H11983

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. n/a

Registry No. H11983

LOCALITY

State California

General Locality Pacific Ocean-- Northern California

Sublocality Point St George

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.
H11983

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-- Northern California

Sublocality: Point St George

Scale: 1: 40,000 Date of Survey: 9/8/2008-11/21/2008

Instructions Dated: 7/7/2008 Project No.: M-L906-KR-08

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

Chief of Party: Dean Moyles

Surveyed by: Orthomann, Moyles, Renyolds, Barrow, Zurita, Todd, Tidey, Cameron, Mount, et al.

Soundings taken by echo sounder: Reson Seabat 7125 & 8125

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: Tony Lukach Automated plot by: N/A

Verification by: Tyanne Faulkes

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

H11983 (Sheet BM) is in the vicinity of Point St George, 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 to make the data suitable to OCS for nautical charting purposes have been taken, as detailed in the 2008 Specifications and Deliverables and described in this and accompanying reports.

Hydrographic data collection began on September 8, 2008 and ended on November 21, 2008.

Table 1 – Sheet Bounds

Point	Latitude (North)	Longitude (West)
1	41-49-54	124-17-46
2	41-49-54	124-08-25
3	41-40-06	124-08-25
4	41-40-06	124-17-46
5	41-49-54	124-17-46

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

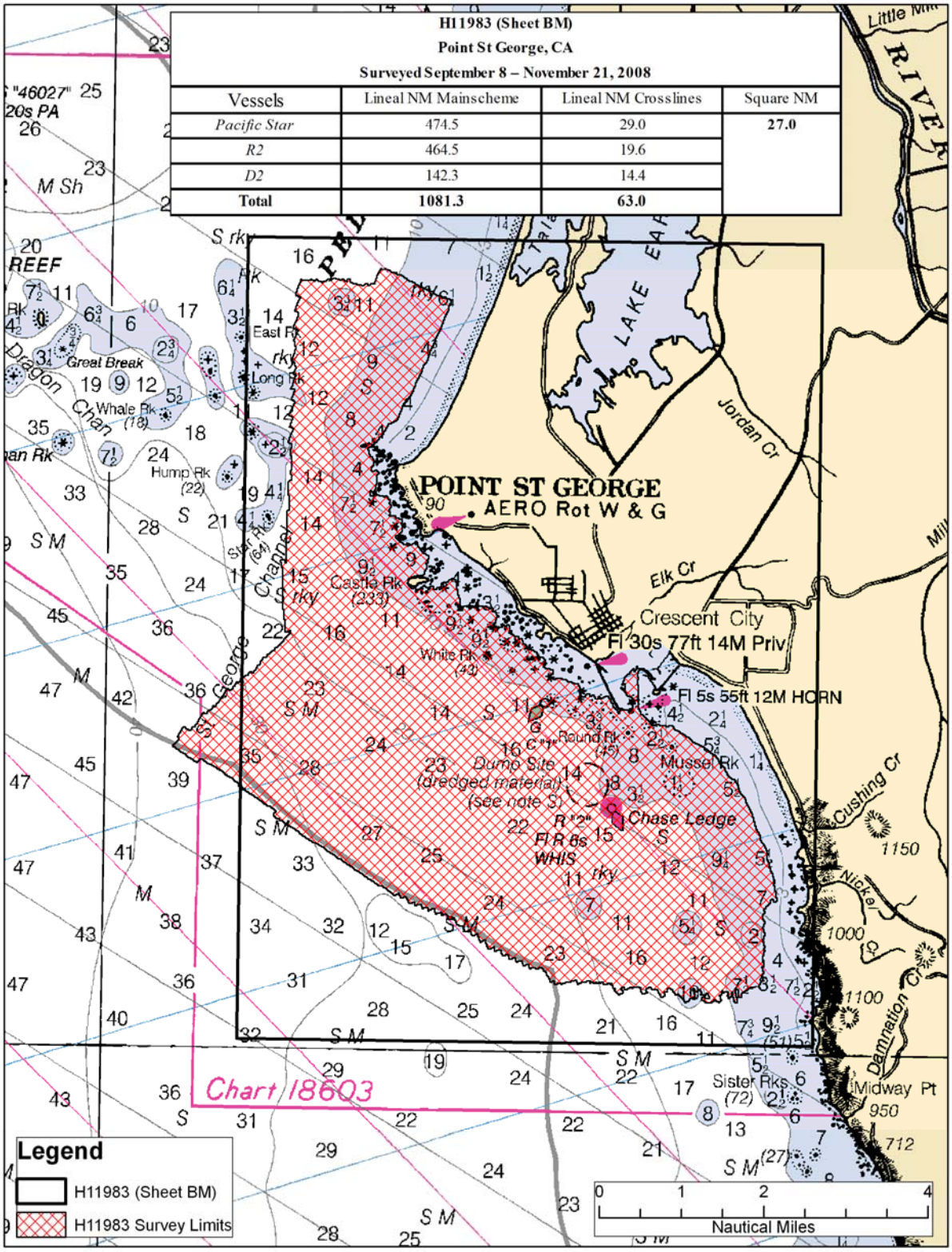


Figure 1 H11983 Area Surveyed

B. DATA ACQUISITION AND PROCESSING

Refer to the M-L906-KR-08 Data Acquisition and Processing Report[3] for a detailed description of all equipment, survey vessels, processing procedures and quality control features. Items specific to this survey and any deviations from the Data Acquisition and Processing Report are discussed in the following sections.

B.1 Equipment & Vessels

The R/Vs R2, D2, and F/V Pacific Star acquired all sounding data for H11983.

The Pacific Star, which is 162 feet in length with a draft of 16 feet, was equipped with a Reson Seabat 7125 (400/200 kHz dual frequency) and a Reson Seabat 8111 for multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors (SV&P) and a Brooks Ocean Moving Vessel Profiler (MVP) for sound velocity profiles. Vessel attitude and position were measured using an Applanix Position and Orientation System for Marine Vessel (POS MV 320 V4) with S7K files logged in Winfrog Multibeam v 3.08.23.

Vessel D2, a Pacific Star launch, at 29 feet in length with a draft of 3 feet, was equipped similarly, except no 8111 or MVP systems were installed. Note: the 7125 was replaced with an 8125 on September 9, 2008 after the vessel hit a submerged rock near Crescent City.

Vessel R2, with the 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

Crosslines were planned and well distributed throughout the survey to ensure adequate quality control. Total crossline length surveyed was 63.0 nautical miles or 5.8 percent of the total main scheme line length, exceeding the 5 percent planned[4]. Each crossline was compared to the entire main scheme line plan and CUBE surface it intersected, using the CARIS HIPS QC report routine.

The majority of QC Reports fall well within the required accuracy specifications[5]. However, beams that fall below the 95 percent confidence level in the QC report are associated with areas and conditions illustrated below. It should be noted that these locations are in agreement with the surrounding adjacent lines and are considered well within the required specifications.

Results are located in Separate IV.

The majority of beams that fall below the 95 percent confidence level are located in areas having extremely steep slopes and/or rocks. Figures 2 and 3 below provide examples, note main scheme lines are shown in yellow and the crossline in purple.

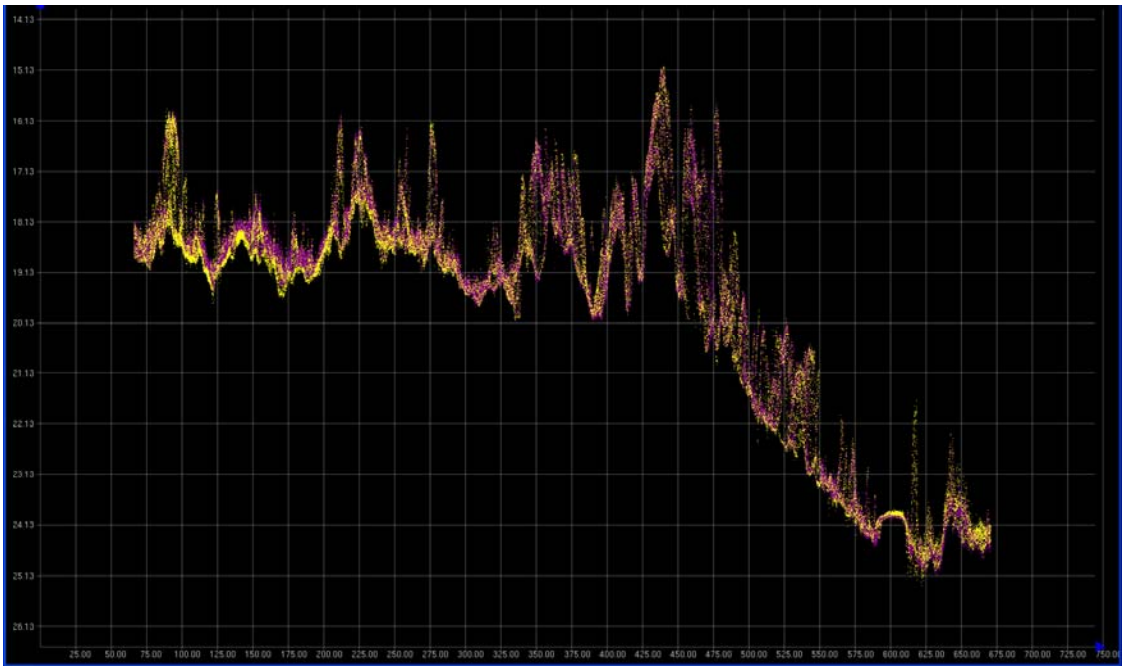


Figure 2 Profile of 4BM01-TIE06

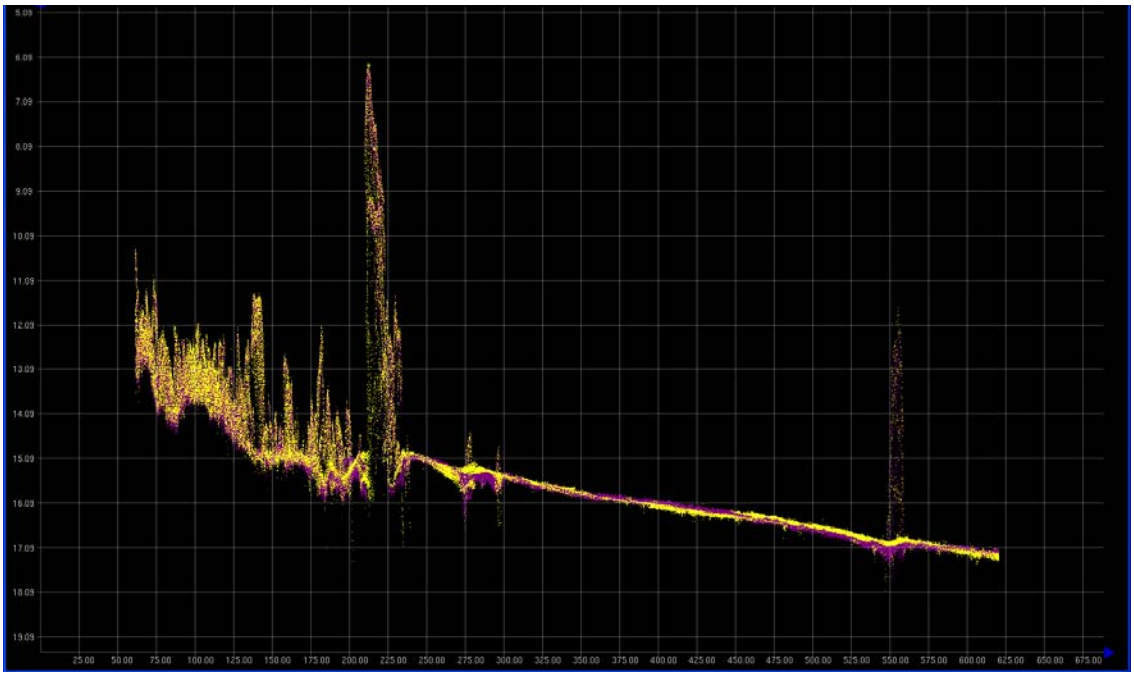


Figure 3 Profile of 4BM02-TIE05

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 H11983 had uncertainty values of 0.25 m to 0.65 m, which met project specifications[6].

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.[7]

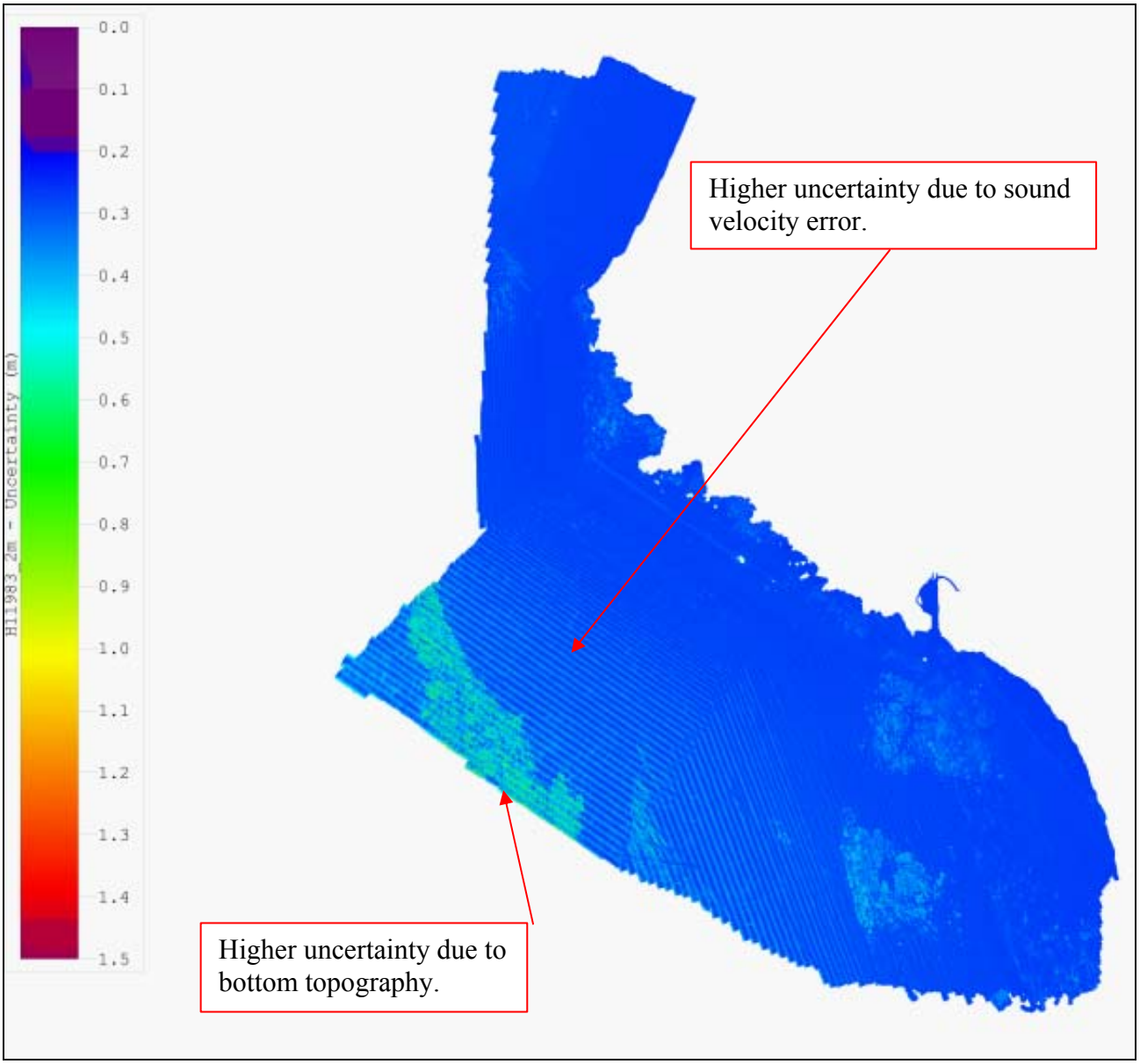


Figure 4 Uncertainty DTM

Survey Junctions

H11983 (Sheet BM) junctions with:

Registry #	Date	Junction Side
H11984	2008	West
H11982	N/A	South (Note: This sheet is not yet completed)

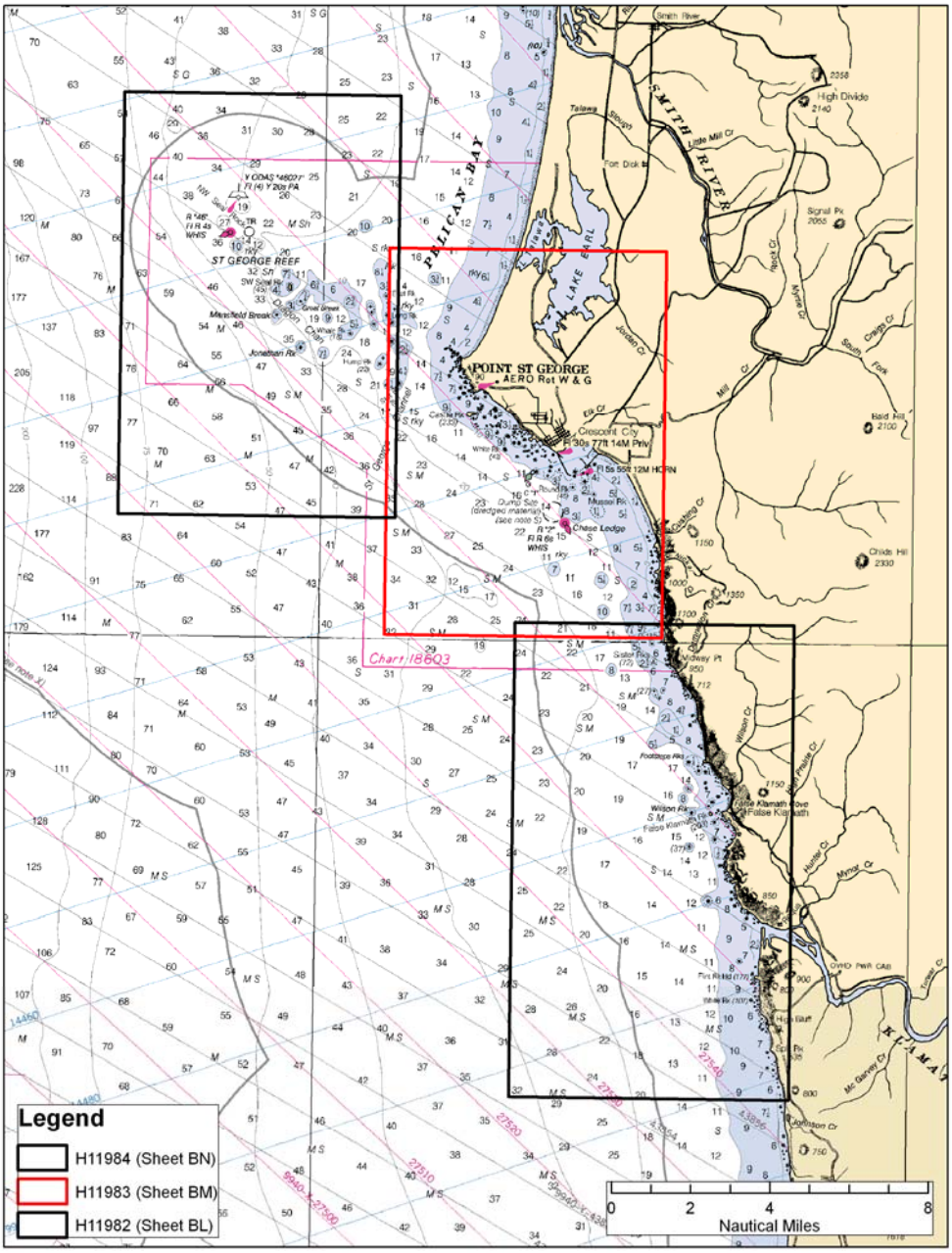


Figure 5 H11983 Survey Junctions

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.[8]

Quality Control Checks

Positioning system confidence checks were conducted on a daily basis using the POS MV controller software. The controller software had numerous real-time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables were achieved. These include, but are not limited to the following: GPS Status, Position Accuracy, Receiver Status (which included HDOP), and Satellite Status. During periods of high HDOP and/or low number of available satellites, survey operations were stopped.

Data Quality

In general, the multibeam data quality for H11983 was good[9]. Two 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 undercurrents in the water column. This problem was addressed by conducting SVP casts more frequently and reducing the line spacing interval. Even though this SVP error is noticeable in the data, it is within required specifications.

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

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

2. During subset cleaning it became apparent in areas of H11983 that bottom features disappeared or were offset vertically. It should be noted that this survey was started on September 8, 2008 and ended on November 21, 2008, but data collection was not exclusive to H11983 during this time. Due to weather conditions and logistical considerations, survey operations were not confined to a particular sheet or area.

In Figure 6, survey lines that are shown in red were collected on or before Julian Day 273 (2008-09-29) and lines shown in green were collected on Julian Day 300 (2008-10-26) and onwards. It is apparent that along this border, that what we deem to be feeding scars have disappeared. These feeding scars vary in magnitude but in most cases are around 0.10 to 0.20 meters. Refer to

Figures 7 and 8.

In Figure 9 the surface for crossline (5BM03-TIE005, conducted on Julian Day 320) is overlaid on Sheet BM block 03 and it reveals no evidence of these feeding scars. We know from talking to the local fisherman along with firsthand experience and research that this area in prone to extreme weather conditions and high currents, which could cause this shift in bottom sediment.

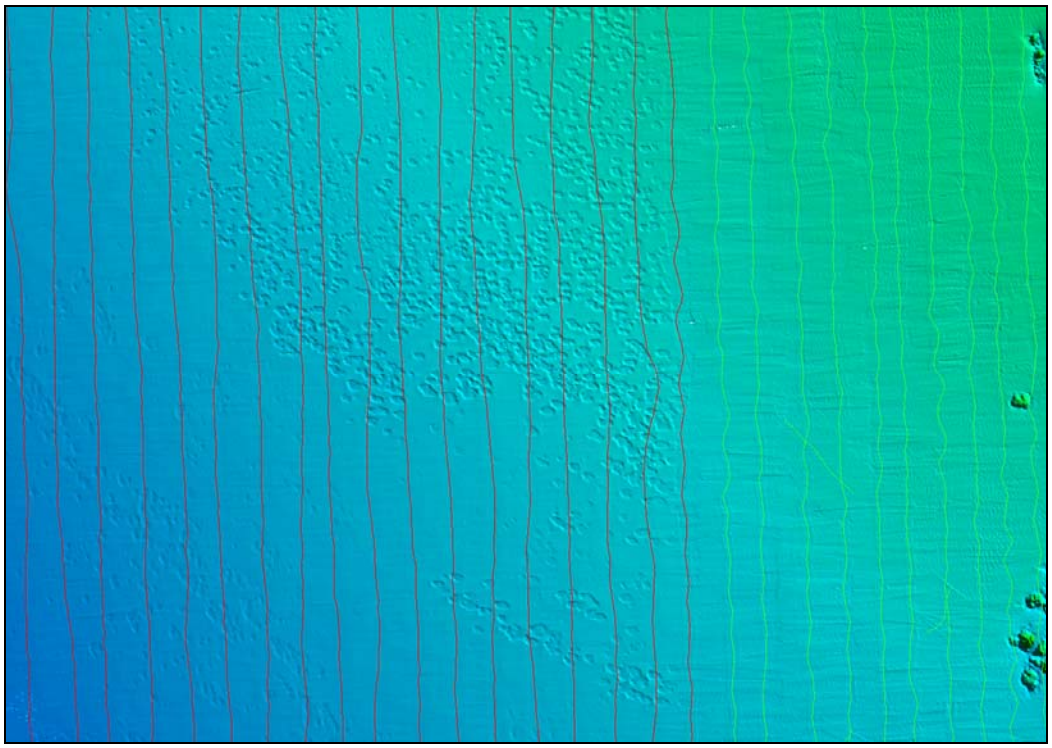


Figure 6 Feeding Scars (Sheet BM Block 03)

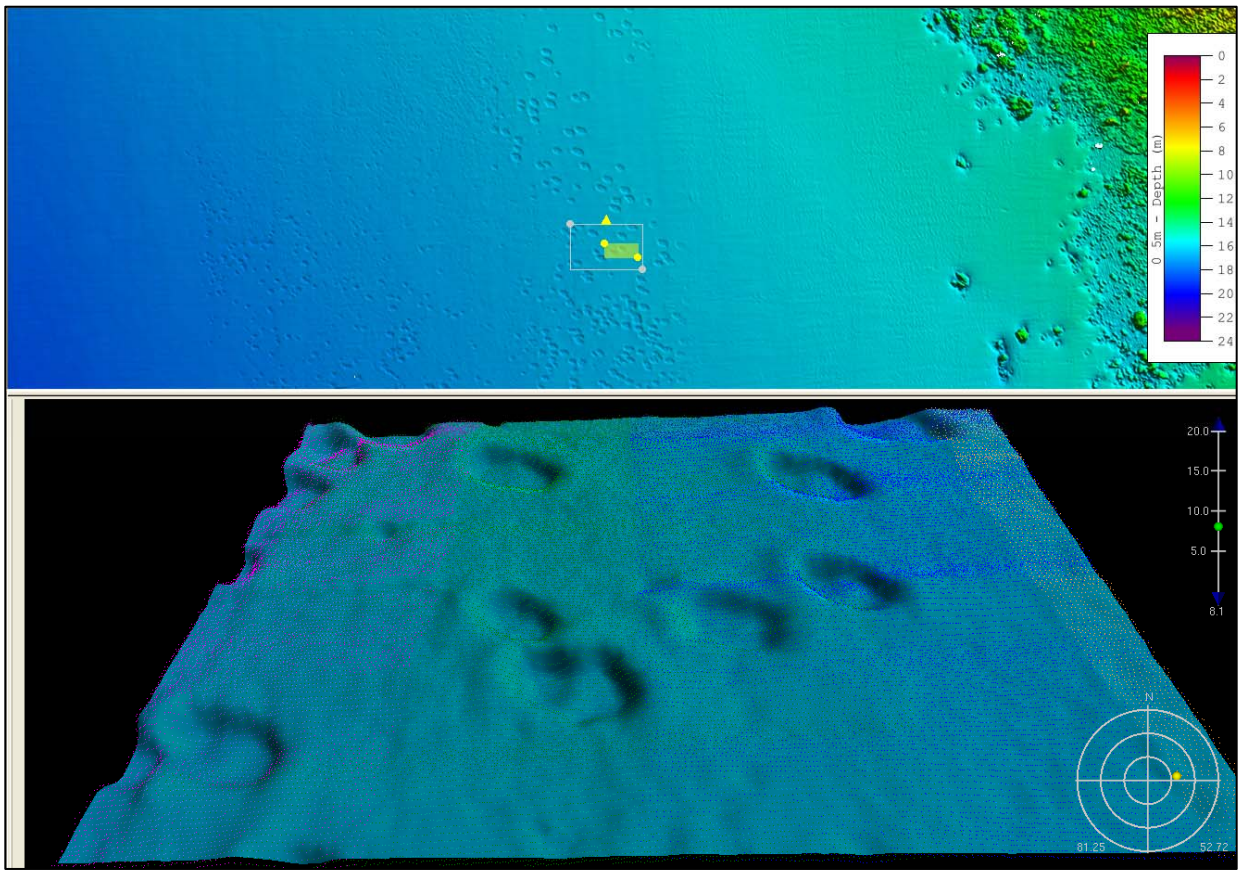


Figure 7 3D slice of feeding scars

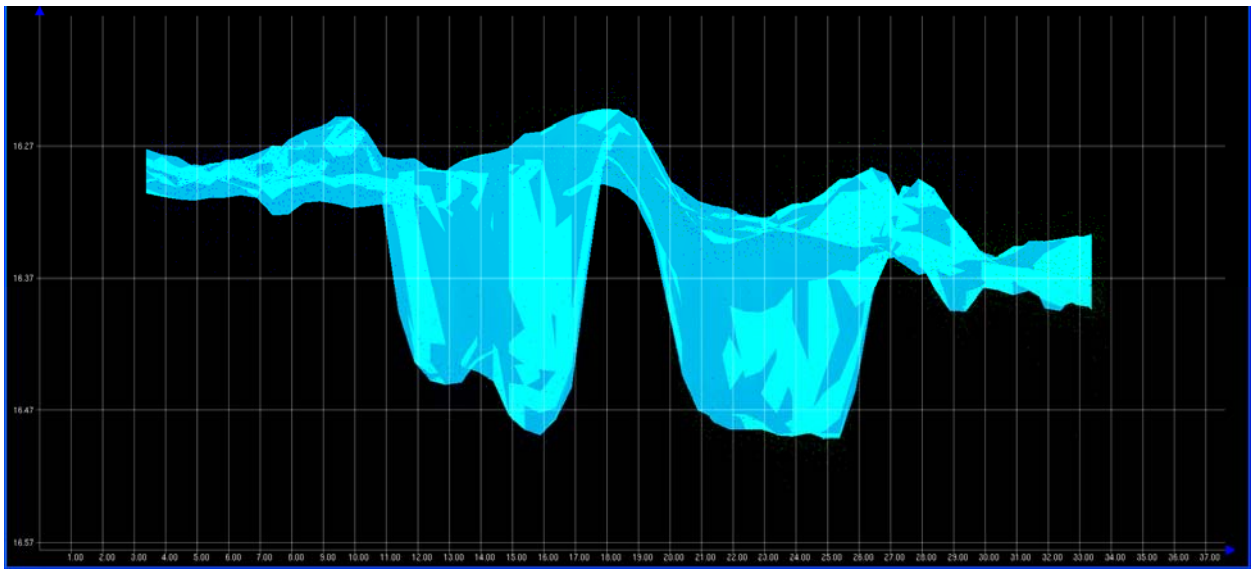


Figure 8 Cross section of feeding scars

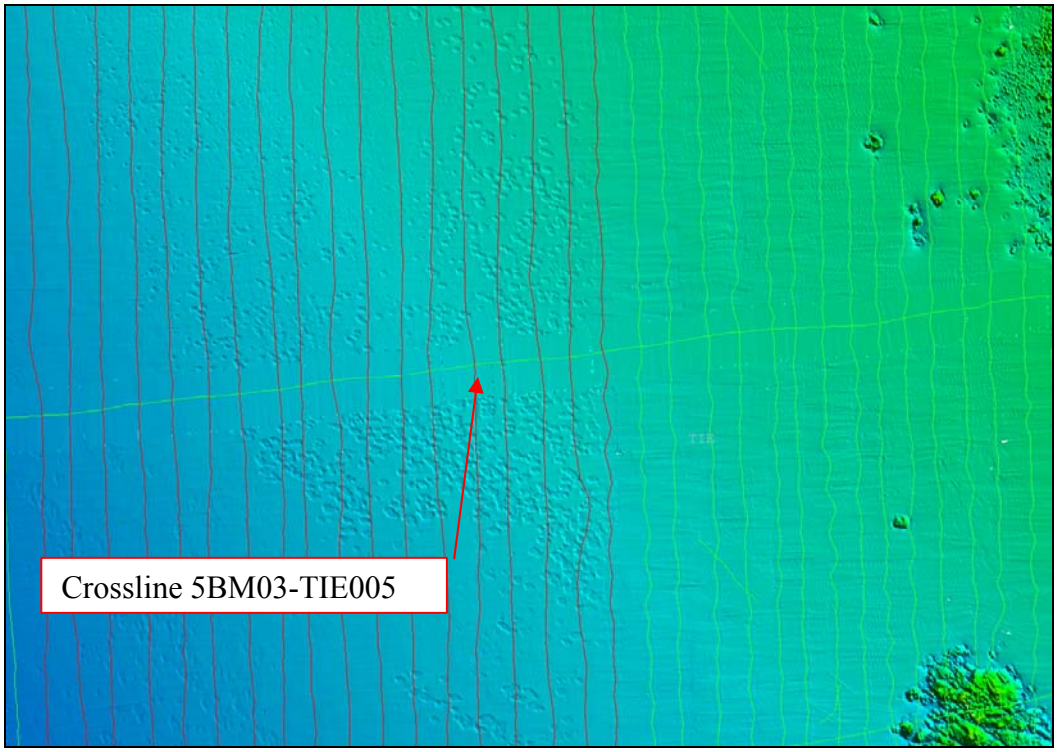


Figure 9 Crossline surface superimposed on Sheet BM Block 03

Areas within Sheet BM blocks 03 and 04 (refer to Figure 10) were also problematic in that they contained vertically shifted data. Data were collected by the R2 on Julian Day 256 and by D2 on Julian Day 319 (displayed as red in Figure 10) for Sheet BM03 and by R2 on Julian Days 256 and 265 for Sheet BM04.

Figure 11 is a cross section of an area where blocks BM03 and BM04 overlap. Data displayed in purple were collected on Julian Day 265 in Sheet BM block 04 and data displayed in yellow were collected on Julian Day 319 in Sheet BM block 03. The vertical shift is very apparent between the two data sets, but it is only a sediment shift and not a systematic error since the peaks of the rocky outcrops compare very closely to one another.

Figure 12 shows another example of this, and it can be again concluded that this is just a sediment shift and not a systematic error of any kind. Data displayed in purple were collected on Julian Day 265 in Sheet BM block 04 and data displayed in yellow were collected on Julian Days 256 and 319 in Sheet BM block 03.

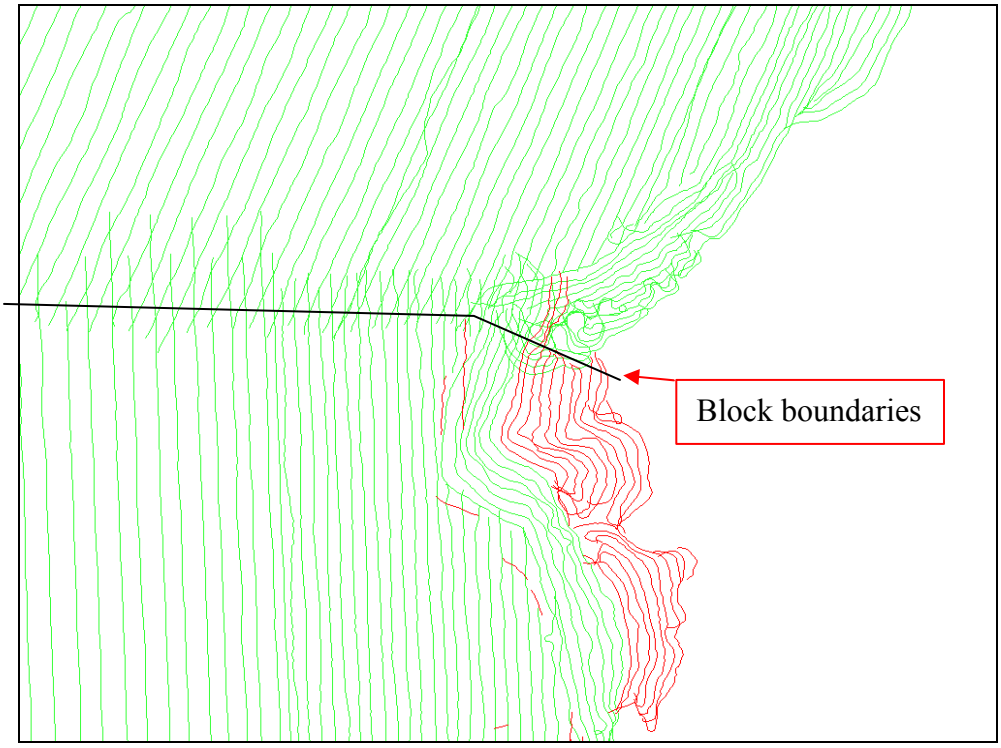


Figure 10 Sheet BM Blocks 03 & 04 border

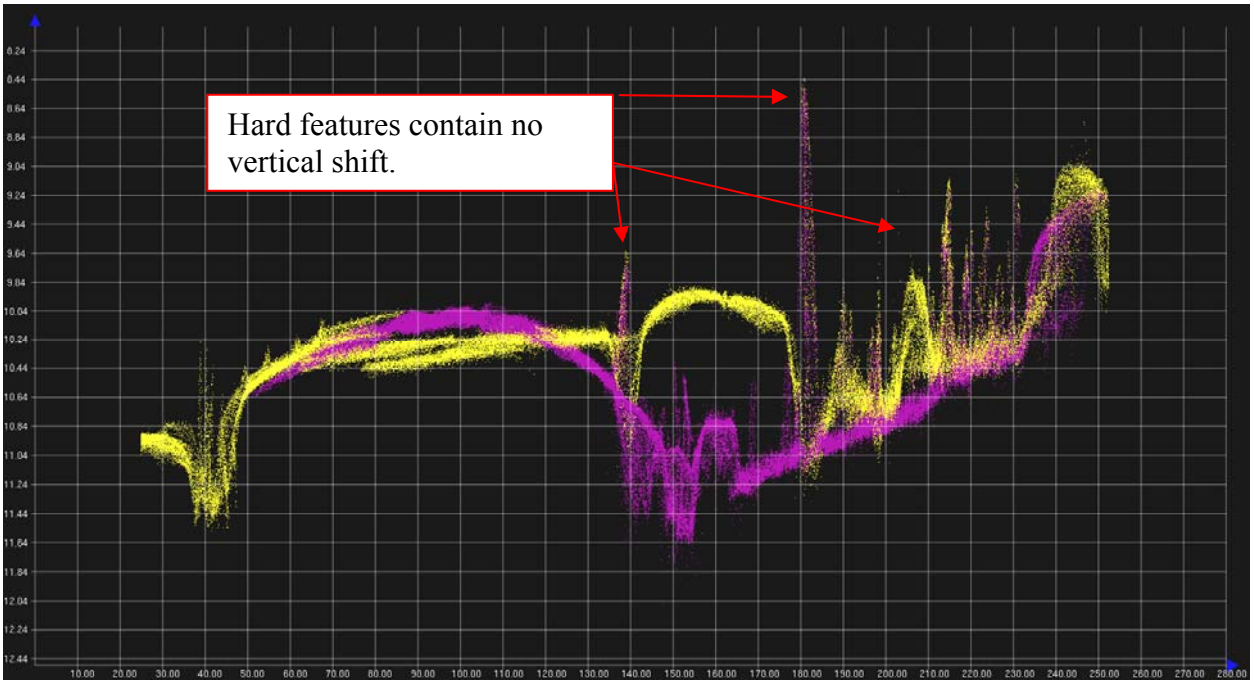


Figure 11 Cross section in Sheet BM blocks 03 and 04 (color coded by block)

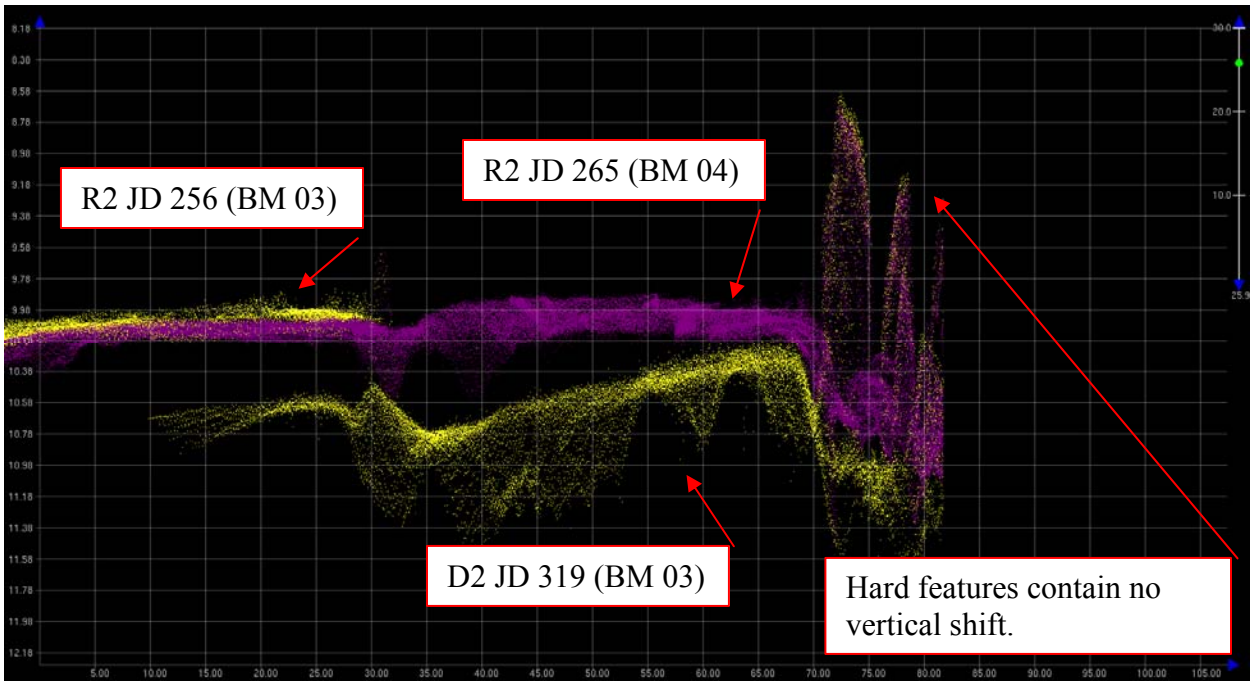


Figure 12 Cross section in Sheet BM blocks 03 and 04 (color coded by block)

Since there is no way to rectify this issue (because this is a dynamic bottom), the data was edited to reflect the shoalest depth and all other data points were marked as rejected in subset editor.

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 fieldsheets for H11983 were divided into separate resolutions (due to the volume of data) and are called:

- "H11983_0_5m" and it contains nine BASE surfaces.
- "H11983_1m" and it contains four BASE surfaces.
- "H11983_1_5m" and it contains three BASE surfaces.
- "H11983_2m" and it contains two BASE surfaces.

The following parameters were used:

0-22 meters: 0.5 m resolution, name "H11983_0_5m"
20-33 meters: 1 m resolution, name "H11983_1m"
30-45 meters: 1.5 m resolution, name "H11983_1_5m"
40-84 meters: 2 m resolution, name "H11983_2m"

Note: Maximum depth was approximately 70 m, therefore resolutions courser then 2 m were not computed.

The final S57 file for this project is called "H11983_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[10] for a detailed description of the horizontal and vertical control used on this survey. No deviations from the report occurred. A summary of the project's horizontal and vertical control follows.

Horizontal Control

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

For real-time DGPS corrections, a CSI MBX-3 unit was tuned to the Cape Mendocino, CA. USCG DGPS site. The unit output differentially corrected positions at 1 Hz to the POS MV 320 V4 where it was integrated with inertial data and a position for the top-center of the IMU was generated. This position was logged concurrently with the bathymetry from Winfrog and logged to the POS file by Winfrog POS logger. It was later corrected for offsets to the MBES sonar by CARIS HIPS in processing.

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

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

Vertical Control

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

Table 2 – Tide Gauges

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

Tides

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

On March 1, 2009, verified tide data was acquired from the National Water Level Observation

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

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

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

H11983 survey was compared with the charts shown on Table 3.

Table 3 – Chart Comparisons

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18600	Raster	n/a	1:196,948	14th	January 2002
18602[11]	Raster	n/a	1:40,000	12th	April 2003
18603	Raster	n/a	1:40,000	16th	December 2002
18600	ENC	US3OR03M	n/a	6th	October 2008
18007[12]	ENC	US2WC12M	n/a	4th	August 2008

Comparison of Soundings

A comparison of soundings was accomplished by overlaying the latest edition of NOAA charts and ENCs on the final BASE surfaces in CARIS HIPS & SIPS. The general agreement between charted soundings and H11983 soundings was noted. A more detailed comparison was undertaken for any charted shoals or other dangerous features.

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

1. Some discrepancy exists at the exact position of charted soundings on steep slopes, likely due to the charted soundings being slightly out of position, making a large difference in

depths apparent. Recommend soundings as charted be superseded by this survey[13].

2. Rocks charted on ENC US3OR03M fall in the multibeam coverage and should be modified to agree with the H11983 survey[14].

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11983[15].

Charted Features

There were no charted features labeled ED, PD, or PA within the limits of H11983[16].

Dangers to Navigation

Eleven dangers to navigation were found and reported for this survey. See Appendix I for the DtoN reports.[17]

D.2 Additional Results

None to note.

Bottom Samples

None were assigned for this sheet.[18]

Aids to Navigation[19]

The following aids to navigation were examined during this survey:

1. Buoy R "2" Fl R 6s WHISTLE at 41-43-00 N, 124-11-49 W (chart 18603) found to exist and to be serving its intended purpose.
2. Buoy R "4" Fl R 4s WHISTLE at 41-43-35 N, 124-11-20 W (chart 18603) 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

H11983

Standard field surveying and processing procedures were followed in producing this survey in accordance with the following documents[20]:

M-L906-KR-08 Statement of Work
NOS Hydrographic Surveys Specifications and Deliverables, April 2008 Edition
Fugro Pelagos, Inc. Acquisition Procedures (2009-MBES_Acquisition_Procedures_R0);
Fugro Pelagos, Inc. Processing Procedures (2009-MBES_Processing_Procedures_R0)

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

This report has been reviewed and approved. All records are forwarded for final review and processing to the Chief, Pacific Hydrographic Branch.

Approved and forwarded,

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

X

Dean Moyles
ACSM Certified

[1] Concur
[2] Concur
[3] Filed with project records.
[4] Concur
[5] Concur
[6] Concur
[7] Concur
[8] At the time of compilation of H11983 junctioning data was not available. Verification of agreement between these surveys will be completed upon compilation of H11982 and H11984.
[9] Concur
[10] Filed with project records.
[11] Not applicable to this survey
[12] Not applicable to this survey
[13] Concur
[14] Concur.
[15] Concur.
[16] Concur
[17] All field DTONs were applied to the chart upon office chart comparison. Additional office DTONs were designated. These DTONs were not applied to the chart used in compilation but are reflected in the chart soundings.
[18] Concur
[19] Use the latest ATONIS information available.
[20] Concur

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H11983 (Sheet BM)

Survey Title: **State:** California
Locality: Pacific Ocean
Sub-locality: Point St George

Project Number: M-L906-KR-08

Survey Dates: September - November 2008

Survey Danger Acquisition Date and Time: See feature.

Features are reduced to Mean Lower Low Water using verified tide data from 9419750 (Crescent City).

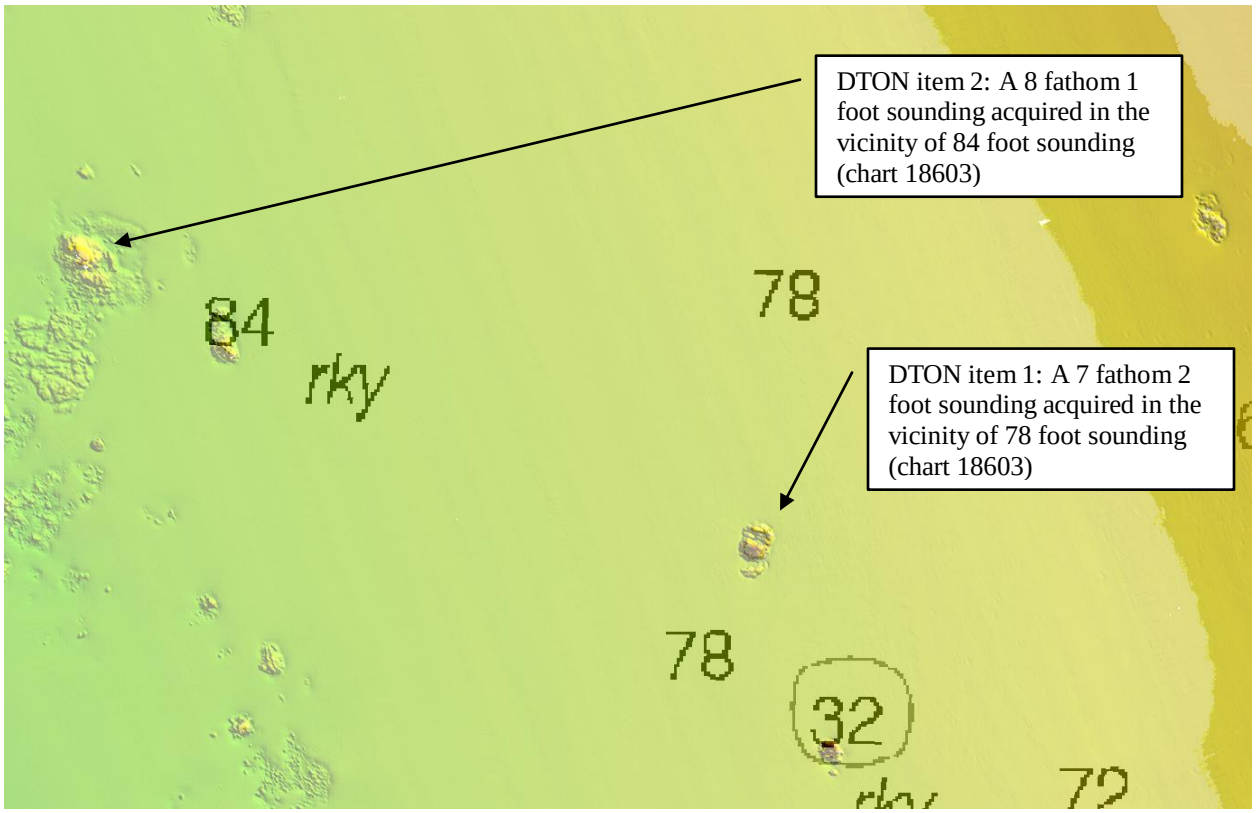
CHARTS AFFECTED:

Chart Number	Type	Cell Name	Scale	Edition	Edition Date
18600	Raster	n/a	1:196,948	14th	January 2002
18603	Raster	n/a	1:40,000	16th	December 2002
18600	ENC	US3OR03M	n/a	6th	September 2008

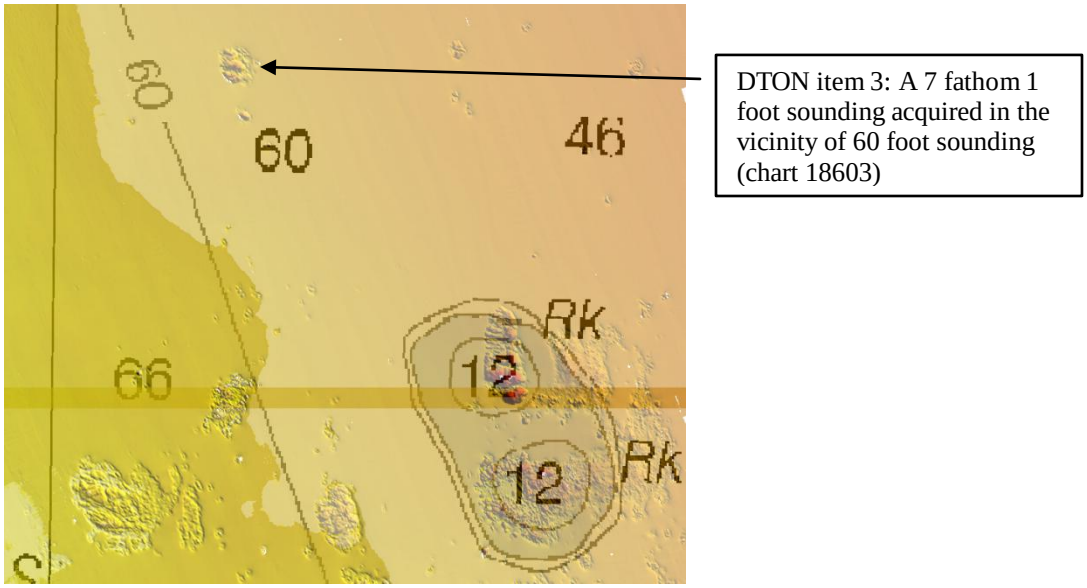
DANGER:

Feature	Depth	Latitude (N)	Longitude (W)	Time (UTC)
1. Sounding	7 fathoms 2 feet	41-41-42.11	124-10-34.20	2008-10-26 @ 20:15:31
2. Sounding	8 fathoms 1 foot	41-41-54.38	124-11-13.92	2008-11-18 @ 09:36:38
3. Sounding	7 fathoms 1 foot	41-41-43.24	124-09-46.91	2008-11-16 @ 22:52:23
4. Sounding	3 fathoms 3 feet	41-44-08.97	124-11-59.24	2008-09-13 @ 01:16:03
5. Rock *	2 fathoms 1 foot	41-44-34.70	124-13-28.92	2008-09-09 @ 14:45:40
6. Rock	1 fathoms 2 feet	41-45-06.52	124-14-07.35	2008-09-26 @ 16:20:38
7. Rock *	1 fathoms 2 feet	41-45-13.75	124-13-52.31	2008-09-28 @ 22:25:54
8. Rock	2 fathoms 2 feet	41-46-06.05	124-15-07.46	2008-11-14 @ 22:00:11
9. Rock	1 fathoms 5 feet	41-46-14.03	124-15-22.35	2008-11-14 @ 16:10:25
10. Rock *	0 fathoms 5 feet	41-46-38.30	124-15-40.89	2008-09-12 @ 23:33:59
11. Rock	3 fathoms 0 feet	41-46-55.85	124-15-51.03	2008-09-12 @ 23:29:20

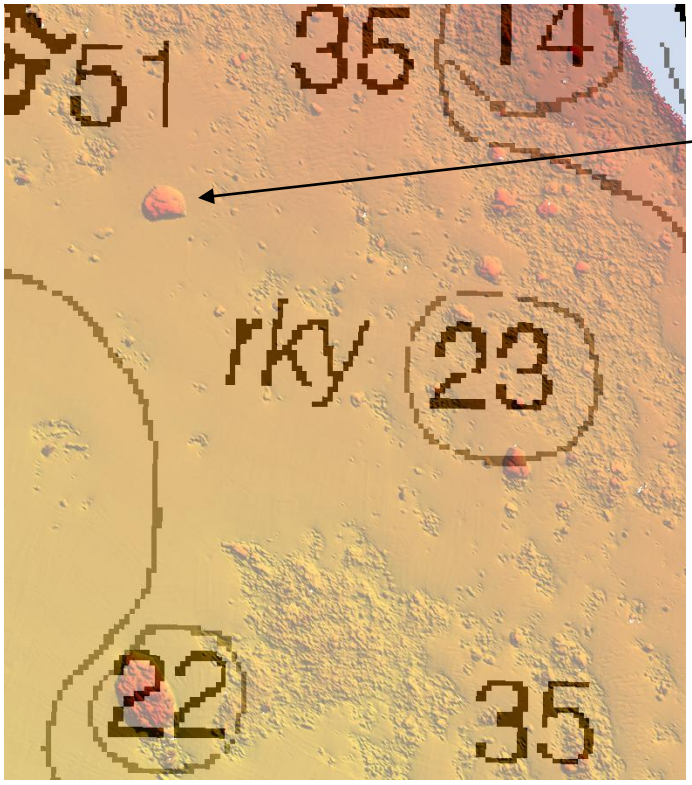
***** *Least depth not obtained. This is the shoalest sounding acquired.*



DTON items 1 &2

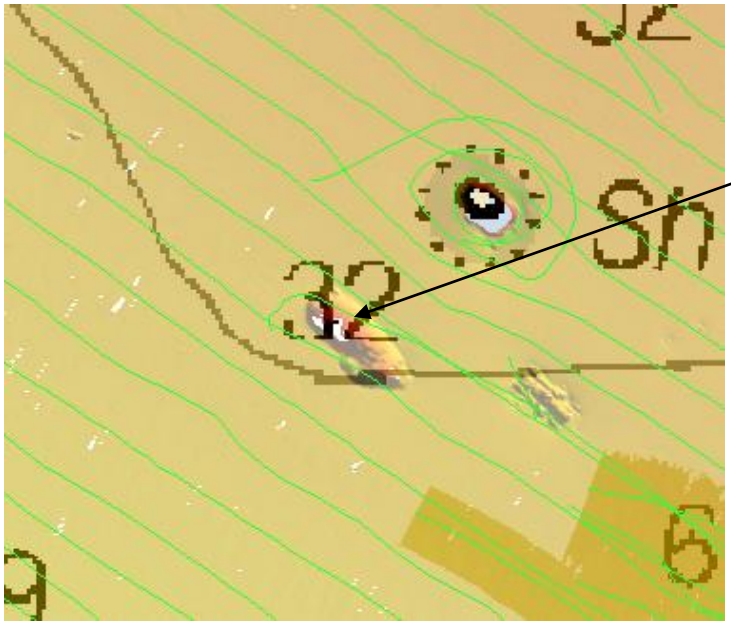


DTON item 3



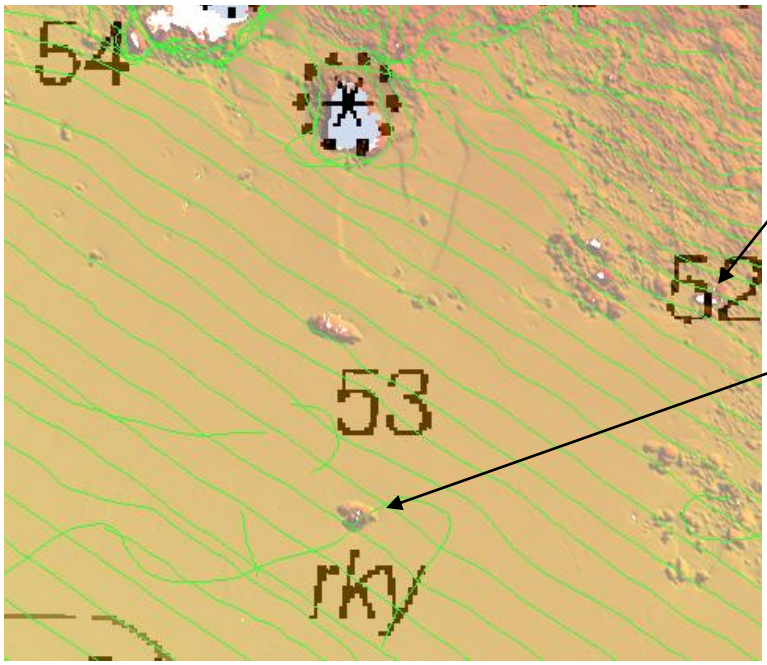
DTON item 4: A 3 fathom 3 foot sounding acquired in the vicinity of 51 foot sounding (chart 18603)

DTON item 4



DTON item 5: A 2 fathom 1 foot sounding acquired in the vicinity of 32 foot sounding (chart 18603)

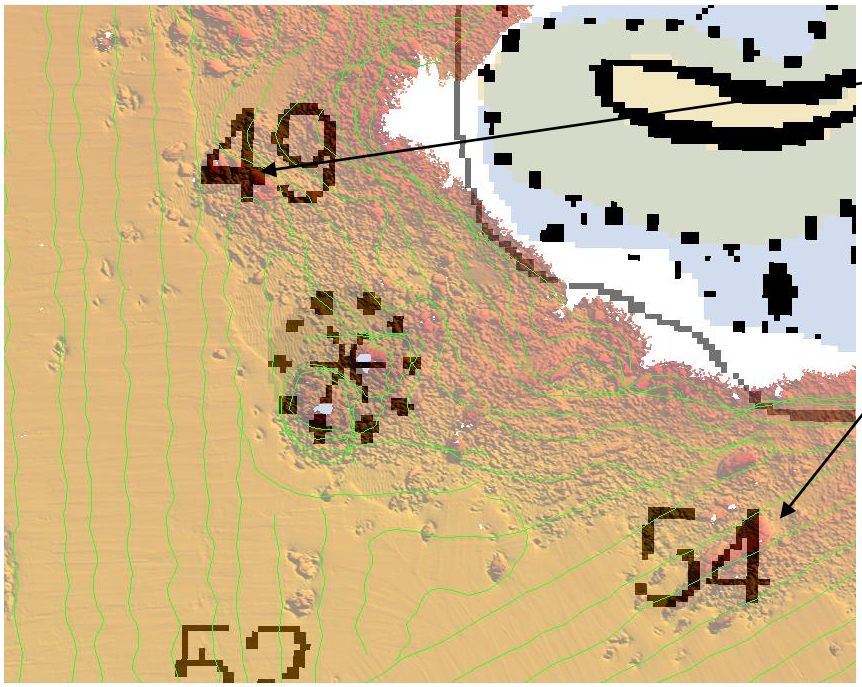
DTON item 5



DTON item 7: A 1 fathom 2 feet sounding acquired in the vicinity of 52 foot sounding (chart 18603)

DTON item 6: A 1 fathom 2 feet sounding acquired in the vicinity of 53 foot sounding (chart 18603)

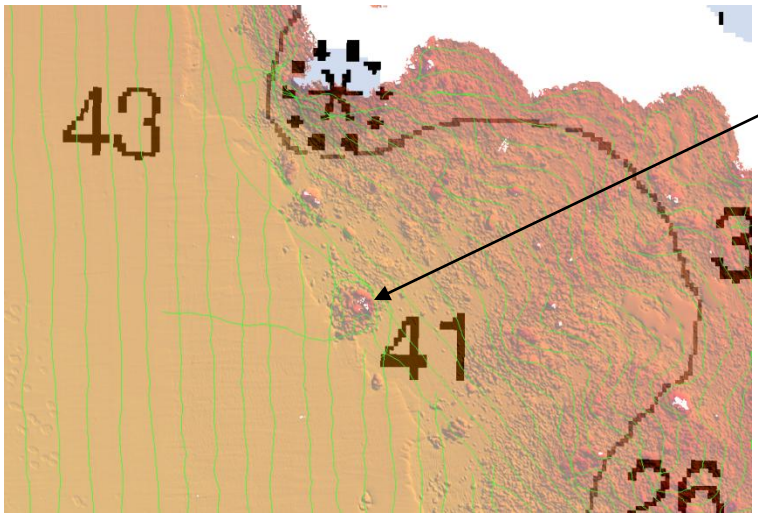
DTON items 6 & 7



DTON item 9: A 1 fathom 5 feet sounding acquired in the vicinity of 49 foot sounding (chart 18603)

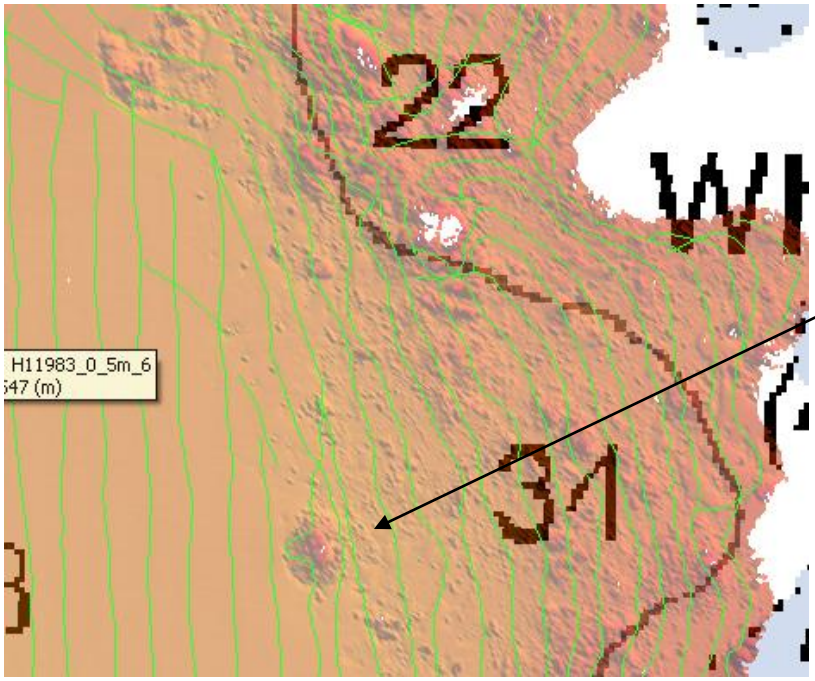
DTON item 8: A 2 fathom 2 feet sounding acquired in the vicinity of 54 foot sounding (chart 18603)

DTON items 8 & 9



DTON item 10: A 0 fathom 5 feet sounding acquired in the vicinity of 41 foot sounding (chart 18603)

DTON item 10



DTON item 11: A 3 fathom 0 feet sounding acquired in the vicinity of 31 foot sounding (chart 18603)

DTON item 11

COMMENTS:

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

H11983 Danger to Navigation Report

Registry Number: H11983

State: California

Locality: Pacific Ocean, Northern California

Sub-locality: Point St George

Project Number: M-L906-KR-08

Survey Dates: 09/08/08 - 11/21/08

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18603	16th	12/01/2002	1:10,000 (18603_2)	USCG LNM: 04/05/2005 (05/12/2009) NGA NTM: None (05/23/2009)
18603	16th	12/01/2002	1:40,000 (18603_1)	USCG LNM: 10/03/2006 (05/12/2009) NGA NTM: 08/05/2006 (05/23/2009)
18600	14th	01/26/2002	1:196,948 (18600_1)	[L]NTM: ?
18010	21st	03/01/2007	1:811,980 (18010_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	9.68 m	41° 45' 21.5" N	124° 14' 39.2" W	---
1.2	Rock	10.29 m	41° 46' 05.7" N	124° 15' 34.2" W	---
1.3	Rock	4.77 m	41° 44' 24.8" N	124° 12' 19.4" W	---
1.4	Rock	2.98 m	41° 44' 36.6" N	124° 12' 59.8" W	---
1.5	Rock	5.98 m	41° 44' 12.8" N	124° 11' 56.5" W	---

1 - Danger To Navigation

1.1) 1124/5

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 45' 21.5" N, 124° 14' 39.2" W

Least Depth: 9.68 m (= 31.77 ft = 5.294 fm = 5 fm 1.77 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.214 m ; **TVU (TPEv)** ±0.269 m

Timestamp: 2008-321.15:46:38.554 (11/16/2008)

Survey Line: sheet_bm02 / 5-d2-8125 / 2008-321 / 5bm02-inf017

Profile/Beam: 1124/5

Charts Affected: 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Patch of rocks found with full multibeam coverage.

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm02/5-d2-8125/2008-321/5bm02-inf017	1124/5	0.00	000.0	Primary

Hydrographer Recommendations

Recommend adding to chart.

Cartographically-Rounded Depth (Affected Charts):

32ft (18603_1)

5 ¼fm (18600_1, 18010_1, 18007_1, 530_1)

9.7m (501_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20081121

SORIND - US,US,survy,H11983

TECSOU - 3:found by multi-beam

VALSOU - 9.682 m

WATLEV - 3:always under water/submerged

Office Notes

Chd shoalest point of patch of rocks, 32ft sounding.

1.2) 1617/239

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 46' 05.7" N, 124° 15' 34.2" W

Least Depth: 10.29 m (= 33.74 ft = 5.624 fm = 5 fm 3.74 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.219 m ; **TVU (TPEv)** ±0.273 m

Timestamp: 2008-301.00:20:09.846 (10/27/2008)

Survey Line: sheet_bm03 / 5-d2-8125 / 2008-301 / 5bm03-0775

Profile/Beam: 1617/239

Charts Affected: 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Rock found with full multibeam coverage.

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm03/5-d2-8125/2008-301/5bm03-0775	1617/239	0.00	000.0	Primary

Hydrographer Recommendations

Recommend adding to chart.

Cartographically-Rounded Depth (Affected Charts):

33ft (18603_1)

5 ½fm (18600_1, 18010_1, 18007_1, 530_1)

10.3m (501_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20081121

SORIND - US,US,survy,H11983

TECSOU - 3:found by multi-beam

VALSOU - 10.285 m

WATLEV - 3:always under water/submerged

Office Notes

Chd of rock, 33ft sounding.

1.3) 7022/245

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 44' 24.8" N, 124° 12' 19.4" W

Least Depth: 4.77 m (= 15.66 ft = 2.610 fm = 2 fm 3.66 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.205 m ; **TVU (TPEv)** ±0.264 m

Timestamp: 2008-322.16:52:06.273 (11/17/2008)

Survey Line: sheet_bm01 / 4-r2-7125-400 / 2008-322 / 4bm01-sh0226

Profile/Beam: 7022/245

Charts Affected: 18603_2, 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Rock found with full multibeam coverage.

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm01/4-r2-7125-400/2008-322/4bm01-sh0226	7022/245	0.00	000.0	Primary

Hydrographer Recommendations

Recommend adding to chart.

Cartographically-Rounded Depth (Affected Charts):

15ft (18603_2, 18603_1)

2 ½fm (18600_1, 18010_1, 18007_1, 530_1)

4.8m (501_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20081121

SORIND - US,US,survy,H11983

TECSOU - 3:found by multi-beam

VALSOU - 4.774 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

[None]

Feature Images

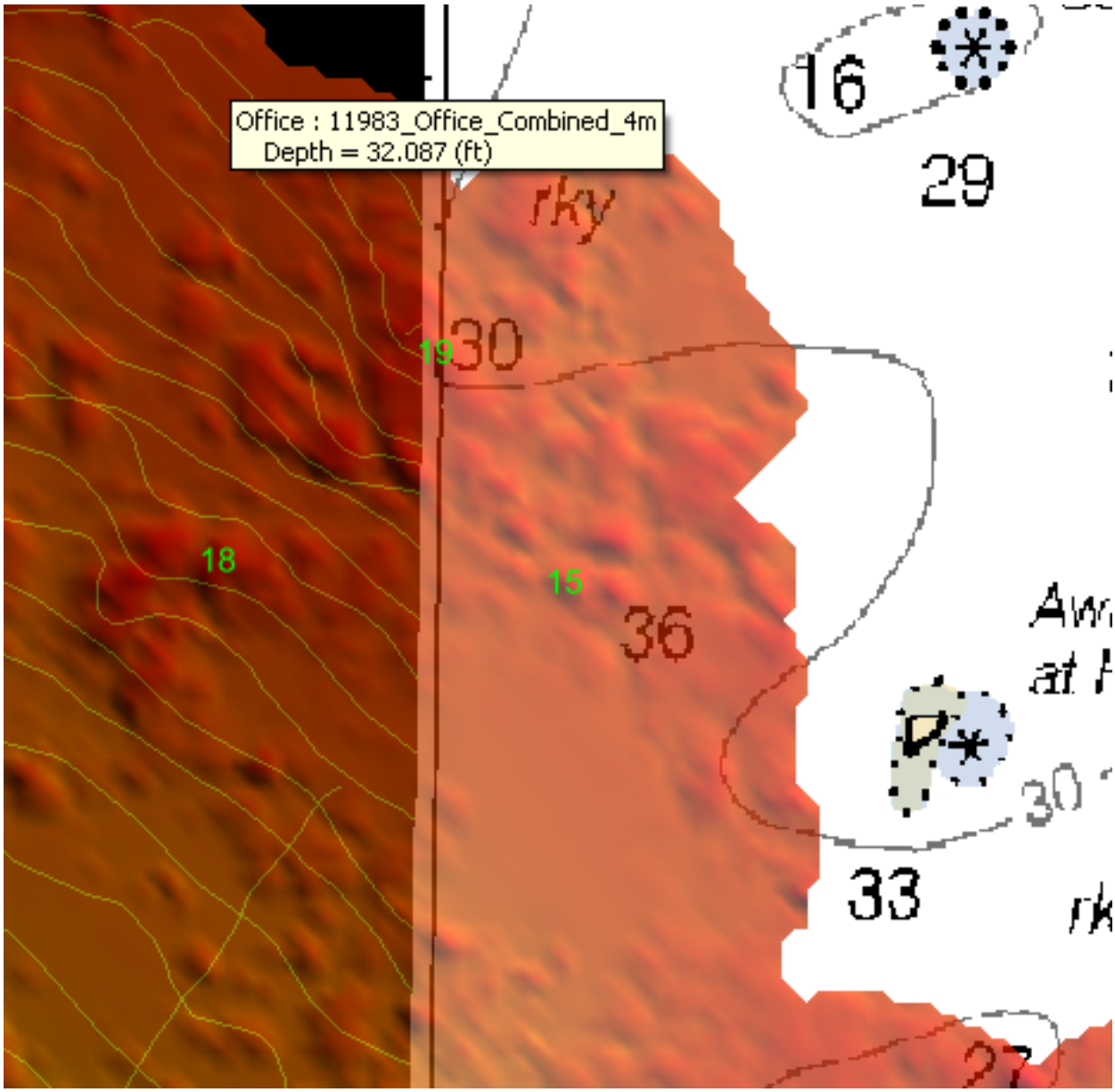


Figure 1.3.1

1.4) 1622/118

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 44' 36.6" N, 124° 12' 59.8" W

Least Depth: 2.98 m (= 9.78 ft = 1.629 fm = 1 fm 3.78 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.119 m ; **TVU (TPEv)** ±0.264 m

Timestamp: 2008-257.18:44:44.756 (09/13/2008)

Survey Line: sheet_bm01 / 4-r2-7125-400 / 2008-257 / 4bm01-sh060

Profile/Beam: 1622/118

Charts Affected: 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Rock found with full multibeam coverage.

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm01/4-r2-7125-400/2008-257/4bm01-sh060	1622/118	0.00	000.0	Primary

Hydrographer Recommendations

Recommend adding to chart.

Cartographically-Rounded Depth (Affected Charts):

10ft (18603_1)

1 ½fm (18600_1, 18010_1, 18007_1, 530_1)

3.0m (501_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20081121

SORIND - US,US,survy,H11983

TECSOU - 3:found by multi-beam

VALSOU - 2.980 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Chd 9ft submerged rk.

Feature Images

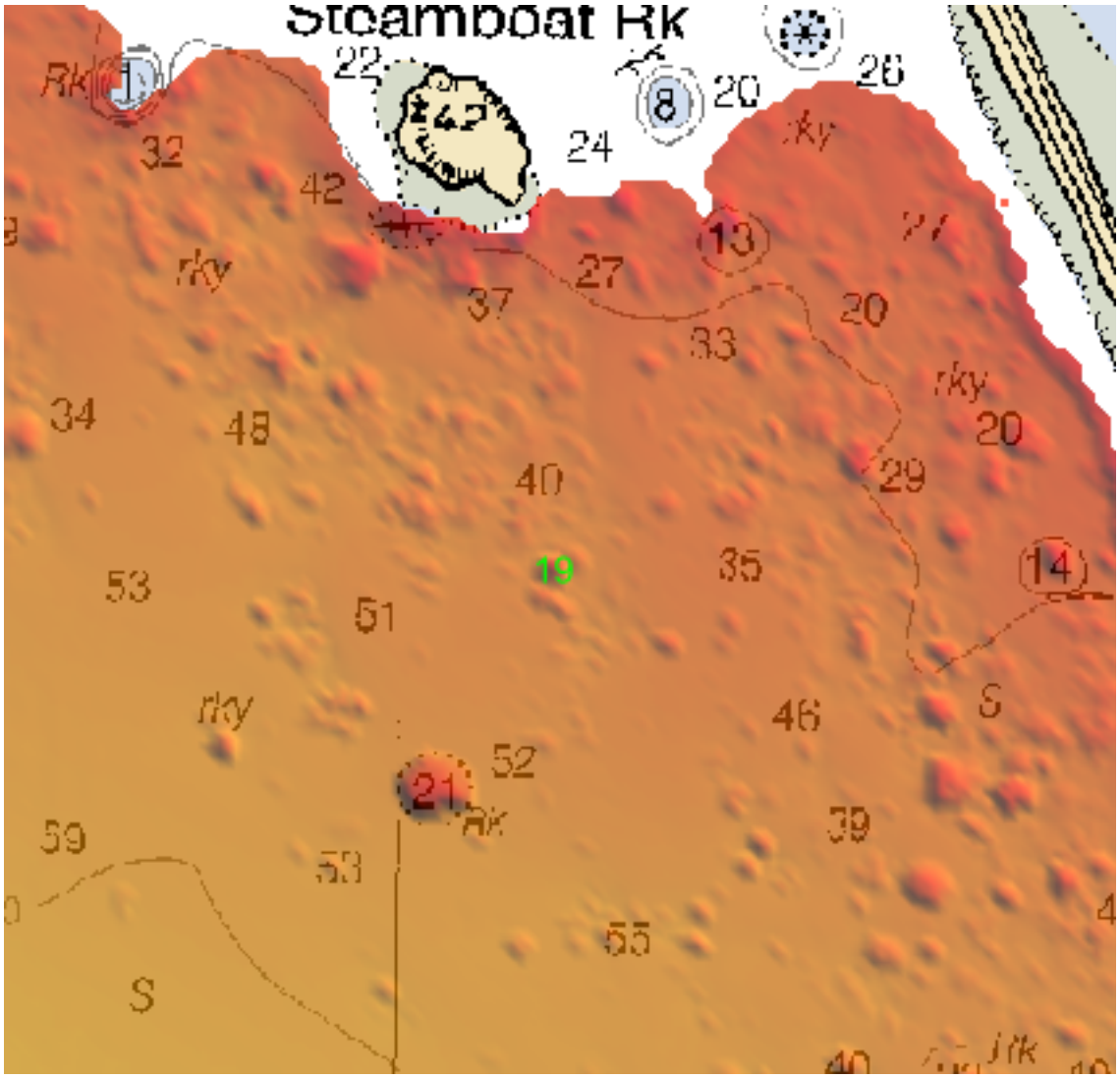


Figure 1.4.1

1.5) 12072/80

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 44' 12.8" N, 124° 11' 56.5" W

Least Depth: 5.98 m (= 19.62 ft = 3.269 fm = 3 fm 1.62 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.124 m ; **TVU (TPEv)** ±0.266 m

Timestamp: 2008-257.19:02:04.232 (09/13/2008)

Survey Line: sheet_bm01 / 4-r2-7125-400 / 2008-257 / 4bm01-sh060

Profile/Beam: 12072/80

Charts Affected: 18603_2, 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Rock found with full multibeam coverage.

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm01/4-r2-7125-400/2008-257/4bm01-sh060	12072/80	0.00	000.0	Primary

Hydrographer Recommendations

Recommend adding to chart.

Cartographically-Rounded Depth (Affected Charts):

19ft (18603_2, 18603_1)

3 ¼fm (18600_1, 18010_1, 18007_1, 530_1)

6.0m (501_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20081121

SORIND - US,US,survy,H11983

TECSOU - 3:found by multi-beam

VALSOU - 5.979 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Chd 19 ft submerged rk.

Feature Images

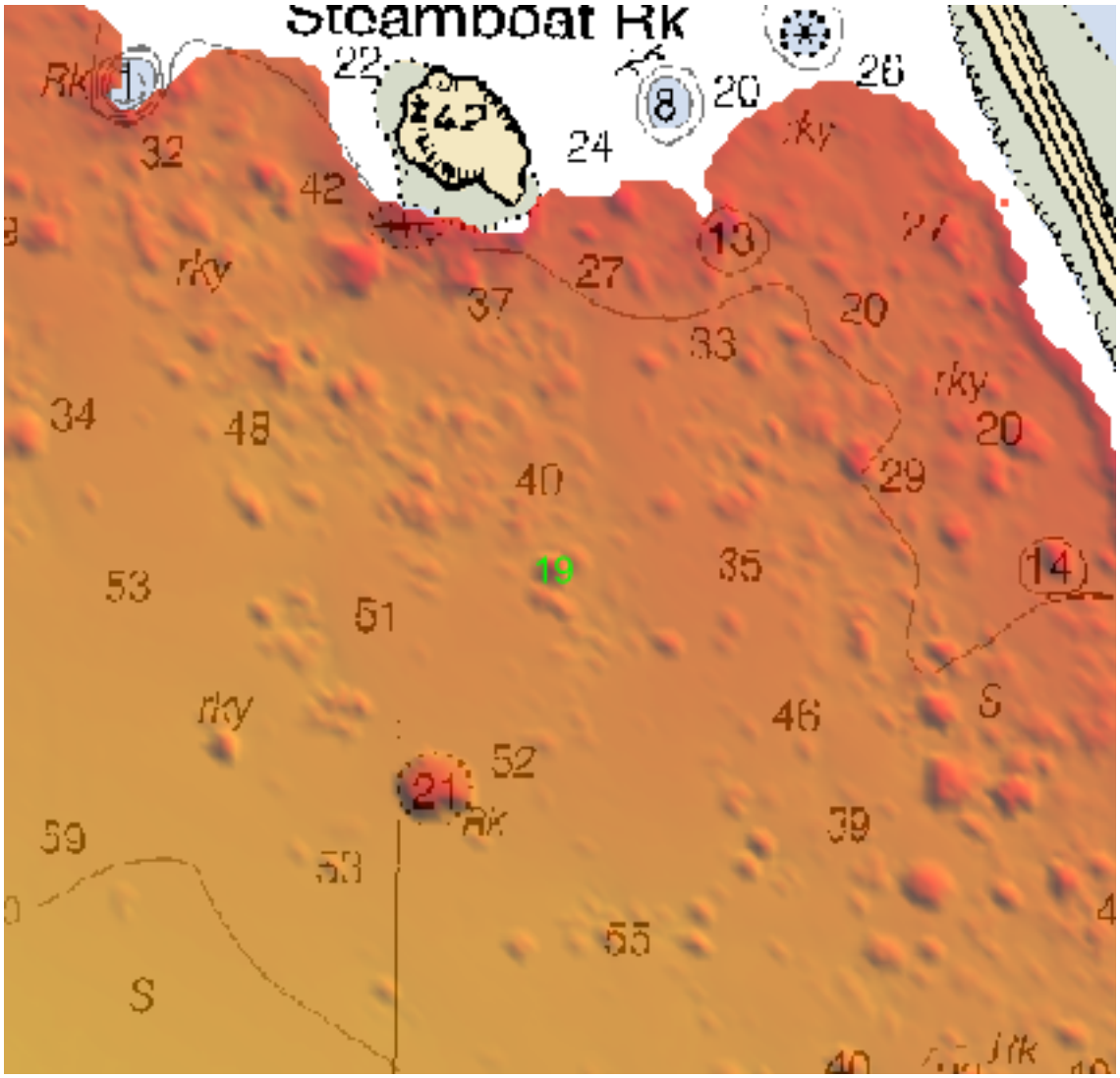


Figure 1.5.1

H11983 Dangers to Navigation

Registry Number: H11983

State: California

Locality: Pacific Ocean-- Northern California

Sub-locality: Point St George

Project Number: M-L906-KR-08

Survey Dates: 9/8/2008 - 11/21/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18603	16th	12/01/2002	1:40,000 (18603_1)	[L]NTM: ?
18600	14th	01/26/2002	1:196,948 (18600_1)	[L]NTM: ?
18010	21st	03/01/2007	1:811,980 (18010_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	0.74 m	41° 46' 01.1" N	124° 14' 51.5" W	---
1.2	Shoal	0.44 m	41° 46' 32.4" N	124° 15' 26.1" W	---

1 - Danger To Navigation

1.1) 1032/2

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 46' 01.1" N, 124° 14' 51.5" W

Least Depth: 0.74 m (= 2.42 ft = 0.403 fm = 0 fm 2.42 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.201 m ; **TVU (TPEv)** ±0.277 m

Timestamp: 2008-320.19:20:48.400 (11/15/2008)

Survey Line: sheet_bm02 / 5-d2-8125 / 2008-320 / 5bm02-sh047b

Profile/Beam: 1032/2

Charts Affected: 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoal rock found

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm02/5-d2-8125/2008-320/5bm02-sh047b	1032/2	0.00	000.0	Primary

Hydrographer Recommendations

Chart rk

Cartographically-Rounded Depth (Affected Charts):

2ft (18603_1)

0 ¼fm (18600_1, 18010_1, 18007_1, 530_1)

.7m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Charted 2 ft rk

1.2) 423/150

DANGER TO NAVIGATION

Survey Summary

Survey Position: 41° 46' 32.4" N, 124° 15' 26.1" W

Least Depth: 0.44 m (= 1.44 ft = 0.241 fm = 0 fm 1.44 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.200 m ; **TVU (TPEv)** ±0.262 m

Timestamp: 2008-319.18:02:58.644 (11/14/2008)

Survey Line: sheet_bm03 / 5-d2-8125 / 2008-319 / 5bm03-sh023

Profile/Beam: 423/150

Charts Affected: 18603_1, 18600_1, 18010_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoal Rk found

Feature Correlation

Address	Feature	Range	Azimuth	Status
sheet_bm03/5-d2-8125/2008-319/5bm03-sh023	423/150	0.00	000.0	Primary

Hydrographer Recommendations

Chart rk

Cartographically-Rounded Depth (Affected Charts):

1ft (18603_1)

0 ¼fm (18600_1, 18010_1, 18007_1, 530_1)

.4m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Charted 1ft rk

H11983 HCell Report

Tyanne Faulkes, ERT Associate
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: US3OR03M; and NOAA RNCs: 18603.

HCell compilation of survey H11983 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 18603 1:40,000 (with a 1:10,000 inset).

2. Soundings

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11983_Office_Combined_4m** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:30,000 survey scale for the area of the survey covered by chart 18603 (1:40,000). A shoal-biased selection was made at 1:5,000 for the areas of the survey 18603's inset area (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 46,888 depths ranging from 0-232 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 71 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth range is 0 to 233 ft.

3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11983_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 Feet	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0	0.00	0.2286	0.229
6	1.8288	2.0574	2.057
12	3.6576	3.8862	3.886
18	5.4864	5.715	5.715
30	9.144	9.3726	9.373
60	18.288	18.5166	18.517

Contours delivered in the H11983_SS file have not been deconflicted against soundings and hydrography as all other features in the H11983_CS file and soundings in the H11983_SS have been. This results in conflicts between the H11983_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 H11983_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell H11983:

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 **H11983_S57_Features.000** was delivered. There were eleven DTONs reported by the field unit and four DTONs discovered during office review. These can be seen in the tables below. The DTONs reported from the field were all applied to the chart upon office chart comparisons. The DTONs discovered during office review had not been applied to the most recent version of the chart.

Feature	Depth (feet)	Latitude (N)	Longitude (W)
Rock	45.174	41-41-42.07	124-10-34.14
Rock	48.970	41-41-54.38	124-11-13.92
Rock	42.920	41-41-43.24	124-09-46.91
Rock	21.745	41-44-08.91	124-11-59.24
Rock	Least Depth Unknown	41-44-34.42	124-13-28.63
Rock	10.072	41-45-06.57	124-14-07.27
Rock	8.665	41-45-13.73	124-13-52.34
Rock	14.993	41-46-06.10	124-15-07.49
Rock	11.168	41-46-14.03	124-15-22.35
Rock	5.187	41-46-38.30	124-15-40.89
Rock	19.655	41-46-55.81	124-15-51.08

Table 1: DTONs reported by the field unit for H11983.

Feature	Depth (feet)	Latitude (N)	Longitude (W)
Rock	16.814	41-44-24.79	124-12-19.28
Rock	20.463	41-44-12.71	124-11-56.37
Sounding	31.765	41-45-21.50	124-14-39.18
Sounding	33.743	41-46-05.69	124-15-34.15
Rock	2.428	41-46-01.1	124-14-51.5
Rock	1.444	41-46-32.4	124-15-26.1
Rock	9.777	41-44-36.6	124-12-59.8

Table 2: DTONs discovered during office review.

90 bottom sample features were imported from chart 18603. The source of all features included in the H11983 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The H11983_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
LNDARE	Islets and islands
UWTROC	Underwater rocks
COALNE	Coastline

The H11983_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 H11983_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.

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 leveling or sounding poles, 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

H11983 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

- H11983_CS, Chart Units, Soundings compiled to 1:10,000 and 1:40,000
- H11983_SS, Chart Units, Soundings compiled to 1:5,000 and 1:30,000
- H11983_Features, survey scale features compiled to 1:15,000
- H11983_DR including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11983 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11983_CS.000
- Chart units base cell file, survey scale soundings H11983_SS.000
- Chart units case cell file, survey scale features H11983_Features.000
- Descriptive Report H11983_DR.pdf
- Survey outline H11983.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:

Tyanne Faulkes, ERT Associate, PHB, Seattle, WA; 206-526-6883;
Tyanne.Faulkes@noaa.gov

APPROVAL SHEET
H11983

Initial Approvals:

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

Tyanne Faulkes

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: 2009.09.01 14:14:24 -07'00'

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

Gary C. Nelson

Gary C. Nelson
for Kurt Brown
2009.09.02 12:22:12
-07'00'

I have reviewed the H-Cell, 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
2009.09.02
12:22:34 -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: 2009.09.03 08:34:19 -04'00'