

H10715

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic
Field No. RA-10-20-96
Registry No. H-10715

LOCALITY

State Alaska
General Locality Southwest Prince William Sound
Sublocality Shelter Bay and Vicinity

1996

CHIEF OF PARTY
CAPT Dean R. Seidel, NOAA

LIBRARY & ARCHIVES

DATE MAR. 6 1998

H-10715

HYDROGRAPHIC TITLE SHEET

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

FIELD NO.

RA-10-20-96

State Alaska

General locality Southwest Prince William Sound

Locality Shelter Bay and Vicinity

Scale 1:10,000 Date of survey September 6-11, 1996

Instructions dated August 23, 1996 Project No. OPR-P139-RA

Vessel RA-2(2122), RA-4(2124), RA-5(2125)

Chief of party CAPT Dean R. Seidel, NOAA

Surveyed by CAPT D. Seidel, LT G. Noll, LT M. Larsen, LTJG J. Crocker

Soundings taken by echo sounder, hand lead, pole DSF-6000N

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Evaluation by: I. Almacen Automated plot by HP Design Jet 650C

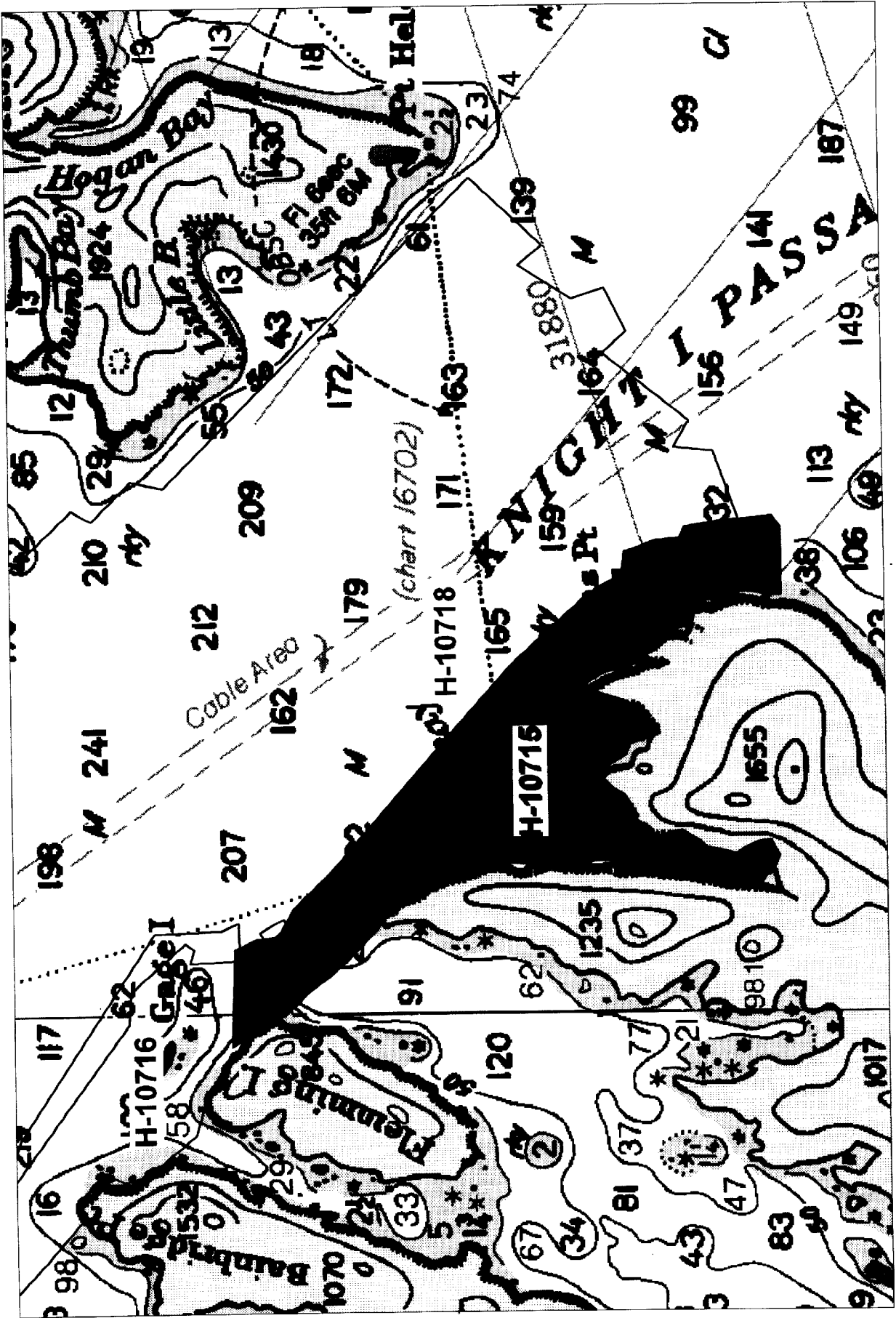
~~Processed by~~ D. Doles, R. Mayor, E. Domingo, J. Stringham

Verification by D. Doles, R. Mayor, E. Domingo, J. Stringham

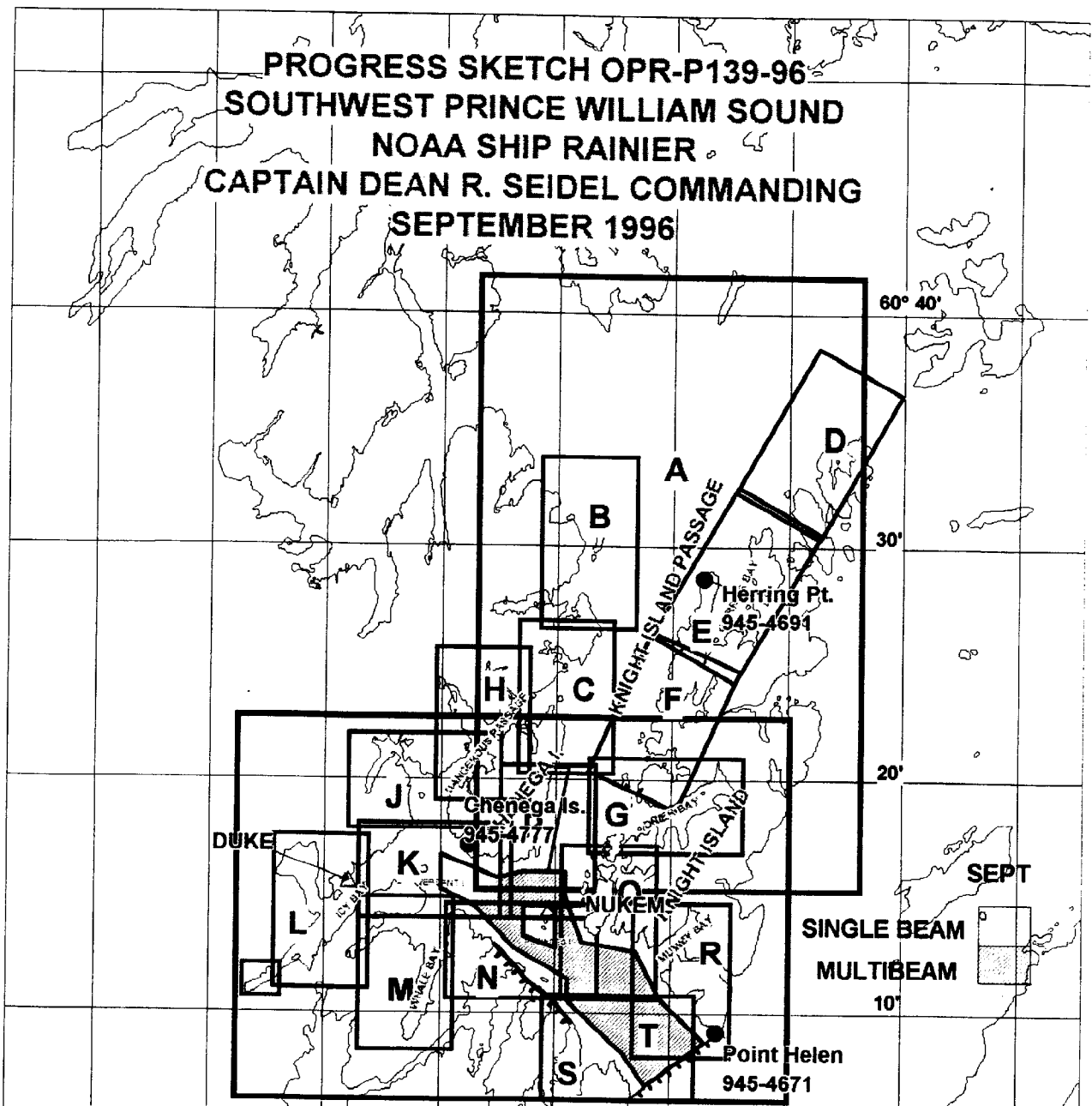
Soundings in fathoms ~~XXX~~ at ~~MLLW~~ MLLW and tenths

REMARKS: All times are UTC, revisions and marginal notes in black were
generated during office processing. All separates are filed with the
hydrographic data, as a result page numbering may be interrupted
or non-sequential.
All depths listed in this report are referenced to mean lower
low water unless otherwise noted.

AWOIS/SURF 1/7/98 mcl



**PROGRESS SKETCH OPR-P139-96
SOUTHWEST PRINCE WILLIAM SOUND
NOAA SHIP RAINIER
CAPTAIN DEAN R. SEIDEL COMMANDING
SEPTEMBER 1996**



Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNI
Q	H-10713	SEP 3	100%	SEP 24		10.4
R	H-10712	SEP 3	100%	SEP 12		5.8
S	H-10715	SEP 6	100%	SEP 11		4.5
N	H-10716	SEP 9	100%	SEP 21		6.5
T	H-10718	SEP 12	80%			26.2
L	H-10721	SEP 23	60%			5.6
J		SEP 28	10%			.5
P	H-10719	SEP 21	90%			4.6
M	H-10717	SEP 18	100%			7.8
K	H-10722	SEP 19	90%			8.7

Downtime_Type	Sept	Oct	Nov
Weather - Days	2	0	0
Mechanical -Hr	14	0	0
Electronic -Hr	2	0	0

Accomplished	Sept	Oct	Nov
LNM Hydro	1621	0	0
LNM SSS	0	0	0
SQ NM	79.9	0	0
AWOIS Invest.	5	0	0
Other Invest.	14	0	0
LNM Multibeam	107.4		

Descriptive Report to Accompany Hydrographic Survey H-10715

Field Number RA-10-20-96

Scale 1:10,000

September 1996

NOAA Ship RAINIER

Chief of Party: Captain Dean R. Seidel, NOAA

A. PROJECT ✓

This basic hydrographic survey was completed as specified by Project Instructions OPR-P139-RA dated August 23, 1996. Survey H-10715 corresponds to sheet S as defined in the sheet layout. This survey will provide data to supercede parts of ^{two} ~~two~~ surveys performed in 1910⁸⁸ and 1957⁹¹. 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 RPT., Sec B)

The survey area is the approaches to Shelter Bay, on the southwestern end of Knight Island Passage. The survey's northern limit is latitude 60° 10' 49" N. The survey's southern limit is 60° 06' 24" N, the western limit is 148° 00' 38" W and the eastern limit is 147° 52' 12" W. Data acquisition was conducted from September 6, 1996 (DN 250) to September 11, 1996 (DN 255).

C. SURVEY VESSELS ✓

Data were acquired by RAINIER survey launches as noted below:

Vessel	EDP #	Operation
RA-2	2122	Hydrography Shoreline Verification
RA-4	2124	Hydrography ✓
RA-5	2125	Hydrography Bottom Samples Sound Velocity Cast

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

All data were acquired and processed using the Hydrographic Data Acquisition and Processing System (HDAPS.) A complete listing of software for HDAPS is included in Appendix VI. *

* Filed with the hydrographic data.

E. SONAR EQUIPMENT ✓

Neither Side Scan Sonar nor multi-beam echo sounder equipment were used on this survey. *Concur*

F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N 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. All DSF-6000N soundings were acquired in meters using the High + Low, high frequency digitized setting. *Survey data was converted to fathoms during office processing and reflected on the smooth sheet.*

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Correctors for the velocity of sound through water were determined from the following cast, the applicability of which was confirmed by comparison to another cast inside Shelter Bay which was not used for hydrography:

Velocity Table #	DN	Cast Position	Deepest Depth (m)	Applicable DN
1	247	60° 12' 12" N 147° 58' 36" W	563.9	All

The sound velocity casts ^{was} ~~were~~ acquired with SBE SEACAT Profiler (S/N 219), calibrated January 16, 1996. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 2.11 (1995), in accordance with Hydrographic Survey Guideline (HSG) No. 69. A printout of the Sound Velocity Corrector Table used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV.* Sounding Equipment Calibrations and Corrections". *Sound velocity cast was taken outside of the survey area.*

A static transducer depth was determined using FPM Fig 2.2 for vessels 2122-2125 in the spring of 1996. Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM Fig. 2.3, and are included with project data for OPR-P139-RA. The data for vessels 2122-2125 were collected in Shilshole Bay, Washington in the spring of 1996. All offset tables* contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables 2-5 correspond to the last digit of the vessel number. The offset tables are included with project data for OPR-P139-RA. The launches are not equipped with heave, roll and pitch sensors.

Tide Correctors ✓

Predicted tides for the project were provided on diskette by the Coastal and Estuarine Oceanography Branch (N/OES334) through N/CS31 for the Cordova, Alaska reference station (945-4050). HDAPS listings of the data used in generating tide corrector tables are included in Appendix V of this report.* Tidal correctors as provided in the project instructions for H-10715 are:

** Filed with the hydrographic data.*

Zone	Time Correction	Height Correction
20	-0 hr 12 min	x0.93

Valdez, Alaska (945-4240) and Cordova, Alaska (945-4050) are the primary control station for datum determination at all subordinate stations. RAINIER personnel installed Sutron 8200 GOES-transmitter equipped tide gages at Point Helen (945-4671) and Chenega Island (945-4777) on September 2, 1996. Five new bench marks were installed at Point Helen, and the gage was not running well during the time of this survey, so the hydrographer recommends using Chenega for datum recovery for this survey. Six of the seven historical benchmarks for Chenega were recovered. 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. *Approved tide note dated January 16, 1997 is attached.*

H. CONTROL STATIONS (See EVAL RPT., Sec. H)

The horizontal datum for this project is NAD 83. One new station, NUKEM, as established on the northernmost rock of the Pleiades Islands using static GPS observations from station DUKE. *List of control stations used for this survey is attached to this report.* See the OPR-P139-RA-96 Horizontal Control Report for more information.

I. HYDROGRAPHIC POSITION CONTROL (See EVAL RPT., Sec. I)

All soundings were positioned using differential GPS. Primary control was a VHF differential reference station installed at NUKEM and repeated on a second VHF frequency by the ship. Launch-to-launch DGPS performance checks were performed in accordance with Section 3.4.4 of the FPM using either the Cape Hinchinbrook DGPS beacon or the Potato Point DGPS beacon as the alternate source of differential corrections. The performance check results are included in the project data for OPR-P139-RA.

J. SHORELINE (See EVAL RPT., Sec. J)

The shoreline manuscript from Coastal Mapping survey CM-92012<sup>DM-10299
DM-14302</sup> was supplied by N/CS341 in Standard Digital Data Exchange Format (SDDEF). The digital file was projected to the survey grid with OPR-P139-RA-96 geodetic parameters using program Shore version 2.0, provided by N/CS32, and plotted on the survey using HDAPS.

Limited shoreline verification was conducted in accordance with the Project Instructions. For this survey the general limit of safe navigation of a survey launch is 5-15 meters offshore of apparent low tide, generally 0-3 meters of depth at Mean Lower Low Water. Features shown in pencil inshore of the NALL are the hydrographer's representation of the shoreline while slowly transiting along the shore. *These features were analyzed during office processing and shown on the smooth sheet as warranted.*

Charted features were compared to an enlargement of chart 16702, 9th Edition, July 21, 1990 supplied by N/CS31. Charted shoreline features which were not found on the manuscript were verified by field positions, with the exception of the rock at latitude 60° 07' 44" N, 147° 55' 10" W which adequately portrays the danger of navigating near this shoreline. *The charted rock discussed above was found inside the NALL line and more shoreward than portrayed on the chart.*

* Filed with the hydrographic data.

from H-3188 should be deleted from the chart. It was retained in error when the rock awash, charted 100 meters to the east was applied from T-9147.

latitude 60° 06' 52.09" N, longitude 147° 57' 41.65" W. ⁽¹⁾ A rock was positioned at latitude 60° 06' 45.48" N, longitude 147° 57' 43.18" W (least depth of 0.4 meters by echosounder on DN 253, VN 2122, position 25137). All features originate with the 1910 and 1957 hydrographic surveys. Charted shoreline should be superseded by the manuscript shoreline and field work as shown on the final field Detached Position and Bottom Sample plot. The heights of rocks plotting offshore of the NALL line are shown on SS in FEET and have been corrected for approved tides. Heights of rocks located inshore of the NALL line were not determined during this survey.

K. CROSSLINES ✓

Crosslines agreed within 1 meter with mainscheme hydrography, except in areas of steep bathymetry. There was a total of 14.5 nautical miles of crosslines, comprising 16.7% of mainscheme hydrography.

L. JUNCTIONS (See EVAL RPT., Sec. L)

This survey junctions with contemporary surveys H-10716, 1:10,000, 1996 on the north and H-10718, 1:40,000, 1996 on the east. Soundings on these 1996 surveys were found to be in good agreement. Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after reduction to final vertical datum.

M. COMPARISON WITH PRIOR SURVEYS (See EVAL RPT., Sec. M)

Prior surveys H-8388, 1:12,500, 1957⁶ and H-3188, 1:20,000, 1910 cover this survey. H-3188 is the most recent survey of the inner portion of Shelter Bay. The prior soundings agreed well with the present survey. No disprovals of shoaler prior depths were necessary. Final comparisons will be done at PHB after reduction to final sounding datum using tidal information collected concurrently with this survey. Prior survey H-3027 (1909) 1:70,000 also covers a portion of the present survey area.

N. ITEM INVESTIGATIONS ✓ None.

O. COMPARISON WITH THE CHART (See EVAL RPT., Sec. O)

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.

Dangers to Navigation ✓

⁽³⁾ Three dangers to navigation within the limits of H-10715 were reported to the Seventeenth Coast Guard District, September 17, 1996. Copies of the correspondence can be found in Appendix I of this report.

P. ADEQUACY OF SURVEY ✓

Survey H-10715 is complete and adequate to supersede prior soundings and features in their common areas. Concur

Q. AIDS TO NAVIGATION ✓

No Aids to Navigation exist within the survey area. *Concur*

R. STATISTICS ✓

NM Hydrography	167.1
Velocity Casts	1
Detached Positions	5
Selected Soundings	7081
AWOIS Items	0
Bottom Samples	17
Tide Stations	2
NM ² Hydrography	4.5
Dives	0

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. Secchi disk observations were performed and indicate that water visibility was approximately ten meters.

T. RECOMMENDATIONS ✓


The hydrographer recommends that minimum bottom sample spacing on surveys be increased to twenty centimeters at the scale of the survey unless the hydrographer needs denser spacing to show variability of characteristics or to delimit anchorage areas. *Concur.*

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-P139-RA Horizontal Control Report	November, 1996	N/CS34
OPR-P139-RA 1996 Coast Pilot Report	November, 1996	N/CS26
Project related data for OPR-P139-RA	Incremental	N/CS34
Secchi Disk Observations for OPR-P139-RA	November, 1996	N/CS31

Respectfully Submitted,


Guy T. Noll
Lieutenant, NOAA

Approved and Forwarded,


Dean R. Seidel
Captain, NOAA
Commanding Officer

CONTROL STATIONS as of 9 Oct 1996 ✓

No	Type	Latitude	Longitude	H	Cart	Freq	Vel Code	MM/DD/YY	Station Name
1	G	060:14:26.408	148:00:42.205	18	250	0.0	0.0	09/03/96	NUKEM
2	G	060:15:37.435	148:18:06.007	18	250	0.0	0.0	10/07/96	DUKE
3	L	060:09:11.260	147:45:58.680	27	257	0.0	0.0	10/07/96	PT. HELEN LIGHT LL#25925
4	L	060:18:46.233	147:55:04.532	23	257	0.0	0.0	10/07/96	NEW YEAR ISLAND LIGHT LL#25915
5	L	060:14:22.912	148:00:37.765	26	257	0.0	0.0	10/07/96	PLEIADES LIGHT LL#25920
6	B	060:14:18.000	148:38:48.000	0	250	0.0	0.0	00/00/00	CAPE HINCHINBROOK USCG BEACON
7	B	061:03:24.000	146:41:48.000	0	250	0.0	0.0	00/00/00	POTATO POINT USCG BEACON



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98101-3262

NOAA Ship RAINIER

September 18, 1996

Commander
Seventeenth Coast Guard District
Post Office Box 3-5000
Juneau, Alaska 99802

**ADVANCE
INFORMATION**

Dear Sir:

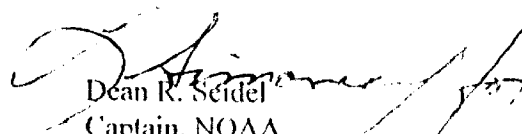
During the processing of hydrographic surveys H-10713 and H-10715 in Knight Island Passage, Prince William Sound eight dangers to navigation have been discovered. These dangers affect the following charts:

<u>Number</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
16700	24th ED.	92/01	1:200,000	NAD83
16701	15th ED.	90/07	1:81,436	NAD83
16702	9th ED.	90/07	1:40,000	NAD83

It is recommended that these dangers to navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6835.

Sincerely,


Dean R. Seidel
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

Enclosure

cc: DMA/HTC
PMC
N/CS262



DANGERS TO NAVIGATION

OPR-P139-RA

SOUTHWEST PRINCE WILLIAM SOUND

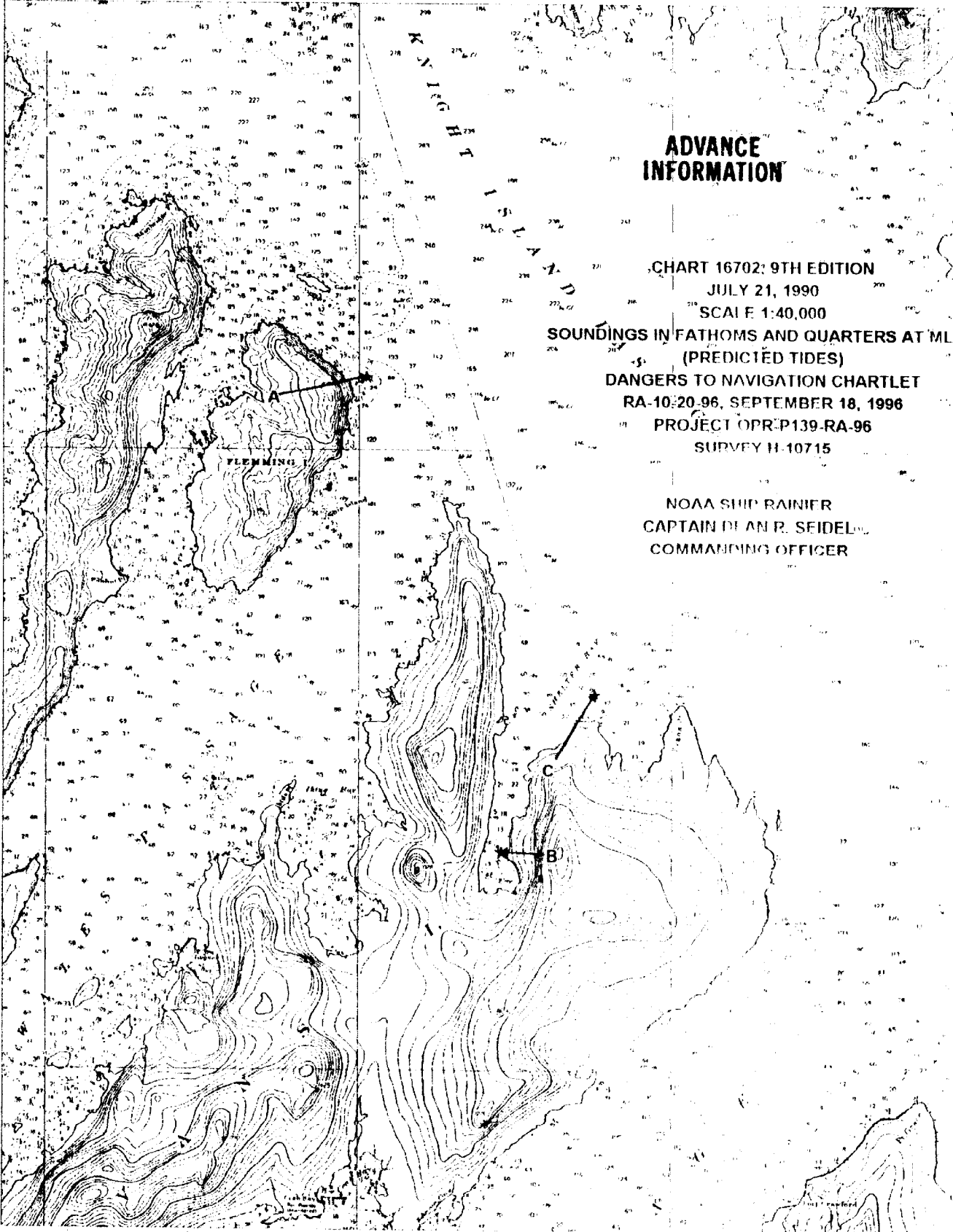
REGISTRY NUMBER: H-10715

AFFECTED CHARTS:

**ADVANCE
INFORMATION**

Chart	ED. Num.	ED. Date	Scale
16700	24	92/01	1:200,000
16701	15	90/07	1:81,436
16702	9	90/07	1:40,000

<u>ITEM</u>	<u>FIX #</u>	<u>DANGER</u>	<u>CHART DEPTH</u>	<u>DEPTH (M)</u>	<u>LATITUDE (N)</u>	<u>LONGITUDE (W)</u>
A	50109+8	SHOAL		2 3/4 FM	5.1	060:10:35.402 147:59:52.897
B	25137+0	ROCK	AWASH		0.1	060:06:45.480 147:57:43.184
C	50147+5	SHOAL		2 1/2 FM	4.7	060:08:01.907 147:56:14.173



**ADVANCE
INFORMATION**

CHART 16702: 9TH EDITION
JULY 21, 1990
SCALE 1:40,000
SOUNDINGS IN FATHOMS AND QUARTERS AT MLLW
(PREDICTED TIDES)
DANGERS TO NAVIGATION CHARTLET
RA-10-20-96, SEPTEMBER 18, 1996
PROJECT OPR-P139-RA-96
SURVEY H-10715

NOAA SHIP RAINIER
CAPTAIN DEAN R. SEIDEL
COMMANDING OFFICER

P 241620Z SEP 96
FM NOAAS RAINIER
TO CCGDSEVENTEEN JUNEAU AK
DMAHTCCNAVWARN WASHINGTON DC//MCNM//
INFO NOAAMOP SEATTLE WA
BT

**ADVANCE
INFORMATION**

DTON MSG RA-11-96

UNCLAS

THE FOLLOWING ARE CORRECTIONS TO THE DANGERS TO NAVIGATION
MESSAGE: P 172325Z SEP 96.

NOAA SHIP RAINIER HAS LOCATED 3 DANGERS TO NAVIGATION IN
SOUTHWEST PRINCE WILLIAM SOUND (PROJECT: OPR-P139-RA)
WITHIN THE LIMITS OF HYDROGRAPHIC SURVEY H-10715.

THE FOLLOWING INFORMATION IS PROVIDED FOR PUBLICATION
IN LOCAL NOTICE TO MARINERS.

DEPTHS ARE REDUCED TO MLLW BASED ON PREDICTED TIDES.

AFFECTED CHARTS:

CHART	ED. NUM	ED. DATE	SCALE
16700	24 TH	92/01	1:200,000
16701	15 TH	90/07	1:81,436
16702	9 TH	90/07	1:40,000

ALL CHART DATUM ARE NAD83.

ITEM	DANGER	DEPTH	LATITUDE (N)	LONGITUDE (W)	FIX NUMBER
A	SHOAL	2 3/4 FM	060:10:35.402	147:59:52.897	50109+8
B	ROCK	AWASH	060:06:45.480	147:57:43.184	25137+0
C	SHOAL	2 1/2 FM	060:08:01.907	147:56:14.173	50147+5

THIS IS ADVANCE INFORMATION SUBJECT OF OFFICE REVIEW.
QUESTIONS CONCERNING THIS MESSAGE SHOULD BE DIRECTED TO THE CHIEF,
PACIFIC HYDROGRAPHIC BRANCH AT (206) 526-6835. A LETTER WITH ATTACHED
CHARTLET WILL BE MAILED TO CONFIRM THIS MESSAGE.

BT
NNNN
KKKK

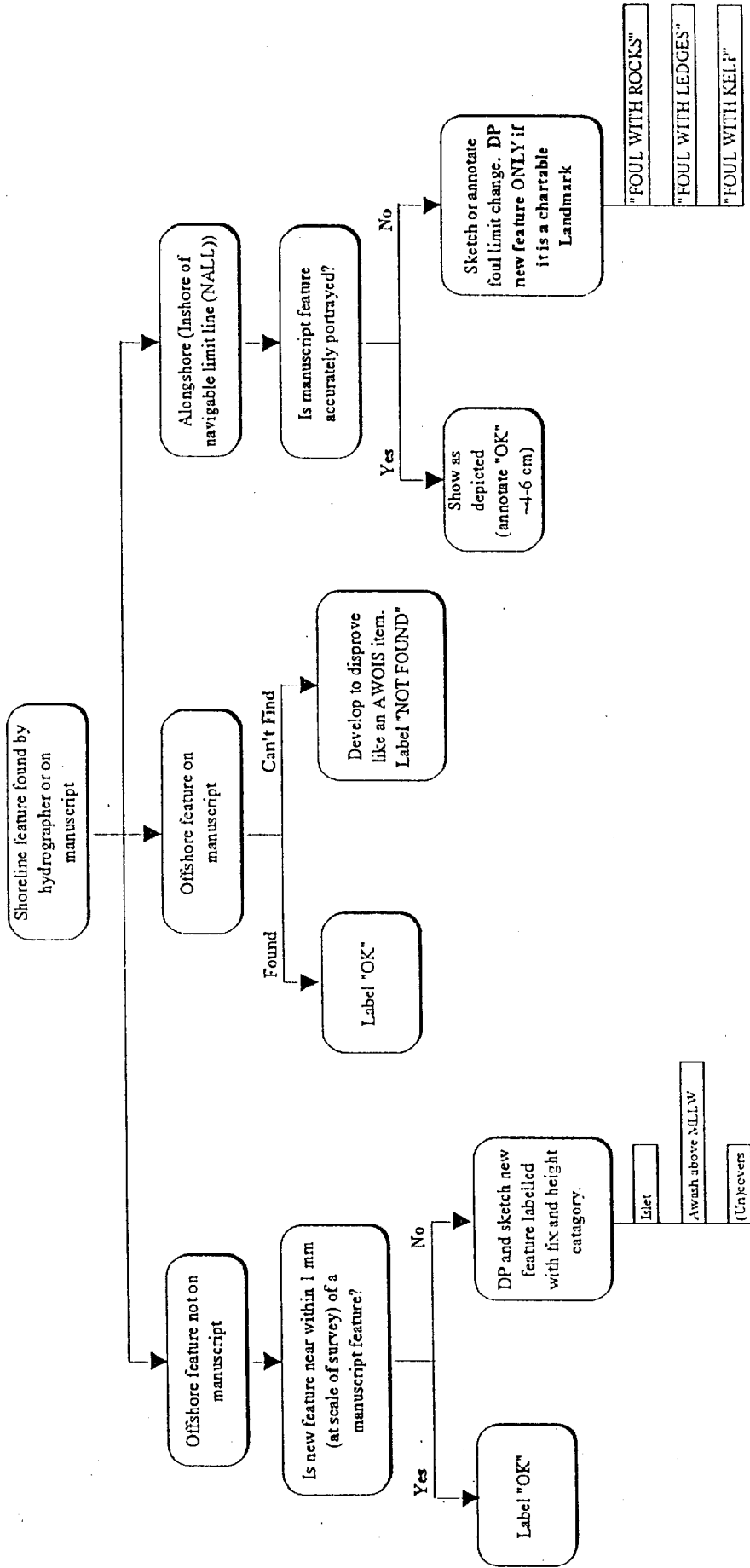
Limited Shoreline Verification: The New Rules

First, understand that the fundamental difference between last year and this year is that the amount of shoreline we must verify is determined by US, not strictly specified in the Project Instructions.

Procedures:

- 1) Determine distance from shore that is the MINIMUM working distance necessary for the survey. Take into account likely vessel traffic, bathymetry, complexity of the shoreline from prior surveys and the chart, and weather (sea) conditions experienced in the area. Use greater distances if shallow depths prevail, or if swell is severe. Even in steep foreshore bathymetry, do not go closer than 3 launch lengths (30 meters), unless vessel usage indicates that the area is used (e.g. a landing ramp is on shore, or an extremely narrow passage is used by fishing vessels to reach a certain bay.)
- 2) Draw the inshore limit determined in (1) on the boat sheet. Collecting data along this line may or may not be feasible, due to tides and project logistics, but the boat sheet line may be used to delimit mainscheme and development hydrography until such a "buffer" line is or may be needed.
- 3) Search for and develop all features seaward of the line drawn in (2). Use low water for this search, if possible. Combining this search with the acquisition of the data along the "buffer" line may be possible in areas which are not too complex. Detached positions are required only if a feature is found offshore of the NALL line and either more than 1 mm away from any manuscript feature or is mis-represented by the manuscript. If a charted or manuscript feature located offshore of the line is NOT found, a full disproval is required.
- 4) Annotate the field copies of the boat sheet (which by definition includes the charted, manuscript, and significant prior survey features) showing that the shoreline features offshore of the NALL each have a full disposition. These copies are bound and used to create the final field sheet, and submitted as official survey records.

Shoreline Decision Tree



APPROVAL SHEET

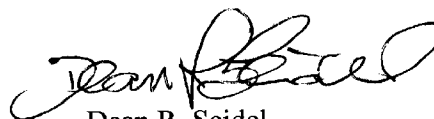
for

H-10715

RA-10-20-96

Standard procedures were followed in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey 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 examined by me, are considered complete and adequate for charting purposes, and are approved.



Dean R. Seidel
Captain, NOAA
Commanding Officer



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: January 16, 1997

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P139-RA
HYDROGRAPHIC SHEET: H-10715

LOCALITY: Approaches to Shelter Bay, Southwest Prince William
Sound, Alaska

TIME PERIOD: September 6 - 11, 1996

TIDE STATION USED: 945-4777 Chenega Island, Southwest End, AK
Lat. $60^{\circ} 17.2'N$ Lon. $148^{\circ} 07.2'W$
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.300 meters

TIDE STATION USED: 945-4671 Point Helen, Knight Island, AK
Lat. $60^{\circ} 09.2'N$ Lon. $147^{\circ} 46.0'W$
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.240 meters


TIDE STATION USED: 945-4691 Herring Point, Knight Island Passage,
AK
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: 3.362 meters

TIDE STATION USED: 945-4240 Valdez, AK
Lat. $61^{\circ} 07.5'N$ Lon. $146^{\circ} 21.7'W$
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.389 meters

REMARKS: RECOMMENDED ZONING

Use zones identified as: PWS17, PWS20 & PWS21
Refer to attachment(s) for zoning information.

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



CHIEF, TIDAL ANALYSIS BRANCH

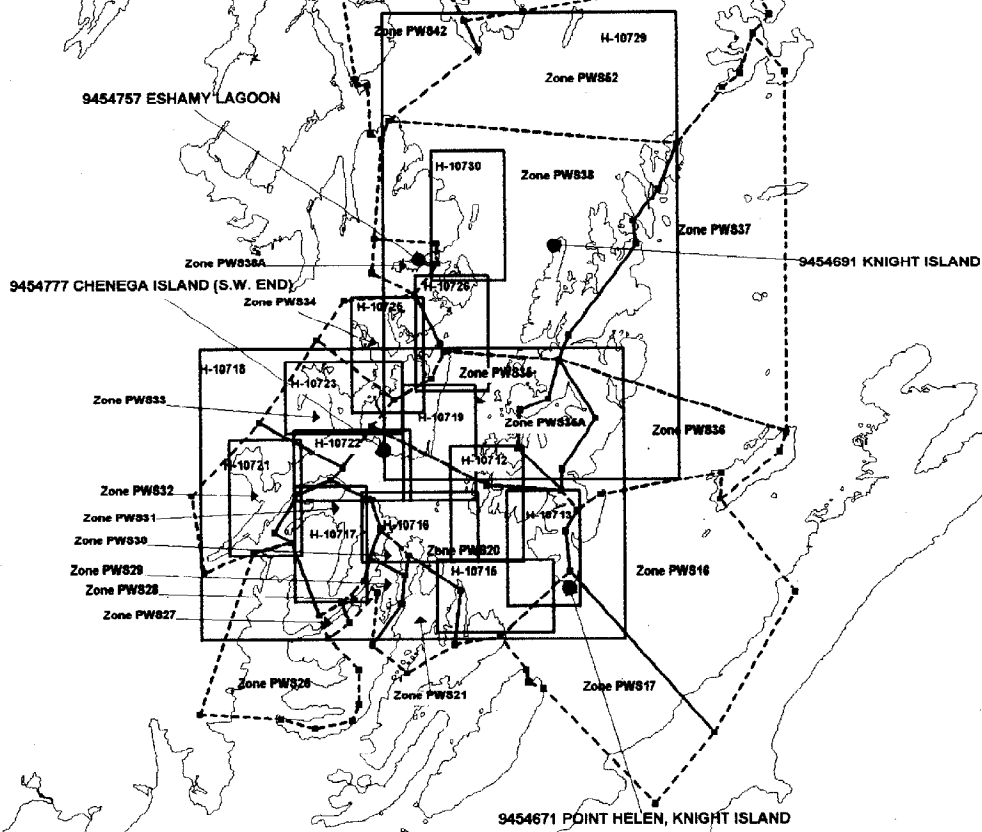


Final tide zone nodal point locations for OPR P139-RA-96.
 Sheet H-10715

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 PWS17				
-147.766071	60.169257	9454671	Direct	Direct
-147.897377	60.108049	9454777	Direct	0.98
-147.848528	60.077316	9454240	Direct	0.95
-147.844895	60.06532			
-147.817231	60.05974			
-147.607856	59.951198			
-147.496732	60.017507			
-147.766071	60.169257			
Zone PWS20				
-148.121387	60.20888	9454777	Direct	Direct
-148.138224	60.236579	9454671	Direct	1.03
-148.213991	60.255044	9454240	Direct	0.97
-148.192103	60.266795			
-148.135913	60.305498			
-147.921026	60.250008			
-147.781279	60.245812			
-147.752622	60.226545			
-147.77381	60.206587			
-147.766071	60.169257			
-147.897377	60.108049			
-147.983011	60.100932			
-147.971537	60.150964			
-148.067509	60.184539			
-148.121387	60.20888			
Zone PWS21				
-148.13654	60.100603	9454671	-6	1.01
-148.082662	60.138374	9454777	-6	0.99
-148.075927	60.166073	9454240	-6	0.96
-148.067509	60.184539			
-147.971537	60.150964			
-147.983011	60.100932			
-148.07256	60.074583			
-148.13654	60.100603			

**Final Zoning for OPR P139-RA-96
Southwest Prince William Sound, AK**



ZONE	TG1	TC1	RR1	TG2	TC2	RR2	TG3	TC3	RR3
PWS16	9454671	0	1.01	9454777	0	0.99	9454240	0	0.96
PWS17	9454671	0	1.00	9454777	0	0.98	9454240	0	0.95
PWS20	9454777	0	1.00	9454671	0	1.03	9454240	0	0.97
PWS21	9454671	-6	1.01	9454777	-6	0.99	9454240	-6	0.96
PWS26	9454671	-12	0.93	9454777	-12	0.91	9454240	-12	0.88
PWS27	9454671	-6	0.95	9454777	-6	0.93	9454240	-6	0.90
PWS28	9454671	0	0.97	9454777	0	0.95	9454240	0	0.92
PWS29	9454671	0	0.99	9454777	0	0.97	9454240	0	0.94
PWS30	9454671	0	1.00	9454777	0	0.98	9454240	0	0.95
PWS31	9454777	0	0.98	9454671	0	1.00	9454240	0	0.95
PWS32	9454777	0	0.97	9454671	0	0.99	9454240	0	0.94
PWS33	9454777	0	0.98	9454671	0	1.00	9454240	0	0.95
PWS34	9454777	0	1.00	9454691	0	0.98	9454240	0	0.97
PWS35	9454777	0	1.01	9454691	0	0.99	9454240	0	0.98
PWS36	9454671	0	1.03	9454691	0	0.98	9454240	0	0.97
PWS37	9454691	0	0.99	9454671	0	1.04	9454240	0	0.98
PWS38	9454691	0	1.00	9454777	0	1.02	9454240	0	0.99
PWS42	9454691	0	1.01	9454777	0	1.02	9454240	0	0.99
PWS52	9454691	0	0.99	9454777	0	1.01	9454240	0	0.98
PWS35A	9454777	0	1.03	9454691	0	1.01	9454240	0	1.00
PWS38A	9454757	0	1.00	9454691	0	0.95	9454777	0	0.97

GEOGRAPHIC NAMES

H-10715

Name on Survey	A 89-547189 16702, 16701, 16700 B ON PREVIOUS SURVEY C ON U.S. QUADRANGLE D FROM LOCAL E INFORMATION F ON LOCAL MAPS G P.O. GUIDE OR MAP H RAND McNALLY I ATLAS K U.S. LIGHT LIST										
	A	B	C	D	E	F	G	H	I	J	K
ALASKA (title)	X		X								1
EVANS ISLAND	X		X								2
EVANS POINT	X		X								3
FLEMMING ISLAND	X		X								4
IKTUA BAY	X		X								5
KNIGHT ISLAND PASSAGE	X		X								6
PRINCE OF WALES PASSAGE	X		X								7
PRINCE WILLIAM SOUND	X		X								8
(title)											9
SHELTER BAY	X		X								10
SHIP ISLAND*	X		X								11
											12
											13
											14
* Not shown on the smooth sheet.											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25

Approved

Chris C. Boy
Chief Geographer

NOV 26 1996

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	2				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

SHORELINE DATA

SHORELINE MAPS (List):	DM-10299, DM-10302
PHOTOBATHYMETRIC MAPS (List):	NA
NOTES TO THE HYDROGRAPHER (List):	NA
SPECIAL REPORTS (List):	NA
NAUTICAL CHARTS (List):	Chart 16702, 9th Ed., July 21, 1990

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 (Selected)			7,080
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	230.5		230.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		8.0	8.0
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		18.0	18.0
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS	230.5	26.0	256.5

Pre-processing Examination by J. Stringham	Beginning Date 10/15/96	Ending Date 10/18/96
Verification of Field Data by D. Doles, R. Mayor, E. Domingo, J. Stringham	Time (Hours) 230.5	Ending Date 8/4/97
Verification Check by B. Olmstead	Time (Hours) 4	Ending Date 8/14/97
Evaluation and Analysis by I. Almacén	Time (Hours) 26.0	Ending Date 8/4/97
Inspection by B. Olmstead	Time (Hours) 8	Ending Date 9/8/97

EVALUATION REPORT

H-10715

A. PROJECT

Project information is discussed in the hydrographer's report.

B. AREA SURVEYED

The survey area is discussed in the hydrographer's report with the following supplemental information.

The inshore area generally consists of scattered rocks and small islets with patches of rocky and gravel beaches. The bottom is made up of pebble, gravel, sand and mud mixed with broken shells. Depth range from 0.0 to 160.0 fathoms.

The hydrographer has determined during this survey the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) within the area of the survey. Charted features inshore of this limit line have been addressed by the hydrographer but no positional information were obtained during survey operations and therefore should be retained as charted. A page-size chartlet of the survey area indicating the limits of supersession is included in this report as Attachment A.

C. SURVEY VESSELS

Survey vessel information is found in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS), AutoCad, Version 12 and MicroStation 95.

At the time of the survey certification the format for transmission of digital data had not been formally approved. In the interim, digital data for this survey exists in the standard HPS format which is a database format using the .dbf extension. In addition, the sounding plot was created with .dbf (extension) and enhanced using the MicroStation system, are filed both in the MicroStation drawing format, .dwg (extension); and in the more universally recognized graphics transfer format, .dxf (extension). Copies of these files will be retained at PHB until data transfer protocols are developed and approved.

The drawing files necessarily contain information which 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 the Hydrographic Survey Guidelines No. 75 and No. 35.

The field sheet parameters have been revised to center the hydrography on the office plot. Data is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was not used during this survey.

F. SOUNDING EQUIPMENT

Sounding equipment is discussed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with present NOS specifications. Actual tide reduction is derived from Chenega Island, Southwest End, Alaska gage (945-4777), Point Helen, Knight Island, Alaska gage (945-4671) and Valdez, Alaska gage (945-4240). Herring Point, Knight Island Passage, Alaska, gage (945-4691), was listed on the approved tide note but not used for final sounding reduction. Refer to the approved tide note attached to this report concerning recommended tidal zoning.

H. CONTROL STATIONS

The control stations used during this survey are adequately discussed in the hydrographer's report.

The MicroStation generated smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with NGS program NADCON. Data based on NAD 27 may be referenced to this survey by applying the following corrections.

Latitude: -2.194 seconds (-67.910 meters)
Longitude: 7.355 seconds (113.510 meters)

I. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control is adequately discussed in the hydrographer's report. A horizontal dilution of precision (HDOP) limits of 3.75 was computed for survey operations.

The maximum HDOP allowable limit has not been exceeded during this survey and the quality of data obtained is considered good. The reference site confirmation test and the daily DGPS performance checks conducted in the field were adequate.

J. SHORELINE

The "limited" shoreline verification method applied to this survey is adequately discussed in the hydrographer's report. The digitized shoreline file and the survey file were merged during Microstation processing.

There are no significant differences noted in the mean high water line configuration between the present and the latest shoreline compilation of the area. However, some significant differences were noted with the presently charted high water line. The charted shoreline particularly in the vicinity of latitude 60/07/30N, longitude 148/55/45W, has substantially changed which resulted in the disappearance of a presently charted small inlet in the area. A change is also noted in the vicinity of latitude 60/07/00N, longitude 147/53/30W, where the charted shoreline is depicted about 50 meters inshore of the recently compiled map. These changes could primarily be the result of ground movement caused by the 1964 earthquake in the area. It could also be attributed to the differences in the source data accuracy of mean high water line determination, differences in reference datum used and the probable chart compilation error. The latest digital shoreline information should be used to compile the next edition of chart 16702 within the area of the present survey.

K. CROSSLINES

Crosslines are discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10715 junctions with the following surveys.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10716	1996	1:10,000	Northwest
H-10718	1996	1:40,000	North

The junctions with surveys H-10716 and H-10718 are complete. Survey H-10718 is a multi-beam hydrography conducted along the main portion of Knight Island Passage. The depth curves and soundings within the junction areas are in satisfactory agreement.

M. COMPARISON WITH PRIOR SURVEYS

Survey H-10715 was compared with the following prior surveys.

H-3027 (1909), scale 1:20,000
H-3188 (1910), scale 1:20,000
H-8388 (1956), scale 1:12,500

Surveys H-3027, H-3188 and H-8388 are the prior USC&GS hydrographic surveys that cover the area from 1909 to 1956, with the exception of the portion east of Evans Point where no prior survey has ever been undertaken in the area. According to the records, survey H-8388 was originally accomplished in 1956 at the scale of 1:12,500 and the smooth sheet was compiled a year later at the scale of 1:10,000. Comparisons with these surveys are considered satisfactory. All depths originating from these prior surveys were adequately addressed during survey operations. A more complete and thorough coverage of the area has been undertaken by the present survey. The present depths were found to be generally shoaler by about 1.0 to 15.0 fathoms which seems to indicate an uplifting trend common around this area of Prince William Sound caused by the 1964 earthquake. The other changes noted in this survey can be attributed to the increased in bottom coverage and the application of more accurate and modern surveying methods.

The following charted rocks originating from the prior surveys listed above were visually verified by the hydrographer and were carried forward on the smooth sheet.

<u>Charted Feature</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>	<u>Prior Survey</u>
Rock Awash	60/07/58.5	147/54/49.0	H-3188 (1910)
Rock Awash	60/07/58.0	147/54/55.0	H-3188 (1910)
Rock Awash	60/07/55.0	147/55/04.0	H-3188 (1910)
Rock Awash	60/06/26.0	147/57/30.0	H-3188 (1910)
Submerged Rock	60/10/32.5	148/00/03.5	H-8388 (1956)

With the exception of the features listed above, H-10715 is adequate to supersede the prior surveys within the common area.

T-9145 (1954), scale 1:10,000
T-9147 (1954), scale 1:10,000

These shoreline maps depict the mean high water line and other topographic features within the survey area. These features were either shown on the latest shoreline maps or adequately defined and developed during survey operations. However, several prior topographic features falling inside the NALL line not superseded by the latest shoreline maps should be retained as follows:

- a. The group of rocks depicted in the vicinity of latitude 60/07/50N, longitude 147/56/20W, falling within the foul limit shown in the present survey should be retained as charted.
- b. The rock awash charted at latitude 60/07/37N, longitude 147/56/51W, should be shown as part of a point of land as depicted on the latest shoreline map.

- c. The charted rock awash at latitude 60/06/45N, longitude 147/57/59W, should be shown as an islet as compiled on the latest map of the area.
- d. The rock awash charted at latitude 60/06/53N, longitude 147/57/38W, is now a part of the point of land depicted on the latest shoreline manuscript.
- e. The small islet charted at latitude 60/07/02N, longitude 147/57/55W, should be retained as part of the HWL on the present survey.
- f. The two small islets located at latitude 60/07/48N, longitude 147/57/37W, should be retained and shown inside the foul limit depicted on the present survey.

Except for the features mentioned above, H-10715 is adequate to supersede the prior topographic surveys within the common area.

M. ITEM INVESTIGATIONS

There were no AWOIS item investigations assigned to this survey.

O. COMPARISON WITH CHART

Survey H-10715 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
16702	9th	July 21, 1990	1:40,000	NAD83

a. Hydrography

Charted hydrography originates with the previously mentioned prior hydrographic and topographic surveys. These prior surveys have been adequately addressed in the preceding section of this report and requires no further discussion.

In accordance with Hydrographic Survey Guideline No. 39, the effects of the 1964 earthquake in Prince William Sound were considered in the comparison of this survey. No reasonable adjustment value based on the prior survey information could be determined. However, according to the U.S. Coast Pilot report (Vol. 9), a bottom uplift of 4.9 feet is known to have occurred around Chenega Island located approximately ten nautical miles northwest of the survey area. The March 1964 earthquake may have also caused bottom uplift throughout Montague Strait which is adjacent to the approaches to Shelter Bay.

Survey H-10715 is adequate to supersede charted hydrography within the common area of coverage. Considering the close proximity of the NALL line along the shore as determined by the field hydrographer and the scale of the existing chart, the present survey could also

be considered adequate to supersede the area inshore of the NALL line, with the exception of the features previously mentioned in this report that should be revised based on the latest information or retained as charted.

b. Dangers to Navigation

Three (3) dangers to navigation were reported to the USCG, NIMA, N/CG261 and N/CS34 on September 17, 1996. A copy of the report is attached. No additional dangers were found during office processing.

P. ADEQUACY OF SURVEY

The hydrography on survey H-10715 is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the standard 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.

Hydrography on survey H-10715 was acquired in the field in metric units while the smooth sheet for this survey was compiled in fathoms to conform to the sounding unit of the existing NOS nautical charts of the area.

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.

Survey H-10715 adequately complies with the project instructions.

Q. AIDS TO NAVIGATION

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

There are no other prominent features of landmark value located within the survey area.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

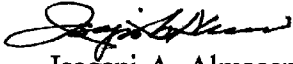
Miscellaneous information concerning this survey is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

Survey H-10715 is a good hydrographic survey and no additional field work is required.

U. REFERRAL TO REPORTS

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


Isagani A. Almacén
Cartographer

APPROVAL SHEET
H-10715

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: 9/8/97
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.

Kathy Timmons Date: 9/23/97
Kathy Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Andrew A. Armstrong III Date: Feb 19, 1998
Andrew A. Armstrong III
Captain, NOAA
Chief, Hydrographic Surveys Division

