H11525

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.	n/a
Registry No.	H11525

LOCALITY

State	Alaska
General Locality	Southwestern Alaskan Peninsula
Sublocality	North of Lighthouse Rocks

2006

CHIEF OF PARTY
Dean Moyles, Fugro Pelagos, Inc.

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTER NO.
	HYDROGRAPHIC TITLE SHEET	H11525
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: **North of Lighthouse Rocks**

Scale: **1:20,000** Date of Survey **07/15/06 - 07/24/06**

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: **K. Brown** Automated plot by **N/A**

Verification by: **K. Brown, N. Forfinski**

Soundings in : **meters 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.

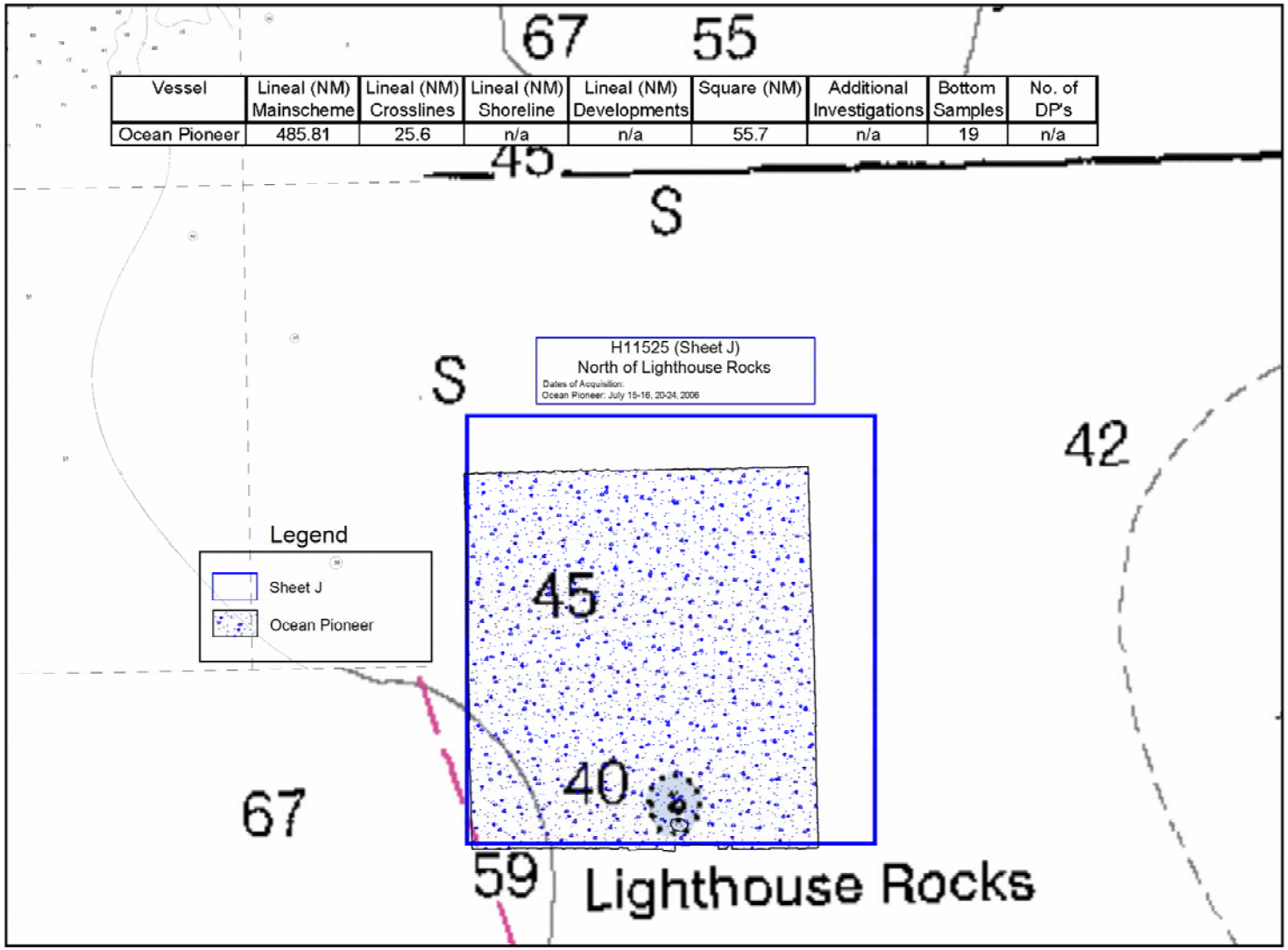
A - Area Surveyed

H11525 (Sheet J) is bound by the coordinates listed below, which encompass 11 NM SW of Lighthouse Rocks.

Hydrographic data collection began on July 15, 2006 and ended on July 24, 2006.

Table 1 - H11525 Sheet Limits

Sheet Limits Task Order # 1 H11525 Sheet J Scale 1:20,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	55º55’10.74” N	157º31’57.40” W
2	55º54’59.12” N	157º16’59.21” W
3	55º46’10.37” N	157º17’22.48” W
4	55º46’21.72” N	157º31’59.99” W



Vessel	Lineal (NM) Mainscheme	Lineal (NM) Crosslines	Lineal (NM) Shoreline	Lineal (NM) Developments	Square (NM)	Additional Investigations	Bottom Samples	No. of DP's
Ocean Pioneer	485.81	25.6	n/a	n/a	55.7	n/a	19	n/a

Figure 1 H11525 Area Surveyed

B – Data Acquisition & 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 sounding data for H11525. 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 & 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 25.6 nautical miles or 5.3 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.

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 H11525 had uncertainty values of about 0.25 to 0.40 meters. The effects of speed sound error are very apparent in the graphic below. Uncertainty values due to steep slopes and areas deemed rocky ranged from .35 to .70 meters No uncertainty values were greater than the IHO level Order 1.[2]

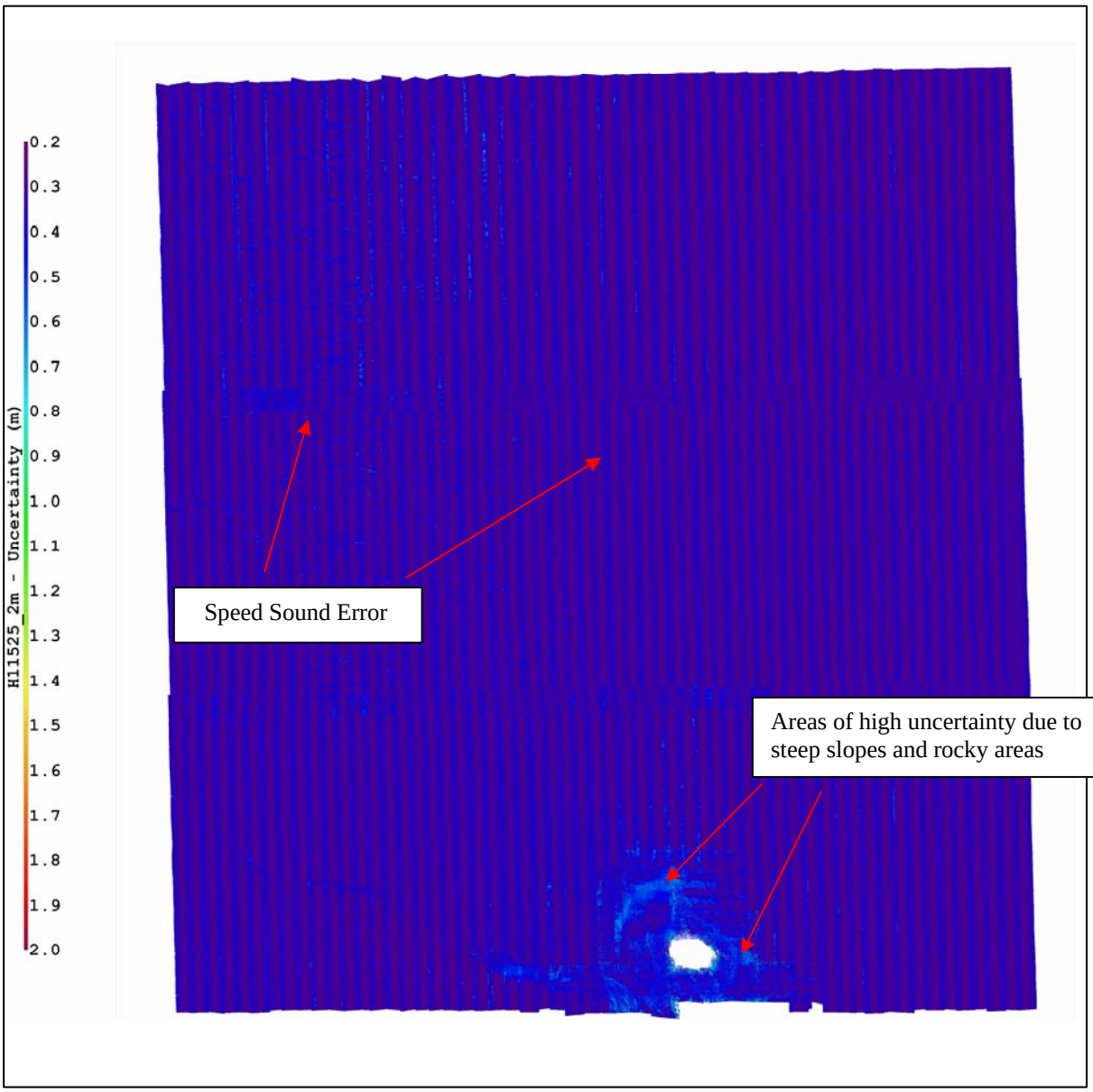


Figure 2 Uncertainty DTM

Survey Junctions

H11525 (Sheet J) junctions with:[3]

Registry #	Scale	Date	Junction Side
H11523	1:20,000	2006	West
H11524	1:20,000	2006	Southwest
H11526	1:20,000	2006	South

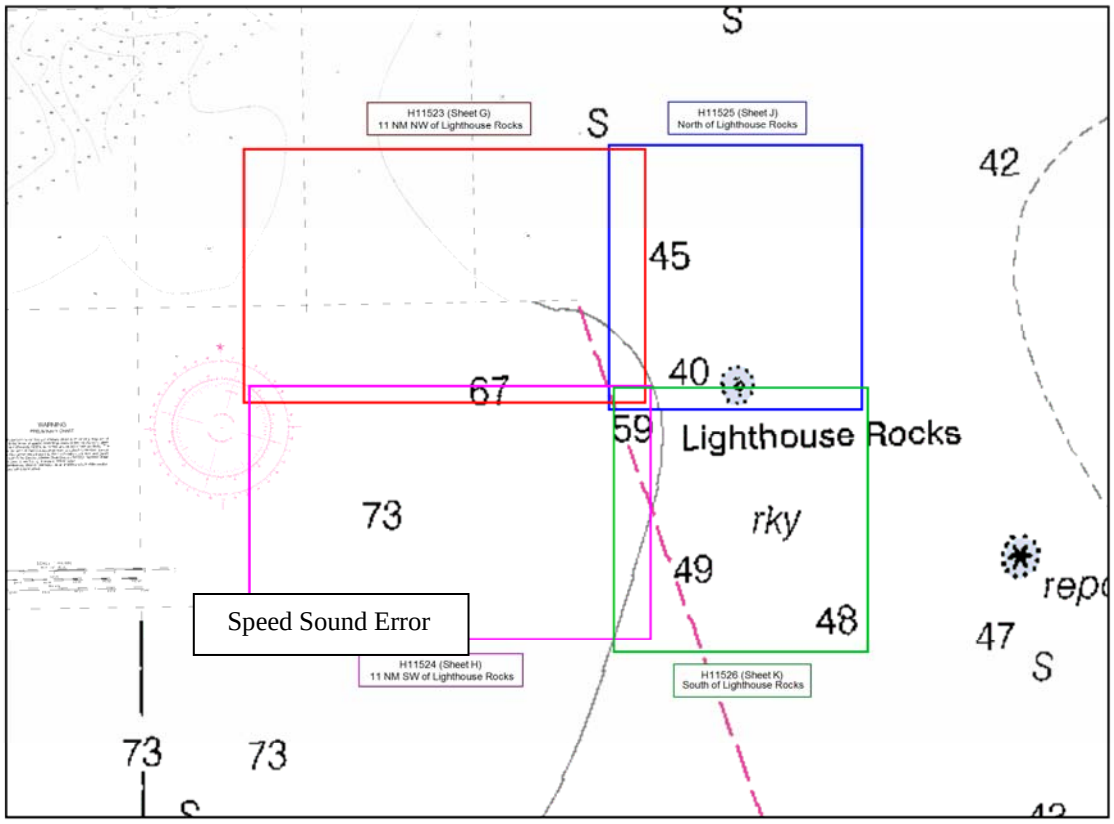


Figure 3 H11525 Survey Junctions

The surveys are in agreement along their common borders. The agreement was noted in the field using the CUBE surfaces during subset cleaning. The conformity is also apparent in the Final Combined BASE Surfaces.[4]

Note: This survey junctions with the H11064 (Tenix LADS) survey conducted in 2001. No overlap was obtained between survey H11525 and H11064.[5] On average there was about a 65 meter gap between the two surveys, which was a result of taking a best effort approach with the Ocean Pioneer around Lighthouse Rock (refer to Appendix V[6] for an email regarding this issue).

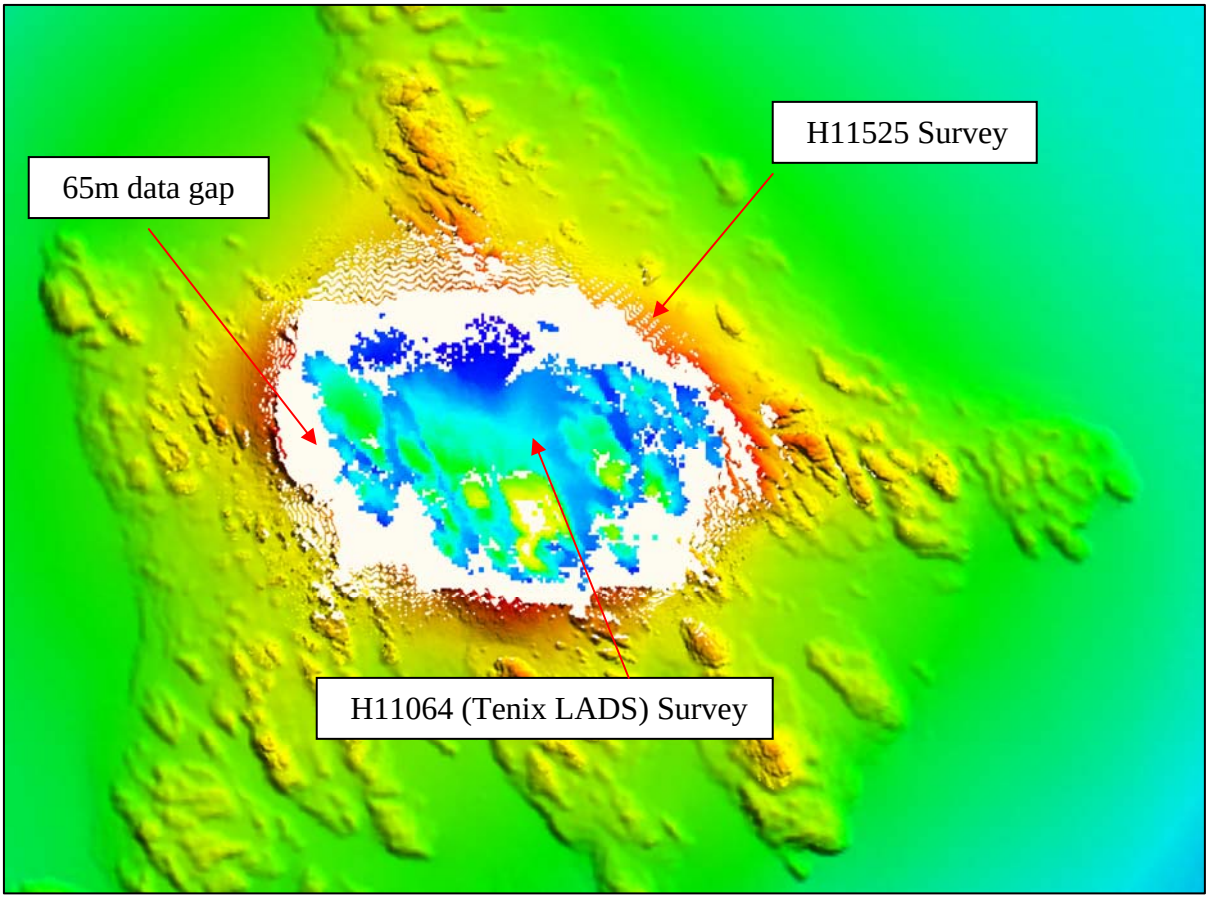


Figure 4 H11525 Survey & H11064 (Tenix LADS) Junctions

Quality Control Checks

During the hydrographic survey OPR-P182-KR-06 the R/Vs Quicksilver and Ocean Pioneer[7] 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 H11525 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.[8]

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.

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 H11525 is called H11525-Final and it contains two BASE surfaces. The follow parameters were used:

- Depth Threshold: 30 to 65 meters resolution=2m, Name in BASE Surface H11521-2m
- Depth Threshold: 60 to Max depth resolution=5m, Name in BASE Surface H11525-5m

The final S57 file for this project is called "H11525_S57_Features.000". This file contains any bottom sample feature data for this project in S57 format as required in the Specifications and Deliverables.

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. No deviations from the report occurred. A summary of the project's horizontal and vertical control follows.

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	55º53'22"N	158º49'11" 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

H11525 survey was compared with charts:[11]

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	1:80,000	4th	Nov. 2002
16561	1:80,000	2nd	Mar. 2005

Comparison of Soundings[12]

Since the existing charts have little to no hydrographic data overlapping within the survey limits of H11525, the comparison of soundings was limited. Areas that do vary to any degree are as follows:

1. Hydrographic survey H11525 revealed a depth of 54 fathoms, located at 55º51’34.18” N, 157º28’02.79” W, which is in the vicinity of a 45 fathom sounding on chart 16013. This area was surveyed with 100% multibeam coverage.
2. Hydrographic survey H11525 revealed a depth of 67 fathoms, located at 55º47’51.56” N, 157º26’40.85” W, which is in the vicinity of a 40 fathom sounding on chart 16013. This area was surveyed with 100% multibeam coverage.

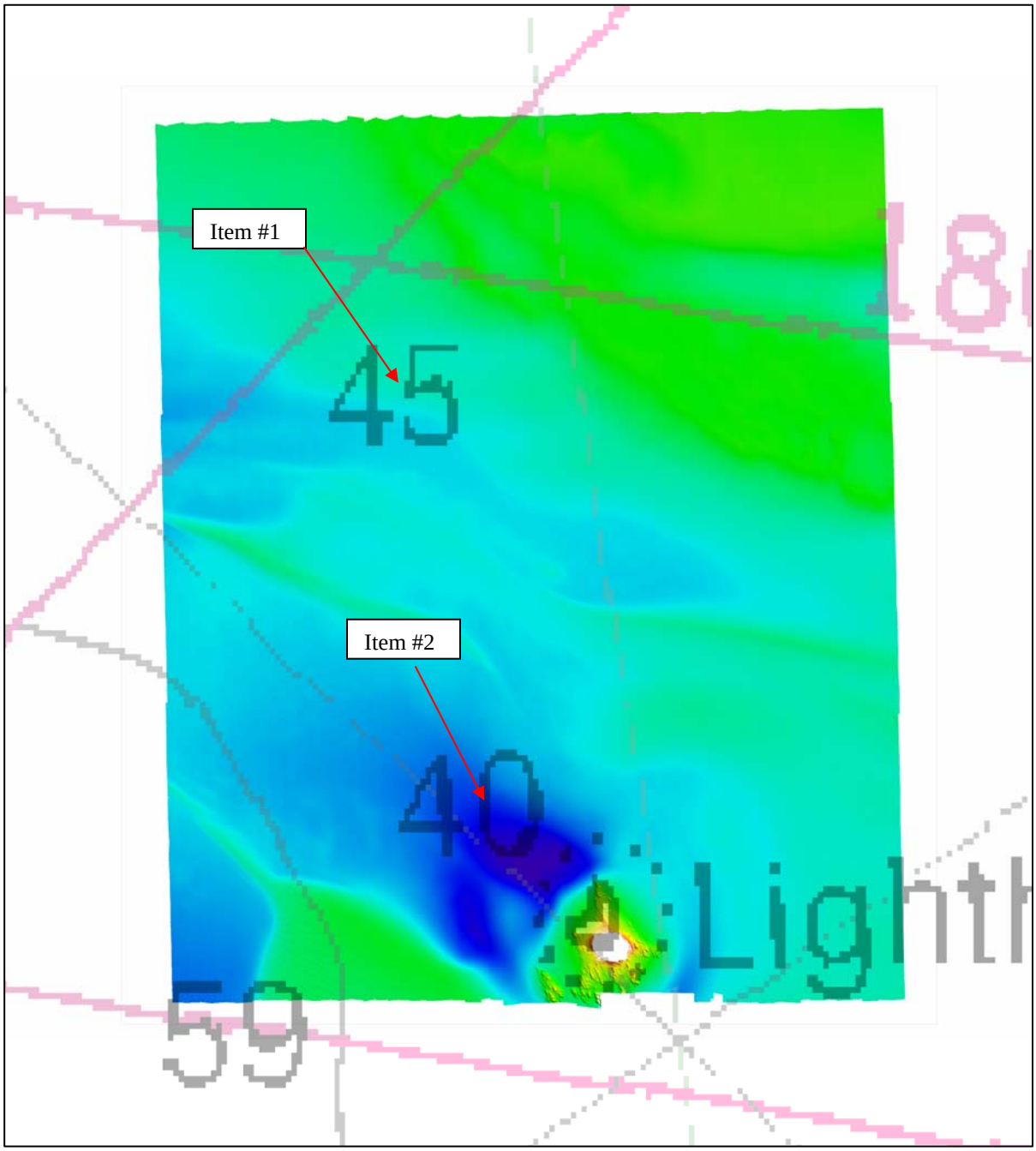


Figure 5 H11525 Chart Comparison

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11525.[13]

Charted Features

There were no charted features labeled PA, ED, PD, or Rep within the limits of H11525.[14]

Dangers to Navigation

No dangers to navigation were located during the hydrographic survey of H11525.[15]

Additional Results

Additional Item Investigations

None were assigned for this sheet.

Bottom Samples

On July 22, 24, 25 & 26, 2006 the R/V Ocean Pioneer was fitted to obtain bottom samples as specified in the Statement of Work. The purpose of this was to characterize the bottom in charted anchorages and for general bottom classification.

Samples were taken with a Van Veen grab sampler and position was recorded with WinFrog V3.6. Sediment retrieved from the sampler were analyzed and then encoded with the appropriate S-57 attributes. Positions and descriptions of all samples are found in Appendix V and in the H11525_S57_Features file.[16]

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.[17]

E – Approval Sheet

Approval Sheet

For

H11525

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

[1]Filed with project records.
[2]Concur.
[3]Concur.
[4]Concur.
[5]H11604 has been compiled and is shown on the latest edition chart.
[6] Appended to this report.
[7]R/V Quicksilver did not acquire data for H11525.
[8]Concur.
[9]Filed with project records.
[10]Preliminary zoning was accepted as the final zoning.
[11]RNC 16587 (1:135,000), the largest scale chart covered by the survey area, was not included in the chart comparison list.
[12]Chart present survey soundings.
[13]Concur.
[14]Concur.
[15]Concur.
[16]Bottom samples from this file were used for compilation of H11525_CS.000. There are no charted bottom samples to retain.
[17]Concur.

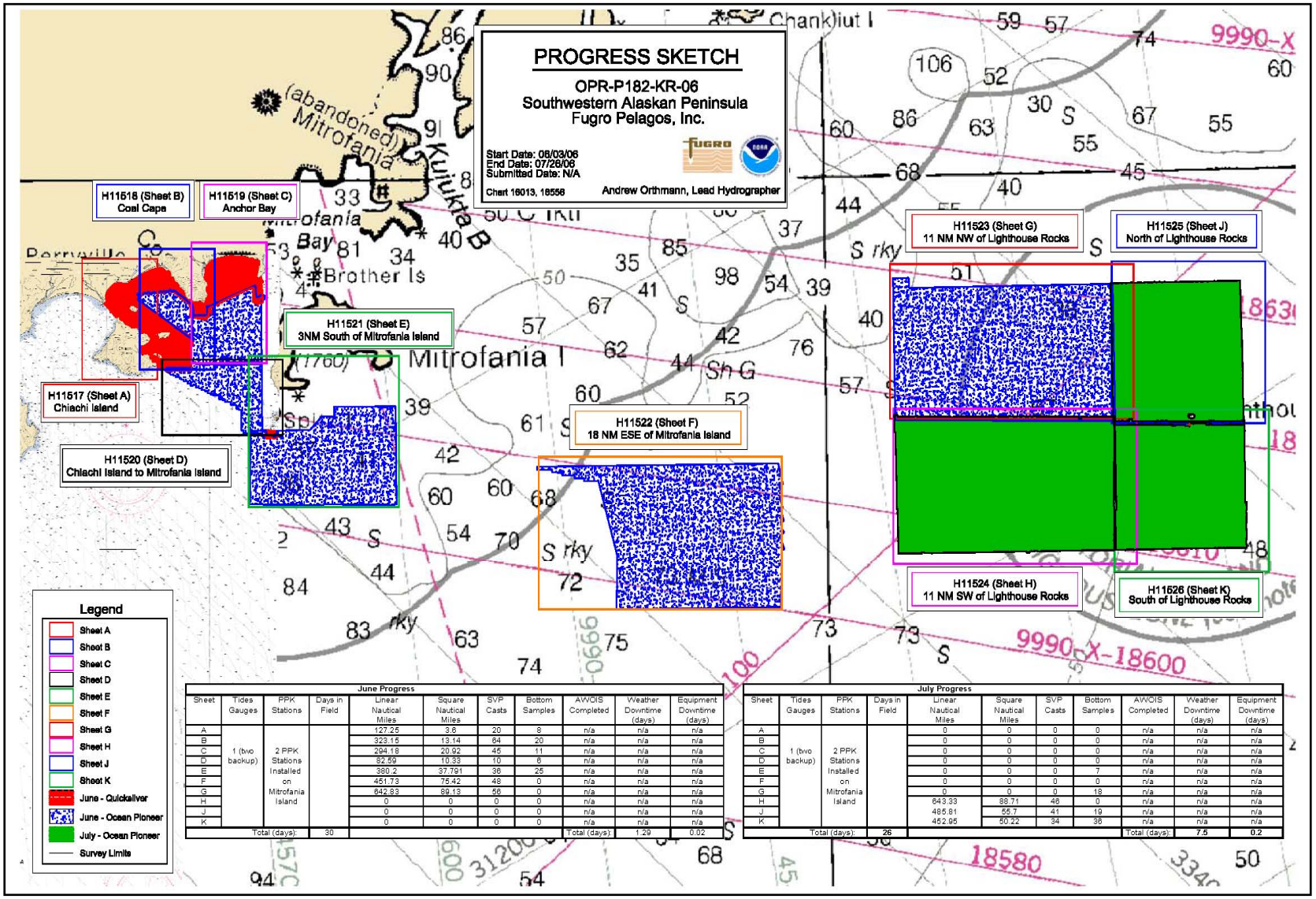
Appendix I - Dangers to Navigation Reports

No dangers to navigation were located during the hydrographic survey of H11525.

Appendix II – Survey Feature Report

No AWOIS items were assigned for H11525.

Appendix III – Final Progress Sheet and Survey Outline



June Progress

Sheet	Tides Gauges	PPK Stations	Days in Field	Linear Nautical Miles	Square Nautical Miles	SVP Casts	Bottom Samples	AWOIS Completed	Weather Downtime (days)	Equipment Downtime (days)
A				127.25	3.6	20	8	n/a	n/a	n/a
B				323.15	13.14	64	20	n/a	n/a	n/a
C	1 (two backup)	2 PPK Stations Installed on Mitrofania Island		294.18	20.92	45	11	n/a	n/a	n/a
D				82.59	10.33	10	6	n/a	n/a	n/a
E				380.2	37.791	38	25	n/a	n/a	n/a
F				451.73	75.42	48	0	n/a	n/a	n/a
G				842.83	89.13	56	0	n/a	n/a	n/a
H				0	0	0	0	n/a	n/a	n/a
J				0	0	0	0	n/a	n/a	n/a
K				0	0	0	0	n/a	n/a	n/a
Total (days):			30					Total (days):	1.29	0.02

July Progress

Sheet	Tides Gauges	PPK Stations	Days in Field	Linear Nautical Miles	Square Nautical Miles	SVP Casts	Bottom Samples	AWOIS Completed	Weather Downtime (days)	Equipment Downtime (days)
A				0	0	0	0	n/a	n/a	n/a
B				0	0	0	0	n/a	n/a	n/a
C	1 (two backup)	2 PPK Stations Installed on Mitrofania Island		0	0	0	0	n/a	n/a	n/a
D				0	0	0	0	n/a	n/a	n/a
E				0	0	0	7	n/a	n/a	n/a
F				0	0	0	0	n/a	n/a	n/a
G				0	0	0	18	n/a	n/a	n/a
H				643.33	88.71	46	0	n/a	n/a	n/a
J				485.81	55.7	41	19	n/a	n/a	n/a
K				462.95	50.22	34	36	n/a	n/a	n/a
Total (days):			26					Total (days):	7.5	0.2

Appendix IV - Tides and Water Levels

Abstract of Times of Hydrography for Smooth Tides
Project Number: OPR-P182-KR-06 Registry Number: H11525
Contractor Name: Fugro Pelagos Inc. Date: December 15, 2006
Sheet Letter: J
Inclusive Dates: July 15, 2006 and ended on July 24, 2006
Fieldwork is complete and verified tides were applied for the production of the final combined BASE surfaces and S-57 feature file. Refer to JOA's final verified tides report for additional information.

Table 5 - Abstract of Times of Hydrography for R/V Ocean Pioneer

YEAR	DAY	START TIME (UTC)	END TIME (UTC)	COMMENTS
2006	196	1:49:51	23:46:56	
2006	197	1:42:59	23:59:59	
2006	198	0:00:00	0:09:26	
2006	201	22:57:27	23:59:59	
2006	202	0:00:00	0:22:51	
2006	202	0:27:26	15:58:57	
2006	203	4:59:22	23:50:43	
2006	204	0:13:58	18:01:46	
2006	205	7:52:24	22:19:16	

Appendix V – Supplemental Survey Records and Correspondence

From: Mark.T.Lathrop [Mark.T.Lathrop@noaa.gov]
Sent: Tuesday, March 21, 2006 11:21 AM
To: Moyles, Dean
Cc: Richards, Bob; Lage, Jana; Orthmann, Andrew
Subject: Re: Lighthouse Rock

Attachments: Card for Mark.T.Lathrop

Dean,
I concur.

Mark

"Moyles, Dean" wrote:

Mark,

As per our conversation, due to safety and logistical issues, the junction with LIDAR (H11064) around Lighthouse rock will be a best effort on the large vessel.

Dean Moyles
Geomatics Engineering Technologist
Fugro Pelagos, Inc.
San Diego, CA 92123
Phone (858) 292-8922
Fax (858) 292-5308
Cell (858) 945-6378www.fugro-pelagos.com

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H11525_Bottom_Samples.xls

Northing	Easting	Approximate Depth (m)	Description	S-57 Feature Codes	Photos
6192898.56	603524.88	93.3	Fine brown sand	NATSUR=sand (4), NATQUA=fine (1), COLOUR=brown (8)	Photos\JD203-01.JPG
6194212.21	595416.29	92	Brown sand and shell fragments	NATSUR=sand,shells (4,17), NATQUA=,broken (,4), COLOUR=brown, (8,)	Photos\JD205-01.JPG
6192591.13	601354.06	82.5	Small pebbles	NATSUR=pebbles (7), NATQUA=, (,), COLOUR=, (,)	Photos\JD205-02.JPG
6182509.17	595175.32	88.8	Fine grey sand with coarse gravel	NATSUR=sand,gravel (4,6), NATQUA=fine,coarse (1,3), COLOUR=grey, (7,)	Photos\JD206-37.JPG
6182082.49	598877.68	92.2	Fine grey sand/gravel/shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD206-38.JPG
6182391.06	604671.09	97.7	Fine grey sand with gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD206-39.JPG
6186097.77	604156.81	97.7	Fine silt fine gravel with shell fragments	NATSUR=silt,gravel,shells (3,6,17), NATQUA=fine,fine,broken (1,1,4), COLOUR=,,, (,,,)	Photos\JD206-40.JPG
6186503.4	602199.54	96.9	Fine grey silt	NATSUR=silt (3), NATQUA=fine (1), COLOUR=grey (7)	Photos\JD206-41.JPG
6190855.56	603399.74	84.8	Rock	NATSUR=rock (9), NATQUA=, (,), COLOUR=, (,)	Photos\JD206-42.JPG
6190870.97	601342.48	89.2	Coarse gravel and coral	NATSUR=gravel,coral (6,14), NATQUA=coarse, (3,), COLOUR=,, (,,)	Photos\JD207-01.JPG
6191202.74	599470.43	97.1	Rock	NATSUR=rock (9), NATQUA=, (,), COLOUR=, (,)	Photos\JD207-02.JPG
6192942.91	595468.44	96.8	Fine grey sand gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD207-03.JPG
6193056.1	597219.28	91.9	Fine grey sand with gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD207-04.JPG
6192834.73	599388.44	84.6	Fine grey sand with gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD207-05.JPG
6194728.26	603537.1	79.7	Coarse gravel	NATSUR=gravel (6), NATQUA=coarse (3), COLOUR=, (,)	Photos\JD207-06.JPG
6194661.71	601405.71	79.1	Fine grey sand with gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD207-07.JPG
6194671.13	599668.19	83.4	Fine grey sand with gravel and shell fragments	NATSUR=sand,gravel,shell (4,6,17), NATQUA=fine,,broken (1,,4), COLOUR=grey,, (7,,)	Photos\JD207-08.JPG
6194696.97	597448.53	86.1	Coarse gravel	NATSUR=gravel (6), NATQUA=coarse (3), COLOUR=, (,)	Photos\JD207-09.JPG
6194645.33	593080.37	95.4	Rock	NATSUR=rock (9), NATQUA=, (,), COLOUR=, (,)	Photos\JD207-10.JPG

H11525 H-Cell Report

Nick Forfinski, Physical Scientist
Pacific Hydrographic Branch

Introduction

The primary purpose of the H-Cell 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 US1WC02M and US2AK5FM, and NOAA RNC 16587.

H-Cell compilation of survey H11525 used Office of Coast Survey H-Cell Specifications Version 3.1 and H-Cell User Guide Version 1.2.

1. Compilation Scale

Depths for H-Cell H11525 were compiled to the largest scale chart in the region - 16587, 1:135,000. Much of the chart coincident with H11525 was previously unsurveyed, so density and distribution of soundings emulate more fully surveyed chart areas northeast of H11525.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 5-meter single resolution combined surface, **H11525_Combined_5m**, in CARIS BASE Editor. A shoal-biased selection was made using a radius of 1.5 mm at 1:135,000. The resultant sounding layer contains 4189 depths ranging from 29.8 to 132.4 meters.

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 geometry of the M_COVR included in the submitted feature file was used as the DEPARE n the H-Cell. The depth range of the DEPARE object is 25 to 135 meters.

3.2 Depth Contours

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

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
50	91.44	92.8116	50.750

Contours delivered in the *_SS file have not been deconflicted against soundings and hydrography as all other features in the *_CS file and soundings in the *_SS have been. This results in conflicts between the *_SS file contours and H-Cell features at or near the survey limits. Conflicts with M_COVR, M_QUAL, DEPARE, and SBDARE objects, should be expected. H-Cell 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 H-Cell 11525:

M_QUAL
M_COVR

The meta objects included in the submitted feature file were used for the meta objects in the H-Cell

5. Features

The hydrographer reported eighteen bottom samples. Four of the 18 SBDARE objects were retained in the H-Cell (1:135,000). There were no charted bottom samples in the survey area to be retained. Additionally, two SBDARE (rock) objects were digitized based on the MBES surfaces.

The source of all features included in the H11525 H-Cell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The *_CS H-Cell contains the following Objects:

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

The *_SS H-Cell contains the following Objects:

SOUNDG	Soundings at the survey scale density
DEPCNT	NOAA rounded contours at chart scale intervals

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

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the H-Cell as $CSYMB features with the Blue Note information located in the INFORM field.

8. Spatial Framework

8.1 Coordinate System

All 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 H-Cell, 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 H-Cell 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 H-Cell 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

H11525 junctions H11523 to the west, H11526 to the south, and H11524 to the southwest..

10. QA/QC and ENC Validation Checks

H11525 was subjected to QA checks in S-57 Composer prior to exporting to the H-Cell base cell (000) file. The millimeter-precision metric S-57 H-Cell was converted to chart units, and NOAA rounding was applied. The program 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 H-Cells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11525 Base Cell File, Chart Units, Soundings compiled to 1:135,000
- H11525 Base Cell File, Chart Units, Soundings compiled to 1:20,000
- H11525 Descriptive Report including end notes compiled during office processing and certification, the H-Cell Report, and supplemental items

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11525_CS.000
- Chart units base cell file, survey scale soundings H11525_SS.000
- Descriptive Report H11525_DR.pdf

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial H-Cell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the H-Cell, correct geometry and build topology, apply final attributes, export the H-Cell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric H-Cell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric H-Cell 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 H-Cells using a COTS viewer.

12. Contacts

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

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APPROVAL SHEET
H11525

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 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 Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2009.07.02 11:42:59 -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
2009.07.02
11:22:53 -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: 2009.07.21 08:47:35 -04'00'