

H10913

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. RA-10-12-99

Registry No. H-10913

LOCALITY

State Alaska

General Locality Womens Bay to Kodiak Harbor
and Approaches

Sublocality Chiniak Bay

1999

CHIEF OF PARTY

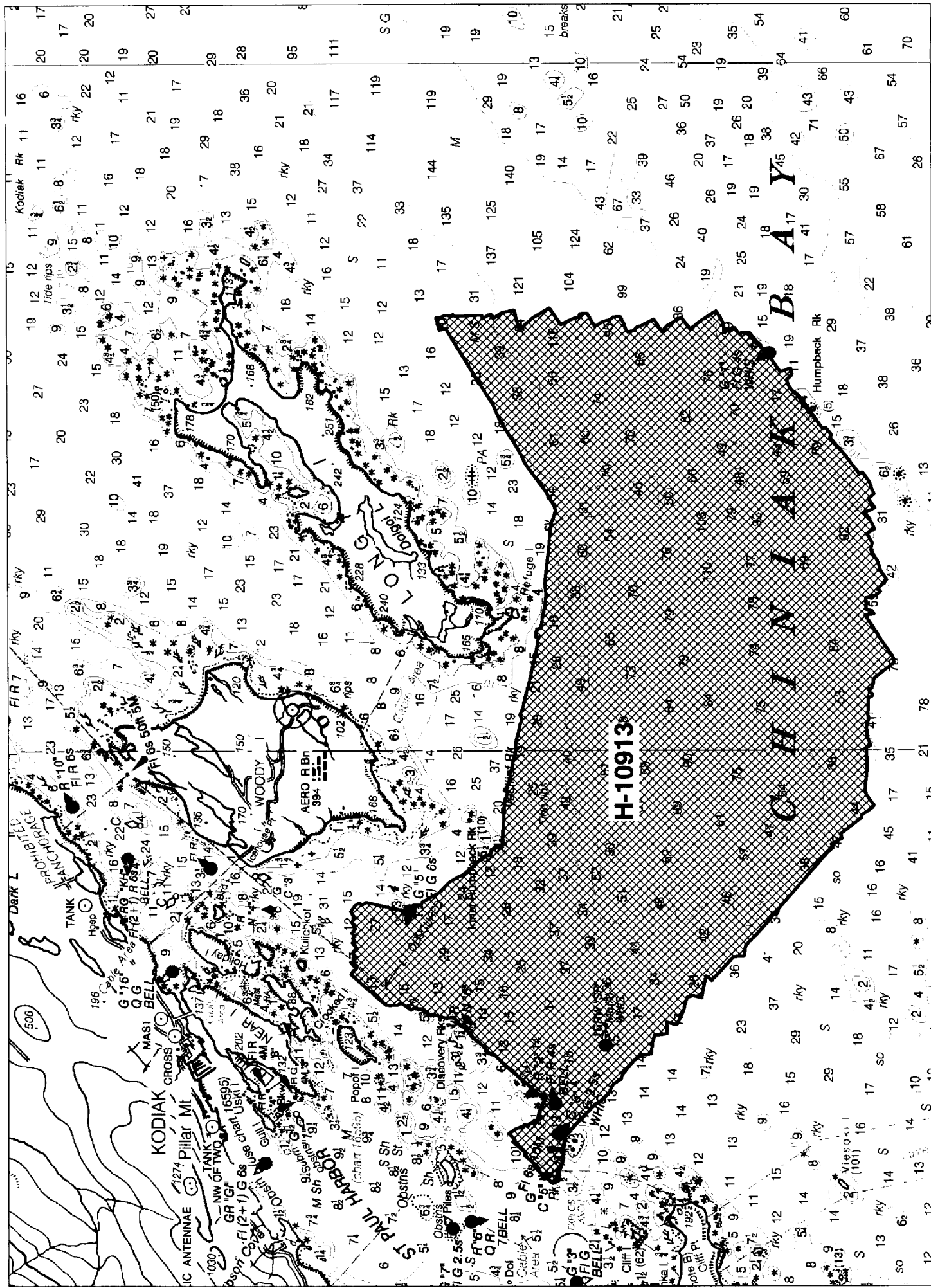
Commander D.R. Herlihy, NOAA

LIBRARY & ARCHIVES

DATE

NOV 8 2000

| | | |
|---|--|--|
| NOAA FORM 77-28 (11-72) | U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | REGISTER NO. <i>H-10913</i> H-10855 |
| HYDROGRAPHIC TITLE SHEET | | <i>GKA</i> <i>11/6/00</i> |
| 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-10-12-99 |
| State <u>Alaska</u> | | |
| General Locality <u>Women's Bay to Kodiak Harbor and Approaches</u> | | |
| Sublocality <u>Chiniak Bay</u> | | |
| Scale <u>1:10,000</u> | | Date of Survey <u>8/2/99-8/6/99</u> |
| Instructions Date <u>July 2, 1999</u> | | Project No. <u>OPR-P337-RA</u> |
| Vessel <u>NOAA Ship RAINIER (2120), RA-1 (2121), RA-2 (2122),</u> | | |
| Chief of Party <u>Commander Dan R. Herlihy, NOAA</u> | | |
| Surveyed by <u>RAINIER Personnel</u> | | |
| Soundings taken by echo sounder, h | | <u>RESON 8101 MB</u> |
| <u>SeaBeam 1050 MKII (High Frequency)</u> | | |
| Graphic record scaled by <u>RAINIER Personnel</u> | | |
| Graphic record checked by <u>RAINIER Personnel</u> | | |
| Evaluation by <u>R. Shipley</u> | | Automated plot by <u>HP Design Jet 750+</u> |
| Verification by <u>D. Doles, R. Mayor, E. Domingo, R. Shipley</u> | | |
| Soundings in <u>Fathoms</u> | | at <u>MLLW</u> |
| REMARKS: <u>Time in UTC. Revisions and marginal notes in black</u> | | |
| <u>were generated during office processing. All separates</u> | | |
| <u>are filed with the hydrographic data. As a result, page</u> | | |
| <u>numbering may be interrupted or non-sequential.</u> | | |
| <u>All depths listed in this report are referenced to</u> | | |
| <u>mean lower low water unless otherwise noted.</u> | | |
| <i>AW015/SURF 11/2/00</i> <i>MUR</i> | | |



Descriptive Report to Accompany Hydrographic Survey H10913

Field Number RA-10-12-99

Scale 1:10,000

August 1999

NOAA Ship RAINIER

Chief of Party: Commander Daniel R. Herlihy, NOAA

A. PROJECT ✓

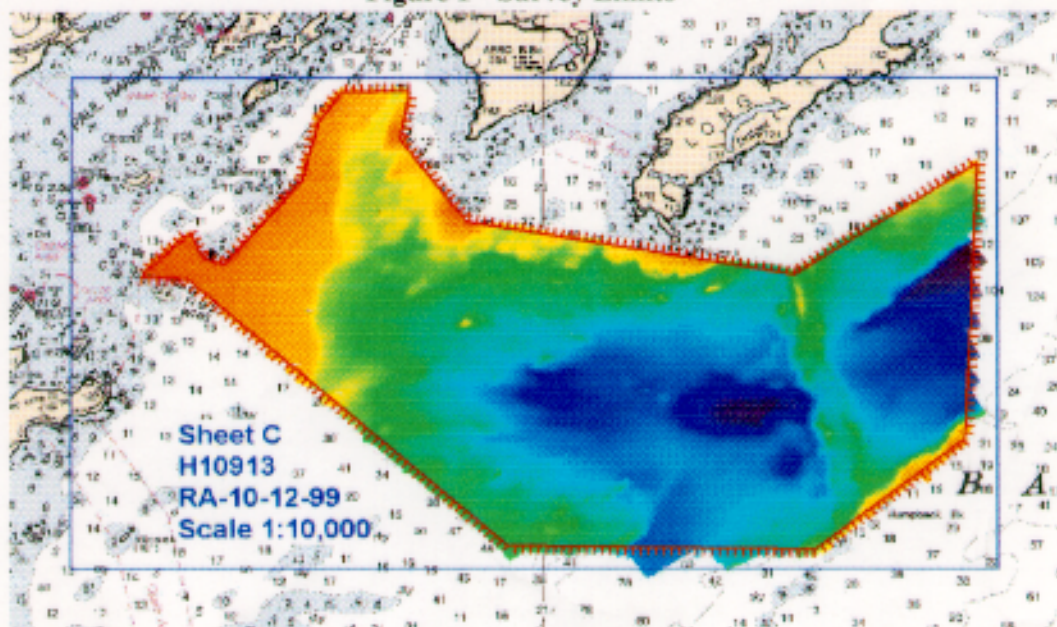
This navigable area survey was completed as specified by the Draft Standing Project Instructions dated April 6, 1999 and Hydrographic Survey Letter Instructions OPR-P337-RA dated July 2, 1999. Survey H10913 corresponds to Sheet C as defined in the sheet layout.

This survey was conducted in response to a request from the U.S. Coast Guard Integrated Support Command (ISC) Kodiak for a new hydrographic survey to be conducted in preparation for the home porting of the 282 foot CGC ALEX HALEY and to support other vessels accessing the facility. This project will provide contemporary hydrography from Womens Bay to Kodiak Harbor, Alaska and approaches. Fuel, cargo, and fishing vessels transit this area. There is concern that undetected hazardous features may exist in the areas common to this project that would not have been detected by the prior surveys using vertical beam echosounders. With the use of shallow water multibeam systems, it is the intent of this survey to provide modern and accurate hydrographic survey data to supersede prior surveys performed from 1933 through 1983 in an effort to update NOS Charts of the harbors and approaches.

B. AREA SURVEYED ✓ SEE EVAL REPORT, SECTION B.

The survey covers approximately 14.1 square nautical miles within Chiniak Bay, Alaska, from Humpback Rock to the approaches into St Paul Harbor and Womens Bay. Figure 1 below shows the survey limits overlaid onto chart 16594. The survey's northern limit is latitude 57°46'00"N and the southern limit is latitude 57°42'04"N. The survey's western limit is longitude 152°26'19"W and the eastern limit is longitude 152°13'42"W. Data acquisition was conducted from August 02 to August 09, 1999 (DN 214 to 221).

Figure 1 - Survey Limits



C. SURVEY VESSELS ✓

Data were acquired by RAINIER (vessel number 2120) and her survey launches (vessel numbers 2121 and 2126) as noted in the Survey Information Summary included with this report. These vessels were used exclusively for multibeam data acquisition and sound velocity casts. See Project Related Data for OPR-P337-RA for vessel descriptions. No unusual vessel configurations or problems were encountered on this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Coastal Oceanographic's HYPACK version 8.9 was utilized for vessel navigation and line tracking during acquisition of shallow water multibeam (SWMB) and SeaBeam 1050D MKII data.

SWMB echosounder data were acquired using the Reson SeaBat 8101 with Triton Elics ISIS version 4.32 and processed using CARIS software version 4.3.

Multibeam data collected by RAINIER were acquired using the SeaBeam 1050D MKII and HydroStar ONLINE version 2.8.5b with Triton Elics ISIS version 4.32 and processed using CARIS software version 4.3.

Reson 8101 and SeaBeam 1050D MKII depth data were reviewed with CARIS-HIPS data cleaning programs. Depth fliers were identified and manually flagged as "rejected". Vessel positioning and attitude data from each system were similarly displayed and manually cleaned. Additionally, instantaneous speed as computed from the positioning data was checked for speed jumps exceeding 3 knots.

After review and cleaning, Reson 8101 and SeaBeam 1050D MKII depth, position and attitude data were merged with sound velocity, preliminary tide and dynamic draft correctors to compute the corrected depth and position of each sounding. Processed soundings were read into a CARIS Workfile by selecting shoal biased line-by-line binning at a density of 1.5mm at scale of the survey. After performing quality assurance on digital terrain models (DTMs) created within CARIS, processed soundings were then exported into HPS through HPTools. Preliminary tides were applied in the Hydrographic Processing System (HPS) and the processed soundings were excessed using a 3mm character size, and plotted at a 2 mm character size to produce the final sounding plot. Soundings based on preliminary tides were saved in MapInfo format. Raster images registered in MapInfo facilitated chart and prior survey comparisons.

Survey H10913 is defined as sheet 03 in HPS. The CARIS workfile name is defined as c_kodiak, and the project name is identified as P337_sheetc in HDCS.

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

A complete listing of software is included in Appendix H. A data flow diagram is included in Appendix G. *

E. SONAR EQUIPMENT ✓

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

F. SOUNDING EQUIPMENT ✓

Two different categories of echosounder systems were used and are described below. The individual system(s) chosen for use in a given area were decided at the discretion of the Hydrographer using the

guidance stated in the Project Instructions and depended upon the limitations of each system, bottom topography, water-depth, and the ability of the platform vessel to safely navigate the area.

1. Launch Shallow Water Multibeam (VN 2121, 2126) ✓

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

2. Ship Shallow Water and Intermediate Depth Multibeam (RAINIER)

RAINIER utilized the SeaBeam 1050D MKII, which is a hull-mounted, dual frequency (180 kHz, 50 kHz), high-resolution multibeam echosounder system for shallow and medium water depths. A TSS 335B attitude sensor was used to correct for the effects of vessel motion during survey operations, and a Sperry MK227 gyro was used for heading. The SeaBeam 1050D MKII ensonifies the seafloor utilizing two narrow beam width transducer arrays pinging into 14 sectors. The receiving beamformer generates 3 narrow beams each sector with a beam width of 1.5° and a spacing of 1.25°. Three subfans are one total fan. Hence, there are 14 sectors x 3 beams x 3 subfans resulting in 126 total beams. Serial numbers for the SeaBeam 1050D MKII, TSS335B and Sperry MK227 are included in Appendix H. *

The high frequency array (180 kHz) is used in depths ranging from 10 to 300 meters, while the low frequency array (50 kHz) is used in depths ranging from 100 to 3100 meters. High frequency was used exclusively on survey H10913 with an acquisition swath width of 128°. During processing, all soundings within the 128° swath were retained and inspected during data cleaning.

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

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Sound Velocity Correctors ✓

The velocity of sound through water was determined by a minimum of one cast every four hours during data acquisition. Cast information is included in the Survey Information Summary** and in Appendix I* Sound Velocity Profile Data.

The sound velocity casts were acquired with SBE SEACAT Profilers (S/N 2543 and 2477), calibrated November 13, 1998. Calibration reports are included with the project data for OPR-P337-RA. Velocity correctors were computed using the program VELOCWIN version 4 beta 2, which generates sound velocity correction tables for both CARIS and HPS.* Sound velocity correctors were applied in CARIS during post processing.

Settlement and Squat Correctors ✓

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

| Vessel No. | Date of Static Draft and Transducer Offset Measurements | Method of Settlement and Squat Measurement | Date of Settlement and Squat Measurement | Location of Settlement and Squat Measurement |
|------------|---|--|--|--|
| 2120 | March 1999 | OTF | March 1999 | Port Angeles, WA |
| 2121 | March 1999 | OTF | March 1999 | Port Angeles, WA |
| 2126 | March 1999 | OTF | March 1999 | Port Angeles, WA |

Settlement and squat correctors, static draft measurements and vessel offsets are included with the project data for OPR-P337-RA.

Heave, Pitch, Roll Biases and Navigation Timing Error ✓

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

RAINIER utilizes a TSS 335B attitude sensor, which provides attitude data (heave, pitch and roll) to correct for the effects of vessel motion during survey operations. Heave resolution is 1cm, with an accuracy of 5cm or 5% of the range, whichever is the greater. The roll and pitch resolution is 0.01° with an accuracy of 0.05° – 0.1°. During acquisition, SeaBeam depth data are corrected for roll in HYDROSTAR to account for beam steering at the transducer face. A Sperry MK227 digital gyro was utilized for vessel heading, which has a resolution of 0.1° and an accuracy of better than 1°. Serial numbers are located in Appendix H. ✱

RAINIER and SWMB vessel configuration files (VCFs) were created within the CARIS program VCFEDIT, and applied to the sounding data during processing. Prior to beginning data acquisition, CARIS Vessel Configuration Files were updated to define the physical relationship (offsets) between the various components that comprise the systems, including the transducer head, TSS motion sensor and POS/MV positioning system. In addition, VCF files contain dynamic draft, timing errors, and heave, roll and pitch biases (system biases). These system biases were determined during a patch test conducted at Port Angeles, WA on March 26-28, 1999 for vessel 2126, and at Shilshole, WA on July 7, 1999 for vessel 2121. System biases for RAINIER were determined during a patch test conducted in Lynn Canal, southeast Alaska on May 21, 1999. Copies of the Vessel Configuration Files are contained in Project Related Data for OPR-P337-RA.

Water Level Correctors ✓

Once data acquisition was complete and all sounding data were processed in HIPS and exported to HPS, CO-OPS preliminary tides for Kodiak Island, Womens Bay (945-7292) were downloaded from the Internet and used to create HPS table #1. The MapInfo tidal zoning table supplied by CO-OPS was then imported into

HPS using the MapBasic application HPT_UTIL.MBX and HP Tools v.3.4.1. Tide zone correctors were then computed and applied to all soundings in HPS to produce a final sounding plot.*

The HPS tide table listing is included in Appendix D* of this report. Water level correctors as provided in the Project Instructions for H10913 are contained in the Survey Information Summary included with this report.

The operating tide station at Kodiak Island, Alaska (945-7292) served as control for datum determination. RAINIER personnel installed a Sutron 8200 tide gage at Near Island (945-7258) on August 2, 1999. The purpose of this gage was to provide information for completion of an overall area zoning scheme and additional information for inclusion in the Tide Prediction Tables. This gage was not required for hydrography on H10913. The Near Island gage was removed on August 9, 1999. Refer to the Field Tide Notes and supporting data in Appendix D* for gage performance and level closure information. This information has been forwarded to N/CS41 in accordance with HSG 50 and FPM 4.8. A request for approved tides was forwarded to N/CS41 in accordance with FPM 4.8. **APPROVED TIDE NOTE DATED NOVEMBER 30, 1999 IS ATTACHED.**

Raw waterlevel data from the Near Island gage was forwarded to N/OPS1 on September 3, 1999 in accordance with HSG 50 and FPM 4.7. The Pacific Hydrographic Branch (PHB) will apply final approved (smooth) tides to the survey data during final processing. A request for delivery of final smooth tides to PHB has been forwarded to N/OPS1 on August 13, 1999 in accordance with FPM 4.8.

H. HYDROGRAPHIC POSITION CONTROL ✓ SEE EVAL REPORT, SECTION H .

The horizontal datum for this project is NAD 83. All soundings were positioned with differential GPS (DGPS) using the USCG beacon located at Kodiak, AK.

Launch to launch DGPS performance checks were conducted in accordance with Section 3.2 of the FPM. Differential corrections from USCG reference stations were received by the independent launch positioning systems as they were rafted together with their GPS antennae 2-3 meters apart. A performance check for RAINIER was not conducted during this survey. However, a performance check was conducted by RAINIER at the end of the previous project OPR-O340-RA in Lynn Canal, AK by comparing DGPS positions acquired by RAINIER's positioning system and the launches positioning systems, while at rest in the davits. Copies of DGPS performance checks are included with the Project Related Data for OPR-P337-RA.

I. SHORELINE ✓ SEE EVAL REPORT, SECTION J.

There are no photogrammetric source data for this project. No shoreline falls within the H10913 survey area.

J. CROSSLINES ✓

Ship multibeam crosslines totaled 6.7 nautical miles, or 10.8% of ship multibeam mainscheme lines. SWMB launch crosslines totaled 7.3 nautical miles, or 6.8% of SWMB mainscheme lines.

Both ship multibeam and SWMB crosslines were in agreement with mainscheme hydrography. Ship multibeam crosslines agreed within 1-2 meters with ship mainscheme multibeam, and SWMB crosslines agreed within 1 meter with SWMB mainscheme.

The Quality Control Report (CARIS HIPS) for the ship multibeam checkline file averaged 95%, with a depth tolerance of 0.023, and the SWMB launch checkline file averaged 97%, with a depth tolerance of 0.023. See Appendix G* for the detailed reports.

K. JUNCTIONS ✓

The following contemporary survey junctions with H10913:

| Registry # | Scale | Date | Junction side |
|------------|---------|------|---------------|
| H10912 | 1:5,000 | 1999 | Northwest |

Soundings from survey H10912 were found to be in very good agreement with H10913, generally matching within 0.3 meters. Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after application of smooth tides. CONCUR

L. COMPARISON WITH PRIOR SURVEYS ✓ *SEE EVAL REPORT, SECTION M.*

The following prior surveys were compared to survey H10913 and are shown in Figure 2 below.

| Registry # | Scale | Date | Area covered |
|------------|----------|------|------------------|
| H05440 | 1:20,000 | 1933 | Center of Survey |
| H5441 A&B | 1:10,000 | 1933 | North and West |
| H6758 | 1:10,000 | 1942 | Western Edge |
| H9763 | 1:5,000 | 1978 | Western Edge |

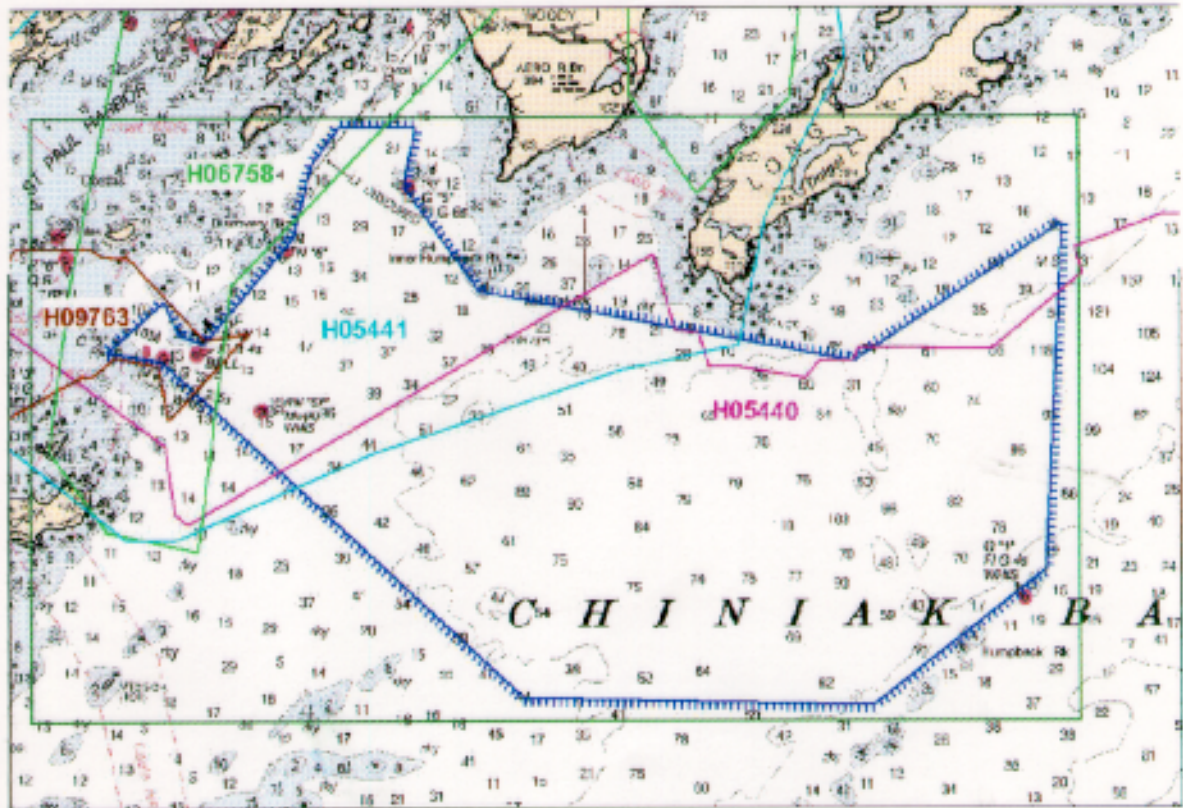


Figure 2 Prior Surveys

Survey H10032 (1:5,000, 1983) was depicted in the MapInfo table provided by the Hydrographic Surveys Division (HSD) to have junctioned with H10913. However, upon inspection of the digital raster image of H10032 it was noted that this survey did not junction with H10913. CONCUR

Prior survey H05440 was conducted in 1933, and is the source for soundings in Chiniak Bay depicted on charts 16594 and 16595. Soundings from prior survey H05440 were found to be in general agreement with H10913. Within a 250m radius of prior survey soundings, present survey depths agreed within 1-2 fathoms. Larger differences in prior survey soundings carried to the chart are discussed in Section N, Comparison with the Chart. **CONCUR**

Prior survey H05441^B is a 1:10,000 wire drag survey conducted in 1933. The quality of the raster scan is poor; no least depths are discernable and annotations are illegible. **CONCUR**

Prior survey H06758 is a 1:10,000 wire drag survey conducted in 1942. Wire drag clearance depths match well with present survey depths. **CONCUR**

Prior survey H09763 is a 1:5,000 survey conducted in 1978. Depths from the prior survey are in general agreement with present survey depths, within 1-3 feet. **CONCUR**

It is the Hydrographer's opinion that comparisons between 100% multibeam surveys and wire drag/leadline surveys should not be a requirement. Current state of the art technology using DGPS and multibeam far surpasses technology used early in this century.

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

M. ITEM INVESTIGATIONS ✓

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

N. COMPARISON WITH THE CHART ✓ SEE EVAL. REPORT, SECTION O.

Survey H10913 was compared to Chart 16594 (13th Ed.; Apr 4, 1998, 1:78,900), Chart 16595 (12th Ed.; Jan 19, 1991, 1:20,000) and Chart 16596 (11th Ed.; Jul 10, 1993, 1:10,000).

Depths from chart 16594 agreed with current survey depths within 0-2 fathoms (comparing present survey depths within a 200m radius of charted soundings). Notable differences are addressed below.

In the vicinity of a charted 15 fathom sounding at 57°45'2.5"N, 152°23'27.5"W, the present survey revealed depths of 17-24 fathoms.

In the vicinity of a charted 16 fathom sounding at 57°44'51.5"N, 152°23'31.6"W, the present survey revealed depths of 18-21 fathoms.

In the vicinity of a charted 17 fathom sounding at 57°44'29.9"N, 152°23'44.5"W, the present survey revealed depths of 19-20 fathoms.

In the vicinity of a charted 14 fathom sounding at 57°44'35.7"N, 152°24'16.5"W, the present survey revealed depths of 16-17 fathoms.

In the vicinity of a charted 39 fathom sounding at 57°44'11.5"N, 152°22'48.1"W, the present survey revealed depths of 42-47 fathoms.

In the vicinity of a charted 70 fathom sounding at 57°43'52.6"N, 152°15'27.3"W, the present survey revealed depths of 75-85 fathoms.

In the vicinity of a charted 38 fathom sounding at 57°44'18"N, 152°17'41"W, the present survey revealed a least depth of 25 fathoms at 57°44'17.6"N, 152°17'44.1"W. This shoal area is also depicted on the larger scale chart 16595.

At 57°44'02.4"N, 152°21'27.9"W, chart 16594 depicts a least depth of ²⁹30 fathoms over a significant shoal area rising from 55-60 fathoms. Present survey depths agreed well, revealing a least depth of 29.1 fathoms at 57°44'00.9"N, 152°21'26.6"W. This shoal area is also depicted on the larger scale chart 16595.

In the vicinity of 57°44'12.4"N, 152°16'23.0"W, chart 16594 depicts a shoal area extending south into the survey area with a least depth of 31 fathoms. The present survey revealed a least depth of ~~28.9~~ ^{29.0} fathoms at 57°44'10.0"N, 152°16'23.8"W.

The Hydrographer recommends that present survey depths be used to supersede depths on chart 16594 in their common areas. *concur*

Depths from chart 16595 agreed with current survey depths within 0-2 fathoms (comparing present survey depths within a 200m radius of charted soundings). Notable differences are addressed below.

In the vicinity of a charted 13 fathom sounding at 57°45'04.96"N, 152°23'51.83"W, the present survey revealed depths of 15-16 fathoms.

In the vicinity of a charted 14 fathom sounding at 57°45'01.74"N, 152°23'39.57"W, the present survey revealed depths of 16-17 fathoms.

In the vicinity of a charted 15 fathom sounding at 57°45'05.67"N, 152°23'27.69"W, the present survey revealed depths of 16-18 fathoms.

In the vicinity of a charted 15 fathom sounding at 57°44'00.00"N, 152°24'15.59"W, the present survey revealed depths of 17-18 fathoms.

In the vicinity of a charted 16 fathom sounding at 57°44'49.79"N, 152°23'30.13"W, the present survey revealed depths of 18-20 fathoms.

In the vicinity of a charted 44 fathom sounding at 57°44'05.69"N, 152°22'31.59"W, the present survey revealed depths of 48-50 fathoms.

The 30-32 fathom shoal area in the vicinity of 57°44'01"N, 152°21'25"W is charted incorrectly. At the charted 32 fathom sounding, the present survey revealed depths of 44-48 fathoms. A least depth of 29.1 fathoms was found 75m northeast of the charted 30 fathom sounding at 57°44'10.0"N, 152°16'23.8"W.

The charted 38 fathom shoal area at 57°44'¹⁶18"N, 152°17'41"W is charted incorrectly. The current survey revealed a least depth of 25.2 fathoms at 57°44'17.6"N, 152°17'44.1"W.

The Hydrographer recommends that present survey depths be used to supersede depths on chart 16595 in their common areas. *concur*

Depths from chart 16596 agreed with current survey depths within 1-3 feet (comparing present survey depths within a 100m radius of charted soundings). Notable differences are addressed below.

In the vicinity of a charted 96 foot sounding at 57°44'36.86"N, 152°24'31.43"W, the present survey revealed depths of 89-94 ft. *14.8 - 15.5 fm*

In the vicinity of a charted 93 foot sounding at 57°44'16.91"N, 152°24'29.35"W, the present survey revealed depths of 97-102 ft. *16-17 fm*

In the vicinity of two 93 foot charted soundings at 57°43'57.04"N, 152°24'29.15"W and 57°44'03.83"N, 152°24'29.55"W, the present survey revealed depths of 96-99 ft.

16-16.5 fm

In the vicinity of two 84 foot charted soundings at 57°44'07.25"N, 152°24'39.40"W and 57°44'04.15"N, 152°24'47.16"W, the present survey revealed depths of 89-95 ft.

14.8-15.8 fm

The Hydrographer recommends that present survey depths be used to supersede depths on chart 16596 in their common areas.

CONCUR

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

Dangers to Navigation ✓

No dangers to navigation were discovered during acquisition and processing of survey H10913. CONCUR

O. ADEQUACY OF SURVEY ✓

Survey H10913 is complete and adequate to supersede charted soundings in their common areas.

P. AIDS TO NAVIGATION ✓

Five floating aids to navigation fall within the H10913 survey area. These five buoys were not positioned due to time constraints and inclement weather on the days the buoys were to be located. Buoy sinkers could not be readily detected in the SWMB, perhaps due to the sinkers being buried in the sand and mud. SWMB launch crews and RAINIER noted that these buoys appear to be in their charted positions and adequately serve their purpose. The following is a list of the five buoys and their charted positions.

| <u>Buoy</u> | <u>Latitude (N)</u> | <u>Longitude (W)</u> |
|----------------------|---------------------|----------------------|
| G C "5" | 57°44'28.53" | 152°26'05.50" |
| G "3" Fl G 2.5s WHIS | 57°44'25.37" | 152°25'32.86" |
| R "2" Fl R 4s BELL | 57°44'28.06" | 152°25'09.62" |
| RW "SP" Mo(A) WHIS | 57°44'03.13" | 152°24'18.76" |
| R N "6" | 57°45'06.09" | 152°23'58.80" |

Q. STATISTICS ✓

Refer to the Survey Information Summary attached to this report.

R. MISCELLANEOUS ✓

Due to time constraints resulting from the short duration of this project, bottom samples were not acquired.

S. RECOMMENDATIONS ✓

None.

CONCUR

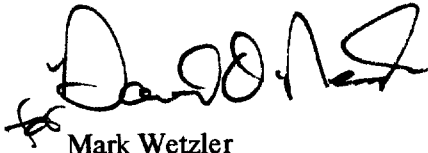
T. REFERRAL TO REPORTS ✓

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

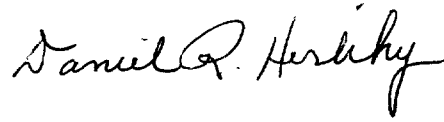
| <u>Title</u> | <u>Date Sent</u> | <u>Office</u> |
|--------------------------------------|------------------|---------------|
| OPR-P337-RA Coast Pilot Report | September 1999 | N/CS26 |
| Project related data for OPR-P337-RA | September 1999 | N/CS34 |

Respectfully Submitted,

Approved and Forwarded,

Handwritten signature of Mark Wetzler in black ink, appearing as 'Mark Wetzler' with a stylized flourish.

Mark Wetzler
Lieutenant, NOAA

Handwritten signature of Daniel R. Herlihy in black ink, appearing as 'Daniel R. Herlihy' with a stylized flourish.

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Survey Information Summary

Project: Project Name:

Instructions Dated: Project Change Info:

Sheet Letter: Registry Number:

Sheet Number:

Survey Title:

Data Acquisition Dates: From: To:

Vessel Usage Summary

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

Sound Velocity Cast Information

Tide Zone Information

| Zone # | Time Corr. | Height Corr. |
|--------|---------------|--------------|
| SWA6 | -00 hr 06 min | 0.99 |
| SWA7 | -00 hr 12 min | 0.99 |

Tide Gage Information

| Tide Gage # | Gage Name | Installed | Removed |
|-------------|-------------|-----------|---------|
| 945-7258 | NEAR ISLAND | 8/2/99 | 8/9/99 |

Statistics Summary

| Type | Total: |
|------|--------|
| MBMS | 56.58 |
| MBXL | 4.99 |
| SWMB | 107.08 |

| | |
|-------------|--------------------------------|
| Percent XL: | <input type="text"/> |
| SQNM: | <input type="text" value="0"/> |

APPROVAL SHEET

for

H10913

RA-10-12-99

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

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

Approved and Forwarded,



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



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: November 30, 1999

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P337-RA-99
HYDROGRAPHIC SHEET: H-10913

LOCALITY: Womens Bay to Kodiak Harbor and Approaches,
AK

TIME PERIOD: August 2 - August 6, 1999

TIDE STATION USED: 945-7292 Kodiak, AK
Lat. 57° 43.8'N Lon. 152° 30.8'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.399 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SWA2, SWA3, SWA5 & SWA6.

Refer to attachments for zoning information.

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

Note 2: Kodiak, AK was used for datum control and tidal zoning in this hydrographic survey. Accepted datums for this station have been updated recently and have changed significantly from previous values.

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY SHEET H-10913 cont.

However, analyses also show that there are several geographic areas which are strongly anomalous from the average sea level trends found across the NWLON and must be treated differently. One of these areas includes the region surrounding Kodiak Island. Relative sea level in this area is decreasing at an anomalous rate due to land emergence from the retreat of glaciers over recent geological time. NOS has adopted a procedure of computing accepted tidal datums for these anomalous regions by using an MSL value calculated from the last several years of data rather than the 19-year NTDE. The accepted range of tide is still based on the 19-year NTDE and, when applied to the updated MSL, will result in updated values for Mean High Water (MHW) and Mean Lower Low Water (MLLW) derived through standard datum calculation procedures. For Kodiak, the MSL value was computed from the period of 1994-1998. This resulted in a lowering of the MLLW datums relative to land by up to -0.56 ft compared to MLLW elevations used in previous surveys. Subordinate tide stations in the area used for hydrographic surveys and controlled by Kodiak will be affected similarly. Accepted datums have been computed and may be accessed on the Internet through the URL specification <http://www.co-ops.nos.noaa.gov>.

Thomas V. Mero 11/30/99

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-P337-RA-99,
Sheet H-10913.

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

| | Tide Station Order | AVG Time Correction | Range Correction |
|-----------------------|-----------------------|------------------------|---------------------|
| Zone SWA2 | | | |
| -152.398958 57.790749 | 945-7292 | 0 | 1.00 |
| -152.430862 57.78665 | | | |
| -152.48236 57.76518 | | | |
| -152.503015 57.736076 | | | |
| -152.47823 57.7222 | | | |
| -152.475115 57.718136 | | | |
| -152.446622 57.726453 | | | |
| -152.417935 57.743023 | | | |
| -152.402983 57.766936 | | | |
| -152.388275 57.777842 | | | |
| -152.383931 57.781897 | | | |
| -152.386842 57.794828 | | | |
| -152.398958 57.790749 | | | |
| Zone SWA3 | | | |
| -152.290852 57.760019 | 945-7292 | -6 | 1.00 |
| -152.279861 57.763544 | | | |
| -152.313664 57.781426 | | | |
| -152.337172 57.796228 | | | |
| -152.355834 57.811007 | | | |
| -152.386842 57.794828 | | | |
| -152.383931 57.781897 | | | |
| -152.388275 57.777842 | | | |
| -152.402983 57.766936 | | | |
| -152.417935 57.743023 | | | |
| -152.446622 57.726453 | | | |
| -152.475115 57.718136 | | | |
| -152.529456 57.646896 | | | |
| -152.492274 57.629746 | | | |
| -152.402467 57.684398 | | | |
| -152.290852 57.760019 | | | |

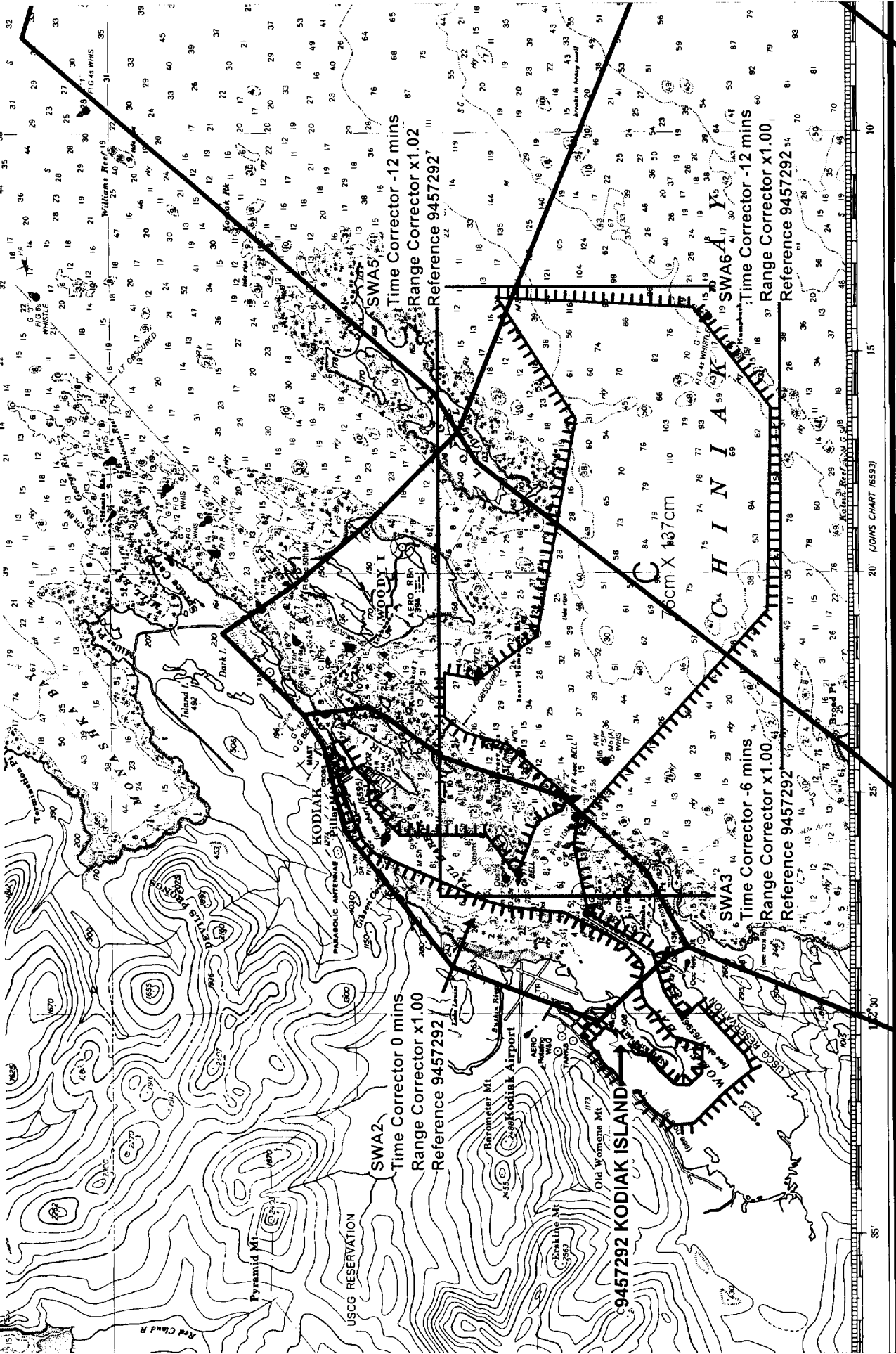
Zone SWA5

| | | | |
|-----------------------|----------|-----|------|
| -152.069808 57.718236 | 945-7292 | -12 | 1.02 |
| -152.279861 57.763544 | | | |
| -152.265035 57.7683 | | | |
| -152.217619 57.797255 | | | |
| -152.13021 57.850422 | | | |
| -151.921773 57.816421 | | | |
| -152.069808 57.718236 | | | |

Zone SWA6

| | | | |
|-----------------------|----------|-----|------|
| -152.492274 57.629746 | 945-7292 | -12 | 1.00 |
| -152.468588 57.586047 | | | |
| -152.234352 57.60877 | | | |
| -152.069808 57.718236 | | | |
| -152.279861 57.763544 | | | |
| -152.290852 57.760019 | | | |
| -152.402467 57.684398 | | | |
| -152.492274 57.629746 | | | |

Final Tidal Zoning for OPR-P337-RA-99 Womens Bay to Kodiak Harbor and Approaches, AK Sheet H-10913



(Marmot Bay and Kupreanof Strait)

GEOGRAPHIC NAMES

H-10913

| Name on Survey | ON CHART NO. 16593, 16594, 16595 ON PREVIOUS SURVEY NO. | | | | | | | | | | | |
|---------------------|--|---|------------------------|---|---------------|---|-------------------|---|--------------------|--|-----------------|----|
| | A | B | C | D | E | F | G | H | K | | | |
| | CON U.S. QUADRANGLE MAPS | | FROM LOCAL INFORMATION | | ON LOCAL MAPS | | P.O. GUIDE OR MAP | | RAND McNALLY ATLAS | | U.S. LIGHT LIST | |
| ALASKA (title) | X | | X | | | | | | | | | 1 |
| CHINIYAK BAY | X | | X | | | | | | | | | 2 |
| CLIFF ISLAND | X | | X | | | | | | | | | 3 |
| CLIFF POINT | X | | X | | | | | | | | | 4 |
| DISCOVERY ROCKS | X | | X | | | | | | | | | 5 |
| DOLGOI LAKE | X | | X | | | | | | | | | 6 |
| HUMPBACK ROCK | X | | X | | | | | | | | | 7 |
| INNER HUMPBACK ROCK | X | | X | | | | | | | | | 8 |
| LONG ISLAND | X | | X | | | | | | | | | 9 |
| POPOF ISLAND | X | | X | | | | | | | | | 10 |
| PUFFIN ISLAND | X | | X | | | | | | | | | 11 |
| REFUGE ISLAND | X | | X | | | | | | | | | 12 |
| SAINT PAUL HARBOR | X | | X | | | | | | | | | 13 |
| VASILIEF ROCK | X | | X | | | | | | | | | 14 |
| VIESOKI ISLAND | X | | X | | | | | | | | | 15 |
| WOODY ISLAND | X | | X | | | | | | | | | 16 |
| | | | | | | | | | | | | 17 |
| | | | | | | | | | | | | 18 |
| | | | | | | | | | | | | 19 |
| | | | | | | | | | | | | 20 |
| | | | | | | | | | | | | 21 |
| | | | | | | | | | | | | 22 |
| | | | | | | | | | | | | 23 |
| | | | | | | | | | | | | 24 |
| | | | | | | | | | | | | 25 |

Dennis J. Rosenberg

FEB 3 - 2000

HYDROGRAPHIC SURVEY STATISTICS

H-10913

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed

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

SHORELINE DATA

| | |
|-----------------------------------|-----|
| SHORELINE MAPS (List): | N/A |
| PHOTOBATHYMETRIC MAPS (List): | N/A |
| NOTES TO THE HYDROGRAPHER (List): | N/A |

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List): 16594(13th Ed., April 4, 1998) 16595 (12th Ed., Jan. 19, 1991)

OFFICE PROCESSING ACTIVITIES 16596 (11th Ed, July 10, 1993)

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

| PROCESSING ACTIVITY | AMOUNTS | | |
|--|--------------|------------|--------|
| | VERIFICATION | EVALUATION | TOTALS |
| POSITIONS ON SHEET | | | |
| POSITIONS REVISED | | | |
| SOUNDINGS REVISED | | | |
| CONTROL STATIONS REVISED | | | |
| | TIME-HOURS | | |
| | VERIFICATION | EVALUATION | TOTALS |
| PRE-PROCESSING EXAMINATION | | | |
| VERIFICATION OF CONTROL | | | |
| VERIFICATION OF POSITIONS | | | |
| VERIFICATION OF SOUNDINGS | | | |
| VERIFICATION OF JUNCTIONS | | | |
| APPLICATION OF PHOTOBATHYMETRY | | | |
| SHORELINE APPLICATION/VERIFICATION | | | |
| COMPILATION OF SMOOTH SHEET | 128 | | 128 |
| COMPARISON WITH PRIOR SURVEYS AND CHARTS | | 30 | 30 |
| EVALUATION OF SIDE SCAN SONAR RECORDS | | | |
| EVALUATION OF WIRE DRAGS AND SWEEPS | | | |
| EVALUATION REPORT | | 55 | 55 |
| GEOGRAPHIC NAMES | | | |
| OTHER: Chart Compilation | | 97 | 97 |
| *USE OTHER SIDE OF FORM FOR REMARKS | TOTALS | 128 | 182 |
| | | | 310 |

| | | |
|---|--------------------------|-------------------------|
| Pre-processing Examination by Pacific Hydrographic Branch | Beginning Date 9/7/99 | Ending Date 12/01/99 |
| Verification of Field Data by R. Davies, G. Nelson, R. Mayor, E. Domingo, R. Shipley | Time (Hours) 128 | Ending Date 6/19/00 |
| Verification Check by D. Hill, R. Davies | Time (Hours) 7 | Ending Date 10/23/00 |
| Evaluation and Analysis by R. Shipley | Time (Hours) 182 | Ending Date 10/25/00 |
| Inspection by D. Hill, R. Davies | Time (Hours) 7 | Ending Date 10/27/00 |

**EVALUATION REPORT
H-10913**

A. PROJECT

The hydrographer's report contains an adequate discussion of the project information.

B. AREA SURVEYED

The survey area is adequately described in the hydrographer's report.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey. Charted features and soundings inshore of this limit line which have not been specifically addressed during survey operations should be retained as charted. A page-size plot of the charted area depicting the specific limits of supersession accompanies this report as Attachment 1.

Depths range from 2.8 to 118 fathoms.

C. SURVEY VESSELS

The hydrographer's report contains adequate information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The acquisition and processing of data in the field has been discussed in the hydrographer's report, section D. Office processing of survey data was conducted using the same Computer Aided Resource Information System (CARIS) and Hydrographic Processing System (HPS) used by the hydrographer. MicroStation 95 was used during office processing to compile the smooth sheet.

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

The drawing files necessarily contain information that is not part of the HPS data set such as geographic name text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by 1999 Specifications and Deliverables.

The data are plotted using a UTM, Zone 5 projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar was not used during survey operations.

F. SOUNDING EQUIPMENT

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

G. CORRECTIONS TO SOUNDINGS

Soundings and elevations below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, static draft, dynamic draft (settlement and squat), and sound velocity. Additional reducers for multibeam survey data include corrections for heave, pitch and roll. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, soundings and elevations were reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW)

as appropriate with verified tide correctors obtained from the Center for Operational Oceanographic Products and Services (CO-OPS). The correctors are zoned direct from tide gage, Kodiak, Alaska, 945-7292.

H. CONTROL STATIONS

Section H of the hydrographer's report contains adequate discussion of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD83. The smooth sheet is annotated with an NAD27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD83 projection by applying the following corrections:

Latitude: -2.729 seconds (-84.437 meters)
Longitude: 7.829 seconds (129.558 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 4.0 was specified for survey operations. The quality of several positions exceeds limits in terms of HDOP. These positions are isolated and occur randomly throughout the survey area. A review of the data, however, confirms that none of these fixes are used to position dangers to navigation. The soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

The reference site confirmation test and daily DGPS performance checks were conducted in the field and found adequate. Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline depicted on the smooth sheet in brown originates from chart 16594, 13th Edition and is for orientation purposes only. No changes to the MHW were observed during this survey.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10913 junctions with the following survey.

| <u>Survey</u> | <u>Year</u> | <u>Scale</u> | <u>Area</u> |
|---------------|-------------|--------------|-------------|
| H-10912 | 1999 | 1:5,000 | Northwest |

The junction with survey H-10912 is complete. A "Joins" note has been added to the smooth sheet where applicable. A sounding has been transferred from the junction survey within the common area to better delineate the bottom configuration.

M. COMPARISON WITH PRIOR SURVEYS

The present survey was compared to the following prior surveys.

| <u>Survey</u> | <u>Year</u> | <u>Scale</u> |
|---------------|-------------|--------------|
| H-9758WD | 1933 | 1:20,000 |

The present survey was compared to a digital copy of survey H-9758WD. This survey was conducted using wire drag techniques and leadline with visual positioning. Digital comparisons were made and registration and legibility were found to be satisfactory. The present survey was conducted using shallow

water multibeam. With full bottom coverage, the prior wire drag survey is considered to be superseded in the common area.

| <u>Survey</u> | <u>Year</u> | <u>Scale</u> |
|---------------|-------------|--------------|
| H-5440 | 1933 | 1:20,000 |
| H-5441 A&B | 1933 | 1:10,000 |
| H-9763 | 1978 | 1:5,000 |

The above prior surveys cover the entire area of the present survey. Digital copies of the above surveys were used to make the comparison. Registration and legibility was good or very good for all of the priors except for H-5441B, a wire drag survey, which was illegible. With the exception of some differences in depths listed in the hydrographer's report, there was very good agreement with the prior surveys, generally with the current survey being 0-3 fathoms shoaler.

Justification for smaller changes can probably be attributed to better bottom coverage, improved positioning and sounding techniques and relative accuracy of the data acquisition methods. A comparison of standard depth curves between the present and prior survey smooth sheets reveals little change in bottom configuration.

Additional information regarding prior survey comparison is found in the hydrographer's report, section L.

Survey H-10913 is adequate to supersede the prior surveys within the common area.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH CHART

Survey H-10913 was compared with the following charts.

| <u>Chart</u> | <u>Edition</u> | <u>Date</u> | <u>Scale</u> |
|--------------|------------------|-------------------|--------------|
| 16594 | 13 th | April 4, 1993 | 1:78,900 |
| 16595 | 13 th | February 14, 1998 | 1:20,000 |
| 16596 | 11 th | July 10, 1993 | 1:10,000 |

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys. The prior surveys have been adequately addressed in section M of the evaluation report and hydrographer's report, section L and require no further discussion.

The application of this survey to charts of a scale less than 1:40,000 may require the generalization of features such as ledges, and reefs. The recommended charting disposition of specific ledges or reefs is their depiction as isolated rocks. The application of this survey to charts of a scale greater than 1:40,000 may be accomplished without generalization of features.

Survey H-10913 is adequate to supersede charted hydrography within the charted area.

b. Dangers To Navigation

No dangers to navigation were discovered during survey operations and/or during office processing.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H-10913 is adequate to:

- Delineate the bottom configuration, determine least depths, and draw the required depth curves;
- Reveal there are no significant discrepancies or anomalies requiring further investigation; and
- Show the survey was properly controlled and soundings are correctly plotted.

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, the Specifications and Deliverables, April 23, 1999 and the Field Procedures Manual, April 1998 Edition.

Q. AIDS TO NAVIGATION

There are five floating aids to navigation within the survey area but they were not located during survey operations. These aids were not positioned by the hydrographer, however, he notes they appear to be in their charted positions and adequately serve their intended purpose.

See section P of the hydrographer's report for additional information. There were no features of landmark value located within the area of this survey.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

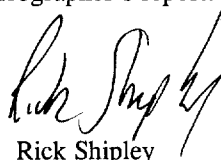
Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. No additional work is recommended. Refer to the hydrograper's report for additional information.

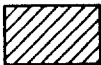
U. REFERRAL TO REPORTS

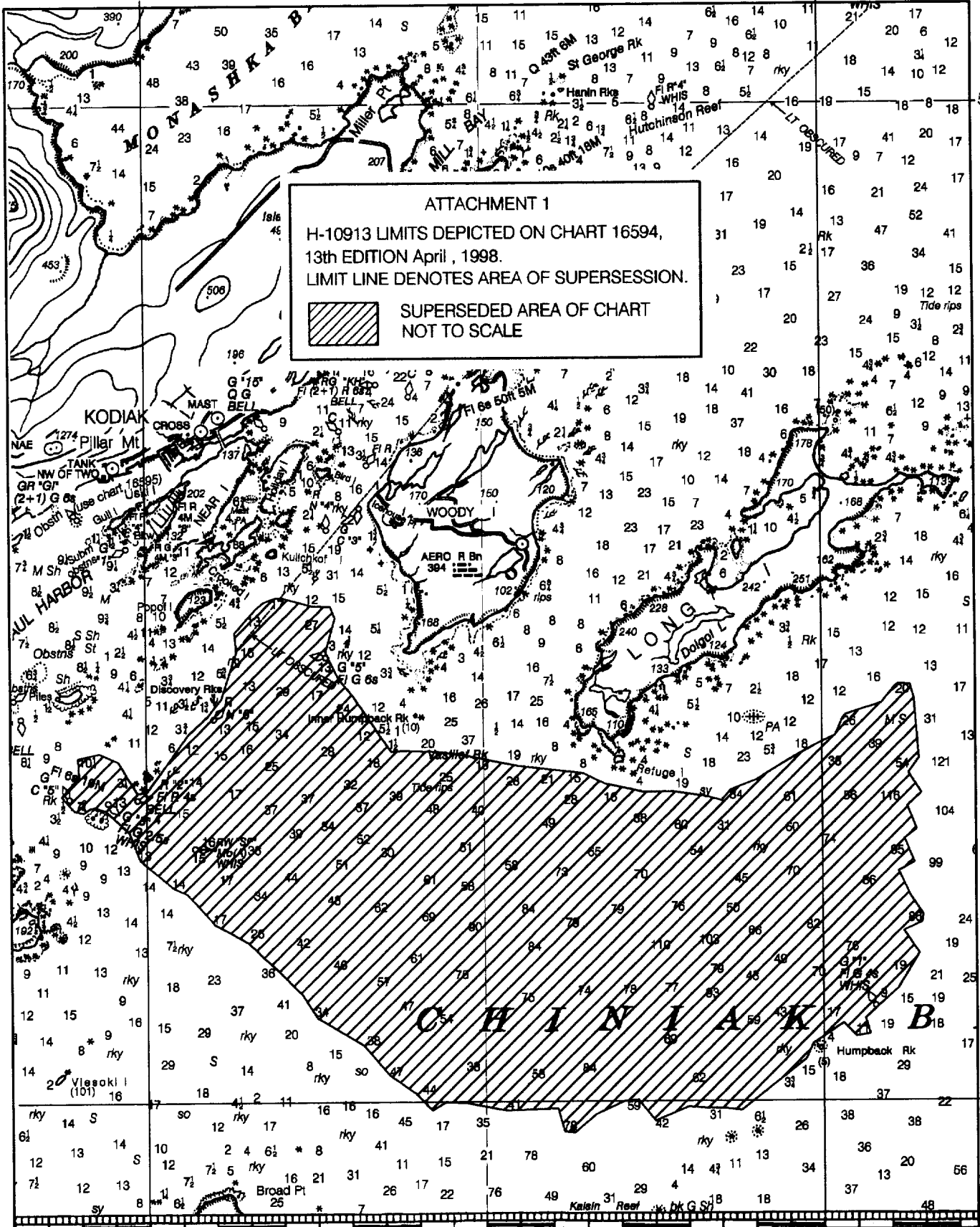
Referral to reports is adequately discussed in the hydrographer's report.



Rick Shipley
Cartographer

ATTACHMENT 1
 H-10913 LIMITS DEPICTED ON CHART 16594,
 13th EDITION April, 1998.
 LIMIT LINE DENOTES AREA OF SUPERSESION.

 SUPERSEDED AREA OF CHART
 NOT TO SCALE



25' 20' JOINS CHART 16593 15'

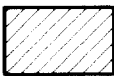
| | | | | | | | | | | | | | | | | | |
|---------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| FATHOMS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| FEET | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 | 84 | 90 | 96 | 102 |

(Marmot Bay and...)
 SOUNDINGS IN FATHOMS

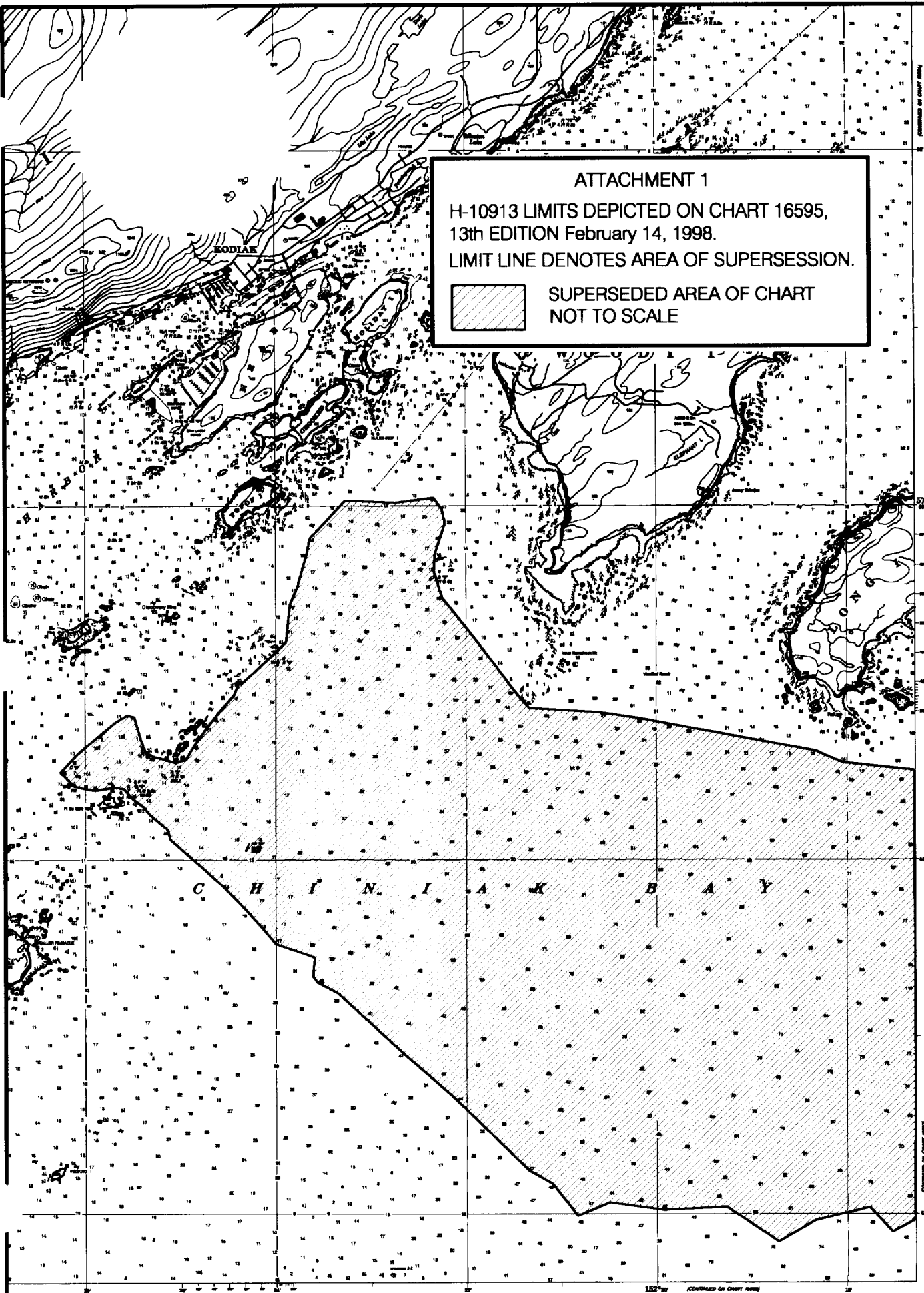
ATTACHMENT 1

H-10913 LIMITS DEPICTED ON CHART 16595,
13th EDITION February 14, 1998.

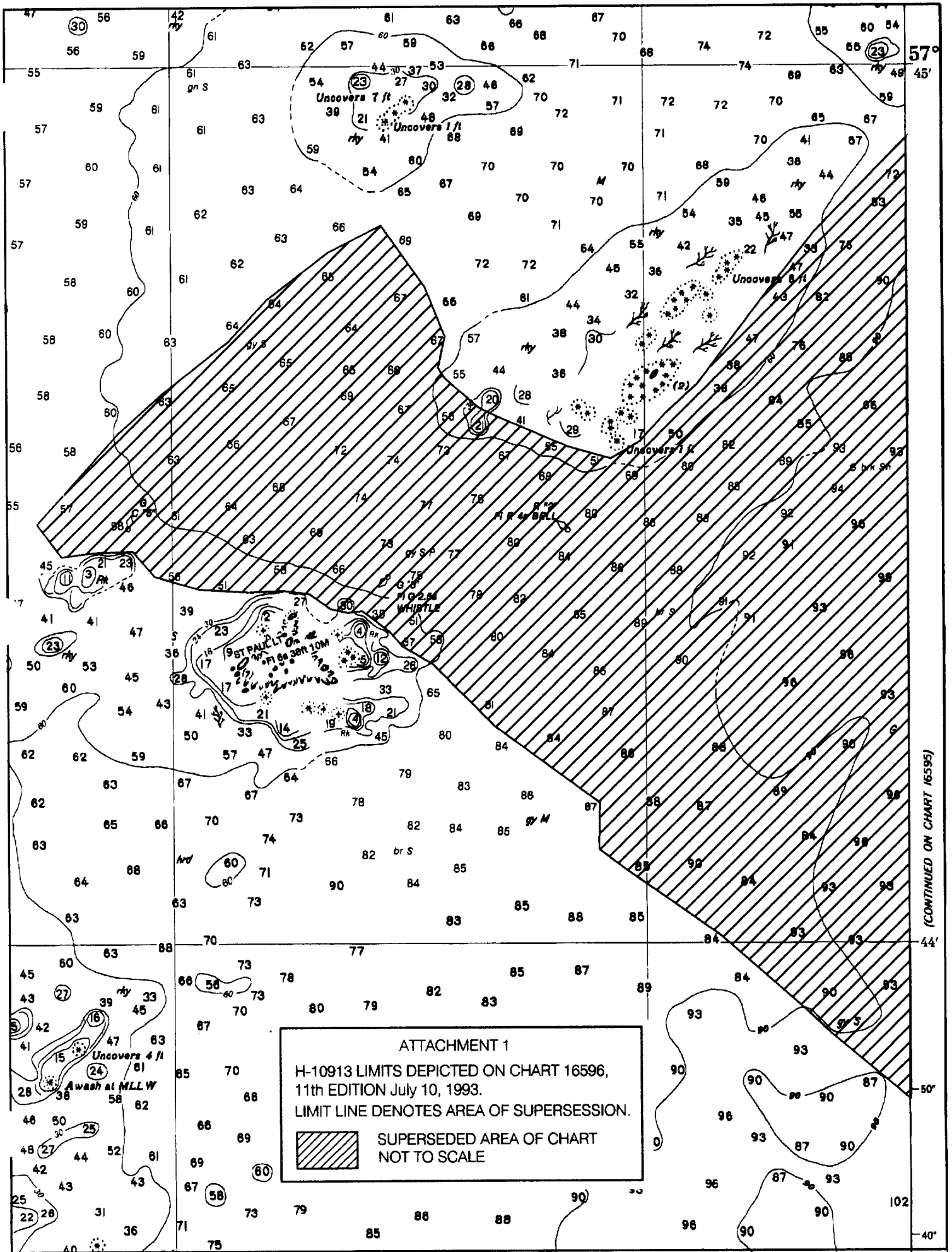
LIMIT LINE DENOTES AREA OF SUPERSESSION.



SUPERSEDED AREA OF CHART
NOT TO SCALE



C H I N I A K B A Y



(CONTINUED ON CHART 16595)

APPROVAL SHEET
H-10913

Initial Approvals:

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

for Charles R. Davis Date: 10-25-00
Dennis J. Hill
Chief, Cartographic Team
Pacific Hydrographic Branch

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

for James C. Gardner Date: 10/31/00
James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

Final Approval

Approved:

Samuel P. De Bow, Jr. Date: 11/8/00
Samuel P. De Bow
Captain, NOAA
Chief, Hydrographic Surveys Division

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10913

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 |
|-------|---------|--------------|--|
| 16594 | 01/4/00 | Rick Stupley | Full Part Before After Marine Center Approval Signed Via Drawing No. FULL APPLICATION OF SOUNDINGS AND FEATURES FROM SMOOTH SHEET |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |
| | | | Full Part Before After Marine Center Approval Signed Via Drawing No. |

