

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey **Hydrographic**
Field No. **RA-20-5-92**
Office No..... **H-10441**

LOCALITY

State **Alaska**
General Locality **Prince William Sound**
Locality **Harriman Fiord**

.....
1992

CHIEF OF PARTY
CAPT Thomas W. Richards, NOAA

LIBRARY & ARCHIVES

DATE **APR 4 1995**

H10441

Master Diagram 8551-4

P/L

Bp150720-21

CHS

COQ

16703

16700

16013 NC

HYDROGRAPHIC TITLE SHEET

H-10441

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-20-5-92

State Alaska

General locality Prince William Sound

Locality Harriman Fiord

Scale 1:20,000 Date of survey Sept. 13 - Oct. 14, 1992

Instructions dated July 7, 1992* Project No. OPR-P125-RA

Vessel NOAA Ship RAINIER (2120), 2123, 2124, 2125, 2126

Chief of party CAPT Thomas W. Richards, NOAA

Surveyed by LT Waddell, LT Brown, LTJG Nelson, LTJG Simmons, LTJG Johnson, ENS Klay, ENS Ramos, ENS Pitts

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

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Verification by: D. Doles Automated plot by PHS Xynetics Plotter

Evaluation by: B.A. Olmstead

Soundings in meters and decimeters at ~~MLLW~~ MLLW

REMARKS: Time is UTC.

*Change 1 dated August 21, 1992

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.

AWOIS & SURF 4/27/95 mcr

Sc 12-13-96 4/4/95

61°20'00" 148°20'00" 147°40'00" 61°00'00"

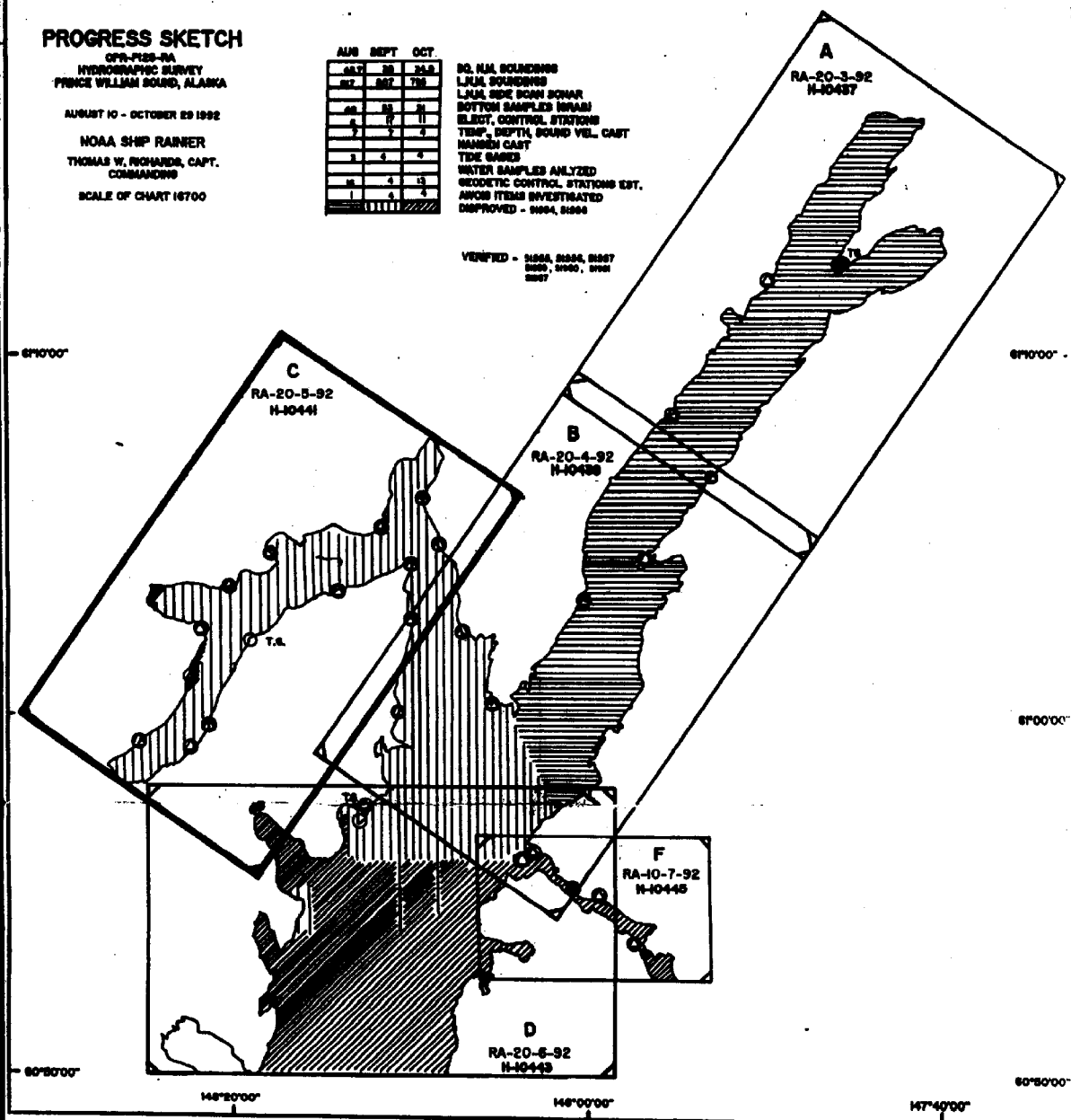
PROGRESS SKETCH

CPR-123-RA
 HYDROGRAPHIC SURVEY
 PRINCE WILLIAM SOUND, ALASKA
 AUGUST 10 - OCTOBER 23 1992
 NOAA SHIP RANGER
 THOMAS W. RICHARDS, CAPT.
 COMMANDING
 SCALE OF CHART 1:6700

	AUG	SEPT	OCT
NO. H.M. SOUNDINGS	107	20	23.0
L.M.A. SOUNDINGS	107	20	23.0
L.M.A. SIDE SCAN SONAR	107	20	23.0
BOTTOM SAMPLES (BRASS)	107	20	23.0
ELECT. CONTROL STATIONS	107	20	23.0
TEMP. DEPTH SOUND VEL. CAST	107	20	23.0
WINDSOM CAST	107	20	23.0
TIDE GAUGES	107	20	23.0
WATER SAMPLES ANALYZED	107	20	23.0
GEODETIC CONTROL STATIONS EST.	107	20	23.0
ANOS ITEMS INVESTIGATED	107	20	23.0
DISPROVED - 2004, 2005	107	20	23.0

NO. H.M. SOUNDINGS
 L.M.A. SOUNDINGS
 L.M.A. SIDE SCAN SONAR
 BOTTOM SAMPLES (BRASS)
 ELECT. CONTROL STATIONS
 TEMP. DEPTH SOUND VEL. CAST
 WINDSOM CAST
 TIDE GAUGES
 WATER SAMPLES ANALYZED
 GEODETIC CONTROL STATIONS EST.
 ANOS ITEMS INVESTIGATED
 DISPROVED - 2004, 2005

VERIFIED - 2004, 2005, 2007
 2008, 2009, 2011
 2017



61°00'00" 61°20'00" 61°40'00" 147°40'00" 148°00'00" 148°20'00"

Descriptive Report to Accompany Hydrographic Survey H-10441

Field Number RA-20-5-92

Scale 1:20,000

September-October 1992

NOAA Ship RAINIER

Chief of Party: Captain Thomas W. Richards

A. PROJECT

This basic hydrographic survey was completed in Northwestern Prince William Sound, Alaska, as specified by Project Instructions OPR-P125-RA dated July 7, 1992, and Change Number One dated August 28, 1992. ✓

Survey H-10441 corresponds to "Sheet C" as defined in the Project Instructions.

This survey is one in a series that will update existing nautical charts. Requests for hydrographic surveys and updated charts have been received from the Defense Mapping Agency, cruise ship lines, Southwest Alaska Pilots Association, and local fishermen.

B. AREA SURVEYED *See Eval Rpt., Section 1*

The survey is located in Harriman Fiord, northwest Prince William Sound, 20 NM northeast of Whittier, Alaska. The survey's southeastern limit is a line from 61°02'40"N, 148°09'57"W to 61°04'22"N, 148°07'35"W. The remaining boundaries are comprised of the mainland. Topographical relief consists of steep U-shaped glaciated valleys, and many tidewater glaciers. The receding glaciers have left several terminal and medial moraines, depicted as submerged shoal areas. ✓

Data acquisition was conducted from September 13, Day Number (DN) 257, through October 14, DN 288.

C. SURVEY VESSELS

Data were acquired by NOAA Ship RAINIER's four survey launches as noted below:

<u>Vessel</u>	<u>EDP No</u>	<u>Operation</u>
RA-3	2123	Hydrography Shoreline Verification ✓
RA-4	2124	Hydrography Shoreline Verification

WR
FOR
LTS-Johnson

16:00, Monday, 28 September 1992
tPostOUT : Hellickson

:
:
R 281904Z SEP 92
FM NOAAAS RAINIER
TO NOAAAMOP SEATTLE WA

BT
UNCLAS
RA-PMC-168-185
PASS TO PMC1X2

1. REQUEST POSITIONS FROM ORIGINAL SOURCE DOCUMENT OF 4 AND 6 FATHOM SHOALS IN BARRY ARM AT 61/05/00N, 148/09/24W AND 61/04/36N, 148/09/30W, RESPECTIVELY.
 2. ORIGINAL SOURCE DOCUMENT IS UNIVERSITY OF ALASKA'S BP 87272, 1973, 1:40,000.
- BT

RA-5	2125	Hydrography Shoreline Verification Bottom Samples Velocity Casts
RA-6	2126	Hydrography Shoreline Verification

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Data acquisition and processing were accomplished with the following HDAPS programs:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
AUTOST	2.00	4/14/92
BACKOLD	1.12	4/14/92
BACKUP	2.00	4/14/92
BASELINE	1.12	4/14/92
BIGABST	2.00	4/14/92
CARTO	2.02	4/14/92
CONVERT	3.02	4/14/92
DAS SURV	6.21	4/14/92
DAS SURV	6.23	7/02/92
DIAGNOSTIC	3.00	4/14/92
DISC UTIL	1.00	4/14/92
DP	2.11	7/02/92
DP	2.00	4/14/92
EXCESS	3.04	4/14/92
FILESYS	2.16	4/14/92
GLOBAL	1.12	4/14/92
INVERSE	1.51	4/14/92
LISTAWOIS	2.01	4/14/92
LOADNEW	1.50	4/14/92
MAKEFIX	1.02	4/14/92
MANU DATA	1.12	4/14/92
NEWCONT	1.17	4/14/92
PLOTALL	2.02	4/14/92
POSTSUR	5.21	4/14/92
PREDICT	1.11	4/14/92
PRINTOUT	3.00	4/14/92
QUICK	1.20	4/14/92
RAMSAVER	1.00	4/14/92
READPROJS	1.08	4/14/92
REAPPLY	1.33	4/14/92
REJECT	1.05	4/14/92
SOFTCHECK	1.13	4/14/92
SURVEY	6.11	4/14/92
SYMBOLS	1.00	4/14/92
ZOOMEDIT	1.10	4/14/92

Velocity corrections were determined using: ✓

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
VELOCITY	1.11	09 Mar 1990

E. SONAR EQUIPMENT ✓

Side scan sonar operations were not performed on this survey.

F. SOUNDING EQUIPMENT

All survey launches were equipped with the Raytheon DSF-6000N echo sounders shown below. The echo sounders were operated in the HIGH + LOW (HIGH DIGITIZED) function, using manual gain controls on both high and low frequencies to obtain the best analog trace. Soundings were recorded in meters and tenths of meters. Six-meter bar checks were conducted and recorded daily, using both the LOW and the HIGH + LOW (HIGH DIGITIZED) functions. The echo sounders were operated in accordance with the Provisional Instructions "Raytheon DSF-6000N Echo-Sounder Operating and Processing Instructions", dated July 5, 1983, and the Field Procedures Manual for Hydrographic Surveying (FPM). ✓

Raytheon DSF-6000N Echo Sounders ✓

<u>Vessel</u>	<u>Serial No.</u>	<u>DN</u>
2123	B044N	257-288
2124	A103N	258-285
2125	B039N	266-281
2126	A117N	257-282

The echo sounders were continuously monitored during data acquisition. All sounding data were scanned at least two times, to ensure all significant peaks were inserted, and to verify the digitized depths. ✓

G. CORRECTIONS TO ECHO SOUNDINGS

Corrections to echo soundings were determined for static draft, velocity of sound through water, settlement and squat. Predicted tides were used for all plots. Sounding correctors apply to both narrow and wide beams of the DSF-6000N echo sounder. Supporting data and computations for all corrections to echo soundings are included in the "Fall 1992 Corrections to Echo Sounding Data Package for OPR-P125-RA." ✓

Sound Velocity

Correctors for the velocity of sound through water were determined from the casts listed below:

<u>Velocity Table No.</u>	<u>Cast No.</u>	<u>Deepest Depth (m)</u>	<u>Applicable DN</u>	<u>Cast Position</u>	<u>Day</u>
5	12	186.6	252-276	61°00'15"N 148°22'00"W	266
9	15	188.3	279-290	61°00'28"N 148°21'55"W	280

The sound velocity casts were acquired with a SBE SEACAT Profiler, S/N 811, which was calibrated at the Northwest Regional Calibration Center in Bellevue, WA, on March 3, 1992. ✓

Velocity correctors were computed using the PC program VELOCITY in accordance with Hydrographic Survey Guideline (HSG) #69. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program are included in the "Fall 1992 Corrections to Echo Sounding Data Package for OPR-P125-RA." ✓

Static Draft

The distance from the transducer face to the gunwale was measured with a large metal square for all launches. Static draft measurements were then determined by dropping a lead line from the gunwale to the water and subtracting this distance from the distance measured with the square. The measurements from the gunwale to the waterline were conducted with the fuel tanks averaging 3/4 full and three people aboard. A transducer depth of 0.6 meter was determined for launches 2123, 2124, 2125 and 2126 on March 21-22, 1992. ✓

Settlement and Squat

Settlement and squat correctors were determined in Shilshole Bay, WA, for launch 2123 on March 11, 2124 on March 16, and 2125 and 2126 on March 18, 1992. Tests were conducted over a hard bottom in depths well exceeding 7 times the vessels' drafts. Both sea and wind were calm. Observations were made through a Zeiss Ni2 leveling instrument to a rod held vertically on deck, directly over the transducer. Correctors were computed in accordance with Hydrographic Manual 4.9.4.2., using FPM Fig. 2.2 and 2.3, and are included in the "Fall 1992 Corrections to Echo Sounding Data Package for OPR-P125-RA." Revised settlement and squat correctors were received from Pacific Marine Center on October 21. These revised correctors were applied to the data on sheet C. ✓

Offset Tables ✓

<u>Vessel</u>	<u>Offset Table No.</u>
2123	3
2124	4
2125	5
2126	6

Heave

Data acquired during periods of significant sea action were check scanned to remove ✓
any errors introduced into the digital data by vessel heave.

Bar Check and Lead Lines

Bar check and lead lines were calibrated by RAINIER personnel on February 19, ✓
1992 at PMC. Calibration forms are included in the "Fall 1992 Corrections to Echo
Sounding Package for OPR-P125-RA."

Tide Correctors

A 0 hr 0 min time correction and a x0.97 range ratio were applied to predicted tides ✓
for the Cordova, Alaska, reference station (945-4050). These correctors were
provided in the Project Instructions for sheet C's tidal zone.

HDAPS listings of the data used in generating tide corrector tables are included in ✓
Appendix V* of this report.

Tide gages were installed and maintained by RAINIER personnel at Whittier ✓
(945-4949), Granite Mine, Port Wells (945-4806) and Harriman Fiord (945-4824). The
control station was Valdez, Alaska (945-4240). Opening levels were completed by
POS personnel in June, 1992. Closing levels were completed by RAINIER personnel ✓
on October 16, 1992.

The station descriptions, field tide records, and Field Tide Notes have been
forwarded to N/OES212 in accordance with HSG 50 and FPM 4.3. Requests for
approved tides have been forwarded to N/OES2. Copies of the Field Tide Notes and
the request for approved tides are included in Appendix V.* *Approved tide note is attached.*

* Filed with the survey records.

H. CONTROL STATIONS *See Eval Rpt, section 2*

Geographic positions for all control stations are based on the North American Datum ✓
of 1983 (NAD83) and the Geodetic Reference System 1980 Ellipsoid.

A listing of the geodetic stations used to control this survey is included in ~~Appendix~~ ✓
~~III~~ of this report.

Positions for all existing stations are from the National Geodetic Survey (NGS) data base. All existing stations were recovered in accordance with methods stated in Section 5.2.4 of the Field Procedures Manual. New stations were positioned via traverse methods to meet third-order class I standards. Further information can be found in the "Fall 1992 Horizontal Control Report for OPR-P125-RA."

I. HYDROGRAPHIC POSITION CONTROL

Method of Position Control

Soundings, bottom samples, and detached positions were positioned using either Ashtech Differential GPS, or Motorola Mini Ranger Falcon 484 microwave system.

Falcon 484

Accuracy requirements specified in the Hydrographic Manual and in FPM 3.1.3.1 were met. When maximum residuals exceeded the specified limits, the launch was held at a constant speed and course while the station(s) causing the problem was deselected and hydrography was continued. These data were reviewed, and any off track data were smoothed (T&C'd) between good positions. No editing was done when the maximum Error Circle Radius (ECR) value was exceeded for one or two soundings, the data plotted on track, and was bracketed by good positioning information. If the data plotted off track but was still bracketed by good positions, it was smoothed between the good positions during processing.

Ashtech GPS

Accuracy requirements as stated in the FPM were met. Occasionally, the data from the Ashtech was interrupted due to extreme corrector age. The HDAPS dead reckons the launch position during short periods of data interruption. The data were retained if the interruption lasted for only one or two soundings and was bracketed by good positions. No editing was performed if the soundings plotted on line. If they plotted off line, they were smoothed during processing.

Serial numbers for Falcon R/T units, RPU's and Ashtech equipment are annotated on the data printouts. Lists of all positioning equipment serial numbers are included in the "Fall 1992 Electronic Control Data Package for OPR-P125-RA."

Calibrations & Systems Check Methods

Falcon 484

Baseline calibrations were conducted in accordance with FPM 3.1.2.1 and 3.1.3.2. Calibrations were performed at the MATTHEWS PARK BEACH BASELINE on May 21-28, 1992 (DN 142-149). Calibration data and a description of the baseline is included in the "Fall 1992 Electronic Control Data Package for OPR-P125-RA."

In accordance with FPM 3.1.3.3, formal system checks were not documented for multiple LOP hydrography. Data acquired with two LOP's were always bracketed by multiple LOP data acquired with ECR and maximum residuals within acceptable limits, which served as critical system checks.

Ashtech GPS

A VHF Differential shore station was established at station PORT. After the station was established, a remote sensor was directly connected to the MXII shore station and its antenna was collocated with the shore station. The computed position was transmitted back to the ship via VHF radio modem link. The difference between the computed location and the station's published position were recorded by the MONITOR program on a PC. Data from a 24-hour period were recorded and examined for signs of multi-path signal reflection, which was not evident at the station. ✓

Launch system checks were made by a direct comparison of the Falcon position with the GPS position. HDAPS Survey Screen Two was used for this comparison, and was dumped to the system printer to record the results. Three such dumps were made for each system check. System checks were normally made each day, and days with no system checks were always bracketed by days with good checks. ✓

Problems

The differential GPS station on PORT ran without problems for sheet C. ✓

Offset

The launch GPS antenna is mounted on the mast of the Falcon R/T unit. Antenna offsets are stored in the HDAPS Offset Tables as listed in Section G. Copies of the Offset Tables are included in the "Separates" to be Included with Survey Data, III. Horizontal Position Control and Corrections to Position Data." ✓

J. SHORELINE *See Eval Rpt, Section 2*

Shoreline maps (T-sheets) used to transfer shoreline detail to the final sheets were TP-01418, TP-01419 and TP-01420 (June-August 1988-photography, 1:20,000, NAD83). Chart 16700 (1:20,000 enlargement, 1992) was used to augment the existing registered shoreline manuscripts. ✓

Unpublished United States Geological Survey (USGS) bathymetric maps developed in 1980 by Austin Post were used to augment rock information shown on the existing registered shoreline manuscripts. Copies of these bathymetric maps were borrowed from Nancy and Jim Lethcoe in Valdez, Alaska and returned later during the project. Of the six USGS rocks shown on the studies, one rock was verified as a new feature while the remaining five rocks were disproved by taking a DP and including full disproval descriptions in the raw master printout. These rocks are discussed later in this section. ✓

Shoreline verification was conducted near predicted lower low water in accordance with FPM 7.1. Shoreline verification was accomplished by assigning sequential reference numbers and taking detached positions (DPs) as explained later in this section. ✓

Inshore hydrography shows that photogrammetric and hydrographic positioning are in excellent agreement. *Concur*

** Filed with the hydrographic data.*

Shoreline and T-sheet features verified via visual inspection were assigned sequential reference numbers, described, and recorded in the field using sounding volumes and corresponding 1:20,000 photocopies of the T-sheet. Reference numbers, descriptions, and heights corrected to MLLW using predicted tides, are recorded in the sounding volume. Corresponding notes were annotated on the photocopies of the T-sheet when deemed necessary. The annotated photocopies of the T-sheet are attached to the sounding volumes which are included with the survey data. ✓

DPs taken during shoreline verification were recorded on the master printouts and indicate significant T-sheet features, features not found on the T-sheet, and locations of disprovals. Where possible, positions of some T-sheet features were verified during inshore mainscheme hydrography and annotated on the master printouts. ✓

T-sheet features which were verified were retained and shown on the final field sheets (FFS). Verified shoreline and new features are shown in black on the FFS, ^{Smooth sheet} while changes to the shoreline are shown in red. Mean high water line revisions consist of a few islets and two other minor revisions to the shoreline. Detailed 1:20,000 paper plots showing all DPs and reference numbers and notes relating to each feature are included with the sheets submitted with this survey. The HDAPS DP Program requires that cartographic codes be assigned to all DPs. These cartographic codes were not plotted because the majority of DPs describe features that are offset slightly from the DP. Position numbers for all DPs are plotted on the DP overlay. Heights are recorded in meters and are corrected to predicted MLLW for approved tides.

Disprovals ✓

The vicinity of the T-sheet rock at 61°05'04"N, 148°15'45"W was inspected (Pos. No. 6453) during a 1.1 meter tide and the rock was not seen. The water visibility was 2.0 m, and the average water depth was 1.5 meters. The search was conducted for 10 minutes and the search radius was 40 meters from the DP. The launch was unable to get to the T-sheet position because of shallow depths. No rock was seen in the search area or on the nearby beach. Rock has not been shown on the smooth sheet.

The vicinity of the T-sheet rock at 61°03'33"N, 148°13'18"W was inspected (Pos. No. 8438) and the rock was not seen. The average water depth was 3.0 meters while the water visibility was 1.0 meter. The search was conducted for 10 minutes and the search radius was 30 meters from the DP. Rock has not been shown on the smooth sheet.

The vicinity of the T-sheet rock at 61°03'42"N, 148°12'30"W was inspected (Pos. No. 8436) and the rock was not seen. The average water depth was 3.0 meters. The search was conducted for 10 minutes and the search radius was 30 meters from the DP. Rock has not been shown on the smooth sheet.

The vicinity of the T-sheet rock at 61°05'31"N, 148°08'54"W was inspected (Pos. No. 2221) and the rock was not seen. The average water depth was 12.0 meters. The search was conducted for 15 minutes and the search radius was 50 meters offshore, and 100 meters along the shore from the DP. Rock has not been shown on the smooth sheet.

Changes ✓ See Eval Rpt, section 2

Reference No. R5-6 describes a T-sheet islet and a T-sheet rock as one feature. The rock symbol has been deleted and the feature is depicted as one T-sheet islet on the ~~FFS. Smooth sheet in red~~ at latitude $61^{\circ}04'12''N$, longitude $148^{\circ}10'24''W$.

Reference No. R6-3 describes a T-sheet islet and a T-sheet rock as one feature. The rock symbol has been deleted and the feature is depicted as one T-sheet islet on the ~~FFS. Smooth sheet in red~~ at latitude $61^{\circ}03'38''N$, longitude $148^{\circ}13'07''W$.

Reference No. R6-7 describes a change in the high water line (HWL). The area shown on the T-sheet as HWL is actually an area of glacial outwash. The islet depicted is an area of scrubby growth in stoney wash. The new HWL has been shown on the ~~FFS. Smooth sheet in red~~ at latitude $61^{\circ}02'42''N$, longitude $148^{\circ}17'24''W$.

Reference No. R6-17 describes a change in the high water line (HWL). The area shown on the T-sheet as HWL is actually an area of glacial outwash. The islet depicted is an area of scrubby growth in stoney wash. The new HWL has been shown on the ~~FFS. Smooth sheet in red~~ at latitude $60^{\circ}58'15''N$, longitude $148^{\circ}25'42''W$.

Other ✓

Five rocks (Pos. Nos. 2297, 8852-54, and 8855), originating from a preliminary 1:20,000-scale USGS bathymetric map borrowed from Nancy and Jim Lethcoe in Valdez, Alaska, were searched for visually (launch unable to get near position for echo sounder search) near lower low water, but not found. The rocks were later searched for by echo sounder during a 1.2 m to 2.0 m tide, and not found. DPs were then taken at the positions. Search time was approximately 10 min for each rock with an average search radius of 20 meters from the DPs. Water visibility was near zero due to glacial silt.

Recommendation: The hydrographer recommends that shoreline detail from this survey be used to supersede prior shoreline information. *Concur*

K. CROSSLINES

Crosslines were used for comparisons with mainscheme hydrography. These totaled 28.38 nautical miles, representing 13.2 % of the total hydrography; this percentage ✓ does not reflect developments run during additional investigations.

Crossline soundings agree to within 2.0 meters with mainscheme soundings in areas that were not steep slopes. These differences are believed to be attributable to predicted tides or bottom slope. ✓
 * The majority of this survey area is covered by submerged terminal moraines causing a very irregular bottom. In areas where the bottom is more regular, crosslines agree within one meter. ✓
 The vessels acquiring crossline data did not always acquire the corresponding mainscheme data. ✓

L. JUNCTIONS *See Eval Rpt, section 5*

This survey junctions with survey H-10438 (1:20,000, 1992) to the southeast. No irregularities were found when comparing soundings and depth curves. Agreement between overlapping soundings is less than 2 meters.

M. COMPARISON WITH PRIOR SURVEYS

Not Applicable. ✓

N. COMPARISON WITH THE CHART *See Eval Rpt, section 7*

This survey was compared to NOS chart 16700, 24th Edition, Jan 11, 1992, 1:200,000 (NAD83). Although there have been some reconnaissance investigations in the area, Harriman Fiord has never been surveyed. Subsidence from the 1964 earthquake is clearly evident and has an effect on the accuracy of pre-earthquake blue print and chart letter data in the area. USGS bathymetric maps show submergence as do dead trees along the shoreline and horizontal control stations that cover at higher stages of tide. The bottom has been relatively stable since the 1964 earthquake.

Recommendation: Sounding data from the present survey should be used to supersede ~~prior~~ ^{charted} soundings. *Concur*

Several charted soundings near Point Doran and the point east-southeast of Surprise Glacier, where extensive shoaling occurs, were investigated using reduced line spacing with the following results:

<u>Position Number</u>	<u>Charted Sounding</u>	<u>Survey Sounding</u>	<u>Recommendation</u>
8849 + 9	10 fm	9.6 fm (17.7 m) 17.4m	Use present survey
8844 + 6	5 fm	3.9 fm (7.2 m) 7.0m	Use present survey
2449 + 4	9 fm	9.1 fm (16.6 m) 16.8m	Use present survey
4350 + 5	6 fm	5.7 fm (10.4 m) 10.2m	Use present survey
4324 + 11	1 fm	1.7 fm (3.2 m) 3.1m	Use present survey ✓
2436 + 4	17 fm	17.3 fm (31.6 m) 31m	Use present survey
6061 + 10	1 fm	3.2 fm (5.8 m) 5.7m	Use present survey
8277 + 4	2 fm	0.3 fm (0.5 m) 0.6m	Use present survey
6095	3 fm	6.1 fm (11.1 m) 10.9m	Use present survey
6077 + 2	20 fm	9.0 fm (16.5 m) 16.4m	Use present survey
6156	16 fm	1.1 fm (2.0 m) 2.1m	Use present survey
8106 + 1	4 fm	5.7 fm (10.5 m) 10.7m	Use present survey

AWOIS Item 51958: Islets and rocks observed by a survey party in 1909 in vicinity of 61°04'45"N, 148°10'30"W. The area was investigated visually and no islets or rocks were seen. This item was also investigated using 25-meter and 5-meter line spacing in a 400-meter radius around the charted location. A shoal exists within the searched location with a depth of 7.2 meters at 61°04'42.9"N, 148°10'29.7"W.

Recommendation: The hydrographer recommends sounding data from the present survey should be used to supersede AWOIS item 51958. *Concur*

Dangers to Navigation

Twelve dangers to navigation within the limits of this survey were reported to the Seventeenth Coast Guard District and DMAHTC. Copies of the radio message and correspondence are included in Appendix I of this report. *One additional danger to navigation was found and reported during office processing.* ✓

O. ADEQUACY OF SURVEY

This survey is complete and adequate to supersede the blue prints and chart letters in the common areas. *Concur* ✓

P. AIDS TO NAVIGATION

No fixed or floating aids to navigation are located on this survey. ✓

Q. STATISTICS

<u>Vessel:</u>	<u>2123</u>	<u>2124</u>	<u>2125</u>	<u>2126</u>	<u>Total</u>
# of Pos	457	949	1035	920	3361
NM Hydro	68.4	122.0	112.2	145.4	448.0
NM ² Hydrography	19.2		Velocity Casts	2	
Detached Positions	28		Tide Stations	17	✓
Reference Numbers	25 59		Bottom Samples	17 19	

R. MISCELLANEOUS

Loran C comparisons were sent to DMAHTC and U.S. Coast Guard in accordance with the Project Instructions. ✓

Bottom samples were not sent to the Smithsonian Institution in accordance with the Project Instructions. ✓

Shallow draft cruise vessels and recreational boats are presently navigating Harriman Fiord. Harriman Fiord can best be accessed by rounding Point Doran at a distance of 0.1 NM or 0.35 NM. These two channels have shoal depths of ~~2.0~~^{1.5} meters and ~~1.0~~^{1.5} meters, respectively. The hydrographer observed strong currents at Point Doran during maximum flood and ebb currents.

Serpentine Cove, located on the northern shore of Harriman Fiord, is a good anchorage for shallow draft recreational boats. A submerged moraine nearly seals the cove off from the fiord. The entrance to the cove is approximately 0.05 NM south of the northern entrance point. The water gradually deepens to 20-27 m near the northern shore. Boaters should beware of shoals existing over the moraine at the entrance. A 1:10,000 scale inset of the anchoring area is included on the FFS.

Ice was observed at the faces of Coxe, Barry, Cascade, Harriman, and Surprise Glacier. Most floating ice from these glaciers calving is brash or growler type. Ice was found floating throughout Harriman Fiord during the survey. The areas near the glaciers were beginning to freeze near the end of October.

S. RECOMMENDATIONS

Mapping and Charting Branch should produce a preliminary 1:100,000 scale metric chart of this area as soon as possible to serve the needs of Southwest Alaska Pilots Association, recreational boaters, and numerous cruise ships that frequent this area.

Concur

T. REFERRAL TO REPORTS

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Fall 1992 Horizontal Control Report for OPR-P125-RA	November 1992	N/CG2333
Fall 1992 Electronic Control Data Package for OPR-P125-RA	November 1992	N/CG245
Fall 1992 Corrections to Echo Soundings Data Package for OPR-P125-RA	November 1992	N/CG245 ✓
Fall 1992 Coast Pilot Report for OPR-P125-RA	November 1992	N/CG245
Fall 1992 User Evaluation Report for OPR-P125-RA	November 1992	N/CG245
Cruising Guide to Prince William Sound; Jim & Nancy Lethcoe, Valdez, Alaska	October 1992	N/CG241
USGS Preliminary Bathymetric Maps, 1980	See Section J	

Respectfully Submitted,

Heidi L. Johnson
Heidi L. Johnson
Lieutenant (jg), NOAA

Approved and Forwarded,

Thomas W. Richards
Thomas W. Richards
Captain, NOAA
Commanding Officer

CONTROL STATIONS as of 28 Oct 1992

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
100	F	061:04:13.341	147:56:49.572	44	250	0.0	0.0	C	08/16/92	COGHILL(GPS) 1947
101	F	061:00:24.394	147:55:01.669	4	250	0.0	0.0	2	08/16/92	HOLY 1992
102	F	061:03:11.820	148:00:04.900	5	250	0.0	0.0	0	08/16/92	LORD 1992
103	F	061:06:34.024	147:52:56.711	9	250	0.0	0.0	6	08/27/92	UPPER 1947
104	F	061:11:57.292	147:49:44.750	5	250	0.0	0.0	9	08/19/92	VASS 1992
105	F	061:12:20.473	147:45:41.190	4	250	0.0	0.0	1	08/27/92	COLLEGE 1947
106	F	061:00:20.003	148:05:28.784	5	250	0.0	0.0	1	09/02/92	HAM 1947
107	F	061:00:07.172	148:10:38.719	5	250	0.0	0.0	B	09/02/92	BARRY RMI 1947
108	F	061:02:20.039	148:07:02.598	4	250	0.0	0.0	7	09/02/92	ORDER 1947
109	F	060:56:03.207	148:03:32.090	56	250	0.0	0.0	4	10/20/92	PREP(GPS) 1992
110	F	061:04:44.163	148:08:27.593	11	250	0.0	0.0	0	09/10/92	GLASS 1947
111	F	061:04:08.365	148:09:53.474	4	250	0.0	0.0	4	09/10/92	DORAN RMI 1947
112	F	061:02:42.590	148:09:51.591	4	250	0.0	0.0	3	09/10/92	BARN 1992
113	F	061:05:58.301	148:09:12.319	8	250	0.0	0.0	A	09/13/92	ACUTE 1947
114	F	061:05:09.058	148:11:28.016	6	250	0.0	0.0	E	09/13/92	LIND 1992
115	F	060:48:05.062	148:10:45.275	7	250	0.0	0.0		09/15/92	PORT(GPS) 1914
116	F	061:03:20.244	148:15:14.930	7	250	0.0	0.0	0	09/15/92	JOINT 1947
117	F	061:00:07.990	148:21:21.276	10	250	0.0	0.0	6	09/22/92	GNOME 1992
118	F	061:03:28.730	148:20:28.179	6	250	0.0	0.0	7	09/22/92	SUPR 1992
119	F	061:02:25.699	148:21:40.950	8	250	0.0	0.0	8	09/22/92	FAIRY 1992
120	F	061:04:33.081	148:18:12.690	6	250	0.0	0.0	5	10/06/92	SEAP 1992
121	F	060:59:07.956	148:22:25.717	29	250	0.0	0.0	2	10/06/92	CALVE 1992
122	F	060:59:27.312	148:25:26.823	7	250	0.0	0.0	3	09/28/92	ROAR 1992
123	F	061:01:05.907	148:22:25.927	17	250	0.0	0.0	3	10/07/92	HARR 1992
124	F	060:46:37.100	148:40:34.304	6	250	0.0	0.0	4	10/10/92	MARGIN 1950
125	F	060:47:59.465	148:40:06.242	4	250	0.0	0.0	E	10/10/92	TRIP 1914
126	F	060:46:48.574	148:39:26.332	4	250	0.0	0.0	A	10/10/92	PUNT 2 1950
127	F	060:57:29.915	148:13:01.522	45	250	0.0	0.0	6	10/19/92	TESE 1992
128	F	060:56:09.124	148:03:20.681	47	250	0.0	0.0	7	10/19/92	PARA 1992
129	F	060:54:48.620	147:59:03.402	4	250	0.0	0.0	8	10/21/92	BERM 1992
130	F	060:55:21.619	148:01:13.320	4	250	0.0	0.0	C	10/23/92	TION 1992
131	F	060:53:31.780	147:57:06.079	5	250	0.0	0.0	5	10/23/92	JELY 1992
132	F	060:52:07.247	147:54:38.050	4	250	0.0	0.0	0	10/23/92	WISP 1951
133	F	060:51:02.341	147:54:57.590	6	250	0.0	0.0	9	10/23/92	TOTAL 1947



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS

NOAA Ship RAINIER S221
1801 Fairview Ave. E.
Seattle, Washington
98102-3767

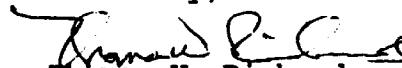
October 21, 1992

Director
DMAHTC
Attn: MCNM
6500 Brookes Lane
Washington, D.C. 20315-0030

Dear Sir:

While conducting hydrographic survey operations in Harriman Fiord, Alaska, NOAA Ship RAINIER discovered 12 dangers to navigation. They have been reported to DMAHTCNAVWARN and the Seventeenth Coast Guard District. A copy of the correspondence describing the dangers is enclosed.

Sincerely,


Thomas W. Richards
Captain, NOAA
Commanding Officer

Enclosures





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS

NOAA Ship RAINIER S221
1801 Fairview Ave. E.
Seattle, Washington
98102-3767

October 21, 1992

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

Dear Sir:

Attached is a confirmation copy of the radio message sent to your office regarding the dangers to navigation which I recommend for inclusion in the Local Notice to Mariners for the Seventeenth Coast Guard District. A copy of the chart showing the areas in which the dangers exist is also attached.

Sincerely,

Thomas W. Richards
Captain, NOAA
Commanding Officer

Enclosures

cc: DMAHTC
N/CG221
PMC



17:37. Monday 19 October 1992
tPostOUT : Hellickson

RA-PMC-200-229

P 192047Z OCT 92
FM NDAAS RAINIER
TO CCGDSEVENTEEN JUNEAU AK
DMAHTCNAVWARN WASHINGTON DC//MCONM//
INFO NOAAMOP SEATTLE WA
ACCT CM-VCAA
BT

**ADVANCE
INFORMATION**

UNCLAS
NOAA SHIP RAINIER HAS FOUND 12 DANGERS TO NAVIGATION IN PRINCE
WILLIAM SOUND, ALASKA (PROJECT OPR-P125-RA) WITHIN THE LIMITS OF
HYDROGRAPHIC SURVEY H-10441, HARRIMAN FIORD.
THE FOLLOWING INFORMATION IS PROVIDED FOR PUBLICATION IN LOCAL
NOTICE TO MARINERS:

CHART AFFECTED: 16700 24TH ED JAN 11/92 1:200,000 NAD83

DEPTHS ARE REDUCED TO MLLW BASED ON PREDICTED TIDES.

ITEM	DANGER	DEPTH	LATITUDE	LONGITUDE
A.	SHOAL	8 FM	61/04/41.89	148/08/49.42
B.	SHOAL	5 1/4 FM	61/05/22.16	148/10/31.55
C.	SHOAL	1/4 FM	61/05/00.24	148/11/13.77
D.	SHOAL	1 FM	61/04/49.12	148/11/12.02
E.	SHOAL	4 1/2 FM	61/04/36.88	148/11/05.07
F.	SHOAL	1/4 FM	61/04/28.12	148/16/40.73
G.	SHOAL	1 1/4 FM	61/04/29.91	148/17/17.60
H.	SHOAL	3 FM	61/03/18.78	148/22/12.86
I.	SHOAL	2 1/2 FM	61/02/22.04	148/21/21.93
J.	SHOAL	7 1/4 FM	61/02/09.44	148/20/17.82
K.	SHOAL	3 1/4 FM	61/01/57.33	148/21/11.57
L.	SHOAL	6 FM	60/58/18.43	148/25/52.31

BECAUSE OF THE SMALL SCALE OF CHART 16700 IT IS RECOMMENDED THAT
THESE DANGERS BE REPORTED IN THE LOCAL NOTICE TO MARINERS AS
DEGREES AND DECIMAL MINUTES.

QUESTIONS CONCERNING THIS MESSAGE SHOULD BE DIRECTED TO:
COMMANDING OFFICER, NOAA SHIP RAINIER, 1801 FAIRVIEW AVE E,
SEATTLE, WA 98102-3767 OR VIA RADIO CONTACT ON 2182 MHZ OR VHF
CHANNELS 13 AND 16. CALL LETTERS WTEF. A LETTER WITH ATTACHED
CHARTLET IS BEING MAILED TO CONFIRM THIS MESSAGE.

BT

30'

20'

10'

148°

LORAN-C GENERAL EXPLANATION

LORAN-C FREQUENCY 100kHz.
 PULSE REPETITION INTERVAL
 7960 79,600 Microseconds

STATION TYPE DESIGNATORS: (Not individual station letter designators)

M	.....	Master
W	.....	Secondary
X	.....	Secondary
Y	.....	Secondary
Z	.....	Secondary

EXAMPLE: 7960-X

RATES ON THIS CHART 7960-X 7960-Y

Loran-C correction tables published by the Defense Mapping Agency or others should not be used with this chart. The lines of position shown have been adjusted based on theoretically determined overland signal propagation delays. They have not been verified by comparison with survey data. Every effort has been made to meet the 1 nautical mile accuracy criteria established by the U.S. Coast Guard. Mariners are cautioned not to rely solely on the lattices in inshore waters.

RADAR REFLECTORS

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

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

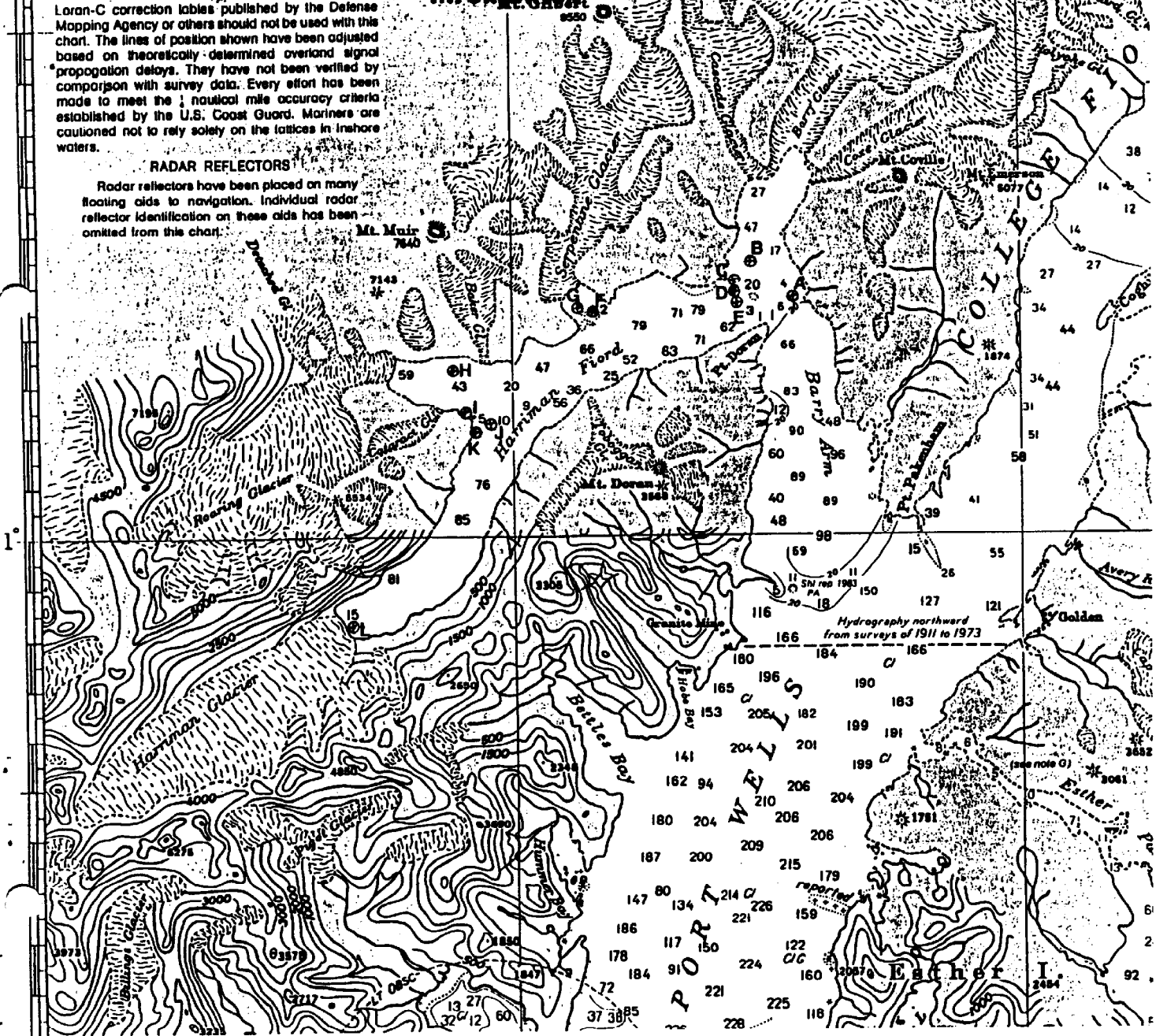
NOTE X

The 12 nautical mile territorial sea was established by Presidential Proclamation 5928, December 27, 1988, and is also the outer limit of the U.S. contiguous zone for the application of domestic law. The 3 nautical mile line, previously identified as the outer limit of the territorial sea, is retained because the proclamation states that it does not alter existing State or Federal law. The 9 nautical mile natural resources boundary of Texas, the Gulf coast of Florida, and Puerto Rico, and the 3 nautical mile line elsewhere remain the inner boundary of the Federal fisheries jurisdiction and the limit of states' jurisdiction under the Submerged Lands Act (P.L. 83-31; 67 Stat. 29, March 22, 1953). These maritime limits are subject to modification, as represented on future charts. The lines shown on the most recent chart edition take precedence.

24th Ed., Jan. 11/92

ADVANCE INFORMATION

16700





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Seattle, Washington 98115-0070

January 29, 1993

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

Dear Sir:

During the office processing of hydrographic survey H-10441 in Prince William Sound, Alaska one additional danger to navigation has been discovered. This danger affects the following chart:

<u>Chart Edition/Date</u>	<u>Datum</u>
16700 24th Ed., 1/11/92	NAD83

It is recommended that this additional danger to navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6853.

Sincerely,

Douglas G. Hennick
Commander, NOAA
Chief, Pacific Hydrographic Section

Enclosure

cc: DMA/TC
PMC
RAINIER
N/CG221



Hydrographic Survey Registry Number: H-10441

Survey Title: State: Alaska
 Locality: Prince William Sound
 Sublocality: Harriman Fiord

Project Number: OPR-P125-RA

Survey date: September - October 1992

Features are reduced to Mean Lower Low Water using predicted tides.

Affected Nautical Chart:

<u>Chart Edition/date</u>	<u>Datum</u>
16700 24th Ed., 1/11/92	NAD83

<u>Danger to Navigation</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
Shoal, covers 0.8 Fathom	61/01/59	148/21/12

Due to the small scale of chart 16700, it is recommended that this danger be reported in the Local Notice to Mariners as degrees and decimal minutes.

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6853.

Form 9-1343

UNITED STATES BOARD ON GEOGRAPHIC NAMES DOMESTIC GEOGRAPHIC NAMES REPORT	Controversial name	Recommended name: SERPENTINE COVE
	Name change	State ALASKA
	Changed application	County ANCHORAGE
	<input checked="" type="checkbox"/> Other (NEW)	

Lat. 061° 04' 42" N. Long. 148° 17' 00" W. Mouth End Center (Circle one)
 Lat. _____ " N. Long. _____ " W. Heading End (Circle one)

Description of feature: where appropriate, give shape, length, width, direction of flow or trend, direction and distance of extremities from points with established names, and section, township, range, meridian where useful, also elevation if known.

Serpentine Cove is a small bowl shaped cove on the north shore of Harriman Fiord, directly southeast of Serpentine Glacier. A submerged moraine nearly seals the cove off from the fiord. The position above is the cove's center. The cove covers an area approximately 1.0 NM square.

Published Maps Using Recommended Name (Map name, date, agency, & scale)	Variant Name or Application	Map or Source Using Variant (Map name, date, agency, & scale)
NOS Chart 16013, 1:969,761	25th Ed., Nov 4/89	
NOS Chart 16700, 1:200,000	24th Ed., Jan 4/92	
USGS Quadrangle Map Anchorage (A-4), 1:63,360, Rev 1973		

Available information as to origin, spelling, and meaning of the recommended name and/or statement concerning nature of difference in usage or application

The recommended name originates from Serpentine Glacier which is directly northwest of the cove. The name has been used in "Cruising Guide to Prince William Sound" by Jim and Nancy Lethcoe. See attached copy. A chartlet is also enclosed.

AUTHORITY FOR RECOMMENDED NAME	MAILING ADDRESS	OCCUPATION
NOAA Ship RAINIER	1801 Fairview Avenue East Seattle, WA 98102	
Submitted by: Name <i>Thomas W. Richards</i> Thomas W. Richards, CAPT, NOAA	Title Commanding Officer	Date 9/25/92
Agency NOAA/NOS/NOAA Ship RAINIER	Address See above address	

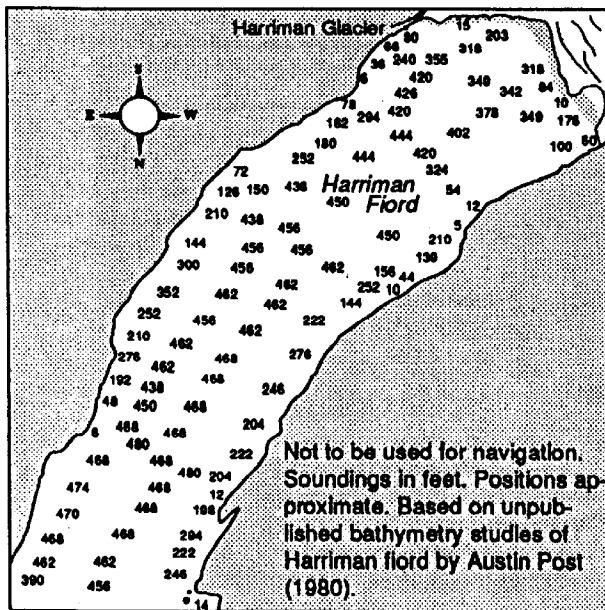


Cruising Guide to Prince William Sound

Volume I. Western Part

**By Jim and Nancy Lethcoe
Alaskan Wilderness Sailing Safaris
P.O. Box 701, Whittier, AK 99693**

Publisher: Prince William Sound Books, P.O. Box 1313, Valdez, AK 99686



more room and is a safer camping area. In Harriman Fjord, campsites are available along the northern shore just before reaching Serpentine Cove. However, the best campsites are opposite Serpentine Cove near Toboggan Glacier. Kayakers also camp on the eastern shore near Dirty Glacier just north of Harriman Glacier.

Serpentine Cove (61°04.7'N., 148°17'W.) We have investigated only one anchorage in the fiord — the bowl shaped cove in front of Serpentine Glacier. From this incredibly beautiful cove, one can see the vast expanse of Harriman Glacier in one direction and the 9,550 foot summit of Mount Gilbert above Serpentine Glacier in the other. A submerged moraine nearly seals this cove off from the fiord. To cross the moraine, proceed slowly on the upper stages of the tide about 75 yards south of the northern entrance point. Since depths of 10 feet or slightly less may be encountered in crossing the moraine, we do not recommend this anchorage for boats drafting more than 6 feet. Proceed directly into the cove. The water gradually deepens to 70 feet. There is ample unobstructed water for anchoring here, but avoid a wide area across the mouth because of shoals over the moraine. A new moraine and extensive mudflats make off from the head of the bay in front of Serpentine Glacier. This anchorage is not recommended when strong westerly or northwesterly winds are blowing or are predicted as strong winds gust off the glacier. The holding bottom is excellent.

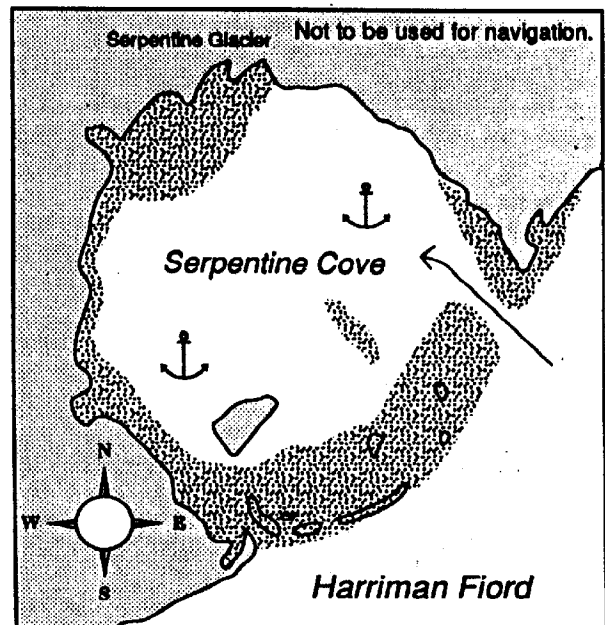
Points of interest: Serpentine Glacier's terminus now rests on a new moraine. At low tide, one can walk across the silty (very muddy) moraine and braided streams that cross it to the glacier. This is a good place to look at glacial features such as



Figure 36 Harriman Fjord is a popular destination for kayakers. Photo courtesy of Nancy Simmerman.

ice crystals, crevasses, and moraines as well as glacial landscape features such as old lateral moraines, striation and chatter marks. The highpoint on the moraine at the mouth of the cove marking Serpentine's 1880 advance is a small islet used extensively by black oyster catchers, mew gulls, arctic terns, and other birds for nesting. Visitors should not go ashore or camp here as disturbance to the birds during nesting season results in greater predation on the chicks and increased mortality.

Land Management: The east side of Serpentine Cove belongs to the State of Alaska. The *Prince William Sound Area Plan* recommends that the land be transferred to the US Forest Service in exchange for lands where management would benefit the state. The remainder of the cove is part of the proposed College Fiord Wilderness Area.



LORAN-C GENERAL EXPLANATION

LORAN-C FREQUENCY100kHz.
 PULSE REPETITION INTERVAL
 796079,600 Microseconds
 STATION TYPE DESIGNATORS: (Not individual station letter designators)
 M Master
 W Secondary
 X Secondary
 Y Secondary
 Z Secondary
 EXAMPLE: 7960-X

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

NOTE X

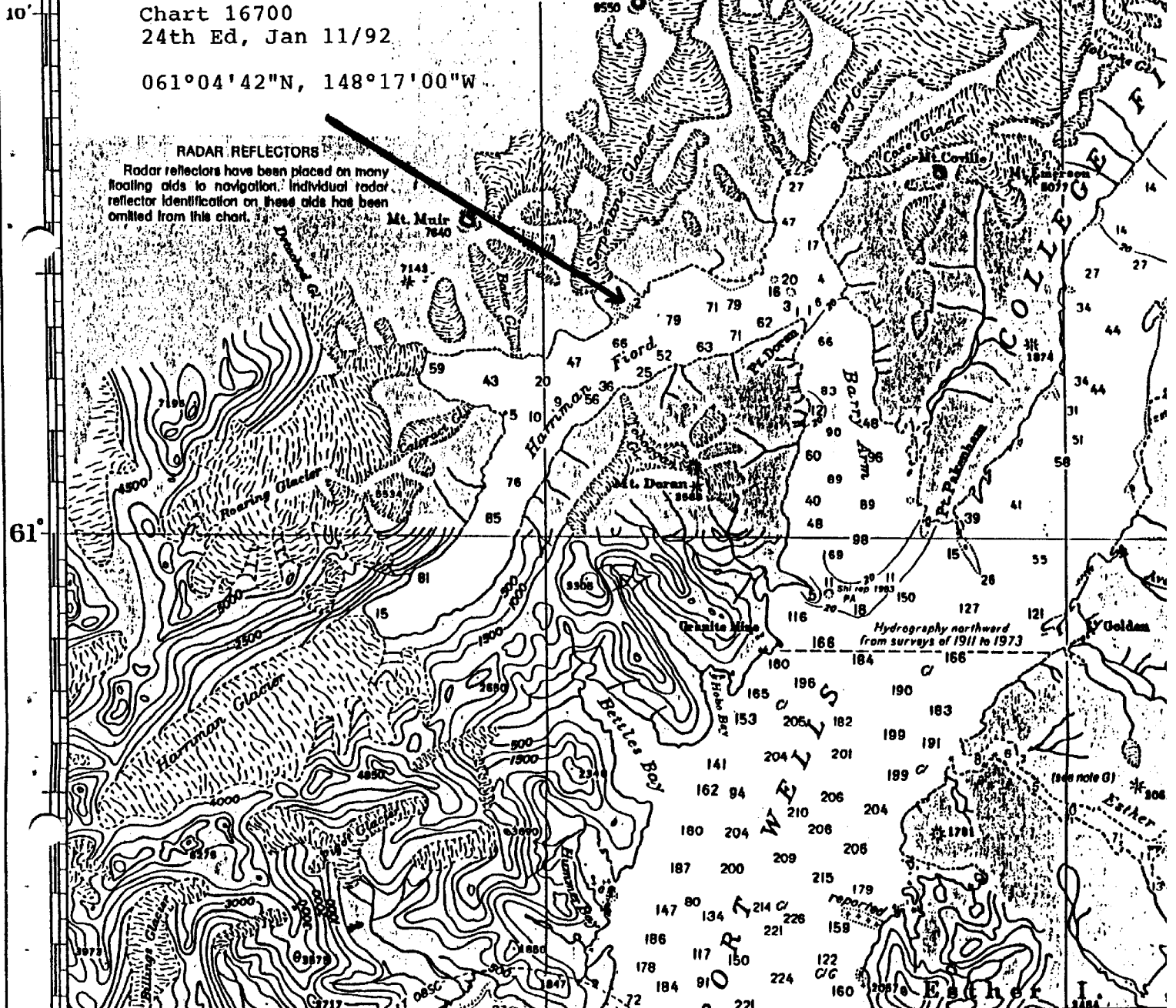
The 12 nautical mile territorial sea was established by Presidential Proclamation 5928, December 27, 1988, and is also the outer limit of the U.S. contiguous zone for the application of domestic law. The 3 nautical mile line, previously identified as the outer limit of the territorial sea, is retained because the proclamation states that it does not alter existing State or Federal law. The 9 nautical mile natural resources boundary of Texas, the Gulf coast of Florida, and Puerto Rico, and the 3 nautical mile line elsewhere remain the inner boundary of the Federal fisheries jurisdiction and the limit of states' jurisdiction under the Submerged Lands Act (P.L. 83-31; 67 Stat. 29, March 22, 1953). These maritime limits are subject to modification, as represented on future charts. The lines shown on the most recent chart edition take precedence.

SERPENTINE COVE

Chart 16700
 24th Ed, Jan 11/92
 061°04'42"N, 148°17'00"W

RADAR REFLECTORS

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





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, MD 20852-3019

OFFICE OF NOAA CORPS OPERATIONS

NOAA Ship RAINIER S221
1801 Fairview Avenue East
Seattle, Washington 98102

April 8, 1992

MEMORANDUM FOR: Lieutenant Commander John D. Wilder, NOAA
Chief, Operations Section

FROM: *Thomas W. Richards*
Captain Thomas W. Richards, NOAA
Commanding Officer, NOAA Ship RAINIER

SUBJECT: Base-line Calibration

The Field Procedures Manual (FPM) states in section 3.1.3.2 that base-line calibrations shall be performed 1) at the beginning of a project or 2) at intervals not exceeding 6 months.

RAINIER is scheduled to work in Northern Cook Inlet from June 2 until August 24. Operations will then immediately shift to Northwest Prince William Sound until November 6. RAINIER's minirangers require considerable time to recalibrate. This calibration time will detract from time available for data acquisition and increase electronic control paperwork.

RAINIER requests that the required base-line calibration between these two back-to-back projects be waived since they encompass an interval of less than 6 months. The correctors applied to minirangers during the Northern Cook Inlet project would also be applied to the Northwest Prince William Sound project. The remaining portions of FPM's section 3.1.3.2 will be adhered to throughout the field season.

cc: PMC1X2





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Rockville, Maryland 20852

APR 16 1992

*THR
FOO, ENSKRAY
looks okay to me
CO*

MEMORANDUM FOR: Captain Thomas W. Richards, NOAA
Commanding Officer, NOAA Ship RAINIER

FROM: Lieutenant Commander *J.D. Wilder*, NOAA
Chief, Operations Section

SUBJECT: Base-line Calibration Waiver

Your request for a waiver of the ^{back}required Mini-Ranger base-line calibrations between two back-to-back projects (OPR-P319-RA, Northern Cook Inlet and OPR-P125-RA, Northwest Prince William Sound) is approved. Adhere to the remaining portions of the Field Procedures Manual section 3.1.3.2 throughout the 1992 field season.

cc: PMCI
N/CG245



APPROVAL SHEET

for

H-10441

(RA-20-5-92)

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

The field sheets and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved.



Thomas W. Richards
Captain, NOAA
Commanding Officer

ORIGINAL



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: March 15, 1993

MARINE CENTER: Pacific

OPR: P-125-RA

HYDROGRAPHIC SHEET: H-10441

LOCALITY: Harriman Fiord, Prince William Sound, Alaska

TIME PERIOD: September 13 - October 14, 1992

TIDE STATION USED: 945-4949 Whittier, Passage Canal
Lat. 60° 46.5'N Lon. 148° 41.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 945-4949 = 10.41 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 945-4949 = 11.2 ft.

REMARKS: RECOMMENDED ZONING

Apply a x0.99 range ratio correction to hourly heights.

NOTE: Hourly heights are tabulated on Greenwich Mean Time.

for Britt Lund

CHIEF, DATUMS SECTION



NOAA FORM 76-155 (11-72)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION						SURVEY NUMBER			
GEOGRAPHIC NAMES		H-10441									
Name on Survey	<div style="display: flex; justify-content: space-between;"> A ON CHART NO. 16700 B ON PREVIOUS SURVEY NO. C TP-01418-TP-01420 D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G GRAND McNALLY ATLAS H U.S. LIGHT LIST </div>										
	ALASKA (title)	X		X							
BAKER GLACIER	X										2
BARRY ARM	X		X								3
BARRY GLACIER	X		X								4
CASCADE GLACIER	X		X								5
CATARACT GLACIER	X										6
COXE GLACIER	X		X								7
DORAN, POINT	X		X								8
DORAN STRAIT			X								9
HARRIMAN FIORD	X		X								10
HARRIMAN GLACIER	X		X								11
PRINCE WILLIAM SOUND (title)	X		X								12
SERPENTINE COVE										(pending BGN decision)	13
SERPENTINE GLACIER	X										14
SURPRISE GLACIER			X								15
SURPRISE INLET			X								16
											17
										Approved:	18
										<i>Charles E. Harrington</i>	19
										Chief Geographer - N/CG 2/5/93	20
										NOV - 9 1993	21
											22
											23
											24
											25

HYDROGRAPHIC SURVEY STATISTICS

H-10441

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		1
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		
DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES					
ENVELOPES					
VOLUMES	5				
CAHIERS	2				
BOXES					

- SHORELINE DATA**
- SHORELINE MAPS (List):
- PHOTOBATHYMETRIC MAPS (List):
- NOTES TO THE HYDROGRAPHER (List):
- SPECIAL REPORTS (List):
- NAUTICAL CHARTS (List):

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			3344
POSITIONS REVISED	1		1
SOUNDINGS REVISED	2		2
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	153.2		153.2
VERIFICATION OF SOUNDINGS	139.5		139.5
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	140.5		140.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		3	
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		22	
GEOGRAPHIC NAMES			
OTHER		24	
USE OTHER SIDE OF FORM FOR REMARKS			
TOTALS	443.2	49	443.2

Pre-processing Examination by J. Griffin	Beginning Date 11/30/92	Ending Date 1/29/93
Verification of Field Data by L. Deodato, E. Domingo, D. Doles, S. Otsubo	Time (Hours) 433.2	Ending Date 4/7/94
Verification Check by S. Otsubo, B. Olmstead, J. Stringham	Time (Hours) 34	Ending Date 5/16/94
Evaluation and Analysis by B. Olmstead	Time (Hours) 49	Ending Date 7/15/94
Inspection by Russ DAUES	Time (Hours) 9	Ending Date 1/23/95

EVALUATION REPORT

H-10441

1. INTRODUCTION

Survey H-10441 is a basic hydrographic survey accomplished by the NOAA Ship Rainier under the following Project Instructions.

OPR-P125-RA, dated July 7, 1992
CHANGE NO. 1, dated August 21, 1992

The purpose of this survey was to provide contemporary hydrographic data in Prince William Sound, Alaska, to support requests by the Alaska Pilots Association, local fishermen, and commercial cruise lines. This survey is twelve nautical miles in length and covers all of Harriman Fiord to include the head of Barry Arm. The surveyed limits extend from 1.4 nautical miles southeast of Point Doran, latitude 61/02/47N, longitude 148/09/53W, north to latitude 61/07/18N, longitude 148/08/30W and proceeds southwest to the head of Harriman Fiord, latitude 60/58/36N, longitude 148/26/30W.

The survey area is characterized by several spectacular valley glaciers which descend into the northern and western portions of Harriman Fiord. These glaciers discharge large quantities of icebergs which drift thru Harriman Fiord and into Barry Arm. The sea floor as defined by the soundings on this survey, portray several terminal moraines resulting from historical glacial activity. The mariner should be aware that these terminal moraines rise up rapidly to near the surface in surrounding depths of 50-100 meters. Of note, the navigable routes thru Doran Strait into Harrison Fiord are greatly affected by a submerged terminal moraine containing numerous pinnacles. Although the routes as defined by the hydrographer in section R of the descriptive report will permit smallcraft access to Harriman Fiord, extreme caution should be exercised when navigating this area. With the exception of those areas defined by terminal moraines, the bottom consists primarily of silt and mud. Depths generally range from 0 meters along the shoreline to over 140 meters.

Predicted tides for Cordova, Alaska, were used for the reduction of soundings during field processing. Approved hourly heights zoned from Whittier, Passage Canal, Alaska, gage number 945-4949, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. NAD 83 is used as the horizontal datum for plotting and position computations. The velocity and other offset correctors are adequate. An accompanying computer printout contains the parameters and the correctors.

A digital file has been generated for this survey as required by Hydrographic Survey Guideline No. 52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning. Additional detailed information on horizontal control is found in the Horizontal Control Report for OPR-P125-RA, dated November 1992.

Positions of horizontal control stations used during hydrography are published and 1992 field values based on NAD 83. The smooth sheet and accompanying overlays are 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: - 2.036 seconds (-63.019 meters)
Longitude: 7.554 seconds (113.351 meters)

The year of establishment of control stations shown on the smooth sheet originates with the previously mentioned horizontal control report and the hydrographer's signal list.

Mini Ranger Falcon 484 and Differential GPS (DGPS) were used to control this survey. The quality of several positions using the mini ranger system exceeds limits in terms of error circle radius and residual or have angles of intersection less than 30 degrees or more than 150 degrees. Survey specifications and accuracy requirements using DGPS were in accordance with the Field Procedures Manual. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations using DGPS. However, the quality of several positions exceed limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data using both positioning systems, however, indicates that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding data. These fixes are considered acceptable.

The following shoreline maps were compiled on NAD 83 and apply to this survey.

<u>Photo</u>	<u>Date</u>	<u>Class</u>	<u>Scale</u>
TP-01418	Jun., Aug., 1988	III	1:20,000
TP-01419	Jun., Aug., 1988	III	1:20,000
TP-01420	Jun., Aug., 1988	III	1:20,000

Several rocks compiled on the shoreline manuscripts were investigated during survey operations and found to bare at mean high water. These features have been revised on the smooth sheet to islets and are shown in solid red at the positions listed below. These revisions are adequate to supersede the shoreline map within the common areas.

Latitude(N) Longitude(W)

61/04/12 148/10/24
61/03/38 148/13/07
61/04/55 148/17/42

Shoreline revisions in the vicinity of latitude 61/02/42N, longitude 148/17/24W and latitude 60/58/13N, longitude 148/25/42W are depicted on the smooth sheet with a dashed red line and were transferred from the final field sheet without supporting positional information.

These revisions are approximate but adequate to supersede the common photogrammetrically delineated shoreline.

3. HYDROGRAPHY

With the exceptions noted in this report, hydrography 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.

The mean lower low water line and several standard depth curves could not always be drawn continuously. This was due to a combination of steep slope, rocky shoreline, and glaciers encountered in Harriman Fiord which affect the limits of safe navigation.

Some anomalous soundings were acquired during this survey. They originate from the poor performance of the echo sounder on steep slopes which were surveyed at excessive vessel speed. The hydrographer attempted to correct the problem by editing the raw sounding data, however, the quality of the echo sounder trace is so poor in some areas that the edits are most likely based on judgement rather than quantifiable data. Office review of the problem has determined that, with the exception of obviously erroneous depths, further editing is not reasonable since no corrective action can be taken to improve the quality of the trace. The judgement of the hydrographer has been accepted and generally the data was not altered during office processing. Generally, the affected depths are deep, in excess of 70 meters, and will have little negative effect on the quality of nautical charts if compiled at scales smaller than 1:20,000.

4. CONDITION OF SURVEY

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, March 1992 Edition, except as follows.

On steep or irregular bottoms as in Harriman Fiord, the echo sounder had a very hard time tracking the bottom while running main scheme hydrographer. Numerous soundings were scanned incorrectly and inserted into the digital record where there was no trace or the trace was miss digitized. Care has to be taken in scanning of the echograms and in reducing the speed of the vessel on steep sloping bottoms.

5. JUNCTIONS

Survey H-10441 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10438	1992	1:20,000	Southeast

The junction with survey H-10438 could not be formally completed since this survey was previously processed and forwarded for charting. The junction comparison was made using an

office copy. Portions of the depth curves on survey H-10438 should be adjusted to conform with those on this survey. The soundings and standard depth curves are in good agreement.

6. COMPARISON WITH PRIOR SURVEYS

There are no prior surveys common to the present survey.

There are no AWOIS items originating from prior surveys.

7. COMPARISON WITH CHART

Survey H-10441 was compared to the following chart.

Chart 16700, 24th edition, dated Jan. 11, 1992; scale 1:200,000

a. Hydrography

Charted hydrography originates from miscellaneous sources, (chart letters and blueprints from reconnaissance surveys conducted from 1910-73). Comparison with the present survey and the limited charted data, generally reveals a 1-5 meter difference in depths although, 10-30 meter discrepancies are noted in a few instances. There is a lack of sufficient comparative information to definitively state whether Harriman Fiord has deepened, shoaled or remained stable. Differences in sounding depths are attributed to positioning and sounding techniques, the effects of the 1964 earthquake, and the historical glacial activity. It is likely that the terminal moraines located on the sea floor in Harriman Fiord will be subject to constant change due to continual glacial activity. See section N of the hydrographer's report for additional information.

Significant shoreline differences noted between the present digital shoreline source document and the chart are likely attributed to a combination of tectonic processes and errors in datum transformation.

The charted islet at latitude 61/02/27N, longitude 148/21/36W was investigated by the hydrographer and found to be a rock which uncovers 2.4 meters at MLLW.

In accordance with Hydrographic Survey Guideline No. 39, the effects of the 1964 Prince William Sound earthquake were considered in the comparison of these surveys. No reasonable adjustment value for prior soundings could be determined.

Survey H-10441 is adequate to supersede charted hydrography within the common area.

b. AWOIS

There is one AWOIS item within the limits of this survey. This item is adequately discussed and disposed of by the hydrographer in his report, section N.

c. Controlling Depths

There are no charted channels with controlling depths within the limits of this survey.

d. Aids to Navigation

There are no fixed or floating aids and or features of landmark value within the survey area.

e. **Geographic Names**

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer. Serpentine Cove has been submitted to the Board of Geographical Names for approval. A decision is currently pending.

f. **Dangers to Navigation**

A total of twelve dangers to navigation were generated during survey operations. One additional danger was generated during office processing. Copies of all reports are attached.

8. COMPLIANCE WITH INSTRUCTIONS

Survey H-10441 adequately complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

This is a good hydrographic survey. No additional field work is recommended.

Bruce A. Olmstead
Bruce A. Olmstead
Senior Cartographer

APPROVAL SHEET
H-10441

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 digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Russ Davis
for Dennis J. Hill Date: 1/23/95
Chief, Hydrographic Processing Unit
Pacific Hydrographic Section

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
Kathy Timmons Date: 2/2/95
Commander, NOAA
Chief, Pacific Hydrographic Section

Final Approval

Approved:

Thomas W. Richards
Thomas W. Richards Date: 3-1-95
Captain, NOAA
Chief, Nautical Charting Division

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10441

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
16700	9/20/95	ALMACEN	Full Part Before After Marine Center Approval Signed Via Full application of Drawing No. Edqs & features from S.2.
16013			Full Part Before After Marine Center Approval Signed Via Drawing No.
500			Full Part Before After Marine Center Approval Signed Via Drawing No.
531			Full Part Before After Marine Center Approval Signed Via Drawing No.
50			Full Part Before After Marine Center Approval Signed Via Drawing No.
16711	8/23/96	ANGELA WILLS	Full Part Before After Marine Center Approval Signed Via Drawing No. 1, ^{1st} Ed, Fully APPLIED 9/20/96 H20
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.