H11978

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. H11978

LOCALITY

State California

General Locality Pacific Ocean - Northern California

Sublocality West of Arcata Bay

2008

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.

H11978

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: California

General Locality: Pacific Ocean - Northern California

Sublocality: West of Arcata Bay

Scale: N/A

Date of Survey: 09/29/2008 -10/ 22/2008

Instructions Dated: 7/7/2008

Project No.: M-L906-KR-08

Vessel: F/V Pacific Star (556510), R/V R2 (623241), R/V D2 (647782)

Chief of Party: Dean Moyles

Surveyed by: Orthmann, Moyles, Reynolds, Barrow, Zurita, Todd, Tidey, Cameron, Mount, et al.

Soundings taken by echo sounder: RESON SEABAT 7125 & 8125 Echosounders, Hull Mounted

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: Fernando Ortiz

Automated plot by: N/A

Verification by: Fernando Ortiz

Soundings in: Fathoms and Feet at MLLW

REMARKS: Time in UTC. UTM Projection Zone 10

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

H11978 (Sheet BH) is west of Arcata Bay, California. It is bound by the coordinates listed in Table 1. 1[1]

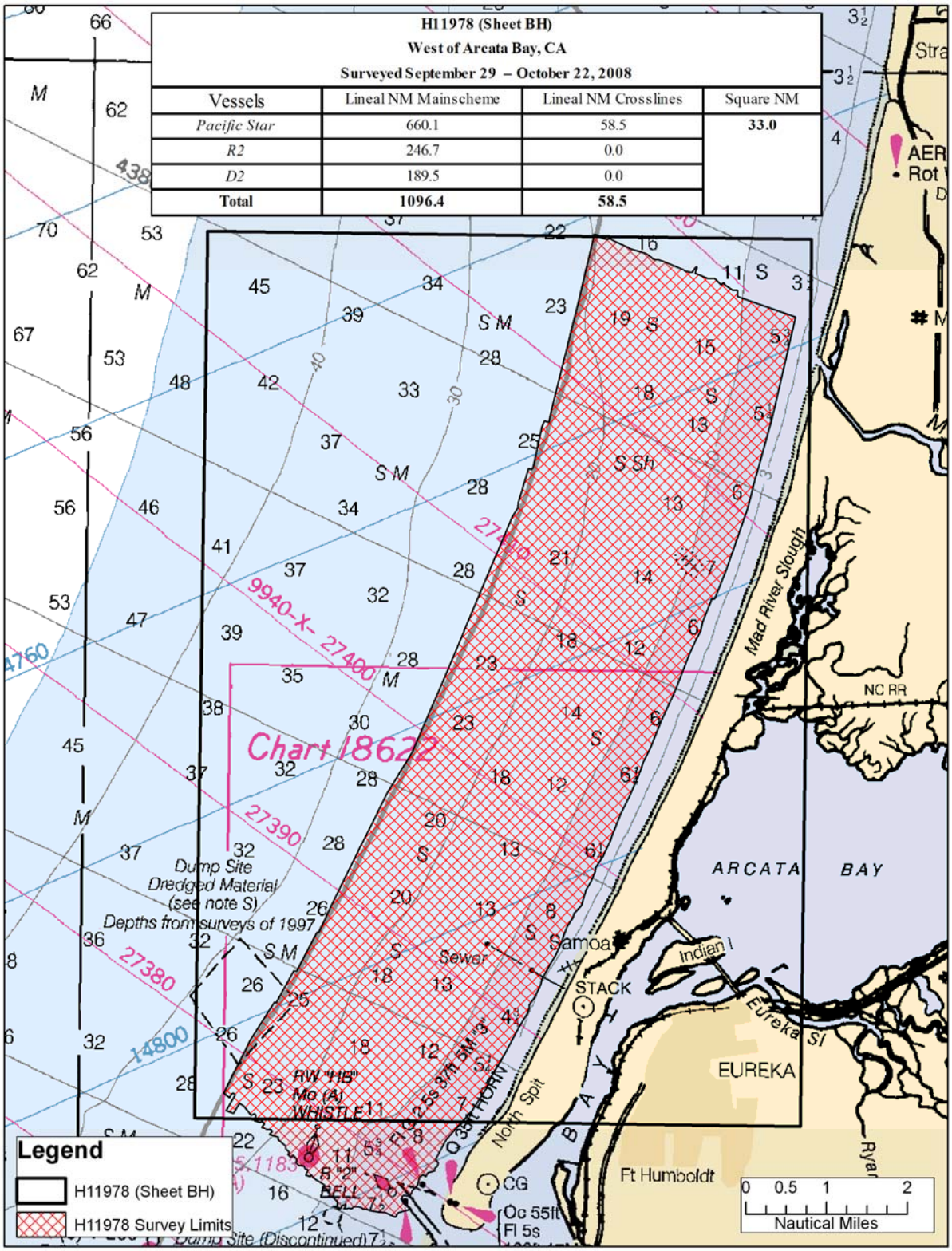
This data was collected by Fugro Pelagos, Inc. for NOAA and the State of California's Coastal Conservancy. While the State of California's interest in this data is primarily for fisheries habitat mapping, the necessary steps to meet NOAA specifications and make the data suitable to OCS for nautical charting purposes have been taken, as detailed in the 2008 Specifications and Deliverables and described in this and accompanying reports.

Hydrographic data collection began on September 29, 2008 and ended on October 22, 2008.

Table 1 – Sheet Bounds

Point	Latitude (North)	Longitude (West)
1	40-57-53	124-18-04
2	40-57-53	124-08-11
3	40-46-50	124-08-11
4	40-46-50	124-18-04
5	40-57-53	124-18-04

Note: The southern bounds were modified slightly (shifted further south) from originally planned to include additional survey area.[2]



H11978 (Sheet BH)
West of Arcata Bay, CA
Surveyed September 29 – October 22, 2008

Vessels	Lineal NM Mainscheme	Lineal NM Crosslines	Square NM
Pacific Star	660.1	58.5	**33.0**
R2	246.7	0.0	
D2	189.5	0.0	
Total	**1096.4**	**58.5**	

Figure 1 H11978 Area Surveyed

B. DATA ACQUISITION AND PROCESSING

Refer to the M-L906-KR-08 Data Acquisition and Processing Report[3] 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 R/Vs R2, D2, and F/V Pacific Star acquired all sounding data for H11978.

The Pacific Star, which is 162 feet in length with a draft of 16 feet, was equipped with a Reson Seabat 7125 (400/200 kHz dual frequency) and a Reson Seabat 8111 for multibeam data acquisition. The vessel was also 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 Vessel (POS MV 320 V4) with S7K files logged in Winfrog Multibeam v 3.08.23.

Vessel D2, a Pacific Star launch, at 29 feet in length with a draft of 3 feet, was equipped with a Reson Seabat 8125 (455 kHz). 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 Winfrog Multibeam v 3.08.23.

Vessel R2, with the same specifications as D2, was similarly equipped, except the 7125 system was single frequency (400 kHz only) and S7K files were logged instead of XTF.

Refer to M-L906-KR-08 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 58.5 nautical miles or 5.3 percent of the total main scheme line length, exceeding the 5 percent planned. Each crossline was compared to the entire main scheme line plan and CUBE surface it intersected, using the CARIS HIPS QC report routine and all beams passed at 95 percent confidence level or better.[4]

Results are located in Separate IV. [5]

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

$+/- \sqrt{(a^2 + (b * d)^2)}$ where a = 0.2, b = 0.01, 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 as follows:

$a = 0.2 * \sqrt{2} = 0.283$
$b = 0.01 * \sqrt{2} = 0.014$

Uncertainty Values

The majority of H11978 had uncertainty values of 0.25 m to 0.45 m, which met project specifications.

As seen in the uncertainly surface, uncertainty is generally lowest near the sonar nadir beams and increases toward the outside of each swath. This is expected and primarily a result of sound velocity error uncertainty.

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

However, despite high uncertainty in these areas, data matchup is good and the data acceptable for nautical charting purposes. [6]

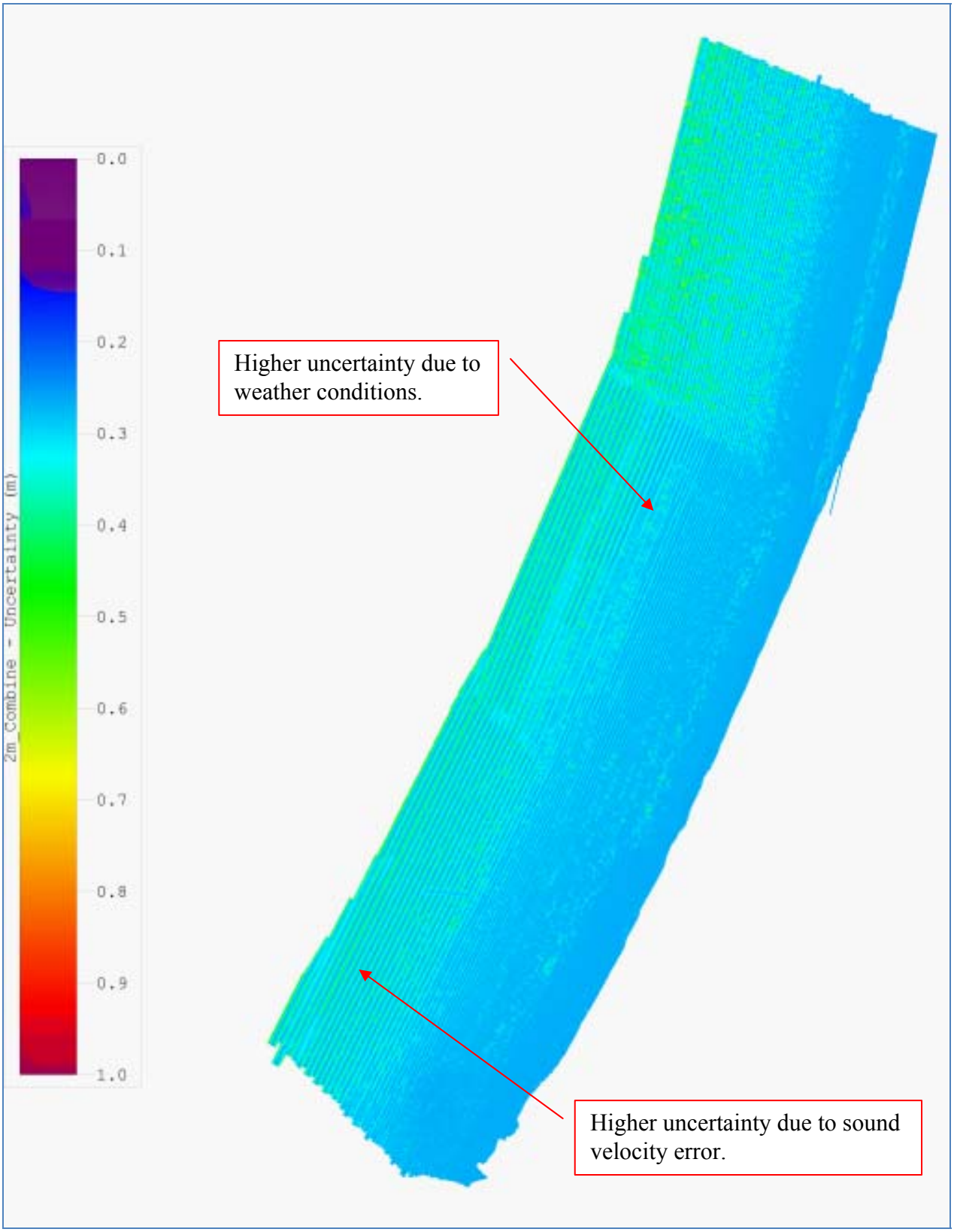


Figure 2 Uncertainty DTM

Survey Junctions

H11978 (Sheet BH) junctions with:

Registry #	Date	Junction Side
H11979	2008	North
H11977	N/A	South (Note: This sheet is not yet completed)

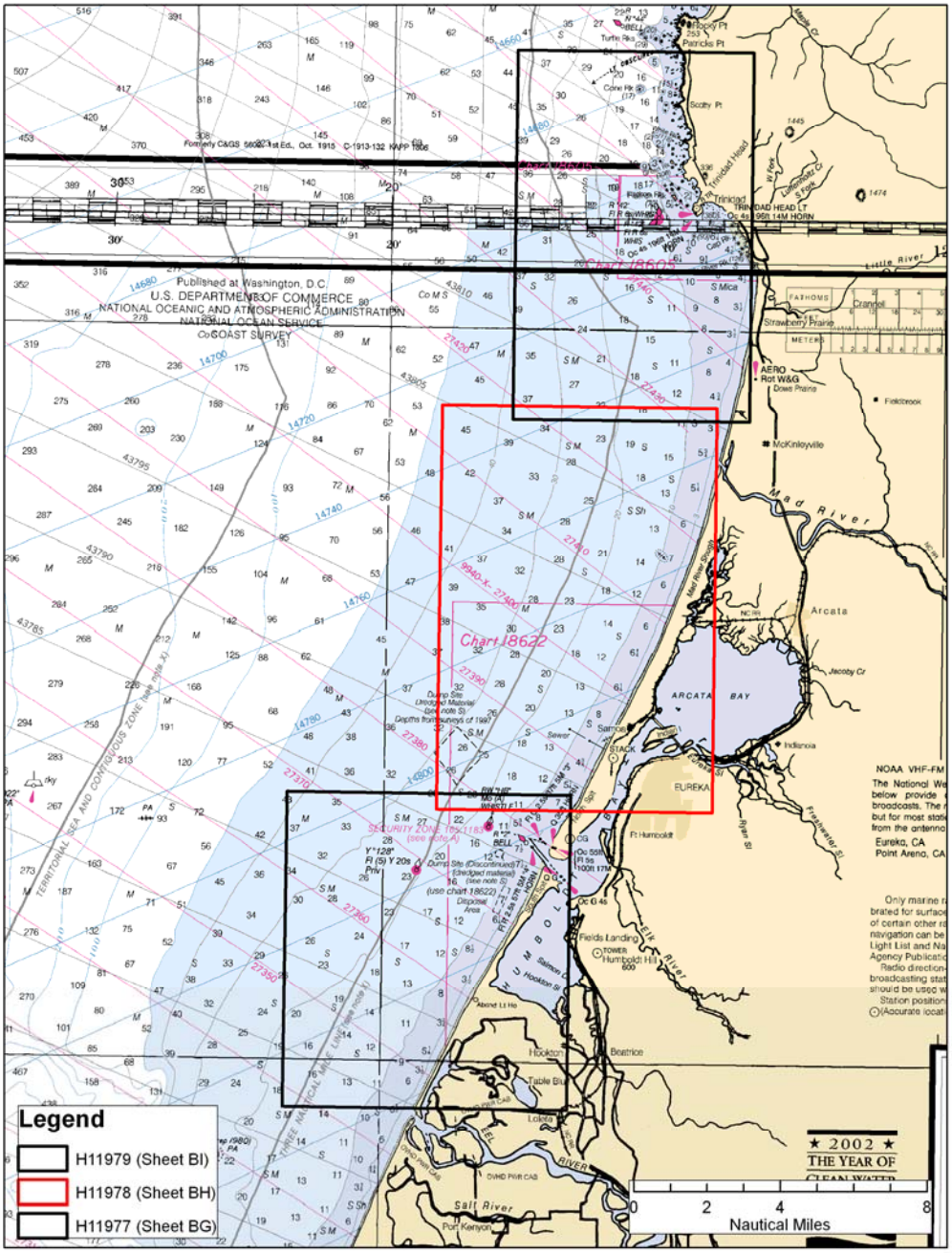


Figure 3 H11978 Survey Junctions

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.[7]

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), 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 H11978 was good. Two notable problems follow:

1. Some small holidays exist in the data, the holidays are small and no shoaling is evident along their edges.[8]

2. 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 R2 and D2 launches collected sound velocity profiles every two hours to compensate for velocity changes over time. Profiles were collected on alternate ends of lines, or often in the middle of lines, to minimize the spatial aspect of sound velocity changes.

The MVP system on the Pacific Star was also used at an interval of every two hours, except that the system was used to collect as many as five profiles along the course of a single line. Two hours later, another set of profiles would be collected, with the net result being the creation of a grid of sound velocity profiles that kept differences in time and distance minimal between the survey data and the in-use sound velocity profile.

Object 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.[10] These variables were adjusted in real-time by the online acquisition crew based on the Winfrog QC and coverage displays. The office-based 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.

Refer to the M-L906-KR-08 Data Acquisition and Processing Report for a detailed description of the survey equipment and methodology used over the course of this survey.[11]

B.3 Corrections to Echo Soundings

Refer to the M-L906-KR-08 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 M-L906-KR-08 Data Acquisition and Processing Report for a detailed description of the processing flow.

The final fieldsheets for H11978 were divided into separate resolutions (due to the volume of data) and are called:

- "H11978_0_5m" and it contains six BASE surfaces.
- "H11978_1m" and it contains three BASE surfaces.
- "H11978_1_5m" and it contains three BASE surfaces.
- "H11978_2m" and it contains three BASE surfaces.

The following parameters were used:

0-22 meters: 0.5 m resolution, name "H11978_0_5m"
20-33 meters: 1 m resolution, name "H11978_1m"
30-45 meters: 1.5 m resolution, name "H11978_1_5m"
40-84 meters: 2 m resolution, name "H11978_2m"

Note: Maximum depth was approximately 50 m, therefore resolutions courser then 2 m were not computed.

The final S57 file for this project is called "H11978_S57_Features.000". This file contains the object and metadata S57 objects as required in the Specifications and Deliverables.

C. VERTICAL AND HORIZONTAL CONTROL

Refer to the M-L906-KR-08 Horizontal and Vertical Control Report[12] 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 Cape Mendocino, CA. 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 logged to the POS file by Winfrog POS logger. It was later corrected for offsets to the MBES sonar by CARIS HIPS in processing.

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

See M-L906-KR-08 Horizontal and Vertical Control Report for a more detailed description of PPK positioning methods used.

Vertical Control

All sounding data were initially reduced to mean lower low water (MLLW) using predicted tidal data. It should be noted that predicted tides were used in the field for preliminary processing only.

Table 2 – Tide Gauges

Gauge	Location	Latitude	Longitude
9419750	Crescent City, CA	41° 44.7' N	124° 10.9' W
9418767	North Spit, CA	40° 46.0' N	124° 13.0' W

Tides

All sounding data were initially reduced to mean lower low water (MLLW) using predicted tidal data. Predicted tidal data for a month long period, UTC (Pacific Standard Time to UTC was +7 hours), was assembled (for gauges 9418767 & 9419750) from the National Water Level Observation Program accessed through the NOAA tides and currents website (**http://tidesandcurrents.noaa.gov/**). A cumulative file for the gauges was updated monthly by appending the new data. It should be noted that predicted tides were used in the field for preliminary processing only. Refer to the Horizontal and Vertical Control Report for any additional tidal information.

On March 1, 2009, verified tide data was acquired from the National Water Level Observation Program accessed through the NOAA tides and currents website (**http://tidesandcurrents.noaa.gov/**). Tidal zoning file was developed and provided by NOAA. From March 1, 2009 to March 2, 2009, all sounding data were re-merged using CARIS HIPS and SIPS tide routine. Verified tidal data from the Crescent City, CA. (9419750) and the North Spit, CA. (9418767) tidal stations were used for the final Navigation Base Surfaces and S-57 Feature files. Tidal Stations were owned and operated by the NOAA's National Ocean Service through the National Water Level Observation Program.

Final tidal corrections for this portion of the project were traditional tides and zoning and not GPS-derived, because to date, no VDatum model exists for conversion from NAD83 to MLLW.[13]

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

H11978 survey was compared with the charts shown on Table 3.

Table 3 – Chart Comparisons

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18620	Raster	n/a	1:200,000	23rd	June 2003
18622	Raster	n/a	1:25,000	54th	April 2004
18620	ENC	US3CA15M	n/a	8th	October 2008
18007	ENC	US2WC12M	n/a	4th	August 2008

Comparison of Soundings

A comparison of soundings was accomplished by overlaying the latest edition of NOAA charts and ENCs on the final BASE surfaces in CARIS HIPS & SIPS. The general agreement between charted soundings and H11978 soundings was noted. A more detailed comparison was undertaken for any charted shoals or other dangerous features.

Agreement between soundings on this survey and all charts is good (Raster and ENC), with BASE surface depths comparing to charted soundings generally within +/- 1 fathom.[14]
Exceptions follow:

1. Some discrepancy exists at the exact position of charted soundings on steep slopes, likely

due to the charted soundings being slightly out of position, making a large difference in depths apparent. Recommend soundings as charted be superseded by this survey.[15]

2. Hydrographic survey H11978 revealed a depth of 42.9 meters in the vicinity of a 32.9 meter sounding on chart ENC US2WC12M at 40º50'03" N, 124º14'53" W. This area was surveyed with 100% multibeam coverage.

3. Hydrographic survey H11978 revealed a depth of 23.5 meters in the vicinity of a 12.8 meter sounding on chart ENC US2WC12M at 40º53'46" N, 124º10'34" W. This area was surveyed with 100% multibeam coverage.

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11978.[16]

Charted Features

There were no charted features labeled ED, PD, or PA within the limits of H11978.[17]

Note: Wreck charted at 40-53-50.67N 124-10-09.04 W on ENC US3CA15M and chart 18620 was not found during the course of the H11978 multibeam survey. The area was ensonified with 100% multibeam coverage and the backscatter examined; no wreck was apparent.[18]

Dangers to Navigation

No dangers to navigation were found during this survey.[19]

D.2 Additional Results

None to note.

Bottom Samples [20]

None were assigned for this sheet.

Aids to Navigation

The following aids to navigation were examined during this survey:[21]

1. Buoy RW "HB" Mo (A) WHISTLE at 40-46-24 N, 124-16-14 W (chart 18622) found to exist and to be serving its intended purpose.
2. Buoy R "2" BELL at 40-45-59 N, 124-14-51 W (chart 18622) found to exist and to be serving its intended purpose.
3. FI G 2.5 s 37ft 5M "3" at 40-46-08 N, 124-14-19 W (chart 18622) found to exist and to be serving its intended purpose.
4. FI R 2.5 s 57ft 5M "4" HORN at 40-45-53 N, 124-14-38 W (chart 18622) found to exist and to be serving its intended purpose.

No uncharted aids to navigation were found in the survey area.

E. APPROVAL SHEET

Approval Sheet

For

H11978

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

M-L906-KR-08 Statement of Work
NOS Hydrographic Surveys Specifications and Deliverables, April 2008 Edition
Fugro Pelagos, Inc. Acquisition Procedures (2009-MBES_Acquisition_Procedures_R0);
Fugro Pelagos, Inc. Processing Procedures (2009-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,

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

Invalid signature

X

Dean Moyles
ACSM Certified

Revision Compiled During Office Processing and Certification

[1] Concur.
[2] Concur and the southern bounds were modified to Latitude 40-45-29.6 N Longitude 124-18-04.8W.
[3] Filed with project records.
[4] Concur.
[5] Filed with hydrographic records.
[6] Concur. Data is adequate to supersede charted data in the common area.
[7] Concur.
[8] Concur.
[9] Concur.
[10] Concur.
[11] Concur.
[12] Filed with project records.
[13] Concur. All data was corrected with verified water levels as stated in the SAR.
[14] Concur.
[15] Concur.
[16] Concur with clarification: no AWOIS items were assigned under this contract; however, 1 AWOIS item fell within survey area. See endnote #18
[17] Concur.
[18] Concur. Wreck charted at 40-53-59.45N, 124-10-04.23W is AWOIS 50404. Survey H11978 included 100% multibeam over AWOIS 50404 and expanded to over a 1000 meter radius from the charted position. It is recommended that the wreck be removed from the chart.
[19] Concur.
[20] No bottom samples were collected during the survey. 9 bottom samples were imported into the HCell from the ENC to be retained (US3CA15M.000).
[21] Chart ATONs according to latest ATONIS information.

H11978 HCell Report

Fernando Ortiz, Hydrographic Intern
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 ENCs and RNCs in the region: NOAA ENCs US3CA51M, and NOAA RNCs 18620_1 and 18622_1.

HCell compilation of survey H11978 used Office of Coast Survey HCell Specifications Version 3.0 and HCell Reference Guide Version 1.0.

1. Compilation Scale

Depths for HCell H11978 were compiled to the largest scale charts in the region, 18622_1, (1:25,000) and 18620_1 (1:200,000). The density and distribution of soundings from H11978 were selected to emulate the distribution on these charts. Non-bathymetric features have been generalized to chart scale.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 2.0-meter finalized surface, **H11978_Office_Combined**, in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 scale for the 18622_1 and 16820_1 charts. These shoal-based selections were made using a Radius Table file with values shown in the table, below . The resultant sounding layer contains depths ranging from 2.14 to 50.53 meters.

NOAA RNC 18622_1

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	2
10	20	3
20	50	3.5
50	345	4

NOAA RNC 16820_1

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	7
10	20	8
20	50	8.5
50	345	9

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 2.14 to 50.53 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth ranges is 7.047 to 165.79 feet.

3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11978_SS HCell 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.

NOAA RNC 18622_1

Chart Contours in Feet	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
24	7.3152	7.5438	24.75
30	9.144	9.3726	30.75
60	18.288	18.5166	60.75
90	27.432	27.6606	90.75
120	36.576	36.8046	120.75
150	45.72	45.9486	150.75

NOAA RNC 18620_1

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
10	18.288	18.5166	10.125
20	36.576	37.9476	20.75

Contours delivered in the H11978_SS file have not been deconflicted against soundings and hydrography as all other features in the H11978_CS file and soundings in the H11978_SS have been. This results in conflicts between the H11978_SS file contours and HCell features at or near the survey limits. Conflicts with M_COVR, M_QUAL, and DEPARE objects with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over

4. Meta Areas

The following Meta object areas are included in HCell 11978:

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

Shoreline verification was not conducted for H11978. A feature file containing M_QUAL and M_COVR areas were delivered from the field in a HOB file. No rocky seabed areas are included in the HCell.

Bottom samples were not collected during H11978. All charted bottom samples were imported from the ENCs US3CA51M to be retained in the HCell.

There were no AWOIS items assigned to the survey. However, AWOIS 50404 is within survey limits and was covered with 100% multibeam. AWOIS 50404 has been removed from the Hcell.

The source of all features included in the H11978 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
SBDARE	Bottom samples and rocky seabed areas
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
DEPCNT	NOAA rounded contours at chart scale intervals

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 charting disposition.

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 skyward of 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 skyward of that.
- 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 Junctions

Survey H11978 junction with survey H11979 to the North.

10. QA/QC and ENC Validation Checks

H11978 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

- H11978 Base Cell File, Chart Units, Soundings compiled to 1:25,000 and 1:200,000
- H11978 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11978 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11978 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11978_CS.000

- Chart units base cell file, survey scale soundings H11978_SS.000
- Descriptive Report package H11978_DR.pdf
- Survey outline H11978_Outline.gml & *xsd

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:

Fernando Ortiz, Hydrographic Intern, PHB, Seattle, WA; 206-526-6883; Fernando.ortiz@noaa.gov.

APPROVAL SHEET
H11978

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

2009.07.22
13:08:16
-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
Gary C. Nelson
2009.07.22
13:41:17 -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.

David Neander
2009.07.22 13:18:04
-07'00'

David Scharff
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: 2009.07.23 14:20:23 -04'00'