H11953

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. M-L906-KR-08

Registry No. H11953

LOCALITY

State California

General Locality Pacific Ocean-- Southern California

Sublocality Vicinity of Point Arguello

2008

CHIEF OF PARTY
Dean Moyles

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28
(11-72)

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

REGISTRY No

HYDROGRAPHIC TITLE SHEET

H11953

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 **California**

General Locality **Pacific Ocean-- Southern California**

Sub-Locality **Vicinity of Point Arguello**

Scale **n/a** Dates of Survey **8/29/2008-9/5/2008**

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)**

Chiefs of party **Dean Moyles**

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

Soundings by echo sounder, hand lead, pole **Reson Seabat 7125 and 8111 Echosounders hull mounted**

Graphic record scaled by **Fugro Pelagos, Inc. Personnel**

Graphic record checked by **Fugro Pelagos, Inc. Personene** Automated Plot **N/A**

Verification by **Tyanne Faulkes**

Soundings in **Fathoms and Feet at MLLW**

REMARKS:

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.

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

A. AREA SURVEYED

H11953 (Sheet AI) is in the vicinity of Point Arguello, California. It is bound by the coordinates listed in Table 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 August 29, 2008 and ended on September 5, 2008.

Table 1 – Sheet Bounds

Point	Latitude (North)	Longitude (West)
1	34-38-21	120-43-40
2	34-38-21	120-33-04
3	34-29-01	120-33-04
4	34-29-01	120-43-40
5	34-38-21	120-43-40

Note: The eastern bounds were modified slightly (shifted further east) from originally planned to include additional survey area.

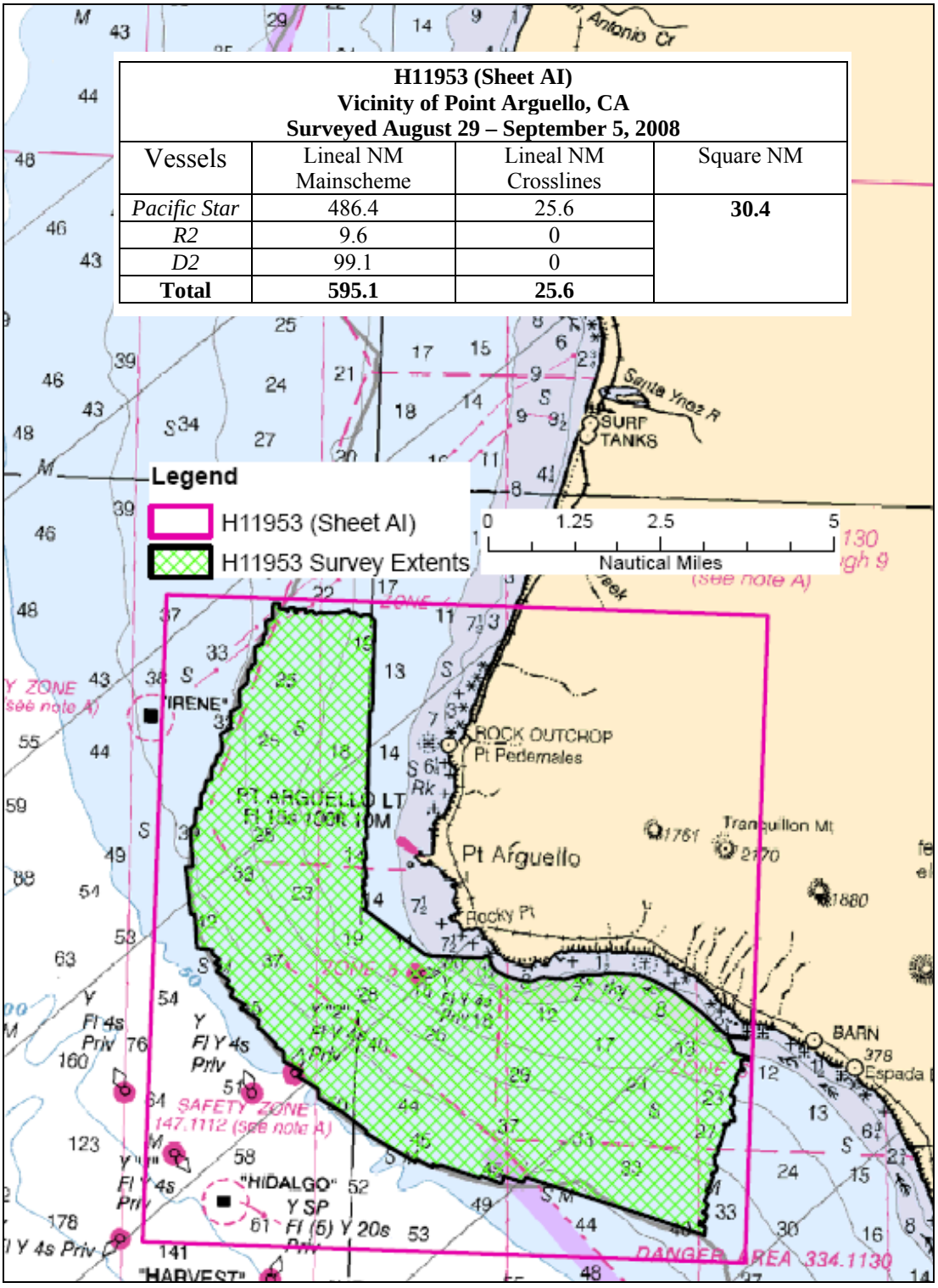


Figure 1 H11953 Area Surveyed

B. DATA ACQUISITION AND PROCESSING

Refer to the M-L906-KR-08 Data Acquisition and Processing Report[2] 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/V's R2, D2 and F/V Pacific Star acquired all sounding data for H11953.

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 (POSMV 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 similarly except no 8111 or MVP systems were installed.

Vessel R2, same specifications as D2, was similarly equipped except the 7125 system was single frequency (400 kHz only).

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

Quality control crosslines were planned so that most main scheme lines would intersect with at least one crossline, were well distributed geographically, and that total crossline nautical miles ran would total 5% of the main scheme nautical miles.

At survey end, total crossline length surveyed ended up as 25.6 nautical miles or 4.3 percent of the total main scheme nautical miles.[3] All crosslines were compared to the mainline CUBE surface, using the CARIS HIPS QC report routine and all beams passed at 95 percent confidence level or better. Results are located in Separate IV[4].

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 * √2 = 0.283
b = 0.01 * √2 = 0.014

Uncertainty Values

The majority of H11953 had uncertainty values of 0.25 m to 0.70 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.

Higher uncertainties are seen in areas of steep or rapidly changing bottom topography and areas where outer beams were left to contribute to the surface. However, despite high uncertainty in these areas, data matchup is good and the data acceptable for nautical charting purposes.

Small patches of higher uncertainty are evident in the uncertainty surface coinciding with lines or sections of lines. This was due to relatively high RMS error in the GPS positioning data during these times, usually due to brief gaps in logged GPS data. However, despite high estimated error, the error did not propagate to the tidal corrections as the data matchup is good in these areas.

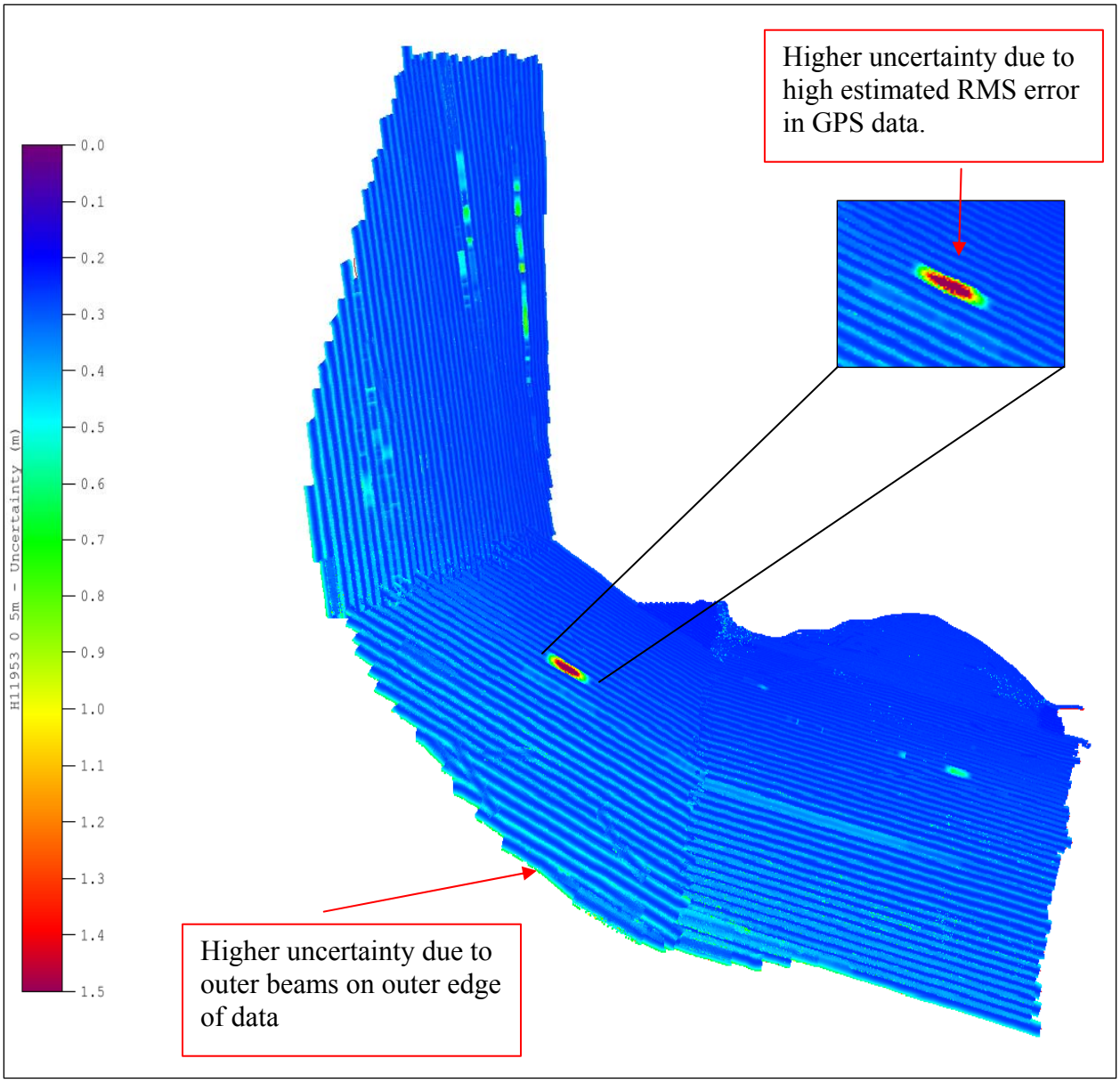


Figure 2 Uncertainty DTM

Survey Junctions

H11953 (Sheet AI) junctions with:

Registry #	Date	Junction Side
H11952	2008	South

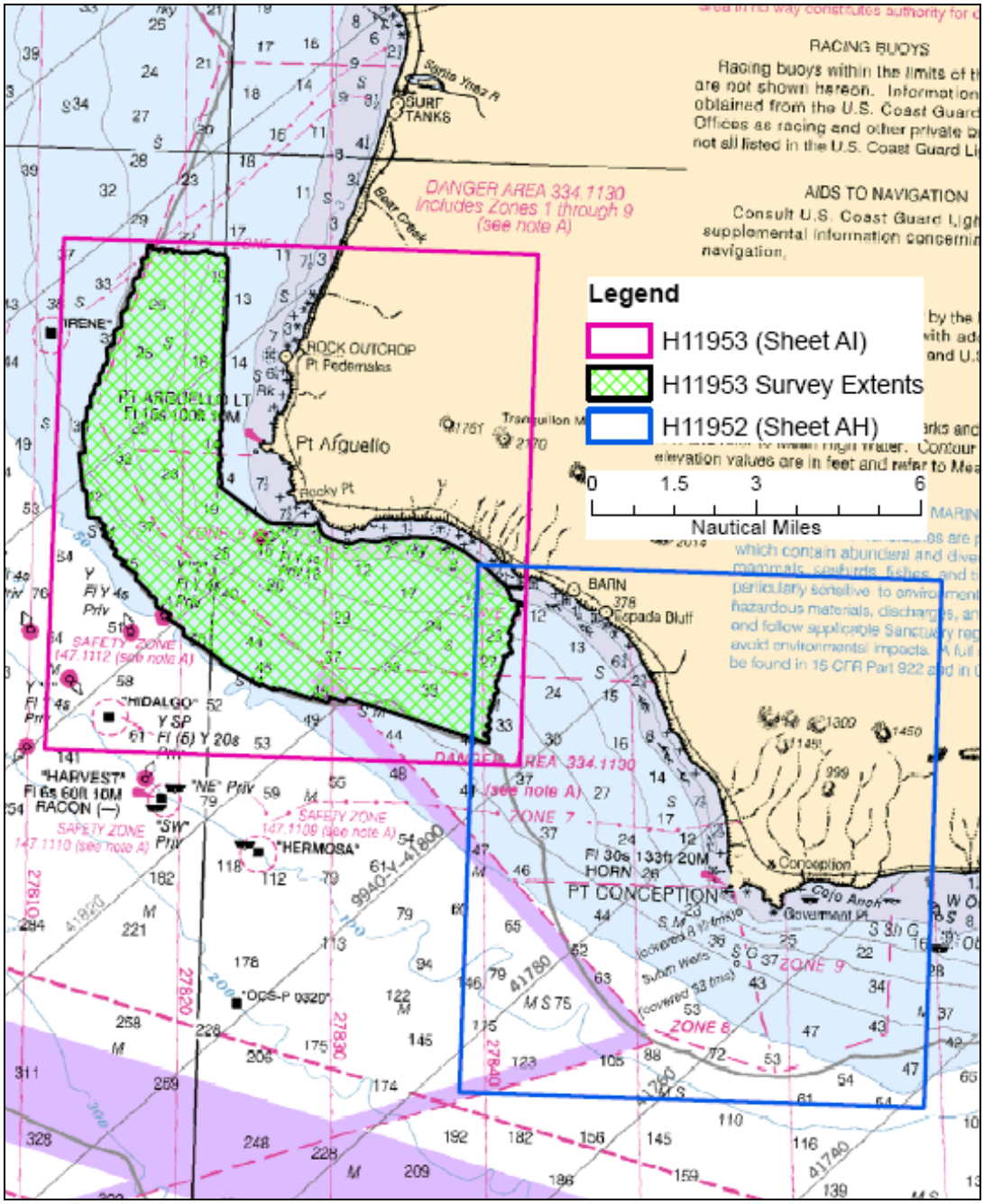


Figure 3 H11953 Survey Junctions

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.

Quality Control Checks

Positioning system confidence checks were conducted on a daily basis using the POSMV 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.

Comparison of PPK-GPSTide and Zoned Verified Tides

Tidal corrections for this survey were done using PPK-GPS derived altitudes which were reduced to MLLW using VDatum grids and the CARIS HIPS GPSTide function. Since conventional tidal data and zones were available, gross error and reality check comparisons were done between data corrected using both methods. The following tests were performed:

1. For a snapshot of general agreement throughout the survey area, a copy of the crossline data was corrected using zoned, verified smoothed tides, and dynamic draft correctors applied. QC reports were then generated in HIPS for these "tidal" crosslines versus the BASE surfaces (GPSTide method) in the same manner described in the crossline comparison section above.

   Results: All "tidal" beams passed at 95 % or better as compared to the BASE surfaces. Results are available in Separate IV.[5]

2. In order to identify and quantify any static offsets between the two processing methods, a difference surface was created in IVS Fledermaus using a CUBE surface created from the crosslines and a CUBE surface created from the same crosslines corrected using zoned, verified smooth tides. (Difference surface = tidal surface minus GPSTide surface, both 4m resolution)

   Results: Average difference was -0.151 m, median difference was -0.158 m, with a standard deviation of 0.067 m. Therefore, the GPSTide surface was about 15 cm shoaler on average. No significant trends were apparent though the difference is slightly greater south of Pt Arguello versus north of Pt Arguello. This may be because the in-use tide gauge for the area for the tidal crosslines was Port San Luis (9412110) which is north of the point, or it may simply be because the crosslines were run at different times (north set

run about 30 hours after the southern set).

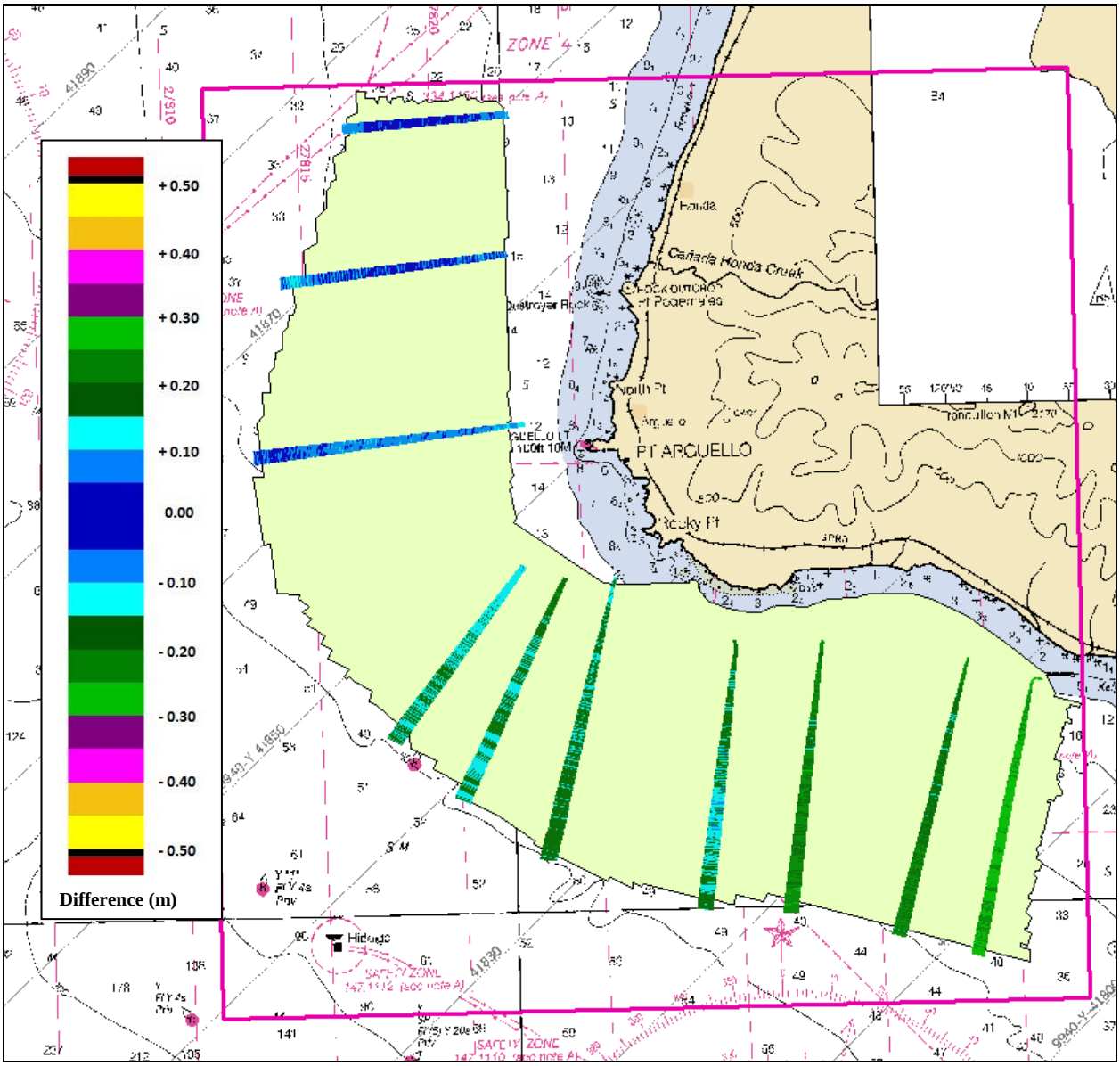


Figure 4 H11953 Difference Surface – Tidal minus GPSTide

In conclusion, absolute correctness of one source of tidal correction over the other cannot be determined by direct comparisons between the two data sets. However, data corrected using both methods statistically compares very well to each other, and qualitatively the matchup between adjacent lines is good using both methods. Therefore, for this survey, the GPSTide method of tidal correction meets specification and is an acceptable alternative to the standard tidal method.[6]

Data Quality

In general, the multibeam data quality for H11953 was good. Three notable problems follow:

1. A general downward and/or upward cupping is noticeable in the across track sounding profiles for certain areas and is attributed to sound velocity error. 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.[7]

2. Some tide busts occur sporadically between adjacent lines. This was due to lower post-processed GPS accuracy then normal on certain lines. Though the busts are apparent in subset edit mode, they are relatively small (less than 0.10 m) and within specifications[8].

3. Zoned, verified tides had to be used on a single survey line due to poor GPS data resulting in an excessive tidal bust. 3AI03-01625 (Julian Day 247, Pacific Star) was loaded and merged with zoned, verified tides. The result matched up well with the adjacent GPSTide-corrected survey lines.

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.[9]

The MVP system on the Pacific Star was also used at an interval of every two hours, except 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, the net result being 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. 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.

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 fieldSheet for H11953 is called "H11953" and it contains five BASE surfaces. The following parameters were used:

0-22 meters: 0.5 m resolution, name "H11953_0_5m"
20-33 meters: 1 m resolution, name "H11953_1m"
0-45 meters: 1.5 m resolution, name "H11953_1_5m"
40-84 meters: 2 m resolution, name "H11953_2m"
80-100 meters: 4 m resolution, name "H11953_4m"

Note: Maximum depth was approximately 90 m, therefore resolutions courser then 4 m were not computed.

The final S57 file for this project is called "H11953_S57_Features.000".[10] 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[11] 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 tuned to the Pt. Loma USCG DGPS site was used. The unit output differentially corrected positions at 1 Hz to the POSMV 320 V4 where it was integrated with inertial data and a position for the top-center of the IMU was generated. This position was then logged concurrently with the bathymetry by 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 MLLW using predicted tidal data from the Gaviota Pier. Predicted tides were used only for preliminary data cleaning.

Final tidal corrections were generated using PPK processing methods in conjunction with NOAA's VDATUM model and the CARIS GPSTide routine. Applanix POSPac software produced a smoothed best estimate of trajectory (SBET) file that, among other data, contained GPS altitudes based on the NAD83 ellipsoid. The SBET altitudes were loaded in to every line in CARIS HIPS, and HIPS' GPSTide routine then run to compute a GPS-based tide. The GPSTide routine used a VDatum NAD83 to MLLW offset grid to produce MLLW tide correctors. This grid is an XYZ text file and is included with the CARIS data under the tide directory.

See M-L906-KR-08 Horizontal and Vertical Control Report for a more detailed description of the GPSTide methods.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

H11953 survey was compared with the charts shown on Table 2.

Table 2 – Chart Comparisons

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18721	Raster	n/a	1:100,000	11th	July 2000
18720	Raster	n/a	1:232,188	33rd	August 2008
18700	Raster	n/a	1:216,116	22nd	July 2003
18700	ENC	US3CA85M	n/a	6th	August 2008

Comparison of Soundings

A comparison of soundings was accomplished by generating shoal-biased soundings and contours in the CARIS FieldSheet Editor and overlaying them on the latest edition NOAA charts. The general agreement between charted soundings and H11953 soundings was noted. A more detailed comparison was undertaken for any charted shoals or other dangerous features.[12]

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.

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11953.[13]

Charted Features

There were no charted features labeled ED, PD, or PA within the limits of H11953.[14]

Dangers to Navigation

No dangers to navigation were found during this survey.[15]

D.2 Additional Results

None to note.[16]

Bottom Samples

None were assigned for this sheet.[17]

Aids to Navigation[18]

The following aids to navigation were examined during this survey:

1. Buoy Y Fl Y 4s Priv at 34-33-00.34 N, 120-39-00.42 W (chart 18721) found to exist and to be serving its intended purpose

2. Buoy Y "2" Fl Y 4s Priv at 34-31-31.17 N, 120-41-13.67 W (chart 18721) found to exist

and to be serving its intended purpose

3. PT Arguello LT Fl 15s at 34-34-38.00 N, 120-38-49.81 W (chart 18721) 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

H11953

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

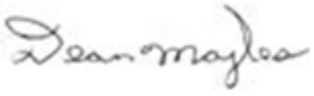
M-L906-KR-08 Statement of Work
NOS Hydrographic Surveys Specifications and Deliverables, April 2008 Edition
Fugro Pelagos, Inc. Acquisition Procedures (2008- NOAAAcquisitionProcedures);
Fugro Pelagos, Inc. Processing Procedures (2008-NOAAProcessingProcedures);

The data were reviewed daily during acquisition and processing, and the survey is complete and adequate for its intended purpose.[19]

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

X 

Dean Moyles
ACSM Certified

[1] Concur
[2] Filed with project records.
[3] Although the 5% requirement for crosslines was not met, the crosslines are adequate for confidence reports.
[4] Filed with hydrographic records
[5] Filed with hydrographic records
[6] Concur.
[7] concur.
[8] Concur.
[9] Concur.
[10] Digitally filed with hydrographic records.
[11] Filed with project records.
[12] Concur.
[13] Concur.
[14] Concur.
[15] Concur.
[16] Concur.
[17] Concur.
[18] Per HCell Specificcations, ATONs were excluded from US411953_CS.000. Use latest ATONIS listing to update chart.
[19] Concur.

H11953 HCell Report

Tyanne Faulkes, Hydrographic Survey Intern
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to directly update NOAA ENCs with new survey information in International Hydrographic Organization (IHO) format S-57. HCell compilation of survey H11953 utilized Office of Coast Survey HCell Specifications Version 3.0, May 2008 and HCell User Guide Version 1.1, June 2008. HCell H11953 will be used to update charts 18721, 1:100,000 (11th Ed., July 2000, NM 2/28/2009) amd IS2CA85M.

1. Compilation Scale

The density of soundings in the HCell are compiled as appropriate to emulate those soundings of Chart 18721, 1:100,000. Position and density of non-bathymetric features included in the HCell have not been generalized from the scale of the hydrographic survey H11953.

2. Soundings

2.1 Source Data

One 4-meter resolution Combined BASE surface, **H11953_Office_Combined** was used as the basis for HCell production following Branch certification.

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11953_Office_Combined** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:15,000 survey scale using a radius table with values shown in **Table 1**.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	100	5

Table 1

2.2 Sounding Feature Objects

In CARIS BASE Editor soundings were manually selected from the high density sounding layer from H11953 and imported into a new layer created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that more closely represents the seafloor morphology and that emulates density and distribution of soundings on charts 18721 than is possible using automated methods. See

section 10.1, Data Processing Notes, for details about the use of manual sounding selection for H11953. The sounding feature object source layer was imported into the **H11953_features.hob** file, which was used as a template to create the S-57 Composer product **H11953_CS.prd**.

3. Depth Areas

3.1 Source Data

Using the combined BASE surface **H11953_Office_Combined** one depth area was generated. No depth contours were delivered per OCS HCell Specifications ver.3.0 and Hcell User Guide ver. 1.1.

3.2 Depth Area Feature Objects

One depth range, 4.62 meters to 90.75 meters, was used for the depth area objects. Upon conversion to NOAA charting units, this depth range is 2.52 fathoms to 221.20 fathoms.

4. Meta Areas

The following Meta object areas are included in HCell **US411953.000**:

M_QUAL
M_COVR

Meta area objects were constructed on the basis of perimeter lines delineating the surveyed limits and extents of data gaps inside the survey area. These perimeters were first used to create the Skin of The Earth (SOTE) layer, then were duplicated to the Meta object layers and attributed per the HCell Specifications, ver. 3.0 and HCell User Guide ver. 1.1.

5. Survey Features

A features file **H11953_S57_Features.000** was delivered. The file contained 82 rocky seabed areas. These 82 rocky seabed areas were generalized to four rocky seabed areas included in the HCell as delivered.

Bottom sample features were imported from ENC US3CA85M.

6. Shoreline / Tide Delineation

Depth areas (DEPARE) were created for all SOTE features.

7. Attribution

All S-57 Feature Objects have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with OCS HCell Specifications, ver. 3.0 and Hcell User Guide ver. 1.1.

8. Layout

8.1 CARIS S-57 Composer Scheme

SOUNDG	Chart scale soundings
DEPARE	Group 1 objects (Skin of the Earth)
SBDARE	Bottom samples from chart and rocky seabed areas
M_COVR	Data coverage meta object
$CSYMB	Blue notes

8.2 Blue Notes

Notes regarding data sources are in S-57 Composer as a $CSYMB feature with the blue note located in the INFORM field. The blue notes are included in the HCell when it is exported to .000. The blue notes are also included as a separate ASCII file **H11953_Bluenotes.txt**.

9. Spatial Framework

9.1 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.

9.2 Horizontal and Vertical Units

During creation of sounding sets in CARIS BASE Editor, and creation of the HCell in

CARIS S-57 Composer, units are maintained as metric with millimeter resolution. NOAA rounding is applied at the same time that conversion to chart units is made to the metric HCell base cell file, at the end of the HCell compilation process.

A CARIS environment variable, uslXsounding_round, controls the depth at which rounding occurs. Setting this variable to NOAA fathoms and feet displays all soundings equal to or greater than 11 fathoms as whole units. Depths shoaler than 11 fathoms are shown in fathoms and feet.

In an ENC viewer fathoms and feet display in the format X**.**YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. For fathoms and feet between 0 and 10 fathoms 4.5 feet (10.75 fms), soundings round to the deeper foot if the decimals of the foot are X**.**Y75000 or greater. For fathoms and feet deeper or equal to 11 fathoms, soundings round to the deeper fathom if feet and decimals of the foot are X**.**45000 (X**.**Y75000) or greater. Drying heights are in feet and are rounded using arithmetic methods. In an ENC viewer, heights greater than 6 feet will register in fathoms and feet using the above stated rules.

S-57 Composer Units
Sounding Units: Meters rounded to the nearest millimeter
Spot Height Units: Meters rounded to the nearest meter

Chart Unit Base Cell Units
Depth Units (DUNI): Fathoms and feet
Height Units (HUNI): Feet (or fathoms and feet above 6 feet)
Positional Units (PUNI): Meters

10. QA/QC

10.1 Data Processing Notes

Manual chart scale sounding selections were made for this survey. Experience has shown that in areas where bathymetry is varied, as in the case of varied topography on the sea floor, automated sounding selection is impractical. None of the default sounding suppression options offered in CARIS BASE Editor or S-57 Composer yields an acceptable density and distribution of depths, generally bunching soundings nearshore with too sparse coverage seaward. While the customized options are more practical for this type of terrain, an inordinate amount of time must be spent in experimentation with variations on the algebraic terms in order to devise the most suitable formula, and manual adjustments are still required to the resulting sounding set.

10.2 ENC Validation Checks

H11953 was subjected to QA and Validation checks in S-57 Composer prior to exporting to the HCell base cell (000) file. Full millimeter precision was retained in the export of the metric S-57 base cell data set. This data set was converted to a chart unit 000 file.

dKart Inspector 5.1 was then used to further check the data set for conformity using the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- **US411953_CS.000** Base Cell File, Chart Units, Soundings compiled to 1:100,000.
- **US411953_SS.000** Base Cell File, Chart Units, Sounding compiled to 1:15,000.
- H11953 Descriptive Report including end notes compiled during office processing and certification
- H11953 HCell Report
- Blue Notes ASCII file

11.2 File Naming Conventions

S-57 Composer Product prefix: *H11953_HCell.prd and H11953_SS.prd*

MCD Chart units base cell file: *US411953_CS.000*

MCD Chart units base cell file, survey scale soundings: *US411953_SS.000*

11.3 Software

HIPS 6.1:	Management and inspection of Combined BASE surfaces
BASE Editor 2.1:	Combination of Product Surfaces and initial creation of the S-57 bathymetry-derived features
S-57 Composer 2.0:	Assembly of the HCell, S-57 products export, QA
HOM 3.3:	Assembly of the HCell, S-57 products unit conversion and sounding rounding
GIS 4.4a:	Setting the sounding rounding variable
dKart Inspector 5.1:	Validation of the base cell file

12. Contacts

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

Tyanne Faulkes, Hydrographic Survey Intern, PHB, Seattle, WA; 206-526-6883; tyanne.faulkes@noaa.gov.

APPROVAL SHEET
H11953

Initial Approvals:

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

Digitally signed by Tyanne Faulkes
DN: cn=Tyanne Faulkes, o=USDOC/NOAA/NOS, ou=Pacific Hydrographic Branch, email=tyanne.faulkes@noaa.gov, c=US
Date: 2009.04.17 13:38:58 -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
2009.04.20
12:39:05 -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
2009.04.20
12:36:54 -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 13:57:09 -04'00'