H11881

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. H11881

LOCALITY

State California

General Locality Pacific Ocean - Southern California

Sublocality San Pedro 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.

HYDROGRAPHIC TITLE SHEET

H11881

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 - Southern California

Sublocality: San Pedro Bay

Scale: N/A

Date of Survey: July 5, 2008 -July 14, 2008

Instructions Dated: 7/7/2008

Project No.: M-L906-KR-08

Vessel: R/V QUICKSILVER (947419)

Chief of Party: Dean Moyles

Surveyed by: Orthmann, Moyles, Reynolds, Gill, Farley, Mount, Todd, Ham, et. Al

Soundings taken by echo sounder: RESON SEABAT 7125 Echosounder Hull Mounted

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: B. Pounds

Automated plot by: N/A

Verification by: B. Pounds, K. Reser

Soundings in: 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

H11881 (Sheet G) is located in San Pedro Bay, California. It is bound by the coordinates listed in Table 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 July 5, 2008 and ended on July 14, 2008.

Table 1 – Sheet Bounds

Point	Latitude (North)	Longitude (West)
1	33-43-55	118-14-38
2	33-43-55	118-03-56
3	33-40-54	118-03-56
4	33-40-54	118-14-38
5	33-43-55	118-14-38

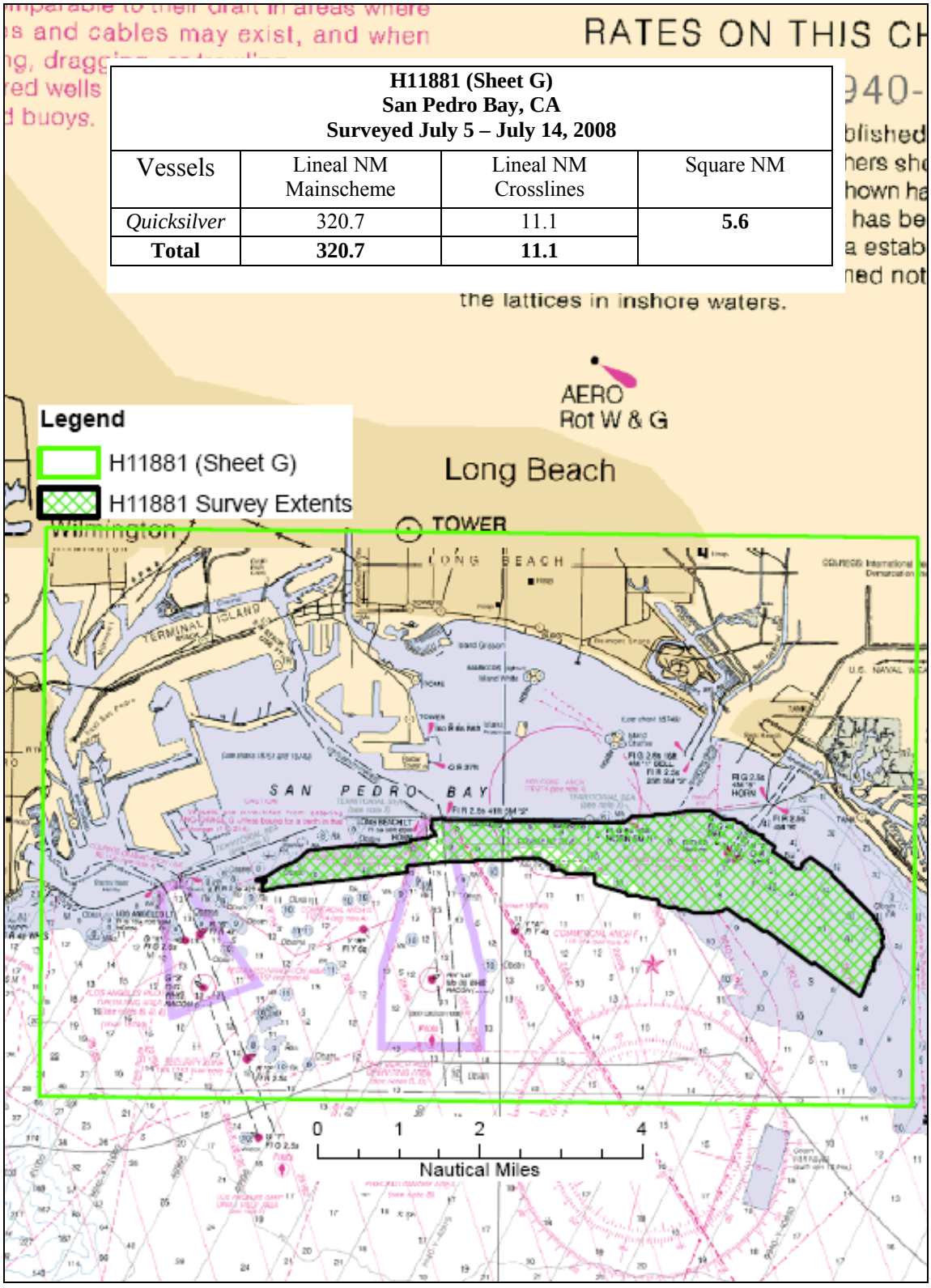

Figure 1 H11881 Area Surveyed

B. DATA ACQUISITION AND PROCESSING

Refer to the M-L906-KR-08 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.

B.1 Equipment & Vessels

The R/V Quicksilver acquired all sounding data for H11881.

The Quicksilver, which is 32 feet in length with a draft of 3 feet, was equipped with a Reson Seabat 7125 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 (POSMV 320 V4) with S7K files logged in Winfrog Multibeam v 3.08.23.

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 project end, actual total crossline length surveyed was 11.1 nautical miles or 3.5 percent of the total main scheme nautical miles.[2] 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.[3] Results are located in Separate IV.

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 H11881 had uncertainty values of 0.20 m to 0.30 m, which met project specifications.[4]

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 uncertainty is seen in areas of rough or rapidly changing bottom topography, and areas with a lot of sound velocity error issues. However, despite high uncertainty in these areas, data matchup is within specifications and the data acceptable for nautical charting purposes.

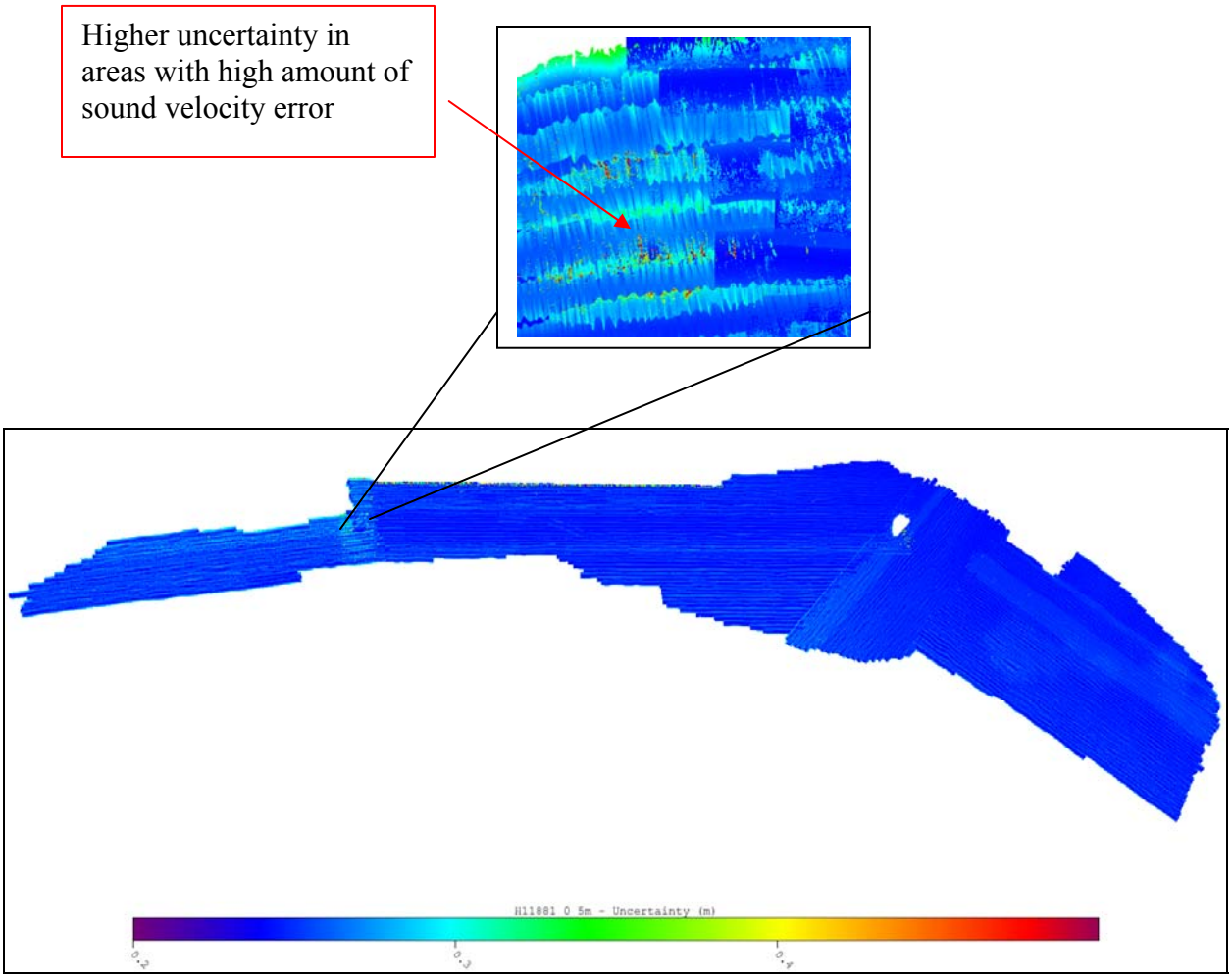

Figure 2 Uncertainty DTM

Survey Junctions

H11881 (Sheet G) junctions with:

Registry #	Date	Junction Side
H11882	2008	West (sheet limits only, actual survey extents do not overlap)

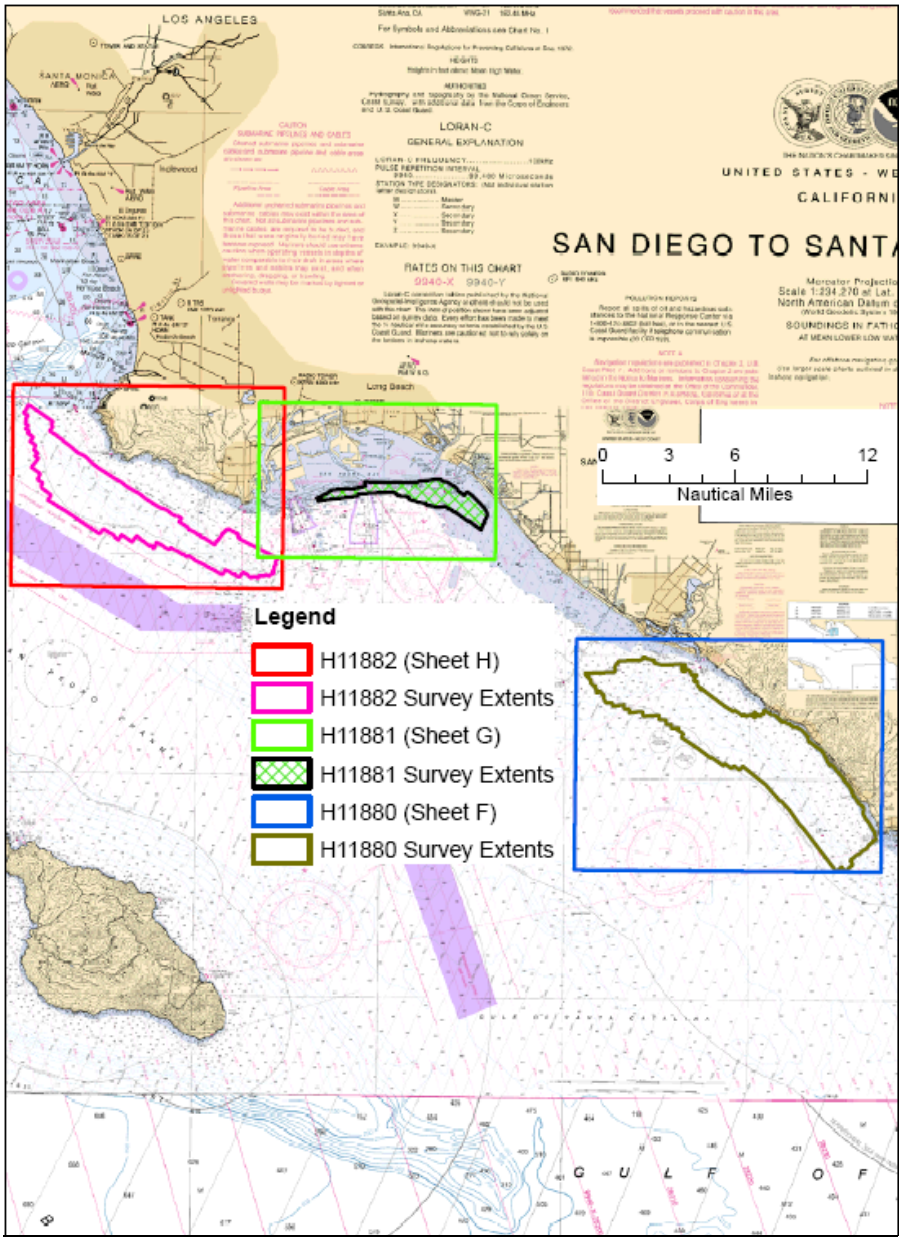

Figure 3 H11881 Survey Junctions

The survey extents do not overlap so no comparison can be made.[5]

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.

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 5 m resolution)

   Results: Average difference was -0.035 m, median difference was -0.044 m, with a standard deviation of 0.071m. One crossline, as evident in the graphic below, was offset from the tidal copy by about 0.40 m for a section of line due to GPS altitude error. However, matchup was generally within 0.10m.

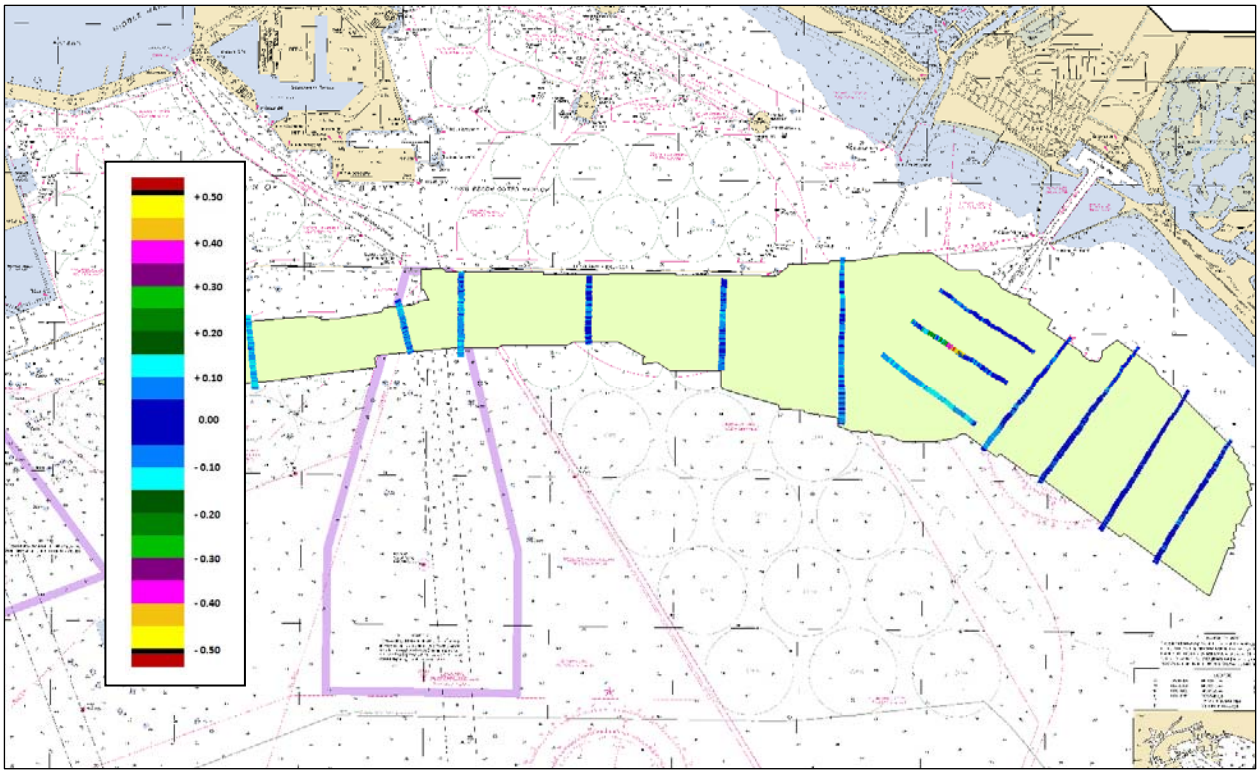

Figure 4 H11881 Difference Surface – Tidal minus GPSTide

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.

Data Quality

In general, the multibeam data quality for H11881 was good. Four notable problems follow:

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 under currents in the water column. This problem was addressed by conducting SVP casts more frequently and reducing the line spacing interval.[6]

2. Some areas have particularly severe sound velocity error apparent in the data. In these areas, data that did not meet specifications was manually rejected.[7]

3. Some small holidays exist in the data. These are usually located where data with sound velocity artifact that exceeded specifications were rejected. The holidays are small with no shoaling along their edges.[8]

4. A large hole was left in the data in the vicinity of offshore platform "ESTHER" at 33-43-06.81 N, 118-06-51.77 W (chart 18749). The survey vessel could not approach closer as the safety zone around the platform was restricted access for all vessels.[9]

Sound velocity profiles were collected every two to three 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.

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.[10]

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 H11881 is called "H11881" and it contains one BASE surface. The following parameters were used:

0 meters to max depth: 0.5 m resolution, name "H11881_0_5m"[11]

Note: Minimum depth in this survey was approximately 3 m, while max depth was approximately 26 m, therefore resolutions courser then 0.5 m were not computed.[12]

The final S57 file for this project is called "H11881_S57_Features.000". This file contains the object and metadata S57 objects as required in the Specifications and Deliverables.[13]

C. VERTICAL AND HORIZONTAL CONTROL

Refer to the M-L906-KR-08 Horizontal and Vertical Control Report[14] 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 Los Angeles (9410660) tide station. Predicted tides were used only for preliminary data cleaning.[15]

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

H11881 survey was compared with the charts shown on Table 2.

Table 2 – Chart Comparisons

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18749	Raster	n / a	1:20,000	42nd	August 2008
18751	Raster	n / a	1:12,000	45th	November 2007
18746	Raster	n / a	1:80,000	37th	August 2007
18740	Raster	n / a	1:234,270	42nd	March 2007
18749	ENC	US5CA61M	n / a	15th	November 2008
18751	ENC	US5CA62M	n / a	17th	October 2008
18740	ENC	US3CA70M	n / a	11th	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 H11881 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 a few feet, with exceptions noted in the table below. It is recommended that soundings from H11881 supersede previously charted soundings where they disagree.[16]

Table 3 – Significant Charted Sounding Discrepancies

Chart	Charted Depth	H11881 depth in vicinity	Latitude (as charted)	Longitude (as charted)
18749	33 feet	45 feet	32-42-01.68 N	118-04-30.95 W
	34 feet	45 feet	33-42-09.44 N	118-04-39.15 W
	38 feet	46 feet	33-42-03.94 N	118-04-46.19 W
	35 feet	45 feet	33-42-15.12 N	118-04-53.50 W
	41 feet	49 feet	33-42-15.50 N	118-05-24.22 W
	42 feet	53 feet	33-42-16.90 N	118-05-40.48 W
	44 feet	55 feet	33-42-15.27 N	118-05-53.15 W
	42 feet	52 feet	33-42-25.90 N	118-05-59.79 W
	29 feet	40 feet	33-42-34.73 N	118-06-02.11 W
	41 feet	29 feet* [17]	33-42-53.25 N	118-05-22.54 W

* not issued as DtoN as a 30 foot sounding was nearby

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11881.[18]

Charted Features

There were no charted features labeled ED, or PD within the limits of H11881.

1. Obstruction (51 feet) at 33-42-51.15 N, 118-13-03.46 W on charts 18751, 18749, and 18746 was not found by this survey; no evidence was found in the multibeam soundings of a feature in this area. Recommend removal.[19]

2. PA feature labeled “Current sensor” at 33-43-01.07 N, 118-11-18.97 W on charts 18751, 18749, and 18746 was not observed by this survey. However, it may be too small to be detected; recommend retain feature.[20]

Dangers to Navigation

Two dangers to navigation were found and reported during this survey.

The latest edition charts used in the above chart comparisons portray the DtoN reported July 25th, 2008 correctly.[21]

See Appendix I for the DtoN reports.[22]

D.2 Additional Results

Offshore platform "ESTHER" at 33-43-06.81 N, 118-06-51.77 W (chart 18749) was confirmed at charted position by this survey.[23]

Bottom Samples

None were assigned for this sheet.[24]

Aids to Navigation

The following aids to navigation were examined during this survey[25]:

1. Buoy G "1" Fl G 4s BELL at 33-43-00.34 N, 118-06-41.58 W (chart 18749) found to exist and to be serving its intended purpose.

2. Buoy R "2" Q R WHISTLE at 33-42-54.93 N, 118-06-33.59 W (chart 18749) found to exist and to be serving its intended purpose.

3. Buoy marked "Fl" at 33-43-06.47 N, 118-06-39.07 W (chart 18749) 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

H11881

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.

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

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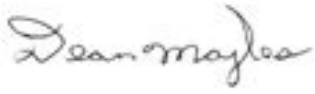
X 

Dean Moyles
ACSM Certified

Revisions Compiled During Office Processing and Certification

[1] Filed with project records.
[2] The crosslines conducted have been examined and are deemed to be adequate despite not totaling 5% of the mainscheme lines as required by specifications.
[3] Concur.
[4] Concur. These data are adequate to supersede charted data in the common area.
[5] Concur.
[6] The data meets specification despite the visible SV errors.
[7] Concur.
[8] Concur. All holidays have been examined to ensure no significant features or shoaling exist within the gap.
[9] Concur. Retain area as charted.
[10] Concur.
[11] The finalized surface H11881_0_5m_Final was used for compilation.
[12] Concur.
[13] The feature file contains rocky seabed areas and two point obstruction features. The rocky seabed areas were modified as appropriate for the scale of the chart. The modified rocky seabed areas and point obstructions are included in the HCell.
[14] Filed with project records.
[15] All data has been corrected with final PPK Tides.
[16] Concur.
[17] Concur with clarification. A 28 ft sounding located at 33-42-54.022N, 118-05-20.526W is included in the HCell to replace the charted 41 ft sounding.
[18] Concur with clarification. There were no AWOIS items assigned to the survey, however there are two within the limits of survey H11881. The first AWOIS item (53236) is a 51 ft obstruction on the edge of the survey coverage at 33-42-51.07N, 118-13-03.33W and was not found in the multibeam data. Since it falls on the edge of coverage and no formal investigation was conducted, the obstruction feature was imported from the ENC to be retained until a formal investigation is conducted. The second AWOIS item (53240) is a 50 ft obstruction at 33-43-01.10N, 118-12-07.58W. It was located in the multibeam data and the least depth was found to be 47 ft. The updated obstruction is included in HCell H11881.
[19] Do not concur. Obstruction is AWOIS item 53236. Although the item is not evident in the multibeam coverage, it is close to the edge of the survey limit. It is recommended this item be retained until a formal investigation is conducted. See endnote 18.
[20] Concur. Retain Current Sensor PA as charted.
[21] Concur with clarification. The latest editions of the charts used for compilation display both reported DTONs correctly and both DTONs are included in the HCell.
[22] See attached DTON reports.
[23] Retain platform “ESTHER” as charted.
[24] Concur with clarification. No bottom samples were collected during H11881, however eighteen were imported into the HCell from the ENCs to be retained. One additional point feature was digitized from the surface to denote a small rocky area that could not be portrayed as an area feature at chart scale.
[25] Chart all Aids to Navigation using the latest ATONIS information.

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: 11881

Survey Title: **State:** CALIFORNIA
Locality: PACIFIC OCEAN
Sub-locality: SAN PEDRO BAY

Project Number: M-L906-KR-08

Survey Dates: July 2008

Survey Danger Acquisition Date and Time: See feature.

Features are reduced to Mean Lower Low Water using PPK-GPS altitudes adjusted by VDatum (CA_socal_8301_03 transformation grid), and are positioned on NAD83.

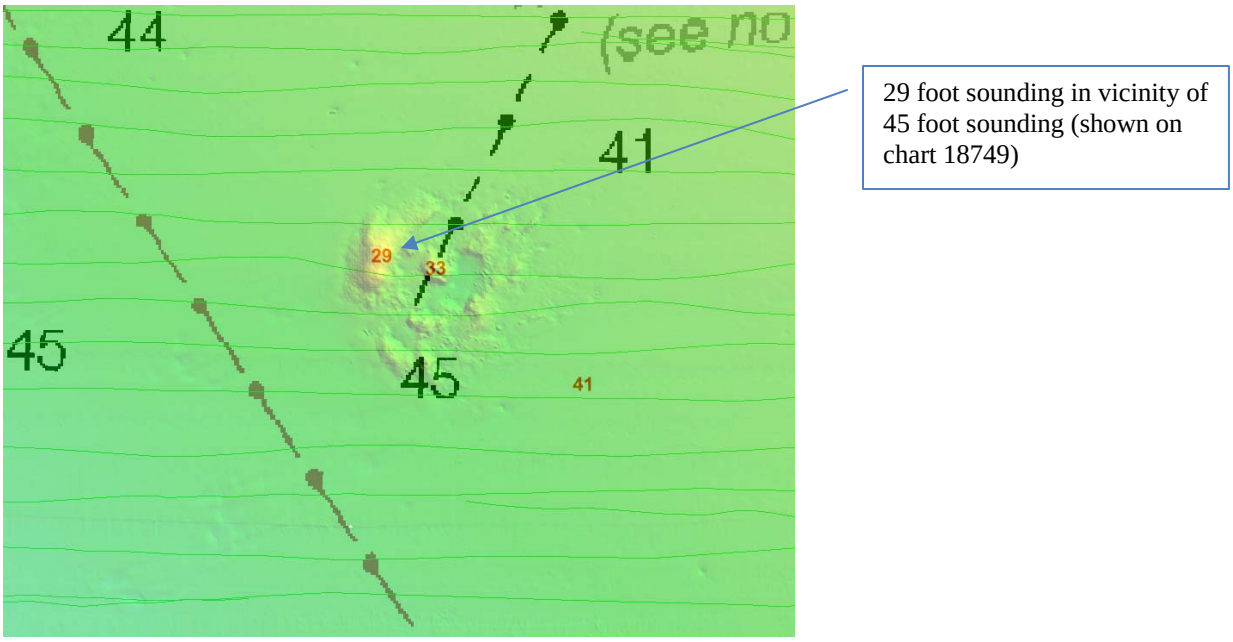
CHARTS AFFECTED:

Chart	Type	Scale	Edition	Edition Date
18749	Raster	1:20,000	41st	August, 2007
18746	Raster	1:80,000	37th	August, 2007
18740	Raster	1:234,270	42nd	March, 2007
US5CA61M	ENC		12th	June, 2008
US3CA70M	ENC		10th	May, 2008

DANGER:

Feature	Depth	Latitude	Longitude	Time (UTC)
Sounding	29 feet	33-43-19.497 N	118-07-33.339 W	July 11, 2008; 20:22

Compiled by Fugro Pelagos, Inc. (July 25th, 2008)



DTON item 1

COMMENTS:

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch (N/CS34), at (206) 526-6836.

Compiled by Fugro Pelagos, Inc. (July 25th, 2008)

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: 11881

Survey Title: **State:** CALIFORNIA
Locality: PACIFIC OCEAN
Sub-locality: SAN PEDRO BAY

Project Number: M-L906-KR-08

Survey Dates: July 5th to July 14th, 2008

Survey Danger Acquisition Date and Time: See feature.

Features are reduced to Mean Lower Low Water using PPK-GPS altitudes adjusted by VDatum (CA_socal_8301_03 transformation grid), and are positioned on NAD83.

CHARTS AFFECTED:

Chart	Type	Scale	Edition	Edition Date
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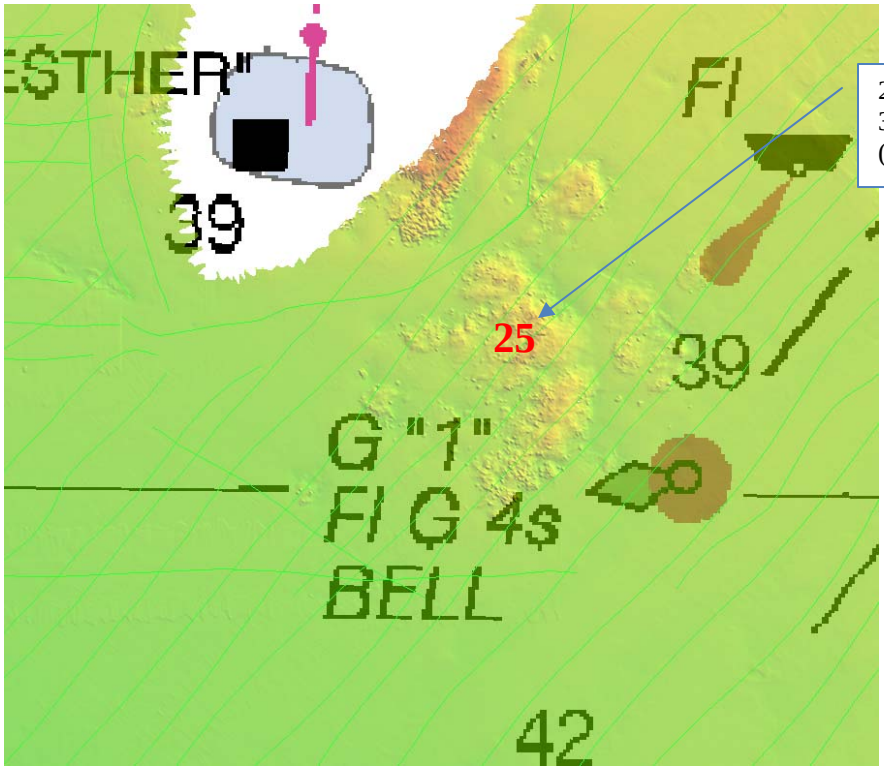
18746	Raster	1:80,000	37th	August, 2007
18740	Raster	1:234,270	42nd	March, 2007
US5CA61M	ENC		15th	November, 2008
US3CA70M	ENC		11th	August, 2008

DANGER:

Feature	Depth	Latitude	Longitude	Time (UTC)
Sounding	25 feet	33-43-03.47 N	118-06-45.32 W	July 08, 2008; 20:23

Compiled by Fugro Pelagos, Inc. (November 29th, 2008)



25 foot sounding in between 39 to 42 foot soundings (shown on chart 18749)

DTON item 1

COMMENTS:

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch (N/CS34), at (206) 526-6836.

Compiled by Fugro Pelagos, Inc. (November 29th, 2008)

H11881 HCell Report

Katie Reser, Physical Scientist
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENCs and RNCs in the region: NOAA ENCs US5CA62M and US5CA61M, and NOAA RNCs 18751 and 18749.

HCell compilation of survey H11881 used Office of Coast Survey HCell Specifications Version 3.0 and HCell Reference Guide Version 1.0.

1. Compilation Scale

Depths for HCell H11881 were compiled to the largest scale charts in the region, 18751, 1:12,000 and 18749, 1:20,000. The density and distribution of soundings from H11881 were selected to emulate the distribution on charts 18751 and 18749. Non-bathymetric features have been generalized to chart scale.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 0.5-meter finalized surface, **H11881_0_5m_Final**, in CARIS BASE Editor. A shoal-biased selection was made at 1:5,000 scale for the 18751 chart area and at 1:10,000 for the 18749 chart area using a Radius Table file with values shown in the table, below. The resultant sounding layer contains depths ranging from 3.1 to 25.6 meters.

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

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

3. Depth Areas and Depth Contours

3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to create the single, all encompassing depth area (DEPARE). One depth range, from 0 to 30 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth ranges are 0 to 98.425feet.

3.2 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 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
0	0.00	0.2286	0.75
12	3.6576	3.8862	12.75
18	5.4864	5.715	18.75
30	5.4864	5.715	30.75
60	18.288	18.5166	60.75

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 HCell features at or near the survey limits. HCell features should be honored over *_SS file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell 11881:

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 H11881. A feature file containing two point obstructions and rocky seabed areas was delivered from the field in a 000 file. The rocky

seabed areas were modified as necessary for the scale of the charts. The point obstruction features and modified rocky seabed areas are included in the HCell.

During office processing, four point obstructions were digitized from the SS sounding file and the high resolution BASE Surfaces and are included in the HCell.

Bottom samples were not collected during H11881. All charted bottom samples were imported from the ENCs to be retained in the HCell.

There were two DTONs reported from survey H11881. Both DTONs have been applied to the charts and are included in the HCell.

There were no AWOIS items assigned to the survey, however there are two within the limits of survey H11881. The first AWOIS item (53236) is a 51 ft obstruction on the edge of the survey coverage at 33-42-51.07N, 118-13-03.33W and was not found in the multibeam data. Since it falls on the edge of coverage and no formal investigation was conducted, the obstruction feature was imported from the ENC to be retained until a formal investigation is conducted.

The second AWOIS item (53240) is a 50 ft obstruction at 33-43-01.10N, 118-12-07.58W. It was located in the multibeam data and the least depth was found to be 47 ft. The updated obstruction is included in HCell H11881.

The source of all features included in the H11881 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
OBSTRN	Point obstruction features
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):	Feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, and therefore have lower precision. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest decimeter

Conversion to charting units and application of NOAA rounding is completed in the same step, at the end of the HCell compilation process.

Conversion to fathoms and feet charting units with NOAA rounding ensures that:

- All depths deeper or equal to 0 feet display as 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, feet depth units (DUNI) display in the format X.YZZZ, where X 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

H11881 does not junction with any other surveys.

10. QA/QC and ENC Validation Checks

H11881 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

- H11881 Base Cell File, Chart Units, Soundings compiled to 1:12,000 and 1:20,000
- H11881 Base Cell File, Chart Units, Soundings compiled to 1:5,000 and 1:10,000
- H11881 Base Cell File, Metric Units, Features compiled to 1:10,000
- H11881 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11881 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings — H11881_CS.000
- Chart units base cell file, survey scale soundings — H11881_SS.000
- Metric base cell file, survey scale features — H11881_Features.000
- Descriptive Report package — H11881_DR.pdf
- Survey outline — H11881_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:

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

APPROVAL SHEET
H11881

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

Katie J. Reser

Katie Reser
2009.06.30
11:18:18 -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.

Pete Holmberg

Digitally signed by Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2009.06.30 11:40:49 -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

Gary C. Nelson
2009.06.30
12:09:02 -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: 2009.07.09 13:53:11 -04'00'