

H10908

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-20-05-99

*Registry No.* H-10908

### LOCALITY

*State* Alaska

*General Locality* Cook Inlet, Navigation Corridors

*Sublocality* 5 NM south of West Foreland

1999

### CHIEF OF PARTY

Commander Daniel R. Herlihy, NOAA

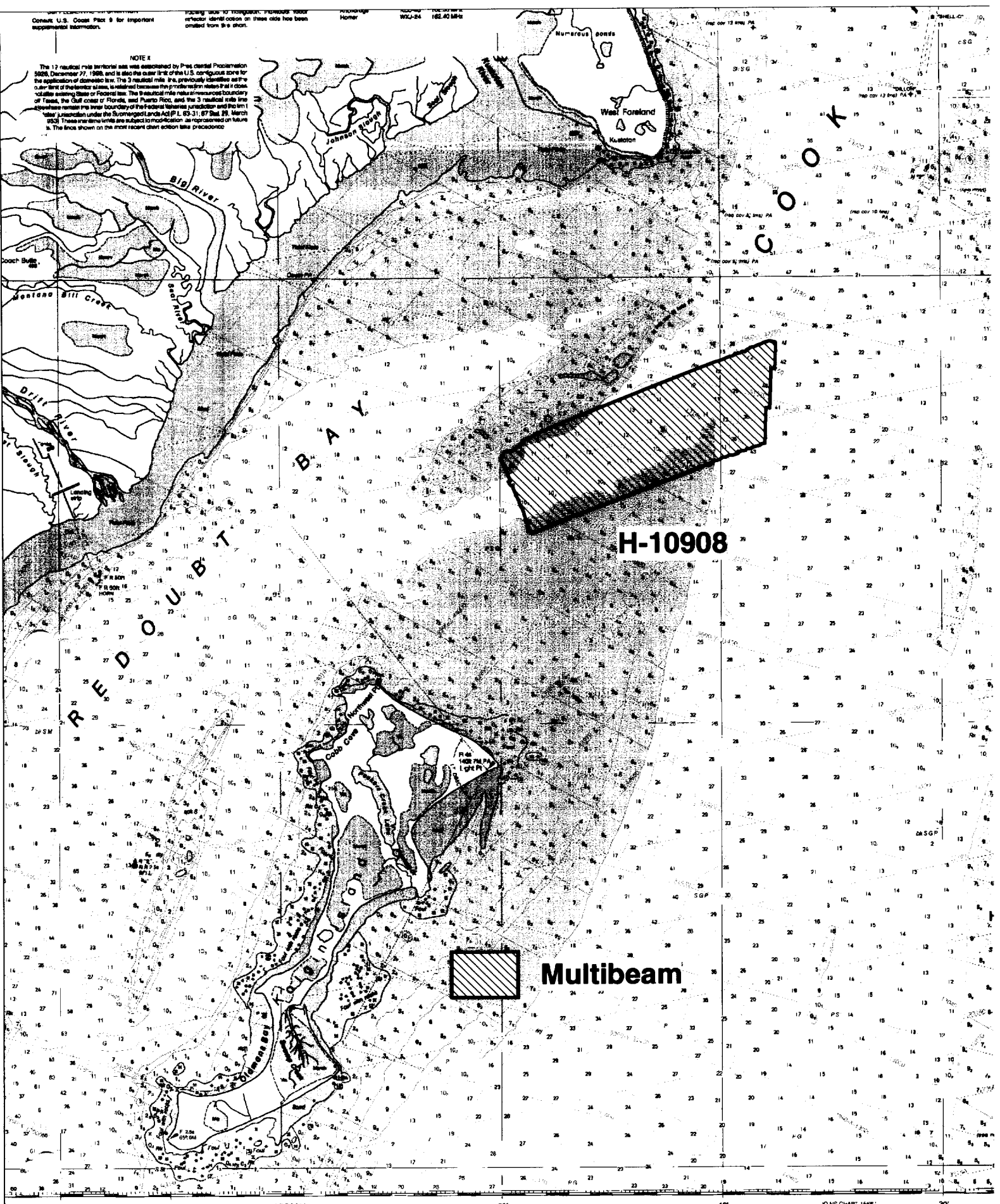
### LIBRARY & ARCHIVES

DATE FEB ' 2 2001

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|---|--|---|
| NOAA FORM 77-28<br>(11-72)  | U.S. DEPARTMENT OF COMMERCE<br>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | REGISTER NO.<br><br><b>H-10908</b>          |
| <b>HYDROGRAPHIC TITLE SHEET</b>   |  |   |
| INSTRUCTIONS -The hydrographic sheet should be accompanied by this form,<br>filled in as completely as possible, when the sheet is forwarded to the office. |  | FIELD NO.<br><b>RA-20-05-99</b>             |
| State <u>Alaska</u>   |  |   |
| General Locality <u>Cook Inlet, Navigation Corridors</u>  |  |   |
| Sublocality <u>5 NM South of West Foreland</u>  |  |   |
| Scale <u>1:20,000</u>   |  | Date of Survey <u>7/16/99 - 8/19/99</u>     |
| Instructions Date <u>June 8,1999</u> *  |  | Project No. <u>OPR-P342-RA</u>              |
| <u>RA-1(2121) and RA-3(2123)</u>  |  |   |
| Chief of Party <u>Commander Daniel R. Herlihy, NOAA</u>   |  |   |
| Surveyed by <u>RAINIER Personnel, K. Sampadian</u>  |  |   |
| Soundings taken by <u>echo sounder</u> , hand lead, pole <u>Knudsen 320M, RESON 8101MB</u>  |  |   |
| Graphic record scaled by <u>RAINIER Personnel</u>   |  |   |
| Graphic record checked by <u>RAINIER Personnel</u>  |  |   |
| Evaluation by <u>I. Almacen</u>   |  | Automated plot by <u>HP Design Jet 750c</u> |
| Verification by <u>E. Domingo, R. Davies, G.Nelson, B. Mihailov, R. Mayor</u>   |  |   |
| Soundings in <u>Fathoms</u> at <u>MLLW</u>  |  |   |
| REMARKS: <u>Time in UTC. Revisions and marginal notes in black</u>  |  |   |
| <u>were generated during office processing. All separates are</u>   |  |   |
| <u>filed with the hydrographic data, as a result page numbering</u>   |  |   |
| <u>may be interrupted or non-sequential.</u>  |  |   |
| <u>All depths listed in this report are referenced to mean lower</u>  |  |   |
| <u>low water unless otherwise noted.</u>  |  |   |
| <u>* Change #1- July 26, 1999</u>   |  |   |
| <u>AWOIS ✓ \$ SURF ✓ 2-1-01 by MBH</u>  |  |   |

NOTE #1

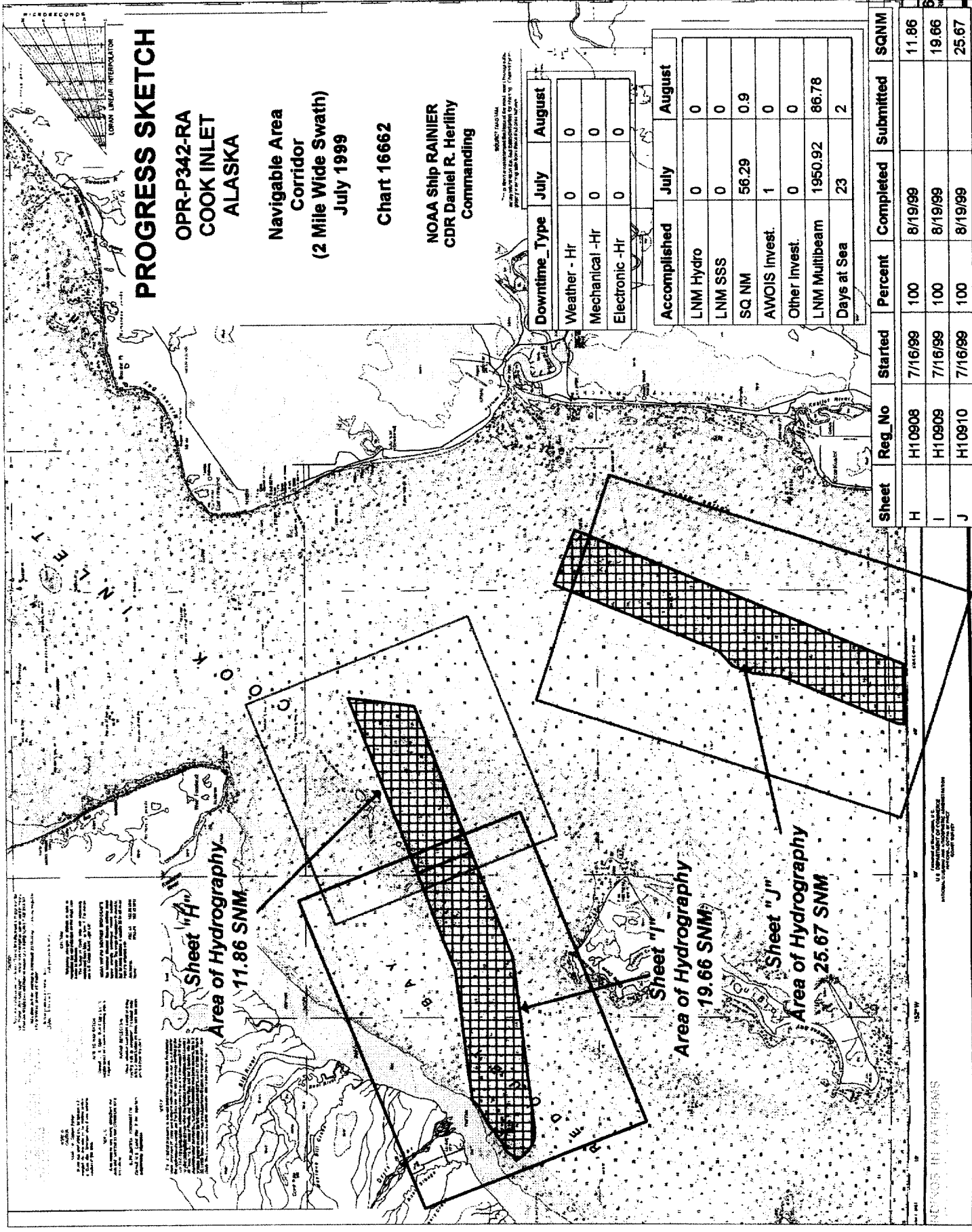
The 12 nautical mile territorial sea was established by Presidential Proclamation 5828, December 27, 1958, and is also the outer limit of the U.S. contiguous zone for the application of domestic law. The 3 nautical mile line, previously identified as the outer limit of the territorial sea, is retained because the promulgation of that line does not affect existing State or Federal law. The 9 nautical mile natural resources boundary of Texas, the Gulf coast of Florida, and Puerto Rico, and the 3 nautical mile line elsewhere remain the lower boundary of the Federal fisheries jurisdiction and the 12 mile jurisdiction under the Seaward Lands Act (P.L. 85-31, 87 Stat. 89, March 1963). These territorial limits are subject to modification as reproduced on future charts. The lines shown on the most recent chart edition take precedence.



H-10908

Multibeam

DEPTH IN FATHOMS  
(AND FEET TO 11 FATHOMS)



# 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

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| 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 |

Sheet "H"  
 Area of Hydrography  
 11.86 SNM

Sheet "I"  
 Area of Hydrography  
 19.66 SNM

Sheet "J"  
 Area of Hydrography  
 25.67 SNM

U.S. GOVERNMENT PRINTING OFFICE: 1999 O-488-000

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# Descriptive Report to Accompany Hydrographic Survey H10908

Field Number RA-20-05-99

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 Hydrographic Survey Letter Instructions OPR-P342-RA dated June 08, 1999, amended July 26, 1999 (change number 1), and the Draft Standing Project Instructions dated April 6, 1999. Survey H10908 corresponds to sheet H 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 5 nm south of West Foreland in Cook Inlet, Alaska, and covers approximately 12 square nautical miles of a navigation corridor. The survey limits are depicted below in Figure 1 on a detail of Chart 16662. The survey's northern limit is latitude  $60^{\circ}38'32''\text{N}$  and the southern limit is latitude  $60^{\circ}34'19''\text{N}$ . The survey's western limit is longitude  $151^{\circ}49'59''\text{W}$  and the eastern limit is longitude  $151^{\circ}37'42''\text{W}$ . Data acquisition was conducted from July 16, 1999 to August 19, 1999 (DN 197 to 231).

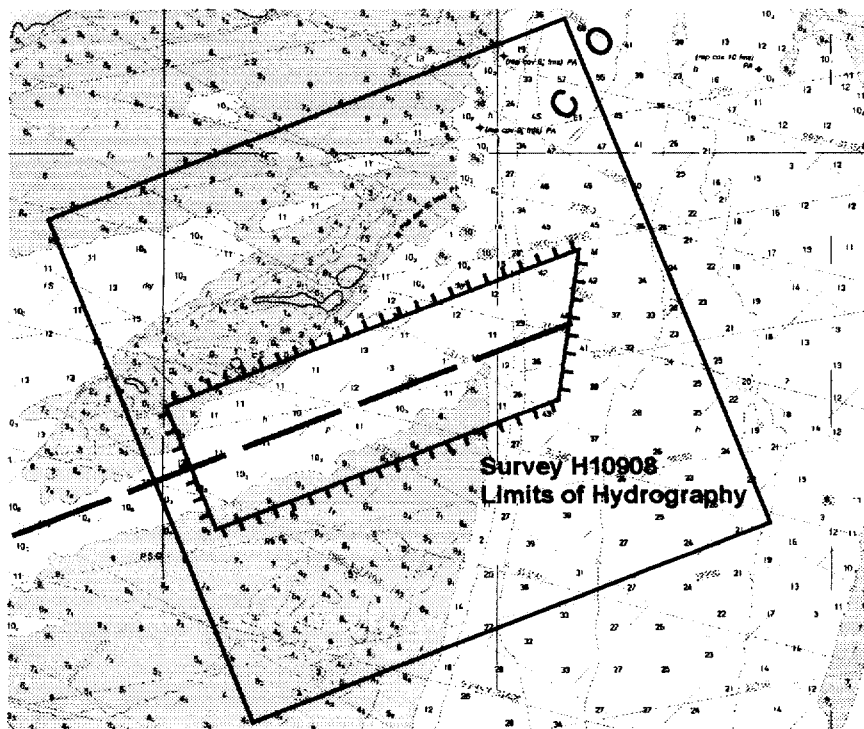


Figure 1 - Survey Limits

**C. SURVEY VESSELS ✓**

Data were acquired by RAINIER (vessel number 2120) and her survey launches (vessel numbers 2121 and 2123) as noted in the Survey Information Summary included with this report. RAINIER was used to collect bottom samples and take sound velocity casts. Vessels 2121 and 2123 were used exclusively for acquisition of shallow-water multibeam data and sound velocity profiles. See Project Related Data for OPR-P342-RA-99 for vessel descriptions. No unusual vessel configurations or problems were encountered on 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 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, speed made good (SMG) 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 a two densities; one at 3m x 3m, the other at 1.5mm 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. This process creates separate tide files for each survey vessel; CARIS tides files used are "9455760H\_RA01.tid", "9455760H\_RA03.tid", and "9455760end.tid". These files are included with the digital HDCS data. Processed soundings were exsessed using a 3mm-character size, and plotted at a 2mm-character size to produce the final sounding plot. Final selected soundings were saved and plotted in MapInfo. An additional sounding plot compiled using MicroStation 95 is also included in hardcopy and digital (".DGN") format. Raster images registered in MapInfo facilitated chart comparisons.

Survey H10908 is defined as sheet 01 in HPS. The CARIS workfile name is defined as h10908, and the project name is identified as P342\_SheetH in HDCS.

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

A complete listing of software is included in Appendix H. <sup>\*</sup>A data flow diagram is included in Appendix G. <sup>\*</sup>

**E. SONAR EQUIPMENT**

Side Scan Sonar (SSS) equipment was not used on this survey. <sup>Concur .</sup> 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.

*\* FILED WITH THE HYDROGRAPHIC DATA.*

## F. SOUNDING EQUIPMENT ✓

One category of echosounder system was used for final depth determination and is described below.

### Launch Shallow Water Multibeam (VN 2121 and 2123)

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 determine corrections for the effects of vessel motion during survey operations. Serial numbers for the Reson 8101 and POS/MV are included in the Appendix H. ✕

It should be noted that vertical beam echosounders (VBES) were utilized as a quality assurance tool for SWMB. Vessels 2121 and 2123 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 online 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 used for final sounding plot compilation and are not included with the digital data. VBES serial numbers are included in the 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 H10908 and tidal correctors as provided in the Project Instructions for H10908 are provided 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) served as control for datum determination at two subordinate stations. 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<sup>\*</sup> for individual gauge performance and level closure information.

Raw water level data from these gauges was 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 Note 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 reports and dates are included with the project 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                             |

Settlement and squat correctors, static draft measurements and vessel offsets are included with the Project Related Data for OPR-P342-RA-99. \*

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

SWMB launches (VN2121 and 2123) 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. \*

Heave, roll, pitch, and navigation latency biases were determined during a patch test conducted at Port Angeles, WA on March 26-28, 1999 for vessel 2123, and at Shilshole, WA, on July 7, 1999 for vessel 2121. SWMB vessel offsets, dynamic draft correctors, and system bias values are contained in CARIS Vessel Configuration Files (VCF's) and were created using the program "VCFEDIT" in CARIS. These offsets and biases are applied to the sounding data during processing in CARIS. A printout of each VCF is contained in Project Related Data for OPR-P337-RA-99, and the VCF's themselves are included with the digital HDCS data. \*

**H. HYDROGRAPHIC POSITION CONTROL** (SEE EVAL RPT, Secs. H & I)

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



Launch to launch DGPS performance checks were performed weekly 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 outside of the survey limits on the field sheet is for orientation purposes only and originates from NOS Chart 16662.

**J. CROSSLINES** ✓

There were a total of 15.4 nautical miles of crosslines, comprising 3.6% of mainscheme hydrography. The Quality Control Report (CARIS HIPS) for the checkline file averaged 95.14%, with a depth tolerance of 0.023. See Appendix G for the detailed report. \*

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

The following contemporary survey junctions with H10908 and is shown in Figure 2 below:

| Registry # | Scale    | Date | Junction side |
|------------|----------|------|---------------|
| H10909     | 1:20,000 | 1999 | Southwest ✓   |

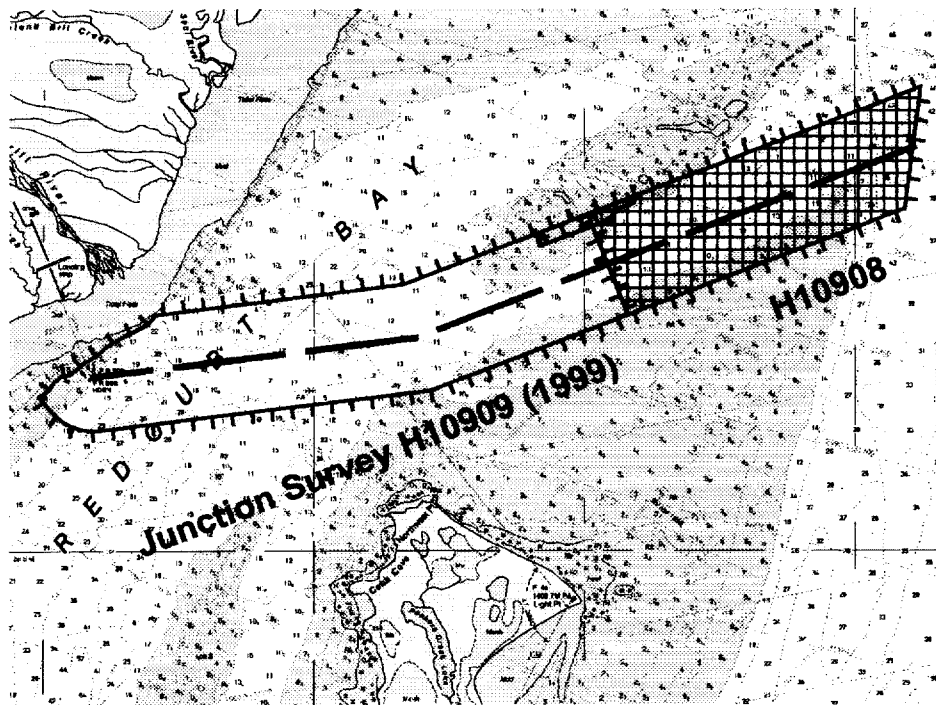


Figure 2 – Contemporary Junction Survey H10909

At the time of writing, data from H10909 had not been fully processed, so a junction comparison was not possible. A junction comparison between these two surveys will be included in the Descriptive Report for H10909. ✓

\* FILED WITH THE HYDROGRAPHIC DATA

**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 J: *this report*.

**M. ITEM INVESTIGATIONS** ✓

There are no AWOIS item investigations within the survey area. *concur*.

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

Survey H10908 was compared to the following charts:

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

H10908 was compared with charts 16013, 16660, and 16662. The current survey agreed well with all three charts, generally within one fathom; exceptions are described in the following paragraphs.

An 8-fathom 3-foot sounding shown on Chart 16662 at 60° 35' 47.72"N, 151° 49' 32.17"W was observed to have a least depth of 10.2 fathoms (Pos. #20770).

With the aid of the 3m x 3m DTM created in CARIS, several submerged rocks were identified during this survey. The significant rocks have been noted on the sounding plot included with this report. Extensive shoaling has occurred at the northwest limit of this survey. During survey operations there were visual observations of a sandbar exposed during periods of low tide. Due to the strong tidal currents in the area, the possibility of rocks and sandbars shifting is high. *concur*.

The current survey was also compared to chart 16013; however, due to the small scale of this chart, a reasonable comparison to this survey was not practical. ✓

Final sounding comparisons will be made at PHB after application of smooth tides.

**Dangers to Navigation** ✓

(20)

Twenty dangers to navigation were discovered during the survey and reported to the Seventeenth Coast Guard District on October 1, 1999. Refer to Appendix I for more information.

8.9

A 8.9-fathom shoal was discovered at 60° 37' 10.87"N, 151° 40' 52.05"W (Pos. #88653). Chart 16662 shows an 11-fathom depth near this position.

3

An 8.3-fathom shoal was discovered at 60° 36' 44.11"N, 151° 41' 35.44"W (Pos. #73468). Chart 16662 shows an 11-fathom depth near this position.

6

An 8.6-fathom shoal was discovered at 60° 36' 48.14"N, 151° 42' 09.56"W (Pos. #85473). This position is between a 10-fathom curve and an 11-fathom depth shown on Chart 16662.

7

A 7.8 fathom shoal was discovered at 60° 37' 14.65"N, 151° 42' 17.44"W (Pos. #90493). Chart 16662 shows an 11-fathom depth near this position.

<sup>6</sup>  
A 9.3-fathom shoal was discovered at 60° 36' 44.91"N, 151° 44' 07.24"W (Pos. #96516). This position is between 12-fathom and 13-fathom depths shown on Chart 16662.

✓  
A 9.5-fathom shoal was discovered at 60° 35' 40.82"N, 151° 44' 53.92"W (Pos. #54510). This position is between 10-fathom 3-foot and 11-fathom depths shown on Chart 16662.

<sup>6</sup>  
A 7.9-fathom shoal was discovered at 60° 35' 56.30"N, 151° 45' 41.73"W (Pos. #80509). Chart 16662 shows a 10-fathom 1-foot depth near this position.

<sup>6</sup>  
A 9.7-fathom shoal was discovered at 60° 35' 50.58"N, 151° 46' 50.58"W (Pos. #79347). Chart 16662 shows an 11-fathom depth near this position.

✓  
A 9.8-fathom shoal was discovered at 60° 36' 03.39"N, 151° 46' 57.41"W (Pos. #15531). Chart 16662 shows an 11-fathom depth near this position.

✓  
A 9.8-fathom shoal was discovered at 60° 36' 12.55"N, 151° 46' 43.10"W (Pos. #117274). Chart 16662 shows an 11-fathom depth near this position.

<sup>3</sup>  
A 9.4-fathom shoal was discovered at 60° 35' 20.87"N, 151° 48' 04.86"W (Pos. #61317). This position is between 10-fathom 3-foot and 11-fathom depths shown on Chart 16662.

<sup>3</sup>  
A 9.5-fathom shoal was discovered at 60° 35' 55.82"N, 151° 48' 00.80"W (Pos. #19147). Chart 16662 shows an 11-fathom depth near this position.

<sup>5</sup>  
A 9.6-fathom shoal was discovered at 60° 36' 32.64"N, 151° 41' 50.40"W (Pos. #81255). Chart 16662 shows an 11-fathom depth near this position.

✓  
An 8.9-fathom shoal was discovered at 60° 36' 33.76"N, 151° 41' 17.07"W (Pos. #76358). Chart 16662 shows an 11-fathom depth near this position.

<sup>6</sup>  
A 6.7-fathom shoal was discovered at 60° 35' 09.79"N, 151° 44' 47.23"W (Pos. #22882). This position is between a 7-fathom 5-foot and the 10-fathom depth curve shown on Chart 16662.

<sup>8</sup>  
A 9.8-fathom shoal was discovered at 60° 37' 03.64"N, 151° 40' 41.31"W (Pos. #83439). Chart 16662 shows an 11-fathom depth near this position.

<sup>7</sup>  
A 9.6-fathom shoal was discovered at 60° 37' 17.83"N, 151° 41' 52.63"W (Pos. #<sup>92415</sup>19147). This position is between 11-fathom and 12-fathom depths shown on Chart 16662.

✓  
A 7.3-fathom shoal was discovered at 60° 36' 02.85" N, 151° 41' 26.49" W (Pos. # 62134). This is near an 8-fathom 5-foot depth as depicted on chart 16662.

A shoal area that extends from 60° 35' 56.4"N, 151° 49' 55.91"W to 60° 36' 38.3"N, 151° 47' 46.08"W (approximately 1.3 nautical miles long). This shoal appears to extend north approximately 0.2 nautical miles and west approximately 1.2 nautical miles of the shoalest depths in the area. These depths are a -0.8 fathom shoal at 60° 36' 05.35"N, 151° 49' 37.24"W (Pos. #103215), a -0.4 fathom shoal at 60° 36' 18.48"N, 151° 48' 58.17"W (Pos. #99864), and a 0 fathom shoal at 60° 36' 27.03"N, 151° 48' 29.50"W (Pos. #74755). Chart 16662 shows depths ranging from 5 to 10 fathoms. ✓

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

Survey H10908 is complete and adequate to supersede prior soundings and features in their common areas. One hundred percent SWMB coverage was obtained in the survey area. CONCUR .

**P. AIDS TO NAVIGATION** ✓

No aids to navigation exist within the survey limits. *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 Project Instructions.

*Do not concur. Chart the latest bottom characteristics shown on the smooth sheet.*

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

**S. RECOMMENDATIONS** ✓

None.

**T. REFERRAL TO REPORTS** ✓

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

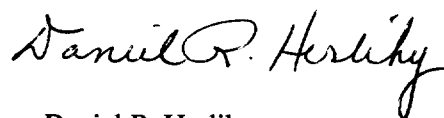
| <u>Title</u>                            | <u>Date Sent</u> | <u>Office</u> |
|---|------------------|---------------|
| OPR-P342-RA-99 1999 Coast Pilot Report  | TBA              | N/CS26        |
| Project Related Data for OPR-P342-RA-99 | Incremental      | N/CS34        |

Respectfully Submitted,



Kimberley Sampadian  
Physical Scientist, NOAA

Approved and Forwarded,



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:** J      **Registry Number:** H-10910

**Sheet Number:** RA-20-07-99

**Survey Title:** 6 nm Northwest of Cape Kasilof

**Data Acquisition Dates:**      **From:** 21-Jul-99      202      **To:** 19-Aug-99      231

## Vessel Usage Summary

| VESNO | MS | SPLITS | DEV | XL | S/L | DP | BS | DIVE |
|-------|----|--------|-----|----|-----|----|----|------|
| 2120  |    |        |     |    |     |    | 1  |      |
| 2121  |    |        |     |    |     |    |    |      |
| 2123  |    |        |     |    |     |    |    |      |
| 2126  |    |        |     |    |     |    |    |      |

## Sound Velocity Cast Information

### Tide Zone Information

| Zone # | Time Corr.    | Height Corr. |
|--------|---------------|--------------|
| CK363  | - 1 hr 00 min | X0.94        |
| CK371  | - 0 hr 54 min | X0.96        |
| CK372  | - 0 hr 54 min | X0.94        |
| Ck397  | - 0 hr 48 min | X0.94        |
| CK398  | - 0 hr 48 min | X0.96        |
| CK407  | - 0 hr 42 min | X0.96        |
| Ck408  | - 0 hr 42 min | X0.94        |
| CK427  | - 0 hr 42 min | X0.94        |
| Ck428  | - 0 hr 42 min | X0.96        |
| CK429  | - 0 hr 42 min | X0.97        |
| CK437  | - 0 hr 36 min | X0.98        |
| CK438  | - 0 hr 36 min | X0.97        |
| CK439  | - 0 hr 36 min | X0.96        |
| CK455  | - 0 hr 30 min | X0.97        |
| CK456  | - 0 hr 30 min | X0.98        |
| CK457  | - 0 hr 30 min | X0.99        |

### Tide Gage Information

| Tide Gage # | Gage Name    | Installed | Removed |
|-------------|--------------|-----------|---------|
| 945-5711    | CAPE KASILOF | 7/18/99   |         |

## Statistics Summary

| Type | Total: |
|------|--------|
| BS   | 6      |
| SWMB | 840.5  |

|             |   |
|-------------|---|
| Percent XL: |   |
| SQNM:       | 0 |



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  
September 28, 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 H10908 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:

| <u>Chart</u> | <u>Scale</u> | <u>Edition</u> | <u>Date</u> |
|--------------|--------------|----------------|-------------|
| 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 using predicted tides.

| <u>Feature</u> | <u>Depth (fm)</u> | <u>Latitude (N)</u> | <u>Longitude (W)</u> | <u>Depth (m)</u> |
|----------------|-------------------|---------------------|----------------------|------------------|
| Shoal          | 9.0               | 60-37-10.87         | 151-40-52.05         | 16.6             |
| Shoal          | 8.5               | 60-36-44.11         | 151-41-35.44         | 15.6             |
| Shoal          | 8.8               | 60-36-48.14         | 151-42-09.56         | 16.1             |
| Shoal          | 7.8               | 60-37-14.40         | 151-42-17.69         | 14.3             |
| Shoal          | 9.5               | 60-36-44.91         | 151-44-07.24         | 17.5             |
| Shoal          | 9.5               | 60-35-40.82         | 151-44-53.92         | 17.4             |
| Shoal          | 7.9               | 60-35-56.30         | 151-45-41.73         | 14.4             |
| Shoal          | 9.7               | 60-35-50.58         | 151-46-50.58         | 17.8             |
| Shoal          | 9.8               | 60-36-03.39         | 151-46-57.41         | 18.0             |
| Shoal          | 9.8               | 60-36-12.55         | 151-46-43.10         | 18.0             |
| Shoal          | 9.5               | 60-35-55.82         | 151-48-00.80         | 17.4             |
| Shoal          | 9.6               | 60-36-32.64         | 151-41-50.40         | 17.7             |
| Shoal          | 8.9               | 60-36-33.76         | 151-41-17.07         | 16.3             |
| Shoal          | 6.7               | 60-35-09.79         | 151-44-47.23         | 12.3             |
| Shoal          | 9.9               | 60-37-03.64         | 151-40-41.31         | 18.2             |
| Shoal          | 9.6               | 60-37-17.83         | 151-41-52.63         | 17.5             |
| Shoal          | 7.3               | 60-36-02.85         | 151-41-26.49         | 13.4             |
| Shoal          | 9.4               | 60-35-20.87         | 151-48-04.86         | 17.3             |

A shoal was found extending from 60° 35' 56.4"N, 151° 49' 55.91"W to 60° 36' 38.3"N, 151° 47' 46.08"W (approximately 1.3 nautical miles long). This shoal extends to the north approximately 0.2 nautical miles and to the west approximately 1.2 nautical miles, and was found to have the following shoalest depths:

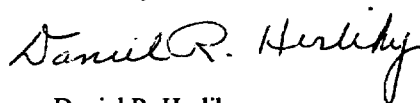


| Feature | Depth (fm) | Latitude (N) | Longitude (W) | Depth (m) |
|---------|------------|--------------|---------------|-----------|
| Shoal   | -0.8       | 60-36-05.35  | 151-49-37.24  | -1.4      |
| Shoal   | -0.4       | 60-36-18.48  | 151-48-58.17  | -0.7      |
| Shoal   | 0.0        | 60-36-27.03  | 151-48-29.50  | 0.0       |

**ADVANCE  
INFORMATION**

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-15-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at [FOO.RAINIER@NOAA.GOV](mailto:FOO.RAINIER@NOAA.GOV).

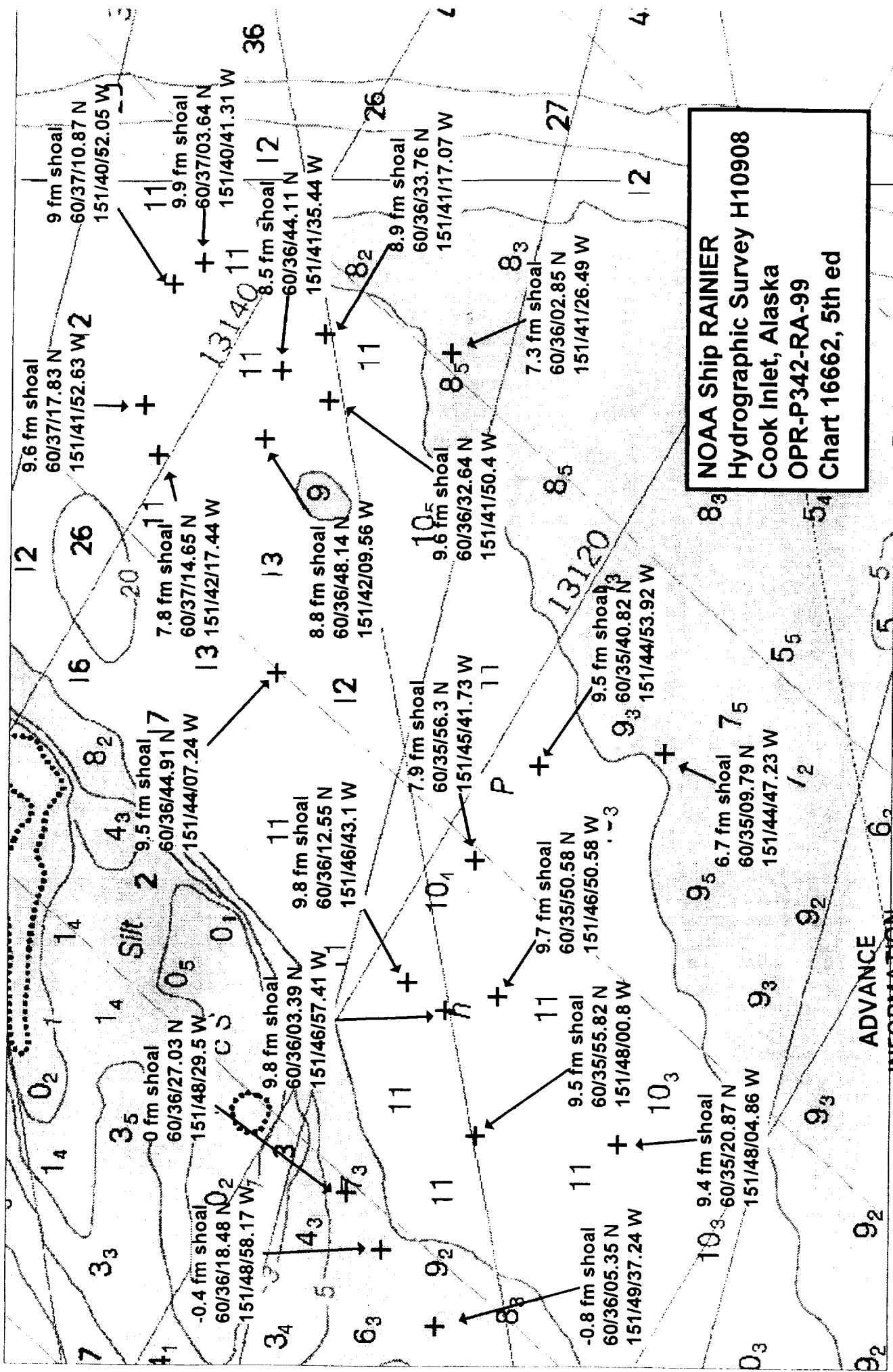
Sincerely,



Daniel R. Herlihy  
Commander, NOAA  
Commanding Officer

Attachment

cc: NIMA  
PMC  
N/CS261  
N/CS34



NOAA Ship RAINIER  
 Hydrographic Survey H10908  
 Cook Inlet, Alaska  
 OPR-P342-RA-99  
 Chart 16662, 5th ed

ADVANCE  
 INFORMATION



**Date:** 9/3/99

**Sender:** FOO Rainier

**To:** ejv, CO Rainier, Chief Survey Technician Rainier, Bradley Fritzler, Daniel Karlson, Nav Rainier, XO Rainier, Angie Venturato, Mark Wetzler, Shiela Allen, Mike Becker, Maureen Goff, Winli Lin, Paul McAnally, Danielle Pattison, Nicole Stagner, Mike Stecher, Lillian Stuart, Scot Warrender, Sandy Zirmheld

**Priority:** Normal

**Subject:** Fwd: Comparison with Priors

---

fyi

100% bottom coverage surveys do not require prior survey comparison. This will apply to the Cook Inlet and Kodiak surveys only. Full chart(s) comparison is still a requirement.

If one is suspect of charted soundings, then I would encourage falling back onto the prior for additional information.

Forward Header

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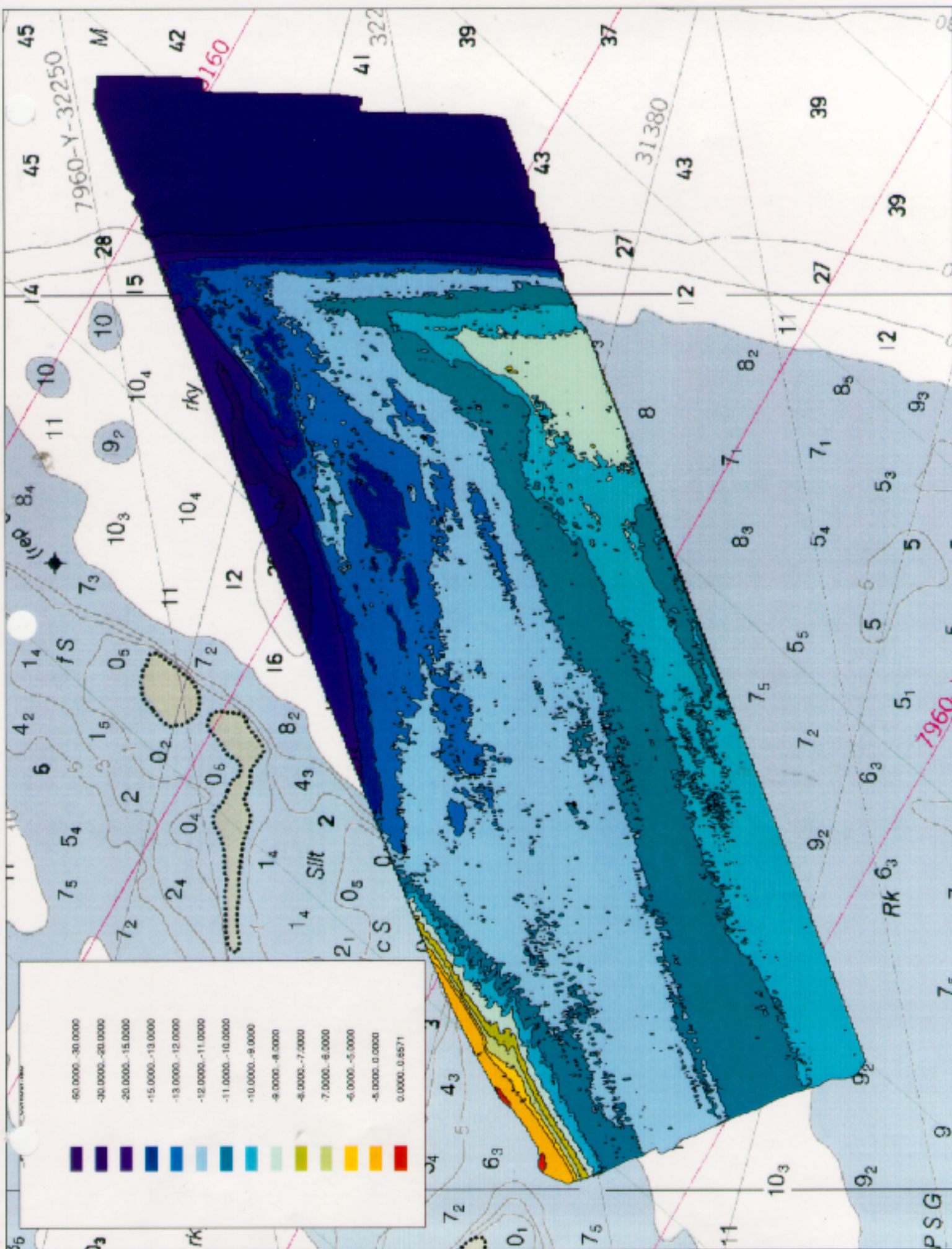
**Subject:** Comparison with Priors  
**Author:** Don.Haines@noaa.gov (Don Haines)  
**Date:** 9/3/99 2:37 PM

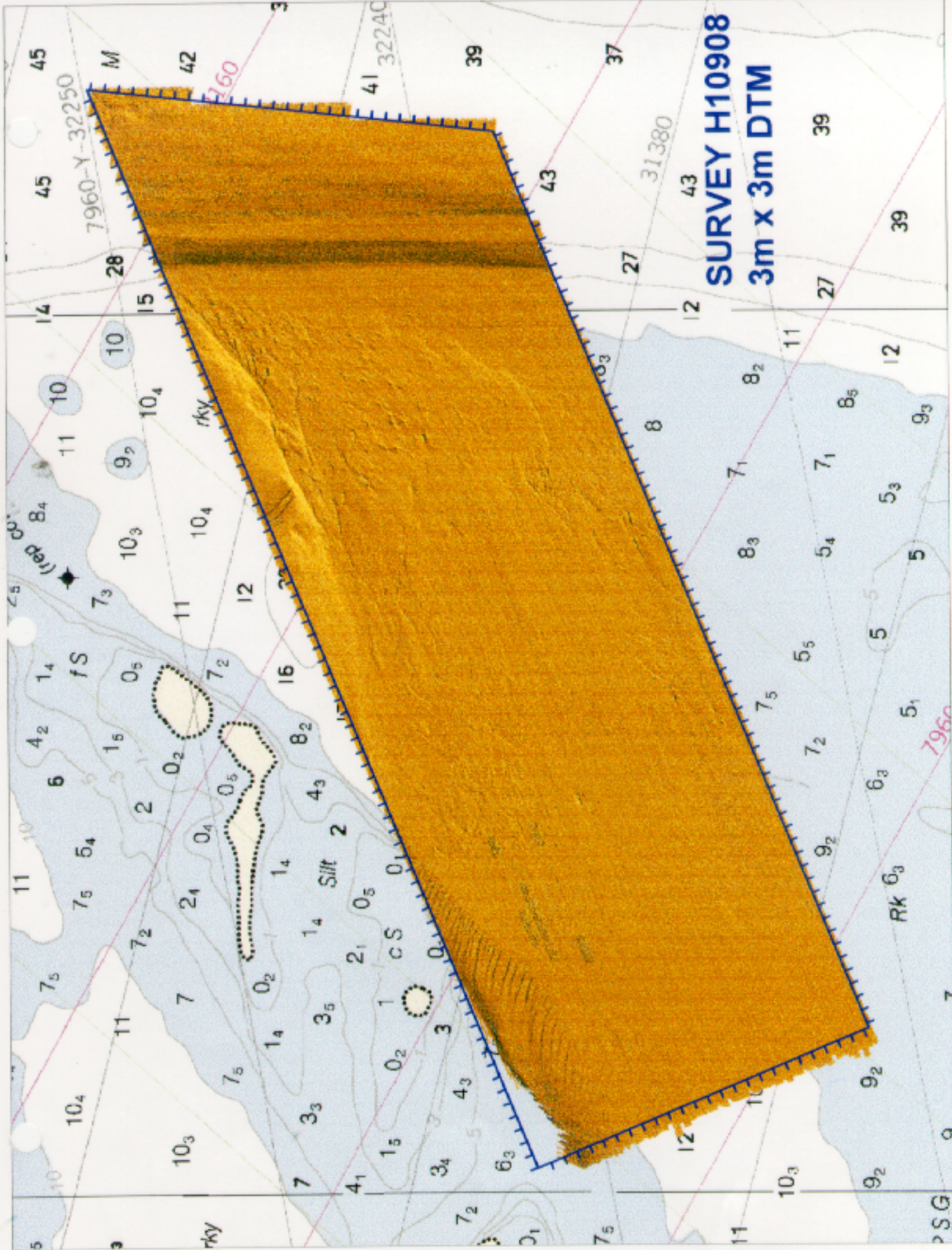
Gentlemen:

RA has requested that relieved of the duty of performing prior comparisons 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 consistency between both coasts and contracts.

Don





**SURVEY H10908**  
**3m x 3m DTM**

7960-Y-32250

31380

260

7960

Silt 2

CS

rkY

rkX

fS

RK 6<sub>3</sub>

PSG

APPROVAL SHEET

for

H10908

RA-20-05-99

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  
Commander, NOAA  
Commanding Officer  
NOAA Ship RAINIER

GEOGRAPHIC NAMES

H-10908

| Name on Survey        | Source of Name   |   |   |   |   |   |   |   |   |  |  |    |
|-----------------------|--|---|---|---|---|---|---|---|---|--|--|----|
|                       | A  | B | C | D | E | F | G | H | K |  |  |    |
|                       | <small>           ON CHART NO. 16662<br/>           ON PREVIOUS SURVEY NO.<br/>           ON U.S. QUADRANGLE MAPS<br/>           FROM LOCAL INFORMATION<br/>           ON LOCAL MAPS<br/>           P.O. GUIDE OR MAP<br/>           GRAND McNALLY ATLAS<br/>           U.S. LIGHT LIST         </small> |   |   |   |   |   |   |   |   |  |  |    |
| ALASKA (title)        | X  |   | X |   |   |   |   |   |   |  |  | 1  |
| COOK INLET            | X  |   | X |   |   |   |   |   |   |  |  | 2  |
| WEST FORELAND (title) | X  |   | X |   |   |   |   |   |   |  |  | 3  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 4  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 5  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 6  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 7  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 8  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 9  |
|                       |  |   |   |   |   |   |   |   |   |  |  | 10 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 11 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 12 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 13 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 14 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 15 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 16 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 17 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 18 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 19 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 20 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 21 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 22 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 23 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 24 |
|                       |  |   |   |   |   |   |   |   |   |  |  | 25 |

*Dennis J. Rosenberg*  
 Chief Geographer  
 JAN 21 2000



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-10908

**LOCALITY:** 5 NM South of West Foreland, 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:** CK487, CK488, CK505, CK506, CK507,  
CK508, CK512, CK513, CK514, CK515, CK516, CK527, CK528, CK529,  
CK530 & CK531.

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-10908.

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<br>Order | AVG Time<br>Correction | Range<br>Correction |
|-----------------------|-----------------------|------------------------|---------------------|
| <b>Zone CK487</b>     |                       |                        |                     |
| -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 |                       |                        |                     |
| <b>Zone CK488</b>     |                       |                        |                     |
| -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 |                       |                        |                     |
| <b>Zone CK505</b>     |                       |                        |                     |
| -151.632089 60.595213 | 945-5732              | +24                    | 1.03                |
| -151.67296 60.596304  |                       |                        |                     |
| -151.677955 60.564828 |                       |                        |                     |
| -151.634031 60.563875 |                       |                        |                     |
| -151.632089 60.595213 |                       |                        |                     |
| <b>Zone CK506</b>     |                       |                        |                     |
| -151.67296 60.596304  | 945-5732              | +24                    | 1.02                |
| -151.724888 60.59769  |                       |                        |                     |
| -151.726948 60.593415 |                       |                        |                     |
| -151.734817 60.566074 |                       |                        |                     |
| -151.677955 60.564828 |                       |                        |                     |



-151.67296 60.596304

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 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 |          |     |      |

Zone CK513

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.752788 60.627273 | 945-5732 | +24 | 1.01 |
| -151.777375 60.599095 |          |     |      |
| -151.724888 60.59769  |          |     |      |
| -151.71115 60.626314  |          |     |      |
| -151.752788 60.627273 |          |     |      |

Zone CK514

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.71115 60.626314  | 945-5732 | +24 | 1.02 |
| -151.724888 60.59769  |          |     |      |
| -151.67296 60.596304  |          |     |      |
| -151.668302 60.625343 |          |     |      |
| -151.71115 60.626314  |          |     |      |

Zone CK515

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.668302 60.625343 | 945-5732 | +24 | 1.03 |
|-----------------------|----------|-----|------|

-151.67296 60.596304  
-151.632089 60.595213  
-151.630296 60.624468  
-151.668302 60.625343

Zone CK516

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.630296 60.624468 | 945-5732 | +24 | 1.05 |
| -151.632089 60.595213 |          |     |      |
| -151.585235 60.593956 |          |     |      |
| -151.58659 60.604545  |          |     |      |
| -151.587476 60.623493 |          |     |      |
| -151.630296 60.624468 |          |     |      |

Zone CK527

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.627537 60.653603 | 945-5732 | +30 | 1.05 |
| -151.630296 60.624468 |          |     |      |
| -151.587476 60.623493 |          |     |      |
| -151.588881 60.653376 |          |     |      |
| -151.627537 60.653603 |          |     |      |

Zone CK528

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.663716 60.653821 | 945-5732 | +30 | 1.03 |
| -151.668302 60.625343 |          |     |      |
| -151.630296 60.624468 |          |     |      |
| -151.627537 60.653603 |          |     |      |
| -151.663716 60.653821 |          |     |      |

Zone CK529

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.697787 60.654024 | 945-5732 | +30 | 1.02 |
| -151.71115 60.626314  |          |     |      |
| -151.668302 60.625343 |          |     |      |
| -151.663716 60.653821 |          |     |      |
| -151.697787 60.654024 |          |     |      |

Zone CK530

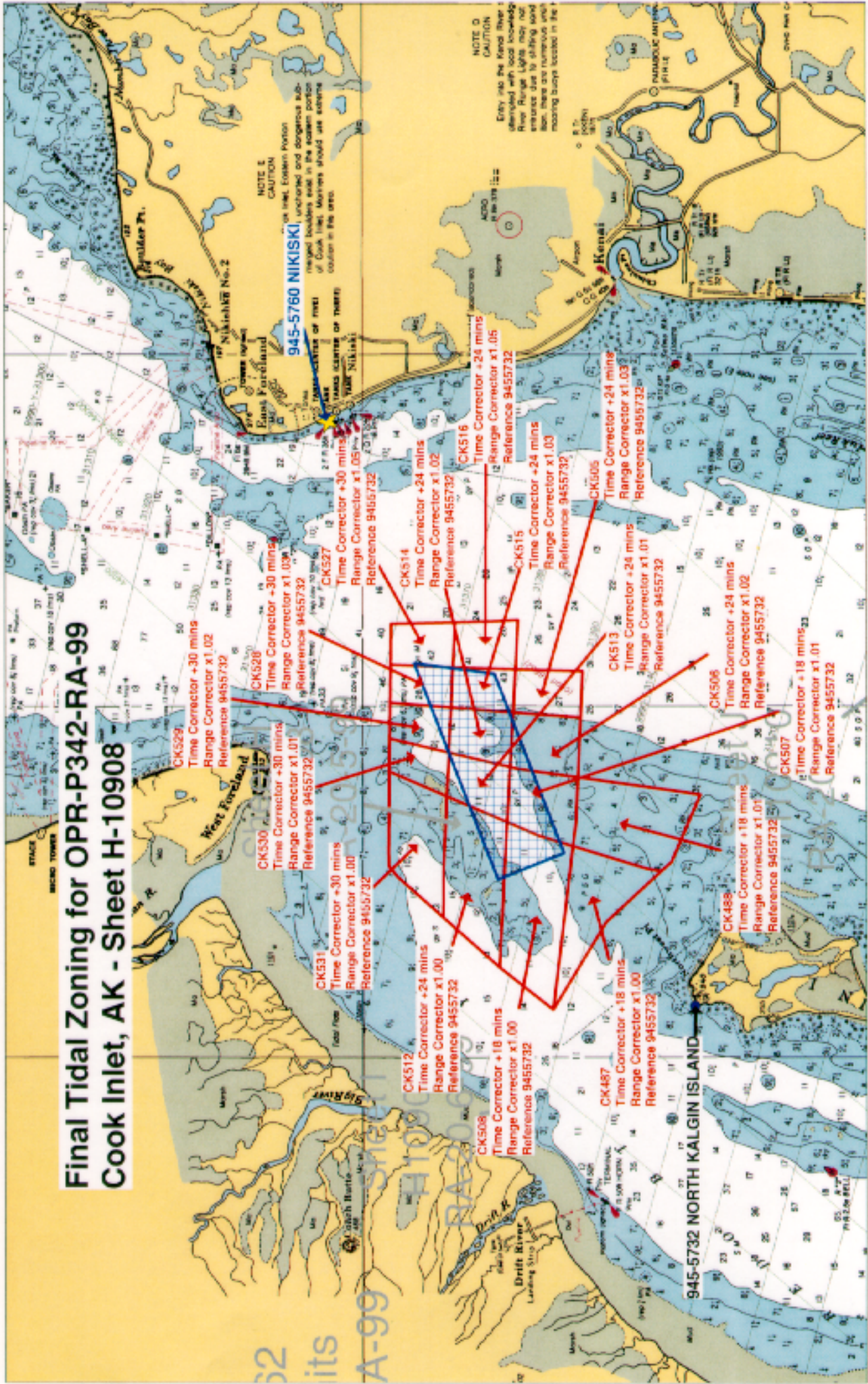
|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.729236 60.654211 | 945-5732 | +30 | 1.01 |
| -151.752788 60.627273 |          |     |      |
| -151.71115 60.626314  |          |     |      |
| -151.697787 60.654024 |          |     |      |
| -151.729236 60.654211 |          |     |      |

Zone CK531

|                       |          |     |      |
|-----------------------|----------|-----|------|
| -151.818931 60.654493 | 945-5732 | +30 | 1.00 |
| -151.829169 60.650502 |          |     |      |
| -151.868015 60.629027 |          |     |      |

-151.824304 60.628901  
-151.752788 60.627273  
-151.729236 60.654211  
-151.804818 60.654663  
-151.818931 60.654493

# Final Tidal Zoning for OPR-P342-RA-99 Cook Inlet, AK - Sheet H-10908



**HYDROGRAPHIC SURVEY STATISTICS**

H-10908

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 Ed., April 19, 1997 |

**OFFICE PROCESSING ACTIVITIES**

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

| PROCESSING ACTIVITY                      | AMOUNTS      |            |        |       |
|--|--------------|------------|--------|-------|
|  | VERIFICATION | EVALUATION | TOTALS |       |
| POSITIONS ON SHEET                       |              |            |        |       |
| POSITIONS REVISED                        |              |            |        |       |
| SOUNDINGS REVISED                        |              |            |        |       |
| CONTROL STATIONS REVISED                 |              |            |        |       |
|  | TIME-HOURS   |            |        |       |
|  | VERIFICATION | EVALUATION | TOTALS |       |
| PRE-PROCESSING EXAMINATION               |              |            |        |       |
| VERIFICATION OF CONTROL                  |              |            |        |       |
| VERIFICATION OF POSITIONS                |              |            |        |       |
| VERIFICATION OF SOUNDINGS                |              |            |        |       |
| VERIFICATION OF JUNCTIONS                |              |            |        |       |
| APPLICATION OF PHOTOBATHYMETRY           |              |            |        |       |
| SHORELINE APPLICATION/VERIFICATION       |              |            |        |       |
| COMPILATION OF SMOOTH SHEET              | 67.0         |            | 67.0   |       |
| COMPARISON WITH PRIOR SURVEYS AND CHARTS |              | 12.0       | 12.0   |       |
| EVALUATION OF SIDE SCAN SONAR RECORDS    |              |            |        |       |
| EVALUATION OF WIRE DRAGS AND SWEEPS      |              |            |        |       |
| EVALUATION REPORT                        |              | 16.5       | 16.5   |       |
| GEOGRAPHIC NAMES                         |              |            |        |       |
| OTHER (Chart Compilation)                |              | 20.0       | 20.0   |       |
| USE OTHER SIDE OF FORM FOR REMARKS       | TOTALS       | 67.0       | 48.5   | 115.5 |

|   |                            |                         |
|---|----------------------------|-------------------------|
| Pre-processing Examination by<br><b>R. Davies</b>   | Beginning Date<br>11/29/99 | Ending Date<br>11/30/99 |
| Verification of Field Data by<br><b>E. Domingo, R. Davies, G. Nelson, B. Mihailov, R. Mayor</b> | Time (Hours)<br>67.0       | Ending Date<br>8/10/00  |
| Verification Check by<br><i>Asst T. Shudate</i>   | Time (Hours)<br>6.0        | Ending Date<br>1/10/01  |
| Evaluation and Analysis by<br><b>I. Almacen</b>   | Time (Hours)<br>28.5       | Ending Date<br>8/15/00  |
| Inspection by<br><i>Asst T. Shudate</i>   | Time (Hours)               | Ending Date<br>1/14/01  |

**EVALUATION REPORT  
H-10908**

**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 to 19.5 fathoms.

**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 a new accepted tidal datum has been adopted for this survey area based on the 1994 to 1998 mean sea level observations. Specific information concerning this latest 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: -2.059 seconds (-63.713 meters)  
Longitude: 8.095 seconds (123.136 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-10908 junctions with the following survey .

| <u>Survey</u> | <u>Year</u> | <u>Scale</u> | <u>Area</u>        |
|---------------|-------------|--------------|--------------------|
| H-10909       | 1999        | 1:20,000     | Southwestern Limit |

The junction with survey H-10909 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

Comparison with the following prior surveys were accomplished as part of the standard office processing procedure.

| <u>Survey</u> | <u>Year</u> | <u>Scale</u> | <u>Datum</u> |
|---------------|-------------|--------------|--------------|
| H-8964        | 1967-74     | 1:20,000     | NAD 27       |
| H-9619        | 1976        | 1:20,000     | NAD 27       |
| H-9620        | 1976        | 1:20,000     | NAD 27       |

The legibility of the prior survey digital image files is considered acceptable and they were adequately registered to the present survey smooth sheet. The plotted soundings and other related features on the prior smooth sheets are readable

Comparison with the above listed prior surveys reveal good agreement. The soundings generally agree within a fathom except along the area of the shoal noted in this survey and those reported as dangers to navigation. A full coverage of the present survey was accomplished utilizing the shallow water multibeam (SWMB) system. The smooth sheet has been annotated to indicate the presence of several isolated rocks which do not appear on the prior surveys. These features are probably boulders which are common to this area of Cook Inlet. The designation of selected depths as rocks or rocky was done based on the echo sounder interpretation in lieu of an actual dive investigation.

Survey H-10908 is adequate to supersede the prior surveys within the area of common coverage.

#### **N. ITEM INVESTIGATIONS**

There were no item investigations assigned to this survey..

#### **O. COMPARISON WITH CHART**

Survey H-10908 was compared with the following charts.

| <u>Chart</u> | <u>Edition</u> | <u>Date</u>    | <u>Scale</u> | <u>Datum</u> |
|--------------|----------------|----------------|--------------|--------------|
| 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-10908 is adequate to supersede charted hydrography within the common area.

The charted configuration of the shoal along the northern limits of this survey has considerably changed. The present survey was compiled on the chart with the portion of the depth curves depicted in dashed lines to delineate the approximate configuration of the shoal where no adequate information is presently available.

The charted "Note B, Caution", concerning numerous uncharted and dangerous submerged boulders in the eastern portion of Cook Inlet should be reviewed for possible revision to include the areas common to the present survey.

##### **b. Dangers to navigation**

Twenty (20) dangers to navigation (DTON) were discovered during this survey and transmitted to the USCG, NIMA, N/CS261 and N/CS3 on September 28, 1999. A copy of the report is attached. No additional dangers were found during office processing.

#### **P. ADEQUACY OF SURVEY**

The hydrography contained on survey H-10908 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.

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 1998 Edition, and the Specifications and Deliverables 1999.

#### **Q. AIDS TO NAVIGATION**

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

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**

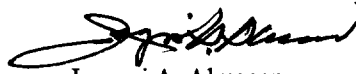
Miscellaneous information is adequately discussed in the hydrographer's report.

**T. RECOMMENDATIONS**

Survey H-10908 is a good hydrographic survey. No additional work is recommended.

**U. REFERRAL TO REPORTS**

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



Isagani A. Almacén  
Cartographer

APPROVAL SHEET  
H-10908

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 disapproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

for Arnaldo T. Piccato Date: 1/11/01  
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.

James C. Gardner Date: 1-16-01  
James C. Gardner  
Captain, NOAA  
Chief, Pacific Hydrographic Branch

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Final Approval

Approved:

Samuel P. De Bow, Jr. Date: February 2, 2001  
Samuel P. De Bow, Jr.  
Captain, NOAA  
Chief, Hydrographic Surveys Division

