9840

Diagram No. 8554-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. RA-20-3-79

Office No. H-9840

LOCALITY

State Alaska

General Locality Cook Inlet

Locality Vicinity of Cape Starichkof

1979

CHIEF OF PARTY
Capt. W.L. Mobley

LIBRARY & ARCHIVES

DATE December 15, 1981

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

NOAA FORM 77-28 (11-72) | U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTER NO. H-9840

FIELD NO. RA-20-3-79

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

State Alaska

General locality Cook Inlet

Locality VICINITY OF Cape Starichkof

Scale 1:20,000 Date of survey 7/22/79 - 8/15/79

Instructions dated March 2, 1979 Project No. OPR-P114-RA-79

Vessel NOAA Ship RAINIER, Launches RA-3 (1007), RA-5 (1003), and RA-6 (1013)

Chief of party Captain Wayne L. Mobley

Surveyed by LT Alan Anderson, LT Tom Clark, LTJG Michael McCluskey, SST Richard Hastings, ENS Dave Kruth,

Soundings taken by echo sounder, ~~hand lead, pole~~ Ross Fineline Echo Sounder

Graphic record scaled by RAINIER Survey Department

Graphic record checked by RAINIER Survey Department

Positions ~~Reviewed~~ Verified by John E. Lotshaw Automated plot by Xynetics Plotter (PMC)

Sounding Verification by John E. Lotshaw

Soundings in fathoms ^ and tenths ~~feet~~ at ~~MLW~~ MLLW

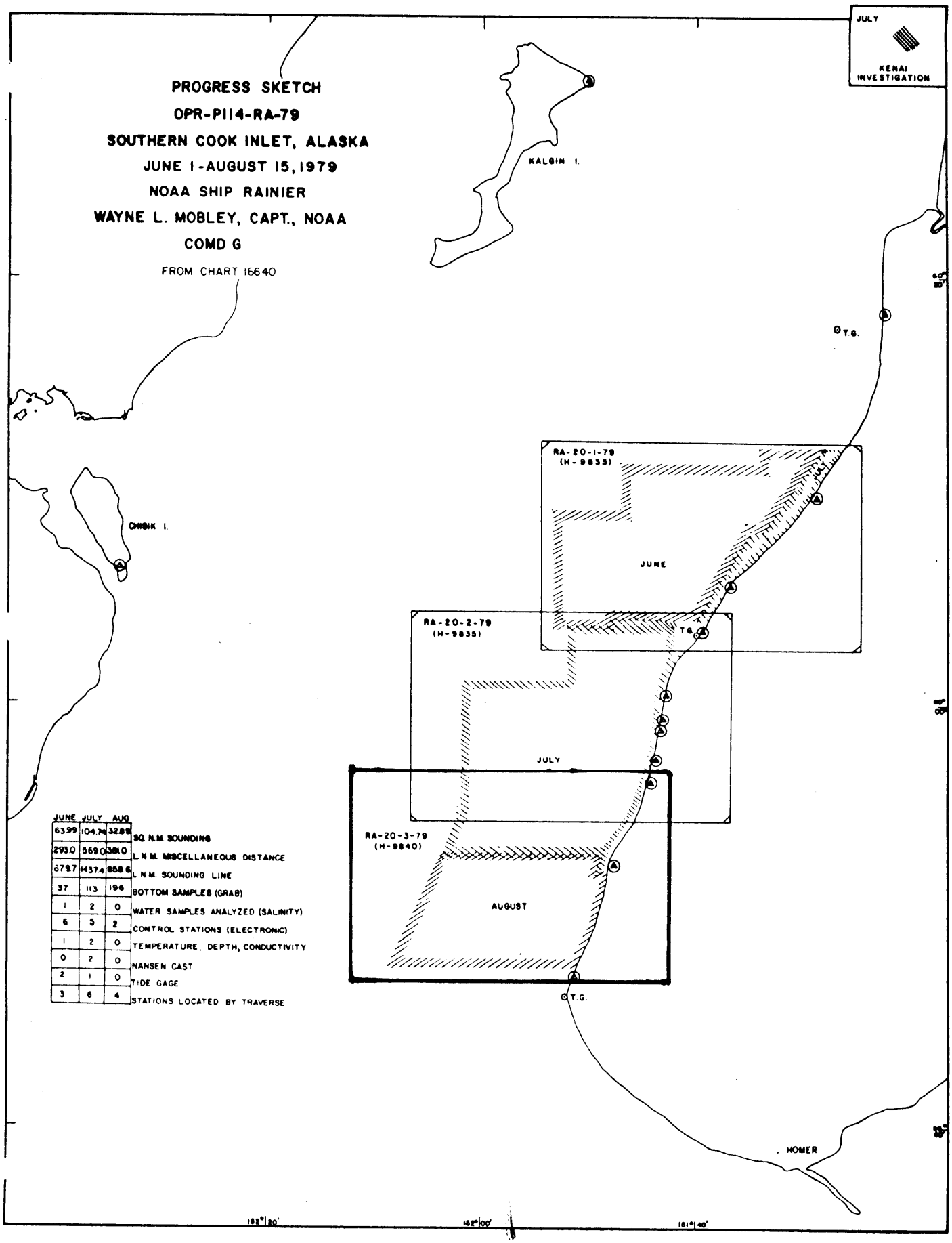
REMARKS: This survey is complete and adequate to supersede all prior surveys.

Time Meridian 0° (GMT)

Misc. data culled from the D.R. is filed with the survey records

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

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—665-661/1222 REGION NO. 6



JUNE	JULY	AUG	
63.99	104.74	32.88	SQ. N.M. SOUNDING
293.0	569.0	361.0	L.N.M. MISCELLANEOUS DISTANCE
679.7	1437.4	858.6	L.N.M. SOUNDING LINE
37	113	196	BOTTOM SAMPLES (GRAB)
1	2	0	WATER SAMPLES ANALYZED (SALINITY)
6	5	2	CONTROL STATIONS (ELECTRONIC)
1	2	0	TEMPERATURE, DEPTH, CONDUCTIVITY
0	2	0	NANSEN CAST
2	1	0	TIDE GAGE
3	6	4	STATIONS LOCATED BY TRAVERSE

A. PROJECT

This hydrographic survey was conducted in accordance with Project Instructions OPR-P114-RA-79, Southern Cook Inlet, Alaska, dated March 2, 1979; Change No.1: Supplement to Instructions, dated March 30, 1979; Change No.2: Amendment to Instructions, dated March 29, 1979; Change No.3: Amendment to Instructions, dated July 18, 1979; and Change No.4: Amendment to Instructions dated August 6, 1979.

B. AREA

The area surveyed was that part of Southern Cook Inlet between the points 59° 55' 30" N; 152° 02' 30" W, 59° 47' 45" N, 152° 09' ~~00~~ 30" W and extending eastward to the shore.

Hydrography was conducted at a scale of 1:20,000 and extends inshore to the zero fathom curve. Survey operations began July 22, 1979 and were concluded August 15, 1979.

C. SOUNDING VESSELS

Hydrography was conducted by launches RA-3 (hull 1007) and RA-6 (hull 1013); bottom samples were taken by launch RA-5 (hull 1003). No unusual vessel configurations were used or problems encountered.

D. SOUNDING EQUIPMENT

Echo soundings obtained during OPR-P114-RA-79 were taken with Ross Fineline fathometer systems which include the following components: Ross Model 4000 Transceiver, Ross Model 5000 Analog Recorder, Ross Model 6000 Digitizer and 100 kHz transducer. Table 1 summarizes the serial numbers of the various components used in each vessel:

Table 1
Echo Sounder Component Serial Numbers

Component	RA-3 (2123)	RA-5 (2125)	RA-6 (2126)
Transceiver	1080	1040	1042
Analog Recorder	1070	1040	1042
Digitizer	1080	1040	1041-4

CORRECTIONS TO ECHO SOUNDINGS

The following echo sounding corrections are discussed: Sound velocity corrections, launch draft corrections, settlement and squat corrections, and instrument corrections for blanking, initial, phase and sea swell errors.

Sound Velocity Corrections

Sound velocity corrections for echo soundings were derived from Martek TDC (S/N 358) water casts that were checked against an initial Nansen Cast (see H.O. 607, Instruction Manual for Obtaining Oceanographic Data, Third Edition, U.S. Naval Oceanographic Office, 1968). Three Marteks and one Nansen cast were performed during OPR-P114-RA-79 and the details of each are presented in Table 2.

Table 2
Nansen/Martek Cast Data, OPR-P114-RA-79

Cast Type	Date Time	Location	Applicable Survey	Velocity Table No.
Martek TDC	June 20, 1979 2200Z	Lat 60/08/48.0 Long 151/38/12.0	RA-20-1-79 RA-20-2-79 RA-20-3-79	1
Martek TDC/ Nansen Cast	July 8, 1979 2400Z	Lat 60/07/00.0 Long 151/41/00.0	RA-20-1-79 RA-20-2-79 RA-20-3-79	1
Martek TDC	Aug. 5, 1979 2000Z	Lat 60/00/00.0 Long 151/57/00.0	RA-20-1-79 RA-20-2-79 RA-20-3-79	1

Samples from these casts (Nansen bottle on surface Martek cast) were analyzed for salinity using standard laboratory procedures (see H.O. 607). The salinometer used for these analyses was a Bissett/Berman Model 6210, S/N 1043, which was last calibrated in March, 1979, by the northwest Regional Center, Bellevue, Washington. The Martek was also calibrated there in January of 1979.

Results from the Nansen and Martek TDC casts along with the data from the salinometer, were input into computer program RK-530-Velocity Correction Computations, and run on RAINIER's PDP-8/e Digital Computer; S/N 1015.

The sound velocity computations and subsequent velocity corrections revealed a uniform water column with excellent mixing. To obtain accurate velocity corrections, all four observations (including Nansen Cast) were coplotted on a velocity graph. Together, they revealed a single, consistent velocity curve from which correctors for all three surveys were scaled. This explains the single velocity corrector tape for all of OPR-114-RA-79. The Nansen cast was used to verify that seawater samples at the bottom of the water column were, indeed, identical to surface samples -- both in temperature and salinity.

Launch Draft Corrections

Corrections for launch draft were determined from standard bar checks (see Hydrographic Manual). Bar checks were performed each day by each launch prior to and at the completion of sounding operations. (Graduations on bar hand lines were compared with steel measuring tapes prior to and at the completion of OPR-P114-RA-79 and were found to be accurate).

The mean values were subtracted from the corresponding mean true bar depths to obtain a series of "bar check correctors". Bar check correctors were not co-plotted on the sound velocity correction curve in that velocity corrections were insignificant. These bar check correctors alone, therefore, represent the computed corrections for launch draft.

Since these corrections were not available until completion of the project, an estimated launch draft correction of 0.3 fathoms was used for plotting of boat, semi-smooth, and smooth field sheets. Computed launch draft corrections were supplied to PMC in TC/TI tapes.

Launch Settlement and Squat Corrections

Settlement and squat of all three launches (RA-3, RA-5 and RA-6) were measured prior to OPR-P114-RA-79 in Lake Washington, Seattle, Washington on March 20 (J.D. 079), 1979, by the following method: A level rod, graduated in feet, was held above the transducer in each launch. A self-leveling Zeiss Ni 2 (S/N 103453) level was set up on stable ground and readings were taken at different speeds as the launch(es) headed directly toward the level operator. These readings were made relative to a zero heading as the launch was dead in water. Since the tests were run on an inland lake, no tidal effects need be considered. The speeds utilized were the same used by RAINIER personnel in the field.

The corrections obtained from the tests are included in the report for reference but they were not placed on TC/TI tapes or applied to field plotting sheets. The corrections are not necessary for this survey in accordance with PMC OPORDER 3-03.06x1, page 3-31.

> "Settlement and squat errors are commonly ignored when operating in areas of irregular bottom, at various speeds, as this error is usually insignificant if the sounding unit is fathoms. "

Sounding Instrument Corrections

During survey operations, if miscellaneous returns were causing misdigitizing, the 'blanking' depth was set to a value slightly shoaler than the shoalest bottom depth expected, and was adjusted as the depth changed. Corresponding analog depths were substituted for missed digital soundings during field scanning operations.

The initial trace on the analog recorder was frequently monitored and was adjusted, when necessary, to prevent errors.

To prevent belt length error or stylus paper misalignment on the analog recorders, RAINIER personnel performed "phase calibrations" of the records each day.

Seas were not always calm in Cook Inlet, therefore, sea/swell corrections were applied, and should not be confused with obvious sand waves on the fathograms.

Manual Sounding Corrections

Manual soundings were taken with hand-held lead lines on those shoals with least depths shoaler than seven fathoms. Depth markings on these lead lines were compared with a steel measuring tape before and after OPR-P114-RA-79, and were found to be accurate. Since the recordings of lead line soundings were interspersed with fathometer soundings, special care was taken to prevent the application of sound velocity corrections to lead line depths. A separate velocity corrector tape was made with zero corrections for this purpose.

For further information concerning echo sounding correction computations refer to Corrections to Echo Soundings Report, OPR-P114-RA-79.

E. HYDROGRAPHIC SHEETS

Two field sheets based on a modified transverse Mercator projection were used to cover the survey (boat sheets 3A and 3B). The sheets junction along latitude 59° 52' 00" N and were constructed utilizing the PDP 8/e complot system. Five expansion sheets were plotted to clarify areas of sand wave development. The list of parameters used to define the hydrographic sheets are included in the separates following the text.

F. CONTROL STATIONS

Horizontal control for this survey was provided by the recovery of eight existing stations and the establishment of nine new control stations. The recovered stations are as follows: Sis 1963,

PT-3 1963, Ninilchik 1908, Deep 1964, Starisky Microwave Tower Center Axis, Lee 1968, Hump 2 1968 Ecc. (Red Raydist 1978), and E. Kalgin 3 Ecc. (Green Raydist Stake ~~1979~~ 1978). The last two were utilized as Raydist antenna sites throughout the course of the survey, their G.P.'s were obtained from the 1978 descriptive report by the RAINIER for H-9777, RA-20-1-78. The new stations established were: Pat 1979, Sue 1979, Pit (T.P.). These stations served as positions for MiniRangers, visual hydro signals, and to extend control southward along the eastern shore of the inlet.

The new stations were established by Third Order Class I methods and, with the exception of Pit (T.P.), Doone (T.P.) and Miller Time (T.P.), all were described and monumented. All stations were referred to the North American 1927 datum.

Refer to Horizontal Control Report OPR-P114-RA-79 for additional information.

G. HYDROGRAPHIC POSITION CONTROL

Electronic range-range methods were used for hydrographic position control during this survey. A Teledyne Hastings-Raydist system and a Motorola MiniRanger III system were both employed.

Description of Raydist Shore Stations

Two Raydist shore stations were recovered and used during this survey: Red Raydist 1978 and Green Raydist Stake 1978.

The Red station was located at Red Raydist 1978 on Chisik Island, Latitude 60^{0} 06' 21.437 N, Longitude 152^{0} 33' 53.267 W. The antenna consisted of four ten-foot sections of structural tower topped with a 35-foot whip antenna. The station was on a flat hilltop approximately 159 meters above MSL.

Power for both Raydist shore stations was provided by propane-fueled Teledyne Hasting thermal generators. The Raydist was operated on a frequency of 3296.46 kHz. The Raydist arc intersections throughout the survey area were between 30^{0} and 150^{0}.

Description of MiniRanger Shore Stations

During this survey two shore stations were recovered and four established for MiniRanger range-range hydrographic operations. MiniRanger was also used to calibrate the Raydist for hydrography as explained below. Shore station numbers, transponder codes and numbers and other relevant data are as follows:

Station Number	Station Name	M/R Code	M/R Transponder	Dates on Station	Remarks
111	Ninilchik	4	1569	199-217	Raydist Hydro
113	Animal Hill	2	4708	199-218	M/R & Raydist Hydro
114	Tubbs	3	1570	201-204	M/R & Raydist Hydro
115	Miller Time	1	4950	201-222	M/R & Raydist Hydro
		3	1570	220-222	Raydist Hydro
116	Ninilchik Entrance Lt	3	1570	214-216	Raydist Hydro
117	Lee	3	1570	217	Raydist Hydro

MiniRanger was used for hydrographic position control only on days 170 through 176 and 204, on days 170 through 172 and 178 through 222 it was used to calibrate the Raydist system as described below. It was also used to control bottom samples and Martek casts. When used in the range-range mode all pairs provided an arc intersection of between 30^0 and 150^0. All stations were positioned over Third Order Class I geodetic control stations. For a Breakdown of Mini-Ranger locations by field sheet and day see "Daily Operations Tables".

At each station, the MiniRanger transponder was two to four meters above the station. See "Master Station List" for station elevations above MSL. Power for each shore station was provided by two 12 volt batteries arranged in series to provide 24 volts DC.

Raydist Shore Station Performance

Both red and green sideband stations gave some trouble during survey operations, necessitating a halt in hydrography or a switch to MiniRanger control while the stations were repaired. The following log summarizes Raydist shore station problems and activity:

Julian Date	Remarks
156	Installed red side band station #232 on Chisik Island.
156	Installed green side band station #242 on Kalgin Island.

Julian Date	Remarks
159	Poor red signal. Checked station.
163	Thermal generator overvoltage output damaged crystal oven. Replaced oven and adjusted generator and transmitter.
176	Poor red signal. Transmitter replaced with # 121.
188	Changed propane bottles at red and green stations.
203	Poor green signal.
205	Replaced green transmitter with # 233.
206	Checked all connections and cut back weed growth in ground plane area to improve green signal.
219	Bad green signal. Removed non-NOAA MiniRanger transponder which had been attached to green transmitter tower.
228	Removed both shore stations.

In spite of these various problems with Raydist shore stations, their operation was acceptable for 1:20,000 scale surveying during the major periods of hydrography. The system however was not working properly and could not be used on a larger scale survey because of position inaccuracies caused by a wavering signal.

MiniRanger Shore Station Performance

There were no MiniRanger shore station failures during survey operations with the exception of a few transponder shut-offs caused by low battery voltage. The code two transponder failed to operate during the third baseline calibration on August 10 thus preventing a final calibration of this code. The performance of all shore stations during survey operations was good, with the following exceptions. Occasional null zones were encoutered causing low signal strengths and requiring occasional repointing of shore transponder antennae. On julian days 218 and 219, interference from an outside source, presumably another non-NOAA MiniRanger system known to be operating north of the survey area with long-range directional antennae, caused very poor and erratic reception of our shore station signals, preventing any hydrography during this period. MiniRanger operation during collection of all non-rejected data was good.

Description of Raydist Mobile Stations

Three vessels used Raydist positioning equipment during this survey: RAINIER launch RA-3 (electronic data processing no. 2123), RAINIER launch RA-5 (electronic data processing no. 2125) and RAINIER launch RA-6 (electronic data processing no. 2126). Positioning equipment used aboard these vessels was as follows:

Vessel	Trans-mitter	Navigator	Position Indicator	Panalogic
2123	170	114	121	12
2125	166	117	117	17
2126	167	115	118	3

Mobile Raydist positioning equipment operated nearly flawlessly during this project. On a few occasions lane gains/losses were experienced during operations, but most of these problems can be attributed to poor shore station signals. For a daily breakdown of vessels used, equipment problems and other pertinent data see "Daily Operations Tables".

Description of MiniRanger Mobile Stations

The above three vessels also employed MiniRanger positioning equipment during survey operations. Equipment used aboard these vessels was as follows:

Vessel	Console	R/T Unit
2123	715	727
2125	720	720
2126	711	718

There were no failures of the mobile MiniRanger equipment during the project. There were several occasions on which weak signals were received in certain areas, probably caused by operating in a transponder null-zone (a zone of poor signal coverage).

The maximum ranges obtained from the MiniRangers during this survey average around ten nautical miles which is considerably less than advertised and could normally be expected. This short range occurred even though the transponders were located on high bluffs with visibility up to thirty miles.

Description of Baseline Calibrations

Three MiniRanger baseline calibrations were performed during the project: The first on June 16 before the start of hydrography,

the second mid-project on July 16 and the third on August 10 after the conclusion of MiniRanger field work. All baseline calibrations were performed at the Homer, Alaska Airport.

Due to the failure of the code 2 transponder (S/N 4708) on August 10, a final calibration of code 2 was not possible on that date.

The initial baseline calibration determined low signal strength cut-off values for each MiniRanger console, R/T unit and transponder combination. When low signal strengths occured during survey operations, data collection in the affected area was discontinued until transponder orientation could be changed or a different station could be found.

The correctors obtained from the initial June 16 baseline calibration were applied to all MiniRanger data during survey operations and were used to plot all field data. Correctors from subsequent calibrations did not differ appreciably from the initial values. Individual and mean correctors are shown in the separates attached to this report. For further information on the baseline calibrations, see the Electronic Control Report, OPR-P114-RA-79.

Description of Daily Calibrations

When Raydist was used for hydrographic position control, it was calibrated prior to the beginning of a day's hydrographic operations, during lunch break, whenever positioning equipment failures were suspected and at the completion of the day's operations. In addition, MiniRanger data was collected simultaneously with Raydist data all through the day to serve as calibration checks.

Calibration of the Raydist was either by three-point sextant fixes (visual) or MiniRanger range-range fixes, all visual calibration signals used were located over Third Order Class I or better triangulation stations. Each visual calibration consisted of at least five sextant fixes which agreed within 0.10 lanes. If a check angle was used, the fix was rejected if the inverse distance between fix and check fix positions exceeded five meters. All angles were measured from the stern of the launch.

MiniRanger was used to calibrate the Raydist quite often during this project. This allowed calibration when visual signals were not visible (during fog or at night), and while collecting hydrographic data, by collecting MiniRanger ranges simultaneously with the hydroplot Raydist fixes. Aside from this information

which was actually collected on line, the regular calibration of Raydist by MiniRanger consisted of at least five and often ten MiniRanger range-range fixes which agreed within 0.10 lane. These were taken with the MiniRanger shore stations near right angles (between 60^{0} and 120^{0}) as seen from the launch. Applicable MiniRanger baseline correctors were applied to the ranges before determining the Raydist lane count, and signal strengths below the cut-off values were not allowed.

On days when MiniRanger was used to calibrate Raydist, it was attempted that at least one launch obtained at least one visual calibration of MiniRanger per day to act as a MiniRanger system check and validate the Raydist calibration technique. On all occasions this visual systems check agreed well with the Mini-Ranger baseline data. It is felt that the MiniRanger calibrations of Raydist in general are as accurate if not more accurate than the horizontal angle method given the effort taken to insure the strength of the MiniRanger fix. (i.e. frequent baseline calibrations, multiple, 5-10, calibration fixes, strong intersections for calibration and frequent system checks of MiniRanger.)

When MiniRanger was used for hydrographic position control, visual calibration system checks were obtained by each launch twice a day (before and after data collection) weather permitting. On some days weather or darkness precluded obtaining the second calibration. These visual calibrations were obtained in the same manner as visual Raydist calibrations. Each calibration consisted of at least five visual fixes agreeing within five meters.

All electronic control and calibration for both Raydist and MiniRanger are considered correct and acceptable for controlling hydrography on H-9840. Data collection was discontinued when problems did occur and was not resumed until the problems were corrected.

Because of the varied use of electronic control systems and calibration methods a table (daily operations table) was constructed to provide the details of each days operations. These tables are located in the separates attached to this report.

H. SHORELINE

The shoreline was transferred from a class III manuscript (T sheet TP-00798). Field edit showed no discrepancies between the manuscript and the real shoreline.

See Verifier's Report Para #2

Rocks not visible on field edit photos were positioned by the field editor at or below MLLW using hydrographic methods. The data was then transferred to the hydrographic records and deleted from the field edit records. An abstract of the rocks transferred to the hydrographic records is included in the separates to this report.

Contact was maintained between the field editor and hydrographer to prevent duplication of information.

I. CROSSLINES

A total of 81.5 nautical miles of crosslines were run or ten percent of mainscheme mileage. Agreement with the principal sounding lines was excellent with all crosslines agreeing to within one fathom of the mainscheme lines with one exception - the areas of sand waves (see section L).

J. JUNCTIONS

Junctioning between the two boat sheets showed no discrepancies.

Junctioning was also carried out with contemporary survey H-9708, 1:40,000 1977. Agreement was excellent with ninety-five percent of the overlaps within one fathom.

See Verifier's Report Para #5

K. COMPARISON WITH PRIOR SURVEYS

The following prior surveys were compared to during the course of this survey:

Registry No.	Scale	Year Surveyed
H-3204	1:40,000	1910
H-3205	1:40,000	1910
H-3206	1:120,000	1910

H-3204 covers the area south of 59° 50' N extending approximately four miles off shore. Agreement of soundings was very good except the present survey shows deeper soundings south from 59° 50' N, 152° 00' W.

H-3205 covers the area immediately north of H-3204. The major discrepancy here is with sand waves which do not appear at all on the prior survey. (See section P).

H-3206 covers the off-shore area through midchannel in Southern Cook Inlet. Agreement again was excellent.

In all common areas it is recommended that the soundings from H-9840 be charted over priors. The potential for change in this area is too great to allow any more than a general comparison

with these 1910 surveys.

Pre-Survey Review Items

The two submerged wells (presurvey review items #8E and 8D) at reported locations of 59° 52~~45~~34" N, 151° 51' 39" W; and 59° 54' 29~~24~~" N, 151° 49' 56" W were developed with sixty meter line spacing. The fathograms were carefully examined and nothing was found. This exceeded the requirements of the presurvey review which stated "No specific investigation of these submerged wells is required; however, the fathograms should be carefully examined for traces of the wells and annotated while sounding in the area." It is recommended that these items remain charted.

See Verifiers Report Para #4

Presurvey Review item #7, a wreck in seven fathoms charted at 59° 47.7' N, 151° 54.8' W was not investigated since it was on the next sheet which will be surveyed at the beginning of next season.

However, a peak of 6.9 fathoms was found at 59° 47' 52.5" N, 151° 53' 41.5" W The area around the peak was further developed with ten meter splits and plotted on an expansion sheet. This peak can be seen on the fathogram between fix #6702 and fix #6703 on julian day 226 (RA-3). There are indications of scouring around the edges of this object. It is believed that this object may be the wreck ("Kandu") that is charted at 59° 47.7' N, 151° 54.8' W and has either been moved 1086 meters in a northeast direction by strong currents, or incorrectly charted. No dive investigation was made for positive identification due to the strong currents and zero underwater visibility. Further investigation of this object and in the charted area of the wreck next season may positively identify the object. It is recommended at this time that the wreck at 59° 47.7' N, 151° 54.8' W remain charted as is. *concur*

See Verifiers Report #6 Para

L. COMPARISON WITH CHART

The present survey was compared with chart 16640, 17th edition, April 1979. Agreement in general was fair. Many areas (especially along the shore) were found to be shoaler than shown on the chart, while a few were deeper. In addition there were significant areas of sandwaves discovered which were not noted on the chart. (See section P).

See Verifiers Report Para #6

On boat sheet 3A, the ten fathom curve is approximately one mile further offshore near 59° 53.5'N, 151° 52.5' W. The area from 59° 53' N, 151° 49.5' W to 59° 55.5' N, 151° 48' W is one fathom shoaler. The shallow elongated area whose center is 59° 55' N, 151° 54' W has shifted offshore ¼ mile, while the areas within 1½ miles to the west of it are now 1-4 fathoms shoaler.

The area about 59° 55' N, 151° 58' W is 2-4 fathoms deeper, and that about 59° 52' N, 151° 58' W is also deeper.

The 20 fathom curve parrallels the shore about ¼ mile further offshore; the elongated area about 59° 52.5' N, 152° 01.5' W is 1-2 fathoms shoaler.

On boatsheet 3B the near-shore area was very like the chart except near 59° 50' N, 151° 53' W which was found to be 1 fathom shoaler.

The area about 59° 51' N, 151° 55.5' W is 2-3 fathoms deeper and that area northwest and west of 59° 48.5' N, 152° 03' W was one fathom deeper.

The twenty fathom curve is the same except for the area south of 59° 49' N, 152° 07.5' W which is 1-2 fathoms shoaler.

Again it is recommended that the soundings from H-9840 be used over charted soundings. The potential for change in this area since it was last surveyed does not allow confidence in those prior soundings. Bottom samples from the current survey indicated sand, mud, and stones, all of which are susceptible to the high currents in this area. This could account for any change from prior soundings.

M. ADEQUACY

The present survey is complete and accurate to supersede prior surveys within the common areas.

N. AIDS TO NAVIGATION

There are no floating aids to navigation within the survey area. However, the microwave tower near Starisky 1964 (near Cape Starichkof) is on the chart as an "approximate position".

This was located by Third Order Class I methods in 1977 at 59° 52' 53.664" N, 151° 47' 02.441" W (see OPR-429-RA-77). A NOAA form 76-40 has been included in the field edit report for TP-00798, and is included in the separates to this report.

It is recommended that the tower be plotted at the above coordinates.

O. STATISTICS

Vessel	Lin. N.M.	Sq. N.M.	Positions	Bottom Samples
RA-3 (1007)	683.3	47.0	2260	0
RA-6 (1013)	271.5	20.13	668	0
RA-5 (1003)	0.0	0.0	66	108
Total	954.8	67.13	2994	108

P. MISCELLANEOUS

It should be noted that alternate mainscheme lines were run on alternate tidal cycles. Sandwaves were found on boatsheets 3A and 3B. The sandwave area on 3A is roughly defined by: 59° 55.5' N, 152° 02' W; 59° 52' N, 151° 58' W; 59° 52' N, 151° 55' W and 59° 55.5' N, 151° 53' W.

Sandwaves are not continuous throughout this area but rather are diversely spread. Additional sounding lines with 200-meter spacing were used to develop the area, running perpendicular to the supposed axis of the waves in order to obtain the best development. The usual heights were 1-3 fathoms above bottom, with occasional four fathom peaks. The least depth in the sandwave area was ~~eight~~ seven fathoms. Three separate expansions were made of the area. Least depths were more easily determined from them.

The sandwave area on 3B was much smaller, roughly defined by: 59^{o} 49.7' N, 151^{o} 56.7' W; 59^{o} 49.7' N, 151^{o} 58' W; 59^{o} 52' N, 151^{o} 55.5' W; 59^{o} 52' N, 151^{o} 57' W.

Sandwaves were throughout this area. Again, 200-meter line spacing was used for development. Peaks were smaller, running 1-2 fathoms. The shallowest peak was thirteen fathoms and this depth was manually plotted on the smooth field sheet. One expansion was made for this area.

The presence of sandwaves is not unusual, considering the swift currents and the predominantly sand bottom discovered by the bottom samples (some gravel, stones and shingle were also mixed in). It was found impossible to contour the sandwaves due to line spacing and the size of the waves. Further, there was indication of a shift in the waves between the time of main scheme hydrography and the time of development. Nevertheless, the sandwaves appear to pose no navigational hazard at this time.

It is recommended that the areas of sandwaves be charted as such.

The southwest corner of 3B has an area where no bottom samples were taken. This error is a result of incorrect navigation when bottom samples were being taken.

Q. RECOMMENDATIONS

All recommendations were made during the text of this report.

R. DATA PROCESSING PROCEDURES

Data acquisition and processing were accomplished per instructions in the Hydrographic Manual, and PMC OPORDER.

Soundings and positions were taken by Hydroplot system using program RK III or manually logged using sextant angles or range-azimuth method. The following is a list of all computer programs and version dates used during the survey:

RK 111	RANGE-RANGE REAL TIME HYDROPLOT	01/30/76

RK 201	GRID, SIGNAL AND LATTICE PLOT	04/18/75
RK 211	RANGE-RANGE NON-REAL TIME PLOT	01/15/76
RK 212	VISUAL STATION TABLE LOAD	04/01/74
RK 215	VISUAL NON-REAL TIME PLOT	08/16/74
RK 216	RANGE-AZIMUTH NON-REAL TIME PLOT	02/05/76
RK 300	UTILITY COMPUTATIONS	02/05/76
RK 330	REFORMAT AND DATA CHECK	05/04/76
PM 360	ELECTRONIC CORRECTOR ABSTRACT	02/02/76
RK 407	GEODETIC INVERSE/DIRECT COMPUTATION	09/25/78
RK 409	GEODETIC UTILITY PACKAGE	09/20/78
AM 500	PREDICTED TIDE GENERATOR	11/10/72
RK 530	LAYER CORRECTIONS FOR VELOCITY	05/10/76
RK 561	H/R GEODETIC CALIBRATION	02/19/75
AM 602	ELINORE - LINE ORIENTED EDITOR	05/20/75
AM 603	TAPE CONSOLIDATOR	10/10/72
RK 606	TAPE DUPLICATOR	08/22/74
RK 612	LINE PRINTER LIST	03/22/78

S. REFERRAL TO REPORTS

This report when submitted to Pacific Marine Center was accompanied by the following supplemental reports:

Horizontal Control Report, OPR-P114-RA-79

Electronic Control Report, OPR-P114-RA-79

Field Edit Report, TP-00795, TP-00796, TP-00797

Corrections to Echo Sounding Report, OPR-P114-RA-79

Respectfully submitted,

Thomas Clark

Thomas Clark
Lieutenant, NOAA

and

Alan D. Anderson
for Dave Kruth
Ensign, NOAA

APPROVAL SHEET

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SURVEY

H-9840

OPR-P114-RA-79

In producing this sheet standard procedures were observed in accordance with the Hydrographic Manual, PMC OPORDER, and the instruction Manual for Automated Hydrographic Surveys. The data was examined daily during the execution of the survey.

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

Wayne L. Mobley
Captain NOAA
Commanding

VELOCITY CORRECTOR TAPE LISTING
RA-20-1-79(H-9833)
RA-20-2-79(H-9835)
RA-20-3-79(H-9840)

TABLE NO.1
SCALE - FATHOMS

```
000033 0 0000 0001 001 000000 000000
000098 0 0001
000162 0 0002
000222 0 0003
000283 0 0004
000353 0 0005
999999 0 0006
```

TABLE NO.0

```
005000 0 0000 0000 000 000000 000000
999999 0 0001
```

NOAA FORM 76-40
(8-74)

Replaces C&GS Form 567.

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

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [ ] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [XX] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

[X] TO BE CHARTED [ ] TO BE REVISED [ ] TO BE DELETED	REPORTING UNIT (Field Party, Ship or Office)	STATE	LOCALITY	DATE
	NOAA SHIP RAINIER	ALASKA	COOK INLET, NINILCHIK	4/77

The following objects HAVE [X] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.	JOB NUMBER	SURVEY NUMBER	DATUM
OPR-P114-RA-79	CM-7412	TP-00798	N.A. 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
TOWER	PARABOLIC ANTENNA	59 52	53.664 1658.2	151 47	02.441 37.7	75 E(1) 0590 JULY 75	3rd Order Traverse July 1979	16640
	Chart Name verified visible from Seaward - J.C. Talbott							
	L-833(83)							

(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

CORRECTIONS IN [redacted] FATHOMS

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

1 5 10 15 20 25 30 35 40

DEPTHS IN FATHOMS

(For deep water add a 0 to these figures

LEGEND:

BLACK DOTS-TDC- 6/20/79

GREEN DOTS-TDC- 7/8/79

RED DOTS-NANSEN 7/8/79

BLUE DOTS-TDC 8/5/79

FORM C&GS-117 (11-65)

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

VELOCITY CORRECTIONS

Ship RAINIER S221

WAYNE L. MOBLEY, CAPT. NOAA Comdg.

These corrections are to be used

between 19 and 19

in the locality COOK INLET ALASKA

for hydrographic surveys Nos.

OPR-P114-RA-79

DEPTH RANGE (FM)	CORRECTIONS (FM)
UP TO 3.3	0.0
9.8	0.1
16.2	0.2
22.2	0.3
28.3	0.4
35.3	0.5
DEEPER	0.6

MASTER STATION LIST
OPR-P114-RA-79
LOWER COOK INLET

FINAL VERSION

```
101 3  60 06 21437 152 33 53267  254 0159 329646
/RED RAYDIST

102 3  60 29 08334 151 50 08087  254 0020 329646
/GREEN RAYDIST

103 4  60 05 46900 151 36 44515  250 0036 000000
/PIT 1979

104 4  60 09 52776 151 29 20457  250 0045 000000
/PAT 1979

105 4  60 12 20461 151 25 46188  250 0076 000000
/PT 4 1963                                601512(1012)

106 4  60 01 12973 151 42 18089  250 0072 000000
/DEEP 1964                                601513(1004)

107 4  60 12 53110 151 24 43974  139 0177 000000
/CLAM (CLAM GULCH MICROWAVE TOWER) 1964 601512(1001)

108 4  60 18 03609 151 27 16845  139 0000 000000
/SIS 1963                                 601512(1013)

109 4  60 18 35152 151 22 45041  139 0017 000000
/PT 3 1963                                601512(1011)

110 4  60 07 18705 151 33 22918  139 0067 000000
/SUE 1979

111 4  60 00 33292 151 42 49781  250 0089 000000
/NINILCHIK 1908                           601513(1011)

112 4  59 58 45569 151 43 27865  250 0031 000000
/GRIESS 1979

113 4  59 57 23336 151 43 58089  139 0051 000000
/ANIMAL HILL 1979

114 3  59 56 07127 151 44 37502  250 0024 000000
/TUBBS 1979

115 4  59 52 24078 151 48 03029  250 0001 000000
/MILLER TIME 1979

116 4  60 03 19062 151 39 45889  250 0000 000000
/NINILCHIK CHANNEL ENTR. LIGHT 1
```

```
 117 4  59 47 46312 151 50 49736  250 0065 000000
/LEE 1968                                591514(1013)

200 4  59 52 53664 151 47 02441  139 0147 000000
/STARISKY (STARISKY MICROWAVE TOWER) 1964 591514

201 4  60 03 03042 151 39 47040  139 0000 000000
/NIVILCHIK CHURCH CUPOLA                 601513(1012)

202 4  59 59 16810 151 43 17661  139 0000 000000
/DOONE 1979

203 4  60 05 54736 151 37 04753  243 0000 000000
/ROCK (TEMPORARY)

204 4  60 02 15881 151 41 21115  139 0000 000000
/HAYNES 1979

300 4  60 08 25994 151 31 24624  243 0000 000000
/PHOTO SIGNAL                            TP-00796

301 4  60 09 03246 151 30 42184  243 0000 000000
/PHOTO SIGNAL                            TP-00796

303 4  60 09 15848 151 30 15548  243 0000 000000
/PHOTO SIGNAL                            TP-00796

304 4  60 08 11350 151 31 49050  243 0000 000000
/PHOTO SIGNAL                            TP-00796

305 4  60 07 53600 151 32 11250  243 0000 000000
/PHOTO SIGNAL                            TP-00796

306 4  60 06 57660 151 34 10680  243 0000 000000
/PHOTO SIGNAL                            TP-00796

307 4  60 06 35170 151 34 59280  243 0000 000000
/PHOTO SIGNAL                            TP-00796

308 4  60 06 14400 151 35 46435  243 0000 000000
/PHOTO SIGNAL                            TP-00796

310 4  60 04 16934 151 38 32990  243 0000 000000
/PHOTO SIGNAL                            TP-00796

311 4  60 03 04890 151 40 02702  243 0000 000000
/PHOTO SIGNAL                            TP-00796
```

```
312 4  60 02 38817 151 40 25261  243 0000 000000
/PHOTO SIGNAL(NW CORNER NINILCHIK SCHOOL)TP-00796

400 4  60 05 36506 151 37 05437  243 0000 000000
/HYDRO SIGNAL

401 4  60 05 06519 151 37 31390  243 0000 000000
/HYDRO SIGNAL

402 4  60 04 46995 151 37 53596  243 0000 000000
/HYDRO SIGNAL

403 4  60 04 01336 151 38 53062  243 0000 000000
/HYDRO SIGNAL
```

FIELD TIDE NOTE
(OPR)-P-114-RA-79
COOK INLET, ALASKA

Primary gage #945-5500, Seldovia, Alaska was used as the control gage for all hydrography during the project. GMT tide correctors for field reduction of soundings were based on the actual observations obtained from the three gages installed by RAINIER and each boat sheet was zoned for certain tide tapes during on-line hydrography. These predicted tides were generated using program AM 500-Predicted Tide Generator, version: November 10, 1972. Three gages were established as dictated by project instructions.

T1, Sisters Rock, #945-5697

RAINIER experienced setbacks in all of the tide gage installations. The dates given here are those that mark the point where consistent data was being obtained and no damage was done to the gage, staff, etc. That is - the point where an installation was thought to be secure.

A Bristol Bubbler (S/N 68A9337) with a 50 foot scale was installed/secured to the highest point of Sister Rock(s) - a set of four large rocks, 2½ nautical miles southwest of Cape Kasilof. The orifice was fastened to a 2" x 4" that was, in turn, lagged to the rock at low tide using shields. A staff (two sections) was also lagged to the same face of the most easterly rock (near vertical face) on June 20, 1979. The gage was installed on June 14, 1979, and removed on August 2, 1979. The geographical position of T1 is latitude 60° 18' 03.6" N and longitude 151° 27' 16.8" W. The staff was 2 sections of 2" x 4" with staff panels nailed to it - the boards lagged to a vertical rock face. The staff length was 20.0 feet. The staff stop was a lag bolt at 19.52 feet above the staff zero.

Four bench marks were installed and one existing triangulation mark was used. Metric installation levels were run on July 7, 1979 (late due to operational limitations) and removal levels were run on August 2, 1979. All levels were run to Third Order Class One standards. The following table relates the differences in elevation between marks for installation and removal of gage no. 945-5697 (Sisters Rock):

Bench Marks	July 7, 1979	August 2, 1979
(a) - Sis 1963	+3.552 m	+3.558 m
Sis - 5697D 1979	-1.184	-1.189
5697D-5697A 1979	-1.093	-1.103
5697A-5697B 1979	+0.614	+0.625
5697B-5697C 1979	-1.997	-2.013

(a) Denotes staff stop

The staff/gage relationship is an average of the 3 hour observations. The gage read 11.3 feet higher than the staff.

Maintenance of the Sister's Rock involved the changing of several Bubbler Gage components. The paper on several of RAINIER's gages would jump off of the sprockets causing the chart drive unit to jam. The installed unit (S/N 68A9337) was replaced by S/N 741438 on July 10, 1979. Then on July 12, 1979 it became necessary to replace the box itself as field personnel could not obtain a bubbler rate other than closed or open stream. No other problems were encountered for the duration of the gage.

There were notable discrepancies between installation and removal levels. This occurred only between bench marks. The staff showed no movement. We attributed the differences to unbalanced level shots (difficult to arrange on the rocks) and also orientation of the rod. (Two different rodmen were used). RAINIER believes these marks to be stable. Unfortunately, operational time limitations prevented our returning to the gage site to rerun these levels.

The chart paper at Sisters Rock jumped off the chart drive sprockets several times, causing errors in the recorded times and heights on the marigram. This data is still usable, since the sprockets left marks on the marigram whenever they became misaligned with the paper sprocket holes.

The data was scanned using a portion of the same chart paper as a moveable scale. The scale was cut so that the sprocket hole used for scale alignment corresponds to an even hour. The time on the marigram was determined by counting sprocket marks and was marked in hours on the marigram border, ignoring the time marks originally printed on the paper. The moveable scale was then placed with its alignment hole over the hour marks on the marigram, and the hourly tide heights read off the scale.

Scales used are attached to the appropriate marigrams.

T2, Ninilchik Harbor, #945-5653

A Bristol Bubbler gage (S/N 68A9332) with a 40 foot scale was secured by chain to a concrete embankment that parallels the access road to the Cannery. About 1500 feet of bubbler tubing was laid out to reach the lowest negative tide. This tubing was anchored using chain and winch cable - fastened with line and plastic ties. The orifice was banded (with stainless steel banding) to a piece of angle iron which was placed in a concrete/cement anchor. The orifice, when positioned, was marked with a green buoy. The geographic position of the orifice was latitude 60^{0} 03' 17.0" N and longitude 151^{0} 40' 53.2" W. A 14 foot fiberglass staff was erected inside the boat harbor of the cannery. As all pilings were made of steel, the following was the manner in which the staff was secured: The bottom of a 16' 2" x 4" was

sharpened and driven 2 feet into the bottom. The top of the board (to which the tide staff was fastened) was nailed to a cross-support of the cannery loading pier. This support was revealed because the cannery was installing a crane. After installation, a rod stop was placed 1.51 feet above the 14.0 mark on the staff - this consisted of a lag driven into the deck planking of the pier. As the harbor is secluded at low water, 3 hour observations were conducted at high water.

Installation levels were run to 5 historic marks on June 4, 1979. As it took time to effectively get the gage on-line a check level was run to the closest mark (B.M. No. 9, 1973) to the rod stop. A small difference showed the stop to be lower than before by 1 cm. However, during the rerun - a cement truck and the new crane were both on the small pier. This suggests that the stop could only be depressed by the excess weight.

The gage went "on-line" on June 12, 1979. Removal levels were run on August 15, 1979 and the gage, itself, was removed on August 15, 1979. All levels were run to Third Order Class One standards.

The following table relates the differences in elevation between marks for installation and removal of gage No. 945-5653;

Bench Marks	June 4, 1979	August 15, 1979
(a) B.M. No. 9 1973	* +0.533	+0.537
B.M. No. 9-B.M. No. 8 1973	-0.507	Destroyed (B.M.8)
B.M. No. 8-B.M. No. 7 1973	-0.284	Destroyed (B.M.7)
B.M. No. 7-B.M. No. 6 1973	+1.819	Destroyed (B.M.7)

Midway through the operating period of the Ninilchik gage, it was discovered the 2 of the installation marks had been bulldozed over, making them unusable. Four new marks were installed on July 31, 1979 and levels run to these.

Bench Marks	July 31, 1979	August 15, 1979
(a) 5653C 1979	+0.008 m	+0.007
5653C-5653B 1979	+1.362	+1.364
5653B-5653A 1979	-0.050	-0.049
5653A-5653D 1979	-0.783	-0.785

*This was the check value on June 12, 1979 - upon installation of the gage.

Again, the staff/gage relationship was an average of the 3 hour observations. The gage read 19.3 feet higher than the staff.

The following table compares the field correctors used by RAINIER versus the actual data obtained from the Ninilchik Tide gage site. All correctors are referenced to the Seldovia Primary Gage:

Date (J.D.)	Ninilchik Values			*Predicted Values		
	Time High	Time Low	Range	Time High	Time Low	+Range
8/5/79 (217)	0005Z (26.7)	0710 (7.7)	19.0	0007 (17.2)	0704 (-0.1)	18.0
	1330 (25.9)	1905 (12.2)		1326 (15.8)	1909 (3.8)	
8/8/79 (220)	0245 (31.3)	0930 (3.1)	28.2	0245 (21.5)	0922 (-4.7)	26.8
	1545 (30.7)	2140 (7.7)		1539 (20.4)	2137 (-0.7)	
8/12/79 (224)	0605 (29.4)	1220 (6.7)	23.6	0600 (19.6)	1218 (-1.6)	22.5
	1830 (30.3)	0100 (8.3)		1832 (20.0)	0053 (-0.4)	

+-Range = Range x 1.04

Predicted Correctors used: High = +52 Minutes
Low = +62 Minutes
Ratio= 1.04

*These correctors are an average of those used for RA-20-1B-79 and RA-20-2A-79. This was done because the gage site is half-way between the correctors. (Junction of the surveys).

GENERAL REMARKS

It should be noted that several gages had broken (sproket problems) chart drive mechanisms and others had bad gasline systems (possibly from silicone oil in the needle valve). In the case of the latter, it became difficult to adjust the bubbler rate - i.e. only full stream or nothing. Hence, RAINIER personnel combined parts of various gages to make working combinations. The serial numbers listed are the longest running systems and the number is that of the chart drive mechanism.

RECOMMENDED ZONING

RAINIER experienced good agreement between crossline, rising/falling mainscheme and development soundings using the correctors developed at the start of the project. Field tide records obtained from both the Sisters Rock and Ninilchik gages were compared with a contoured (ranges & times) preliminary tidal zoning sheet furnished by Rockville. There were only slight differences which were used to adjust the contours. Zone correctors were scaled at the middle of each of the areas shown in the attached sketch so as to minimize any errors that could be caused by tides at sheet junctions. RA-20-1-79 was divided in four sections; East and

west as divided by the 10 fathom curve and north and south by the designated "A" and "B" sheets. This zoning and these correctors worked well for RAINIER and it is recommended they be used for final processing of OPR-P114-RA-79.

The surveys were conducted in such a manner that discrepancies in tides will be accented between sounding lines at crosslines and junctions.

T3, Anchor Point, #945-5606

A Bristol Bubbler gage (S/N 73A227) with a 50 foot scale was installed very near the Anchor Point Navigation Light. The gage box was secured by chain to a set of trees near a referenced telephone pole. The installation was finished on July 13, 1979 and the position of the orifice was fixed at latitude 59° 46' 12" N and longitude 151° 52' 42" W. The tubing was anchored by about 2000 feet of cable, fastened with plastic "ty-wraps". The orifice anchor was a trash can filled with cement with the orifice being steel-banded to a piece of angle-iron, imbedded in the cement. There was no possible location for a tide staff, so levels were run from a reference point (equivalent staff stop) to the waters edge. During installation of the gage, RAINIER personnel encountered the same "sprocket-jump" problem. The initial chart drive component was replaced with the serial number mentioned above.

Installation levels were run to 6 historic bench marks that surround the Anchor Point Light, on July 12, 1979. The marks were located on the bluff with the light and were referenced to the cement reference point (staff stop) on the beach. This stop was given an arbitrary value of 100 feet in order to obtain positive observation values to compare with the gage. Removal levels were run to the same 6 marks on August 15, 1979. All levels were run to Third Order Class One standards.

The following table relates the differences in elevation between marks for installation and removal of gage number 945-5606:

Bench Marks	July 12, 1979	August 15, 1979
(a) - 5606E 1977	+4.490 m	+4.490 m
5606E 1977-BM 5 1973	+0.160	+0.160
BM 5-BM 4 1973	-0.083	-0.082
BM 4-BM 7 1973	-0.431	-0.430
BM 7-BM 6 1973	+0.077	+0.077
BM 6-BM 8 1973	-0.048	-0.048

For the information of Rockville Tides Branch, an attempt was made to use a 40 foot "Tide Monster" platform to support an ADR tide gage. The currents, floating seaweed and a storm proved to be too much for the structure. RAINIER was forced to use Bubbler gages in all three locations.

A gage/staff comparison was obtained by running levels from the reference mark (on beach) to the estimated waters edge. The staff read 65.4 feet higher than the gage. The reference mark was given an arbitrary value of 100 feet (i.e. water levels were consistently below the reference mark).

The Anchor Point gage suffered a 2½ day lapse in data due to local vandalism. An inshore piece of tubing and cable was stolen (cut) on Julian Day 202 (July 20).

The following table compares the correctors (Rockville's suggested ones) used in the field versus those obtained directly from the Anchor Point Gage:

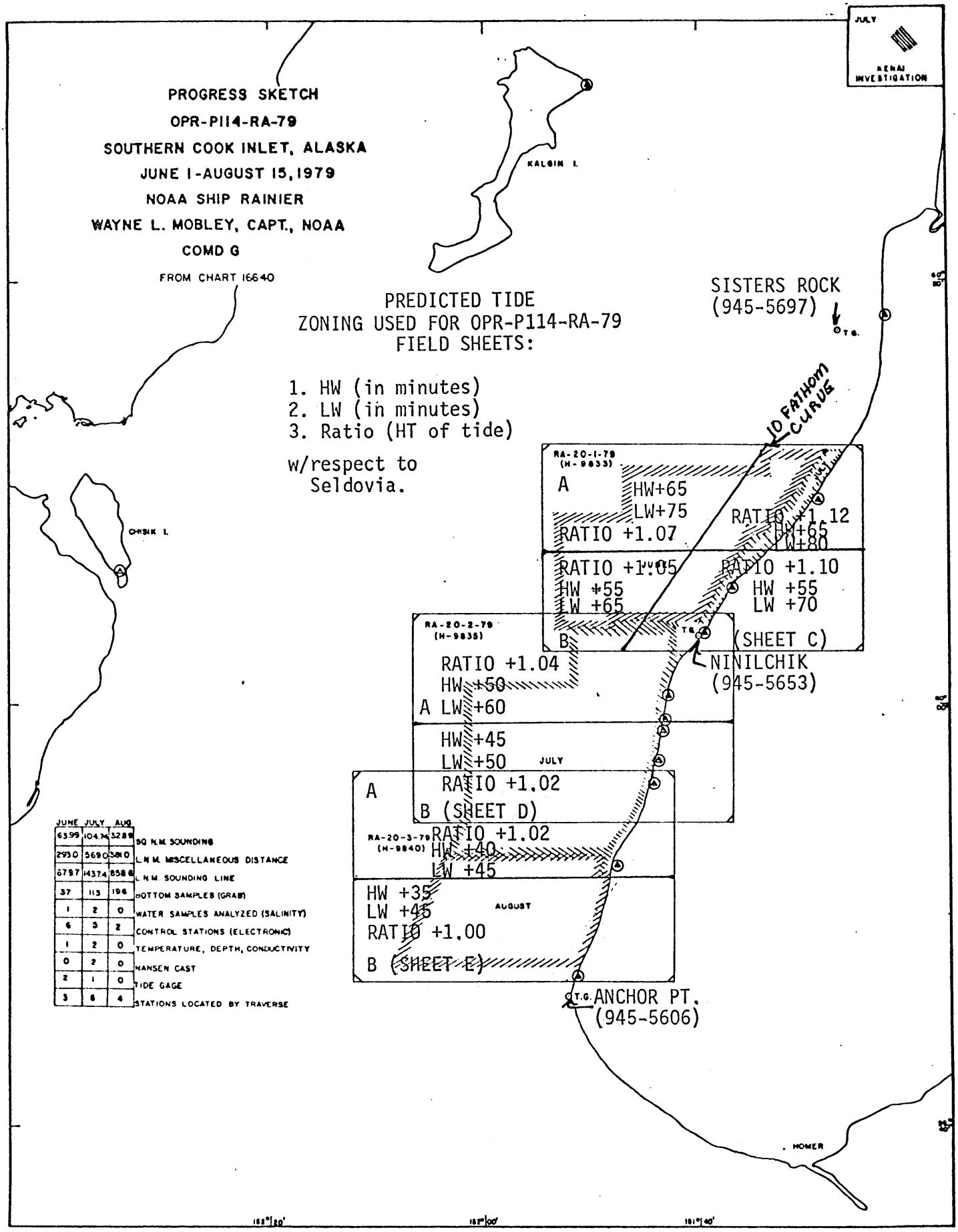
Date (J.D.)	Anchor Point Values			*Predicted Values		
	Time High	Time Low	Range	Time High	Time Low	Range
8/5/79 (217)	2350 (28.3) 1315 (27.1)	0630 (10.7) 1840 (14.5)	17.6	2345 (17.2) 1304 (15.8)	0638 (-0.1) 1843 (3.8)	17.3
8/8/79 (220)	0215 (32.5) 1520 (31.8)	0845 (6.1) 2100 (10.0)	26.4	0223 (21.5) 1517 (20.4)	0856 (-4.7) 2111 (-0.7)	26.2
8/12/79 (224)	0540 (30.3) 1820 (31.1)	1151 (9.4) 0020 (10.7)	21.7	0538 (19.6) 1810 (20.0)	1152 (-1.6) 0027 (-0.4)	21.6

All times are local, (corrected for daylight savings) as seen in the Tide Tables.

Predicted Correctors used; High = +30 Minutes
Low = +36 Minutes
Ratio= 1.00

*These correctors were not used by field personnel as our southernmost boatsheet did not encompass the Anchor Point gage. Instead, the correctors were taken from the Preliminary Tidal Zoning Sheet (Quadrangles) given to us by Rockville.

Also, no comparisons were made with the Sisters Gage as it was too far north to make a comparison feasible.



JUNE	JULY	AUG	
6399	10474	3288	SQ N.M. SOUNDING
2930	3690	3810	L.N.M. MISCELLANEOUS DISTANCE
6787	14374	8586	L.N.M. SOUNDING LINE
37	113	196	BOTTOM SAMPLES (GRAB)
1	2	0	WATER SAMPLES ANALYZED (SALINITY)
6	3	2	CONTROL STATIONS (ELECTRONIC)
1	2	0	TEMPERATURE, DEPTH, CONDUCTIVITY
0	2	0	NANSEN CAST
2	1	0	TIDE GAGE
3	6	4	STATIONS LOCATED BY TRAVERSE

April 9, 1980

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): 945-5653 Ninilchik Harbor, AK

Period: July 22 - August 15, 1979

HYDROGRAPHIC SHEET: H-9840

OPR: P114

Locality: Lower Cook Inlet, Alaska

Plane of reference (mean lower low water): 8.7 ft.

Height of Mean High Water above Plane of Reference is 18.4 ft. - Ninilchik

REMARKS: Recommended zoning:

(1). West of 152°00' apply -25 minute time correction and range ratio x 0.90.
(2). 152°00' to 151°54' apply -25 minute time correction and range ratio x 0.93.
(3). East of 151°54' apply -25 minute time correction and range ratio x 0.96.

Chief, Datums and Information Branch

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-9840

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 16640	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K Manuscript	
Cape Starichkof ✓	X								TP 00798	1
Cook Inlet ✓	X								TP 00798	2
Whiskey Gulch ✓									TP 00799	3
Laida Spit (topo feature)									TP 00799	4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
				Approved:						18
										19
				Chas. E. Harrington						20
				Chief Cartographer - C3x5						21
					15 April 1982					22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

APPROVAL SHEET

FOR

SURVEY H-9840

A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.

B. The verified smooth sheet has been inspected,is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: October 13, 1981

James S. Green

Chief, Verification Branch

NOAA FORM 77-27 (5-77) | U. S. DEPARTMENT OF COMMERCE NOAA | HYDROGRAPHIC SURVEY NUMBER H-9840

HYDROGRAPHIC SURVEY STATISTICS

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS & PRELIMINARY OVERLAYS	13
DESCRIPTIVE REPORT	1	SMOOTH OVERLAYS: POS, ARC, EXCESS	9

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES				[redacted]	[redacted]	
CAHIERS			2- Raw	[redacted]	[redacted]	
VOLUMES			[redacted]	[redacted]	[redacted]	
BOXES	[redacted]		1 - Smooth Plo & Tide List			

T-SHEET PRINTS (List) TP-00799 Class III Mylar and TP-00798 Class I (paper copy)

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS: PRE-VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET	[redacted]	[redacted]	
POSITIONS CHECKED		3094	
POSITIONS REVISED		26	
SOUNDINGS REVISED		181	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
[redacted]	TIME – HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	7		
VERIFICATION OF CONTROL		6	
VERIFICATION OF POSITIONS		22	
VERIFICATION OF SOUNDINGS		184	
COMPILATION OF SMOOTH SHEET		58	
APPLICATION OF TOPOGRAPHY		8	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		20	
COMPARISON WITH PRIOR SURVEYS & CHARTS		40	
VERIFIER'S REPORT		26	
OTHER			
TOTALS	7	364	371

	Beginning Date	Ending Date
Pre-Verification by: James S. Green	3/20/80	3/20/80
Verification by: John E. Lotshaw	9/24/80	9/30/81
Verification Check by: James S. Green and James L. Stringham	Time (Hours) 41	Date 10/13/81
Marine Center Inspection by: HIT	Time (Hours) 12	Date 12/3/81
Quality Control Inspection by: F.P.Saulsbury	Time (Hours) 16	Date Apr. 1982
Requirements Evaluation by: RW Derkazarian	Time (Hours) 4 hrs.	Date Aug 5, 1983

D. Myers 3hr 5/27/82

REGISTRY NO. H9840

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE_____ TIME REQUIRED_____ INITIALS_____

REMARKS:

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9840 FIELD NO. RA-20-3-79

Alaska, Cook Inlet, Cape Starichkof

SURVEYED: July 22 - August 15, 1979

SCALE: 1:20,000 PROJECT NO: OPR-P114-RA-79

SOUNDINGS: Ross Fineline Fathometer
RA-3 S/N 1080
RA-5 S/N 1040
RA-6 S/N 1042

CONTROL: Range-Range
Mini-ranger
Range-Range Raydist

Chief of Party: . . . . . .CAPT Wayne L. Mobley

Surveyed by: . . . . . .LT Alan Anderson
LT Tom Clark
LTJG Michael McClusky
ENS Dave Kruth
SST Richard Hastings

Automated Plot by: . . . . . .PMC Xynetics Plotter

Verified by: . . . . . .John E. Lotshaw

1. INTRODUCTION

Hydrography on H-9840 lies between the points 59°55'30"N, 152°02'30"W and 59°47'45"N, 152°09'30"W; and extending eastward from these points to the shoreline.

Tide parameters were developed from the Ninilchik Harbor gauge. Details of tide gauge locations and operating parameters are contained in the parameter listing file for H-9840.

No unusual problems were encountered in processing datum on H-9840.

2. CONTROL AND SHORELINE

a. Raydist was used to control the bulk of the survey. Raydist stations are adequately described in paragraph G of the Descriptive Report. Problems in calibration which are discussed under paragraph G do not appear to have degraded the quality of hydrography on H-9840.

Miniranger was used for Raydist calibration and for control when Raydist was inoperative. No problems with miniranger operation were noted. Listings of miniranger locations are contained in paragraph

G of the descriptive report, and in the control file lisitng for H-9840.

b. Shoreline on H-9840 was derived from Class I unreviewed map TP-00798 and Class III unreviewed map TP-00799. Date of photography for both maps was July, 1975. Date of field edit for TP-00798 was July and August 1979, with final compilation in June 1980. TP-00799 has not been field edited. Shoreline data related to TP-00799 has been ~~lifted~~ transferred to the smooth sheet in pencil. inked during QCI

3. HYDROGRAPHY

Crosslines are in excellent agreement with the main scheme of hydrography. Only minor differences in depth have been noted during verification. These occur in the northwest quadrant of the sheet in an area of highly irregular bottom, and do not constitute a conflict of data. concur

The sounding pattern on H-9840 is relatively dense, generally allowing detailed depth curves to be drawn over the entire sheet. Least depths are adequately developed in all cases. There is no conflict between shoreline manuscripts and hydrography. The zero curve has been defined by hydrography along approximately 90% of the shoreline. concur

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate and conform to the requirements of the Hydrographic Manual. concur

5. JUNCTIONS

H-9835, 1979
H-9708, 1977

H-9840 joins H-9835, 1979, along the northern edge of the sheet. A firm junction has been made and the junction curves inked.

H-9840 joins H-9708, 1977, along the western edge of the sheet. A firm junction has been made and the depth curves inked. The curves on H-9708 should be inked to conform with those shown on the survey.

There is no contemporary survey along this southern edge of H-9840. Depth curves in this area have been left in pencil. H-9967(1981) on southern edge Processing incomplete (1-10-83)

6. COMPARISON WITH PRIOR SURVEYS

H-3204	1910	1:40,000	Soundings in feet
H-3205	1910	1:40,000	Soundings in feet
H-3206	1910	1:120,000	Soundings in feet

H-3204, 1910: H-3204 covers the area between 59°47'45"N and 59°50'00"N from the shoreline out to depths of approximately eleven fathoms. Water depths on H-3204 agree with those on H-9840 within one fathom in most cases. There are no critical hydrographic or topographic features on H-3204 which connot be superseded by H-9840. It is recommended that H-3204 be superseded by H-9840 in areas of common coverage. concur

H-3205, 1910, joins H-3204 on the north and covers the portion of H-9840 which lies between the 10fm curve and the shoreline north of latitude 59°49'30". Sounding agreement is excellent, with agreement within one fathom in most cases. There are no hydrographic or topographic features on H-3205 which are in conflict with data on H-9840. It is recommended that H-9840 supersede H-3205 in areas of common coverage. concur

H-3206, 1910: This offshore 1:~~40,000~~ 120,000 scale survey covers the western half of H-9840. Comparison is somewhat difficult due to the scale difference and the datum shift which must be applied to H-3206. Most soundings compared are in close agreement with H-9840 and there are no large discrepancies between the surveys. It is recommended that H-9840 supersede H-3206 in areas of common coverage. concur

Two submerged wells located at latitude 59°52'~~24~~45"N, longitude 151°51'39"W, and latitude 59°54'~~24~~29"N, longitude 151°49'56"W were searched for by the hydrographer. However, the 60 meter line spacing used in nine fathoms of water did not scan the entire bottom. Although nothing was found, the existence of the charted wells has not been disproven. These PSR items should continue to be charted. concur (chtd from CL-328/68)

The 6.9 fathom peak found by the hydrographer at latitude 59°47'52.5"N, longitude 151° 53'41.5"W has not been identified as to the nature of this feature. It is, however, the shoal feature in the immediate area and should be charted as a shoal. See also item k, "Pre Survey Review Items" paragraph 3

7.a. COMPARISON WITH CHARTS

Comparison with Chart 16640, 17th Edition, April 7, 1979, shows fair general agreement, as noted in the descriptive report. Differences of up to three fathoms are common, with no particular pattern noted. Soundings on H-9840 tend to be generally deeper than those charted, and some migrations of sand wave features is evident. Only three features other than depths are charted. These are two submerged wells (PSR items) and one rock awash located at latitude 59°51'58"N, longitude 151°48'30"W. The wellheads were not located by the hydrographer (see paragraph 6 above) and should continue to be charted. The rock was not searched for by either the hydrographer or the field editor. Its source is unknown and it is not shown on H-3205, 1910. Since this charted rock has not been disposed of by the present survey it should continue to be charted. concur

The portion of chart 16645, 13th Edition, October 4, 1980 between latitudes 59°47'45"N and 59°49'00"N is also covered by H-9840. ✓

No comparison with this chart is included in the Descriptive Report. Soundings on H-9840 agree closely with depths on chart 16645 with most differences being well under one fathom. A rock awash charted at latitude 59°48'12"N, longitude 151°50'56"W was not located by hydrography or field edit on H-9840. This rock awash should continue to be charted until further field investigation can confirm or ~~deny~~ disprove its existence. concur

With the exception of the above described wellheads and rocks, H-9840 is adequate to supersede all charted data in its area of coverage. concur (see also item 9 below)

b. Controlling Depths

There are no controlling depths governing any area within this survey. concur

c. Aids to Navigation

There are no floating aids to navigation within the area covered by H-9840. A landmark, a microwave tower, is located at latitude 59°52'54"N, longitude 151°47'02"W. This tower is the location for triangulation station Starisky Microwave Tower, 1964, and is described on a NOAA form 76-40 attached to the descriptive report. This feature is charted at latitude 59°52'55"N, longitude 151°46'53"W. The charted positions should be adjusted to agree with the true location of the tower. concur

8. ADDITIONAL FIELD WORK

a. Additional field work is recommended to establish the current status of the rock features discussed in paragraph 7 above. The two rocks awash, charted from an unknown source (may be a Coast Pilot investigation) should be retained as charted. Rock awash charted in lat. 59°51'58"N, long. 151°48'30"W should be investigated at an opportune time to verify or disprove its validity.

b. H-9840 is an adequate basic survey considered an excellent basic survey

9. NOTES TO COMPILER

The rock charted at latitude 59°48'12"N, longitude 151°50'56"W on chart 16645 does not appear on chart 16640. concur

Respectfully submitted,

John Lotshaw
Cartographic Technician
October 13, 1981

Examined ad Approved:

James S. Green
Chief, Verification Branch

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

December 4, 1981 OA/CPM3/JWC

TO: OA/CPM - Charles K. Townsend

FROM: OA/CPM3 - John W. Carpenter

SUBJECT: PMC Hydrographic Inspection Team Report for Survey H-9840

This survey is a basic hydrographic survey of Cape Starichkof, Cook Inlet, Alaska. This survey was conducted by NOAA Ship RAINIER in 1979 in accordance with Project Instructions OPR-P114-RA-79 dated March 2, 1979; Change No. 1, dated March 30, 1979; Change No. 2, dated March 29, 1979; Change No. 3, dated July 18, 1979; and Change No. 4, dated August 6, 1979.

The Inspection Team finds H-9840 to be a basic survey adequate to supersede common areas of prior surveys and charted hydrography. Administrative approval is recommended. *concur*

John W. Carpenter

James M. Wintermyre

for James W. Steensland

Stanley H. Otsubo

ADMINISTRATIVE APPROVAL

H-9840

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.

The Verifier's Report (Section 8) recommends that additional field work be accomplished to address two charted rocks awash. Although this is technically true, it is recommended, from a practical point of view, that further work be given a low priority in scheduling future survey work to verify these items. *concur*

Charles K. Townsend
Director
Pacific Marine Center

12/4/81
Date

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C352:FPS

April 14, 1982

TO: Glen R. Schaefer DRS for
Chief, Hydrographic Surveys Division

THRU: Chief, Quality Control Branch JM

FROM: F. P. Saulsbury FPS
Quality Evaluator

SUBJECT: Quality Control Report for H-9840 (1979), Alaska, Cook Inlet, Vicinity of Cape Starichkof

A quality control inspection of H-9840 was accomplished to monitor the survey for adequacy with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, shoreline transfer, decisions made and actions taken by the verifier, and the cartographic presentation of data. In general, the survey was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

Sunken rocks, with reliable survey depths, covered 3 feet or more at MLLW, are not shown on the present survey as prescribed by the Hydrographic Manual. A sounding in tenths of fathoms, or whole fathoms and tenths labeled "RK," should have been shown instead of a sunken rock symbol described by the depth of water in feet the feature is covered at MLLW. Since this information is clear, with no danger of misinterpretation, it was not revised during quality control inspection.

cc:
C351

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
CHARTING AND GEODETIC SERVICES
Rockville, Md. 20852

N/CG241:RWD

AUG 31 1983

TO: N/MOP - Charles K. Townsend

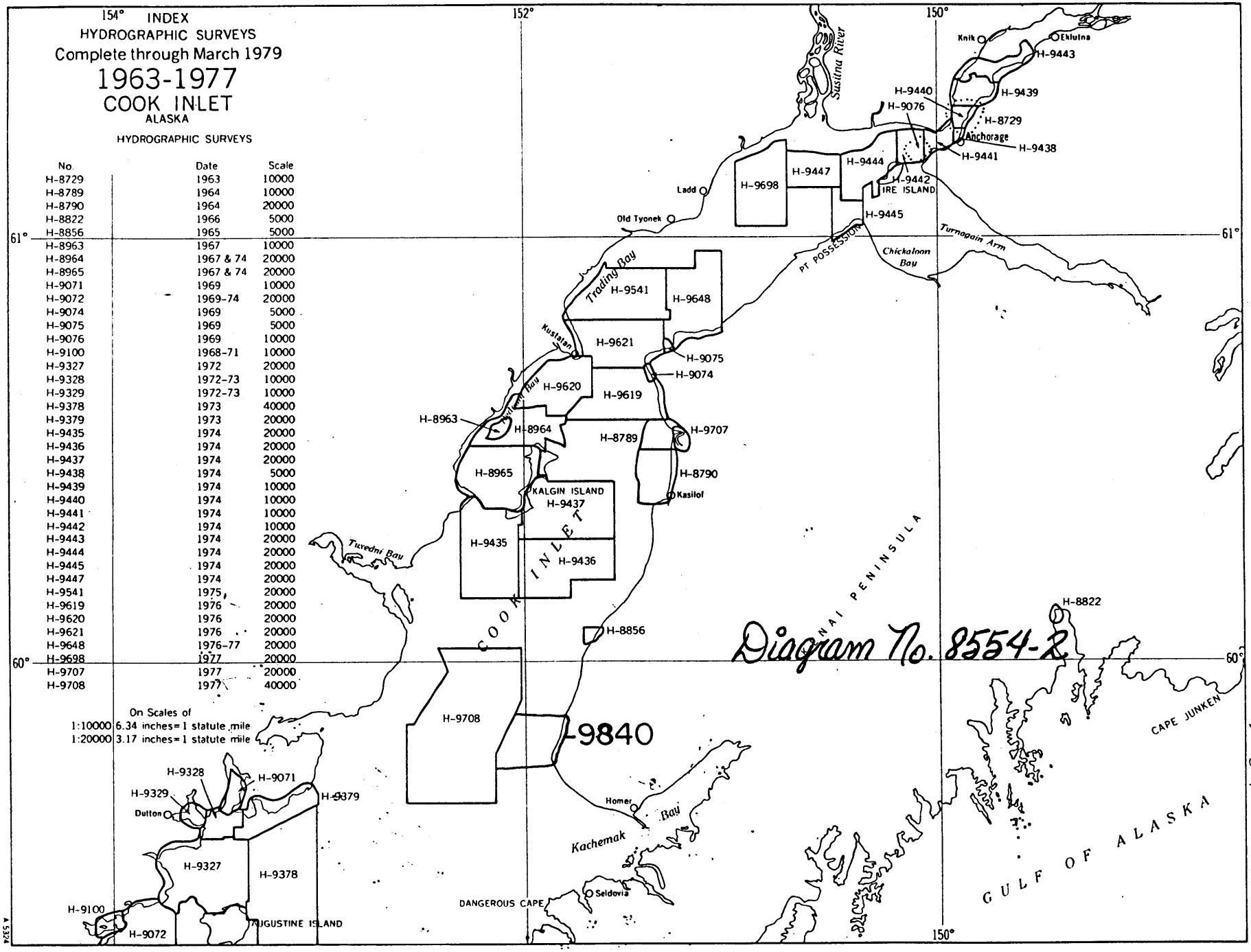
FROM: for N/CG2 - C. William Hayes Signed R. Peters

SUBJECT: Report of Compliance for Survey H-9840

The smooth sheet and Descriptive Report for survey H-9840 (1979), Alaska, Cook Inlet, Vicinity of Cape Starichkof, have been examined. This survey, except as noted in the Quality Control Report, dated April 14, 1982 (copy attached), and the Hydrographic Survey Inspection Team Report, dated December 4, 1981, is complete and adequate for the purposes intended and is in compliance with Project Instructions OPR-P114-RA-79, dated March 2, 1979.

Attachment

cc:
N/CG242 w/o att.



DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Survey
Washington, D.C.

Hydrographic Index No. 114E

FORM C&GS-8352
(3-25-63)

NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9840

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
16013	6/8/84	J. Baily	PART ~~Full~~ ~~Full Part Before~~ After ~~Verification Review~~ Inspection Signed Via
			Drawing No. 27, Appld hydro thru 16640 except in the ~~Exam. for critical corr. No corr.~~ area where it was not revised on 16640 thru larger scale chart 16645.
16640	7/9/84	J. Bailey	~~Full~~ Part ~~Before~~ After ~~Verification Review~~ Inspection Signed Via
			Drawing No. 22 Revised hydro, except area overlapping chart 16645.
16661	8-24-84	Roy A. Diamond	Full [redacted] After Verification Review Inspection Signed Via
			Drawing No.
16645	10/4/88	Corbin	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 17, 14th Ed. (16661)
16640	6/21/89	Pearce Hunt	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 23 20th Ed.
500	7-27-89	John Pierce	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 6 Examined, no corrections applied
16013	8-8-97	William Heyser	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. #30 Applied fully thru 16661
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.

FORM C&GS-8352 SUPERSEDES ALL EDITIONS OF FORM C&GS-975.

USCOMM-DC 8558-P63