curve, in obtaining final corrections for depths greater than six fathoms.

Hand lead soundings were taken and recorded while drifting over shoals.

SERIAL TEMPERATURES:

Serial temperatures and salinities were observed on 26 July 1946 at Latitude 52° - 45'.5 N., Longitude 173° - 25'.6 E., to a depth of 43 fathoms. The velocity corrections derived from these observations were applied to the entire period.

INVESTIGATIONS MADE:

The investigations made will be discussed in the order given in the Director's Letter dated 15 March 1946, referring to the Paragraph Numbers of that letter.

1. Additional sounding lines were run in the vicinity of Lat. 52° - 46'.7, Long. 173° - 17'.9, reducing the general spacing of sounding lines to 100 meters. This area is generally foul with numerous rocks and kelp fields.

2. The 13 fathom sounding in Lat. 52° - 43'.6, Long. 173° - 12'.7 was developed on Sheet H-7018 and is discussed in the report of that sheet.

3. Sounding lines were run over the charted 5-1/6 fathom sounding at Lat. 52° - 47'.3 Long. 173° - 14'.6. The least depth obtained was 8.0 fathoms. As it was too rough for drift sounding over the area during the investigation, it is recommended that the 5-1/6 fathom sounding be retained.

4. The 12 fathom sounding in Lat. 52° - 49'.07, Long. 173° - 27'.8 was developed by the Ship DERICKSON in 1945.

5. The 4-4/6 fathom sounding at Lat. 52° - 45'.6, Long. 173° - 20'.6 was developed by running two close systems of lines normal to each other. The least depth obtained was 4.9 fathoms between Positions 44 - 45 B (blue). This appears on Chart 9128 as 4-1/2 fathoms which should be retained. In the course of developing this spot, a ~~4.8~~<sup>5.0</sup> fathom sounding was obtained between Positions ~~89 - 90~~<sup>61 - 62</sup> B (blue), ~~300~~<sup>310</sup> meters southeast of the above position.

6. The 5-1/2 fathom sounding marked "Rk" on Chart 9128 at Lat. 52° - 47'.9, Long. 173° - 17'.0 was thoroughly investigated by running two close system of lines normal to each other and drift sounding over the area. The least depth obtained was 5.3 fathoms on the fathometer and 5.9 fathoms on the hand lead. The rock is marked by a few streamers of kelp. It is recommended that the 5-1/2 fathom sounding on the chart be retained. *Present depth should be charted*

7. The P. A. sunken rock shown on Chart 9128 at Lat. 52° - 45'.8, Long. 173° - 21'.8 could not be found in that location. Two close systems of lines normal to each other gave a least depth of 14 fathoms at that position. About ~~350~~<sup>360</sup> meters south of the above position, between Positions ~~43 - 44~~<sup>43 - 44</sup> B (blue) a ~~4.3~~<sup>4.5</sup> fathom sounding was obtained. The Ship PATTON spent two hours drifting over the area and no sounding shoaler than ~~4.3~~<sup>4.5</sup> fathoms could be found.

It is recommended that the sunken rock symbol be deleted from the chart and that the ~~4-3~~<sup>5 1/2</sup> fathom sounding be plotted in its correct position.

✓  
So recommended  
in Review

The remainder of the rocks listed under Paragraph 7 were investigated on Sheet H-7018 and are discussed in the report of that sheet.

8. The 4-2/6 fathom sounding in Lat. 52° - 48'.55, Long. 173° - 21'.5 was developed by the Ship DERICKSON in 1945. On H-7088

9. The area around the charted 2-1/2 fathom sounding P. A. Lat. 52° - 46'.1, Long. 173° - 17'.4 was thoroughly sounded with a least depth of ~~2~~<sup>1 1/2</sup> fathoms obtained at that spot. However, a kelp patch was noticed 300 meters south of the above position at Lat. 52° - 45'.9, Long. 173° - 17'.4. The launch was allowed to drift over this patch several times, feeling with the hand lead and operating the fathometer. The shoalest depth obtained by the hand lead and fathometer was ~~2-3~~<sup>3 1/6</sup> fathoms.

It is recommended that the 2-1/2 fathom P. A. sounding be deleted from the chart and that the ~~2-3~~<sup>3 1/6</sup> fathoms, marked by kelp, be charted in its proper position.

✓  
So recommended  
in Review

10. A close system of lines was run over the charted 3 fathom sounding at Lat. 52° - 46'.17, Long. 173° - 16'.7 and the least depth obtained was ~~3~~<sup>5 1/2</sup> fathoms. This sounding was verified on adjacent lines.

It is recommended that the 3 fathom sounding be deleted and the ~~3~~<sup>5 1/2</sup> fathom sounding be plotted.

✓  
5 1/2 plotted

11. A close system of sounding lines was run over the charted 2-1/2 fathom spot at Lat. 52° - 47'.12, Long. 173° - 15'.47 with a least depth obtained of ~~2 1/2~~ fathoms on the fathometer. A half hour was then spent drifting over the shoal, feeling with the hand lead and operating the fathometer. The least depth obtained on the fathometer was ~~2 1/2~~ fathoms and 8.4 on the hand lead.

The spot is marked by kelp and it is believed that the charted 2-1/2 fathom sounding obtained was from a kelp marking on the fathogram.

It is recommended that the 2-1/2 fathom sounding be deleted from the chart and the ~~2-1/2~~<sup>6 5/8</sup> fathom sounding be plotted.

✓  
6 5/8 plotted as  
least depth

In addition to the above development, the charted 3-3/4 fathom sounding in Lat. 52° - 49'.05, Long. 173° - 15'.2, originating from blueprint No. 37850 was investigated in accordance with Captain F. B. T. Siems' letter dated 28 March 1946.

This area was thoroughly covered by two close systems of sounding lines normal to each other, and one half hour drift sounding over the area. The shoalest depth obtained was ~~5-7~~<sup>6 1/8</sup> fathoms with the fathometer and 6.3 fathoms with the hand lead. The spot is marked by a small kelp patch.

It is recommended that the 3-3/4 fathom sounding be deleted from the chart and the ~~3-3/4~~<sup>6 1/8</sup> fathom sounding be charted in its stead.

Additional bottom specimens were obtained by vertical wire casts in the anchorage area of Massacre Bay.

Completion of Survey:

It is believed that the additional work called for in the Supplemental Instructions has been satisfactorily completed, and no additional field work is recommended. *see Review par. 3*

*Kenneth G. Crosby*  
Kenneth G. Crosby,  
Lt. Comdr., C&GS  
Cmdg., USC&GSS PATTON

TIDAL NOTE TO ACCOMPANY SHEET H-6939

Tide reducers were obtained from the Standard Tide Gage located in Massacre Bay, Latitude  $52^{\circ} - 50'.5$  North, Longitude  $173^{\circ} - 11'.6$  East.

M.L.L.W. on staff as furnished by the Ship EXPLORER is 3.4 feet.

No time or range corrections were applied.

*Kenneth G. Crosby*  
Kenneth G. Crosby  
Lt. Comdr., C&GS  
Cmdg., USC&GSS PATTON

STATISTICS TO ACCOMPANY SHEET H-6939

DATE 1946	DAY LTR.	VOL. NO.	H.L. & WIRE SNDG.	POS.	STAT. MILES	BOAT USED
30 July	a	1	6	132	20.0	Lch #3
1 Aug.	b	1	-	12	1.3	do
2 Aug.	c	1	4	51	5.5	do
12 Aug.	d	1	2	174	25.3	do
23 July	A	2	1	5	- -	PATTON
27 July	B	2	-	175	32.2	do
23 Aug.	C	2	<u>52</u>	<u>53</u>	<u>*</u>	do
TOTALS			65	602	84.3	

No Area- Development Only

\* Taking Bottom Samples.



FATHOMETER CORRECTIONS

USC&GSS PATTON

JULY & AUGUST 1946

S. E. COAST OF ATTU ISLAND

DORSEY FATHOMETER & 808 FATHOMETER No. 74 USED FOR SHIP WORK

CORRECTION fms.	DEPTH fms
0.0	0.0 - 4.0
-0.1	4.1 - 10.2
-0.2	10.3 - 16.0
-0.3	16.1 - 21.0
-0.4	21.1 - 26.0
-0.5	26.1 - 31.5
-0.6	31.6 - 36.5
-0.7	36.6 - 41.5
-0.8	41.6 - 46.0
-0.9	46.1 - 51.0
-1.0	51.1 - 56.0
-1.1	56.1 - 61.0

"808" FATHOMETER #61 USED FOR LAUNCH WORK

CORRECTION fms.	DEPTH fms
+0.3	0.0 - 2.9
+0.2	3.0 - 7.0
+0.1	7.1 - 12.6
0.0	12.7 - 18.1
-0.1	18.2 - 23.4
-0.2	23.5 - 28.7
-0.3	28.8 - 34.2

Seattle processing Office, 1500 Westlake Ave. N. Seattle 9, Wn.

FBTS/bbj

28 March 1946.

To: The Commanding Officer, USC&GS EXPLORER.

Subject: Supplemental Instructions (I)

Reference: (a) Instructions (Tentative) of 21 March 1946.

1. While engaged on Operations III and V of reference (a) and while at NAF Attu for supplies, etc., you will, when weather and circumstances permit, undertake field work in the vicinity of Massacre Bay as follows:

(a) Additional work in the approaches to Massacre Bay as called for in the Director's letter of 15 March 1946, except where this work was completed in 1945. Note: Items 4 and 8 of the work listed in the letter was apparently accomplished by the DERICKSON in 1945, see 2 boat sheets, DE-6939, (1945). Photostat copies of smooth plotting of DE 6939 (1945) will be furnished later.

(b) Completion of foul ground area on H-7018, about 8 miles south of Massacre Bay. The Washington Office has been requested to furnish you with a photostat of H-7018 (1943-1945) and boat sheets (see my letter of 8 March 1946.).

(c) Investigation to confirm or disprove the existence of the 3-3/4 fathom shoal charted in Massacre Bay in latitude 52° 49.05' longitude 173° 15.2'. This sounding originated with blueprint #37850 and may possibly be based on unrecorded information.

(d) Additional bottom specimens in the area of Massacre Bay.

2. With a view to prosecuting surveys to advantage, the Commanding Officer of the EXPLORER is authorized to assign part of the above work in sub-paragraphs (a), (c), and (d) to the SURVEYOR, and by copy of these instructions the Commanding Officer of that vessel will, when weather and circumstances permit, undertake the work assigned while engaged on Operations III and V of reference (a) and while at NAF Attu for supplies, etc.

cc to: Director, USC&GS  
Supervisor, N. W. District  
C. O., SURVEYOR and C.O., PATTON

F. B. T. Siems.

To: Captain F.B.T. Siems  
U.S. Coast and Geodetic Survey  
1500 Westlake Avenue, North  
Seattle 9, Washington

1946  
15 MAR 1

Subject: Additional field work in the approaches to Massacre Bay

In assigning the field work to the parties to be working in the vicinity of Attu Island this year, you will please issue instructions to have the following additional work accomplished in the approaches to Massacre Bay, except in instances where this work was completed last year:

1. Additional soundings lines should be run in the vicinity of lat.  $52^{\circ} 46.7'$  long.  $173^{\circ} 17.9'$  to reduce the general spacing of about 200 meters in this area. This area is relatively unimportant but the additional lines are desirable in making this a basic survey.
2. Develop the 13 fm. sounding in lat.  $52^{\circ} 43.6'$ , long.  $173^{\circ} 12.7'$ . *On H-7018*
3. Develop the 5-1/6 fm. sounding in lat.  $52^{\circ} 47.3'$ , long.  $173^{\circ} 14.6'$ . *On H-7018*
4. Develop the 12 fm. sounding in lat.  $52^{\circ} 49.07'$ , long.  $173^{\circ} 27.8'$ . *On H-7018*
5. Develop the 4-4/6 fm. sounding in lat.  $52^{\circ} 45.6'$ , long.  $173^{\circ} 20.6'$ . *On H-7018*
6. Investigate the 5-1/2 fm. sounding charted in lat.  $52^{\circ} 47.9'$ , long.  $173^{\circ} 17.0'$ . *On H-7018*
7. Investigate rocks charted in the vicinity of lat.  $52^{\circ} 45.2'$ , long.  $173^{\circ} 21.6'$ ; (lat.  $52^{\circ} 45.8'$ , long.  $173^{\circ} 26.9'$ , and lat.  $52^{\circ} 45.4'$ , long.  $173^{\circ} 29.7'$ ). The rock charted in the vicinity of lat.  $52^{\circ} 45.8'$ , long.  $173^{\circ} 26.9'$ , is probably out of position and has recently been removed from chart 9128. The rock in lat.  $52^{\circ} 45.1'$ , long.  $173^{\circ} 21.4'$  from blue print 37470 was reported by Navy patrol vessels. *On H-7018*
8. Develop the 4-2/6 fm. sounding in lat.  $52^{\circ} 48.55'$ , long.  $173^{\circ} 21.5'$ . *On H-7018*
9. Develop the 2-1/2 fm. sounding in lat.  $52^{\circ} 46.1'$ , long.  $173^{\circ} 17.4'$ . *On H-7018*
10. Develop the 3 fm. sounding in lat.  $52^{\circ} 46.17'$ , long.  $173^{\circ} 16.7'$ . *On H-7018*
11. Develop the 2-1/2 fm. sounding in lat.  $52^{\circ} 47.12'$ , long.  $173^{\circ} 15.47'$ . *On H-7018*

Boat Sheet No. 6939 covering the approaches to Massacre Bay is being forwarded to you to be used on this development work.

Director.

118939

TEMPERATURE AND SALINITY OBSERVATIONS AND VELOCITY CORRECTIONS

U. S. C. & G. S. S. PATTON - K. G. CROSBY CMDG.

PROJECT C. S. 218 - AREA S. E. COAST ATTU ID.

JULY AND AUGUST 1946

RECORD OF TEMPERATURES, SALINITIES, AND THEORETICAL VELOCITIES

SHEET No. 1

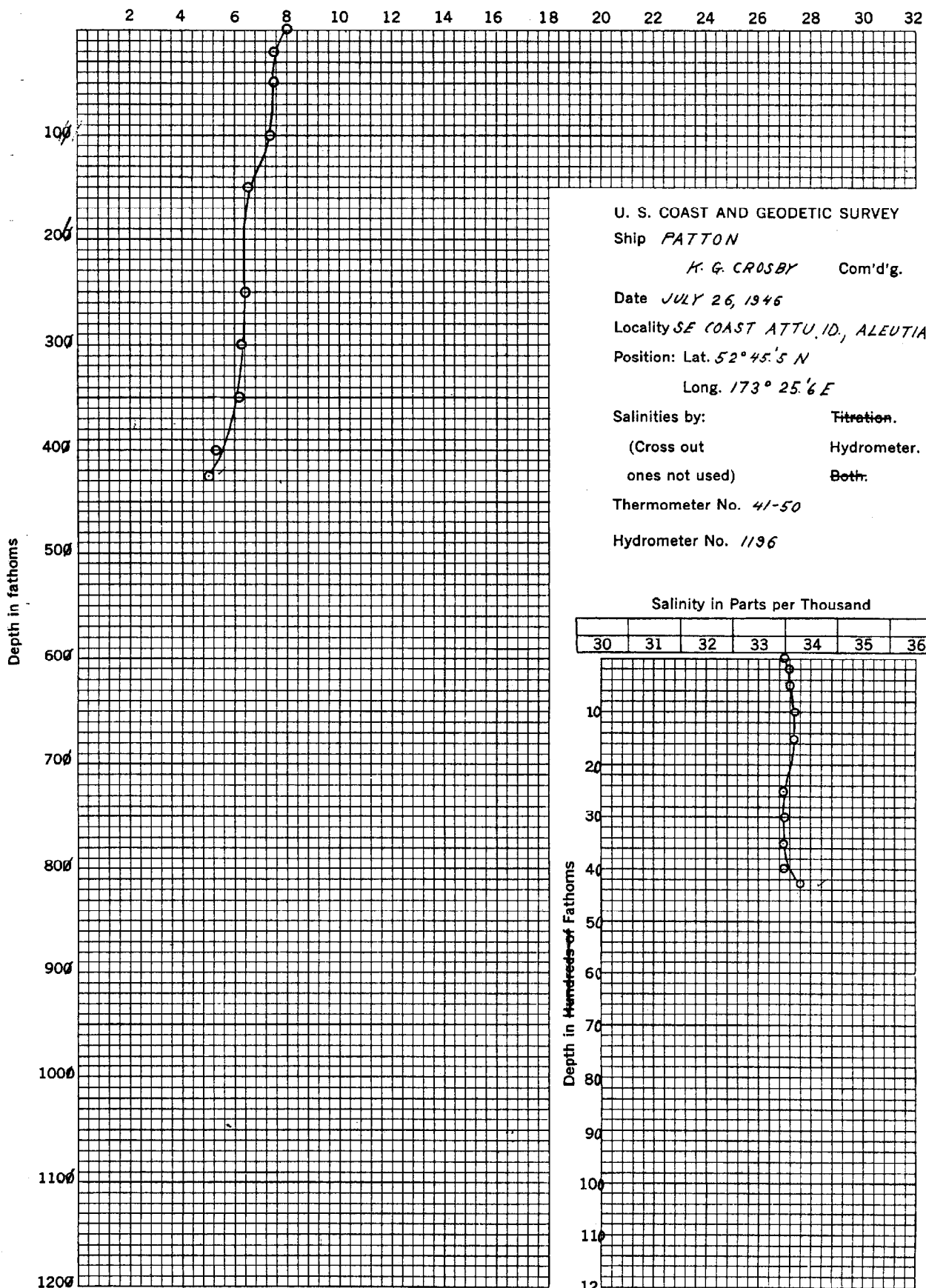
Ship or party Ship PATTON K. G. Crosby, Chief of party. 26 July  
Locality S. E. Coast of Attu Id., Aleutian Is. Project C. S. 218 Survey No. 146

Page	Time	Latitude and Longitude	Depth	TEMP. AT DEPTH		SPECIFIC GRAVITY		AT TEMP.		Salinity	CORRECTIONS			Therm. No.	Hydro. No.	Remarks (weather, bottom, etc.)
				Obs.	Cor.	Obs.	Cor.	Obs.	Cor.		M./Sec.	Sal.	Pres.			
146	h. m.															
26 July	08 38	52°-15.5' N 173°-25.6' E (Dorsey)	35 (Wire)* 12.18 13.33 (808-A) 13.1	5.0		1.0262		8.0		* 33.8				111-50 MBS 737681	1196	Cup thermometer #380929
	08 50		35	6.2		1.0260		7.5		33.5						Calm. Mod. SWILY swell. Fog.
	08 55		40	5.3		1.0261		7.0		33.5						
	09 03		30	6.3		1.0260		7.5		33.5						Green Sand and fine shell on bottom.
	09 10		25	6.4		1.0260		7.5		33.5						
	09 15		15	6.5		1.0261		8.1		33.7						
	09 25		10	7.4		1.0261		8.2		33.7						
	09 20		5	7.5		1.0260		8.0		33.6						
	09 10		0	—		1.0259		8.0		33.5						
	09 35		2	7.5		1.0260		8.0		33.6						

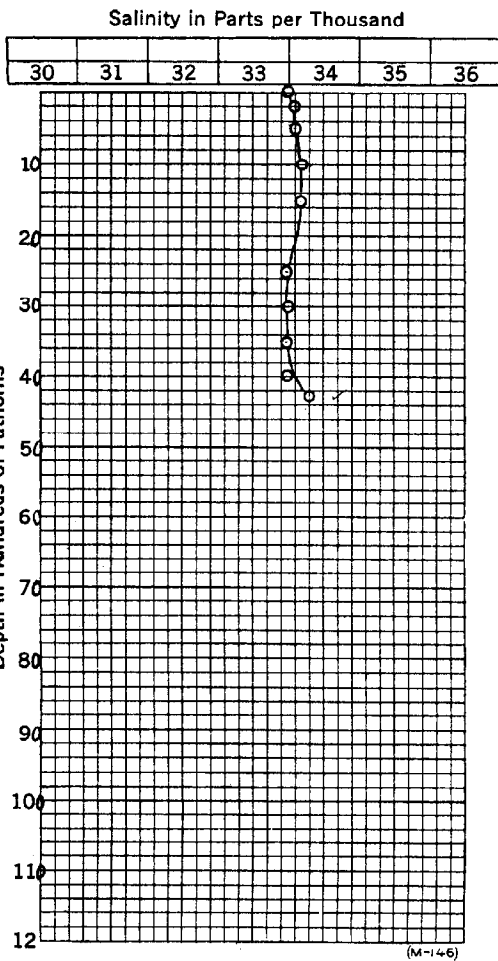
\* If depth recorded is bottom indicate thus: 865 B  
† Express in parts/1000. If by titration indicate thus: 34.16 T

# GRAPH OF WATER TEMPERATURES AND SALINITIES

Degrees Centigrade



U. S. COAST AND GEODETIC SURVEY  
 Ship *PATTON*  
*K. G. CROSBY* Com'd'g.  
 Date *JULY 26, 1946*  
 Locality *SE COAST ATTU. ID., ALEUTIAN IS.*  
 Position: Lat. *52° 45.5' N*  
 Long. *173° 25.6' E*  
 Salinities by:  Titration.  
 (Cross out  Hydrometer.  
 ones not used)  Both.  
 Thermometer No. *41-50*  
 Hydrometer No. *1196*



TEMPERATURE & SALINITY VALUES

Oscillator depth taken as 1.0 fathoms. Each layer is taken for 5-fathom intervals. Depth indicated below is for mid-point of layer.

DEPTH fms.	TEMPERATURE °C	SALINITY Parts per 1000
3.5	7.5	33.6
8.5	7.4	33.6
13.5	7.0	33.7
18.5	6.4	33.7
23.5	6.4	33.5
28.5	6.4	33.5
33.5	6.2	33.5
38.5	5.8	33.5
43.5	5.0	33.8

41°F

$\frac{9}{5} \times 5 = 41^{\circ}$

ABSTRACT OF BAR CHECKS

SHEET H-6939

EXPLORER LAUNCH No. 3 (USED BY SHIP PATTON)

DATE 1946	DAY LETTER	TIME	808 FATHOMETER No. 61		
			2 fms. BAR DEPTH	4 fms. BAR DEPTH	6 fms. BAR DEPTH
30 July	a	0830	1.7	3.7	5.7
"	a	1220	1.6	3.8	5.7
"	a	1711	1.65	3.75	5.8
1 Aug.	b	0815	1.8	3.9	5.9
2 Aug.	c	1320	1.8	3.85	5.9
"	c	1635	1.8	3.85	5.8
12 Aug.	d	0807	1.75	3.8	5.9
"	d	1142	1.65	3.8	6.0
"	d	1630	1.75	3.95	6.0
			(9)	(9)	(9)
		Sums	15.50	34.40	52.7
		Means	1.72	3.82	5.85

CORRECTIONS

2 fms. - +0.28 fms.  
 4 fms. - +0.18 fms.  
 6 fms. - +0.15 fms.



(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

CORRECTIONS IN FATHOMS

FATHOMETER CORRECTIONS

U.S. Coast and Geodetic Survey

Ship *PATTON*

*K. G. Crosby*

Comdg.

These corrections are to be used  
between *July 1946* and *August 1946*  
in the locality *S. E. Coast of ATTU, I.*

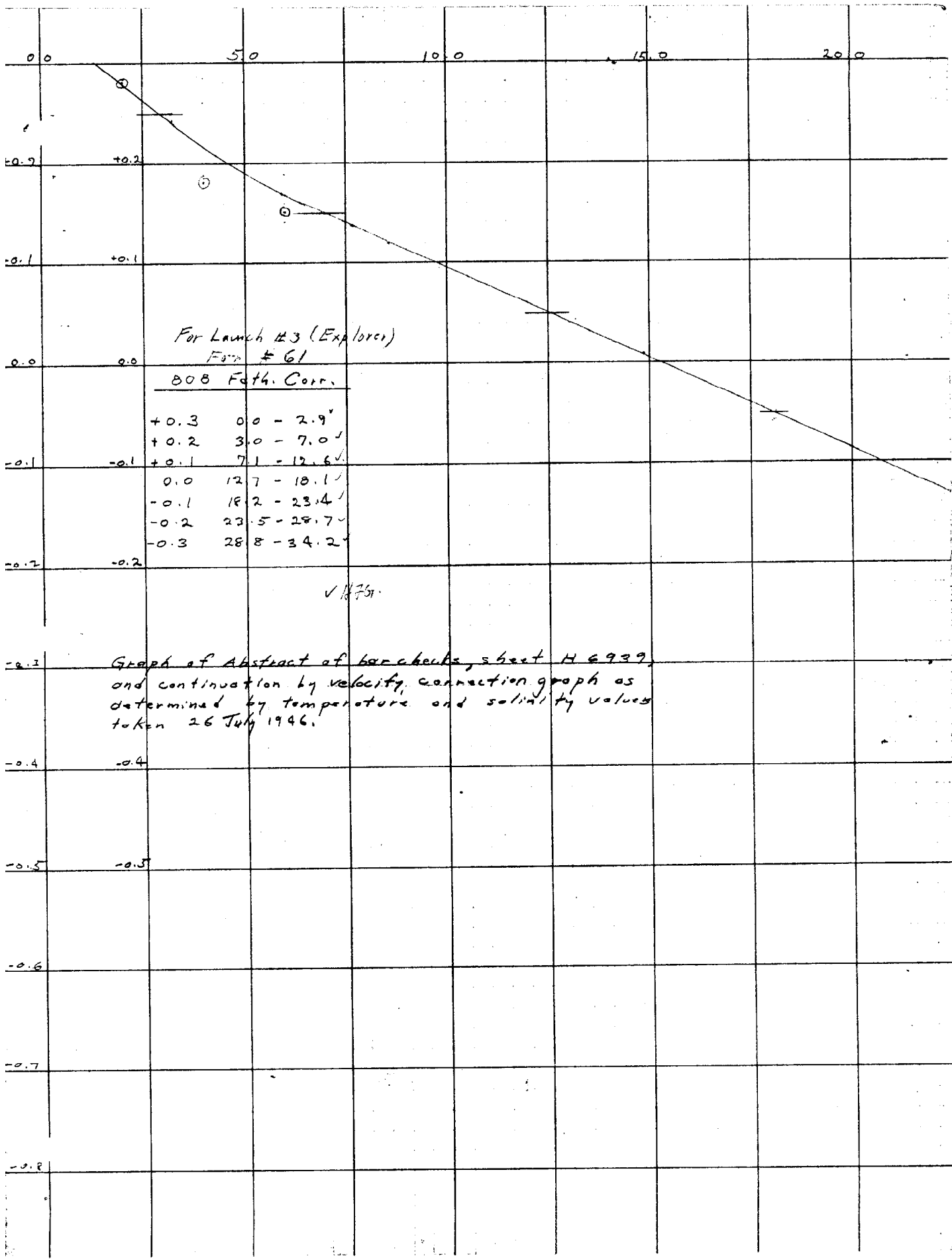
for hydrographic surveys Nos. *H 6239*  
and *H 7818*

(For deep water at 0 to these figures.)

PRINTED IN U.S.A.

DEPTHS IN FATHOMS

10  
20  
30  
40  
50  
60  
70  
80  
90  
100  
110  
120  
130  
140  
150  
160  
170  
180  
190



For Launch 123 (Explorer)  
 Form # 61  
 808 Fath. Corr.

+0.3	00	- 2.9'
+0.2	30	- 7.0'
+0.1	71	- 12.6'
0.0	127	- 18.1'
-0.1	182	- 23.4'
-0.2	235	- 28.7'
-0.3	288	- 34.2'

V. H. 751.

Graph of Abstract of bar checks, sheet H 6939,  
 and continuation by velocity connection graph as  
 determined by temperature and salinity values  
 taken 26 July 1946.

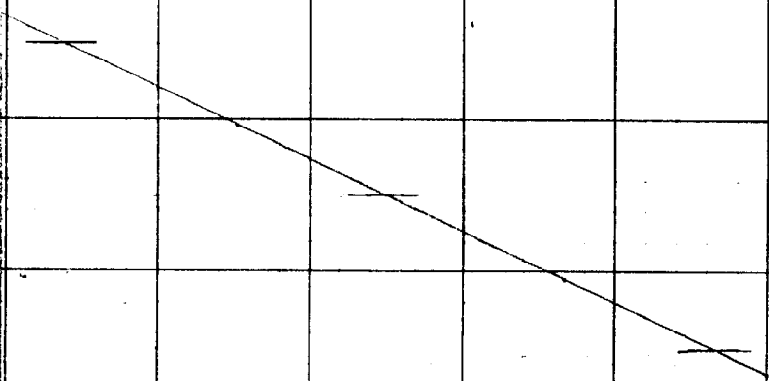
250

300

350

400

450



FATHOMETER CORRECTIONS

USC&GSS PATTON

JULY & AUGUST 1946

S. E. COAST OF ATTU ISLAND

DORSEY FATHOMETER & 808 FATHOMETER No. 74 USED FOR SHIP WORK

CORRECTION fms.	DEPTH fms
0.0	0.0 - 4.0
-0.1	4.1 - 10.2
-0.2	10.3 - 16.0
-0.3	16.1 - 21.0
-0.4	21.1 - 26.0
-0.5	26.1 - 31.5
-0.6	31.6 - 36.5
-0.7	36.6 - 41.5
-0.8	41.6 - 46.0
-0.9	46.1 - 51.0
-1.0	51.1 - 56.0
-1.1	56.1 - 61.0

"808" FATHOMETER #61 USED FOR LAUNCH WORK

CORRECTION fms.	DEPTH fms
+0.3	0.0 - 2.9
+0.2	3.0 - 7.0
+0.1	7.1 - 12.6
0.0	12.7 - 18.1
-0.1	18.2 - 23.4
-0.2	23.5 - 28.7
-0.3	28.8 - 34.2

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. H-6939 Ad. Wk.)

Records accompanying survey:

Boat sheets 1....; sounding vols. 2....; wire drag vols. ....;  
bomb vols. ....; graphic recorder rolls 1....;  
special reports, etc. 1 cahier of F. S. Obs. & velocity Corrections.  
.....

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

Number of positions on sheet	.602.	<i>Stirni</i> 602.
<del>Number of positions checked</del>	.....	131
<del>Number of positions revised</del>	.....	7
<del>Number of soundings revised</del> (refers to depth only)	.....	26
Number of soundings <i>Penciled</i> erroneously spaced	.3612	56
Number of signals erroneously plotted or transferred	.....	.....
<del>Topographic details</del> <i>Plotting of positions</i>	Time	.93 hrs
Junctions <i>Plotting</i>	Time	40
Verification of soundings from graphic record	Time	.90 hrs 24
to		
Verification by <i>A. R. Small</i> A. R. STIRNI	Total time	.123.. Date 3-31-47 102 hrs 6/17/47
Reviewed by <i>R. H. Carstens</i>	Time	.28 hr Date 7/16/47

DIVISION OF CHARTS

REVIEW SECTION - NAUTICAL CHART BRANCH

REVIEW OF HYDROGRAPHIC SURVEY

REGISTRY NO. H-6939 Ad. Wk.  
1946

FIELD NO. H-6939

Alaska-Aleutian Ids., Attu I., Approaches to Massacre Bay  
Surveyed in July - August 1946 Scale 1:20,000  
Project No. CS-218

Soundings:

Control:

Handlead  
Sounding Machine  
808 Fathometer  
Dorsey Fathometer

Sextant fixes on shore signals

Chief of Party - K. G. Crosby  
Surveyed by - K. G. Crosby, H. F. Garber and R. H. Brown  
Protracted by - D. B. Small  
Soundings plotted by - D. B. Small  
Verified and inked by - A. R. Stirni  
Reviewed by - R. H. Carstens, July 16, 1946  
Inspected by - H. W. Murray

1. Instructions

This additional work was accomplished in compliance with the Director's Instructions of March 15, 1946 and March 21, 1946, and has been plotted on H-6939 (1943) in green.

2. Scope and Results of Survey

The additional work consists of the following investigation and development:

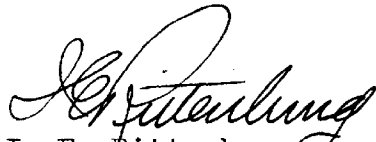
- A. Additional hydrography in the sparsely developed area in the vicinity of lat.  $52^{\circ} 46.7'$ , long.  $173^{\circ} 17.9'$ . The bottom in this area is now adequately delineated.
- B. Development of the 5-1/6-fm. sounding (charted 5-1/4) in lat.  $52^{\circ} 47.3'$ , long.  $173^{\circ} 14.6'$ . The additional development revealed no depth shoaler than the charted depth.

- C. Development of the 4-4/6-fm. sounding (charted 4-1/2) in lat.  $52^{\circ} 45.6'$ , long.  $173^{\circ} 20.6'$ . The 4-4/6 was verified by the present soundings.
- D. Investigation of the 5-1/2-fm. sounding charted in lat.  $52^{\circ} 47.9'$ , long.  $173^{\circ} 16.9'$  from Bp. 37287 (1943). The 5-1/2 is from unrecorded information. Present depths of 5-2/6 fms. supersede the charted 5-1/2.
- E. Investigation of the sunken rock P. A., charted in lat.  $52^{\circ} 45.1'$ , long.  $173^{\circ} 21.43'$  from Bp. 37470 (1944). This rock was reported by Navy patrol vessels and is disproved by present depths of 14 to 18 fms.
- F. Investigation of the 2-1/2 fms. P. A., charted in lat.  $52^{\circ} 46.1'$ , long.  $173^{\circ} 17.43'$ , from Bp. 37470. The 2-1/2 was plotted on the boat sheet of H-6939 from unrecorded information and is probably the assumed position of the shoal struck by the ship DELLWOOD which sank 1230 meters to the eastward. The present development disproves the shoal in the charted position. A 3-1/6-fm. shoal was discovered 310 meters to the southward and supersedes the charted 2-1/2.
- G. Investigation of the 3-fm. sounding (charted) in lat.  $52^{\circ} 46.17'$ , long.  $173^{\circ} 16.7'$  from additional work of 1944. A depth of 5-1/2 fms. was the shoalest depth found by the present investigation. The 3 fms. is apparently a kelp trace and is superseded by present depths.
- H. Investigation of the 2-1/2-fm. sounding (charted) in lat.  $52^{\circ} 47.13'$ , long.  $173^{\circ} 15.48'$  from additional work of 1944. A least depth of 6-5/6 fms. was obtained by the present investigation. The 2-1/2 fms. is considered to be a kelp trace and is superseded by present depths.
- I. Investigation of the 3-3/4-fm. sounding charted in lat.  $52^{\circ} 49.05'$ , long.  $173^{\circ} 15.22'$  from Bp. 37850 (1944). The 3-3/4 fms. is probably from unrecorded information and is disproved by the present development. A 5-2/6-fm. depth from H-6940 (1943) supersedes the charted 3-3/4 fms.
- J. The additional bottom characteristics obtained in Massacre Bay now provides adequate coverage.

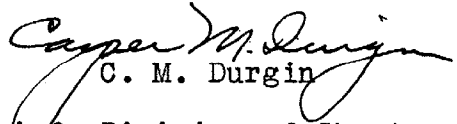
3. Additional Work Recommended

The present additional work adequately completes the basic survey of the area covered by H-6939 and no additional work is recommended.

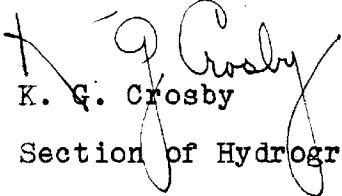
Examined and approved:

  
I. E. Rittenburg


Chief, Nautical Chart Branch

  
C. M. Durgin

Chief, Division of Charts

  
K. G. Crosby

Chief, Section of Hydrography

  
C. K. Green

Chief, Division of Coastal Surveys



## TIDE NOTE FOR HYDROGRAPHIC SHEET

~~Division of Hydrography and Topography:~~

10 January 1947

Division of Charts: H. W. MURRAY

Plane of reference approved in  
2 volumes of sounding records for

HYDROGRAPHIC SHEET 6939 (additional work)

Locality - Massacre Bay, Attu Island, Aleutian Islands, Alaska

Chief of Party: K. G. Crosby in 1946  
Plane of reference is mean lower low water, reading  
3.4 ft. on tide staff at Massacre Bay  
6.8 ft. below B. M. 1

Height of mean high water above plane of reference is 3.3 feet.

Condition of records satisfactory except as noted below:

*E. C. McKay*  
Section  
Chief, Division of Tides and Currents.



# 6939

Additional work 1944

Form 504

U. S. COAST AND GEODETIC SURVEY  
DEPARTMENT OF COMMERCE

## DESCRIPTIVE REPORT

Type of Survey ..... HYDROGRAPHIC SHEET  
Field No. H-6939a ..... Office No. **6939**

### LOCALITY

State ..... ALASKA  
General locality ..... ALEUTIAN ISLANDS  
Locality ..... ATTU ISLAND - MASSACRE BAY

194 4.

CHIEF OF PARTY

Roland D. Horne

LIBRARY & ARCHIVES

DATE ..... **JAN 20 1945**

B-1870-1 (1)++

# 6939

Additional work 1944

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

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. H-6939a

REGISTER NO.

State ALASKA

General locality Aleutian Islands

Locality Massacre Bay - Attu Island

Scale 1:20,000 Date of survey Summer, 1944.

Vessel EXPLORER - Launch No. 1 and No. 2

Chief of Party Roland D. Horne

Surveyed by H.O. Fortin and J.E. Schultz

Protracted by D.H. Benson

Soundings penciled by D.H. Benson

Soundings in fathoms fms

Plane of reference M.L.L.W.

Subdivision of wire dragged areas by

Inked by D.H. Benson

Verified by D.H. Benson

Instructions dated March, 1944.

Remarks:

REG. NO. H6939 Additional work 1944

DESCRIPTIVE REPORT

TO ACCOMPANY

HYDROGRAPHIC SHEET NO. H-6939a

INSTRUCTIONS:

Instructions for project C.S.-218, dated March 24, 1944.

SURVEY METHODS:

Standard survey methods were used throughout this sheet. The control was based on triangulation executed by the U.S. Navy, U.S. Engineers, and supplemented by the Ship EXPLORER. All on U.S.N. 1934 (Gannet) datum.

The 808 depth recorder was used to obtain the soundings in the ship's launches. Bar checks were made in accordance with standard practice.

Only a limited number of vertical casts and bottom characteristics were taken. It is suggested that additional ones be taken in accordance with standard practice.

COMPARISON WITH PREVIOUS SURVEYS:

The purpose of this survey was to supplement the original survey on sheet H-6939, to develop shoal areas, and to verify or disprove dangers to navigation.

DISCREPANCIES AND DANGERS:

	<u>Lat. &amp; Long.</u>	<u>Position</u>	<u>Fathoms</u>	<u>Date</u>	<u>Remarks</u>
1	52° 46.9' 173° 17.8'E	74c to 76c	Depth not recorded	1944	Sunken rock.
2	52° 46.45' 173° 17.85'E	92c to 93c	Rock	1944	Awash at M.H.W. <sup>LLW</sup>
3	52° 46.47' 173° 17.64'E 17.72	96c to → 97c	depth not recorded Sunken Rock	1944 (120 <del>145</del> m. W.N.W. of above)	1943 (position correct.)
4	52° 46.50' 173° 17.60'E	96c to 97c	Rock "H"	1943	Saw no indication of rock 170 m. N.W. of above sunken rock. <i>1943 position of rock incorrect. see item 6-A(2) of Review</i>

	Lat. & Long.	Position	Fathoms	Date	Remarks
5	52° 46.85'	79c to 80c	least depth not obtained	1944	Position correct.
	173° 17.30' E.		Rock "D"		
6	52° 46.88	84c to 85c	Sunken Rock	1943	120 m. N.E. of above position not observed.
	173 17.40 E				
7	52° 46.76	98c	least depth not obtained	1944	220 m. S.W. of above position correct.
	173 17.07 E		Sunken Rock		
8	52° 46.1'	14a to 15a	10-3/4	1943	Wreck of Dellwood. The boom no longer shows. However top of mast could be seen below surface of water.
	173° 18.5 E.		4/6		
9	52° 46.09'	60d to 61d	Position approx.	1944	Least depth found on this position.
	173° 17.43' E.	See Page 17, 1943 report			
10	52° 46.36'	17d to 18d	Rock "F"	1943	No indication of this rock was found. However, a <del>2 5/8 fms</del> <sup>2 5/6 fms</sup> sounding was obtained 500 m. S.W. of the above position.
	173° 17.05' E.		15 11		

Evidently, same sunken rock etc.

NO EVIDENCE OF SUNKEN ROCK AT THIS POSITION ddb.

Position of 2 1/2 fms.

For further investigation see items of review.

Retain until definitely disproved ddb.

Four cuts shown on 1943 boat sheet. Retain as sunken rock awash. Cuts taken at low water in 1943 are too definite to reject.

2 5/6 deep by Ad WK 1946

Channels and anchorages and other pertinent information can be found in the 1943 report for this sheet.

All other shoal indications are indicated by notations on the boat sheet.

Due to the fact that several days of investigation and coverage of unsurveyed areas remain on this boat sheet it is requested that it be returned to the ship EXPLORER for the 1945 season.

STATISTICS:

Number of positions - - - - - 448  
 Number of Statute Miles of sounding lines - 99.3

TIDAL NOTE:

A standard automatic tide gage was in operation on Navy Pier No. 1, Attu Island, Massacre Bay, during the 1944 field season. All necessary data was taken from this gage and compiled by the officer personnel of the Ship EXPLORER. Mean lower low water as compiled by the Washington Office was 3.94 feet on the staff.

Respectfully submitted,

*Henry O. Fortin*  
Henry O. Fortin,  
Lieut. Comdr., C. & G. S.

*John E. Schultz*  
John E. Schultz,  
Lieut. (j.g.) C. & G. S.

APPROVED AND FORWARDED:

*Roland D. Horne*  
Roland D. Horne,  
Commanding Officer,  
U.S.C. & G.S.S. EXPLORER.

Seattle Processing Office Notes

H-6939 - Additional Work

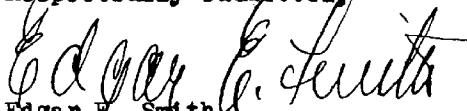
Massacre Bay, Attu I.

All signals already are plotted on the smooth sheet.

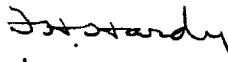
Records forwarded to Washington for plotting on the original smooth sheet.

It is requested that the boat sheet be returned to the Seattle Processing Office when verified, as there is need for more development in the eastern part of the sheet.

Respectfully submitted,

  
Edgar E. Smith  
Cart. Engineer

Approved and Forwarded:



F. H. Hardy  
Officer in Charge,  
Seattle Processing Office.



Statistics

H-6939 - Additional Work 1944

Massacre Bay, Attu I.

<u>Date</u>	<u>Day</u>	<u>Vessel</u>	<u>Miles of</u> <u>Sdg. Line</u>	<u>No. of</u> <u>Positions</u>	<u>Vol. No.</u>
1944					
6/29	a	Launch 1	11.4	49	1
7/9	b	Launch 2	16.9	101	1
7/9	b	"	5.5	35	2
7/10	c	"	26.3	123	2
9/7	d	Launch 1	39.2	142	3
	4		99.3	450	3

Massacre Bay - Attu Island

Tidal Note

Additional Work - 1944 - H-6939, H-6940, & H-6941

Massacre Bay

Standard Automatic Gage on Navy Pier No. 1

Latitude 52° 50.5

Longitude 173 11.7

Staff Reading of MLLW  
as fixed by the Washington Office

3.94 feet

GEOGRAPHIC NAMES

Survey No.

88934

Additional work 1944  
Name on Survey

	A	B	C	D	E	F	G	H	K	
	On Chart No.	On previous survey No.	On U. S. quadrangle Maps	From local information	On local Maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List		
										1
										2
										3
										4
										5
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pac  
HMC

Form 712  
DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY  
Rev. June 1937

## TIDE NOTE FOR HYDROGRAPHIC SHEET

January 23, 1945.

~~Division of Hydrography and Topography:~~

✓ Division of Charts: Attention: H. R. EDMONSTON

Plane of reference approved in  
3 volumes of sounding records for Additional Work

HYDROGRAPHIC SHEET 6939

Locality Massacre Bay, Attu Island, Aleutian Islands, Alaska.

Chief of Party: R. D. HORNE in 1944

Plane of reference is mean lower low water reading  
3.9 ft. on tide staff at of June 20, 1944 at Massacre Bay  
6.5 ft. below B. M. 1

Height of mean high water above plane of reference is 3.3 feet.

Condition of records satisfactory except as noted below:

*H. A. Warner*  
Acting Chief, Division of Tides and Currents.

Surveys Section (Chart Division)

HYDROGRAPHIC SURVEY NO. **H693** Additional work  
1944

Records accompanying survey:

Boat sheets <sup>1</sup>...; sounding vols. <sup>3</sup>..; wire drag vols. ....;  
bomb vols. ....; graphic recorder rolls <sup>1</sup>...;  
special reports, etc. ....  
.....

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

Number of positions on sheet	406
Number of positions checked	0
Number of positions revised	0
Number of soundings recorded	2632
Number of soundings revised (refers to depth only)	20
Number of soundings erroneously spaced	.....
Number of signals erroneously plotted or transferred	0
Topographic details	Time 0
Junctions	Time 0
Verification of soundings from graphic record	Time 40 hrs

*Plotted*  
Verification by *P.H. Bauman* Total time 213 hrs Date 2/27/45

Review by *R.H. Carstensen* Time 33 hr Date 3/5/45

