H10909

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. RA-20-06-99

Registry No. H-10909

LOCALITY

State Alaska

General Locality Cook Inlet, Navigation Corridors

Sublocality Redoubt Bay

1999

CHIEF OF PARTY

Commander Daniel R. Herlihy, NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28
(11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-10909

STRUCTIONS -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-20-06-99

State **Alaska**

General Locality **Cook Inlet, Navigation Corridors**

Sublocality **Redoubt Bay**

Scale **1:20,000** Date of Survey **7/16/99-8/19/99**

Instructions Date **June 8,1999** * Project No. **OPR-P342-RA**

Vessel **RA-1(2121), RA-3(2123), RA-6(2126), RAINIER (2120)**

Chief of Party **Commander Daniel R. Herlihy, NOAA**

Surveyed by **RAINIER Personnel**

Soundings taken by echo sounder, hand lead, pole **Knudsen 320M, RESON 8101MB**

Graphic record scaled by **RAINIER Personnel**

Graphic record checked by **RAINIER Personnel**

Evaluation by **I. Almacen** Automated plot by **HP Design Jet 750c**

Verification by **E. Domingo, R. Davies, G. Nelson, R. Mayor**

Soundings in **Fathoms** at **MLLW**

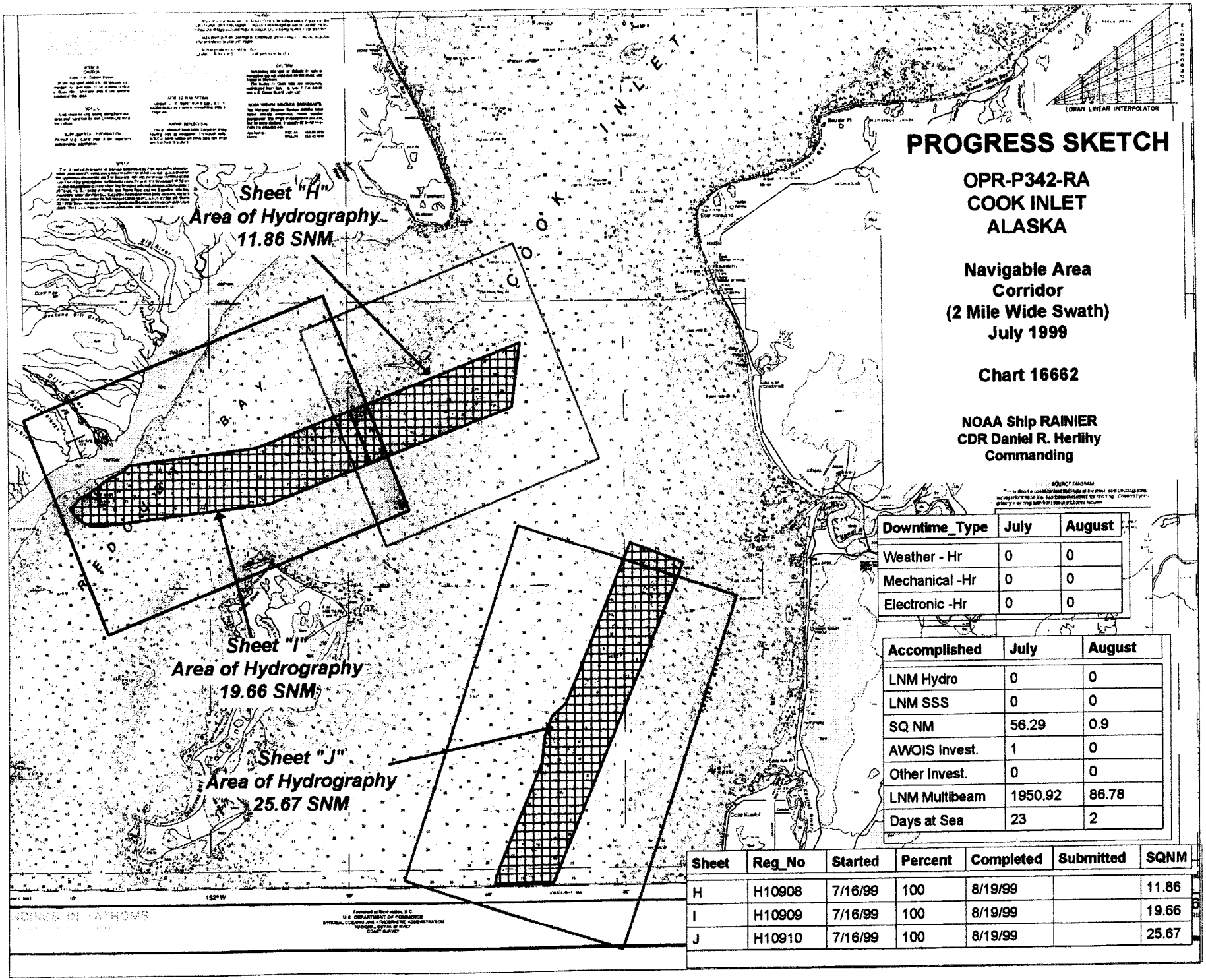
REMARKS: **Time in UTC. Revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.**

All depths listed in this report are referenced to mean lower low water unless otherwise noted.

*** Change #1- July 26, 1999**

AWOIS / SURF 11/14/00
mcR

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537U.S. GOVERNMENT PRINTING OFFICE: 1986 - 652-007/41215



PROGRESS SKETCH

OPR-P342-RA
COOK INLET
ALASKA

Navigable Area
Corridor
(2 Mile Wide Swath)
July 1999

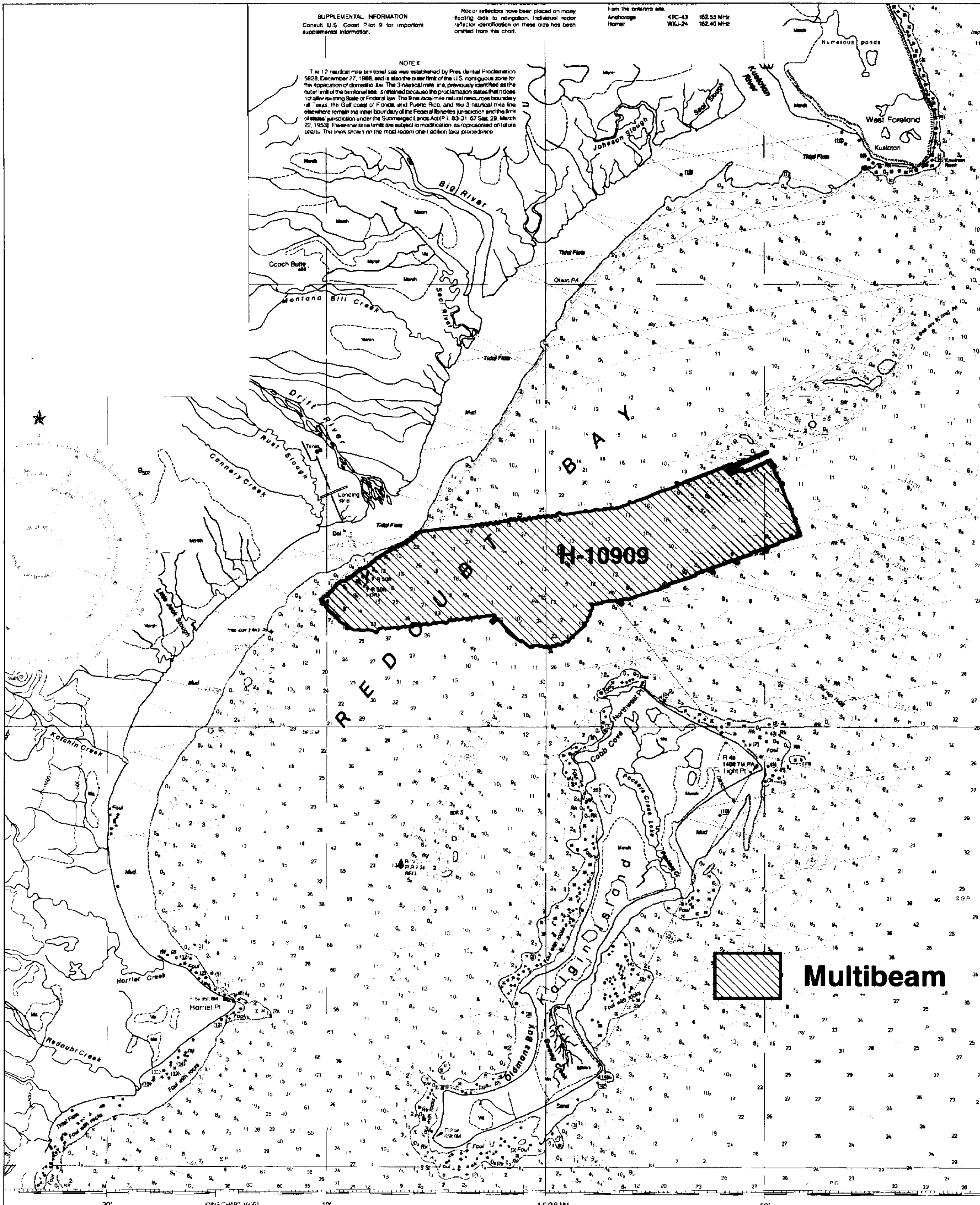
Chart 16662

NOAA Ship RAINIER
CDR Daniel R. Herlihy
Commanding

Downtime_Type	July	August
Weather - Hr	0	0
Mechanical -Hr	0	0
Electronic -Hr	0	0

Accomplished	July	August
LNM Hydro	0	0
LNM SSS	0	0
SQ NM	56.29	0.9
AWOIS Invest.	1	0
Other Invest.	0	0
LNM Multibeam	1950.92	86.78
Days at Sea	23	2

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
H	H10908	7/16/99	100	8/19/99		11.86
I	H10909	7/16/99	100	8/19/99		19.66
J	H10910	7/16/99	100	8/19/99		25.67



SOUNDINGS IN FATHOMS

...signed to promote safe navigation. The National ... to submit corrections, additions, or comments for ... Marine Chart Division (N/CS2), National Ocean ... ryland 20910 - 3282.

Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST SURVEY

Descriptive Report to Accompany Hydrographic Survey H10909

Field Number RA-20-06-99
Scale 1:20,000
July-August 1999
NOAA Ship RAINIER
Chief of Party: Commander Daniel R. Herlihy, NOAA

A. PROJECT ✓

This navigable area survey was completed as specified by the Draft Standing Project Instructions dated April 6, 1999 and Hydrographic Survey Letter Instructions OPR-P342-RA dated June 08, 1999, amended July 26, 1999 (change number 1). Survey H10909 corresponds to Sheet I as defined in the sheet layout.

This project is being conducted in response to requests from the Southwest Alaska Pilot's Association for full bottom coverage hydrographic surveys of a navigation corridor in Cook Inlet and specifically the approaches to Nikiski. Heavy marine traffic including deep draft tankers, liquid nitrogen gas (LNG) tankers, ammonia tankers, bulk vessels, container vessels, and barges transit this area. With the use of shallow water multibeam systems, it is the intent of this survey to provide modern and accurate full-coverage hydrographic survey data to supersede prior surveys performed from 1967 through 1976 in an effort to update NOS Charts of the area.

B. AREA SURVEYED. (See EVAL RPT. Sec B)

The survey area is located Redoubt Bay in Cook Inlet, Alaska, and covers approximately 20 square nautical miles of a navigation corridor. The survey limits are depicted below in Figure 1 on a detail of Chart 16660. The survey's northern limit is latitude 60°38'32"N and the southern limit is latitude 60°34'19"N. The survey's western limit is longitude 151°49'59"W and the eastern limit is longitude 151°37'42"W. Data acquisition was conducted from July 16 to August 19, 1999 (DN 197 to 231).

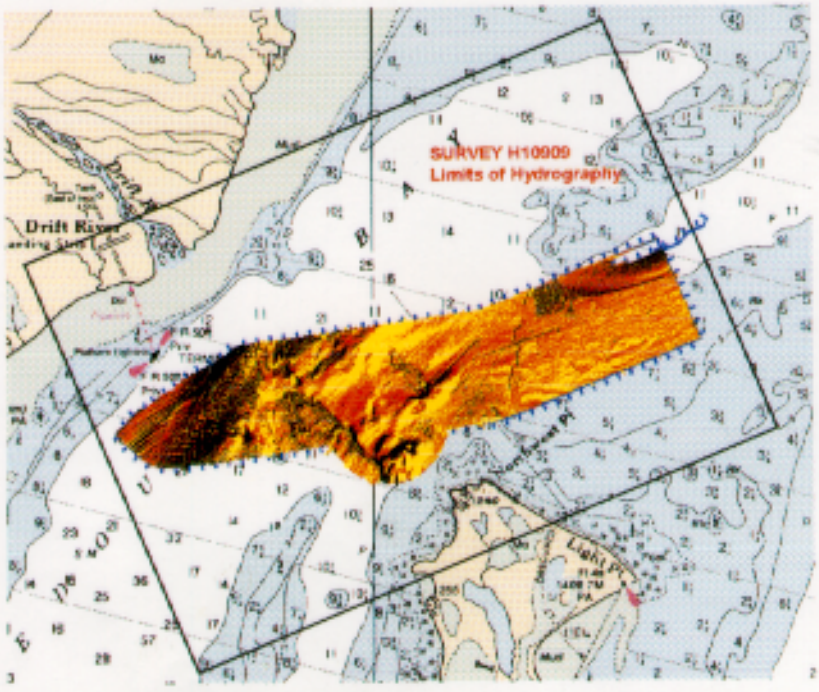


Figure 1: Limits of Hydrography for Survey H10909

C. SURVEY VESSELS ✓

Data were acquired by RAINIER (VN 2120) and her survey launches (vessel numbers 2121, 2123, and 2126) as noted in the Survey Information Summary included with this report. Vessels 2121, 2123, and 2126 were used exclusively for the acquisition of shallow water multibeam data and sound velocity profiles, while vessel 2120 was used to collect bottom samples. See the Project Related Data for OPR-P342-RA-99 for vessel descriptions. No unusual vessel configurations or problems were encountered during this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Coastal Oceanographic's HYPACK version 8.9 was utilized for vessel navigation and line tracking during acquisition of shallow water multibeam (SWMB) data.

Shallow water multibeam (SWMB) echosounder data were acquired using the Reson SeaBat 8101 with Triton Elics ISIS version 4.32 and processed using CARIS HIPS software version 4.3.

Reson 8101 depth data were reviewed with CARIS Hydrographic Data Cleaning System (HDCS). Depth fliers were identified and manually flagged as "rejected". Vessel positioning and attitude data from each system were similarly displayed and manually cleaned. Additionally, instantaneous speed as computed from the positioning data was checked for speed jumps exceeding 3 knots as an indication of potential position fliers. For this survey, all soundings beyond a maximum angle of 60° off nadir were rejected in an attempt to reduce the noise and refraction errors observed in these outer beams.

After review and cleaning, Reson 8101 depth, position and attitude data were merged with sound velocity, verified tide and dynamic draft correctors to compute the corrected depth and position of each sounding. Processed soundings were read into a CARIS Workfile by selecting shoal-biased "line-by-line" binning at two densities; one at 5-m x 5-m, the other at 1.5-mm x 1.5-mm at survey scale. The former was used to create digital terrain models (DTMs) which were used to demonstrate multibeam coverage and perform multibeam quality-assurance, while the latter was used to export soundings into HPS through HPTools. Soundings were corrected using verified tides fully adjusted using HP Tools for the MapInfo tidal zoning scheme provided with the project files. Processed soundings were excessed using a 3-mm character size, and plotted at a 2-mm character size to produce the final sounding plot. Final selected soundings were saved and plotted in MapInfo. Raster images registered in MapInfo facilitated chart and prior survey comparisons.

Survey H10909 is defined as sheet 02 in HPS. The CARIS workfile name is defined as "cook_i", and the project name is identified as "P342_SheetI" in HDCS.

All final plots were created in MapInfo using UTM Zone 5 projection.

A complete listing of software is included in Appendix H.* Data flow diagrams are included in Appendix G.*

E. SONAR EQUIPMENT ✓

Side Scan Sonar (SSS) equipment was not used on this survey. Concur. However, it should be noted that the Reson SeaBat 8101 SWMB system provides a low-resolution digital SSS record of the SWMB swath. This SSS imagery is primarily used during final processing of SWMB depth data to aid in determining whether anomalous soundings are true features or noise. Side-scan sonar imagery from the SeaBat 8101 was also used to aid in the search for assigned AWOIS items.

* Filed with the hydrographic data.

F. SOUNDING EQUIPMENT ✓

One category of echosounder system was used to acquire and record sounding data and is described below.

Launch Shallow Water Multibeam (VN 2121, 2123, and 2126) ✓

The shallow water multibeam (SWMB) system utilized for this survey was the Reson SeaBat 8101, which is a 240 kHz multibeam system that measures relative water depths across a wide swath perpendicular to the vessel's heading. The Reson 8101 ensonifies the seafloor with a 150° swath, consisting of 101 individual 1.5° x 1.5° beams. A TSS POS/MV Position and Orientation Sensor was used to correct for the effects of vessel motion during survey operations. Serial numbers for the Reson 8101 and POS/MV are included in Appendix H. *

It should be noted that vertical beam echosounders (VBES) were utilized as a quality assurance tool for SWMB. Vessels 2121, 2123 and 2126 are equipped with the Knudsen 320M, which is a dual frequency (100 kHz, 24 kHz) digital recording echosounder with an analog paper trace. Sounding data acquired by this system were used for two purposes. First, VBES depth data were compared in real time to nadir beams of the shallow water multibeam. A digital comparison between the two is displayed within the ISIS interface. Second, during acquisition digital VBES data is sent to ISIS, which then focuses the shallow water multibeam on a variable "gate" determined from the VBES data. The latter is extremely helpful in areas of extreme relief, when the shallow water multibeam tends to lose bottom lock. VBES data were not recorded or used for final sounding plot compilation, and are not submitted with the digital data. VBES serial numbers are included in Appendix H. *

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Water Level Correctors ✓

Soundings were reduced to Mean Lower-Low Water (MLLW) using verified tide data for station Nikiski, AK (945-5760) obtained from the Center for Operational Oceanographic Products and Services (CO-OPS) web site. These data were used in creating HPS tide table #1 and were also used in CARIS. All tide correctors were fully adjusted for the MapInfo tidal zoning scheme supplied with the project files.

Listings of HPS tide tables used for H10909 and tidal correctors as provided in the Project Instructions for H10909 are contained in the Survey Information Summary included with this report.

The operating National Water Level Observation Network (NWLON) tide stations at Nikiski, Alaska (945-5760) and Anchorage, Alaska (945-5920) will serve as control for datum determination. RAINIER personnel installed a Sutron 8200 tide gauge at North Kalgin Island (945-5732) on July 15, 1999 and at Cape Kasilof (945-5711) on July 19, 1999. The North Kalgin Island gauge was removed on August 19, 1999. The NOAA contractor Terra Surveys, LLC removed the Cape Kasilof gauge during the week of August 30, 1999. Refer to the Field Tide Notes and supporting data in Appendix D* for individual gauge performance and level closure information.

Raw water level data from these gauges were forwarded to N/OPS1 on September 2, 1999 in accordance with HSG 50 and FPM 4.7. The Pacific Hydrographic Branch will apply final approved (smooth) tides to the survey data during final processing. A request for delivery of final approved (smooth) tides to the Pacific Hydrographic Branch was forwarded to N/OPS1 on September 3, 1999 in accordance with FPM 4.8.

Approved Tide Data dated December 22, 1999 is attached to this report.

* Filed with the hydrographic data.

Sound Velocity Correctors ✓

The velocity of sound through water was determined by a minimum of one cast every four hours of acquisition in accordance with the Draft Standing Project Instructions. Cast information is included in the Survey Information Summary and in Appendix I.*

The sound velocity casts were acquired with SBE SEACAT Profilers (S/N 2543 and 2477). Calibration dates and reports are included with the Project Related Data for OPR-P342-RA-99. Velocity correctors were computed using the program VELOCWIN version 4 beta 2, which generates correction tables for both CARIS and HPS. Sound velocity correctors were applied in CARIS during post processing.

Settlement and Squat and Static Draft Correctors ✓

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

Vessel No.	Date of Static Draft and Transducer Offset Measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2121	March 1999	OTF	March 1999	Port Angeles, WA
2123	March 1999	OTF	March 1999	Port Angeles, WA
2126	March 1999	OTF	March 1999	Port Angeles, WA

Settlement and squat correctors, static draft measurements and vessel offsets are included with the Project Related Data for OPR-P342-RA. *

Heave, Pitch, Roll and Heading, Including Biases and Navigation Timing Errors ✓

SWMB launches (VN2121, 2123 and 2126) utilize a TSS POS/MV Model 320 Position and Orientation System (POS), which provides accurate navigation and attitude data to correct for the effects of heave, pitch, roll and heading. The POS generates attitude data in three axes (roll, pitch and heading) to an accuracy of 0.05° or better. Heave measurements supplied by the POS maintain an accuracy of 5% of the measured vertical displacement for movements that have a period of up to 10 seconds. The POS delivers heading measurements by two distinct methods. First, the Dynamic Heading Alignment determines the vessels heading by using the data supplied by the Internal Measurement Unit (IMU) and GPS receivers to achieve heading that is, at best, accurate to within 0.35°. This method suffers from drift but is relatively unaffected by noise. Second, the GPS Azimuth Measurement System (GAMS) determines the geographic vector between two GPS antennas fixed to the vessel by comparing the phase of satellite signals they receive. The error from this method is largely due to noise, but exhibits no drift. The POS uses the advantages of each method to compensate for the disadvantages of the other to arrive at an optimal accuracy of 0.05°. Serial numbers are located in Appendix H. *

SWMB launches Vessel Configuration Files (VCF) were created within the CARIS program VCFEDIT, and applied to the sounding data during processing. Prior to beginning SWMB data acquisition, the launch CARIS Vessel Configuration Files were updated to define the physical relationship between the various components that comprise the systems, including the transducer head, TSS motion sensor and POS/MV positioning system. In addition, these offset files contain heave, roll and pitch biases determined during patch tests conducted at Port Angeles, WA on March 26-28, 1999 for vessels 2123 and 2126, and at Shilshole, WA on July 7, 1999 for vessel 2121. Copies of the Vessel Configuration Files are contained in the Project Related Data for OPR-P342-RA-99, and the VCF's themselves are included with the digital HDCS data. *

* Filed with the hydrographic data.

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

The horizontal datum for this project is NAD 83. All soundings were positioned with differential GPS (DGPS) using USCG beacons located at Kenai, AK (Beacon ID 896) and Kodiak, AK (Beacon ID 897).

Launch to launch DGPS performance checks were conducted in accordance with Section 3.2 of the FPM. Differential corrections from USCG reference stations were received by the independent launch positioning systems as they were rafted together with their GPS antennae 2-3 meters apart. Copies of DGPS performance checks are included in the Project Related Data for OPR-P342-RA-99. *

I. SHORELINE ✓

This is an offshore project. Shoreline shown in brown on the final field sheet is for orientation purposes only and originates from NOS Chart 16662.

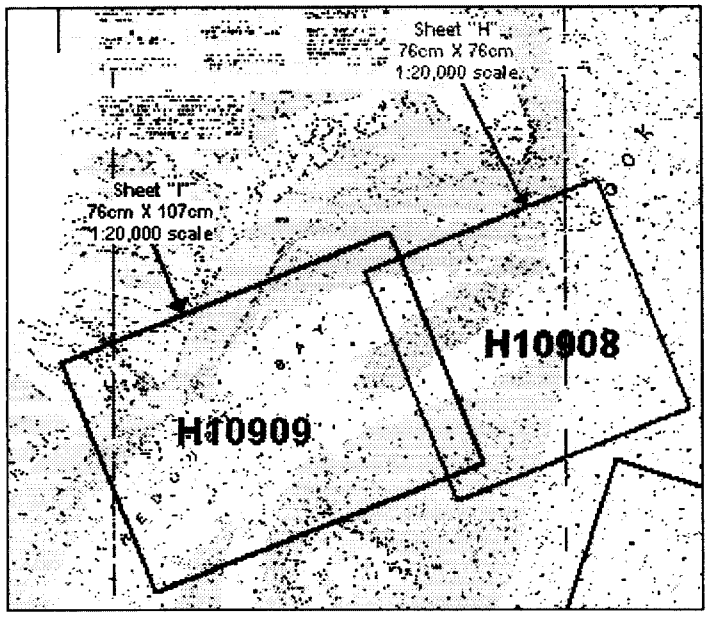
J. CROSSLINES ✓

There were a total of 27.48 nautical miles of multibeam crosslines, comprising 3.7% of mainscheme hydrography. The Quality Control Report (CARIS HIPS) for the checkline file averaged 97.89% across all beams, with a depth tolerance of 0.023. See Appendix E for the detailed report. *

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

The following contemporary survey junctions with H10909 and is shown in Figure 2.

Registry #	Scale	Date	Junction side
H10908	1:20,000	1999	Northeast ✓



✓

Figure 2. Junction Survey

* Filed with the hydrographic data.

All soundings from this survey agreed within one fathom of neighboring soundings from H10908. Contour lines also matched well. (Except along the area of the shoal on the northeast limit of the survey where significant change was noted.

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

In accordance with correspondence from N/CS3 dated September 3, 1999, no prior survey comparisons were required. A copy of the electronic mail message is included in ~~Appendix I.~~ this report.

PRIOR SURVEYS: H-8964 (1967 & 1974), 1:20,000
H-9620 (1976), 1:20,000

M. ITEM INVESTIGATIONS

There was one AWOIS item within the assigned survey area, which is described below.

AWOIS 52442 ✓

1. **Area of Investigation:**

AWOIS Number:	52442 ✓
State and Locality:	Redobut Bay, AK
Reported Position:	Latitude: 60/32/55.2N
	Longitude: 152/00/08.8W
	Datum: NAD83
Type of Feature:	Submerged wreck (PA)
Reported Depth:	Not listed

2. **Description and Source of Item:** ✓

NM51/62 & LNM48/62 (17CGD) – REPORTS A 57-FOOT FISHING VESSEL HAS BEEN REPORTED SUNK IN APPROXIMATELY 60/33N. 152/00 W (NAD 27). ✓

3. **Survey Requirements:** Shallow-water multibeam, 200% side-scan sonar, echo-sounder development, dive investigation, salvage documentation. 2000-meter search radius.

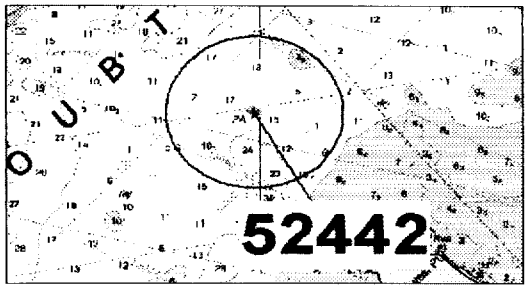
4. **Method of Investigation:** The entire search radius was covered with 100% SWMB

5. **Results of Investigation:** No wreck was noticed in either the SWMB sounding data or accompanying side-scan sonar imagery.

6. **Comparison with Prior Surveys:** Not required (refer to section L).

7. **Comparison with the Chart and Charting Recommendation:** Charts 16660 and 16662 depict a wreck at the reported position. The Hydrographer recommends deleting the wreck from all charts. CONCUR

8. **Evaluator Comments:** Chart the area based on the present survey.



✓

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

Survey H10909 was compared to the following charts:

Chart	Scale	Edition Number	Date	Datum
16013	1:969761	27th	September 6, 1997	NAD 83
16660	1:194154	27th	April 19, 1997	NAD 83
16662	1:100000	5th	July 5, 1997	NAD 83

✓

Survey H10909 generally agreed within one fathom of chart 16662 with the following exceptions:

In an area approximately two nautical miles southeast of the mouth of the Drift River, survey soundings ranged from two fathoms deeper to two fathoms shoaler than charted soundings. This is likely a result of shifting sedimentation from the river. The area was covered with 100% SWMB. Concur.

Soundings of 14 to 17 fathoms were obtained in the vicinity of a 19-fathom depth charted at 60°34'25.18" N, 152°03'28.18" W. Inspection of the DTM reveals numerous sand waves in this area, which may account for the change. The area was covered with 100% SWMB. concur.

In the northeastern-most area of the survey, a shoal area, which uncovers at MLLW, was discovered in the vicinity of charted 6- to 8-fathom depths. This shoal appears to be an extension of a charted shoal centered at 60°36'31.2" N, 151°50'44.57" W. Although the shoal was not fully covered by this survey, the Hydrographer estimates that the shoal extends several hundred meters north and west of the surveyed shoal area, and therefore recommends revising the chart to depict the charted shoal connected with the surveyed shoal area.

Soundings between 7 and 9 fathoms were obtained in the vicinity of a 5-fathom 3-foot depth charted at 60°35'30.5" N, 151°51'11.17" W. This is near the shoal area referenced above. The area was covered with 100% SWMB.

Survey H10909 generally agreed within one fathom of chart 16660, with the same exceptions noted in the comparison with chart 16662.

Because of the small scale of chart 16013, a practical comparison was not possible.

Dangers To Navigation ✓

Six dangers to navigation were discovered during the survey and reported to the Seventeenth Coast Guard District on October 9, 1999. Refer to Appendix I for more information

A shoal which uncovers was reported at 60° 35' 54.84"N, 151° 50' 11.86"W (Pos. # 116543). Chart 16662 shows a 7-fathom 5-foot depth near this position. This is near the shoal discussed previously in the chart comparison.

A 1~~8~~4-fathom shoal was discovered at 60° 35' 50.77"N, 151° 51' 33.43"W (Pos. #102750). Chart 16662 shows a 6-fathom 5-foot depth near this position.

A 6~~9~~7-fathom shoal was discovered at 60° 35' 13.34"N, 151° 54' 33.79"W (Pos. #150135). Chart 16662 shows an 11-fathom depth near this position.

A 9~~8~~4-fathom shoal was discovered at 60° 33' 44.91"N, 151° 54' 29.57"W (Pos. #99107). Chart 16662 shows an 11-fathom depth near this position.

A 9.9-fathom shoal was discovered at 60° 33' 28.36"N, 151° 56' 14.16"W (Pos. #99405). Chart 16662 shows 11-fathom and 13-fathom depths in the vicinity.

A 9.9-fathom shoal was discovered at 60° 33' 30.16"N, 151° 55' 20.95"W (Pos. #95434). Chart 16662 shows an 11-fathom depth near this position.

O. ADEQUACY OF SURVEY (See EVAL RPT, Sec. P)

Survey H10909 is complete and adequate to supersede prior surveys in their common areas. One hundred percent shallow-water multibeam coverage was obtained within the survey limits. Concur, with the exception of the shoal area that was not fully covered during this survey.

P. AIDS TO NAVIGATION ✓

Two Lights were located within the survey limits, on a fuel pier at the southwest corner of the survey area. They were positioned using DGPS on DN202 with launch 2123 (Pos. #32299 and 32300). Their positions were compared to chart 16662. The lights are accurately charted, and serve their intended purpose. Concur.

Q. STATISTICS ✓

Refer to the Survey Information Summary attached to this report.

R. MISCELLANEOUS ✓

Extensive bottom sampling was not conducted since the project area has been surveyed previously and the characteristics had been determined adequately. Random samples were taken to verify that changes have not occurred. The acquired samples did not indicate areas of significant change, which would have warranted additional sampling. The Hydrographer recommends retaining bottom characteristics as depicted on the chart. Bottom samples were not sent to the Smithsonian in accordance with the Project Instructions.

Strong tidal currents were found during this survey. Several large logs and other debris were found floating predominantly in the shoal area at the northeast end of survey. ✓

S. RECOMMENDATIONS ✓

None.

T. REFERRAL TO REPORTS ✓

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

Title	Date Sent	Office
OPR-P342-RA 1999 Coast Pilot Report	TBA	N/CS26
Project Related Data for OPR-P342-RA	September 17, 1999	N/CS34

Respectfully Submitted,

E. J. VanDeCar

for Daniel K. Karlson
Ensign, NOAA
Junior Officer

Approved and Forwarded,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Survey Information Summary

Project: OPR-P342-RA **Project Name:** COOK INLET NAVIGATION CORRIDORS

Instructions Dated: 6/8/99

Project Change Info:

Change #	Dated
1	7/26/99

Sheet Letter: I **Registry Number:** H-10909

Sheet Number: RA-20-06-99

Survey Title: Redoubt Bay

Data Acquisition Dates: **From:** 16-July-99, DN197 **To:** 19-Aug-99, DN231

Vessel Usage Summary

VN	SWMB	DP	BS
2120			5
2121	152.32		
2123	166.19	2	
2126	451.03		
Total:	**769.54**	**2**	**5**

Tide Gauge Information

Tide Gauge #	Gauge Name	Installed	Removed
945-5732	NORTH KALGIN	7/15/99	8/19/99
945-5711	CAPE KASILOF	7/18/99	8/19/99

Tide Zone Information

Zone #	Time Corr.	Height Corr.
CK 422	0 hr 36 min	X 0.88
CK 445	0 hr 30 min	X 0.89
CK 446	0 hr 30 min	X 0.88
CK 448	0 hr 24 min	X 0.89
CK 449	0 hr 24 min	X 0.9
CK 470	0 hr 18 min	X 0.9
CK 471	0 hr 18 min	X 0.89

List of Horizontal Control Stations

NAME	year established	ellipsoidal height	STATE	TYPE	LATITUDE	LONGITUDE	SITE ID	source of position
KENAI	n/a	n/a	AK	USCG Beacon	60 40.100 N	151 21.000 W	896	USCG
KODIAK	n/a	n/a	AK	USCG Beacon	57 37.100 N	152 11.600 W	897	USCG

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER

October 9, 1999

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

ADVANCE INFORMATION

Dear CDR Hamblett:

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10909 in Cook Inlet, Alaska, in July-August, 1999. The dangers are shown graphically on the attached chartlet.

The following dangers to navigation affect the following charts:

Chart	Scale	Edition	Date
16660	1:194,154	27th	19-Apr-97
16662	1:100,000	5th	5-Jul-97

The positions are on the NAD 83 datum and depths have been corrected to Mean Lower Low Water.

Feature	Depth (fm)	Latitude (N)	Longitude (W)	Depth (m)
Shoal	Uncovers	60-35-54.84	151-50-11.86	-
Shoal	1.5	60-35-50.77	151-51-33.43	2.7
Shoal	6.9	60-35-13.34	151-54-33.79	12.5
Shoal	9.6	60-33-44.91	151-54-29.57	17.5
Shoal	9.9	60-33-28.36	151-56-14.16	18.1
Shoal	9.9	60-33-30.16	151-55-20.95	18.1

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P342-RA-99 and Danger to Navigation message RA-16-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

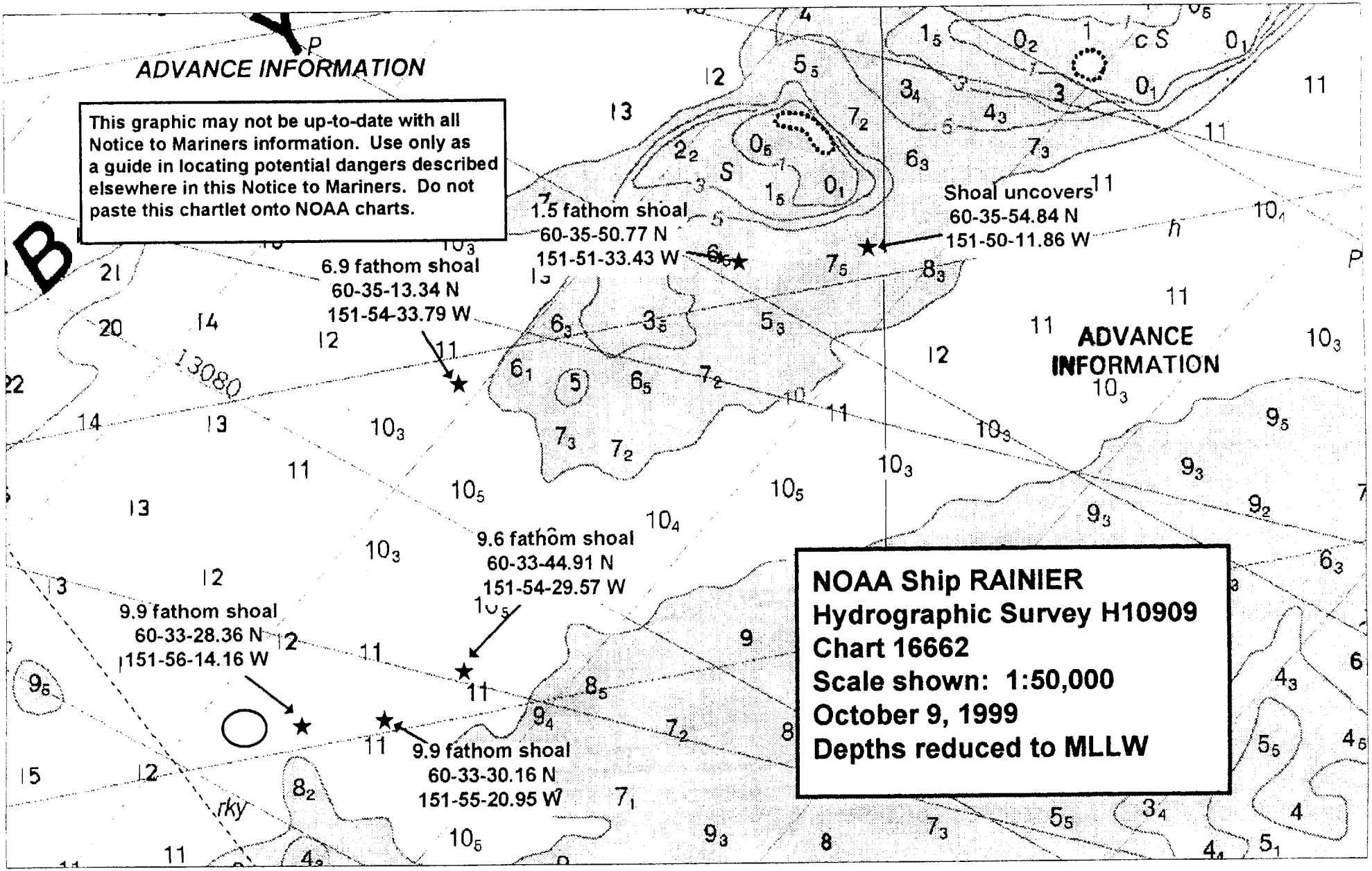
Sincerely,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Attachment

cc: NIMA N/CS261
PMC N/CS34


ADVANCE INFORMATION
This graphic may not be up-to-date with all Notice to Mariners information. Use only as a guide in locating potential dangers described elsewhere in this Notice to Mariners. Do not paste this chartlet onto NOAA charts.
1.5 fathom shoal
60-35-50.77 N
151-51-33.43 W
Shoal uncovers
60-35-54.84 N
151-50-11.86 W
6.9 fathom shoal
60-35-13.34 N
151-54-33.79 W
ADVANCE INFORMATION
9.6 fathom shoal
60-33-44.91 N
151-54-29.57 W
9.9 fathom shoal
60-33-28.36 N
151-56-14.16 W
9.9 fathom shoal
60-33-30.16 N
151-55-20.95 W
NOAA Ship RAINIER
Hydrographic Survey H10909
Chart 16662
Scale shown: 1:50,000
October 9, 1999
Depths reduced to MLLW

ADVANCE INFORMATION

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10909 in Cook Inlet, Alaska, in July-August, 1999. The dangers are shown graphically on the attached chartlet.

The following dangers to navigation affect the following charts:

16660 (scale 1:194,154, 27th edition, 19-Apr-97)
16662 (scale 1:100,000, 5th edition, 5-Jul-97)

The positions are on the NAD 83 datum and depths have been corrected to Mean Lower Low Water.

Feature: Shoal
Depth: Uncovers
Latitude: 60-35-54.84 N
Longitude: 151-50-11.86 W

Feature: Shoal
Depth: 1.5 fathoms
Latitude: 60-35-50.77 N
Longitude: 151-51-33.43 W

Feature: Shoal
Depth: 6.9 fathoms
Latitude: 60-35-13.34 N
Longitude: 151-54-33.79 W

Feature: Shoal
Depth: 9.6 fathoms
Latitude: 60-33-44.91 N
Longitude: 151-54-29.57 W

Feature: Shoal
Depth: 9.9 fathoms
Latitude: 60-33-28.36 N
Longitude: 151-56-14.16 W

Feature: Shoal
Depth: 9.9 fathoms
Latitude: 60-33-30.16 N
Longitude: 151-55-20.95 W

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P342-RA-99 and Danger to Navigation message RA-16-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

Lotus cc:Mail for FOO Rainier

Date: 9/3/99
Sender: Don.Haines@noaa.gov (Don Haines)
To: FOO Rainier
Priority: Normal
Subject: Comparision with Priors

Gentlemen:
RA has requested that relieved of the duty of performing prior comparisions for the Cook Inlet and Kodiak Projects, since the surveys were nav area and 100% multibeam. I discussed this with Dennis and we agree to relieve RA of this for these two projects.

As this subject involves several different variables, it should be discussed at the board meeting to allow consistancy between both coasts and contracts.

Don

APPROVAL SHEET

for

H10909

RA-20-06-99

Standard field surveying and processing procedures were followed in producing this survey in accordance with the NOS Hydrographic Surveys Specifications and Deliverables; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998.

The field sheet and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and Forwarded,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer
NOAA Ship RAINIER

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10909

Name on Survey	A ON CHART NO. 16660, 16662	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	
ALASKA (title)	X		X							1
COBB~~S~~ COVE (GAM 11/29/00)	X		X							2
COOK INLET	X		X							3
DRIFT RIVER (ppl)	X									4
DRIFT RIVER	X		X							5
KALGIN ISLAND	X		X							6
REDOUBT BAY	X		X							7
										8
										9
										10
NORTHWEST PT (GAM 11/29/00)	X									11
										12
										13
										14
										15
										16
										17
										18
										19
										20
										21
										22
										23
										24
										25

Dennis J Romesburg
JAN 24 2000

NOAA FORM 76-155 SUPERSEDES C&GS 197

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: December 22, 1999

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P342-RA-99
HYDROGRAPHIC SHEET: H-10909

LOCALITY: Redoubt Bay, AK

TIME PERIOD: July 16 - August 19, 1999

TIDE STATION USED: 945-5732 North Kalgin Island, AK
Lat. 60° 30.5'N Lon. 151° 56.8'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.460 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: CK449, CK450, CK458, CK459, CK460, CK461, CK462, CK463, CK487, CK488, CK507, CK508, CK509 & CK512.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Greenwich Mean Time.

Note 2: Nikiski, AK served as datum control for subordinate tide stations and for tidal zoning in this hydrographic survey. Accepted datums for this station have been updated recently and have changed significantly from previous values.

The current National Tidal Datum Epoch (NTDE) used to compute tidal datums at tide stations is the 1960-78 NTDE. Traditionally, NTDEs have been adjusted when significant changes in mean sea level (MSL) trends were found through analyses amongst the National Water Level Observation Network (NWLON) stations. Epochs are updated to ensure that tidal datums are the most accurate and practical for navigation, surveying and engineering applications and reflect the existing local sea level conditions. For instance, analyses of sea level trends show that a new NTDE is necessary and efforts are underway to update the 1960-78 NTDE to a more recent 19-year time period. However, analyses also show that there are several geographic

areas whose sea level trends are strongly anomalous from the average trends found across the NWLON and thus, must be treated differently. One of these areas is in Cook Inlet, Alaska. Nikiski has shown a significant relative sea level change due to continued vertical land movement after the 1964 earthquake. NOS has adopted a procedure for computing accepted tidal datums for this anomalous region by using an MSL value calculated from the last several years of data rather than the 19-year NTDE. The accepted range of tide is still based on the 19-year NTDE and, when applied to the updated MSL, will result in updated values for Mean High Water (MHW) and Mean Lower Low Water (MLLW) derived through standard datum calculation procedures. For Nikiski, the MSL value was computed from the period of 1994-1998. This resulted in a lowering of the MLLW datums relative to land by approximately 1.0 ft at Nikiski compared to the previous MLLW elevations used in surveys prior to January 1, 1998. Subordinate tide stations in the area used for hydrographic surveys and controlled by Nikiski will be affected similarly. Accepted datums have been computed and may be accessed on the Internet through the URL specification http://www.co-ops.nos.noaa.gov.

For ----------

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-P342-RA-99,
Sheet H-10909.

Format: Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone CK449			
-152.069899 60.533247	945-5732	0	0.98
-152.056661 60.504686			
-152.038497 60.506267			
-151.973506 60.504202			
-151.978047 60.529571			
-152.042844 60.534136			
-152.069899 60.533247			
Zone CK450			
-152.165424 60.530106	945-5732	0	0.97
-152.134542 60.497898			
-152.056661 60.504686			
-152.069899 60.533247			
-152.165424 60.530106			
Zone CK458			
-152.070087 60.561408	945-5732	+6	0.97
-152.215499 60.57016			
-152.165424 60.530106			
-152.069899 60.533247			
-152.074801 60.543878			
-152.070087 60.561408			
Zone CK459			
-151.974189 60.548139	945-5732	+6	0.98
-152.032696 60.559125			
-152.070087 60.561408			
-152.074801 60.543878			
-152.069899 60.533247			
-152.042844 60.534136			
-151.978047 60.529571			

-151.979771 60.539222
-151.974189 60.548139

Zone CK460			
-151.897755 60.496823	945-5732	+6	0.99
-151.87827 60.495344			
-151.899334 60.519132			
-151.941371 60.541992			
-151.974189 60.548139			
-151.979771 60.539222			
-151.978047 60.529571			
-151.961666 60.528421			
-151.921078 60.514844			
-151.897755 60.496823			

Zone CK461			
-152.056232 60.593996	945-5732	+12	0.97
-152.105174 60.60192			
-152.119578 60.588376			
-152.142382 60.578629			
-152.215499 60.57016			
-152.070087 60.561408			
-152.062739 60.588693			
-152.056232 60.593996			

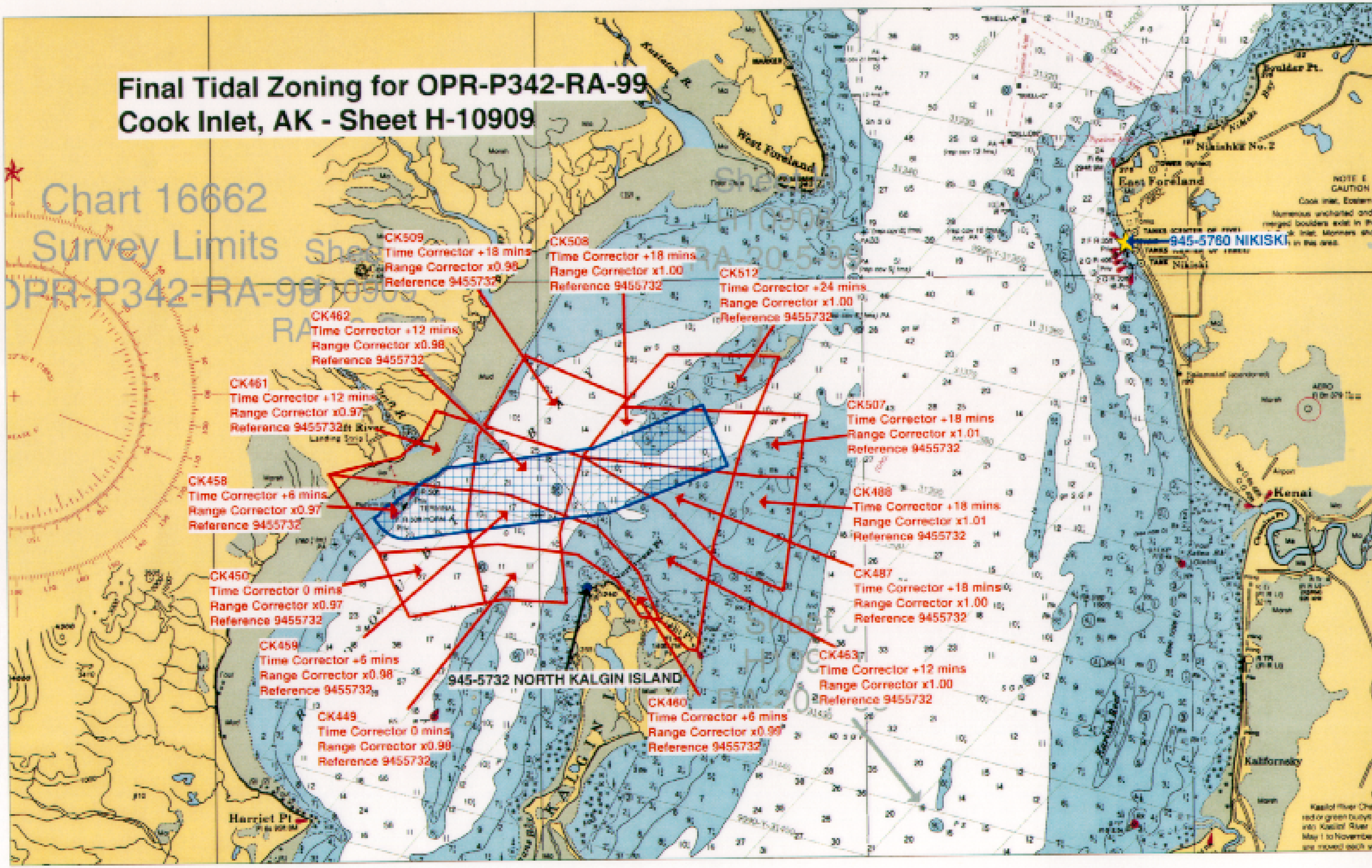
Zone CK462			
-151.955565 60.577684	945-5732	+12	0.98
-152.056232 60.593996			
-152.062739 60.588693			
-152.070087 60.561408			
-152.032696 60.559125			
-151.974189 60.548139			
-151.955565 60.577684			

Zone CK463			
-151.823874 60.527289	945-5732	+12	1.00
-151.872271 60.552967			
-151.955565 60.577684			
-151.974189 60.548139			
-151.941371 60.541992			
-151.899334 60.519132			
-151.87827 60.495344			
-151.850049 60.480521			
-151.83992 60.479585			
-151.823874 60.527289			

Zone CK487			
-151.955565 60.577684	945-5732	+18	1.00
-151.872271 60.552967			
-151.823874 60.527289			
-151.821595 60.534167			
-151.800231 60.568418			
-151.955565 60.577684			
Zone CK488			
-151.800231 60.568418	945-5732	+18	1.01
-151.821595 60.534167			
-151.823874 60.527289			
-151.815256 60.522705			
-151.751148 60.509313			
-151.748222 60.519468			
-151.73482 60.566075			
-151.776345 60.566988			
-151.800231 60.568418			
Zone CK507			
-151.724888 60.59769	945-5732	+18	1.01
-151.777375 60.599095			
-151.790397 60.584178			
-151.800231 60.568418			
-151.776345 60.566988			
-151.73482 60.566075			
-151.726948 60.593415			
-151.724888 60.59769			
Zone CK508			
-151.955565 60.577684	945-5732	+18	1.00
-151.800231 60.568418			
-151.790397 60.584178			
-151.777375 60.599095			
-151.915342 60.602792			
-151.955565 60.577684			
Zone CK509			
-152.012809 60.629246	945-5732	+18	0.98
-152.056232 60.593996			
-151.955565 60.577684			
-151.915342 60.602792			
-151.907858 60.606931			
-152.012809 60.629246			

Zone CK512

-151.868015 60.629027	945-5732	+24	1.00
-151.824304 60.628901			
-151.752788 60.627273			
-151.777375 60.599095			
-151.915342 60.602792			
-151.907858 60.606931			
-151.868015 60.629027			


Final Tidal Zoning for OPR-P342-RA-99
Cook Inlet, AK - Sheet H-10909
Chart 16662
Survey Limits
OPR-P342-RA-99
CK509
Time Corrector +18 mins
Range Corrector x0.98
Reference 9455732
CK508
Time Corrector +18 mins
Range Corrector x1.00
Reference 9455732
CK512
Time Corrector +24 mins
Range Corrector x1.00
Reference 9455732
CK462
Time Corrector +12 mins
Range Corrector x0.98
Reference 9455732
CK461
Time Corrector +12 mins
Range Corrector x0.97
Reference 9455732
CK507
Time Corrector +18 mins
Range Corrector x1.01
Reference 9455732
CK458
Time Corrector +6 mins
Range Corrector x0.97
Reference 9455732
CK488
Time Corrector +18 mins
Range Corrector x1.01
Reference 9455732
CK450
Time Corrector 0 mins
Range Corrector x0.97
Reference 9455732
CK487
Time Corrector +18 mins
Range Corrector x1.00
Reference 9455732
CK459
Time Corrector +6 mins
Range Corrector x0.98
Reference 9455732
CK463
Time Corrector +12 mins
Range Corrector x1.00
Reference 9455732
945-5732 NORTH KALGIN ISLAND
CK460
Time Corrector +6 mins
Range Corrector x0.99
Reference 9455732
CK449
Time Corrector 0 mins
Range Corrector x0.98
Reference 9455732
945-5760 NIKISKI
West Foreland
East Foreland
Nikishka No. 2
Nikiski
Kenai
Kalifornsky
Harriet Pt

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

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER
H-10909

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	N/A
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	N/A

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

SHORELINE DATA

SHORELINE MAPS (List):	None
PHOTOBATHYMETRIC MAPS (List):	None
NOTES TO THE HYDROGRAPHER (List):	None
SPECIAL REPORTS (List):	None
NAUTICAL CHARTS (List):	16662, 5th Edition, July 5, 1997; 16660, 27th Edition, April 19, 1997

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS VERIFICATION	AMOUNTS EVALUATION	AMOUNTS TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			

	TIME-HOURS VERIFICATION	TIME-HOURS EVALUATION	TIME-HOURS TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	56.0		56.0
COMPARISON WITH PRIOR SURVEYS AND CHARTS		16.0	16.0
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		27.0	27.0
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		25.0	25.0
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	56.0	68.0	124.0

Pre-processing Examination by: R. Davies	Beginning Date: 11/30/99	Ending Date: 12/01/99
Verification of Field Data by: E.Domingo,R.Davies,G.Nelson,R.Mayor	Time (Hours): 56.0	Ending Date: 7/20/00
Verification Check by: L.T. Deodato	Time (Hours): 4.0	Ending Date: 10/26/00
Evaluation and Analysis by: I. Almacen	Time (Hours): 43.0	Ending Date: 7/21/00
Inspection by: L.T. Deodato	Time (Hours): 2.0	Ending Date: 10/26/00

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

EVALUATION REPORT
H-10909

A. PROJECT

Project information is adequately discussed in the hydrographer's report.

B. AREA SURVEYED

The survey area is adequately discussed in the hydrographer's report

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

The bottom consists mainly of mud, sand, gravel and pebbles. Depths range from ~~6.5~~ 0 to ~~19.5~~ 37 fathoms. GKM 11/29/00

C. SURVEY VESSELS

Survey vessels are adequately discussed in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The acquisition and processing of data in the field has been adequately discussed in the hydrographer's report.

Office processing of survey data was conducted using the same Computer Aided Resource Information System (CARIS), and Hydrographic Processing System (HPS) used by the hydrographer. The smooth sheet was compiled with MicroStation 95.

Digital data for this survey exists in the standard HPS format, a database format using the .dbf extension. In addition, the smooth sheet drawing is filed in the MicroStation format, i.e., dgn extension. Copies of these files have been forwarded to the Hydrographic Surveys Division and a backup copy retained at PHB. Database records forwarded are in the Internal Data Format (IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data are plotted using a Universal Transverse Mercator (UTM) projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was not utilized during this survey.

F. SOUNDING EQUIPMENT

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

G. CORRECTIONS TO SOUNDINGS

Soundings have been reduced to Mean Lower Low Water (MLLW), with approved tide correctors obtained from the Center For Operational Oceanographic Products and Services. The approved tide correctors are zoned from North Kalgin Island, Alaska, gage 945-5732. It should be noted that the tidal datums for the area have been recently updated based on the 1994 to 1998 mean sea level observations. Further information concerning this latest tidal adjustment is contained in the attached Tide Note for this survey.

Other sounding reducers include corrections for static draft, dynamic draft, sound velocity, heave, roll and pitch. These reducers have been reviewed and are consistent with NOS specification.

H. CONTROL STATIONS

Control stations have been adequately discussed in the hydrographer's report.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -2.093 seconds (-64.767 meters)
Longitude: 8.035 seconds (122.936 meters)

I. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control has been adequately discussed in the hydrographer's report.

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 7.5 for a 1:20,000 scale survey was computed for survey operations. The maximum (HDOP) allowable limit has not been exceeded during this survey and the quality of data obtained is good. During Shallow water multibeam (SWMB) data gathering, satellite configuration as indicated by HDOP and the number of satellites, is monitored visually on HYPACK. The final positions are provided by the POS-MV that combines the DGPS position with inertial navigation information. In the event that the differential GPS corrector signal is lost, the POS-MV will continue to provide positions based on inertial navigation. Data was analyzed during processing to ensure it contains no significant errors. DGPS performance checks were conducted in the field and found adequate.

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

Additional information concerning specific control system type, calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and correction to position data.

J. SHORELINE

There is no shoreline within the area of this survey.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10909 junctions with the following survey .

Survey	Year	Scale	Area
H-10908	1999	1:20,000	Northeastern Limit

The junction with survey H-10908 is complete and. a "Joins" note had been added to the smooth sheet. The soundings and depth curves between the two surveys are in good agreement.

M. COMPARISON WITH PRIOR SURVEYS

As per correspondence received from N/CS, no prior survey comparisons were required in the field for this survey. However, comparison with the following prior surveys were accomplished as part of the standard office processing procedure.

Survey	Year	Scale	Datum
H-8964	1967 &74	1:20,000	NAD 27
H-9620	1976	1:20,000	NAD 27

The legibility of the prior survey digital image files is good and they were adequately registered to the present survey smooth sheet. The registration was accomplished by matching known geographic points between the present and the prior survey smooth sheets

Comparison with the above listed prior surveys reveal good agreement. The soundings generally agree within one fathom except in the areas of the charted shoal mentioned in this report and those reported as dangers to navigation. A more thorough coverage of the area utilizing the shallow water multibeam (SWMB) system has revealed no significant changes other than in those areas mentioned in this report

It is evident on this present survey that about twenty-three (23) years since its last survey, the shoal had continuously changed which could be attributed to the strong current prevailing along this region of Cook Inlet. The shoal composed mainly of sand waves seems to have migrated southward and gradually deposited in the surrounding area of the bay.

Survey H-10909 is adequate to supersede the prior surveys within the area of common coverage.

N. ITEM INVESTIGATIONS

AWOIS Item 52442 was investigated during this survey. The disposition of this feature is adequately addressed in section M of the hydrographer's report.

O. COMPARISON WITH CHART

Survey H-10909 was compared with the following charts.

Chart	Edition	Date	Scale	Datum
16660	27th	April 19, 1997	1:194,154	NAD 83
16662	5th	July 5, 1997	1:100,000	NAD 83

a. Hydrography

Charted hydrography originates with the previously mentioned prior surveys and require no further discussion.

Survey H-10909 is adequate to supersede charted hydrography within the common area of coverage.

b. Dangers to navigation

Six (6) dangers to navigation (DTON) were discovered during this survey and transmitted to the USCG, NIMA, N/CS261 and N/CS3 on October 9, 1999. A copy of the report is attached. No additional dangers were found during office processing.

P. ADEQUACY OF SURVEY

With the exception of the item mentioned below, the hydrography contained on survey H-10909 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the required depth curves;
b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
c. show the survey was properly controlled and soundings are correctly plotted.

A "holiday" exist in the vicinity of latitude 60/35/58N, longitude 151/50/30W, which should have been developed to adequately to determine the present configuration of the shoal mentioned in section M of this report. There is a significant change noted within the shoal area since its last survey in 1976. This area was compiled on the chart with the portions of the depth curves shown in dashed lines to delineate the approximate configuration of the shoal where no recent depth information is available.

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, the Field Procedures Manual, April 1994 Edition, and the NOS Hydrographic Surveys Specifications and Deliverables dated April 23, 1999.

Q. AIDS TO NAVIGATION

Two (2) privately maintained lights were located within the area of the present survey. These lights were on top of the mooring dolphins situated on both ends of the Drift River Marine Terminal pier. The position of the lights

were verified in the field using DGPS. These fixed aids were found to be accurately charted, in good condition and serve their intended purpose.

There were no features of landmark value found within the area of this survey.

R. STATISTICS
Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS
Miscellaneous information is adequately discussed in the hydrographer's report.

T. RECOMMENDATIONS
Survey H-10909 is an adequate hydrographic survey. Additional field work may be required on a non-priority basis to adequately determine the present configuration of the shoal area mentioned in this report.

U. REFERRAL TO REPORTS
Referral to reports is adequately discussed in the hydrographer's report.

Isagani A. Almacen
Cartographer

APPROVAL SHEET
H-10909

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Date: 10/26/00

for Dennis Hill
Supervisory Cartographer
Pacific Hydrographic Branch

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

Date: 10/30/00

for James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

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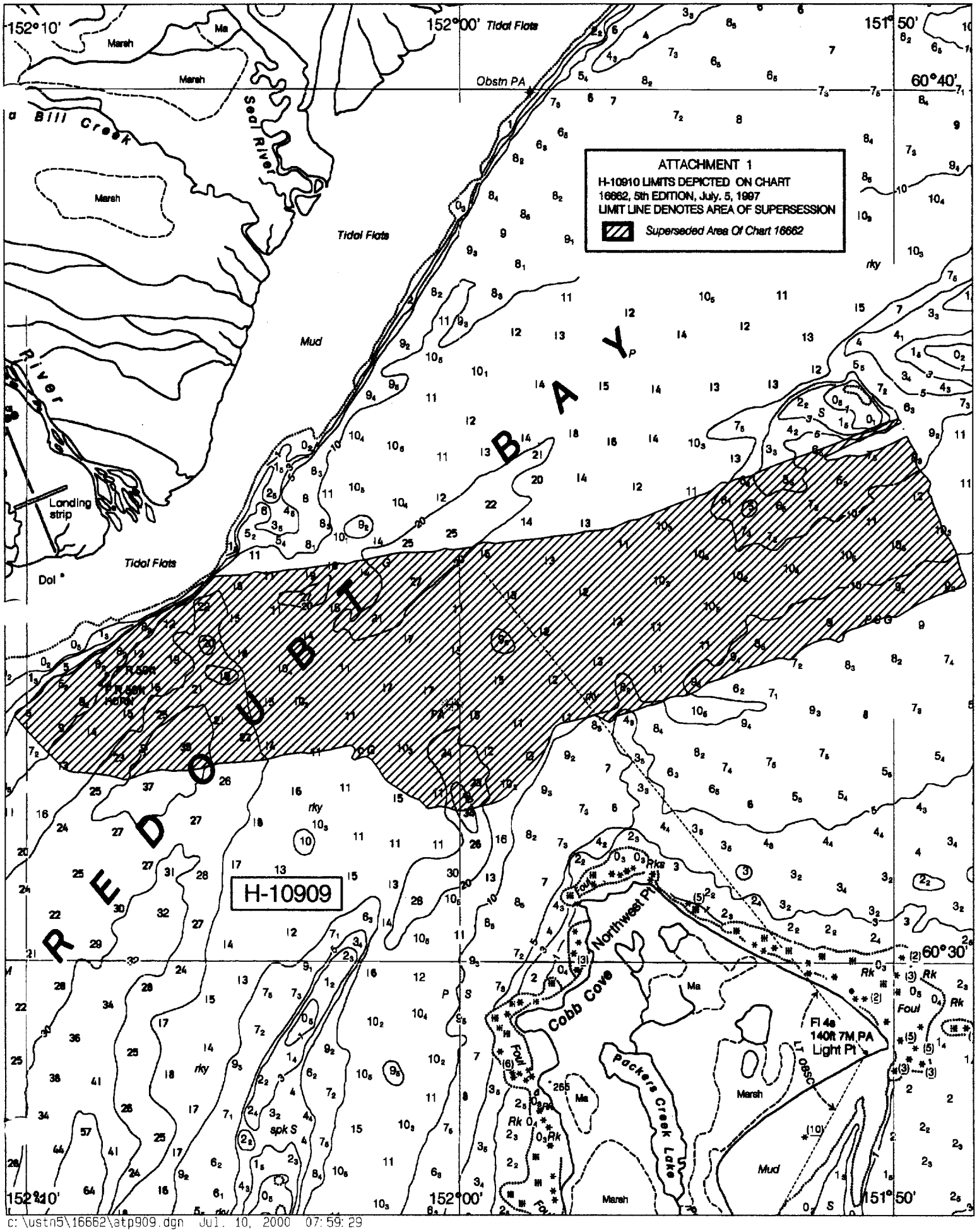
Final Approval

Approved:

Date: 11/29/00

Samuel P. De Bow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division



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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-10903

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
16662	7/11/00	[illegible]	Full ~~Part Before~~ After Marine Center Approval Signed Via Full application of
(INSET)			Drawing No. soundings from smooth sheet.
16662	8/17/00	[illegible]	Full ~~Part Before~~ After Marine Center Approval Signed Via Full application of
			Drawing No. soundings from SS thru inset (Drift River)
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
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			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.