

H10883

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-10-09-99
Registry No. H-10883

LOCALITY

State Alaska
General Locality Lynn Canal
Sublocality Approach to Glacier Bay

1999

CHIEF OF PARTY
CAPT Alan D. Anderson, NOAA

LIBRARY & ARCHIVES

DATE JUL 23 2000

H-10883

HYDROGRAPHIC TITLE SHEET

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-10-09-99

State Alaska

General locality Lynn Canal

Locality Approach to Glacier Bay

Scale 1:10,000 Date of survey 5/10/99 - 5/20/99

Instructions dated March 5, 1998 * Project No. OPR-0340-RA

Vessel RA-1(2121), RA-3(2123), RA-6(2126)

Chief of party CAPT Alan D. Anderson, NOAA

Surveyed by RAINIER Personnel

Soundings taken by echo sounder, ~~hand lead, spot~~ Multibeam, DSF-6000N, Knudson 320M, Reson 8101ME

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: R. Shipley Automated plot by HP 1050L

Verification by D. Doles, M. Bigelow, R. Mayor, E. Domingo, R. Shipley

Soundings in fathoms ~~feet~~ at MLW MLLW data collected in Meters

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.

*Change #1 March 30, 1998
Change #2 April 12, 1999
Change #3 May 6, 1999

AWAIS / SURF 6/13/00 MCR

PROGRESS SKETCH

May, 1999

GPR-C940 RA-89
Lynn Canal, Alaska

Capt. A. D. Anderson
COMMANDING

Chart 17300

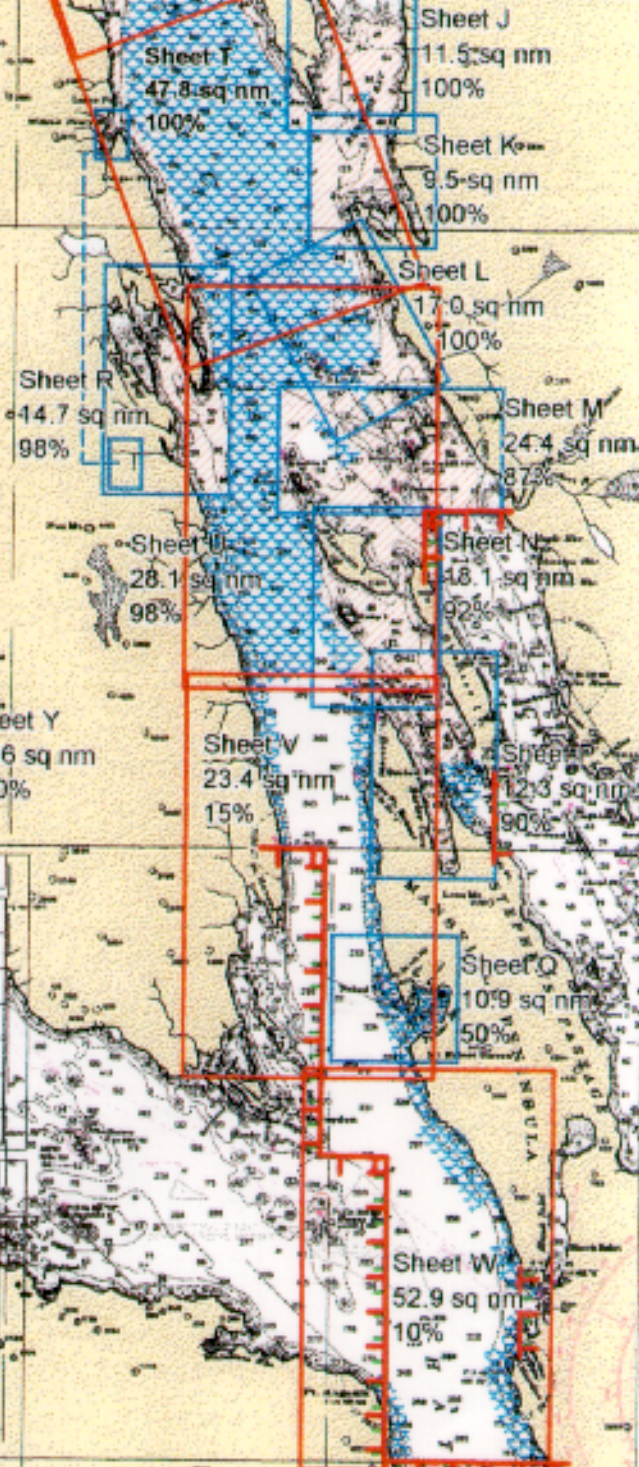


Downtime Type	April	May	June
Weather - Hr	0	0	
Mechanical -Hr	2	0	
Electronic -Hr	2	2	

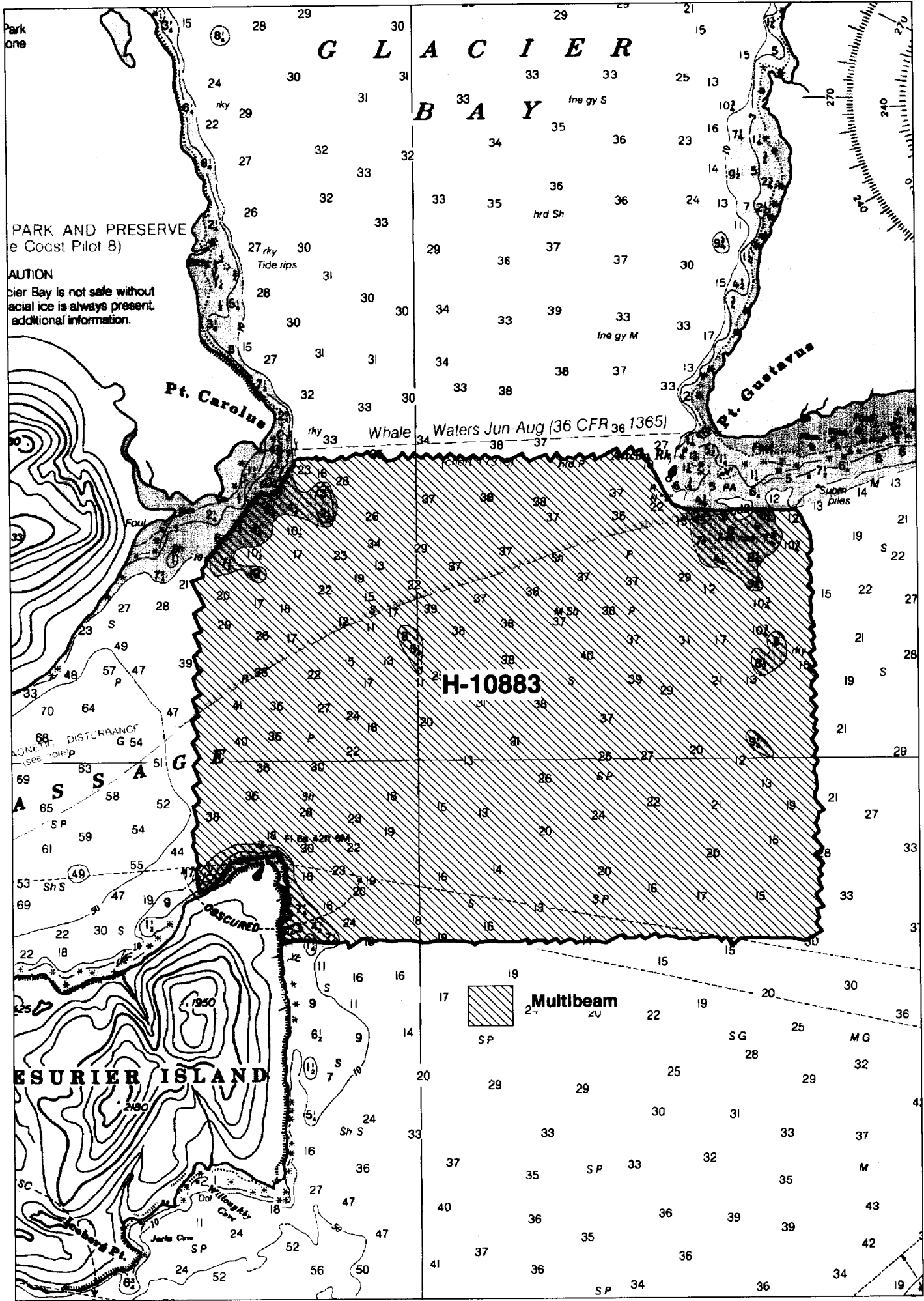
Sheet X
19.6 sq nm
100%

Accomplished	April	May	June
LNM Hydro	2910	679	
LNM SSS	0	0	
SQ NM	43.89	144.17	
AWOIS Invest.	0	9	
Other Invest.	0	4	
LNM Multibeam	174.4	1053.64	
Days at Sea	28	26	

Sheet	Reg No	Started	Percent	Completed	Submitted	SQNM
J	H-10860	4/6	100	5/24		11.5
K	H-10861	4/6	100	5/22		9.5
L	H-10862	4/8	100	5/25		17.0
M	H-10868	4/14	87			21.2
N	H-10865	4/14	92			16.7
P	H-10870	4/20	90			11.1
Q	H-10879	5/1	50			5.5
R	H-10869	4/18	98	6/2		14.4
T	H-10864	4/13	100	5/25		47.8
U	H-10880	5/3	98	6/2		27.5
V	H-10881	5/2	15			3.5
W	H-10882	5/6	10			5.3
Y	F00451	5/20	100	5/20		0.16
X	H-10883	5/10	100	5/20		19.6



Check for any other sheets in the area that may be needed to complete the survey. The sheets in this area are listed in the adjacent table. The sheets in this area are listed in the adjacent table. The sheets in this area are listed in the adjacent table.



Descriptive Report to Accompany Hydrographic Survey H10883

Field Number RA-10-09-99

Scale 1:10,000

May 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-0340-RA dated March 5, 1998, Change number 1, dated March 30, 1998, Change number 2, dated April 12, 1999, and Change number 3, dated May 6, 1999. Survey H10883 corresponds to Sheet X as defined in the sheet layout. This survey will provide contemporary hydrographic survey data as part of a continuing program to improve chart coverage of the Inside Passage in southeast Alaska. Requests for hydrographic surveys and updated charts in this area have been received from the Southeastern Alaska Pilot's Association (SEAPA) and the commercial fishing industry.

B. AREA SURVEYED ✓ SEE EVAL REPORT, SECTION B.

The survey area is located in Icy Strait, Alaska, at the Approach to Glacier Bay (see Figure 1 below). The survey's northern limit is latitude $58^{\circ}22'35''\text{N}$ and the southern limit is latitude $58^{\circ}18'29''\text{N}$. The survey's western limit is longitude $136^{\circ}03'23''\text{W}$ and the eastern limit is longitude $135^{\circ}53'38''\text{W}$. Project Instructions did not require the acquisition of data around the inshore areas of Point Carolus, Point Gustavus and the northernmost point of Lemesurier Island. Data acquisition was conducted from May 10, 1999 to May 20, 1999 (DN 130 to 140).

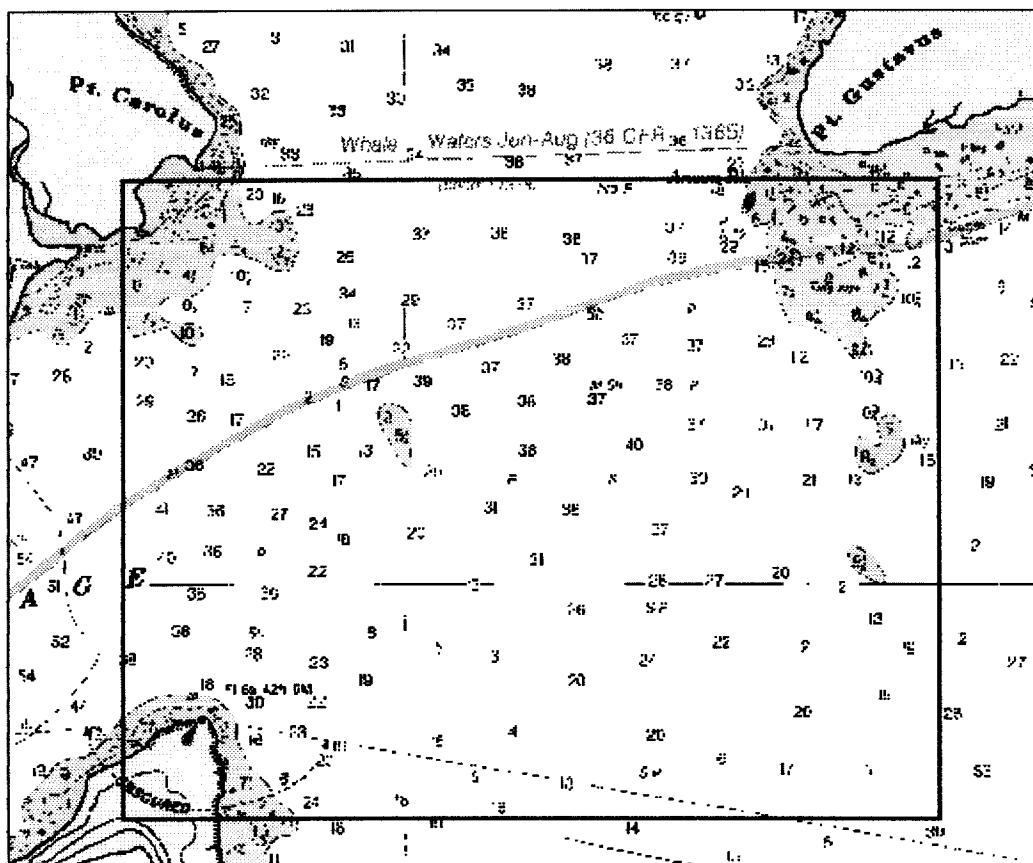


Figure 1 – Survey Area

C. SURVEY VESSELS

Data were acquired by RAINIER survey launches, vessel numbers 2121, ~~2122~~, 2123, ~~2125~~ and 2126 as noted in the Survey Information Summary included with this report. ^{**} See Project related data for OPR-O340-RA for vessel descriptions. No unusual vessel configurations or problems were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Coastal Oceanographic's HYPACK version 8.9 was utilized for vessel navigation and line tracking during acquisition of shallow water multibeam (SWMB) and SeaBeam 1050D MKII data. Preliminary processing was accomplished with HPS version 9.3 and MapInfo version 5.0. Final detached positions and soundings based on observed tides were saved in MapInfo format. Raster images registered in MapInfo facilitated chart and prior survey comparisons.

Shallow water multibeam (SWMB) echosounder data were acquired using the Reson SeaBat 8101 with ISIS version 4.25 and processed using CARIS HIPS software version 4.3.

Reson SeaBat 8101 depth data were reviewed with the CARIS Hydrographic Data Cleaning System (HDCS). Depth fliers were identified and manually flagged as "rejected". Vessel positioning and attitude data from each system were similarly displayed and manually cleaned. An automated utility was used to check positioning data for speed jumps greater than 2 knots, which were then examined manually by the hydrographer.

After review and cleaning, Reson 8101 depth, position and attitude data were merged with sound velocity, preliminary tide and dynamic draft correctors to compute the corrected depth and position of each sounding. These processed data were binned in a CARIS Workfile by selecting shoal soundings at a density of 5 meters x 5 meters. These excessed soundings were then suppressed in CARIS using a search radius of 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°.

Survey H10883 is defined as sheet 14 in HPS. The CARIS workfile name is defined as lynn_x, and the project name is identified as O340_Sheetx in HDCS.

All final plots were created in MapInfo using UTM Zone 8 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 SeaBat 8101 SWMB system provides a low-resolution digital SSS record of the SWMB swath. This SSS imagery is primarily used during final processing of SWMB depth data to aid in determining whether anomalous soundings are true features or noise. ~~CONCUR~~

F. SOUNDING EQUIPMENT ✓

Shallow water multibeam was the only category of echosounder system used for depth determination on survey H10883, and is described below.

* FILED WITH THE SURVEY RECORDS

2

** DO NOT CONCUR, SEE EVAL REPORT, SECTION P.

Launch Shallow Water Multibeam (VN 2121, 2123, 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 swath perpendicular to the vessel's heading. 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 heave, roll, pitch and yaw during survey operations. Serial numbers for the Reson 8101 and POS/MV are included in Appendix VI. *

It should be noted that vertical beam echosounders (VBES) were utilized as a quality assurance tool for SWMB. Vessels 2121, 2123 and 2126 are equipped with a Knudsen 320M, which is a dual frequency (100 kHz, 24 kHz) digital recording echosounder with an analog paper trace. Sounding data acquired by this system were used for two purposes: First, VBES depth data were compared online to nadir beams of the shallow water multibeam. A digital comparison between the two is displayed within the ISIS GUI interface. Second, during acquisition digital VBES data is sent to ISIS, which then focuses the shallow water multibeam on a variable "gate" determined from the VBES data. The latter is extremely helpful in areas of extreme relief, when the shallow water multibeam tends to lose bottom lock. VBES data were not used for final sounding plot compilation. VBES serial numbers are included in the Appendix VI. *

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Sound Velocity Correctors ✓

Twelve sound velocity casts were used for this survey. Information on the casts is included in the Survey Information Summary report.

The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 219, S/N 2477 and S/N 2543), calibrated November 13, 1998. Calibration reports are included with the project data for OPR-O340-RA-99. Velocity correctors were computed using the PC program VELOCWIN version 4 beta 2, which directly generates sound velocity correction tables for both CARIS and HPS. *

Vessel Offset Correctors ✓

The following table shows when the vessel offset correctors used for this survey were last measured:

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
2121	March 1999	OTF	March 1999	Port Angeles, WA
2123	March 1999	OTF	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-O340-RA-99. Offset tables # 1, #3, and #6 correspond to the last digit of the respective vessel number. Offset tables were applied to the raw sounding data in HPS during post processing.

Heave, Pitch, Roll and Heading, Including Biases and Navigation Timing Error

SWMB launches (VN2121, 2123 and 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°. Serial numbers are located in Appendix VI. *

SWMB launch Vessel Configuration Files (VCFs) were created within the CARIS program VCFEDIT, and applied to the sounding data during processing. VCF files define the physical relationships 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 patch tests conducted at Port Angeles, WA on March 26-28, 1999. A printout of each vessel's VCF are included in the Project Related Data for OPR-O340-RA, and the digital VCF files are included with the HDCS data.

Water Level Correctors ✓

Predicted tide tables were generated for both HPS and CARIS using Tides & Currents v2.5. Tide correctors for survey H10883 were based on Juneau (945-2210) reference station. Tide table HPS #14 was used only for preliminary inspection of the VBES soundings. CARIS tide table sheet_x.tid was also based on Tides & Currents and was used throughout the entire CARIS processing pipeline.

Once data acquisition was complete and all sounding data consolidated in HPS, Center for Operational Oceanographic Products and Services (CO-OPS) preliminary observed water levels for Juneau (945-2210) were downloaded from the Internet and used to create HPS table #1. The MapInfo tidal zoning table supplied by CO-OPS was then imported into HPS using the MapBasic application HPT_UTIL.MBX and HP Tools v.9.4.1. Tide zone correctors were then computed and applied to all soundings in HPS to produce a final sounding plot. Listings of HPS tide tables used for H10883 are included in the Separates of this report. *

Juneau, Alaska (945-2210), Sitka, Alaska (945-1600), and Skagway, Alaska (945-2400) are the primary control stations for datum determination. RAINIER personnel installed a Sutron 8200 tide gage at Point Gustavus (945-2421) on May 10, 1998, and the gage was removed on June 21, 1998. 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

OCTOBER 6, 1999 IS ATTACHED.

H. HYDROGRAPHIC POSITION CONTROL ✓ SEE EVAL REPORT, SECTION H.

The horizontal datum for this project is NAD 83. The control stations used for this survey are listed in Appendix III. See the OPR-O340-RA-99 Horizontal Control Report for more information.

ATTACHED TO THIS REPORT

All soundings were positioned using differential GPS. Primary control was the US Coast Guard Beacon at GUSTAVUS. DGPS reference station information is located in Appendix III of this report. Serial numbers for positioning equipment are included in Appendix VI.

Launch-to-launch DGPS performance checks were performed in accordance with Section 3.2 of the FPM. Differential corrections from two reference stations were received by the independent launch positioning systems as they were rafted together with their GPS antennae 2-3 meters apart. Copies of DGPS performance checks are included in the Separates.

I. SHORELINE ✓ *SEE EVAL REPORT, SECTION J.*

In accordance with the Project Instructions, no shoreline verification was conducted in this area. Shoreline for Point Carolus and Lemesurier Island was digitized using prior survey H10335, while shoreline for Point Gustavus was digitized using prior survey H10333. Prior survey shoreline is intended for orientation purposes only and is shown in brown on the DP and BS plot and Final Sounding plot as unverified shoreline.

concur

J. CROSSLINES

Multibeam crosslines generally agreed within 1 meter of mainscheme hydrography. Crosslines totaled 48.49 nautical miles, comprising 14.1% of SWMB hydrography. The Quality Control Report (CARIS HIPS) for the checkline file averaged a 0.1081 meter deviation from the reference surface, with an average standard deviation of .3280 meters. See Appendix VI for the detailed report. *

K. JUNCTIONS ✓

There are no contemporary surveys that junction with H10883. *concur*

L. COMPARISON WITH PRIOR SURVEYS ✓ *SEE EVAL REPORT, SECTION M.*

Seven prior surveys were compared to the H10883 area, and are shown in Figure 2 below.

Prior Survey Registry Number	Scale	Date Surveyed	Area Covered by Prior
H9638	1:5,000	1976	Mid-Northeast Corner of sheet
H10334	1:20,000	1990	Southeast border of sheet
H10335	1:10,000	1990	Western border of sheet
H9848	1:20,000	1979	North and West of sheet
H8816	1:20,000	1964	North and Center of sheet
H10333	1:10,000	1990	Northwest Corner and Center of sheet
H4310WD	1:40,000	1923	Entire sheet; except NW and SW corners

Prior survey H9638 soundings were found to be in general agreement, usually within 1 fathom of those from H10883. Least depths from the current survey were shoaler or in agreement with prior survey H9638.

Prior survey H10334 soundings were found to be in general agreement, usually within 1 meter of those from H10883. Least depths from the current survey were shoaler or in agreement with prior survey H10334. Notable exceptions were: a shoal area at 58°19'50.8"N, 135°59'26.9"W, revealed a present survey sounding of 23.3 meters while the prior survey depicted 24.7 meters; a shoal at 58°20'34.5"N, 135°59'51.5"W revealed a present survey sounding of 21.5 meters while the prior survey depicted 23.5 meters. *concur*

Prior surveys H10335 and H9848 were difficult to compare to H10883. The scans were of very poor quality; few least depths were discernible and many annotations on the priors were illegible. However, the soundings that were legible were in general agreement, usually within 1 meter. Present survey soundings were shoaler than either H10335 or H9848. *concur*

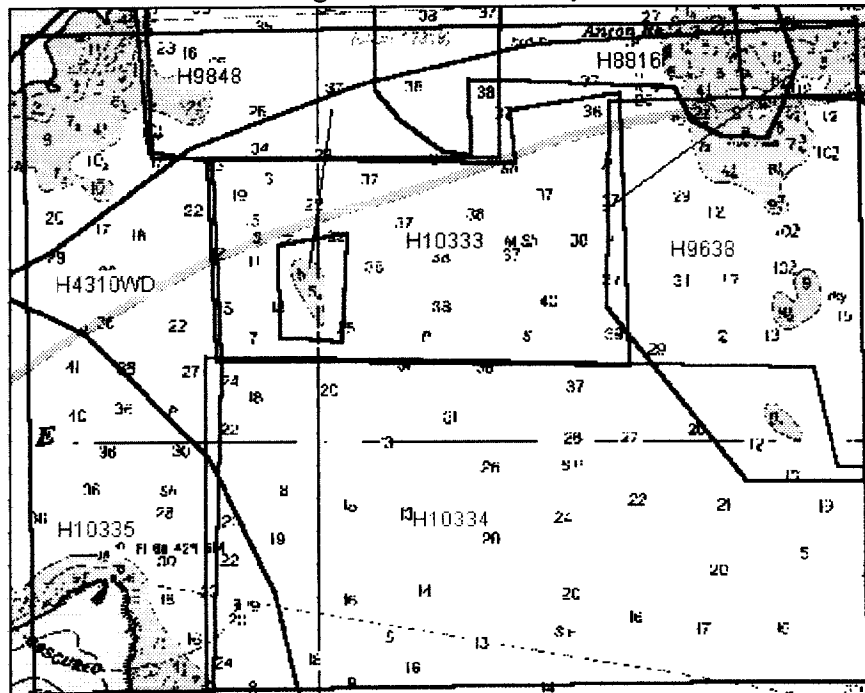
Prior survey H8816 soundings were found to be in general agreement, usually within 1/2 fathom of those from H10883. Least depths from the current survey were shoaler or in agreement with prior survey H8816. A notable exception is the area 300-750 meters east of the Ancon rock buoy. Several of the current soundings in that area are up to 2 fathoms shoaler than prior survey H8816. *concur*

Prior survey H10333 soundings were found to be in general agreement, usually within 1 meter of those from H10883. Least depths from the current survey were shoaler or in agreement with prior survey H10333. Some soundings were illegible on the prior. *concur*

Prior survey H4310WD was a wire drag survey. The drag clearances were well above the current soundings of H10883. However, some of the wire drag depths were illegible. *concur*

Some of the differences between the current survey and priors can probably be attributed to scale and improved modern positioning and sounding equipment. Final comparisons will be done at PHB after application of smooth tides.

Figure 2 – Prior Surveys



M. ITEM INVESTIGATION REPORTS ✓ SEE EVAL. REPORT, SECTION N.

One AWOIS item was assigned and investigated on survey H10883. *concur*

AWOIS 51792

1. Area of Investigation

AWOIS #: 51792

Reported Position: Latitude: 58/22/22 N ✓
Longitude: 135/55/06 W ✓

State and Locality: Glacier Bay, Alaska
Datum: NAD83

Type of Feature: Unknown; possible wreck

Reported Depth: Unknown

2. Description of Source Item

History

NM42/61—A 43 FT. Fishing vessel has been reported sunk about 500 yards east of Ancon Rock (58-22-30N, 135-55-30W); In Lat 58-22-24N, Long 135-55-00W(NAD27)(Scaled from chart 17302) (Entered MSM 5/90)

H10333/90—OPR-0186-RA; Wreck not located after an echo sounder search with 20 meter line spacing; search radius unknown; item was not assigned. Evaluator recommends retaining wreck as charted.

3. Survey Requirements

Echosounder search, bottom drag, diver investigation, and disproval by salvage documents. Search radius 200 meters. It should be noted that this item is located outside the assigned area for this survey.

4. Method of Investigation

Dive operations were conducted at 2 locations and limited to 50 meter search radii due to strong rip currents in the area. Search centers are located by detached positions 40919 and 40920. The item is in a non-navigable area and therefore was not investigated with VBES or SWMB echosounder.

5. Results of Investigation

Divers were unable to find any trace of the wreck within each search radius.

6. Comparison with Prior Surveys

Prior survey H10333 attempted to find the wreck with vertical beam echosounders at 20 meter spacing, but did not locate the wreck. The wreck was not depicted on any other prior survey.

7. Charting Recommendations

The 50 meter search radius was not sufficient to disprove the wreck. Although the wreck was not found, its charted position was approximated and the wreck could lie just outside the search radius. The hydrographer recommends retaining the dangerous wreck symbol, position approximated. *concur*

N. COMPARISON WITH THE CHART ✓ SEE EVAL. REPORT, SECTION O.

This survey was compared in the field to the following charts:

Chart	Scale	Edition Number	Date	Datum
17302	1:80,000	17 th	August 14, 1993	NAD 83
17300	1:209,978	27 th	August 14, 1993	NAD 83

The survey was compared with Chart 17302 and was in good agreement, generally within one fathom. Significant charted shoal areas are discussed below.

Chart 17302 depicts a shoal area at 58°20'59"N, 136°00'14"W with a least depth of 5 ¼ fathoms. The present survey revealed a least depth of 5.4 fathoms at 58°20'58"N, 136°00'08"W, and 58°20'55"N, 136°00'04"W.

Chart 17302 depicts a shoal area at 58°20'07"N, 135°54'40"W with a least depth of 9 ½ fathoms. The current survey revealed a least depth of 10.7 fathoms at 58°20'03"N, 135°54'35"W.

Chart 17302 depicts an 8 ½ - 9 fathom shoal area at 58°20'51"N, 135°54'23"W. The current survey revealed a least depth of 8.9 fathoms (in the vicinity of the charted 9 fathom depth) at 58°20'58"N, 135°54'12"W. In the vicinity of the charted 8 ½ fathom charted depth, the current survey revealed a least depth of 8.2 fathoms at 58°20'51"N, 135°54'27"W. See Dangers to Navigation below for additional information.

In the vicinity of 58°22'12"N, 136°01'36"W, chart 17302 depicts a 2 ½ - 3 fathom shoal area. Present survey depths revealed depths from 2.1 - 3.3 fathoms. See Dangers to Navigation below for additional information.

The Hydrographer recommends that present survey depths be used to supersede charted depths in their common areas.

Final sounding comparisons will be made at PHB after application of smooth tides.

Dangers to Navigation

Two Dangers to Navigation were discovered during processing of survey H10883 and reported to the Seventeenth Coast Guard District.

A shoal depth of 2.1 fathoms (submitted as a 2 fathom shoal) was discovered at 58°22'12.2"N, 136°01'29.8"W.

A shoal depth of 8.2 fathoms (submitted as an 8 fathom shoal) was discovered at 58°20'50.7"N, 135°54'27.5"W.

A copy of the Danger to Navigation Report is included in Appendix I.

O. ADEQUACY OF SURVEY

Survey H10883 is complete and adequate to supersede prior soundings in their common areas.

P. AIDS TO NAVIGATION

An attempt was made to position Lemesurier Island light, however, vegetation and topography prevented receiving a sufficient GPS signal. The light was adequately positioned in 1990 and appears to be in its charted location.

One floating aid to navigation was positioned using DGPS:

Ancon Rock Buoy #2

R N "2"

Light List #24190

Position number: 20000 and 20001 (DN 131)

	<u>Latitude</u>	<u>Longitude</u>
Charted Position:	58°22'22.9"N	135°55'56.1"W
Survey Position 20000:	58°22'24.9"N	135°56'00.3"W
Survey Position 20001:	58°22'23.6"N	135°56'00.2"W

	<u>Easting</u>	<u>Northing</u>
Charted Position:	445470	6470620
Survey Position 20000:	445403	6470682
Survey Position 20001:	445404	6470642

The buoy's characteristics match the Light List characteristics. The aid adequately serves its purpose, which is to mark the location of Ancon Rock. The aid is maintained by the USCG.

Q. STATISTICS ✓ SEE EVAL REPORT, SECTION P

Statistics are listed in the Survey Information Summary included with this report. **do NOT CONCUR**

R. MISCELLANEOUS ✓

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

There were no suitable anchorage areas within the sheet boundaries.

The survey area is a highly transited area with diverse traffic, from small miscellaneous craft to large cruise ships. A high number of commercial and sport fishing vessels were noted to frequent the area.

S. RECOMMENDATIONS ✓

The shoreline depicted on the "DP and BS Plot" and "Final Sounding Plot" should not be used for the purpose of changing the charted shoreline. It is displayed on the final plots for orientation purposes only. **CONCUR**

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-O340-RA Horizontal Control Report	July 1999	N/CS34
Project related data for OPR-O340-RA	July 1999	N/CS34
OPR-O340-RA Coast Pilot Report	July 1999	N/CS34

Respectfully Submitted,

Bradley H. Fritzler
Ensign, NOAA Corps

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer

List of Horizontal Control Stations

NAME	year established	ellipsoidal height	STATE	TYPE	LATITUDE	LONGITUDE	SITE ID	source of position
GUSTAVUS	n/a	n/a	AK	USCG Beacon	58 25.1000N	135 41.8000W	892	USCG



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
September 2, 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 H10883 in Icy Strait, southeast Alaska. The dangers are shown graphically on the attached chartlet.

The following dangers to navigation affects chart 17302, 17th Ed.; Aug 14, 1993, 1:80,000 and chart 17300, 27th Ed.; Aug 14, 1993, 1:209,978. The position is on the NAD 83 datum and depth has been corrected to Mean Lower Low Water using preliminary tides.

<u>Feature</u>	<u>Depth (fm)</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Depth (m)</u>
Shoal	2	58:22:12.20	136:01:29.80	4.0
Shoal	8	58:20:50.70	135:54:27.50	15.0

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-O340-RA-99 and Danger to Navigation message RA-10-99. 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



ADVANCE INFORMATION

Date: 9/2/1999

Sender: FOO Rainier

To: Dennis.Hill@noaa.gov, Inm@cgalaska.uscg.mil, navinfonet@nima.mil, Lynn [NDS-NCG22]
Preston, Chief Survey Technician Rainier

Priority: Normal

Subject: DTON Message RA-10-99

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 H10883 in Icy Strait, southeast Alaska. A letter with an attached chartlet showing the danger will be forwarded by mail.

The following dangers to navigation affects chart 17302, 17th Ed.; Aug 14, 1993, 1:80,000 and chart 17300, 27th Ed.; Aug 14, 1993, 1:209,978. The position is on the NAD 83 datum and depth has been corrected to Mean Lower Low Water using preliminary tides.

<u>Feature</u>	<u>Depth (fm)</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Depth (m)</u>
Shoal	2	58:22:12.20	136:01:29.80	4.0
Shoal	8	58:20:50.70	135:54:27.50	15.0

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-O340-RA-99 and Danger to Navigation message RA-10-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

APPROVAL SHEET

for

H10883

RA-10-09-99

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

for -



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 6, 1999

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-0340-RA
HYDROGRAPHIC SHEET: H-10883

LOCALITY: Approach to Glacier Bay, AK
TIME PERIOD: May 10 - May 20, 1999

TIDE STATION USED: 945-2542 Point Gustavus, AK
Lat. 58° 22.9'N Lon. 135° 55.6'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.056 meters

TIDE STATION USED: 945-2437 Excursion Inlet (South End), AK
Lat. 58° 25.0'N Lon. 135° 26.8'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.248 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SEA23, SEA27, SEA28, SEA29, SEA30,
SEA31, SEA32 & SEA50

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time.

Note 2: Use tide data from the appropriate station with applicable zoning correctors for each zone according to the order in which they are listed in the Tidezone corrector files. For example, tide station one (TS1) would be the first choice for any zone followed by TS2, etc. when data are not available.


Note 3: Juneau, AK and Skagway, AK were used as datum control for subordinate tide stations and for tidal zoning in this hydrographic survey. Accepted datums for these two stations have been updated recently and have changed significantly from previous values.



TIDE NOTE FOR HYDROGRAPHIC SURVEY SHEET H-10883 cont.

The current National Tidal Datum Epoch (NTDE) used to compute tidal datums at tide stations is the 1960-78 NTDE. Traditionally, NTDEs have been adjusted when significant changes in mean sea level (MSL) trends are found through analyses among the stations of the National Water Level Observation Network (NWLON). Epochs are updated to ensure that tidal datums are the most accurate and practical for navigation, surveying and engineering applications and reflect the existing local sea level conditions. For instance, analyses of sea level trends show that a new NTDE is necessary and efforts are underway to update the 1960-78 NTDE to a more recent 19-year time period.

However, analyses also show that there are several geographic areas which are strongly anomalous from the average sea level trends found across the NWLON and must be treated differently. One of these areas is in southeast Alaska covering the Lynn Canal, Icy Strait, and Glacier Bay region. Juneau and Skagway show relative sea level trends of -0.038 ft/yr and -0.052 ft/yr, respectively due to land emergence from the retreat of glaciers over recent geological time. NOS has adopted a procedure of computing accepted tidal datums for these anomalous regions by using a MSL value calculated from the last several years of data rather than the 19-year NTDE. The accepted range of tide is still based on the 19-year NTDE and, when applied to the updated MSL, will result in updated values for Mean High Water (MHW) and Mean Lower Low Water (MLLW) derived through standard datum calculation procedures. For both Juneau and Skagway, the MSL values were computed from the period of 1994-1998. This resulted in a lowering of the MLLW datums relative to land by -0.40 ft at Juneau and -0.53 ft at Skagway compared to the previous MLLW elevations used in last year's surveys. Subordinate tide stations in the area used for hydrographic surveys and controlled by Juneau or Skagway will be affected similarly. Accepted datums have been computed and may be accessed on the Internet through the URL specification <http://www.co-ops.nos.noaa.gov>.



For CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-O340-RA-99,
Sheet H-10883.

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 SEA23			
-136.052556 58.298553	9452542	-12	0.91
-136.041263 58.313204	9452437	0	0.86
-136.026252 58.314827			
-135.996122 58.281756			
-135.970612 58.251558			
-135.945709 58.215213			
-135.975332 58.193792			
-135.994019 58.187542			
-136.003984 58.186556			
-136.020179 58.188859			
-136.032636 58.186885			
-136.02001 58.202831			
-136.027256 58.240854			
-136.042592 58.276248			
-136.052556 58.298553			
Zone SEA27			
-136.052556 58.298553	9452542	-6	0.91
-136.041263 58.313204	9452437	+6	0.86
-136.026252 58.314827			
-136.091056 58.355499			
-136.110739 58.344236			
-136.052556 58.298553			
Zone SEA28			
-136.091056 58.355499	9452542	-6	0.93
-136.026252 58.314827	9452437	+6	0.88
-135.996122 58.281756			
-135.970612 58.251558			
-135.945709 58.215213			

-135.906924 58.241482
-135.9602 58.296707
-136.00826 58.329313
-136.079479 58.366454
-136.091056 58.355499

Zone SEA29

-135.906924 58.241482	9452542	-6	0.95
-135.859451 58.249114	9452437	+6	0.89
-135.898828 58.288779			
-135.937624 58.317127			
-135.991473 58.343626			
-136.060375 58.371322			
-136.076247 58.38438			
-136.088702 58.372927			
-136.079479 58.366454			
-136.00826 58.329313			
-135.9602 58.296707			
-135.906924 58.241482			

Zone SEA30

-135.859451 58.249114	9452542	-6	0.96
-135.825212 58.272635	9452437	+6	0.91
-135.867569 58.313775			
-135.913891 58.339362			
-135.976423 58.360976			
-136.042204 58.377842			
-136.046944 58.382079			
-136.060375 58.371322			
-135.991473 58.343626			
-135.937624 58.317127			
-135.898828 58.288779			
-135.859451 58.249114			

Zone SEA31

-135.825212 58.272635	9452542	-6	0.98
-135.782457 58.285423	9452437	+6	0.93
-135.80157 58.32261			
-135.835734 58.3488			
-135.894991 58.368016			
-135.917129 58.379846			
-135.96814 58.379015			
-136.047641 58.386834			
-136.046944 58.382079			
-136.042204 58.377842			

-135.976423 58.360976
-135.913891 58.339362
-135.867569 58.313775
-135.825212 58.272635

Zone SEA32

-135.96814 58.379015	9452542	0	1.00
-135.917129 58.379846	9452437	+12	0.94
-135.905219 58.400818			
-135.958485 58.405985			
-136.007118 58.409329			
-136.068306 58.409717			
-136.061063 58.39319			
-136.047641 58.386834			
-135.96814 58.379015			

Zone SEA50

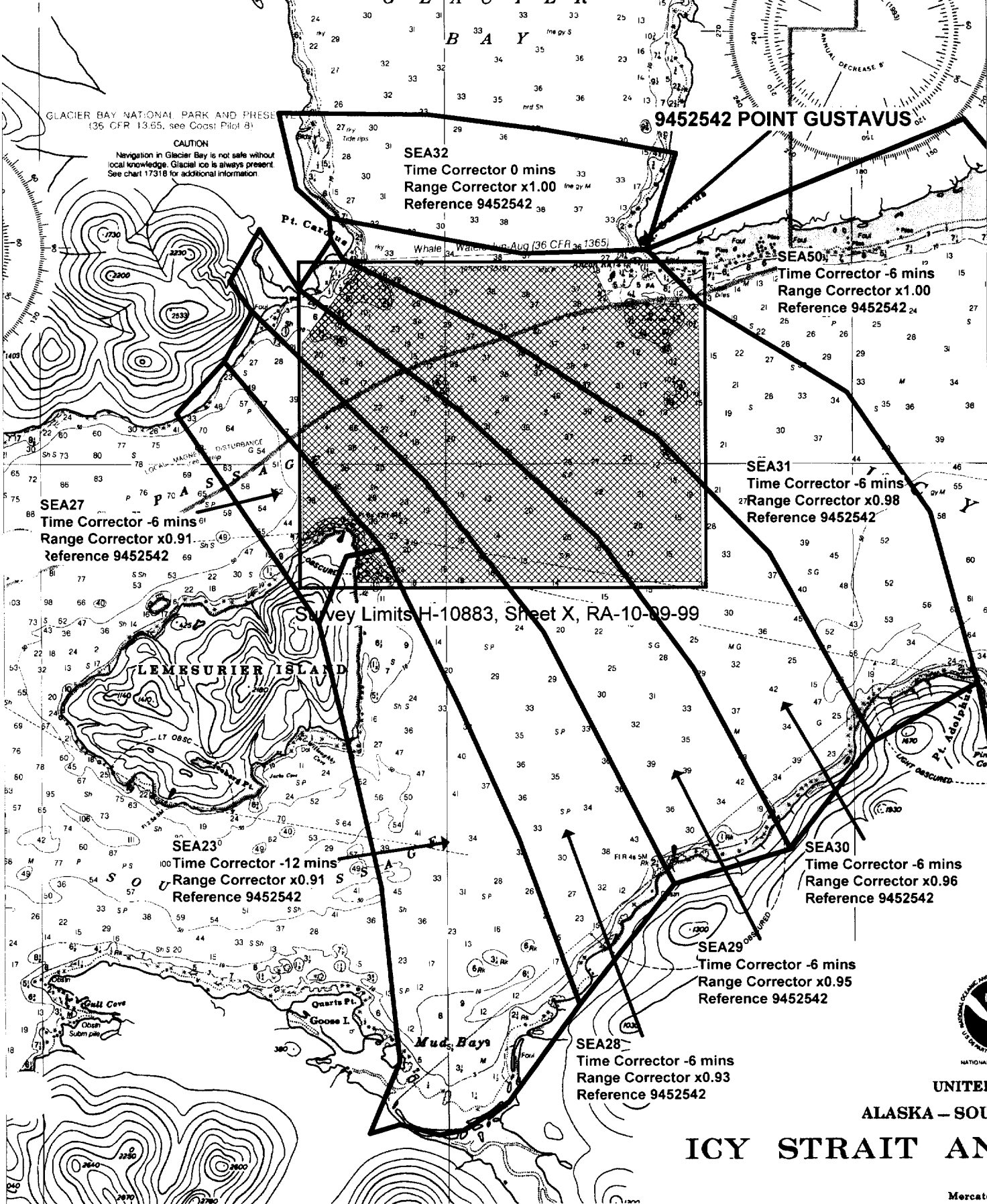
-135.732743 58.235359	9452542	-6	1.00
-135.772266 58.256877	9452437	+6	0.94
-135.782457 58.285423			
-135.80157 58.32261			
-135.835734 58.3488			
-135.894991 58.368016			
-135.917129 58.379846			
-135.787244 58.408252			
-135.726819 58.369323			
-135.720936 58.319497			
-135.732743 58.235359			

Final Tidal Zoning for OPR-O340-RA-99

Lynn Canal, AK - Sheet H-10883

Whale
advised
Diagram
s are p
gulation
of spee
school
basing season

in the boundaries of Glacier Bay National Park Sport
with Alaska State fishing regulations
read the information board at the U.S. National Park
the Bartlett Cove ranger station by radiotelephone



GLACIER BAY NATIONAL PARK AND PRESE
(36 CFR 13.55, see Coast Pilot 8)

CAUTION
Navigation in Glacier Bay is not safe without
local knowledge. Glacial ice is always present.
See chart 17318 for additional information.

9452542 POINT GUSTAVUS

SEA32
Time Corrector 0 mins
Range Corrector x1.00
Reference 9452542

SEA50
Time Corrector -6 mins
Range Corrector x1.00
Reference 9452542

SEA27
Time Corrector -6 mins
Range Corrector x0.91
Reference 9452542

SEA31
Time Corrector -6 mins
Range Corrector x0.98
Reference 9452542

Survey Limits H-10883, Sheet X, RA-10-09-99

LEMESURIER ISLAND

SEA23
Time Corrector -12 mins
Range Corrector x0.91
Reference 9452542

SEA30
Time Corrector -6 mins
Range Corrector x0.96
Reference 9452542

SEA29
Time Corrector -6 mins
Range Corrector x0.95
Reference 9452542

SEA28
Time Corrector -6 mins
Range Corrector x0.93
Reference 9452542

UNITED
ALASKA - SOUTH

ICY STRAIT AND

Mercator

GEOGRAPHIC NAMES

H-10883

Name on Survey	ON CHART NO: 17302, 17318		ON PREVIOUS SURVEY		CON 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							
ALASKA (title)	X		X													1
ANCON ROCK	X		X													2
CAROLUS, POINT	X		X													3
GLACIER BAY	X		X													4
GUSTAVUS, POINT	X		X													5
ICY STRAIT	X		X													6
LEMESURIER ISLAND	X		X													7
NORTH PASSAGE	X		X													8
																9
																10
																11
																12
																13
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																24
																25

Approved

Dennis J. Rasmussen
Chief Geographer

DEC 21 1999

HYDROGRAPHIC SURVEY STATISTICS

H-10883

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION			AMOUNT
SMOOTH SHEET			SMOOTH OVERLAYS: POS., ARC, EXCESS			N/A
DESCRIPTIVE REPORT			FIELD SHEETS AND OTHER OVERLAYS			N/A
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS	
ACCORDION FILES	N/A					
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

SHORELINE DATA						
SHORELINE MAPS (List):		N/A				
PHOTOBATHYMETRIC MAPS (List):		N/A				
NOTES TO THE HYDROGRAPHER (List):		N/A				
SPECIAL REPORTS (List):		N/A				
NAUTICAL CHARTS (List):		17302 17th Ed., August 14, 1993				

OFFICE PROCESSING ACTIVITIES

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

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				
COMPILATION OF SMOOTH SHEET	276		276	
COMPARISON WITH PRIOR SURVEYS AND CHARTS		29	29	
EVALUATION OF SIDE SCAN SONAR RECORDS				
EVALUATION OF WIRE DRAGS AND SWEEPS				
EVALUATION REPORT		35	35	
GEOGRAPHIC NAMES				
OTHER (Chart Compilation)		48	48	
USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	276	112	388

Pre-processing Examination by R. Davies	Beginning Date 9/7/99	Ending Date 11/4/99
Verification of Field Data by R. Davies, D. Doles, G. Nelson, R. Mayor, R. Shipley	Time (Hours) 276	Ending Date 4/7/00
Verification Check by D. Hill	Time (Hours) 4	Ending Date 4-18-00
Evaluation and Analysis by R. Shipley	Time (Hours) 112	Ending Date 4/18/00
Inspection by D. Hill	Time (Hours) 6	Ending Date 5-31-00

**EVALUATION REPORT
H-10883**

A. PROJECT

The hydrographer's report contains an adequate discussion of the project information.

B. AREA SURVEYED

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

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

The bottom consists mainly of hrd. Depths range from the 0.2 to 49 fathoms.

C. SURVEY VESSELS

The hydrographer's report contains adequate information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The acquisition and processing of data in the field has been discussed in the hydrographer's report, section D. Office processing of survey data was conducted using the same Computer Aided Resource Information System (CARIS), Hydrographic Processing System (HPS) and Multibeam Support Vax System used by the hydrographer and MicroStation 95.

Shallow water multibeam data sets were processed to reject beams 1,2,3,4,98,99,100 and 101 during office processing. In addition, the beam angle filter was used to reject all data outside of a 65-degree angle from nadir.

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 name 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 UTM, Zone 8 projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was not used during survey operations.

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, static draft, dynamic draft (settlement and

squat), and sound velocity. Additional reducers for multibeam survey data include corrections for 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 were 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 direct from tide gages, Point Gustavus, Alaska, 945-2542 and Excursion Inlet, Alaska, 945-2437.

H. CONTROL STATIONS

Section H of the hydrographer's report contains adequate discussion of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD83. The smooth sheet is annotated with an NAD27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD83 projection by applying the following corrections:

Latitude: -1.243 seconds (-38.443 meters)
Longitude: 6.569 seconds (106.879 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The quality of several positions exceeds 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 soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

NAD83 is used as the horizontal datum for plotting and position computations.

The reference site confirmation test and daily DGPS performance checks were conducted in the field and found adequate. Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline depicted on the smooth sheet in brown originates from chart 17302, 17th Edition and is for orientation purposes only. No changes to the MHW were observed during this survey.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10883 junctions with no contemporary surveys.

M. COMPARISON WITH PRIOR SURVEYS

The present survey was compared to the following prior survey work.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H-4310WD	1923	1:40,000

The present survey was compared to a digital copy of survey H-4310WD. This survey was conducted using wire drag techniques and leadline with visual positioning. Digital comparisons were made and

registration and legibility were found to be marginal or poor. Shoreline alignment, where shoreline is shown, tends to be poor, and numeric data is sparse or non-existent. There was insufficient reliable information to make definitive comparisons with current survey work. Assuming that all critical depths and clearances would have been previously transferred from the prior survey to the chart, the chart functioned as a proxy for the survey for the purpose of supersession analysis. Since the present survey data is consistently high quality and sufficiently dense to eliminate the possibility of any hazards to navigation remaining undetected, the prior wire drag survey is considered to be superseded.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H-8816	1964	1:20,000
H-9638	1976	1:5,000
H-9848	1979	1:20,000
H-10333	1990	1:10,000
H-10334	1990	1:20,000
H-10335	1990	1:10,000

The above prior surveys cover the entire area of the present survey. Digital copies of the above surveys were used to make the comparison. Registration and legibility was good or very good. With the exception of some differences in depths listed in the hydrographer's report, there was very good agreement with the prior surveys, generally with the current survey being 0-3 fathoms shoaler.

Justification for smaller changes can probably be attributed to better bottom coverage, improved positioning and sounding techniques and relative accuracy of the data acquisition methods. A comparison of standard depth curves between the present and prior survey smooth sheets reveals little change in bottom configuration.

Additional information regarding prior survey comparison is found in the hydrographer's report, section L.

Survey H-10883 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

There was one AWOIS item assigned to this survey that is adequately addressed in section M of the hydrographer's report.

O. COMPARISON WITH CHART

Survey H-10840 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
17302	17th	August 14, 1993	1:80,000

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys. The prior surveys have been adequately addressed in section M of the evaluation report and hydrographer report, section L and require no further discussion.

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.

Survey H-10883 is adequate to supersede charted hydrography within the charted area.

b. Dangers To Navigation

One danger to navigation was discovered during survey operations. This danger was reported to the USCG, NIMA, N/CS261 and N/CS34 on September 2, 1999. A copy of this report is attached.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H-10883 is adequate to:

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

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, and the Field Procedures Manual, April 1998 Edition except as follows:

The Survey Information Summary was not included with the report as required by the Field Procedures Manual, Figure 5.3, Descriptive Report Check off List, section Q.

Two detached positions (2000 and 2001) were taken by vessel 2122 on DN 131 at Ancon Rock Buoy #2. However, the hydrographer did not specify which position to use for plotting purposes. In the event that multiple detached positions are taken, the decision as to which will be used should be made by the hydrographer in the field where it can be determined which would best portray the position of the aid on the smooth sheet.

Q. AIDS TO NAVIGATION

There was one fixed aid and one floating aid to navigation within the survey area. Lemesurier Island Light could not be positioned due to vegetation and topography.

Ancon Rock Buoy #2 was positioned using position 2001, Latitude 58/22/23.59 N, Longitude 135/56/00.22 W. Both aids adequately serve their intended purpose. See section P of the hydrographer's report for additional information. There were no features of landmark value located within the area of this survey.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

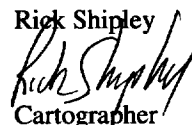
Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. No additional work is recommended. Refer to the hydrographer's report for additional information.

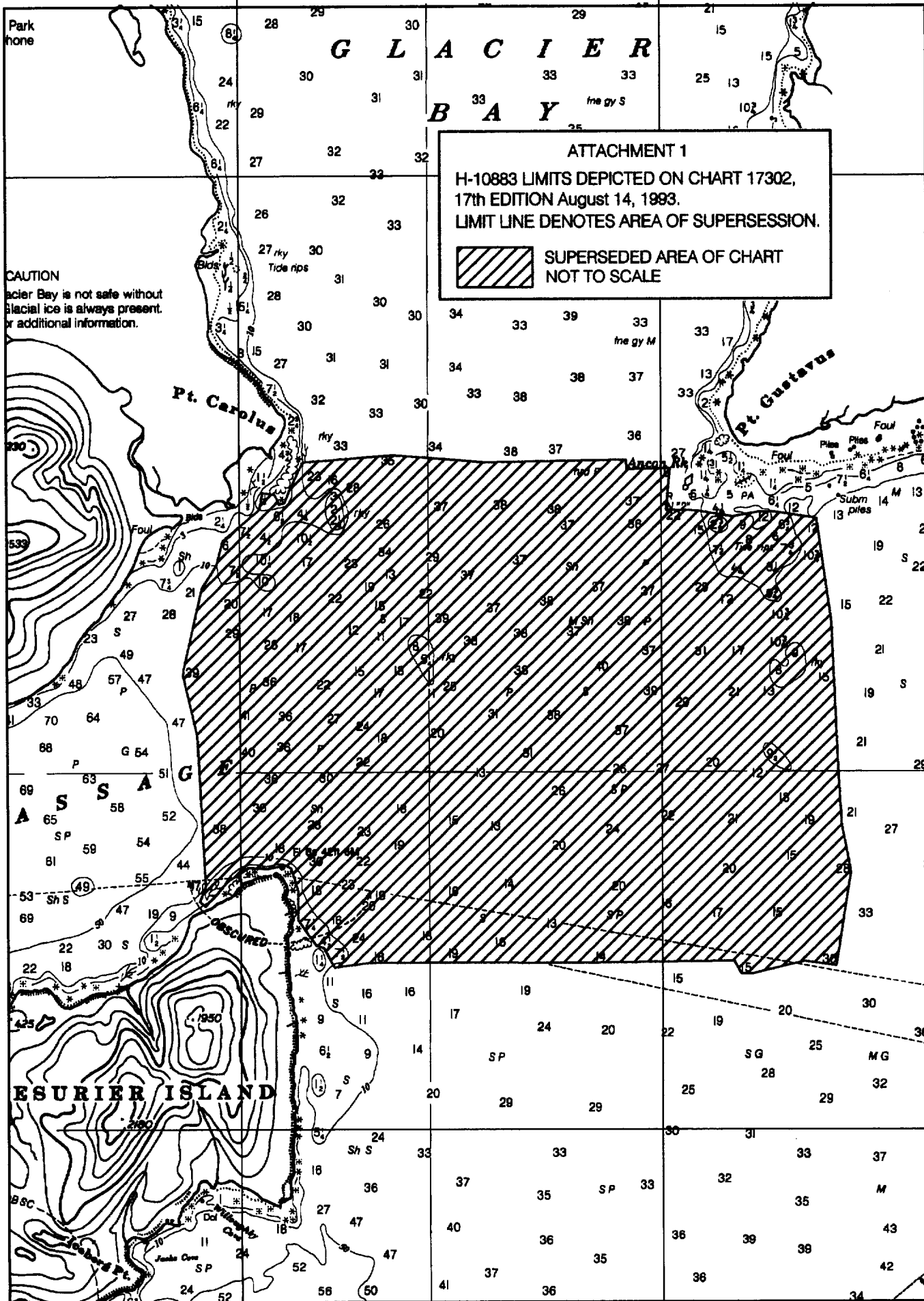
U. REFERRAL TO REPORTS

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

Rick Shipley

Cartographer

136/03/00

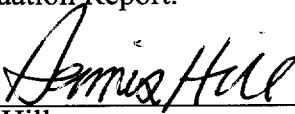
135/55/00



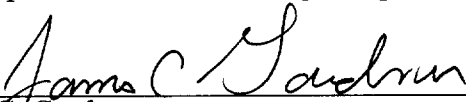
APPROVAL SHEET
H-10883

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.


Date: 5-31-00
Dennis J. Hill
Chief, Cartographic Team
Pacific Hydrographic Branch

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.


Date: 5-31-00
James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Date: July 23, 2000
Samuel P. De Bow
Captain, NOAA
Chief, Hydrographic Surveys Division

