

H10902

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic
Field No. RA-10-11-99
Registry No. H-10902

LOCALITY

State Alaska
General Locality Yakutat and Disenchantment Bays
Sublocality Hubbard Glacier to Bancas Point...
..... and West of Knight Island

1999

CHIEF OF PARTY

CAPT. A. D. Anderson

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET

H-10902

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.

RA-10-11-99

State Alaska

General locality Yakutat and Disenchantment Bays

Locality Hubbard Glacier to Bancas Point and West of Knight Island

Scale 1:10,000 Date of survey June 15 - 20, 1999

Instructions dated June 2, 1999 Project No. OPR-0351-RA

Vessel RAINIER(2120), RA-1(2121), RA-2(2122), RA-3(2123), RA-4(2124), RA-5(2125), RA-6(2126)

Chief of party CAPT Alan D. Anderson, NOAA

Surveyed by RAINIER Personnel

Soundings taken by echo sounder, ~~hook lead, price~~ DSF-6000N, Knudsen 320M, RESON 8101MB, SeaBeam 1050D(High Frequency)

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Verification by: B.A. Olmstead Automated plot by HP-650C
~~Processed by~~

Evaluation by: B.A. Olmstead
~~Verified by~~

Soundings in fathoms ~~FEET~~ at ~~MEAN~~ MLLW and tenths

REMARKS: All times are UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

All depths listed in this report are referenced to mean lower low water unless otherwise noted.

Smoothsheet Parameters:

UTM (Zone 7), Central Meridian 135/00/00W Scaling Factor: 0.9996

AW015 / SU125 7/17/06 mcr



UNITED STATES
ALASKA - SOUTH COAST
YAKUTAT BAY

Mercator Projection
Scale 1:80,000 at Lat. 59°45'
North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FATHOMS
(FATHOMS AND FEET TO 1 FATHOM)
AT MEAN LOWER LOW WATER

PROGRESS SKETCH

June, 1999
OPR-O351-RA-99
Yakutat Bay, Alaska

Capt A. D. Anderson
COMMANDING

Chart 16761

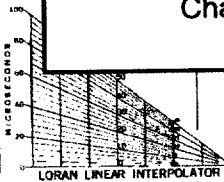
Sheet A
15.6 sq nm
100%

Accomplished	June
LNM Hydro	272.6
LNM SSS	0
SQ NM	15.6
AWOIS Invest.	1
Other Invest.	0
LNM Multibeam	108.6
Days at Sea	7

Downtime_Type	June
Weather - Hr	0
Mechanical -Hr	0
Electronic -Hr	0

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
A	H-10902	6/15	100	6/18		15.6

AWOIS # 50584



NOAA WXT FM WEATHER BROADCASTS
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Telnet: WXX-02 0248 MPT



LOGAN, C. OVERSHOULDER



UNITED STATES
ALASKA - SOUTH COAST

YAKUTAT BAY

H-10902

Mercator Projection
Scale 1:80,000 at Lat. 59°45'

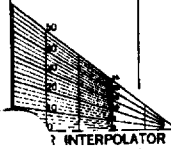
North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FATHOMS
FATHOMS AND FEET TO 1' FATHOMS
AT MEAN LOWER LOW WATER

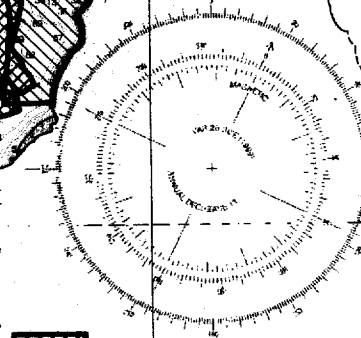
HEIGHTS
Heights in feet above Mean High Water.

AUTHORITIES
Hydrography and topography by the National Ocean Service, Coast Survey, with depth one data from the U.S. Coast Guard.

HORIZONTAL DATUM
The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83) which for charting purposes is considered equivalent to the World Geodetic System 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 1.072" southeast and 5.986" westward to agree with this chart.



RADIO BROADCASTS
Service station listed
whose marine band
of receipt on is variable,
usually 20 to 40 miles
99 162.40 MHz

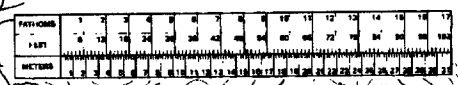
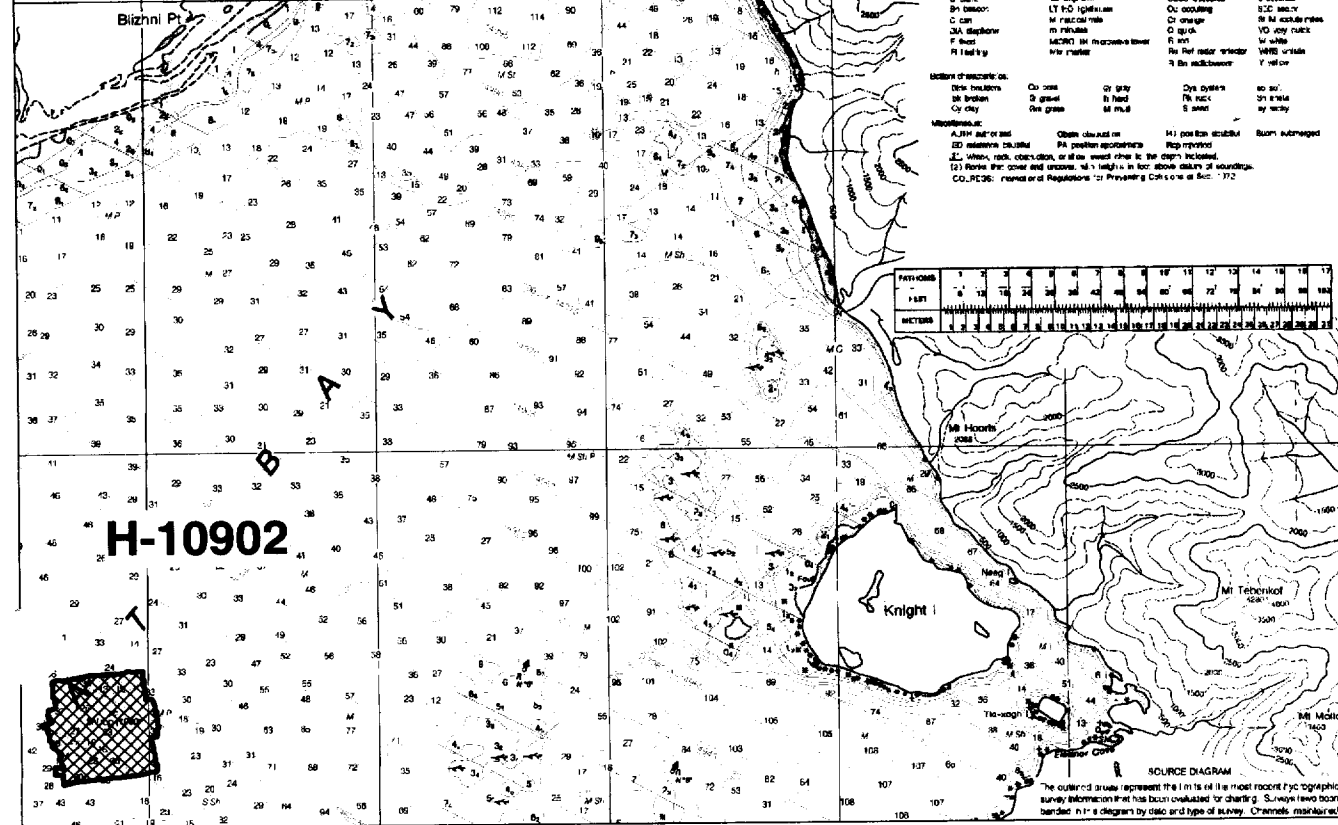


Multibeam
Single beam

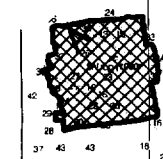
of 1' spots of 0' and hazardous 1' between 1/2 the National
Chart Color = 400' - 499' (dark blue) 500' - 599' (medium blue)
Coast Guard facility if telephone communication is impossible (33 CFR
153).

ABBREVIATIONS (For complete list of Symbols and Abbreviations, see Chart No. 11
Add a Navigation Guide as well as the charters indicated.)

A	Artificial	C	Can	GA	Shipwreck	F	Field	R	Red	Y	Yellow
B	Black	CA	Canal	GA	Shipwreck	F	Field	R	Red	Y	Yellow
CH	Channel	CA	Canal	GA	Shipwreck	F	Field	R	Red	Y	Yellow
CH	Channel	CA	Canal	GA	Shipwreck	F	Field	R	Red	Y	Yellow



H-10902



ABBREVIATIONS (For complete list of Symbols and Abbreviations, see Chart No. 11
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CH	Channel	CA	Canal	GA	Shipwreck	F	Field	R	Red	Y	Yellow

Source Diagram
The outermost circle represents the limit of the most recent hydrographic survey information that has been evaluated for charting. Surveys have been conducted in the diagram by date and type of survey. Channels marked

LORAN-C OVER

Descriptive Report to Accompany Hydrographic Survey H10902

Field Number RA-10-11-99

Scale 1:10,000

June 1999

NOAA Ship RAINIER

Chief of Party: Captain Alan D. Anderson, NOAA

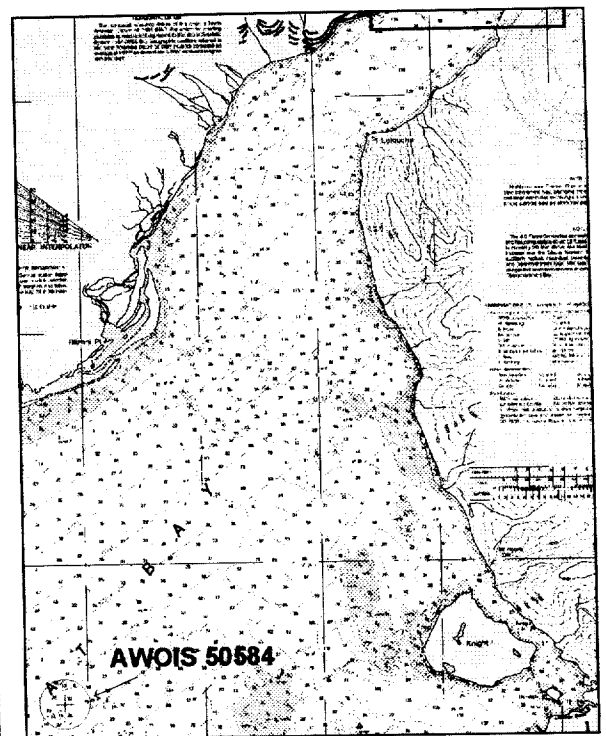
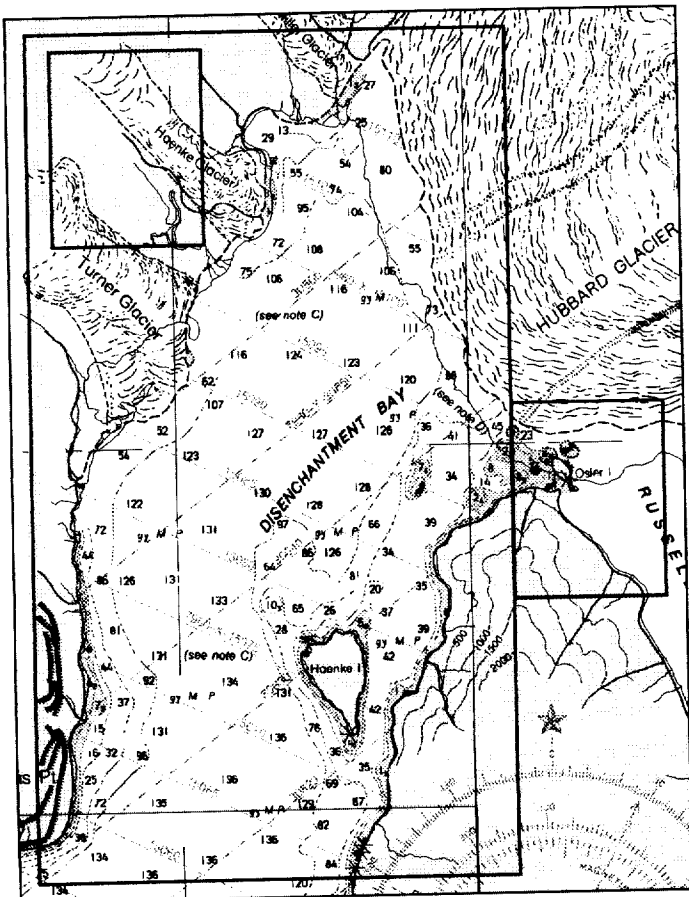
A. PROJECT ✓

This hydrographic survey was completed as specified by Project Instructions OPR-O351-RA, June 2, 1999. Survey H10902 corresponds to Sheet A (Sheet 1 in HPS) as defined in the sheet layout. This survey will provide contemporary hydrographic survey data in Yakutat Bay, Alaska. Due to the shifts in position of Hubbard Glacier and nearby shoreline, requests for hydrographic surveys and updated charts in this area have been received from the Southeastern Alaska Pilot's Association (SEAPA), the Alaska Coastwise Pilots Association, and the tourism industry.

B. AREA SURVEYED *See Eval Rpt., Section B*

The survey area is located near Hubbard Glacier in Disenchantment Bay and includes the entrance to Russell Fiord, all which are north of Yakutat Bay, Alaska. The survey's northern limit is $60^{\circ}03'28.24''N$, the western limit is $139^{\circ}38'05.89''W$, the eastern limit is $139^{\circ}25'40.4''W$, and the southern limit is $59^{\circ}56'24.56''N$, based on chart 16761 (see Illustration 1). This survey also included AWOIS item 50584, 15.2 nautical miles south of the sheet limits at $59^{\circ}42'02.68''N$, $139^{\circ}50'56.41''W$. Data acquisition was conducted from June 17 to June 20, 1999 (DN 165 to 171).

Illustration 1. Survey area for OPR-O351-RA-99



C. SURVEY VESSELS ✓

Data were acquired by RAINIER and her survey launches (vessel numbers 2120, 2121, 2122, 2123, 2124, 2125 and 2126) as noted in the Survey Information Summary included with this report. See Project Related Data* for OPR-O351-RA for vessel descriptions. No unusual vessel configurations or problems were encountered during this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

All vertical beam echo sounder (VBES) data were acquired using HYPACK version 8.9 and preliminary processing was accomplished with HPS version 9.3 and MapInfo version 5.0. Final detached positions, features, and soundings based on preliminary tides from Yakutat gage (945-3220) were saved in MapInfo format. Raster image and shoreline data in MapInfo facilitated charted and prior survey comparisons.

Shallow water multibeam (SWMB) echosounder data were acquired using the Reson SeaBat 8101 with Triton Elics ISIS version 4.32 and processed using CARIS software version 4.3.

Multibeam data collected by RAINIER were acquired using the SeaBeam 1050D MKII and HydroStar ONLINE version 2.8.5b with Triton Elics ISIS version 4.32 and processed using CARIS software version 4.3.

Reson 8101 and SeaBeam 1050D MKII depth data were reviewed with CARIS-HIPS data cleaning programs. Depth flyers were identified and manually flagged as "rejected". Vessel positioning and attitude data from each system were similarly displayed and manually cleaned. Additionally, instantaneous speed as computed from the positioning data was checked for speed jumps exceeding 3 knots.

After review and cleaning, both Reson 8101 and SeaBeam depth, position and attitude data were merged with sound velocity, preliminary tides and dynamic draft correctors to compute the true depth and position of each sonar footprint. These processed data were excessed into a CARIS Workfile by selecting shoal soundings at a density of 3 meters x 3 meters. These excessed soundings were then suppressed at 2.5 mm at survey scale, and exported into HPS through HP Tools. For this survey, the outer ten beams of the Reson 8101 on each side of the swath (beam numbers 1-10 and 92-101) were not used, reducing the effective swath width to 120°. If there were obvious effects due to sound velocity, a swath of 90° to 110° was retained. This was one solution in limiting the effects of varying salinity and tidal influences. *See Section R, Miscellaneous, regarding gaps in data coverage.*

All final Detached Positions and soundings were based on preliminary tides to produce final plots in MapInfo using UTM Zone 7 projection.

A complete listing of software is included in Appendix VI.*

E. SONAR EQUIPMENT ✓

Side Scan Sonar (SSS) equipment was not used on this survey. However, it should be noted that the Reson 8101 provides a low-resolution digital SSS record of the SWMB swath. This SSS imagery is primarily used to aid in final processing of the SWMB depth data but can also be used to provide imagery of features such as wrecks, rocks, and obstructions. *Concur*

* Filed with the hydrographic records.

F. SOUNDING EQUIPMENT ✓

Three different categories of echosounder systems were used and are described below. The individual system(s) chosen for use in a given area were decided at the discretion of the Hydrographer using the guidance stated in the Project Instructions and depended upon the limitations of each system, bottom topography, water-depth, and the ability of the platform vessel to safely navigate the area.

1. Launch Vertical Beam Echo Sounder (VN 2121, 2122, 2123, 2124, 2125, 2126) ✓

Vertical beam echosounders (VBES) utilized for this survey were the Raytheon DSF-6000N and Knudsen 320M, which are dual frequency (100 kHz, 24 kHz) digital recording echosounders with analog paper traces.* Soundings were acquired in meters using the High + Low, high frequency digitized setting. In depths over 250 meters, low frequency was scanned in place of the high when the fathometer lost its high frequency trace. VBES launches were used to collect mainscheme hydrography in areas that were considered too hazardous or too shallow for shipboard SeaBeam 1050 MKII coverage, generally areas less than 200 meters of depth. In addition, singlebeam launches were used to perform all shoreline verification. VBES serial numbers are included in the Separates.*

2. Launch Shallow Water Multibeam (SWMB) (VN 2121, 2126) ✓

The shallow water multibeam (SWMB) system utilized for this survey was the Reson SeaBat 8101, which is a 240 kHz multibeam system that measures relative water depths across a wide path perpendicular to the vessels path. The Reson 8101 ensonifies the seafloor with a 150° swath, consisting of 101 individual 1.5° x 1.5° beams. A TSS POS/MV Position and Orientation Sensor was used to correct for the effects of vessel motion during survey operations. Serial numbers for the Reson 8101 and POS/MV are included in the Separates.*

Although the Reson 8101 was designed to survey to depths in excess of 300 meters, RAINIER has discovered that maximum attainable depths are approximately 80-150 meters, depending on sea conditions and bottom topography. However, the installation this winter of an extended range projector on VN 2126 has extended the maximum depth range by 30-40%. SWMB launches were used to collect full-bottom coverage of select areas identified during singlebeam hydrography, generally areas determined to be less than 100 meters deep that could safely be investigated without the risk of damaging the SWMB transducer. SWMB launches were not used for shoreline verification due to the extremely high risk of damaging the SWMB transducers on submerged rocks. For this survey, SWMB data acquisition was limited to small development areas due to the effects of varying salinity and tidal influences in Disenchantment Bay. *Concur*

3. ELAC SeaBeam 1050D MKII ✓

The SeaBeam 1050D MKII is a hull-mounted, dual frequency (180 kHz, 50 kHz), high resolution multibeam echosounder system for shallow and medium water depths. A TSS 335B attitude sensor was used to correct for the effects of vessel motion during survey operations, and a Sperry MK227 gyro was used for heading. The SeaBeam 1050D MKII ensonifies the seafloor utilizing two narrow beam width transducer arrays pinging into 14 sectors. The receiving beamformer generates 3 narrow beams each sector with a beam width of 1.5° and a spacing of 1.25°. Three subfans are one total fan. Hence, there are 14 sectors x 3 beams x 3 subfans resulting in 126 total beams. Serial numbers for the SeaBeam 1050D MKII, TSS335B and Sperry MK227 are included in the Separates.*

The high frequency array (180 kHz) is used to acquire soundings ranging from 10 to 300 meters, while the low frequency array (50 kHz) is used to acquire soundings ranging from 100 to 3100 meters. The high

frequency was used exclusively on survey H10902 with an acquisition swath width of 128°. During processing, all soundings beyond a maximum angle of 50° off nadir were rejected to further reduce noise in the outer beams.

G. CORRECTIONS TO ECHO SOUNDINGS ✓

On June 14-15, 1999 (DN 165, 166), VN 2125 performed a grid of sound velocity casts (N = 12) to determine if the water body was experiencing even mixing, or if there were significant differences in salinity in different areas of Disenchantment Bay. Comparisons were performed between each cast and it was determined that there was no consistency in salinity correctors. Thus, SWMB hydrography was limited and performed only on small areas. SeaBeam data, however, was collected for the majority of the area. The SeaBeam system was considered more robust under these circumstances. Sound velocity casts were taken every 2-4 hours.

A total of 17 sound velocity casts were used for this survey: one for VBES data, eleven for Reson 8101 SWMB, and six for SeaBeam 1050D MKII data. One cast was used for both Reson and SeaBeam data. Information on the casts is included in the Survey Information Summary report, in Separate IV^{*}Sounding Equipment Calibrations and Corrections, and SVCasts.WOR in MapInfo.

The sound velocity casts were acquired with SBE SEACAT Profilers (S/N 219, 2543 and 2477), calibrated November 13, 1998. Calibration reports are included with the project data for OPR-O351-RA-99. Velocity correctors were computed using the PC program VELOCITY, version 4.0, 1998. New for the 1999 field season is the program VELOCWIN version 4 beta 2, a GUI interface for the DOS program VELOCITY, with the additional ability to directly generate and export sound velocity correction tables for both CARIS and HPS.

For VBES launches, sound velocity correctors were applied to the raw sounding data in HPS during post processing. For Reson 8101 and SeaBeam 1050D MKII data, sound velocity correctors were applied in CARIS during post processing. *Concur*

The following table (Table 1) shows when the vessel offset correctors used for this survey were determined:

Table 1. Offset correctors for vessels ✓

Vessel No.	Date of Static Draft and Transducer Offset Measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2120	March 1999	OTF	March 1999	Port Angeles, WA
2121	March 1999	OTF	March 1999	Port Angeles, WA
2122	March 1999	Rod leveling	March 1999	Port Angeles, WA ✓
2123	March 1999	OTF	March 1999	Port Angeles, WA
2124	March 1999	Rod leveling	March 1999	Port Angeles, WA
2125	March 1999	Rod leveling	March 1999	Port Angeles, WA
2126	March 1999	OTF	March 1999	Port Angeles, WA

Settlement and squat correctors, static draft measurements and vessel offsets are included with the project data for OPR-O351-RA-99. Offset tables # 1-6 correspond to the last digit of the vessel number, with RAINIER being designated as #7 for HPS processing. For VBES launches, offset tables were applied to the raw sounding data in HPS during post processing. *Concur*

* Filed with the hydrographic data.

SWMB launches (VN2121, 2126) utilize a TSS POS/MV Model 320 Position and Orientation System (POS), which provides accurate navigation and attitude data (heave, pitch, roll and heading) to correct for the effects of vessel motion during survey operations. The POS generates attitude data in three axes (roll, pitch and heading) to an accuracy of 0.05° or better. Heave measurements supplied by the POS maintain an accuracy of 5% of the measured vertical displacement for movements that have a period of up to 10 seconds. The POS delivers heading measurements by two distinct methods. First, the Dynamic Heading Alignment determines the vessels heading by using the data supplied by the Internal Measurement Unit (IMU) and GPS receivers to achieve heading that is, at best, accurate to within 0.35°. This method suffers from drift but is relatively unaffected by noise. Second, the GPS Azimuth Measurement System (GAMS) determines the geographic vector between two GPS antennas fixed to the vessel by comparing the phase of satellite signals they receive. The error from this method is largely due to noise, but exhibits no drift. The POS uses the advantages of each method to compensate for the disadvantages of the other to arrive at an optimal accuracy of 0.05° and a heave accuracy of 0.1 meter. Serial numbers are located in Appendix VI.*

RAINIER utilizes a TSS 335B attitude sensor, which provides attitude data (heave, pitch and roll) to correct for the effects of vessel motion during survey operations. Heave resolution is 1cm, with an accuracy of 5cm or 5% of the range, whichever is the greater. The roll and pitch resolution is 0.01° with an accuracy of 0.05° – 0.1°. During acquisition, SeaBeam depth data are corrected for roll in HYDROSTAR to account for beam steering at the transducer face. A Sperry MK227 digital gyro was utilized for vessel heading, which has a resolution of 0.1° and an accuracy of better than 1°. Serial numbers are located in Appendix VI.*

SWMB launches and RAINIER Vessel Configuration Files (VCF) were created within the CARIS program VCFEDIT, and applied to the sounding data during processing. VCF files define the physical relationship between the various components that comprise the systems. The VCF files contain offsets, dynamic draft, timing errors, and heave, roll and pitch biases. System biases for the SWMB launches were determined during a "patch test" conducted at Port Angeles, WA on March 26-28, 1999. System biases for RAINIER were determined during a "patch test" conducted in Lynn Canal, southeast Alaska on May 21, 1999. A copy of each vessel VCF are included in the Project Related Data for OPR-O351-RA.*

Predicted Tidal Correctors ✓

The Oceanographic Products and Services Division, User Services Branch (N/CS41) did not supply predicted tides for this project (OPR-O351-RA-99). Using Tides & Currents v2.5, a preliminary predicted tide table (HPS #2) based on Yakutat (945-3220) was generated for HPS and was used for initial inspection of the VBES soundings. CARIS tide table yak_predicted99.tid was also based on Tides & Currents and was used throughout the entire CARIS processing sequence. After completion of data acquisition, OPSD preliminary tides for Yakutat (945-3220) were downloaded from the Internet and used to create 9453220yakutat.tid. This table was applied to all SeaBeam and SWMB soundings for final inspection prior to suppression of data and conversion in HPS.

Once all sounding data was consolidated in HPS, OPSD preliminary observed tides for Yakutat (945-3220) were downloaded from the Internet and used to create HPS table #5. The MapInfo tidal zoning table supplied by OPSD was then imported into HPS using the MapBasic application HPT_UTIL.MBX and HP Tools v.3.4.1. Tide zone correctors were then computed and applied to all soundings in HPS (SeaBeam, SWMB, & VBES) to produce a final sounding plot.

Listings of HPS tide tables used for H10902 are included in the Separates* of this report. Tidal correctors as provided in the Project Instructions for H10902 are provided in the Survey Information Summary** included with this report. Do not concur** Tide zones and tide gage information were not included.

* Filed with the hydrographic data.

Yakutat, Alaska (945-3220) was the primary control station for datum determination. RAINIER personnel installed two Sutron 8200 tide gages Monday, June 14th at Disenchantment Bay (945-3196) geographic position: 60°02'⁵⁴''N, 139°33'³⁵''W and in Russell Fiord at Marble Point (945-3178) geographic position: 59°56'^{05.854}''N, 139°34'^{29.085}''W. Both gages were removed on June 20th, 1999. Refer to the Field Tide Notes and supporting data in Appendix V* for individual gage performance and level closure information. This information has been forwarded to N/CS41 in accordance with HSG 50 and FPM 4.8. A request for approved tides was forwarded to N/CS41 in accordance with FPM 4.8. *Approved Tide Note dated February 17, 2000 is attached.*

H. HYDROGRAPHIC POSITION CONTROL *See Eval Rpt., Section P*

The horizontal datum for this project is NAD 83. See the OPR-O351-RA-99 Horizontal Control Report for more information.

All soundings were positioned using differential GPS. Primary control was the VHF differential reference station at HAENKE. The US Coast Guard Beacon at SITKA (305kHz) was used as backup.

Due to the short duration of this project, launch and ship DGPS performance checks were not conducted. System checks were performed on the previous project OPR-O340-RA-99 in Lynn Canal, Alaska.

I. SHORELINE *See Eval Rpt., Section I.*

Method of Shoreline Verification ✓

The shoreline manuscript, supplied by N/NGS3, was composed from two cartographic feature files (CFF): GC-10443, 1:20,000 and GC-10445, 1:20,000, compiled using photography from 1998. The files were received in the original SDDEF format and in MapInfo format for import to Hypack.

Shoreline verification was conducted near predicted low water in accordance with the Project Instructions and FPM 6.1 and 6.2. For this survey the general limit of safe navigation of a survey launch is 5-30 meters offshore of apparent low tide, with the exception of the glacier faces, where the possibility of calving was quite extensive. Water depths along this limit of safe navigation are generally 2-5 meters at Mean Lower Low Water (MLLW). Features shown inshore of the Navigable Area Limit Line (NALL) are the Hydrographer's representation of the shoreline while slowly transiting along the shore, and are intended to aid chart compilation. Detached positions were not taken on some DM or charted features inshore of the NALL if the hydrographer visually identified the object during shoreline verification. If not present and inshore of the NALL, a detached position of the closest navigable location was recorded and an estimated range and visual search for to the proposed object was annotated. *A few charted features along and or inshore of the NALL were not satisfactorily investigated and have been transferred from the prior surveys to the smooth sheet.* For safety reasons, hydrography was limited to a 1/4 mile off the face of Hubbard Glacier. To verify the position of Hubbard Glacier's edge, several detached positions were taken at distances from the glacier face. Ranges from the launch to the glacier face were determined by radar. *Concur*

Detached positions taken during shoreline verification were recorded within HYPACK and on DP forms.* These indicate significant features and features not found on the DM or chart.

A detailed "DP and BS Plot" in MapInfo format is provided showing all detached positions and bottom samples with notes relating to each feature. Updated shoreline and features were then transferred to the final sounding plot. *Shoreline verification conducted by the hydrographer has been analyzed during office processing and shown on the smooth sheet as warranted.*

CHANGES AND NEW FEATURES ✓

Several changes and new features were found and are depicted on the final sounding plot. DM rocks and islets were often identified as high points of new ledges or reefs. Some DM rocks were also represented on the charts (e.g., DP #50085, #50300). *Concur*

DP 50085 (rock, uncovers 13ft), DP 50300 (rock, uncovers 7ft)
 6 Lat. 59°56'22N Long. 139°36'33W Lat. 60°10'22N, Long. 139°23'12.5W

* Filed with the hydrographic data.

The present face of Hubbard Glacier appears to have advanced since 1998, when the photos used to compile the DM shoreline was taken. This survey also found that the glacier face extends further into Disenchantment Bay than is depicted on the charts. The Hydrographer recommends that the glacier limits be adjusted to reflect current survey results. *Concur*

Recommendations ✓

The Hydrographer recommends that the shoreline as depicted on the final field sheet from the survey be used to supercede shoreline information compiled on the cartographic feature files. *Concur with clarification. See amended statement on last paragraph of this page.*

CHARTED FEATURES

Charted rocks were either identified as new rocks, DM rocks, high points or extensions of DM ledges and reefs with the following exceptions:

A charted rock at $59^{\circ}58'26.037''N$, $139^{\circ}32'45.869''W$ was not found (Pos. #20036). Depths in the vicinity are approximately 5-6m, water visibility 2m. A 50-m radius visual search (DN166, VN2122) was conducted at MLLW for 5 minutes. The Hydrographer recommends deleting the charted rock at $59^{\circ}58'26.037''N$, $139^{\circ}32'45.869''W$. *Do not concur See Eval Rpt., Section M*

A charted rock at $59^{\circ}58'24.728''N$, $139^{\circ}32'53.215''W$ was not found (Pos. # 20037). Depths in the vicinity are approximately ¹⁸⁻²⁰30m, water visibility 2m. A 50-m radius visual search (DN166, VN2122) was conducted at MLLW for 10 minutes. A new rock was found at Pos.#20038 located at $59^{\circ}58'24.461''N$, $139^{\circ}32'49.505''W$, 50 meters east of the charted rock. The Hydrographer recommends deleting the charted rock at $59^{\circ}58'24.728''N$, $139^{\circ}32'53.215''W$ and charting a new rock at $59^{\circ}58'24.461''N$, $139^{\circ}32'49.505''W$. *Do not concur See Eval Rpt., Section M.*

A charted rock at $59^{\circ}56'37.717''N$, $139^{\circ}32'3.841''W$ was not found (Pos. # 40027). Depths in the vicinity are approximately 12m, water visibility 3m. A 50-m visual and logged search (DN166, DN2124) was conducted at MLLW for 10 minutes. A DM rock was located inshore of the NALL approximately 60m east of the charted rock at $59^{\circ}56'37.68''N$, $139^{\circ}32'00.03''W$. The Hydrographer believes that this charted rock is indeed the DM rock which was moved further from the shoreline during chart compilation in an effort to both leave the high water shoreline unobscured and to better depict the rock at the scale of the chart. Careful examination of the priors revealed the rock corresponds with the charted rock in question. *Concur Chart rock From DM as shown on the smooth sheet.*

A charted rock at $59^{\circ}58'37.467''N$, $139^{\circ}30'28.315''W$ was not found (Pos. # 40119). Depths in the vicinity are approximately 2.1m, water visibility 3m. A 30-m visual search (DN166, VN2124) was conducted at MLLW for 5 minutes. The Hydrographer recommends deleting the charted rock at $59^{\circ}58'37.467''N$, $139^{\circ}30'28.315''W$. *Do not concur See Eval Rpt., Section M.*

The charted shoreline should be revised using the manuscript shoreline and fieldwork notes as recorded in the MapInfo digital files named "Shoreline" and "Shoreline_Update" within the bounds of the survey, and as portrayed on the smooth sheet during final office processing.

J. CROSSLINES ✓

VBES crosslines totaled 17.28 nautical miles, or 11.6% of mainscheme hydrography. As mainscheme VBES hydrography extended to 200m depths, not all VBES crosslines overlapped VBES data. The crosslines that did overlap agreed within 1-2 meter with mainscheme hydrography. ** 109 Fathoms

Due to artifacts in SWMB data caused by sound velocity effects, SWMB data acquisition was limited to small development areas. SeaBeam data was collected for the majority of the survey area greater than 200m. Concur The SeaBeam system was not as sensitive to the temporal changes in salinity and tide. The area near shore out to approximately 200m in depth was covered by VBES launches. Concur

The SeaBeam data showed downsloping at both ends of the swath, despite attempting to minimize sound velocity and tidal influences by eliminating outer beams. It is possible the SeaBeam had difficulty in bottom detecting due to the bottom material of Disenchantment Bay. In areas where there were distinct slopes and formations, the SeaBeam compared well with VBES and SWMB data. Overall, the SeaBeam compared within 1-3 meters of the VBES and Reson data (see Illustration 2 on next page). Concur

The VBES and Reson data compared well, generally within 1-2 meters in regions of low vertical gradients. Larger differences between VBES and Reson occurred in areas of steep relief. These differences between the two methods of surveying are a function of horizontal positioning, beam width, water depth, slope and echo return processing (see Illustration 2). Concur

Included in Appendix VI is a Quality Control Report (QCR), which was generated in Caris. This report summarizes a comparison of the SeaBeam crosslines against a DTM of the SeaBeam mainscheme soundings. For this report IHO statistics a/b of 1.0 and 0.023 were selected and beams #29 through #92 passed with at least 80 percent. The beam numbers 19-28 and 93-108 passed within 1 and 79 percent. There was a total of 11.99 nautical miles of SeaBeam crosslines, comprising 37.9% of mainscheme SeaBeam hydrography.

K. JUNCTIONS See Eval Rpt., Section L.

There are no contemporary surveys that junction with H10902. Concur

L. COMPARISON WITH PRIOR SURVEYS See Eval Rpt., section M.

One of the two prior surveys listed in the Project Instructions was mistyped. The prior H-9776 listed is located within Cook Inlet, east of Tuxedni Bay. The correct prior for this survey area is H-9779. Concur Table 2 and Illustration 3 (on page 10) shows the two prior surveys conducted in the H10902 area:

Table 2.

Registry #	Scale	Date	Junction side
*H-9779 ✓	1:20,000	1978	Entire survey area except for Russell Fiord
*FE-435 ✓	1:10,000	1997	Southeast corner

** H-9779 has been partially superseded by F00435. FE-435 (F00435) revised registry to conform with existing guidance.

* Filed with the hydrographic data.

Illustration 2. Comparison between VBES, SWMB, and SeaBeam ✓

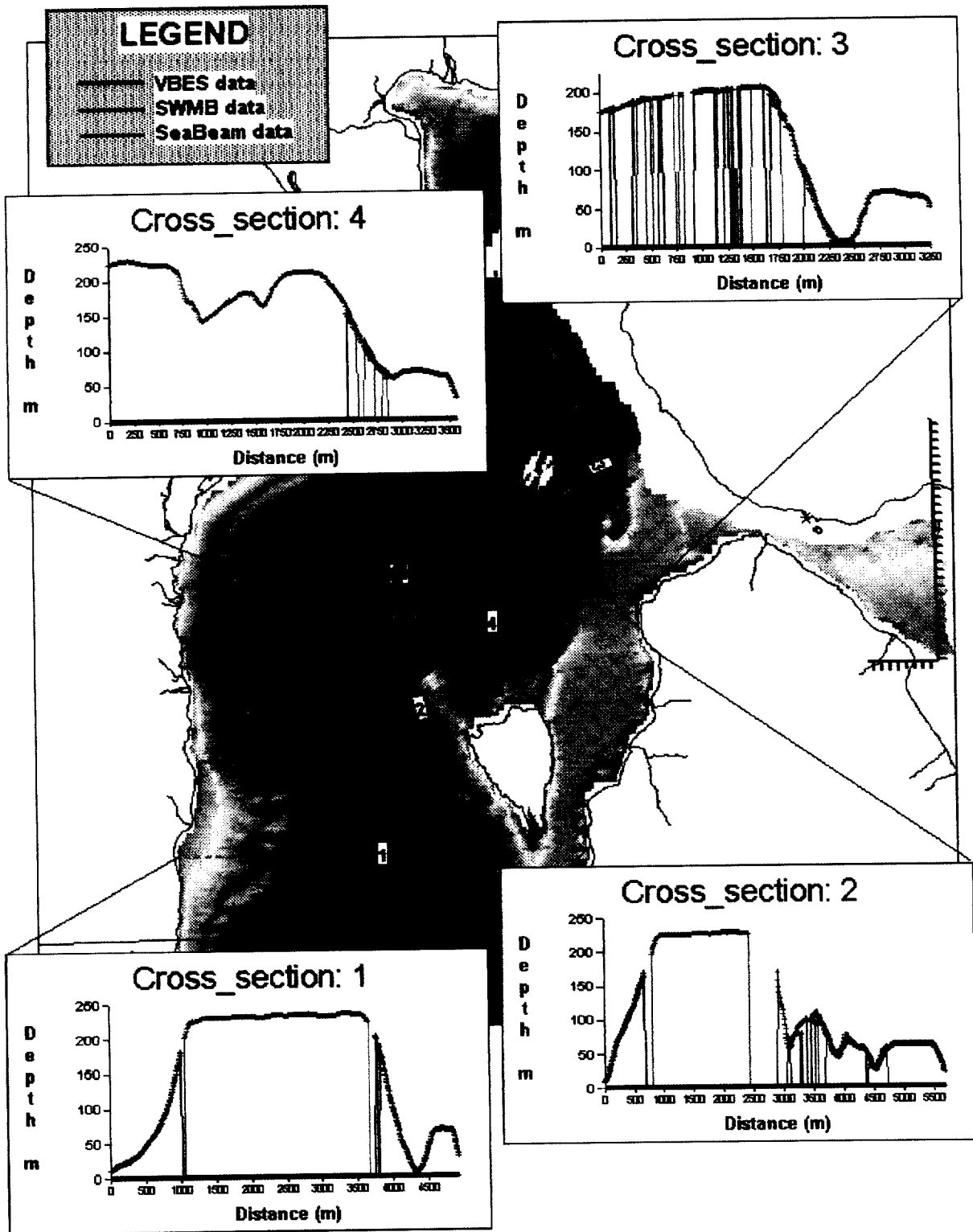
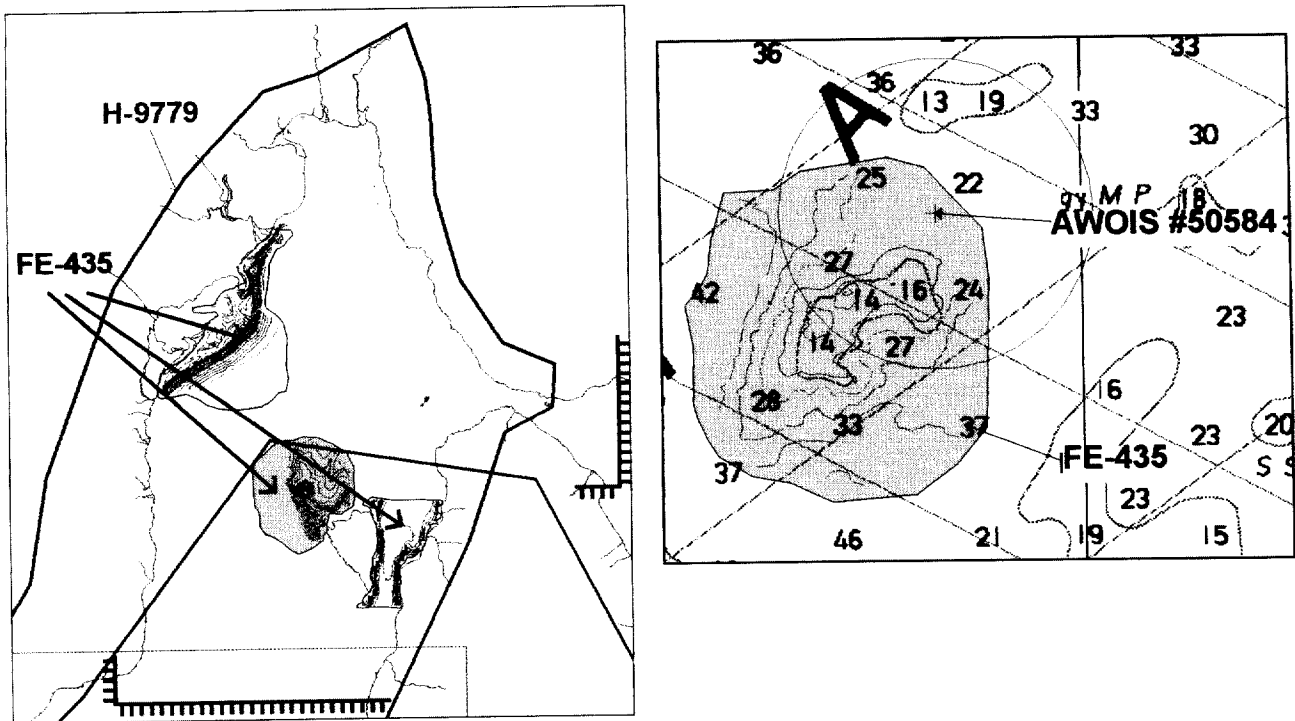


Illustration 3. Priors surveys covering H10902 survey area.



Prior soundings originating from FE-435 were found to be in good agreement with those from the current survey. Least depths from the current survey were generally shoaler in depth by 1-3 meters, or in agreement. A few exceptions were found in the area facing Turner Glacier. Unlike FE-435, the current survey was unable to navigate in the small bay in front of Turner Glacier. *Concur*

Both H10902 and FE-435 developed the shoal area northwest of Haenke Island. The prior survey found a slightly shoaler depth of 18.1m versus a present survey depth of 18.3m at 59°58'43.58"N, 139°33'24.88"W. *Concur Chart 9 from present Survey*

A shoal sounding of 3.1m was reported as a Danger to Navigation for FE-435, at 60°00'32.764"N, 139°34'36.771"W. The current survey revealed a depth of 3.7m at 60°00'31.49"N, 139°34'37.13"W, and a 3.2m depth at 60°00'33.22"N, 139°34'35.89"W. *Concur Chart 2 Fms from present Survey*

AWOIS item 50584, which was assigned to this survey, was also investigated by prior survey FE-435. The soundings were generally in very good agreement, within 1-2 meters. This item is discussed in Section M, Item Investigation Reports. *Concur*

Comparing H-9779 with the current survey, it is apparent that significant changes have occurred since the prior survey. There is no longer a small navigable gap between Miller and Hubbard Glacier. In the vicinity in front of Miller Glacier, the present survey is 4-20 fathoms shoaler. The current soundings between Haenke and Hubbard Glaciers are generally 5-20 fathoms shoaler than the prior soundings; while in the vicinity of Turner and Hubbard Glaciers, current soundings are approximately 10 fathoms shoaler. Turner Glacier has receded since the prior survey, and current survey soundings in the vicinity are generally 10-30 fathoms shoaler than the prior. During data acquisition of the current survey, Hubbard Glacier was extremely active. The glacier face has advanced and receded since the prior survey. The current soundings were generally 10-40 fathoms shoaler than the prior. [The majority of Osier Island is currently under the glacier, with small portions eroded away and visible at low tide. Just north of the little islands at the West end of the pass leading into Russell Fiord, the current soundings are generally 1-5 fathoms shoaler than H-9779. East of Gilbert Point, the current soundings are 1-5 fathoms shoaler as well. South of Turner Glacier as well as Haenke Island and the shoreline east of Haenke Island, the current shoreline matches well with the prior.] *Concur*

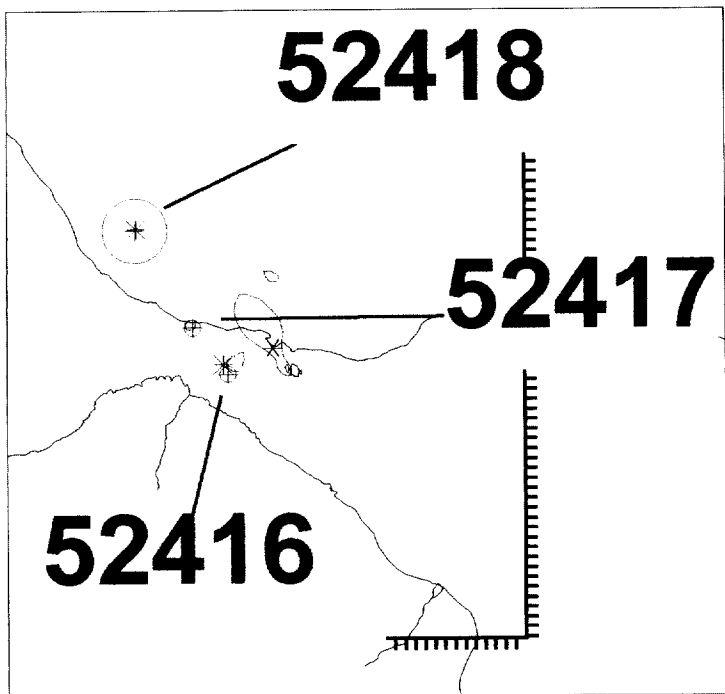
* Concur with clarification. See note on following page.

Depths in these areas are generally 1-8 fathoms shoaler than the prior survey. *Concur*

Differences between the current survey and prior surveys can probably be attributed to scale and improved modern positioning and sounding equipment, along with changes caused by the dynamic advance and retreat of the glaciers. Final comparisons will be done at PHB after reduction to final sounding datum using tidal information collected concurrently with this survey. *Much of H-9779 has been superseded by F00435 (1997) in the vicinity of Turner, Hanke, Miller and Hubbard Glaciers and around Hanke Island. See Eval Rpt., Section M.*
M. ITEM INVESTIGATION REPORTS *See Eval Rpt., Section N*

There were four AWOIS items assigned for survey H10902. Of these, Hubbard Glacier covered AWOIS 52418 and 52417. AWOIS 52416 was not covered by Hubbard Glacier, but was within 250m of the glacier face, which was too close for safe navigation, hence was not investigated. The charted shoreline, which the AWOIS items used as a source, is shown in brown (see Illustration 4). *Concur*

Illustration 4. Location of assigned AWOIS items not investigated.



A detached position (Pos. # 20867, DN167, VN2122) was taken on the rock located west of the reported AWOIS 52416 but was not further investigated due to the close proximity to the glacier face. *Concur* Rock (*) is shown on the smooth sheet.

AWOIS 50584 is the only assigned item that could be safely investigated (see Illustration 5). A depth plot of current survey soundings is included with the plots (Final Sounding; Detached Position and Bottom Samples *Concur* plots) for H10902.

AWOIS 50584

1. Area of Investigation:

AWOIS #: 50584
Reported Position: Latitude: 58/42/00.00N ✓ State and Locality: Yakutat Bay, Alaska
Longitude: 139/51/00.00W ✓ Datum: NAD83
Type of Feature: Shoal depth Reported Depth: 8 fathom

2. Description of Source Item:

HISTORY

H9695/77--NOS

CL641/83--SOUTHEASTERN ALASKA PILOTS' ASSOCIATION; 8 FATHOM SHOAL REPORTED IN THE VICINITY OF LAT.59-41-40N, LONG.139-51-30W. BY THE CUNARD PRINCESS ON THE SAME DAY AS THE JUNE 27, 1983 EARTHQUAKE OCCURRING 40 MILES EAST OF YAKUTAT BAY. LNM29/83(7/19/83)--17TH CGD; ISSUED NOTE IN THE NOTICE REGARDING SIEMIC ACTIVITY NEAR YAKUTAT BAY ON JUNE 27, 1983.

CL254/84--RECON. SURVEY (RA-80-1-83)-S-O908-RA-83; MINI-RANGER RANGE/RANGE CONTROL; PREDICTED TIDES; A SURVEY WITHIN A 1,000M RADIUS OF THE REP. POS. WAS CONDUCTED AT 1:10,000 SCALE WITH 100M LINE SPACING. A LD OF 13FMS WAS FOUND 150M NORTH OF THE REP 8FM SHOAL. THIS SURVEY AND THE AREA'S BOTTOM TOPOGRAPHY COMPARE TO WITHIN 1FM OF H9695/77 AT 1:20,000 SCALE. NO UNUSUAL BOTTOM FEATURES WERE FOUND DURING 1:80,000 RECON. USING SIDE SCAN SONAR COVERAGE. THE REP. SHOAL IS NON-EXISTENT AND THE HYDRO. RECOMMENDS RETAINING THE PRESENTLY CHARTED DEPTHS. (REVISED, 2/9/84, MJF)

CL469/91--SEA PILOTS KETCHIKAN-(5/20/91 LTR); CRUISE SHIP ROTTERDAM REPORTED THAT "POSSIBLE SHOALING REPORTED 6/15/90", AS WAS SHOWN ON SKETCH THAT WAS PROVIDED. POSITION GIVEN AS LAT 59/42N, LONG 139/51W (NAD83).

LNM23/91(6/5/91)--17TH-CGD; SHOAL REPORTED 1990 PA, POSITION GIVEN IN LAT 59/42/00N, LONG 139/50/30W. (THE LONGITUDE SHOULD HAVE BEEN 139/51/00W, AS WAS GIVEN ABOVE IN CL469/91).

F00435/1997--AREA INVESTIGATED WAS PRIMARILY OVER THE 8FM DISPROVED REPORTED DEPTH OF 1983. A 13.2 FM DEPTH WAS OBTAINED ON THE PRESENT SURVEY. RETAIN THE CHARTED "SHOAL REPORTED 1990 PA" NOTE. (UPDATED & REVISED 12/98 RWD)

3. Survey Requirements:

Multibeam investigation; Singlebeam investigation; 100% side scan. 1000 meter search radius. ✓

4. Method of Investigation:

Search radius was covered by the 100% SWMB (DN 168, VN 2126). *Concur* ✓

5. Results of Investigation:

No evidence of the reported 8 fathom shoal was found. A 13 fathom depth was found 700m SW of the reported 8 fathom shoal. *Concur* ✓

6. Comparison with Prior Surveys:

AWOIS 50584 was investigated by prior survey ^{F00435} ~~FE-435~~. Present survey soundings were generally in good agreement, within 1-2 meters. The least depth determined by FE-435 was 13.2* fathoms, while the least depth from the current survey was 13 fathoms. *Concur with clarification, see Eul Rpt, Section M.*

7. Comparison with the Chart and Charting Recommendation:

AWOIS 50584 was compared to Chart 16761^{*} (14th Ed.; Jun 2, 1990; 1:80,000), and Chart 16760 (8th Ed.; Sep 28, 1990, 1:300,000). Chart 16760 depicts "Shl Rep 1990" at the AWOIS location, with 13-14 fathom soundings in the vicinity. Chart 16761 (larger scale) does not depict "Shl Rep 1990". However, 13-14 fathom soundings are shown in the vicinity of AWOIS 50584 on Chart 16761. Illustration 5 below depicts AWOIS 50584 on chart 16760. This item was not submitted as a Danger to Navigation. *Concur*

** Office processing used Chart 16761 18th Edition date 3/6/1999. ** Soundings have been applied from F00435(1997)*

Charting Recommendations

The Hydrographer recommends removing the "Shoal Reported 1990 PA" on Chart 16760, and chart present survey soundings on both chart 16760 and 16761. *Concur*

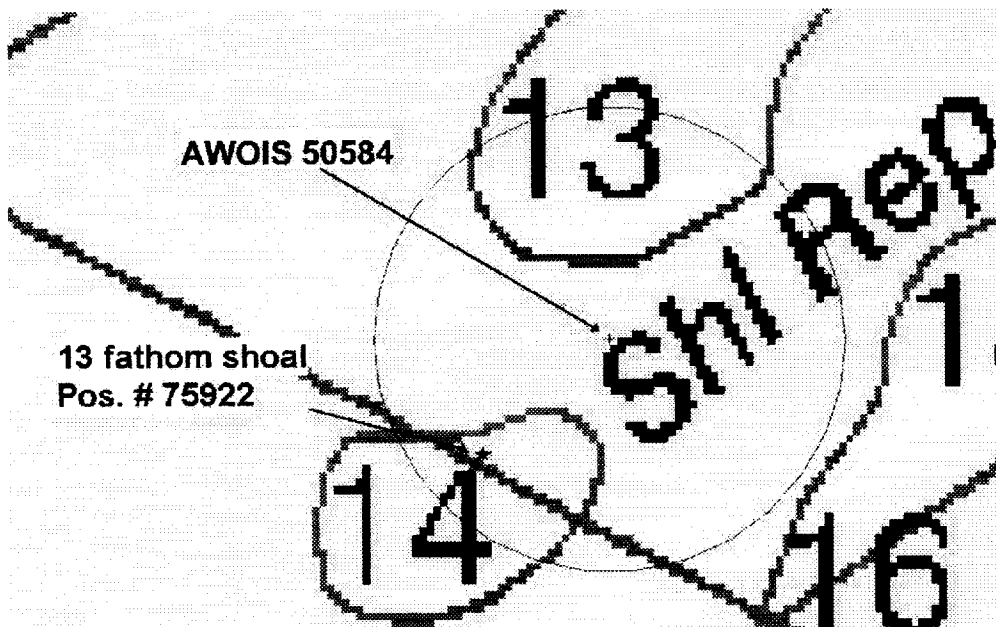


Illustration 5. Location of AWOIS 50584 on Chart 16760

N. COMPARISON WITH THE CHART *See Eval Rpt., Section O.*

This survey will affect two charts (see Table 4), which were used to compare features in the field.

Table 4. Charts affected by H10902

Chart	Scale	Edition Number	Date	Datum
16761 ✓	1:80,000	14th *	June 2, 1990	NAD 83
16760 ✓	1:300,000	8th	September 28, 1990	NAD 83

* Office Processing used 15th Edition, March 6, 1999.

The survey was compared with Chart 16761 and was in general agreement, although consistently 2-20 fathoms shoaler than the charted depths. In front of Turner Glacier, the current survey was shoaler than charted depths by approximately 5-10 fathoms. The present survey found Turner Glacier and surrounding shoreline to have receded, thus the present sounding exceeds the charted shoreline. The current survey found within Disenchantment Bay, west of Haenke Island, depths shoaler than charted by approximately 10 fathoms. Near the shore south of Turner Glacier, the current survey compared well with the chart, shoaler by approximately 1-5 fathoms. The position of Hubbard Glacier has changed as well. It appears that the glacier has advanced when compared with the chart. There is evidence of a slight moraine at the glacier face.

Current soundings are shoaler in front of Hubbard Glacier, generally 5-20 fathoms shoaler than charted depths. *Discussion with charted depths has been previously addressed in section L. Prior surveys H-9779 and F00435 are the source documents for Chart 16761. See Eval Rpt., Section O for additional information.* The most significant change is the channel from Disenchantment Bay eastward into Russell Fiord. The glacier presently covers most of the charted islands and rocks in the channel. Osier Island is visible under the glacier from the cross-section view, with small portions apparently cut off from Osier Island, exposed at high tide. The shoreline at Gilbert Point has altered quite a bit as well, seeming to have been eroded south. The present survey found that the area around Haenke Island agrees well with the chart, generally within 1-5 fathoms. The shoreline of Haenke Island as well as the shoreline east of Haenke Island agrees well with the chart.

Comparing the present survey with Chart 16760, the current soundings were consistently shoaler than the charted depths, approximately 10 fathoms. Although the trend in shoaling was consistent, a few

consistencies are noted below:

The reported 11 fathom shoal in 1996 should be deleted from Chart 16760 and replaced with a present survey depth of 10.3 fathoms (19m) sounding at 60°00'20.181"N, 139°34'55.919"W. *Concur with clarification. Chart this area based on the present survey depths.*

The reported 7 fathom shoal in 1990 should be deleted from Chart 16760 and replaced with a present survey depth of ^{9.9}10.3 fathoms (18.8m) sounding at 59°58'43.428"N, 139°33'24.742"W. *Concur Chart 9 Fms, 5 FT (9.5) on Charts 16760 and 16761.*

Non-sounding features are discussed in Section J. Final sounding comparisons will be made at PHB after application of approved tides.

Dangers to Navigation (*Revised charted depths are based on Chart 16761 1st Ed., present survey depths listed below are based on predicted tides.*)

Seven dangers to navigation were discovered during survey H10902 and reported to the Seventeenth Coast Guard District. Copies of the Dangers to Navigation Report are included in ^{this report} Appendix I.

A shoal depth of 5.2 fathoms (submitted as a 5 fathom shoal) was found northeast of Haenke Island at 59°58'34.25"N, 139°31'53.04"W (Pos. # 75149, DN169). A depth of ^{4.5 fathom four feet}5.4 fathoms is charted at this location ^{approximately} 100 meters southwest. ✓

A shoal depth of 10.0 fathoms (submitted as a 10 fathom shoal) was found northeast of Haenke Island at 59°58'39.76"N, 139°31'47.29"W (Pos. # 75223, DN169). Charted depths in the vicinity are between 20 and ^{1 fathom four feet (1.6 Fms)}5.4 fathoms. *Concur* ✓

A shoal depth of 1.8 fathoms (submitted as a 1 ¼ fathom shoal) was found southwest of Osier Island at 59°59'34.0"N, 139°29'49.99"W (Pos. # 77153, DN169). A depth of ^{2 fms 4 ft (2.6 Fms)}2.4 fathoms is charted at this location. *Concur* ✓

A shoal depth of 1.3 fathoms (submitted as a 1 ¼ fathom shoal) was found in front of Turner Glacier at 60°00'19.71"N, 139°35'15.04"W (Pos. # 31369, DN167). Charted depths ^{is 1.5 fathom in the exact location}between the 100 fathom curve ^{of present survey depth}and the face of Turner Glacier are 52 - 62 fathoms. *Concur* ✓

A shoal depth of 2.1 fathoms (submitted as a 2 fathom shoal) was found in front of Turner Glacier at 60°00'31.47"N, 139°34'37.13"W (Pos. # 31202, DN167). Charted depths ^{is 1 fm 4 ft in the exact location of the present survey depth}between the 100 fathom curve and the face of Turner Glacier are 42 - 62 fathoms. *Concur* ✓

A shoal depth of 2.3 fathoms (submitted as a 2 ¼ fathom shoal) was found at 59°59'46.48"N, 139°30'48.32"W (Pos. # 20511, DN167) near the entrance to Disenchantment Bay, north of a small unnamed islet. A depth of ^{Fms 4 FT (7.3 Fms)}7.4 fathoms is charted at this location. *Concur* ✓

A shoal depth of 10 fathoms (submitted as a 10 fathom shoal) was found northwest of Haenke Island at 59°58'43.58"N, 139°33'24.88"W (Pos. # 180787, DN167). A depth of 10.7 fathoms is charted at this location. *Concur* ✓

O. ADEQUACY OF SURVEY ✓ *See Eval Rpt., section P.*

Survey H10902 is complete and adequate to supersede prior soundings and features in their common areas. ^{Do not} *Concur*

P. AIDS TO NAVIGATION ✓

No aids to navigation were located within the H10902 survey area. *Concur*

Q. STATISTICS ✓

Statistics are listed in the Survey Information Summary included with this report. *Concur*

R. MISCELLANEOUS ✓

Bottom samples were collected and sent to the Smithsonian in accordance with Project Instructions. *Concur*

The survey area was frequently visited by large cruise ships which followed a route straight down the middle of the bay or to the east of Haenke Island, ice dependent. RAINIER found suitable anchorage approximately 16.2 nautical miles north of Knight Island, southeast of Haenke Island.

The currents within the pass between Disenchantment Bay and Russell Fiord were exceptionally strong. Slack tide appeared to occur approximately 2 to 2 ½ hours after that experienced at Yakutat Bay. A note has been added to the smooth sheet reflecting this situation.

Discontinuities or gaps in data coverage were due primarily to the presence of impenetrable ice flows, thereby preventing acquisition of hydrographic data. Note has been added to smooth sheet to reflect that a few areas could not be surveyed. See Eval Rpt, section P.

On June 20, 1999 (DN 171), the RAINIER performed a short reconnaissance of the shoreline of Khantaak Island, from the seaward side of Port Mulgrove to the southern-most extent of the island. The ship's location was marked six times while simultaneously taking an associated photo of the radar screen on the bridge in an effort to determine any changes to the peninsula extending south from Port Mulgrove, thereby possibly affecting the entrance to Yakutat Harbor (see Illustration 6). The peninsula appears to have expanded westward approximately 280m from the charted seaward most extent. Although the shift is marginal, the hydrographer recommends monitoring the area in the future for changes to Monti Bay and Yakutat Harbor. *Concur*

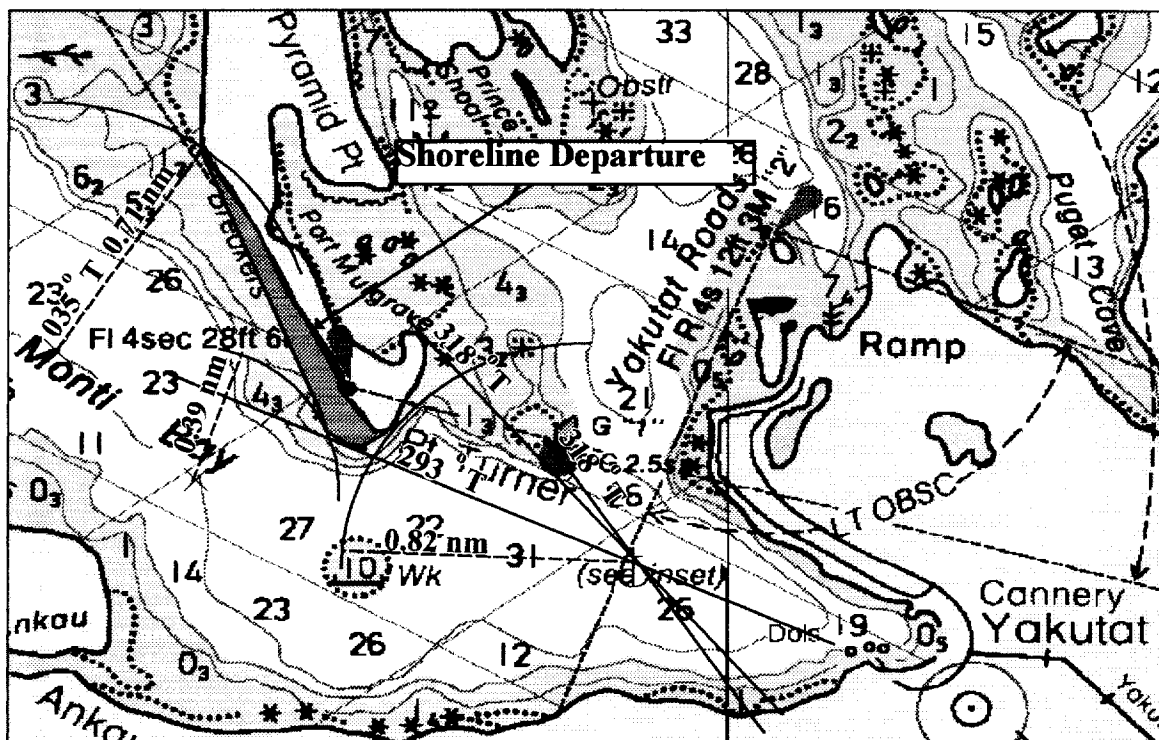


Illustration 6. Reconnaissance of south extent of Khantaak Island

On June 20, 1999 (DN 171), RAINIER performed a reconnaissance survey of Russell Fiord. The reconnaissance survey, D00130 (RA-40-1-99), was conducted by launch 2126 and consisted of a SWMB trackline into, and back out of Russell Fiord. Additional information is contained in a separate report submitted for Reconnaissance survey D00130. *Concur*

S. RECOMMENDATIONS ✓

The Hydrographer recommends that photogrammetric shoreline continues to be provided for survey areas before the hydrographic field party begins the survey. The shoreline received for this survey was extremely accurate. Precise, low-water shoreline information is imperative when conducting basic hydrographic surveys along the complex Alaska coast. When shoreline manuscripts are not provided, significant extra effort is required to adequately delineate the shoreline and its features. *Concur*

Due to significant changes in the present shoreline, charts 16761 and 16760 should be updated using the above-mentioned photogrammetric source (1998). The Hydrographer recommends extreme caution when mariners navigate within ¼ nautical mile of glacier faces as the depths are up to 20 fathoms shoaler than the chart and continue to vary with time. *Concur*

The Hydrographer recommends removing Note D on Chart 16761 as Hubbard Glacier has receded since the chart update and Russell Fiord is no longer an isolated lake. *Do not concur. Note D on 15th Edition discusses significant shoaling when approaching glaciers at head of Disenchantment Bay. See Paragraph above. Also retain Note C.*
 The Hydrographer discourages any cruise ships or other marine vessels from attempting to enter Russell Fiord, as the pass is unsafe due to the extreme narrowness, the threat of sudden calving and strong currents. Cruise ships should be wary and navigate with extreme caution when approaching Hubbard Glacier, as icebergs, ice flows, and large swells occur suddenly. Furthermore, the current flowing into and out of Russell Fiord is extremely fast and can be treacherous, carrying large icebergs. The Hydrographer recommends charting the pass as foul for all mariners. *Concur*
 If the chart is updated prior to the data from a new survey being applied, the following note should be added to the chart "Extreme currents occur at the opening of Russell Fiord into Disenchantment Bay. The pass is deemed unsafe and not navigable by mariners". *Note added to the smooth sheet.*

T. REFERRAL TO REPORTS ✓

The following supplemental reports contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
OPR-O351-RA Horizontal Control Report	July 1999	N/CS34
Project related data for OPR-O351-RA	July 1999	N/CS34
OPR-O351-RA Coast Pilot Report	July 1999	N/CS26
Reconnaissance Survey D00130	August 1999	N/CS34

Respectfully Submitted,

Winli Lin

Winli Lin
Senior Survey Technician

Approved and Forwarded,

Daniel R. Herbich, CDR/NOAA

Alan D. Anderson
Captain, NOAA
Commanding Officer

for

Survey Information Summary

Project: Project Name:

Instructions Dated: Project Change Info:

Sheet Letter: Registry Number:

Sheet Number:

Survey Title:

Data Acquisition Dates: From: To:

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2120								
2121	2	2		1		1		
2122	2	1	1		1	2		
2123	2	1						
2124	3	2	1		1	2		
2125	5				1	1	2	
2126	1	1						

Sound Velocity Cast Information

Tide Zone Information

Tide Gage Information

Statistics Summary

Type	Total:
BS	22
DEV	22.45
DP	28
MBMS	31.57
MBXL	11.99
MS	149.49
S/L	16.3
SPLIT	67
SWMB	65.08

Percent XL:	11.6%
SQNM:	15.6



UNITED STATES DEPARTMENT OF COMMERCE
 National Oceanic and Atmospheric Administration
 Office of NOAA Corps Operations
 Pacific Marine Center
 1801 Fairview Avenue East
 Seattle, Washington 98102-3767

NOAA Ship RAINIER
 August 20, 1999

**ADVANCE
 INFORMATION**

Commander (mon)
 Seventeenth Coast Guard District
 Post Office Box 25517
 Juneau, Alaska 99802-5517

Dear CDR Hamblett:

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10902 in Yakutat Bay, Alaska. The dangers are shown graphically on the attached chartlet. These dangers to navigation affect the following charts:

Chart 16761, 14th edition, June 2, 1990, 1:80,000, NAD83
 Chart 16760, 8th edition, September 28, 1990, 1:300,000, NAD83

All positions are on the NAD 83 datum and depths have been corrected to Mean Lower Low Water using preliminary tides.

Feature	Depth (fm)	Latitude (N)	Longitude (W)	Position #	Depth (m)
Shoal	5	59:58:34.25	139:31:53.04	75149	9.6
Shoal	10	59:58:39.76	139:31:47.29	75223	18.3
Shoal	1 3/4	59:59:34.00	139:29:49.99	77153	3.4
Shoal	1 1/4	60:00:19.71	139:35:15.04	31369	2.5
Shoal	2	60:00:31.47	139:34:37.13	31202	3.9
Shoal	2 1/4	59:59:46.48	139:30:48.32	20511	4.3
Shoal	10	59:58:43.58	139:33:24.88	180787	18.3

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-O351-RA-99 and Danger to Navigation message RA-09-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

Sincerely,

Daniel R. Herlihy
 Commander, NOAA
 Commanding Officer

Attachment

cc: NIMA
 PMC
 N/CS261
 N/CS34



List of Horizontal Control Stations ✓

NAME	year established	ellipsoidal height (m)	STATE	TYPE	LATITUDE	LONGITUDE	SITE ID	source of position
HAENKE	1974	28.1	AK	DGPS Flyaway	59 58.2961N	139 32.8992W	n/a	NOAA Ship RAINIER

GEOGRAPHIC NAMES

H-10902

*REC'D
11/2000*

Name on Survey	A		B		C		D		E		F		G		H		K	
	ON CHART NO.	16761	ON PREVIOUS SURVEY NO.	CON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST									
ALASKA (title)	X		X															1
BANCAS POINT	X		X															2
DISENCHANTMENT BAY	X		X															3
HAENKE GLACIER	X		X															4
HAENKE ISLAND	X		X															5
HUBBARD GLACIER	X		X															6
MILLER GLACIER			X															7
OSIER ISLAND	X		X															8
RUSSELL FIORD	X		X															9
TURNER GLACIER	X		X															10
YAKUTAT BAY	X		X															11
																		12
																		13
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Approved:
Dennis J. Koresky
DEC 29 1999



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 17, 2000

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O351-RA-99
HYDROGRAPHIC SHEET: H-10902

LOCALITY: Yakutat Bay, Disenchantment Bay, AK
TIME PERIOD: June 15 - 20, 1999

TIDE STATION USED: 945-3220 Yakutat, AK
Lat. 59° 32.9'N Lon. 139° 44.0'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.804 meters

TIDE STATION USED: 945-3196 Disenchantment Bay, AK
Lat. 60° 02.9'N Lon. 139° 33.6'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.748 meters

TIDE STATION USED: 945-3178 Russell Fjord, AK
Lat. 59° 56.3'N Lon. 139° 24.0'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.885 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: CA11, CA12, CA13, CA14, CA15, CA16,
CA17, CA18, CA19 & CA20.

Refer to attachments for zoning information.

Note : Provided time series data are tabulated in metric units
(Meters), relative to MLLW and on Greenwich Mean Time.

Thomas V. Mero 2/17/00
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION



Final tide zone node point locations for OPR-O351-RA-99,
Sheet H-10902.

Format: Longitude in decimal degrees (negative value denotes
Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone CA11			
-140.150361 59.57692	945-3220	0	1.00
-140.3415 59.701869			
-139.872249 59.990643			
-139.604738 60.00269			
-139.572199 59.988335			
-139.548616 59.971305			
-139.536805 59.965426			
-139.536805 59.965426			
-139.535705 59.960788			
-139.524183 59.950686			
-139.422817 59.678711			
-139.674651 59.516326			
-140.150361 59.57692			
Zone CA12			
-139.536805 59.965426	945-3196	0	1.02
-139.548616 59.971305			
-139.572199 59.988335			
-139.604738 60.00269			
-139.576797 60.024654			
-139.55737 60.037051			
-139.54223 60.045831			
-139.52445 60.056688			
-139.511364 60.035807			
-139.500022 60.012878			
-139.505296 60.004529			
-139.515202 59.99351			
-139.523918 59.983574			
-139.533485 59.973973			
-139.536805 59.965426			

Zone CA13

-139.55737 60.037051	945-3196	0	1.00
-139.567016 60.044331			
-139.554579 60.051197			
-139.54223 60.045831			
-139.55737 60.037051			

Zone CA14

-139.524183 59.950686	945-3196	+12	1.00
-139.535705 59.960788			
-139.536805 59.965426			
-139.533485 59.973973			
-139.523918 59.983574			
-139.515202 59.99351			
-139.505296 60.004529			
-139.500022 60.012878			
-139.496104 60.008191			
-139.499366 60.001758			
-139.501867 59.98507			
-139.506234 59.970476			
-139.524183 59.950686			

Zone CA15

-139.496104 60.008191	945-3196	+24	0.96
-139.489255 60.00526			
-139.493531 59.98748			
-139.501867 59.98507			
-139.499366 60.001758			
-139.496104 60.008191			

Zone CA16

-139.48157 60.001982	945-3196	+42	0.89
-139.489255 60.00526			
-139.493531 59.98748			
-139.486226 59.988427			
-139.48157 60.001982			

Zone CA17

-139.48157 60.001982	945-3178	-48	1.19
-139.468759 60.002653			
-139.478676 59.987262			
-139.486226 59.988427			
-139.48157 60.001982			

Zone CA18

-139.468759 60.002653	945-3178	-30	1.09
-139.478676 59.987262			
-139.470016 59.981869			
-139.454921 60.002199			
-139.468759 60.002653			

Zone CA19

-139.470016 59.981869	945-3178	-12	1.03
-139.462291 59.979489			
-139.454485 59.983543			
-139.443024 59.986571			
-139.429717 59.988779			
-139.414916 59.988888			
-139.418399 59.997069			
-139.428846 60.001867			
-139.454921 60.002199			
-139.470016 59.981869			

Zone CA20

-139.462291 59.979489	945-3178	0	1.00
-139.444886 59.944772			
-139.392297 59.920813			
-139.350683 59.932418			
-139.374658 59.966847			
-139.414916 59.988888			
-139.429717 59.988779			
-139.443024 59.986571			
-139.454485 59.983543			
-139.462291 59.979489			

Final Tidal Zoning for OPR-O351-RA-99 Yakutat Bay, AK - Sheet H-10902

Note: See second graphic for time and range correctors in small zones.

945-3196 DISENCHANTMENT BAY

UNITED STATES
ALASKA - SOUTH COAST
YAKUTAT BAY

Scale 1:50,000 at Lat. 59°45'
North American Datum of 1983
SOUNDINGS IN FATHOMS
AT LOW WATER TO 11 FATHOMS
AT SMALL LETTERS LOW WATER

16 METERS
Height in feet above Mean High Water

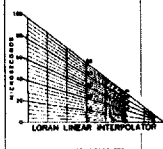
AUTHORITY
Underwritten and published by the National Oceanic and Atmospheric Administration, Office of Hydrography, Washington, D.C. 20315

HORIZONTAL DATUM
The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83). The datum is based on a geocentric datum and is not related to the Mean Sea Level datum used for the soundings on this chart.

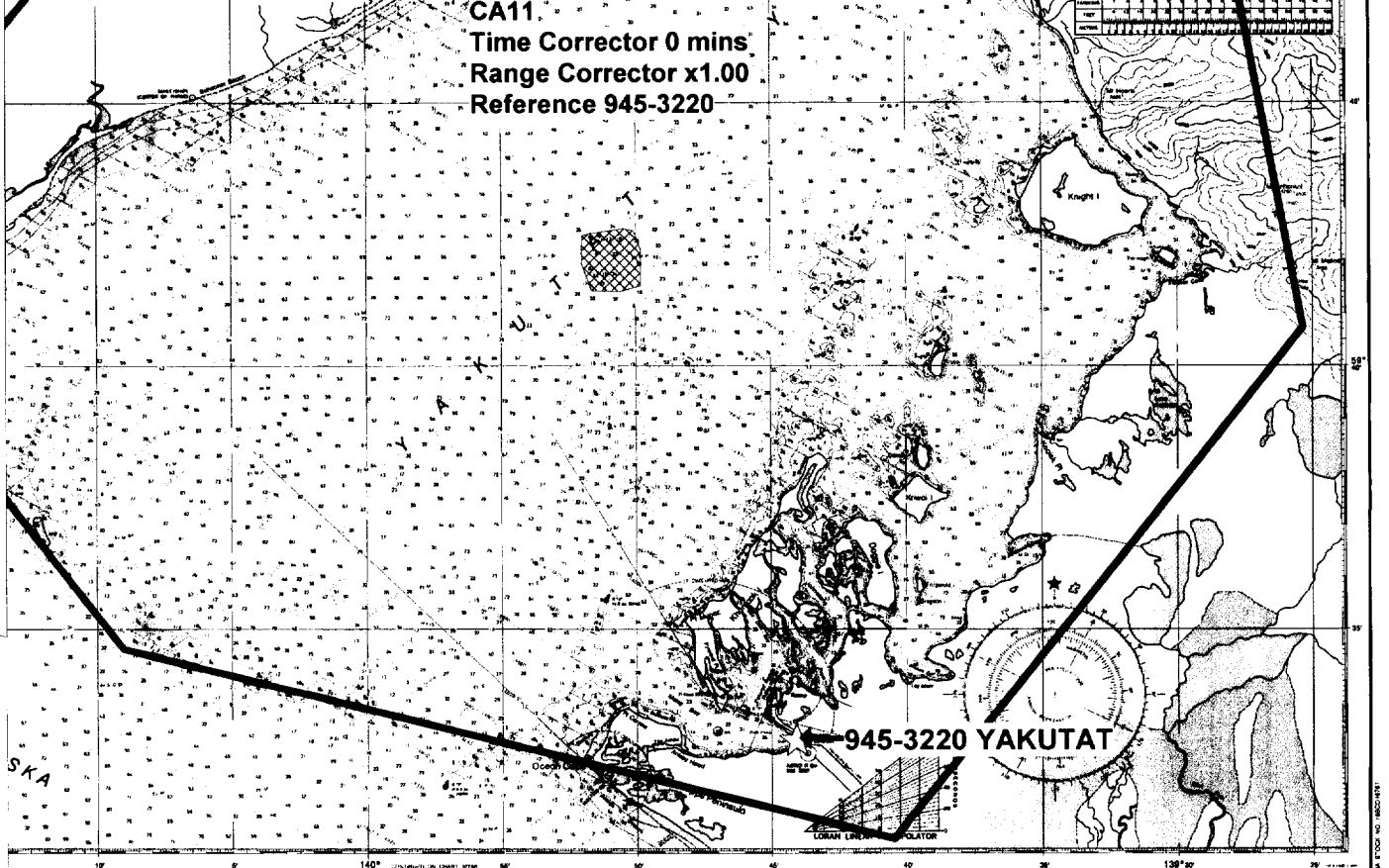
945-3178 RUSSELL FJORD

LORAN-C
GENERAL EXPLANATION
CHANGED FREQUENCY
RANGE DIRECTIONAL VERTICAL
EXAMPLE 1987
RATES ON THIS CHART
7900-X 7900-Y
CAUTION
This chart is not to be used for navigation purposes. It is intended for use as a reference only. It is not to be used for navigation purposes. It is not to be used for navigation purposes.

ADDITIONAL INFORMATION
Consult the Chart Part B for important supplemental information.
CAUTION
This chart is not to be used for navigation purposes. It is intended for use as a reference only. It is not to be used for navigation purposes. It is not to be used for navigation purposes.



HOW TO USE THE WEATHER BROADCASTS
The National Weather Service issues weather forecasts, general information, marine weather forecasts, and other information. The charts on this chart are based on the information provided in the weather broadcasts.



CA11
Time Corrector 0 mins
Range Corrector x1.00
Reference 945-3220

945-3220 YAKUTAT

LORAN-C OVERPRINTED 16761

16761

Final Tidal Zoning for OPR-O351-RA-99 Yakutat Bay, AK - Sheet H-10902



NATIONAL OCEAN SERVICE

UNITED STATES

SOUTH COAST

TAT BAY

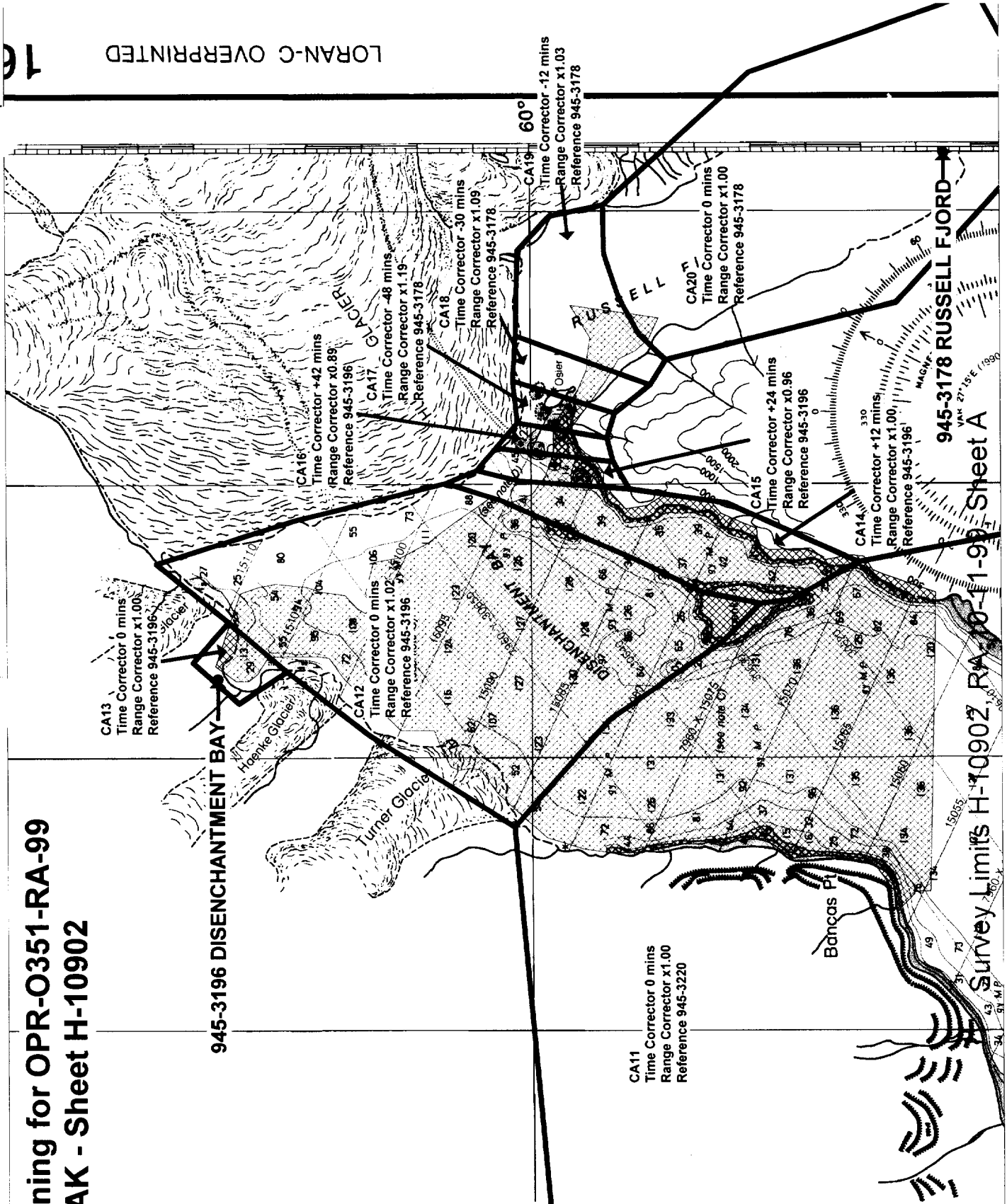
Chart Projection
30,000 at Lat. 59°45'
Spheroid Datum of 1983
Geoid System 1984

HEIGHTS IN FATHOMS
AND FEET TO 11 FATHOMS
IN LOWER LOW WATER

HEIGHTS
Set above Mean High Water.

AUTHORITIES
Surveyed by the National Ocean Service,
with additional data from the U.S.

HORIZONTAL DATUM
Reference datum of this chart is North
1983 (NAD 83) which for charting
is equivalent to the World Geodetic
System 1984. Geographic positions referred to
Datum of 1927 must be corrected an
amount of 5.985' westward to agree





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER
July 21, 1999

MEMORANDUM FOR: CDR James Gardner
Chief, Pacific Hydrographic Branch

THROUGH: RADM Nicholas A. Prah
Director, Pacific Marine Center

FROM: *Daniel R. Herlihy*
CDR Daniel R Herlihy
Commanding Officer

SUBJECT: Survey Data Transmittal Delay

There will be a delay in the transmission of survey data for projects OPR-O340-RA-99 and OPR-O351-RA-99. The transmission of data will exceed four weeks from completion of field work.

The surveys affected are H-10866 (RA-10-4-99), H-10865 (RA-10-5-99), H-10869 (RA-10-6-99), H-10870 (RA-10-7-99), H-10879 (RA-10-8-99), H-10880 (RA-20-3-99), H-10882 (RA-20-4-99), H-10883 (RA-10-9-99), F-00451 (RA-10-10-99), and H-10902 (RA-10-11-99). There are numerous reasons for this delay including, but not limited to, use of untested software for the acquisition of data, lack of experienced personnel, and the need to efficiently use the vessels as acquisition platforms while processing data already collected. In addition, the Commanding Officer and Field Operations Officer rotated during the summer inport; there was a ramp up period on the above projects to allow for adequate review.

The four week submittal of survey data recommendation noted in the Field Procedures Manual (FPM) does not reflect knowledge of current data acquisition and processing timelines. As you know, the shallow water multibeam (SWMB) systems allow for extremely large data sets to be collected in a very short amount of time. The processing of these data sets takes a much longer amount of time than does the processing of single beam data. In fact, the ratio of time processing SWMB data to time collecting SWMB data is 4:1. In comparison, the ratio of processing single beam data to the collection of single beam data is 1:3. The FPM should be updated to recognize the larger amount of time needed to process SWMB data by the field units. It is recommended that the FPM be changed to allow eight weeks for the submittal of survey data from the date of field work completion.

The anticipated transmittal date for the above mentioned surveys is the beginning of August 1999.



APPROVAL SHEET

for

H10902

RA-10-11-99

Standard field surveying and processing procedures were followed in producing this survey in accordance with the NOS Hydrographic Surveys Specifications and Deliverables; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998.

The field sheet and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and Forwarded,

Daniel R. Herlihy, CDR NOAA
Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

NOAA FORM 77-27(H) (9-83)		U.S. DEPARTMENT OF COMMERCE		REGISTRY NUMBER		
HYDROGRAPHIC SURVEY STATISTICS				H-10902		
RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.						
RECORD DESCRIPTION		AMOUNT		RECORD DESCRIPTION		
MOOTH SHEET		1		SMOOTH OVERLAYS: POS., ARC, EXCESS		
DESCRIPTIVE REPORT		1		FIELD SHEETS AND OTHER OVERLAYS		
DESCRIP- TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR- GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	1					
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						
SHORELINE DATA						
SHORELINE MAPS (List): GC-10443 and GC-10445						
PHOTOBATHYMETRIC MAPS (List): NA						
NOTES TO THE HYDROGRAPHER (List): NA						
SPECIAL REPORTS (List): NA						
NAUTICAL CHARTS (List): 16761 15th Edition, March 6, 1999						
OFFICE PROCESSING ACTIVITIES <i>The following statistics will be submitted with the cartographer's report on the survey</i>						
PROCESSING ACTIVITY				AMOUNTS		
				VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET						
POSITIONS REVISED						
SOUNDINGS REVISED						
CONTROL STATIONS REVISED						
				TIME-HOURS		
				VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION						
VERIFICATION OF CONTROL						
VERIFICATION OF POSITIONS						
VERIFICATION OF SOUNDINGS						
VERIFICATION OF JUNCTIONS						
APPLICATION OF PHOTOBATHYMETRY						
SHORELINE APPLICATION-VERIFICATION						
COMPILED OF SMOOTH SHEET				226		226
COMPARISON WITH PRIOR SURVEYS AND CHARTS						
EVALUATION OF SIDE SCAN SONAR RECORDS						
EVALUATION OF WIRE DRAGS AND SWEEPS						
EVALUATION REPORT					18	18
GEOGRAPHIC NAMES						
OTHER (Chart Compilation)					60	60
USE OTHER SIDE OF FORM FOR REMARKS			TOTALS	226	78	304
Pre-processing Examination by R. Davies				Beginning Date 8/25/99	Ending Date 2/18/2000	
Verification of Field Data by B. Olmstead				Time (Hours) 226	Ending Date 2/27/2000	
Verification Check by				Time (Hours)	Ending Date	
Evaluation and Analysis by B. Olmstead				Time (Hours) 18	Ending Date 6/14/2000	
Inspection by D. Hill				Time (Hours) 7	Ending Date 6/23/00	

EVALUATION REPORT H10902

A. PROJECT

The hydrographer's report contains a complete discussion of the project information.

B. AREA SURVEYED

The survey area is adequately described in the hydrographer's report except as follows.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey area. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operations and should be retained as charted. Page-size plots of the charted area depicting the specific limits of supersession accompanies this report as Attachments 1 and 2.

The bottom consists mainly of gray silt. Depths generally range from one fathom along the shoreline and in areas of shoal developments, to between 100 and 130 fathoms along the central portions of Disenchantment Bay.

C. SURVEY VESSELS

Survey vessels are adequately discussed in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The acquisition and processing of data in the field has been adequately addressed in the hydrographer's report, section D.

Office processing of survey data was conducted using the same Computer Aided Resource Information System (CARIS) and Hydrographic Processing System (HPS) used by the hydrographer. MicroStation 95 was used during office processing to compile the smooth sheet.

Processed digital data for this survey exists in the standard HPS format, a database format using the .dbf extension. In addition, the smooth sheet drawing is filed in the MicroStation format, i.e., .dgn extension. Copies of these files have been forwarded to the Hydrographic Surveys Division and a backup copy retained at PHB. Database records forwarded are in the Internal Data Format (IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data are plotted using a Universal Transverse Mercator (UTM) projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar equipment was not used during survey H10902

F. SOUNDING EQUIPMENT

Sounding equipment has been adequately addressed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

Soundings and elevations below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. Additional

reducers for multibeam survey data include heave, pitch and roll. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, soundings and elevations have been reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW) as appropriate with verified tide correctors obtained from the Center for Operational Oceanographic Products and Services (CO-OPS). The correctors are zoned from tide gages Yakutat, Alaska, 945-3220, Disenchantment Bay, Alaska, 945-3196 and Russell Fiord, Alaska, 945-3178.

H. CONTROL STATIONS

Control stations are adequately discussed in the hydrographer's report.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 datum by applying the following corrections:

Latitude: -1.090 seconds (-33.720 meters)
Longitude: 6.139 seconds (95.162 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 4.0 for 1:10,000 was computed for survey operations. The quality of some positions exceeded limits in terms of HDOP. These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable. NAD 83 is used as the horizontal datum for plotting and position computations.

DGPS performance checks were not conducted in the field. Additional information concerning specific control system type, calibrations and system checks, can be found in the hydrographer's report and the separates related to horizontal position control and corrections to position data. The evaluation report, section P, contains information regarding performance check requirements.

J. SHORELINE

Shoreline maps GC10443 and GC10445 were compiled on NAD 83 and apply to this survey. Shoreline drawn on the smooth sheet in black originates from the above digital data as provided by the Coastal Mapping Program. The shoreline data and the hydrographic data were merged in MicroStation during the compilation of the smooth sheet.

There were no MHW revisions delineated during this survey. The hydrographer was only able to approach Hubbard Glacier within 400-500 meters using radar to approximate the glacier limits. Based on radar positioning, it appears that the 1998 photography is still accurate. However, the mean high water line will be subject to constant change as the glaciers in Disenchantment Bay continue to recede and advance.

The shoreline maps and the results of the fieldwork as portrayed on the smooth sheet should supersede charted shoreline.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

There are no contemporary hydrographic surveys that junction H10902. Reconnaissance survey, D00130 (1999), was conducted southeast of the present survey in Russell Fiord. However, there is no depth data common to either survey.

M. COMPARISON WITH PRIOR SURVEYS

The following prior surveys fall within the common area of the present survey and have been compared with during office processing.

Survey	Year	Scale	Datum
H9779	1978	1:20,000	NAD 27
F00435	1997	1:10,000 & 1:60,000	NAD 83

Prior surveys H9779 and F00435 are the source data for the existing chart. These surveys were conducted using single beam echo sounders with the additional use of side scan sonar in 1997 to investigate AWOIS item 50584. Positioning was accomplished using MiniRanger in 1978 and DGPS during 1997 survey work. Comparison with H9779 was made using a digital raster copy. The registration and legibility of this prior work to the present survey was satisfactory. Comparison with survey F00435 was made using a film copy of the smooth sheet.

F00435 comprises four distinct surveyed areas, two of which are in the common area of the present survey; AWOIS 50584 (1:10,000) situated approximately 15 nautical miles south of Bancas Point, and the area around Haenke Island, Turner, Miller, and Hubbard Glaciers (1:60,000). A comparison of soundings with F00435 reveals general differences of 0.5-1 fathom in depths to 100 fathoms. There appears to be no consistently deeper or shoal bias. Differences of 1-2 fathoms are readily evident in depths over 100 fathoms with the present survey shoal biased. A comparison with the estimated mean high water line shown on F00435 in the areas of Turner and Hubbard Glaciers shows significant change. Turner Glacier has receded several hundred meters since 1997 and Hubbard Glacier has advanced from 100-200 meters farther into Disenchantment Bay.

The present survey investigation of AWOIS item 50584 found a least depth of 13 fathoms at latitude 59°42'24N, longitude 139°51'06W. This depth is approximately 1350 meters northwest of a 13.2-fathom sounding found in 1997 at latitude 59°41'43.5N, longitude 139°51'36W. In addition, a depth of 13.3 fathoms was found during the present survey very near the prior depth. The evaluator recommends charting both 13-fathom depths from the present survey.

Several soundings were transferred from survey F00435 in red along the western side of Hubbard Glacier and along the western shoreline of Disenchantment Bay between Turner and Miller Glaciers. The present survey did not approach these areas due to glacial activity and the threat to safe navigation.

Survey H9779 encompasses the entire area of the present area but has been superseded in part by survey F00435. A comparison of soundings with survey H9779 shows a consistent 1 fathom shoaler bias in depths to 120 fathoms with the 1978 survey work. However, much larger differences are readily evident in depths exceeding 120 fathoms. General differences range from 6-10 fathoms throughout the central portions of Disenchantment Bay and from 10-20 fathoms directly west and southeast of Hubbard Glacier. The prior survey mean high water line at the entrance to Russell Fiord now falls in present depths exceeding ten fathoms. Other than in the areas of the glaciers, the shoreline from Haenke Island south to Bancas, appears to be have the same shape and configuration as shown on the 1998 photography. The following features were not adequately addressed during the present survey and have been transferred in violet from the prior survey.

Feature	Latitude (N)	Longitude (W)
Rock, cov 2 ft	59°58'26	139°32'51
Rock, cov 2 ft	59°58'26.5	139°32'46
Ledge	59°58'40	139°30'24

The large depth differences with H9779 are mostly the result of glacial activity since 1978. The evaluator feels the smaller changes when comparing to both prior surveys are attributed to a combination of dynamic bottom changes associated with glacial activity, along with better bottom coverage, improved sounding techniques, and relative accuracy of the data acquisition methods. A more thorough coverage of the area utilizing the shallow

water and intermediate depth multibeam systems has provided better definition of the bottom in Disenchantment Bay. Additional information can be found in the hydrographer's report sections L and N.

With the transfer of the items listed above, survey H10902 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

There were four AWOIS items assigned for investigation within the survey area. AWOIS items 52417 and 52418 were not investigated since they are now located beneath Hubbard Glacier. The evaluator recommends that these items be considered resolved based on the activity of the glacier over the past twenty-two years. AWOIS item 52416 was not adequately investigated and should be considered unresolved. However, dynamic changes to the shoreline have taken place in this area and the wreck now plots approximately two hundred meters north of the existing shoreline. The current edition of the chart does not show this feature. AWOIS 50584 has been adequately addressed in the hydrographer's report, section M.

O. COMPARISON WITH CHART

Survey H10902 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
16761	15th	March 6, 1999	1:80,000

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and has been adequately addressed in section M of the evaluation report, and in the hydrographer's report, section N. The shoreline shown on Chart 16761, 15th Edition, appears to be a combination of 1998 photography, estimated shoreline from F00435 in the vicinity of Turner and Miller Glaciers and possibly older photography around Hubbard Glacier. The shoreline on the west side of Disenchantment Bay, approximately 1.5 nautical miles north of Bancas Point, appears to be offset in a westerly direction. Other than in the areas of the glaciers, shoreline agreement with the remainder of the chart is good. The evaluator recommends that the latest photography be used to update the entire shoreline within Disenchantment Bay.

The charted rock located at latitude 59°30'42N, longitude 139°36'35W was not investigated during survey operations and should be retained on the chart. The source of this rock is unknown. The notes pertaining to glacial activity and shoaling at the head of Disenchantment Bay should be retained as charted.

The application of this survey to charts of a scale less than 1:40,000 may require the generalization of features such as ledges, and reefs. The recommended charting disposition of specific ledges or reefs is their depiction as isolated rocks. The application of this survey to charts of a scale greater than 1:40,000 may be accomplished without generalization of features. Additional discussion can be found in the hydrographer's report, sections N, R, and S.

Except as mentioned above, survey H10902 is adequate to supersede charted hydrography within the common area.

b. Dangers To Navigation

Seven dangers to navigation were identified during survey operations. These dangers were reported to the USCG, NIMA, N/CS261, and N/CS 34 on August 20, 1999. There were no additional dangers to navigation found during office processing.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H10902 is adequate to:

- Delineate the bottom configuration, determine least depths, and draw the required depth curves;
- Reveal there are no significant discrepancies or anomalies requiring further investigation; and
- Show the survey was properly controlled and soundings are correctly plotted.

With the exception of the following, the hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, the NOS Hydrographic Surveys Specifications and Deliverables, and the Field Procedures Manual, April 1998 Edition.

The geographic positions listed below each mark the central portion of an area measuring from 600 meters long and from 150-600 meters wide that could not be surveyed due to standing ice. These inaccessible portions of the survey area are located in depths of 50 to over 100 fathoms and will have little negative effect on the quality of nautical charts if compiled at scales smaller than 1:40,000.

<u>Latitude(N)</u>	<u>Longitude(W)</u>
60°00'39	139°33'45
60°00'06	139°31'48
59°59'15	139°33'15
60°01'12	139°33'15
59°58'42	139°32'48
59°56'33	139°33'12

The following deficiencies were noted with the DGPS flyaway station set up on Haenke Island. Performance checks were not conducted in accordance with the Field Procedures Manual. Performance checks shall be performed at the beginning and end of every project and at intervals not to exceed 10 days. Further, there was no site monitoring tests conducted. Before a portable reference site can be used to control a survey, the site must be monitored for twenty-four hours ("Scatter Plot Test") to confirm that no multi-path or other site-specific problems exist. However, office review of the data revealed no indication of significant positional problems. Reference the FPM, sections 3.3 and 3.2.2.1.

There is no requirement to discuss sounding comparisons and or features that originate from prior surveys already mentioned in section L and or Section M, Item Investigations. Reference the FPM, Figure 5.3. Descriptive Report Check off List.

The geographic position for the Disenchantment Bay tide gage as listed in the hydrographer's report, section G, disagrees by 300 meters with the position shown on the approved tide note. Both positions are in disagreement by approximately 800 meters with the bottom sample and detached position plot as provided by the field. The true position of the gage is unknown and the evaluator has shown the tide gage on the smooth sheet based on the field plot.

Some anomalous soundings were acquired during this survey. They originate from the poor performance of the echo sounder on steep slopes, which may have been surveyed at excessive vessel speed. The hydrographer attempted in many cases to correct the problem by editing the raw sounding data, however, the quality of the echo sounder trace is so poor in some areas that the edits are likely based on judgement rather than quantifiable data. Office review of the problem has determined that, with the exception of obviously erroneous depths, further editing is not reasonable since no correction is possible to improve the quality of the trace. The judgment of the hydrographer has been accepted and generally the data was not altered during office processing. Generally, the affected depths are deep, in excess of 50 fathoms, and will have little negative effect on the quality of nautical charts if compiled at scales smaller than 1:40,000.

Q. AIDS TO NAVIGATION

There are no fixed or floating aids to navigation within the survey area. There were no features of landmark value located and or recommended for charting within the area of this survey.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

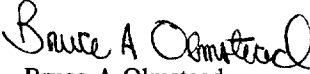
Miscellaneous information is adequately discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. The evaluator feels that as this area is in a constant state of change due to glacial activity and also popular as a tourist attraction, that consideration be given to periodically updating the chart with new survey information. Additional information regarding recommendations is found in the hydrographer's report.

U. REFERRAL TO REPORTS

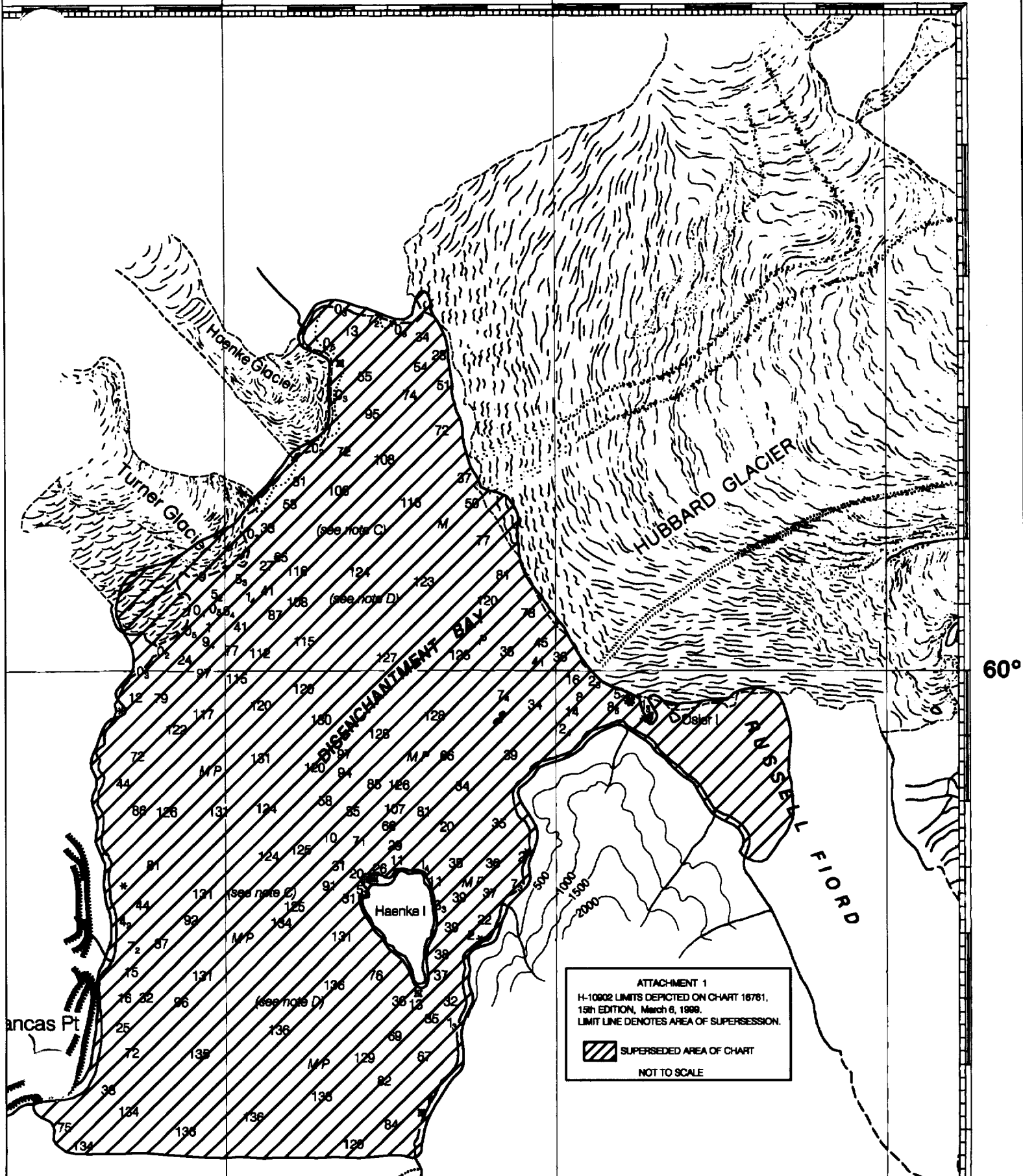
Referral to reports is adequately discussed in the hydrographer's report.


Bruce A Olmstead
Cartographer

35'

139°30'

25'



60°


ancas Pt

supplemental information concerning aids to navigation.

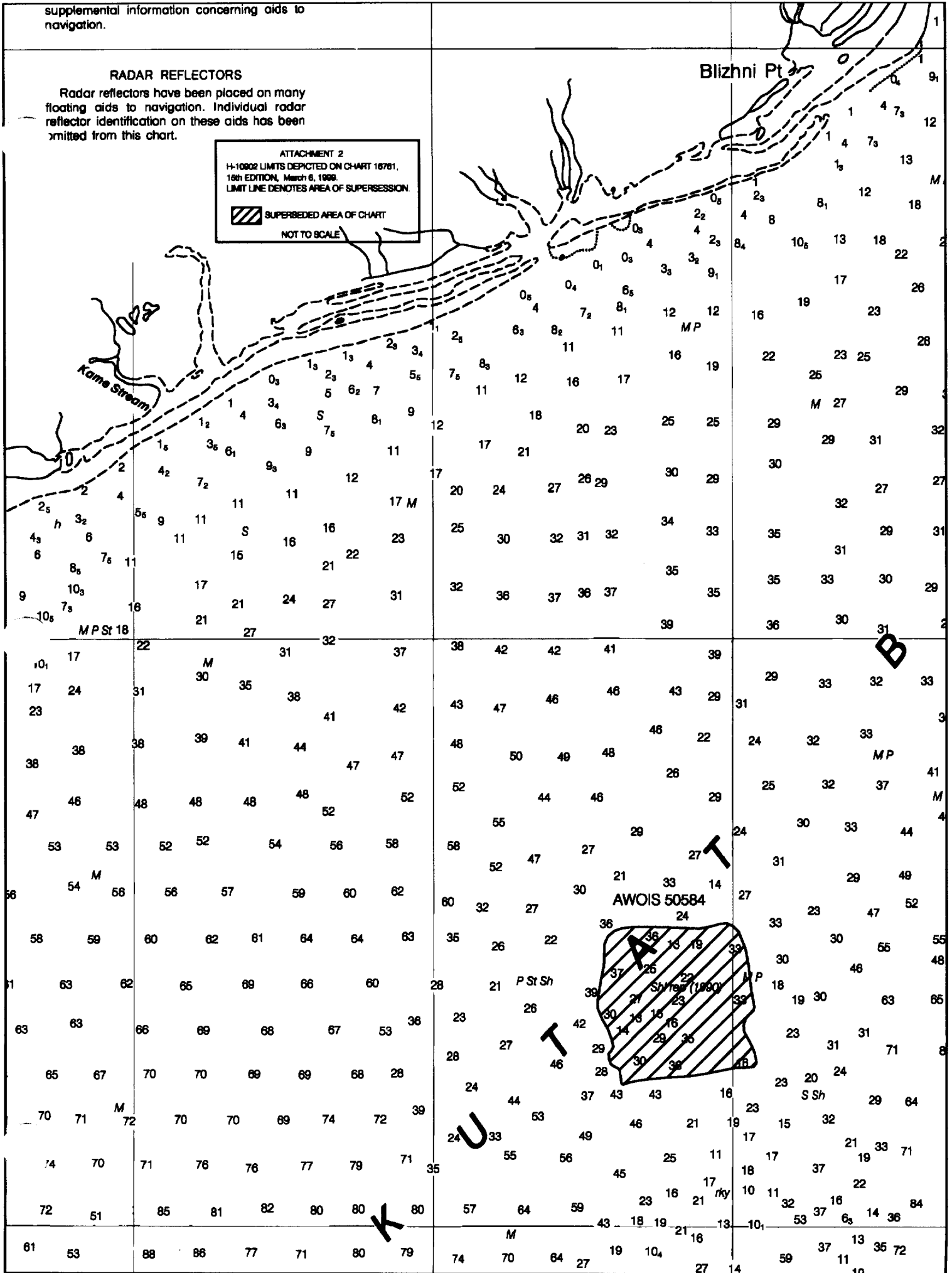
RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

ATTACHMENT 2
H-10902 LIMITS DEPICTED ON CHART 16761,
16th EDITION, March 6, 1999.
LIMIT LINE DENOTES AREA OF SUPERSESSION.

 SUPERSEDED AREA OF CHART


NOT TO SCALE



APPROVAL SHEET
H-10902


Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.



Dennis J. Hill
Chief, Cartographic Team
Pacific Hydrographic Branch
Date: 6-23-00

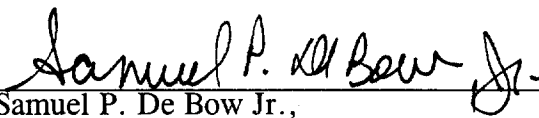
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.



James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch
Date: 6-23-00

Final Approval

Approved:



Samuel P. De Bow Jr.,
Captain, NOAA
Chief, Hydrographic Surveys Division
Date: July 28, 2000

