

9482 a&b

Diag. Cht. No. 8201-3

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey ... HYDROGRAPHIC
Field No. DA-20-5-74
Office No. H-9482 a & b

LOCALITY

State ... Alaska
General Locality ... Endicott Arm
Locality ... Upper Portion (H-9482 a),
Fords Terror (H-9482 b)

19 74

CHIEF OF PARTY
M.H. Fleming

LIBRARY & ARCHIVES

DATE ... October 6, 1978

☆ U.S. GOV. PRINTING OFFICE: 1976-689-441

9482 a&b

Green 6
CHT
17360

HYDROGRAPHIC TITLE SHEET

H-9482 a & b

INSTRUCTIONS - 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.

DA-20-5-74

H-9482a

H-9482 b

State Alaska

Alaska

General locality Endicott Arm
~~South Eastern~~

Endicott Arm

Locality Upper Portion
~~Endicott Arm/Fords Terror~~

Fords Terror

Scale 1:20,000 ~~inserts at 1:10,000 & 1:5,000~~ Date of survey Sept 10 - Oct 7, 1974

Instructions dated May 16, 1974

Project No. OPR-999

Vessel NOAA Ship DAVIDSON & Launches DA-1 & DA-2

Chief of party M.H. Fleming, CDR, NOAA

LTJG J.L. Oswald, LTJG R.W. Mercer, LTJG D.S. Eilers, LT R.D. Hopkins,

Surveyed by ENS D.J. Tennesen and ENS J.D. Sarb

Soundings taken by echo sounder, hand lead, pole Ross 5000 fineline

Graphic record scaled by DAVIDSON Personnel

Graphic record checked by DAVIDSON Personnel

Positions verified

~~XXXXXX~~ by James L. Stringham

Automated plot by PMC Xynetics Plotter

Soundings

Verification by James L. Stringham

Soundings in fathoms ~~XXXX~~ ^{and tenths} at ~~XXXX~~ MLLW Predicted tides, Holkham Bay, AK

REMARKS: The time zone used for all of the records for this survey was

GMT (zulu) 000°. The boatsheet is complete.

The smooth sheet is complete and adequate for charting.

Applied to stels 2-28-79
[Signature]

135°-20'

135°-10'

133°-00'

56'

56'

BOAT SHEET LAYOUT ENDICOTT ARM and FORDS TERROR

H-9482; DA-20-S-74
OPR-999; 1974
NOAA Ship Davidson
M.H. Fleming Comdg.

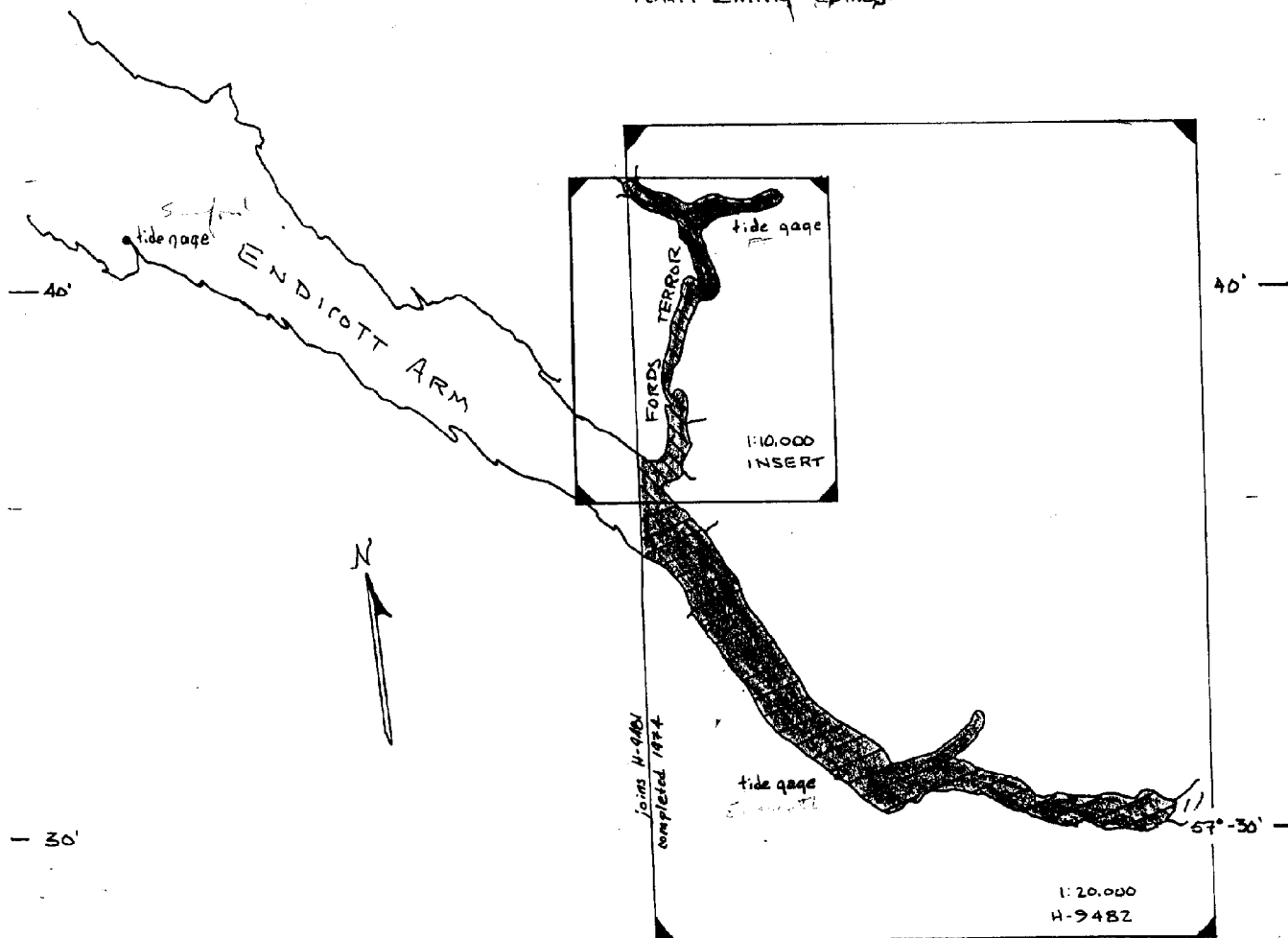


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✓ = Misc. items filed in Cahier No. 1 with the field records

A. PROJECT

This entire hydrographic survey was conducted under Project Instructions OFR-999-DA-74, Navigable Area Survey, Tracy and Endicott Arms, Alaska. The original project instructions were dated May 16, 1974, and the supplement no. 1 was dated August 16th, 1974. ✓

B. AREA SURVEYED

The area of interest in this report is the southeastern end of Endicott Arm, southeast of the entrance to Ford's Terror which lies approximately 60 nautical miles southeast of Juneau. This sheet includes the full extent of Ford's Terror. All of the hydrography on the Endicott Arm portion was at the scale of 1:20,000; whereas, the Ford's Terror is a 1:10,000 ~~sheet~~ ^{plot} on the ~~20,000~~ ^{50,000} sheet. All records were separated according to whether in the arm or in the terror; however, for the purposes of this report, this is to be considered one sheet under the survey number H-9482. ✓

The survey was begun on Julian day 253 and was completed on day 280, which correspond to the dates September 10 to October 7, 1974. The survey is complete. ✓

C. SOUNDING VESSELS

A total of three sounding vessels were employed in the survey: two hydro launches DA-1 and DA-2 and the ship. The ship's sounding equipment was only used to obtain the depths recorded for the bottom samples, whereas the launches were responsible for the entire hydrography. ✓

<u>Vessel</u>	<u>Color Code</u>
DAVIDSON	Brown
DA-1 (WZ 3039)	Red
DA-2 (WZ 3040)	Blue

D. SOUNDING EQUIPMENT

A breakdown of the equipment is given:

<u>Launch DA-1 Aluminum Boat</u>		
Fathometer.....	Ross 5000 Fineline	S/N 1048
<u>Launch DA-2 Fiberglass Bertram 25</u>		
Fathometer.....	Ross 5000 Fineline	S/N 1053 ✓
<u>Ship DAVIDSON CSS-31</u>		
Fathometer.....	Ratheon DE 723	S/N 1286

The two launches had digitizing fathometers linked with ASI loggers. The digitized depths were assumed to be correct upon scanning unless the machine obviously digitized on kelp fish or any "midwater" object. Refer also to Section I of this report for discussion of fathometer traces. ✓

See the report of the Correction to Echo Sounders OPR-999 for a complete analysis of the methods used to determine velocity correctors for the soundings. These correctors are based on Nansen cast data which was taken by the ship. The inked soundings in the smooth sheet have two correctors applied: the predicted tides at Holkham Bay and the TRA Correctors. ✓ boat

E. BOATSHEETS

The boatsheets were initially prepared by the Pacific Marine Center. The final smooth sounding overlay for the hydro in Endicott Arm was drawn on the ship from a PMC projection. This accounts for the non-standard size on this particular overlay. The Ford's Terror insert sheets were made by ship's personnel. It should also be noted that the Endicott sheet was shifted easterly from the original layout because the Dawes Glacier has receded nearly five miles from what is shown on the nautical chart. Thus to get the newly exposed water on the boatsheet, the easterly shift was required. However, the position overlay is the approved boatsheet layout. It is physically possible to get all of Ford's Terror plus the 1:5,000 enlargements totally onto the approved sheet layout. For flexibility in our operation, the sheets were compiled separately during this survey; hence, two sounding overlays and two position overlays will accompany this report. ✓ See Verifiers report item I

F. STATION CONTROL

There was no previous geodetic control established in Endicott Arm; thus a complete second order net was extended to the head of the arm. The triangulation originated from four stations previously recovered. These four stations, CLOT 2, BUSHY, NOT, and N, were reoccupied. The new stations established on this sheet in Endicott Arm were FORDS, ENDI, ERROR, RAM, COTT, and ARF. These stations were monumented and described as triangulation. No tie was made at the head of the fjord and no azimuth check to polaris was made due to poor weather. A traverse was extended into Ford's Terror originating from station ERROR. Methods were used so that stations would be at least third order accuracy. The traverse did not loop or tie into any other control at the northern end. This control extension was felt to be adequate as the project instructions suggest that control of "lesser accuracy" may be extended into this minor fjord. The stations DORF, ENTRANCE, CURLER, BOULDER, FALL, CAPITAN, LONELY and BROWN comprise this scheme and are all monumented and described as traverse stations. ✓

There were no problems at all in obtaining tellurometer distances inside of Ford's Terror despite the bare rock walls, and flat water, both of which can cause "ground swing" problems in certain instances. ✓

All horizontal and vertical angles were turned with Wild T2 theodolites #19302 and #35797 and all distances were measured with a set of Tellurometers model CA 1000, serial numbers 1040 and 1041 for master and remote, respectively. ✓

All mini-ranger sites and visual hydro signals were established using the main scheme points as a basis. These stations were established by either spur traverse, intersection, resection, or by sextant cuts. All electronic control sites were monumented as topographic stations and many other stations throughout the fjords were also marked and described in this same manner. ✓

Copies of the computations for all stations on this sheet are included in the appendix of this report. If any further information is required, refer to the Horizontal Control Report, Tracy and Endicott Arm, OPR-999, 1974. All observations computations and descriptions may easily be found in this report. The North American Datum, 1927, was used for all geodetic control. ✓

G. POSITION CONTROL

Two methods were used for positioning, electronic and visual. The electronic mode was used earlier in the survey and employed the Motorola Mini-Ranger III. The Mini-Ranger navigation system was used only for a five mile section of Endicott Arm southeast of the mouth of Ford's Terror. Beyond this point, the shore tends to be of more bare rock which produced reflections. From this point on, visual control was used exclusively. Calibrations were accomplished statically by "parking" the launch near a control point and measuring the offset of the antenna. The appropriate station would then be cycled and then averaged and compared to the true computed ranges. Since the beach was very steep, the launch antenna could be placed very close to the control stations, and this position could easily be duplicated regardless of the state of the tide. Refer to the electronic control abstracts for the values obtained from these calibrations in the appendix. Because the arm was so narrow, many station pairs had to be used; thus, zoning the Mini-Ranger was extremely important in order to achieve proper geometry of the intersecting arcs. See the chartlet in the appendix showing the approximate zones in which each station pair was used. Some zones were so small that the hydro on a pair of transponders could be completed in an hour's time. Consequently, shore stations were moved quite frequently by either skiff parties or the launch crews. ✓

The visual hydro was done normally except for the logging. The semi-automated system did not have a storage capability so the time, day, fix number, and digitized depth were logged on time, but all angles and control were hand-logged in a sounding volume. In the evenings, the angles and control were written on the original printout. Later, this data was relogged in smooth form for automated processing by PMC. Thus, the sounding volumes accompanying the data are part of the original data and are considered to be correct.

Since the DAVIDSON has no computer capabilities, no correctors were applied to any of the plotted positions. Also, slope correctors should be considered nil as all of the Mini-Ranger sites were located on the beach line. See the station list in the appendix for a complete tabulation of the elevations.

H. SHORELINE

No photography has been flown by NOS; thus, no photogrammetric compilation of the shoreline was available. The shoreline shown in red on the boatsheets was obtained in the field by taking many fixes with either Mini-Ranger or with the sextant. Appropriate notes and/or sketches would also be made at each fix in order to help draw in the shoreline. A further explanation may be found in the Field Edit Report, Upper Endicott Arm Fjord, OPR-999, 1974. All data and notes are included in this report.

Since no shoreline was available, any shoreline that was obtained is considered a change; thus, it is shown in red. Some areas of the beach are shown with red dashed lines denoting the general trend of the shoreline where only a few fixes were taken. In the constant search to find better ways in which to accomplish our mission of navigable area surveys, we did find an available source of metric photographs which could be most beneficial. These photographs are taken by the U.S. Forest Service for land use information. The photos are taken by a mapping camera, 9 by 9 inch format with a 6 inch focal length. The scale of the photos in this area of Endicott Arm and Ford's Terror is approximately 1:17,000. The DAVIDSON purchased several samples of these photographs of the Ford's Terror area. The man who led us to these photos was Mr. Ray Thomas of the Mapping Section of the USFS in Juneau.

See Kerrigan
report item II

If contact could be established with the Forest Service to obtain photography of this nature, the control could be photo identified in the field, then a photogrammetric compilation would be simple. It is obvious that this would not be of the same accuracy as normal photogrammetric compilation methods, but for this type of area, these photos could be used to great advantage in compiling shoreline and topographic features. The method that we used this year offers no continuity between fixes, whereas this type of photogrammetric

compilation would be much faster and provide for a more vivid account of the real shoreline. If the compiler has questions, then a normal field edit routine could be carried out. The low water line and the high water line are nearly one and the same for ninety percent of the shoreline in this region due to the steep beach line. Because of this, only the high water line was shown except in areas where there were tidal flats, namely at the moraines of long receded glaciers. Because of the poor control used for the prior survey in 1889, this shoreline better approximates the true position, and, therefore, should be used for the new chart of this area. ✓

I. CROSSLINES

There were a total of 15.1% crosslines on this survey including both Endicott Arm and Ford's Terror. Crosslines were run using both launch DA-1 and DA-2. In several places, crosslines were run by one launch over main scheme work that had been done by the other launch. In these cases, the agreement was usually within two fathoms except in areas of steep slope which comprise the areas near the shore. In general, in comparing the crosslines, 70% to 80% of the soundings agree within two fathoms, but the agreement in areas of steep slope is not good; i.e., within five fathoms in some instances. An example to note is by examining the analog trace from two different lines in an area of steep slope near the shore. The trace from the line run parallel to the shore is very poor and upon scanning, one cannot determine where the sounding is within ten fathoms. In cases such as this, the digitized depth was simply believed and used as the "correct" depth. Upon examining the bathymetry of Endicott Arm, one can see that it is a very deep glaciated canyon filled with water. The topography of the shoreline appears to be an extension of the underwater features and is very steep and mountainous, especially at the head of the arm. The center of the arm is relatively flat due to the continual action of melting glacial ice with talus and mud, as well as the settlement of silt from several large rivers near the glacier front. One can easily see this from the type of bottom samples that were taken in the arm, as well as those of the same nature taken in Ford's Terror. ✓

J. JUNCTIONS

This survey junctions with the contemporary survey H-9481, DA-20-4-74, completed by the DAVIDSON prior to the start of the survey H-9482. This junction, with soundings shown in blue, takes place just south of the entrance to Ford's Terror. In the center of the arm, the soundings from the two surveys agree within 2 fathoms but on the steeper slopes nearer the shore the soundings agree within only ✓

about 6 fathoms in several cases. Refer to the discussion under Section I, Crosslines, for further explanation of the reasons for this type of agreement. The junction being compared here was run by the same launch, DA-1, and using the same fathometer equipment. The junction and overlap has been adequately completed between these two contemporary surveys. ✓

K. COMPARISON WITH PRIOR SURVEYS

The one presurvey review item on this sheet that was investigated was the rock reported at 2-1/2 fathoms at the narrow constriction in Ford's Terror. This area was developed rather extensively, and the minimum depth found was 0.4 fathom. There is a rock ledge that extends nearly all the way across the channel here and is the shoalest area of the channel. The depths in this area could be in error as much as 6 or 7 feet because of the tidal situation in this cut. For a further discussion of the strange tidal situation that exists here, see Section P of this report and the field tide note and the article about the Ford's Terror reversible river in the appendix. This will help explain the tidal datum that exists in this area of Ford's Terror. Chart present survey depths. The present survey indicates a continuous channel with depths exceeding 2 fathoms. ✓

057° 38.0'
133° 10.3'

See Verifiers report item VII

The prior survey H-1999 of the area was done at the scale of 1:40,000 and completed in August-September 1889. The general nature of the bathymetry between the two surveys does agree; i.e., that this fjord is deep and very steep walled. This survey produced a much better delineation of bottom features mostly because of the density of soundings on this survey being about 45 times that of the 1889 survey; and in Ford's Terror, the density of soundings inked on the smooth sheet is nearly 75 times that of the old survey. Also the geographical (true) position of the area has been much better defined this year as a new horizontal network was extended into the fjord. Control on the old survey was most likely done by sextant triangulation, which, although yielding good relative position of soundings with respect to the shoreline, tends to increase in error the further the net is extended into the fjord. Thus, if the shoreline from the old survey would be compared to the new survey, one would see quite readily that they are not in the same geographical place. It should be quite clear that the data from the present survey is much more accurate and denser than the prior survey. ✓

Comparison of this survey with the chart is the same as the comparison with the prior survey as only this one survey has ever been compiled of this area. Another point to note is that the Dawes Glacier has receded more than four nautical miles from the presently charted face which is derived from the 1889 survey. Also, the Brown Glacier in the northeastern end of Ford's Terror has receded out of sight as viewed from the water. Thus, the first hydrography ✓

of these newly exposed areas was completed this year. Because of the danger of surveying in the proximity of large glacier fronts, the hydrography stops short of the actual water limits of Endicott Arm.

L. COMPARISON WITH THE CHART

Since only one survey has ever been made of this region, the comparison with the prior survey in Section K should be referred to. The rocks reported at the constriction in Ford's Terror have been discussed under Section K also. The chart that includes this part of Endicott Arm and Ford's Terror is Etolin Island to Midway Islands including Summer Strait, #17630 (C&GS 8201), 19th Ed., dated March 2, 1974, at a scale of 1:217,828, more than 10 times smaller a scale than the boatsheet scale.

M. ADEQUACY OF THE SURVEY

This survey is complete and adequate and should supersede prior surveys for charting purposes. One area of the survey is sub-standard with respect to the tidal datum. This again is the constriction in Ford's Terror where phenomenal currents are generated. Refer to Section Q, Recommendations, for suggested tidal zoning of this area. The predicted tides for Sanford Cove, Endicott Arm, were used for all the soundings in Ford's Terror. As can be seen from the tide notes, the tides north of the constriction are radically different from those in Endicott Arm. All the fathograms were scanned, and the appropriate peaks and deeps were added to the original records, as well as the smooth printouts and tapes.

N. AIDS TO NAVIGATION

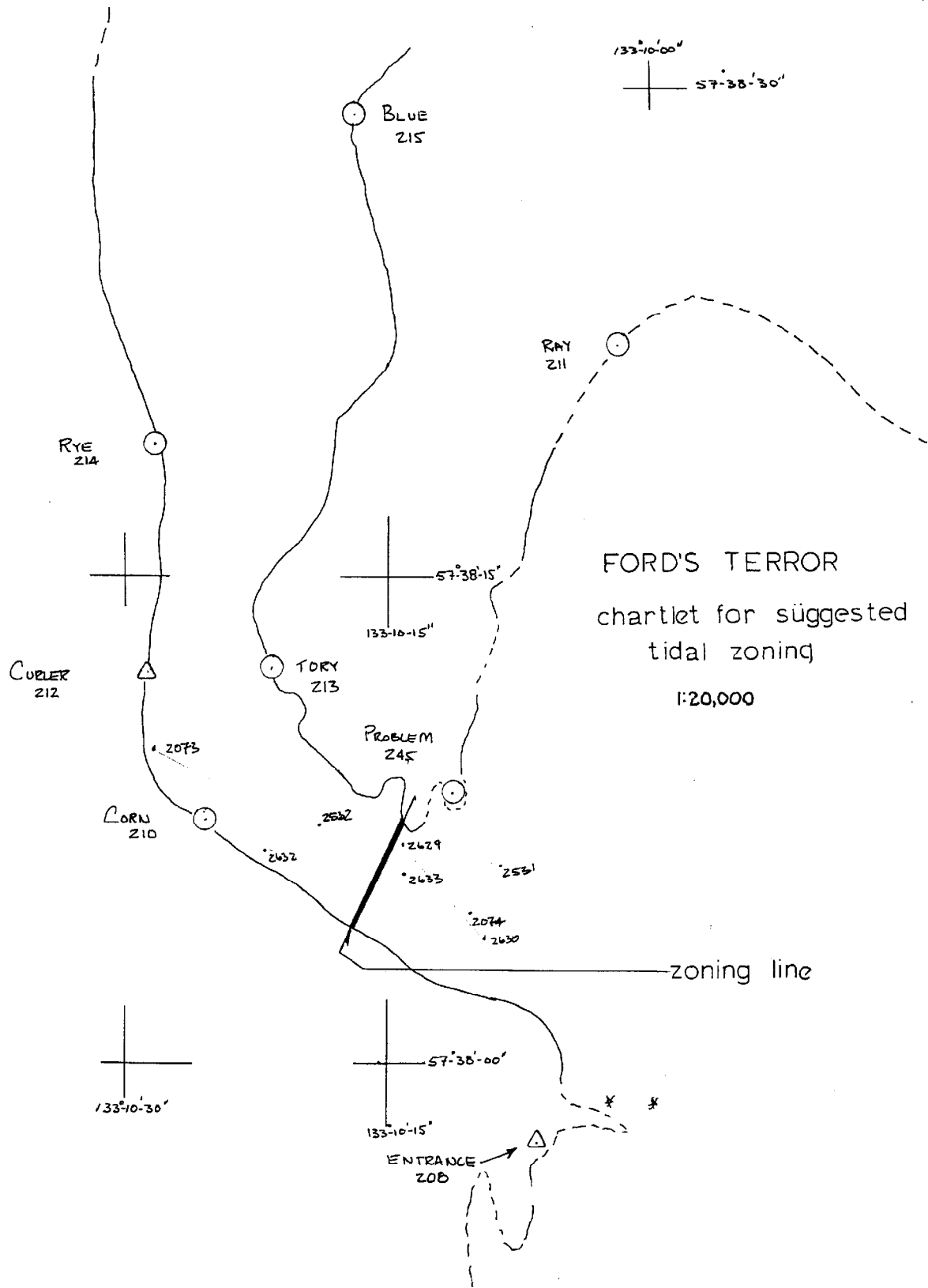
There are no aids to navigation located on this sheet.

O. STATISTICS

	<u>Nautical Miles</u>	<u>Positions</u>
Launch DA-1	175.3	770
Launch DA-2	38.3	427

P. MISCELLANEOUS

The constriction in Ford's Terror presents certain problems with respect to tidal zoning of this minor fjord. Refer to the two articles in the appendix under tides for an explanation. What I would like to suggest here is the logical method of tidal zoning of the fjord. This constriction lies in the area of signals 245, 210, 212, and 213, which are all shown on the attached chartlet at the scale of 1:5,000. Also on this chartlet, one will find the position numbers of the hydrolines that penetrated this area. Of these lines the positions 2073 and 2074 from Launch DA-2 represent



the best bottom profile that was obtained. A heavy black line has been drawn southwest of signal 245 which is the exact position where a rock ledge runs across the channel, and it is here that the break in tidal zoning should occur. All soundings inside the Terror would be reduced according to the actual tides as recorded by the Ford's Terror Tide Gage, and all the soundings outside this line (to the east) should be reduced from the data from the Endicott Arm Tide Gages. ✓

Even by applying the tidal reductions in this manner, errors in the actual reducers are quite possible. During a flood, tide water cannot get through the constriction and will literally pile up in the vicinity of signal 211. This can be proven from observers who saw water cascading over rocks just north of signal 245 on a full spring flood tide. Differences in this spot have been seen up to about 6 feet. Thus the water level due east of this ledge denoted by the line is anybody's guess as to height. Furthermore, during the ebb tide, the water roars out (southeasterly) and at the lower tides, a large standing wave appears at this ledge with a curling top. Also, during the ebb, the water will roar over the rocks just north of signal number 245, dropping down 6 feet at times to the pool below. It is with these reasons that the ledge which is drawn should be the logical break in the tidal zoning. It should be noted, however, that hydrography in this cut was conducted during periods of relatively slack current. ✓

Because of the congestion of soundings and positions in two narrow places on this sheet, enlargements were made at the scale of 1,500. These are drawn on the Ford's Terror overlays with their respective control also plotted, although some stations are outside the borders of these inserts. The following latitudes and longitudes are listed here for ease in computer plotting of these enlargements: ✓

See Verifiers report item I

Enlargement at the entrance to the northeast fork of the head of the fiord:

Lower left	57° 41' 15"	133° 08' 30"
Lower right	57° 41' 15"	133° 07' 45"
Upper left	57° 41' 30"	133° 07' 30"
Upper right	57° 41' 30"	133° 07' 45"

Enlargement at the constriction to the fiord:

Lower left	57° 37' 45"	133° 11' 00"
Lower right	57° 45' 45"	133° 09' 30"
Upper left	57° 38' 30"	133° 11' 00"
Upper right	57° 38' 30"	133° 09' 30"

Q. RECOMMENDATIONS

There are three recommendations I wish to offer with regards to this survey:

1. A manuscript should be made from the photographs submitted and then compared to the shoreline that was compiled in the field. Refer to the Field Edit Report in the appendix of this report. An objective evaluation should be made of these photographs. ✓
2. A careful examination is necessary with respect to the tides, especially in Ford's Terror. The full aspect of this has been covered elsewhere, but possibly a note should be included on the nautical chart pertaining to the dangerous currents in Ford's Terror. ✓
3. The smooth sheet will contain three inserts, a 1:10,000 of Ford's Terror, a 1:5,000 of the southern constriction in Ford's Terror, and a 1:5,000 of the constriction in the entrance to the northeastern part of Ford's Terror. All inserts can be plotted on a standard size boatsheet, including all of H-9482. The final nautical chart should at least show an enlargement of the constriction in Ford's Terror. ✓ *See previous report item I*

Submitted by:

John L. Oswald

John L. Oswald
LTjg, NOAA

FIELD TIDE NOTE

OPR-999-DA-74

ENDICOTT ARM AND FORDS TERROR

CONTROL GAGE: Juneau, Alaska
 PREDICTED TIDES: Wood Spit, Holkam Bay
 TIME OF ALL DATA: 0000 GMT
 LOCAL TIME: Pacific Daylight Time, +7 hours on GMT

Predicted tides of Wood Spit, Holkam Bay, were applied as tide correctors to soundings. These tides were obtained from the PDP8/e computer aboard the NOAA Ship FAIRWEATHER, using program AM500.

There is a total of three (3) tide gages operating in Endicott Arm.

SANFORD COVE

N 57° 40.8'
 133° ~~48.3~~^{48.8} W
 28.4

Bristol Bubbler
 S/N 73A233

This bubbler began operation on 9 Aug 74, and good traces have been recorded with this gage. No serious problems have occurred at this station. One three-day week-end period was lost when the gage ran down (17, 18, 19 AUG). However, no hydro was run on these days.

UPPER ENDICOTT

N 57° 30.8⁸
 133° ~~05.0~~^{05.0} W
 4.5

Bristol Bubbler
 S/N 64A11033

This bubbler began operation on 15 AUG 74. The problems encountered at this gage were: large ice floes moving the orifice once; large icebergs destroying orifice

and anchor, and recording pen mysteriously lifting off the marigram and losing trace, then returning, causing loss of several hours of trace. On 6 SEP 74 a new pen adjustment was tried which cured the pen lifting problem. On 9 SEP 74 a new anchor and orifice were installed in a new, more protected site. This cured the ice problems. Also, new recording paper was installed to correct for a misprint on the paper on 7 SEP 74. The bubbler recorded problem-free traces after 9 SEPT 74.

FORDS TERROR

N 57° 41.4²
 133° ~~08.4~~^{08.5} W

Bristol Bubbler
 S/N 73A234

This bubbler began operation 7 SEP 74, and good traces were recorded at this gage. No serious problems occurred at this gage; however, a

slightly slow clock has made scanning of the marigram more tedious than usual. Gage was removed on 10 Oct 74, a last minute decision in order to obtain an extra week's data.

LEVELS

The staff at SANFORD COVE was leveled to five existing benchmarks, while the staff at UPPER ENDICOTT and tape staff in Fords Terror were leveled to five new benchmarks established at each station. The SANFORD COVE benchmarks were all recovered in good condition. A summary of before and after leveling and results are as follows:

<u>SANFORD COVE</u>	ELEVATION OF BENCHMARK ABOVE ZERO OF STAFF		
	<u>9 AUG 74</u>	<u>26 SEP 74</u>	<u>DIFFERENCE</u>
BM #1	13.607 ft	13.608 ft	+0.001 ft
BM #2	14.270 ft	14.270 ft	0.000 ft
BM #3	16.504 ft	16.502 ft	-0.002 ft
BM #4	15.846 ft	15.850 ft	+0.004 ft
CLOT 1927	16.617 ft	16.616 ft	-0.001 ft

There appears to have been no appreciable movement of the SANFORD COVE tide staff.

UPPER ENDICOTT

	ELEVATION OF BENCHMARK ABOVE ZERO OF TIDE STAFF		
	<u>15 AUG 74</u>	<u>26 SEP 74</u>	<u>DIFFERENCE</u>
BM #1	17.830 ft	17.845 ft	+0.015 ft
BM #2	21.256 ft	21.269 ft	+0.013 ft
BM #3	21.129 ft	21.141 ft	+0.012 ft
BM #4	19.924 ft	19.936 ft	+0.012 ft
BM #5	20.486 ft	20.495 ft	+0.009 ft

There was some slight settling of the staff at the UPPER ENDICOTT tide station (a positive increase in the height of benchmark indicates a downward settling of the staff - average here +0.012 ft).

FORDS TERROR

	ELEVATION OF BENCHMARK ABOVE ZERO OF TIDE STAFF		
	<u>7 SEP 74</u>	<u>26 SEP 74</u>	<u>DIFFERENCE</u>
BM #1	5.380 ft	5.381 ft	+0.001 ft
BM #2	4.916 ft	4.915 ft	+0.001 ft
BM #3	2.315 ft	2.319 ft	+0.004 ft
BM #4	1.448 ft	1.446 ft	+0.002 ft
BM #5	1.264 ft	1.249 ft	-0.015 ft

A slight settling appears at this gage, if in fact there was any at all. The odd difference for Benchmark Five is puzzling; the odd number is probably due to a field leveling error.

RECOMMENDATIONS

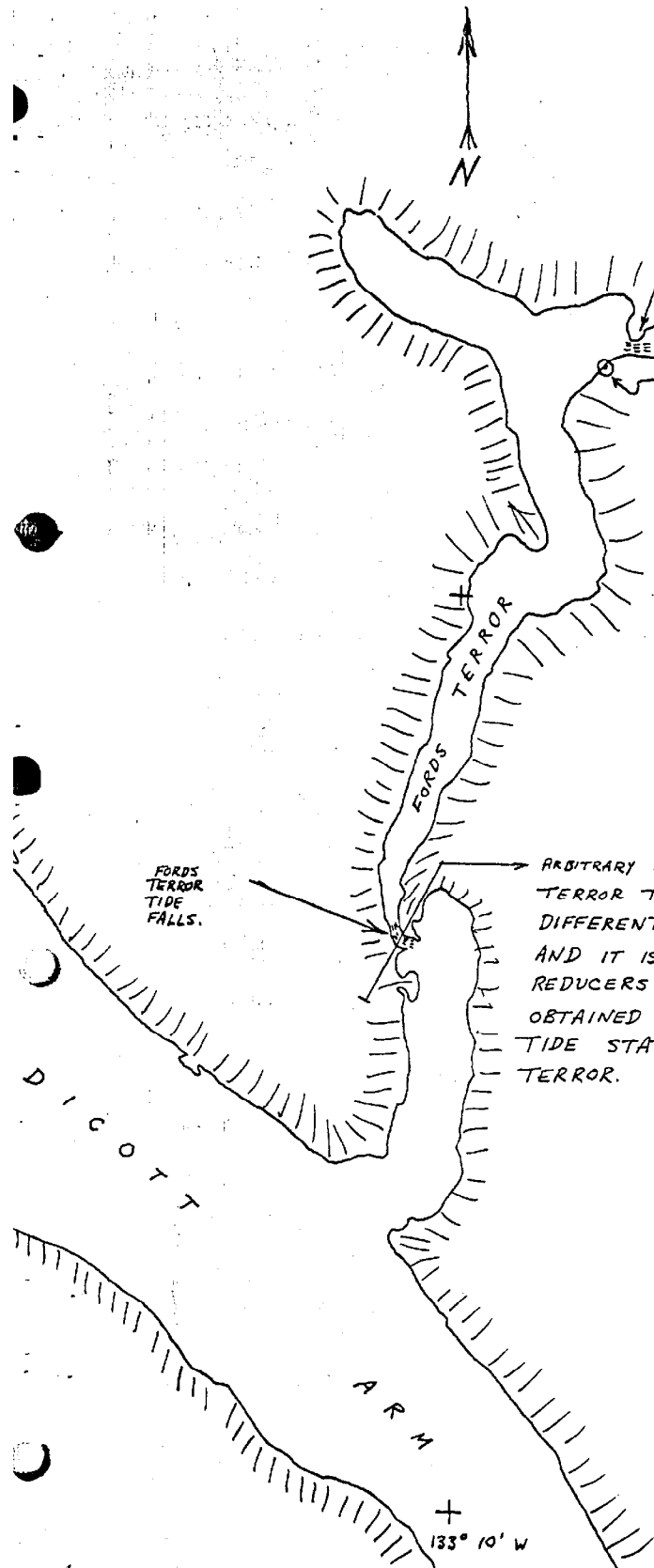
Sanford Cove tides be used on sheet H-9395 (DA-20-4-74). Fords Terror tides be used for obtaining tide reducers inside Fords Terror, behind the rapids.*

Upper Endicott tides be used for obtaining tide reducers on sheet H-9396 (DA-20-6-74). But, also recommend that no Upper Endicott tides be used before 9 SEPT 74, because of the difficulties occurring at that gage before that date.

ADDITION INFORMATION FORDS TERROR

A strong current was observed at the opening of the northeast arm of Fords Terror. It is suspected that a different tidal datum could possibly exist in this arm, even though this constriction was not nearly as restrictive as at the mouth of Fords Terror. This current was observed to reverse its direction with tidal changes, although no tidal falls were seen to exist here.

* See next page for diagram and explanation.



STRONG CURRENT WAS OBSERVED HERE ALSO BUT NOT AS STRONG AS CURRENT AT MOUTH OF FJORD TO THE SOUTH. STILL THE POSSIBILITY EXISTS FOR ANOTHER DIFFERENT TIDAL DATUM PLANE IN THE NE. ARM BEHIND THIS CONSTRICTION

FORDS TERROR TIDE GAGE

FORDS TERROR TIDE FALLS.

ARBITRARY LINE DRAWN THRU FORDS TERROR TIDE FALLS, BEHIND WHICH DIFFERENT TIDAL DATUM EXISTS; AND IT IS RECOMMENDED THAT TIDE REDUCERS INSIDE OF THIS LINE BE OBTAINED FROM THE FORDS TERROR TIDE STATION FOR H-9396 FORDS TERROR.

+ 57° 40' N

+ 133° 10' W

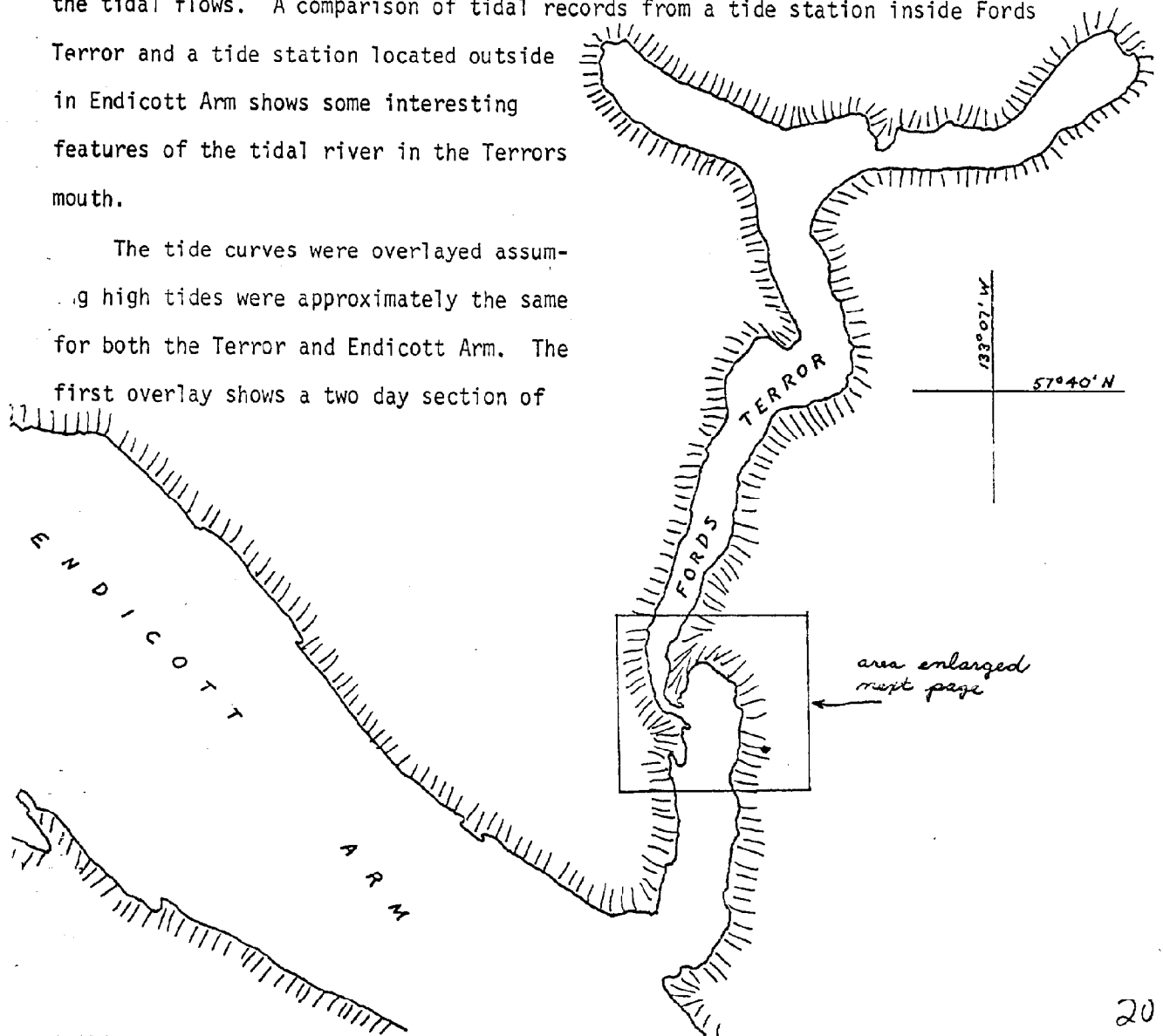
+ 57° 35' N
133° 05' W



FORDS TERROR'S REVERSIBLE RIVER

Fords Terror is a small T-shaped six mile fjord connected to a larger twenty mile long saltwater arm. This is Endicott Arm and is situated about sixty miles southeast of Juneau along Alaska's very scenic Inside Passage. Fords Terror is a deep fjord connected to Endicott Arm by a narrow shallow sill. Thru this channel a very high velocity saltwater river races regularly, changing its direction with the tidal flows. A comparison of tidal records from a tide station inside Fords Terror and a tide station located outside in Endicott Arm shows some interesting features of the tidal river in the Terrors mouth.

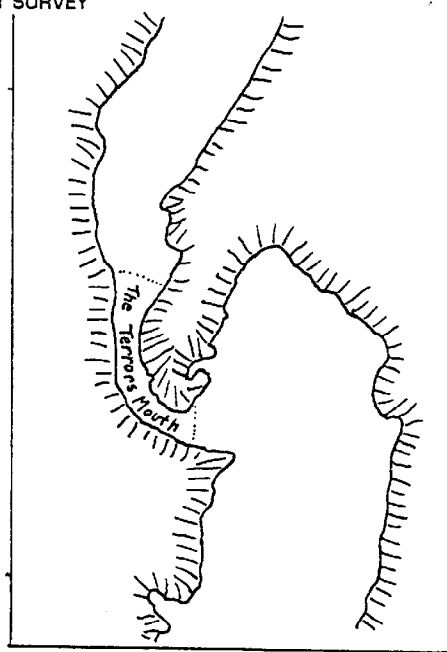
The tide curves were overlayed assuming high tides were approximately the same for both the Terror and Endicott Arm. The first overlay shows a two day section of





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spring tides overlaid. During the springs the comparison shows high tide in Fords Terror to follow the Sanford Cove high by about thirty minutes. The high slack lasts only a few minutes and observations of the Terrors mouth indicate no real slack water merely a quick current direction change with the current less than one knot. As the tide falls the water level outside the Terror drops faster than the Terror can discharge water. This develops



a maximum tidal seawaterfall of approximately seven feet in this comparison. The tide continues to fall in Fords Terror until the outside waterlevel again overtakes it this time rising. As the water level outside rises past the Terrors water level, low slack occurs and the tide inside floods. Low slack in Fords Terror lags low tide outside by approximately two hours, and similar to the high slack lasts only a few minutes. Flooding occurs much quicker inside as the cross sectional area available for flooding the Terror increases with an outside rise in waterlevel, although the comparison of the two curves shows that the tide falls in the mouth also occur during flood. Maximum flood shows a five foot drop in the water level across Fords Terrors mouth. Observations of these maximum flood and ebb currents verify the sharp water level drop. This drop is indicated by the marigrams traces along with the high velocity saltwater current, large standing waves behind the falls, and dangerous whirlpools in the twisted thin inlet to Fords Terror.

The second trace comparisons shows a two day section of neap tides from the same two gages located both inside and outside Fords Terror. The same pattern of



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tidal relationships is shown as was found for spring tides although not as pronounced. The high tides inside occur at approximately the same time as the highs in Sanford Cove. The time duration of high slack is much longer than during the springs for the Terror. During ebb, outside waterlevels still drop faster than the Terror can discharge water forming again the high velocity current of water dropping out into Endicott Arm. The low in Fords Terror again doesn't occur until the outside flooding tide stops the discharge and reverses its direction.

Low slack occurs much more quickly after Sanford Coves' during the neaps, sometimes as quickly as thirty minutes later. The incoming flood again creates a flood current strongly pushing water into Fords Terror. Observations of the neap tides flowing through the Terrors mouth showed very strong current existing but with no large standing waves or tidal waterfalls.

Submitted:

Approved:

David J. Tennesen

Michael H. Fleming

David J. Tennesen
Design NOAA

Michael H. Fleming
Commanding Officer
NOAA Ship DAVIDSON CSS-31

Survey No.
H-9482
DA-20-5-74
 Name on Survey

	On Chart No. 8201	On Previous No.	On U. S. Que Maps	From local information	On local Ma.	P. O. Guide	Rand Mch.	U. S. Ligh.	
	A	B	C	D	E	F	G	H	K
Endicott Arm	*		*	*	*				1
<i>geographic</i> <i>CEH</i> Ford's Terror	*		*	*	*				2
									3
									4
Dawes Glacier	*		*	*	*				5
									6
									7
									8
									9
NOTE:									10
No research was done for a geographic names									11
investigation during this survey. The names listed									12
above are the only names on the nautical chart									13
thus they should be retained as there is no									14
question as to their validity. I would like to									15
point out further that other names have been									16
applied to this area by early explorers, namely									17
John Muir and a traveling companion Dr. Young.									18
They gave names to many of the features in Ford's Terror									19
and Endicott Arm none of which are in common use today.									20
* Since this whole area will be contained in a proposed									21
Wilderness Area, a careful look into the early names									22
in this area might be justified. In the years to									23
come this fjord will be in the public spotlight									24
as one of the most remarkable natural areas									25
in all of southeastern Alaska.....									26
* BGN has a policy of <u>not</u> naming geographic						J.L.Oswald			27
features in a Wilderness Area except in special									28
cases. CEH									29
						APPROVED			30
						<i>Chas. E. Harrington</i>			31
						CHIEF GEOGRAPHER - C378			32
						2 Dec 1978			33

(23)

- 33 -

VELOCITY CORRECTIONS..TAPE PRINTOUT

H-9482..Endicott Arm and Ford's Terror

Launches DA-1 and DA-2

31323474

.002000 0 1001 0001 000 000000 000000

The above corrector of -.1 was not applied to
H-9482 smooth sheet see item I verification
report

J. Stuyvesant

STATION LIST
 H-9396
 ENDICOTT ARM (EASTERN PART)
 OPR-999, 1974

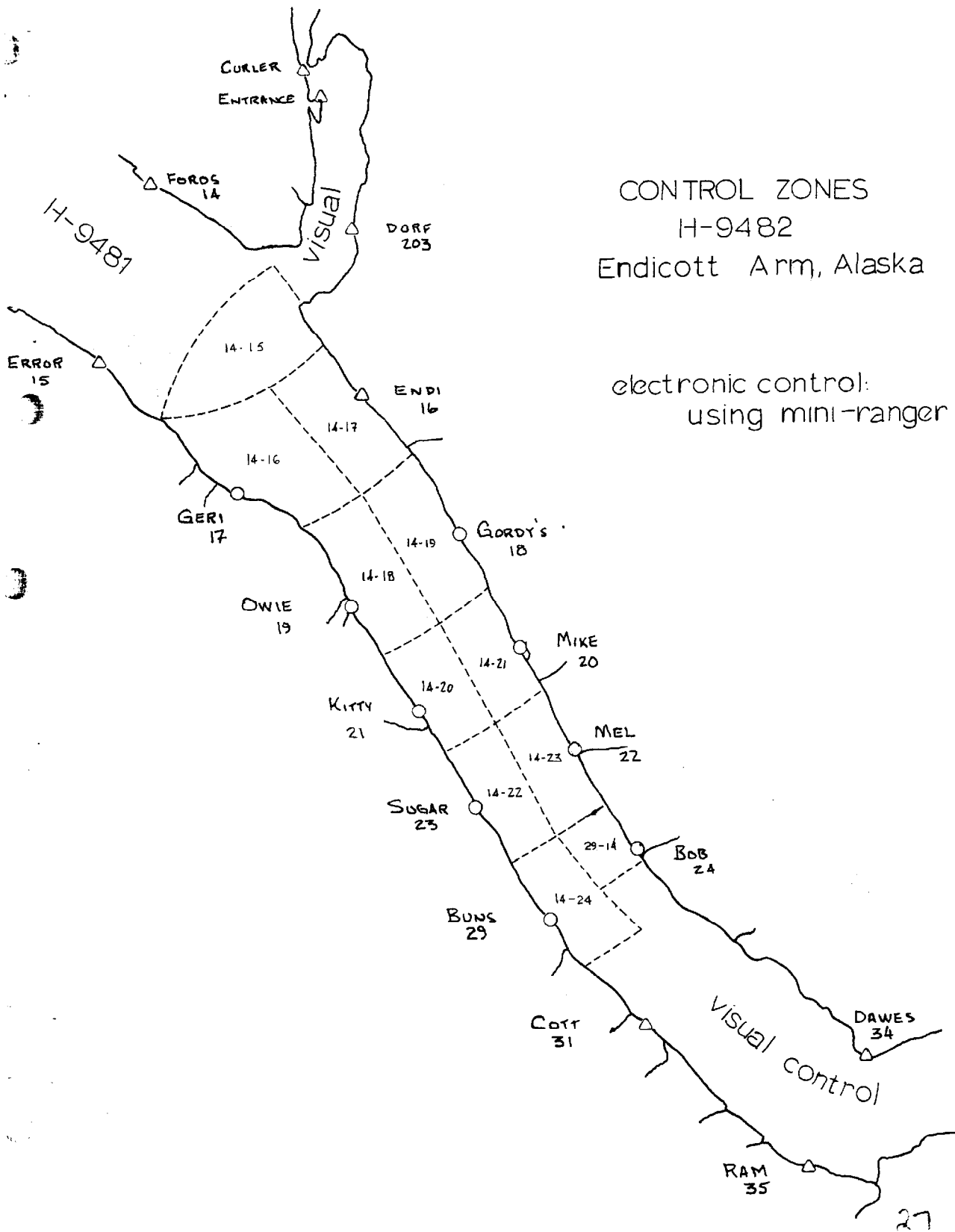
STA	LATITUDE	LONGITUDE	CRT	ELEV	F. HKZ	TYPE/NAME	SOURCE
014	37 19.891	12 37.502	250	0002	149835	FORDS	
015	36 03.199	13 04.757	250	0003	149835	ERROR	
016	35 52.007	09 50.824	250	0003	149835	ENDI	
017	35 10.880	11 15.905	254	0002	149835	Geri	
018	34 53.742	08 31.590	254	0002	149835	Gordy's	
019	34 22.924	07 51.910	254	0002	149835	Owie	
020	34 07.660	07 43.140	254	0003	149835	Mike	
021	33 42.397	09 03.915	254	0002	149835	Kitty	
022	33 28.661	07 02.308	254	0002	149835	Mel	
023	33 05.303	08 19.794	254	0003	149835	Sugar	
024	32 42.865	06 07.474	254	0003	149835	Bob	
028	32 14.861	05 05.641	254	0003	149835	Dan	
029	32 18.879	07 26.133	254	0003	149835	Buns	
030	32 02.335	04 22.010	243	0002	000000	John	
031	31 22.532	05 38.622	139	0002	000000	COTT	
032	31 43.610	03 47.240	243	0002	000000	Swat	
033	30 59.753	05 01.140	243	0001	000000	Staff	
034	31 20.604	03 10.544	139	0002	000000	DAWES	
035	30 34.227	04 01.167	139	0001	000000	RAM	
036	31 31.811	02 23.814	243	0003	000000	Roger	
037	30 30.172	03 15.735	243	0002	000000	Knute	
038	31 43.994	01 31.879	243	0002	000000	Ortho	
039	30 50.245	02 15.636	243	0003	000000	Dave	
040	32 00.593	00 43.649	243	0002	000000	Clase	
041	32 52.414	01 05.959	243	0003	000000	Wes	
042	32 12.951	00 27.033	243	0001	000000	Bio	
043	30 44.764	00 24.056	243	0001	000000	Randy	
044	32 19.504	59 52.424	243	0002	000000	Del ta	
045	30 25.743	59 54.063	243	0001	000000	Greg	

1 of 2

25

STA	LATITUDE	LONGITUDE	CRT	ELEV	F. HKZ	TYPE/NAME	SOURCE
'046	57 32	01.352	243	0002	000000	Feld	
'047	57 30	21.941	243	0003	000000	Tosh	
'048	57 31	46.610	243	0000	000000	Spar	
'049	57 30	03.827	243	0001	000000	Ward	
'050	57 31	37.890	243	0002	000000	Plagio	
'051	57 29	54.154	243	0002	000000	Fred	
'052	57 31	29.486	243	0003	000000	Horn	
'053	57 29	58.483	243	0003	000000	Keith	
'054	57 31	25.576	243	0002	000000	Blende	
'055	57 29	49.813	243	0002	000000	Nasty	
'056	57 31	22.459	243	0001	000000	Quartz	
'058	57 30	56.690	243	0002	000000	Viki	
'060	57 30	56.250	243	0001	000000	Erika	
'062	57 30	45.319	243	0002	000000	Swede	
'064	57 30	29.889	139	0005	000000	ARF	
'068	57 30	41.871	243	0002	000000	Rust	
'070	57 30	28.219	132	0001	000000	Chills	
'072	57 30	34.009	252	0002	000000	Ice	
'074	57 30	25.395	132	0001	000000	Glacier	

26



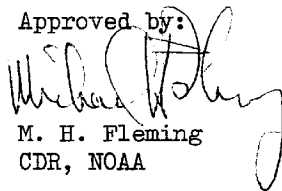
CONTROL ZONES
H-9482
Endicott Arm, Alaska

electronic control:
using mini-ranger

APPROVAL SHEET

This survey was done under my command, and frequent examinations were made of the smooth sheet and all field records. This survey is complete as submitted.

Approved by:

A handwritten signature in cursive script, appearing to read "Michael Fleming".

M. H. Fleming
CDR, NOAA

2/7/75

U.S. DEPARTMENT OF COMMERCE
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NATIONAL OCEAN SURVEY

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for Form 362
Sanford Cove
Tide Station Used (NOAA Form 77-12): Fords Terror
Endicott Arm
Period: August 9 - October 8, 1974

HYDROGRAPHIC SHEET: ~~H-9396~~ H 9482

OPR: 999

Locality: Endicott Arm, Alaska 7.2 ft. (Sanford Cove)
7.2 ft. (Fords Terror)
Plane of reference (mean lower low water): 3.1 ft. (Endicott Arm)
6.9 ft. (" ") *
Height of Mean High Water above Plane of Reference is
15.0 (Sanford Cove & Endicott Arm)
12.8 (Fords Terror)

Remarks: Recommended zoning:

- (1) In Endicott Arm, south to $133^{\circ}10'$ direct on Sanford Cove.
- (2) South of $133^{\circ}10'$ in Endicott Arm direct on Endicott Arm including the mouth of Fords Terror Fjord from approximately $56^{\circ}34'$ to $56^{\circ}36'$.
- (3) Approximately $56^{\circ}36'$ - $56^{\circ}38'$ apply the following corrections to Fords Terror gage:
-15 min. and x1.10 range ratio.
- (4) Above $56^{\circ}38'$ zone direct on Fords Terror.

James R. Hubbard
Chief, Tides Branch

* From Day 252 1800 till end of run. Per telegram
Stony/Green 4/24/78

HYDROGRAPHIC SURVEY STATISTICS

H-9482

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		2	BOAT SHEETS & PRELIMINARY OVERLAYS ^{4-POS} 2- <i>cm.</i> 4- <i>Boat Sheets</i> & 6- <i>prelim. overlays</i>		* 10
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS ^{4-POS} 4- <i>ARC'S</i>		15 8
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS
ENVELOPES			18		ABSTRACTS/ SOURCE DOCUMENTS <i>credit & photos</i>
CAHIERS	2 with P.O.'s & photos.				
VOLUMES	7				
BOXES			1 box of raw data & field corrected P.O.'s		

T-SHEET PRINTS (List)

SPECIAL REPORTS (List) Corrections to Echo Sounders H-9482

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	PRE-VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			2412
POSITIONS CHECKED		2412	
POSITIONS REVISED		115	
SOUNDINGS REVISED		476	
SOUNDINGS ERRONEOUSLY SPACED			
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED			
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	13		
VERIFICATION OF CONTROL		8	
VERIFICATION OF POSITIONS		64	
VERIFICATION OF SOUNDINGS		191	
COMPILATION OF SMOOTH SHEET		91	
APPLICATION OF TOPOGRAPHY		-	
APPLICATION OF PHOTOBATHYMETRY		-	
JUNCTIONS		3	
COMPARISON WITH PRIOR SURVEYS & CHARTS		6	
VERIFIER'S REPORT		21	
OTHER			
TOTALS	13	384	
Pre-Verification by R.D. Lynn	Beginning Date 2/14/75	Ending Date 2/14/75	
Verification by James L. Stringham	Beginning Date 2/14/78	Ending Date 7/31/78	
Verification Check by Stanley H. Otsubo & James S. Green	Time (Hours) 61	Date 8/1/78	
Marine Center Inspection by HIT	Time (Hours) 15	Date 9/8/78	
Quality Control Inspection by R.W. Wellman	Time (Hours) 56	Date 11-24-78	
Requirements Evaluation by J. Baumgardner	Time (Hours) 2	Date 12/20/78	

Carstens - 12/16/78

REGISTRY NO. _____

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY NO. H-9482a and b

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO: H-9482 a and H-9482 b
Upper Portion, and
Alaska, Endicott Arm, Fords Terror

FIELD NO: DA-20-5-74

SURVEYED: September 10 to October 7, 1974

SCALE: 1:10,000
1:20,000

PROJECT NO: OPR-999

SOUNDINGS: Ross Fineline

CONTROL: Range-Range
Mini-Ranger
Visual

Chief of Party.....CDR M.H. Fleming
Surveyed by.....LTJG J.L. Oswald, LTJG R.W. Mercer,
LTJG D.S. Eilers, LT R.D. Hopkins,
ENS D.J. Tennesen and ENS J.D. Sarb
Automated plot by.....Xynetics Plotter (PMC)
Verified by.....James L. Stringham
July 31, 1978

I. INTRODUCTION

H-9482, 1974 is a navigable area survey conducted from September 10 to October 7, 1974 by the NOAA Ship DAVIDSON. The area surveyed was ~~lower~~ ^{upper} Endicott Arm and Fords Terror, Alaska. The ~~lower~~ Endicott Arm sheet, denoted as H-9482A₂ is plotted at 1:20,000 scale and Fords Terror, denoted as H-9482B₂ is plotted on a separate 1:10,000 sheet.

The smooth sheet does not display either of the enlargements plotted on the boatsheet at the following coordinates; Latitude 57°38.1'N, Longitude 133°10.5'W and Latitude 57°41.35'N, Longitude 133°08.2'W.

A 1:2,500 scale paper plot was made at PMC of the first area with all soundings plotted. The line of soundings from position 2632 to 2633 at Lat. 57°38'06.11"N and Long. 133°10'31.88"W supports the two fathom curve as drawn thru the constricted area. This line of hydrography disproves the depth curves displayed on the 1:5,000 boatsheet enlargement drawn from the least depths. The 1:2,500 enlargement is folded and stored in the 1:10,000 survey (H-9482B) accordion file.

The constricted area at Lat. 57°41.35'N, Long. 133°08.2'W was handled with two PPO plots and verified at scale of 1:10,000.

The smooth boatsheet soundings were reduced using predicted tides from Wood Spit and Holkam Bay, Alaska. (See Ship's Field Tide Note) The smooth sheet soundings were reduced using the following gages SANFORD COVE, FORDS TERROR and ENDICOTT ARM and four tide zones (see smooth printout for ratios and location of tide zones).

All correctors used to plot and reduce soundings on H-9482 can be located in the smooth printout and are as submitted by the Ship DAVIDSON except the velocity corrector. A velocity corrector of 0 was used for all depths instead of the -.1 recommended by the ship. A review of the data indicates that the velocity corrector should have been 0 to 8 fathoms, -.1 to 20 fathoms and beyond 20 fathoms, it is negligible being less than 1/2 of 1% of the depth. Therefore, the smooth sheets are .1 fathom deeper than they should be in depths of 8 to 20 fathoms. This discrepancy was not discovered until the smooth sheet was plotted and was a result of changes to the data file after the initial corrective action had been accomplished. The discrepancy of .1 fathom is deemed not significant for either sheet in view of the bottom configuration and general depths in the area.

II. CONTROL AND SHORELINE

Horizontal control and shoreline are adequately described in ship's report under items F, G, and H.

The shoreline displayed on H-1999, 1889 north of Lat. 57°37'00"N, is not in agreement with the apparent shoreline indicated by H-9482^{B, b}. H-1889 water area is approximately 50 to 150 meters west of H-9482^{B, b} scale 1:40,000. The scale difference between the chart and H-9482^{B, b} is 21X but it appears that H-9482 agrees with charted water area. The shoreline south of Lat. 57°37'00" agrees very well with H-9482^{A-B, 2 and b}.

Shoreline is not shown on the smooth sheets. Although the ship delineated a shoreline on the field sheet from detached positions and descriptive notes, this data was not deemed sufficiently accurate for smooth sheet use. These shoreline delineation detached positions are plotted on the second PPO and maybe of some value if no other source of the shoreline is available. The need for photography and photogrammetric compilation of the shoreline is apparent. (See S.C. Report - item 2)

The Mini-Ranger control for the north part of the 1:20,000 sheet appears to be in very good agreement with shoreline and visual hydrography.

III. HYDROGRAPHY

Crosslines are generally in good agreement within two to eight tenths of a fathom over most of the survey.

Standard depth curves were adequately drawn except in areas of steep slope. In these congested areas, the shoalest depth curve is shown and the next depth curve that can be accurately drawn through the area.

Basic hydrography is adequate to delineate bottom configurations and determine least depths.

IV. CONDITION OF SURVEY

With the following exceptions, the hydrographic records, overlays, smooth sheet and reports are adequate and conform to the requirements of the Hydrographic Manual.

A. H-9482B^b; Fords Terror, the 1:10,000 scale sheet, had many detached positions with inadequate descriptive notes, most noticeable was day 280, position number 4004 thru 4052. The above positions were plotted on the second PPO to preserve the position data. No information was shown for the data, because of the lack of raw descriptive notes.

B. The tide coverage appears to be accurate to within three tenths of a fathom at Lat. 57°38'15"N. A tide gage was needed just south of the constriction at approximate Lat. 57°38.1'N and Long. 133°10.5'W for zoning the 1:10,000 sheet more accurately. Because of the distance between tide gages and apparent realization of the tide complexity, the hydrography between Lat. 57°37'30"N to Lat. 57°38'25"N should have been accomplished at the high water slack to reduce the zoning problem caused by using one gage. See Ship's Report, Item K, first paragraph and Item P, Miscellaneous Section for detailed description of the problem.

V. JUNCTIONS

This survey junctions to the west with H-9481, 1:20,000 (1974). Soundings and depth curves are in fair agreement. A small adjustment to the ends of the penciled curve on H-9481 will have to be made before curve is inked. The junction note and curves are inked on H-9482.

VI. COMPARISON WITH PRIOR SURVEYS

H-1999 (1889) 1:40,000

(See Q.C. Report - item 4)

Soundings on H-9482A^a, 1:20,000 scale, are generally 2 to 20 fathoms deeper in soundings between 50 to 185 fathoms in ~~Lower~~ Endicott Arm.

Upper

Soundings on H-9482B^b, 1:10,000 scale, are generally 2 to 10 fathoms deeper than soundings on H-1999, 1889.

Due to the vintage of the prior survey and the improvements in the surveying methods, no prior data from H-1999 was transferred to supplement H-9482. H-9482, 1974 is adequate to supersede H-1999, 1889 over common areas of hydrography.

VII. COMPARISON WITH CHART

(See G.C. Report - item 5)
H-9482 was compared to Chart C&GS 8201 (17³⁶20), 19th Edition, March 2, 1974, scale 1:217,828.

The shoreline in the area of Ford's Terror displays close agreement with H-9482 north of Lat. 57°37'00". (Disregard)

PSR #1, a 2 1/2 fathom depth at approximate lat. 57°38.0'N, Long. 133°10.30'W originated with Chart letter No. 914 of 1959. The soundings developed at approximate Lat. 57°38.1'N and Long. 133°10.5'W agrees very well with the reported 2 1/2 fathom depth. There is a difference in the location of the 2 1/2 fathom. The data from this survey should be charted.

There are no controlling depths or aids to navigation located on H-9482 1974.

H-9482 is adequate to supersede charted information, ~~except for the shoreline features.~~ The hydrographic coverage is adequate to produce the 1:40,000 scale chart as mentioned in the Project Instructions.

VIII. COMPLIANCE WITH PROJECT INSTRUCTIONS

This survey adequately complies with Project Instructions, dated May 16, 1974, and the supplement No. 1, dated August 13, 1974.

IX. ADDITIONAL FIELD WORK

This is a good navigational area survey and is considered complete except for the shoreline.

Recommend a Horizontal Control net be established over the survey area and photography be flown to up date the high water line.

Respectfully submitted,

James L. Stringham
James L. Stringham

Cartographic Technician
July 31, 1978

Examined and approved,

James S. Green

James S. Green
Chief, Verification Branch

APPROVAL SHEET

FOR

SURVEY H- 9482

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: 1 Aug 1978

Signed: _____

f. S. [Signature]

Title: Chief, Verification Branch



**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

Pacific Marine Center
1801 Fairview Ave. E.
Seattle, WA 98102

DATE : 8 September 1978
TO : Eugene A. Taylor
Director, Pacific Marine Center
FROM : *Glen R. Schaefer*
Glen R. Schaefer
Chief, Processing Division

SUBJECT: PMC Hydrographic Inspection Team Report for Survey H-9482

This survey is a navigable area hydrographic survey of Fords Terror, Endicott Arm, Alaska. This survey was conducted by NOAA Ship DAVIDSON in 1974 in accordance with Project Instructions OPR-999-DA-74 dated 16 May 1974 and Supplement No. 1 dated 13 August 1974.

The objectives of this survey have been met. The Descriptive Report and Verifier's Report have adequately described the survey. No substantive comments are necessary.

The inspection team finds H-9482 to be a very good navigable area survey adequate to supersede common areas of prior surveys and charted hydrography. Administrative approval is recommended.

Glen R. Schaefer
Glen R. Schaefer

David B. MacFarland Jr.
David B. MacFarland, Jr.

James W. Steensland
James W. Steensland

Stanley H. Otsubo
Stanley H. Otsubo



ADMINISTRATIVE APPROVAL
H-9482

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.

E. A. Taylor

Eugene A. Taylor, RADM
Director
Pacific Marine Center

11 Sept 1978

Date



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C352/KWW

November 24, 1978

TO: *A. J. Patrick*
A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: K. W. Wellman *Kenneth W. Wellman*
Quality Evaluator

SUBJECT: Quality Control Report (Combined) for H-9482a (1974), Alaska,
Endicott Arm, Upper Portion, and H-9482b (1974), Alaska,
Endicott Arm, Fords Terror

Quality Control inspections of H-9482a and b were accomplished to monitor the surveys for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths and navigation hazards, junctions, shoreline transfer, decisions and actions by the verifier, and cartographic presentation of data.

In general, the present surveys were found to conform to National Ocean Survey standards and requirements except as discussed in the Verifier's Report, the HIT Report, and as follows:

1. When hydrographic survey registry numbers are modified by the addition of an alphabetic character, they are customarily shown with a lowercase letter. The title blocks on the two present survey smooth sheets contained capital letters. Appropriate revisions were effected during quality control inspection. In the future, when registry numbers are modified as indicated above, lowercase alphabetic characters should be shown in the title block.
2. The shoreline should have been added to the smooth sheets during verification. It is acknowledged that an extensive shoreline determined by detached positions does not conform to commonly accepted standards of accuracy. Nevertheless, the shoreline determined by the hydrographer comprises the best and most contemporary topographic information available and, as such, should have been delimited by a dashed red line during verification. The approximated shoreline was added to the smooth sheets during quality control inspection.

Section II of the Verifier's Report is supplemented by the following:



The most likely approximation of the shoreline is delimited on the smooth sheets by a red dashed line. In addition, it is noted that the general shoreline is closely approximated by the limits of hydrographic development along the sides of the fjords. Such development in proximity to the shoreline was possible due to the steep bluffs and near vertical walls which generally characterize the topography of the present survey area. No adequate hydrographic determination of the shoreline is provided in the vicinity of latitude $57^{\circ}38.00'$, longitude $133^{\circ}10.30'$ (Fords Terror). This precludes its delineation on H-9482b.

3. During verification, two positions were noted to be plotted in error. The smooth plotted positions placed the associated soundings well up on the steep rock walls comprising the shoreline in the vicinity. Appropriate revisions were effected during quality control inspection.

4. Reference section VI of the Verifier's Report:

The comments included in the referenced section are considered incomplete. It is customary to include comments pertaining to significant changes which have occurred in the area. In addition, a statement regarding the probable cause(s) of any noted changes should also be included. Such comments are not necessarily limited to depth changes only. The referenced section lacks any comments relative to the significant withdrawal of the glaciers in the upper reaches of Endicott Arm and Fords Terror. A 4- to 5-mile retreat of a glacier which exposes depths of as much as 160 fathoms is considered worthy of note.

Section VI of the Verifier's Report is supplemented by the following:

a. Reference comments pertaining to H-9482a:

However, present depths in the upper reaches of Endicott Arm indicate shoaling of 10 fathoms. In addition, the terminus of Dawes Glacier has retreated approximately 4.7 miles from its former position, thereby exposing depths of as much as 160 fathoms. The noted depth differences are attributed to the less detailed and less accurate methods employed on the prior survey and to natural causes.

b. Reference comments pertaining to H-9482b:

However, a few scattered indications of present depths 10 to 13 fathoms shoaler than prior depths were also noted in Fords Terror. In addition, the apparent terminus of a glacier in the easterly arm of upper Fords Terror (as shown on H-1999) has retreated an indeterminate distance. The retreat of the glacier in this area has exposed depths of as much as 34 fathoms as well as the mouth of a river which falls slightly beyond the limits of the present survey development in the area. A spit has developed

in the vicinity of latitude 57°41.40', longitude 133°08.20' and has intruded into the main channel of upper Fords Terror. The narrow channel off the end of the spit has a controlling depth of 0.2 fathom which restricts access to the upper reaches of the fjord. The noted differences and changes are attributed to the less detailed and less accurate methods employed on the prior survey and to natural causes.

5. Reference section VII of the Verifier's Report:

The referenced section does not conform to the accepted format and is lacking any reference to the source of the charted hydrography. Further, the reference to Presurvey Review item 1 is considered unnecessary since the item is adequately discussed in section K of the Descriptive Report. (See the memorandum dated March 21, 1977, from the Office of Marine Surveys and Maps entitled "Verifier's Report Format.") In addition, the comment pertaining to the shoreline is considered misleading and should be disregarded.

Section VII of the Verifier's Report is supplemented by the following:

The charted hydrography originates with the previously discussed prior survey which requires no further consideration and with CL 914 of 1959.

The charted shoreline in the northern section of Fords Terror appears to be displaced approximately 30" of longitude to the west of its present survey delineation.

cc:
C35
C351

NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9482

INSTRUCTIONS

- A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
- 1. Letter all information.
- 2. In "Remarks" column cross out words that do not apply.
- 3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
17360	4/4/79	Raitor	Full Part Before After Verification Review Inspection Signed Via Drawing No. 28 OL A
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