

H11588

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H11588

LOCALITY

State Alaska

General Locality Vicinity of Semidi Island

Sublocality Vicinity of Semidi Island and Chirikof Islands

2006

CHIEF OF PARTY

Commander Guy T. Noll, NOAA

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET

H11588

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.

n/a

State Alaska

General Locality Vicinity of Semidi Islands

Sublocality Vicinity of Semidi and Chirikof Islands

Scale 1:30,000

Date of Survey 7/6/2006-7/27/2006

Instructions Dated 6/16/2006

Project No. S-P909-RA-06

Vessel RAINIER (S221)

Chief of Party Commander Guy T. Noll, NOAA

Surveyed by RAINIER Personnel

Soundings taken by echo sounder Seabeam/Elac 1050D MKII

Graphic record scaled by N/A

Graphic record checked by N/A

SAR by Sarah Wolfskehl

Automated plot by N/A

Compilation by Tyanne Faulkes

Soundings in Fathoms

at

MLLW

REMARKS: Time in UTC. UTM Projection Zone 4

Revisions and annotations appearing as endnotes were

generated during office processing.

As a result, page numbering may be interrupted or non-sequential

All separates are filed with the hydrographic data.

Descriptive Report to Accompany Hydrographic Survey H11588

Project OPR-S-P909-RA-06

Offshore Vicinity of Semidi Islands, Alaska

Scale 1:135,000

July 2006

NOAA Ship RAINIER (s221)

Chief of Party: Commander Guy T. Noll, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-S-P909-RA-06 dated June 16, 2006, and all other applicable direction¹, with the exception of deviations noted in this report. The survey area is offshore in the vicinity of Semidi and Chirikof Islands, AK. This survey corresponds to sheet "C" in the sheet layout provided with the Letter Instructions. OPR-S-P909-06 responds to a request from the Hydrographic Surveys Division to update bathymetry in sparsely surveyed areas in support of a new, larger scale chart covering the Chirikof and Semidi Islands area.

Full bottom coverage was not required for this project. The survey was planned for maximum coverage gaps of 800m between the multi-beam echosounder swaths of adjacent lines, in accordance with the Letter Instructions. No significant shoals or pinnacles were detected to warrant decreased line spacing or full bottom coverage. No Shoreline Verification was performed for the survey area.¹

Data acquisition was conducted from July 6, 2006 (DN187) to July 27, 2006 (DN208).

Data Acquisition Type	Hull Number with Mileage (nm)
	s221
VBES (mainscheme)	-
MBES (mainscheme)	359.42
SSS (mainscheme)	-
Crosslines	32.75
Developments	-
Shoreline	-
Bottom Samples	-
Total Number of Items Investigated	-
Total Area Surveyed (sq. nm)	270.02

Table 1: Statistics for survey H11588

¹ Standing Instructions for Hydrographic Surveys (March 2004), NOS Hydrographic Surveys Specifications and Deliverables (March 2004), OCS Field Procedures Manual for Hydrographic Surveying (March 2005), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

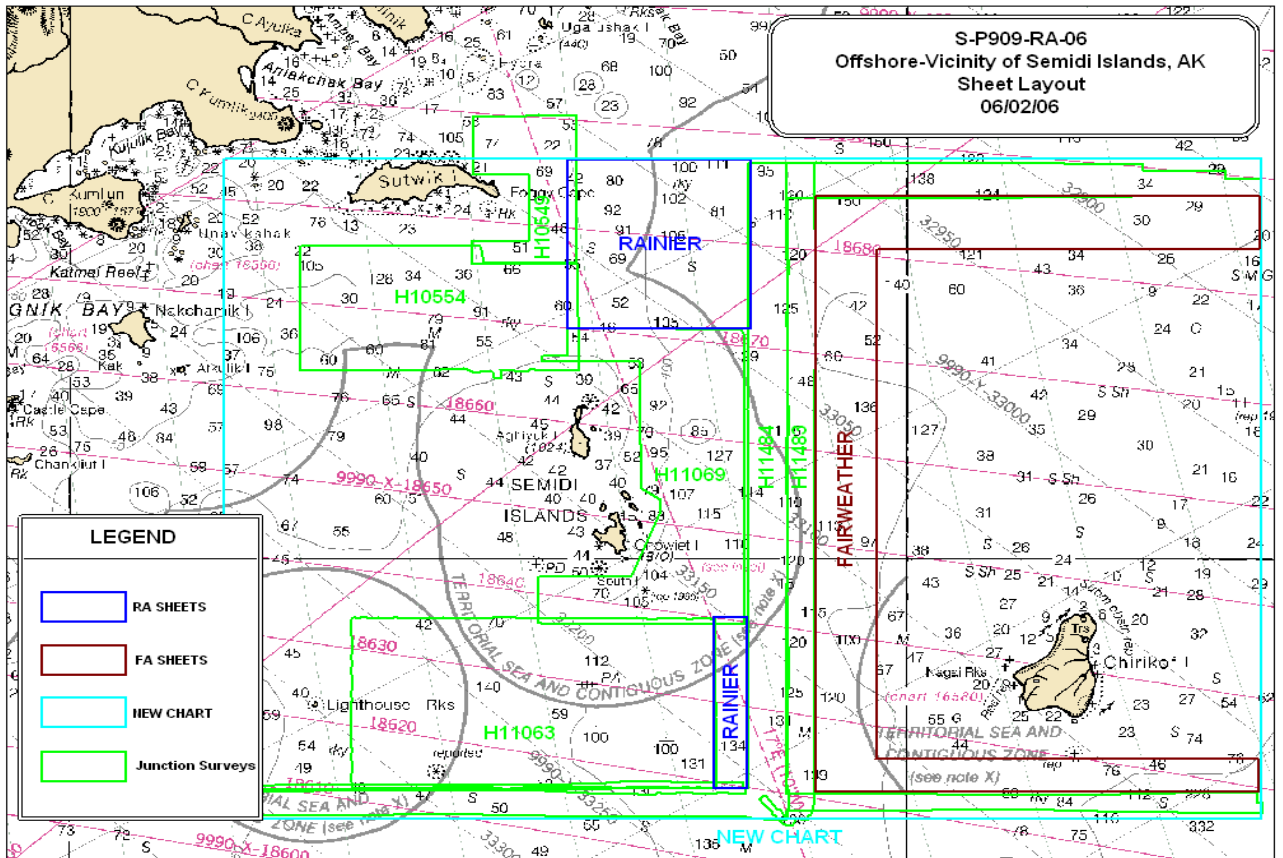


Figure 1. H11588 Sheet layout with Survey Limits

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-S-P909-RA-06 Data Acquisition and Processing Report (DAPR)*², submitted under separate cover. Items specific to this survey, and any deviations from the aforementioned report are discussed in the following sections.

Final Approved Water Levels have been applied to this survey. See Section C. for additional information.

B1. Equipment and Vessels

Data for this survey were acquired by the following vessel:

Hull Number	Name	Acquisition Type
s221	RAINIER	Multi-Beam Echosounder

Table 2. Data Acquisition Vessel for H11588.

RAINIER (s221) acquired all multi-beam echosounder data and sound speed profiles. The ship’s hull mounted Elac 1050D was operated in 50 kHz mode throughout the survey. No unusual vessel configurations were used for data acquisition. However, the ELAC system, which is normally run in ‘remote’ mode, was operated in ‘local’ mode due to repeated software reset errors. These problems did not affect the quality of the bathymetry acquired.³

B2. Quality Control

Crosslines

Multi-beam echosounder (MBES) crosslines were run in the northern survey area and totaled 32.87 nautical miles, comprising 10.6% of MBES hydrography in the northern survey area, and 9.1% of total bathymetry. The mainscheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode and agreed well, with no distinguishable differences.⁴

No crosslines were run in the southern survey area of H11588.

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2006 RAINIER Hydrographic System Readiness Review package⁵ submitted with this survey.

Junctions

The following contemporary surveys are adjacent to the H11588 survey area. (See Figure 1):

<u>Registry #</u>	<u>Scale</u>	<u>Year Surveyed</u>
H11483	1:135,000	2005
H11484	1:10,000	2005
H10549	1:20,000	1994
H10554	1:40,000	1994
H11063	1:40,000	2001
H11069	1:40,000	2001

Junction comparison was not required for this survey.

Data Quality Factors

H11588 was specifically assigned as a “track line survey”, to be accomplished while transiting to and from the OPR-P183-RA-06 project area without significant impact on time allotted to that project. As a result, RAINIER’s standard data acquisition procedures were altered as follows:

- CTD cast frequency: CTD casts were acquired only every 5 to 8 hours, rather than the standard 4 hour period.
- Vessel Speed: Approximately 10 kts, rather than the usual 7 kts for the Elac 1050D.

- Sonar Swath Width: 153° mode, rather than the usual 131°. (Crosslines were acquired in 108° mode to improve along track bathymetric density for mainscheme comparison).
- Line Spacing: As mentioned in Section A., lines were planned to produce coverage gaps no greater than 800m in width, rather than the usual 100% MBES coverage.

The result is bathymetry which is relatively sparse, includes holidays up to 800m wide, and shows signs of refraction errors (see below). Had any indications of hazards to surface navigation been found, they would have been investigated by methods compliant with standard RAINIER procedure to the accuracy requirements of the NOS Hydrographic Surveys Specifications and Deliverables. However, waters in the survey area were found to be universally deep and featureless, and thus, no further investigation was conducted.⁶

TrueHeave application and apparent refraction artifacts were the only notable data quality issues encountered during survey H11588.⁷

TrueHeave Application

Applanix TrueHeave files were acquired during Elac data acquisition, and applied to the bathymetry during initial processing. However, there was found to be an irreconcilable offset between the time stamps on the TrueHeave data and the Elac data as converted in Caris HIPS & SIPS 6.0. This issue is discussed in greater detail in the *OPR-S-P909-RA-06 Data Acquisition and Processing Report*. The data were reprocessed with real time heave applied. The final data did not appear to have any significant heave artifacts.⁸

Refraction Artifacts

As discussed above, sound speed profiles were not taken at the standard 4-hour interval for this survey. Sound speed profiles were initially applied to the data using the 'previous in time' selection. The characteristic bathymetric 'smiles' often caused by inaccurate sound speed profile correction were noted, but were not rejected from the data set so as to preserve swath coverage. Only gross flyers were removed. The data was reprocessed using the 'nearest in distance within time' selection, but did not appear to make a significant difference in the sound speed errors. The errors were found to be particularly severe in the southern survey area, and northeast corner of the northern area, where vertical errors of up to 10m in approximately 200m of water were noted.⁹

The CARIS HIPS Refraction Editor could be used to adjust the applied sound speed profile, resulting in a flatter, more realistic representation of the seabed. Although the OCS Field Procedures Manual prohibits the Hydrographer from using this tool to estimate a sound speed profile while processing data on board, this step could provide an alternate technique at the Pacific Hydrographic Branch. Given the depth of the survey area, and lack of features detected, this would provide a viable option to rectify existing sound speed errors.¹⁰

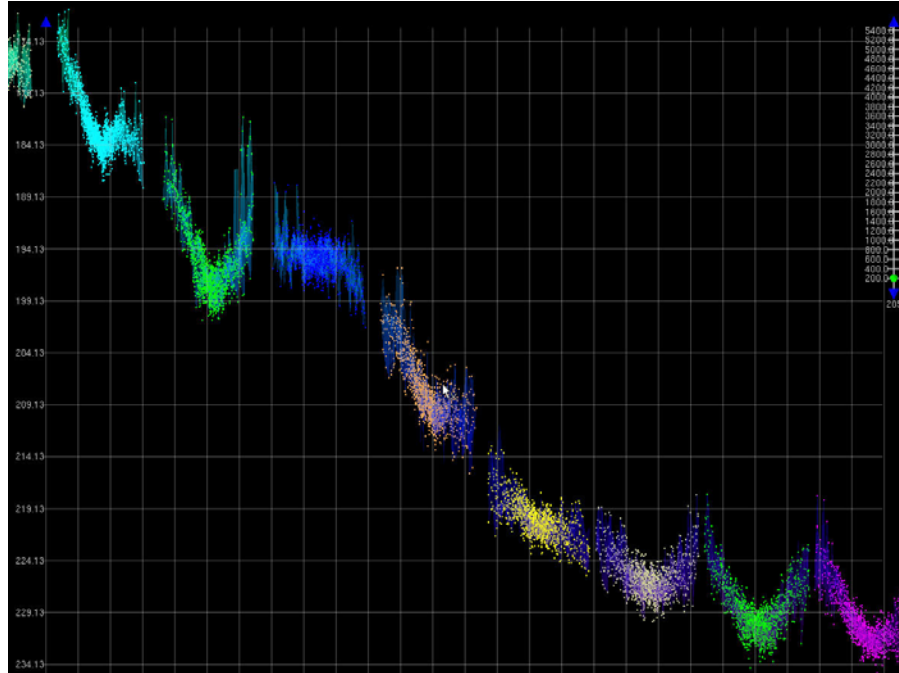


Figure 2. 2D view of MBES swaths in the southeast corner of the northern survey area, exhibiting “smile” artifacts characteristic of inaccurate sound speed correction.

B3. Data Reduction

Data reduction procedures for survey H11588 conform to those detailed in the *OPR-S-P909-RA-06 DAPR*.¹¹

B4. Data Representation

Two field sheets were created for the processing of H11588, each with a finalized BASE surface at the 10m resolution. The final submissions are shown in Figures 3, 4, and 5. The submission field sheets have fewer than 25×10^6 nodes.

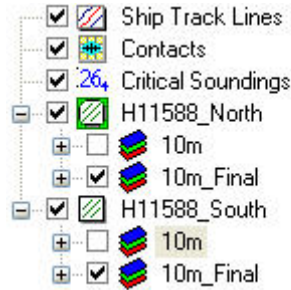


Figure 3: Field sheets and BASE surfaces submitted with H11588

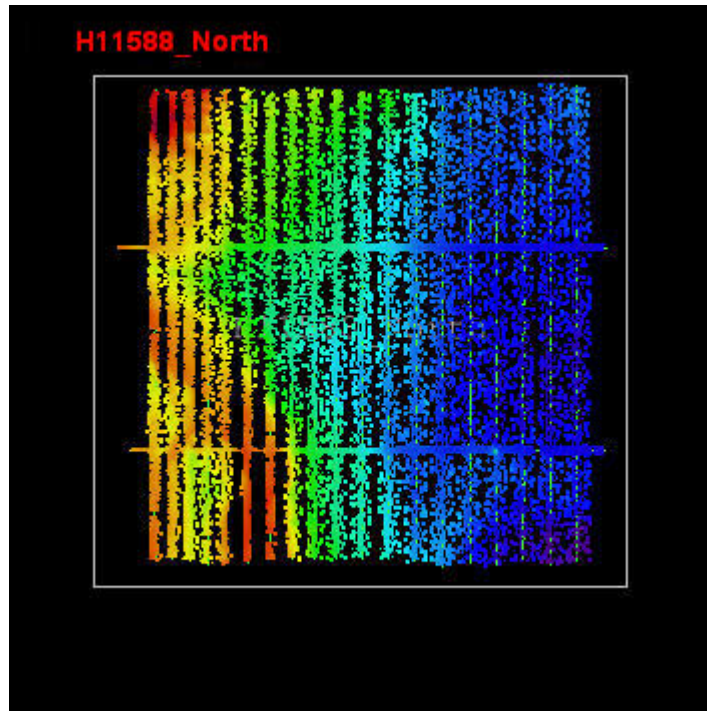


Figure 4: Layout of field sheet and 10m final BASE surface for northern survey area of H11588.

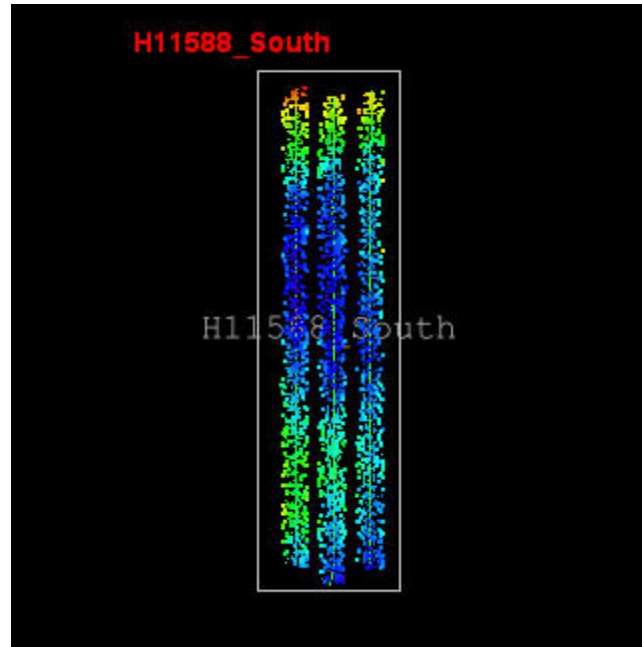


Figure 5: Layout of field sheet and 10m final BASE surface for southern survey area of H11588

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-S-P909-RA-06 required neither horizontal control work nor subordinate tide station installation and thus no Horizontal and Vertical Control Report will be submitted.

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. The differential corrector beacons utilized for this survey are given in Table 2.

Location	Frequency	Custodian	Range	Priority
Kodiak	313 kHz	USCG	175nm	Primary
Cold Bay	289 kHz	USCG	220nm	Secondary

Table 3: Differential Corrector Sources for H11588

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 Kodiak Island, AK (945-7292), and Sand Point, AK (945-9450), served as control for datum determination and as the primary source for water level reducers for survey H11588.

An additional temporary station had been installed at Alitak (945-7804) for the CO-OPS tsunami program with the intent to be operational prior to the start of the survey OPR-P909-FA-2006. Although Alitak was functional, the tidal data from the station was not available to

us until after survey operations for H11588 had been completed. Ultimately, the Alitak station observations were not included in the final approved water levels.

No tertiary gauges were required for survey H11588.

All data were reduced to MLLW using final approved water levels from station Sand Point, AK (945-9450), using the tide file 9459450.tid and final time and height corrector file H11588CORF.zdf.

The request for Final Approved Water Levels for H11588 was submitted to CO-OPS on September 3, 2006 and the Final Tide Note was received on September 26, 2006. This documentation is included in Appendix IV.¹²

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11588 was compared with the following charts¹³:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
16013	1:969,761	30 th Ed; July 2006	February 17, 2007
16568	1:106,600	13 th Ed; September 2005	February 17, 2007
16011	1:1,023,188	36 th Ed; August 2004	February 17, 2007

Table 4: Charts compared with H11588

Chart 16568

The northern survey area of H11588 was compared to the southeast corner of chart 16568. The southern survey area was not covered by this chart. Soundings from survey H11588 generally agreed well with charted depths, with discrepancies typically within 2 to 3 fathoms, and rarely exceeding 10 fathoms. There were two exceptions that did exceed a 10 ten fathom difference:

1. A charted 86-fathom depth in the northwest corner of the survey area, at position 56°31'38"N 156°44'24" W, was surveyed at 68-fathoms.¹⁴
2. A charted 81-fathom depth in the northwest corner of the survey area, at position 56°33'09" N 156°42'37" W, was surveyed at 66-fathoms.¹⁵

Chart 16013

The northern survey area east of Sutwik Island, as well as the southern survey area between the Semidis and Chirikof Island, were compared to the southwest portion of chart 16013. Charted depths agree well with survey soundings. The northern survey area had a number of depths available for comparison and revealed an average discrepancy of approximately 2 to 3 fathoms, rarely exceeding a difference of more than 10 fathoms. The discrepancies that were

revealed typically showed survey depths to be deeper than charted depths. In some instances, this survey found shoaler soundings between charted soundings even though agreement at the position of the charted depths was good.¹⁶

The southern survey area had one charted depth available for comparison in chart 16013. Survey soundings did agree within 5 fathoms of charted depth data.¹⁷

Survey soundings and contours were not compared to the ENC or to raster chart 16011 as required by the letter instructions. Chart comparisons were made to the largest scale raster charts of the survey area in accordance with verbal instructions received from the Chief, Hydrographic Surveys Division Operations Branch, at the 2007 Field Procedures Workshop.

D.1.b. Dangers to Navigation

No dangers to navigation (DTONs) were found in survey H11588.¹⁸

D.1.c. Other Features

Automated Wreck and Obstruction Information System (AWOIS) Investigations

No AWOIS items were assigned to this project.¹⁹

Additional Items

An uncharted submarine pinnacle was surveyed in the southeast corner of the northern survey area, in position 56° 23' 49"N, 156° 27' 57"W. The feature was ensonified by both mainscheme and crossline MBES coverage. The pinnacle stands approximately 50m high in surrounding depths of approximately 200m, and does not pose a hazard to surface navigation. Charted depths in this area are extremely sparse, and range from approximately 100 to 150 fathoms. The hydrographer recommends charting the sounding with appropriate depths and contours only.²⁰

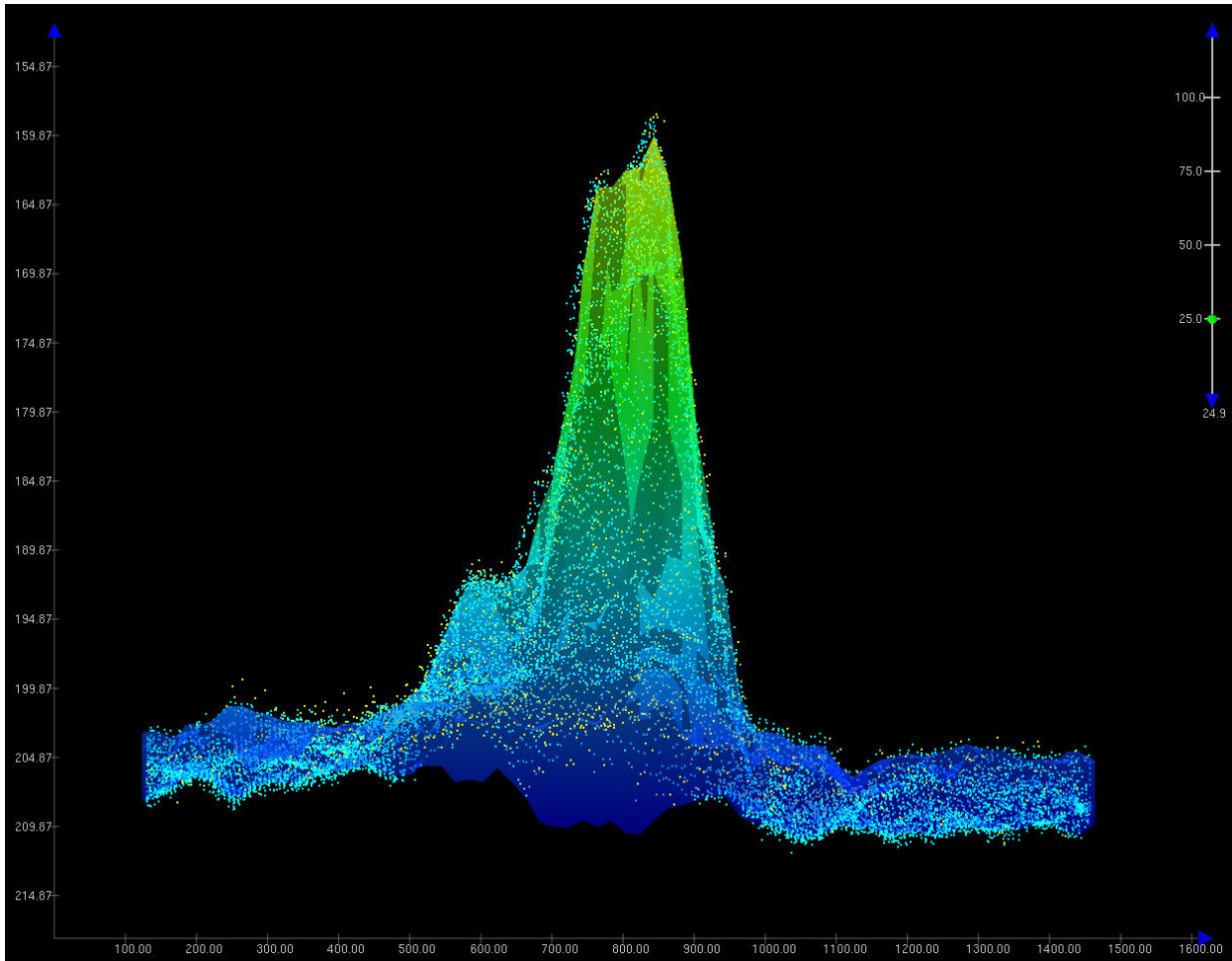


Figure 6: Uncharted pinnacle in northern survey area of H11588

D.2. Additional Results

D.2.a. Prior Survey Comparison

Prior survey comparison with H11588 was not performed.

D.2.b. Shoreline Verification

Shoreline verification was not performed for survey H11588.²¹

D.2.c. Aids to Navigation

There are no Aids to Navigation within the limits of H11588.²²

D.2.d. Overhead features

There are no overhead features in survey H11588.²³

D.2.e. Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the limits of H11588, and none were detected by the survey.²⁴

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H11588, and none were observed to be operating in the area.²⁵

D.2.g. Bottom Samples

Bottom samples were not performed in survey H11588.²⁶

D.2.h. Miscellaneous


None.

E. APPROVAL

As Chief of Party, Field operations for hydrographic survey H11588 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (March 2004), Field Procedures Manual (May 2006 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through July 2006. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.


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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-S-P909-RA-06	3/12/2007	N/CS34


Approved and Forwarded:  Guy Noll
I am approving this document
2007.03.26 08:16:19 -07'00'

 Guy T. Noll
 Commander, NOAA
 Commanding Officer


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

Survey Sheet Manager:  Amy Sheehan
I am the author of this document
2007.03.21 17:01:32 Z

 Amy Sheehan
 Assistant Survey Technician, NOAA

Chief Survey Technician:  James B Jacobson
I have reviewed this document
2007.03.26 14:22:26 Z

 James B. Jacobson
 Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:  LT Benjamin K. Evans, NOAA
I have reviewed this document
2007.03.26 14:36:06 Z

 Benjamin K. Evans
 Lieutenant, NOAA

¹ Concur.

² Filed with project records.

³ Concur.

⁴ Concur.

⁵ Filed with project records.

⁶ Concur.

⁷ Concur.

⁸ Concur.

⁹ Concur.

¹⁰ During survey acceptance review (SAR) it was determined that data does not meet IHO Order 2 specifications in this region. Refraction Editor was not used to rectify the situation. Despite the apparent data quality issues the bathymetry collected exceeds the levels of accuracy and object detection from the prior lead line survey. Data from H11588 shall supersede prior charted soundings.

¹¹ Filed with project records.

¹² The tide note has been appended to this document.

¹³ Charts used for office comparison and compilation:

Chart	Scale	Edition/Date	Local Notice to Mariners
16568	1:106,600	13 th Edition/Sept. 2005	3/13/2010
16587	1:135,000	1 st Edition/Sept. 2006	3/13/2010

¹⁴ Concur.

¹⁵ Concur.

¹⁶ Concur.

¹⁷ Concur.

¹⁸ Concur.

¹⁹ Concur.

²⁰ Concur.

²¹ Concur.

²² Concur.

²³ Concur.

²⁴ Concur.

²⁵ Concur.

²⁶ Retain charted bottom samples.

Revisions Compiled During Office Processing and Certification

¹ Concur.

² Filed with project records.

³ Concur.

⁴ Concur.

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¹⁵ Concur.

¹⁶ Concur.

¹⁷ Concur.

¹⁸ Concur.

¹⁹ Concur.

²⁰ Concur.

²¹ Concur.

²² Concur.

²³ Concur.

²⁴ Concur.

²⁵ Concur.

²⁶ Retain charted bottom samples.



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : September 19, 2006

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: S-P909-RA-2006
HYDROGRAPHIC SHEET: H11588

LOCALITY: Vicinity of Semidi and Chirikof Islands, Semidi Island, AK
TIME PERIOD: July 6 - 27, 2006

TIDE STATION USED: 945-9450 Sand Point, Ak
Lat. 55° 19.9' N Long. 160° 30.3' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.988 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SS91, SS93, SS94, SS101, SS102, SS103,
SS104, SWA148, SWA149, SWA150, SWA152,
SWA154, SWA155 and SWA170

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, PRODUCTS AND SERVICES DIVISION



Final tide zone node point locations for S-P909-RA-2006, H11588

Format: Tide Station (in recommended order of use)
 Average Time Correction (in minutes)
 Range Correction
 Longitude in decimal degrees (negative value denotes Longitude West),
 Latitude in decimal degrees

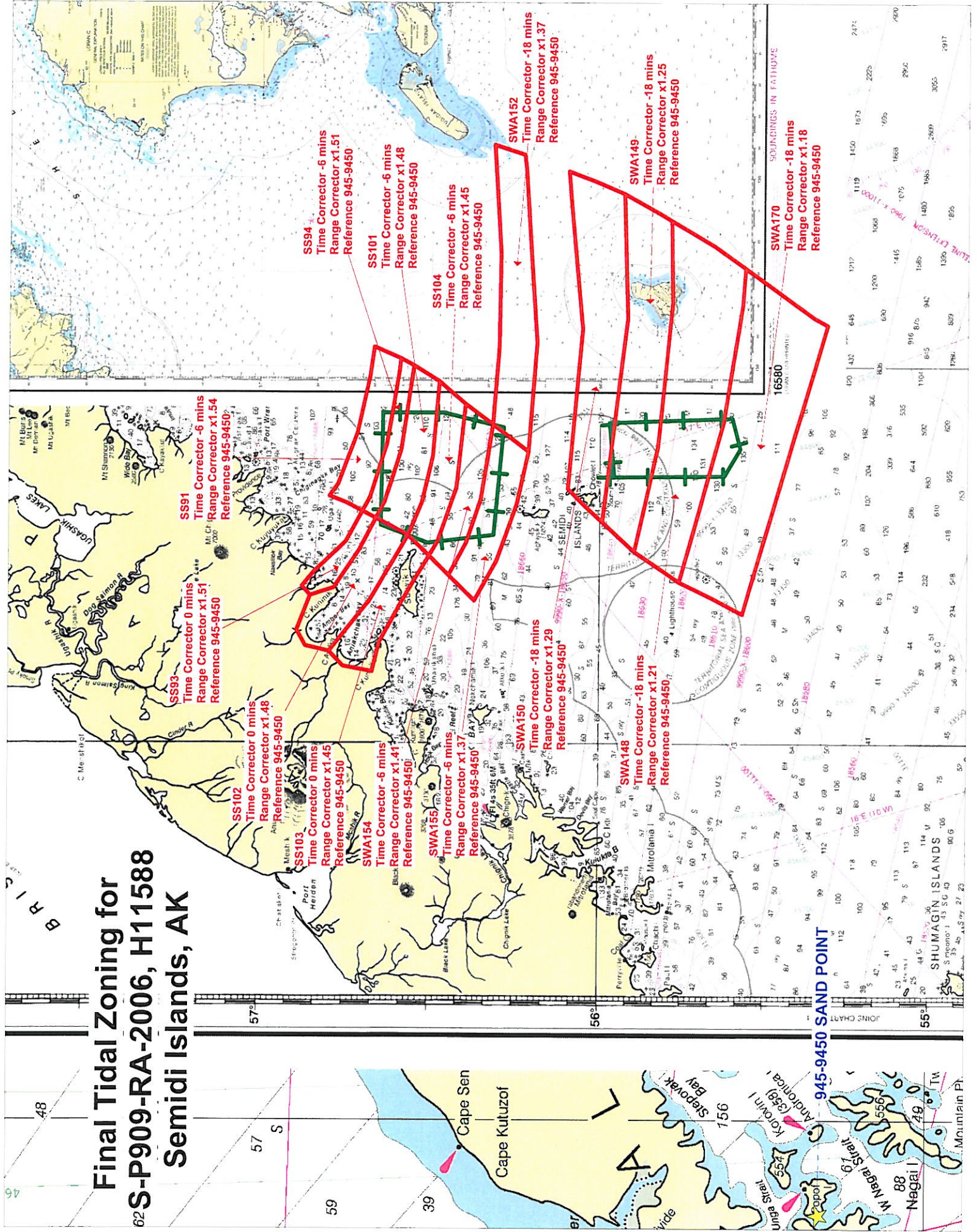
	Tide Station Order	AVG Time Correction	Range Correction
Zone SS91	945-9450	-6	1.54
-155.896845 56.665606			
-156.053759 56.678119			
-156.349558 56.713681			
-156.625831 56.770567			
-156.688491 56.795451			
-156.724502 56.745546			
-156.768919 56.698906			
-156.693706 56.676334			
-156.411185 56.62761			
-156.024281 56.592796			
-155.958501 56.588565			
-155.896845 56.665606			
Zone SS93	945-9450	0	1.51
-157.175053 56.782358			
-157.215159 56.85121			
-157.16682 56.875511			
-157.091148 56.840881			
-156.930384 56.747321			
-156.768919 56.698906			
-156.805961 56.659028			
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Zone SS94	945-9450	-6	1.51
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-156.439676 56.585981			
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-156.411185 56.62761			
-156.693706 56.676334			
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Zone SS101	945-9450	-6	1.48

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-156.71866 56.63386			
-156.805961 56.659028			
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-156.72051 56.52476			
-156.478477 56.494118			
-156.080347 56.475447			
-155.996183 56.55001			
Zone SS102	945-9450	0	1.48
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Zone SS103	945-9450	0	1.45
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Zone SS104	945-9450	-6	1.45
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Zone SWA148	945-9450	-18	1.21
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-156.981997 55.897305			

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Zone SWA149	945-9450	-18	1.25
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Zone SWA150	945-9450	-18	1.29
-154.962872 56.09745			
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-155.798963 56.053871			
-156.648857 56.095583			
-156.744045 56.042004			
-156.82468 55.992969			
-155.744446 55.919675			
-155.081499 55.931725			
-155.015639 56.018436			
-154.962872 56.09745			
Zone SWA152	945-9450	-18	1.37
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-156.451752 56.212443			
-155.871846 56.188861			
-155.33695 56.20937			
-154.956803 56.22315			
-154.875331 56.228534			
-154.82337 56.317191			
Zone SWA154	945-9450	-6	1.41
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-156.64511 56.424375			
-156.927793 56.478454			
-157.004841 56.503826			
-157.107648 56.445969			
-156.937857 56.395634			
-156.704922 56.352554			

-156.307887 56.317676			
-156.199466 56.398178			
Zone SWA155	945-9450	-6	1.37
-157.107648 56.445969			
-157.241858 56.370111			
-157.032765 56.306289			
-156.730153 56.246814			
-156.451752 56.212443			
-156.307887 56.317676			
-156.704922 56.352554			
-156.937857 56.395634			
-157.107648 56.445969			
Zone SWA170	945-9450	-18	1.18
-155.474619 55.565371			
-155.671598 55.573477			
-156.292961 55.629358			
-157.142303 55.760791			
-157.229433 55.659196			
-157.310831 55.570259			
-155.777153 55.315755			
-155.737992 55.356934			
-155.540579 55.512545			
-155.474619 55.565371			

Final Tidal Zoning for S-P909-RA-2006, H11588 Semidi Islands, AK



H11588 HCell Report
Tyanne Faulkes, ERT Associate
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC's and RNC's in the region: NOAA RNCs, 16568 (1:106,600) and 16587 (1:135,000) and corresponding NOAA ENC, US1WC02M. (See section 4. Meta Areas.)

HCell compilation of survey H11588 utilized Office of Coast Survey DRAFT HCell Specifications Version 4.0. For additional information on the standards and protocols used for HCell Compilation, see the DRAFT A/PHB HCell Reference Guide, version 2.0, 22 February, 2010.

1. Compilation Scale

Depths and features for HCell H11588 were compiled to the largest scale charts in the region, 16568 (1:106,600) and 16587 (1:135,000). (See section 4. Meta Areas.)

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 10-meter surfaces (10m_Final_North and 10m_Final_South) in CARIS BASE Editor. A shoal-biased selection was made at 1: 75,000 and 1:100,000 survey scale using a Radius Table file with values shown in the table, below. The resultant sounding layer contains 4013 depths ranging from 65.837 to 252.374 meters.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-4.7	10	3
10	20	4
20	50	4.5
50	500	5

In CARIS BASE Editor soundings were manually selected from the high density sounding layers and imported into a new layer created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

3. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the *_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 16568 & 16587	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H11588_SS.000
50	91.44	92.8116	50.750	50
100	182.88	184.2516	100.750	100

With the exception of the zero contours included in the *_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the *_CS file and soundings in the *_SS have been. This may result in conflicts between the *_SS file contours and HCell features at or near the survey limits. Conflicts with M_QUAL, DEPCNT, COALNE and SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over *_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell H11588:

M_QUAL
M_CSCL

Meta area objects were constructed on the basis of the limits of the hydrography. (See 3.1 *Depth Areas*.)

5. Features

5.1 Generalization of Features to Chart Scale

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base surface are included in the HCell. The geometry of these features is modified to emulate chart scale.

6. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

\$CSYMB	Blue Notes
M_CSCL	Compilation scale meta area to define an additional scale
M_QUAL	Data quality Meta object
SOUNDG	Soundings at the chart scale density

The *_SS HCell contains the following Objects:

DEPCNT	Generalized contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

All S-57 Feature Objects in the *_CS HCell have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with current guidance and the OCS HCell Specifications.

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features. By agreement with MCD, the NINFOM field is populated with an abbreviated version of the Blue Note (30 characters or less), describing the chart disposition, to be used by MCD in generating their Chart History spreadsheet.

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

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

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, so precision is less. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

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

Conversion to charting units and application of NOAA rounding is completed in the same step, at the end of the HCell compilation process.

Conversion to fathoms and feet charting units with NOAA rounding ensures that:

- All depths deeper or equal to 11 fathoms display as whole fathoms.
- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units above 0 fathoms (MLLW) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet above that. (This is a deviation from the traditional 'fathoms and feet' charting rule that requires that all depths above MLLW will be

shown in feet. The display in fathoms and feet for depths between MLLW and 2 feet above MHW accommodates S-57 rules that require the same charting units to be used for all depth units (DUNI) in an ENC.)

- All height units (HUNI) which have been converted to charting units, and that are 2.00 feet above MHW and greater, are shown in feet.

In an ENC viewer fathoms and feet depth units (DUNI) display in the format X.YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. In an ENC viewer, heights (HUNI) display as whole feet.

9. Data Processing Notes

9.1 Junction with H11588

H11588 did not junction with any current surveys.

10. QA/QC and ENC Validation Checks

H11588 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

H11588_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:106,600 and 1:135,000
H11588_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:75,000 and 1:100,000
H11588_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11588_outline.gml	Survey outline to populate SURDEX

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.3	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.

CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12. Contacts

Inquiries regarding this HCell content or construction should be directed to:

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APPROVAL SHEET
H11588

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell Specifications.

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 disproof 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.

I have reviewed the HCell, 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.