H12264

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. H12264

LOCALITY

State Alaska

General Locality Krenitzin Islands

Sublocality Akun Bay

2010

CHIEF OF PARTY
David D. Briggs, Fugro Pelagos, Inc.

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12264

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 **Krenitzin Islands**

Sub-Locality **Akun Bay**

Scale **1:10,000** Date of Survey **06/09/2010 – 07/04/2010**

Instructions dated **April, 2010** Project No. **OPR-Q191-KR-10**

Vessel **F/V Pacific Star (556510)**

Chief of party **David D. Briggs, FUGRO PELAGOS, INC.**

Surveyed by **BRIGGS, REYNOLDS, FARLEY, ROKYTA, LYDON, LOPEZ, TIXIER, GOODALL, CAIN, ESPOSITO, et.al**

Soundings by **Reson Seabat 7125**

SAR by **Adam Argento** Compilation by **Fernando Ortiz**

Soundings compiled in **Fathoms**

REMARKS: **All times are UTC. UTM Projection 3N**

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and end notes in red were generated during office processing.

Page numbering may be interrupted or non sequential.

All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

A. Area Surveyed

H12264 (Sheet E) is located in the area near Akun Bay.

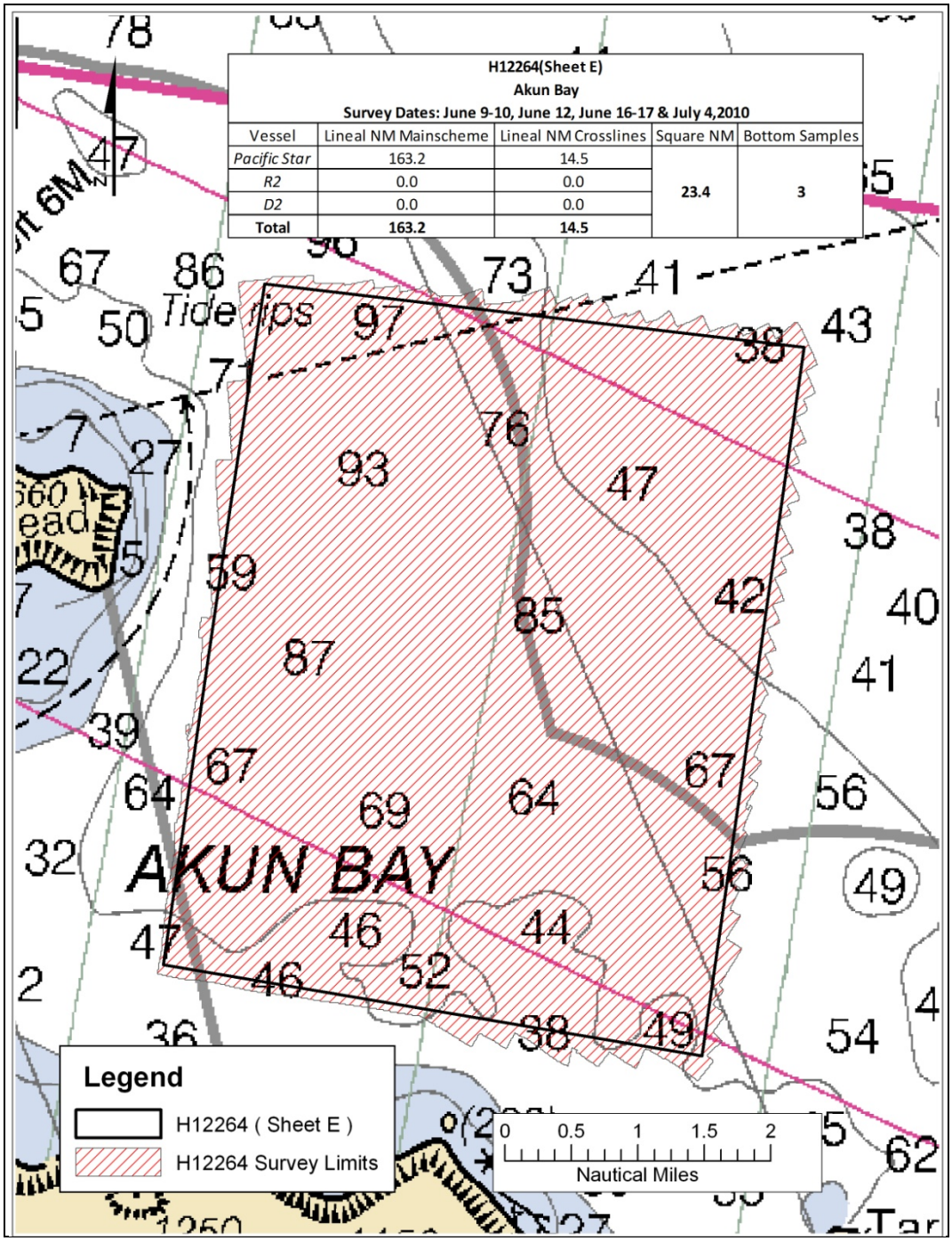

Figure 1 H12264 Area Surveyed

B. Data Acquisition and Processing

Refer to the OPR-Q191-KR-10 Data Acquisition and Processing Report 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.

B.1 Equipment & Vessels

The F/V Pacific Star acquired all sounding data for H12264.

F/V Pacific Star, 162 feet in length with a draft of 16 feet, was equipped with a hull mounted Reson SeaBat 7125 dual-frequency multibeam echosounder system for the OPR-Q191-KR-10 project. The Reson 7125 operates at two user-selectable frequencies of 400 and 200 kHz. The 7125 forms 256 or 512 beams over 128° with a beam width of 0.5° (across-track) in the 400 kHz mode, and 256 beams over 128° with a beam width of 1° (across-track) in the 200 kHz mode. It allows the operator to select equi-angle or equi-distant beam spacing. For this project, both the 400 kHz and 200 kHz systems were configured for 256 equi-angle beams. The selection of these frequencies as well as range scale, gain, power levels, ping rates, etc. was a function of water depth and data quality and was noted on the survey line logs (see Separate 1). All 7125 multibeam data files were logged in the S7K format using WinFrog Multibeam v3.09.02. The vessel was equipped with two AML sound velocity and pressure sensors (SV&P), and a Brooks Ocean Moving Vessel Profiler (MVP), for sound velocity profiles. Vessel attitude and position were measured using an Applanix Position and Orientation System for Marine Vessels (POS MV) 320 V4. OTT RLS radar sensors were installed on the port and starboard gunwales of F/V Pacific Star to obtain a more precise static draft measurement. Samples were taken over a 10 minute period and averaged to determine the vessel's draft. Traditional static draft measurement techniques were also employed as a substitute to the OTT RLS measurements when required.

Refer to OPR-Q191-KR-10 Data Acquisition and Processing Report for a complete listing of equipment and vessel descriptions.

B.2 Quality Control

Crosslines

Crosslines were planned and well distributed throughout the survey to ensure adequate quality control. Total crossline length surveyed was 14.5 nautical miles or 8.9 percent of the total main scheme line length. Each crossline was compared to the entire main scheme line plan through an 8m CUBE surface, using the CARIS HIPS QC report routine.

All of the QC Reports fall well within the required 95% confidence level.[1] Results are located in Separate IV.

Note: The QC reports were generated based on the IHO Order 1a accuracy specification:

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

Where, a=0.5 and b=0.013, d=depth

Uncertainty Values

The majority of H12264 had uncertainty values of 0.45 m to 1.6 m, which met project specifications (**Figure 2**).[2]

As seen in the uncertainty surface graphic, uncertainty is generally lowest near the nadir beams and increases toward the outer beams of each swath. This is expected and primarily a result of sound velocity error uncertainty and bottom detection, particularly in the deeper areas.[3]

Some areas of higher uncertainty are a result of rock outcrops, steep slopes, and greater depth.[4]

Oscillations along track and port to starboard on the uncertainty surface are due to higher uncertainty computed due to vessel roll, again prevalent mostly in the outer beams.

A small area of higher uncertainty was viewed on the northwest slope of the canyon. This was a result of a steep incline combined with a lower data density obtained on the slope compared to the surrounding area. Though the uncertainty was noticeably higher in this area than in the surrounding region, all data met uncertainty and data density requirements.[5]

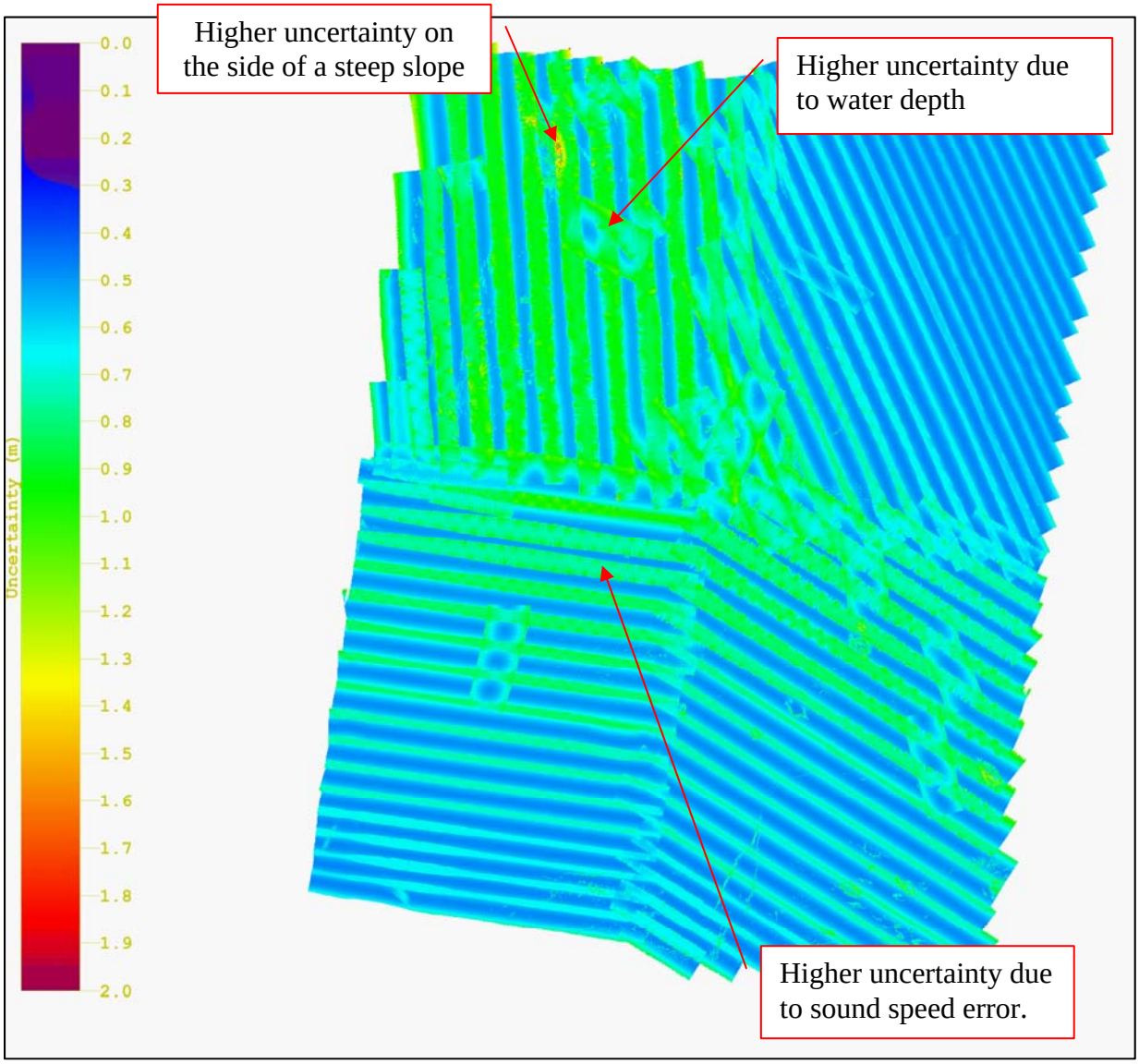

Figure 2 Uncertainty DTM

Data Density

The NOS Hydrographic Surveys Specifications and Deliverables, April 2010, require 95% of all nodes to be populated with at least five soundings. Survey H12264 met these project specifications.[6] (**Figure 3**)

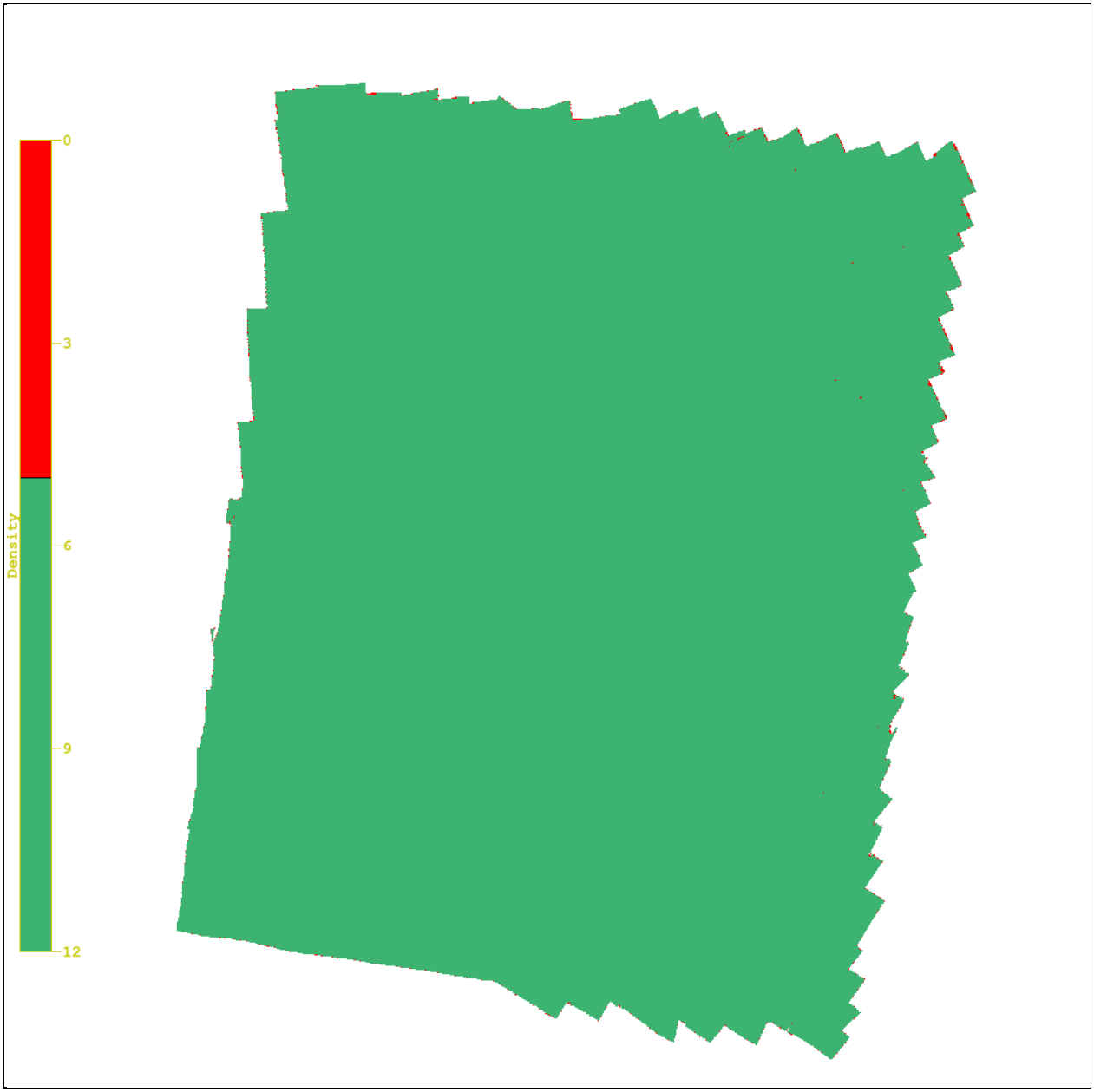

Figure 3 Density DTM

Detection requirements were met by minimizing vessel speed when necessary, using sonar range scales appropriate to the water depth to maximize ping rates, and maximizing swath overlap. These variables were adjusted in real-time by the online acquisition crew based on the WinFrog QC and coverage displays. The shipboard processing crew provided feedback after preliminary processing and coverage creation in CARIS HIPS, and reported re-runs or in-fills as necessary to the acquisition crew.

Survey Junctions

H12264 (Sheet E) junctions with: [7]

Registry #	Date	Junction Side
H12262	2010	East
H12263	2010	East

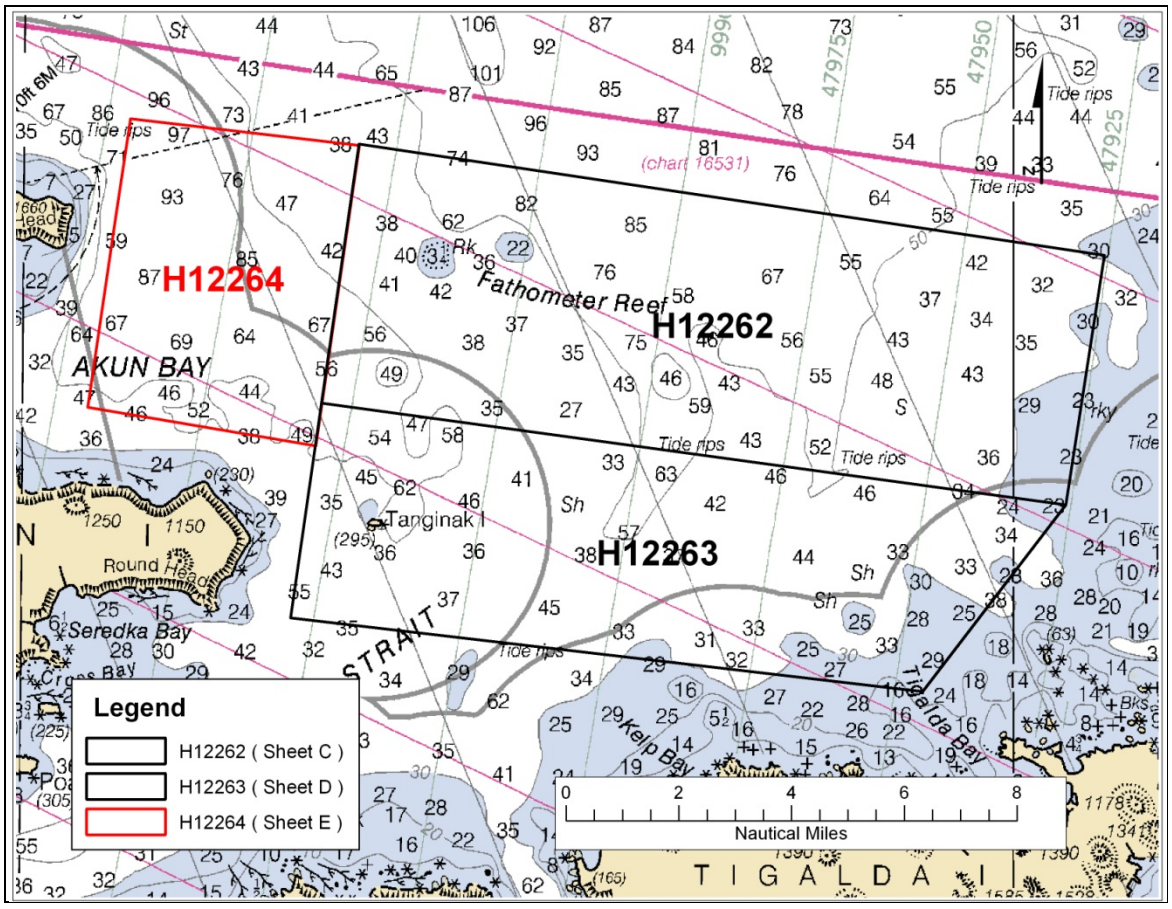

Figure 4 H12264 Survey Junctions

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 Finalized BASE Surfaces.[8]

Quality Control Checks

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 were achieved. These include, but are not limited to the following: GPS Status, Position Accuracy, Receiver Status (which included HDOP & PDOP), and Satellite Status. During periods of high HDOP and/or a low number of available satellites, survey operations were suspended.

Sonar system confidence checks were performed weekly by comparing post processed depth information collected by multiple vessels surveying over a common area. In addition, bar checks were performed to maintain a high confidence level. Sound Velocity Probe confidence checks were conducted weekly by producing comparable sound velocity data between all vessels. This was conducted by having all sound velocity profiling equipment (MVP and SVPs) perform a cast in close proximity to each other in a near simultaneous time period.

Data Quality

In general, the multibeam data quality for H12264 was good. One notable problem follows:

1. A general downward and/or upward cupping is noticeable in the across track sounding profiles for certain areas. This is possibly due to a high volume of thermal layering and strong undercurrents 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 in the data, it is within required specifications.[9]

The Pacific Star collected sound velocity profiles every two hours (or less) to compensate for sound velocity changes over time. Profiles were collected on alternate ends of lines or in the middle of lines to minimize the spatial aspect of sound velocity changes.

Refer to the OPR-Q191-KR-10 Data Acquisition and Processing Report for a detailed description of the survey equipment and methodology used over the course of this survey.

B.3 Corrections to Echo Soundings

Refer to the OPR-Q191-KR-10 Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings. No deviations from the report occurred.

B.4 Data Processing

Refer to the OPR-Q191-KR-10 Data Acquisition and Processing Report for a detailed description of the processing flow.

TPU models for the 7101 and 7125 system were found to be incorrectly applied in CARIS v7.0. The DeviceModel.xml file was edited to correct the sonar TPU values. See the Data Acquisition and Processing Report Section B for a more specific description of the issue and corrective action.

In order to provide more accurate project wide TPU values, all full water column sound speed cast measurements were statistically analyzed in MBTools, via the SVP Statistics utility. This utility calculated a mean, variance, and standard deviation at a user specified depth interval. The standard deviation was then used to produce a TPU value of higher accuracy that was vessel and sheet specific. TPU values specific to H12264 are shown in **Table 1**.

Table 1 H12264 TPU Values

Vessel	Measured	Surface
3-Pacific Star	1.087	0.250

The final fieldsheet for H12264 is called "H12264_(Sheet_E)", and it contains three BASE surfaces. The following parameters were used:[10]

40-88 meters: 4 m resolution, name "H12264_4m_Final"
80-176 meters: 8 m resolution, name "H12264_8m_Final"
160-max.depth: 16 m resolution, name "H12264_16m_Final"

Notes:

- Minimum depth was approximately 72m; therefore, resolutions shoaler than 4m were not computed.
- Maximum depth was approximately 185m; therefore, resolutions coarser than 16m were not computed.

- Final CUBE BASE surfaces were created with CARIS v 7.0 in the CARIS Spatial Archive (CSAR) format. These surfaces are located under the "H12264(Sheet_E)\CARIS\Fieldsheets\" directory.

The final S57 file for this project is called "H12264_S57_Features.000".[11] This file contains the object and metadata S57 objects as required in the Specifications and Deliverables.

C. Vertical and Horizontal Control

Refer to the OPR-Q191-KR-10 Horizontal and Vertical Control Report 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).

For real-time DGPS corrections, a CSI MBX-3 unit was tuned to the Cold Bay, Alaska USCG DGPS site. The unit output differentially corrected positions at 1 Hz to the (POS MV) 320 V4 where it was integrated with inertial data and a position for the top-center of the IMU was generated. This position was logged concurrently with the bathymetry from WinFrog and the POS file with Fugro Pelagos PosMvLogger. It was later corrected for offsets to the multibeam echosounder (MBES) by CARIS HIPS in post processing.

Final positioning was done using post-processed kinematic (PPK) methods. Applanix POSPac v5.3 software was used in conjunction with the POS files and local 1Hz base station data to generate a higher accuracy position which was applied in processing, replacing the real-time position records.

See OPR-Q191-KR-10 Horizontal and Vertical Control Report for a more detailed description of PPK positioning methods used.

Vertical Control

All sounding data were reduced to MLLW initially using observed tidal data from two John Oswald and Associates (JOA) tide stations located in Akun Bay and Tigalda Bay, AK and one NOAA COOPS tide station located in King Cove, AK. 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 F/V Pacific Star at the end of every Julian Day. A cumulative file for the gauges was updated each day by appending the new data. It should be noted that these unverified tides were used in the field for preliminary processing only. The NOAA supplied tidal zoning was modified by JOA, providing a more elaborate zoning scheme than those zones issued in the Statement of Work.

On March 29, 2011, JOA issued verified tidal data and final zoning for H12260, H12261, H12262, H12263, & H12264 of OPR-Q191-KR-10. All sounding data was then re-merged using CARIS HIPS and SIPS tide routine. Verified tidal data were used for all final Navigation BASE surfaces and S57 Feature files.

For additional information, refer OPR-Q191-KR-10 Horizontal and Vertical Control Report.

Table 2 Tide Gauge

Gauge	Location	Latitude	Longitude
946-2719	Akun Island, AK	54° 14' 20" N	165° 32' 28" W
946-2782	Tigalda Bay, AK	54° 07' 05" N	164° 58' 35" W
945-9881	King Cove, AK	55° 03' 42" N	162° 19' 36" W

D. Results and Recommendations

D.1 Chart Comparison

H12264 survey was compared with charts shown in **Table 3**.

Table 3 Chart Comparisons

Chart Number	Type	Scale	Edition	Edition Date
16520	Raster	1:300,000	23	August-2008
16531	Raster	1:80,000	7	February-2002
US3AK61M	ENC	n/a	16	January-2011
US4AK6FM	ENC	n/a	7	October-2010

Comparison of Soundings

A comparison of soundings was accomplished by overlaying the NOAA RNCs and ENCs downloaded from the NOAA Office of Coast Survey website on the 7th of March, 2011. These charts were overlayed onto the final BASE surfaces in CARIS HIPS & SIPS. The general agreement between the charted soundings and H12264 soundings is noted. A more detailed comparison was undertaken for any charted shoals or other dangerous features.

Agreement between the H12264 BASE surface depths and the charted soundings for all applicable ENC and Raster charts was within +/- 1 to 2 fathoms.[12] Since the survey area was ensonified with 100% multibeam coverage, shoaler depths were discovered between the charted soundings. In these areas, when necessary, the sounding was designated to ensure its inclusion in the finalized BASE surface. Exceptions follow:

1. Charted contours were in general found to be adequate, but the 100% multibeam coverage discovered discrepancies between charted and observed contours. Hydrographer recommends contours and soundings be modified to agree with the H12264 survey.[13]

2. A 67 fathom area of shoaling was found between the 80 and 90 fathom contours in RNC 16531 & ENC US4AK6FM. The shoal is found in the northwest section of Sheet H12264 along the western edge of the canyon.[14]

3. A 58 fathom area of shoaling was found along the 70 fathom contours in chart RNC 16531 & ENC US4AK6FM. The shoal is found in the southeast section of Sheet H12264.[15]

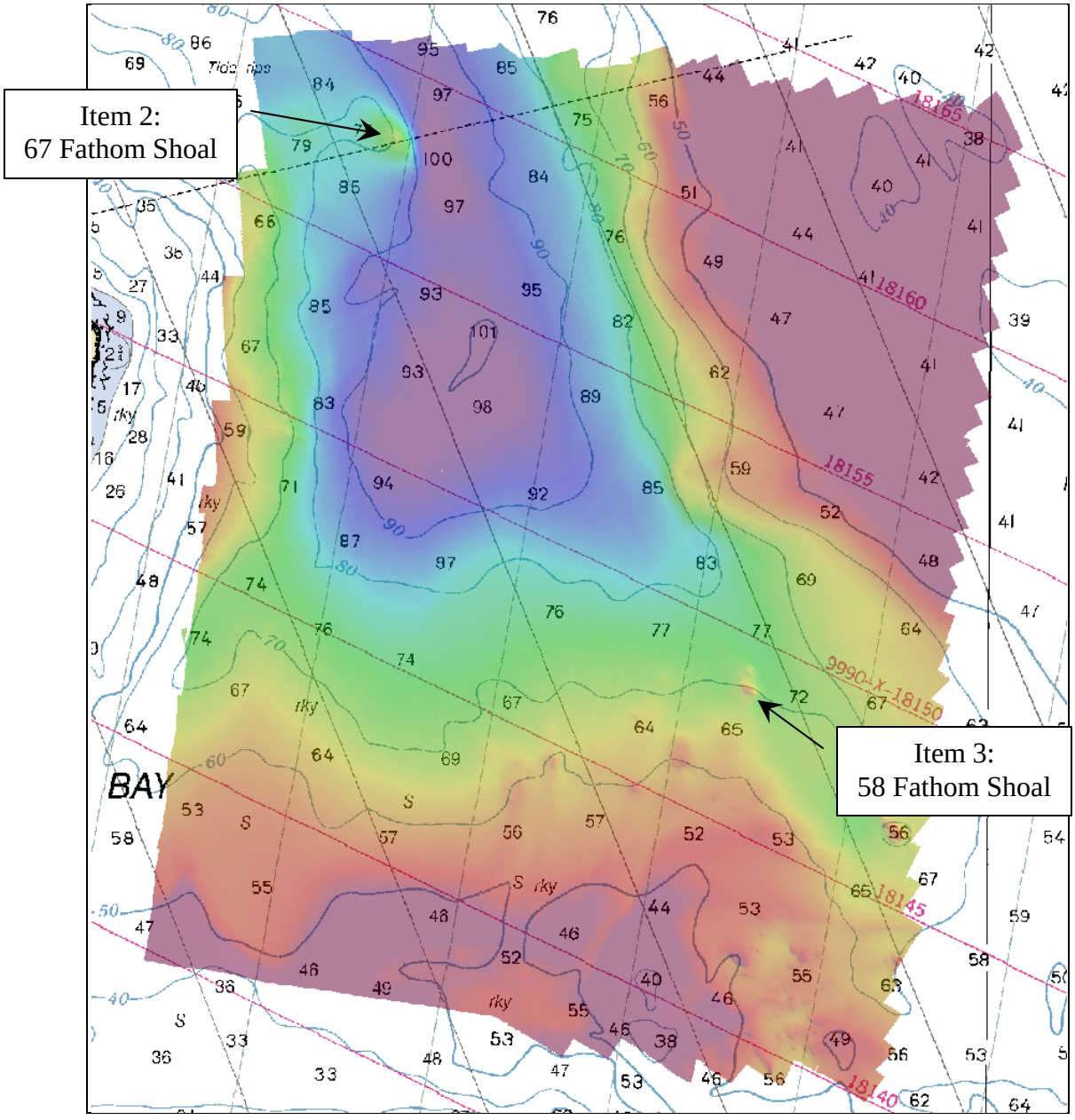

Figure 5: Bathymetry overlayed on Chart 16531

The Hydrographer recommends that soundings within the survey limits of H12264 supersede all prior survey and charted depths.[16]

Automated Wreck and Observation Information System (AWOIS)

There were no AWOIS items assigned for investigation.[17]

Charted Features

There were no charted features labeled ED, PD, or PA within the limits of H12264.[18]

Dangers to Navigation

No dangers to navigation were found or reported for this survey.[19]

D.2 Additional Results

None to note.

Bottom Samples

The F/V Pacific Star and launches (R2 and D2) were fitted to obtain bottom samples as specified in the Statement of Work. Three samples were obtained by F/V Pacific Star in survey H12264.[20]

Samples were taken with a Van Veen grab sampler and positions were recorded with WinFrog Multibeam v 3.09.02. Samples retrieved were analyzed and then encoded with the appropriate S57 attributes. Positions and descriptions of samples are found in the H12264_S57_Features.000 file.

Aids to Navigation

There were no charted aids to navigation in the survey area.[21] No uncharted aids to navigation were found in the survey area.[22]

E. Approval Sheet

Approval Sheet

For

H12264

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

OPR-Q191-KR-10 Statement of Work
NOS Hydrographic Surveys Specifications and Deliverables, April 2010 Edition
Fugro Pelagos, Inc. Acquisition Procedures (2010-MBES_Acquisition_Procedures_R0);
Fugro Pelagos, Inc. Processing Procedures (2010-MBES_Processing_Procedures_R0)

The data were reviewed daily during acquisition and processing, and the survey is complete and adequate for its intended purpose.

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,

David D Briggs,
Lead Hydrographer
Fugro Pelagos, Inc.
April 7, 2011

4/8/2011

X 

David D Briggs
Lead Hydrographer

Revisions and corrections performed during office processing and certification.

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[1] Concur.
[2] Concur.
[3] Concur. Data is within specifications and adequate to supersede charted data in the common area, despite sound speed error.
[4] Concur. Data is within specifications and adequate to supersede charted data in the common area.
[5] Concur. Data is adequate and within specifications to supersede charted data in the common area.
[6] Concur.
[7] H12264 junctions with H12262 and H12263 to the East. A common junction will be made with these surveys during compilation process.
[8] Concur.
[9] Concur. Data is adequate and within specifications to supersede charted data in the common area.
[10] A 16 meter combined surface was created during the Survey Acceptance Review and was used for cartographic compilation of this survey.
[11] Concur with clarification. The submitted hob files were used in the compilation of HCell H12264. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.
[12] Concur.
[13] Concur. Chart contours and fathoms as depicted in the HCell.
[14] Concur. Sounding is 68 fm after the final tide correction. Chart as depicted in the HCell
[15] Concur. Chart sounding as depicted in the HCell
[16] Concur. Data is adequate to supersede charted data in the common area.
[17] Concur.
[18] Concur.
[19] Concur.
[20] Three bottom samples from the field are included in the HCell to be charted. There were no charted bottom samples to retain.
[21] Concur.
[22] Concur.

H12264 HCell Report

Fernando Ortiz, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12264 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.
HCell Reference Guide: Version 2.0, 2 June, 2010.

2. Compilation Scale

Depths and features for HCell H12264 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
16531	1:80,000	7th	02/16/2002	07/02/2011

The following ENCs were also used during compilation:

Chart	Scale
US4AK6FM	1:80,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 16-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:20,000 at survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	2
10	20	3
20	50	3.5
50	500	4

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

4. 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 16531	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 H12264_SS.000
40	73.152	74.5236	40.750	40
50	91.44	92.8116	50.750	50
60	109.728	111.0996	60.750	60
70	128.016	129.3876	70.750	70
80	146.304	147.6756	80.750	80
90	164.592	165.9636	90.750	90
100	182.88	184.2516	100.750	100

5. Meta Areas

The following Meta objects area is included in HCell H12264:

M_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography.

6. Features

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 may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

7. Spatial Framework

7.1 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.

7.2 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

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

7. 3 S-57 Object Classes

The CS HCell contains the following Object Classes:

$CSYMB	Blue Notes (points) —Notes to the MCD chart Compiler
M_QUAL	Data quality Meta object
SBDARE	Bottom samples
SOUNDG	Soundings at chart scale density

The M_QUAL is adequate for NDB product searches.

The SS HCell contains the following Object Classes:

DEPCNT	Generalized contours at chart scale intervals (See table under section 4.)
SOUNDG	Soundings at the survey scale density (See table under section 3.)

8. Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

9. QA/QC and ENC Validation Checks

H12264 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.

10. Products

10.1 HSD, MCD and CGTP Deliverables

H12264_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:80,000
H12264 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:20,000
H12264 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12264 _outline.gml	Survey outline
H12264 _outline.xsd	Survey outline

10.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.0	Creation of soundings and bathy-derived features, creation of the 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, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

11. Contacts

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

Fernando Ortiz
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6859
Fernando.ortiz@noaa.gov.

APPROVAL SHEET
H12264

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

Fernando Ortiz
2011.08.05
12:50:31 -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.

Signed for
Martha Herzong

Pete
Holmberg

Digitally signed by Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2011.08.08 11:32:07 -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.

Digitally signed by NELSON.GARY.C.1365885318
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=NELSON.GARY.C.1365885318
Date: 2011.08.08 09:20:21 -07'00'