

H10880

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-20-03-99
Registry No. H-10880

LOCALITY

State Alaska
General Locality Lynn Canal
Sublocality Point Retreat to Point Whidbey

1999

CHIEF OF PARTY
CAPT Alan D. Anderson, NOAA

LIBRARY & ARCHIVES

DATE JUL 23 2000

HYDROGRAPHIC TITLE SHEET

H-10880

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-20-03-99

State Alaska

General locality Lynn Canal

Locality Point Retreat to Point Whidbey

Scale 1:20,000 Date of survey 5/3/99 to 6/2/99

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

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

Chief of party CAPT Alan D. Anderson, NOAA

Surveyed by RAINIER Personnel

Soundings taken by ~~echo sounder, hand lead, pole~~ DSF-6000N, Knudsen 320M, Seabeam 1050D

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: M. Bigelow Automated plot by HP750C & HP755CM

Verification by D.Doles, E.Domingo, D.Hill, R.Mayor, G. Nelson, M.Bigelow

Soundings in fathoms ~~feet~~ at MLLW ~~MSL~~ 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.

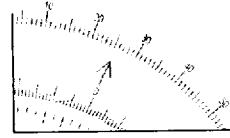
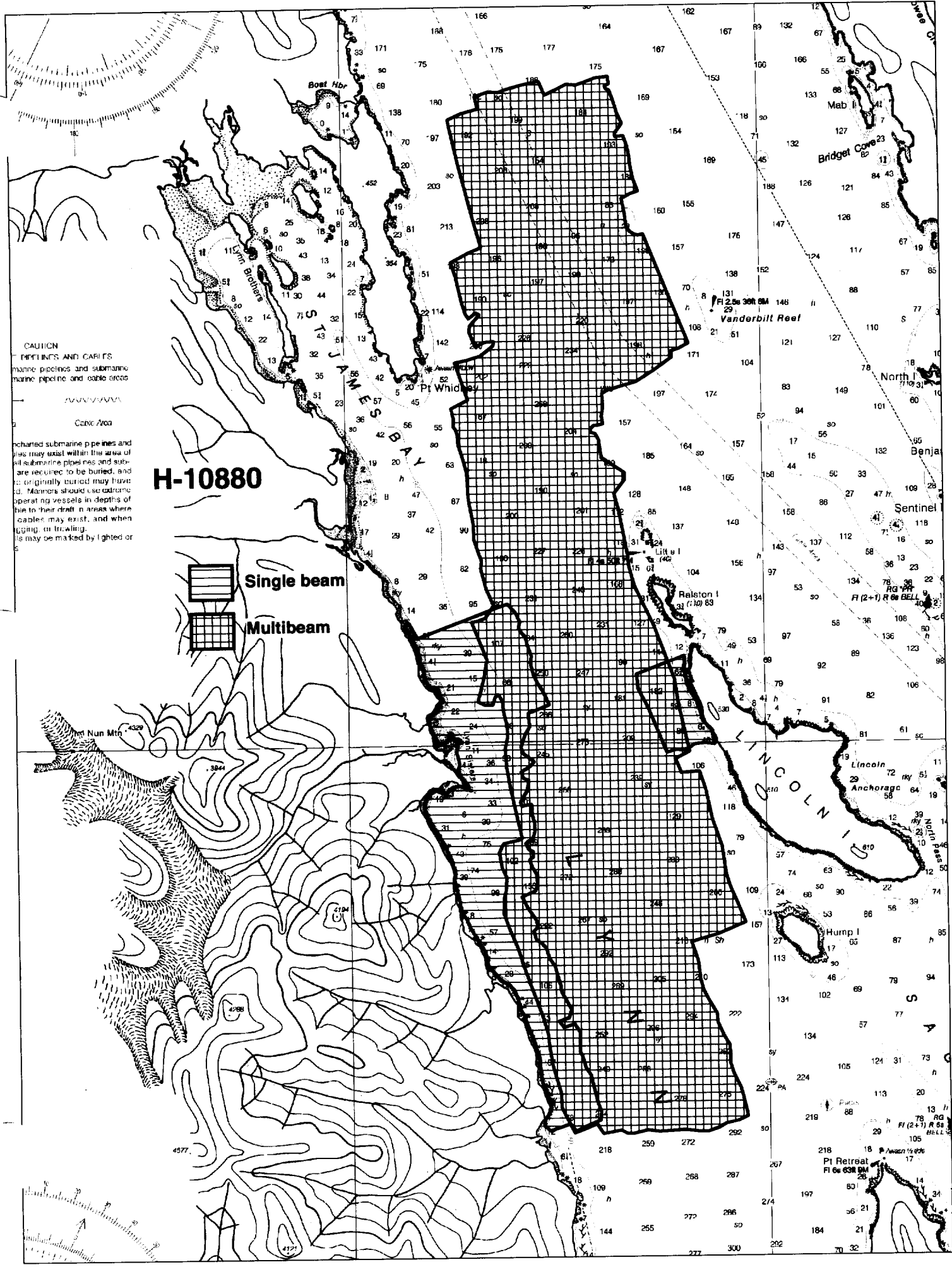
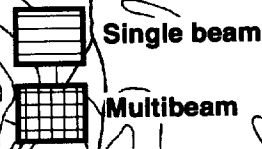
Always SURF 5/19/00 MCB

CAUTION
 PIPELINES AND CABLES
 Marine pipelines and submarine
 marine pipeline and cable areas

CAUTION
 Cable Area

Charted submarine pipelines and
 cables may exist within the area of
 all submarine pipelines and sub-
 cables required to be buried, and
 to or from a conduit may have
 been. Mariners should use extreme
 operating vessels in depths of
 five to their draft in areas where
 cables may exist, and when
 logging or trawling.
 Cables may be marked by lighted or
 daymarks.

H-10880



PROGRESS SKETCH

May, 1999

OPR-0340-RA-99
Lynn Canal, Alaska

Capt. A. D. Anderson
COMMANDING

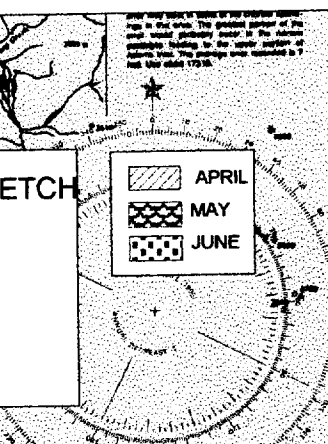
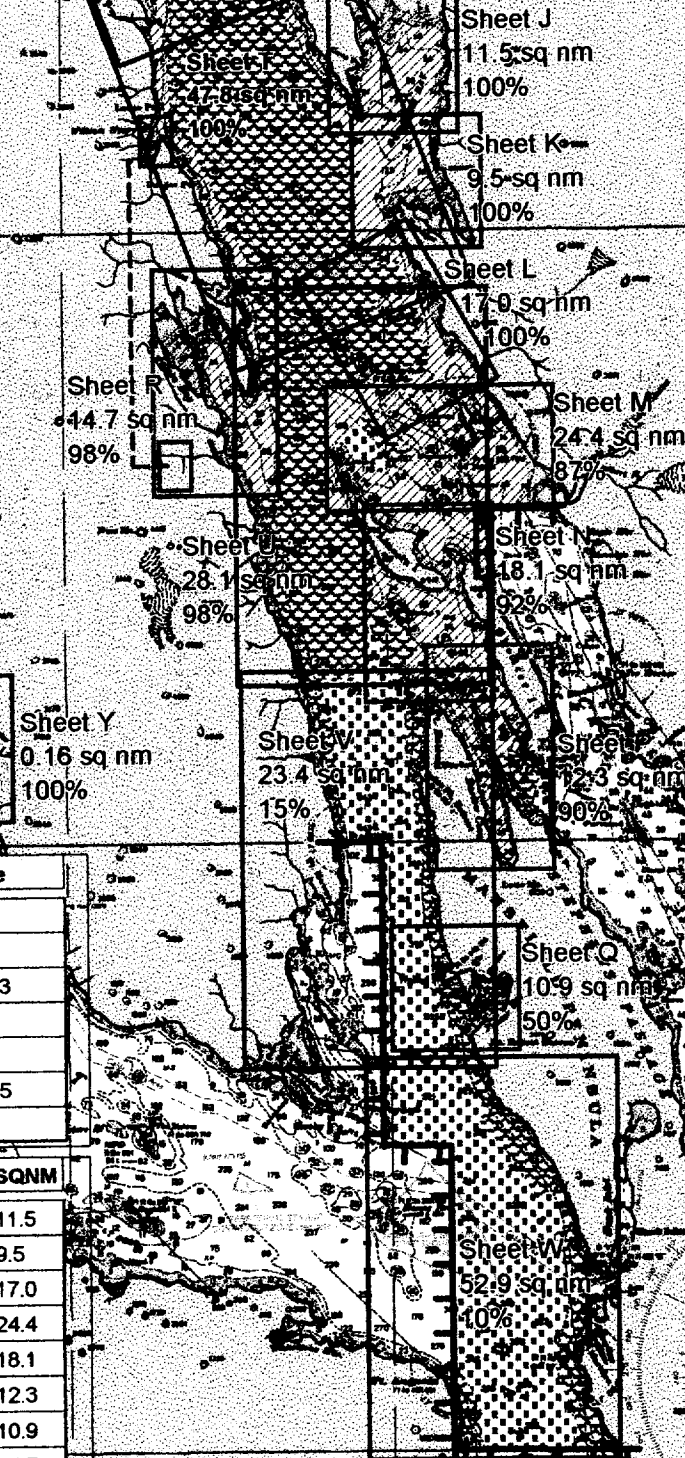
Chart 17300

	APRIL
	MAY
	JUNE

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

Accomplished	April	May	June
LNM Hydro	2910	679	41.8
LNM SSS	0	0	0
SQ NM	43.89	144.17	102.3
AWOIS Invest.	0	9	5
Other Invest.	0	4	2
LNM Multibeam	174.4	1053.64	290.5
Days at Sea	28	26	11

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-10866	4/14	100	6/3		24.4
N	H-10865	4/14	100	6/7		18.1
P	H-10870	4/20	100	6/7		12.3
Q	H-10879	5/1	100	6/5		10.9
R	H-10869	4/18	100	6/2		14.7
T	H-10864	4/13	100	5/25		47.8
U	H-10880	5/3	100	6/2		28.1
V	H-10881	5/2	100	6/5		23.4
W	H-10882	5/6	100	6/8		52.9
Y	F00451	5/20	100	5/20		0.16
X	H-10883	5/10	100	5/20		19.6



Copyright © 1999 by the U.S. Government. All rights reserved. This work is in the public domain in the United States of America. It is not to be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without permission in writing from the U.S. Government. The use of the name of the U.S. Government or the U.S. Navy in this work does not constitute an endorsement or approval of the views or opinions expressed herein, nor does it constitute an endorsement or approval of the products or services mentioned herein.

Descriptive Report to Accompany Hydrographic Survey H10880

Field Number RA-20-03-99

Scale 1:20,000

May - June 1999

NOAA Ship RAINIER

Chief of Party: Captain Alan D. Anderson, NOAA

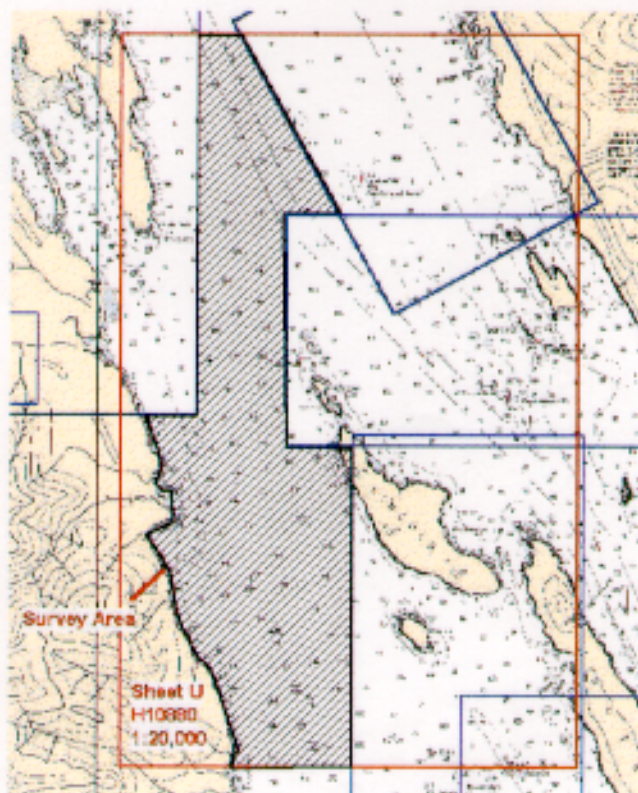
A. PROJECT ✓

This hydrographic survey was completed as specified by Project Instructions OPR-O340-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 H10880 corresponds to Sheet U (Sheet 10 in HPS) 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 Lynn Canal, Alaska from Pt. Retreat to Pt. Whidbey. The surveys northern limit is bounded by surveys H10864, H10869, and H10862 at latitude $58^{\circ}38'10''\text{N}$, the surveys southern limit is bounded by surveys H10881 and H10865 at latitude $58^{\circ}25'09''\text{N}$. The eastern limit of the survey junctions survey H10866 at longitude $135^{\circ}03'37''\text{W}$ and survey H10865 at longitude $135^{\circ}01'22''\text{W}$. H10869 junctions this survey to the west at Longitude $135^{\circ}06'35''\text{W}$. Survey limits are depicted in red in Figure 1 below. Data acquisition was conducted from May 3 to June 2, 1999 (DN 123 to 153).

Figure 1. Survey Limits



C. SURVEY VESSELS ✓

Data were acquired by RAINIER and her survey launches (vessel numbers 2120, 2121, 2122, 2124 and 2125) as noted in the Survey Information Summary included with this report. See OPR-O340-RA project related data 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 was 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 observed tides were saved in MapInfo format. Raster image and shoreline data in MapInfo facilitated charted and prior survey comparisons.

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.

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 2 knots.

After review and cleaning, SeaBeam 1050D MKII depth, position and attitude data were merged with sound velocity, predicted tide and dynamic draft correctors to compute the true depth and position of each sonar footprint. Prior to the final application of correctors in CARIS, the heave, pitch and roll data were manually deleted from the HDCS data to prevent these data from being applied twice. The heave, pitch and roll values have been archived in TAR format and left with the HDCS data in the event they are needed at a future date. These data were then extracted to a CARIS Workfile with a grid size of 5 meters x 5 meters. These soundings were further excessed by suppressing soundings with a shoal bias to produce one sounding every 2.5 mm at survey scale. Processed soundings were then exported into HPS through HP Tools.

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.

F. SOUNDING EQUIPMENT

Two 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, the bottom topography, the water-depth, and the ability of the platform vessel to safely navigate the area. No Shallow Water Multibeam (SWMB) echosounder data were acquired for this survey.

✱ FILED WITH THE SURVEY RECORDS.

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

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 150 meters of depth. In addition, singlebeam launches were used to perform all shoreline verification. VBES serial numbers are included in the Separates.

2. 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. Low frequency was used exclusively on survey H10880 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 ✓

Four sound velocity casts were used for this survey: two for SeaBeam 1050D MKII, and two for VBES. Information on the casts is included in the Survey Information Summary report and in Separate IV--Sounding Equipment Calibrations and Corrections.

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-O340-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 SeaBeam 1050D MKII data, sound velocity correctors were applied in CARIS during post processing.

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

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
2124	March 1999	Rod leveling	March 1999	Port Angeles, WA
2125	March 1999	Rod leveling	March 1999	Port Angeles, WA

OTF = ON THE FLY

Settlement and squat correctors, static draft measurements and vessel offsets are included with the project data for OPR-O340-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. *

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 5 cm 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.

RAINIER's Vessel Configuration File (VCF) was 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. VCF files contain offsets, dynamic draft, timing errors, and heave, roll and pitch biases. System biases for RAINIER were determined during a "patch test" conducted in Lynn Canal, southeast Alaska on May 21, 1999. A copy of RAINIER's VCF is included in the Project Related Data for OPR-O340-RA.

Predicted Tidal Correctors ✓

For the 1999 field season, the Oceanographic Products and Services Division (OPSD), User Services Branch (N/CS41), supplied no predicted tides for OPR-O340-RA-99. Predicted tide tables were generated for both HPS and CARIS using Tides & Currents v2.5. Tide correctors for H10880 were based on the location William Henry Bay, Lynn Canal (945-1705) which uses Juneau (945-2210) as a reference station. Tide table HPS #99 was used only for preliminary inspection of the VBES soundings. CARIS tide table whbay_new.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, OPSD preliminary observed tides for Juneau (945-2210) were downloaded from the Internet and used to create HPS table #1. 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, VBES) to produce a final sounding plot.

Listings of HPS tide tables used for H10880 are included in the Separates of this report. Tidal correctors as provided in the Project Instructions for H10880 are provided in the Survey Information Summary included with this report.

** FILED WITH THE SURVEY RECORDS.*

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 Cove Point (945-2346) on April 4, 1999. The Cove Point gage was removed on June 2, 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 OCT. 6 1999 IS ATTACHED TO THIS REPORT
H. HYDROGRAPHIC POSITION CONTROL ✓ SEE EVAL REPORT SECTION I.

The horizontal datum for this project is NAD 83. See the OPR-O340-RA-99 Horizontal Control Report for more information.

All hydrographic features were positioned using differential GPS (DGPS). VHF reference stations were set up at stations JOE and CURTIS. Due to its proximity to the H10880 survey area, station JOE was used as the primary station for VHF differential correctors. In addition, differential corrections from the US Coast Guard Beacon at Gustavus were also utilized during this survey. 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 weekly 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. RAINIER performance checks were conducted weekly by comparing DGPS positions acquired by RAINIER's positioning system and the launches positioning systems, while at rest in the davits. Copies of DGPS performance checks are included in the Separates.

I. SHORELINE ✓ SEE EVAL REPORT SECTION J.
△ PRE-APPROVAL NEEDED FIRST. SHOULD BE IN BROWN (FOR REFERENCE ONLY) ON THE FFS

Method of Shoreline Verification

No official registered shoreline was supplied by N/CS341 for any of the eastern shoreline for the entire Lynn Canal project. Prior surveys and digitized versions of chart 17316 also proved to be of poor quality for the area covered by H10880. This problem was resolved by registering NASA aerial photos acquired from the U.S. Forest Service. The photos were scanned and registered using prominent landmarks along the shoreline. To differentiate between areas of gently sloping beaches and ledges, the registered photos were digitized in MapInfo using a combination of the shoreline on the photograph, chart, and notes taken during vertical beam echo sounder mainscheme. The resultant shoreline was then exported in .DXF format for use with Hypack during data acquisition. While conducting shoreline verification, numerous detached positions were obtained on ledges and rocks to field check the NASA photo's registration. Adjustments to the registration of the digitized shoreline were then made based upon the detached positions. This method proved to be remarkably reliable and accurately depicted the shoreline when checked against the detached positions, soundings, and tracklines. During shoreline verification these digitized NASA photos were treated as official digital manuscript (DM) shoreline for the purpose of distinguishing new shoreline feature.

The following table lists reference points used to register NASA satellite photographs into MapInfo.

Photo #	Point	Latitude	Longitude	Geographical Location
0025	2	58.504172	-134.868739	North Point of Gull Island
0025	3	58.520311	-135.028603	North point of Lincoln Island
0025	4	58.453856	-134.982272	South Point of Hump Island
0025	1	58.460689	-134.892058	Southernmost Point inside Halibut Cove, Shelter Island

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. 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. *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.

Detailed "DP and BS Plots" are 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.

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.

A new ledge was found at 58°30'53.115"N, 135°08'06.976"W (Pos. #40072, DN123, VN2124) in the vicinity of a DM rock. The Hydrographer recommends deleting the DM rock at 58°30'52.87"N, 135°08'08.68"W and charting a new ledge at 58°30'53.115"N, 135°08'06.976"W.

Recommendations

The Hydrographer recommends that the shoreline as depicted on the DP and BS plot (MapInfo digital files "U_shoreline" and "~~shoreline~~_updates") and final sounding plot be used to supersede shoreline information compiled on the digitized NASA photos. *SHORELINE*

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 new ledge located at 58°26'32.166"N 135°05'46.245"W was observed in the vicinity of a charted rock. The hydrographer recommends deleting the charted rock at 58°26'32.16"N, 135°05'45.76"W and charting the new ledge as depicted on the final DP and BS plot.

No charted rocks were disproved during this survey.

Recommendations

The charted shoreline should be revised using the manuscript shoreline and fieldwork notes as recorded in the MapInfo digital files named "U_shoreline" and "~~shoreline~~_updates". *SHORELINE*

J. CROSSLINES ✓

VBES crosslines agreed to within 1 meter with mainscheme hydrography in regions of relatively flat bathymetry. Crosslines totaled 16.09 nautical miles, or 23.9% of mainscheme hydrography. Ship multibeam and VBES tended to agree within 2 meters of each other in regions of low vertical gradients. This larger difference for ship multibeam to VBES is a function of depth; ship multibeam was run in waters of 100 meters or more in depth where SWMB* was run in 100 meters or less.

* NO SWMB DATA WERE COLLECTED ON THIS SURVEY.

The Quality Control Report (CARIS HIPS) for the checkline file averaged 90.1%, with a depth tolerance of 0.05. See Appendix VI for the detailed report.

K. JUNCTIONS ✓ *SEE EVAL REPORT SECTION L.*

The following contemporary surveys junction with H10880, and are shown in Figure 2 below.

Registry #	Scale	Date	Junction side
H10869	1:10,000	1999	Northwest
H10864	1:20,000	1999	North
H10862	1:10,000	1999	Northeast
H10866	1:10,000	1999	East
H10865	1:10,000	1999	Southeast
H10881	1:20,000	1999	South

Soundings from these 1999 surveys were found to be in good agreement. A difference of 0 to 5 meters in 200 meter depths or greater suggests that the comparison is good when comparing Seabeam soundings in Lynn Canal with the junction soundings. Generally the depths agree within 6 meters at the junction between H10880 and H10869 which lies in 350-390 meters of water. This trend is also seen when comparing H10864, H10881, H10862, H10866 and H10865 to H10880.

An area approximately 220m x 300m at the junction between H10866 and H10880 at 58°34'26"N 135°03'47"W, contains no data from the present survey. This area slopes down toward the northeast at depths between 330 and 380 meters. Another area which contains no data is located just South of that location at 58°33'58"N 135°03'56"W, and is approximately 450m x 450m. The depths bordering this area are from 240m to 320m. In addition, there is no overlap of data at 58°29'46"N 135°01'47"W near the junction between H10880 and H10865. This area slopes down toward east-southeast and the surrounding depths are from 195 meters to 325 meters. Chart 17316 depicts a depth of 106 fathoms (194 meters) in this area. Based upon the size of the holidays and surrounding depths, the Hydrographer believes that these areas require no additional work. *CONCUR*

*EXCEPT FOR THE JUNCTION OF H-10865
SEE EVAL REPORT SECTION L.*

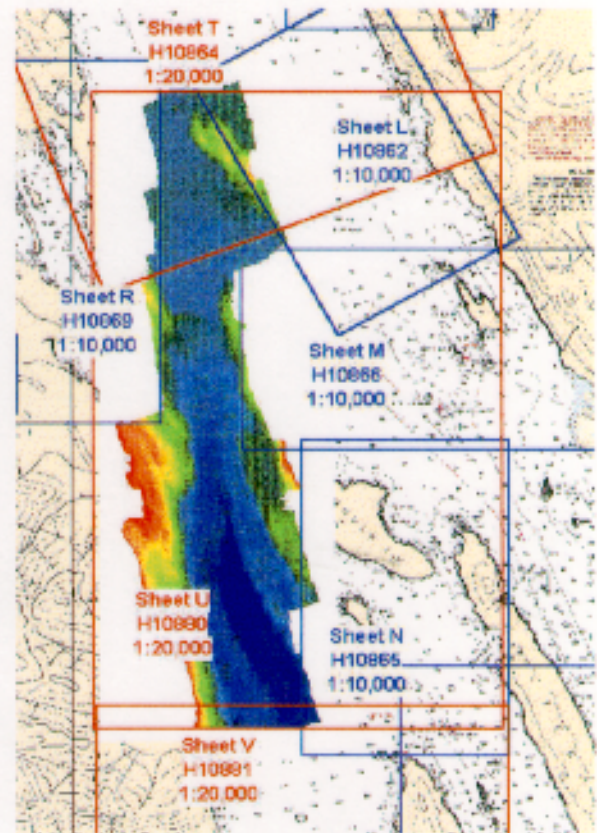


Figure 2. Junction Surveys

Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after application of smooth tides.

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

Four prior surveys were compared to H10880, and are shown in Figure 3 below.

Registry #	Scale	Date	Area Covered
H4228 ✓	1:40,000	1922	Lynn Canal
H1602A ✓	1:40,000	1884	Lynn Canal
H3985WD ✓	1:20,000	1917	Lynn Canal
H2056 ✓	1:40,000	1890	Lynn Canal

Prior survey soundings were found to be in good agreement with those from the current survey. Seabeam depths ranging from 240 to 300 fathoms in fairly flat bottom closely matched depths from prior survey H-2056. Generally, the Seabeam depths were either the same as or shoaler than depths from H-2056. This trend was not observed when comparing VBES or Seabeam soundings to prior survey depths in less than 240 fathoms, near areas of steep relief. Soundings in these areas from H10880 matched well with H-2056, but not always shoaler. In comparing the western shoreline of Lynn Canal south of Pt. Whidbey, discrepancies coincided with areas where the modern digital shoreline is noticeably different than the shoreline depicted for the 1890 survey. Differences between the current survey and priors can be attributed to scale, data density, and improved modern positioning and sounding equipment. *CONCUR*

A comparison of the current survey with survey H-4228 was not conducted. The scan is of poor quality; no least depths were discernable and annotations were illegible. *CONCUR*

A comparison between the current survey and H-3985WD revealed no depths from the prior in their common areas. *CONCUR*

Survey H-1602a, conducted in 1884, is a rough sketch of the landforms in the region with relative positioning to one another. Shoreline matches poorly and there is only one sounding in the region of H10880. *CONCUR*

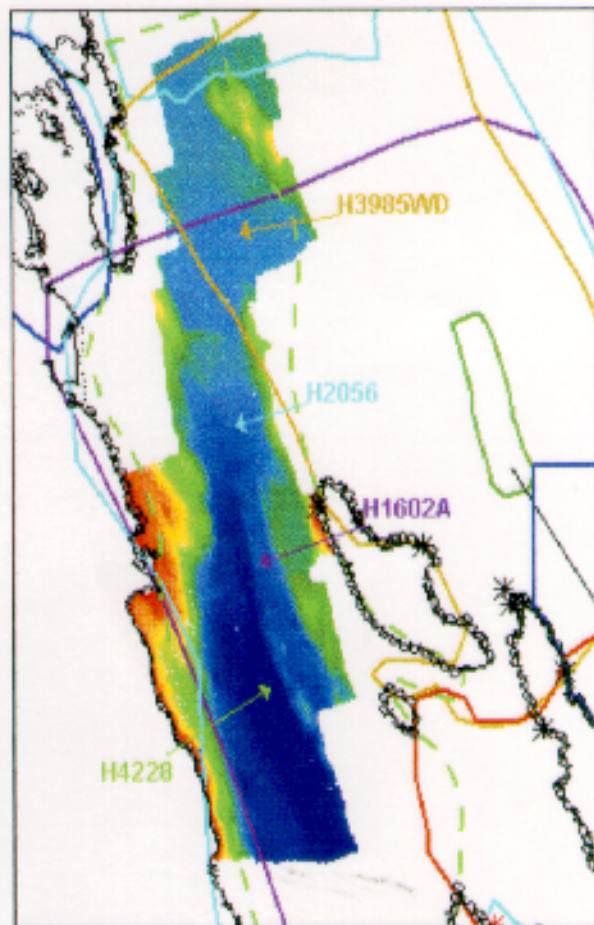


Figure 3. Prior Surveys

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

M. ITEM INVESTIGATION REPORTS ✓

No item investigations accompany this report. *CONCUR*

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

This survey was compared in the field to features portrayed on the following charts:

Chart	Scale	Edition Number	Date	Datum
17316	1:80,000	18 th	July 18, 1998	NAD 83
17300	1:209,978	27 th	August 14, 1993	NAD 83

17300, 28th edition, SEPT. 12, 1998 WAS AVAILABLE.

The survey was compared with both charts and was found to be in good agreement, generally within one fathom. Exceptions are noted below.

Several of the charted depths East of Pt. Whidbey in Lynn Canal were significantly deeper than those found on H10880. For example, in the vicinity of 58°35'18.43"N 135°04'12.016"W, 201 to 208 fathom soundings were found on the current survey, while chart 17316 shows 220 fathoms. Similarly, Chart 17300 depicts a depth of 268 fathoms at 58°34'21.7"N 135°05'19.15"W, while the current survey reveals depths of 210 to 214 fathoms. This area has much greater deviation between charted and contemporary depths than the southern portion of H10880.

At the junction between Sheet R (H10869) and H10880, northwest of Lynn Sisters at 58°31'21.380"N 135°08'7.505"W, a charted sounding of 5 ³/₄ fathoms (chart 17316) was not found. This area was covered with VBES data, and depths ranged from 19 to 22 fathoms. Due to the steep dropoff in this area, the 5 ³/₄ fathom depth was most likely placed slightly offshore from its actual position during chart compilation. The Hydrographer recommends that the 5 ³/₄ fathom charted depth be superseded by current survey data.

CONCUR

A charted underwater cable crossing lies within the H10880 survey area. The cable crossing was not investigated and is shown in brown on the final DP and BS plot. The Hydrographer recommends retaining the cable crossing as charted. CONCUR

The Hydrographer recommends that soundings and shoreline detail from the current survey be used to update the chart in their common areas. Non-sounding features are discussed in Section J. Final comparisons will be made at PHB after application of smooth tides. CONCUR

Dangers to Navigation

No dangers to navigation were found within the H10880 survey area.

O. ADEQUACY OF SURVEY ✓ SEE EVAL REPORT SECTION P

Survey H10880 is complete and adequate to supersede prior soundings and features in their common areas.

P. AIDS TO NAVIGATION

 ✓

There are no aids to navigation within the H10880 survey area.

Q. STATISTICS

 ✓

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

R. MISCELLANEOUS

 ✓

Bottom samples were collected and sent to the Smithsonian in accordance with the Project Instructions. No unusual tidal currents or magnetic variations were found during this survey.

Survey H10880 covers a 6 km wide area of Lynn Canal that is frequently transited by fishing vessels, recreational boats, Alaska Marine Highway ferries and cruise ships.

S. RECOMMENDATIONS ✓

DO NOT CONCUR SEE EVAL REPORT SECTION J.

Because no photogrammetric shoreline was provided for the entire survey area, the Hydrographer recommends that shoreline depicted on survey H10880 be used to update the chart in their common areas. 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.

CG 10 424, TP-01527, AND TP-01528 COVER THIS SURVEY.

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-0340-RA Horizontal Control Report	July 1999	N/CS34
Project related data for OPR-0340-RA	July 1999	N/CS34
OPR-0340-RA Coast Pilot Report	July 1999	N/CS26

Respectfully Submitted

Approved and Forwarded,

[Signature]
for Paul J. McAnally
Senior Survey Technician

[Signature] CDR/NOAA
for Alan D. Anderson
Captain, NOAA
Commanding Officer

List of Horizontal Control Stations

NAME	STATE	TYPE	LATITUDE	LONGITUDE	SITEID	DEC_LAT	DEC_LON
CURTIS	AK	DGPS Flyaway	58 27.2687N	134 58.7415W	n/a	58.45447833	134.97902500
GUSTAVUS	AK	USCG Beacon	58 25.1000N	135 41.8000W	892	58.41833333	135.69666667
JOE	AK	DGPS Flyaway	58 40.7343N	134 59.3429W	n/a	58.67890500	134.98904833

Survey Information Summary

Project: Project Name:

Instructions Dated: Project Change Info:

Change #	Dated
1	3/30/98
2	4/12/99
3	5/6/99

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		1		1				
2122	1	1		1				
2124	2	2		2	1	1		
2125	1				1	1	1	

Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
8		120	201	58/22/59	120 - 138
				134/54/30	
10		139	585	58/14/25	139 - 155
				134/57/05	

Tide Zone Information

Zone #	Time Corr.	Height Corr.
SEA3	00 hr 00 min	X0.98
SEA59	00 hr 00 min	X0.97

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-2346	COVE POINT	4/4/99	6/2/99

Statistics Summary

Type	Total:
BS	4
DP	20
MBMS	48.82
MBSP	1.89
MBXL	7.1
MS	67.38
S/L	8.72
SPLIT	25.51
XL	16.09

Percent XL:

SQNM:



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: 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

H10880

RA-20-03-99

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-10880

LOCALITY: Pt. Retreat to Pt. Whidbey, Lynn Canal, AK
TIME PERIOD: May 3 - June 2, 1999

TIDE STATION USED: 945-2318 Barlow Cove, AK
Lat. 58° 19.3'N Lon. 134° 52.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.509 meters

TIDE STATION USED: 945-2346 Cove Point, Berners Bay, AK
Lat. 58° 45.1'N Lon. 135° 01.6'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.637 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SEA64 & SEA65.

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 an applicable 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-10880 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>.



CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Fcu

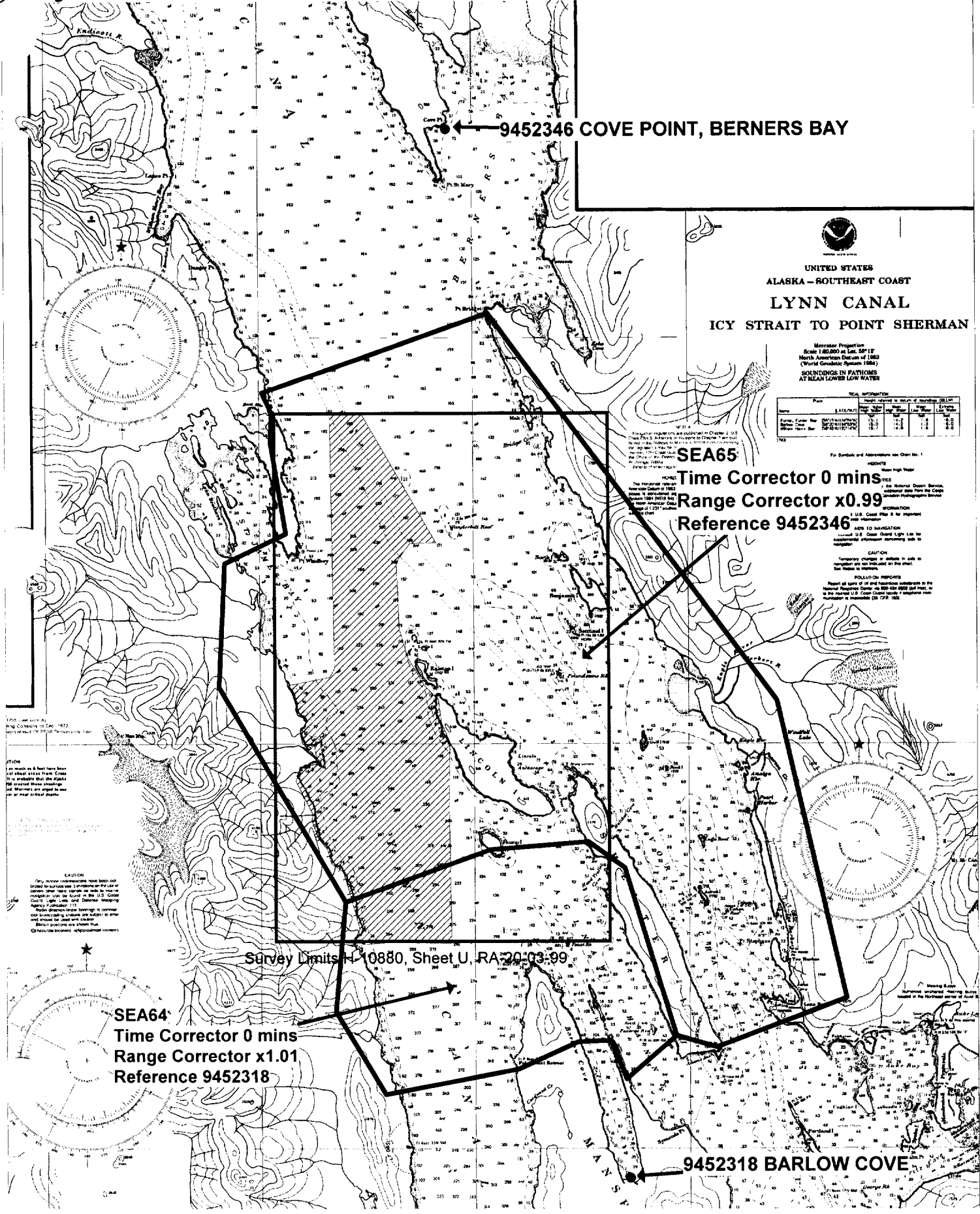
Final tide zone node point locations for OPR-O340-RA-99,
Sheet H-10880.

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 SEA64			
-134.966311 58.366237	9452318	0	1.01
-135.070146 58.355822			
-135.108804 58.389757			
-135.101046 58.434896			
-134.987639 58.456439			
-134.911523 58.459634			
-134.883282 58.448923			
-134.843845 58.379935			
-134.882525 58.362237			
-134.894794 58.378041			
-134.920234 58.377383			
-134.966311 58.366237			
Zone SEA65			
-134.712062 58.395475	9452346	0	0.99
-134.81273 58.375272	9452318	0	1.02
-134.843845 58.379935			
-134.883282 58.448923			
-134.911523 58.459634			
-134.987639 58.456439			
-135.101046 58.434896			
-135.198572 58.523417			
-135.19381 58.574286			
-135.146121 58.586495			
-135.157859 58.623886			
-135.156902 58.635886			
-135.164237 58.644226			
-134.988058 58.676589			
-134.765259 58.517721			
-134.712062 58.395475			

Final Tidal Zoning for OPR-O340-RA-99

Lynn Canal, AK - Sheet 10880



9452346 COVE POINT, BERNERS BAY



UNITED STATES
ALASKA - SOUTHEAST COAST
LYNN CANAL
ICY STRAIT TO POINT SHERMAN

Metric Projection
Scale 1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)
SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER

Name	DATE/NO.	Height adjusted to datum of sounding (MLLW)			
		Mean	Low	Very Low	Extreme
Scale	1:60,000	1.0	1.0	1.0	1.0
Water	1983	1.0	1.0	1.0	1.0
Other	1983	1.0	1.0	1.0	1.0

SEA65
Time Corrector 0 mins
Range Corrector x0.99
Reference 9452346

SEA64
Time Corrector 0 mins
Range Corrector x1.01
Reference 9452318

Survey Limits H-10880, Sheet U, RA-20-03-99

9452318 BARLOW COVE

1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)

NOTES
1. As much as 6 feet have been
cut shall areas from Coast
to be probable that the depth
has varied these soundings
and soundings are subject to error
and should be used with caution.
2. Soundings are shown from
① Actual bottom depth (soundings)

CAUTION
Only minor underwater hazards are
shown on this chart. In the case of
dredging operations, the user is
responsible for obtaining the latest
depth soundings from the Coast
Guard, Light House and District Mapping
Office (DMSO).

1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)

SEA65
Time Corrector 0 mins
Range Corrector x0.99
Reference 9452346

SEA64
Time Corrector 0 mins
Range Corrector x1.01
Reference 9452318

Survey Limits H-10880, Sheet U, RA-20-03-99

9452318 BARLOW COVE

9452346 COVE POINT, BERNERS BAY

UNITED STATES
ALASKA - SOUTHEAST COAST
LYNN CANAL
ICY STRAIT TO POINT SHERMAN

Metric Projection
Scale 1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)
SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER

Name	DATE/NO.	Height adjusted to datum of sounding (MLLW)			
		Mean	Low	Very Low	Extreme
Scale	1:60,000	1.0	1.0	1.0	1.0
Water	1983	1.0	1.0	1.0	1.0
Other	1983	1.0	1.0	1.0	1.0

NOTES
1. As much as 6 feet have been
cut shall areas from Coast
to be probable that the depth
has varied these soundings
and soundings are subject to error
and should be used with caution.
2. Soundings are shown from
① Actual bottom depth (soundings)

CAUTION
Only minor underwater hazards are
shown on this chart. In the case of
dredging operations, the user is
responsible for obtaining the latest
depth soundings from the Coast
Guard, Light House and District Mapping
Office (DMSO).

1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)

SEA65
Time Corrector 0 mins
Range Corrector x0.99
Reference 9452346

SEA64
Time Corrector 0 mins
Range Corrector x1.01
Reference 9452318

Survey Limits H-10880, Sheet U, RA-20-03-99

9452318 BARLOW COVE

9452346 COVE POINT, BERNERS BAY

UNITED STATES
ALASKA - SOUTHEAST COAST
LYNN CANAL
ICY STRAIT TO POINT SHERMAN

Metric Projection
Scale 1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)
SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER

Name	DATE/NO.	Height adjusted to datum of sounding (MLLW)			
		Mean	Low	Very Low	Extreme
Scale	1:60,000	1.0	1.0	1.0	1.0
Water	1983	1.0	1.0	1.0	1.0
Other	1983	1.0	1.0	1.0	1.0

NOTES
1. As much as 6 feet have been
cut shall areas from Coast
to be probable that the depth
has varied these soundings
and soundings are subject to error
and should be used with caution.
2. Soundings are shown from
① Actual bottom depth (soundings)

CAUTION
Only minor underwater hazards are
shown on this chart. In the case of
dredging operations, the user is
responsible for obtaining the latest
depth soundings from the Coast
Guard, Light House and District Mapping
Office (DMSO).

1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)

SEA65
Time Corrector 0 mins
Range Corrector x0.99
Reference 9452346

SEA64
Time Corrector 0 mins
Range Corrector x1.01
Reference 9452318

Survey Limits H-10880, Sheet U, RA-20-03-99

9452318 BARLOW COVE

9452346 COVE POINT, BERNERS BAY

UNITED STATES
ALASKA - SOUTHEAST COAST
LYNN CANAL
ICY STRAIT TO POINT SHERMAN

Metric Projection
Scale 1:60,000 as laid, S.P. 11°
North American Datum of 1983
(World Geodetic System 1984)
SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER

GEOGRAPHIC NAMES

H-10880

Name on Survey	<div style="display: flex; justify-content: space-between;"> <div style="width: 10%;">A</div> <div style="width: 10%;">B</div> <div style="width: 10%;">C</div> <div style="width: 10%;">D</div> <div style="width: 10%;">E</div> <div style="width: 10%;">F</div> <div style="width: 10%;">G</div> <div style="width: 10%;">H</div> <div style="width: 10%;">K</div> </div>											
	ON CHART NO. 17316	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST				
ALASKA (title)	X		X									1
BENJAMIN ISLAND	X		X									2
BRIDGET COVE	X		X									3
FAUST ROCK	X		X									4
HALIBUT COVE	X		X									5
HUMP ISLAND	X		X									6
LINCOLN ANCHORAGE	X		X									7
LINCOLN ISLAND	X		X									8
LITTLE ISLAND	X		X									9
LYNN CANAL	X		X									10
LYNN SISTERS	X		X									11
MAB ISLAND	X		X									12
NORTH ISLAND	X		X									13
NORTH PASS	X		X									14
POUNDSTONE ROCK	X		X									15
RALSTON ISLAND	X		X									16
RETREAT, POINT (title)	X		X									17
SAINT JAMES BAY	X		X									18
SENTINEL ISLAND	X		X									19
SHELTER COVE	X		X									20
SHELTER ISLAND	X		X									21
VANDEBILT REEF	X		X									22
WHIDBEY, POINT	X		X									23
YANKEE COVE	X		X									24
												25

Dennis J. Rosenberg
DEC 20 1999

HYDROGRAPHIC SURVEY STATISTICS

H-10880

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

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

SHORELINE DATA

SHORELINE MAPS (List):	GC 10424, TP-01527, TP-01528
PHOTOBATHYMETRIC MAPS (List):	N/A
NOTES TO THE HYDROGRAPHER (List):	N/A
SPECIAL REPORTS (List):	N/A
NAUTICAL CHARTS (List):	17316 18th Ed., July 18, 1998

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	143.00		
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT	22.00		
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)			
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	165.00	

Pre-processing Examination by Pacific Hydrographic Branch	Beginning Date 1/3/00	Ending Date
Verification of Field Data by D. Doles, E. Domingo, D. Hill, R. Mayor, G. Nelson, M. Bigelow	Time (Hours)	Ending Date
Verification Check by D. Hill	Time (Hours)	Ending Date
Evaluation and Analysis by M. Bigelow	Time (Hours) 13.00	Ending Date
Inspection by D. Hill	Time (Hours) 10	Ending Date 4-28-2000

EVALUATION REPORT H-10880

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. A page-size plot of the charted area depicting the limits of supersession accompanies this report as attachment 1.

The bottom is typically sand, mud and gravel. Depths range from -2 to 319 fathoms. The NALL line (Navigable Area Limit Line) was determined by the ship to be between 5 and 30 meters offshore. The depths along this NALL are between 1 and 3 fathoms.

C. SURVEY VESSELS

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

All vertical beam echo sounder (VBES) data was acquired with HYPACK version 8.9 and preliminary processing was done with HPS version 9.3 and Mapinfo 5.0. Multibeam data was collected 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. Mapinfo was used to compile the field sheet. See the hydrographer's report, Section D. Automated data acquisition and processing, for more information.

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 Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was not used during the field work.

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; sound velocity; and heave, pitch and roll. Additional reducers for multibeam survey data include heave, pitch and roll. These reducers have been reviewed and are consistent with NOS specifications. Reduction of sounding data for sound velocity is based on two separate casts which do not bracket the period of data collection. Casts were conducted on DN 147 at time 01:10:00 and DN 147 at time 13:30:00. Data collection began on DN 146 at time 21:27:16 and ended on DN 147 at time 18:37:50. Although the period of data collection is in excess of 4 hours beyond the time of the latest

cast there is no indication that the sounding data quality has been compromised.

Unverified real tides were downloaded from the Internet for the tide gauge Juneau (945-2210) and were used for the reduction of soundings during field processing. During office processing, tide reducers were derived from approved hourly heights zoned from the following tide gauges: 945-2318, Barlow Cove, AK and gauge 945-2346, Cove Point, Berners Bay, AK.

H. CONTROL STATIONS

Section H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The geographic positions of all survey data are 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 projection by applying the following corrections:

Latitude: -1.186 seconds (-36.709 meters)
Longitude: 6.485 seconds (104.953 meters)

NAD 83 is used as the horizontal datum for plotting and position computations.

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

I. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control and horizontal control is adequately discussed in section H of the hydrographer's report. See the OPR-O340-RA-98 horizontal control report for more information. A horizontal dilution of precision (HDOP) not to exceed 3.75 for a 1:10,000 scale survey was computed for survey operations. The maximum (HDOP) allowable limit has not been exceeded during this survey and the quality of data obtained is good.

All soundings and features were positioned using differential GPS (DGPS). VHF differential reference stations were established at JOE and CURTIS. JOE was the primary source for differential corrections for this survey. The USCG beacon located at Gustavus, Alaska was also used for differential corrections. See the OPR-O340-RA-98 horizontal control report for more information. The ship also used SHIPDIM, version 2.2R (April 1996) with a Trimble Centurion P-code receiver and an Ashtech sensor (both differentially corrected) to monitor the performance of the USCG beacon.

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

The hydrographer used an unconventional source for shoreline, registered NASA aerial photos acquired from the U.S. Forest Service. The hydrographer should have used photogrammetric digital map GC 10424 and analog maps TP-01527 and TP-01528. Nautical chart 17316, 18th edition, July 18th 1998 should have been used in areas not common to the photogrammetric maps. The authorized source documents were utilized during office processing to compile the smooth sheet.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report with the following exception: Section F. Sounding Equipment specifically states that no SWMB data were collected on this survey. Section K. says SWMB was collected inside the 100 meter curve. Collection actually was done with echo sounder.

L. JUNCTIONS

Survey H-10880 junctions with the following surveys:

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10864	1999	1:20,000	North
H-10869	1999	1:10,000	Northwest
H-10862	1999	1:10,000	Northeast
H-10881	1999	1:20,000	South
H-10865	1999	1:10,000	Southeast
H-10866	1999	1:10,000	East

The junctions with surveys H-10864, H-10869, H-10862, H-10881, H-10865 and H-10866 are complete. For the deep water junction with H-10865 there are one to four fathom differences throughout the common area, with H-10865 generally tending shoaler. The cause of this problem is unknown. A few soundings from each of these junctional surveys have been transferred in color within the common areas to better delineate the bottom configuration and to support common depth curves. A "Joins" note has been added to the smooth sheet where applicable to indicate completed junctions. There is a holiday between survey H-10880 and survey H-10866 between Latitude 58°34'30" N and Latitude 58°33'15" N along Longitude 135°04'00" W. Depths in the holiday are between 138 fathoms and 183 fathoms. A comparison to prior survey H-2056 reveals that this survey is also deficient in providing sounding coverage in the area. There are two more holidays between survey H-10880 and survey H-10865. The first is west of Lincoln Island between Latitude 58°30'00" N and Latitude 58°29'30" N and between Longitude 135°02'00" W and Longitude 135°01'30" W. The second holiday is west of Hump Island between Latitude 58°27'30" N and Latitude 58°26'45" N and between Longitude 135°02'00" W and Longitude 135°01'30" W. These holidays do not appear to contain any significant bottom features which might pose a problem to surface navigation. Elsewhere, depths are in good agreement within the junction area between the present survey and surveys H-10864, H-10866, H-10862, H-10865 and H-10881.

M. COMPARISON WITH PRIOR SURVEYS

The present survey was compared to the following prior surveys:

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H-1602A	1884	1:40,000
H-2056	1890	1:40,000
H-4228	1922	1:40,000

The digital raster images of prior surveys H-4228, H-1602A and H-3985WD are poor quality with no depths or grid, therefore difficult to register to the present survey. Comparison could only be made with survey H-2056. Depths from survey H-2056 along the west side of Lynn Canal in depths less than 20 fathoms match within 1 to 2 fathoms. In depths more than 20 fathoms and in depths between 240 and 300 fathoms along the flat bottom soundings are within 1 fathom. Depths along the west side of Lincoln Island in depths less than 20 fathoms do not compare well due to the differences between the shorelines which was utilized to register the survey images. Depths between 20 and 50 fathoms are shoaler on the prior survey. In depths more than 50 fathoms, the depths compare within one to two fathoms. It is difficult to compare the prior shoreline features to the newer digital shoreline due to the poor registration of the two surveys. The same goes for the shoreline on the west side of

Lynn Canal. Differences between prior survey depths and the present survey may be attributed to greater sounding coverage; improved positioning and sounding methods; and relative accuracy of the present data acquisition techniques.

Because the raster images of the remaining prior surveys are illegible, a comparison was made between the present survey and chart 17316. Assuming that all critical depths and clearances would have been previously transferred from the prior surveys to the chart the chart functioned as a proxy for the surveys 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 surveys H-1602a, H-2056, H-3985WD, and H-4228 are considered to be superseded.

N. ITEM INVESTIGATION REPORTS

No AWOIS items fall within the limits of this survey.

O. COMPARISON WITH THE CHART

Survey H-10880 was compared with the following chart:

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
17316	18 th	July 18, 1998	1:80,000

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and requires no further discussion.

The three-fathom curve and the fifty-fathom curve depicted on chart 17316, 18th edition, on both sides of Lynn Canal, is actually closer to shore than is charted.

Numerous rocks are presently charted near shore within the survey area. The hydrographer failed to specifically discuss or otherwise provide definitive disposition of these features. A close examination of the prior surveys, the chart and the present hydrography, has led the evaluator to the conclusion these rocks are likely representations of ledges observed during earlier survey work. Accordingly, the charted depiction is recommended for supersession by the present survey which provides good detail in the near shore areas.

The kelp charted on the west side of Lynn Canal between Latitude 58°25'25" N and Latitude 58°25'37" N was not completely addressed by the hydrographer. While there are no specific detached positions locating kelp there are a few random notations on the field sheet documenting the existence of kelp. The instances have been symbolized on the smooth sheet and are recommended for charting. Other charted kelp should remain as charted.

Survey H-10880 is adequate to supersede charted hydrography within the charted area.

b. Dangers to Navigation

There were no dangers to navigation reported during the survey or during office processing.

P. ADEQUACY OF SURVEY

With the following exception survey H-10880 is adequate to:

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

With the following exceptions 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 (FPM), April 1998 edition, and the NOS Hydrographic Surveys Specifications and deliverables, dated April 23, 1999.

Many holidays exist between survey H-10880 and the junction surveys. An unapproved source for shoreline was used during the survey. Appendix VI. Supplemental Correspondence, contained documents that should be under other appendices.

Q. AIDS TO NAVIGATION

There are no aids to navigation in the surveyed area. There are 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

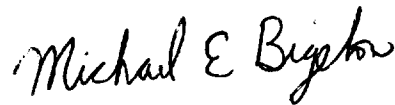
Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

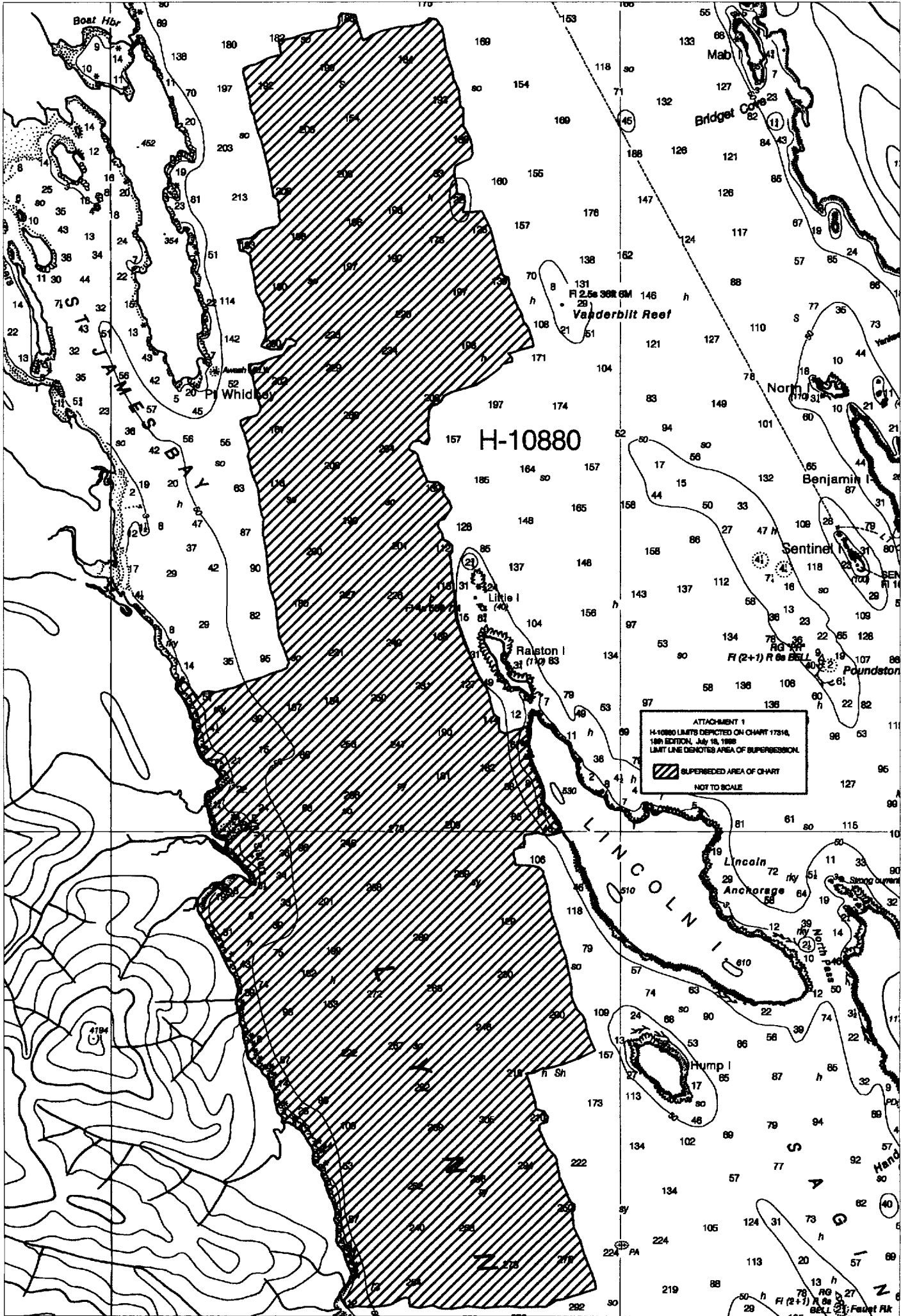
This is an adequate hydrographic survey. No additional field work is recommended

U. REFERRAL TO REPORTS

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



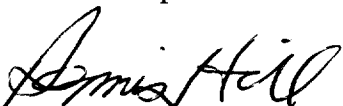
Michael E. Bigelow
Cartographer



APPROVAL SHEET
H-10880

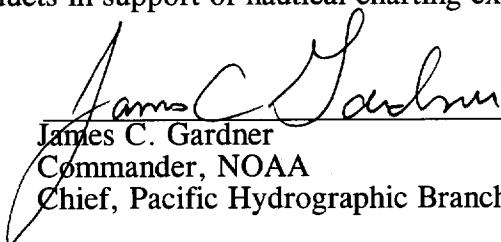
Initial Approvals:

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 Hill
Cartographer, Cartographic Team
Pacific Hydrographic Branch
Date: 4-25-00

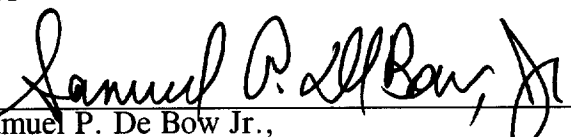
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.



James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch
Date: 4-28-00

Final Approval

Approved:



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

