

H10538

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

Type of Survey ..... Hydrographic  
Field No. .... RA-10-3-94  
Registry No. .... H-10538

### LOCALITY

State ..... Alaska  
General Locality ..... Cook Inlet  
Sublocality ..... North Point to Point Mackenzie

1994

CHIEF OF PARTY  
CAPT Russell C. Arnold, NOAA

### LIBRARY & ARCHIVES

DATE ..... MAR 22 1995

DESCRIPTION OF PART	
Type of Survey	Hydrographic
Port	
State	Alaska
General Locality	Coast of Alaska
Particular Locality	
Date	
Name of Officer in Charge	
Name of Observer	
Name of Assistant	
Name of Recorder	
Name of Stoker	
Name of Deck Hand	
Name of Engineer	
Name of Cook	
Name of Cabin Boy	
Name of Steward	
Name of Surgeon	
Name of Chaplain	
Name of Interpreter	
Name of Other Personnel	
Name of Vessel	
Name of Commanding Officer	
Name of Executive Officer	
Name of Deck Officer	
Name of Engineer Officer	
Name of Stoker Officer	
Name of Deck Hand Officer	
Name of Engineer Officer	
Name of Stoker Officer	
Name of Deck Hand Officer	
Name of Other Personnel	

85134

Chts  
 16665 used  
 16663  
 16660  
 16013 NA

**HYDROGRAPHIC TITLE SHEET**

H-10538

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

FIELD NO.

RA-10-3-94

State Alaska

General locality Cook Inlet

Locality North Point to Point Mackenzie

Scale 1:10,000 Date of survey May 12 - May 20, 1994

Instructions dated March 16, 1994 Project No. OPR-P395-RA

Vessel RA(2120), RA-3(2123), RA-4(2124), RA-5(2125), RA-6(2126)

Chief of party CAPT Russell C. Arnold, NOAA

Surveyed by LT D.Haines, LTJG D.Lemke, ENS J.Graham, ENS G.Glover,  
ENS S. Maenner, CST F. Paranada, SST J. Fleischmann, ST J.Jacobson

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

Graphic record scaled by RAINIER Personnel

Graphic record checked by RAINIER Personnel

Verification by: E. Domingo, R. Mayor, R. Mihailov Automated plot by PHS Xynetics Plotter

Evaluation by: R. Mihailov

Soundings in ~~fathoms xxxxxx~~ meters and decimeters at ~~MLW~~ MLLW

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

*5/2-19-96*

*AWOIS and SURF ✓ 5/95 RUD*

150 10' 00"

150 05' 00"

150 00' 00"

# PROGRESS SKETCH

**OPR-P395-RA**

HYDROGRAPHIC SURVEY  
NORTHERN COOK INLET, ALASKA

MAY 12-23, 1994

**NOAA SHIP RAINIER**

R. C. ARNOLD, CAPT, NOAA  
COMMANDING

SCALE OF CHART 16665  
1:50,000


61 15' 00"

## COOK INLET

Pt. MacKenzie

RA-20-1-94  
D-122

MAY

36.7	SQ. NM SOUNDINGS
1121	LNM SOUNDINGS
0	LNM SIDE SCAN SOUNDINGS
135	BOTTOM SAMPLES (GRAB)
2	ELECTRONIC CONTROL STATIONS
1	SOUND VELOCITY CASTS
2	GEO. CONT. STATIONS EST/REC
0	AWOIS ITEMS INVESTIGATED
	AREA SURVEYED

North Point Shoal

Kink Arm Shoal

Woronzof Shoal

Pt. Woronzof

RA-10-3-94  
H-10538

North Pt.

61 10' 00"

# Descriptive Report to Accompany Hydrographic Survey H-10538

Field Number RA-10-3-94

Scale 1:10,000

May 1994

NOAA Ship RAINIER

Chief of Party: Captain Russell C. Arnold

## A. PROJECT ✓

This basic hydrographic survey, under the navigable area concept, was completed in Northern Cook Inlet, Alaska, as specified by Project Instructions OPR-P395-RA dated March 16, 1994.

There was only one basic survey sheet required by the Project Instructions.

This project responds to a request from the U.S. Army Corps of Engineers (USACE) to survey Knik Arm, North Point, and Woronzof Shoals to monitor their rate of migration and its effect on navigation in Northern Cook Inlet.

## B. AREA SURVEYED ✓ See Eval Rpt., section 1

This survey area is located in Northern Cook Inlet, in the approaches to Anchorage. The survey's northern and southern limits are bounded by latitudes 61°14.5' N and 61°10.5' N; the eastern and western limits by longitudes 149°58.75' W and 150°12.0' W. The inshore limit of sounding was the 0-meter depth curve, except where limited by the sheet limit.

Data acquisition was conducted from May 12, 1994, Day Number (DN) 132, through May 20, 1994, DN 140.

## C. SURVEY VESSELS ✓

Data were acquired by the NOAA SHIP RAINIER and four survey launches as noted below:

<u>Vessel</u>	<u>EDP #</u>	<u>Operation</u>
RAINIER	2120	Sound Velocity Cast
RA-3	2123	Hydrography Shoreline Verification
RA-4	2124	Hydrography Shoreline Verification
RA-5	2125	Hydrography Bottom Samples Detached Positions on Buoys Shoreline Verification
RA-6	2126	Hydrography Shoreline Verification

#### D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

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

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
BACKUP	2.00	3/7/94
BASELINE	1.14	3/7/94
BIGABST	2.07	3/7/94
BIGAUTOST	3.01	3/7/94
BLKEDIT	2.02	3/7/94
CARTO	2.13	5/12/94
CLASSIFY	1.05	3/7/94
CONVERT	3.62	3/7/94
CONTACT	2.34	5/12/94
CONVERT	3.62	3/7/94
DAS_SURV	6.70	5/12/94
DIAGNOSE	3.04	5/12/94
DISC-UTIL	1.00	3/7/94
DP	2.14	3/7/94
EXCESS	4.21	3/7/94
FILESYS	3.24	5/12/94
GRAFEDIT	1.06	3/7/94
HIPSTICK	1.01	3/7/94
HPRAZ	1.26	3/7/94
INVERSE	2.01	3/7/94
LISTDATA	1.02	3/7/94
LOADNEW	2.10	3/7/94
LSTAWOIS	3.07	5/12/94
MAINMENU	1.20	3/7/94
MAN_DATA	2.01	3/7/94
NEWPOST	6.01	3/7/94
PLOTALL	2.27	5/12/94
POINT	2.10	3/7/94
PREDICT	2.01	3/7/94
PRESURV	7.08	5/12/94
PRINTOUT	4.03	5/3/94
QUICK	2.05	5/12/94
RAMSAVER	1.02	3/7/94
REAPPLY	2.10	3/7/94
RECOMP	1.02	3/7/94
SCANNER	1.00	3/7/94
SELPRINT	2.04	3/7/94
SYMBOLS		3/7/94
VERSIONS	1.00	3/7/94
ZOOMEDIT	2.24	5/12/94

Velocity corrections were determined using:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
VELOCITY	2.10	3/15/94

**E. SONAR EQUIPMENT** ✓

Sonar equipment was not used on this sheet.

**F. SOUNDING EQUIPMENT** ✓

The Raytheon DSF-6000N is a dual frequency (100 kHz, 24 kHz), paper trace echo sounder. Serial numbers are included on the headers of the daily Raw Master Printouts.\* No problems which affect survey data were encountered. All soundings were acquired using the High + Low, High frequency digitized setting.

**Problems**

none

**G. CORRECTIONS TO ECHO SOUNDINGS** ✓

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

<u>Velocity</u> <u>Table #</u>	<u>Cast</u> <u>#</u>	<u>DN</u>	<u>Cast</u> <u>Position</u>	<u>Deepest</u> <u>Depth (m)</u>	<u>Applicable</u> <u>DN</u>
1	1	136	61°13'07" N 149°59'08" W	62.5	132 - 140

The sound velocity cast was acquired with SBE SEACAT Profiler (S/N 811), calibrated 12/17/93. Velocity correctors were computed using the PC program VELOCITY in accordance with Hydrographic Survey Guideline (HSG) No. 69. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV, Sounding Equipment Calibrations and Corrections". ✕

**Static Draft** ✓

A transducer depth was determined using FPM Fig 2.2 for launches 2123, 2124, 2125 and 2126 in the spring of 1994 and was entered into the offset tables\* for each launch.

**Settlement and Squat** ✓

Correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM Fig. 2.3, and are included with project data for OPR-P395-RA. The data used was collected in Shilshole Bay, Washington in March of 1994.

**Offset Tables** ✓

Offset tables contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables 3-6 correspond to the number of the launch. The offset tables were compiled with new measurements in the spring of 1994 and are contained in the "Separates to be Included with Survey Data". ✕

\* Filed with the hydrographic records.

**Heave** ✓

The launches are not equipped with heave, pitch and roll sensors. No significant sea action was encountered during this survey. *Concur*

**Bar Check and Lead Lines** ✓

Bar check and lead lines were calibrated by RAINIER personnel during the winter 1993-1994 inport. Calibration forms are included with the project data for OPR-P395-RA. Bar checks were performed at the beginning and end of the project and served as a functional check of the DSF-6000N.

**Tide Correctors** ✓

The tidal reference and control station used for this survey was Anchorage, Alaska (945-5920).

Tidal correctors as provided in the project instructions for this sheet are:

<u>Zone</u>	<u>Time Correction</u>	<u>Height Correction</u> <u>Range Ratio</u>	<u>Location</u>
Zone VII	-0 hr 20 min	X0.92	East of 150°15.0' W West of 150°05.0' W North of 61°08.06' N South of 61°15.05' N
Zone VIII	-0 hr 10 min	X0.94	East of 150°05.0' W West of 150°01.4' W North of 61°10.0' N South of 61°15.5' N
Zone IX	-0 hr 5 min	X0.96	East of 150°01.4' W West of 149°59.0' W North of 61°10.0' N South of 61°15.5' N
Zone X	0 hr 0 min	X0.98	East of 149°59.0' W West of 149°55.8' W North of 61°10.0' N South of 61°15.5' N

Zone X was specified in the project instructions, but due to the minimal amount of hydrography in this zone, correctors for zone IX were used instead.

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

The tide gage at Anchorage is maintained by Pacific Operations Section (N/OES214). The tide gage was checked for data output by POS via computer modem on week days. Opening levels were performed by RAINIER personnel on May 10 and 11, 1994. Closing levels were performed on May 23, 1994.

\* Filed with the hydrographic records



Cross lines and day to day comparisons did not fall within expected tolerances in some areas. N/OES231 was contacted through N/CG241 and a comparison between predicted and real time tides was done as per Project Instructions, Section 5.9. This revealed up to a .8 meter difference between predicted and real tides during certain times of the day.

The station description, field tide records, and Field Tide Note (Appendix V) were forwarded to N/OES212 in accordance with HSG 50 and FPM 4.3. A request for approved tides was forwarded to N/OES2. *Approved Tide Note dated August 2, 1994 is attached.*

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

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

Two DGPS base stations were setup on the existing stations WOR7 and ANCHOR STEAM. Station WOR7 is at the end of the Anchorage International Airport and station ANCHOR STEAM is on the roof of the restaurant Elevation 92 on 3rd street. Horizontal datum for this project is NAD 83. All existing stations were recovered in accordance with methods stated in Section 5.2.4 of the FPM. A Horizontal Control Report was not submitted since the two DGPS base stations were established on existing stations, using NGS published positions (Appendix III).\*

## I. HYDROGRAPHIC POSITION CONTROL ✓

### Method of Position Control

All soundings and features were positioned using differential GPS. Serial numbers for Ashtech GPS equipment are annotated on the data printouts.\*

### Calibrations & Systems Check Methods ✓

System checks were performed by launch to launch comparisons of position. Three observations of position were made by each launch using correctors from two independent DGPS base stations. System checks were performed at the beginning and end of the project, the results were transferred to forms which are included in the project data for OPR-P395. An abstract of the system checks is included in the "Separates to be Included with Survey Data, III. Horizontal Position Control and Corrections to Position Data". \*

### Problems ✓

None

### Ashtech GPS ✓

VHF differential shore stations were established at stations ANCHOR STEAM and WOR7. The difference between the computed location and the station's published position was recorded by the MONITOR program on a PC. Data from a 24-hour period were recorded and examined for signs of multi-path signal reflection, which was not evident at either station. Scatterplot results are included in the "Project related data for OPR-P395-RA".

### Problems ✓

No problems were encountered.

\* Filed with the hydrographic data.

**Offset** ✓

The launch GPS antenna offsets are stored in the HDAPS Offset Tables as listed in Section G. Copies of the Offset Tables are included in the "Separates to be Included with Survey Data". \*

**J. SHORELINE** ✓ See Eval Rpt, section 2

There was no photogrammetric source data for OPR-P395. Shoreline for field sheets was drawn from an enlargement of Preliminary NOS chart 16665, 3rd Edition, May 15, 1993, 1:50,000 (NAD 83), shown in brown, and used for orientation purposes only.

Verification of the shoreline shoreward of the 0 m depth curve was not required for this project.

**K. CROSSLINES** ✓

Crosslines are within 1 meter agreement with mainscheme hydrography. Some minor discrepancies were noted due to the rapid tide changes and multiple tide zones. Crosslines totaled 93.7 nautical miles, representing 10.7% of the total mainscheme hydrography. Application of approved tides brought crosslines within 5 meter agreement with mainscheme hydrography.

**L. JUNCTIONS** This survey junctions D-22 (1:20,000, 1994) to the Northwest. No irregularities were found comparing soundings and depth curves. There were no joining surveys.

**M. COMPARISON WITH PRIOR SURVEYS** - See Evaluation report, section 6.

Prior Survey H-10431 (1992) covers the entire area of survey H-10538. Preliminary comparisons with prior surveys were conducted by RAINIER during survey operations. Significant changes were noted in some areas due to the silty bottom, high current, and shifting shoals. Of particular note, North Point Shoal appears to have expanded and shifted approximately 1.0 NM to the east encroaching on the Point Mackenzie Range. Final prior survey comparison will be accomplished by N/CG245.

**N. ITEM INVESTIGATIONS** ✓

There were no item investigations for this sheet.

**O. COMPARISON WITH THE CHART** See Evaluation report, section 7

This survey was compared to Preliminary NOS chart 16665, 3rd Edition, May 15, 1993, 1:50,000 (NAD 83).

**Changes**

The charted soundings were found to vary in the areas as noted under section M. Recommend retaining on the chart the notation "Changeable Area" in the vicinity of North Point Shoal. Final comparisons will be made by N/CG245. Concur

**Dangers to Navigation**

Three dangers to navigation within the limits of this survey were reported to the Seventeenth Coast Guard District by letter dated May 18, 1994. Copies of the correspondence can be found in Appendix I of this report.

\* Filed with the hydrographic data. 6

**P. ADEQUACY OF SURVEY** ✓ *See Eval Rpt., section G.*

Prior to final approval, survey H-10538 is complete and adequate to supersede charted depths and features in their common areas.

**Q. AIDS TO NAVIGATION** ✓

There are <sup>seven</sup> ~~six~~ Light List Aids to Navigation within the survey boundaries.

*Five* ~~Four~~ of these are fixed aids, and two are navigation buoys. Due to the recent survey of this area completed in 1992 (OPR-P319-RA), N/CG24 did not require fixed aids to be positioned to Third Order Class I accuracy.

Detached positions were obtained on the two navigation buoys which were found to be within close proximity to their charted locations. These buoys are repositioned seasonally by the Coast Guard.

Detailed information is summarized in Appendix VI. *Information on these two buoys is appended to this report as Section Q, Descriptive Report Insert.*

Hydrography lines were run along the Point MacKenzie, Point Woronzof, and Fire Island ranges and quarters to delineate depths along the ranges.

The charted cable area between Point Woronzof and Point MacKenzie was verified in 1992 by a visit to Chugach Electric. Refer to project OPR -P319-RA, survey H-10431. No further investigation was done. Recommend the cable area be retained as charted. *CONCUR*

The charted sewer pipe extending north from Point MacKenzie was not investigated. Recommend the sewer pipe be retained as charted. *CONCUR*

**R. STATISTICS** ✓

<u>Vessel:</u>	<u>2120</u>	<u>2123</u>	<u>2124</u>	<u>2125</u>	<u>2126</u>	<u>Total</u>
Number of Positions	0	1213	2230	949	1734	<del>6126</del> 6423
NM Hydrography	0	204.8	399.8	117.1	283.4	1005.1
Velocity Casts	1					
Detached Position	9					
Bottom Samples	115					
Tide Stations	1					
NM <sup>2</sup> Hydrography	24					

**S. MISCELLANEOUS** ✓

Bottom samples were obtained in accordance with Sections 1.6.3 and 4.7.1 of the Hydrographic Manual. Bottom samples were stored and shipped in accordance with section 4.7.1 of the Hydrographic Manual and Hydrographic Survey Guideline No. 36. Bottom samples were sent to the USACE in accordance with the Project Instructions.

The Coast Pilot comparisons were made in accordance with Project Instructions. See Section U for report information.

Preliminary survey data was given to the USACE, Anchorage Office per Attachment I of the Project Instructions. Preliminary data was also given to the U.S. Coast Guard and to the Anchorage Port Captain.

Current and predicted current comparisons were made in accordance with the Project Instructions. The current predictions as stated in the Coast Pilot were adequate and the descriptions accurate.

No unusual magnetic variations were noted.

**T. RECOMMENDATIONS** ✓

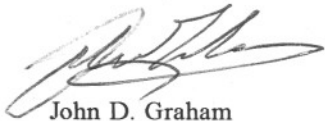
Recommend that a new Preliminary Chart of the Approaches to Anchorage be published as soon as possible. *Concur*

**U. REFERRAL TO REPORTS** ✓

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Spring 1994 Coast Pilot Report for OPR-P395-RA	May 1994	N/CG245
Project related data for OPR-P395-RA	May 1994	N/CG245

Submitted,



John D. Graham  
Ensign, NOAA

Approved and Forwarded,



Russell C. Arnold  
Captain, NOAA  
Commanding Officer

CONTROL STATIONS as of 12 May 1994

No	Type	Latitude	Longitude	H	Cart	Freq	Vel Code	MM/DD/YY	Station Name
100	F	061:13:11.230	149:54:09.308	47	250	0.0	0.0	05/12/94	ANCHOR STEAM 1982(GPS STA.CH6)
101	F	061:12:08.534	150:00:59.323	25	250	0.0	0.0	05/12/94	WOR7 1992(GPS STA.CH3)

APB 5/12

Section Q  
Descriptive Report Insert

Name of Aid: Knik Arm Shoal Lighted Buoy "7"  
Light List #: 26420  
Pos. # 6463 Method of Positioning: 3rd Order Hydro

Positioning Info

	Latitude N	Longitude W		
Charted Pos.	61°12'12"	150°05'24"		
Survey Pos.	61°12'17"	150°05'34"		
	Easting	Northing		
Charted Pos.	44601.6	41238.6		
Survey Pos.	44455.3	41381.4		
Difference Between Survey/Charted Position			<u>204.4</u> m	<u>314.3</u> deg T

Characteristics

Do Characteristics Match Light List? (y/n) Yes  
If NO, what are the characteristics? \_\_\_\_\_

New/Uncharted Aids (if info is known or easily obtained)

Date Established: \_\_\_\_\_  
Maintained By: \_\_\_\_\_ Private (y/n)   
Frequency of Maintenance: May 1 - Nov 1 yearly  
Purpose: \_\_\_\_\_

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Name of Aid: Knik Arm Shoal North Side Buoy "2KA"  
Light List #: 26425  
Pos. # 6464 Method of Positioning: 3rd Order Hydro

Positioning Info

	Latitude N	Longitude W		
Charted Pos.	61°12'24"	150°05'36"		
Survey Pos.	61°12'29.24"	150°05'55.39"		
	Easting	Northing		
Charted Pos.	44421.5	41609.6		
Survey Pos.	44131.7	41771		
Difference Between Survey/Charted Position			<u>331.7</u> m	<u>299.1</u> deg T

Characteristics

Do Characteristics Match Light List? (y/n) Yes  
If NO, what are the characteristics? \_\_\_\_\_

New/Uncharted Aids (if info is known or easily obtained)

Date Established: \_\_\_\_\_  
Maintained By: \_\_\_\_\_ Private (y/n)   
Frequency of Maintenance: May 1 - Nov 1  
Purpose: \_\_\_\_\_

1/24/95  
sent to Aids  
for NM? EB



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

May 18, 1994

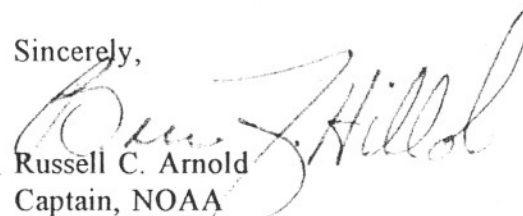
**ADVANCE  
INFORMATION**

Director  
DMAHTC  
ATTN: MCNM  
6500 Brookes lane  
Washington, DC 20315-0030

Dear Sir:

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

Sincerely,

  
Russell C. Arnold  
Captain, NOAA  
Commanding Officer

Enclosures





P 182035Z MAY 94  
FM NOAA S RAINIER  
TO CCGDSEVENTEEN JUNEAU AK  
HTCCNAVWARN WASHINGTON DC//MCNM//  
O NOAMOP SEATTLE WA

ADVANCE  
INFORMATION

ACCT CM-VCAA

BT

UNCLAS

NOAA SHIP RAINIER HAS LOCATED 3 DANGERS TO NAVIGATION ON THE APPROACHES TO ANCHORAGE, NORTHERN COOK INLET, ALASKA (PROJECT OPR-P395-RA) WITHIN THE LIMITS OF HYDROGRAPHIC SURVEY H-10538. THE FOLLOWING INFORMATION IS PROVIDED FOR PUBLICATION IN THE LOCAL NOTICE TO MARINERS:

CHART AFFECTED: 16665 3RD ED MAY 15/93 1:50,000 NAD 83

DEPTHS ARE REDUCED TO MLLW BASED ON PREDICTED TIDES.

NORTH POINT SHOAL HAS MIGRATED EAST 1NM REPRESENTING A HAZARD FOR MARINERS TRANSITING NORTH OF KNIK ARM SHOAL ON THE POINT MACKENZIE RANGE. THE FOLLOWING SHOAL DEPTHS ARE ENCROACHING ON THE POINT MACKENZIE RANGE.

ITEM	DANGER	CHART	DEPTH	LATITUDE	LONGITUDE	POS #
A.	SHOAL	16665	22 FT	61/12/08.5N	150/07/45.0W	3615/0
B.	SHOAL	16665	13 FT	61/12/21.0N	150/07/17.5W	3650/5
C.	SHOAL	16665	7 FT	61/12/24.5N	150/07/38.0W	3631/0

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

BT

Mud

61° 15'

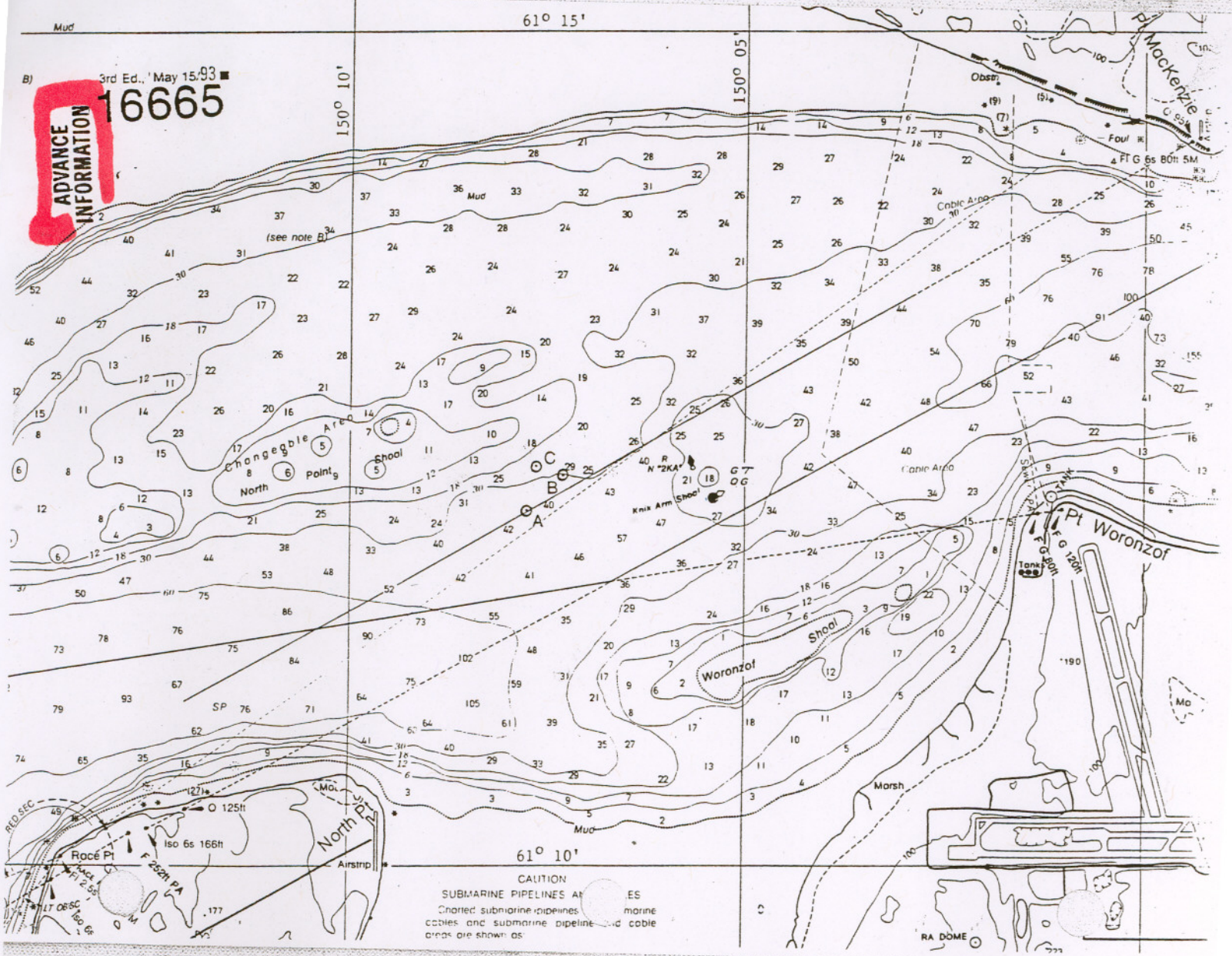
150° 05'

B) 3rd Ed., May 15, 93

**ADVANCE INFORMATION**

**16665**

150° 10'



61° 10'

CAUTION  
 SUBMARINE PIPELINES AND CABLES  
 Charted submarine pipelines and marine cables and submarine pipeline and cable areas are shown as

APPROVAL SHEET

for

H-10538  
RA-10-1-94

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

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



Russell C. Arnold  
Captain, NOAA  
Commanding Officer



TIDE NOTE FOR HYDROGRAPHIC SURVEY

ORIGINAL

DATE: August 2, 1994

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-P395-RA

HYDROGRAPHIC SHEET: H-10538

LOCALITY: Pt. Mackenzie to North Pt., Northern Cook Inlet, Alaska

TIME PERIOD: May 12 - 20, 1994

TIDE STATION USED: 945-5920 Anchorage, Ak.  
Lat.  $61^{\circ} 14.3'N$  Lon.  $149^{\circ} 53.3'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.00 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 28.3 ft.

REMARKS: RECOMMENDED ZONING

1. East of  $150^{\circ} 15.0'W$ , west of  $150^{\circ} 05.0'W$ , north of  $61^{\circ} 08.6'N$ , south of  $61^{\circ} 15.5'N$ , apply a -0 hr 20 min time correction, and a X0.92 range ratio to Anchorage, Ak. (945-5920).
2. East of  $150^{\circ} 05.0'W$ , west of  $150^{\circ} 01.4'W$ , north of  $61^{\circ} 10.0'N$ , south of  $61^{\circ} 15.5'N$ , apply a -0 hr 10 min time correction, and a X0.94 range ratio to Anchorage, Ak. (945-5920).
3. East of  $150^{\circ} 01.4'W$ , west of  $149^{\circ} 59.0'W$ , north of  $61^{\circ} 10.0'N$ , south of  $61^{\circ} 15.5'N$ , apply a -0 hr 5 min time correction, and a X0.96 range ratio to Anchorage, Ak. (945-5920).
4. East of  $149^{\circ} 59.0'W$ , west of  $149^{\circ} 55.8'W$ , north of  $61^{\circ} 10.0'N$ , and south of  $61^{\circ} 15.5'N$ , times are direct, and apply a X0.98 range ratio.

Note: Times are tabulated in Greenwich Mean Time.

*William M. Fisher*  
CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10538

Name on Survey	<div style="display: flex; justify-content: space-between;"> <span>A ON CHART NO.</span> <span>B ON PREVIOUS SURVEY NO.</span> <span>C ON U.S. QUADRANGLE MAPS</span> <span>D FROM LOCAL INFORMATION</span> <span>E ON LOCAL MAPS</span> <span>F P.O. GUIDE OR MAP</span> <span>G RAND McNALLY ATLAS</span> <span>H U.S. LIGHT LIST</span> <span>K</span> </div>											
	ALASKA (title)	X										
COOK INLET	X		X									2
FIRE ISLAND	X		X									3
KNIK ARM SHOAL	X											4
MACKENZIE, POINT	X		X									5
NORTH POINT	X		X									6
NORTH POINT SHOAL	X											7
WORONZOF, POINT	X		X									8
WORONZOF SHOAL	X											9
												10
												11
												12
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Approved:

*Charles P. Harrison*  
Chief Geographer - N/C6245

SEP 27 1994

**HYDROGRAPHIC SURVEY STATISTICS**

H-10538

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

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

SHORELINE DATA

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS			
	VERIFICATION	EVALUATION	TOTALS	
POSITIONS ON SHEET			6423	
POSITIONS REVISED				
SOUNDINGS REVISED				
CONTROL STATIONS REVISED				
	TIME-HOURS			
	VERIFICATION	EVALUATION	TOTALS	
PRE-PROCESSING EXAMINATION				
VERIFICATION OF CONTROL				
VERIFICATION OF POSITIONS	17.0		17.0	
VERIFICATION OF SOUNDINGS	141.5		141.5	
VERIFICATION OF JUNCTIONS				
APPLICATION OF PHOTOBATHYMETRY				
SHORELINE APPLICATION/VERIFICATION				
COMPILATION OF SMOOTH SHEET	83.0		83.0	
COMPARISON WITH PRIOR SURVEYS AND CHARTS		9.5	9.5	
EVALUATION OF SIDE SCAN SONAR RECORDS				
EVALUATION OF WIRE DRAGS AND SWEEPS				
EVALUATION REPORT		51.5	51.5	
GEOGRAPHIC NAMES				
OTHER*				
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	241.50	61.0	302.5

Pre-processing Examination by <b>LT M. Larsen</b>	Beginning Date 5/12/94	Ending Date 6/24/94
Verification of Field Data by <b>E. Domingo, R. Mayor, R. Mihailov, J. Stringham</b>	Time (Hours) 241.50	Ending Date 12/02/94
Verification Check by <b>L. Deodato, J. Stringham</b>	Time (Hours) 23	Ending Date 11/15/94
Evaluation and Analysis by <b>B. Mihailov</b>	Time (Hours) 51	Ending Date 2/16/95
Inspection by <b>B. Olmstead</b>	Time (Hours) 27	Ending Date 3/3/95

## EVALUATION REPORT

H-10538

### 1. INTRODUCTION

Survey H-10538 is a basic hydrographic survey accomplished by the NOAA Ship *Rainier*, under the following Project Instructions.

OPR-P395-RA, dated March 16, 1994

This survey was conducted in Cook Inlet, Alaska, along the navigable approaches to the Port of Anchorage extending from North Point to Point Mackenzie and Point Woronzof. Specifically, this survey encompasses North Point Shoal, Knik Arm Shoal, and Woronzof Shoal which are located in an area that is extremely changeable due to the presence of high current velocities and large amounts of sand and sediment. The surveyed area is bounded by latitude 61/14/30N to the north and latitude 61/10/30N to the south. The eastern limit is longitude 149/58/45W and the western limit is longitude 150/12/00W. The bottom generally consists of sand. Depths range from 0 meters along the shore to 52 meters.

Depth curves depicted on the smooth sheet were selected from those authorized through HSG 69. However, instead of drafting all authorized curves only those curves considered necessary for the reasonable portrayal of the bottom were drafted. The selected curves were the 0, 5, 10 and 20 meter. A note was added to the smooth sheet to identify these values. A few supplemental depth curves have been added to the smooth sheet in brown as warranted.

Predicted tides for Anchorage, Alaska were used for the reduction of soundings during field processing. Approved hourly heights zoned from Anchorage, Alaska, gage 945-5920, were used during office processing.

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

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

### 2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

Additional detailed information on horizontal control is found in the Spring 1994 Horizontal Control Report for OPR-P395-RA.

Differential GPS (DGPS) was used to control this survey. Daily system checks were performed by launch to launch comparisons of positions which confirmed the DGPS was operating properly. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The quality of 216 positions exceeded the limit in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

The positions of the horizontal control stations used during hydrography are published values based on NAD 83.

The smooth sheet and accompanying overlays are annotated with NAD 27 adjustment ticks based on values determined with NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -1.986 seconds (-61.484 meters)  
Longitude: 7.989 seconds (119.282 meters)

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

There are no shoreline maps applicable to this survey. The shoreline in brown depicted on the smooth sheet was compiled from an enlarged copy of Chart 16665, 3rd edition, dated May 15th, 1993.

### **3. HYDROGRAPHY**

Hydrography 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.

### **4. CONDITION OF SURVEY**

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, April 1994 Edition.



## 5. JUNCTIONS

Survey H-10538 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
D-122	1994	1:20,000	West

The junction with survey D-122 is complete and the soundings are in good agreement.

## 6. COMPARISON WITH PRIOR SURVEYS

H-10431 (1992) 1:10,000

H-10432 (1992) 1:20,000

Comparison with these prior surveys conducted in 1992 shows the area has experienced significant change. This change is attributed to the large amounts of sand and sediment on the bottom which is greatly effected by the prevailing strong currents within the approaches to the Port of Anchorage and the considerable movement of ice throughout the winter period. The greatest differences in depths are found directly around North Point Shoal and Knik Arm Shoal. Differences range from 3-6 meters(9.8-19.7 ft) which reflects both shoaling and an increase in depths throughout these areas. Significant shoaling in the vicinity of North Point Shoal has displaced portions of the five meter depth curve over 1,000 meters to the north and northeast since 1992. Woronzof Shoal has remained generally stable in shape and size although depth differences of two meters are readily evident. The area from longitude 149/58/45W to longitude 150/06/00W and south of latitude 61/14/30N to latitude 61/10/30N is the area of least change and reflects agreement within 1-1.5 meters.

The following features plotted on survey H-10431 were not investigated or inadequately resolved by the hydrographer. These features were brought forward to this survey and shown as listed.

<u>Features(meters)</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
11.7 Rk	61/12/50	150/03/54
18.6 Rk	61/13/16	150/00/54
13.8 Rk	61/13/03	150/00/22
13.7 Rk	61/13/04	150/00/10
11.8 Rk	61/13/17	149/59/56
9.5 Rk	61/13/01	149/59/45
10.3 Rk	61/12/58	149/59/50
rock uncovers	61/12/10	149/59/36
rock uncovers	61/14/25	150/01/50
rock uncovers	61/14/21.4	150/00/52
rock uncovers	61/14/10.2	150/59/52
wreck	61/14/27	150/00/09

There were no AWOIS items which originated from prior surveys, and assigned for investigation.

With the transfer of the features noted above, survey H-10538 is adequate to supersede the prior surveys within the common area.

## 7. COMPARISON WITH CHART

Survey H-10538 was compared with the following chart. In addition, comparison has been made with a copy of the compiled H-Drawing for chart 16665 which has been generated at the Pacific Hydrographic Section. This drawing reflects the full application of soundings and features from hydrographic surveys conducted in 1992.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
16665	3rd	May 15, 1993	1:50,000	NAD 83

### a. Hydrography

The charted hydrography on Chart 16665 (3rd Ed) originates from prior surveys H-9941, H-9942, H-10000 and H-10012 and miscellaneous sources which have been superseded by H-10431 and H-10432 within the common areas. H-10538 has been fully applied to the H-Drawing for chart 16665 (4th Ed) and supersedes H-10431 and H-10432 within the common areas and requires no further discussion except for the following.

A charted tank located at latitude 61/12/14N, longitude 150/01/09W was not verified during present survey operations. However, this feature was located in 1992 and should be retained as charted.

Except as noted above, survey H-10538 is adequate to supersede charted hydrography within the common area.

### b. AWOIS

There were no AWOIS items identified in the Project Instructions for this survey.

### c. Controlling Depths

There are no channels with controlling depths located within the limits of survey H-10538. However, hydrographic lines were run along the Point Mackenzie, Point Woronzof and Fire Island ranges and quarters to delineate depths along the ranges. A danger to navigation letter, dated May 20, 1994 was generated by the field to note several shoal depths which are encroaching on the Point Mackenzie Range.

### d. Aids to Navigation

The hydrographer states in Descriptive Report Section Q, "Aids to Navigation that due to the recent survey of this area completed in 1992, N/CG24 did not require fixed aids to be positioned to Third Order Class I accuracy. However, the recent survey mentioned by the hydrographer, ie "Summer 1992 Horizontal Control Report for Northern Cook Inlet, Alaska OPR-P319-RA", failed to locate Point Mackenzie Range Rear Light and Point Mackenzie Light 11 to third order specifications. The positions for these fixed aids were taken from H-10431 and have been shown on the smooth sheet as less than Third Order.

### e. Geographic Names

Names appearing in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation

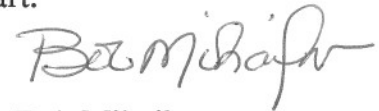
The hydrographer reported three shoal soundings as dangers to navigation during the survey. These dangers to navigation were reported to the local United States Coast Guard District, DMAHTC and N/CG221. A copy of this report is attached.

**8. COMPLIANCE WITH INSTRUCTIONS**

Survey H-10538 adequately complies with the Project Instructions.

**9. ADDITIONAL FIELD WORK**

This is a good hydrographic survey. However, due to the shifting of bottom sediments noted along the navigable approaches to the Port of Anchorage, periodic field investigation is recommended for purposes of updating the chart.



Bob Mihailov  
Cartographer

APPROVAL SHEET  
H-10538

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

*Bruce A. Olmstead*  
for Dennis J. Hill Date: March 3, 1995  
Chief, Hydrographic Processing Unit  
Pacific Hydrographic Section

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

*Kathy Simmons, CDR NOAA*  
Kathy Simmons Date: 3/7/95  
Commander, NOAA  
Chief, Pacific Hydrographic Section

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Final Approval

Approved:

*for Andrew B. Christman*  
Thomas W. Richards Date: April 27, 1998  
Captain, NOAA  
Chief, Nautical Charting Division

