H11883

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. H11883

LOCALITY

State California

General Locality Pacific Ocean - Southern California

Sublocality Vicinity of Santa Monica

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

H11883

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: Vicinity of Santa Monica

Scale: N/A

Date of Survey: July 15, 2008 -August 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, TIXIER, TIDEY, FARLEY, MOUNT, ET AL.

Soundings taken by echo sounder: RESON SEABAT 7125 ECHOSOUNDER MOUNTED

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: J. Tegeder, M. Litrico

Automated plot by: N/A

Verification by: J. Tegeder, M. Litrico, T. Luckach

Soundings in: Fathoms and at MLLW

REMARKS: Time in UTC. UTM Projection Zone 11

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

H11883 (Sheet I) is in the vicinity of Santa Monica, 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 July 15, 2008 and ended on August 14, 2008.

Table 1 – Sheet Bounds

Point	Latitude (North)	Longitude (West)
1	34-02-44	118-41-21
2	34-02-44	118-23-52
3	33-50-24	118-23-52
4	33-50-24	118-41-21
5	34-02-44	118-41-21

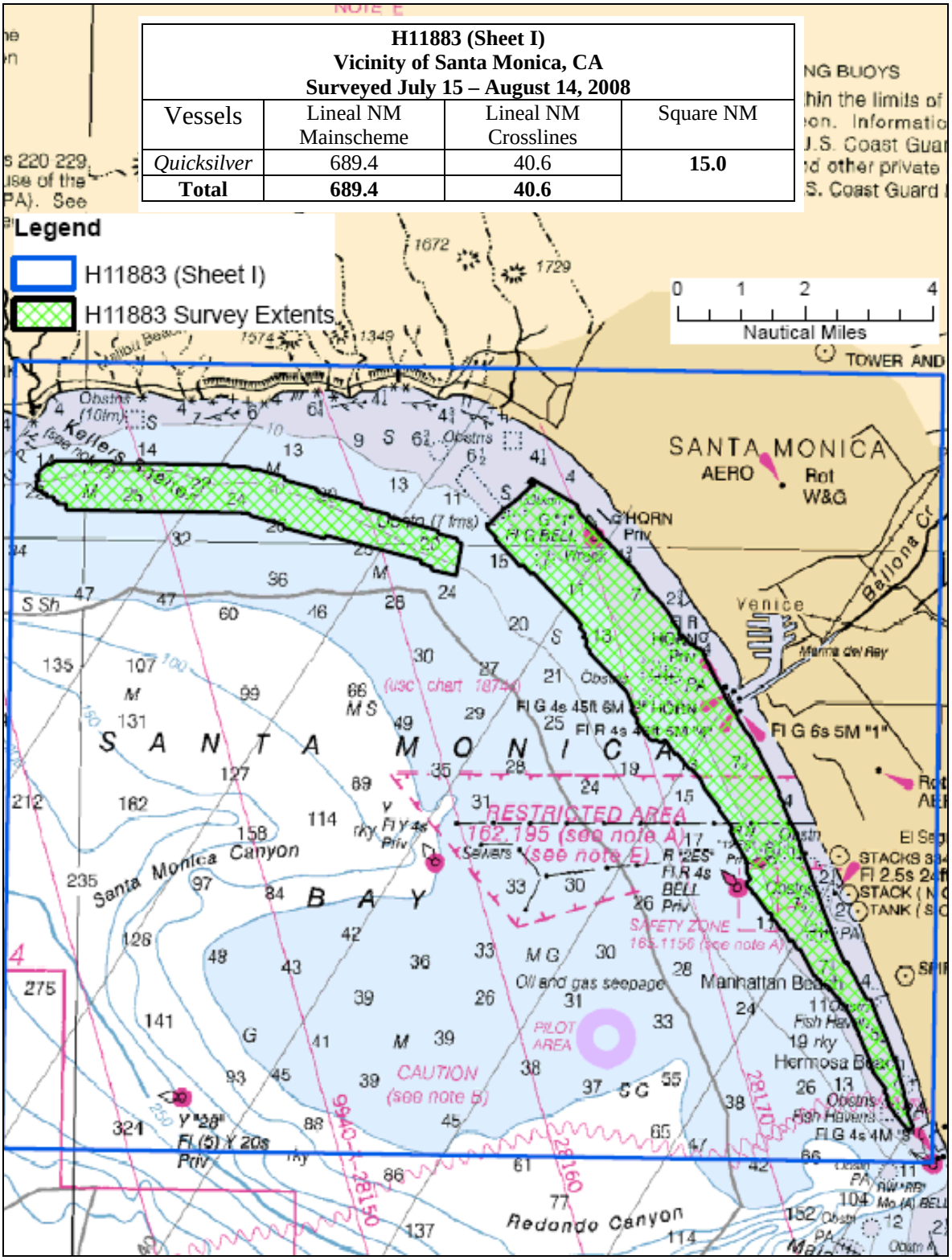


Figure 1 H11883 Area Surveyed

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 Quicksilver acquired all sounding data for H11883.

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.

Total crossline length surveyed was 40.6 nautical miles or 5.9 percent of the total main scheme nautical miles. 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. [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 H11883 had uncertainty values of 0.20 m to 0.30 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 uncertainty is seen in areas with rough or rapidly changing bottom topography. However, despite high uncertainty in these areas, data matchup is good and the data acceptable for nautical charting purposes.[5]

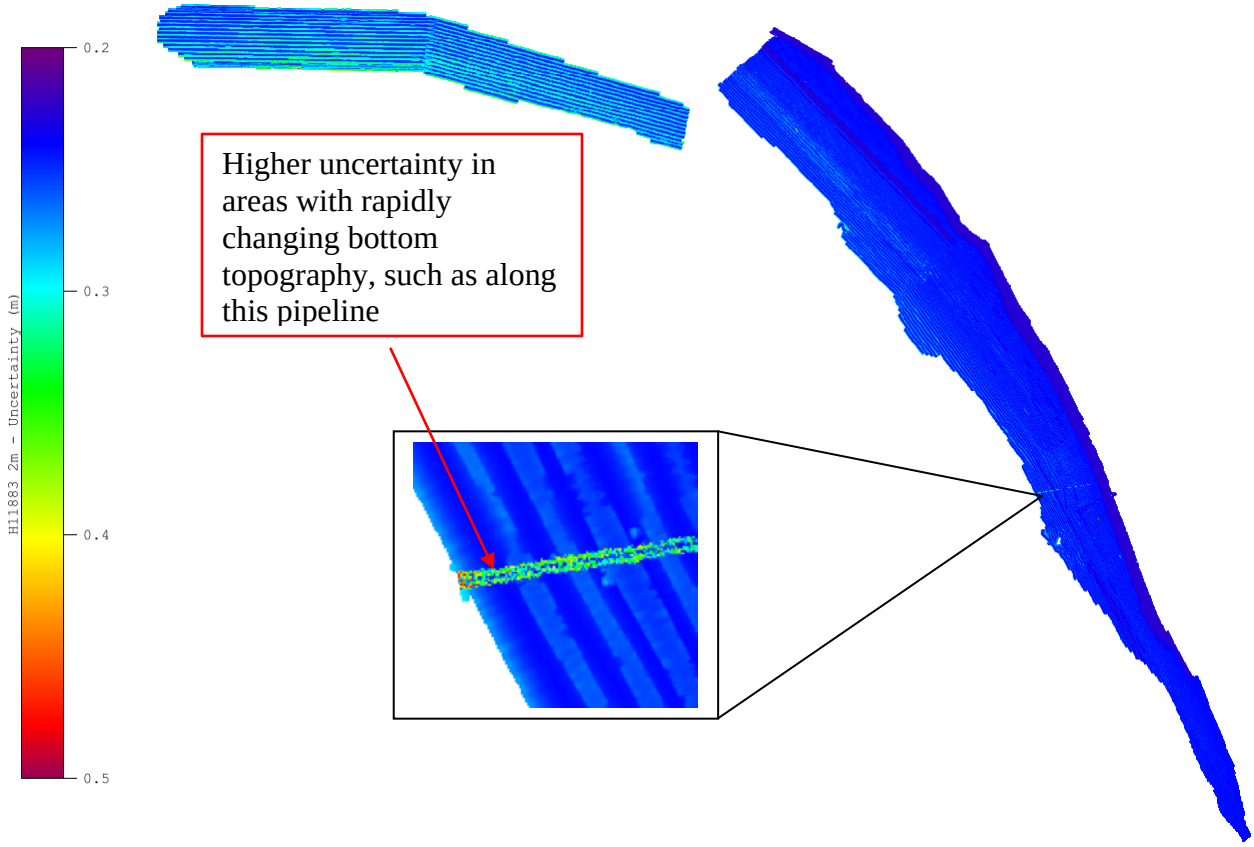


Figure 2 Uncertainty DTM

Survey Junctions

H11883 (Sheet I) does not overlap the other surveys.

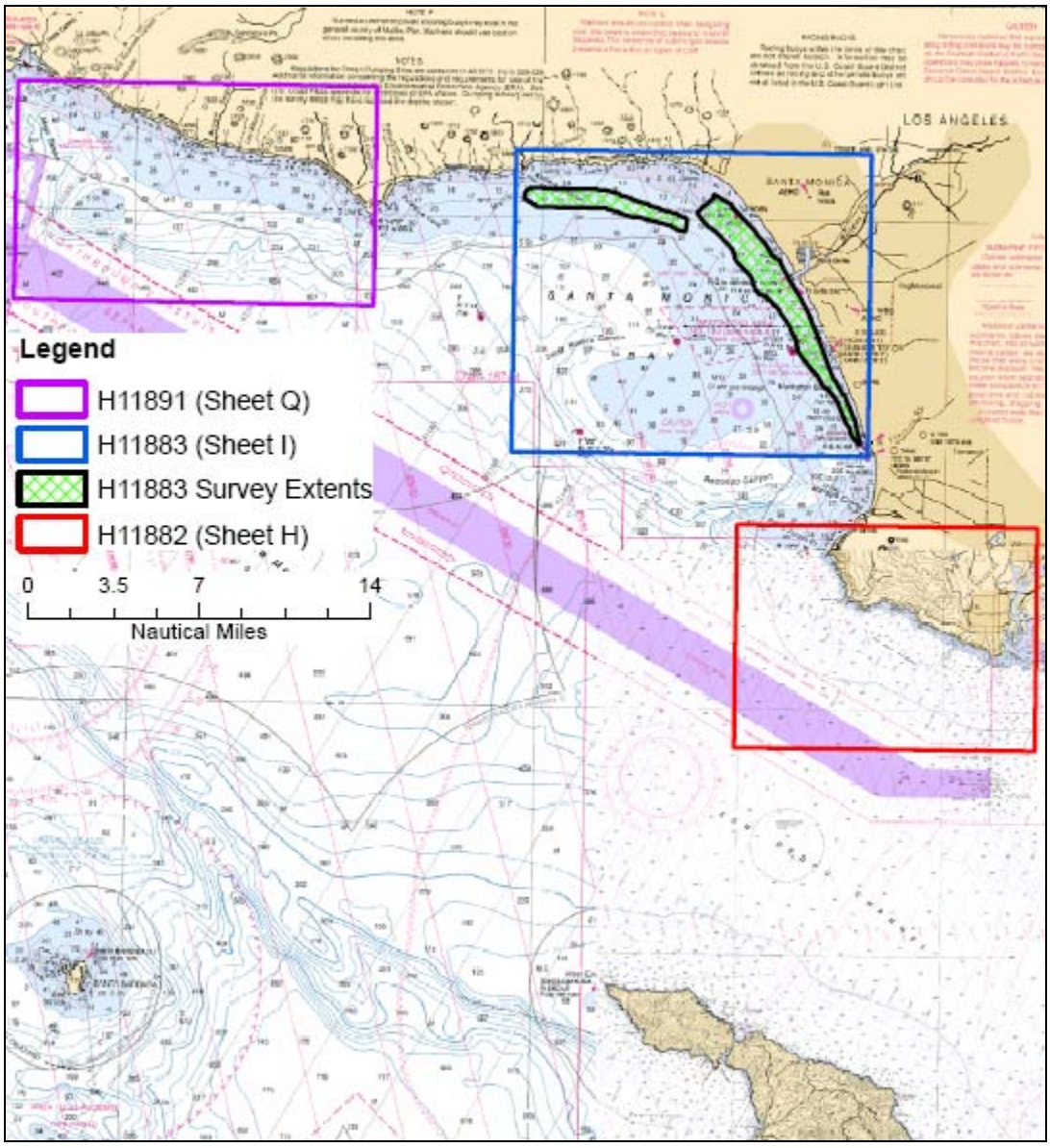


Figure 3 H11883 Survey Junctions

The survey extents do not overlap therefore they could not be compared.

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 4m resolution)

   Results: Average difference was -0.096 m, median difference was -0.072 m, with a standard deviation of 0.084 m. Therefore, the GPSTide surface was about 10 cm shoaler on average. No significant trends were apparent.

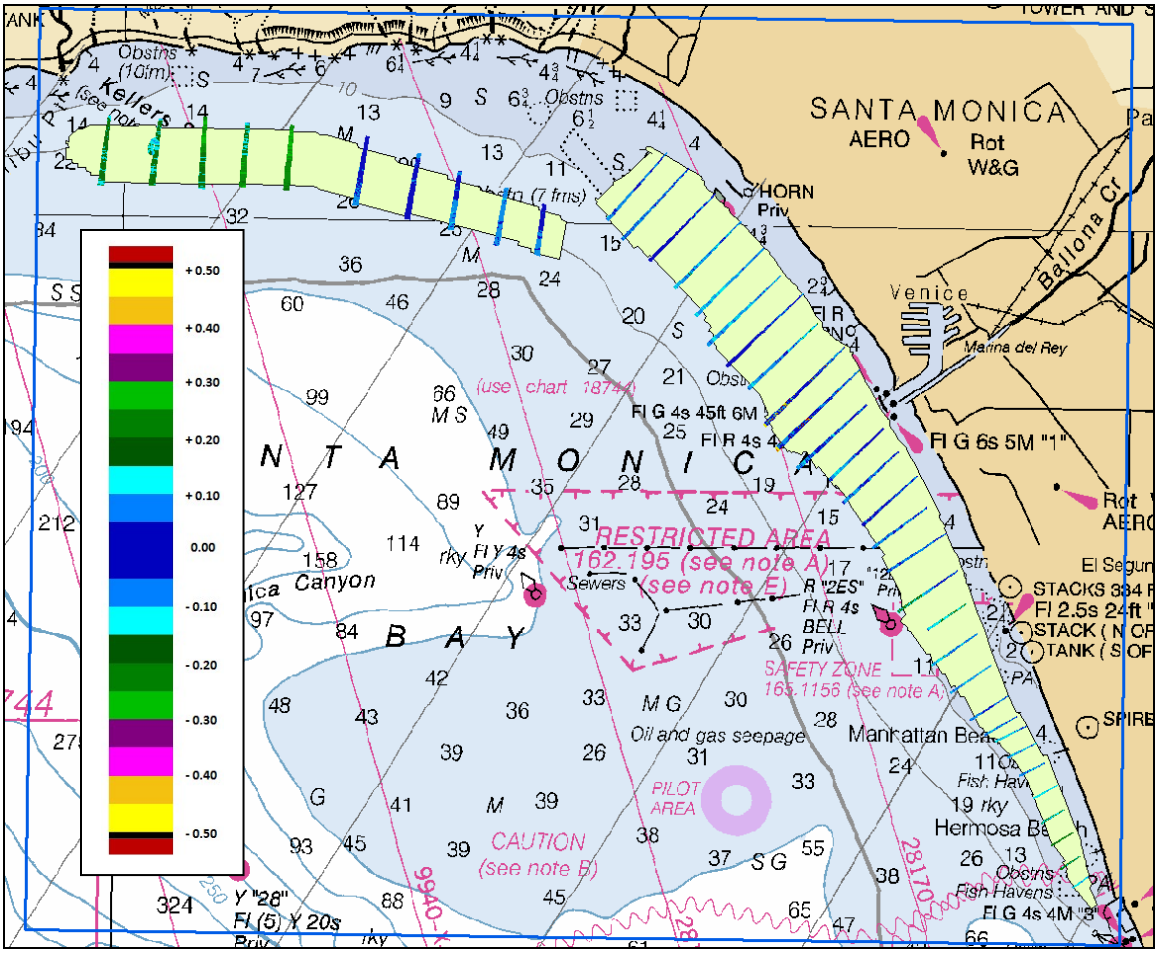


Figure 4 H11883 Difference Surface – Tidal minus GPSTide

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 H11883 was good. Notable problems follow:

1. A large hole was left within the survey bounds centered around 33-54-40 N, 118-27-10 W. Many anchored / moored vessels made the area inaccessible for survey.

2. 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.

3. Some small holidays exist in the data. The holidays are small with no shoaling along their edges.[7]

4. Some tide busts are apparent between adjacent lines. This was due to lower post-processed GPS accuracy then normal on certain lines. When these offsets occur they are small (less then 0.15m) and within specifications.[8]

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.

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 H11883 is called “H11883” and it contains four BASE surfaces. The following parameters were used:

0-22 meters: 0.5 m resolution, name “H11883_0_5m”
20-33 meters: 1 m resolution, name “H11883_1m”
30-45 meters: 1.5 m resolution, name “H11883_1_5m”
40-max depth: 2 m resolution, name “H11883_2m”

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

The final S57 file for this project is called "H11883_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[9] for a detailed description of the horizontal and vertical control used on this survey. No deviations from the report occurred. A summary of the project's horizontal and vertical control follows.

Horizontal Control

The horizontal control datum for this survey was the North American Datum of 1983 (NAD83).

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 tide station. 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

H11883 survey was compared with the charts shown on Table 2.

Table 2 – Chart Comparisons

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18748	Raster	n/a	1:15,000	1st	June 2007
18744	Raster	n/a	1:40,000	32nd	March 2006
18740	Raster	n / a	1:234,270	42nd	March 2007
18740	ENC	US3CA70M	n / a	11th	September 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 H11883 soundings was noted. A more detailed comparison was undertaken for any charted shoals or other dangerous features.

General 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.[10]

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11883.[11]

Charted Features

There were no charted features labeled ED or PD within the survey limits of H11883.[12]

1. PA wreck at 33-53-59.48 N, 118-26-00.06 W was not found during this survey despite full multibeam coverage in the area. However, the feature is located approximately 300 meters from the edge of the survey bounds, therefore it is recommended the PA wreck be retained. [13]

2. PA wreck at 33-57-59.55 N, 118-28-59.94 W was not found during this survey at this position. Some features exist nearby that could be the wreck but cannot be certain from the data. Recommend retain PA wreck.[14]

3. Feature at 33-58-36.72 N, 118-29-08.16 W appears to be an uncharted wreck. It is not in the AWOIS database; recommend charting wreck and add feature to AWOIS database.[15]

4. Obstn Fish Haven centered around 34-00-34.97 N, 118-31-47.63 W on chart 18744 appears to be slightly out of position; recommend extending west to enclose features evident in BASE surface at 34-00-32.75 N, 118-31-52.39 W.[16]

5. Rectangular-shaped Obstn Fish Haven on chart 18744 should be extended to include features evident in BASE surface at 34-00-35.74 N, 118-32-02.24 W, and 34-00-17.04 N, 118-32-12.83 W, and 34-00-27.16 N, 118-31-57.76 W, and 34-00-22.41 N, 118-32-19.57 W.[17]

Dangers to Navigation

Three dangers to navigation were reported during this survey. See Appendix I for the DtoN report.[18]

D.2 Additional Results

None to note.

Bottom Samples

None were assigned for this sheet.[19]

Aids to Navigation

1. Buoy R N “6ES” Priv at 33-54-28.04 N, 118-26-03.19 W was found to be in good condition and serving its intended purpose by this survey.

2. Buoy R N “8ES” Priv at 33-54-59.21 N, 118-26-11.08 W was found to be in good condition and serving its intended purpose by this survey.

3. Buoy R “2ES” Fl R 4s BELL Priv at 33-54-41.12 N, 118-27-33.95 W was found to be in good condition and serving its intended purpose by this survey.

4. Buoy R “10ES” Q R GONG Priv at 33-55-13.40 N, 118-26-30.07 W was found to be in good condition and serving its intended purpose by this survey.

5. Buoy G “1” Fl G 4s BELL at 34-00-10.42 N, 118-30-13.70 W was found to be in good condition and serving its intended purpose by this survey.

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

E. APPROVAL SHEET

Approval Sheet

For

H11883

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);

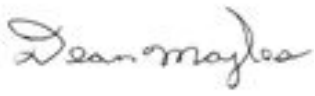
The data were reviewed daily during acquisition and processing, and the survey is complete and adequate for its intended purpose.

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

Invalid signature

X 

Dean Moyles
ACSM Certified

[1] Concur.
[2] Filed with project records.
[3] Concur.
[4] Filed with hydrographic records.
[5] Concur. Data are adequate to supersede charted data in the common area.
[6] Concur.
[7] Concur.
[8] Concur.
[9] Filed with project reports.
[10] Concur.
[11] Concur with clarification: no AWOIS items were assigned under this contract; however 2 AWOIS items fell within survey area:

AWOIS 50303 is a wreck charted at position 33-59-48.03N, 118-31-15.28W with a least depth of 42ft. Full multibeam coverage was acquired over AWOIS 50303. New position and depth was determined to be 33-59-48.60N, 118-31-13.20W with a least depth of 60ft.

AWOIS 53247 is a wreck charted at position 33-55-15.08N, 118-26-54.72W with a least depth of 38ft. Full multibeam coverage was acquired over AWOIS 50303. New position and depth was determined to be 33-55-15.00N, 118-26.54.60W with a least depth of 39 feet.

[12] Concur.
[13] Concur with clarification: adequate search not conducted. Recommend retain as charted. Wreck PA is not in AWOIS database. Recommend adding to database.
[14] Do not concur. Wreck discovered 1.14km north of wreck PA. Recommend charting wreck (see endnote 15) and remove wreck PA from chart.
[15] Concur. Wreck has been added to HCell. Recommend adding to AWOIS database.
[16] Concur. Recommend adjusting fish haven limits to incorporate obstructions located in current survey.
[17] Concur. Recommend adjusting fish haven limits to incorporate obstructions located in current survey.
[18] Concur. DTON Report was made, located P:\D A T A\Archive\H11883\DTON. DTON 1.3 of the report was not charted, added by cartographer.
[19] Concur. All charted bottom samples were retained.

Hydrographic Survey Registry Number: 11883

Survey Title: **State:** CALIFORNIA
Locality: PACIFIC OCEAN
Sub-locality: VICINITY OF SANTA MONICA

Project Number: M-L906-KR-08

Survey Dates: July 15 to August 14, 2008

Survey Danger Acquisition Date and Time: See feature.

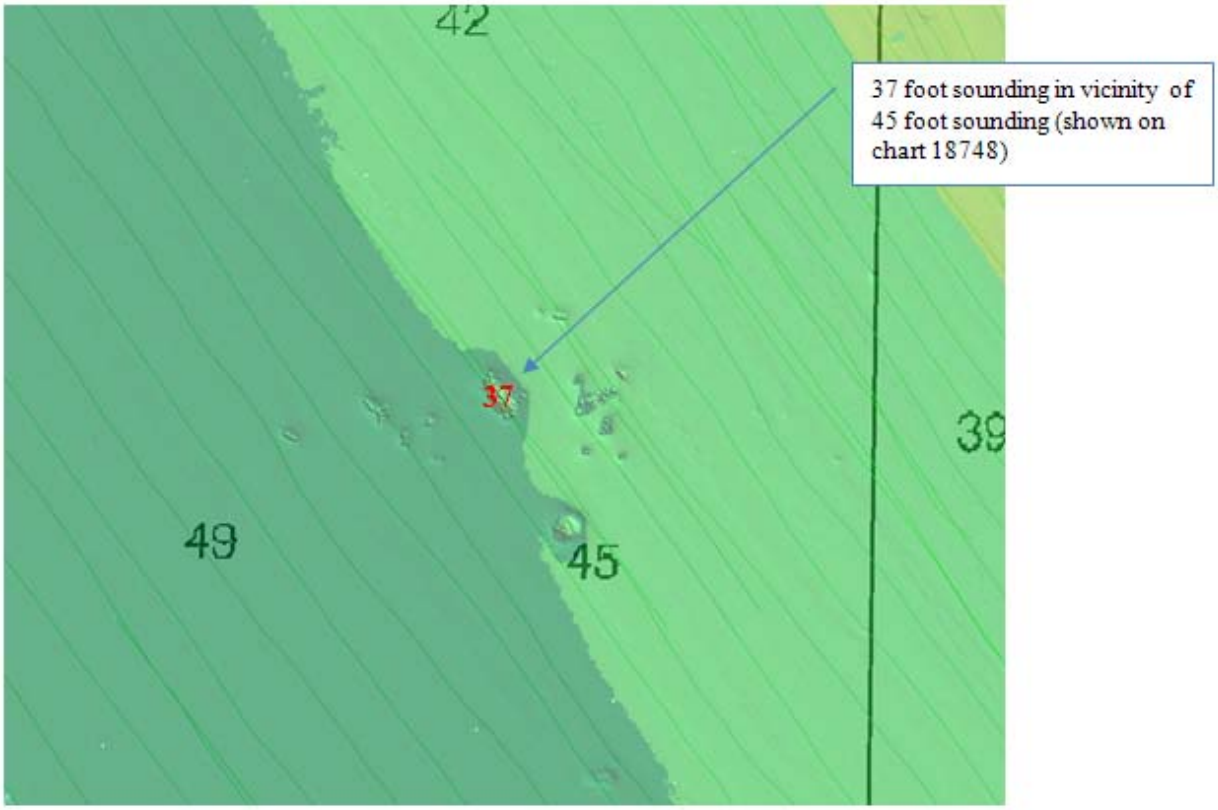
Features are reduced to Mean Lower Low Water using PPK-GPS altitudes adjusted by VDatum (CA_socal_8301_03 transformation grid), and are positioned on NAD83.

CHARTS AFFECTED:

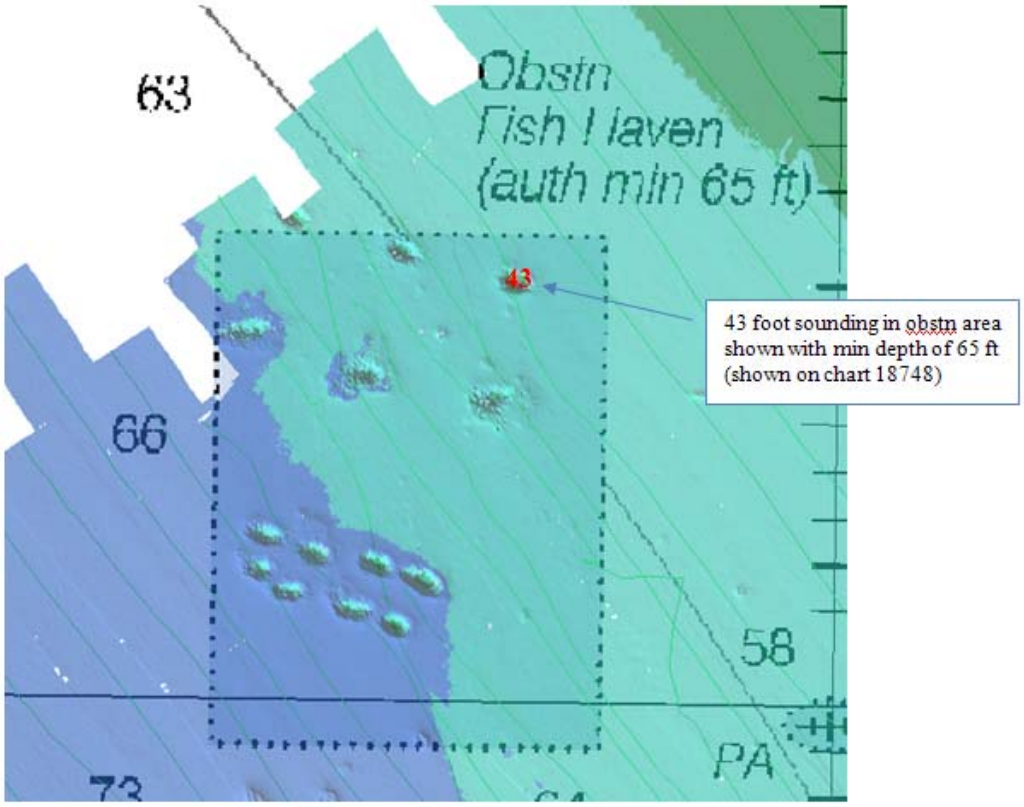
Chart	Type	Scale	Edition	Edition Date
18748	Raster	1:15,000	1st	June, 2007
18744	Raster	1:40,000	32nd	March, 2006
18740	Raster	1:234,270	42nd	March, 2007
US3CA70M	ENC		10th	May, 2008

DANGER:

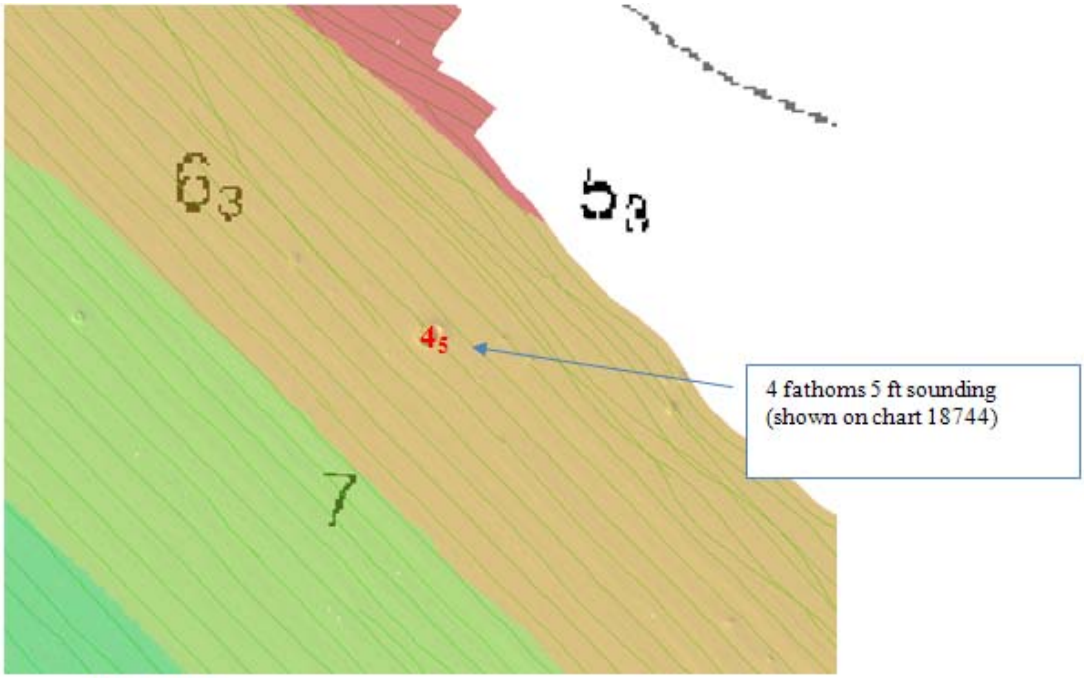
Feature	Depth	Latitude	Longitude	Time (UTC)
Sounding	37 feet	33-57-31.93 N	118-28-09.57 W	July 23, 2008; 10:01
Obstn	43 feet	33-58-09.02 N	118-29-08.18 W	July 15, 2008; 18:00
Sounding	4 fathoms 5 feet	34-00-27.88 N	118-30-43.00 W	July 19, 2008; 16:10


42
37 foot sounding in vicinity of 45 foot sounding (shown on chart 18748)
37
39
49
45

DTON item 1


63
Obstn
Fish Haven
(auth min 65 ft)
43
43 foot sounding in obstn area shown with min depth of 65 ft (shown on chart 18748)
66
58
PA

DTON item 2



DTON item 3

COMMENTS:

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

Andy Orthmann

From: Dean Moyles [DMoyles@fugro.com]
Sent: Wednesday, June 18, 2008 11:07 AM
To: Amey Mount; Andy Orthmann; Bob Richards; David Briggs; Dale Reynolds; Darin Stock; Colin Gill; James Hailstones
Subject: FW: VDatum

As per Crescents email we are good to go with VDatum and no bottom sampling is required. We have been doing bottom samples, but will discontinue as of today.

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

From: Crescent Moegling [mailto:Crescent.Moegling@noaa.gov]
Sent: Wednesday, June 18, 2008 11:02 AM
To: Dean Moyles
Cc: David.Scharff@noaa.gov
Subject: Re: VDatum

Yes, by all means on the VDatum. The full coast model will be available by December of this year.

There is no bottom sample requirement for this project.

Crescent

Dean Moyles wrote:

Crescent,

When we talked at the field procedures workshop we discussed if it was ok to use VDatum to reduce our data to MLLW (via the ellipsoid)and you thought that it would be no problem to take this approach. I just want to get a final okay on this approach before we get to far into this project.

Also, are we required to conduct bottom samples for this project?

Dean Moyles

Geomatics Engineering Technologist

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San Diego, CA 92123

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Cell (858) 945-6378

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--
Crescent Moegling
NOAA Hydrographic Surveys Division
Branch Chief - Data Acquisition Control
301.713.2700 x111

Andy Orthmann

From: Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Tuesday, July 08, 2008 9:10 AM
To: Ed Saade
Cc: Andy Orthmann; Bob Richards; Jeffrey Ferguson
Subject: Re: data transfer

Ed,

To further clarify, Fugro will only send raw data to NGDC, no other products or data types such as processed data, BAGs, etc.

Crescent

Ed Saade wrote:
Andy;

Just a note to confirm that when I met with NOAA in late June, Jeff indicated we plan to only send the master copy of the NOAA portion of the California data set directly to NGDC. You will not need to duplicate this data to your regulasr channels at Sand Point.

Regards;

Ed

--
Crescent Moegling
NOAA Hydrographic Surveys Division
Branch Chief - Data Acquisition Control
301.713.2700 x111

Andy Orthmann

From: Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Wednesday, November 05, 2008 6:23 AM
To: Andy Orthmann
Cc: 'Gary Nelson'; 'David.Scharff'
Subject: Re: gpstides and vdatum

Hi Andy,

This sounds great! Just out of curiousity, how are you getting the VDatum correctors into the data? I know you use CARIS HIPS for bathy processing so I'd be curious to hear how you've established the workflow.

Looking forward to your response.

Crescent

Andy Orthmann wrote:

Hey Gary.

As you may know, we are using VDatum with post-processed GPS altitudes for tidal correction for much of our California work. Tides are being used for comparison only, at least for Southern California.

The specs and deliverables don't address this directly, so I am wondering what you would like to see in the reports in terms of data QC.

What we are proposing for QC is a direct comparison with conventional zoned, tidal data, to show that the matchup is good and as a reality check. To do this we would, for each survey and the results outlined in each DR:

1. Create QC reports using crosslines corrected using convential tides compared to the BASE surface that was created using GPSTides. This would quantitatively show the matchup to be within spec regardless of the source of corrections (tide or GPSTide) and show any geographical discrepancies

2. Directly compare surfaces corrected using tides and surfaces corrected using GPSTides by creating a difference surface, which would compute average difference and standard deviations. This would show any systematic bias. For expediency's sake we would compare the crosslines only.

The Data Acquisition and Processing report would outline how the data was processed to create a GPSTide, and the Horizontal and Vertical Control report would discuss the base stations used, VDatum grids, and some comparison between gauge tides and the tides computed by GPS methods. The DR's would have the specific results of the above tests.

Your thoughts appreciated.

Thank you,

Andy Orthmann

--
Crescent Moegling
NOAA Hydrographic Surveys Division
Branch Chief - Data Acquisition Control
301.713.2700 x111

Andy Orthmann

From: David.Scharff [David.Scharff@noaa.gov]
Sent: Tuesday, November 04, 2008 12:06 PM
To: Andy Orthmann
Subject: Re: svp calibrations f/ California
Attachments: David_Scharff.vcf

Andy,

I would recommend simply treating it as a single survey. You could always run a final calibration check towards the end of the project as a check, but you are correct this is technically one continuous survey.

Dave

Andy Orthmann wrote:
>
> Dave,
>
> We haven't had a continuous project quite as long as this one so the
> subject of sound velocity profiler calibrations has come up.
>
> The specs and deliverables say that all profilers shall be calibrated
> within six months prior to the start of survey operations, and
> re-calibrated at an interval no greater then 12 months until survey
> completion.
>
> For purposes of SVP calibration, will California be considered three
> separate surveys, or one single survey? We would argue that since ops
> have been continuous since survey operations began that it is
> effectively the same survey despite it being broken up for
> administrative purposes into three separate ops.
>
> Thanks a lot,
>
> Andy Orthmann
>
> Fugro Pelagos, Inc.
>

H11883 HCell Report

Anthony Lukach, 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 ENC and RNC in the region: NOAA ENC: US3CA70M; and NOAA RNCs: 18740, 18744, and 18748.

HCell compilation of survey H11883 utilized Office of Coast Survey HCell Specifications Version 3.1, with approved modifications to better align with PHB's HCell process and to meet MCD needs.

1. Compilation Scale

The density of soundings in the HCell are compiled as appropriate to emulate those soundings of Charts 18748 1:15,000 and 18744, 1:40,000 (with two 1:10,000 insets). Position and density of non-bathymetric features included in the HCell have not been generalized from the scale of the hydrographic survey H11883.

2. Soundings

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11883_Office_Combined_2m** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:15,000 survey scale for the area of the survey covered by chart 18744 (1:40,000). A shoal-biased selection was made at 1:15000 for the areas of the survey covered by chart 18748 (1:15,000) and the 1:5,000 for 18748's inset areas (1:10,000). These shoal-based selections were made using a Radius Table file with values shown in the table, below. The resultant sounding layer contains 23,761 depths ranging from 5.928 to 170.108 feet.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	150	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 53 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth range is 0 to 173.885 feet.

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	0.00
5	5.4864	5.715	3.125
10	18.288	18.5166	10.125
20	36.576	37.9476	20.750
50	91.44	92.8116	50.750

Contours delivered in the *_SS file have not been deconflicted against soundings and hydrography as all other features in the *_CS file and soundings in the *_SS have been. This results in conflicts between the *_SS file contours and HCell features at or near the survey limits. Conflicts with M_COVR, M_QUAL, M_CSCL and DEPARE objects should be expected. HCell features should be honored over *_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell H11883:

M_QUAL
M_COVR
M_CSCL

Meta area objects were constructed on the basis of the limits of the hydrography. (See 3.1 *Depth Areas*.)

5. Features

A features file **H11883_S57_Features.000** was delivered. The file contained three OBSTRNs and two WRECKS features which were adequately charted.

There were three DTONs reported from survey H11883. The first DTON was a reported 37ft sounding at 33-67-31.9N, 118-28-09.6W. The second DTON was a reported 43ft obstruction at 33-58-09.0N, 118-29-08.2W. The third DTON was a reported 29ft sounding at 34-00-27.9N, 118-30-43.0W.

25 bottom sample features were imported from ENC US3CA70M, RNC 18744 and 18748.

25 bottom sample features were imported from ENC US3CA70M, RNC 18744 and 18748. The source of all features included in the H11883 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 and intertidal areas
SBDARE	Bottom samples and ledges
M_COVR	Data coverage Meta object
M_CSCL	Compilation scale Meta object
M_QUAL	Data quality 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

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 charting units with NOAA rounding ensures that:

- All depths will display as whole feet.
- All depth units above MLLW (0 feet) to 2.0 feet above MHW display in whole feet.
- 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, depths (DUNI) and heights (HUNI) display as whole feet.

9. Data Processing Notes

9.1 Junctions

The survey extents do not overlap therefore they could not be compared.

10. QA/QC and ENC Validation Checks

H11883 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

- H11883 Base Cell File, Chart Units, Soundings compiled to 1:10,000, 1:15,000, and 1:40,000
- H11883 Base Cell File, Chart Units, Soundings compiled to 1:10,000, 1:15,000, and 1:40,000
- H11883 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items

11.2File Naming Conventions

- Chart units base cell file, chart scale soundings US511883_CS.000
- Chart units base cell file, survey scale soundings US511883_SS.000
- Descriptive Report H11883_DR.pdf

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:

Anthony Lukach, Hydrographic Intern, PHB, Seattle, WA; 206-526-6871;
Tony.Lukach@noaa.gov.

APPROVAL SHEET

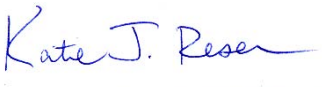
H11883

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.

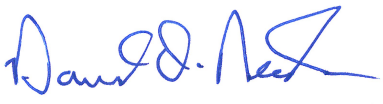
Digitally signed by Anthony Lukach
DN: cn=Anthony Lukach, o=NOAA, ou=NOAA OCS PHB, email=tony.lukach@noaa.gov, c=US
Date: 2009.06.10 10:17:04 -07'00'

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.



Katie Reser
2009.06.10
10:11:29 -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
2009.06.10
10:36:12 -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: 2009.06.25 16:55:37 -04'00'