H11522

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.

Registry No. H11522

LOCALITY

State Alaska

General Locality Southwestern Alaskan Peninsula

Sublocality 18 NM ESE of Mitrofania Island

2006

CHIEF OF PARTY

Dean Moyles, Fugro Pelagos, Inc.

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DATE

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

H11522

HYDROGRAPHIC TITLE SHEET

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: Southwestern Alaskan Peninsula

Sublocality: 18 NM ESE of Mitrofania Island

Scale: 1:20,000

Date of Survey: June 17, 2006 -July 12, 2006

Instructions Dated: 2/3/2006

Project No.: OPR-P182-KR-06

Vessel: R/V OCEAN PIONEER (557401)

Chief of Party: DEAN MOYLES

Surveyed by: MOYLES, ORTHMANN, REYNOLDS, GILL, MOUNT, STOCK, FARLEY, ET AL

Soundings taken by echo sounder: Reson 8111 (Hull Mounted)

Graphic record scaled by: FUGRO PELAGOS, INC. PERSONNEL

Graphic record checked by: FUGRO PELAGOS, INC. PERSONNEL

Evaluation by: E. Campbell

Automated plot by: N/A

Verification by: E. Campbell, K. Reser

Soundings in: Fathoms and Feet 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.

A – Area Surveyed

H11522 (Sheet F) is bound by the coordinates listed below, which encompasses 18 NM ESE to Mitrofania Island.

Hydrographic data collection began on June 17, 2006 and ended on July 12, 2006.

Table 1 – H11522 Sheet Limits

Sheet Limits Task Order #1 H11522 Sheet F Scale 1:20,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	55-36-30.18 N	158-28-57.95 W
2	55-44-51.69 N	158-28-57.95 W
3	55-44-51.69 N	158-03-48.08 W
4	55-36-30.18 N	158-03-48.08 W

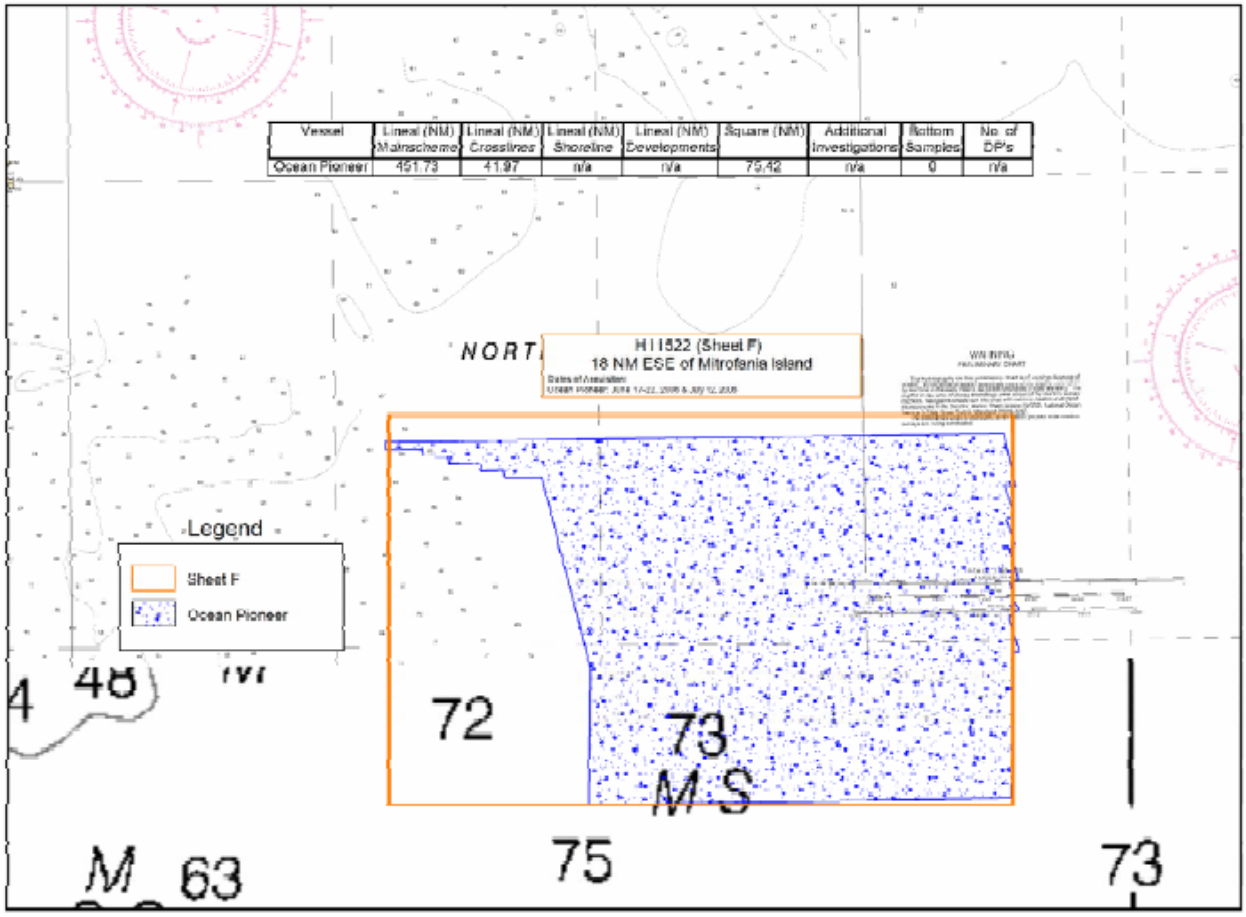


Figure 1: H11522 Area Surveyed

B – Data Acquisition and Processing

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report[1] for a detailed description of all equipment, survey vessels, processing procedures and quality control features. Items specific to this survey and any deviations from the Data Acquisition and Processing Report are discussed in the following sections

Equipment & Vessels

The R/V Ocean Pioneer acquired all off-shore sounding data for H11522. The Ocean Pioneer, which is 205 feet in length with a draft of 17 feet, was equipped with a Reson 8111 with option 033 (pseudo Side Scan) for multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors (SV&P) for sound velocity profiles. Vessel attitude and position were measured using an Applanix Position and Orientation System for Marine Vessel (POS MV 320 V4) with XTF files logged in Triton ISIS V 7.0.413.9.

Refer to OPR-P182-KR-06 Data Acquisition and Processing Report for a complete listing of equipment and vessel descriptions.

Quality Control

Crosslines

Quality control crosslines were planned to total at least five percent of the main scheme line length. Total crossline length surveyed was 42.0 nautical miles or 9.3 percent of the total main scheme nautical miles. Conducted crosslines were well distributed throughout the sheet to ensure adequate crossline quality control. Each crossline was compared to all main scheme lines it intersected, using the CARIS HIPS QC report routine and all were within the 95 percent confidence level.[2]

Note: The QC reports were generated based on the given accuracy specification of:

$$\pm\sqrt{[a^2 + (b * d)^2}$$

where, a = 0.5, b = 0.013 and d = depth.

However, since a variance of a difference, rather than a variance from a mean is being used, the a and b values were defined in the user defined option within the CARIS HIPS QC Report routine:

$$a = 0.5 * \sqrt{2} = 0.707$$
$$b = 0.013 * \sqrt{2} = 0.018$$

Uncertainty Values (CARIS BASE Surface)

The majority of H11522 had uncertainty values of about 0.25 to 0.35 meters. The effects of sound speed error are very apparent in the graphic below and the uncertainty values on average were around 0.40 meters. No uncertainty values were greater than IHO Order 1.[3]

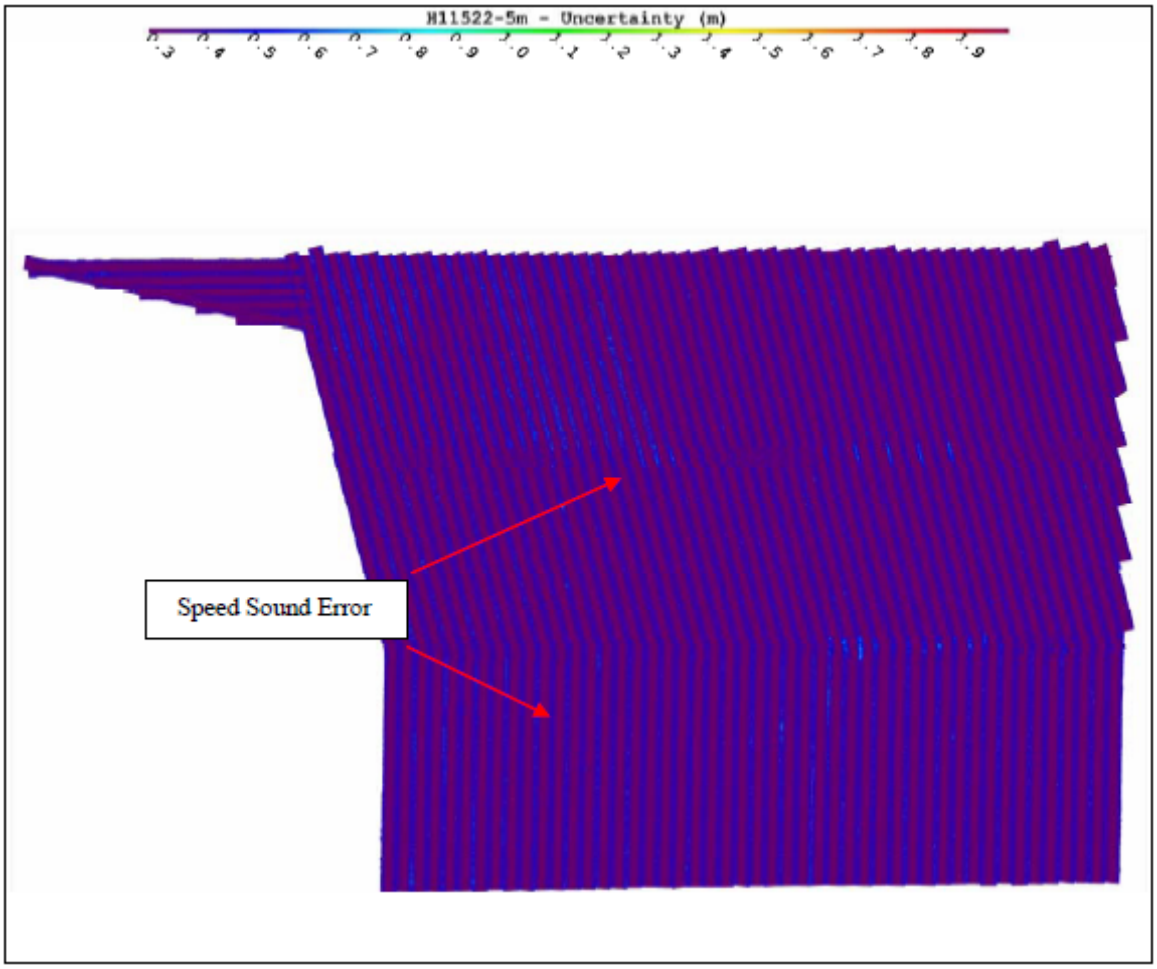


Figure 2: Uncertainty DTM

Survey Junctions

H11522 (Sheet F) does not junction with any other sheet.[4]

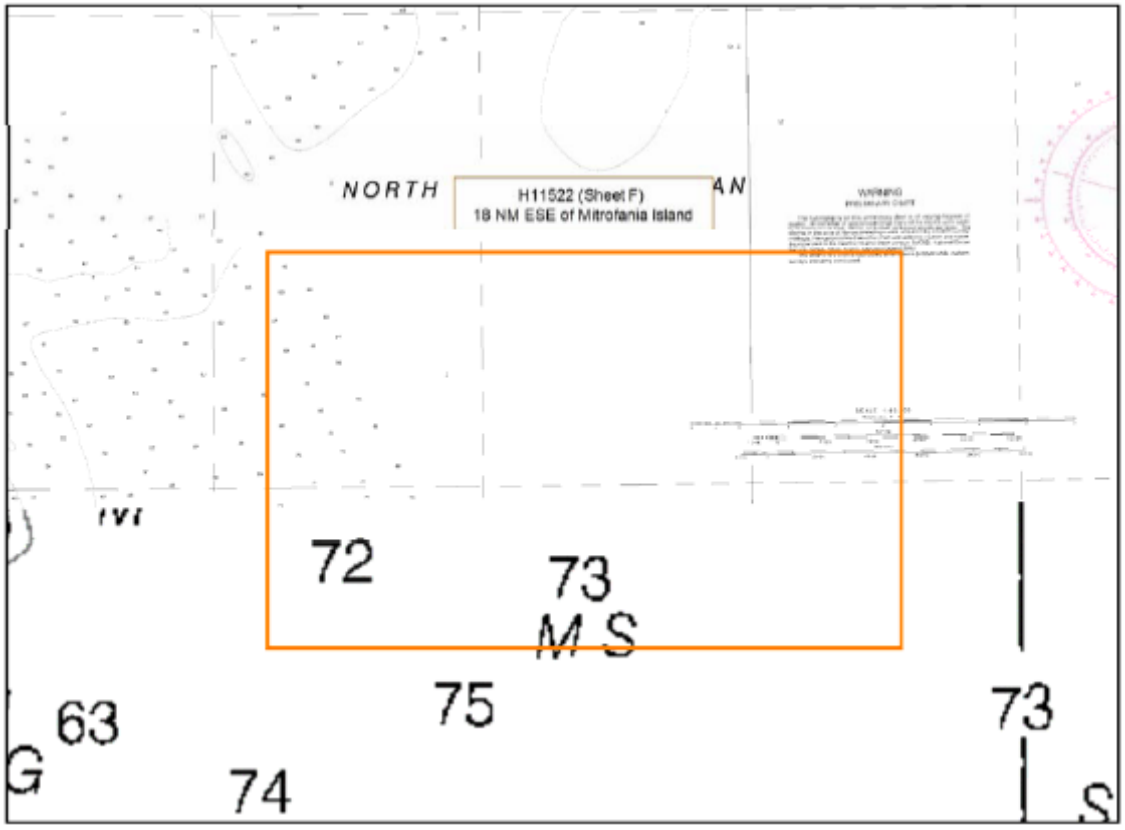


Figure 3: H11522 Survey Junctions

Quality Control Checks

During the hydrographic survey OPR-P182-KR-06 the R/Vs Quicksilver and Ocean Pioneer conducted a number of confidence checks. This usually consisted of the vessels running two lines in the opposite direction over a reference surface (normally the patch test site). The data sets collected with Reson 8101 and 8111 systems that were installed on the Quicksilver and Ocean Pioneer respectively, compared within 5 to 10 centimeters.

Positioning system confidence checks were conducted on a daily basis using the POS MV controller software. The controller software had numerous real time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables (version June 2006) were achieved. These include, but are not limited to the following: GPS Status, Position Accuracy, Receiver Status (which included

HDOP) and Satellite Status. During periods of high HDOP and/or low number of available satellites survey operations were stopped.

Data Quality

In general, the multibeam data quality for H11522 was excellent. One notable problem follows:

- During data acquisition and routine processing, a general downward and/or upward cupping was noticed in the across track sounding profiles for certain areas. This is possibly due to a high volume of thermal layering and strong under currents in the water column. This problem was addressed by conducting SVP casts more frequently and reducing the line spacing interval. Even though this SVP error is noticeable on the Uncertainty surface, the data are well within the required specifications.[5]

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of the survey equipment and methodology used over the course of this survey.

Corrections to Echo Soundings

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings and lead line measurements. No deviations from the report occurred.[6]

Data Processing

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of the processing flow.

The final BASE surface for H11522 is called H11522-Final and it contains one BASE surface.[7] The following parameters were used:

- Depth Threshold: 60 to Max depth resolution=5m, Name in BASE Surface H11522-5m

The final S57 file for this project is called “H11522_S57_Features.000”. This file contains any bottom sample feature data for this project in S57 format as required in the Specifications and Deliverables.[8]

C –Vertical & Horizontal Control

Refer to the OPR-P182-KR-06 Horizontal and Vertical Control Report[9] for a detailed description of the horizontal and vertical control used on this survey. A summary of the project's horizontal and vertical control follows. No deviations from the report occurred.

Horizontal Control

The horizontal control datum for this survey was the North American Datum of 1983 (NAD83). All raw positions were originally collected in WGS84 and transformed to NAD83 during the post-processed kinematic GPS (KGPS) routine.

It was necessary to acquire dual frequency GPS data at a known location/s on the ground so that a KGPS solution could be used for final positioning. JOA established two local control points: station "SITE 1" was located on the USCGS station MIT (UW0401) and station "SITE 2", was located on a piece of pipe off of "SITE 1". Refer to the Appendix B of the Vertical & Horizontal Control Report for results and procedures.

Vessel position was determined in real time using a Trimble Zephyr L1/L2 GPS antenna, which was connected to a Trimble BD950 L1/L2 GPS card residing in the POS MV. The POS MV was setup via the Com 2 to accept USCG differential corrections, which were output from a CSI MBX-3S Coast Guard beacon receiver. Note: since the pseudorange corrections received by the POS MV are based on the NAD 83 position of the reference station antenna position, all positions were NAD 83. However, final positions were determined using a post-processed KGPS solution using the POSPac 4.3 processing software (Refer to the "2006-NOAAProcessingProcedures" document for KGPS processing procedure).

Table 2 – DGPS Stations

Station	ID	Latitude	Longitude	Freq.	Tx. Rate	Rx. No.	Wt.
Cold Bay, USCG	296	55°05'30"N	162°31'54" W	289	100BPS	1	1
Kodiak, USCG	295	57°37'06"N	152°11'36"W	313	100BPS	2	1

Positioning system confidence checks were conducted on a daily basis using the POS MV controller software. The controller software has numerous real time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables (version June 2006) were achieved. These include, but are not limited to the following: GPS Status, Position accuracy, Receiver Status (which included HDOP) and Satellite Status. During periods of high HDOP and/or low number of available satellites survey operations were suspended.

Vertical Control

All sounding data were initially reduced to mean lower low water (MLLW) using unverified tidal data from one tide station located on Mitrofania Island, AK. A sub-contractor, John Oswald & Associates LLC (JOA), operated the gauge.

Table 3 – Tide Gauges

Gauge	Model	Gauge Type	Location	Latitude	Longitude	Operational
9459016	H350/355	Digital Bubbler	Mitrofania Island, AK	55°53'22"N	158°49'11" W	May-July

Table 4 – Final Tide Zones

Zone	Primary			
	Site	Number	Time	Range Ratio
JOA001	Mitrofania Island, AK	9459016	0	1.00
JOA002	Mitrofania Island, AK	9459016	-6	1.00
JOA003	Mitrofania Island, AK	9459016	-6	1.07
JOA004	Mitrofania Island, AK	9459016	-12	1.00
JOA005	Mitrofania Island, AK	9459016	-12	1.07
JOA006	Mitrofania Island, AK	9459016	-12	1.14

Tidal data for a twenty-four hour period, UTC (Alaska Daylight Time to UTC was +8 hours), was assembled by JOA and e-mailed to the Ocean Pioneer at the end of every Julian Day. A cumulative file for the gauge was updated each day by appending the new data.

On September 9, 2006, JOA issued verified tidal data and final zoning for OPR-P182-KR-06. The tidal zoning was modified by JOA, providing a simpler zoning scheme from those issued in the Statement of Work (for additional information, refer to JOA's Final Technical Report). From September 20, 2006 to September 22, 2006 all sounding data were re-merged using CARIS HIPS and SIPS tide routine. Verified tidal data were used for the final Navigation Base Surfaces and S57 Feature files.[10] Refer to the Vertical and Horizontal Control Report for additional tidal information and station descriptions.

D – Results and Recommendations

Chart Comparison

H11522 survey was compared with charts:

Chart Number	Scale	Edition	Edition Date as of Feb. 2006
OPR-P182-KR-06			
16006	1:1,534,076	33rd	Dec. 2000
16011	1:1,023,188	36th	Aug. 2004
16013	1:969,761	29th	Nov. 2003
16556[11]	80,000	4th	Nov. 2002
16561	80,000	2nd	Mar. 2005

Comparison of Soundings

Since the existing charts have little to no hydrographic data overlapping within the survey limits of H11522, the comparison of soundings was limited. Soundings from chart 16013 coincide with the soundings from H11522 to within 1 fathom.[12]

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11522.[13]

Charted Features

There were no charted features labeled PA, ED, PD, or Rep within the limits of H11522.[14]

Dangers to Navigation

No dangers to navigation were located during the hydrographic survey of H11522.[15]

Additional Results

Additional Item Investigations

None were assigned for this sheet.[16]

Bottom Samples

There were no bottom samples retrieved in this sheet.[17]

Aids to Navigation

There were no charted aids to navigation in the survey area. No uncharted aids to navigation were found in the survey area.[18]

E – Approval Sheet

Approval Sheet

For

H11522

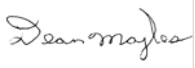
Standard field surveying and processing procedures were followed in producing this survey in accordance with the following documents:

OPR-P182-KR-06 statement of work and hydrographic manual;
Fugro Pelagos, Inc. Acquisition Procedures (2006- NOAAAcquisitionProcedures);
Fugro Pelagos, Inc. Processing Procedures (2006-NOAAProcessingProcedures);
Technical Report for Tides, 9459016 Mitrofania Report Complete 2006

The data were reviewed daily during acquisition and processing.

This report has been reviewed and approved. All records are forwarded for final review and processing to the Chief, Pacific Hydrographic Branch.

Approved and forwarded,



Dean Moyles,
Lead Hydrographer
Fugro Pelagos, Inc. Survey Party

Revisions Compiled During Office Processing and Certification

[1] Filed with project records.
[2] Concur.
[3] Concur.
[4] Concur with clarification. H11522 junctions with survey H11587 from OPR-P182-FA-06, which had not been completed at the time of survey H11522. A cursory inspection of the junction during compilation shows good agreement in the common area.
[5] Concur. These data are adequate to supersede charted data in the common area.
[6] Concur.
[7] Concur with clarification. The BASE surface used for compilation was a 5m single resolution surface named H11522-5m.
[8] There were no features verified and no bottom samples were collected during survey H11522.
[9] Filed with project records.
[10] Concur. Final approved water levels have been applied to all data.
[11] No part of H11522 falls on chart 16556.
[12] Concur.
[13] Concur with clarification. There were no AWOIS items assigned and none exist within the limits of H11522.
[14] Concur.
[15] Concur.
[16] Concur.
[17] Concur with clarification. No bottom samples were collected during survey H11522. There were two charted bottom samples in the survey area that are included in HCell H11522 to be retained.
[18] Concur.

H11522 HCell Report

Katie Reser, Physical Scientist
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 ENCs and RNCs in the region: NOAA ENCs US4AK59M and US2AK5FM, and NOAA RNCs 16561 and 16013.

HCell compilation of survey H11522 used Office of Coast Survey HCell Specifications Version 3.1 and HCell User Guide Version 1.2.

1. Compilation Scale

Depths for HCell H11522 were compiled to the largest scale charts in the region, 16561, 1:80,000 and 16013, 1:969,761. Much of the charts coincident with H11522 were previously unsurveyed, so density and distribution of soundings emulate more fully surveyed chart areas north and east of H11522.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 5-meter single resolution surface, **H11522-5m**, in CARIS BASE Editor. A shoal-biased selection was made at 1:20,000 scale using a Radius Table file with values shown in the table, below. The resultant sounding layer contains depths ranging from 116.1 to 137.8 meters.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	150	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 Areas and Depth Contours

3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to

create the single, all encompassing depth area (DEPARE). One depth range, from 0 to 150 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth range is 0 to 82.02 fathoms.

3.2 Depth Contours

There were no depth contours at the intervals on the largest scale chart in the survey area. There are no contours included in the *_SS HCell for MCD raster charting division to use for guidance in creating chart contours.

4. Meta Areas

The following Meta object areas are included in HCell 11522:

M_QUAL	M_CSCL
M_COVR	

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

5. Features

No bottom samples were delivered from the field for survey H11522. There were two charted bottom samples in the survey area included in HCell H11522 to be retained.

The source of all features included in the H11522 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
DEPARE	All-encompassing depth area and intertidal areas
SBDARE	Bottom samples and ledges
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
M_CSCL	Chart scale Meta object
$CSYMB	Blue notes

The *_SS HCell contains the following Objects:

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 with the Blue Note information located in the INFORM field. The NINFOM field is populated with the survey registry number, chart number, chart edition and edition date.

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, and therefore have lower precision. 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 MLLW (0 fathoms) 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.
- All height units (HUNI) which have been converted to charting units, and that are 2.0 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 Junctions

H11522 junctions with surveys H11587, which has already been compiled. A common junction was made between the two surveys.

10. QA/QC and ENC Validation Checks

H11522 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a 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 have been approved by MCD as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11522 Base Cell File, Chart Units, Soundings compiled to 1:80,000 and 1:969,761
- H11522 Base Cell File, Chart Units, Soundings compiled to 1:20,000
- H11522 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11522_CS.000
- Chart units base cell file, survey scale soundings H11522_SS.000
- Descriptive Report H11522_DR.pdf

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.1	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. 2.0	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:

Katie Reser, Physical Scientist, PHB, Seattle, WA; 206-526-6864;
Katie.Reser@noaa.gov.

APPROVAL SHEET
H11522

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

Katie Reser
2009.05.07
07:30:51 -07'00'

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
2009.05.07
07:48:32 -07'00'

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.

Gary C. Nelson
for Capt. Neander
2009.05.07 07:49:07
-07'00'

Digitally signed by David Scharff
DN: cn=David Scharff, o=OCS, ou=NOAA, email=david.scharff@noaa.gov, c=US
Reason: AWOIS and Surf Check complete
Date: 2009.05.11 13:15:56 -04'00'