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Form 504 Rev. April 1935	
DEPARTMENT OF COMMERCE U. S. COAST AND GEODETIC SURVEY	
DESCRIPTIVE REPORT	
Topographic Hydrographic	Sheet No. <u>E 1040</u> Reg. No. <u>76758</u>
U. S. COAST & GEODETIC SURVEY LIBRARY AND ARCHIVES JAN 14 1941 Acc. No.	
State <u>SE. Alaska</u>	
LOCALITY	
<u>Glacier Bay</u>	
<u>Muir Inlet. Upper end</u>	
<u>19340</u>	
CHIEF OF PARTY	
<u>Benjamin H. Rigg</u>	

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO.

TOPOGRAPHIC TITLE SHEET

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

Field No. E 1640

76758

REGISTER NO. T-6758

State S.E. Alaska

General locality Glacier Bay

Locality Muir Inlet, upper end

Scale 1:20000 Date of survey July, August, 1940

Vessel WESTDAHL

Chief of party Benjamin H. Rigg

Surveyed by William F. Deane

Inked by William F. Deane

Heights in feet above MHW to ground ~~to tops of trees~~

~~Contours, approximate contours~~ Form line interval 100 feet

Instructions dated March 10, 1938 and April 19,, 1939

Remarks: Form lines to be determined on small scale sheet

DESCRIPTIVE REPORT

to accompany

TOPOGRAPHIC SHEET NUMBER E 40

Reg. No. T 6758

SOUTHEASTERN ALASKA

1940

M. V. WESTDAHL

PROJECT HT-221

INSTRUCTIONS

This survey was made in compliance with the Director's Instructions dated March 10, 1938 and supplemental instructions dated April 19, 1939.

LOCALITY

This sheet covers the area in Muir Inlet from Cushing Arm westward to the face of Cushing Glacier and northward to the face of Muir Glacier.

METHOD OF SURVEY

Standard planetable methods were used and no traverses were run. Resections, three-point fixes, and graphic triangulation were used throughout. Graphic triangulation was resorted to in Cushing Arm where control was scarce and in the upper end of Muir Inlet; artificial and natural objects were used as intersection stations. The faces of Cushing and Muir Glaciers were determined by cuts all taken in each case on the same day.

ELEVATIONS

Elevations were determined from vertical angles with the alidade, and, since trees are scarce in this area, heights are from mean high water to the ground in every case. These elevations were taken to supplement the work on the small scale form line sheet.

GENERAL DESCRIPTION OF THE COAST

The east side of Muir Inlet will be discussed first. The survey started at triangulation station MORaine, 1939 which was built on terminal moraine. This moraine has an irregular profile because of the erosive action of many glacial streams; the vegetation consists of occasional alders. These streams of glacial origin shift their beds from time to time thus making the moraine a mess of water-courses, dry and flowing. To the northward approximately a mile and a half the shore is formed of lateral moraine. This lateral moraine runs at a large angle of repose to heights of 25 to 400 feet and is composed of boulders and gravel with the remains of pre-glacial trees mixed in. In some cases three strata of vegetation were encountered, one of which is the present surface growth of alders.

Just eastward of Muir Island is another terminal moraine that is a repetition of that around station MORaine. This forms the east side of a small bight; the west side is of rock in various stages of erosion. This rocky outcrop continues northward past Muir Island giving way to steep lateral moraine benches before McBride Arm is reached. The benches decrease in height as the head of the arm is approached; there, another terminal moraine is found. This latter is of too recent origin to be cut up by streams as those are to the southward because the glacier is only three hundred meters from the high water line here. McBride Glacier is dead and is not discharging bergs. The north shore of McBride Arm is rocky as is the east side of Muir Inlet for a mile north of the arm. From here to within two hundred meters of the east side of Muir Glacier the shore is made up of frozen lateral moraine benches with small terminal moraine areas at break-throughs. These benches are almost vertical

and occasionally fall with the same effect as a discharged iceberg. Just short of the glacier face is found a rock outcrop that has just been bared by the retreating glacier. The glacier although overhanging the water is almost on land here but continues to discharge bergs in the inlet. Muir Island, just off the east side of Muir Inlet, is a small and rocky mound with steep sides. Some grass is growing in the infrequent earthy places and the island is a rookery for gulls, cormorants, and oyster-catchers. A small bight offers an approach on the south side but no protection from the ice.

On the west side of Muir Inlet conditions are about the same as on the east. From triangulation station CUSHING, 1939, which is on a rocky point, the shore is of lateral moraine as Cushing Arm is entered. Vegetation is sparse here consisting mostly of the hardy alder. This lateral moraine runs back for over a mile giving place to an irregular and steep rocky shoreline which in turn is cut by a gravel terminal moraine of almost all low water extent. At high water bergs are discharged from this section of Cushing Glacier. To the westward of this small terminal moraine is a rocky point that has been recently exposed by the recession of the glacier. Cushing Glacier discharges a large amount of ice although the north portion of the face is almost on land. The north shore of Cushing Arm is steep, rocky, and devoid of vegetation. This rocky shoreline continues on out to the inlet and runs north to a cataract west of Muir Island. This cataract is fed from the glacier just above it and is always filled with white water. A small section of lateral moraine with steep sides is found just north of the cataract, then the outcrop takes over for a quarter of a mile. A terminal moraine is found at the head

of the bight west of triangulation station LAST, 1940. This moraine is not cut with many water-courses for the glacier front is not far from the edge of the water. A rocky point forms the east boundary of the bight giving way to steep lateral moraine about four hundred meters northeast of station LAST. This lateral moraine is overhung by the glacier and gives way to terminal moraine in latitude $59^{\circ} 00'$. Here the glacier, though separated from the water at low tide, occasionally discharges ice. From this moraine northward the shoreline is steep and rocky until the face of Muir Glacier is reached. Icebergs are discharged almost continually here and the topographic party remained very alert while surveying in the vicinity. Muir Glacier is going aground on the east side but the central and west portions of the face are over water. The glacier face is about 200 feet high.

ICE CONDITIONS

Glacial ice is always present in the water areas of this sheet and constitute hazards that sometimes have to be ignored. During the first two months of this season the WESTDAHL attempted unsuccessfully to penetrate further north than Cushing Point. Even small boats could not reach Muir Island because of the thickly packed growlers and bergs. With the coming of Summer the conditions were better and it was possible to reach almost any section by small boat, always taking into consideration that devious routes to objectives had to be followed. Since wind and current effected the ice drift they had to be considered in planning the work for the day. On several occasions the dinghy which the topographic party used was held fast in the ice for long periods.

Swell caused by bergs falling from the glaciers created havoc if

the boats were not watched alertly. Overturning bergs were particularly dangerous for it was not always possible to keep clear of these.

While surveying the east side of Muir Inlet just south of the Muir Glacier the rodmen were continually on watch for huge ice slides that occur over and through the moraine benches. Needless to say, all members of the party were poised for flight most of the time.

OFFLYING DANGERS

A reef baring ³8 feet at mean lower low water was located in Latitude $58^{\circ} 56' 170$ meters N., Longitude $136^{\circ} 09' 920$ meters W.

LANDMARKS FOR CHARTS

Only one landmark was scaled from this sheet and is submitted on Form 567. This landmark is ^{$58^{\circ} 59' 136^{\circ} 06'$} RED CONICAL PEAK. *Chart Letter 702 (1940)*

DECLINATOIRE OBSERVATIONS

Declinatoire No. 209 was used for all observations. This instrument was standardized at Lincoln Park, Seattle on April 1, 1940. The declinatoire variation was $22^{\circ} 54'$ E.; the variation from the chart was ⁽⁶⁴⁵⁰⁾ $23^{\circ} 15'$ E.; the correction to be applied is then $+0^{\circ} 21'$.

Observations

Station	Date	Scaled Value	Corrected Value
Triang. MUIR	July 20	$30^{\circ} 24' E$	$30^{\circ} 45' E$
Hydro. GULL	August 10	$30^{\circ} 22' E$	$30^{\circ} 43' E$
Hydro. GLACIER	July 27	$29^{\circ} 51' E$	$30^{\circ} 12' E$

* This treatment is very approximate but it is obvious that ^{strong} no local attraction is present. H.W.M.

GEOGRAPHIC NAMES

The following new names for features on this sheet are suggested:

- ✓ Muir Island for the island in Latitude $58^{\circ} 57.6'$, Longitude $136^{\circ} 07.3'$ after John Muir, the naturalist, who visited Glacier Bay in 1879 and 1890.
- ✓ McBride Arm for the arm once occupied by McBride Glacier.
- ✓ Cushing Arm for the arm up which Cushing Glacier is retreating.
- ✓ Cushing Point for the point on the south side of the entrance to Cushing Arm after Cushing Glacier.

Local inhabitants both white and native were queried as to names now in use but they could give the party no assistance. This section is probably too recently uncovered to have the various geographic features named. This party suggests the afore-mentioned names because the features referred to justify some designation.

✓ Geographic names will be covered in a special report to contain all names of features surveyed in 1940.

JUNCTIONS WITH OTHER SHEETS

This sheet joins Sheet D 40 (field number) ^{T-6757(1940)} on the south and is limited by the faces of the glaciers to the west and north.

STATISTICS

Shoreline, statute miles.....28.6
Area, square statute miles.....16.0

CONTROL STATIONS

The following triangulation stations appear on this sheet and were used for control of the survey:

LAST, 1940	Lat. 58° 58' 1397.5m., Long. 136° 08' 383.7m.
MUIR, 1940	Lat. 58° 57' 1102.4m., Long. 136° 07' 242.4m.
NOIR, 1940	Lat. 58° 57' 204.6m., Long. 136° 08' 807.4m.
CUSHING, 1939	Lat. 58° 56' 99.2m., Long. 136° 07' 397.3m.
MORaine, 1939	Lat. 58° 55' 754.6m., Long. 136° 03' 358.0m.

The following recoverable stations were marked with standard hydrographic station disks: (*See descriptions on forms 524*)

GULL, 1940	Lat. 59° 01' 314m., Long. 136° 07' 188m.
TERN, 1940	Lat. 59° 00' 340m., Long. 136° 09' 110m.
RAIN, 1940	Lat. 58° 56' 1334m., Long. 136° 04' 910m.
BIRD, 1940	Lat. 58° 56' 1280m., Long. 136° 09' 23m.
ICE, 1940	Lat. 58° 56' 434m., Long. 136° 12' 450m.
GLACIER, 1940	Lat. 58° 55' (248m) , Long. 136° 11' (311m).

Respectfully submitted,

William F. Deane,
Jr. H. & G. E.

Approved:

For

Benjamin H. Rigg, H. & G. E.,
Chief of Party.

A. M. Sobieralski

Officer in Charge,
Seattle Processing Office

Remarks

Decisions

1	Do not ink pending Board decision	585360
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GEOGRAPHIC NAMES

Survey No. **T6758**

GEOGRAPHIC NAMES										
Survey No. T6758										
Name on Survey										
	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		
A,	B,	C,	D,	E,	F,	G,	H,	K,		
Cushing Arm										1
Cushing Point										2
Glacier Bay										3
Mc Bride Arm										4
Muir Inlet										5
Muir Island										6
Cushing Glacier										7
Muir Glacier										8
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McBride Glacier										12
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Names underlined in red approved

by L. Heck on 4/19/41

M 234

Names underlined in red approved
by L. Heck on 2/19/41

MEMORANDUM

IMMEDIATE ATTENTION

SURVEY
DESCRIPTIVE REPORT
PHOTOSTAT OF

~~NO. 11~~

No. T T6758

received Jan. 14, 1941
registered Jan. 16, 1941
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
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RETURN TO

82	T. B. Reed
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✓ *JBR*

DIVISION OF CHARTS

SURVEYS. SECTION

REVIEW OF TOPOGRAPHIC SURVEY NO. 6758 (1940) FIELD NO. E-40

S. E. Alaska, Glacier Bay, Muir Inlet, Upper End
Surveyed in July - August 1940, Scale 1:20,000
Instructions dated March 10, 1938,
and April 19, 1939, (WESTDAHL)

Plane Table Survey

Aluminum Mounted

Chief of Party - B. H. Rigg
Surveyed by - William F. Deane
Inked by - William F. Deane
Reviewed by - Harold W. Murray, July 30, 1941
Inspected by - H. R. Edmonston

1. Junctions with Contemporary Surveys

The junction on the south with T-6757 (1940) is satisfactory.

2. Comparison with Prior Surveys

T-2852 (1907), Scale 1:80,000 and 1:127,000

This is a copy of a phototopographic survey of the Alaska-Canada boundary. Comparison with the present survey indicates considerable differences in the glacial fronts and exposed terrain due to the recession of the glaciers. The area covered by the present survey is practically all new exposed terrain. The front of Muir Glacier, now 200 feet in height, has receded about 3 miles northward. This is an average rate of 150 m. per year. Cushing Arm is also a new exposure.

The present survey supersedes this 1907 work. Inland formlines are to be surveyed on a smaller scale and will be considered when that work is received from the field.

3. Comparison with Chart 8306 (New Print date 9-30-40)

Topography shown on the chart originates with surveys discussed in the preceding paragraphs and no further consideration is necessary.

4. Compliance with Instructions for the Project

The survey complies with the Instructions for the Project.

5. Condition of Survey

- a. The inking of the shoreline and inland details is very neat.
- b. The Descriptive Report is clear and descriptive and satisfactorily covers all items of importance.

6. Additional Field Work Recommended

This is an excellent survey and no additional work is necessary.

7. Superseded Surveys

T-2852 (1907) In part, (Copy, original survey not on file)

Examined and approved:

Thos. S. Reid

Chief, Surveys Section

J. S. Borden

Chief, Division of Charts

C. H. Green

Chief, Section of Hydrography

G. H. Hude

Chief, Division of Coastal Surveys