H10923

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-10-18-99

Registry No. H-10923

LOCALITY

State Alaska

General Locality Southwest Prince William Sound

Sublocality Northwest of Montague Point

1999

CHIEF OF PARTY

Commander Daniel R. Herlihy, NOAA

LIBRARY & ARCHIVES

DATE JAN 31 2001

NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.: H-10923

FIELD NO.: RA-10-18-99

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: Northwest of Montague Point

Scale: 1:10,000 Date of survey: 8/15/99 - 8/27/99

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

Vessel: NOAA Ship RAINIER, RA-1(2121), RA-5(2125)

Chief of party: CDR Daniel R. Herlihy, NOAA

Surveyed by: RAINIER Personnel

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

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, R. Davies, G. Nelson, R. Mayor, B. Mihailov

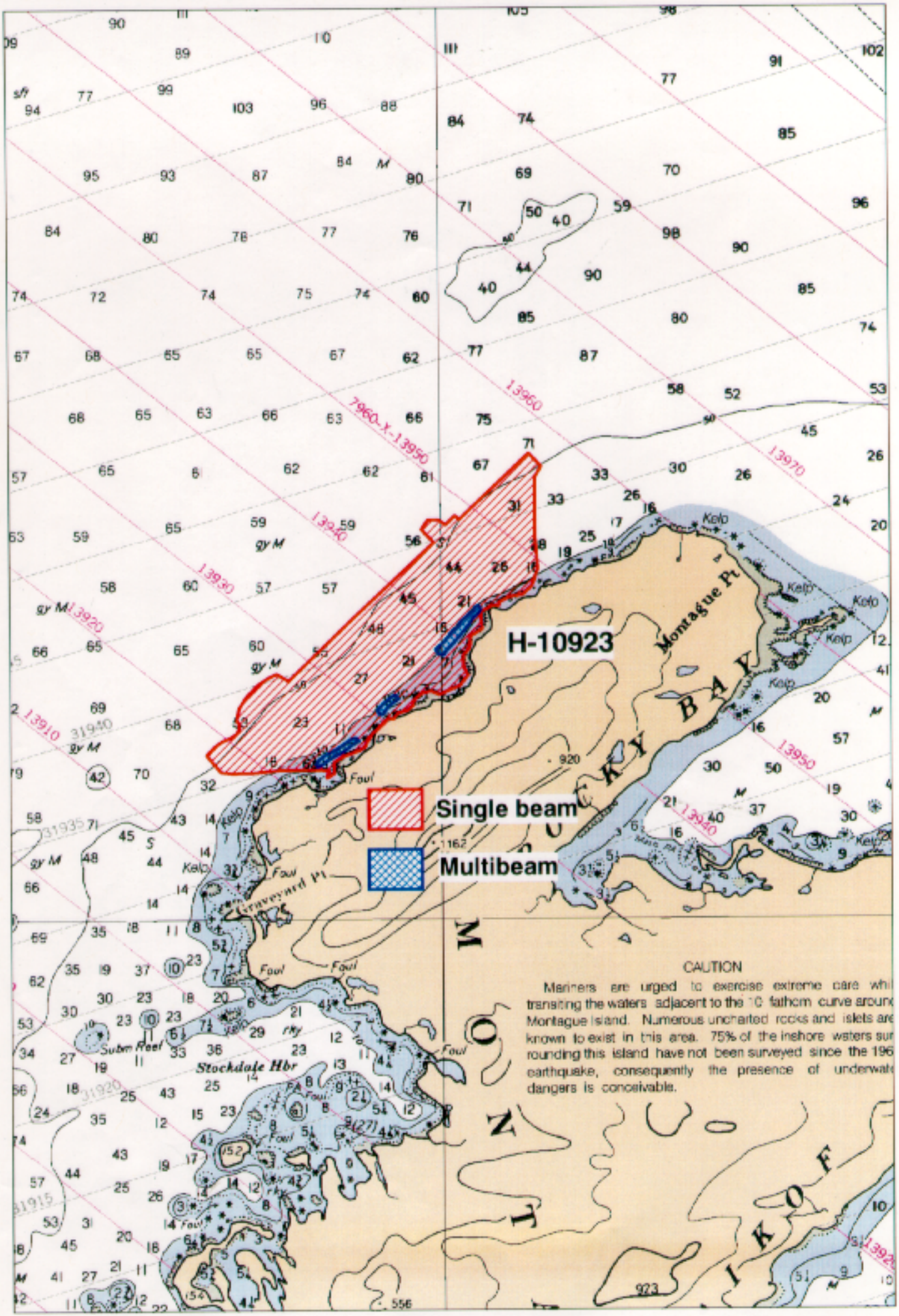
Soundings in fathoms ~~feet~~ at ~~MLW~~ MLLW and tenths (data collected in meters)

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 / SURF 12/29/00 MCB

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


H-10923
Single beam
Multibeam
Montague Pt
Kelp
Foul
Stockdale Hbr
Graveyard Pt
Subm Reef
CAUTION
Mariners are urged to exercise extreme care whi
transiting the waters adjacent to the 10 fathom curve around
Montague Island. Numerous uncharted rocks and islets are
known to exist in this area. 75% of the inshore waters sur
rounding this island have not been surveyed since the 196
earthquake, consequently the presence of underwat
dangers is conceivable.

Descriptive Report to Accompany Hydrographic Survey H10923

Field Number RA-10-18-99
Scale 1:10,000
August 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 20, 1999. Survey H10923 corresponds to sheet AC 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, 16705, 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.

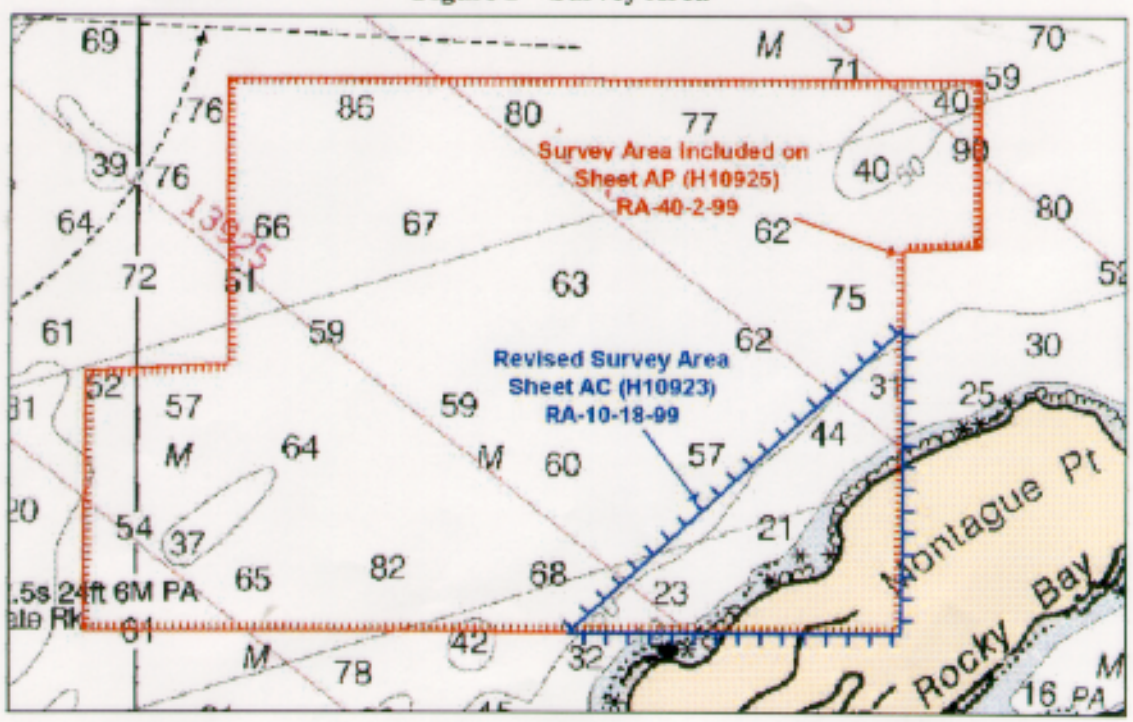
Significant changes in depths and shoreline may have occurred in the project area as a result of the earthquake of March 27, 1964.

B. AREA SURVEYED

The survey area is located west-northwest of Montague Point, which is located at the northern tip of Montague Island in Prince William Sound, Alaska. The survey limits identified in the original sheet layout were revised to include the offshore portion of sheet AC on sheet AP (H10925, RA-40-2-99). Figure 1 below depicts the new survey limits for sheet AC in blue, and the old limits are depicted in red. The revised survey's northern limit is latitude 60°23'22.1"N and the southern limit is latitude 60°21'06.6"N. The revised survey's western limit is longitude 147°13'37.1"W and the eastern limit is the 147°08'40.7"W.

Data acquisition was conducted from August 15 to 27, 1999 (DN 227 to 239).

Figure 1 – Survey Area



C. SURVEY VESSELS ✓

Data were acquired by RAINIER survey launches (vessel numbers 2121and 2125) as noted in the Survey Information Summary included with this report. See 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 HYPACK version 8.9 and preliminary processing was accomplished with HPS version 9.3 and MapInfo 5.0. Final Detached Positions, Features, and Soundings based on predicted and observed tides were saved in MapInfo format.

Shallow water multibeam (SWMB) echosounder data were acquired using the Reson SeaBat 8101 with ISIS version 4.25 and processed using CARIS-HIPS software version 4.3.

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

After review and cleaning, Reson 8101 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 density of 1.5mm at scale of the survey. After performing quality assurance on digital terrain models (DTMs) created within CARIS, processed soundings were then exported into HPS through HPTools. 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. Soundings based on predicted tides were saved in MapInfo format. Raster images registered in MapInfo facilitated chart and prior survey comparisons.

Survey H10923 is defined as sheet 01 in HPS. The CARIS workfile name is defined as pws_ac, and the project name is identified as p139_ac 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. 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.

F. SOUNDING EQUIPMENT ✓

Two different categories of echosounder systems were used and are described below. The individual system(s) chosen for use in a given area were decided at the discretion of the Hydrographer using the guidance stated in the Project Instructions and depended upon the limitations of each system, the bottom topography, the water-depth, and the ability of the platform vessel to safely navigate the area.

* Filed with the hydrographic data.

1. Launch Vertical Beam Echo Sounder (VN 2121, 2125) ✓

The vertical beam echo sounders (VBES) utilized for this survey were the Raytheon DSF-6000N (VN 2125) and Knudsen 320M (VN2121), which are dual frequency (100 kHz, 24 kHz), digital recording singlebeam fathometers with analog paper traces. Soundings were acquired in meters using the High + Low, high frequency digitized setting. VBES serial numbers are included in Appendix H. *

VBES data were acquired concurrently with SWMB and were compared to nadir beams of the shallow water multibeam online during data acquisition. In addition, digital VBES data is sent to ISIS, which then focuses the shallow water multibeam on a variable "gate" determined from the VBES data. The latter is extremely helpful in areas of extreme relief, when the shallow water multibeam tends to lose bottom lock. VBES data acquired during SWMB were not used for final sounding plot compilation, and are not included with the digital survey data.

2. Launch Shallow Water Multibeam (VN 2121) ✓

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

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Water Level Correctors ✓

The Center for Operational Oceanographic Products and Services (CO-OPS, N/OPS1), through N/CS31, provided predicted tides for the project on diskette for the Cordova reference station (945-4050). Due to problems encountered with the tide zone application in HPS, the predicted tides at Cordova were not adjusted for time and height correctors. Hence, HPS predicted tide table #99 was applied to the soundings without adjustment for zoning. Tidal correctors as provided in the Project Instructions for H10923 are provided in the Survey Information Summary included with this report.

The operating National Water Level Observation Network (NWLON) tide stations at Cordova (945-4050) and Valdez (945-4240) serve as control for datum determination. A Next Generation Water Level Measurement System (NGWLMS) Aquatrak is the primary sensor at these stations. Consequently, RAINIER was not required to inspect or perform leveling of these stations. RAINIER personnel installed Sutron 8200 tide gages at Port Chalmers (945-4511) and Zaikof Point (945-4411) on August 10, 1999, and at Snug Harbor (945-4662) on August 11, 1999. None of these gages had been removed at the time of this writing. Refer to the Field Tide Notes and supporting data in Appendix D* for individual gage performance and level information. This information has been forwarded to N/CS41 in accordance with HSG 50 and FPM 4.8.

Raw water level data from the Port Chalmers, Zaikof Point and Snug Harbor gauges has been forwarded to N/OPS1 in accordance with HSG 50 and FPM 4.7. The Pacific Hydrographic Branch (PHB) will apply final approved (smooth) tides to the survey data during final processing. A request for approved tides was forwarded to N/CS41 on September 3, 1999 in accordance with FPM 4.8.

Approved Tide Note dated May 15, 2000 is attached to this report.

* Filed with the hydrographic data.

Sound Velocity Correctors ✓

Three sound velocity casts were used for this survey. 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 Profiler (S/N 219), calibrated November 13, 1998 and (S/N 2477), calibrated November 13, 1998. Velocity correctors were computed using the PC program VELOCWIN, version 4 beta 2, which directly generated 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.

Vessel Offset 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
2125	March 1999	Rod leveling	March 1999	Port Angeles, WA

✓

Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2, using FPM Fig. 2.4, and are included with project 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 and 5 correspond to the last digit of the vessel number. For VBES launches, offset tables were applied to sounding data in HPS during post-acquisition processing. For the SWMB launch, offsets were applied during Caris processing.

The offset tables are included with project related data for OPR-P139-RA-99. *

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

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

A SWMB vessel configuration file (VCF) was created within the CARIS program VCFEDIT, and applied to the sounding data during processing. Prior to beginning data acquisition, the CARIS Vessel Configuration File was updated to define the physical relationship (offsets) between the various components that comprise the systems, including the transducer head and POS/MV. In addition, VCF files contain dynamic draft,

* Filed with the hydrographic data.

timing errors, and heave, roll and pitch biases (system biases). These system biases were determined during a patch test conducted at Shilshole, WA on July 7, 1999 for vessel 2121. A printout of the Vessel Configuration File is included in Project Related Data for OPR-P139-RA, and the VCF itself is included with the digital HDCS data. *

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 source of differential corrections were the US 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 Project Related Data for OPR-P139-RA. *

I. SHORELINE ✓

Method of Shoreline Verification ✓

N/NGS3 supplied photogrammetric shoreline in MapInfo format for T-12708 ✓ and 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, 16705, and 16709 were digitized in MapInfo by RAINIER personnel and imported into Hypack for field verification.

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.

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.

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 "ac_shoreline" and "Shoreline_Update_AC". Concur.

Charted Features ✓

Charted rocks were identified as T-sheet rocks or high points or extensions of T-sheet ledges.

Two charted rocks at 60°21'29.1"N, 147°10'43.9"W (Pos. # 50034) and 60°21'23.8"N, 147°11'00.9"W (Pos. #50036) were identified as the north and south limits of a new ledge. Chart the area based on the latest survey information.

* Filed with the hydrographic data.

Recommendations

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

J. CROSSLINES ✓

Crosslines totaled 5.54 nautical miles, comprising 15.7% of mainscheme hydrography. Crosslines agreed within 1 meter of mainscheme hydrography.

K. JUNCTIONS (See EVAL RPT., Sec. L)

The following contemporary surveys junction with H10923:

Registry #	Scale	Date	Junction side
H10918 ✓	1:10,000	1999	South
H10921 ✓	1:10,000	1999	East
H10925 ✓	1:40,000	1999	Northwest

Soundings from surveys H10918 and H10921 agreed well with the present survey, matching within 1 meter. The portion of H10925 which junctions with H10923 had not been completed at the time of writing, thus no comparison was done. 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 survey shares common area with survey H10923:

Registry #	Scale	Date	Area covered
H5421 ✓	1:20,000	1933	Entire Survey (Valdez Datum)

Prior survey H5421 covers the entire area of present survey H10923. The prior soundings agreed well with the present survey, except in the southwest section of the survey area where the soundings from this survey average 3-5 fathoms shoaler than soundings from prior survey H5421. This is possibly a result of uplift from the 1964 earthquake.

Two other soundings were found during the present survey which are significantly shoaler than those on the prior survey. A 0.8 fathom sounding at 60°21'33.3"N, 147°10'49.2"W (Pos. # 80167) was found where prior survey H5421 revealed depths of 3 ¾ to 5 fathoms. A 1.1 fathom sounding at 60°21'59.8"N, 147°09'55.9"W (Pos. # 80084) was found where the prior survey shows 8 fathom soundings. Both of these shoal areas were developed with 100% SWMB coverage.

The Hydrographer recommends that soundings from survey H10923 supersede all prior soundings from H5421. Concur.

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

M. ITEM INVESTIGATIONS ✓

There were no AWOIS items assigned for survey H10923. Concur.

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

This survey was compared to the following charts:

Chart	Scale	Edition Number	Date	Datum
16700	1:200,000	26th	September 19, 1998	NAD 83
16701	1:81,436	17th	July 25, 1998	NAD 83
16705	1:80,000	18th	March 27, 1999	NAD 83
16709	1:80,000	21st	June 29, 1996	NAD 83

✓

Soundings from charts 16700, 16701, 16705 and 16709 were in good agreement with present survey soundings, generally within 1 fathom, except as noted below.

In the vicinity of a charted 48 fathom sounding at 60°22'06"N, 147°10'58"W (chart 16709), the present survey revealed depths of ~~34-42~~ 29-41 fathoms.

In the vicinity of a charted 31 fathom sounding at 60°22'59"N, 147°09'02"W (chart 16709), the present survey revealed depths of ~~23-50~~ 32-39 fathoms.

In the vicinity of a charted 16 fathom sounding at 60°22'09"N, 147°10'04"W (chart 16701, 16705, 16709), the present survey revealed depths of 20-25 fathoms.

In the vicinity of a charted 11 fathom sounding at 60°21'27"N, 147°11'33"W (chart 16705), the present survey revealed depths of ~~17-23~~ 12-15 fathoms.

The Hydrographer recommends that present survey depths be used to supersede depths on charts 16700, 16701, 16705 and 16709 in their common areas. Concur.

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

Dangers to Navigation ✓

(1)
One Danger to Navigation was found and reported to the Seventeenth Coast Guard District.

A shoal depth of 1.~~5~~ 6 fathoms (submitted as 1 ½ fathom shoal) was discovered at 60°21'59.8"N, 147°09'55.9"W. This danger lies between charted 7 and 16 fathom soundings.

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

O. ADEQUACY OF SURVEY ✓

Survey H10923 is complete and adequate to supersede prior soundings and features in their common areas. Concur.

P. AIDS TO NAVIGATION ✓

There are no Aids to Navigation within the survey limits of H10923. Concur.

Q. STATISTICS ✓

Refer to the Survey Information Summary attached to this report.

R. MISCELLANEOUS ✓

Bottom samples were collected and sent to the Smithsonian in accordance with 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 Horizontal Control Report	TBA	N/CS34
OPR-P139-RA 1999 Coast Pilot Report	TBA	N/CS26
Project related data for OPR-P139-RA	Incremental	N/CS34

Respectfully Submitted,

Danielle Pattison

Danielle Pattison
Senior Survey Technician

Approved and Forwarded,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Survey Information Summary

Project: OPR-P139-99 **Project Name:** SOUTHWEST PRINCE WILLIAM SOUND

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

Sheet Letter: AC **Registry Number:** H-10923

Sheet Number: RA-10-18-99

Survey Title: Northwest of montague Point

Data Acquisition Dates: **From:** 15-Aug-99 227 **To:** 27-Aug-99 239

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2121		1		1			1	
2125	2	1			1	1		
2128								

Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
1		224	135.8	60/21/16	223-235
				147/04/39	
3		236	122.5	60/20/20	236-239
				146/57/00	

Tide Zone Information

Zone #	Time Corr.	Height Corr.
PWS8	-00 hr 06 min	X0.95

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-4662	SNUG HARBOR	8/11/99	
945-4411	ZAIKOF POINT	8/10/99	
945-4511	PORT CHALMERS	8/10/99	

Statistics Summary

Type	Total:
BS	3
DP	31
MS	35.25
S/L	2.29
SPLIT	18.39
SWMB	3.14
XL	5.54

Percent XL:	15.7%
SQNM:	0

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
September 2, 1999

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

Dear CDR Hamblett:

It is requested that the following danger to navigation be included in the Local Notice to Mariners. The NOAA Ship RAINIER positioned this feature while conducting hydrographic survey H10923 in Prince William Sound, Alaska. The danger is shown graphically on the attached chartlet.

The following danger to navigation affects charts: 16700, 26th Ed., Sep 19, 1998, 1:200,000; 16701, 17th Ed., Jul 25, 1998, 1:81,436; 16705, 18th Ed., Mar 27, 1999, 1:80,000; 16709, 21st edition, 1996, 1:80,000. The position is on the NAD 83 datum and depth has been corrected to Mean Lower Low Water using predicted tides.

Feature	Depth (fm)	Latitude (N)	Longitude (W)	Depth (m)
Shoal	1.7	60:21:59.8	147:09:55.9	3.2

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-11-99. More information on current RAINIER survey projects may be obtained by e-mail; contact the Field Operations Officer at FOO.RAINIER@NOAA.GOV.

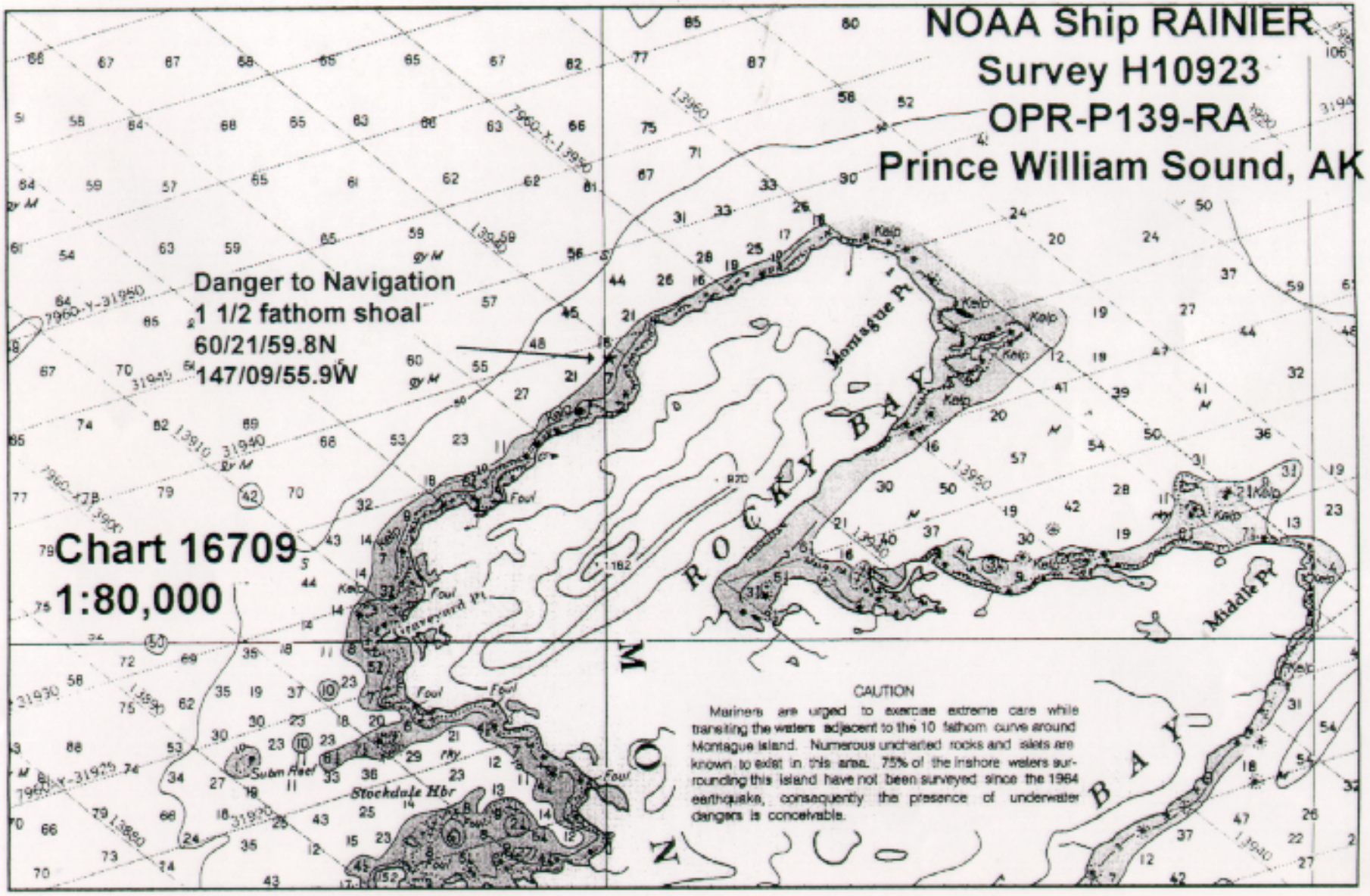
Sincerely,

Daniel R. Herlihy

Daniel R. Herlihy
Commander, NOAA
Commanding Officer

Attachment

Cc: NIMA
PMC
N/CS261
N/CS34


NOAA Ship RAINIER
Survey H10923
OPR-P139-RA
Prince William Sound, AK
Danger to Navigation
1 1/2 fathom shoal
60/21/59.8N
147/09/55.9W
Chart 16709
1:80,000
ROCKY BAY
Montague Pt
Middle Pt
Stockdale Hbr
Subm Reef
Graveyard Pt
Kelp
Foul
CAUTION
Mariners are urged to exercise extreme care while transiting the waters adjacent to the 10 fathom curve 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.

APPROVAL SHEET

for

H10923

RA-10-18-99

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

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: May 15, 2000

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P139-RA-99
HYDROGRAPHIC SHEET: H-10923

LOCALITY: Northwest of Montague Point,
Southwest Prince William Sound, AK

TIME PERIOD: August 15 - August 27, 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 & 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 N. Neu 5/10/00

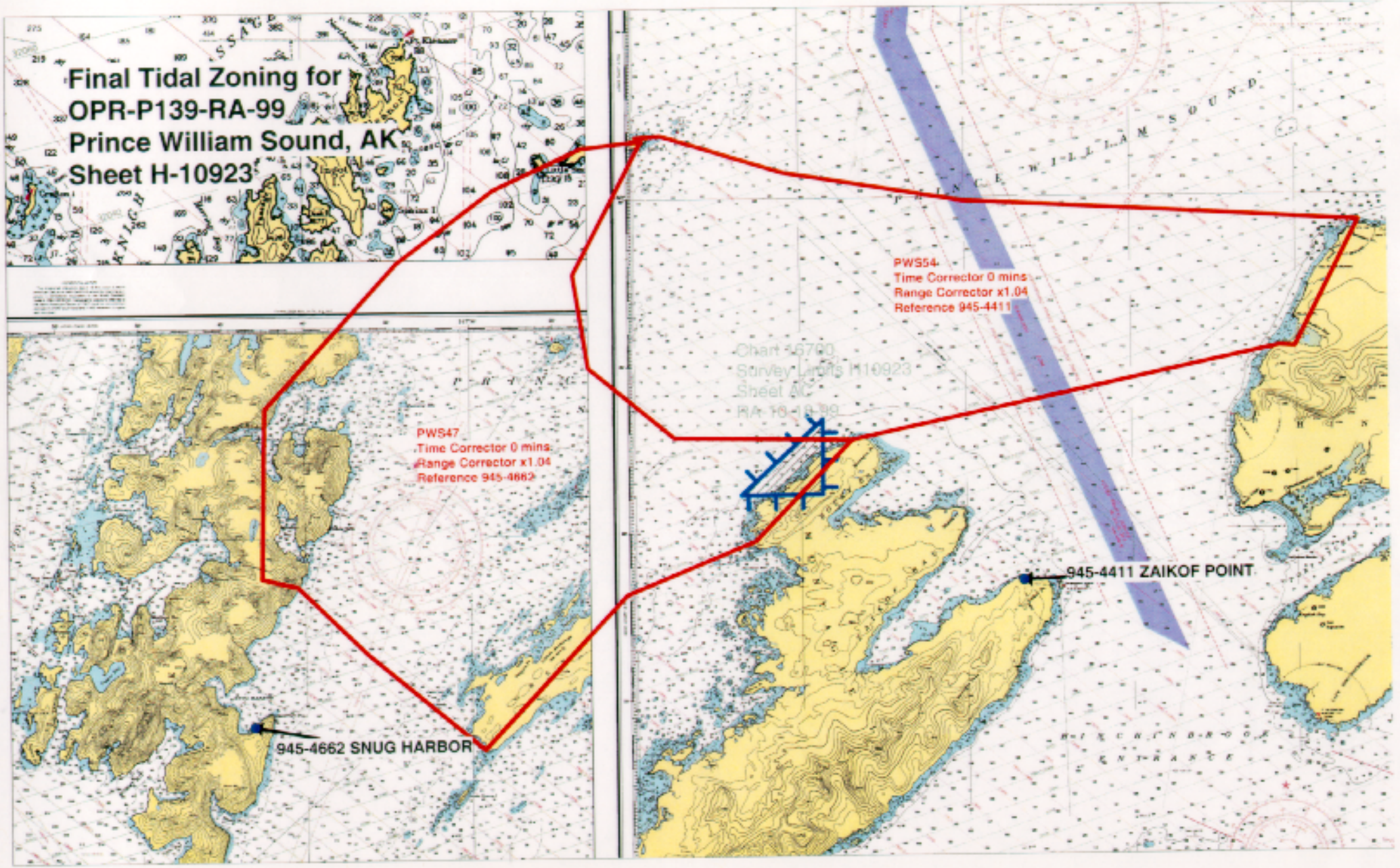
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR-P139-RA-99,
Sheet H-10923.

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			
-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 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-99
Prince William Sound, AK
Sheet H-10923
PWS47
Time Corrector 0 mins
Range Corrector x1.04
Reference 945-4662
PWS54
Time Corrector 0 mins
Range Corrector x1.04
Reference 945-4411
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-10923

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):	TP-12662, TP-12708
PHOTOBATHYMETRIC MAPS (List):	None
NOTES TO THE HYDROGRAPHER (List):	None
SPECIAL REPORTS (List):	None
NAUTICAL CHARTS (List):	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 (selected)			2615
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			
COMPARISON WITH PRIOR SURVEYS AND CHARTS	70.5		70.5
EVALUATION OF SIDE SCAN SONAR RECORDS		8.0	8.0
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		16.0	16.0
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		18.0	18.0
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	70.5	42.0	112.5

Pre-processing Examination by: R. Davies	Beginning Date: 1/6/00	Ending Date: 1/6/00
Verification of Field Data by: E.Domingo,R.Davies,G. Nelson,R. Mayor,B.Mihailov	Time (Hours): 70.5	Ending Date: 9/29/00
Verification Check by: ~~D. Hill~~ R.DAVIES	Time (Hours): 1	Ending Date: 11/28/00
Evaluation and Analysis by: I. Almacen	Time (Hours): 24.0	Ending Date: 10/12/00
Inspection by: ~~D. Hill~~ R.DAVIES	Time (Hours): 2	Ending Date: 11/28/00

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

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10923

Name on Survey	A ON CHART NO. 16700, 16701, 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
MONTAGUE ISLAND	X		X							3
MONTAGUE POINT (title)	X		X							4
				Approved.						5
										6
				Dennis L. Romberg						7
				Chief Cartographer				MAR 27 2009		8
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NOAA FORM 76-155 SUPERSEDES C&GS 197

EVALUATION REPORT
H-10923

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 0.6 to 63.0 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: -2.193 seconds (-67.885 meters)
Longitude: 7.025 seconds (107.629 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. 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 3.80 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

The digitized 1:10,000 scale registered topographic manuscripts T-12662 and T-12708 compiled on NAD 83 datum was used during this survey. The digitized shoreline file and the survey file were merged during Microstation processing.

The shoreline maps 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-10923 junctions with the following surveys .

Survey	Year	Scale	Area
H-10918	1999	1:10,000	Southern Limit
H-10921	1999	1:10,000	Northern Limit
H-10925	1999	1:40,000	Northeastern Limit

The junctions with surveys H-10918, H-10921 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. H-10918

M. COMPARISON WITH PRIOR SURVEYS

Survey	Year	Scale	Datum
H-5421	1933	1:20,000	VALDEZ

Prior survey H-5421 covers the entire area of the present survey. The present survey was compared to a digital copy of this prior survey The legibility of the prior survey digital image file is considered acceptable and was adequately registered to the present survey smooth sheet. The sparsely plotted soundings and other related features on the prior smooth sheet are legible

Comparison with the above listed prior survey reveals satisfactory agreement. The soundings generally differ by about 1 to 3 fathoms except around the area of the shoals noted during this survey and the shoal reported as danger to navigation. These differences may be attributed to greater sounding coverage and positioning accuracy from modern surveying methods presently employed in the field as well as the possible effects of prior earthquakes in the region. 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-10923 is adequate to supersede the prior surveys within the area of common coverage.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned for survey H-10923.

O. COMPARISON WITH CHART

Survey H-10923 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 requires 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-10923 have been generalize on chart 16709 along the high water line where applicable. Additional information can be found in section N of the hydrographer's report.

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.

Survey H-10923 is adequate to supersede charted hydrography within the common area.

b. Dangers to navigation

One (1) danger to navigation (DTON) was found during this survey and reported to the USCG, NIMA, N/CS261 and N/CS3 on September 2, 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-10923 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-10923 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-10923

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.

Charles R. Ference Date: 11/28/00

for Dennis Hill
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: 12-15-00

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

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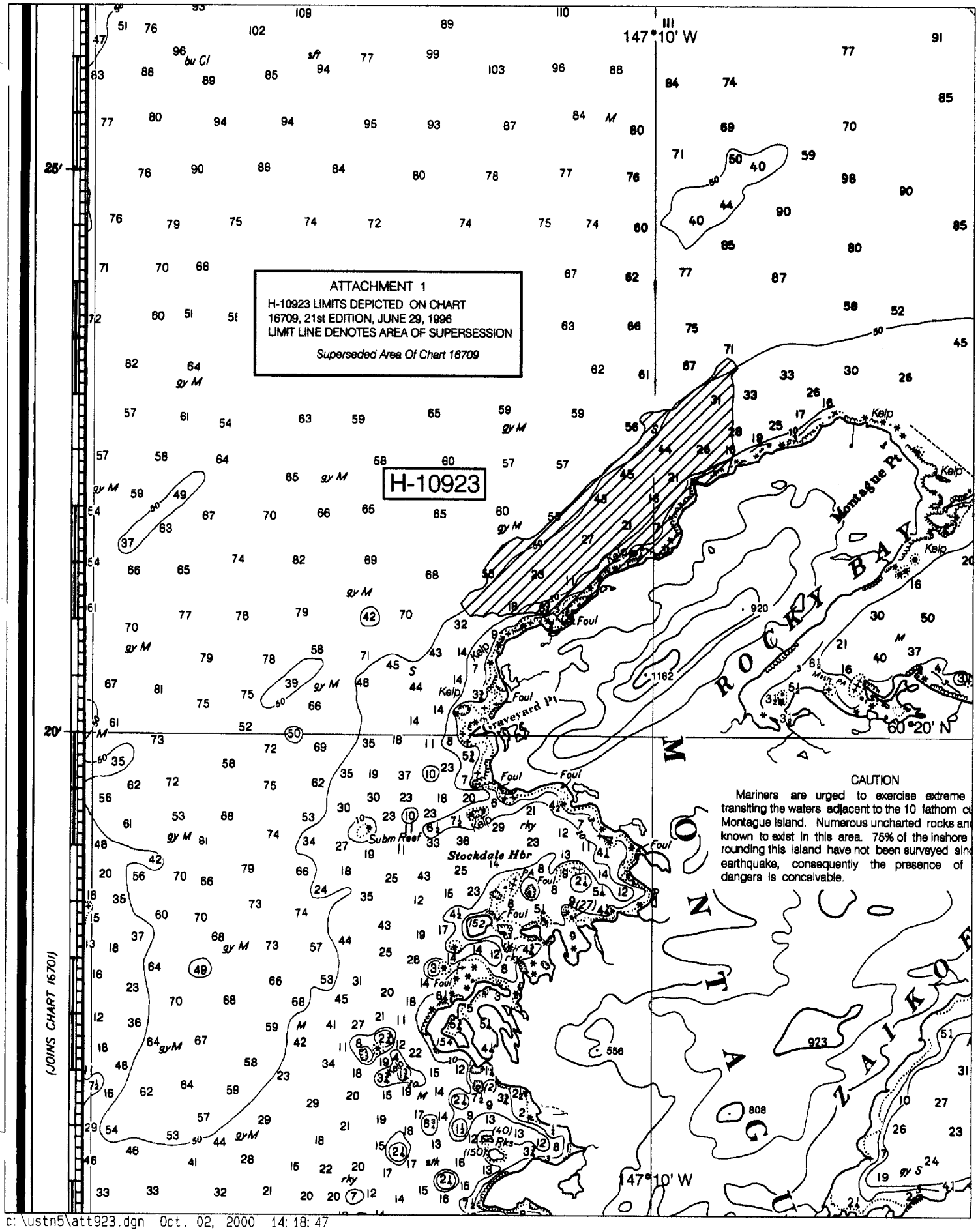
Final Approval

Approved:

Samuel P. de Bow Date: 1-31-01

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-10923

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	10/10/00		Full Part Before After Marine Center Approval Signed Via Full application of
			Drawing No. soundings & features from the smooth sheet.
16709	2/20/01	Rev 3/8/01 TMK	Full Part Before After Marine Center Approval Signed Via
			Drawing No. full application of soundings and features from BP 173328
16705	2/20/01	Rev 3/9/01 TMK	Full Part Before After Marine Center Approval Signed Via
			Drawing No. appd through 16709
16701	2/20/01	Rev 3/12/01 TMK	Full Part Before After Marine Center Approval Signed Via
			Drawing No. appd through 16705
16700	2/20/01	Rev 3/12/01 TMK	Full Part Before After Marine Center Approval Signed Via
			Drawing No. appd through 16701
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.