H10920

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-10-13-99

Registry No. H-10920

LOCALITY

State Alaska

General Locality Southwest Prince William Sound

Sublocality Zaikof Bay

1999

CHIEF OF PARTY

Commander D.R. Herlihy, NOAA

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DATE MAR 2 3 2001

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

H-10920

HYDROGRAPHIC TITLE SHEET

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-10-13-99

State: Alaska

General locality: Southwest Prince William Sound

Locality: Zaikof Bay

Scale: 1:10,000 Date of survey: 8/11/99 - 9/28/99

Instructions dated: July 30, 1999 Project No.: OPR-P139-RA-99

Vessel: RA-1(2121),RA-2(2122),RA-4(2124), RA-5(2125), RA-6(2126)

Chief of party: CDR D. R. Herlihy, NOAA

Surveyed by: RAINIER Personnel

Soundings taken by echo sounder, ~~hand lead, pole~~: DSF-6000N, Knudsen 320M, RESON 8101 MB

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Verification by: ~~Protracted By~~: B.A. Olmstead Automated plot by: HP-650C

Evaluation by: ~~Verification by~~: B.A. Olmstead

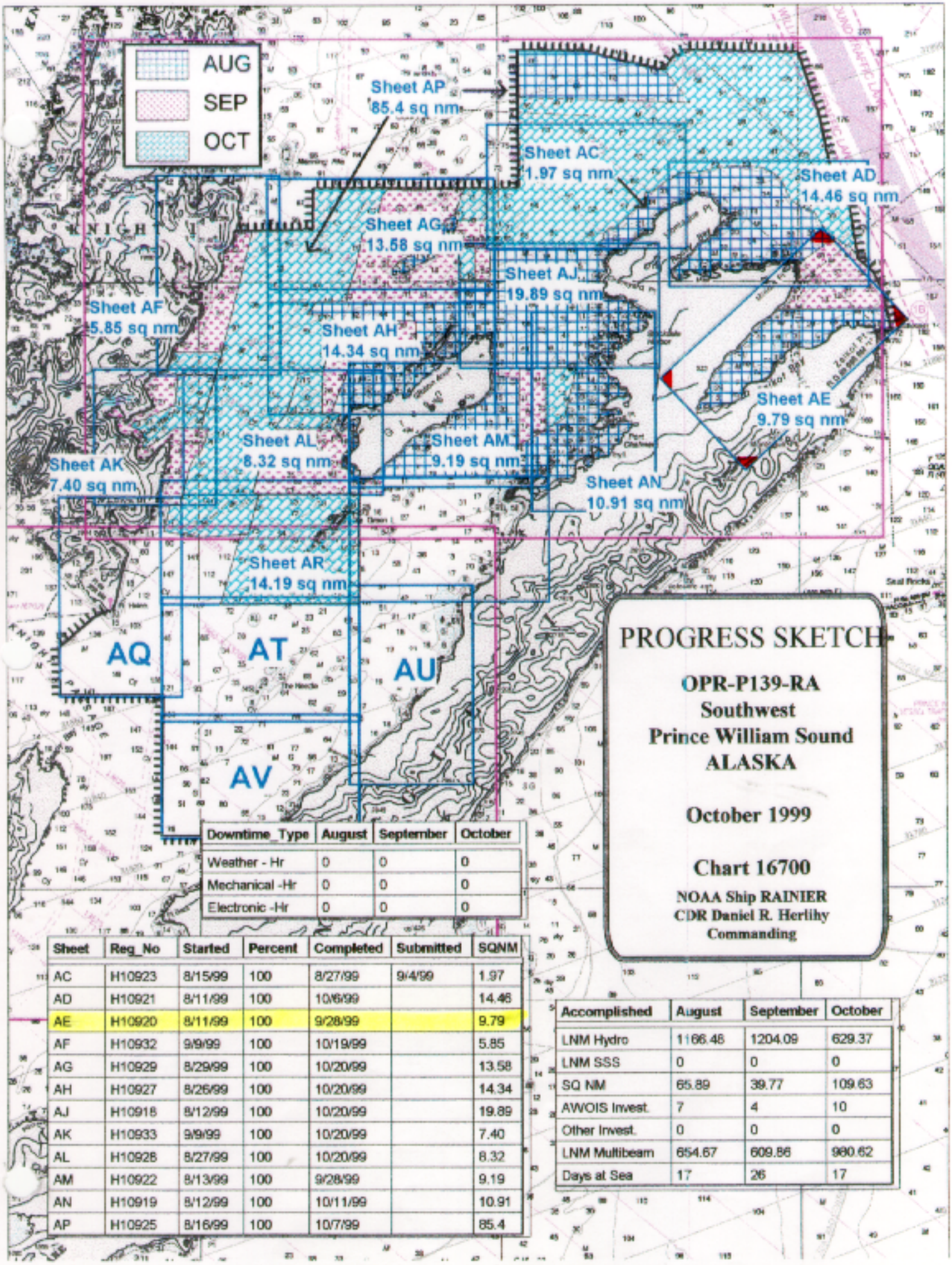
Soundings in fathoms ~~feet~~ at ~~MLLW~~ MLLW and tenths

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

All depths listed in this report are referenced to mean lower low water unless otherwise noted. AWOIS/SURF 1/26/01 mcR

Smooth sheet Parameters:

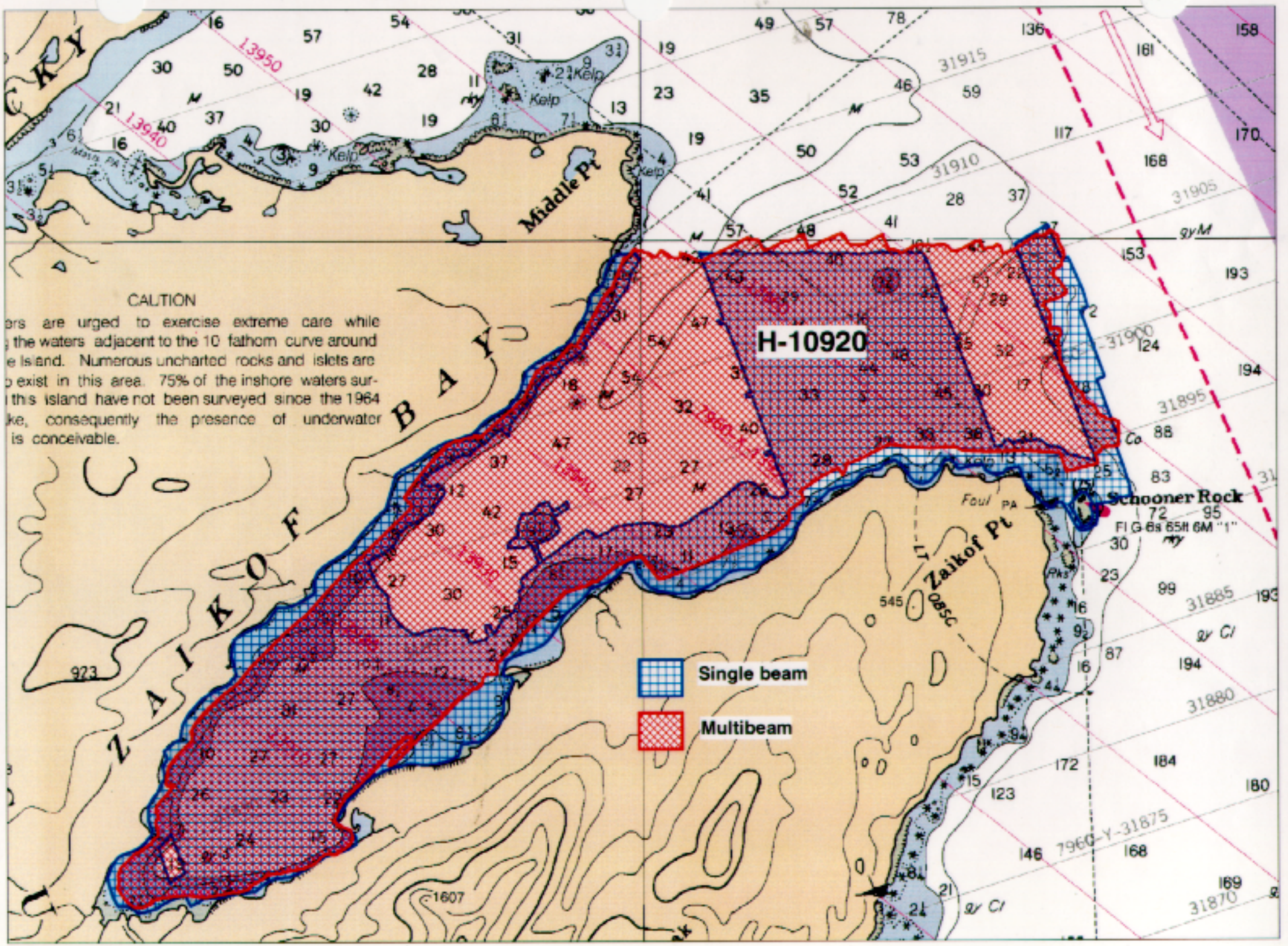
UTM (Zone 6) Central Meridian 147/00/00W Scaling Factor 0.9996



Downtime_Type	August	September	October
Weather - Hr	0	0	0
Mechanical -Hr	0	0	0
Electronic -Hr	0	0	0

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
AC	H10923	8/15/99	100	8/27/99	9/4/99	1.97
AD	H10921	8/11/99	100	10/6/99		14.46
AE	H10920	8/11/99	100	9/28/99		9.79
AF	H10932	9/9/99	100	10/19/99		5.85
AG	H10929	8/29/99	100	10/20/99		13.58
AH	H10927	8/26/99	100	10/20/99		14.34
AJ	H10918	8/12/99	100	10/20/99		19.89
AK	H10933	9/9/99	100	10/20/99		7.40
AL	H10928	8/27/99	100	10/20/99		8.32
AM	H10922	8/13/99	100	9/28/99		9.19
AN	H10919	8/12/99	100	10/11/99		10.91
AP	H10925	8/16/99	100	10/7/99		85.4

Accomplished	August	September	October
LNM Hydro	1166.48	1204.09	629.37
LNM SSS	0	0	0
SQ NM	65.89	39.77	109.63
AWOIS Invest.	7	4	10
Other Invest.	0	0	0
LNM Multibeam	654.67	609.86	980.62
Days at Sea	17	26	17


H-10920
Single beam
Multibeam
Middle Pt
Zaikof Pt
Schooner Rock
Fl G 6s 65ft 6M "1"
Foul PA
Kelp
CAUTION
ers are urged to exercise extreme care while
the waters adjacent to the 10 fathom curve around
e Island. Numerous uncharted rocks and islets are
exist in this area. 75% of the inshore waters sur-
this island have not been surveyed since the 1964
ke, consequently the presence of underwater
is conceivable.
13950
13940
31915
31910
31905
31900
31895
31885
31880
31875
31870
7960-Y-31875
1607

Descriptive Report to Accompany Hydrographic Survey H10920

Field Number RA-10-13-99
Scale 1:10,000
August – September 1999
NOAA Ship RAINIER
Chief of Party: Commander Daniel R. Herlihy, NOAA

A. PROJECT ✓

This basic hydrographic survey was completed as specified by the Draft Standing Project Instructions dated April 6, 1999 and Hydrographic Survey Letter Instructions OPR-P139-RA dated July 30, 1999. Survey H10920 corresponds to sheet AE as defined in the sheet layout. This survey will provide data to supersede prior surveys conducted in the early 1900s, and will affect Charts 16700 and 16709. Requests for hydrographic surveys and updated charts in this area have been received from the National Imagery and Mapping Agency (NIMA), the U.S. Coast Guard, the Southwest Alaska Pilot's Association, cruise ship lines, and local fishermen.

Significant changes in depths and shoreline may have occurred in the project area as a result of the earthquake of March 27, 1964.

B. AREA SURVEYED See Evel Rpt., Section B.

The survey area covers approximately 9.79 square nautical miles within Zaikof Bay, which is located between Zaikof Point and Middle Point on the northeast tip of Montague Island in Prince William Sound, Alaska. Figure 1 below depicts the survey limits with respect to chart 16709. The survey's northern limit is latitude 60°20'02"N and the southern limit is latitude 60°15'41"N. The survey's western limit is longitude 147°07'08"W and the eastern limit is the 146°53'35"W.

Data acquisition was conducted from August 11 to September 28, 1999 (DN 223 to 271).

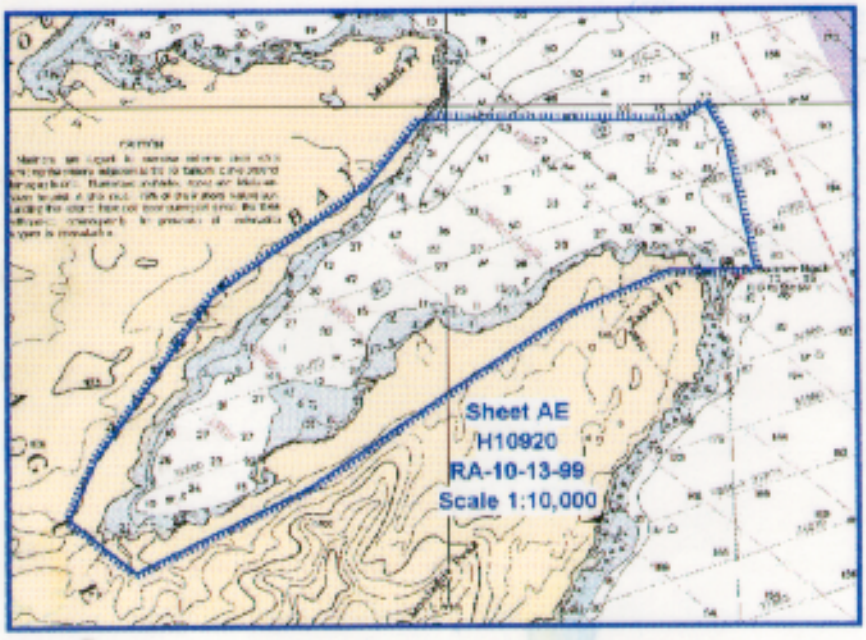


Figure 1 – Survey Area

C. SURVEY VESSELS ✓

Data were acquired by RAINIER survey launches (vessel numbers 2121, 2122, 2124, 2125 and 2126) as noted in the Survey Information Summary included with this report. Vessel 2121 was used for the acquisition of shallow-water multibeam (SWMB) data and sound velocity profiles (SVP). Vessel 2122 was used exclusively for vertical beam echo sounder (VBES) data acquisition. Vessel 2124 was used for the acquisition of VBES data and as a dive platform. Vessel 2125 was used for the acquisition of VBES data and bottom samples. Vessel 2126 was used for SWMB, VBES, and SVP acquisition. See the Project Related Data for OPR-P139-RA-99 for vessel descriptions. No unusual vessel configurations or problems were encountered on this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

All VBES data were acquired using Coastal Oceanographic's HYPACK version 8.9 and processed with the Hydrographic Processing System (HPS) version 9.3 and MapInfo 5.0. Final detached positions, features, and soundings based on preliminary tides were saved in MapInfo format.

Shallow-water multibeam echo sounder data were acquired using Triton-Elics' ISIS software version 4.32 and processed using Universal Systems Limited's CARIS HIPS software version 4.3.

Shallow-water multibeam data were reviewed with the CARIS Hydrographic Data Cleaning System (HDCS). Depth fliers were identified and manually flagged as "rejected". Vessel positioning and attitude data from each system were similarly displayed and manually cleaned. Additionally, instantaneous speed as computed from the positioning data was checked for speed jumps exceeding 3 knots as an indication of potential position fliers. For this survey, all soundings beyond a maximum angle of 60° off nadir were rejected in an attempt to reduce the noise and refraction errors observed in these outer beams.

After review and cleaning, 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 two densities; one at 3m x 3m, the other at 1.5mm x 1.5mm at survey scale. The former was used to create digital terrain models (DTMs) which were used to demonstrate multibeam coverage and perform multibeam quality-assurance, while the latter was used to export soundings into HPS through HPTools. 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. Final selected soundings were saved and plotted in MapInfo. Raster images registered in MapInfo facilitated chart and prior survey comparisons.

Survey H10920 is defined as sheet 03 in HPS. Three CARIS workfiles were created and named as follows: "H10920" for soundings to be exported to HPS, "H10920_dtm" for the DTM showing multibeam coverage, and "H10920_qc" for the crossline Quality Control Report. The project name is identified as "P139_SheetAE" in HDCS.

All final plots were created in MapInfo using UTM Zone 6 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

* Filed with the hydrographic data.

imagery is primarily used during final processing of SWMB depth data to aid in determining whether anomalous soundings are true features or noise.

F. SOUNDING EQUIPMENT ✓

Two different categories of echo sounder 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, the bottom topography, the water depth, and the ability of the platform vessel to safely navigate the area.

1. Launch Vertical Beam Echo Sounder (VN 2122, 2124, 2125, 2126) ✓

The vertical beam echo sounders (VBES) utilized for this survey were the Raytheon DSF-6000N (VN 2122, 2124, 2125) and Knudsen 320M (VN 2126), which are dual frequency (100 kHz, 24 kHz), digital recording single beam fathometers with analog paper records.* Soundings were acquired in meters for both frequencies, with high frequency utilized as the primary frequency. VBES serial numbers are included in Appendix H.*

VBES data were also acquired concurrently with SWMB data and were compared to nadir beams of the shallow-water multibeam in real-time during data acquisition to assure SWMB data quality. In addition, digital VBES depth data are used by Isis to assist the Reson 8101 in tracking the bottom. The latter is extremely helpful in areas of extreme relief, when the shallow-water multibeam tends to lose bottom lock. VBES data acquired during SWMB were not used for final sounding plot compilation, and are not included with the digital survey data. Concur

2. Launch Shallow-water multibeam (VN 2121, 2126) ✓

The SWMB system utilized for this survey was the Reson SeaBat 8101, which is a 240 kHz multibeam system that measures relative water depths across a wide swath perpendicular to the vessel's heading. The Reson 8101 has 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.*

Shallow-water multibeam (SWMB) was used generally in depths between 10 and 100 meters (8.5-55 FMS) including 100% coverage within Zaikof Bay.

G. CORRECTIONS TO ECHO SOUNDINGS See Eval Rpt., Section G.

Water Level Correctors ✓

Soundings were reduced to Mean Lower-Low Water (MLLW) using unverified observed tide data for station Cordova, AK (945-4050) obtained from the Center for Operational Oceanographic Products and Services (CO-OPS) web site. These data were used in creating HPS tide table #1. All tide correctors were fully adjusted for the MapInfo tidal zoning scheme supplied with the project files.

Listings of HPS tide tables used for H10920 and tidal correctors as provided in the Project Instructions for H10920 are contained in the Survey Information Summary included with this report. Concur

The operating National Water Level Observation Network (NWLON) primary tide stations at Cordova, Alaska (945-5760) and Valdez, Alaska (945-4240) will serve as control for datum determination at four subordinate stations. Because a Next Generation Water Level Measurement System (NGWLMS) Aquatrak sensor is the only sensor installed at these primary stations, RAINIER personnel were neither required nor able to inspect and perform leveling at these stations.

* Filed with the hydrographic data.

RAINIER personnel installed Sutron 8200 "bubbler" tide gauges at the following subordinate stations:

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Zaikof Point **	945-4411	30-day	10 August 1999	14 October 99
Port Chalmers	945-4511	30-day	10 August 1999	20 October 99
Snug Harbor	945-4662	30-day	11 August 1999	20 October 99
Montague Island	945-4616	30-day	31 August 1999	20 October 99

Tide Gage is plotted on the SS

** used for H-10920

Refer to the Field Tide Notes and supporting data in Appendix D* for individual gauge performance and level closure information.

Raw water level data from these gauges was forwarded to N/OPS1 throughout the project period, with the final package submitted on October 29, 1999 in accordance with HSG 50 and FPM 4.7. The Pacific Hydrographic Branch will apply final approved (smooth) tides to the survey data during final processing. A request for delivery of final approved (smooth) tides to the Pacific Hydrographic Branch was forwarded to N/OPS1 on October 29, 1999 in accordance with FPM 4.8. Approved Tide Note dated May 18, 2000 is attached

Sound Velocity Correctors ✓

The velocity of sound through water was determined by a minimum of one cast every four hours of SWMB acquisition, and one cast every week for VBES acquisition, in accordance with the Draft Standing Project Instructions. Information on the casts can be found in the Sound Velocity Cast List included in Appendix I.*

The sound velocity casts were acquired with SBE SEACAT Profilers (S/N 219, 2044, 2543). Calibration reports and dates are included with the Project Related Data for OPR-P139-RA-99. Velocity correctors were computed using the PC program VELOCWIN, version 4 beta 2, which directly generates sound velocity corrector tables for both HPS and CARIS.

For VBES, sound velocity correctors were applied to the raw sounding data in HPS during processing. For SWMB, sound velocity correctors were applied in CARIS during processing.

Settlement and Squat and Static Draft Correctors ✓

The following table shows when vessel correctors used for this survey were last measured:

Vessel No.	Date of Static Draft and Transducer Offset Measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2121	March 1999	OTF	March 1999	Port Angeles, WA
2122	March 1999	Rod leveling	March 1999	Port Angeles, WA
2124	March 1999	Rod leveling	March 1999	Port Angeles, WA
2125	March 1999	Rod leveling	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 Related Data for OPR-P139-RA-99. All offset tables contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables # 1, 2 and 4-6 correspond to the last digit of the respective vessel number. For VBES launches, offset tables were applied to sounding data in HPS during post-acquisition processing. For SWMB launches, offsets were applied during CARIS processing.

* Filed with the hydrographic data.

Heave, Pitch, Roll and Heading, Including Biases and Navigation Timing Error ✓

SWMB launches (VN 2121, 2123, and 2126) utilize a TSS POS/MV Model 320 Position and Orientation System (POS), which provides accurate navigation and attitude data to correct for the effects of heave, pitch, roll and heading. The POS generates attitude data in three axes (roll, pitch and heading) to an accuracy of 0.05° or better. Heave measurements supplied by the POS maintain an accuracy of 5% of the measured vertical displacement for movements that have a period of up to 10 seconds. The POS delivers heading measurements by two distinct methods. First, the Dynamic Heading Alignment determines the vessels heading by using the data supplied by the Internal Measurement Unit (IMU) and GPS receivers to achieve heading that is, at best, accurate to within 0.35°. This method suffers from drift but is relatively unaffected by noise. Second, the GPS Azimuth Measurement System (GAMS) determines the geographic vector between two GPS antennas fixed to the vessel by comparing the phase of satellite signals they receive. The error from this method is largely due to noise, but exhibits no drift. The POS uses the advantages of each method to compensate for the disadvantages of the other to arrive at an optimal accuracy of 0.05°. Serial numbers are located in Appendix H.*

Heave, roll, pitch, and navigation latency biases were determined during Patch Tests conducted at Port Angeles, WA on March 26-28, 1999 for vessel 2126, and at Shilshole, WA, on July 7, 1999 for vessel 2121. SWMB vessel offsets, dynamic draft correctors, and system bias values are contained in CARIS Vessel Configuration Files (VCF's) and were created using the program "VCFEDIT" in CARIS. These offsets and biases are applied to the sounding data during processing in CARIS. A printout of each VCF is contained in the Project Related Data for OPR-P139-RA-99, and the VCF's themselves are included with the digital HDCS data.

H. HYDROGRAPHIC POSITION CONTROL See Eval Rpt., Sections H and I

The horizontal datum for this project is NAD 83. All soundings were positioned with differential GPS (DGPS) using the U.S. Coast Guard Beacons at Cape Hinchinbrook and Potato Point.

Launch-to-launch DGPS performance checks were performed in accordance with Section 3.2 of the FPM. Copies of the performance checks are included in the Project Related Data for OPR-P139-RA.

I. SHORELINE See Eval Rpt., Section J

Method of Shoreline Verification ✓

N/NGS3 supplied photogrammetric shoreline in MapInfo format for T-12662 ✓ and T-12663 ✓ for use as source shoreline. The T-Sheet shoreline was imported into Hypack for field verification of shoreline manuscript features. In addition, features shown on the current editions of charts 16700 and 16709 were digitized in MapInfo by RAINIER personnel and imported into Hypack for field verification of charted features.

Shoreline verification was conducted near predicted low water in accordance with the Project Instructions and FPM 6.1 and 6.2. For this survey the general limit of safe navigation of a survey launch was 5-30 meters offshore of apparent low tide. Water depths along this limit of safe navigation are generally 2-5 meters at Mean Lower Low Water (MLLW). Features unreachable by survey launch shown inshore of the Navigable Area Limit Line (NALL) are the hydrographer's approximate representation of the shoreline.

Detached positions taken during shoreline verification were recorded within HYPACK and on DP forms,* and processed in HPS. These indicate revisions to features, and features not found on the T-Sheet or chart.

A detailed "DP and BS Plot" is provided showing all detached positions and bottom samples with notes relating to each feature. Updated shoreline and features are also depicted on the final sounding plot. Concur

* Filed with the hydrographic data.

Source Shoreline Changes and New Features ✓

Several changes and new features were found and are depicted on the final DP plot. T-Sheet rocks were often identified as high points or extensions of new ledges or reefs. Concur

The T-Sheet rock depicted at 60°18'51"N, 147°01'52.2"W was not found. A 100-meter radius visual search was conducted for 5 minutes on DN223 by vessel 2125. Water visibility was 6 meters, and depths in the vicinity were 5-6 meters. A detached position was obtained at 60°18'51"N, 147°01'52.2"W (Pos. #50064). Concur

Recommendations ✓

The Hydrographer recommends that the shoreline as depicted on the DP and BS plot and final sounding plot supersede shoreline information compiled on the T-Sheets as noted. These revisions are recorded in the MapInfo digital files named "H10920_Shoreline" and "H10920_Shoreline_Updates". This data was analyzed during office processing and shown on the smooth sheet as warranted.

Charted Features ✓

Charted rocks were identified as T-Sheet rocks, or high points or extensions of T-Sheet ledges and reefs except as noted below. Concur

The dangerous rock charted at 60°18'383"N, 147°02'24.4"W was not found. A 50-meter radius visual search was conducted for 10 minutes on DN236 by VN2122. Water visibility was 4 meters and depths in the vicinity were 20 meters. A detached position was obtained at 60°18'40.0"N, 147°02'24.7"W (Pos. #20134). In addition, 100% SWMB and VBES sounding lines run at 50-meter spacing revealed no indication of the rock. The Hydrographer recommends removing the dangerous charted rock at 60°18'38.3"N, 147°02'24.4"W. Concur

The following three charted rocks were also present on the supplied photogrammetric shoreline, the apparent source of these items:

The dangerous rock charted at 60°19'15.64" N, 147°00'45.88" W was not found. A 200-meter radius visual search was conducted for 5 minutes on DN223 by VN2125 (Pos# 50037). Water visibility was 6 meters, and depths in the vicinity were 47 meters. In addition, 100% SWMB was acquired over this area, with no indication of the charted rock. The Hydrographer recommends deleting the rock from the charts. Concur

The dangerous rock charted at 60°18'588" N, 147°00'49.87" W was not found. A 200-meter radius visual search was conducted for 5 minutes on DN223 by VN2125 (Pos.# 50038).. Water visibility was 6 meters, and depths in the vicinity were 70 to 75 meters. In addition, 100% SWMB was acquired over this area, with no indication of the rock. The Hydrographer recommends deleting the rock from the charts. Concur

The dangerous rock charted at 60°18'4845" N, 147° 01'49.82" W was not found. A 150-meter radius visual search was conducted for 5 minutes on DN223 by VN2125 (Pos. #50063). Water visibility was 5 to 6 meters, and depths in the vicinity were approximately 25 meters. In addition, 100% SWMB and 50-meter splits in the area revealed no indication of the rock. The Hydrographer recommends deleting the rock from the charts. Concur

Recommendations ✓

The charted shoreline should be revised using the T-sheet shoreline and fieldwork notes as recorded in the MapInfo digital files named "H10920_Shoreline" and "H10920_Shoreline_Updates". Concur

J. CROSSLINES ✓

VBES crosslines totaled 14.6 nautical miles, comprising 12.8% of mainscheme VBES hydrography. Crosslines agreed within 1 meter of mainscheme hydrography.

SWMB crosslines totaled 11.06 nautical miles, comprising 6.5% of SWMB hydrography. The Quality Control Report (CARIS HIPS) for the SWMB launch checkline file averaged 97.5%, with a depth tolerance of 0.023. See Appendix E for the detailed report..

K. JUNCTIONS See Eval Rpt., Section L

The following contemporary surveys junction with H10920:

Registry #	Scale	Date	Junction side
H-9385 ✓	1:20,000	1973	East-Northeast
H10921 ✓	1:10,000	1999	North

Soundings from survey H9385 generally agreed well with the present survey, matching to within 1 fathom in areas of regular relief. However, the present survey did find three shoaler depths over features. A 6.6-fathom sounding at 60°19'44.3"N, 146° 56'55.94"W was found in the vicinity of a 7.8-fathom sounding from H-9385. This corresponds to AWOIS item 52492 and is discussed further in section M. In addition, an 18.8-fathom sounding at 60° 19'39.35"N, 146° 55'26.95"W was found midway between junctioning soundings of 29 and 27 fathoms, and a 14.8-fathom sounding at 60°19'06.78"N, 146°55'11.85"W was found in the vicinity of a prior 17-fathom sounding. The shoaler depths discovered are likely attributable to the increased bottom coverage obtained through the use of SWMB. Concur

Soundings from survey H10921 agreed well with the present survey, matching within 1 meter. Concur

Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after the application of smooth tides.

L. COMPARISON WITH PRIOR SURVEYS See Eval Rpt., Section M

The following prior survey shares common area with survey H10920:

Registry #	Scale	Date	Area covered
H-2612	1:40,000	1912	Entire Survey ✓

Prior survey H-2612 covers the entire area of H10920. Prior soundings agreed well, generally 1-2 fathoms deeper, when compared at their common positions. However, numerous soundings shoaler than those depicted on the prior were obtained in areas between prior survey soundings. For example, along a ridge centered at 60°19'45.71"N, 146°56'51.09"W, the current survey revealed least depths between 6.6 and 15 fathoms. The ridge appears to have been covered by only two sounding lines from H-2612, which revealed least depths of 18 to 44 fathoms. Other examples include a 14.8-fathom sounding at 60°19'06.78"N, 146°55'11.85"W which lies between prior soundings of 48 and 67 fathoms, a 26-fathom sounding at 60°19'13.25"N, 146°56'30.94"W which lies between prior soundings of 42 to 48 fathoms, a 16.7 fathom sounding at 60°19'03.24"N, 146°59'03.99"W which lies between prior soundings of 34 to 36 fathoms, and a 15.5-fathom sounding at 60°18'36.75"N, 146°59'59.24"W which lies between prior soundings of 26 to 27 fathoms. All of these areas were covered with 100% SWMB. The differences* are likely attributable to increased coverage obtained with SWMB and possible uplift from the 1964 earthquake. Concur

* Differences are also attributed to visual positioning methods and leadline measurements.

Final comparisons will be made at the Pacific Hydrographic Branch after the application of smooth tides.

M. ITEM INVESTIGATIONS ✓

Five AWOIS items were assigned for survey H10920.

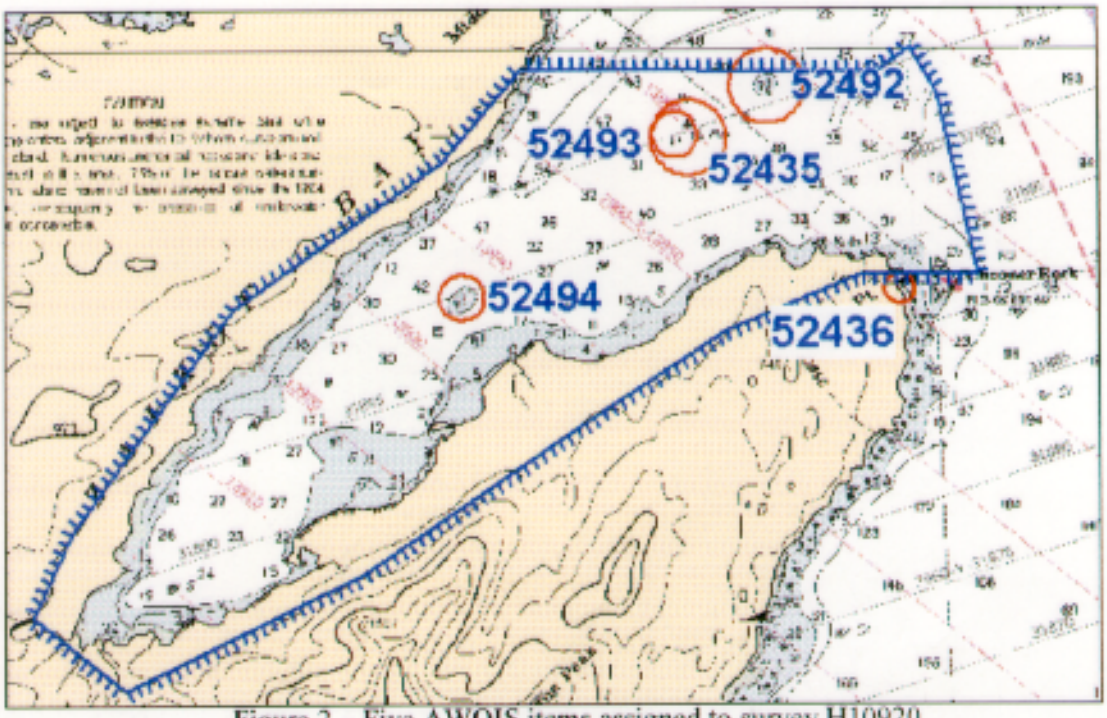


Figure 2 – Five AWOIS items assigned to survey H10920

AWOIS 52435 ✓

1. Area of Investigation

AWOIS Number:	52435
State and Locality:	Prince William Sound, Alaska
Reported Position:	Latitude: 60/19/21.26N ✓
	Longitude: 146/58/03.6W ✓
	Datum: NAD83
Type of Feature:	Shoal
Reported Depth:	14 fathoms ✓

2. Description and Source of Item

CL786/44-USC&GS Ship LESTER JONES, 10/16/44; Due to 14-15 fathoms soundings obtained in an area where deeper soundings are charted, it is recommended that a 14 fathom reported be shown. Poor weather conditions prevented accurate positioning. (Entered 6/98 MCR)
H-9385/73-DA-20-1-73; Item 5, development of the area revealed a shoal with a minimum depth of 7.8 fathoms (See AWOIS 52492). The hydrographer states that the least depth in the area may not have been found. The westerly of two reported 14 fathom reported retained as charted, as shown on present edition of chart 16709, 21st ed, 6/96. (Entered 7/99 MCR)
BP93140/75-DA-20-4-75; 13 fathom sounding located approximately 300 m to wsw of reported 14 fathoms in position.

3. Survey Requirements

Single beam echo sounder investigation; Shallow-water multibeam investigation. 500-meter search radius.

4. Method of Investigation

Vessel 2124 investigated the area on DN 223 and 250 using VBES. Vessels 2121 and 2126 investigated the area on DN 236, 237, and 251 using SWMB. The entire search area was covered with 100% SWMB.

5. Results of Investigation

A shoal was found approximately 270 meters west of the reported 14-fathom shoal. The shoalest depth located was 10.9 fathoms (Pos. #74789) discovered at 60°19'25.8"N, 146°58'12.49"W. This 10.9-fathom sounding is also the least-depth of AWOIS item 52493. Concur

6. Comparison with Prior Surveys:

Prior survey H-2612 shows no indication of the 14-fathom shoal. Concur

7. Comparison with the Chart and Charting Recommendation:

This results of this investigation were compared with charts 16709 (1:80,000, 21st Edition, September 19, 1998), and 16700 (1:200,000, 26th Edition, June 29, 1996). The chart depicts a 13-fathom depth, and a 14-fathom depth with a "Rep" annotation, within the search area of the item. The current survey discovered depths ranging from 32 to 41 fathoms at the location of the reported 14-fathom depth.

The Hydrographer recommends deleting the 14FM "Rep" annotation from the charts and superseding charted depths with soundings from this survey. Concur

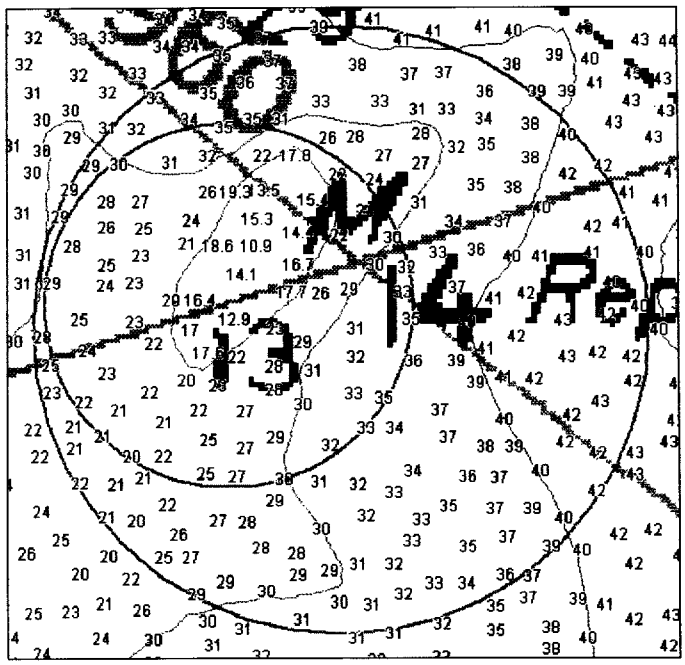


Figure 3 – The search radius of AWOIS item 52435 (the outer red circle)

AWOIS 52436 ✓

1. Area of Investigation

AWOIS Number:	52436
State and Locality:	Prince William Sound, Alaska
Reported Position:	Latitude: 60/18/15.96N ✓
	Longitude: 146/55/01.40W ✓
	Datum: NAD83
Type of Feature:	Wreck ✓
Reported Depth:	N/A

2. Description and Source of Item

LNM30/73-17th CGD, 7/24/75; The F/V MR. GEORGE reported aground and abandoned on schooner rock and is partly visible. CGC Sorrel Reports position to be 60-18.3 N, 146-54.9 W, 200' from shore. (Entered 6/98 MCR)

3. Survey Requirements

Visual Search; Echo sounder investigation; Salvage Documentation. 200-meter search radius.

4. Method of Investigation

Vessel 2124 investigated the area on DN 271 with both a visual search and a dive investigation.

5. Results of Investigation

The wreck was not located during this investigation. Divers conducted a detailed search at the position of DP #43769. Visibility in the water was 5 to 6 meters. In addition to the dive, a visual search was conducted with both VN 2124 and the diver chase boat (RA-8). This half-hour search was conducted 500 meters to both the north and south of the DP along the shoreline. The visual search was continued around Schooner Rock with no results.

6. Comparison with Prior Surveys:

Prior survey H-2612 shows no indication of the wreck. Concur

7. Comparison with the Chart and Charting Recommendation:

The results of this investigation were compared with charts 16709 (1:80,000, 21st Edition, September 19, 1998), and 16700 (1:200,000, 26th Edition, June 29, 1996). The charts show a visible wreck at the position of the AWOIS item.

The Hydrographer recommends deleting the wreck from the charts. Concur

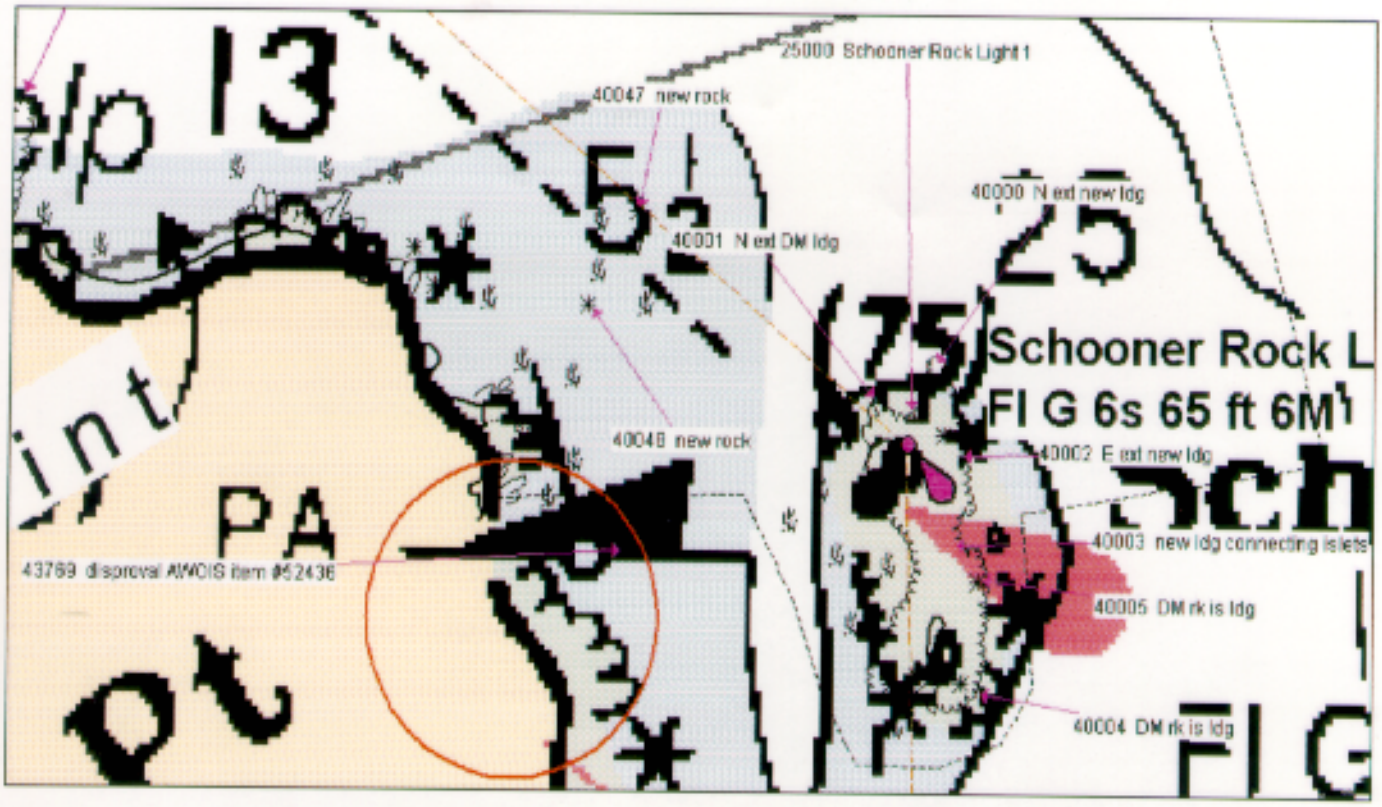


Figure 4 – The search radius of AWOIS item 52436 (the wreck)

AWOIS 52492

1. Area of Investigation

AWOIS Number:	52492
State and Locality:	Prince William Sound, Alaska
Reported Position:	Latitude: 60/19/43.58N
	Longitude: 146/56/56.05W
	Datum: NAD83
Type of Feature:	Shoal
Reported Depth:	7.8 fathoms

2. Description and Source of Item

H-9385/73-PSR item 5; Development of the area revealed a shoal area with a 7.8-fathom depth in position 60/19.76 N 146/56.81 W. Time did not allow a complete development to determine least depth. (Entered 7/99 MCR).

3. Survey Requirements

Singlebeam echo sounder investigation; Shallow-water multibeam investigation; Diver investigation. 500-meter search radius.

4. Method of Investigation

Vessel 2124 investigated the area on DN 223 and 250 using a single beam echo sounder. Vessels 2121 and 2126 investigated the area on DN 236, 237, 251, and 264 using shallow-water multibeam. The entire 500-meter search radius was covered with 100% SWMB.

5. Results of Investigation

A least depth of 6.7 fathoms (Pos.#74881) was discovered at 60°19'44.30"N, 146°56'55.94"W.

6. Comparison with Prior Surveys:

Prior survey H-2612 shows no indication of the 7.8-fathom shoal. Concur

7. Comparison with the Chart and Charting Recommendation:

The results of this investigation were compared with charts 16709 (1:80,000, 21st Edition, September 19, 1998), and 16700 (1:200,000, 26th Edition, June 29, 1996). The chart depicts a 7 ¾-fathom depth at the position of the AWOIS item.

The Hydrographer recommends that soundings from the current survey supersede the 7 ¾-fathom sounding at 60°19'43.58"N, 146°56'56.05"W. Concur Chart 6½ FM

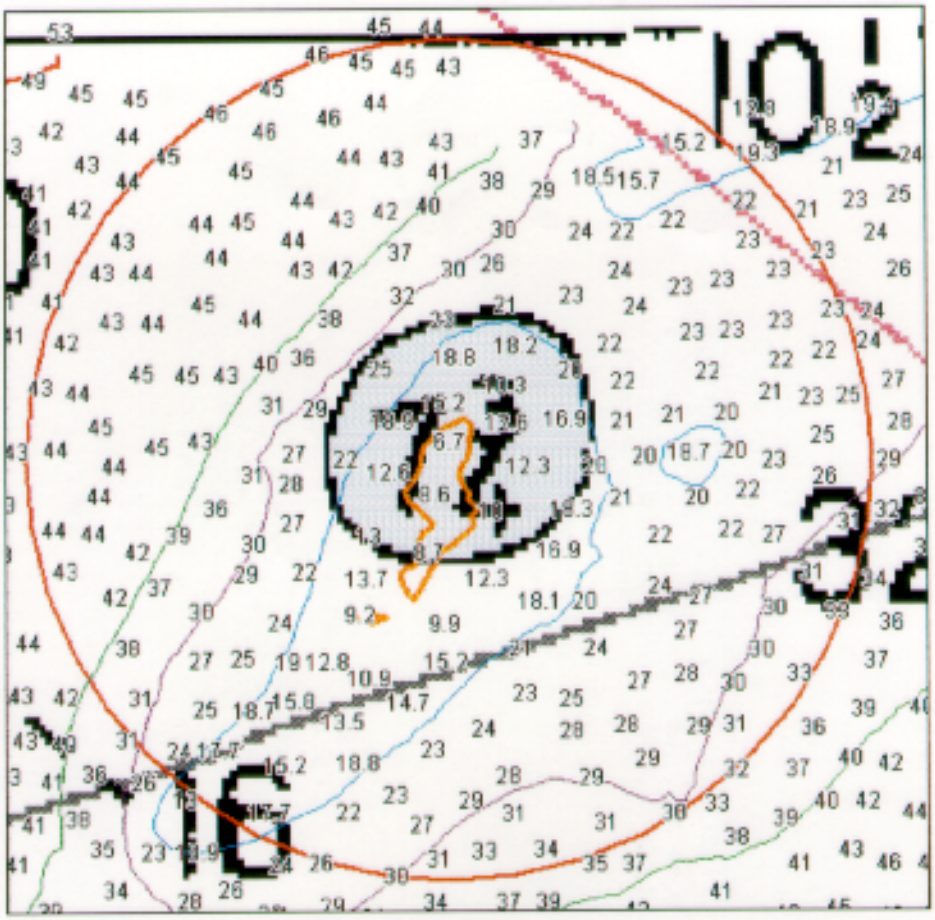


Figure 5 – The search radius of AWOIS item 52492 (7.8-fathom sounding)

AWOIS 52493 ✓

1. Area of Investigation

AWOIS Number:	52493
State and Locality:	Prince William Sound, Alaska
Reported Position:	Latitude: 60/19/22.59N ✓
	Longitude: 146/58/15.46 ✓
	Datum: NAD83
Type of Feature:	Shoal
Reported Depth:	13 fathoms ✓

2. Description and Source of Item

BP93140/74-NOS Reconnaissance survey; 13 fathom sounding located within shoal area containing depths of 16 to 20 fathoms. (Entered 7/99 MCR).

3. Survey Requirements

Singlebeam echo sounder investigation; Shallow-water multibeam investigation; Diver investigation. 300-meter search radius.

4. Method of Investigation

Vessel 2124 investigated the area on DN 223 and 250 using a single beam echo sounder. Vessels 2121 and 2126 investigated the area on DN 236, 237, and 251 using shallow-water multibeam. The entire 300-meter search radius was covered with 100% SWMB.

5. Results of Investigation

A least depth of 10.9 (8) fathoms (Pos.#74789) was discovered at 60°19'25.8"N ✓, 146°58'12.49"W. ✓
A 12.8 Fm depth was found 25 meters north of the reported 13 Fathoms.

6. Comparison with Prior Surveys:

Prior survey H-2612 shows no indication of the 13-fathom shoal. Concur

7. Comparison with the Chart and Charting Recommendation:

The results of this investigation were compared with charts 16709 (1:80,000, 21st Edition, September 9, 1998), and 16700 (1:200,000, 26th Edition, June 29, 1996). The current survey found a 12.9-fathom sounding in the vicinity of a charted 13-fathom sounding. The charted 13-fathom sounding is approximately 180 meters south of the shoalest point of the feature, the 10.9 (8)-fathom sounding.

The Hydrographer recommends that depths from this survey supersede charted depths. Concur Chart 11 FM

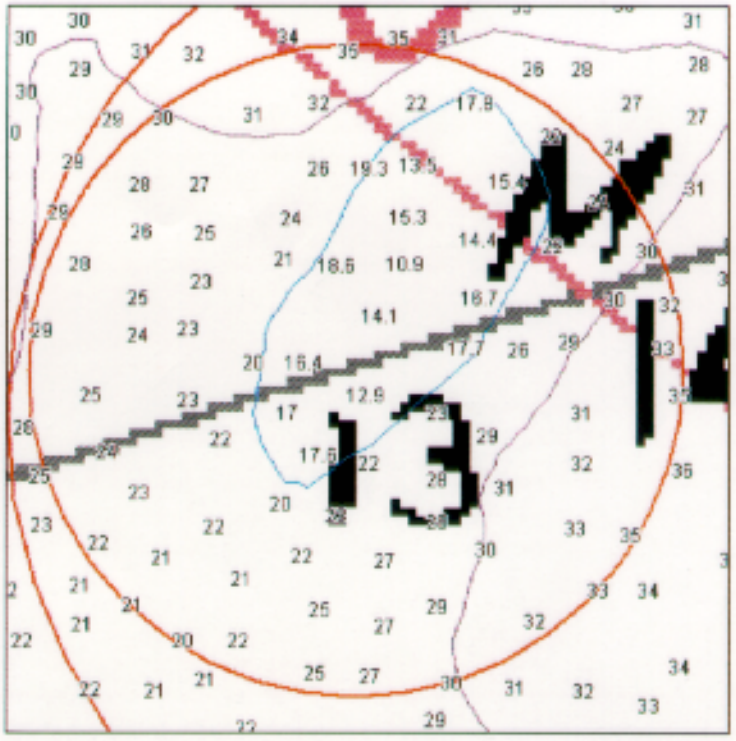


Figure 6 – The search radius of AWOIS item 52493 (13-fathom sounding)

AWOIS 52494 ✓

1. Area of Investigation

AWOIS Number:	52494
State and Locality:	Prince William Sound, Alaska
Reported Position:	Latitude: 60/18/12.5N ✓
	Longitude: 147/01/19.94W ✓
	Datum: NAD83
Type of Feature:	Shoal
Reported Depth:	9 ¼ fathoms ✓

2. Description and Source of Item

BP93140/74-NOS reconnaissance survey; 9¼-fathom sounding located within shoal area containing depths of 12 to 17 fathoms. (Entered MCR).

3. Survey Requirements

Singlebeam echo sounder investigation; Shallow-water multibeam investigation; Diver investigation. 300-meter search radius.

4. Method of Investigation

Vessels 2124 and 2125 investigated the area on DN 245 and 250 using a single beam echo sounder. Vessels 2121 and 2126 investigated the area on DN 243, 244, 245, 251, and 264 using shallow-water multibeam. The entire 300-meter search radius was covered with 100% SWMB.

5. Results of Investigation

A least depth of 8.7 fathoms (Pos.#84497) was discovered at 60°18'12.94"N, 147°01'20.84"W.

6. Comparison with Prior Surveys:

Prior survey H-2612 shows no soundings in the immediate vicinity of the 9¼-fathom shoaling. The shoalest sounding obtained over the shoal is 15 fathoms, approximately 460 meters to the southwest. Concur

7. Comparison with the Chart and Charting Recommendation:

The results of the investigations were compared with charts 16709 (1:80,000, 21st Edition, September 19, 1998), and 16700 (1:200,000, 26th Edition, June 29, 1996). The charts depict a 9¼-fathom depth at the position of the item.

The Hydrographer recommends superseding charted depths with depths from this survey. Concur Chart 8FM

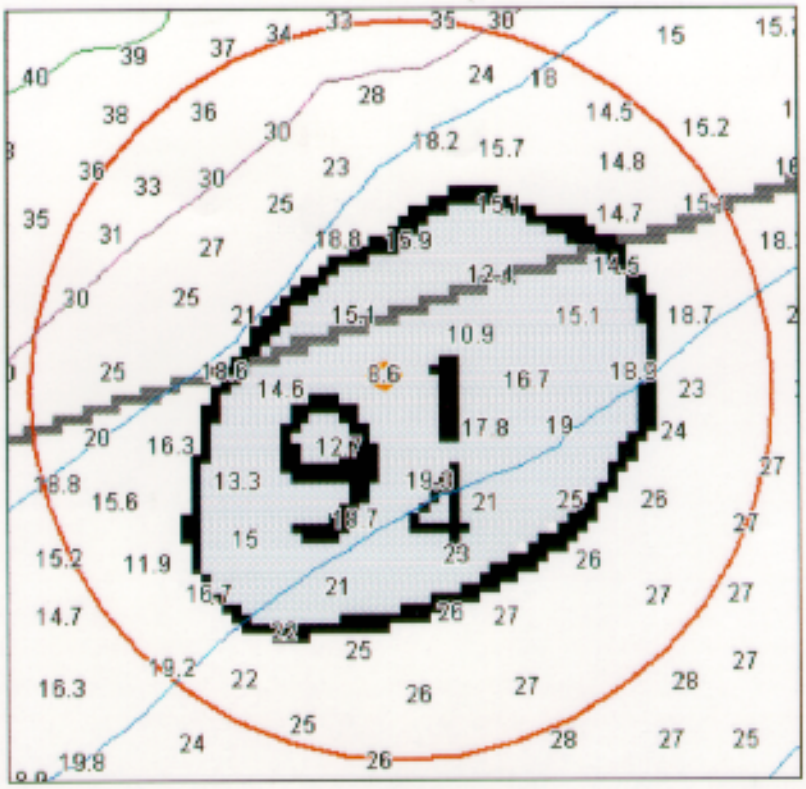


Figure 7 – The search radius of AWOIS item 52494 (the 9¼-fathom sounding)

N. COMPARISON WITH THE CHART See Eval Rpt., Section N

This survey was compared to the following charts:

Chart	Scale	Edition Number	Date	Datum
16700	1:200,000	26th	September 19, 1998	NAD 83
16709	1:80,000	21st	June 29, 1996	NAD 83

Soundings from charts 16700 and 16709 were in fair agreement with present survey soundings, with the current soundings generally 1 to 3 fathoms shoaler, except as noted below.

At the head of Zaikof Bay, the 10-fathom curve appears to have retreated shoreward 100 to 180 meters. This is most apparent in the vicinity of a charted 7-fathom sounding on chart 16709 at 60°16'19.11"N, 147°05'51.38"W, where the present survey revealed depths of 10 to 13 fathoms. Another example appears in the vicinity of a 10-fathom sounding on chart 16709 at 60°16'47.49"N, 147°05'31.16"W, where the present survey revealed depths of 23 to 25 fathoms. This entire area was covered with 100% SWMB. Concur

In the vicinity of a 2½-fathom sounding on chart 16709 at 60°16'52.3"N, 147°02'43.27"W, the present survey revealed depths of 4 to 5 fathoms. A sounding of 2.2 fathoms was located, however, at 60°16'56.38"N, 147°02'44.16"W (Pos. #78570), approximately 120 meters to the north. Although the 2.2-fathom sounding was found with SWMB on the present survey, the charted 2½-fathom sounding was only covered with VBES at 50-meter line spacing. Chart 2 Fm from present survey.

In the vicinity of an 18-fathom sounding on chart 16709 at 60°19'05.58"N, 147°00'55.18"W, the present survey revealed depths of 38 to 40 fathoms. This area was covered by 100% SWMB. Chart Soundings from present survey.

This survey also found several instances where charted and survey soundings agreed well at their common positions although shoaler depths were located close nearby. For example, this survey found a 14.2 fathom sounding at 60°19'06.78"N, 146°55'11.85"W (Pos. #70014), in close proximity to a charted 17-fathom sounding at 60°19'05.07"N, 146°55'12.37"W (charts 16700, 16709). Another example is 12.3 fathom sounding at 60°18'48.72"N, 146°55'30.53"W (Pos. #85831), which falls between charted soundings of 31 and 36 fathoms (chart 16709). Finally, a 3.9 fathom sounding at 60°16'10.26"N, 147°04'34.25"W (Pos.#88830) was located between charted soundings of 4.5 and 15 fathoms (chart 16709).

The Hydrographer recommends that survey depths supersede depths on charts 16700 and 16709 in their common areas. Concur

Non-sounding features are discussed in Section I. Final sounding comparisons will be made at the Pacific Hydrographic Branch after the application of smooth tides.

Dangers to Navigation

Ten Dangers* to Navigation were found and reported to the Seventeenth Coast Guard District.

A rock which ~~exposes 0.1 fathoms~~ covers 1 Foot was discovered at 60°18'04.07"N, 146°58'35.00'W, between a charted 7½-fathom sounding and a charted rock.

A rock ~~with a least depth of 0.1 fathoms~~ which covers 1 Foot (submitted as rock awash) was discovered at 60°18'32.61"N, 146°54'50.49"W, over a charted 5½-fathom sounding.

A shoal depth of 2.1 2 fathoms was discovered at 60°18'17.06"N, 146°58'52.95"W, in the vicinity of a charted 13-fathom sounding.

* Dangers corrected for approved tides.

A shoal depth of 2.7 fathoms was discovered at 60°16'56.38"N, 147°02'44.16"W, ~~over~~ a charted 7¼-fathom ~~sounding~~ Sounding.

A shoal depth of 3.7 fathoms was discovered at 60°16'10.26"N, 147°04'34.25"W, between charted 4¼- and ~~3~~-fathom soundings.

A shoal depth of 4.7 fathoms was discovered at 60°18'41.45"N, 146°56'50.34"W, ~~close~~ offshore of the 10-fathom curve. ~~between charted 28- and 45-fathom soundings~~.

A shoal depth of 6.7 fathoms was discovered at 60°19'44.3"N, 146°56'55.94"W, over a charted 7¾-fathom sounding.

A shoal depth of 8.6 fathoms was discovered at 60°18'12.94"N, 147°01'20.84"W, over a charted 9¼-fathom sounding.

A shoal depth of 10.2 fathoms was discovered at 60°18'31.21"N, 147°02'01.41"W, between charted 12- and 37-fathom soundings.

A shoal depth of 10.9 fathoms was discovered 60°19'25.8"N, 146°58'12.49"W, in the vicinity of a charted 13-fathom sounding.

A copy of the Danger to Navigation report is included in ~~Appendix A~~ this report.

O. ADEQUACY OF SURVEY

Survey H10920 is complete and adequate to supersede prior soundings and features in their common areas. Concur

P. AIDS TO NAVIGATION See Eval Rpt., Section Q

One non-floating aid to navigation was positioned using DGPS. Schooner Rock Light (Light List #25525) was found to be positioned accurately on charts 16700 and 16709, and adequately serves its intended purpose.

Q. STATISTICS

Refer to the Survey Information Summary attached to this report.

R. MISCELLANEOUS

Bottom samples were collected and sent to the Smithsonian Institute in accordance with the Project Instructions.

No unusual tidal currents or magnetic variations were found during this survey.

S. RECOMMENDATIONS

None.

T. REFERRAL TO REPORTS ✓

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

Title	Date Sent	Office
OPR-P139-RA 1999 Coast Pilot Report	TBA	N/CS26
Project Related Data for OPR-P139-RA	December	N/CS34

Respectfully Submitted,

James B. Jacobson
Chief Survey Technician

Approved and Forwarded,

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Survey Information Summary

Project: OPR-P139-RA **Project Name:** SOUTHWEST PRINCE WILLIAM SOUND

Instructions Dated: 7/30/99 **Project Change Info:**

Sheet Letter: AE **Registry Number:** H10920

Sheet Number: RA-10-13-99

Survey Title: Zaikof Bay

Data Acquisition Dates: **From:** 10-Aug-99 222 **To:** 28-Sep-99 271

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2121								
2122	2	2				1		
2124	2	1			1	3		1
2125	2	1			1	1	1	
2126								

Sound Velocity Cast Information

Cast Name	HPS Table #	Cast DN	Max Depth	Position	Applicable DN
99224191	1	224	135.8	60/21/16 147/04/39	223-235
99236165	3	236	132.5	60/20/20 146/57/00	236-253
99264170	7	264	230	60/20/02 146/57/31	261-267
99270224	12	270	329.3	60/11/00 147/41/10	268-274
99277214	13	277	293.2	60/27/24 147/09/36	278-285

Tide Zone Information

Zone #	Time Corr.	Height Corr.
PWS10	-00 hr 06 min	0.90
PWS11	-00 hr 06 min	0.88

Tide Gage Information

Tide Gauge #	Gauge Name	Installed	Removed
945-4511	Port Chalmers	8/10/1999	10/20/1999
945-4662	Snug Harbor	8/11/1999	10/20/1999
945-4411	Zaikof Point	8/10/1999	10/14/1999

Statistics Summary

Type	Total
BS	32
DP	31
MS	114.42
XL	14.6
S/L	14.25
SPLIT	52.84
SWMB	169.57
SWMB_XL	11.06

VBES XL %	12.8
SWMB XL %	6.5
SQNM	9.79

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER

December 6, 1999

ADVANCE
INFORMATION

Commander (mon)
Seventeenth Coast Guard District
Post Office Box 25517
Juneau, Alaska 99802-5517

Dear CDR Hamblett:

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10920 in Prince William Sound, Alaska, in August through September 1999. The dangers are shown graphically on the attached chartlet.

The following dangers to navigation affect the following charts:

Chart	Scale	Edition	Date
16700	1:200,000	26th	19-Sep-98
16709	1:80,000	21st	29-Jun-96

The positions are on the NAD 83 datum and depths have been corrected to Mean Lower Low Water.

Feature	Depth (fm)	Latitude (N)	Longitude (W)	Depth (m)
Rock	Uncovers	60-18-04.07	146-58-35.0	-0.2
Rock	Awash	60-18-32.61	146-54-50.49	0.2
Shoal	2.1	60-18-17.06	146-58-52.95	3.9
Shoal	2.2	60-16-56.38	147-02-44.16	4.0
Shoal	3.7	60-16-10.26	147-04-34.25	6.8
Shoal	4.3	60-18-41.45	146-56-50.34	8.0
Shoal	6.7	60-19-44.3	146-56-55.94	12.3
Shoal	8.6	60-18-12.94	147-01-20.84	15.9
Shoal	10.2	60-18-31.21	147-02-01.41	18.7
Shoal	10.9	60-19-25.8	146-58-12.49	19.9

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P139-RA-99 and Danger to Navigation message RA-24-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

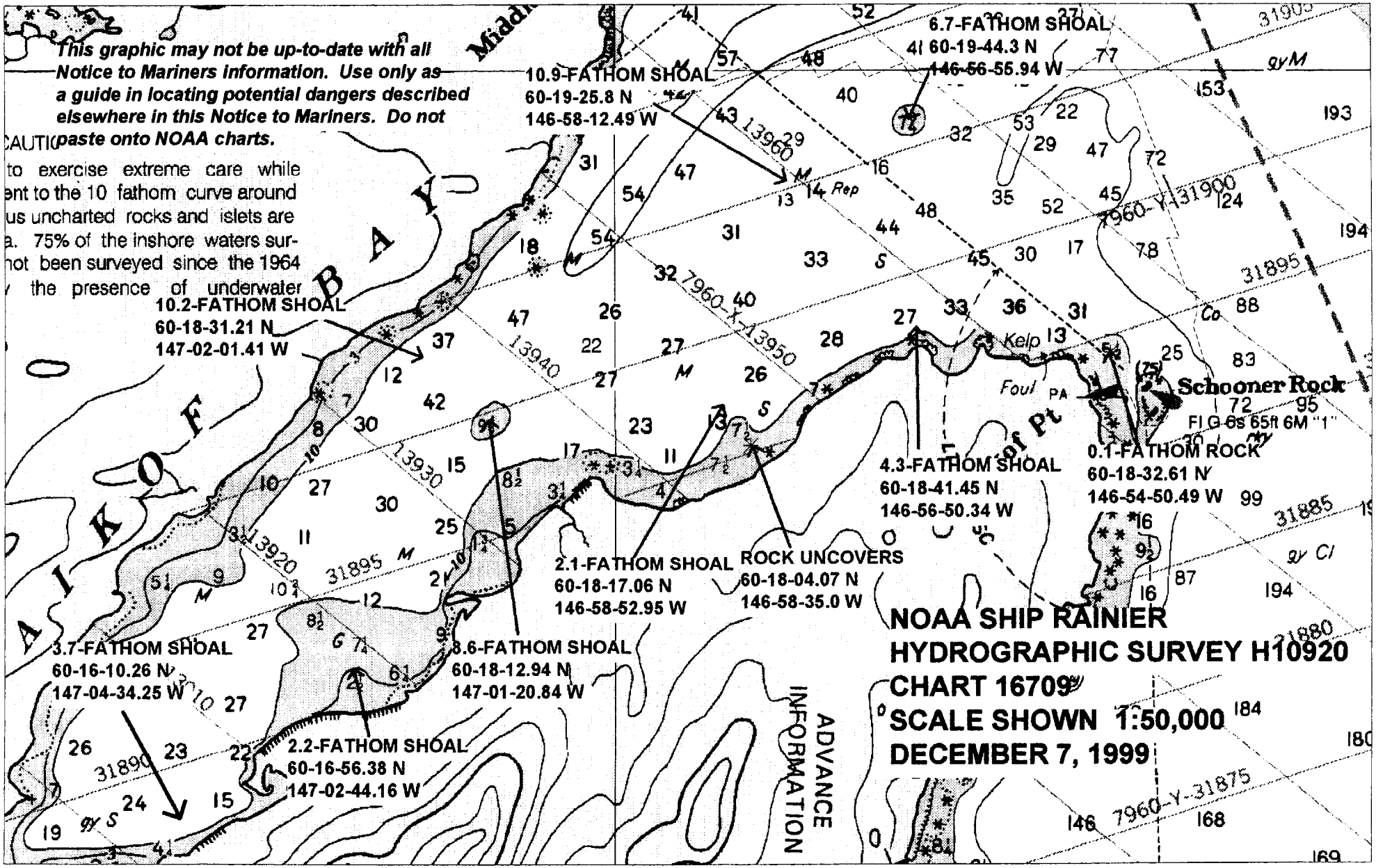
Sincerely,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Attachment

cc: NIMA PMC
N/CS261 N/CS34


This graphic may not be up-to-date with all Notice to Mariners information. Use only as a guide in locating potential dangers described elsewhere in this Notice to Mariners. Do not paste onto NOAA charts.
CAUTI
to exercise extreme care while
ent to the 10 fathom curve around
us uncharted rocks and islets are
a. 75% of the inshore waters sur-
not been surveyed since the 1964
the presence of underwater
10.9-FATHOM SHOAL
60-19-25.8 N
146-58-12.49 W
6.7-FATHOM SHOAL
60-19-44.3 N
146-56-55.94 W
10.2-FATHOM SHOAL
60-18-31.21 N
147-02-01.41 W
4.3-FATHOM SHOAL
60-18-41.45 N
146-56-50.34 W
0.1-FATHOM ROCK
60-18-32.61 N
146-54-50.49 W
Schooner Rock
Fl G 6s 65ft 6M "1"
2.1-FATHOM SHOAL
60-18-17.06 N
146-58-52.95 W
ROCK UNCOVERS
60-18-04.07 N
146-58-35.0 W
3.7-FATHOM SHOAL
60-16-10.26 N
147-04-34.25 W
8.6-FATHOM SHOAL
60-18-12.94 N
147-01-20.84 W
2.2-FATHOM SHOAL
60-16-56.38 N
147-02-44.16 W
ADVANCE INFORMATION
NOAA SHIP RAINIER
HYDROGRAPHIC SURVEY H10920
CHART 16709
SCALE SHOWN 1:50,000
DECEMBER 7, 1999

ADVANCE
INFORMATION

Date: 12/7/1999
Sender: FOO Rainier
To: Chief Survey Technician Rainier, Lynn [NDS-NCG22] Preston, navinfonet@nima.mil, lnm@cgalaska.uscg.mil, Dennis.Hill@noaa.gov
Priority: Normal
Subject: DTON Message RA-24-99

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10920 in Prince William Sound, Alaska, in August through September 1999.

The following dangers to navigation affect charts 16700(scale 1:200,000; 26th edition, 19-Sep-98) and 16709(scale 1:80,000; 21st edition, 29-Jun-96).

The positions are on the NAD 83 datum and depths have been corrected to Mean Lower Low Water.

Feature: Rock
Depth: Uncovers
Latitude: 60-18-04.07 N
Longitude: 146-58-35.00 W

Feature: Rock
Depth: Awash
Latitude: 60-18-32.61 N
Longitude: 146-54-50.49 W

Feature: Shoal
Depth: 2.1 fathoms
Latitude: 60-18-17.06 N
Longitude: 146-58-52.95 W

Feature: Shoal
Depth: 2.2 fathoms
Latitude: 60-16-56.38 N
Longitude: 147-02-44.16 W

Feature: Shoal
Depth: 3.7 fathoms
Latitude: 60-16-10.26 N
Longitude: 147-04-34.25 W

Feature: Shoal
Depth: 4.3 fathoms
Latitude: 60-18-41.45 N
Longitude: 146-56-50.34 W

Feature: Shoal
Depth: 6.7 fathoms
Latitude: 60-19-44.30 N
Longitude: 146-56-55.94 W

Feature: Shoal
Depth: 8.6 fathoms
Latitude: 60-18-12.94 N
Longitude: 147-01-20.84 W

Feature: Shoal

Depth: 10.2 fathoms
Latitude: 60-18-31.21 N
Longitude: 147-02-01.41 W

Feature: Shoal
Depth: 10.9 fathoms
Latitude: 60-19-25.80 N
Longitude: 146-58-12.49 W

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P139-RA-99 and Danger to Navigation message RA-24-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF COAST SURVEY
Pacific Hydrographic Branch
Seattle, Washington 98115-0070

January 12, 2000

Commander (OAN)
Seventeenth Coast Guard District
P.O. Box 25517
Juneau, AK 99802

Dear Sir:

During office review of hydrographic survey H-10920, Alaska, Southwest Prince William Sound, Zaikof Bay, a shoal depth was found and is considered to be a potential danger to navigation.

It is recommended that the enclosed Report of Danger to Navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6836.

Sincerely,

James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosure

cc: NIMA
N/CS261
NOAA Navigation Advisor, Alaska

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H-10920

Survey Title:
State: ALASKA
Locality: SOUTHWEST PRINCE WILLIAM SOUND
Sublocality: ZAIKOF BAY

Project Number: OPR-P139-RA

Survey Date: AUGUST 11, - SEPTEMBER 21, 1999

Sounding is reduced to Mean Lower Low Water using predicted tides and is positioned on NAD 83.

Chart affected: 16709 21st Edition June 29, 1996, scale 1:80,000, NAD 83

DANGER TO NAVIGATION	LATITUDE(N)	LONGITUDE(W)
7.1 fathom sounding	60/18/04.80	146/59/21.16

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206)526-6836.

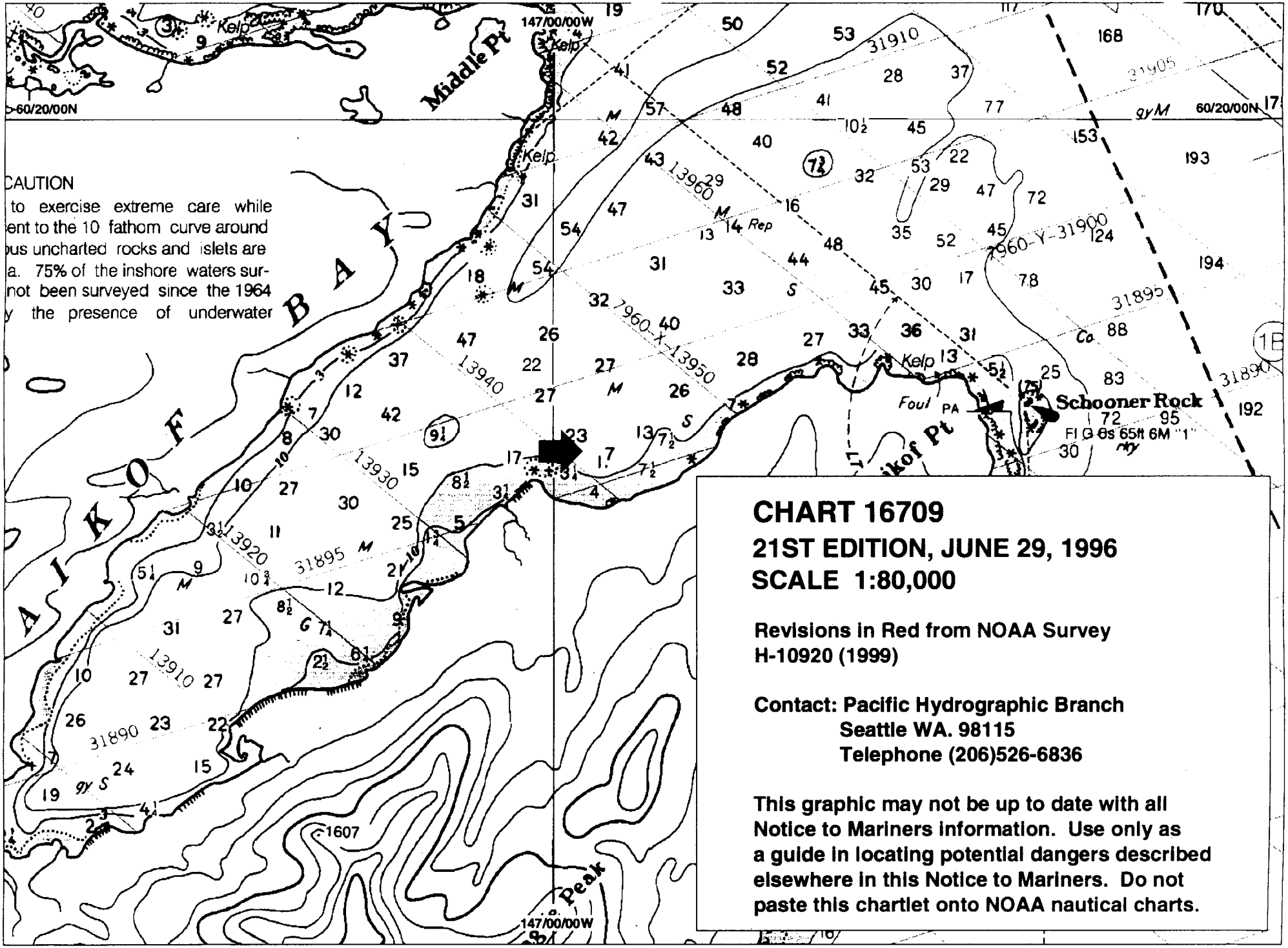


CHART 16709

21ST EDITION, JUNE 29, 1996

SCALE 1:80,000

Revisions in Red from NOAA Survey H-10920 (1999)

Contact: Pacific Hydrographic Branch
Seattle WA. 98115
Telephone (206)526-6836

This graphic may not be up to date with all Notice to Mariners information. Use only as a guide in locating potential dangers described elsewhere in this Notice to Mariners. Do not paste this chartlet onto NOAA nautical charts.

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10920

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 16700, 16709	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
ALASKA (title)	X		X							1
PRINCE WILLIAM SOUND	X		X							2
MIDDLE POINT	X		X							3
MONTAGUE ISLAND	X		X							4
SCHOONER ROCK	X		X							5
ZAIKOF BAY	X		X							6
ZAIKOF POINT	X		X							7
				Approved:						8
				Dennis J. Romesburg						9
				Chief Cartographer MAR 14 2002						10
										11
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NOAA FORM 76-155 SUPERSEDES C&GS 197

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: May 18, 2000

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P139-RA-99
HYDROGRAPHIC SHEET: H-10920

LOCALITY: Southwest Prince William Sound, AK

TIME PERIOD: August 10 - September 28, 1999

TIDE STATION USED: 945-4411 Zaikof Point
Lat. 60° 18.6'N Lon. 146° 56.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.207 meters

TIDE STATION USED: 945-4050 Cordova
Lat. 60° 33.5'N Lon. 146° 45.2'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.529 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: PWS52.

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: Use tide data from the appropriate station with applicable zoning correctors for each zone according to the order in which they are listed in the Tidezone corrector files. For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available.

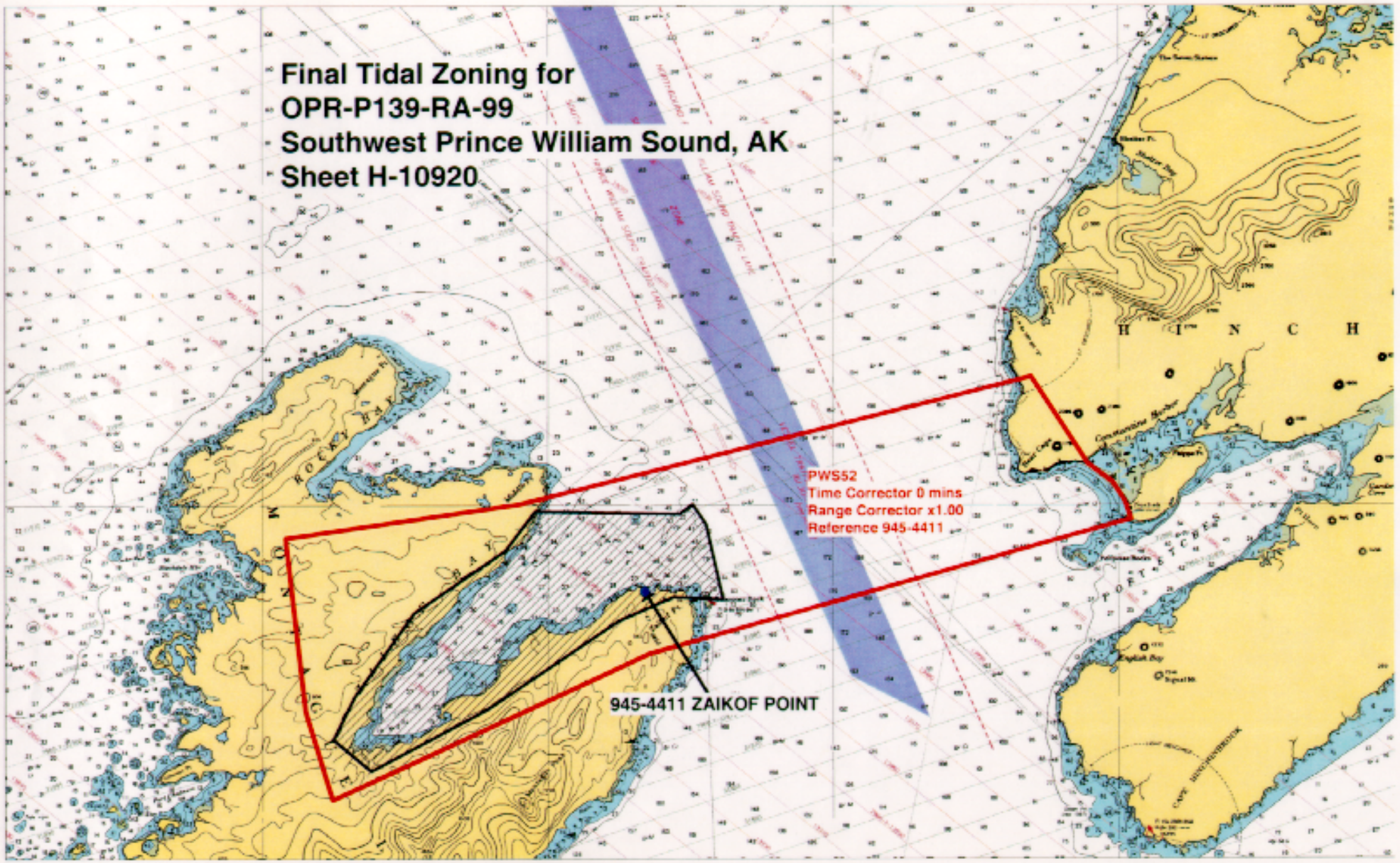
Thomas N. Meo 5/18/00

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-P139-RA-99,
Sheet H-10920.

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 PWS52			
-147.017466 60.333488	945-4411	0	1.00
-147.15325 60.323765	945-4050	0	0.90
-147.141645 60.273831			
-147.12588 60.248158			
-146.940685 60.290383			
-146.659408 60.329274			
-146.663109 60.334575			
-146.6701 60.339876			
-146.684904 60.34538			
-146.717804 60.370613			
-147.017466 60.333488			


Final Tidal Zoning for
OPR-P139-RA-99
Southwest Prince William Sound, AK
Sheet H-10920
PWS52
Time Corrector 0 mins
Range Corrector x1.00
Reference 945-4411
945-4411 ZAIKOF POINT
ROCKY BAY
HINCH

APPROVAL SHEET

for

H10920

RA-10-13-99

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

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

NOAA FORM 77-27(H) (9-83)

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: H-10920

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
MOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	NA
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	NA

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	1					
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List): T-12662, T-12663

PHOTOBATHYMETRIC MAPS (List): NA

NOTES TO THE HYDROGRAPHER (List): NA

SPECIAL REPORTS (List): NA

NAUTICAL CHARTS (List): Chart 21st Ed., June 29,1996

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	*EVALUATION*	*TOTALS*
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	119		119
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		25	25
GEOGRAPHIC NAMES			
OTHER: (Chart Compilation)	71		71
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	190	25	215

Pre-processing Examination by R. Davies, G. Nelson	*Beginning Date* 12/16/99	*Ending Date* 1/12/2000
Verification of Field Data by B. Olmstead	*Time (Hours)* 119	*Ending Date* 9/1/2000
...ification Check by I. Alamcen	*Time (Hours)* 3	*Ending Date* 11/28/2000
Evaluation and Analysis by B. Olmstead	*Time (Hours)* 25	*Ending Date* 9/8/2000
Inspection by I. Almacen	*Time (Hours)* 2	*Ending Date* 11/29/2000

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EVALUATION REPORT
H10920

A. PROJECT

The hydrographer's report contains a complete discussion of the project information.

B. AREA SURVEYED

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

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey area. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operations and 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.

The bottom consists mainly of green mud, sand and shells. The foreshore area of Zaikof Bay is comprised of sand and gravel beaches mixed intermittently with isolated rocks and ledges. Depths generally range from the mean lower low water line throughout Zaikof Bay to ninety fathoms north of Schooner Rock.

C. SURVEY VESSELS

Survey vessels are adequately discussed in the hydrographer's report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The acquisition and processing of data in the field has been adequately addressed 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 names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The data are plotted using a Universal Transverse Mercator (UTM) projection and are depicted on a single sheet.

E. SONAR EQUIPMENT

Side scan sonar equipment was not used during survey H-10920

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, dynamic draft, and sound velocity. Additional

reducers for multibeam survey data include 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 have been 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 from tide gage Zaikof Point, Alaska, 945-4411.

H. CONTROL STATIONS

Control stations are adequately discussed in the hydrographer's report.

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The smooth sheet is annotated with an NAD 27adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 datum by applying the following corrections:

Latitude:	-2.062 seconds (-63.811 meters)
Longitude:	7.315 seconds (+112.353 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 for 1:10,000 was computed for survey operations. The quality of some positions exceeded limits in terms of HDOP and have been rejected during field processing. These positions were isolated and occurred randomly throughout the survey area. A review of the data indicated that none of these fixes are used to position dangers to navigation. NAD 83 is used as the horizontal datum for plotting and position computations.

DGPS performance checks were conducted in the field and found adequate. Additional information concerning specific control system type, calibrations and system checks, can be found in the hydrographer's report and the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline maps T-12662 and T-12663 were compiled on NAD 83 and apply to this survey. Shoreline drawn on the smooth sheet in black originates from the above digital data as provided by the Coastal Mapping Program. The shoreline data and the hydrographic data were merged in MicroStation during the compilation of the smooth sheet.

There were no MHW revisions delineated during this survey. The shoreline maps and the results of the fieldwork as portrayed on the smooth sheet should supersede charted shoreline.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10920 junctions with the following surveys.

Survey	Year	Scale
H-9385	1973	1:20,000
H-10921	1999	1:10,000

The junction with H-10921 is complete. Soundings and depth curves are in good agreement. A few soundings have been transferred to the smooth sheet to support standard depth curves and to better delineate the bottom configuration. A "Joins" note has been added to the smooth sheet.

Survey H-9385 was conducted in 1973 and covers a considerable spatial extent with the common area of the present survey. Depths and standard depth curves within the common area are in adequate agreement. However, the present survey employed multibeam ensonification providing a better delineation of the bottom configuration and should supersede within the common area. An "Adjoins" note has been added to the smooth sheet. A few soundings have been transferred to the smooth sheet to support standard depth curves.

M. COMPARISON WITH PRIOR SURVEYS

The following prior survey falls within the common area of the present survey and has been compared with during office processing.

Survey	Year	Scale	Datum
H-2612	1912	1:40,000	Valdez
H-9385	1973	1:20,000	NAD 27

Prior survey H-2612 and junction survey H-9385 are the source data for most of the charted data. Comparison with H-2612 and H-9385 were made using a digital raster and a hard copy plot. The registration with H-2612 was satisfactory but the legibility of sounding data was poor. The registration and legibility of H-9385 was good.

H-2612 (1912)

H-2612 was conducted using lead lines and visual positioning. Considering the data gathering techniques employed in 1912, a comparison of depths reflects good agreement. Present survey depths generally reflect a consistently shoal bias of 1-3 fathoms. However, a few prior survey depths located along the steeper slopes reflect both a shoal and deep bias that exceed 5 fathoms. The evaluator feels these depths are likely the result of erroneous lead line depths and or positional errors. In these cases, similar depths with the present survey can be found within 50-100 meters in a westerly direction. The three and ten fathom depth curves on the west side of Zaikof Bay have moved shoreward approximately 50-125 meters while the east side of Zaikof Bay reveals the ten fathom curve has moved offshore in places from 50-100 meters. Comparison with the prior shoreline shows good agreement. There appears to be no major changes to the mean high water line. Aside from the effects of past earthquake activity, depth differences may well be attributed to improved positioning and sounding methods.

A portion of H-2612 has been superseded by the 1973 survey work near the entrance to Zaikof Bay and near Schooner Rock.

H-9385 (1973)

Survey H-9385 is an offshore survey that encompasses the area in the vicinity of Schooner Rock and extends northwest approximately 1.5 nautical miles near the entrance to Zaikof Bay. This survey was conducted using single beam echo sounders and Raydist electronic positioning. A comparison of soundings with survey H-9385 shows a consistent 0.5-1 fathom difference in depths. There appears to be no consistently deeper or shoal bias. Standard depth curves reflect much the same shape and configuration with some minor differences largely attributed to better delineation of the bottom configuration. . Aside from the effects of past earthquake activity, depth differences may well be attributed to improved positioning and sounding methods.

A more thorough coverage of the area utilizing the shallow water multibeam system has provided better definition of the bottom in Zaikof Bay since surveys conducted in 1912 and 1973.

Additional information can be found in the hydrographer's report sections L and N.

In accordance with the Hydrographic Survey Guideline No. 39, the effect of the 1964 Prince William Sound earthquake were considered in the comparison of this survey. Prince William Sound experienced a bottom uplift

of 4-32 feet during the 1964 earthquake. However, due to the differences in data acquistion methods, no reasonable adjustment value for prior soundings could be determined.

Survey H-10920 is adequate to supersede prior surveys H-2612 and H-9385 within the common area.

N. ITEM INVESTIGATIONS

There were five AWOIS items assigned for investigation within the survey area. These items have been adequately investigated during survey operations. Refer to the hydrographer's report, section M, for specific item discussion.

O. COMPARISON WITH CHART

Survey H-10920 was compared with the following chart.

Chart	Edition	Date	Scale
16709	21st	June 29, 1996	1:80,000

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and miscellaneous source data and have been have been adequately addressed in sections L and M of the evaluation report, and in the hydrographer's report, sections K, L, M, and N.

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. Additional discussion can be found in the hydrographer's report, section N.

Except as mentioned above, survey H-10920 is adequate to supersede charted hydrography within the common area.

b. Dangers To Navigation

Ten potential dangers to navigation were reported during survey operations. One additional potential danger to navigation was reported during office processing. These dangers were reported to the USCG, NIMA, N/CS261, N/CS 34 and the NOAA Navigation Advisor, Alaska, on December 6, 1999 and January 12, 2000. Copies of both reports are attached.

P. ADEQUACY OF SURVEY

Hydrography contained on survey H-10920 is adequate to:

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

With the exception of the following, 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 NOS Hydrographic Surveys Specifications and Deliverables, and the Field Procedures Manual, April 1998 Edition.

Q. AIDS TO NAVIGATION

One fixed aid to navigation exists within the survey area. The hydrographer visually verified the existence of Schooner Rock Light 1 and in conjunction provided a detached position plotting approximately 75 meters north of the light. The hydrographer determined it to adequately serve the purpose for which it was established. Schooner Rock Light 1 has not been shown on the smooth sheet and should be retained as charted. There are no

floating aids to navigation within the survey area. There were no features of landmark value located and or recommended for charting within the area of this survey.

Additional information can be found in the hydrographer's report, section P, and the detached position folder filed with the hydrographic records.

R. STATISTICS
Statistics are adequately itemized in the hydrographer's report.

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

T. RECOMMENDATIONS
This is a good hydrographic survey. There is no additional information provided by the hydrographer and or the evaluator as a result of office processing.

U. REFERRAL TO REPORTS
Referral to reports is adequately discussed in the hydrographer's report.

Bruce A. Olmstead
Bruce A Olmstead
Cartographer

APPROVAL SHEET
H-10920

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 _____ Date: 12/4/00
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.

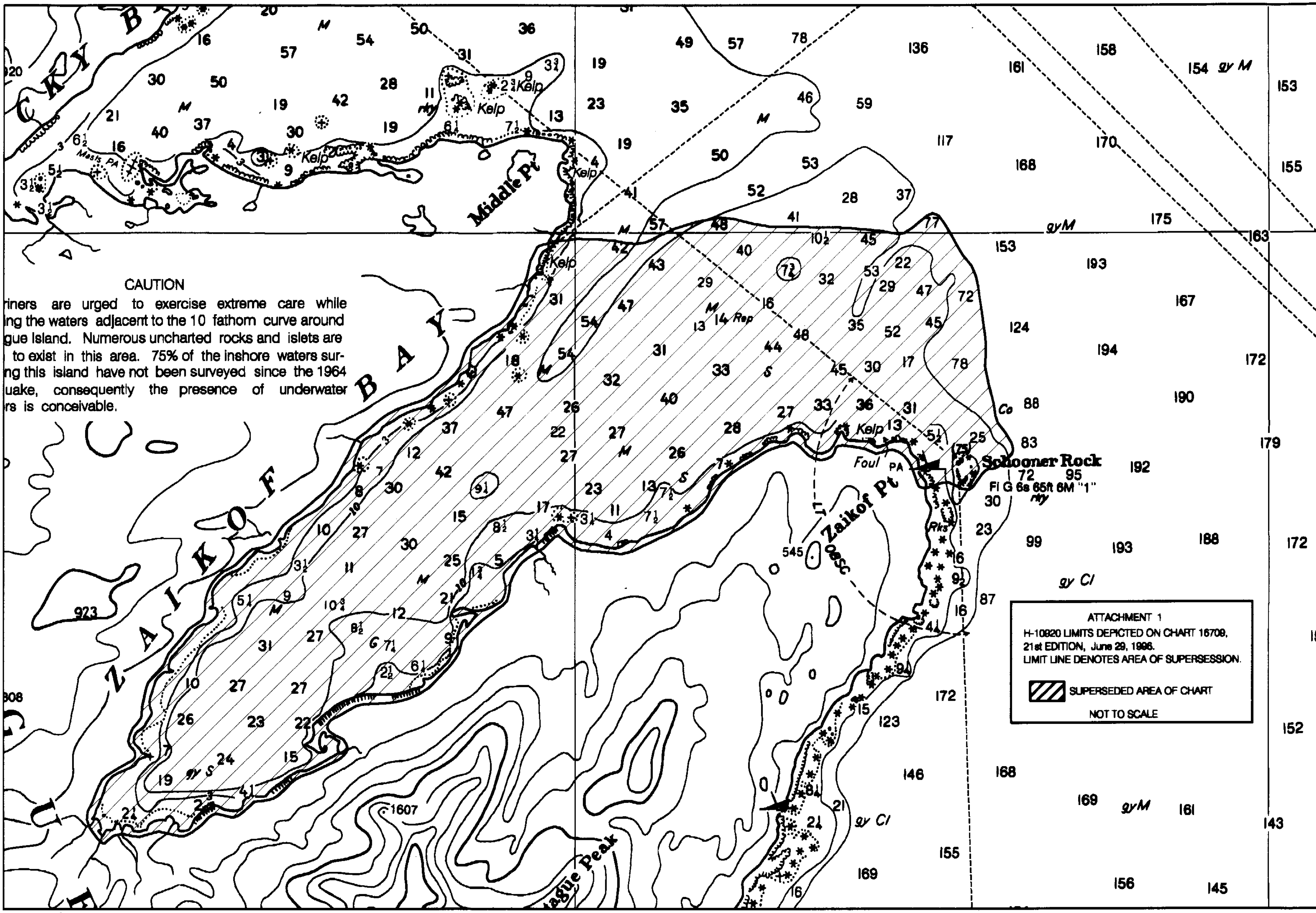
_____ Date: 12-22-00
James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

****

Final Approval

Approved:

_____ Date: March 23, 2001
Samuel P. De Bow Jr.,
Captain, NOAA
Chief, Hydrographic Surveys Division


CAUTION
riners are urged to exercise extreme care while
ing the waters adjacent to the 10 fathom curve around
gue Island. Numerous uncharted rocks and islets are
to exist in this area. 75% of the inshore waters sur-
ng this island have not been surveyed since the 1964
uake, consequently the presence of underwater
rs is conceivable.
ZAIKOF BAY
Middle Pt
Zaikof Pt
Schooner Rock
Fl G 6s 65ft 6M "1"
Foul
Kelp
ATTACHMENT 1
H-10920 LIMITS DEPICTED ON CHART 16709,
21st EDITION, June 29, 1996.
LIMIT LINE DENOTES AREA OF SUPERSESSION.
SUPERSEDED AREA OF CHART
NOT TO SCALE

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10920

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
16709	8/22/2000	Bruce A. Olmstead	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.
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			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.