H10921

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-10-14-99

Registry No. H-10921

LOCALITY

State Alaska

General Locality Southwest Prince William Sound

Sublocality Rocky Bay and Vicinity

1999

CHIEF OF PARTY

Commander Daniel R. Herlihy, NOAA

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NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.: H-10921

FIELD NO.: RA-10-14-99

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

State: Alaska

General locality: Southwest Prince William Sound

Locality: Rocky Bay and Vicinity

Scale: 1:10,000 Date of survey: 8/11/99 - 10/6/99

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

Vessel: NOAA Ship RAINIER, RA-1(2121),RA-2(2122),RA-3(2123),RA-4(2124),RA-5(2125),RA-6(2126)

Chief of party: CDR Daniel R. Herlihy, NOAA

Surveyed by: RAINIER Personnel

Soundings taken by echo sounder, ~~hand lead, pole~~ Knudsen 320M,RESON 8101MB,DSF6000N

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Evaluation by: I. Almacen Automated plot by: HP Design Jet 750C

~~Protracted by~~

Verification by: E.Domingo,I.Almacen,R.Davies, G. Nelson, R. Mayor, M. Bigelow

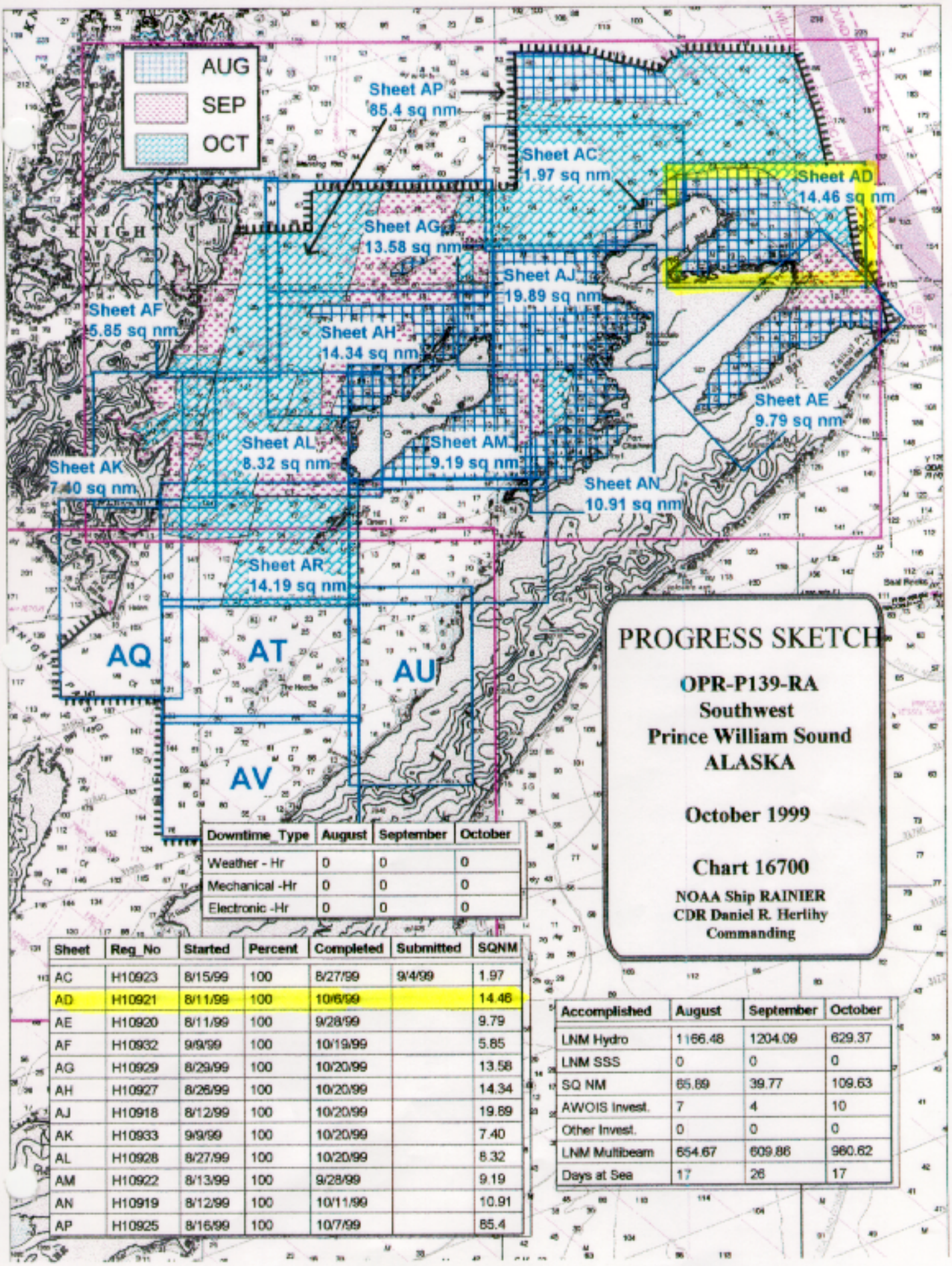
Soundings in fathoms ~~feet~~ at ~~MLW~~ MLLW and tenths (data collected in meters)

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 / SUIZF 1/29/01 mcR

U.S. GOVERNMENT PRINTING OFFICE: 1986 - 652-007/41215



PROGRESS SKETCH

OPR-P139-RA
Southwest
Prince William Sound
ALASKA

October 1999

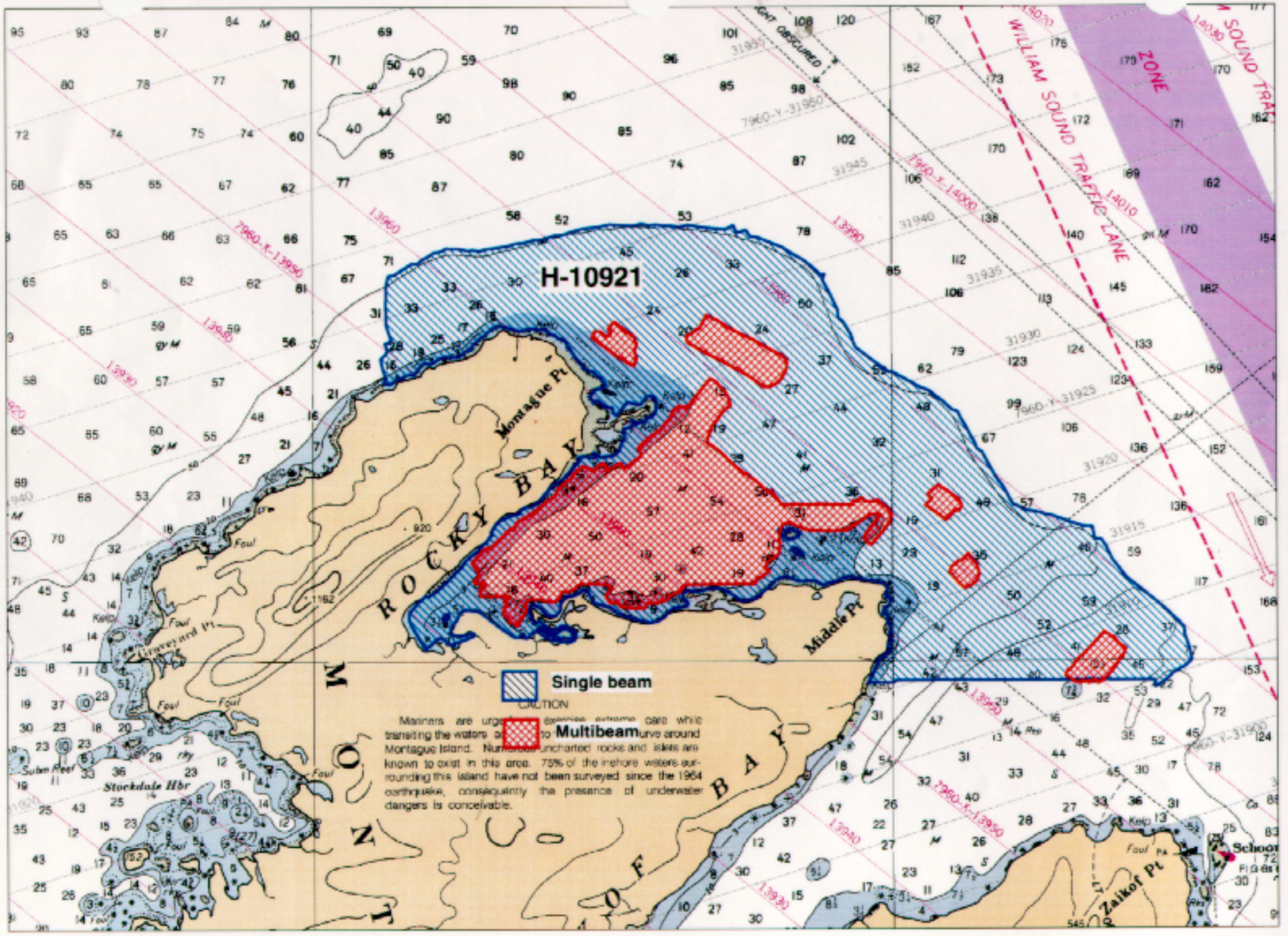
Chart 16700

NOAA Ship RAINIER
CDR Daniel R. Herlihy
Commanding

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	65.69	39.77	109.63
AWOIS Invest.	7	4	10
Other Invest.	0	0	0
LNM Multibeam	654.67	609.86	960.62
Days at Sea	17	26	17


H-10921
Montague Pt
ROCKY BAY
Middle Pt
Vineyard Pt
Stockdale Hbr
Zaikof Pt
WILLIAM SOUND TRAFFIC LANE
ZONE
Single beam
Multibeam
CAUTION
Mariners are urged to exercise extreme care while transiting the waters around Montague Island. Numerous uncharted rocks and islets are known to exist in this area. 75% of the inshore waters surrounding this island have not been surveyed since the 1964 earthquake, consequently the presence of underwater dangers is conceivable.

Descriptive Report to Accompany Hydrographic Survey H10921

Field Number RA-10-14-99
Scale 1:10,000
August-October 1999
NOAA Ship RAINIER
Chief of Party: CDR Daniel R. Herlihy, NOAA

A. PROJECT ✓

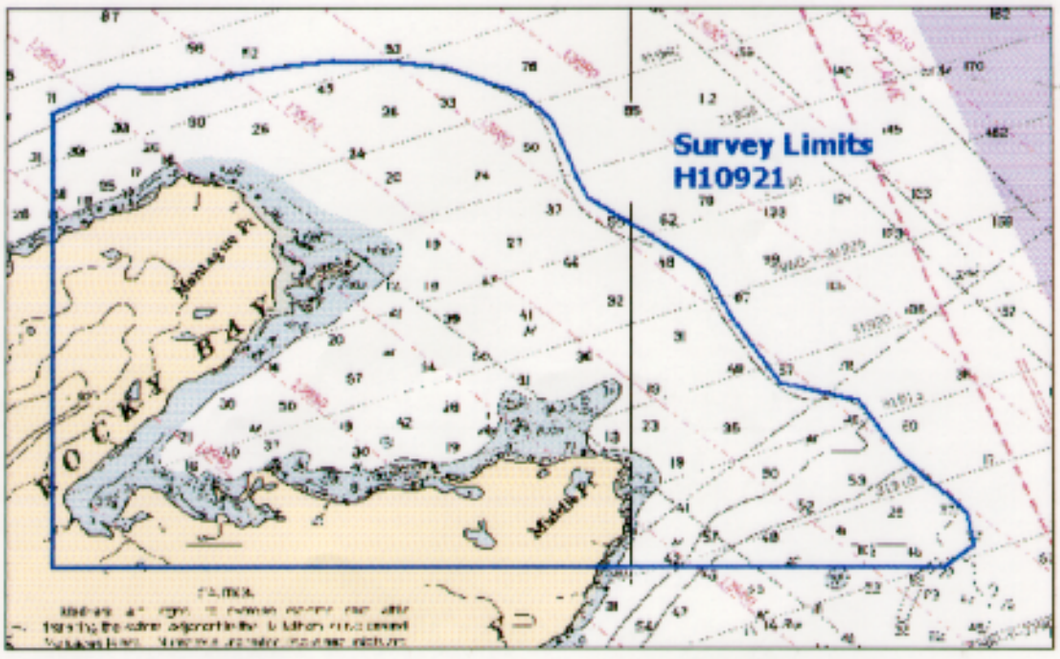
This basic hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-P139-RA-99, dated July 30, 1999, and the Draft Standing Project Instructions dated April 6, 1998. Survey H10921 corresponds to sheet AD as defined in the sheet layout. This survey will provide data to supersede prior surveys conducted in the early to mid 1900s, and will affect Charts 16700,16701 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. Concur

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

The survey area is located in and around Rocky Bay, on the northeast end of Montague Island in Prince William Sound, Alaska. The survey's northern limit is latitude 60°23'36"N and the southern limit is latitude 60°19'49"N. The survey's western limit is longitude 147°08'40"W and the eastern limit is longitude 146°54'45"W.

Data acquisition was conducted from August 11 to October 6, 1999 (DN 223 to 279). ✓



C. SURVEY VESSELS ✓

Data were acquired by the RAINIER's survey launches (vessel numbers 2121, 2122, 2123, 2124, 2125 and 2126) as noted in the Survey Information Summary included with this report. RAINIER was used to take sound velocity casts. Vessels 2122, 2124 and 2125 were used exclusively for acquisition of vertical beam echo sounder data. Vessels 2121, 2123 and 2126 were used for collection of multibeam sounding data, vertical beam echo sounder data, and sound velocity profiles. 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 vertical beam echo sounder (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 observed tides were saved in MapInfo format.

Shallow-water multibeam (SWMB) 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. In addition, all soundings beyond a maximum angle of 45° off nadir were rejected from data acquired during least-depth developments over features. Concur

After review and cleaning, depth, position and attitude data were merged with sound velocity, predicted tide and dynamic draft correctors to compute the corrected depth and position of each sounding. Processed soundings were read into a CARIS Workfile by selecting shoal-biased "line-by-line" binning at a two densities; one at 3m x 3m, the other at 1.5mm x 1.5mm 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. Predicted 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 H10921 is defined as sheet 02 in HPS. The CARIS workfile names are defined as "pws_ad_5m" for the 5-meter grid workfile and "pws_ad_15m" for the 15-meter grid workfile. The project name is identified as "P139_AD" 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. *

* Filed with the hydrographic data.

E. SONAR EQUIPMENT ✓

Side Scan Sonar (SSS) equipment was not used on this survey. concur 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 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 Instruction. This decision 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 2121, 2124 and 2125) ✓

The vertical beam echo sounders (VBES) utilized for this survey were the Raytheon DSF-6000N (VN 2122, 2124, 2125) and Knudsen 320M (VN 2121, 2123, 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, 2123 and 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 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. *

SWMB was used to develop shoal areas and acquire least depths over significant features identified during VBES data acquisition. In addition, full multibeam coverage was obtained in most of Rocky Bay, except for inshore areas less than 20-30 meters. Concur

G. CORRECTIONS TO ECHO SOUNDINGS ✓

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.

* filed with the hydrographic data.

Listings of HPS tide tables used for H10921 and tidal correctors as provided in the Project Instructions for H10921 are contained in the Survey Information Summary included with this report.

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.

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 1999
Port Chalmers	945-4511	30-day	10 August 1999	20 October 1999
Snug Harbor**	945-4662	30-day	11 August 1999	20 October 1999
Montague Island	945-4616	30-day	31 August 1999	20 October 1999

** Zaikof Point tide gage and Snug Harbor tide gage used for H-10921

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 were 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 to this report.

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. Cast information is included in the Survey Information Summary and in Appendix I. *

The sound velocity casts were acquired with SBE SEACAT Profilers (S/N 2543, 219, 2044). Calibration reports and dates are included with the Project Related Data for OPR-P139-RA-99. Velocity correctors were computed using the program VELOCWIN version 4 beta 2, which generates correction tables for both CARIS and HPS. Sound velocity correctors were applied to SWMB soundings in CARIS and to VBES soundings in HPS during post processing.

Settlement and Squat and Static Draft Correctors

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

Vessel No.	Date of Static Draft and Transducer Offset Measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2121	March 1999	OTF	March 1999	Port Angeles, WA
2122	March 1999	Rod leveling	March 1999	Port Angeles, WA
2123	March 1999	OTF	March 1999	Port Angeles, WA

* Filed with the hydrographic data.

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. *

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

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 vessels 2126 and 2123, and at Shilshole, WA, on July 7, 1999 for vessel 2121. SWMB vessel offsets, dynamic draft correctors, and system bias values are contained in CARIS Vessel Configuration Files (VCF's) and were created using the program "VCFEDIT" in CARIS. These offsets and biases are applied to the sounding data during processing in CARIS. A printout of each VCF is contained in Project Related Data for OPR-P139-RA-99, and the VCF's themselves are included with the digital HDCS data. Concur

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

The horizontal datum for this project is NAD 83. Differential GPS was the sole method of positioning. The US Coast Guard Beacons at Cape Hinchinbrook (ID# 894) and Potato Point (ID# 883) were the sources of differential correctors.

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 Project Related Data for OPR-P139-RA-99. *

I. SHORELINE See Eval Rpt., Section I

Method of Shoreline Verification

N/NGS3 supplied photogrammetric shoreline in MapInfo format for T-12662 for use as source shoreline. The T-sheet shoreline was imported into Hypack for field verification. In addition, features shown on the current editions of charts 16700, 16701, and 16709 were digitized in MapInfo by RAINIER personnel and displayed in Hypack for field verification.

* Filed with the hydrographic data.

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). In some instances however, the Navigable Area Limit Line (NALL) was used to delineate foul areas and these areas could have deeper soundings. It should be noted that in some cases, regular hydrography was conducted within the delineated foul areas. This was done at a higher state of tide, making these areas passable. Features unreachable by survey launch shown inshore of the 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

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 extents of new ledges. Four T-sheet rocks that were not found during shoreline verification are listed below.

A submerged rock** depicted at 60°20'47.19"N, 147°03'41.49"W was disproved with 100% SWMB and a 5-minute visual search in conjunction with the VBES. A depth of 34 fathoms was found in this location. Concur
** Charted as dangerous underwater rock, uncertain depth. Delete rock, chart area based on present survey.
A submerged rock** depicted at 60°20'30.62"N, 147°04'24.27"W was disproved with 100% SWMB and a 5-minute visual search in conjunction with the VBES. A depth of 5 fathoms was found in this location. Concur
** See above. Delete dangerous underwater rock. A 1.9fm sounding plots 100 meters directly west of rock. Chart as 1¾fm sndg.
A rock depicted at 60°20'35.25"N, 147°04'05.05"W was disproved with 100% SWMB and a 5-minute visual search in conjunction with the VBES. A depth of 12 fathoms was found in this location. Delete
Charted rock awash, height unknown. Chart area based on present survey.
A rock depicted at 60°20'11.37"N, 147°07'39.58"W was not located following a visual search from a distance of 50 meters. The immediate area of the rock was too shallow for safe navigation of a survey launch. Water clarity was excellent on the day of the search. Delete charted rock. Chart
*(9) located about 1 com. NE of the presently charted rock.

Recommendations

The Hydrographer recommends that the shoreline as depicted on the DP and BS plot and final sounding plots supersede and complement shoreline information compiled on the T-sheets as noted.* These revisions are recorded in the MapInfo digital files named "H10921_shoreline" and "H10921_Shoreline_Update". Concur. Shoreline verification data has been 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. Concur

There were four charted rocks that were not found during shoreline verification.

A rock charted at 60°20'10.68"N, 147°08'00.53"W on charts 16709 and 16700 was disproved with a 5-minute visual search in conjunction with the VBES. Depths in this area were approximately 1 fathom. Concur
Remove charted rock. Chart area based on present survey.

* Filed with the hydrographic data.

A pair of rocks awash charted at 60°21'27.5"N, 147°05'34.58"W on charts 16709 and 16700 were disproved with a visual search and 100% multibeam coverage. Soundings in the area are between 11 and 25 fathoms. Concur Chart area based on the present survey.

A rock awash charted at 60°21'35.23"N, 147°05'21.54"W on charts 16709 and 16700 was disproved with a visual search and 100% multibeam coverage. Depths in the vicinity are between 3 and 20 fathoms. Concur Chart area based on present survey. (A 0.0 fathom shoal was found about 100 m. inshore of the charted rock position)

A new wreck (Pos# 22707) was found on Middle Point that is not depicted on charts 16709 or 16700. The wreck is at 60°20'36.56" N, 147°00'05.62" W. It appears to have been a ship of small to moderate size and has been there for many years. It is broken and the main structure rests upon a ledge. Debris is scattered around the site and along a rocky beach to the south. The only part that is still below the high water line is one of the boilers which is approximately 5 meters in diameter and is exposed approximately 2 meters at high water. The wreck is completely exposed at low tide. Concur Wreck uncovers 3 ft Chart visible wreck at datum.

Recommendations:

The charted shoreline should be revised using the T-sheet shoreline and fieldwork notes as recorded in the MapInfo digital files named "H10921_shoreline" and "H10921_Shoreline_Update". Concur.

J. CROSSLINES

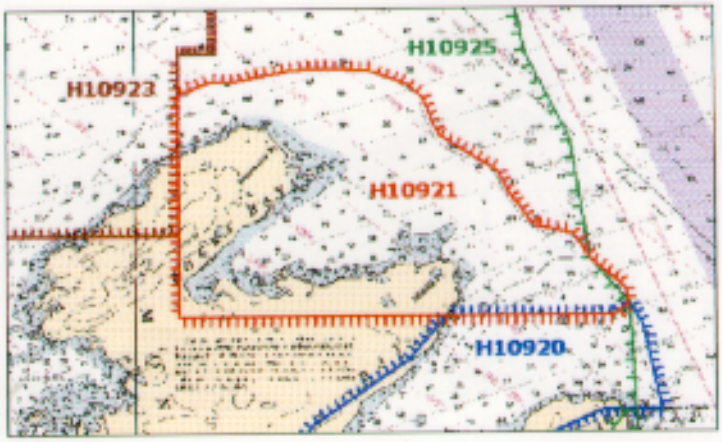
VBES crosslines totaled 29.20 nautical miles, comprising 10.2% of mainscheme hydrography. Crosslines agreed within one fathom of mainscheme hydrography.

SWMB crosslines totaled 6.22 nautical miles, comprising 7.5% of SWMB hydrography. The Quality Control Report (CARIS HIPS) for the checkline file averaged 90.20%, with a depth tolerance of 0.023. See Appendix E* for the detailed report.

K. JUNCTIONS (See evhc rpt., Sec. L)

The following contemporary surveys junction with H10921:

Registry #	Scale	Date	Junction side
H10920	1:10,000	1999	Southeast
H10923	1:10,000	1999	West
H10925	1:40,000	1999	North/Northeast



* Filed with the hydrographic data.

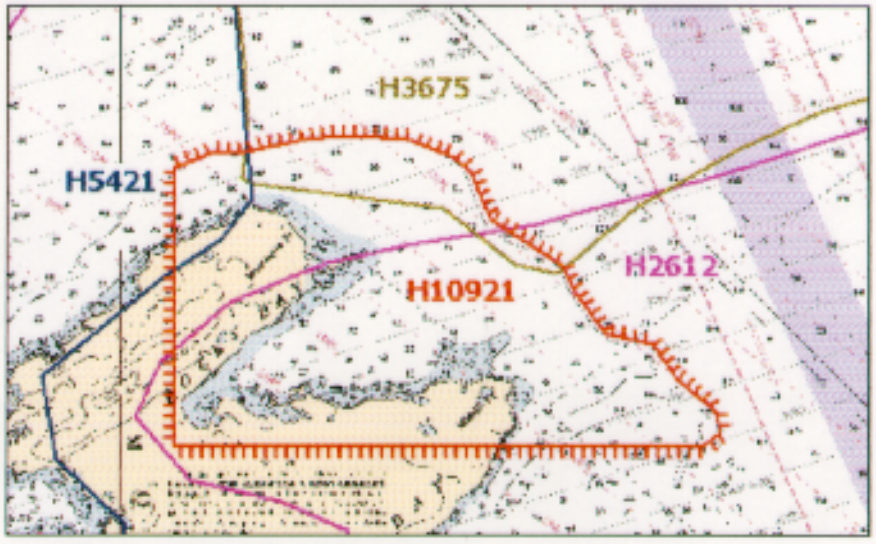
All junction surveys compared well, generally within than 1 fathom of soundings from H10921. Concur

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

L. COMPARISON WITH PRIOR SURVEYS (See EVAL Rpt., Sec. M)

The following prior surveys share common area with survey H10921:

Registry #	Scale	Date	Area covered
H5421 ✓	1:20,000	1933	Northeast corner
H2612 ✓	1:40,000	1902	Southeast
H3675 ✓	1:80,000	1914	North



Prior survey H-2612 covers the southeast portion of H10921. In some areas the current survey soundings agreed fairly well with H-2612, generally within 1-2 fathoms. However, in select areas soundings were both shoaler and deeper than H-2612. Current soundings close to shore were generally 2-3 fathoms shoaler than H-2612. Also, there were several soundings in deeper water that varied from H-2612. For instance, at position 60°21'56.47"N, 147°03'15.53"W, H-2612 depicts a sounding of 26 fathoms, whereas H10921 revealed a 36-fathom soundingsin the same location. At 60°20'06.69"N, 146°58'54.93"W, H-2612 depicts a 57-fathom sounding, whereas H10921 reveals a 47-fathom soundings. These two examples were the extremes and other soundings differed to a lesser amount. Concur

Prior survey H-3675 covers the northern portion of H10921, where soundings agreed generally within 1-2 fathoms. However, in some areas soundings from H-3675 did not agree with H10921. For instance, at position 60°22'19.85"N, 147°01'51.42"W, H3675 depicts a sounding of 27 fathoms, whereas the current survey revealed a depth of 40 fathoms. Also, at position 60°22'31.09"N, 147°00'12.95"W, H3675 depicts a 55-fathom sounding, whereas H10921 found a 47-fathom soundings.Again these two examples were the extremes. Concur

Prior survey H-5421 covers the northwest portion of H10921 up to Montague Point. The current soundings agree well with the soundings from H-5421, generally within 1 fathom. The exception is just

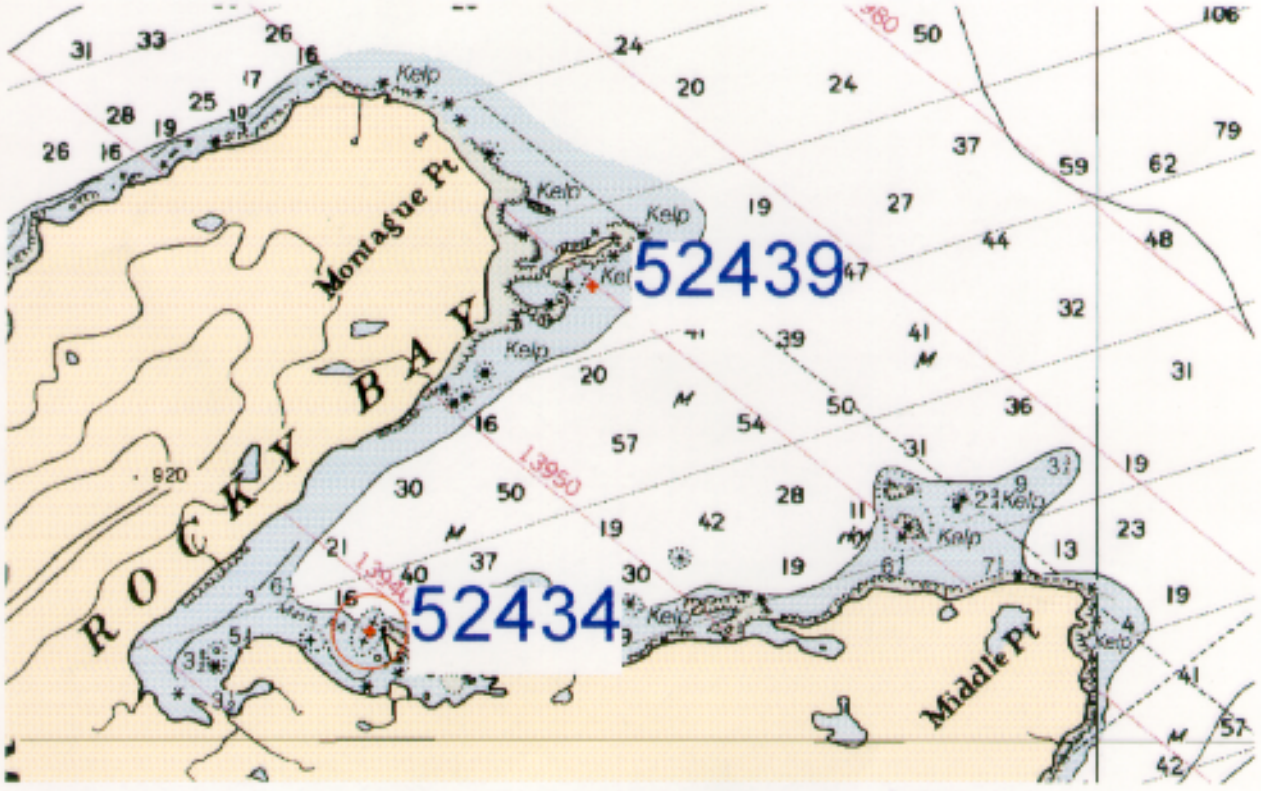
off of Montague Point, where current soundings reveal a slope at the sounding limit for H-5421. In this location, the current soundings are 2-3 fathoms deeper than the prior survey. Concur.

Differences between H10921 and prior surveys are likely due to increased coverage and positioning accuracy from modern survey equipment, as well as possible changes to the seafloor caused by the earthquake of 1964. Concur

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

M. ITEM INVESTIGATIONS ✓

(2)
There were two Automated Wreck and Obstruction Information System (AWOIS) items investigated within the survey area.

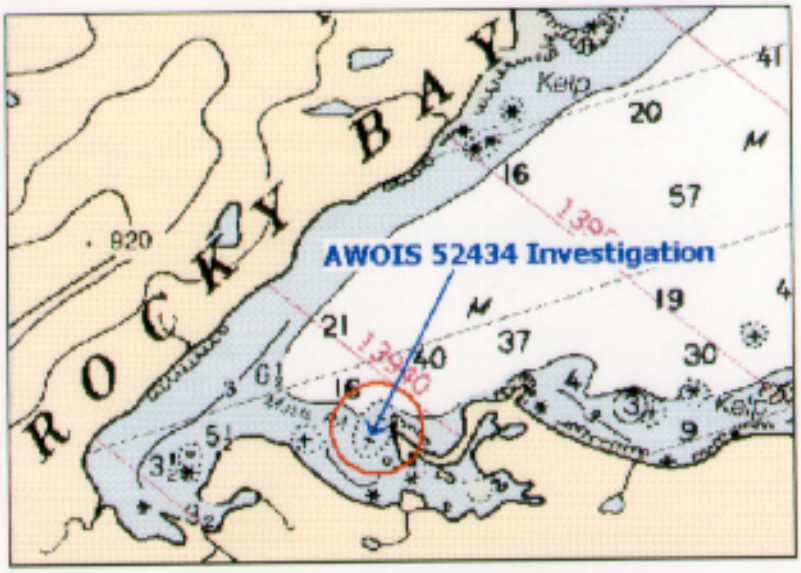


AWOIS item locations within the limits of H10921

AWOIS 52434

1. **Area of Investigation:**

AWOIS Number:	52434 ✓
State and Locality:	Rocky Bay, AK
Reported Position:	Latitude: 60/20/27.91N ✓
	Longitude: 147/06/22.27W ✓
	Datum: NAD83
Type of Feature:	Obstruction
Reported Depth:	None



2. **Description and Source of Item:**

CL184/80---The 83-ft pilot vessel "Blue Moon" sunk in pos. Lat60-20-30N, Long. 147-06-15W,NAD 83. The vessel is on a shoal and could possibly move. Entered 6/98 MCR. NM6/80—Summary of CL184/80 W/O vessel name.

3. **Survey Requirements:** Visual search, echo sounder, multibeam, and salvage documents. Search radius is 300 meters

4. **Method of Investigation:** Area was very shoal (Shallow) and was therefore investigated with VBES at 10-meter line spacing, supplemented with a 10-minute visual search.

5. **Results of Investigation:** The investigation revealed no evidence of the wreck.

6. **Comparison with Prior Surveys:** This wreck is not depicted on any prior survey.

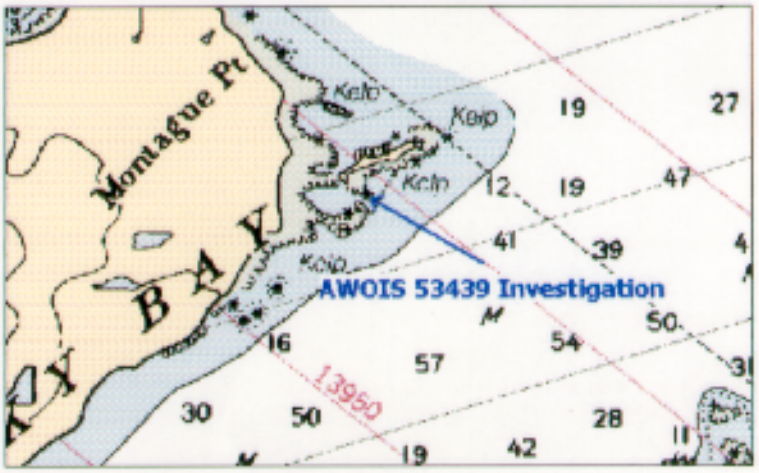
7. **Comparison with the Chart and Charting Recommendation:** Compared with chart 16709 (21st Ed.; June 29, 1996, 1:80,000) and Chart 16700 (26th Ed.; September 19, 1998, 1:200,000). The charts show a wreck with masts showing at this location.

The Hydrographer recommends removing the wreck from the chart. Concur.

AWOIS 52439 ✓

1. **Area of Investigation:**

AWOIS Number:	52439 ✓
State and Locality:	Rocky Bay, AK
Reported Position:	Latitude: 60/21/57.93N ✓
	Longitude: 147/04/25.34W ✓
	Datum: NAD83
Type of Feature:	Wreck
Reported Depth:	None



2. **Description and Source of Item:**

History***Item is not on NOS charts
Description
25(#36800) Chilkooe, sunk 6/5/49, GT 41, Pos. Lat. 60-22-00N, Long. 147-04-18W(NAD 27, No description given.

3. **Survey Requirements:** Information

4. **Method of Investigation:** 10-minute visual search including using VBES.

5. **Results of Investigation:** There were no visual signs of the wreck and depths in the area were 1-2 fathoms, however the proximity to a ledge prohibited much of the fathometer search.

6. **Comparison with Prior Surveys:** There was no wreck depicted on the prior surveys. All prior surveys predate the wreck.

7. **Comparison with the Chart and Charting Recommendation:** Compared with chart 16709 (21st Ed.; June 29, 1996, 1:80,000) and Chart 16700 (26th Ed.; September 19, 1998, 1:200,000). The charts do not show a wreck at this location. The Hydrographer does not recommend any changes to the charts. Concur. Chart area based on the present survey. It is recommended that this item be resolved for AWOIS file purposes.

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

Survey H10921 was compared with chart 16709 (21st Ed.; June 29, 1996, 1:80,000), chart 16700 (26th Ed.; September 19, 1998, 1:200,000), and chart 16701 (17th Ed.; July 25, 1998, 1:81,436).

Chart 16709 was found to be in fair agreement only northeast of Montegue Point. Soundings in this area were 1-3 fathoms shoaler than the chart. Elsewhere, the current soundings did not compare to the chart with any consistent trend. For instance, in the vicinity of a charted 40-fathom sounding at 60°20'41.43"N, 147°06'01.25"W, the present survey revealed a depth of 18.9 fathoms. In the vicinity of a charted 16-fathom sounding at 60°21'20.8"N, 147°05'22.96"W, the present survey revealed a depth of 42 fathoms. Both areas were close to shore and covered by 100% SWMB. These two examples were the extremes and other soundings differed to a lesser degree. A charted 3-fathom shoal at 60°20'32.05" N, 147°04'30.94" W was found to have soundings over six fathoms within its depicted area. However, 200 meters to the northwest, there was a new shoal area discovered that had a minimum depth of 0.3 fathom. Both of these areas were covered with 100% multibeam. Concur Also, a 1.9 fathom sounding was found within 100 meters South of the charted depth.
Chart 16700 also did not agree well with H10921. For instance, in the vicinity of a charted 19-fathom sounding at 60°20'43.21"N, 147°02'40.46"W, the present survey revealed a depth of 8.1 fathoms. Also, in the vicinity of a charted 29-fathom sounding at 60°20'13.15"N, 147°55'52.4"W, the present survey revealed a depth of 39 fathoms. These two examples were extremes and other soundings differed to a lesser degree, while a few were in agreement with the chart. Additionally, several new shoal soundings less than 10 fathoms were located offshore of the charted 10-fathom curve, especially along the southern shore of Rocky Bay. Concur .

Chart 16701 was found to be in fair agreement with current soundings, generally 1 fathom shoaler than the chart. Notable differences are listed below.

In the vicinity of a charted 17-fathom sounding at 60°22'53.95"N, 147°07'22.13"W, the present survey revealed a depth of 19 fathoms. This area is close to shore and was covered by VBES with 50-meter line spacing. Concur

In the vicinity of a charted 25-fathom sounding at 60°22'47.11"N, 147°07'48.7"W, the present survey revealed a depth of 20 fathoms. This area is close to shore and was covered by VBES with 50-meter line spacing. Concur

In the vicinity of a charted 16-fathom sounding at 60°23'0.19"N, 147°06'55.68"W, the present survey revealed a depth of 22 fathoms. This area is close to shore and was covered by VBES with 50-meter line spacing. Concur 20.1

The differences* in soundings are likely due to increased coverage and positioning accuracy from modern survey equipment, as well as possible changes caused by the 1964 earthquake. Concur .
* Differences are also attributed to visual positioning methods and leadline measurements.

Dangers to Navigation

Thirteen Dangers to Navigation were found and reported to the Seventeenth Coast Guard District on November 16, 1999.

A shoal depth of 1 fathom was discovered at 60°22'41.52"N, 147°04'38.15"W, in an area without charted soundings, although it is seaward of the charted 10-fathom curve.

A shoal depth of 10.7 fathoms was discovered at 60°22'45.87"N, 147°03'02.32"W, in an area without charted soundings, although it is seaward of the charted 10-fathom curve.

A shoal depth of 8.7 fathoms was discovered at 60°22'30.5"N, 147°02'17.96"W, in an area without charted soundings, although it is seaward of the charted 10-fathom curve.

A shoal depth of 8.2 fathoms was discovered at 60°22'03.41"N, 147°03'22.59"W, in an area without charted soundings, although it is seaward of the charted 10-fathom curve.

A shoal depth of 0.4 fathoms was discovered at 60°~~22'41.52~~ 20'33.46"N, 147°~~04'38.15~~ 06'28.00"W, in the area of a 16-fathom charted sounding.

A shoal depth of 9.4 fathoms was discovered at 60°20'37.08"N, 147°06'07.38"W, in the proximity of a 40-fathom charted sounding.

A shoal depth of 4.6 fathoms was discovered at 60°20'41.79"N, 147°05'20.78"W, in the proximity of a 37-fathom charted sounding. This reported depth is about 200 m. NE of a 1.1 fathom shoal sounding located during the survey.

A shoal depth of 7.6 fathoms was discovered at 60°20'43.31"N, 147°02'35.67"W, near a 19-fathom charted sounding.

A shoal depth of 5.8 fathoms was discovered at 60°20'59.24"N, 147°02'06.28"W, at the position of an 11-fathom charted sounding.

A shoal depth of 6.4 fathoms was discovered at 60°21'14.78"N, 147°01'43.75"W, near a 31-fathom charted sounding.

A submerged rock* with a least depth of 0.4 fathoms was discovered at 60°21'14.51"N, 147°00'17.69"W, near a 3 ¾-fathom charted sounding. * CoV 1FT based on approved tides.

A shoal depth of 7.1 fathoms was discovered at 60°20'45.07"N, 146°59'45.44"W, in an area without charted soundings, although it is seaward of the charted 10-fathom curve.

A shoal depth of 7 fathoms was discovered at 60°20'14.49"N, 146°59'45.07"W, in an area without charted soundings.

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

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

Survey H10921 is complete and adequate to supersede charted soundings and features in their common areas. Concur.

P. AIDS TO NAVIGATION ✓

There were no aids to navigation located within the limits of survey H10921. Concur.

Q. STATISTICS ✓

Refer to the Survey Information Summary included with 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.

During survey work, the only observed traffic within the survey limits were commercial fishing vessels and tug and barge combinations transiting outside Rock Bay. The western most part of Rocky Bay was the only observed anchorage location.

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-99 1999 Coast Pilot Report	TBD	N/CS26
Project Related Data for OPR-P139-RA-99	December, 1999	N/CS34

Respectfully Submitted,

Bradley H Fritzler
Ensign, NOAA

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: AD
Registry Number: H10921
Sheet Number: RA-10-14-99

Survey Title: Rocky Bay
Data Acquisition Dates: **From:** 11-Aug-99 223 **To:** 06-Oct-99 279

Vessel Usage Summary

VESNO	MS	SPLITS	XL	S/L	DP	BS	SWMB	DIVE
2121	2		2				2	
2122	3	4		1	3			
2123	2	1					3	
2124	3	2		2	2			
2125	2	1				2		
2126							3	

Sound Velocity Cast Information

Cast	Vessel	Day Applicable	Depth (m)	Latitude	Longitude
99237164	2126	237	110.7	60/22/36 N	147/00/51 W
99237211	2126	237	148.7	60/21/21 N	147/03/58 W
99243174	2126	243	82.7	60/21/14 N	147/05/29 W
99243205	2126	243	87.5	60/21/42N	147/02/53 W
99250170	2121	250	105.9	60/20/02 N	146/57/31 W
99264170	2121	264	110.9	60/20/02 N	146/58/14 W
99279231	2123	279	120.2	60/21/02 N	147/05/30 W
99284223	2126	284	103.1	60/16/42 N	147/33/43 W

Cast	Vessel	Day Applicable	Depth (m)	Latitude	Longitude
99224191	2124	223	135.8	60/21/16 N	147/04/39 W
99236165	2120	236	122.5	60/20/20 N	146/57/00 W
99254174	2120	254	209.1	60/24/30 N	147/07/10 W

HPS #
1
3
6

Tide Zone Information

Zone #	Time Corr.	Height Corr.
PWS08	-00 hr 06 min	0.95
PWS09	-00 hr 06 min	0.92
PWS10	-00 hr 06 min	0.90

Tide Gage Information

Tide Gauge #	Gauge Name	Installed	Removed
945-4616	Montague Island	36403	36453
945-4662	Snug Harbor	36383	36447
945-4411	Zaikof Point	36382	36447
945-4511	Port Chalmers	36382	36453

Statistics Summary

Type	Total
BS	22.00
DP	38.00
MS	257.99
S/L	15.84
SPLIT	101.01
SWMB	82.98
XL	29.20

Percent XL	11%
SQNM	18.34

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

November 16, 1999

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

ADVANCE INFORMATION

Dear CDR Hamblett:

It is requested that the following dangers to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned these features while conducting hydrographic survey H10921 in Prince William Sound, Alaska, in August – October 1999. The dangers are shown graphically on the attached chartlet.

The following dangers to navigation affect chart Chart 16709 (21th Ed.; June 29, 1996, 1:80,000), Chart 16700 (26th Ed.; September 19, 1998, 1:200,000), and Chart 16701 (17th Ed.; July 25, 1998, 1:81,436). 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	0.2	60°21'14.51"	147°00'17.69"	0.4
Shoal	0.4	60°22'41.52"	147°04'38.15"	0.7
Shoal	1	60°22'41.52"	147°04'38.15"	1.9
Shoal	4.6	60°20'41.79"	147°05'20.78"	8.5
Shoal	5.8	60°20'59.24"	147°02'06.28"	10.7
Shoal	6.4	60°21'14.78"	147°01'43.75"	11.7
Shoal	7	60°20'14.49"	146°59'45.07"	12.9
Shoal	7.1	60°20'45.07"	146°59'45.44"	13.1
Shoal	7.6	60°20'43.31"	147°02'35.67"	14
Shoal	8.2	60°22'03.41"	147°03'22.59"	15
Shoal	8.7	60°22'30.50"	147°02'17.96"	15.9
Shoal	9.4	60°20'37.08"	147°06'07.38"	17.2
Shoal	10.7	60°22'45.87"	147°03'02.32"	19.7

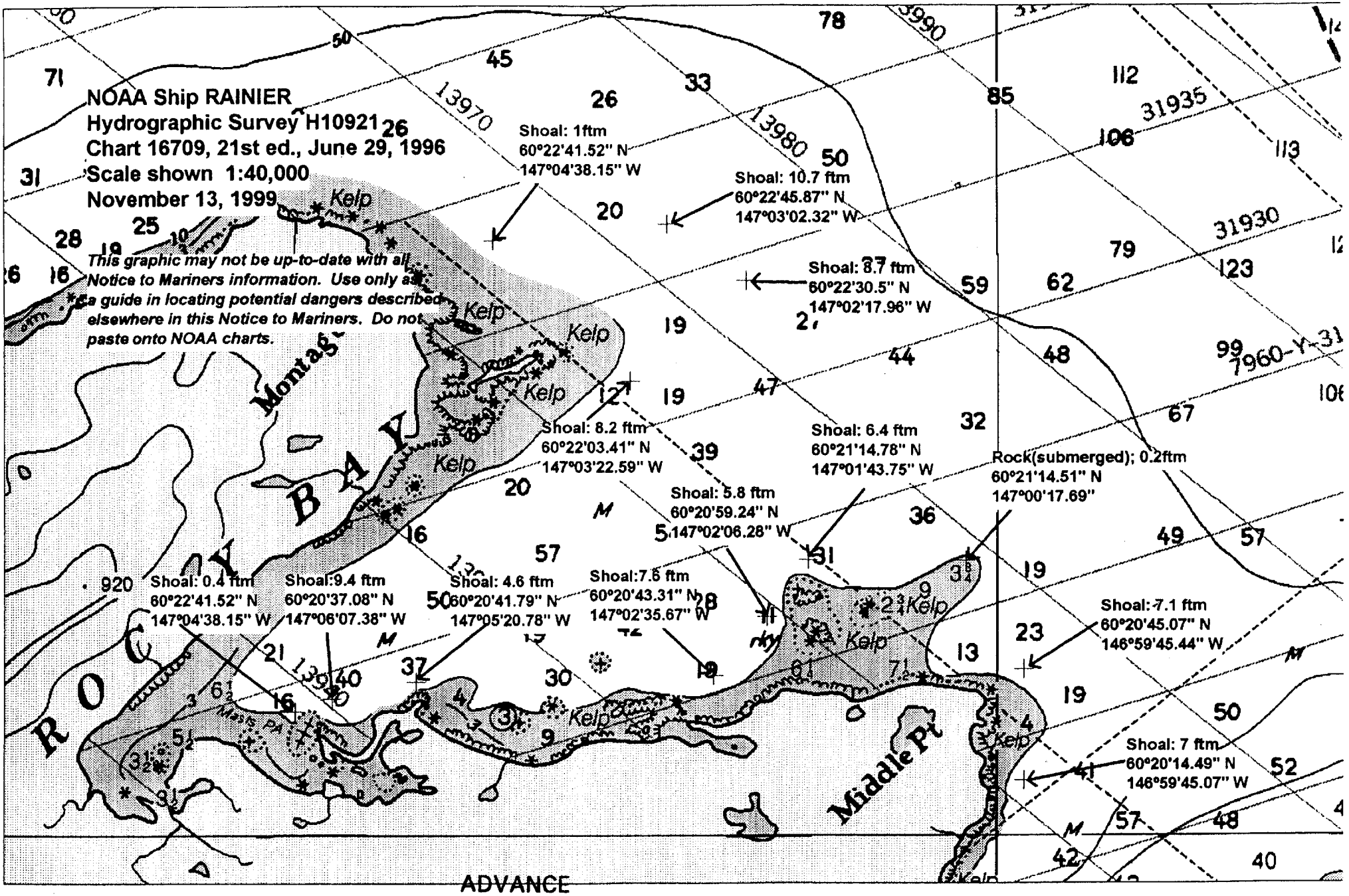
This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Branch, (206) 526-6835. Refer to survey project OPR-P139-RA-99 and Danger to Navigation message RA-19-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

Sincerely,

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Attachment

cc: NIMA
PMC
N/CS261
N/CS34



ADVANCE
INFORMATION

APPROVAL SHEET

for

H10921

RA-10-14-99

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

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10921

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
MONTAGUE POINT	X		X							5
ROCKY BAY	X		X							6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20
										21
										22
										23
										24
										25

Approved

Dennis J. Romesburg

Chief, Cartographer

MAR 15 2000

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-10921

LOCALITY: Southwest Prince William Sound, AK

TIME PERIOD: August 11 - October 6, 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: 945-4662 Snug Harbor
Lat. 60° 14.4'N Lon. 147° 43.2'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.218 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: PWS47, PWS52, PWS53 & PWS54.

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 K. Neu 5/16/00

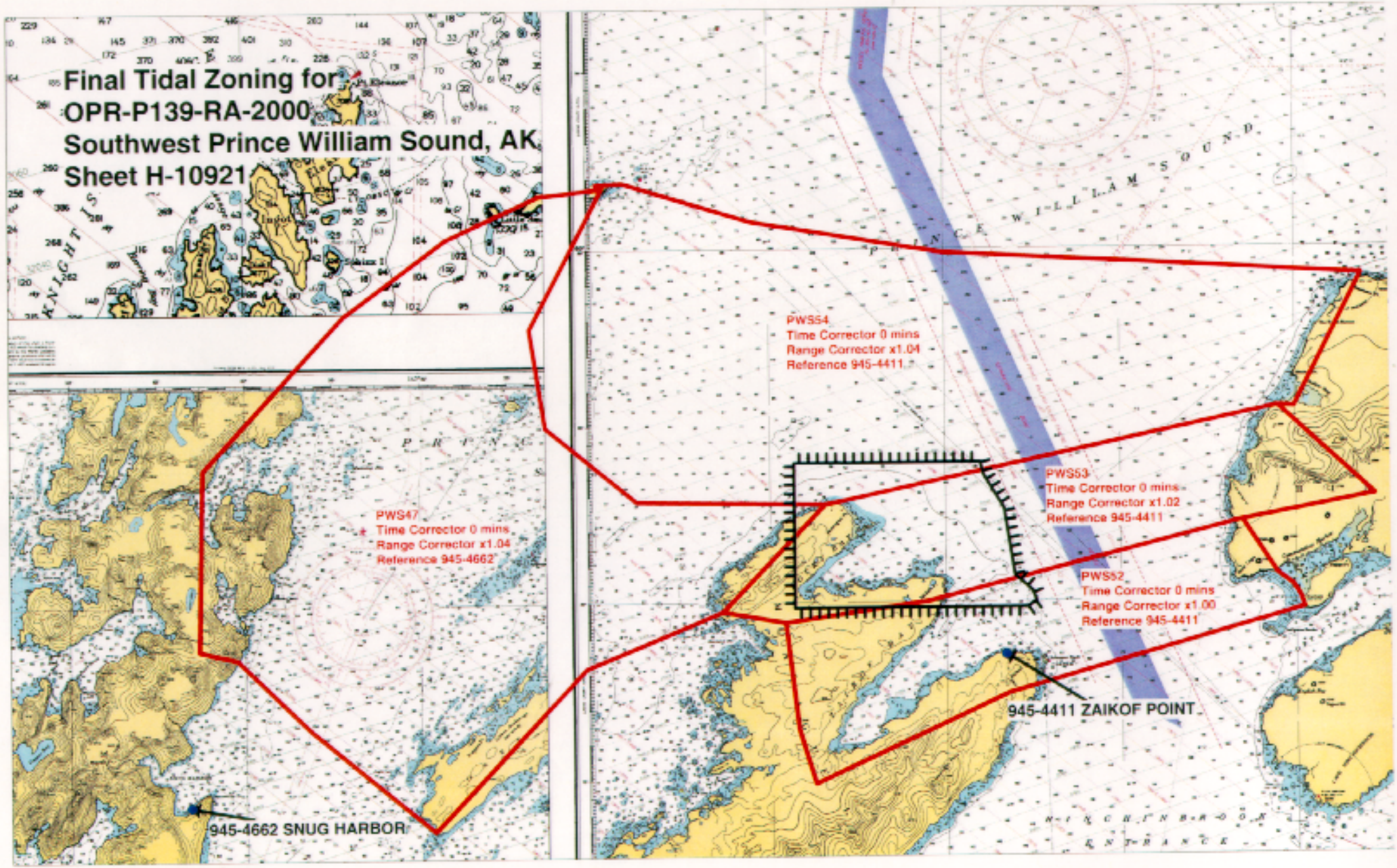
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-P139-RA-99,
Sheet H-10921.

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 PWS47			
-147.385584 60.525438	945-4662	0	1.04
-147.474011 60.505541	945-4411	0	1.04
-147.572046 60.469896			
-147.706768 60.397587			
-147.710815 60.312655			
-147.674795 60.308452			
-147.604351 60.274729			
-147.487763 60.226861			
-147.343216 60.302686			
-147.212948 60.329021			
-147.115049 60.379232			
-147.294086 60.380883			
-147.38032 60.416307			
-147.394959 60.462944			
-147.324788 60.528831			
-147.385584 60.525438			
Zone PWS52			
-147.017466 60.333488	945-4411	0	1.00
-147.15325 60.323765			
-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			
Zone PWS53			

-146.683522 60.424393	945-4411	0	1.02
-146.591692 60.382398			
-146.717804 60.370613			
-147.017466 60.333488			
-147.15325 60.323765			
-147.212948 60.329021			
-147.115049 60.379232			
-146.683522 60.424393			
Zone PWS54			
-147.324788 60.528831	945-4411	0	1.04
-147.394959 60.462944			
-147.38032 60.416307			
-147.294086 60.380883			
-147.115049 60.379232			
-146.683522 60.424393			
-146.667982 60.423944			
-146.603222 60.486673			
-146.751935 60.491074			
-147.002014 60.497978			
-147.183429 60.512725			
-147.305728 60.531336			
-147.330451 60.530561			
-147.324788 60.528831			


Final Tidal Zoning for
OPR-P139-RA-2000
Southwest Prince William Sound, AK
Sheet H-10921
PWS54
Time Corrector 0 mins
Range Corrector x1.04
Reference 945-4411
PWS53
Time Corrector 0 mins
Range Corrector x1.02
Reference 945-4411
PWS52
Time Corrector 0 mins
Range Corrector x1.00
Reference 945-4411
PWS47
Time Corrector 0 mins
Range Corrector x1.04
Reference 945-4662
945-4662 SNUG HARBOR
945-4411 ZAIKOF POINT

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

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: H-10921

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	N/A
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	N/A

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

SHORELINE DATA

SHORELINE MAPS (List): T-12662

PHOTOBATHYMETRIC MAPS (List): None

NOTES TO THE HYDROGRAPHER (List): None

SPECIAL REPORTS (List): None

NAUTICAL CHARTS (List) 16700,26th Ed., Sept 19,1998;16701,17th Ed.,July 25,1998,16709,21st 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	AMOUNTS EVALUATION	AMOUNTS TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			

	TIME-HOURS VERIFICATION	TIME-HOURS EVALUATION	TIME-HOURS 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	183.0		183.0
COMPARISON WITH PRIOR SURVEYS AND CHARTS		22.0	22.0
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		26.0	26.0
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		41.0	41.0
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	183.0	89.0	272.0

Pre-processing Examination by R.Davies	Beginning Date 1/10/00	Ending Date 1/11/00
Verification of Field Data by E.Domingo,I.Almacen,R.Davies,G.Nelson,R.Mayor,M.Bigelow	Time (Hours) 183.0	Ending Date 9/11/00
Verification Check by B. Olmstead	Time (Hours) 10	Ending Date 11/29/2000
Evaluation and Analysis by I.Almacen	Time (Hours) 48.0	Ending Date 10/3/00
Inspection by B. Olmstead	Time (Hours) 6	Ending Date 12/4/2000

☆ U.S. GOVT. PRINTING OFFICE 1983: 764-006/6061

EVALUATION REPORT
H-10921

A. PROJECT
Project information is adequately discussed in the hydrographer's report.

B. AREA SURVEYED
The survey area is adequately described in the hydrographer's report A page-size plot of the charted area depicting the specific limits of supersession accompanies this report as Attachment 1.

The bottom consists mainly of mud, sand and pebbles mixed with corals and broken shells. Depths range from 0 to 89.0 fathoms.

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING
The acquisition and processing of data in the field has been adequately discussed in the hydrographer's report.

Office processing of survey data was conducted using the same Computer Aided Resource Information System (CARIS), and Hydrographic Processing System (HPS) used by the hydrographer. The smooth sheet was compiled with MicroStation 95.

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

The drawing files necessarily contain information that is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

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

E. SONAR EQUIPMENT
Side scan sonar was not utilized during this survey.

F. SOUNDING EQUIPMENT
Sounding equipment has been adequately discussed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS
Soundings and elevations of features have been reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW), with approved tide correctors obtained from the Center For Operational Oceanographic Products and Services. The approved tide correctors are zoned from Zaikof, Alaska, gage 945-4411 and Snug Harbor, gage 945-4662.

Other sounding reducers include corrections for static draft, dynamic draft, sound velocity, heave, roll and pitch. These reducers have been reviewed and are consistent with NOS specification.

H. CONTROL STATIONS

Section H of the hydrographer's report contain information concerning horizontal control and hydrographic positioning .

The positions of horizontal control stations used during hydrographic operations are published values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -2.081 seconds (-64. 414 meters)
Longitude: 7.293 seconds (111.797 meters)

I. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control has been adequately discussed in the hydrographer's report.

Differential GPS (DGPS) was used to control this survey. In the event that the differential GPS corrector signal is lost, a switch to P-Code is made automatically by the Trimble receiver. Although P-Code accuracy is less than DGPS at 0.5 or better it is sufficient for a survey of 1:40,000 scale. The satellite configuration, as indicated by HDOP and number of satellites, is monitored visually on the IDSSS and Trimble displays, and data are not collected when HDOP exceeds 3.75 for this survey. The maximum (HDOP) allowable limit has not been exceeded during this survey and the quality of data obtained is good. DGPS performance checks were conducted in the field and found adequate.

NAD 83 is used as the horizontal datum for plotting and position computations.

Additional information concerning specific control system type, calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and correction to position data.

J. SHORELINE

A digitized 1:10,000 scale registered topographic manuscript T-12662 on NAD 83 datum was used during this survey. The digitized shoreline file and the survey file were merged during Microstation processing.

The shoreline map and the results of the fieldwork as portrayed on the smooth sheet should supersede the presently charted shoreline.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10921 junctions with the following surveys .

Survey	Year	Scale	Area
H-10920	1999	1:10,000	Southern Limit
H-10923	1999	1:10,000	Northwestern Limit
H-10925	1999	1:40,000	Northeastern Limit

The junctions with surveys H-10920, H-10923 and H-10925 are complete and "Joins" notes have been added to the smooth sheet where applicable. A few soundings from the junction surveys have been transferred to the present survey to delineate the bottom configuration within the common area.

M. COMPARISON WITH PRIOR SURVEYS

Survey	Year	Scale	Datum
H-2612	1902-12	1:40,000	VALDEZ

H-3675	1914	1:80,000	VALDEZ
H-5421	1933	1:20,000	VALDEZ

Prior surveys H-2612, H-3675 and H-5421 cover the area of the present survey with the exception of a small portion of the near shore area off Montague Point where no survey had ever since been undertaken. The present survey was compared to a digital copy of the above listed prior surveys. The legibility of the prior survey digital image files is considered acceptable and they were adequately registered to the present survey smooth sheet. The plotted soundings and other related features on the prior smooth sheets are legible

Comparison with the above listed prior surveys reveal satisfactory agreement. The soundings generally differ by about 1 to 3 fathoms except around the area of the shoals noted during this survey and those reported as dangers to navigation. These differences may be attributed to greater sounding coverage and positioning accuracy from modern surveying instruments presently used in the field as well as the possible changes caused by the shifting of the ocean floor due to earthquakes. An adequate coverage of the survey area was accomplished utilizing both the shallow water multibeam (SWMB) system and the standard vertical beam echo sounding system (VBES).

In accordance with the Hydrographic 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 depths of water and the difference in data acquisition methods, no reasonable adjustment value for prior soundings could be ascertained.

Survey H-10921 is adequate to supersede the prior surveys within the area of common coverage.

N. ITEM INVESTIGATIONS

AWOIS items 52434 and 52439 were investigated during this survey. The disposition of these features is adequately addressed in section M of the hydrographer's report.

O. COMPARISON WITH CHART

Survey H-10921 was compared with the following charts.

Chart	Edition	Date	Scale	Datum
16700	26th	Sept. 19, 1998	1:200,000	NAD 83
16701	17th	July 25, 1998	1:81,436	NAD 83
16709	21st	June 29, 1996	1:80,000	NAD 83

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys 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 charted 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. Features from survey H-10921 have been generalize on chart 16709 along the high water line where applicable.

Charted shoreline changes were noted during this survey. A few charted rocks were identified in the field as part of the reefs and high point or extension of the newly located ledges.

The charted caution to mariners transiting the waters adjacent to the 10-fathom curve around Montague and Green Islands should be retained until such time when the entire area is adequately surveyed and the latest information applied to the current edition of the chart.

Survey H-10921 is adequate to supersede charted hydrography within the common area.

b. Dangers to navigation

Thirteen (13) dangers to navigation (DTON) were discovered during this survey and reported to the USCG, NIMA, N/CS261 and N/CS3 on November 16, 1999. A copy of this report is attached. No additional dangers were found during office processing.

P. ADEQUACY OF SURVEY

The hydrography contained on survey H-10921 is adequate to:

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

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

Q. AIDS TO NAVIGATION

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

There were no features of landmark value found within the area of this survey.

R. STATISTICS

Statistics are adequately itemized in the hydrographer's report.

S. MISCELLANEOUS

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

T. RECOMMENDATIONS

Survey H-10921 is a good hydrographic survey. No additional work is recommended.

U. REFERRAL TO REPORTS

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

Isagani A. Almacen
Cartographer

APPROVAL SHEET
H-10921

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.

Bruce A Olmstead for Dennis Hill Date: 12/5/2000
Supervisory Cartographer
Pacific Hydrographic Branch

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

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

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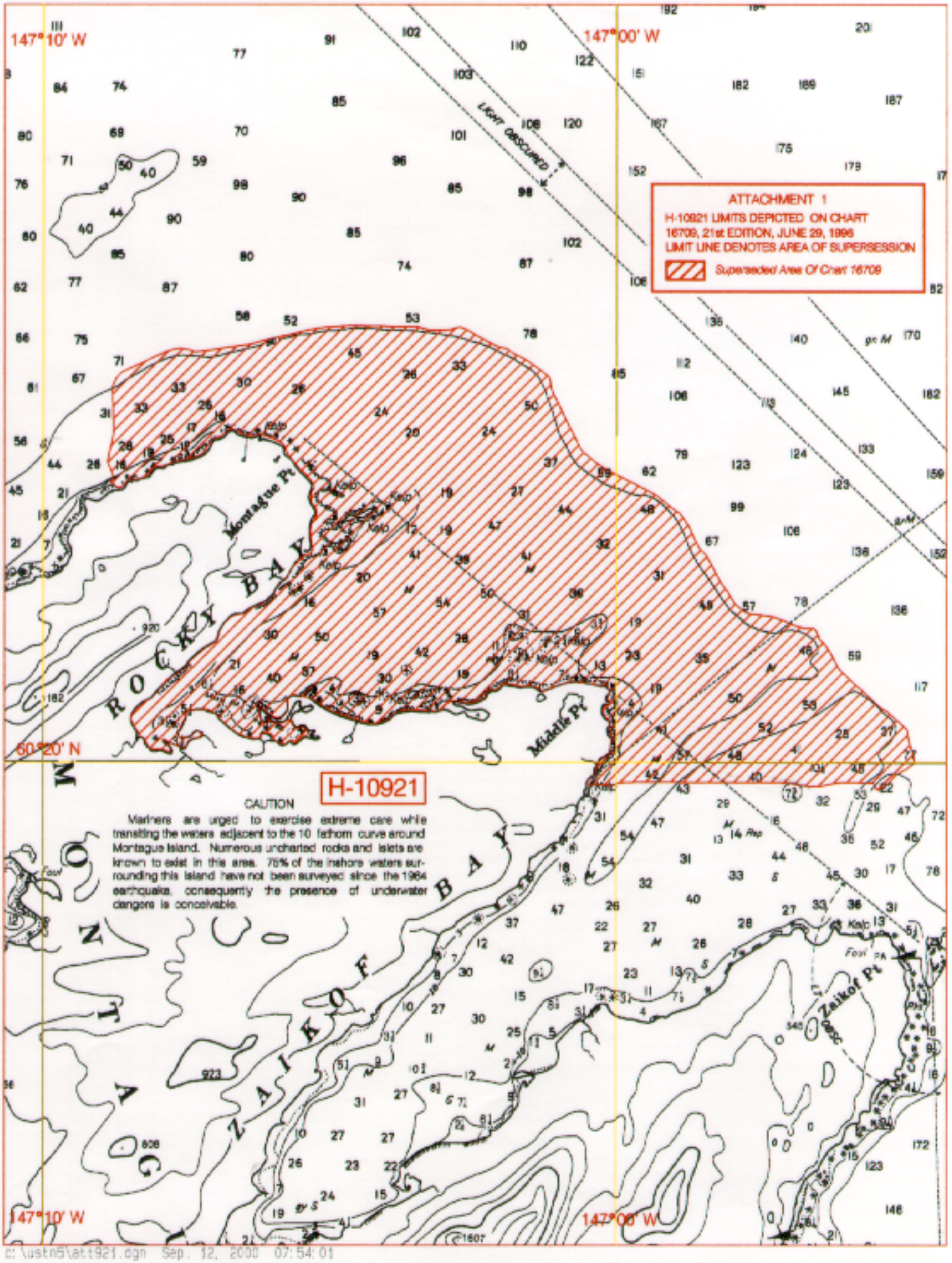
Final Approval

Approved:

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



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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-10321

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	9/14/00	[illegible]	Full ~~Part~~ ~~Before~~ After Marine Center Approval Signed Via Full application of
			Drawing No. soundings [illegible] features from the smooth sheet.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED