H11130

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-O112-TC-04**

Registry No. **H-11130**

LOCALITY

State **Alaska**

General Locality **Sitka Sound**

Sublocality **Vicinity of Vitskari Rocks**

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-11130

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 **Sitka Sound**

Sublocality **Vicinity of Vitskari Rocks**

Scale **1:10,000** Date of Survey **10/27/04-10/28/04**

Instructions Date **September 22, 2004** Project No. **OPR-O112-TC-04**

Vessel **R/V DAVIDSON, LAUNCHES D2 and R2**

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

Surveyed by **SAIC Personnel**

Soundings taken by echo sounder,hand lead,pole **RESON 8111 MB (DAVIDSON)**
RESON 8101 MB (D2), RESON 8125 MB (R2)

Graphic record scaled by **N / A**

Graphic record checked by **N / A**

Evaluation by **D. Sinson, B. Johnston, LT JG J.Lomnicky, S.Allen, M. Amend**

Verification by **D. Sinson, B. Johnston, LT JG J.Lomnicky, S. Allen, M. Amend**

Soundings in **Fathoms** 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 H-11130 [1]

Project OPR-O112-TC-04
Sitka Sound, Alaska
Scale 1:10,000
October 2004
NOAA Time Charter R/V DAVIDSON
Lead Hydrographer: PS David A. Sinson, NOAA
Survey Manager: Bonnie Johnston, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-O112-TC-04, dated September 22, 2004, and the Draft Standing Project Instructions dated March 23, 2004. The survey area includes the deep waters of Sitka Sound, Alaska in the vicinity of Vitskari Rocks. Operations for this survey were limited to ship multibeam acquisition due to the brief time available and unstable weather conditions. Multibeam sonar bathymetry and snippet side-scan data were acquired in depths appropriate for the Reson 8111ER (~ 40 – 250 meters) at the request of the Alaska Department of Fish and Game (ADFG) to map essential fish habitat in Sitka Sound.[2] Refer to the project letter instructions for additional information about the ADFG contact, Cleo Brylinski.

Northern Limit[3]	Southern Limit	Western Limit	Eastern Limit
57° 2' 30.50" N	56° 58' 21.58" N	135° 27' 48.21" W	135° 38' 42.53" W

Data acquisition was conducted from October 27 to October 28, 2004 (Julian day numbers 301 to 302).

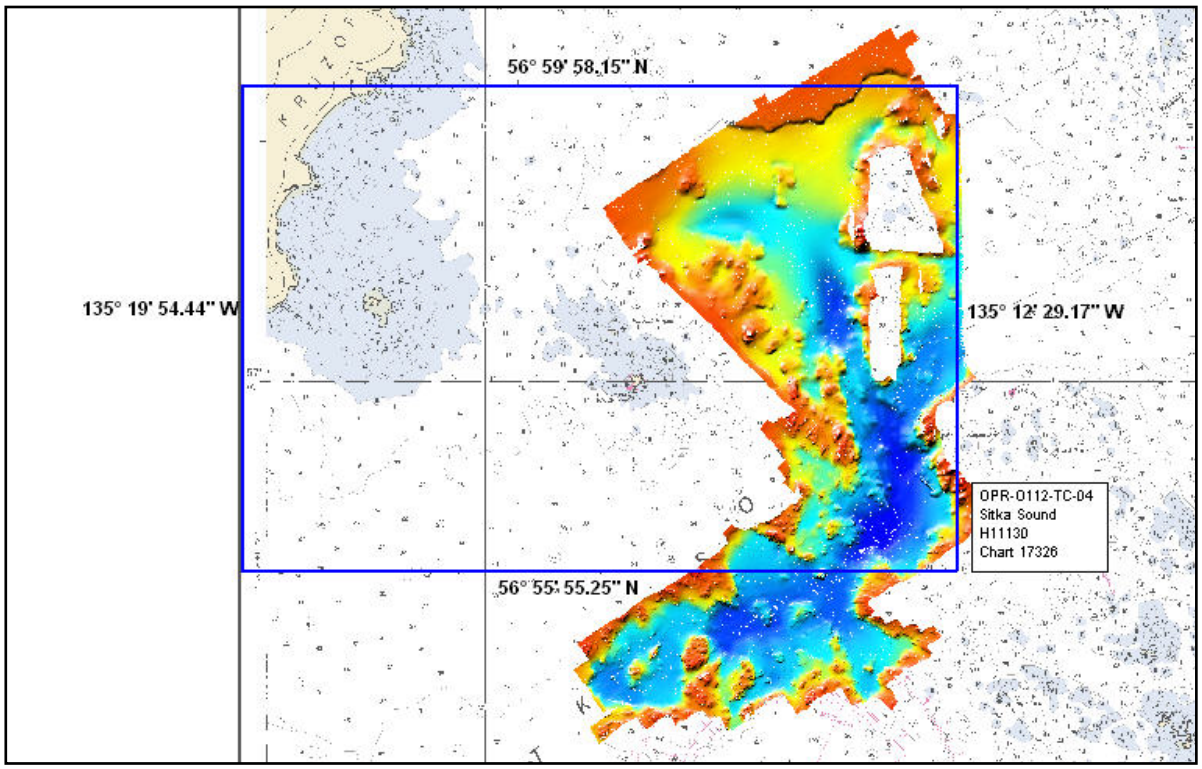


Figure 1. *OPR-O112-TC-04 Survey H11130 limits and coverage.*

B. DATA ACQUISTION AND PROCESSING

Refer to ***OPR-O112-TC-04 Data Acquisition and Processing Report (DAPR)*** [4] for a complete description of data acquisition and processing systems, survey vessels, 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.

B1. Equipment and Vessel

Data were acquired by the R/V DAVIDSON, using a Reson 8111ER echosounder system to obtain mid-water multibeam soundings (MWMB) in depths generally greater than 40 meters. Sound velocity profile (SVP) casts were collected regularly during multibeam acquisition to model sound speed through the water column. Surface sound velocity was measured continuously at the transducer to correct acoustic pitch steering. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

B2. Quality Control

B2.1 System Installation

Refer to ***OPR-P139-TC-04*** [5] ***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.

Prior to performing the QC analysis of the submitted survey data, a BASE Surface uncertainty-weighted grid of the soundings, was generated in Caris HIPS and SIPS 5.4. The threshold for acceptable uncertainty was set to IHO Order 1 tolerances. The optimal grid resolution to represent the variability in the data, was selected based on the depth range of the survey and the resolution of the multibeam acquisition system (Reson 8111ER) at those depths. For Survey H11130, a BASE surface with a resolution of 5 meters was used to QC review and clean the data. BASE surfaces of 2, 5, and 10 meter resolution were created for branch submission.

B2.2 Crosslines

Multibeam echosounder crosslines totaled 5.23 nautical miles, comprising 5.9 % of MWMB hydrography. Crossline soundings were evaluated with respect to main scheme soundings in Caris HIPS 5.4 subset area editor and gridded BASE surface models. The most significant offset was observed between main scheme lines and the outer beams of crossline damba04302_d21. The offset was generally less than 1 meter and occurred at an approximate depth of 180 meters (Figure 2). At such depth, an offset under 1 meter is acceptable within survey specifications and is most likely attributable to sound velocity correction in deep water. In general, there was good agreement between soundings and no significant systematic or water level offsets were observed during sounding subset and base surface analysis.

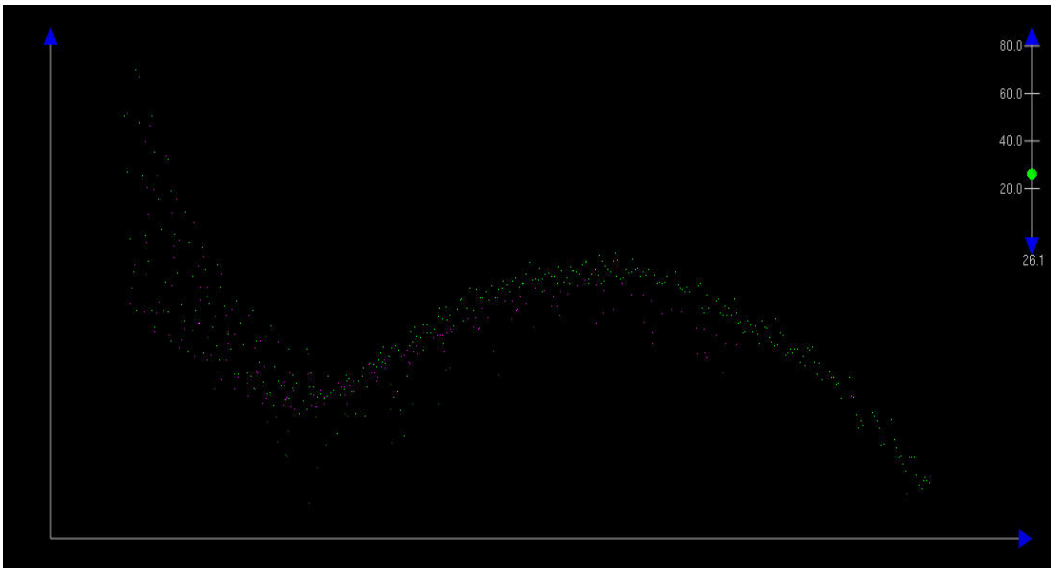


Figure 2. *Offset between crossline (purple) and mainscheme line (green) shown in Caris HIPS 5.4 Subset Editor.*

B2.3 Junctions

The following contemporary survey junctions with survey H11130:

Registry #	Scale	Date	Junction side
H11119	1:10,000	2004	North

Survey H11119 (OPR-O112-RA-04) was conducted by the NOAA ship RAINIER during the same field season and is not yet available for review. A junction comparison between the two surveys will be completed in the branch office.[6]

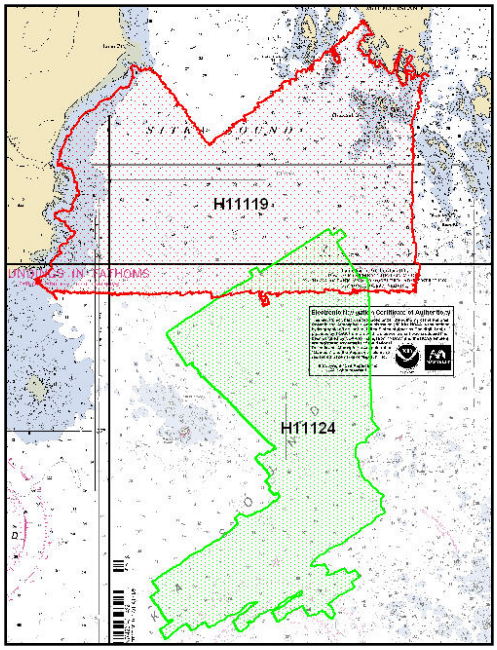


Figure 3. *Junction area of surveys H11130 and H11119.*

B2.4 Data Quality Factors

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 water column conditions in the survey area. Surface sound velocity was monitored continuously on the DAVIDSON with the Reson 8111ER to ensure correct beam formation. Surface sound velocity was used by the 8111ER for correct beam formation, a necessary parameter for pitch stabilization. Changes in surface sound velocity were also evaluated as an indicator of changes in the water column sound velocity.

There was some disagreement found in the outer beams primarily in deep water ranging between 180-225 meters (Figure 4). An example of the offset is shown below in Figure 5. Outer beams of line damba04302_d13, represented by blue soundings, follow a convex bend typical of the characteristic "frown" associated with errors in SVP correction. Offsets did not exceed 2 meters and are most likely due to inaccurate sound velocity correction in large depths. Aside from the offsets observed in the deepest waters of the survey region, there was very good agreement (< 1 meter) of depths between overlapping outer beams of survey lines.

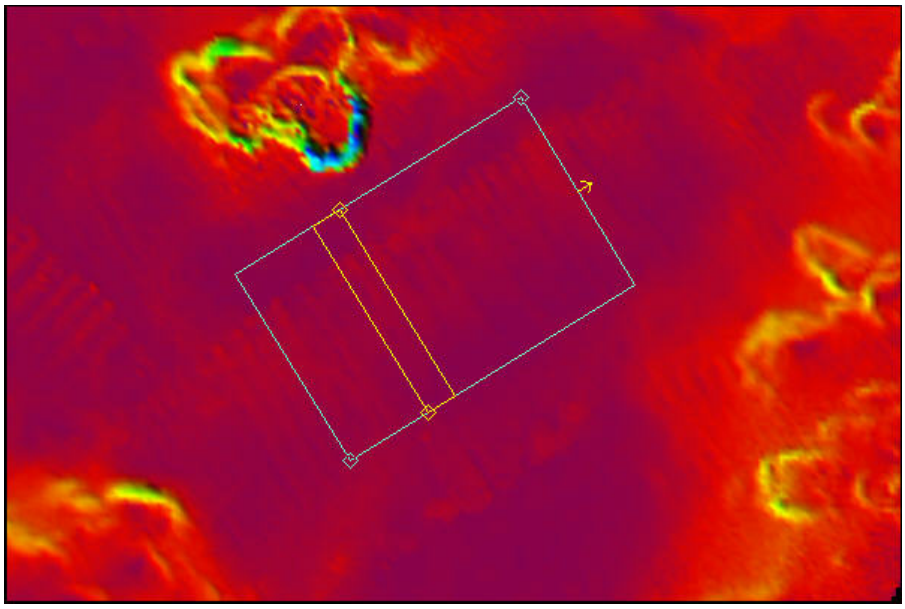


Figure 4. *Evidence of line offset in the standard deviation layer of the Caris HIPS 5.4 BASE Surface.*

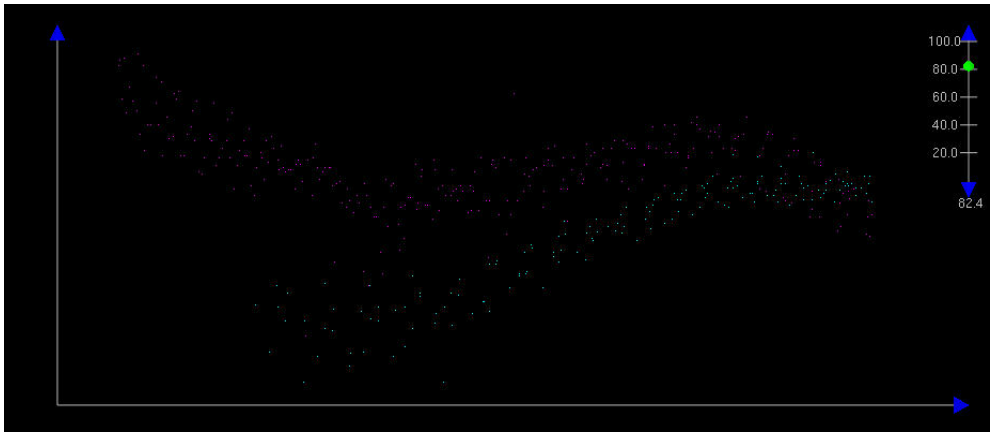


Figure 5. *Line offset in outer beams of survey H11130 shown in Caris HIPS 5.4 Subset Editor.*

B2.4.2 Water level correction

ISS2000 applies predicted water-level correctors with CO-OPS supplied zoning in real-time during echosounder acquisition. Observed tides from the primary tide gauge were applied to soundings prior to NOAA quality review in Caris HIPS/SIPS 5.4. Soundings from crosslines and overlapping lines were examined in 3-D sounding subsets and BASE 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

BASE surfaces were evaluated 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 0.00 – 18.828, having been reduced to a value that corresponded to general bathymetric relief for the survey area. The highest standard deviation values were observed over features in deep water, where rapid shoaling occurred near steep slopes. Soundings from multiple lines were evaluated when possible to distinguish noise from bathymetric features.

B2.4.4 Systematic Errors

BASE surfaces were evaluated to identify systematic errors in data correctors including motion, attitude, tide and sound velocity. Sunlight illuminated surface digital terrain models (DTM) were evaluated to find errors in heave, pitch and roll correction. Standard deviation surface models were evaluated to find areas where disagreement occurred between multiple lines – an indication of errors in tide or sound velocity correction.

A striping pattern across track was observed in data acquired on JD 302. Sea conditions were rough on this date, with winds recorded at 20-30 knots and waves measured at 8-10 feet. The rough weather conditions may have interfered with the accuracy of the pitch correction, accounting for the striping visible on the depth layer of the BASE surface (Figure 6) and across-track alignment of soundings (Figure 6a).[7]

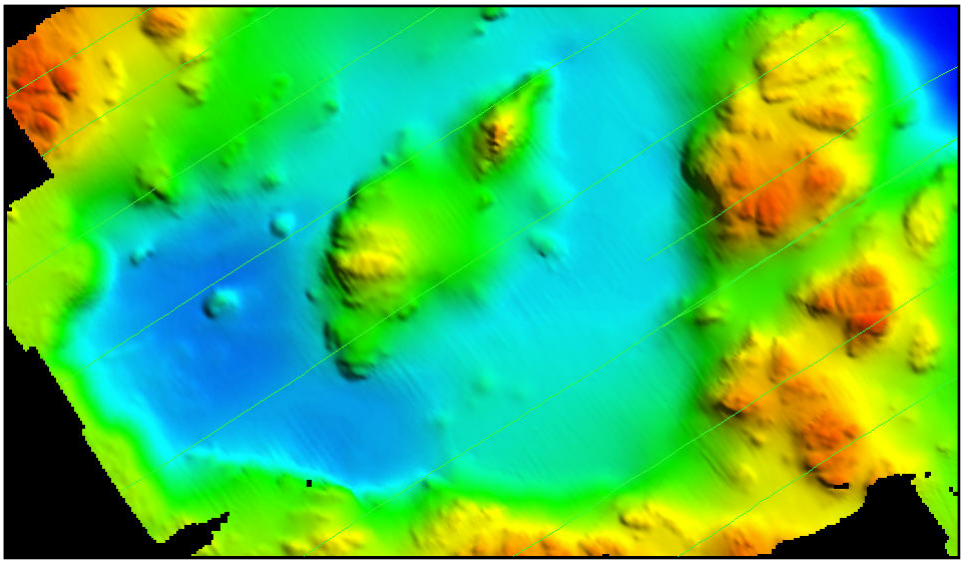


Figure 6. *Evidence of Systematic Errors in the depth layer of the Caris BASE Surface.*

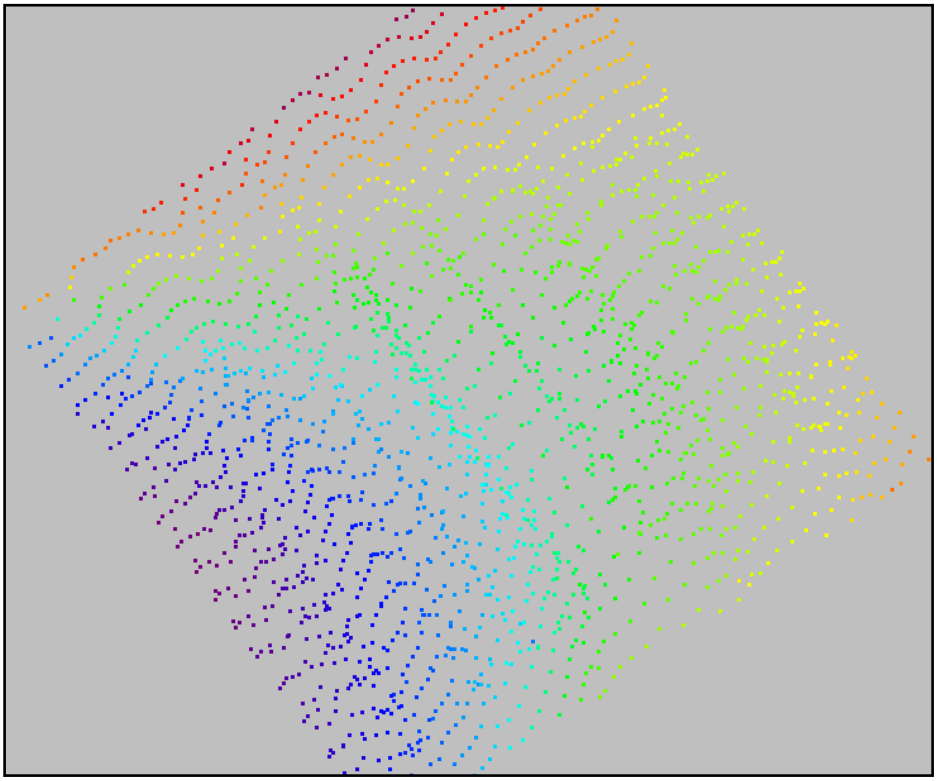


Figure 6a. *Evidence of Systematic pitch error in soundings.*

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 DAVIDSON. Easting, Northing, Depth (E, N, d) data were imported into MapInfo and re-gridded in Vertical Mapper. DTMs were subsequently evaluated for

coverage and delineation of the 8-meter inshore limit. Final sounding coverage was evaluated in CARIS HIPS/SIPS 5.4 using BASE surface DTM, TPE and sounding density models. There were no significant holidays observed in a 5-meter resolution BASE surface within the scope of survey coverage.[8]

B2.4.6 Swath Angle Filtering

All soundings were filtered to within 55 degrees of nadir for mutibeam echosounder bathymetry to increase confidence in sounding accuracy and minimize sound velocity errors. In some instances, outer-beam soundings were reaccepted to fill small gaps in coverage between lines. All soundings used to create the final BASE surfaces met IHO Order 1 error tolerances.

B2.4.7 Total Propagated Error (TPE)

Raw soundings were not filtered for TPE.[9] BASE surfaces were created from soundings filtered for TPE values that met IHO Order 1 tolerance. TPE filtering increased the overall confidence of sounding accuracy based upon system parameter settings in the Caris Vessel Configuration File (.hvf). Caris configuration files were created from manufacturer system performance specifications and offsets provided by SAIC from the System Acceptance Test (SAT). Caris configuration files for the launches and 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 1.00 – 2.026 meters in water depths ranging from 30 – 230 meters. All soundings are qualified by an associated TPE confidence value.

In areas where outer-beam data was re-accepted to cover holidays, TPE values were largest, exceeding 1 meter (Figure 7). The increased uncertainty in this region is due to higher errors associated with beam spreading, sound velocity correction, angular motion, and lower sounding density at outer beams. All BASE surface soundings met IHO Order 1 tolerances. [10]

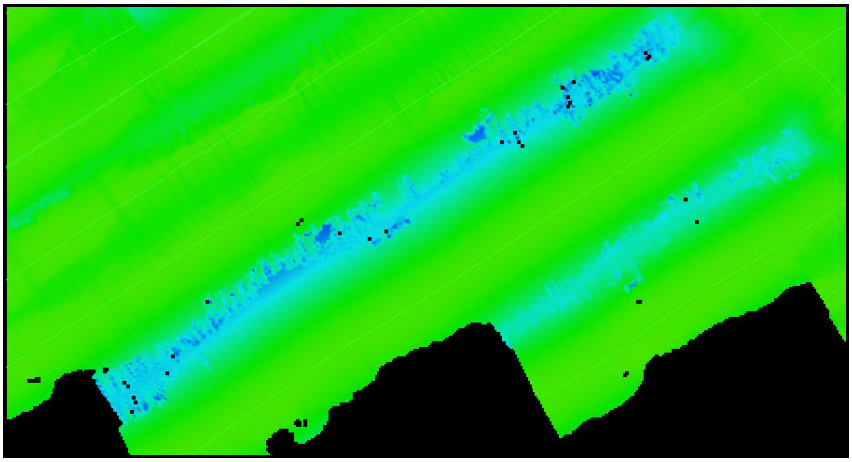


Figure 7. *High TPE values (blue) in areas of outer beam re-acceptance shown in the uncertainty layer of the Caris HIPS 5.4 BASE Surface.*

B3. Water Level Datum Reduction

HDCS sounding data were reduced to mean lower-low water (MLLW) using verified tides from the primary station at Sitka, AK (945-1600). Verified tides were adjusted for zoned range and amplitude correctors provided by CO-Ops as specified in the project instructions and illustrated in Figure 8.

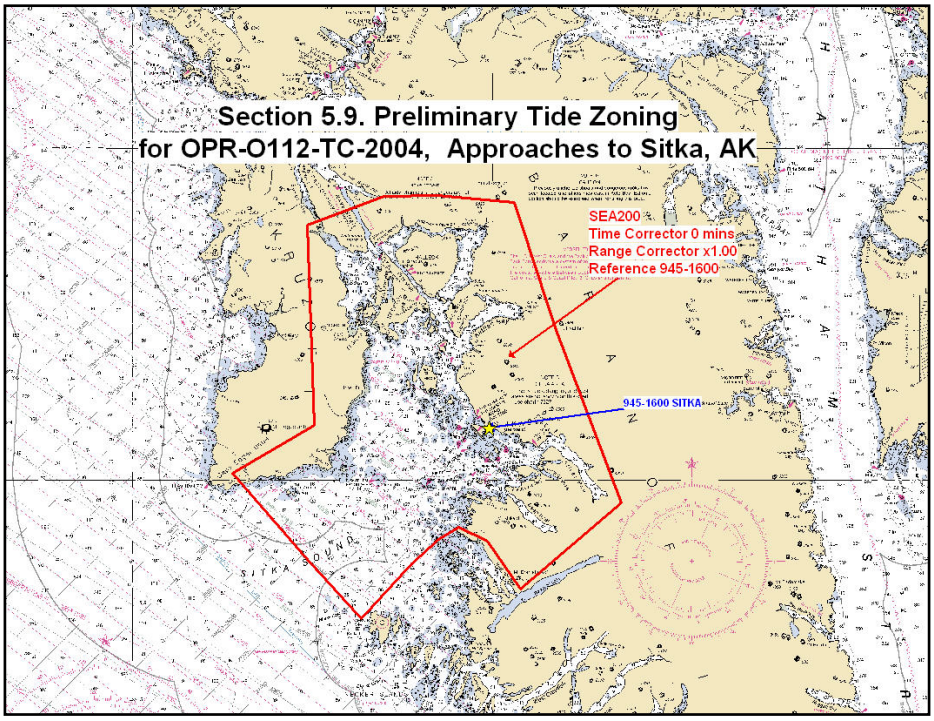


Figure 8. *OPR-O112-TC-04 Survey H11130 Tide Zoning Limits.*

These data and correctors were also used to reduce soundings and heights of detached positions (DPs) to MLLW when acquired relative to a local water-level datum.

All other datum reduction procedures conform to those outlined in the ***DAPR***.

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H11130 can be found in the ***OPR-O112-TC-04 Horizontal and Vertical Control Report***.[11] 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 Annette Island and Gustavus were utilized during this survey. DGPS Confidence checks were performed daily by comparing positions acquired by primary (POS/MV) 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 station at Sitka, AK (945-1600) will serve as control for datum determination and as the primary source for water level reducers for survey H11130.

The Pacific Hydrographic Branch will apply final approved (smooth) tides to the survey data during final processing. A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 on December 1, 2004 in accordance with the FPM and project letter instructions. [12]

D. RESULTS AND RECOMMENDATIONS

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

No AWOIS items were located within the limits of H11130.[13]

D.2 Chart Comparison

Survey H11130 was compared with chart 17326 (13th Ed.; August 2000, 1:40,000).[14] Chart comparisons were performed in MapInfo Professional 7.5 using xyz (E,N,d) sounding data exported from the final Caris BASE surface.[15] Xyz data from the BASE surface were exported at 5-meter resolution from the finalized BASE surface. BASE surface soundings were reviewed within an appropriate search radius of the charted depth or feature. Chart comparison recommendations and comments were recorded as an attribute of a digital MapInfo radius table and compiled to a final chart comparison workspace and plot.

Chart 17326
Depths from charts 17326 generally agree with sounding depths from survey H11130, with differences generally less than 0.5 fathoms.[16] In the northern region of the survey, there was a trend of survey soundings being slightly shoaler than the charted soundings, with differences of 1 – 4 fathoms charted in green in Figure 9 below.[17]

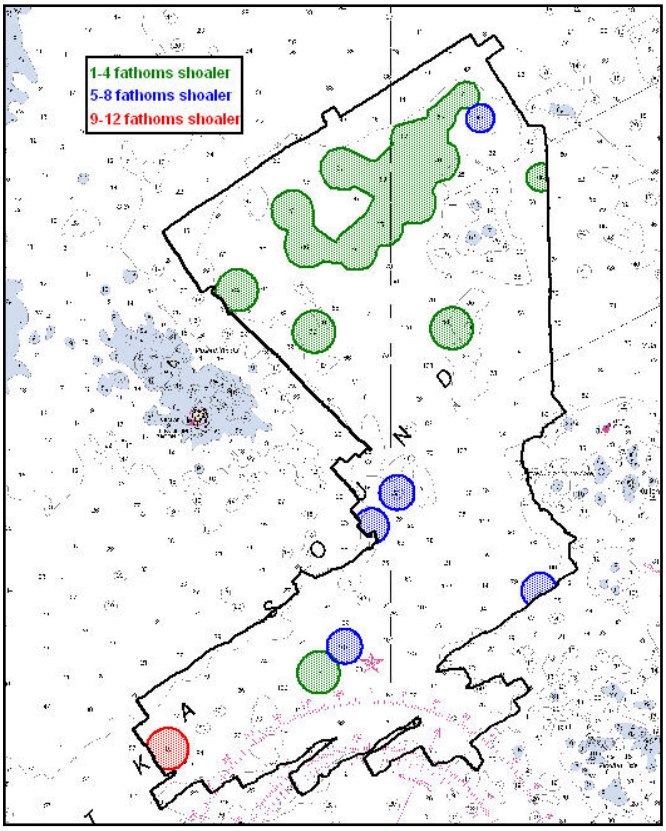


Figure 9. *Chart Discrepancies for Survey H11130: Shoaler Soundings.*

There were several occurrences where survey soundings over or in the vicinity of charted soundings were greater than 4 fathoms shoaler than charted depths (Figure 9). Positions of these instances are listed in Table 1 below, along with the difference between survey and charted depths. [18]

Charted Sounding (fm)	Survey Sounding (fm)	Sounding Difference (fm)	Coordinates		Comment
			Latitude	Longitude	
42 [19]	37	5	57° 02' 17.8'' N	135° 28' 44.8'' W	Shoal Sounding in Vicinity, within a 200-m radius.
50 [20]	45	5	56° 59' 24.3'' N	135° 29' 54.9'' W	Shoal Sounding in Vicinity, within a 250-m radius
41 [21]	33.4	7.6	56° 58' 38.6'' N	135° 27' 54.3'' W	Shoal Sounding in Vicinity, within a 250-m radius
50 [22]	42.4	7.6	56° 59' 5.75'' N	135° 30' 17.0'' W	Shoal Sounding Beyond 50-fm Contour, within 250-m radius
107 [23]	101.2	5.8	56° 58' 12.9'' N	135° 30' 39.5'' W	Shoal Sounding Over Charted Sounding
109 [24]	97	12	56° 57' 25.6'' N	135° 33' 8.75'' W	Shoal Sounding Over Charted Sounding

Table 1. Shoaler

Some areas of the survey were revealed to be deeper than the charted soundings. The most pronounced example was the discovery of a 90.8-fathom sounding over a charted depth of 73 fathoms at **57° 00' 19.8''**

N, 135° 28' 33.6'' W. Table 2 lists the coordinates of the charted soundings where survey soundings recorded deeper depths. [25]

Charted Sounding (fm)	Survey Sounding (fm)	Sounding Difference (fm)	Coordinates		Comment
			Latitude	Longitude	
39	44.7	5.7	57° 02' 38.5'' N	135° 29' 28.9'' W	Survey Sounding Deeper than Charted
60	64.9	4.9	57° 01' 38.6'' N	135° 28' 0.59'' W	Survey Sounding Deeper than Charted
56	61.5	5.5	57° 01' 40.1'' N	135° 30' 29.7'' W	Survey Sounding Deeper than Charted
73	90.8	17.2	57° 00' 19.8'' N	135° 28' 33.6'' W	Survey Sounding Deeper than Charted

Table 2. Observed depths deeper than charted

All areas discussed in this section were covered with 100% multi-beam. Differences between charted and observed depths are probably attributed to modern methods used for this survey, irregular seafloor topography and the high resolution and 100% sonar coverage.[26] Final sounding comparisons, selection and designations will be made after the application of smoothed tides.

D.3 Dangers to Navigation and Shoals

D3.1 DTON

No dangers to navigation were reported for this survey. Shoal soundings and features are listed and described in the following section.[27]

D3.2 Shoals

This survey primarily addressed water depths exceeding 40 meters. Shallow water acquisition with the ship was limited due to size and maneuverability constraints, as well as resolution limitations of the Reson 8111 sonar frequency. Depths recorded for this survey ranged between 16.8 and 124.4 fathoms (30 – 230 meters). Multi-beam was not acquired over charted (17326) shoal areas within the sheet limits of H11130, and will require additional survey operations in the future.[28]

D.4 Aids to Navigation

No aids to navigation (ATONs) are located within the limits of H11130.[29]

D.5 Coast Pilot Information

Survey findings were consistent with those documented in the Coast Pilot 2004 (26th) Edition.[30]

D.6 Miscellaneous

Bottom Samples

No bottom samples were collected during this survey.[31]

D.7 Statistics

Vessel	Survey day	Linear nmi	SVP	Bottom Samples
DA	**301**	**45.39**	**3**	**N/A**
DA	**302**	**57.33**	**4**	**N/A**

Survey totals:

Survey days	Linear nmi	Square nmi	SVP	Bottom Samples
2	**102.72**	**14**	**7**	**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 within the scope and limits of 2004 operations. [32]

Summary and Recommendations for Additional Work

This survey provides continuous, 100% multibeam echosounder coverage of the deeper waters of Sitka Sound in the vicinity of Vitscari Rocks and does not include shallow water, shoals and shoreline for the survey limits defined in the project instructions.[33] High fishing, commercial, cruise line and small-craft vessel traffic observed and reported in this area warrants additional operations for a full navigable area survey.[34]

This area is exposed to open-sea winds, swell and surf. Weather patterns were extremely unpredictable and forecasts were unreliable in late October. In general, survey operations were conducted in high winds and heavy seas, and terminated when it was deemed unsafe to acquire CTD casts. Additional survey operations should be scheduled to coincide with more seasonable weather.[35]

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[36]	TBD[37]	N/CS34
Horizontal and Vertical Control Report for OPR-P139-TC-04[38]	TBD[39]	N/CS34
Tides and Water Levels Package for OPR-P139-TC-04[40]	April, 21, 2005	N/OPS1

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:

Assistant Survey Manager:

for Bonnie Johnston
ECO Intern, NOAA

Revisions Compiled During Office Processing and Certification

[1] Replaced P139B1 with H-11130
[2] No filed records support this request other than printed ADFG contact information in the Letter Instructions.
[3] These are the original sheet limits, survey limits are Northern 57° 3' 14.31"N, Southern 56° 56' 41.68"N, Western 135° 34' 31.15"W, and Eastern 135° 26' 46.53"W
[4] Filed with project records
[5] Strike ~~OPR-P139-TC-04~~ Insert OPR-O112-TC-04
[6] A survey junction comparison with H11119 (northern boundary of H11130) was conducted during Office Review. The surveys agree to within 1 meter in average water depths of over 100m for the vast majority of the overlapping areas. The greatest differences were in small areas of high vertical relief, with a maximum of 9.04 meters.
[7] All BASE surface soundings met IHO Order 1 tolerances.
[8] Concur.
[9] Raw soundings, unfiltered by TPE, were delivered on-board by the Time Charter contractor to NOAA Personnel for the creation of gridded products.
[10] Concur.
[11] Filed with project records
[12] Final approved tides were received by PHB on May 19, 2005. Tide zoning file H11130CORF.zdf was applied to HDCS data in CARIS HIPS 6.0 on February 16, 2006 during final survey certification.
[13] Concur.
[14] PHB chart comparison used Chart 17632 14th Edition, June 2005, corrected through NM 01/14/2006.
[15] PHB chart comparison performed using Combined 5m BASE surface displayed in chart units in CARIS BASE Editor 1.0.
[16] Concur with clarification. Upon PHB review, charted soundings generally agree within 1 fathom. See endnotes 16-23 for a description of more notable discrepancies.
[17] Do not concur. Using the Combined Surface during office review, no trend, either shoaler or deeper, was observed. In general, differences of three fathoms shoaler to 5 fathoms deeper than charted were found in the northern region of the survey.
[18] The largest differences, greater than 5 fathoms, occur in water depths greater than 100 fathoms.
[19] During office comparison, the following was noted in this location: Charted depth: 42; H-11130 depth: 42; A nearby 36 fathom depth was selected for compilation.
[20] During office comparison, the following was noted in this location: Charted depth: 50; H-11130 depth range: 44-66; The 44 fathom depth was selected for compilation.
[21] During office comparison, no charted depth was found in or near this location.
[22] During office comparison, the following was noted in this location: Charted depth: 41; H-11130 depth: 42.
[23] See endnote 17.
[24] See endnote 17.
[25] Concur.
[26] Concur.
[27] Concur.
[28] Concur with clarification. OPR-O112-RA-05, H-11271, covered these shoal depth regions. Survey H-11271 had not been submitted to PHB for review by the time survey H-11130 was being processed.
[29] Concur.
[30] Concur with clarification. PHB review found consistency with information documented in the Coast Pilot 2006 (28th) Edition.
[31] Bottom samples were digitized to the H-Cell from chart 17326. See "H-11130 H-Cell Supplemental Report", section 5, "Additional Survey Features" for details.
[32] Concur.
[33] Strike ~~Vitscari~~ Insert Vitskari
[34] Do not concur. See D.9 Adequacy of Survey. Additional work is not required.
[35] See endnote 34.
[36] Strike ~~OPR-P139-TC-04~~ Insert OPR-O112-TC-04; DAPR Transmittal date: 8/4/2005.
[37] Filed with project records
[38] Strike ~~OPR-P139-TC-04~~ Insert OPR-O112-TC-04; Horizontal and Vertical Control Report Transmittal date: 8/4/2005.

[39] Filed with project records
[40] Strike ~~OPR-P139-TC-04~~ Insert OPR-O112-TC-04

H-11130 H-Cell Supplemental Report

Project OPR-O112-TC-04
Survey Scale 1:10,000 Chart Compilation Scale 1:40,000
Cartographer: PS Mark Amend, PHB

1. Compilation Purpose

The H11130 H-Cell is a submission of a NOAA navigational product update collected under the NOAA "Time Charter" contract, project OPR-O112-TC-04, Vicinity of Vitskari Rocks, Sitka Sound, Alaska. The H11130 survey covered depths of 30.119 to 227.598 m and contained no Dangers to Navigation (DtoN) or shoreline features.

H-Cell compilation of survey H11130 utilized HSD H-Cell Guidelines 2.0 and OCS H-Cell Specifications Version 1.1 (March 2006). The compilation is based on Chart 17632 14th Edition, June 2005, corrected through NM 01/14/2006. The H11130 H-Cell will be used to update charts 17326, 17327, 17320, and also ENC US2AK30M.

2. Soundings

2.1 Source Data

A 5 m resolution Combined BASE surface, H11130_Combined was used as the basis for H-Cell production following survey product certification. This surface contained no designated soundings.

A survey-scale full density sounding (SOUNDG) feature object source layer was built from the H11130_Combined surface in CARIS BASE Editor. A shoal-biased selection radius of 5 mm was used at 1:10,000 survey scale. A supplemental survey-wide DEPARE object was also created and included in this layer. The sounding feature object source layer was exported as H11130_sndgs_area.HOB.

2.2 Sounding Feature Objects
In CARIS HOM, a shoal-biased sounding suppression routine was applied to the survey scale density sounding layer to emulate the spacing of soundings on chart 17326. Chart density H-cell SOUNDG feature objects were created from "Background" and "Selected" sounding spatial objects in HOM.

3. Contours and Depth Areas

3.1 Source Data

A generalized Product Surface, H11130_PSrf was created from H11130_Combined using a buffer radius of 100 m and a node spacing of 5 m to maintain the resolution of the source BASE surface. To fill in small (1-2 empty nodes) gaps present in the Product Surface, interpolation was used in CARIS HIPS 6.0 to create a final compilation surface, H11130_PSrf_Interp. Interpolation operated on a 3x3 window (15 x 15 m) with a minimum of 6 neighbors. Contour and depth area feature objects were created from this surface in CARIS BASE Editor and exported as H11130_cntrs_depare.HOB.

3.2 Contour and Depth Area Feature Objects

Charted curve values present in chart 17326, listed below, were specified in a metric depth contour list of fathom curve-equivalents found in OCS H-Cell Specifications 1.1 (March 2006).

METERS	FATHOMS
5.715	3
18.517	10
37.948	20
92.812	50
184.252	100

Contour linework was smoothed using CARIS GIS, with the maximum smooth setting. This level of smoothing had no noticeable displacement effect on line location and worked best to smooth small jagged excursions. Contour lines were then filtered using a 0.05 mm vertex tolerance at map scale (1:10,000) to reduce the number of vertices per line segment.

The following series of DRVAL(1,2) values were used in the creation of depth areas to coincide with charted curves of Chart 17326 and the range of depth values in H11130.

18.517 m
37.948 m
92.812 m
184.252 m
367.132 m

4. Meta Areas

4.1 Source Data

H11130_PSrf_Interp was used as the source surface for Meta area objects. Meta areas were created and attributed as described in OCS H-Cell Specifications 1.1.

4.2 Meta Area Feature Objects

A single Meta layer of M_COVR was created as a feature object in BASE Editor and included in the feature file H11130_cntrs_depare.HOB. The spatial geometry of this feature object was then used as the basis for M_QUAL and M_NSYS area objects built in HOM.

5. Additional Survey Features

DP or AWOIS data were not collected for survey H11130.

Several charted SBDARE features from Chart 17326 were digitized in CARIS HOM. Charted features are distinguished by SORDAT and SORIND attributes.

6. Shoreline / Tide Delineations

No shoreline attributes, including Mean Lower Low Water (MLLW) or Mean High Water (MHW) lines were used in the creation of H-Cell 11130.

7. Attribution

All S-57 Feature Objects have been attributed as specified in OCS H-Cell Specifications 1.1.

8. Layout

8.1 HOM Layer Numbers

100	Soundings
200	Group 1 objects (Skin of the Earth)
300	Point features (SBDARE) digitized from Chart 17326
600	Other Group 2 objects (Meta layers)

8.2 Blue Notes

No Blue Notes were deemed necessary for H-Cell 11130. Digitized features from Chart 17326 are distinguished by SORDAT and SORIND attributes.

9. Spatial Framework

9.1 Coordinate System

Both the CARIS map and the base cell file deliverables are in a LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

9.2 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 Data Processing Notes

CARIS has designed special utilities to meet OCS H-Cell Specifications 1.1, accommodations for NOAA 's unique rounding, thresholding, and chart unit requirements. However, in order for soundings to maintain millimeter precision from HIPS throughout HOM processing, NOAA rules are not applied until after export to the base cell file. Once the HOM H-Cell has been exported to

the base cell file, soundings in millimeters are converted to feet, then rounded and threshold using NOAA rounding rules, and finally converted to fathoms and feet for chart display.

10.2 ENC Validation Checks

H11130 was subjected to QA and Validation checks in HOM prior to altering the VALDCO and DRVALs, as required to meet OCS H-Cell Specifications 1.1. Full millimeter precision was retained in the export of the metric S-57 base cell data set (000 file). 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.

11. Products

11.1 MCD Deliverables

- MCD Chart Units Base Cell File, 1:40,000
- MCD Chart Units Base Cell File - survey scale density soundings only, 1:40,000
- Descriptive Report with endnotes from cartographic review and H-Cell Supplemental Report appended
- Text file stating no Blue Notes were created.

11.2 File Naming Conventions

MCD Chart units base cell file: US511130_CU.000

MCD Chart units base cell soundings file: US511130_SS.000

11.3 Software

HIPS 6.0:	Management and creation of BASE and Product Surfaces
BASE Editor 1.0:	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; Smoothing contours.
dKart Inspector 5.0:	Validation of the base cell file

12. Contacts

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

Cathleen Barry, Cartographer, PHB, Seattle, WA 206-526-6841, cathleen.barry@noaa.gov

H-11130 AWOIS Items

No AWOIS items were assigned or investigated for this survey.

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : May 19, 2005

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O112-TC-2004
HYDROGRAPHIC SHEET: H11130

LOCALITY: Vitskari Rocks, Sitka Sound, AK
TIME PERIOD: October 27 - October 28, 2004

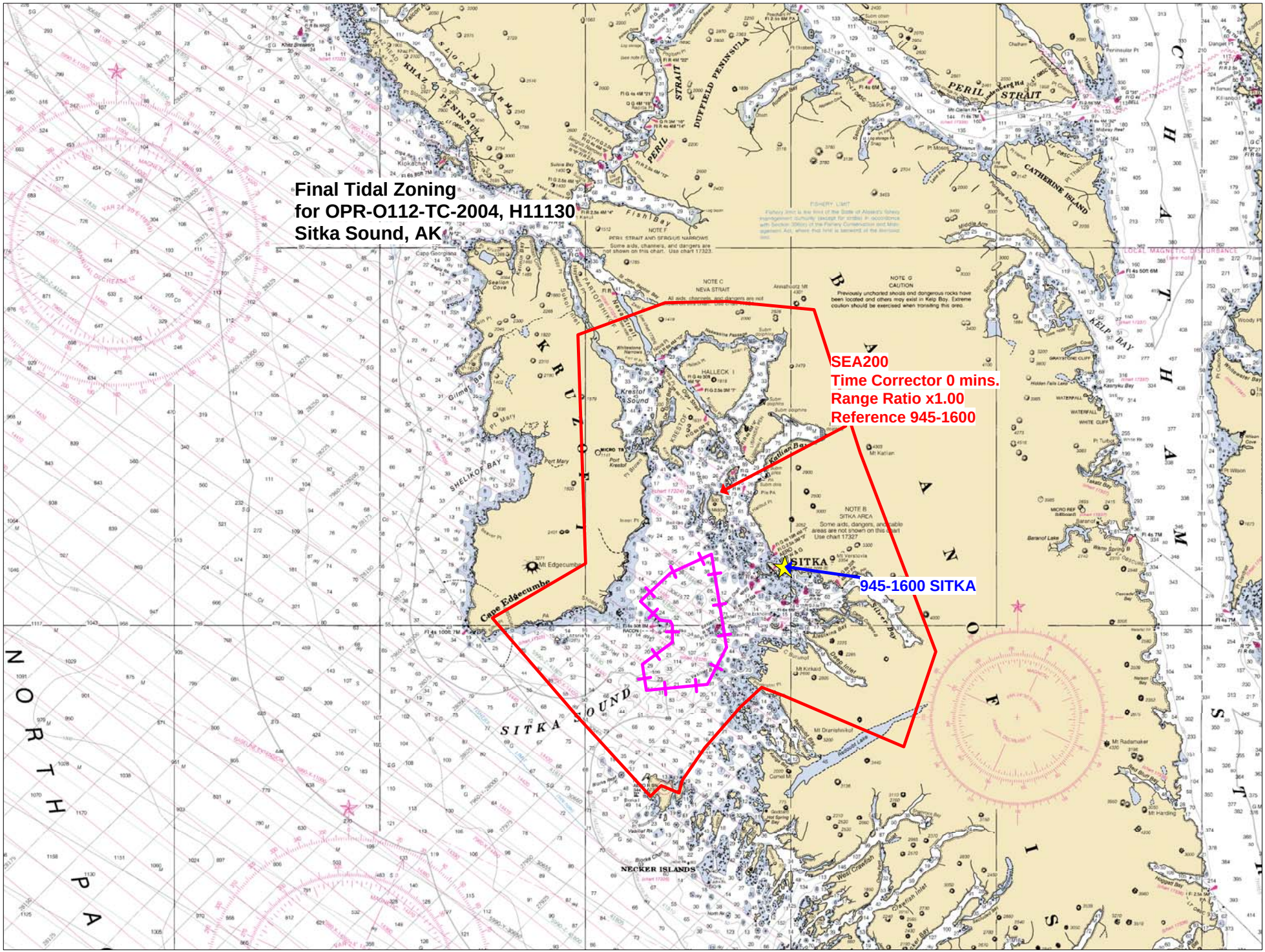
TIDE STATION USED: 945-1600 Sitka, Alaska
Lat. 57 03.1'N Long. 135 20.5' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.791 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SEA200

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 on the 1983-2001 National Tidal Datum Epoch (NTDE).

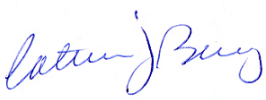
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION


Final Tidal Zoning
for OPR-O112-TC-2004, H11130
Sitka Sound, AK
SEA200
Time Corrector 0 mins.
Range Ratio x1.00
Reference 945-1600
945-1600 SITKA
SITKA
SITKA SOUND
KRUZOF I.
BARANOF I.
CHICHAGOF I.
NORTH PACIFIC OCEAN
DUFFIELD PENINSULA
RHAZ PENINSULA
PERIL STRAIT
KELP BAY
CATHERINE ISLAND
NECKER ISLANDS
Cape Edgecumbe
SHELIKOF BAY
Fishery Limit

APPROVAL SHEET
H-11130

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.



Digitally signed by Cathleen Barry, Cartographer
Reason: I am approving this document
Date: 2006.05.03 07:28:13 -07'00'

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 Donald W. Haines, NOAA
I am approving this document
2006.05.03 08:25:39 -07'00'

Michael Riddle
AWOIS & SURF check
Operations Branch N/CS31
2006.06.02 14:18:01 -04'00'