

H10782

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-40-4-97
Registry No. ....	H-10782
LOCALITY	
State .....	Alaska
General Locality .....	Northwest Prince William Sound
Sublocality .....	North of Knight Island to Perry Passage and Vicinity
<u>1997</u>	
CHIEF OF PARTY CAPT Alan D. Anderson, NOAA	
LIBRARY & ARCHIVES	
DATE .....	FEB 22 1999

**HYDROGRAPHIC TITLE SHEET**

H-10729

**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-40-4-97

State Alaska

General locality Northwest Prince William Sound

Locality North of Knight Island to Perry Passage and Vicinity

Scale 1:40,000 Date of survey Sept. 26 - Oct. 31, 1997

Instructions dated 8/27/97, Change #1: 10/1/97 Project No. OPR-P125-RA

Vessel NOAA Ship RAINIER

Chief of party CAPT Alan D. Anderson, NOAA

Surveyed by CAPT A. Anderson, LT G. Noll, SST J. Jacobson, ST J. Ruhland

Soundings taken by echo sounder, hand lead, pole Hydrochart II IDSSS (Multibeam)

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: C. Barry Automated plot by HP 650C

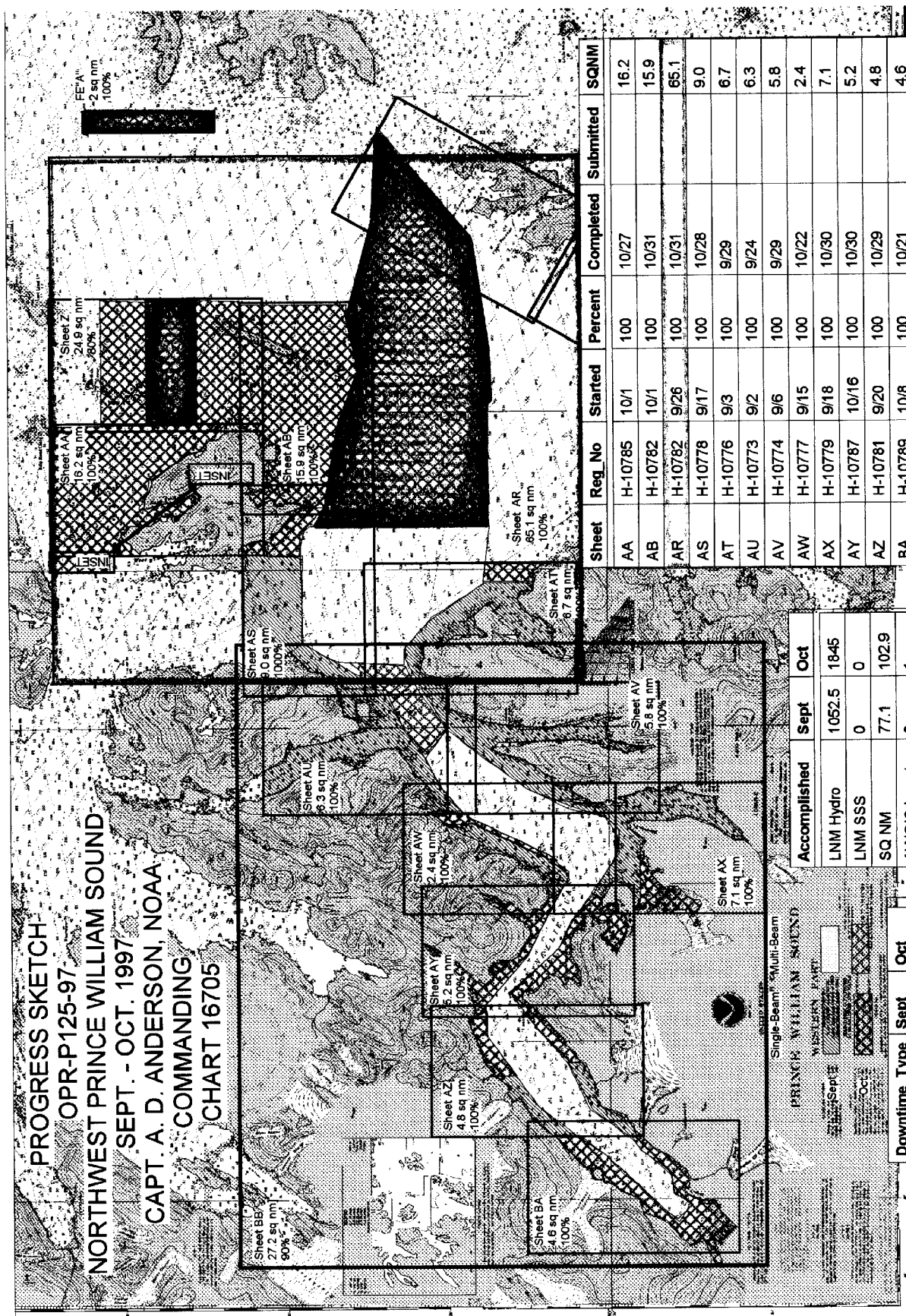
Verification by M. Bigelow, R. Mayor, E. Domingo, C. Barry

Soundings in fathoms ~~feet~~ at ~~MEW~~ MLLW and tenths

REMARKS: Time in 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.

AWOIS/SURF 2/8/99 MCR

**PROGRESS SKETCH**  
**OPR-P125-97**  
**NORTHWEST PRINCE WILLIAM SOUND**  
**SEPT. - OCT. 1997**  
**CAPT. A. D. ANDERSON, NOAA**  
**COMMANDING**  
**CHART 16705**



Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
AA	H-10785	10/1	100	10/27		16.2
AB	H-10782	10/1	100	10/31		15.9
AR	H-10782	9/26	100	10/31		65.1
AS	H-10778	9/17	100	10/28		9.0
AT	H-10776	9/3	100	9/29		6.7
AU	H-10773	9/2	100	9/24		6.3
AV	H-10774	9/6	100	9/29		5.8
AW	H-10777	9/15	100	10/22		2.4
AX	H-10779	9/18	100	10/30		7.1
AY	H-10787	10/16	100	10/30		5.2
AZ	H-10781	9/20	100	10/29		4.8
BA	H-10789	10/8	100	10/21		4.6
BB	H-10775	9/11	100	10/21		27.2
Z	H-10791	9/11	80	10/29		24.9
FE'A"	AR INSET	10/5	100	10/5		2.0

Accomplished	Sept	Oct
LNM Hydro	1052.5	1845
LNM SSS	0	0
SQ NM	77.1	102.9
AWOIS Invest.	0	1
Other Invest.	3	16
LNM Multibeam	164.4	241.5
Days At Sea	28	29

Downtime_Type	Sept	Oct
Weather - Days	3	0
Mechanical -Hr	0	2
Electronic -Hr	0	1

16705  
 10/1/97  
 10/1/97  
 10/1/97



# Descriptive Report to Accompany Hydrographic Survey H-10782

Field Number RA-40-4-97

Scale 1:40,000

December 1997

**NOAA Ship RAINIER**

Chief of Party: Captain Alan D. Anderson, NOAA

## A. PROJECT ✓

This basic hydrographic survey was completed in Northwest Prince William Sound as specified by Project Instructions OPR-P125-RA dated August 27, 1997 and Change No. 1 to Project Instructions OPR-P125-RA dated <sup>Oct. 1, 1997</sup> ~~Sept. 24, 1997~~. Survey H-10782 corresponds to sheet AR as defined in the sheet layout. This survey will provide data to supersede <sup>line</sup> ~~eleven~~ prior surveys performed between 1905-1964. Requests for hydrographic surveys and updated charts in this area have been received from the Defense Mapping Agency, the U.S. Coast Guard, the Southwest Alaska Pilot's Association, cruise ship lines, and local fishermen.

## B. AREA SURVEYED ✓ SEE EVAL. REPT., SECTION B.

The survey area is <sup>north of</sup> ~~offshore~~ Knight Island to Perry Passage, Alaska. In addition to the main survey area, a deep region within H-10791 (sheet Z97) and a gap between H-10519 and H-10578 (sheet Gap1) was included. The hole in H-10791's northern limit is latitude 60° 43' 45" N. The southern limit is 60° 42' 33" N, the western limit is 147° 50' 57" W and the eastern limit is 147° 47' 00" W. The gap between H-10519 and H-10578's northern limit is latitude 60° 46' 00" N. The gap's southern limit is 60° 42' 00" N, the western limit is 147° 32' 45" W and the eastern limit is 147° 31' 45" W.

Below lies a detailed listing of the corner points of the irregular main survey area. The table begins in the northwest corner of the survey and proceeds clockwise.

Latitude	Longitude	LATITUDE	LONGITUDE
60-39-20.45 N	148-04-39.46 W		148° 05' 00"
60-39-14.98 N	147-57-32.98 W		147° 57' 12"
60-38-35.97 N	147-56-09.36 W		
<del>60-37-34.36 N</del>	147-47-16.95 W	60° 37' 45"	
60-37-42.58 N	147-46-05.87 W		147° 46' 24"
60-40-14.48 N	147-44-29.7 W		
<del>60-36-59.43 N</del>	147-44-29.7 W	60° 40' 15"	147° 44.00"
60-36-58.75 N	147-33-01.19 W	60° 38' 10"	147° 44' 15"
60-35-48.18 N	147-33-01.19 W		147° 31' 10"
60-35-37.9 N	147-36-19.1 W		
60-33-53.67 N	147-38-39.87 W		
60-34-01.21 N	148-01-31.31 W	60° 33' 30"	147° 40' 00"
60-36-15.59 N	148-04-22.74 W	60° 33' 12"	147° 53' 45"
60-36-14.22 N	148-06-01.7 W	60° 33' 50"	147° 53' 45"
60-37-41.21 N	148-04-49.22 W	60° 33' 30"	148° 00' 50"
60-38-02.43 N	148-05-58.91 W	60° 36' 15"	148° 05' 15"
60-39-20.45 N	148-04-39.46 W	60° 36' 40"	148° 09' 00"
		60° 36' 45"	148° 06' 00"
		60° 38' 00"	148° 06' 00"
		60° 38' 00"	148° 06' 35"

The main area's northern limit between Culross Island and Perry Island is 60° 39' 20" N. Continuing east the northern limit skirts ½ mile offshore of Meares Pt to a point one mile south of Lone Island. A single line of hydro extends north ½ mile off the eastern side of Lone Island to ~~60° 40' 16" N~~<sup>60° 39' 30" N</sup>. The northern limit continues on to the east along 60° 40' 00" N. The survey's irregular southern limit lies approximately at ~~60° 34' 15" N~~<sup>60° 33' 30" N</sup>. The western limit is bound by Culross Island to the north and the mainland to the south with hydro ending approximately ½ mile offshore. In the channel between Culross Island and the mainland the most western edge of the irregular hydro limit is ~~148° 06' 10" W~~<sup>148° 09' 00" W</sup>. Eleanor Island binds the eastern limit to the south with hydro ending approximately ½ mile offshore. The most eastern limit north of Eleanor Island is 147° 33' 00" W. Data acquisition was conducted from September 26 to October 31, 1997 (DN 269-304).

### C. SURVEY VESSELS ✓

Data were acquired by RAINIER as noted in the Survey Information Summary printout appended to this report.

### D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Swath data collected by the RAINIER were acquired and processed using Intermediate Depth Swath Survey System (IDSSS) and Hydrochart II (Seabeam Inc.) programs. Bottom sample data were acquired and processed using the Hydrographic Data Acquisition and Processing System (HDAPS). Final Detached Positions and Soundings based on predicted tides were saved in MapInfo 4.1 format. A complete listing of all programs used to acquire and process data is included in Appendix VI.\*

### E. SONAR EQUIPMENT ✓

No Side Scan Sonar equipment was used on this survey. *Concur*

### F. SOUNDING EQUIPMENT ✓

During bottom sample acquisition the RAINIER used a Raytheon DSF-6000N which is a dual frequency (100 kHz, 24 kHz), paper trace echo sounder. Serial numbers are included on the headers of the daily Raw Master Printouts. No new problems, which affect survey data, were encountered. DSF-6000N soundings generally were acquired in meters using the High + Low, high frequency digitized setting, but in depths over 300 meters, low frequency was scanned in place of the high when the fathometer lost its high frequency trace.

The IDSSS configuration consisted of a data acquisition system (DAS). The DAS consisted of a Digital Equipment Corporation's (DEC) VAX Station 4000-90 computer system interfaced with a Seabeam Instruments Inc. Hydrochart II sonar system, Datawell heave-roll-pitch sensor (HIPPY), Sperry gyrocompass, a Trimble P-code GPS system, and Ashtech DGPS system. Hydrochart II is a multibeam sonar system that uses two transducer arrays to produce an athwartship swath of bathymetric data approximately 2.5 times the water depth.

The DEC VAX Station 4000-90 computer collected input from the Hydrochart II, HIPPY, gyrocompass, and the navigation system. It also provided guidance to the helmsman and plotted a near real time contour map. The DAS consisted of the following equipment:

\* FILED WITH THE HYDROGRAPHIC DATA.

## DAS EQUIPMENT ✓

Hydrochart II Sonar System  
DEC Server DSRVW-7C  
DEC VAX Station 4000-90 (DAS)  
TTi 8212 Tape Drive  
Sperry MK 227 Gyrocompass  
DATAWELL Hippy  
ZETA 24" Plotter  
DEC monitor

Data processing was also controlled on the DAS system. The DEC VAX Station 4000-90 computer was used to process the data and create corrected merge files, selected sounding files, and processing sheets.

## Problems ✓

Sonar error messages (VP RESET COMPLETE) continued to plague multibeam data collection between DN 269-301. Replacement of the Hippy serial card prior to DN 304 appears to have finally cured the problem. Datasets prior to DN 304 required many bad sections of data to be manually edited out by survey personnel. Bad data was also a problem on very steep slopes, even at slow speeds, requiring several lines to be repeated. Causes for this poor data could be upwelling currents in addition to the steepness of the slopes themselves. SURVEY DATA WERE ANALYZED DURING OFFICE PROCESSING AND FOUND TO CONTAIN NO SIGNIFICANT PROBLEMS.

## G. CORRECTIONS TO ECHO SOUNDINGS ✓

Six sound velocity casts were acquired ✓ within the survey limits as shown in the appended Survey Information Summary report. The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 219), calibrated December 15, 1996. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 3.3 (1997), in accordance with Field Procedures Manual (FPM) section 2.4.3. Printouts of the sound velocity profile, data, and correctors used in field processing are included in the "Separates to be Included with Survey Data, IV. Sounding Equipment Calibrations and Corrections".\*

RAINIER'S static transducer depth was determined during dry-dock in 1995 using the form in Field Procedures Manual (FPM) Fig. 2.2.

Offsets for GPS antennae, static draft, and settlement and squat correctors were tabulated in the HDAPS Offset Tables.\* Offset table #7 was used for the RAINIER. Printouts of these tables are included with project data for OPR-P125-RA-97.

The Coastal and Estuarine Oceanography Branch (N/OES334) through N/CS31 provided predicted tides for the project on diskette for the Cordova, Alaska reference station (945-4050). HDAPS listings of the data used in generating tidal correctors are included in Appendix V of this report. Tidal correctors as provided in the project instructions for H-10782 are shown on the appended Survey Information Summary report.

Valdez, Alaska (945-4240) and Cordova, Alaska (945-4050) are the primary control stations for datum determination at all subordinate stations. RAINIER personnel installed Sutron 8200 tide gages at Herring Point (945-4691) on September 2, 1997 and at Point Perry (945-4729) on September 30, 1997. When station Herring Point was removed on October 31<sup>st</sup> the battery was dead and data collection had ceased on October 26<sup>th</sup>. The gauge at Point Perry was also removed prior to the collection of the last bit of hydro on DN 304. The hydrographer recommends that existing tide data be extrapolated to cover the time of missing data. Hydro run at the time of missing tide gauge coverage is in such a depth that any slight inaccuracies caused

\* See Eval Rpt., Section G.

\* FILED WITH THE HYDROGRAPHIC DATA

by extrapolation would be insignificant relative to water depth.

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/OES212 in accordance with HSG 50 and FPM 4.3. A request for approved tides was forwarded to N/OES23 in accordance with FPM 4.2.3.

TIDE NOTE DATED FEB. 5 1998 IS ATTACHED. SEE EVAL. REPT. SECTION G.

#### H. CONTROL STATIONS ✓ SEE EVAL REPORT SECTION H

The horizontal datum for this project is NAD 83. Station ROCK, recovered in 1996 and checked in 1997, was used to verify and establish local geodetic control for this survey. See the OPR-P125-RA-97 Horizontal Control Report\* for more information.

CONTROL STATIONS LIST DATED 9 DECEMBER 1997 IS ATTACHED.

#### I. HYDROGRAPHIC POSITION CONTROL ✓ SEE EVAL. REPT., SECTION I

All soundings were positioned using differential GPS. Primary hydrographic control was based on the USCG beacons located at the Kenai Peninsula and Cape Hinchinbrook. Stations on Kodiak Island and Potato Point were also received in this area. A VHF differential reference station at ROCK was used when possible.

Launch-to-launch DGPS performance checks were performed in accordance with Section 3.4.4 of the FPM. Two observations of position were made from two different DGPS base stations while the launches were rafted together with their GPS antennae within 2-3 meters of each other. RAINIER 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. Periodic comparisons and occasional performance checks were logged with the SHIPDIM system. Some outliers were noted, but none indicated systematic or continuous errors in the beacons. The SHIPDIM OUTLIER.SUM results are included in the project data for OPR-P125-RA-97.

#### J. SHORELINE ✓ SEE EVAL. REPT., SECTION J

There was no shoreline associated with this survey. Brown shoreline on the MapInfo plots is displayed for orientation purposes only.

#### K. CROSSLINES ✓

Crosslines agreed within 2 fathoms with mainscheme hydrography, except in areas of steep bathymetry. There were a total of 43.5 nautical miles of crosslines, comprising 26.5% of mainscheme hydrography.

#### L. JUNCTIONS ✓ SEE EVAL. REPT., SECTION L

Junctions with the gap between H-10519 & H-10578 (sheet Gap1):

Registry #	Scale	Date	Junction side
✓ H-10578	1:10,000	1994	East
✓ H-10580	1:10,000	1994	South
✓ H-10519	1:20,000	1993-94	West
✓ H-10571	1:20,000	1994	North

\* FILED WITH THE HYDROGRAPHIC DATA



Junction soundings with the surveys above were found to be in general agreement with this survey. Differences of 1 to 3 fathoms observed. The junction with both H-10519 and H-10578 is better towards the northern end where the bathymetry is both deeper and much flatter than that found at the southern end. *Concur*

**Junctions with the main survey area:**

Registry #	Scale	Date	Junction side
✓ H-10580	1:10,000	1994	East
✓ H-10730	1:10,000	1996	South
✓ H-10729	1:40,000	1996	South
✓ H-10776	1:10,000	1997	West
✓ H-10775	1:40,000	1997	West
✓ H-10778	1:10,000	1997	West & North
✓ H-10658	1:10,000	1995	North
✓ H-10657	1:10,000	1995	North
✓ H-10786	1:10,000	1997	North
✓ H-10519	1:20,000	1993-94	North
✓ H-10773	1:10,000	1997	West

Comparisons to the contemporary surveys showed a generally good agreement within 1-4 fathoms, with the exception of survey H-10776. \* Even in the area of very steep bathymetry east of Lone Island, the junction with H-10786 has an average agreement within 3 fathoms and a 15-fathom difference in the worst case. But H-10776 showed <sup>a few</sup> differences of between 10-50 fathoms, <sup>shallower</sup> on areas of steep slopes in comparisons to <sup>multi-beam</sup> single beam data. Extensive editing to H-10776 has somewhat alleviated this problem. <sup>Concur</sup> (In all cases) IDSSS soundings were deeper than single beam soundings. <sup>Concur</sup> It is the opinion of the Hydrographer that the discrepancies are attributed to problems associated with the single beam acquisition system. <sup>Concur</sup> Much of the area referenced above was surveyed using older <sup>Raytheon</sup> fathometers at or near their limits of depth recording. Agreement between this survey and the other junction surveys, agreement with all junctions in non-steep areas, and agreement within individual IDSSS swaths, adjacent IDSSS swaths, and crosslines support the confidence established in the accuracy of this survey. *Concur*

**Junctions with deep region within H-10791 (sheet Z97):**

Registry #	Scale	Date	Junction side
✓ H-10791	1:10,000	1997	North & South
✓ H-10519	1:20,000	1993-94	East
✓ H-10785	1:10,000	1997	West

Junction soundings with the surveys above were found to be in general agreement with this survey. Differences of 2 to 4 fathoms were observed, with the flat and deep junction with H-10519 showing particular good agreement. <sup>Concur</sup> This agreement breaks down on H-10785 south of 60° 43' 07" N where a few <sup>10-15</sup> multibeam soundings are much deeper (in places > 100 fathoms) than the single beam soundings obtained in an area of steep bathymetry. <sup>Concur</sup> Again it is the opinion of the Hydrographer that the discrepancies are attributed to problems associated with the single beam acquisition system. <sup>Concur</sup> Agreement between this survey and the other junction surveys, agreement with all junctions in non-steep areas, and agreement within individual IDSSS swaths, adjacent IDSSS swaths, and crosslines support the confidence established in the accuracy of

\* Three multibeam soundings from H-10782 have been rejected in favor of shallower single beam data within the area of poor agreement.

this survey. A multibeam holiday exists at  $60^{\circ} 43' 00''$  N where H-10782 junctions with H-10791. Although the area is sufficiently deep to present no danger to navigation, the hydrographer suggests performing another line of multibeam in this holiday as time permits.

\* Extent of holiday runs along latitude  $60^{\circ} 42' 40''$  N, From longitude  $147^{\circ} 46' 00''$  W to longitude  $147^{\circ} 51' 00''$  W.

Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after reduction to final vertical datum.

**M. COMPARISON WITH PRIOR SURVEYS** ✓ SEE EVAL. REPT. SECTION M AND ATTACHMENT 2:  
H-10782 PRIOR SURVEY SOUNDING COVERAGE

Below lies a table that depicts the source of all charted soundings that lie within that area surveyed for H-10782.

Registry #	Scale	Date	Area Covered	
✓ H-2807	1:100,000	1905	?	No soundings in survey area Along longitude $147^{\circ} 40' 00''$ W
✓ H-2916	1:20,000	1907	Southeast corner	
✓ H-3383	1:40,000	1912	Extreme northern point	
✓ H-3408	1:20,000	1912	Sheet Z97 (H-10791)	
✓ H-3570	1:20,000 & 1:40,000	1913	West of $147^{\circ} 49' 00''$ W & South of $60^{\circ} 39' 00''$ N	
✓ H-7678	1:20,000	1948-49	West of $147^{\circ} 53' 00''$ W	
✓ H-7764	1:20,000	1949	East of $147^{\circ} 38' 00''$ W	
✓ H-7765	1:20,000	1949	Sheet Gap 1	East of $147^{\circ} 34' 00''$ W
✓ H-7766	1:40,000	1949	Extreme eastern edge	East of $147^{\circ} 40' 00''$ W Centered on $60^{\circ} 34' 00''$ N
✓ BP-43214	1:200,000	1947	?	Misc Source
✓ BP-65971	1:80,000	1964	?	Misc Source
✓ BP-66414	1:80,000	1964	Sheet Z97 (H-10791)	Misc Source
✓ H-3028	1:20,000	1909	Extreme Eastern Edge	

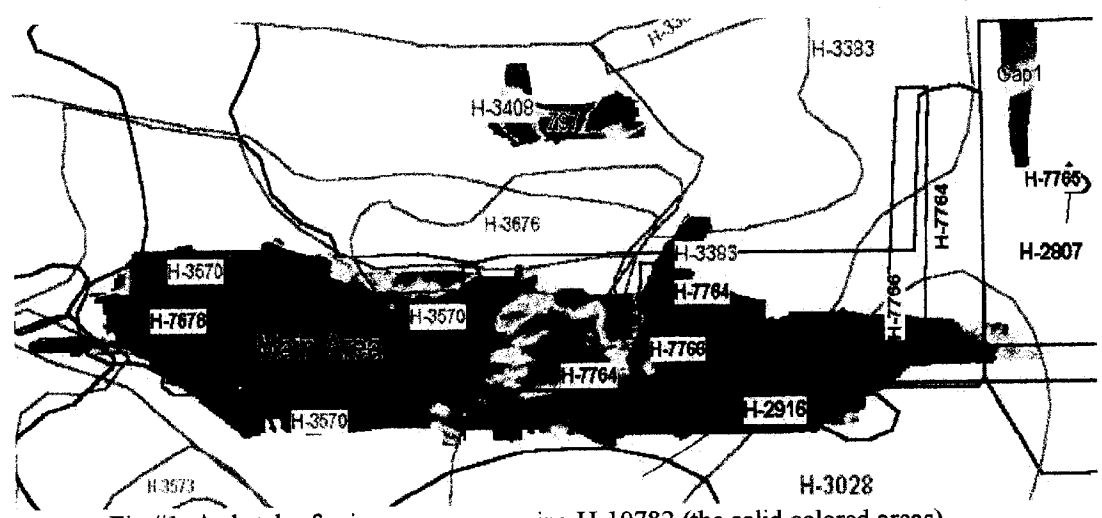


Fig #1 A sketch of prior surveys covering H-10782 (the solid colored areas).

H-3408 covers the entire survey area of sheet Z97. The trend of prior soundings agreed well with the present survey, with multibeam soundings being 5-10 fathoms shoaler. Due to sparse soundings, the relatively shoal sounding of 134 fathoms at  $60^{\circ} 43-04.02$  N  $147^{\circ} 49-31.59$  W was missed on H-3408, which has a 190-fathom in the same area. The 143-fathom sounding on the chart which came from BP-66414 much better depicts the afore mentioned shoal.

Charted soundings agree very well with the multibeam soundings collected on sheet Gap 1. On average the difference between the soundings of this survey and the prior is 1-2 fathoms. Shoaler soundings on the chart just east of the soundings at the southeast end can be attributed to the steep slope rising to the east. *CONCUR*

In general there is good agreement between the main section of this survey and the charted soundings. In particular H-7678 agrees within a couple of fathoms with this survey although other prior surveys typically differ by five fathoms or less. *CONCUR* Although soundings did agree in areas of common coverage there are two notable instances where shoaler depths were found during this survey due to the superior bottom coverage obtained with multibeam. A 63-fathom sounding at 60-36-58.74 N 147-47-28.13 W was found between two charted soundings of 147 and 117 fathoms. In the second case a 74-fathom sounding at 60-37-18.98 N 147-51-15.51 W was found in the vicinity of a charted 145-fathom sounding. *CONCUR* On the same feature, just to the south, at 60-36-29.86 N 147-50-49.09 W a 161-fathom depth lies atop a charted 262-fathom depth. Looking at the prior survey from which this sounding was drawn, H-3570, it appears that the charted 262-fathom was *CONCUR* ~~misread~~ *CONCUR* from a 162-fathom sounding. This depth is much more in line with the soundings obtained with this survey. *CONCUR*

Final comparisons will be done at PHB after reduction to final sounding datum using tidal information collected concurrently with this survey.

#### N. ITEM INVESTIGATIONS ✓

None. *CONCUR*

#### O. COMPARISON WITH THE CHART ✓ SEE EVAL. REPT. SECTION O.

Chart 16705, 1:80,000, 16<sup>th</sup> Edition, August 24, 1996<sup>\*</sup> is the largest scale chart covering the survey area. Comparison of soundings is described in Section M. Non-sounding features are discussed in Section J. Final sounding comparisons will be made at PHB after reduction to final vertical datum.

*\* 17TH EDITION ISSUED SEPT. 27, 1997*

#### Dangers to Navigation ✓

No dangers to navigation were reported to the Seventeenth Coast Guard District for H-10782. *CONCUR*

#### P. ADEQUACY OF SURVEY ✓ SEE EVAL. REPT. SECTION P

Survey H-10782 is complete and adequate to supersede prior soundings and features in their common areas. *CONCUR*  
*WITH THE EXCEPTION OF THE GAP IN DATA WHERE H-10782 JUNCTIONS WITH H-10791.*

#### Q. AIDS TO NAVIGATION ✓ See Eval Rept., Section Q

No navigational aids exist within the survey area. *CONCUR with clarification*

#### R. STATISTICS ✓

Refer to the Survey Information Summary attached to this report.

*\* FILED WITH THE HYDROGRAPHIC DATA.*

**S. MISCELLANEOUS ✓**

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

**T. RECOMMENDATIONS ✓ SEE EVAL. REPT. SECTION T.**


None. DO NOT CONCUR. ADDITIONAL FIELDWORK RECOMMENDED.

**U. 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-P125-RA Horizontal Control Report	November, 1997	N/CS34
OPR-P125-RA 1997 Coast Pilot Report	November, 1997	N/CS26
Project related data for OPR-P125-RA	Incremental	N/CS34

Respectfully Submitted,

  
James B. Jacobson  
SST, NOAA

Approved and Forwarded,

  
Alan D. Anderson  
Captain, NOAA  
Commanding Officer

CONTROL STATIONS as of 9 Dec 1997 ✓

No	Type	Latitude	Longitude	H	Cart	Freq	Vel Code	MM/DD/YY	Station Name
1		060:14:18.000	146:38:48.000	0	0	0.0	0.0	04/06/96	CAPE HINCHINBROOK USCG BECON
2		060:27:20.117	146:39:54.333	0	0	0.0	0.0	10/01/97	DDN DGPS
3		060:03:23.000	146:41:48.000	0	0	0.0	0.0	03/01/96	POTATO POINT USCG BEACON
4		060:39:17.513	<del>147:58:28.500</del> 55°58.265'	18	0	0.0	0.0	00/00/00	ROCK

# Survey Information Summary

**Project:** OPR-P125-97      **Project Name:** NORTHWEST PRINCE WILLIAM SOUND  
**Instructions Dated:** 8/27/97      **Project Change Info:**

Change #	Dated
1	9/24/97

  
**Sheet Letter:** AR      **Registry Number:** H-10782      10/1/97  
**Sheet Number:** RA-40-04-97  
**Survey Title:** OFFSHORE KNIGHT ISLAND TO PERRY PASSAGE  
**Data Acquisition Dates:** From: 26-Sep-97      269      To: 31-Oct-97      304

## Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2120							1	

## Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
		268	820	60/34/30 147/44/24	269-276
4		277	979	60/35/09 147/44/27	277-281
	4	282	820	60/39/06 147/44/24	282-292
5		293	963	60/39/07 147/44/49	293-299
6		300	597.7	60/43/45 147/50/30	300-301
		301	952.5	60/39/18 147/44/36	301-304

## Tide Zone Information

Zone #	Time Corr.	Height Corr.
PWS38		X0.95

## Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-4691	HERRING POINT	9/2/97	10/31/97
945-4729	POINT PERRY	9/30/97	10/31/97

## Statistics Summary

Type	Total:
BS	5
MBMS	164.4
MBSP	64.9
MBXL	43.5

Percent XL:	
SQNM:	65.1

APPROVAL SHEET

for


H-10782

RA-40-4-97

Standard procedures were followed in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Guidelines; and the 1994 version of the Field Procedures Manual in producing this survey. The data were examined daily during data acquisition and processing.

The field sheet and accompanying records have been reviewed by me and 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,

  
Alan D. Anderson  
Captain, NOAA  
Commanding Officer  
NOAA Ship RAINIER



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE:** February 5, 1998

**HYDROGRAPHIC BRANCH:** Pacific

**HYDROGRAPHIC PROJECT:** OPR-P125-RA-97  
**HYDROGRAPHIC SHEET:** H-10782

**LOCALITY:** Northwest Prince William Sound, AK

**TIME PERIOD:** Sep 26 - Oct 31, 1997

**TIDE STATION USED:** 945-4691 Herring Point, Knight Island Passage  
Lat.  $60^{\circ} 28.5'N$  Lon.  $147^{\circ} 47.5'W$

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.326 meters

**TIDE STATION USED:** 945-4729 Pt. Perry, Perry Island  
Lat.  $60^{\circ} 45.1'N$  Lon.  $147^{\circ} 57.8'W$

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.386 meters

**TIDE STATION USED:** 945-4794 Applegate Island  
Lat.  $60^{\circ} 37.4'N$  Lon.  $148^{\circ} 09.9'W$

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.385 meters

**REMARKS: RECOMMENDED ZONING**

Use zone(s) identified as: PWS38, PWS42, PWS52 & PWS53  
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.

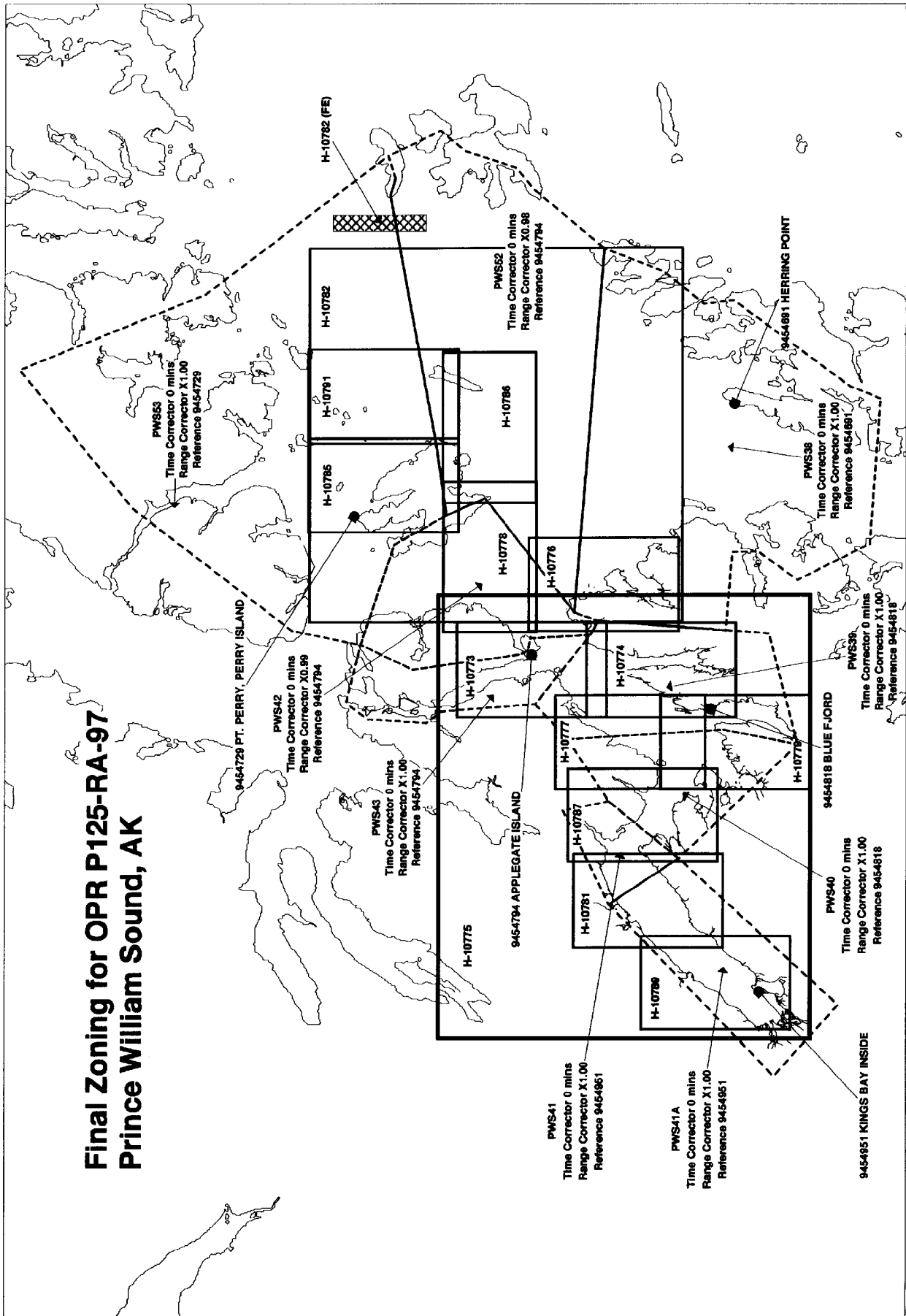
**Note 2:** Use tide data from the appropriate station for each zone according to the order in which they are listed in the "Tidezone" corrector files. For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available. All zones within a survey sheet may not have the same order of applicable tide stations.

  
-----  
CHIEF, OPERATIONAL ANALYSIS BRANCH





# Final Zoning for OPR P125-RA-97 Prince William Sound, AK



GEOGRAPHIC NAMES

H-10782

Name on Survey	<div style="display: flex; justify-content: space-between;"> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">PART NO. 96705</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">ON PREVIOUS SURVEY</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">CON U.S. QUADRANGLE MAPS</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">FROM LOCAL INFORMATION</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">ON LOCAL MAPS</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">P.O. GUIDE OR MAP ATLAS</span> <span style="writing-mode: vertical-rl; transform: rotate(180deg);">U.S. LIGHT LIST</span> </div>										
	A	B	C	D	E	F	G	H	K		
ALASKA (title)	X										1
APPLEGATE ISLAND	X		X								2
BILLINGS POINT	X		X								3
BUSH POINT	X		X								4
CULROSS ISLAND	X		X								5
DUTCH GROUP	X		X								6
EAST TWIN BAY	X		X								7
ELEANOR ISLAND	X		X								8
FOOL ISLAND	X		X								9
FOUL BAY	X		X								10
INGOT ISLAND	X		X								11
KNIGHT ISLAND PASSAGE	X		X								12
LONE ISLAND	X		X								13
LONE PASSAGE	X		X								14
MAIN BAY	X		X								15
MEARES POINT	X		X								16
NORTHWEST BAY	X		X								17
PERRY ISLAND	X		X								18
PERRY PASSAGE	X		X								19
POINT ELEANOR	X		X								20
PRINCE WILLIAM SOUND (title)	X		X								21
SOUTH BAY	X		X								22
UPPER PASSAGE	X		X								23
WEST TWIN BAY											24
											25

*Dennis J. Kernerberg*  
Chief Cartographer  
APR 22 1998

**HYDROGRAPHIC SURVEY STATISTICS**

H-10782

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		NA
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		NA
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS: SOURCE DOCUMENTS
ACCORDION FILES	1				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

**SHORELINE DATA**

SHORELINE MAPS (List): DM-10188, DM-10189, DM-10194, DM-10293, DM-10294, (CM-92011, CM-92012)

PHOTOBATHYMETRIC MAPS (List): NA

NOTES TO THE HYDROGRAPHER (List): NA

SPECIAL REPORTS (List): NA

NAUTICAL CHARTS (List): CHART 16705, 17th Ed., Sept. 27, 1997

**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	140.0		140.0
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		170.0	170.0
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		89.0	89.0
*USE OTHER SIDE OF FORM FOR REMARKS			
	<b>TOTALS</b>	<b>140.0</b>	<b>259.0</b>
Pre-processing Examination by <b>M. Bigelow</b>	Beginning Date 2/17/98	Ending Date 4/7/98	
Verification of Field Data by <b>R. Mayor, E. Domingo, C. Barry</b>	Time (Hours) 140.0	Ending Date 12/30/98	
Verification Check by <b>B. Olmstead</b>	Time (Hours) 13.0	Ending Date 1/13/99	
Evaluation and Analysis by <b>C. Barry</b>	Time (Hours) 259.0	Ending Date 12/30/98	
Inspection by <b>B. Olmstead</b>	Time (Hours) 10.0	Ending Date 1/19/99	

## EVALUATION REPORT

H-10782

### 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 accompany this report as Attachment 1.

The bottom consists mainly of gray mud. Depths range from 32 to 412 fathoms.

### C. SURVEY VESSELS

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

### D. AUTOMATED DATA ACQUISITION AND PROCESSING

Hydrochart II (Seabeam, Inc.), Intermediate Depth Swath Survey System (IDSS) was used by the field unit for acquisition and some processing of swath data. The bulk of field processing was accomplished using the Multibeam Support Vax system. Office processing was accomplished using the Hydrographic Processing System (HPS) and MicroStation 95.

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 is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

### E. SONAR EQUIPMENT

Side scan sonar equipment was not used during survey H-10782.

### F. SOUNDING EQUIPMENT

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

### G. CORRECTIONS TO SOUNDINGS

Soundings below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. 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, tide reductions were derived for all tide zones from approved hourly heights zoned direct from Applegate Island, tide gauge 945-4794, and apply from September 25 through October 29, 1997. Pt. Perry, Perry Island, tide gauge 945-4729, was used for all tide zones after October 29, 1997.

## **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:	-2.048 seconds	(-63.392 meters)
Longitude:	7.648 seconds	(111.940 meters)

## **I. HYDROGRAPHIC POSITION CONTROL**

Differential GPS (DGPS) was used to control this survey. In the event that the differential GPS corrector signal is lost, a switch to P-Code is made automatically by the Trimble receiver. Although P-Code accuracy is less than DGPS, at 0.5mm or better, it is adequate for survey operations at 1:40,000 scale. The satellite configuration, as indicated by HDOP and number of satellites, is monitored visually on the IDSSS and Trimble displays, and data are not collected when HDOP exceeds 15. DGPS performance checks were conducted in the field and found adequate.

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.

## **J. SHORELINE**

Shoreline maps DM 10188, DM 10189, DM10194, DM 10293 and DM 10294 (scale 1:20,000) originate from projects CM 92011 and CM 92012 and were compiled on NAD83 to apply to this survey. Shoreline drawn on the smooth sheet in black originates from the above digital data as provided by the Coastal Mapping Program. The shoreline data and the hydrographic data were merged during MicroStation processing.

Refer to the shoreline maps and the results of the fieldwork portrayed on the inshore surveys for detailed information.

There were no MHW revisions on this survey.

## **K. CROSSLINES**

Crosslines are adequately discussed in the hydrographer's report.

## **L. JUNCTIONS**

Survey H-10782 junctions with the following surveys:

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10519	1993	1:20,000	Vicinity of Lone Island
H-10571	1994	1:20,000	Five Nautical Miles Southwest of Glacier Island
H-10578	1994	1:10,000	Storey Island and Vicinity
H-10580	1994	1:10,000	Western Side of Naked Island and Vicinity
H-10657	1995	1:10,000	Eastern Portion of Perry Passage
H-10658	1995	1:10,000	Western Portion of Perry Passage
H-10729	1996	1:40,000	Northern Portion of Knight Island Passage
H-10730	1996	1:10,000	Crafton Island and Vicinity
H-10773	1997	1:10,000	Southern Culross Passage
H-10775	1997	1:40,000	Culross Passage to Kings Bay
H-10776	1997	1:10,000	Main Bay and Approaches
H-10778	1997	1:10,000	Southern Approaches to Perry Island
H-10785	1997	1:10,000	Northern Portion of Perry Island and Vicinity
H-10786	1997	1:10,000	Lone Island to Perry Passage
H-10791	1997	1:10,000	Northern Portion of Perry Island to Perry Island and The Dutch Group

The depths on surveys H-10519, H-10571, H-10578 and H-10580 are in meters, while the depths on the present survey are in fathoms. There is generally good agreement between soundings, however, the depth curves shown on the 1993-94 survey work delineate different depths and, therefore, do not agree. A 169 fathom depth on H-10519 at Lat. 60°40'16"N, Long. 147°44'22"W, was not verified by the present survey. A multibeam depth of 273 fathoms was found in this area and should discredit the 1993 survey sounding. "Adjoins" notes have been shown on the smooth sheet where applicable.

The junctions with surveys H-10657, H-10658, H-10729, H-10730 and H-10773 were not formally completed since these surveys were processed previously. However, depths are generally in good agreement within the common area. Some soundings from H-10657 and H-10729 have been transferred within the common area to better delineate the bottom configuration. "Adjoins" notes have been added to the smooth sheet where applicable.

The junctions with the remaining surveys are good. General differences of 0-4 fathoms are noted throughout the common area, and standard depth curves are in good agreement. In most cases, the present survey multibeam soundings tend to be slightly deeper in the common areas with junctional single beam surveys. Some soundings from H-10778, H-10785, H-10786 and H-10791 have been transferred within the common area to better delineate the bottom configuration. "Joins" notes have been added to the smooth sheet where applicable.

The following junctional items were noted:

- a) Two multibeam depths in the vicinity of Lat. 60°43'30"N, Long. 147°51'40"W and Lat. 60°35'14"N, Long. 148°03'24"W were found to be 98 and 83 fathoms deeper than depths on single beam surveys H-10785 and H-10776, respectively. The two multibeam soundings have been rejected in favor of the single beam soundings.
- b) An incomplete junction with H-10791 exists along the area of Lat. 60°42'30"N to Lat. 60°42'50"N, and from Long. 147°46'00"W to Long. 147°51'00"W. Additional work is recommended in the evaluation report, section T, and the hydrographer's report, section L.

Additional information regarding junctional comparisons is found in the hydrographer's report, section L.

## M. COMPARISON WITH PRIOR SURVEYS

The nine prior surveys listed below generally cover the entire area of the present survey. The prior survey work conducted from 1907 to 1913 provided very sparse sounding density and bottom coverage within the common areas of the present survey. See Attachment 2, Evaluation Report, H-10782: Prior Survey Sounding Coverage.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H-2916	(1907)	1:20,000
H-3028	(1909)	1:20,000
H-3383	(1912)	1:40,000
H-3408	(1912)	1:20,000
H-3570	(1913)	1:20,000 & 1:40,000

Data acquisition for prior surveys H-2916, H-3028, H-3383, H-3408 and H-3570 was accomplished using lead line and visual positioning techniques. Sounding density for the 1907 and 1913 prior surveys is exceptionally sparse. Several of these prior surveys are difficult to read, making comparison difficult in some areas. However, the following was noted in comparing with the present survey work:

Agreement between the lead line and multibeam soundings is generally within 5 to 10 fathoms (multibeam shoaler biased). However, a few larger depth discrepancies are noted in the areas listed below. For the purposes of making these comparisons, it was commonly required that multibeam values be extrapolated between smooth sheet soundings.

DEPTH IN FATHOMS			SOURCE OF SOUNDING	DIFF. BTWN SOUNDINGS	GEOG. LATITUDE	POSITION LONGITUDE
PRIOR	PRESENT	CHARTED				
217	309	217	H-3570	92	60°36'13"N	148°04'11"W
188	301	188	H-3570	113	60°34'30"N	148°01'56"W
*	245	129	H-3028	116	60°34'38"N	147°38'11"W

\* No discernible soundings in this area of the prior survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H-7678	(1948-49)	1:20,000
H-7764	(1949)	1:20,000
H-7765	(1949)	1:20,000
H-7766	(1949)	1:40,000

Data acquisition for prior surveys H-7678, H-7764, H-7765 and H-7766 was accomplished using early version echo sounder and visual positioning techniques. Agreement is generally within 5 to 10 fathoms, reflecting no consistent pattern of shoaling or an increase in depth. However, a few larger disagreements ranging from 62 to 162 fathoms, with the multibeam reading predominantly deeper than the 1949 echo sounder, are found in comparison of these surveys. The two largest depth discrepancies are noted in the areas listed below.

DEPTH IN FATHOMS			SOURCE OF SOUNDING	DIFF. BTWN SOUNDINGS	GEOG. LATITUDE	POSITION LONGITUDE
PRIOR	PRESENT	CHARTED				
*	366	216	H-7766	162	60°36'33"N	147°45'15"W
295	409	296	H-7764	113	60°35'41"N	147°45'12"W

\* No discernible soundings in this area of the prior survey.

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

Vastly improved data acquisition techniques, providing more thorough sounding coverage and improved positioning, have revealed previously undisclosed shoals and largely account for differences between prior and current sounding values. Regional seismic activity, in the form of subsidence or uplift occurring over the decades since the early surveys, may also account for differences.

In accordance with the Hydrographic Guideline No. 39, the effect of the 1964 Prince William Sound earthquake were considered in the comparison of this survey. Prince William Sound experienced a bottom uplift of 4-32 feet during the 1964 earthquake. However, due to the depths of water and the differences in data acquisition methods, no reasonable adjustment value for prior soundings could be determined.

Survey H-10782 is adequate to supersede all of the prior surveys within the common area.

#### **N. ITEM INVESTIGATIONS**

There were no AWOIS items assigned to this survey.

#### **O. COMPARISON WITH CHART**

Survey H-10782 was compared with the following chart:

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
16705	17th	Sept. 27, 1997	1:80,000

##### a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and miscellaneous source data. The prior surveys have been adequately addressed in section M and require no further discussion.

##### Miscellaneous Sources For Charted Soundings

<u>Number</u>	<u>Year</u>	<u>Scale</u>
BP-43214	(1947)	1:200,000
BP-65971	(1964)	1:80,000
BP-66414	(1964)	1:80,000

Comparison of miscellaneous source data listed above reveals general differences of 5 to 10 fathoms. The lack of sounding information from the miscellaneous sources prevents an accurate assessment of sounding discrepancies.

Survey H-10782 is adequate to supersede charted hydrography within the common area.

##### b. Dangers To Navigation

No dangers to navigation were discovered during survey operations or during office processing.



## **P. ADEQUACY OF SURVEY**

With the exception of the deficiencies mentioned in the preceding sections of this report, hydrography contained on survey H-10782 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 1994 Edition, except as noted below.

An adequate junction in one area of this survey was not affected with H-10791. Refer to section L, Junctions. The specified area is not in compliance with survey requirements based on incomplete bottom coverage.

In the event that the field unit's submission of survey data will exceed four weeks from the completion of field work, the Chief of Party will submit a written explanation for the delay indicating the anticipated transmittal date to the Chief of the appropriate processing section. Marine Center ships will forward their explanation through the Marine Center Director. Fieldwork for survey H-10782 was completed October 31, 1997 and was transmitted for office processing on February 17, 1998.

## **Q. AIDS TO NAVIGATION**

Port Nellie Juan Light and Perry Island Light were transferred to the smooth sheet from inshore surveys H-10776 and H-10786 respectively. Refer to the Descriptive Report and smooth sheet for these surveys regarding position information.

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

There were no features of landmark value located within the area of this survey. The hydrographer made no charting recommendations for new landmarks.

## **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**

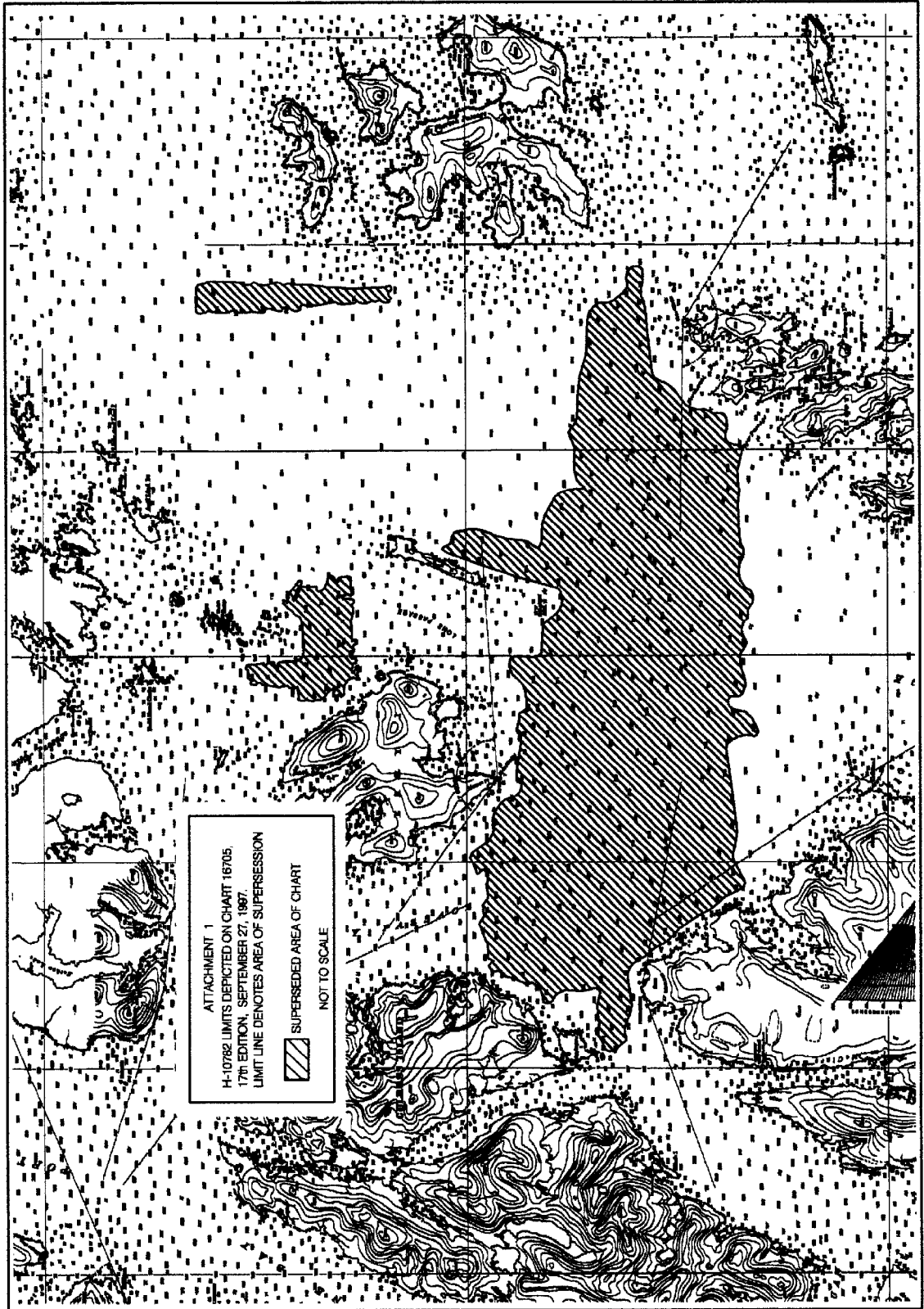
This is a good hydrographic survey. It is recommended that additional fieldwork be performed on a non-priority basis to fill the junctional data gap noted in section L and in the evaluation report, section T, for H-10791.

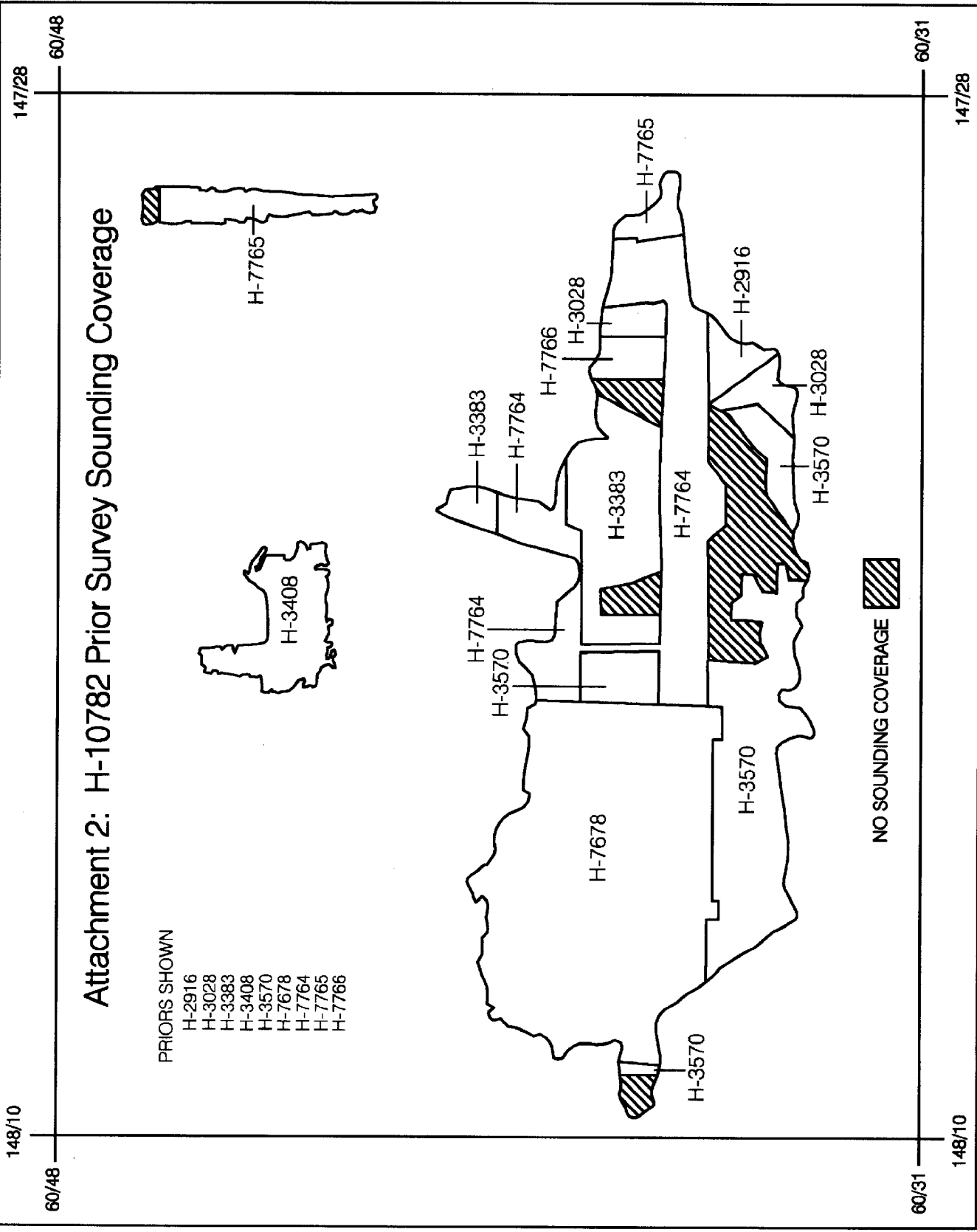
**U. REFERRAL TO REPORTS**

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



C.J. Barry  
Cartographer





APPROVAL SHEET  
H-10782

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.

Bruce A. Olmstead Date: 1/19/99  
Bruce A. Olmstead  
Senior Cartographer, Cartographic Section  
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.

James C. Gardner Date: 1/28/99  
James C. Gardner  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

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Final Approval

Approved:

Andrew A. Armstrong III Date: Feb 19, 1999  
Andrew A. Armstrong III  
Captain, NOAA  
Chief, Hydrographic Surveys Division

