H11393

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. **OPR-P139-TC-04**

Registry No. **H-11393**

LOCALITY

State **Alaska**

General Locality **South Prince William Sound**

Sublocality **Port Bainbridge and Vicinity**

2004

CHIEF OF PARTY

David A. Sinson

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-11393

INSTRUCTIONS The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO.

State **Alaska**

General Locality **South Prince William Sound**

Sublocality **Port Bainbridge and Vicinity**

Scale **1:20,000** Date of Survey **9/22/04-10/19/04**

Instructions Date **Sept 22, 2004** Project No. **OPR-P139-TC-04**

Vessel **R/V DAVIDSON**

Chief of Party **P.S. David A. Sinson, NOAA**

Surveyed by **SAIC Personnel**

Soundings taken by echo sounder,l **RESON 8111 MB**

RESON 8101 MB, RESON 8125 MB

Graphic record scaled by **N / A**

Graphic record checked by **N / A**

Evaluation by **D. Sinson, P. Holmberg, M. Amend** **Automated plot by: N/A**

Verification by **D. Sinson, P. Holmberg, M. Amend**

Soundings in **Fathoms and feet** at **MLLW**

REMARKS: **Time in UTC. Revisions and endnotes were generated during office processing. All separates are filed with the project data.**

All depths listed in this report are referenced to mean lower low water unless otherwise noted.

Descriptive Report to Accompany Hydrographic Survey H11393

Project OPR-P139-TC-04
Port Bainbridge
Prince William Sound, Alaska
Scale 1:20,000
September-October 2004
NOAA Time Charter R/V DAVIDSON
Lead Hydrographer: PS David A. Sinson, NOAA
Survey Manager: PS Peter S. Holmberg, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-P139-TC-04, dated September 22, 2004, and the Draft Standing Project Instructions dated March 23, 2004. The survey area includes the southern approach to Port Bainbridge and Prince William Sound, Alaska.

Northern Limit[1]	Southern Limit	Western Limit	Eastern Limit
59° 59’ 05.24” N	59° 45’35.35” N	148° 29’ 9.91” W	148° 11’ 38.55” W

Data acquisition was conducted from September 22 to October 19, 2004 (Julian day numbers 266 to 293).

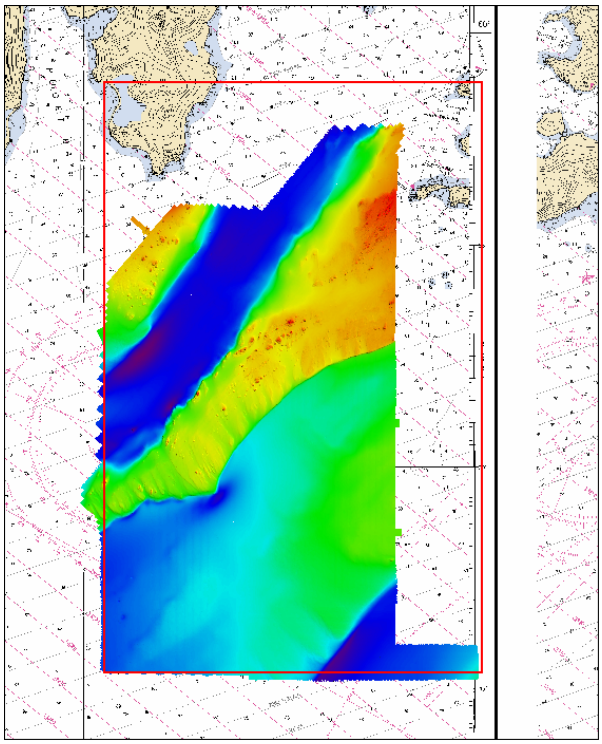

Figure 1 OPR-P139-TC-04 Survey H11393 limits and coverage

B. DATA ACQUISTION AND PROCESSING

Refer to ***OPR-P139-TC-04 Data Acquisition and Processing Report (DAPR)***[2] for a complete description of data acquisition and processing systems, survey vessel, quality control procedures and data processing methods, submitted under a separate cover. Additional information to supplement sounding and survey data, and any deviations from the DAPR are included in this descriptive report[3].

B1. Equipment and Vessel

All data were acquired by the R/V DAVIDSON. Vessel configuration, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

B2. Quality Control

B2.1 System Certification and Calibration

Refer to ***OPR-P139-TC-04 Data Acquisition and Processing Report (DAPR)*** for a description of SAIC's quality assurance (QA) and quality control (QC) plan. A System Acceptance Test Report, included as an appendix to the DAPR, describes system integration and initial calibration results for equipment and sensors utilized for this survey.

A system calibration survey was performed in Seward Harbor on September 27, 2004 (JD 271) to verify sensor performance as well as tide, sound velocity, alignment and offset corrections.

B2.2 Crosslines

Multibeam echosounder crosslines totaled 33.87 nautical miles, comprising 6.12% of Shallow Water Multibeam (SWMB) hydrography. Crossline soundings were evaluated with respect to main scheme soundings in CARIS HIPS subset area editor and a gridded base surface model. In general, there was good agreement between mainscheme and crossline soundings. Observed sounding differences were generally less than 1 meter in less than 100 meter water depths and no significant systematic or water level offsets were observed in the crossline evaluation.

B2.3 Junctions

The following contemporary surveys junction with P139G:[4]

Registry #	Scale	Date	Junction side
H11167	1:10,000	2002	East
H11168	1:40,000	2002	East
H11172	1:10,000	2002	North

Junction survey soundings were provided by the Pacific Hydrographic Branch in Microstation .dgn format. Junction analysis was performed in CARIS HIPS Fieldsheet editor, .dgn files were converted to CARIS maps and imported as background files for subsequent comparison with BASE surface soundings. Comparisons were made with verified tides applied to the data. Survey H11167 junctions very well with this survey, differences are less than one meter in 55 to 64 meters of water. Surveys H11168 and H11172 junction adequately with this survey; in general sounding differences range from one to three meters in 55 to 165 meters of water. Figure 2 displays the boundaries of the junction surveys.[5]

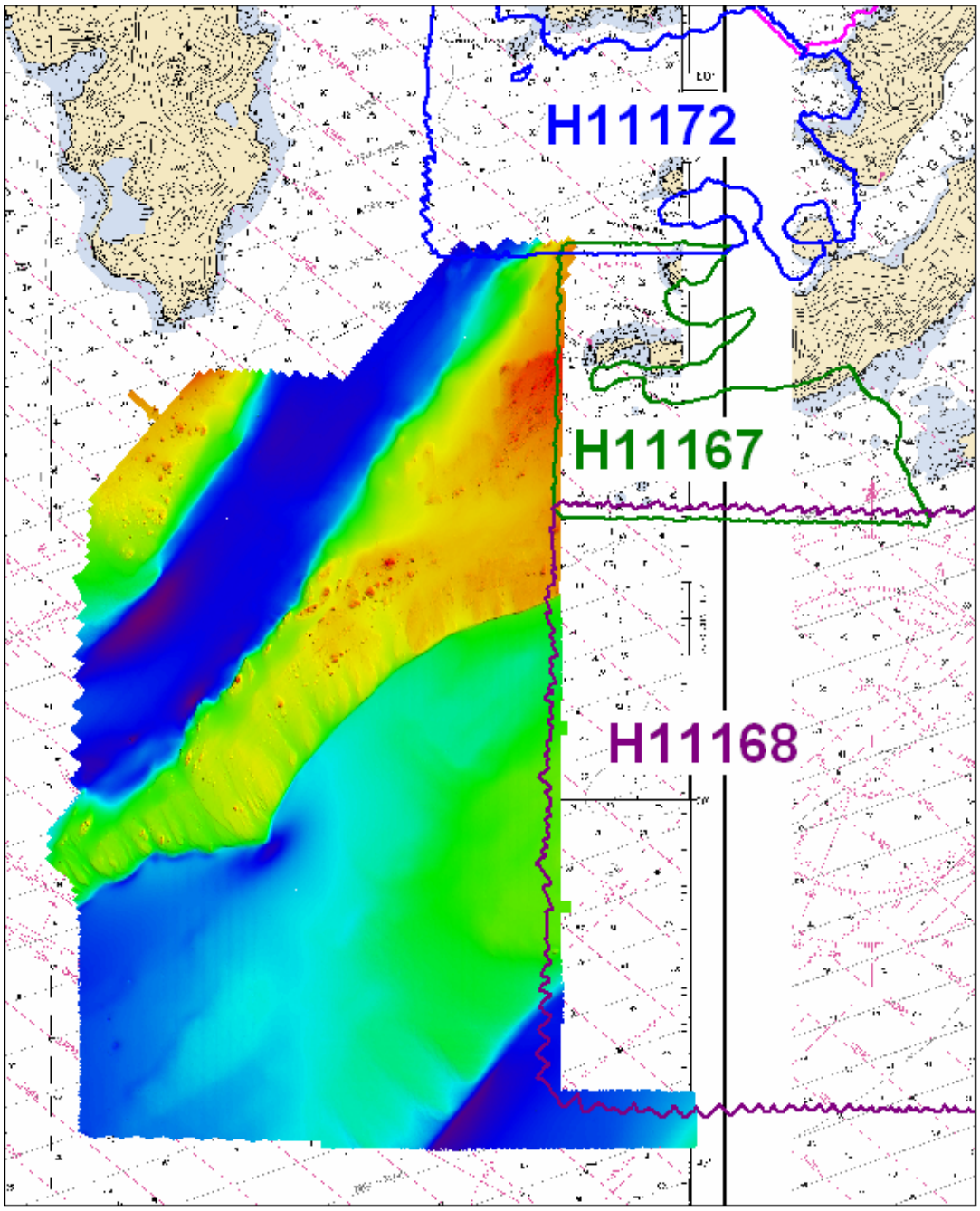

Figure 2. H11393 Junction Surveys.

B2.4 Data Quality Factors

Caris BASE surfaces were created at 5-meter resolution for ship soundings and the entire range of depths for this survey.[6] BASE surfaces were used to focus full-density sounding evaluation and editing in areas of high standard deviation and total propagated error (TPE). Sounding subsets were evaluated in areas of high topographic relief to ensure the depth BASE surface accurately represented shoal soundings and features.

B2.4.1 Sound Velocity Profiles

ISS2000 applies sound velocity correction in real-time during echosounder acquisition. Sound velocity profiles were collected often to characterize the variable and complex water column conditions in the survey area. Surface sound velocity was monitored continuously on the DAVISON with the Reson 8111ER to ensure correct beam formation. Surface sound velocity was used on the 8111ER for correct beam formation for pitch stabilization. Changes in surface sound velocity were also evaluated as an indicator of changes in the water column sound velocity. In general, there was good agreement of depths between overlapping outer beams of survey lines. There is an insignificant sound velocity error in the south-western vicinity of the survey (figure 3) where some of the lines have a sounding difference of roughly one meter. The error is only noticed in this area where depths exceed 130 meters. This error (<1%) is well within specifications for survey requirements and is an indication of overall excellent quality of sound velocity measurement correction.[7]

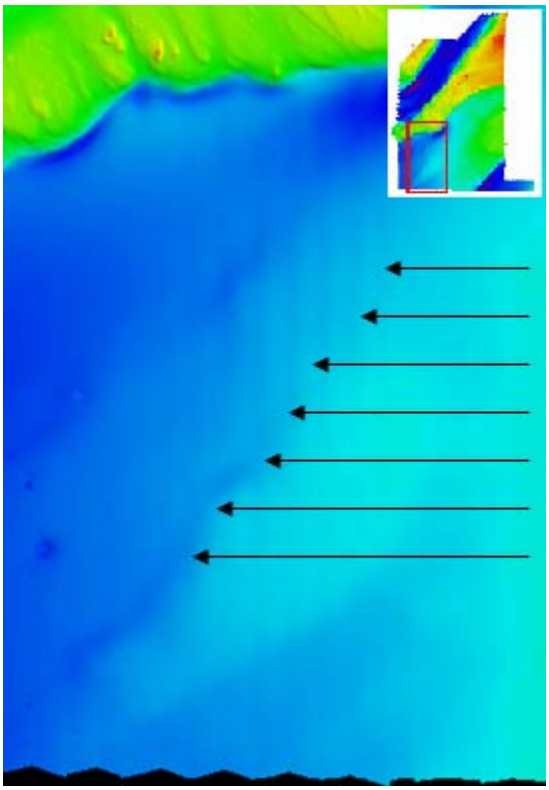

Figure 3. Sound Velocity Errors

B2.4.2 Water level correction

ISS-2000 applies predicted water-level correctors with CO-OPS supplied zoning in real-time during echosounder acquisition. Observed tides from the primary tide gauges are applied to soundings prior to NOAA quality review in CARIS HIPS/SIPS. Soundings from crosslines and overlapping lines were examined in 3-D sounding subsets and base[8] surfaces to identify temporal variation of water level modeling. In general, there was no indication of significant water level correction errors visible in line-to-line comparisons or the final base surfaces.

B2.4.3 Residual Sounding Fliers and Noise

CARIS BASE surfaces were evaluated by NOAA hydrographers to focus data editing on areas of high standard deviation of depth. Full-density sounding subsets were reviewed where high standard deviation was indicated. Residual gross flyers and noise were identified in areas of unusually high standard deviation and flagged as rejected. The total range of standard deviation was reduced to a value that corresponded to general bathymetric relief for the survey area. Soundings from multiple lines were evaluated when possible to distinguish noise from bathymetric features. In general, NOAA quality review required minimal editing and any significant quality deficiencies were corrected before final submission.

B2.4.4 Systematic Errors

CARIS BASE surfaces were evaluated by NOAA hydrographers to identify systematic errors in data correctors including motion, attitude, tide and sound velocity. Sunlight illuminated surface digital terrain models (DTM) indicated[9] errors in heave, pitch and roll correction. Standard deviation surface models indicated[10] areas where disagreement occurred between multiple lines – an indication of temporal variation in water-level or sound velocity correction. There were no significant systematic errors observed during review of this survey.[11]

B2.4.5 Sounding Coverage

Daily coverage was evaluated with DTM models created from preliminary, gridded sounding data. SAIC submitted 5-meter shoal-biased binned data for the ship. Easting, Northing, depth data were imported into MapInfo and re-gridded in Vertical Mapper. DTMs were subsequently evaluated for coverage. Final sounding coverage was evaluated in CARIS using BASE surface DTM, TPE and sounding density models.

B2.4.6 Swath Angle Filtering

All soundings were filtered (flagged as offline) by SAIC processing software (ISS-2000) to within 55 degrees of nadir for mutibeam echosounder bathymetry to increase confidence in sounding accuracy and minimize sound velocity errors. In some cases, outer-beam soundings were re-accepted for holidays and general bathymetry in deeper water to fill in small gaps in the final BASE surface. All data used to create the final base surfaces were filtered to meet IHO Order 1 quality tolerances.

B2.4.7 Total Propagated Error (TPE)

Raw soundings were not filtered for TPE. BASE surfaces were created from soundings filtered for TPE values that met IHO Order 1 tolerance. TPE filtering increased the confidence of sounding accuracy based upon system parameter settings in the HIPS Vessel File (.hvf). The HVF was created from manufacturer system performance specifications and offsets provided by SAIC from the System Acceptance Test (SAT). CARIS configuration files for the ship were submitted to HSTP and PHB for review and validation. TPE was viewed in CARIS surface models to evaluate sounding accuracy and confidence for significant features and final coverage. Total propagated error for the survey ranged from 0.265 – 1.340 meters. All designated[12] soundings are qualified by an associated TPE confidence value.

B3. Water Level Datum Reduction

HDCS sounding data were reduced to mean lower-low water (MLLW) using verified tides from the primary stations at Cordova (945-4050) and Seward (945-5090). Verified tides were adjusted for zoned range and amplitude correctors provided by CO-Ops as specified in the project instructions and illustrated in Figure 4.

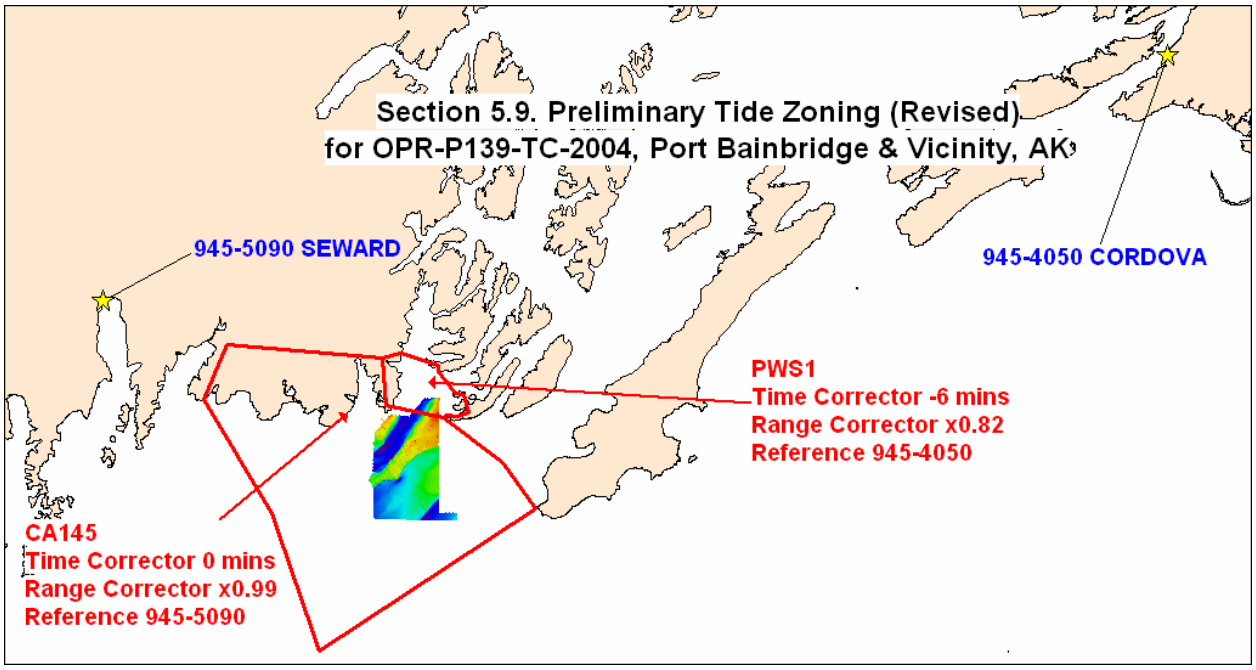

Figure 4. Tide Zoning for H11393

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H11393 can be found in the

OPR-P139-TC-04 Horizontal and Vertical Control Report, submitted as an appendix to the DAPR.[13] A summary of horizontal and vertical control for this survey follows.

C1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Potato Point (323 kHz) and Hichenbrook (288 kHz) were utilized during this survey. DGPS Confidence checks were performed daily by comparing positions acquired by primary (POS/MV) and secondary (Trimble MS 750) positioning systems on the ship.

C1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide stations at Cordova, AK (945-4050) and Seward, AK (945-5090) will serve as control for datum determination and as the primary source for water level reducers for survey H11393.

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 for this survey was forwarded to N/OPS1 on December 01, 2004 in accordance with the FPM and project letter instructions.[14]

D. RESULTS AND RECOMMENDATIONS

D.1 Automated Wreck and Obstruction Information System (AWOIS) Investigations

No AWOIS items were assigned to this survey.[15]

D.2 Chart Comparison

Survey H11393 was compared with charts 16683 (10th Ed.; Feb, 2004, 1: 81,436[16]), and 16702 (12th Ed.; Nov, 2004, 1: 40,000[17]), shown[18] in figure 5. Chart comparisons were performed in MapInfo using xyz (E,N,d) sounding data exported from the final base surface.[19] Xyz data from the base surface were exported at 5-meter resolution from the finalized base surface. A MapBasic utility[20] was used to evaluate base surface soundings within an appropriate search radius of the charted depth or feature. Chart comparison recommendations and comments are recorded as an attribute of a digital MapInfo radius table and compiled to a final chart comparison workspace and plot.

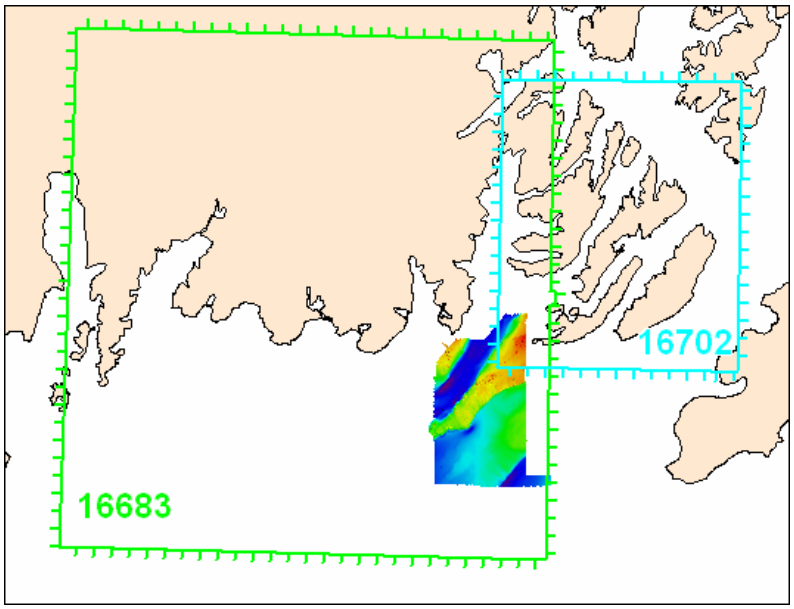

Figure 5. Chart Comparison

Chart 16702

Most depths from chart 16702 disagree with the soundings from H11393; differences vary from 1 – 7[21] fathoms.

The majority of the survey soundings differ from charted soundings by only 0-3 fathoms, however there are three areas in particular that are 3-7[22] fathoms shoaler than charted (figures 6-8):

- Area a, 5 fathom difference 59° 55’ 56.0” Lat, 148° 17’ 3.2” Lon
- Area b, 7 fathom difference 59° 54’ 39.9” Lat, 148° 18’ 20.2” Lon
- Area c, 5 fathom difference 59° 54’ 12.4” Lat, 148° 16’ 0.8” Lon

Outdated soundings on the chart are due to older survey tools and possibly geologic activity. Review of SWMB data in CARIS HIPS 5 meter density BASE surface and 3-D subset editor reveals what looks be uplift from the earthquake of 1964 (noted on chart). Figures 6-8 also show that the charted soundings do not consistently line up with shoalest points. Incorrect soundings on the chart are mostly attributed to outdated survey technology (singlebeam and leadline), incapable of defining all points of least depth.[23]

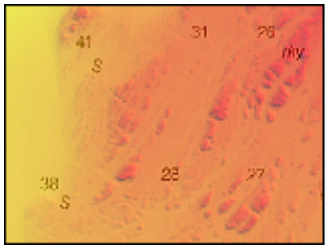

Figure 6. Area a

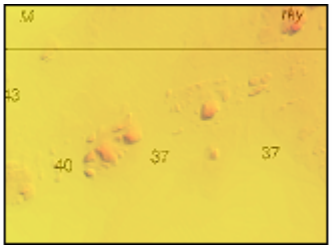

Figure 7. Area b

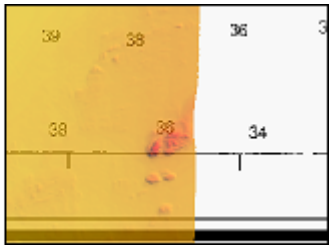

Figure 8. Area c

The hydrographer recommends that survey soundings from H11393 supersede current charted soundings.[24]

Chart 16683

Almost all depths from chart 16683 disagree with soundings from H11393; nearly the entire area is shoaler than charted.[25] Differences vary from 1 – 24 fathoms. Note: Discrepancies on the portion of chart 16683 that is overlapped by chart 16702 are not discussed in this section.

Differences greater than 5 fathoms were generally found along the edges and tops of ledges.[26] Prior surveys using lead line and singlebeam were incapable of thoroughly defining ledges and pinpointing the tops of all outstanding geologic features (figure 9). Thus in addition to the disagreement with charted soundings there are also numerous high points scattered between existing charted soundings that were previously undetected. In addition charted soundings can also be attributed to the uplifting effects of the 1964 earthquake.[27]

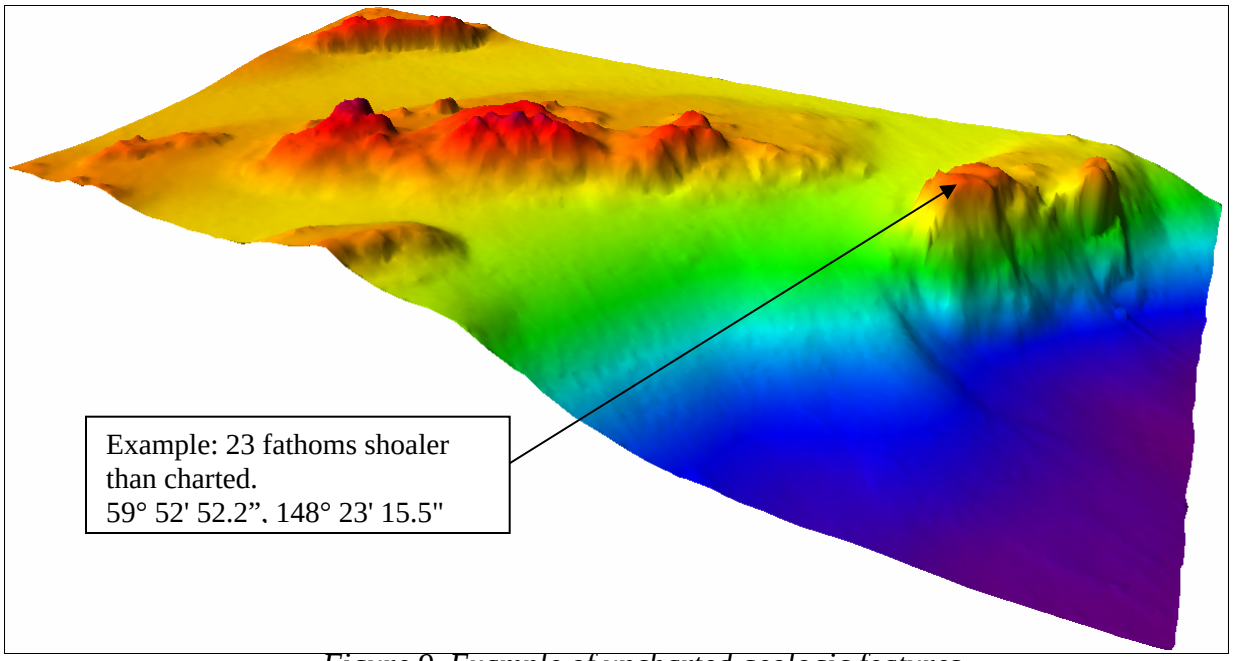

Figure 9. Example of uncharted geologic features

The hydrographer recommends that survey soundings from H11393 supersede current charted soundings.[28]

D.3 Shoreline

No shoreline data were acquired for this survey. The entire survey area is off-shore (figure 1).[29]

D.4 Dangers to Navigation and Shoals

D4.1 DTON

No dangers to navigation were reported for this survey.[30]

D4.2 Shoals

No navigationally significant shoals or features were observed during this survey.[31]

D.5 Aids to Navigation

No aids to navigation (ATONs) are located within the limits of H11393.[32]

D.6 Coast Pilot Information

There is no mention of this area in the coast pilot. The entire survey is off shore and unsuitable for anchoring.[33]

D.7 Miscellaneous

Bottom Samples

No bottom samples were collected for this survey. General depths were in excess of 100 meters. Characterization of the bottom for anchorage purposes was deemed unnecessary for the survey area.[34]

BASE Surface Deliverables

To meet the BASE surface collection requirements from section 4.2.6.3 of the Field Procedures Manual (FPM) four overlapping field sheets were created to accommodate the higher resolution BASE surfaces (figure 10). Each of the field sheets contains a 1, 2, and 5 meter BASE surface.[35]

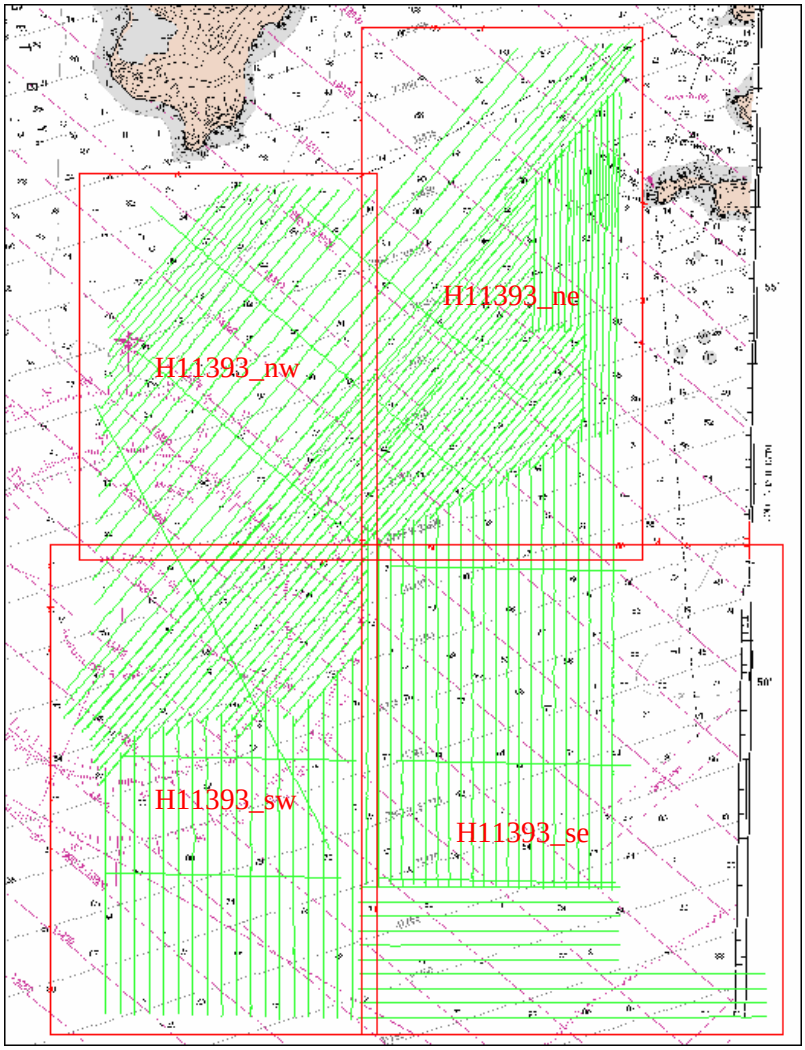

Figure 10. Overlapping Field Sheets

Software Versions

The following list specifies what versions and updates of Pydro and CARIS were used during the processing of H11393 data.

Preliminary Smooth sheet created with Pydro version o 4.9.3

Data converted with CARIS version 5.4, service pack 1 and hot fix 12.

BASE surfaces created with CARIS version 5.4, service pack 1 and hot fix 21.

D.7 Statistics

Vessel	Survey day	Linear nmi	SVP	Bottom Samples
DA	266	17.81	1	N/A
DA	267	40.83	3	N/A
DA	268	55.13	4	N/A
DA	276	101.24	5	N/A
DA	277	38.14	3	N/A
DA	279	57.41	3	N/A
DA	280	44.62	3	N/A
DA	281	92.21	4	N/A
DA	282	103.4	6	N/A
DA	283	2.35	0	N/A
DA	288	6.77	1	N/A
DA	293	27.48	7	N/A

Survey totals:

Survey days	Linear nmi	Square nmi	SVP	Bottom Samples
12	587.4	74.91	43[36]	N/A

D.9 Adequacy of Survey

This survey is considered complete and adequate to supercede prior surveys for requirements specified in the Project Letter Instructions.[37]

Summary and Recommendations for Additional Work

Survey H11393 is complete and adequate to supersede charted soundings in their common areas. No additional work is required for this survey.[38]

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition, Hydrographic Survey Guidelines, Field Procedures Manual and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for 2004.

The digital data and supporting records have been reviewed 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.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

Title	Date Sent	Office
Data Acquisition and Processing Report for OPR-P139-TC-04	TBD[39]	N/CS34
Horizontal and Vertical Control Report for OPR-P139-TC-04	TBD[40]	N/CS34
Tides and Water Levels Package for OPR-P139-TC-04	TBD[41]	N/OPS1
Coast Pilot Report for OPR-P139-TC-04	TBD[42]	N/CS26

Approved and Forwarded:

David A. Sinson
Physical Scientist, NOAA
Lead Hydrographer

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Survey Manager:

Peter S. Holmberg
Physical Scientist, NOAA

Revisions Compiled During Office Processing and Certification

[1] These correspond to sheet limits. Survey limits are Northern 59° 58’ 38.60”, Southern 59° 44’ 54.04”, Western 148° 34’ 26.52”, and Eastern 148° 7’ 29.73”
[2] Upon submission will be filed with project records.
[3] Concur
[4] Old name for survey sheet. Should be “H11393”.
[5] In Figure 2, chart shoreline does not match survey outlines, possible horizontal datum error in GIS.
The junctions with H11167, H11168, and H11172 have not been completed since these surveys are in office processing. The junction of these surveys with H11393 will be discussed in their Descriptive Reports.
[6] BASE is acronym for “Bathymetry Associated with Statistical Error”
Insert text: “as listed in the 2005 Draft Field Procedures Manual”
[7] Concur.
[8] Strike ~~base~~ Insert “BASE” for all references to BASE surfaces
[9] Strike ~~Did indicate errors~~ Insert “did not indicate errors”
[10] Strike ~~Did indicate errors~~ Insert “did not indicate errors”
[11] Concur.
[12] All soundings. None were designated.
[13] Upon submission will be filed with project records
[14] Final approved tides applied to BASE surfaces on 18 May 2005 in accordance with the Field Procedures Manual.
Final tide zoning file: H11393CORF.zdf
Tide Note attached to this report.
[15] Concur.
[16] Office comparison with chart 16683 10th ed. corrected through NM 7/04
[17] Office comparison with chart 16702 12th ed. corrected through NM 6/04
[18] Strike ~~shown~~ Insert “outlines of which are shown”
[19] Surface name: H11393_QC
[20] Custom MapBasic tool known as Chart Comparison
[21] A PHB comparison indicated differences of 1-9 fathoms.
[22] A PHB comparison indicated differences of 5-9 fathoms. Office chart comparison conducted using Caris HOM. Checks were made between BSB Charts and Caris HIPS-generated soundings from a generalized 5m Product Surface using a survey scale of 1:20,000. Additional differences include the following:
9 fathom difference at 59° 55’ 33.0” N, 148° 16’ 44.6” W
7 fathom difference at 59° 55’ 57.3” N, 148° 16’ 46.9” W
[23] Concur.
[24] Concur with the Hydrographer’s recommendation to supersede the current charted soundings.
[25] Concur.
[26] Concur.
[27] Strike ~~charted soundings can~~ Insert “.. the difference between charted soundings and the current survey may..”
[28] See endnote 24.
[29] Concur.
[30] Concur.
[31] Concur.
[32] Concur.
[33] Concur.
[34] Concur with clarification. Bottom samples in survey area should be retained in charts 16883 and 16702.
[35] No “Designated” soundings were selected, at high resolutions the BASE surface accurately depicted the shoal features.
A finalized, combined 5m resolution BASE surface with approved tides applied was created in Caris HIPS 5.4 on 18 May 2005.
[36] SVP Totals from D.7 Statistics table are 40 not 43. A total of 38 SVP files exist in the survey Caris/SVP directory. As compared to the survey SVP logs in the Original DR Seperates, there is one less cast from Day 267, one less cast from Day 277.
[37] See endnote 24.
[38] See endnote 24.
[39] See endnote 2.

[40] See endnote 13.
[41] 25 April 2005
[42] Not applicable.

APPROVAL SHEET
H11393

Initial Approvals:

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

Gary C. Nelson Date: 1 Dec 2005

Gary Nelson
Chief, Cartographic Team
Pacific Hydrographic Branch

I have reviewed the H-Cell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.

CDR/NOAA Date: 1 DEC. 2005

Donald W. Haines
CDR, NOAA
Chief, Pacific Hydrographic Branch

Digitally signed by Jeremy McHugh
Reason: AWOIS / SURF check complete
Date: 2005.12.05 10:31:22 -05'00'

H11393 H-Cell Supplemental Report

Project OPR-P139-TC-04
Port Bainbridge and Vicinity
Prince William Sound, Alaska
Survey Scale 1:20,000 Chart Compilation Scale 1:40,000
September-October 2004
NOAA Time Charter R/V DAVIDSON
Cartographer: PS Mark Amend, PHB

1. Compilation Purpose

The H11393 H-Cell is a submission of a NOAA navigational product update collected under the NOAA "Time Charter" contract for project OPR-P139-TC-04, Port Bainbridge and Vicinity, South Prince William Sound, Alaska. The H11393 multibeam sonar survey covered depths of 20.79 – 183.90 m and contained no Dangers to Navigation, Aids to Navigation, or survey features. S-57 feature objects were imported into the H-Cell from existing NOAA ENC products. As stated in the Descriptive Report, data from this survey will fully supersede all prior survey data within the survey perimeter.

The primary purpose of the H-Cell is to directly update the NOAA Nautical Chart with new survey information. A secondary purpose is to directly update NOAA ENCs. At this time, the deliverable contains S-57 objects that are compiled to maintain the appearance and quality of a traditional paper chart. The H11393 H-Cell will be used to update raster charts 16702 and 16683 and corresponding ENCs US5AK28M and US4AK2GM.

H-Cell compilation of survey H11393 was based on HSD H-Cell Guidelines 2.0 and OCS H-Cell Specifications Version 1.0.

The H11393 H-Cell is compiled at the largest scale nautical chart overlapping the survey area, Chart 16702, 1:40,000 (12th Ed.; Nov, 2004, NM 6/04). It should be noted that most of the survey extent resides in the region of Chart 16683, 1: 81,436 (10th Ed.; Feb, 2004, NM 7/04).

2. Soundings

2.1 Source Data

The complete BASE surface, **`Combined5m,`** located in fieldsheet **`All.des,`** was used as the basis for H-Cell compilation following survey certification at PHB.

A shoal-biased Product Surface called **`H11393_20_200_30`** was created using survey scale settings of 1:20,000, a buffer radius of 200 m, and a node spacing of 5 m to maintain the resolution of the source BASE surface. 30 m surface defocusing was also applied to broaden the shoals for contour displacement.

Because of relatively small (1-2 empty nodes) holiday gaps in swath coverage present in the BASE and Product Surfaces, interpolation was used to create the final compilation surface **H11393_20_200_30_Interp.** Interpolation operated on a 3x3 window (15 x 15 m) with a minimum of 6 neighbors.

2.2 Sounding Selection

A survey scale sounding layer was created using **H11393_20_200_30_Interp** in CARIS BASE Editor 1.0 beta. A selection radius of 5mm was used at 1:20,000 survey scale. Shoal areas and pinnacles were inspected to confirm the biased selection of the suppression routine.

Soundings were imported as HOB files into HOM 3.3 and assigned to CARIS map layer number 100.

2.3 Sounding Suppression

In CARIS HOM, a sounding suppression routine was applied to the survey scale density sounding layer 100 to emulate the spacing of soundings on chart 16702. Retained soundings were flagged as "Background", while suppressed soundings were flagged as "Suppressed".

2.4 Sounding Feature Objects

SOUNDG feature objects were created from the "Background" sounding spatial objects in HOM. Recent custom changes in CARIS software allowed for the maintenance of millimeter depth value precision through to the creation of the chart unit base cell file. NOAA rounding rules and thresholding to whole integers (at the 11 fathom cutoff) were applied to depth values upon creation of the chart unit 000 product.

3. Contours

3.1 Contour Creation

Contours were created in BASE Editor 1.0 beta. Contour values present in chart 16702 and/or ENC US5AK28M were specified in a metric depth list of fathom values found in OCS H-Cell Specifications 1.0 (Nov. 2005). Contours were assigned to a CARIS layer number 200, which was then used in HOM for Skin of the Earth (SOTE), Group 1 objects.

METERS	FATHOMS
18.517 *	10 *
92.812 *	50 *
184.252 *	100 *

* *values used for H11393 based on compilation chart.*

Contour lines were filtered using a 0.05 mm vertex tolerance to reduce the number of vertices per line segment.

3.2 Contour / Depth Area Feature Objects

The following series of VALDCO and DRVAL(1,2) values were then used in creation of depth areas to coincide with contours and/or the depth areas of US5AK28M and Chart 16702.

18.517 m
92.812 m
184.252 m

After CARIS QA tests were passed, these values were changed to true fathom equivalents using a custom utility. This step was necessary to maintain compatibility upon conversion to chart units, as NOAA rounding rules are not applied to VALDCO or DRVAL attributes.

4. Meta Area Objects

Meta areas were created through the duplication of the SOTE perimeter and attributed as described in OCS H-Cell Specifications 1.0.

5. Survey Features

Bottom samples as SBDARE features were imported into the H-Cell as Stand-Alone HOB files created following the import of NOAA ENCs US5AK28M and US4AK2GM into HOM. SCAMIN values were deleted from all imported features to comply with the OCS H-Cell Specifications 1.0. All other S-57 attribution was retained. Only those features within the survey perimeter are included in the H-Cell.

6. Shoreline / Tide Delineations

No shoreline features, including Mean Lower Low Water (MLLW) or Mean High Water (MHW) lines were used in the creation of H-Cell 11393.

7. Attribution

All S-57 Feature Objects have been attributed as described in OCS H-Cell Specifications 1.0.

8. Layout

8.1 CARIS HOM Layer Numbers

100	Soundings
200	Group 1 objects
30x	Bottom Samples imported from US5AK28M, US4AK2GM
600	Survey perimeter for Meta area objects

8.2 Blue Notes

Blue Notes were not considered necessary for H-Cell 11393.

9. Spatial Framework

9.1 Horizontal and Vertical Datum

The WGS-84 ellipsoid and MLLW (1983-2001 NTDE) tidal datum were used in H-Cell 11393.

9.2 Coordinate System

Both the CARIS map and the base cell file deliverables are in a LLDG geographic coordinate system.

9.3 Horizontal and Vertical Units

HOM Units

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest meter

Chart Unit Base Cell Units

Depth Units (DUNI):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

10. QA/QC

10.1 Prior Survey Comparison

Prior surveys examinations were not conducted for survey H11393.

10.2 ENC Validation Checks

H11393 was subjected to QA and Validation checks in HOM prior to altering the VALDCO and DRVALs, as required to meet OCS H-Cell Specifications 1.0. Full millimeter precision was retained in the export of the metric S-57 data set. This data set was then converted to a chart unit 000 file. dKart Inspector 5.0 was then used to further check the data set for conformity using the S-58 ver.2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary. Acceptable errors were only those provided in advance by MCD.

11. Products

11.1 Branch Deliverables

- CARIS HOM H-Cell, 1:20,000
- MCD Chart Units Base Cell File (*_*cu.000*), 1:40,000
- MCD Chart Units Base Cell File soundings only (*_*ss.000*), 1:40,000
- H-Cell Supplemental Report
- Descriptive Report with endnotes from cartographic review

11.2 File Naming Conventions

CARIS HOM file set prefix: *11393_hc*

Chart units base cell file: *US511393_cu.000*

Chart units base cell file, survey scale density sounding set: *US511393_ss.000*

11.3 Software

HIPS 5.4:	Management and creation of BASE and Product Surfaces
BASE Editor 1.0 beta:	Creation of the sounding layer and contours
HOM 3.3:	Creation of the H-Cell, S-57 products, QA
GIS 4.4a:	Setting the sounding rounding variable
dKart Inspector 5.0:	Validation of the base cell file

12. Contacts

Inquiries regarding this H-Cell content or construction should be directed to:

Mark Amend, Physical Scientist, Production Team, PHB, Seattle, WA 206-526-6839, mark.amend@noaa.gov

Appendix A: FEATURE OBJECT GUIDE

CARIS HOM Layer Structure

Layer	Spatial Object Description	S-57 Feature Object
100	Soundings	SOUNDG
200 **SOTE**	Depth Areas Depth Contours	DEPARE DEPCNT
300	Bottom Samples – Survey and ENC point objects	SBDARE
600	Survey Perimeter, Bounding Box	M_QUAL, M_COVR, M_NSYS