10188

Diagram No. 8802-3

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-20-3-86

Office No. H-10188

LOCALITY

State Alaska

General Locality Bristol Bay

Locality Ten Miles Southeast of Round Island

1985

CHIEF OF PARTY
CAPT J.P.Vandermeulen

LIBRARY & ARCHIVES

DATE August 25, 1986

☆U.S. GOV. PRINTING OFFICE: 1980—766-230

10188

Area 5 + ACPC
CHTS:
A16315
m16011
m16006
} to sign off see Record of Application

NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.

H-10188

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 20-3-85

State: Alaska

General locality: Bristol Bay

Locality: Ten miles Southeast of Round Island

Scale: 1:20,000 Date of survey: July 21 - Aug. 5, 1985

Instructions dated: April 30, 1985 Project No.: OPR-R184-RA-85

Vessel: RAINIER S221(2120)

Chief of party: Captain J.P. Vandermeulen, NOAA

Surveyed by: RAINIER Personnel

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

Graphic record scaled by: RAINIER personnel

Graphic record checked by: RAINIER personnel

Verification XXXXXXXX Protracted by: P. Niland, R. Shipley Automated plot by: ~~PMC~~ Xynetics Plotter

Evaluation XXXXXXXXX Verification by: I. Almacen

Soundings in fathoms XXXX feet at XXX MLW MLLW and tenths of fathoms

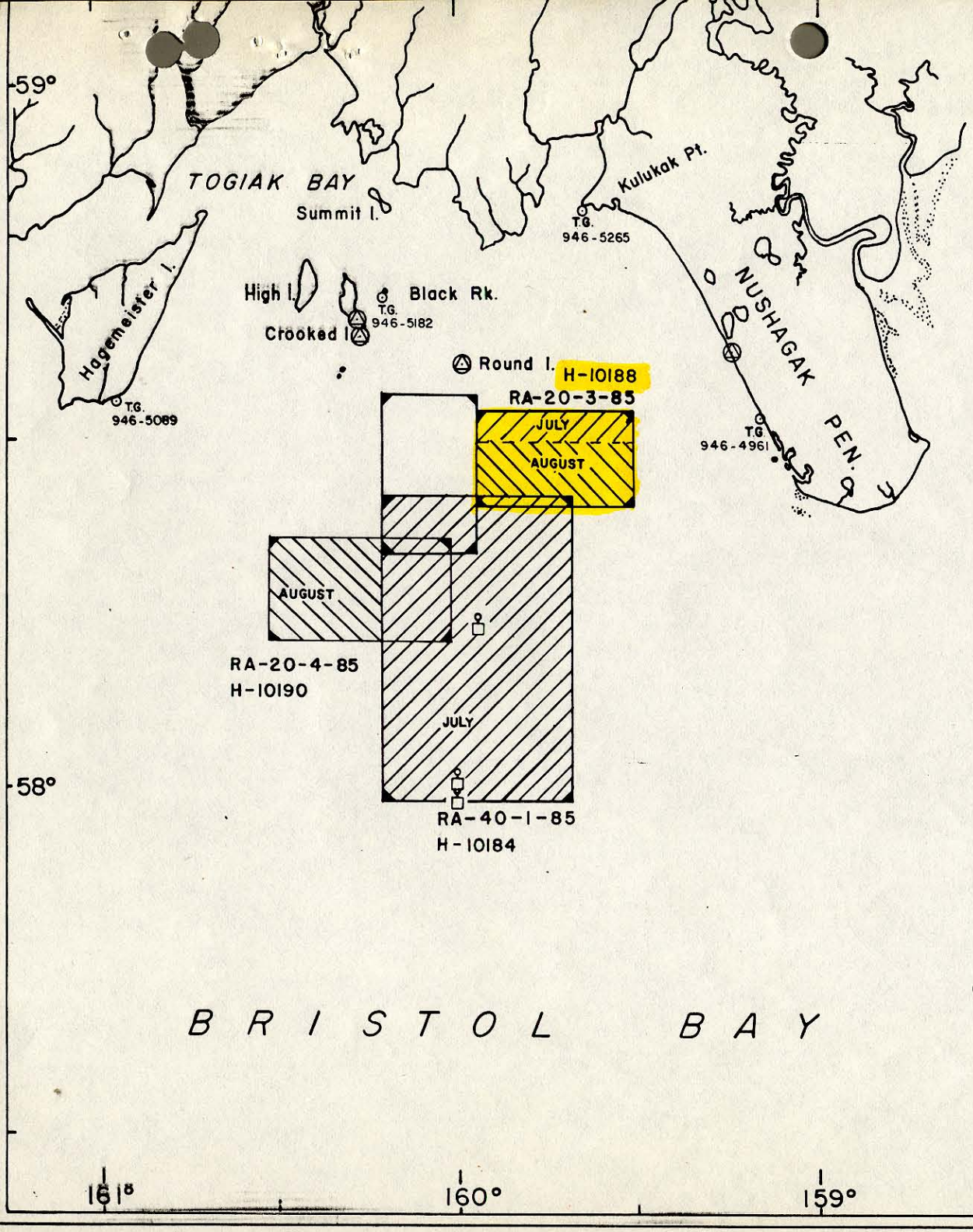
REMARKS: Marginal Notes in black made by evaluator. Separates are filed with hydrographic data.

✓ AWOIS and SURF NUS 8/86

SC 4-8-97
JWW

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

☆ U.S. GOVERNMENT PRINTING OFFICE 1978-665-010-1174



PROGRESS SKETCH

OPR-R184-RA-85

HYDROGRAPHIC SURVEY
TOGIAK BAY, ALASKA

JUNE 7 — AUGUST 27, 1985

NOAA SHIP RAINIER
JOHN P. VANDERMEULEN, CAPT., NOAA
COMMANDING

FROM CHART 16011

JUNE	JULY	AUG.	
—	434.5	139.4	SQ.N.M. Sounding
—	672.9	611.0	L.N.M. Misc. Distance
—	2774.8	1469.7	L.N.M. Sounding
31	39	115	Bottom Samples (Grab)
4	—	—	Control Station (Electronic)
—	1	2	Temp., Depth, Sound Velocity
—	—	—	Nansen Cast
4	—	—	Tide Gages
1	—	—	Stations Located by Traverse
—	2	4	Water Samples Analyzed
—	—	—	SQ.N.M. Side Scan Sonar
—	—	—	L.N.M. Side Scan Sonar

A. PROJECT

Basic hydrographic survey H-10188 sheet RA-20-3-85, was accomplished in accordance with Project Instructions OPR-R184-RA-85, Togiak Bay, Alaska, dated April 30, 1985.

B. AREA SURVEYED

Survey operations were conducted from July 21 (DN 202) to August 5 (DN 217), 1985. The area was surveyed to a scale of 1:20,000 and lies approximately 10 nm southeast of Round Island in Bristol Bay. The area is bounded by latitudes 58/32/30 N and 58/25/00 N, and longitudes 159/56/00 W and 159/30/00 W.

C. SOUNDING VESSELS

All sounding data for this survey were obtained by the RAINIER (2120). RA-5 (2125) was used to collect a portion of the bottom samples. No unusual sounding vessel configurations occurred during the acquisition of hydrographic data. The RAINIER (2120) was utilized for all sound velocity casts.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

Sounding Equipment

The RAINIER and RA-5 were equipped with Raytheon DSF-6000N dual-beam echo sounders. Depths in the survey area ranged from 9 to 20 fathoms. Serial numbers for sounding equipment used in this survey are as follows:

VESSEL	SERIAL NO.
RAINIER (2120)	A119N, A117N,
RA-5 (2125)	A103N

Settings for the DSF-6000 echo sounders throughout the survey were as follows:

RANGE SCALE: 0 - 25 fm (Phase 1)

CHART SPEED: 30 mm/min

FUNCTION: High + Low (High frequency digitized)

GAIN SETTINGS: Manual

Sounding Equipment Failures

In general, the DSF-6000N echo sounders performed adequately during the course of the survey. On July 22, 1985 (DN 203) the stylus belt of echo sounder A117N malfunctioned. This echo sounder was replaced with A119N. On July 23, 1985 (DN 204) echo sounder A119N failed. This failure was characterized by an excessive amount of noise that obliterated the graphic record. Echo sounder A117N was reinstalled after the stylus belt was repaired.

Data quality was not impaired by these failures as junctions between sounding lines recorded with different echo sounders agreed well.

Transducer Depth and ANDIST

All soundings were recorded with the starboard aft transducer of the RAINIER with Raydist range-range control. The ANDIST associated with this transducer is 32.2 meters. ANDIST WAS APPLIED DURING OFFICE PROCESSING.

A transducer depth of 2.3 fathoms was used to correct all soundings in this survey. This value has been used in prior surveys and can be derived from plans of the RAINIER. The transducer depth was verified using a 3D Instruments pneumatic gage (S/N 8504192). On July 29, 1985, divers placed the orifice of the pneumatic gage alongside the transducer. Measurements were recorded before and after fueling resulting in an average transducer depth of 2.3 fathoms for the aft transducers.

TC/TI tapes were made in accordance with PMC OPORDER Appendix Q. Printouts of the TC/TI tapes are included in the separates following the text.

Sound Velocity-Settlement and Squat Corrections

Velocity corrections were derived from three Plessy 9040 SV/D/T profiling system casts:

Cast Number	Date	Position
1	11 July 85 (DN 192)	57/58/35.6 N 159/59/58.7 W
2	5 Aug 85 (DN 217)	58/56/25.0 N 159/56/25.0 W
3	27 Aug 85 (DN 239)	58/00/00.0 N 160/13/00.0 W

One table of velocity corrections (Table No. 3) was created by averaging casts 2 and 3. The maximum velocity correction

in this survey is +0.2 fathoms. The final field sheet was plotted with a preliminary velocity correction table based on the first cast. A printout of the velocity tables is included in the separates following the text.

The transducer depth and sound velocity corrections were checked with leadline casts taken at various depths. The quality of the leadline comparisons was generally poor due to current and sea conditions throughout the survey area. Comparisons made at shallower depths generally confirmed the 2.3 fathom transducer depth. Insufficient precision in the comparisons measured at deeper depths made verification of the small velocity correction impossible.

Settlement and squat trials were conducted with the RAINIER on August 26, 1985. A LORAN-C controlled line was run over an area with a nearly flat bottom near Kulukak Point. Depth readings were recorded at the same three locations along the line while running at the following speeds: 0 rpms, 120 rpms (10 ft pitch), 150 rpms (10 ft pitch), and 180 rpms (10 ft pitch). The tide level was monitored during the trials. Results showed that the settlement and squat correctors for the RAINIER were less than 0.1 fathoms and were not applied to soundings.

Calibration information regarding the Plessy 9040 SV/D/T and the 3D Instruments pneumatic gage can be found in the Corrections to Echo Sounding Report, OPR-R184-RA-85.

Corrections Due to Sea Surface Conditions

Throughout the survey area, a regular sand and mud bottom was observed. Irregularities in the graphic record were generally due to sea conditons. Corrections for sea action were necessary for about 3 percent of the digitized soundings. Depths which digitized on or near the crests or troughs of waves were replaced with soundings scanned from the graphic record. The following guidelines were used in scanning out sea action:

see EVAL RPT sect. 4

1. In depths greater than 10 fathoms: If the digitized depth differed from the mean sea action depth by more than 0.2 fm, the sounding was changed to compensate for sea action.

2. In depths less than 10 fathoms: If the digitized depth differed from the mean sea action depth by more than 0.1 fm. the sounding was changed to compensate for sea action.

On Days 202-203 about 30 percent of the digitized soundings were corrected for sea action. During this period, sea action averaged about 1 fathom. This condition at times exceeded the recommended operations cutoff outlined in Hydrographic Survey Guideline No. 31. Because of the

extreme flatness of the bottom in this area it was determined that the graphic record could be scanned adequately and sounding operations continued.

Tide Reduction of Data

Preliminary plots using tide correctors furnished in the project instructions resulted in crosslines and splits that disagreed with main scheme lines by 1 - 2 fathoms. During the course of the project, by analyzing real time tides, it was determined that the predicted tides for Black Rock reasonably reflected the tidal cycle in the immediate area. Therefore, predicted tides for Black Rock, derived directly from the 1985 Tide Tables were used to plot the final field sheets. By using these tide correctors, disagreements were reduced to not more than 1 fathom in all cases.

See EVAL RPT sect. I

E. HYDROGRAPHIC SHEETS

Two 1:20,000 scale plotter sheets designated RA-20-3N-85 and RA-20-3S-85 were prepared on the RAINIER with the PDP 8/e Hydroplot system which draws a modified transverse mercator projection. There are no larger scale expansion sheets. The final field sheets were prepared by ST Yvette Barnes. A list of parameters used to define the field sheets are provided in the separates following the report.

All data and accompanying field records will be forwarded to the Pacific Marine Center for verification.

F. CONTROL STATIONS

Three Class I Control Stations used for this survey were established in 1947 and 1948. Stations recovered and used for electronic control sites or calibration sites are as follows:

Signal #	Station	Class I
100	CROOKED 1948 AZ MK ECC	
101	PENINSULA 1947 AZ MK	2nd Order
202	CROOKED 1948 AZ MK	2nd Order
104	ROUND 1948	3rd Order

Adjusted positions (Nov. 1976) for these stations were provided by NGS. Positions of CROOKED 1948 AZ MK and ROUND 1948 were verified by ground survey methods commensurate with Section 3.1.1.2 of the Hydrographic Manual. PENINSULA AZ MK 1947 was recovered in 1983 by PMC Photogrammetry Section and found to be in good condition.

Station BOOBOO 1985 (105) was established and located to Third Order Class I Standards for use as a calibration site ~~sight~~. CROOKED 1948 AZ MK ECC (100) was located for use as a Raydist and Mini-Ranger site. Details of the location and

verification of horizontal control can be found in the Horizontal Control Report for OPR-R184-RA-85.

All positions in the survey are based on the 1927 North American Datum.

G. HYDROGRAPHIC POSITION CONTROL

This survey was conducted using the range-range method of position control. Hastings-Raydist ranging equipment was used for positioning all sounding lines.

Some of the bottom samples were positioned using LORAN-C. The LORAN-C time delays were converted to Raydist ranges by using programs RK-321 and RK-300. The time delays were adjusted using a correction range and azimuth that were computed by comparing a sample of Raydist ranges to LORAN-C time delays which were recorded simultaneously by the Hydroplot Controller during survey operations.

No problems were encountered while using the Raydist equipment, except for a minor electronic failure on 4 August (DN 216) as detailed below. Motorola Mini-Ranger III equipment was used for setting and periodically checking the lane count on the Raydist equipment. Wild T-2 Theodolites were used for calibrating the Mini-Ranger equipment. A list of all equipment serial numbers follows:

Wild Theodolites

T-2 #75599E
T-2 #68648

Motorola Mini-Ranger III Equipment

Console #711
R/T Unit #C1712

Codes

E - #911721
F - #911711
D - #1569
B - #1628
O - #01789

Hastings-Raydist Equipment

DR-S System Navigator Model ZA-67A #58
Transmitter Model TA 96B #167 Frequency - 3296.475 kHz
Red Shore Station #233 Frequency - 1648.015 kHz
Green Shore Station #120 Frequency - 1648.425 kHz

Gould Strip Chart Recorders

Model 220 #11662
Model 220 #11314

The Raydist shore stations and Mini-Ranger codes were set up on the following stations:

Raydist Red - Signal 100, CROOKED 1948 AZ MK ECC
Raydist Green - Signal 101, PENINSULA 1947 AZ MK

Mini-Ranger Codes

D - Signal 102, CROOKED 1948 AZ MK ECC
O - Signal 103, PENINSULA 1947 AZ MK
E & F - Signal 104, ROUND 1948
B - Signal 105, BOOBOO 1985

Mini-Ranger Calibration

On May 24 (DN 144), 1985, an opening baseline calibration for the Mini-Ranger equipment was conducted in Juneau, Alaska , following the specifications of PMC Oporder, Appendix M. A closing calibration will be conducted at the conclusion of operations. The Mini-Ranger system checks were performed by the theodolite intersection method. A system check was performed prior to data acquisition for this survey on 1 August (DN 213) for codes B and D. No significant deviation from the base line calibration results was detected. A closing system check was performed on 14 August (DN 226), with similar results.

No system check was performed for code O due to the lack of control in the area. This code was used for direct comparisons with the green Raydist station, which was initially calibrated using codes D and E, and upon computing a direct comparison, the range from code O was in close agreement with the observed Raydist range. This provided an indirect check on code O's performance.

Code F was located on the same station as code E, and was not used. Code E was used for on-line checks of the lane count.

Raydist Calibration

The Raydist lane counts were set and checked using the Mini-Ranger system and program RK-561. These calibrations were performed on the following dates:

July 17 (DN 198)
July 23 (DN 204)

August 2 (DN 214)
August 7 (DN ~~216~~) 219

In addition to periodic calibrations of this type, numerous direct comparisons were performed during data acquisition. These were performed by recording the Mini-Ranger range from the code mounted on the Raydist tower at the station being checked, and then dividing the range by 45.453 meters/lane to obtain the equivalent Raydist lane count. These comparisons were recorded on the data printouts as they were being performed.

Another type of lane count check was also performed during data acquisition. This check consisted of recording a Mini-Ranger range from a third, independent station when the Hydroplot system recorded its Raydist fix. The Raydist ranges were used to compute an X-Y position with program RK-300, and then a distance was computed from the independent station to this X-Y position. This computed distance was then compared to the observed Mini-Ranger range, verifying the lane count. These verifications were also recorded on the data printouts.

Raydist Correctors (See letter dated Oct. 28, 1985 attached to DR)
Additional information in Preprocessing Critique.

The final field sheets were plotted using the average of the opening and closing correctors for the period during which the data were acquired. For instance, the data acquired between the dates of July 17 and July 23 were plotted using an average of the corrector values obtained from the calibrations of July 17 and July 23.

Date	Red Corrector	Green Corrector	Av Red Corrector	Av Green Corrector
17 July	-0.02	-0.02		
23 July	-0.14	-0.03	-0.02	-0.02
2 Aug	-0.40	-0.20		
4 Aug	-0.16	-0.72	-0.23	-0.47
4 Aug(1430z)	-0.16	-0.56		
4 Aug(1857z)	+0.04	-0.56	-0.07	-0.56
4 Aug(1857z)	+0.04	-0.56		
4 Aug(2240z)	-0.13	-0.37	-0.06	-0.50
4 Aug(2240z)	+0.03	-0.45		
4 Aug(2321z)	+0.12	+0.06	+0.08	-0.20

On August 4 (DN 216) at time 13:25:36 GMT, a minor electronic failure occurred in the shipboard Raydist

equipment. The local reciever PMA module failed, causing the phase meter for the "Green" channel to stop. Two calibrations were recorded; one before the problem was corrected and one after the phase meters for both channels were re-slewed.

For further information refer to the Electronic Control Report, OPR-R184-RA-85.

H. SHORELINE

There is no shoreline within the limits of this survey.

I. CROSSLINES

A total of 63.4 nm of crosslines, comprising 6 % of total hydrography, were run on this survey. In all cases, comparisons between mainscheme and crossline hydrography were within one fathom.

See EVAL RPT Sect 3

J. JUNCTIONS

This survey junctions to the south with contemporary survey RA-40-1-85 (H-10184). The junction with RA-40-1-85 was accomplished by running compatible east-west mainscheme hydrography. No irregularities in contours exist at the junction.

K. COMPARISON WITH PRIOR SURVEYS

This survey was compared to one prior survey; H-7718 (1:100,000, 1948). All soundings from the prior survey within the limits of this survey were used for comparison. Agreement was consistently within one fathom.

See EVAL RPT. Sect. 7

L. COMPARISON WITH THE CHART

Survey RA-20-3-85 (H-10188) was compared with the following charts:

Chart Number	Scale	Edition	Date
16011	1:1,023,188	30 th	4/2/83
16315	~~1:1,000,000~~ 1:100,000	1 st	3/9/85 (Provisional)
16315	1:100,000	2 nd	3/4/86 (Preliminary)

See EVAL RPT Sect. 7

All soundings from the charts within the limits of this survey were used for comparisons. All depths agreed within one fathom.

AWOIS item number 50884 a *shoal reported in 1930 by the Alaska Packers Association at 58/30/45 N and 159/52/00 W was investigated. East - West splits were run at 100 meter spacing over this entire area (1500 m radius) and no

*Depths found during investigation are 12 to 13 fathoms.

shoaling was found. It is recommended that this item be removed from the charts. concur

M. ADEQUACY OF THE SURVEY

This survey is complete and adequate to supersede all prior surveys for charting purposes. ✓

N. AIDS TO NAVIGATION

There are no aids to navigation within the limits of this survey, and none are recommended. ✓

O. STATISTICS

Linear nautical miles of hydrography	1065.6 nm
Square nautical miles of hydrography	101.4 nm sq
Number of positions	3406
Bottom samples	66
Velocity casts	2
Tide stations	4

P. MISCELLANEOUS

No quantitative current measurements were recorded in the survey area. However, pronounced tidal current effects were evident in the survey area. There were several instances when abrupt course changes had to be made to maintain the ship on line. ✓

LORAN-C data were acquired in conjunction with hydrography for 100% of the survey. A sample of 15 time delays was taken at random from the lines run on this survey and checked for accuracy in the following manner. Program RK-300 was used to compute a G.P. from the Raydist rates, and then program RK-321 was used to compute time delays from the G.P.'s. An error value was then determined by subtracting the computed time delays from the observed time delays. The errors for all 15 samples were averaged and a standard deviation was computed. From this average, a positional corrector in terms of a range and azimuth was computed. ✓

	Mean Error	Std Dev	Max Error	Min Error
9990-Z	+ 2.75	0.12	+ 2.98	+ 2.55
9990-Y	+ 2.87	0.16	+ 3.15	+ 2.65

✓

Distance: 725.7 m Azimuth: 035/44/11.1

As per section 6.8 of the project instructions, all bottom samples have been sent to the Smithsonian Institution.

Q. RECOMMENDATIONS

This survey is complete and no additional field work is required.

R. AUTOMATED DATA PROCESSING

Data acquisition and processing were accomplished in accordance with the Hydrographic Manual (Fourth Edition), Manual of Automated Hydrographic Surveys, the PMC OPORDERS, Hydrographic Survey Guidelines and the Hydrographic Data Requirements for 1985.

Soundings and positions were collected by a Hydroplot system using the Hyperbolic Range/Range Hydroplot program Rk 112. Daily master tapes and corresponding corrector tapes include the TRA for the sounding vessels, electronic control correctors for the Raydist green and red stations, and all depth corrections. Velocity tapes were generated from SV/D/T cast data. The following is a list of all computer programs version dates used for data acquisition or processing:

Number	Description	Version
RK 112	Hyperbolic, R/R Hydroplot	4/23/84
RK 201	Grid, Signal, and Lattice Plot	4/18/75
RK 211	Range/Range Non-Real Time Plot	2/13/84
RK 300	Utility Computations	10/21/80
RK 321	LORAN-C Computations	10/21/80
RK 330	Reformat and Data Check	5/04/76
PM 360	Electronic Corrector Abstract	2/02/76
RK 407	Geodetic Inverse/Direct Computation	9/25/78
AM 500	Predicted Tide Generator	11/10/72
RK 530	Layer Corrections for Velocity	5/10/76
RK 561	H/R Geodetic Calibration	12/01/82
RK 562	Theodolite Calibration	9/05/84
AM 602	Elinore-Line Oriented Editor	12/08/82
AM 606	Tape Duplicator	8/22/74
AM 607	Self-Starting Binary Loader	8/10/80
RK 610	Binary Tape Duplicator	12/01/82
RK 612	Line Printer List	3/22/78
RK 900	Plot Test Tape Generator for AM902	5/07/76
RK 901	Core Check	3/01/72
AM 902	Real Time Checkout	11/10/72
DA 903	Diagnostic-Instruction Time	2/27/76
RK 905	Hydroplot Controller Checkout	3/18/81
RK 935	Hydroplot Hardware Tests	3/15/82

S. REFERENCE TO OTHER REPORTS

The following reports contain information relevant to this survey:

* Corrections to Echo Soundings Report OPR-R184-RA-85
Electronic Control Report OPR-R184-RA-85
Horizontal Control Report OPR-R184-RA-85
Coast Pilot Report OPR-R184-RA-85

*Filed with the field records for H-10190
KWW 8/7/92

Respectfully submitted,

Mark H Pickett, LTJG, NOAA

APPROVAL SHEET

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SURVEY

RA 20-3-85 (H-10188)

In producing this sheet, standard procedures were observed in accordance with the Hydrographic Manual, Hydrographic Survey Guidelines and PMC OPORDERS. The data were examined daily during the execution of the survey.

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

for Richard W. Vandermeulen
John P. Vandermeulen
Captain, NOAA
Commanding Officer

MASTER STATION LISTING
OPR-R184-RA-85.TOGIAK BAY. AK

VERSION FINAL

```
100 3  58 38 22048 160 16 08578  254 0092 329647
/CROOKED 1948 AZ MK ECC (RED RAYDIST) PRELIM G.P

101 3  58 37 40676 159 14 47361  250 0053 329647
/PENINSULA 1947 AZ MK(GREEN RAYDIST)  PRELIM G.P

102 3  58 38 22048 160 16 08578  254 0081 000000
/CROOKED 1948 AZ MK ECC (M/R)          PRELIM G.P

103 3  58 37 40676 159 14 47361  250 0042 000000
/PENINSULA 1947 AZ MK (M/R)            PRELIM G.P

104 3  58 36 19285 159 58 33257  250 0430 000000
/ROUND 1948                            PRELIM G.P

105 3  58 39 35290 160 15 14561  250 0127 000000
/BOOBOO                                RAINIER G.P

200 3  58 42 10704 160 17 18642  139 0050 000000
/CROOKED 1948                          PRELIM G.P

201 3  58 50 49897 160 13 15720  139 0151 000000
/SUMMIT 1948 AZ MK                           581601

202 3  58 38 21908 160 16 08412  250 0050 000000
/CROOKED 1948 AZ MK                    PRELIM G.P
```

ASCII SIGNAL TAPE LISTING
RA-20-3-85 (H-10188)

PRELIMINARY SIGNAL TAPE
USED FOR SMOOTH PLOTTING

100	3	58	38	22030	160	16	08598	250	0092	329647
101	3	58	37	40526	159	14	46689	250	0053	329647
102	3	58	38	22030	160	16	08598	250	0081	000000
103	3	58	37	40526	159	14	46689	250	0042	000000
104	3	58	36	19285	159	58	33257	250	0430	000000
105	3	58	39	35290	160	15	14561	250	0127	000000
200	3	58	42	10704	160	17	18642	139	0307	000000
201	3	58	50	49897	160	13	15720	139	0151	000000
202	3	58	38	21908	160	16	08412	250	0060	000000

FINAL SIGNAL TAPE

100	3	58	38	22048	160	16	08578	254	0092	329647
101	3	58	37	40676	159	14	47361	250	0053	329647
102	3	58	38	22048	160	16	08578	254	0081	000000
103	3	58	37	40676	159	14	47361	250	0042	000000
104	3	58	36	19285	159	58	33257	250	0430	000000
105	3	58	39	35290	160	15	14561	250	0127	000000
202	3	58	38	21908	160	16	08412	250	0060	000000

FIELD TIDE NOTE
RA-20-3-85
H-10188

Field tide reduction of soundings was based on predicted tides from Nushagak Bay, Alaska. Corrections were applied from Black Rock, Walrus Islands, Bristol Bay, Alaska. Black Rock predicted correctors are as follows:

TIME		HEIGHT	
high	low	high	low
+7 min	-7 min	-10.2	.70 (ratio)

The predicted tides were derived using program AM500. All times of both predicted and recorded tides are UTC.

Bristol Bubbler tide gages were installed at four locations in the project area. At three of these locations backup gages were installed. Tide station information follows:

BLACK ROCK (946-5182)

Geographic Locale	- Black Rock, Walrus Islands, Bristol Bay, Alaska. 58-42.5 N, 160-11.3 W.
Installation Date	- 6/8/85.
Gage Type	- Two 0-30 scale Bristol Bubblers, primary S/N 63A 2920 and backup S/N 67A 16205.
Level and 3 hr Obs	- 6/10/85.
Bench Marks	- Three recovered (BM No. 1 1948, No. 2 1948, No. 3 1948). Two set (BMs 5182 A 1985, 5182 B 1985).
Gage/Water	- Primary = 19.3 ft (from BM 5182 A) - Backup = 20.1 ft.
Removal Date	- 8/24/85
Marigram Records	- Primary (6/10/85 - 8/24/85) lost 5 days of records from 7/5/85 @ 1930 UTC through 7/10/85 at 2030 UTC when the marigram paper ran out. Primary gage lost 7 days from 7/10/85 - 7/17/85 when the marigram paper jumped sprockets. - Backup (6/27/85 - 8/24/85)

On 6/26/85 it was discovered that the staff was destroyed and the orifice tubing on the backup gage (S/N 63A 2920) had separated. A second staff was installed and divers repaired the orifice tubing. The new staff was leveled to three benchmarks and three hour observations were done on both gages.

On 7/23/85 it was discovered that the second staff was destroyed. Both gages were still operating. A third staff was installed and on 7/31/85 was leveled to three benchmarks. A 1 hr observation was done on both gages.

On 8/11/85 it was discovered that the third staff was destroyed. Both gages were still operating. Levels were run to the waters edge for the remainder of the project.

The levels run on 8/22/85 to the waters edge suggested that the backup gage orifice may have moved during the period 8/14 - 8/22. The marigram during that period shows heavy storm action and the orifice may have moved to a position approximately 1 foot shallower. Final levels on 8/24/85 confirmed this difference.

KULUKAK POINT (946-5265)

Geographic Locale	- Kulukak Point, AK. 58-50.4 N, 159-38.8W
Installation Date	- 6/11/85
Gage Type	- Bristol Bubbler 0-30 ft scale, S/N 64A 11028.
Level and 3 hr Obs	- 6/12/85
Bench Marks	- Set 5 (BM's 5265 A 1985, 5265 B 1985, 5265 C 1985, 5265 D 1985, 5265 E 1985).
Gage/Staff	- 16.1 ft
Removal Date	- 8/24/85
Marigram Records	- Uninterupted records 6/12/85 - 8/7/85

On 6/25/85 it was discovered that 5 ft of the staff had broken off below the bottom bolt. The staff was secure and observations could still be made at low water by taping the distance to the water level from the lowest staff graduation.

Because of severe weather in the area this gage was not checked during August. On 8/24/85 the gage was removed. The staff was missing and the orifice tubing was broken. Final levels could not be run to the waters edge since the gage was not operating. Levels were run to the benchmarks only.

HAGEMEISTER ISLAND (946-5089)

Geographic Locale	- South end, Hagemeister Island, AK. 58-33.4 N, 160-57.0 W.
Installation Date	- Gage 6/21/85. - Staff 6/28/85.
Gage Type	- Two 0-30 ft scale Bristol Bubblers Primary S/N 64A 11042, Backup S/N 67A 16209.
Level and 3 hr Obs	- 6/29/85.
Bench Marks	- Set 5 (BM's 5089 A 1985, 5089 B 1985, 5089 C 1985, 5089 D 1985, 5089 E 1985)
Gage/Staff	- Primary 9.4 ft - Backup 9.1 ft.
Removal Date	- 8/23/85
Marigram Records	- Primary (6/29/85 - 8/14/85) bad records from 7/24/85 - 8/13/85 when marigram paper jumped sprockets. Lost records from 8/6/85 - 8/13/85. - Backup (6/29/85 - 8/14/85) lost 4 days from 7/20/85 - 7/24/85 when the gage timer drive gear disengaged. Lost records from 7/26/85 - 8/1/85 when marigram paper jammed. Lost records from 8/6/85 - 8/13/85.

In this location very strong currents and tidal surges were observed. The marigrams show these anomalies and combined with heavy surf in the area caused some difficulty in obtaining good staff/gage comparisons.

On 8/13/85 it was discovered that the tide station was completely destroyed. Gages, orifices, and staff were not found. New gage S/N 73A-231 was installed on this date. Levels were run to the waters edge and a 2 hour observation was performed. The gage/water constant (from BM 5089 C) = 12.6 ft. This gage ran for 13 hours before the tubing was broken by a severe storm. Final levels were run to benchmarks only.

NUSHAGAK PENINSULA (946-4961)

Geographic locale	- Southwest side Nushagak Peninsula, AK 58/31.4 N, 159/09.2 W
Installation date	- 6/24/85
Gage type	- Two 0-30 ft Bristol Bubblers Primary S/N 67A 10294 Backup S/N 68A 14940
Level and 3 hr Obs	- 6/27/85
Bench Marks	- Set 5 rod marks 6 ft into ground (BM's 4961 A 1985, 4961 B 1985, 4961 C 1985, 4961 D 1985, 4961 E 1985)
Gage/Water	- Primary = 20.3 ft (from BM 4961 A) - Backup = 25.4 ft
Removal Date	- 8/24/85
Marigram records	- Primary (6/27/85 - 8/7/85) lost 8 days from 7/24/85 - 7/31/85 when the marigram paper jammed. - Backup (6/27/85 - 8/7/85)

Because of high surf conditions and an unremarkable shoreline a tide staff could not be installed, therefore, levels were run to the waters edge. During the 3 hr observation the backup gage marigram had to be re-zeroed to ensure recording of minus tides. Three feet were added to the backup gage trace. The second half of the observation reflects the resetting of the trace.

On 6/27/85 it was discovered that the tubing had parted from the orifice on the backup gage (S/N 68A 14940). Divers repaired and secured the orifice tubing.

Scanning the marigram for the primary gage from 7/17/85 - 7/24/85 revealed that the orifice was clogged with sand. On 7/31/85 divers were sent to investigate this problem and it was discovered that the orifice tubing had recently ruptured. The tubing was repaired and the sand was cleared from the orifice and tubing.

On 8/11/85 both gages were found to be inoperative. The orifice tubing was broken and the orifices were covered by two feet of sand and could not be recovered. Due to weather conditions these gages were not re-installed.

LEVELS

The control station at Unalaska was leveled June 15, 1985. Final levels were run August 16, 1985. No problems were encountered with this station.

Final levels on the subordinate stations compared very well.

GAGES

Field comparisions were made using marigram data from each tide station and a predicted tide curve for Black Rock.

Based on Black Rock Predicted:

GAGE	TIME CORR.	RANGE RATIO
Black Rock	-30 min	1.1
Kulukak	-45 min	1.2
Nushagak	-70 min	1.2
Hagemeister	+60 min	0.7

These approximate values are based on a sample of five days taken during the period of the survey.

ZONING

It should be noted that the predicted tides supplied in the project instructions proved to be inadequate. Preliminary plots showed disagreements up to 2 fathoms in some areas of crosslines and splits. Predicted tides off Black Rock provided better agreement in these areas minimizing disagreements to 1 fathom. During this survey, all four stations were in operation. The Tides and Water Level Branch in Rockville will supply smooth tide correctors for this survey.

MISCELLANEOUS

At all four tide station locations the gages were exposed to open water and heavy surf conditions. Many times they were impossible to tend and went for extended periods without being checked.

In scanning the marigrams which had jumped sprocket holes special methods were needed to obtain accurate hourly heights. The large time errors were distributed linearly and heights had to be corrected by the amount that the sprockets missed the guide holes in the marigram paper.

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

SUPERSEDED 6/7/91

DATE: 04/09/86

Marine Center: Pacific

OPR: R-184

Hydrographic Sheet: H-10188

Locality: 10 miles south east of ~~Crooked~~ Round Island, Bristol Bay, AK

Time Period: July 21 - August 12, 1985

Tide Station Used: 946-5182 Black Rock, AK

Plane of Reference (Mean Lower Low Water): 20.29 ft.

Height of Mean High Water Above Plane of Reference: 9.0 ft.

Remarks: Recommended Zoning:

1) East of longitude 159°38.0' apply a -60 minute time correction and x0.92 range ratio to all heights.

2) West of 159°38.0' and east of 159°47.0' apply a -65 minute time correction and x1.03 range ratio to all heights.

3) West of longitude 159°47.0' apply a -70 minute time correction and x1.14 range ratio to all heights.

James R. Hubbard
Chief, Tidal Datum Quality
Assurance Section

ORIGINAL

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: June 7, 1991

MARINE CENTER: Pacific

OPR: R-184

HYDROGRAPHIC SHEET: H-10188 **(REVISED)**

LOCALITY: 10 Miles South of Crooked Island, Bristol Bay, Alaska

TIME PERIOD: July 21 to August 12, 1985

TIDE STATIONS USED: 946-5182 Black Rock, Alaska
Lat. 58° 42.5'N Lon. 160° 11.3'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 20.29 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 9.0 ft.

REMARKS: RECOMMENDED ZONING

Apply a -20 min. time correction and a x0.81 range ratio to Black Rock (946-5182).

Note: Times are tabulated in Greenwich Mean Time.

CHIEF, TIDAL DATUM QUALITY
ASSURANCE SECTION

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10188

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 1615 16011	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
BRISTOL BAY	X									1
ALASKA (Title)										2
										3
										4
										5
										6
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NOAA FORM 76-155 SUPERSEDES C&GS 197

10184

RECEIVED
OCT 31 1985
PACIFIC MARINE CENTER

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

NOAA Ship RAINIER
1801 Fairview Ave East
Seattle Wa. 98102

MOP 2,21

October 28, 1985

TO: N/MOP - Robert L. Sandquist

FROM: S221 - Carl W. Fisher

SUBJECT: Preprocessing Examination of H-10184

This memo addresses a question raised in the Preprocessing Examination of survey H-10184 concerning partial Raydist lane correctors. As pointed out in Section D.3 of the critique, discrepancies exist between the Raydist correctors listed in Section G. of the Descriptive Report and the correctors appearing on the Electronic Corrector Abstract.

RAINIER has determined that the corrector listing given in Section G. of the Descriptive Report is not valid. The proper correctors are as listed in the Electronic Corrector Abstract. Field records forwarded with the survey should confirm this.

The table listed in the Descriptive Report reflects preliminary correctors computed based on an unadjusted position of NUSHAGAK PENINSULA AZ MK, 1948. This station was used as the GREEN Raydist site, as well as a calibration signal. When the adjusted position of this station was determined the correctors were recomputed. The change was applied to the final tapes (as reflected by the Electronic Control Abstract) but was mistakenly omitted in the Descriptive Report listing. If further clarification is needed, RAINIER will provide assistance upon arrival in Seattle on November 14.

NOAA FORM 77-27(H)
(9-83)

U.S. DEPARTMENT OF COMMERCE

REGISTRY NUMBER H-10188

HYDROGRAPHIC SURVEY STATISTICS

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1 + 1	SMOOTH OVERLAYS: POS., ARC, EXCESS	5
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	2

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	2					
ENVELOPES						
VOLUMES	1					
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List): 16011 & 16315

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			3421
POSITIONS REVISED			2
SOUNDINGS REVISED			106
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	4.0		
VERIFICATION OF SOUNDINGS	40.0		
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	19.0		
COMPARISON WITH PRIOR SURVEYS AND CHARTS		11.5	11.5
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		27.0	27.0
GEOGRAPHIC NAMES			
OTHER* Digitizing			8.0
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	63.0	38.5	

Pre-processing Examination by Lt. S. Iwamoto	*Beginning Date* 10/1/85	*Ending Date* 10/3/85
Verification of Field Data by P. Niland, R. Shipley	*Time (Hours)* 63.0	*Ending Date* 5/14/86
Verification Check by J. Stringham, J. Green, B. Olmstead	*Time (Hours)* 33.5	*Ending Date* 6/10/86
Evaluation and Analysis by I. Almacen	*Time (Hours)* 38.5	*Ending Date* 6/3/86
Inspection by D. Hill	*Time (Hours)* 2.0	*Ending Date* 6/13/86

☆ U.S. GOVT. PRINTING OFFICE 1983: 764-006/6061

PACIFIC MARINE CENTER
EVALUATION REPORT
H-10188

1. INTRODUCTION

H-10188 was accomplished by NOAA Ship RAINIER in accordance with the following project instructions:

OPR-R184-RA-85 dated April 30, 1985

This is a basic hydrographic survey of an area in Bristol Bay, Alaska, located about ten miles southeast of Round Island. It is bounded by latitude 58°32'30"N to the north, latitude 58°25'00"N to the south, longitude 159°30'00"W to the east and longitude 159°56'00"W to the west. The bottom configuration is generally flat and composed mainly of sand and mud. Depths range from 9 to 20 fathoms.

The recommended preliminary tide correctors listed in section 5.9 of the project instruction were not used. Instead, the predicted tides used during field processing were based on the reference station at Nushagak Bay (Clarks Point), Alaska, corrected for subordinate station Black Rock, Walrus Island, Alaska. For further information, see section D of the hydrographer's report. The tide correctors used for the reduction of final soundings reflect approved hourly heights zoned from Black Rock, Walrus Island, Alaska.

The field plot parameters were revised to change the Modified Transverse Mercator projection to polyconic and to meet the size requirements for the smooth sheet. Corrections based on the antenna distance (ANDIST) of 32.2 meters have been applied to positional data during office processing. The revised data is listed in the smooth position and sounding printouts.

A digital file for this survey has been generated and includes categories of information required to comply with N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. Certain descriptive information, however, may not be included 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

Hydrographic control and positioning are adequately discussed in sections F and G of the hydrographer's report and in the Horizontal and Electronic Control Reports for OPR-R184-RA-85.

Horizontal control station positions used during hydrography are field and NGS published positions based on North American Datum of 1927.

There is no shoreline within the limits of this survey.

3. HYDROGRAPHY

Crossline soundings in general are in reasonably good agreement. However, differences of as much as 0.4 fathom exist in some parts of the survey. It was also noted that in some instances every other main scheme line differs in depths by about the same amount. These differences are probably related to the problem in determining consistent tide reduction values. No evidence could be found that would relate these differences to equipment or data processing deficiencies. In all cases, sounding agreement still conforms with NOS specifications. The 10-fathom depth curve is adequately drawn on this survey. The delineation of the bottom configuration and determination of least depths as well as the field investigation of AWOIS item #50884 are adequate.

4. CONDITION OF SURVEY

The hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change Three, except as noted in the Preprocessing Examination Report, dated October 15, 1985.

On this survey, portions of the digitized soundings were revised in the field to compensate for the effect of vessel motion due to the sea surface conditions. It was noted that the average crest-to-trough measurements of the heave generally varied from 0.5 to 1.0 fathom. At times it exceeded the recommended maximum value outlined in the Hydrographic Survey Guideline No. 31. However, because of the flatness of the bottom configuration in the area, it was determined that the graphic records could be scanned adequately. The hydrographer should be commended for this effort, involving tedious and subjective interpretation of graphic records to bring the field sounding data to an acceptable level of accuracy.

5. JUNCTIONS

H-10188 junctions to the south with contemporary survey H-10184. The junction has been adequately effected.

No junctions exist to the north, east and west of this survey; however, comparison with charted depths shows good agreement.

6. COMPARISON WITH PRIOR SURVEYS

H-7718 (1948) 1:100,000

The prior survey of 1948 is generally in good agreement. Soundings agree within 0.3 to 1.0 fathom.

H-10188 is adequate to supersede the prior survey within the common area.

7. COMPARISON WITH CHART

Chart 16011, 30th Edition, April 2, 1983, 1:1,023,188
Chart 16315, 1st Edition, March 9, 1985, 1:100,000 (Provisional)
Chart 16315, 2nd Edition, January 4, 1986, 1:100,000 (Preliminary)

a. Hydrography - Charted information on Chart 16315, (1st Edition) and Chart 16011 originate from the prior survey mentioned in the preceding section of this report, except for the reported shoal (AWOIS item 50884). A preliminary edition of chart 16315 (2nd Edition) was compiled by Marine Chart Branch (N/CG22), incorporating the field sounding data from this survey, to make a new edition available to users until the final chart is published. For further information, see section 1.7.1 of the Project Instructions and section L of the hydrographer's report.

AWOIS item 50884 was adequately investigated and the disposition is contained in section L of the hydrographer's report.

The geographic name appearing on the smooth sheet originates with these charts.

H-10188 is adequate to supersede charted hydrography within the common area.

There have been no dangers to navigation identified or reports submitted by the hydrographer or PMC Nautical Chart Branch for this survey.

b. Controlling Depths - There are no charted channels with controlling depths within the limits of this survey.

c. Aids to Navigation - There are no fixed or floating aids within the limits of this survey.

8. COMPLIANCE WITH INSTRUCTIONS

H-10188 adequately complies with the project instructions noted in section 1 of this report.

9. ADDITIONAL FIELD WORK

This is a good basic hydrographic survey and no additional field work is recommended.

Isagani A. Almacen
Cartographer

This survey has been examined and it meets Charting and Geodetic Services standards and requirements for use in nautical charting. The survey is recommended for approval.

Dennis Hill
Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-10188

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

6-23-86
Chief, Nautical Chart Branch (Date)

CLEARANCE: SIGNATURE AND DATE:

N/MOP2:LWMordock 6-23-86

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendations are forwarded with my concurrence.

6-23-86
Director, Pacific Marine Center (Date)

ADDENDUM
H-10188

Survey H-10188 has been revised. This revision consists of a recomputation of depths and heights based on the establishment of a new tidal datum. The revisions are displayed on a film overlay which is intended to supplement hydrographic information previously displayed on the smooth sheet. The latest Tide Note, documenting the new tidal datum, has been attached to the descriptive report. The completed revision plot has been inspected with regard to delineation of depth curves, depiction of critical depths, junctions, cartographic symbolization, comparison with prior surveys and the verification or disproval of charted features. The digital data have been completed and all revisions and processing have been entered into the magnetic tape record for this survey. A final sounding listing has been made and is included with the survey records. The revised data and records comply with NOS requirements for use in nautical charting.

Dennis Hill Date 1-29-92

Dennis J. Hill
Chief, Hydrographic Processing Unit
Pacific Hydrographic Section

I have reviewed the smooth sheet revision overlay and accompanying data. This overlay and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting.

Douglas G. Hennick Date 1/29/92

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

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Final Approval

Approved:

J. Austin Yeager Date 10/27/94

J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

N/CG242:LQ

May 12, 1987

TO: N/CG24 - Roy K. Matsushige

FROM: N/CG242 - George K. Myers, Jr.

SUBJECT: Examination of Hydrographic Survey H-10188 (1985), Alaska, Bristol Bay, Ten Miles Southeast of Round Island

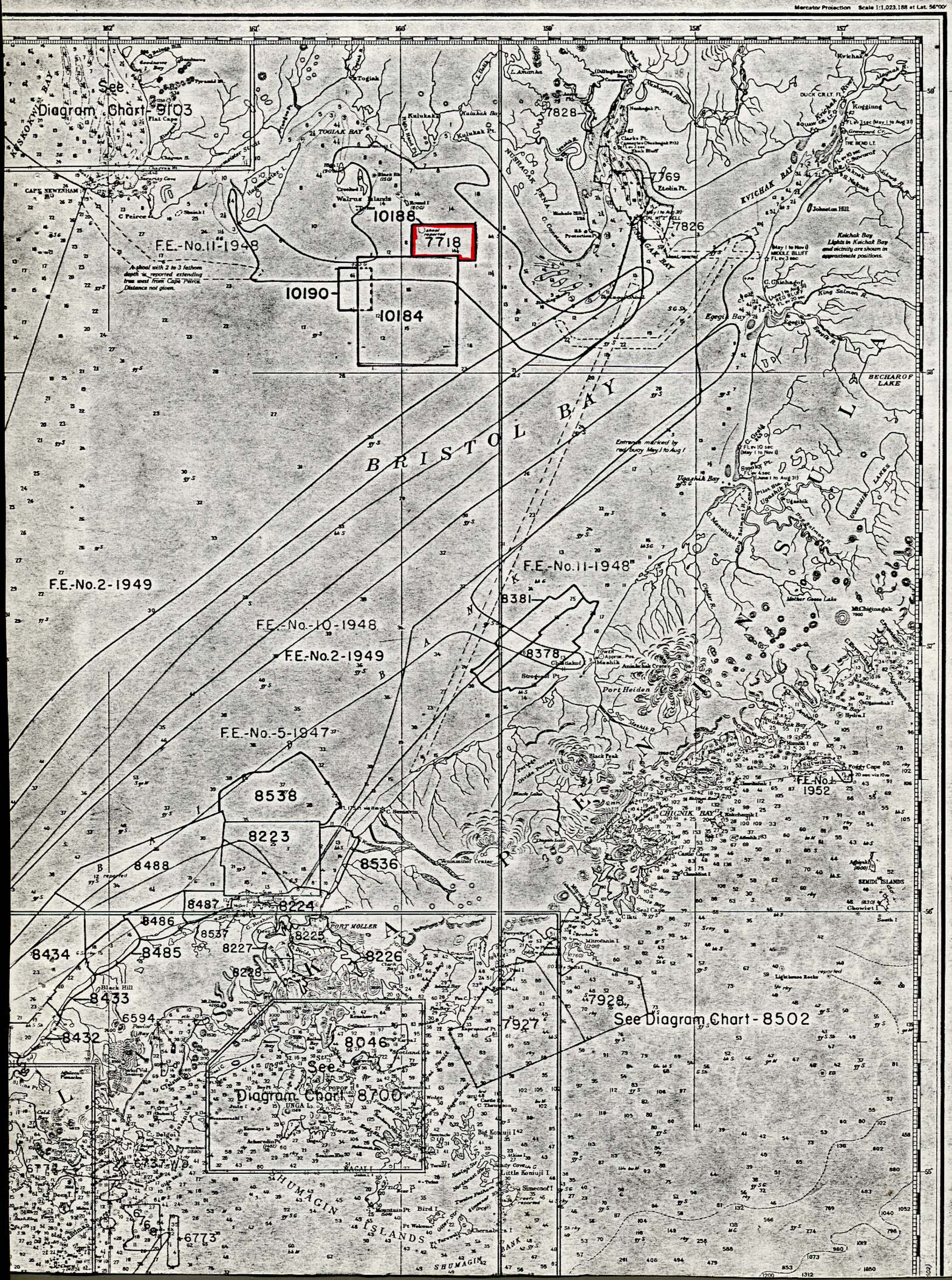
Chief of Party	J. P. Vandermeulen
Field Unit	NOAA Ship RAINIER
Processed by	Pacific Marine Center
Examined by	L. Quinlan

An examination of hydrographic survey H-10188 (1985) was accomplished to monitor the survey for adequacy with respect to data acquisition, conformance with applicable project instructions, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions made and actions taken by the evaluator, and the cartographic presentation of data.

Cartographic deficiencies and a constructive comment are noted on a ½-scale copy of the survey smooth sheet which will be forwarded to the marine center. Digital data on magnetic tape were not available during the examination of this survey. Therefore, an inspection of a graphic plot from the certified tape was not performed.

In general, the survey was found to conform to National Ocean Service standards and requirements except as stated in the Evaluation Report.

8802 No.3 (3 sheets)



NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10188

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
16315	10-21-87	Kevin Barthel	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 3
16011	3-14-89	Russell Kennedy	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 30 Applied through 16315
16006	3-21-90	John Pierce	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 26 Exam, NC through 16011
16315	9/24/92	Fannie B Powers	Full ~~Part Before~~ After Marine Center Approval Signed Via
(Overlay)			Drawing No. 8 No additional corrections.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.

Appd. To STD 8-25-86 psr