

9440

Diag. Cht. No. 8553.

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT (HYDROGRAPHIC)

Type of Survey ... HYDROGRAPHIC

Field No. RA-10-4-74

Office No. H-9440

LOCALITY

State ALASKA

General Locality COOK INLET

Locality SOUTH PORTION OF KNIK ARM

1974

CHIEF OF PARTY

..... K. W. Jeffers

LIBRARY & ARCHIVES

DATE 7/15/76

☆ U.S. GOV. PRINTING OFFICE: 1975-668-353

*Area 6
cat
8557
8553
2502 WC*

HYDROGRAPHIC TITLE SHEET

H-9440

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

FIELD NO.

RA-10-4-74

State ALASKA

General locality COOK INLET

South Portion of

Locality KNIK ARM

Scale 1:10,000

Date of survey May 28 - June 30, 1974

Instructions dated February 8, 1974

Project No. OPR-469-RA-74

Vessel NOAA Ship RAINIER MSS 21, ^{launches} 2125 (RA-5), 2126 (RA-6)

Chief of party CDR. K. William Jeffers

L. Pfeifer, D.R. Seidel, G.W. Stanley, P.E. Gadd, M.H. Allen, G.W. Stroble, R.W. Ellis, H.T. Langeveld

Surveyed by Junior Officers of the RAINIER

Soundings taken by echo sounder, hand lead, pole Ross 5000 Fathometers 2125--S/N 1041,
2126--S/N 1040

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Personnel

Positions verified

~~verified~~ by James S. Green

Automated plot by PMC Xynetics Plotter

Soundings ~~verified~~ ^{verified} by James S. Green

Soundings in ~~fathoms~~ feet at ~~MLLW~~ MLLW

REMARKS: Survey Time Zone ~~000~~ Mean Longitude of Survey 149°52'00"W

Boatsheet is complete for charting purposes.

No prior field work or descriptive or technical reports used
to accomplish the field work.

Applied to stabs 11/19/76

[Signature]

KWW: 3/9/91

DESCRIPTIVE REPORT
TO ACCOMPANY HYDROGRAPHIC SURVEY

H-9440

RA-10-4-74

Scale 1:10,000

1974

NOAA Ship RAINIER

CDR. K. WILLIAM JEFFERS
Commanding

A. PROJECT

This hydrographic survey was conducted in accordance with PROJECT INSTRUCTIONS, OPR-469-RA-74, Upper Cook Inlet, Alaska, dated 8 February, 1974.

B. AREA SURVEYED

The area covered by this survey included a portion of Knik Arm in Upper Cook Inlet, Alaska, approximately one mile north of the Port of Anchorage, Alaska. The survey was bounded on the south by latitude $61^{\circ} 14' 50''$ N and on the north by latitude $61^{\circ} 18' 32''$ N. The eastern limit for the survey was the eastern shoreline of Knik Arm and the western limits were the western shoreline of Knik Arm and longitude $149^{\circ} 55' 30''$ W.

The survey commenced on May 28 (JD 148), 1974, and ended on June 30 (JD 181), 1974.

The survey made junctions with the following contemporary surveys.

| Registry Number | Field Number | Scale |
|-----------------|---------------|----------|
| H-9438 | RA- 5-2(A)-74 | 1: 5,000 |
| H-9439 | RA-10-3(B)-74 | 1:10,000 |
| H-9441 | RA-10-5(B)-74 | 1:10,000 |

C. SOUNDING VESSEL

NOAA Ship RAINIER launches 2125 (RA-5) and 2126 (RA-6) obtained all soundings for this survey. The RAINIER obtained the bottom samples

for the survey.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

Sounding equipment operated well during the survey. Ross fathometers (model 5000, serial numbers (S/N): RA-5-1041, RA-6-1040) and Ross digitizers (model 6000, S/N: RA-5-1041, RA-6-1040) obtained all soundings. Both launches worked within the entire range of depths and in various areas of the survey. Technicians monitored the fathometers continuously during operation and kept the initial value on the analogue trace at zero. In addition the fathograms were scanned during real time sounding acquisition to compare analogue and digitized values. Major discrepancies between the values were changed to agree with the analogue value. The blanking function was employed to reduce spurious returns, and the fathometers were internally phased and adjusted so as to have no phase correction. Phase checks were made routinely by setting the Ross switch to "Calibrate Phase Set" and entering a depth to assure no change in phasing.

All applicable corrections were incorporated on a TC/TI (Transducer Correction/Table Indicator) tape for automated processing (refer to Separates Following the Text for listings of these tapes). A transducer correction (TRA) as determined for each of the launches from routine bar checks was used for processing of the soundings aboard the RAINIER. When bar checks were not available a value for TRA for each launch was used from the previous days' bar checks. Velocity corrections were

computed from three TDC and two Nansen casts taken on May 28, June 18, and June 25, 1974. Results from the Nansen casts did ~~not~~ agree with results from the three TDC casts whose results were consistent. It was decided that the TDC results would take precedence. Vertical casts were taken for launches 2125 (RA-5) and 2126 (RA-6) during the project. Values from the vertical casts did not agree (one to two feet of difference) with the depths obtained from the Ross fathometers. During execution of the vertical casts the currents would put an unavoidable slope in the lead line, and in addition it was difficult to determine when the lead line hit the bottom. As a result an accurate depth for sounding comparison could not be attained. It is recommended that these vertical casts not effect the corrections to echo soundings.

For further information concerning sounding equipment and corrections to soundings refer to Corrections to Echo Soundings, OPR-469-RA-74.

E. BOAT SHEET

The Transverse Mercator Projection and soundings were plotted by RAINIER personnel using the ship PDP8/e Hydroplot system. Equipment in the system included the PDP8/e computer (S/N 1011), and Complot plotter (model DP-3, S/N 4670-4).

The central meridian for the project was $150^{\circ} 10' 00''$ W and the control latitude was 6,738,000 meters north of latitude zero. Rough plots were made daily, and a final plot collated as the work progressed. The final plot was begun May 16, 1974, and was completed July 2, 1974.

A good grade of polyester drafting film (mylar, .003 inches thickness) was used for the final plot. No discernable distortion could be detected in the boat sheet during the period of the final plot.

F. STATION CONTROL

Electronic control stations for this survey made use of existing triangulation station ARM USE 1941, 1964 and newly established topographic stations of third order ^{accuracy} ~~precision~~. Topographic stations KEN 1974 and FIFE 1974 were intersected and topographic station DAVE 1974 was resected with T-2 theodolites. Topographic stations ~~ANCHOR~~ 1964 Eccentric and LAP 1974 were traversed (open) with tapes and T-2 theodolites. Topographic station ZOF 1974 was traversed (open) with a CA-1000 tellurometer and T-2 theodolite and was also trilaterated with a CA-1000 tellurometer. Refer to Geodetic Control Report, OPR-469-RA-74, for more specific procedures used in establishing these stations. It should be noted that these topographic stations were located close to bluff edges for reception purposes. As a result these stations will probably be lost in the near future due to the extensive erosion of the areas.

Control stations for visual three-point fix Mini-Ranger calibration included the electronic control stations and other existing triangulation stations in the area.

The ASCII signal tape used during the project contained more stations than included in the Station List and ASCII signal tape submitted with this report. Field Copy of Stations used during the project reflects

these additional signals and is included in the Separates Following the Text.

G. POSITION CONTROL

This survey made use of the super-high frequency (SHF) Motorola Mini-Ranger III (range-range system) for position control of soundings. The system worked satisfactorily during the survey. Mini-Ranger stations that were established as described in section "F. STATION CONTROL" of this report were located to prevent weak geometric configurations at range-range intersections (greater than thirty degrees). For information concerning the definition of areas that were controlled by the various pairs of electronic control stations refer to Abstract of Positions in the Separates Following the Text.

Occasionally during the survey the Mini-Ranger system would malfunction for short periods of time giving erratic ranges or no ranges at all. The cause of the malfunctions could not be ascertained at the time of the survey but was believed to be either reflection problems from the steep bluffs, phase cancellation, or electrical interference from the numerous military installations in the area. In any event the malfunctions did not seriously affect the survey and were handled with little difficulty in the processing of the data. (Soundings that involved Mini-Ranger malfunctions were deleted from the master tape and inserted on the corrector tape to be timed and coursed between soundings with adequate fix data.)

Mini-Ranger equipment used aboard the launches was interchanged during the survey as indicated by the following table.

| Date | Local Time | Component | RA-5 S/N | RA-6 S/N |
|------------|------------|----------------------|----------|----------|
| 05 May 74 | 0800 | Range Console | 711 | 715 |
| | | Receiver-Transmitter | 718 | 720 |
| 17 June 74 | 1600 | Range Console | 715 | 711 |
| | | Receiver-Transmitter | 720 | 718 |

Mini-Ranger transponders remained the same throughout the survey. Serial numbers for the four codes are listed in the following table.

| Code | Serial Number |
|------|---------------|
| 1 | 774 |
| 2 | 775 |
| 3 | 776 |
| 4 | 777 |

Calibration of the Mini-Ranger system was accomplished once in the morning and once in the afternoon, visibility permitting, by using visual three-point sextant fixes. A mathematical solution for three-point fixes was obtained by using program AM 560S (with slope correction) in the PDP8/e computer. Results of the calibration were analyzed and the corrections obtained from the analysis were applied through the corrector tape when the data was processed in the evening. Therefore, the position control of the plot of the soundings on the boat sheet include the correctors obtained from the calibrations. Mini-Ranger range slope correction, however, was not applied to position control of soundings. Refer to Electronic Control Report (Mini-Ranger System), OPR-469-RA-74,

for further information concerning the operation of the Mini-Ranger III system during the project.

H. SHORELINE

Shoreline for the boat sheet was transferred from T-sheet Manuscripts T-12007, T-12008, and T-12016. All shoreline and topographic detail on the boat sheet was verified by field edit and rocks that could be of potential danger to navigation were located with three-point sextant fixes. Field edit on this boat sheet was complete.

Random three-point sextant fixes were taken on previously photo-identified rocks. On rocks that were checked, no movement could be ascertained from the previous photo information. No changes in detail in the T-sheet manuscripts were necessary. Additional rocks and foul areas delineated by field edit were added to the boat sheet in red. For further information on shoreline refer to Field Edit Report, OPR-469-RA-74.

I. CROSSLINES

Crosslines totaled 8.5 nautical miles or 5.3 per cent of the main scheme of soundings. All crossline soundings as compared to main scheme soundings agreed within three feet. Predicted tides from reference station at Anchorage, Alaska, were used to reduce all soundings. Observed tide correctors to be applied at Pacific Marine Center's Processing Division will probably make crossings agree within closer

limits.

Crossline soundings were plotted in red except for positions 5365-5366 (JD 158-59 RA-5) and 5767-5769, 5782-5785 (JD 171 RA-5) which were accidentally plotted in black.

J. JUNCTIONS

Adequate junctions were made with contemporary surveys H-9438 (RA-5-2(A)-74), H-9439 (RA-10-3(B)-74), and H-9441 (RA-10-5(B)-74) that were plotted in blue, purple, and green, respectively. Junction soundings as compared to the soundings of this survey agreed within three feet. Depth curves continued smoothly through junctions.

K. COMPARISONS WITH PRIOR SURVEYS

This survey verified the existence of presurvey review item number four which involved three areas of concern. Significant soundings obtained during the survey from these three areas were plotted on an enlarged scale of 1:5,000. Least depths were circled in each of the areas which are labeled area one, two, and three. Area number one with a reported presurvey review depth of twenty-seven feet at latitude $61^{\circ} 15' 04''$ N and longitude $149^{\circ} 53' 33''$ W showed a depth of thirty-~~seven~~^{four} feet in this survey. This least depth was located at latitude $61^{\circ} 15' 02''$ N and longitude $149^{\circ} 53' 30.0''$ W. Area number two at latitude $61^{\circ} 15' 31''$ N and longitude $149^{\circ} 54' 50''$ W with a reported depth of six feet in presurvey review showed a depth of eight feet ✓ in this survey. In addition at latitude $61^{\circ} 15' 37''$ N and longitude

149° 54' 55" W in the immediate vicinity of the presurvey review depth is a depth of ~~five~~^{Six} feet. The last of these areas, number three, at latitude 61° 15' 40" N and longitude 149° 5~~8~~³' 17" W with a reported depth of four feet in presurvey review showed a least depth of ~~seven~~^{eight} ✓ feet.

Only area number one showed a significant difference in presurvey review and soundings from this survey. Presurvey review notes indicated that the validity of the twenty-seven foot depth was doubtful. The 1964 earthquake could have subsided the whole area to cause the consistent decrease in depth of all three areas of concern. Also the cutting and scouring hydraulic effect of this particular area as mentioned later in this section of this report could have caused a trend toward deeper depths. The two to three foot discrepancy between presurvey review and this survey in area number two and area number three could possibly have been attributed to the use of predicted tides to reduce the soundings. Refer to section "P. MISCELLANEOUS" in this report for further explanation of this tides discrepancy. It is recommended that the least depths from all three of these areas be checked after observed tides correctors have been applied to the soundings to reveal their agreement or disagreement with presurvey review. ✓

See
Verifiers
Report

Main scheme soundings were compared with prior survey H-3200, scale 1:40,000, 1910. Most soundings from this prior survey are more shallow than the soundings obtained from this contemporary survey. Prior survey soundings toward the northern end agree more closely than those soundings

See
Verifiers
Report

toward the southern end of the survey in the bottle-neck configuration of Knik Arm in the vicinity of Cairn Point. Differences in this area vary from five to thirty-five feet. The extreme tides and currents in Knik Arm create hydraulic conditions that approach typical river flow. Substantial eroding, scouring, and depositing has probably occurred. The 1964 earthquake could have also caused change. Considering these factors and the improved methods used during this survey as compared to 1910 methods, it is recommended that soundings from this contemporary survey take precedence.

L. COMPARISON WITH THE CHART

This survey was compared with C&GS Chart 8557, scale 1:40,000, 14th Edition dated December 29, 1973. Comparison of soundings of this survey with chart 8557 was very similar to the comparisons of soundings of this survey to prior surveys. The same remarks on sounding comparison as given in section "K. COMPARISON WITH PRIOR SURVEYS" of this report hold true for comparison to the chart. ✓

Many additional rocks were located during this survey in addition to those on the chart. These rocks were plotted on the boat sheet with pertinent information. The shoreline as verified during this survey does not agree with the chart. Significant erosional changes have occurred to cause the shoreline to recede. Refer to Field Edit Report, OPR-469-RA-74, for further information on additional rocks and shoreline detail.

M. ADEQUACY OF SURVEY

This hydrographic survey, H-9440(RA-10-4-74) is complete and adequate to supersede prior surveys for charting purposes. The survey is deficient, however, in crosslines and also in development of one-half mile of the zero foot curve in the northeast corner of the survey. The crosslines that were run agree adequately, and in the northeast corner of the survey soundings were developed to at least the two foot curve.

✓
0 curve
crossed on
3. sheet

The fathogram was scanned in the field and checked for peaks and deeps. Changes and additions were made to the original records accordingly.

N. AIDS TO NAVIGATION

No aids to navigation were located in the area covered by this survey. No new aids are recommended.

O. STATISTICS

This survey contains 170 nautical miles of soundings covering an area of 6.5 square nautical miles obtained by the following vessels.

| Vessel | Nautical Miles | Positions | Remarks |
|-------------|----------------|------------|----------------|
| 2120 | --- | 6 | Bottom Samples |
| 2125 | 130 | 827 | Hydro |
| <u>2126</u> | <u>40</u> | <u>195</u> | <u>Hydro</u> |
| Totals | 170 | 1028 | |

Refer to Abstract of Positions in Separates Following the Text for

further information on statistics.

P. MISCELLANEOUS

It will be necessary to refer to Report to Accompany Hydrographic Survey, H-9439, OPR-469-RA-74, to obtain sounding data for a holiday at latitude $61^{\circ} 18' 15''$ N and longitude $149^{\circ} 52' 00''$ W. The data can be located under Julian Day 169-170, launch 2125 (RA-5), position numbers 5391 to 5392. See *Verifier's Report*-sect Fb

A special note on tide reducers for this survey seems appropriate. A significant discrepancy in reduced soundings occurred between two different days of hydro at latitude $61^{\circ} 18' 00''$ N and longitude $149^{\circ} 50' 30''$ W. After a thorough study of the matter it was resolved that the discrepancy was in the predicted tides reducers as generated from PDP8/e computer program AM 500. The difference in these predicted tides and tides from predicted hourly heights (at reference station Anchorage, Alaska) differed by as much as six feet for the time under consideration. Though other days were not checked, a study of the tidal curve of the Anchorage area revealed that it was not a smooth sine curve. Reliance upon tides from the predicted tides reducers from the predicted tides computer program AM 500 should be observed with caution. Observed tides reducers as applied by Pacific Marine Center's Processing Division should resolve the differences.

Range-range intersections did not meet the thirty degree requirement on data collected by launch 2125 (RA-5) on Julian Day

180-181, positions 5801-5832. The thirty degree requirement was not met because the main survey project had progressed farther south down Cook Inlet and this was the only available control. This data was entirely shoal development for presurvey review item number four and was plotted on the 1:5,000 presurvey review enlargement. Area number one, two, and three's (refer to section "K. COMPARISON WITH PRIOR SURVEYS" in this report) range-range intersections were approximately twenty-three, eighteen, and eighteen degrees, respectively. No significant junction problem could be associated with the shallow intersections.

Bottom samples taken for this survey were all virtually identical consisting of a gray fine sand. The ship anchored at latitude $61^{\circ} 18' 50''$ N and longitude $149^{\circ} 51' 25''$ W in these sediments and found them adequate for anchorage.

Q. RECOMMENDATIONS

No further specific recommendations are considered necessary for this survey.

R. REFERENCES TO REPORTS

Corrections to Echo Soundings, OPR-469-RA-74.

Geodetic Control Report, OPR-469-RA-74.

Electronic Control Report (Mini-Ranger System), OPR-469-RA-74.

Field Edit Report, OPR-469-RA-74.

Report to Accompany Hydrographic Survey, H-9439, OPR-469-RA-74.

Tidal Bore Report, Knik Arm, Alaska, OPR-469-RA-74.

Landmarks for Charting Report, OPR-469-RA-74.

S. DATA PROCESSING PROCEDURES

Data acquisition and processing was conducted using standard procedures. Soundings were obtained using the Hydrolog/Hydroplot system with computer program AM 100 (version date 10 November, 1972) in launch 2125 (RA-5) and by using the Hydrolog system with computer program AM 170 (version date 10 November, 1972) in launch 2126 (RA-6). Raw data tapes were corrected for misdepths and Mini-Ranger malfunctions to produce electronic master tapes. For each electronic master tape an electronic corrector tape was made that included TRA and Mini-Ranger calibration correctors. Also included on the electronic corrector tape were peaks, deeps, and Mini-Ranger malfunctions that were timed and coursed between soundings with good fix data. The boat sheet was plotted with these tapes. Revised master and corrector tapes and master reduced to sea level tapes were made from the electronic master tapes. Additional corrector tapes are supplied with Mini-Ranger correctors as averaged from the entire project. These additional tapes are submitted per Mini-Ranger pair, per launch, per sheet. Pacific Marine Center's Processing Division is to decide whether daily correctors or average correctors are to apply.

✓

Used
Daily
Correctors

Proper formats were observed for all tapes and printouts were made

for all of these tapes. Ignore correctors in the corrector words on master tapes. Use daily correctors as supplied on the corrector tapes.

Other computer programs used during the survey include the following programs:

| Program | Version Date | Description |
|---------|------------------|--|
| AM 200 | 23 March 1973 | Offline Plot |
| AM 201 | 10 November 1972 | Grid and Lattice Plot |
| AM 300 | 24 May 1973 | Utility Computations |
| AM 301 | 08 December 1972 | VISTA |
| AM 407 | 10 November 1972 | Geodetic Inverse |
| AM 500 | 10 November 1972 | Predicted Tide Generator |
| AM 560S | 10 April 1972 | Mini-Ranger Calibration with Slope Correction |
| AM 602 | 10 March 1972 | ELINORE |
| PM 340 | 01 December 1972 | Master Tape Reduction to Sea Level |
| RK 408 | 10 November 1972 | Direct Geodetic Computation |

Refer to Electronic Control Report (Mini-Ranger System), OPR-469-RA-74, to obtain corrector tapes with correctors as averaged from the entire project for the Mini-Ranger system as mentioned previously in this section.

Respectfully submitted,



Bryan K. Mezger
ENS., NOAA

Separates Following the Text

| Item | Page |
|--|------|
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✓ = Items filed in the cahier with the field records.

TIDE NOTE

RA-10-4-74 (H-9440)

Tide reducers for boatsheet sounding were generated by Hydro Plot Program AM 500, using the daily values of Anchorage, Alaska reference station listed in "Tide Tables, High and Low Water Predictions, 1974, West Coast of North and South America."

Verified Form 362, value of MLLW, Form 712, time and height relationships between gages, and recommended tidal zoning for the smooth sheet will be furnished by Tide Branch (C331) Rockville. The tide gages within the survey and/or bracketing it are:

| <u>STATION</u> | <u>LOCATION</u> | <u>DATES OF INSTALLATION/REMOVAL</u> |
|----------------|-----------------------|--|
| 1. Anchorage | 61°14.3'N, 149°53.3'W | N/A |
| 2. Goose Creek | 61°23.5'N, 149°51.3'W | 24 May/20 June |

It should be noted that Anchorage reference station is the control station for all hydrography accomplished by the RAINIER on project OPR-469 during 1974.

4/1/75

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): Anchorage

Period: May - June 1974

HYDROGRAPHIC SHEET: H-9440

OPR: 469

Locality: Knik Arm, Upper Cook Inlet

Plane of reference (mean lower low water): 6.6 ft.

Height of Mean High Water above Plane of Reference is 28.4 ft.

Remarks: Recommended zoning:

North of $61^{\circ}16'$ apply range ratio $\times 1.02$ and a time correction of +10 minutes.

South of $61^{\circ}16'$ zone direct.

James R. Hubbard
for Chief, Tides Branch

Survey No.
H-9440

Name on Survey

| | A | B | C | D | E | F | G | H | K | |
|---------------|-----------------|--------------------|-------------------------------|---------------------------|---------------|-------------------------------|------------|---|---|----|
| | On Chart No. | On previous No. | On U.S. or Foreign Maps | From local information | On local maps | P.O. Guide or Rand McNally | U.S. Light | | | |
| CAIRN POINT | | | | | | | | | | 1 |
| KNIK ARM | | | | | | | | | | 2 |
| SIXMILE CREEK | | | | | | | | | | 3 |
| | | | | | | | | | | 4 |
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Approved
Chas. E. Harrington
 Staff Geographer - CS142
 6 Aug. 1976

3-9-1976

V09440 H151

EOF..

| | | | |
|------------|----|--|---|
| 1 74 2120 | | | |
| 155 220000 | 00 | | 4 |
| 155 235959 | 00 | | 4 |

Tc/TE
Ship

EOF..

| | | | |
|------------|----|--|---|
| 1 74 2125 | | | |
| 148 223937 | 16 | | 1 |
| 149 2446 | 16 | | 1 |
| 158 181801 | 16 | | 1 |
| 159 10 | 16 | | 1 |
| 159 1300 | 16 | | 1 |
| 161 185417 | 16 | | 2 |
| 162 25 | 16 | | 2 |
| 163 18 | 16 | | 2 |
| 164 194409 | 16 | | 2 |
| 165 191127 | 16 | | 2 |
| 169 210229 | 16 | | 2 |
| 171 5137 | 16 | | 2 |
| 172 215740 | 16 | | 2 |
| 172 221900 | 16 | | 2 |
| 180 234334 | 18 | | 3 |
| 181 7 | 18 | | 3 |
| 181 1800 | 18 | | 3 |
| 181 235959 | 18 | | 3 |

Tc/TE
RA-5

EOF..

| | | | |
|------------|----|--|---|
| 1 74 2126 | | | |
| 158 182247 | 24 | | 1 |
| 158 221833 | 24 | | 1 |
| 161 225209 | 22 | | 2 |
| 164 181640 | 22 | | 2 |
| 164 192600 | 22 | | 2 |
| 164 235959 | 22 | | 2 |

Tc/TE
RA-6

EOF..

| | | | |
|--------|---|--|--|
| 2 74 1 | | | |
| 500 | 0 | | |
| 1520 | 2 | | |
| 2500 | 4 | | |

Velocity
Table 1

EOF..

| | | | |
|--------|----|--|--|
| 2 74 2 | | | |
| 140 | 0 | | |
| 400 | 2 | | |
| 650 | 4 | | |
| 900 | 6 | | |
| 1150 | 8 | | |
| 1400 | 10 | | |
| 1650 | 12 | | |
| 1900 | 14 | | |
| 2200 | 16 | | |

Velocity
Table 2

EOF..

| | | | |
|--------|---|--|--|
| 2 74 3 | | | |
| 80 | 0 | | |
| 2000 | 2 | | |

Velocity
Table 3

EOF..

| | | | |
|--------|---|--|--|
| 2 74 4 | | | |
| 1000 | 0 | | |

Velocity
Table 4

EOF..

STATION LIST
H-9440
RA-10-4-74

| STA | O | LATITUDE | LONGITUDE | CRT | ELEV | F. | KHZ | TYPE/NAME | SOURCE |
|-----|---|-------------|-----------|-------|------|------|--------|---|--------|
| 101 | 4 | 61 12 15360 | 150 00 | 49560 | 243 | 0048 | 149835 | ZOF 1974 OPEN ELECTRONIC TRAVERSE AND TRILATERATION | REF.* |
| 102 | 7 | 61 13 11576 | 149 54 | 05541 | 243 | 0029 | 149835 | ANCHOR 1964 ECCENTRIC OPEN TAPED TRAVERSE | REF. |
| 104 | 4 | 61 14 20461 | 149 58 | 56770 | 243 | 0028 | 149835 | KEN 1974 INTERSECTION | REF. |
| 105 | 5 | 61 18 23836 | 149 54 | 32781 | 243 | 0053 | 149835 | FIFE 1974 INTERSECTION | REF. |
| 106 | 7 | 61 18 30584 | 149 49 | 02638 | 243 | 0021 | 149835 | DAVE 1974 RESECTION | REF. |
| 108 | 6 | 61 21 38090 | 149 53 | 20460 | 139 | 0060 | 149835 | ARM USE 1941,1964 | |
| 109 | 7 | 61 22 13524 | 149 42 | 59924 | 243 | 0040 | 149835 | LAP 1974 RESECTION | REF. |
| 201 | 7 | 61 09 34034 | 150 01 | 54683 | 139 | :::: | 000000 | SITE POINT RADOME 1964 | |
| 203 | 7 | 61 12 25181 | 149 55 | 20367 | 139 | :::: | 000000 | ANCHORAGE RADIO STATION KENI TOWER 1954,1964 | |
| 204 | 7 | 61 13 07869 | 149 53 | 32868 | 139 | :::: | 000000 | ANCHORAGE TV STATION KENI MAST 1964 | |
| 207 | 7 | 61 13 46510 | 149 52 | 35348 | 139 | :::: | 000000 | ANCHORAGE MUNICIPAL TANK 1964 | |
| 208 | 7 | 61 13 55988 | 149 52 | 21661 | 139 | :::: | 000000 | ANCHORAGE ACS MICROWAVE TOWER 1960,1964 | |
| 210 | 7 | 61 14 40491 | 149 52 | 21193 | 139 | :::: | 000000 | SANDBAG 1960,1964 | |
| 212 | 7 | 61 17 01974 | 149 49 | 22604 | 139 | :::: | 000000 | GLOBE BIE USE 1961,1964 | |
| 213 | 5 | 61 19 05814 | 149 54 | 57722 | 139 | :::: | 000000 | MULE 1973 | |
| 214 | 7 | 61 19 23850 | 149 47 | 06044 | 139 | :::: | 000000 | BIRCH USE 1941,1964 | |
| 217 | 7 | 61 23 48762 | 149 51 | 10551 | 139 | :::: | 000000 | SITE BAY RADOME 1964 | |

STATION LIST
H-9440
RA-10-4-74
(CONCLUDED)

* REFER TO "GEODETIC CONTROL REPORT", OPR-469-RA-74
FOR COMPUTATIONS
:::: VISUAL SIGNAL--NO ELEVATION OBSERVED IN THE FIELD
G.P.'S APPEAR AS ON PARAMETER TAPES

APPROVAL SHEET

H-9440

RA-10-4-74

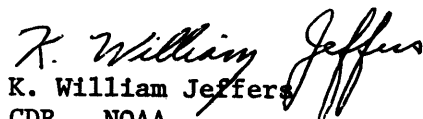
OPR-469-RA-74

Cook Inlet - Knik Arm

Alaska

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

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


K. William Jeffers
CDR., NOAA
Commanding Officer
NOAA Ship RAINIER

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9440

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

| RECORD DESCRIPTION | | AMOUNT | RECORD DESCRIPTION | | AMOUNT | |
|---------------------------|---------------|----------------------|--------------------|------------|----------------|--------------------------------|
| SMOOTH SHEET & 2-Overlays | | 1 | BOAT SHEETS | | 2 | |
| DESCRIPTIVE REPORT | | 1 | OVERLAYS | | 2 6 | |
| DESCRIPTION | DEPTH RECORDS | HORIZ. CONT. RECORDS | PRINTOUTS | TAPE ROLLS | PUNCHED CARDS | ABSTRACTS/ SOURCE DOCUMENTS |
| ENVELOPES | | | 1 | | | |
| CAHIERS | 1 & P/O. | 1 | | | | |
| VOLUMES | | | | | | |
| BOXES | | | | | | |
| T-SHEET PRINTS (List) | | | | | | |
| T-12008 | | | | | | |
| 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 | REVIEW | TOTALS |
| POSITIONS ON SHEET | | | | 1028 |
| POSITIONS CHECKED | | 1028 | | |
| POSITIONS REVISED | | 54 | | |
| DEPTH SOUNDINGS REVISED | | 153 | | |
| DEPTH SOUNDINGS ERRONEOUSLY SPACED | | | | |
| SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED | | 0 | | |
| | TIME (MANHOURS) | | | |
| Verification of Control | | 5 | | |
| Verification of Positions | | 21 | | |
| VERIFICATION OF SOUNDINGS | | 77 | | |
| Smooth Sheet | | 49 | | |
| ALL OTHER WORK | | 24 8 | | |
| TOTALS | | 176 152 | HIT 33 | |
| PRE-VERIFICATION BY James S. Green | BEGINNING DATE Nov. 29, 1974 | ENDING DATE Nov. 29, 1974 | | |
| VERIFICATION BY James S. Green | BEGINNING DATE May 11, 1975 | ENDING DATE May 5, 1976 | | |
| REVIEW BY QUALITY CONTROL Kenneth W. Wellman | BEGINNING DATE 7-26-76 | ENDING DATE 8-6-76 | | |

REGISTRY NO. H-9440

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY NO. H-9440

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:

H-9440

Information for Future Presurvey Reviews

This area is subject to the erosional effect of the strong currents in the area. In addition, the severe earthquake of 1964 is believed to have been a contributing factor to changes in the bottom configuration. Several rocks with elevations as great as 17 feet above MLLW on the 1963 survey were not detected during field work on the present survey and may have been affected by the 1964 earthquake. Any future work in the area should dispose of the soundings and all rocks carried forward to the present survey from prior surveys.

| <u>Position Index</u> | | <u>Bottom Change Index</u> | <u>Use Index</u> | <u>Resurvey Cycle</u> |
|-----------------------|--------------|--------------------------------|----------------------|---------------------------|
| <u>Lat.</u> | <u>Long.</u> | | | |
| 611 | 1500 | 9 | 2 | 10 years |

VERIFIER'S REPORT

RA-10-7-74

H-9440

This survey was verified and plotted at the Pacific Marine Center, Seattle, Washington. Information relating to this survey is provided as specified in Chapter 6 of the Provisional Hydrographic Manual.

I. INTRODUCTION

This survey of the area just north of the Port of Anchorage was conducted by NOAA Ship RAINIER during May and June 1974, utilizing MINI-RANGER for positional control. No major problems were encountered in the verification of this survey. The following data was revised during verification.

- a. The three velocity tables were extended to include the deepest depths encountered. The revised tables are attached.
- b. Positions 2391-93 were added from junctioning survey H-9439, 1974. These position numbers were changed from 5391-93 on H-9439 to preclude the use of duplicate position numbers on H-9440.
- c. One line, positions 5600 to 5603, and part of another line, positions 609901 to 6100, were rejected because of conflict with adjoining hydrography. The cause of these discrepancies could not be determined.

II. CONTROL AND SHORELINE

The horizontal control utilized for this survey is described adequately in Paragraph F. Station Control of the Descriptive Report.

The shoreline data was transferred from unreviewed Class I manuscripts as follows:

| | <u>Photography</u> | <u>Field Edit</u> | <u>Final Compilation</u> |
|------------|--------------------|-------------------|--------------------------|
| T-12007(2) | July 1973 | May - Sept. 1974 | January 1975 |
| T-12008(2) | June-July 1973 | May 1974 | January 1975 |
| T-12016(2) | July 1973 | May-Aug. 1974 | January 1975 |

III. HYDROGRAPHY

In view of the extreme tide range and strong currents in the area of this survey, the quality of the hydrography is as good as can be expected. Soundings at crossings are generally within two feet. There are no conflicts with the photogrammetric mean high water line and the hydrography agrees very well with the photogrammetric MLLW line (generally within one foot). Rock elevations were reduced utilizing observed tides and the

recommended zoning when elevation data was provided on the field sheets. These rock elevations are generally two feet higher than the rock elevations reduced from predicted tides by Coastal Mapping Division. When available, rock elevations derived from observed tides and the recommended zoning are shown on the smooth sheet. The bottom configuration and least depths have been adequately delineated.

IV. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate and confirm to the requirements stated in the manual. See Q.C. Report - item 8

V. JUNCTIONS

This survey junctions with H-9439, 1974, on the north; H-9438, 1974, on the south; and H-9441, 1974, on the southwest. All junctions have been accomplished, are inked on the smooth sheet and are adequate.

VI. COMPARISON WITH PRIOR SURVEYS

Reference Paragraph K of the Descriptive Report. The three pre-survey review items have been investigated during the hydrographic survey and are covered thoroughly in the Descriptive Report. In area number one, the two 27-foot soundings, a least depth of 34 feet was found in the vicinity of the eastern most 27-foot sounding. The application of observed tides did not change the field values, which utilized predicted tides, more than one foot. It is, therefore, recommended that the data from this survey supersede the soundings in the three areas referenced in the pre-survey review. See Q.C. Report - item 2

This survey was compared with H-8729, 1963. H-8729 is the source of most of the soundings on the chart north of $60^{\circ}15'10''$. H-9440 is generally deeper, up to 40 feet in places, than H-8729. In spite of this large difference, because of the extreme tidal currents and the fine sand bottom, it is recommended that the soundings on H-9440 completely supersede those from H-8729 for charting. Several rocks, however, were not disproved on H-9440 and are carried forward to the smooth sheet in violet. Of particular significance is the rock bearing 11 feet at $60^{\circ}18'32''N$, $149^{\circ}53'44''W$ which plots in 18 feet of water. It is probably not there, but is not disproven and should be a subject of the next pre-survey review. Also note that rock elevations from H-8729 differ radically, generally about 6 feet higher, for the same rocks on the 1974 survey. The elevations shown on the smooth sheet have been confirmed by comparing observed with predicted tide values. Therefore, with the exception of the rocks carried forward to the smooth sheet in violet, that portion of H-8729 covered by H-9440 is superseded. See Q.C. Report - items 1 and 10

H-9440 was also compared with prior survey H-8203, 1955, as it is the source of most charted soundings south of $60^{\circ}15'10''$. The soundings from H-8203, the bottom three inches of this smooth sheet, agree within 10 feet. That portion of H-8203 covered by H-9440 is, therefore, also superseded.

VII. COMPARISON WITH CHART (8557, 14th Edition, December 1973)

The large differences between soundings on H-9440, 1974, and the chart have been discussed previously during the prior survey comparisons. The following rocks falling within the area of hydrography are not substantiated by the hydrographic survey, photogrammetric manuscript or the prior surveys that were compared:

- (1) Rock awash at $61^{\circ}15'55''$ and $149^{\circ}55'02''$. Since it plots in 3' and is not disproven by hydrography, its retention on the chart is recommended, provided the source for charting is confirmed. *Disregard rock awash - close to zero curve*
from H-6658(1941)
- (2) Sunken rock at $61^{\circ}15'12''$ and $149^{\circ}52'55''$. Three rocks awash are indicated in this area on H-8729, 1963. The photogrammetric manuscript contains one rock awash. The one rock awash from the photogrammetric manuscript is plotted on the smooth sheet and is recommended for charting. See Q.C. Report-item 4
- (3) Two rocks awash and a sunken rock at $61^{\circ}15'33''$ and $149^{\circ}52'40''$. *from H-8729(1963) and H-6657(1941)*
These rocks are not disproven by hydrography; therefore, their retention on the chart is recommended, provided the source for charting is confirmed. See Q.C. Report-item 5

This survey is adequate to supersede the charted hydrography, with the exception of the rocks noted above, which should be carried forward from ~~its~~ ^{their respective} sources, in accordance with the recommendations in the Q.C. Report.

There were no aids to navigation located in the area covered by this survey nor any new aids recommended. No landmarks were recommended by the hydrographer either.

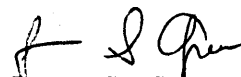
VIII. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the project instructions.

IX. ADDITIONAL FIELD WORK

This is a good basic survey. No additional field work is recommended.

Respectfully submitted,



James S. Green
Chief, Verification Branch



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY, Pacific Marine Center
1801 Fairview Ave. E., Seattle, WA 98102

Date: 2 July 1976

To: Robert E. Williams, CAPT
Acting Director, PMC

From: *Donald E. Nortrup*
Donald E. Nortrup, LCDR
Chief, Processing Division

Subject: PMC Hydrographic Survey Inspection Team Report - H-9440

This survey is a basic hydrographic survey of Knik Arm, Alaska conducted by NOAA Ship RAINIER in 1974 in compliance with Project Instruction OPR-469-RA-74, dated 08 February 1974. A considerable number of cartographic additions were made to the smooth sheet as a result of the inspection process.

This survey was controlled using Mini-Ranger prior to the implementation of the base line calibration procedure. As a result, daily electronic correctors have been applied to the data rather than mean correctors.

During the verification process it was necessary to incorporate a number of peaks which had not been scaled in the field. Development of shoal soundings is generally adequate, however, several undeveloped peaks of from 3-5 feet in depths of approximately 20 feet exist in the northern portion of the survey.

The verifier found it necessary to carry forward a number of rocks from a 1963 survey. Although there is doubt as to the existence of some of these rocks they were not disproven by this survey and were carried forward in the interest of safety.

The inspection team finds H-9440 to be an adequate survey for charting purposes and, with the addition of the rocks from the prior survey, adequate to supersede prior surveys of the area. Administrative approval is recommended.

Donald E. Nortrup
D. E. Nortrup, LCDR

A. E. Eichelberger
A. E. Eichelberger


Dean R. Seidel
D. R. Seidel, LCDR

Richard D. Lynn
R. D. Lynn

ADMINISTRATIVE APPROVAL

H-9440

The smooth sheet and reports of this survey have been reviewed and the survey is complete and adequate to supersede all prior surveys.


R. E. Williams
Acting Director, PMC

7/2/76
Date



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

C352

August 6, 1976

TO: *A. J. Patrick*
A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: K. W. Wellman *K. W. Wellman*
Quality Evaluator

SUBJECT: Quality Control Report, H-9440 (1974), Alaska, Cook Inlet,
South Portion of Knik Arm

A quality control inspection has been accomplished to evaluate the accuracy and adequacy of the survey with respect to data acquisition, delineation of the bottom, determination of least depths and navigational hazards, junctions, shoreline transfer, decisions and actions taken by the verifier and cartographic presentation of data.

Junctional sheet H-9441 (1974) is not presently available for examination of the junctional adequacy. Aside from this junction, the quality control examination revealed a general conformity with National Ocean Survey standards and requirements except as follows:

1. Section VI of the Verifier's Report is supplemented by the following:

Comparison with prior survey H-8729 (1963) reveals variable depth differences, generally within a range of ± 20 feet, with the 40-foot deeper depths, noted in the Verifier's Report, generally occurring in present depths exceeding 150 feet. It is considered significant to note however, that, in the northeast portion of the survey area, present depths are generally 2 to 17 feet shoaler than prior depths. In this general area of the present survey, the 0 to 18-foot depth curves have migrated approximately 300 to 400 meters offshore of their former position. The present zero-depth curve in the area falls in the general vicinity of the former 6-foot curve. The noted depth differences are attributed to a combination of the effects of the severe 1964 earthquake and the scouring action of the strong currents on the generally sandy bottom.

2. The verifier failed to make a comparison with prior wire-drag survey H-4036 (1918) W.D. [See provisional manual--section 6.6(11).] A comparison made during the quality control inspection revealed no conflicts



between present survey depths and the cleared depths of the prior wire-drag survey. A 27-foot sounding in the vicinity of latitude $61^{\circ}15'02''$, longitude $149^{\circ}53'33''$ on H-4036 W.D. however, is not considered disproved by the present survey development and was therefore carried forward as 29 feet (1964 subsidence adjustment) to supplement the present survey.

3. Reference Verifier's Report--section VII-1: The charted rock in latitude $61^{\circ}15.93'$, longitude $149^{\circ}55.00'$ originates with H-6658 (1941) and was carried forward to H-8729 (1963). Inasmuch as the present low water line is close to the position of the rock and the present survey adequately reflects the dangers in this area, the rock is considered of little significance and has not been carried forward.

4. Reference Verifier's Report--section VII-2: The two rocks in the vicinity of latitude $61^{\circ}15.20'$, longitude $149^{\circ}52.93'$ on H-8729 (1963) are not disproved by the present survey. Inasmuch as they are identified by side echoes on the fathogram (vicinity of present survey position 510403), they have been carried forward as rocks awash covered 2 feet at MLLW during quality control inspection and the chart should be revised as considered appropriate.

5. Reference Verifier's Report--section VII-3: The most easterly charted rock in the vicinity of latitude $61^{\circ}15.55'$, longitude $149^{\circ}52.67'$ originates with H-6657 (1941) and was applied to H-8729 (1963) and the present survey. It is considered to have been displaced during application to the chart. The other rock awash also has been transferred to the present survey. This area of the chart should be revised to agree with the present survey.

6. The note identifying the source of rocks carried forward to the present survey from the prior survey was lettered in vertical rather than slanted lettering. [See provisional manual--section 7.2.5.2.] The notation was revised during quality evaluation.

7. The Approval Sheet, giving the status of the final printouts and tapes, was not included with the Verifier's Report. [See provisional manual--page 6-79 and figure 6-4.]

8. Numerous rock elevations and/or depths were in error on the verified smooth sheet due to:

A. The erroneous application of the recommended time corrections in determining the applicable tide corrector from the tide curve.

B. The utilization of a tide curve for the wrong date.

During the quality control examination the correctors applied to the field edit rock elevations were reexamined and revised as necessary.

9. Reference section II of the Verifier's Report:

A. The photogrammetric manuscripts were improperly identified in section II of the Verifier's Report inasmuch as the edition number was omitted.

B. The list referencing the T-sheets is unnecessarily detailed. It is sufficient to identify the sheet number, edition number if applicable, year of photography, and year of field edit thus: T 12007(2) 1973/74.

10. Several rocks awash near both shores of Knik Arm, seaward of the low water line on H-8729 (1963), were not found on the present survey. However, their existence is not considered disproved and they were carried forward to the present survey as submerged rocks during quality control inspection.

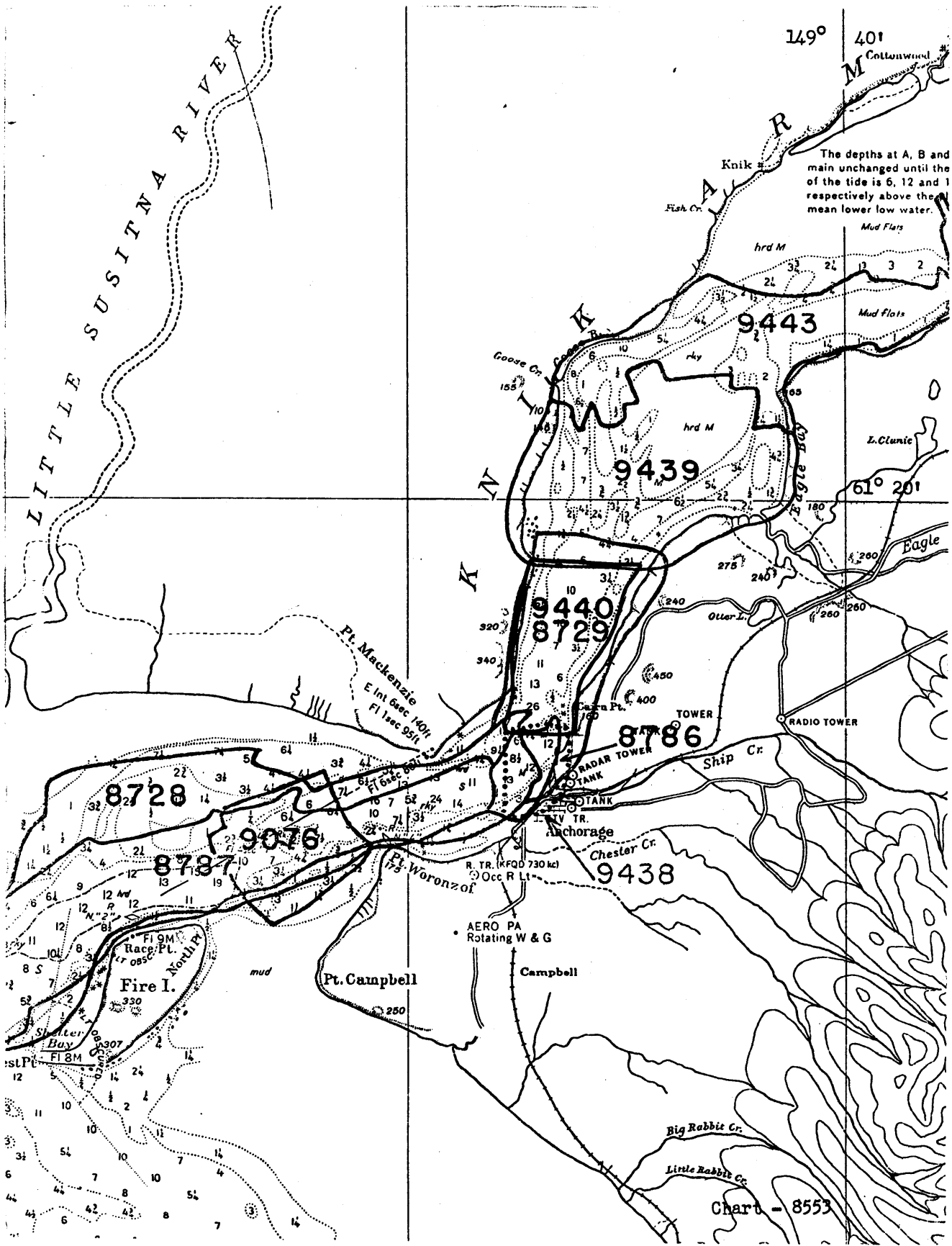
11. The rock awash at MLLW on T-12016(2) in latitude $61^{\circ}14'54''$, longitude $149^{\circ}52'46''$ was added to the smooth sheet during quality control inspection.

12. Section III of the Verifier's Report lacks any reference to the adequacy of depth curves. [See provisional manual section 6.6(8).] The usual depth curves are adequately delineated. A few dashed and supplemental curves are included to emphasize important isolated bottom features.

13. Section VII of the Verifier's Report does not follow the commonly accepted format for the chart comparison discussion. [See copies of prior reviews for sample format.]

14. The title sheet of the Descriptive Report did not specify the names of the individual members of the hydrographic survey party. [See provisional manual section 5.3.2.] The names were gleaned from the raw data printouts and added to the Descriptive Report during quality control inspection.

cc:
C351



149° 40'

The depths at A, B and main unchanged until the of the tide is 6, 12 and 1 respectively above the mean lower low water.

9443

9439

9440
8729

8786

8728

9076

8787

9438

Chart - 8553

