H12219

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H12219

LOCALITY

State Washington

General Locality Olympic Coast National Marine Sanctuary

Sublocality Point of Arches

2010

CHIEF OF PARTY
Captain David O. Neander

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12219

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 Washington

General Locality Olympic Coast National Marine Sanctuary

Sub-Locality Point of Arches

Scale 1:20,000 **Date of Survey** June 2 to June 22, 2010

Instructions dated 5/11/2010 **Project No.** OPR-N324-FA-10

Vessel FAIRWEATHER S-220, FA Launches: 2805, 2806, 2807, 2808

Chief of party CAPT David O. Neander, NOAA

Surveyed by NOAA Ship FAIRWEATHER Personnel

Soundings by Multi-Beam Echo Sounders (MBES): Reson 7111, Reson 8160, Reson 7125.

SAR by Keith Toepher Compilation by Martha Herzog

Soundings compiled in Fathoms at MLLW

REMARKS: All times are UTC. UTM Zone 10

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.

All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

Descriptive Report to Accompany Hydrographic Survey H12219

Project OPR-N324-FA-10
Olympic Coast National Marine Sanctuary, Washington
Scale 1:20,000
June 2010
NOAA Ship *Fairweather*
Chief of Party: Captain David O. Neander, NOAA

A. AREA SURVEYED

The survey area is located in the Olympic Coast National Marine Sanctuary, within the sub-locality of Point of Arches. This survey corresponds to Sheet 1 in the original sheet layout provided with the Project Instructions, as shown in Figure 1 below. Though the project layout was changed while *Fairweather* was conducting acquisiton on OPR-N324-FA-10, the original, planned limits of H12219 were not affected (see Project Correspondence).[1]

Data acquisition was conducted from June 2 to June 22, 2010 (DN 153 to DN 173).

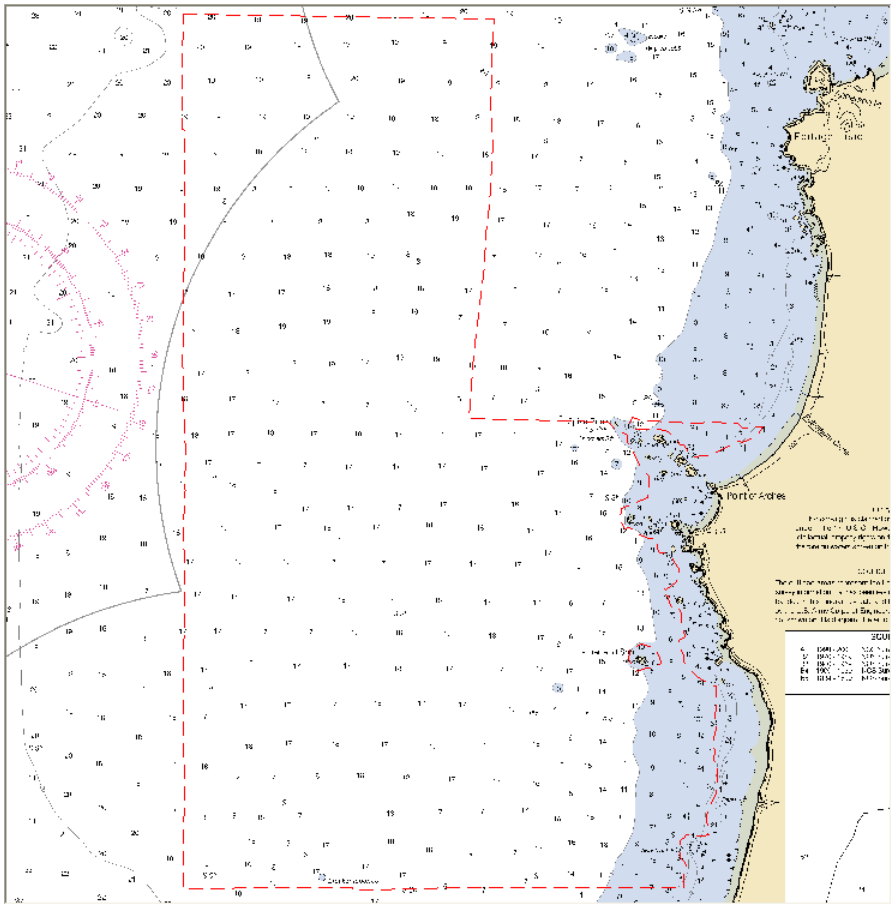


Figure 1: H12219 Survey Outline

Complete multibeam echosounder (MBES) coverage was obtained to the 8-meter curve or the to the limits of safe navigation within the survey area. Data were acquired as close to shore as safely possible. Due to weather, safety, and logistical factors, shoreline verification was not conducted on sheet H12219.[2] Those features which were addressed by MBES coverage were examined and classified as per section 3.5.5 of the Field Procedures Manual April 2010 (FPM). Addressed features were given S-57 attribution and included for submission in CARIS Notebook '.hob' files. All addressed features were delineated or disproved exclusively by MBES.

For vessel S220, dual acquisition of both Reson 7111 and Reson 8160 data was conducted throughout the entire survey area of H12219. For linear nautical mileage (LNM) reporting purposes, only the Reson 7111 data were used for the following figures and tables. Mainscheme and crossline mileage for MBES and shoreline acquisition were calculated and are displayed in Table 1 below.

MAIN SCHEME - Mileage		
0	**Single Beam MS**	
427.81	**Multibeam MS mileage**	
	240.22	FAIRWEATHER S-220
	45.87	Launch 2805
	34.06	Launch 2806
	34.30	Launch 2807
	73.37	Launch 2808
0	**SideScan MS**	
427.81	**Total MS**	
CROSSLINE - Mileage		
0	**Single Beam XL**	
20.37	**Multibeam XL**	
	20.37	FAIRWEATHER S-220
	0.00	Launch 2805
	0.00	Launch 2806
	0.00	Launch 2807
	0.00	Launch 2808
20.37	**Total XL**	
OTHER		
0	**Developments/AWOIS - Mileage**	
0	**Shoreline/Nearshore Investigation - Mileage**	
0	**Total # of Investigated Items**	
0	**Total Bottom Samples**	
18.4	**Total SNM**	
June 2, June 3, June 6, June 7, June 8, June 9, June 13, June 22, 2010	**Specific Dates of Acquisition**	
153,154,157,158,159,160,164,173	**Specific Dn#s of Acquisition**	

Table 1: H12219 Survey Statistics

B. DATA ACQUISTION AND PROCESSING

A complete description of data acquisition, processing systems and survey vessels along with quality control procedures and data processing methods are included and described in the *NOAA Ship Fairweather* 2010 *Data Acquisition and Processing Report* (DAPR), submitted under separate cover. Items specific to this survey and any deviations from the DAPR are discussed in the following sections. This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-N324-FA-10, dated May 11, 2010.

B.1. Equipment and Vessels

Equipment and vessels used for data acquisition and survey operations during this survey are listed below in Table 1.

	FAIRWEATHER	**Launch 2805**	**Launch 2806**	**Launch 2807**	**Launch 2808**
Hull Registration Number	S220	2805	2806	2807	2807
Builder	Aerojet-General Shipyard	All American	All American	All American	All American
Length Overall	231 feet	28’ 10”	28’ 10”	28’ 10”	28’ 10”
Beam	42 feet	10’ 8”	10’ 8”	10’ 8”	10’ 8”
Draft, Maximum	15’ 6”	4’ 0” DWL	4’ 0” DWL	4’ 0” DWL	4’ 0” DWL
Cruising Speed	12.5 knots	28 knots	28 knots	28 knots	28 knots
Max Survey Speed	8 knots	8 knots	8 knots	8 knots	8 knots
Primary Echo-sounder(s)	RESON 7111 & RESON 8160	RESON 7125	RESON 7125	RESON 7125	RESON 7125
Sound Velocity Equipment	SBE 19plus, MVP 200, SVP70	SBE 19plus	SBE19plus	SBE19plus	SBE19plus
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	POS/MV V4	POS/MV V4	POS/MV V4
Type of operation	MBES	MBES	MBES	MBES	MBES

Table 2: Vessel Inventory

No vessel configurations used during data acquisition deviated from the DAPR.

B.2. Quality Control

The MBES quality control checks were conducted as discussed in the quality control section C of the DAPR.

B.2.1. Crosslines

Multibeam crosslines for this survey totaled 20.37 linear nautical miles (LNM), comprising 4.8% of the 427.81 LNM of mainscheme MBES hydrography. Both main scheme and crossline mileage are summarized in Table 1 above. All crosslines were acquired by S220 Reson 7111 and Reson 8160, primarily over data collected with the same sonar systems, with one exception being a small portion of line 2010M_1591638 from Launch 2808. Crosslines were not acquired by launches for mainscheme launch data due to logistical and weather constraints. Near the end of the project launches could not be deployed to obtain crosslines nearshore on survey H12219 due to heavy weather.

All crosslines were filtered 45 degrees to port and starboard. Crossline data beyond 45 degrees were reaccepted in some areas to cover mainscheme holidays. Surface differencing in CARIS BathyDataBASE was used to assess crossline agreement with main scheme lines. Figure 3 depicts a difference surface between a 2-meter surface made with mainscheme lines only and a 2-meter surface made with crosslines only. This difference surface is submitted digitally in the Separates I folder. Ninty-five percent of nodes common between the two surfaces agree within plus or minus 0.27 meters, so it has been determined that crosslines agree with main scheme lines within the total allowable vertical and horizontal uncertainty in their common areas.[3] Portions of crosslines reaccepted beyond the 45 degree from nadir filter can show significantly greater differences.

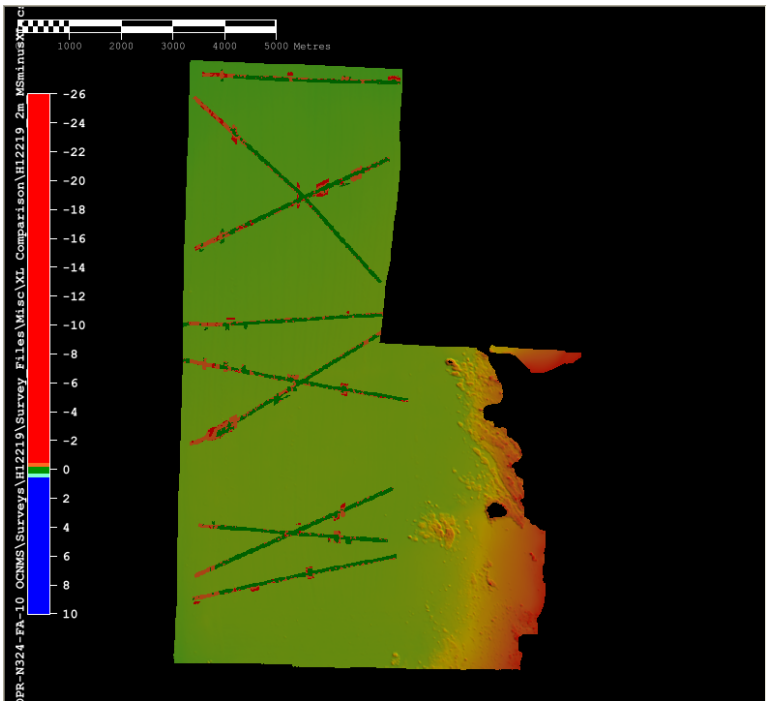


Figure 2: Crossline and main scheme differences (green indicates agreement, red colors indicate a Xls shoaler than mainscheme and blue colors indicate XLs are deeper).

B.2.2. Junctions

Survey H12219 junctions with H12220 and H12221 which are all of the same project.[4] Survey H12219 also junctions with prior survey H11083 from project OPR-N342-RA-03, but H12219 and H11083 were not compared to one another due to data format differences. The area of overlap between H12219 and H12220 and H12221 was reviewed in CARIS Subset Editor for consistency and data were found to be in agreement within the total allowable vertical and horizontal uncertainty in their common areas (generally less than one meter difference).[5] The sheet limits and areas of overlap for sheets H12219, H12220, and H12221 are shown in Figure 3.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H11083	20000	2001	Cape Flattery to Point of Arches
H12220	20000	20100603-2010629	NW Offshore Portion of Cape Flattery
H12221	20000	20100607-20100622	Central Offshore Portion of Cape Flattery

Table 3: Junction Surveys

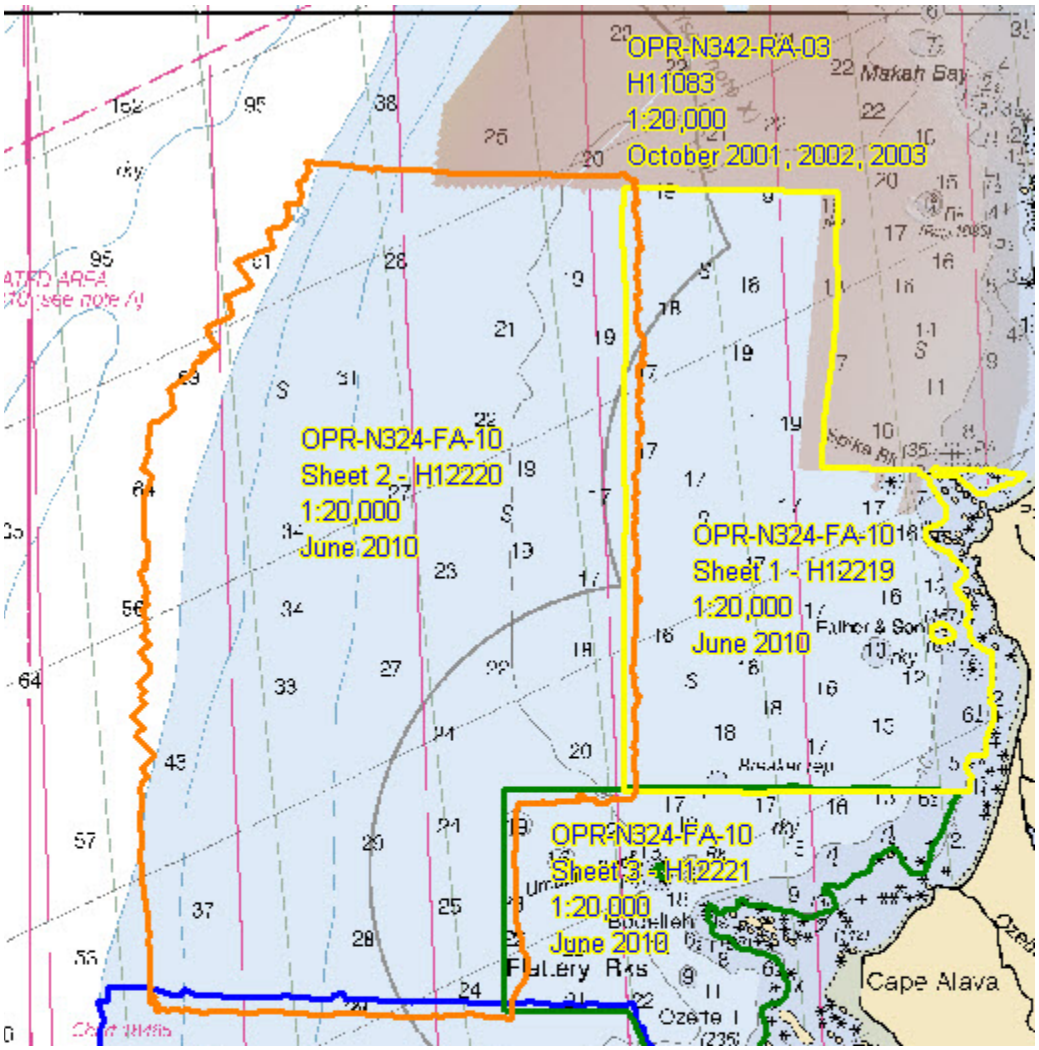


Figure 3: Survey Junctions between H12219, H12220, H12221, and H11083

B.2.3. Quality Control Checks

The MBES quality control checks were conducted as discussed in the quality control section B of the DAPR.

B.2.4. Data Quality Factors

COVERAGE ASSESSMENT
Complete multibeam coverage was obtained within the limits of H12219. For holidays larger than three surface grid nodes, the corresponding multibeam side scan data were examined and no navigationally significant items were found. The least depths of all navigationally significant features are represented by H12219.[6]

Five holidays larger than three surface nodes are present within H12219. See Figure 4 for an overview of their locations. See Figures 5, 6, 7, 8 & 9 for further details.

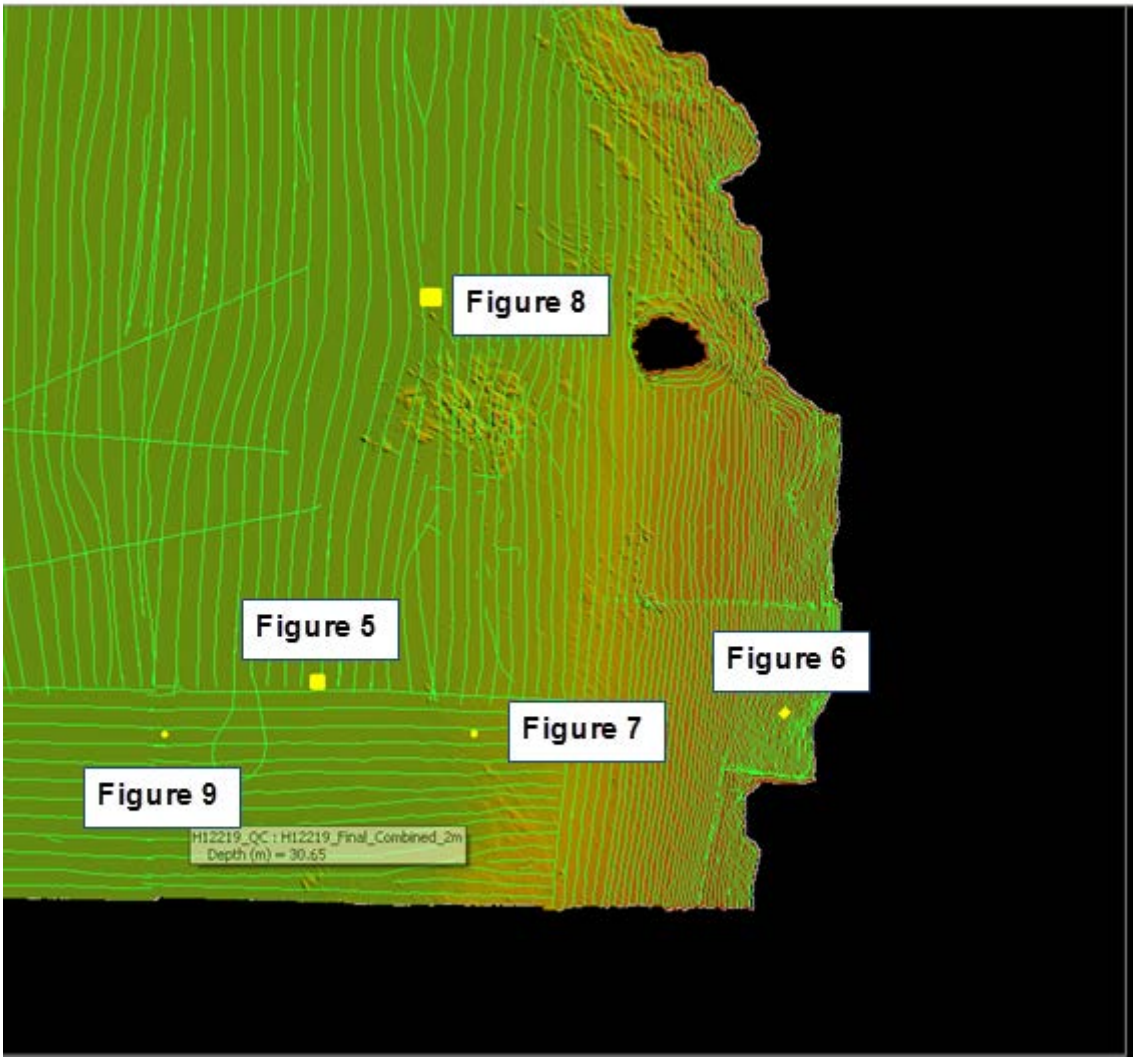


Figure 4: Holiday locations, marked in yellow

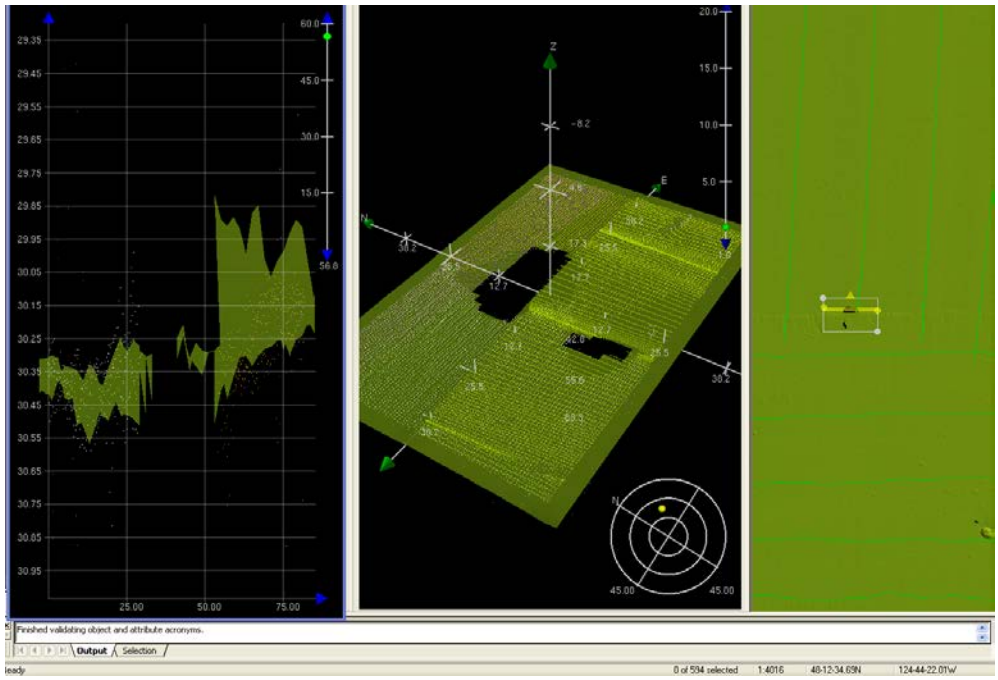


Figure 5: Holiday located at 48-12-34.76N 127-44-15.12W[7]

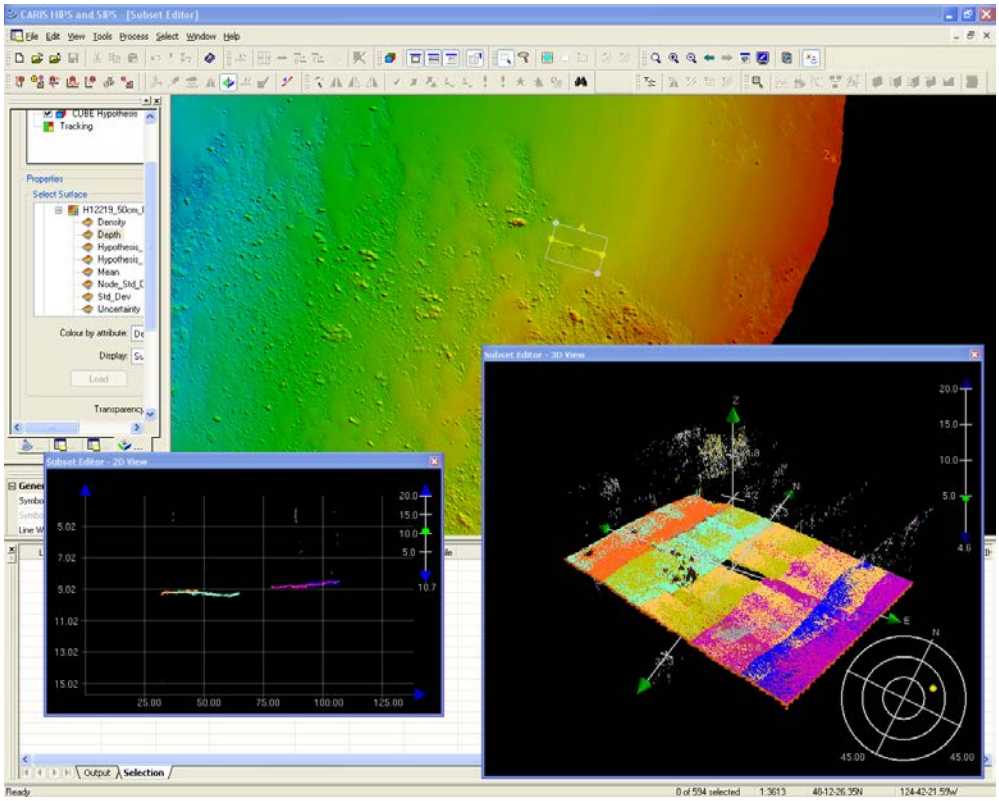


Figure 6: Holiday located at 48-12-35.22N 124-42-13.78W[8]

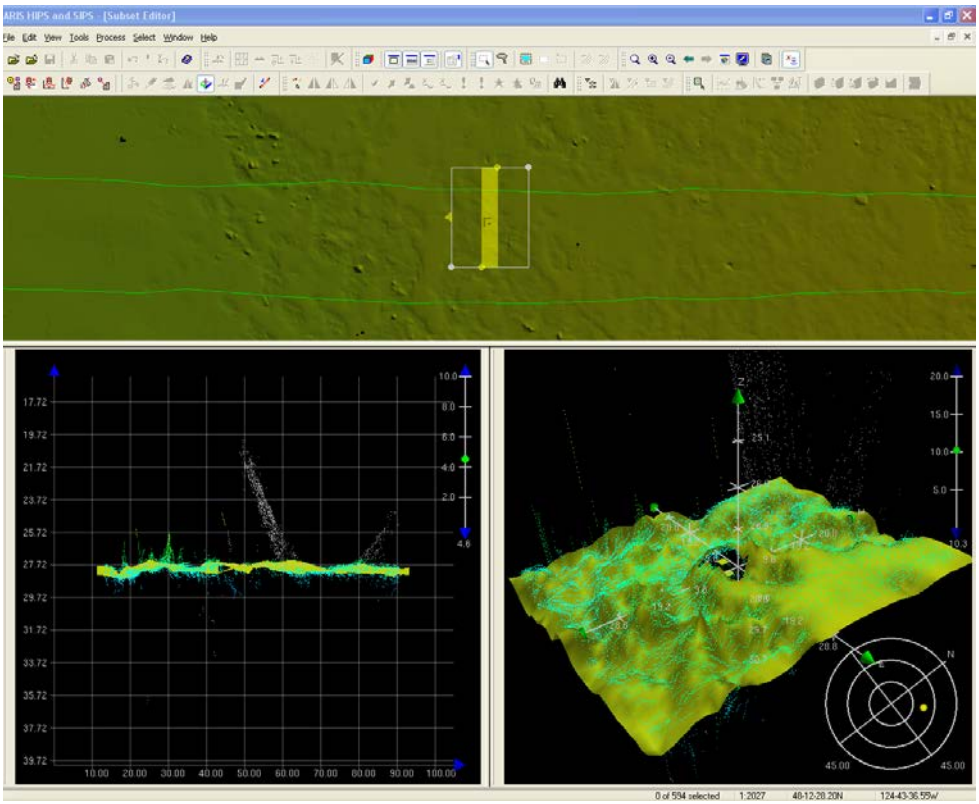


Figure 7: Holiday located at 48-12-25.76N 124-43-33.60W[9]

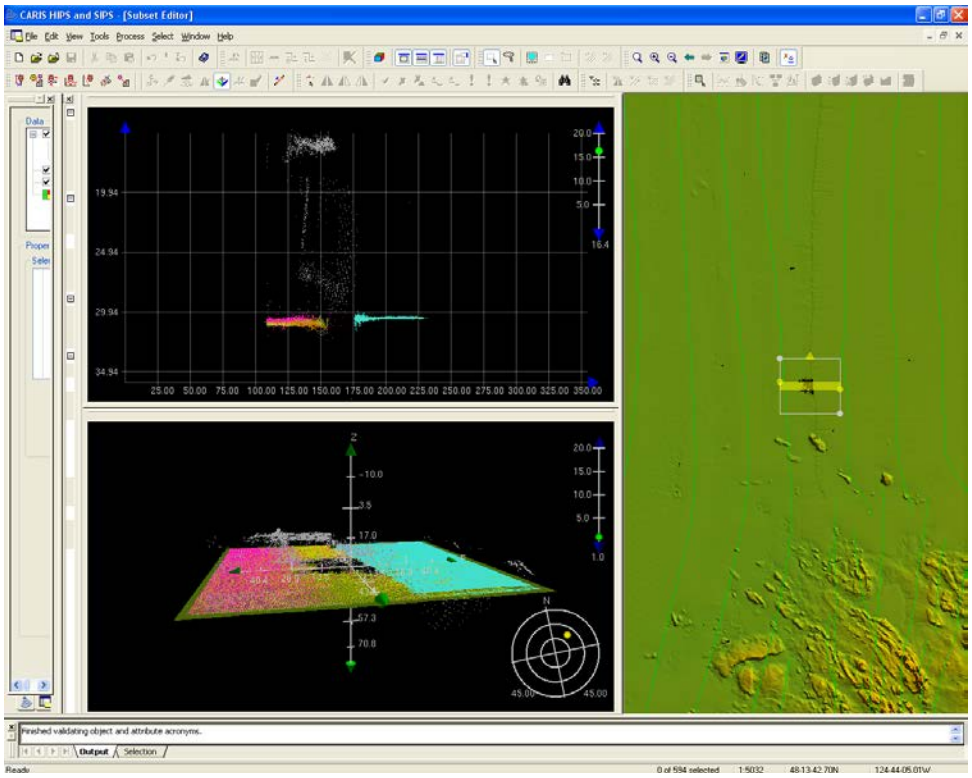


Figure 8: Holiday located at 48-13-43.01N 124-43-47.56W[10]

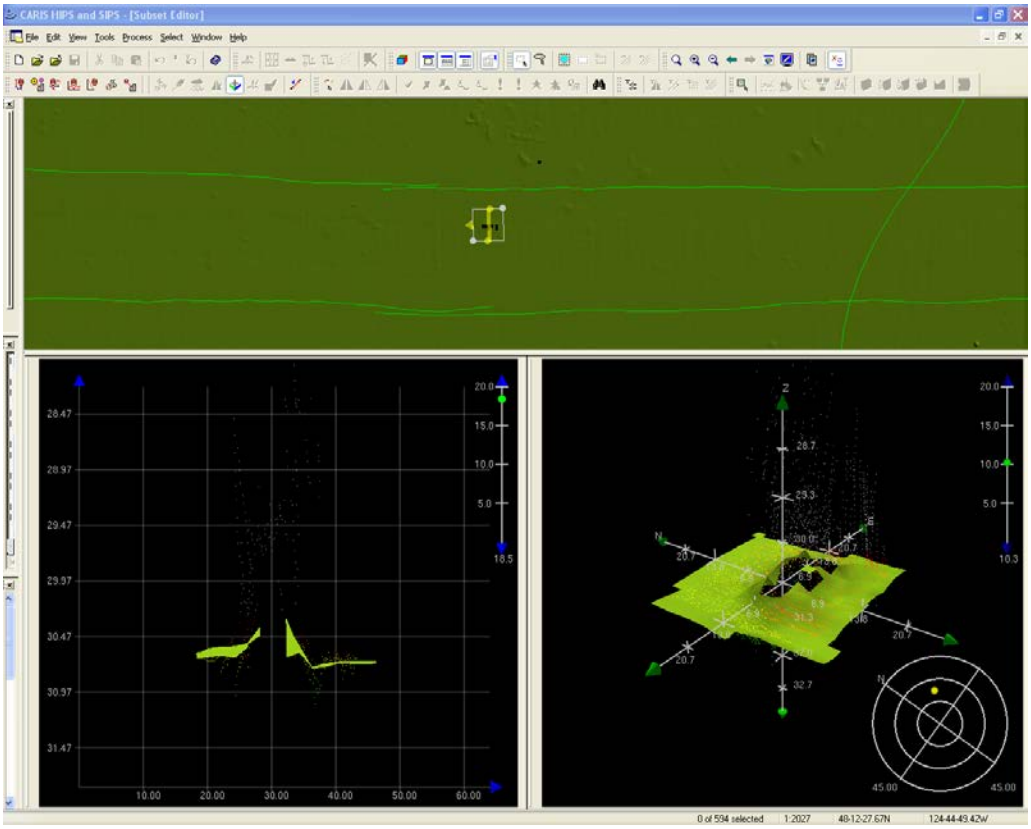


Figure 9: Holiday located at 48-12-24.50N 124-44-56.05W[11]

POSITIONING:
Launch 2808 logged lines for several hours at the start of the day on DN 157 with a degraded GAMS (GPS Azimuth Measurement Subsystem) solution due to faulty cabling on one of the GPS antennas. The data were reviewed in CARIS HIPS and found to meet horizontal accuracy standards and align well with adjacent data. No notable heading errors were observed either, so the data were not reacquired and are submitted as part of H12219.[12]

TRUEHEAVE:
To enable the application of TrueHeave some POS/MV TrueHeave files were "fixed" using the *fixTrueHeave.exe* utility from CARIS. Fixed files were assigned an additional *.fixed suffix. This was performed for data acquired by Launch 2808 on DN 159.[13]

ROLL:
Possible roll artifacts were investigated in the Reson 7111 data throughout H12219. However, the apparent roll artifacts fall within allowable total vertical uncertainty (TVU) for the depth ranges in which they occur.[14]

SURFACE SOUND SPEED:
Due to the rough sea surface conditions in the project area, *Fairweather* experienced "pounding" or hard

pitching when surveying into seas and swell. As a result, "spidery beams" occurred throughout H12219 when air bubbles flowed down the hull across the Surface Sound Velocimeter. In areas where surface sound speed spikes affected the surfaces as depicted in Figure 10, the Hydrographer manually rejected the erroneous soundings in CARIS HIPS Subset Editor to ensure the surfaces honor the true seafloor.[15] Figure 10 depicts both Reson 7111 and Reson 8160 data being "blown out" by a dramatic and erroneous measured surface sound speed change.

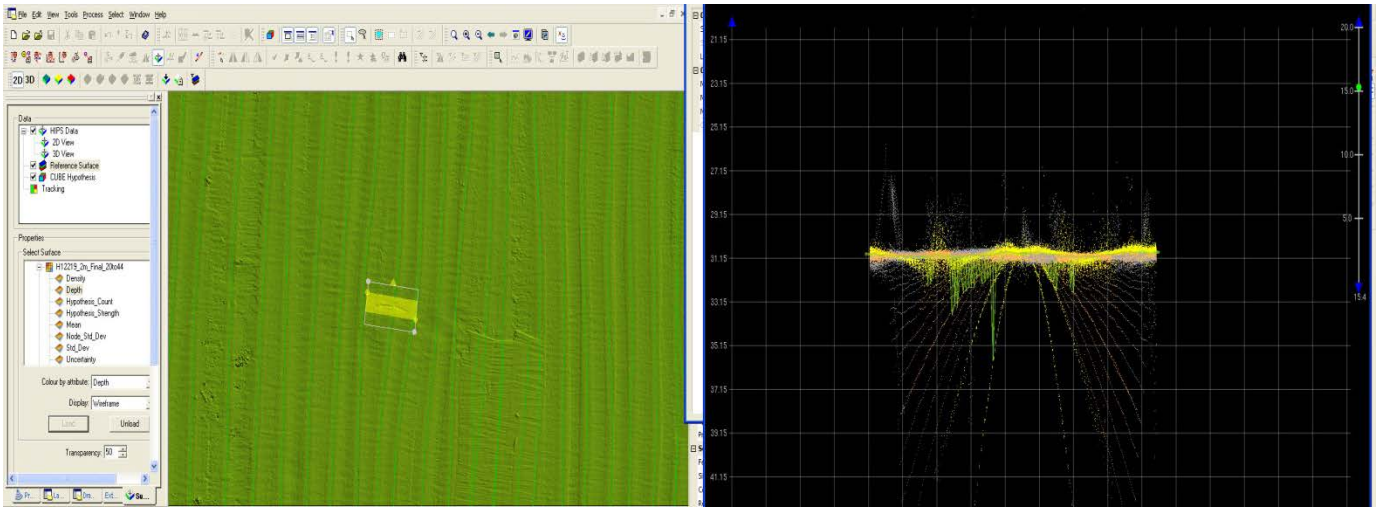


Figure 10: Example sound velocity spike, caused by sea state, located at 48-14-07.15N 124-44-43.33W

WATER COLUMN BIOMASS:
Several objects were observed in the water column resulting in acoustic shadows and surface tearing. These objects were most likely bait balls or some other biological matter suspended in the water column. Figures 6 and 8 demonstrate this as large concentrations of noise above the bottom. Where the surface inconsistencies exceeded allowable TVU, data were manually rejected by the Hydrographer to ensure the true seafloor is modeled appropriately. Multibeam side scan data were evaluated in all cases for navigationally significant objects, and none were found.[16]

SEA STATE INTERFERENCE:
Significant levels of acoustic interference were observed in the water column during periods of high seas, as depicted in Figure 10. In all areas where interference affected the surface beyond the TVU, data were manually rejected by the Hydrographer to ensure the true seafloor is modeled appropriately. Multibeam side scan data were evaluated in all cases for navigationally significant objects, and none were found.[17]

RESON 7111:
Project OPR-N324-FA-10 was the first project during the 2010 field season in which the Reson 7111 was used for MBES acquisition. During the Hydrographic Survey Readiness Review (HSRR) of S220 in the months prior to the start of OPR-N324-FA-10, the Reson 7111 stopped receiving acoustic returns and the transceiver was diagnosed by Reson engineers to have a number of failed cards in the transceiver box. Ultimately a senior engineer from Reson sailed with *Fairweather* to repair the Reson 7111 and troubleshoot data quality issues observed during the 2009 field season (see Project Correspondence). Despite replacement of several components of the transceiver and a software update containing the first release of the IFREMER (French Research Institute for Exploration of the Sea) bottom detection algorithm, *Fairweather* personnel continued to observe nadir gaps and errant outer beam artifacts difficult to attribute to oceanographic conditions or systematic biases. Due to the suspect performance of the Reson 7111, Reson 7111 and Reson 8160 data were acquired simultaneously with tighter line spacing during H12219.

CRITICAL SOUNDINGS:
Designation of soundings followed procedures as outlined in section 5.2.1.2 of the NOS Hydrographic Surveys Specifications and Deliverables (HSSD) dated April 2010.

Forty-five critical soundings are present in H12219. Twelve designated were submitted as dangers to navigation.[18] One outstanding sounding was created for an anti-DTON of an AWOIS item.[19] All other designated soundings were created to preserve shoal depths. A large portion of the designated soundings were created in a new rocky seabed area included with H12219_Final_Feature_File to ensure the most navigationally significant soundings are represented by the surfaces. A small field sheet containing a 50-centimeter surface was created in the southeast portion of H12219 to reduce the need for additional designated soundings to force surfaces to honor least depths on features.

B.2.5. Accuracy Standards

All data meet the data accuracy specifications as stated in the HSSD.[20] All nodes of all finalized surfaces are within total allowable uncertainty.

B.3. Corrections to Echo Soundings

Data reduction procedures for survey H12219 conform to those detailed in the DAPR, with the exceptions discussed below.

B.4. Data Processing

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound velocity application is noted in the H12219_Data_Log spreadsheet. All datalogs are submitted digitally in the Separates I folder.

Data processing procedures for survey H12219 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v7.0, Service Pack 1 (Hotfixes 4 and 5), Notebook v3.1 Hotfix 2, and BathyDatabase v2.3 (Hotfix 17) in conjunction with version #2 of the NOAA object catalog support files. During the course of survey H12219, processing computer systems were updated to CARIS HIPS & SIPS v7.0, Service Pack 2, and Hotfix 3. The finalized and combined surfaces were created using Beta HF4 to force designated soundings to be honored in the finalized surfaces (see CARIS HelpDesk Request ID 01002900). Additional processing details regarding Total Propagated Uncertainty

(TPU/TPE) and CUBE (Combined Uncertainty and Bathymetry Estimator) Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

TPU VALUES:
The survey specific parameters used to compute TPU in CARIS for H12219 are listed in Table 4.

Tide values:	Measured	0.01 m	Zoning	0.10 m
7125 Sound Speed Values:	Measured	1.00 m/s	Surface	0.50 m/s
7111/ 8160 Sound Speed Values:	Measured	0.50 m/s	Surface	0.50 m/s

Table 4: Survey Specific CARIS TPE Parameters

CUBE SURFACES:
The CARIS HIPS BASE (Bathymetry Associated with Statistical Error) surfaces delivered with H12219 and their associated resolutions are listed in Table 5. All field sheet extents were adjusted using the *Base 16 Calculator* tool to ensure coincident nodes among all bathymetric surfaces regardless of the field sheet in which they are contained given the standard surface resolutions of one and two meters. The NOAA CUBE parameters mandated by the 2010 HSSD were used for the creation of all CUBE BASE surfaces used in H12219.

An additional fieldsheet was created in the southeast corner of H12219, named H12219_A. It contains a 50-centimeter resolution surface finalized from 0-22 meters.[21]

Fieldsheet Name	Surface Name	Depth Ranges (m)	Resolution (m)
H12219_QC	H12219_1m	All	1
	H12219_2m	All	2
	H12219_1m_Final_0to22	0-22	1
	H12219_2m_Final_20to44	20-44	2
	H12219_Final_Combined_2m	All	2
	H12219_Ellipsoid_2m	All	2
H12219_A	H12219_A_50cm	All	.5
	H12219_A_50cm_Final_0to22	0-22	.5

Table 5: Surfaces, Depth Ranges, Resolutions

SURFACE FILTERING:
Suspected noise that incurred surface tearing beyond allowable error specifications was manually rejected by the Hydrographer in Subset Editor. The following cases use alternative data processing techniques that deviate from those described in the DAPR in order to address data quality issues:

- All Reson 8160 and Reson 7111 ship data were filtered to 65 degrees from nadir on both port and starboard side. Where holidays were produced, data was re-accepted by the Hydrographer. Additionally, Reson 8160 and Reson 7111 lines 2010M_1531305, 2010M_1640313, 2010M_1531305, and 2010M_1640313 were filtered to 53 degrees on the starboard side.
- All launch Reson 7125 data had quality 1 soundings rejected in an effort to reduce noise. Rejected data were accepted as needed by the Hydrographer.

POST-PROCESSED KINEMATIC DATA AND ELLIPSOIDALLY-REFERENCED SURFACES:
Kinematic data post-processed using the Single Base Applanix POSPac processing software methods described in the DAPR in the form of Single Best Estimate of Trajectory (SBET) files are applied to all data with the following exceptions:

- DN 158 data from vessel S220 were processed using the PPP (Precise Point Positioning) method. The SBETs were still produced and applied.

- DN 153 vessel S220 lines 2010M_1531440 from the Reson 7111 and Reson 8160 MBES had a 64-second data gap that prevented SBET and SMRMSG application to a portion of this line.

Due to a known error in CARIS HIPS and SIPS, only HDCS lines that had SBET and SMRMSG files applied after Service Pack 2 will query accurately (CARIS Helpdesk Ticket ID 01002324). A text document containing the contents of the CARIS HIPS Output window after SBET and SMRMSG application is submitted with the digital data in the GNSS folder as a record of the application of these files.

A single 2-meter ellipsoidally-referenced surface is submitted with H12219 for experimental and evaluation purposes as part of the Office of Coast Survey's initiative to survey to the ellipsoid. This surface was created while the soundings were reduced to the ellipsoid after merging with "GPS Tides" applied in CARIS HIPS as described in the DAPR. After the ellipsoidal surface was created, the soundings were referenced back to MLLW during the CARIS merge process by unselecting the "Apply GPS tide" option. The traditional MLLW-vertically referenced finalized surfaces were then created as described in the DAPR according the HSSD and FPM. The ellipsoidal surface appears out of date because the soundings used to create them have been moved back to MLLW.

The submitted 2-meter ellipsoid surface exhibits notable systematic offsets due to computed vessel altitude exceeding two meters in some locations. Offsets of this nature can be found on the following lines:

- DN 153 vessel S220 Lines 2010M_1531649 and 2010_1531440 for both Reson 7111 and Reson 8160

- DN 159 vessel 2808 Lines 2010M_1592337, 2010M_1592356, 2010M_160000, 2010M_1600005, for Reson 7125

- DN 160 vessel S220 Lines 2010M_1600518 for both Reson 7111 and Reson 8160

DAPR DEVIATIONS:
Line 2010M_1600825 of Reson 8160 for vessel S220 on DN 160 was logged through a turn of the ship in operator error. The data were found acceptable and not removed from the project.[22]

C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H12219 can be found in the *OPR-N324-FA-10 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential correctors from the U.S. Coast Guard beacon at Fort Stevens, WA (287 kHz) were used during real-time acquisition. The Post Processing Kinematic (PPK) method was the primary method of horizontal positioning of MBES soundings on H12219. Correctors from the Neah Bay, WA CORS station were used for single-base post processing of all vessel-day POSMV files except DN 158 for vessel S220, which was processed using the PPP (Precise Point Positioning) method. Single Best Estimate of Trajectory (SBET) files and their associated error files (SMRMSG) were applied to all MBES data in CARIS HIPS using the single-base and PPP methods.

For further detail see the Acquisition and Processing logs for the particular days located in Separates I

C.2. Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW) as specified in the Project Instructions. The operating National Water Level Observation Network (NWLON) primary tide station at LaPush, WA (9442396) served as control for datum determination and as the primary source for water level correctors for survey H12219. No subordinate water level stations were required for this project.

Water level corrections were applied to data using Discrete Tidal Zoning.

A request for delivery of final, approved tides for survey H12219 was forwarded to N/OPS1 on July 2, 2010, in accordance with the FPM. A copy of the request is included in Appendix V. On July 13, 2010 prelininary zoning was accepted as final zoning by COOPS in the Final Tide Note.[23]

As per the Project Instructions, all data were reduced to MLLW using final, approved tides from the LaPush, WA station (9442396) by applying tide file 9442396.tid and time and height correctors through the preliminary zone corrector file N324FA2010CORP.zdf. **It will not be necessary for the Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.**

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSD, utilizing CARIS HIPS and Notebook software program.

Survey H12219 was compared with the following charts listed in Table 6. Soundings generally agree with previously charted (18460) depths within one to two fathoms. Significant differences between

surveyed soundings and charted soundings were found in small, isolated groups, and mainly attributed to offshore underwater rocks that were not previoulsy charted.[24] Contours generally agree to existing charted contours within 150 meters horizontally in both offshore and nearshore directions. See Figure 11 for examples of chart differences.

NOAA Chart Number	Chart Scale	Edition Number	Edition Date	Updated with Notice to Mariners through
18485	1:40,000	16th Ed.	May 2007	July 27, 2010
18480	1:176,253	31st Ed.	October 2006	September 19, 2010
18460	1:100,000	13th Ed.	October 2006	September 10, 2010

Table 6: NOAA Charts compared with Survey H12219

D.1.1. Chart 18485

SOUNDING COMPARISON:
Soundings generally agree with previously charted (18485) depths within one to two fathoms. Significant differences between surveyed soundings and charted soundings were found in small, isolated groups, and mainly attributed to offshore underwater rocks that were not previoulsy charted. Tweleve (12) Dangers to Navigation (DTONs) were submitted which represented navigationally signigicant new or repositioned rocks found by MBES.[25]

CONTOUR COMPARISON:
Depth contours generally agree with previously charted (18485) within 150 meters horizontally.[26]

TREND COMPARISON:
Charted soundings and contours are generally accurate.[27]

ADDITIONAL INFORMATION:
Survey H12219 is within a charted Regulated Navigation Area and a charted Area To Be Avoided (ATBA). The charted Regulated Navigation Area corresponds with the restrictions on traffic for Vessel Traffic Services (VTS) coverage. Detailed description of VTS area extents and regulations can be found in 33 CFR Part 161, the Coast Pilot, and the applicable VTS User's Guide. The ATBA corresponds with the Olympic Coast National Marine Sanctuary, which is closed to transit for vessels over 1600 Gross Tons, carrying hazardous cargoes, or carrying oil. Detailed description of Sanctuary extents and regulations can be found in 15 CFR Part 922 and in the Coast Pilot. See notes A, D, E, F, G and H on chart 18485.

D.1.2. Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the HSSD. **All soundings from H12219 are adequate to supersede prior surveys in their common areas.**[28]

D.2. Automated Wreck and Obstruction Information System (AWOIS) Investigations

There was one AWOIS item located within the limits of H12219. The AWOIS item was addressed and is included in the H12219_Final_Feature_File. Updates to the AWOIS database were made directly in the H12219_AWOIS Micrsoft Access Database submitted with Appendix II.[29]

D.3. Dangers to Navigation

Twelve dangers to navigation were found within the limits of H12219, and were reported to the Marine Chart Division on July 12, 2010. A copy of H12219_DTON_Report_No1 is included in Appendix I, and the email correspondence are included in Appendix V.[30]

D.4. Charted Feature Removal Request

The AWOIS Item 53141 was disproved, with the disproved obstruction submitted ot the Marine Chart Division on July 11, 2010, as an Anti-DTON Report. A copy of H12219_Anti-DTON_Report_No1 is included in Appendix I, and the email correspondence are included in Appendix V. A new rock believed to be associated with the charted 'Reported Breaker' (AWOIS 53141) was submitted as a DTON within junction survey H12221.[31]

D.5. Additional Results

D.5.1. Shoreline Verification

Due to heavy seas and surf nearshore, limited shoreline verification as described in the FPM was not conducted during H12219. All addressed features were delineated or disproved exclusively by MBES. Two rocks within the survey area did not have least depths obtained due to safety considerations.[32]

D.5.2. Shoreline Data Processing

Feature processing procedures were followed as outlined in the DAPR.

D.6. Source Shoreline Changes, New Features and Charted Features

In accordance with section 4.4.10 of the FPM, field notes made by the Hydrographer were provided in the feature's Remarks field. When appropriate, recommendations to the cartographer were included in the Recommendations field.

D.6.1. Shoreline Recommendations

The Hydrographer recommends that the features depicted in the CARIS Notebook files and final sounding files supersede and complement offshore feature information compiled on the CSF and charts.

D.7. Aids to Navigation

There were no aids to navigation within the survey limits.[33]

D.8. Overhead Features

There are no overhead features within the limits of survey H12219.[34]

D.9. Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the limits of H12219, and none were detected during H12219.[35]

D.10. Ferry Routes

There are no ferry routes charted within the limits of survey H12219, and ferries were not observed operating within the survey area.[36]

D.11. Bottom samples

Bottom Samples were not collected for survey H12219.[37] There are future plans for Olympic Coast National Marine Sanctuary personnel to conduct extenstive bottom sampling for use in ground truthing backscatter mosaics derived from the MBES data acquired during OPR-N324-FA-10. It is reccomended that charted (18485) bottom samples be retained.

D.12. Supplemental Reports

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

Title	Date Sent	Office
Hydrographic Systems Readiness Review 2010	April 9, 2010	N/CS34
Data Acquisition and Processing Report 2010	August 15, 2010	N/CS34
Horizontal and Vertical Control Report for OPR-N324-FA-10	August 15, 2010	N/CS34

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
NOAA Ship FAIRWEATHER S-220
1010 Stedman Street
Ketchikan, AK 99901

November 1, 2010

MEMORANDUM FOR: Gary Nelson
Chief, Pacific Hydrographic Branch

FROM: CAPT David O. Neander, NOAA
Commanding Officer
2010.11.06 11:58:31 -08'00'

TITLE: Approval of Hydrographic Survey H12219, OPR-N324-FA-10

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H12219 in accordance with the Hydrographic Manual, Fourth Edition; Field Procedures Manual, April 2010; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for April 2010. Additional guidance was provided by applicable Hydrographic Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

I acknowledge that all of the information contained in this report is complete and accurate to the best of my knowledge.

In addition, the following individuals were responsible for oversight of acquisition and processing of this survey:

ENS Steven Loy
2010.11.06 04:45:47 Z

ENS Steven T. Loy
Survey Manager

Digitally signed by Briana Welton
DN: cn=Briana Welton, o=NOAA Ship Fairweather, ou=NOAA, email=briana.welton@noaa.gov, c=US
Date: 2010.11.06 04:43:09 Z

LT Briana J. Welton
Field Operations Officer

Attachment

Revisions Compiled During Office processing and Certification.

---

[1] Concur. The planned limits of H12219 were not affected by the project layout change. The correspondence is appended to this report.
[2] Concur.
[3] Concur.
[4] H12221 has not been complied at this time. A common junction was made with H12220.
[5] Concur.
[6] Concur.
[7] Least depth has been achieved in this area. The HCell data is adequate to supersede charted data.
[8] Least depth has been achieved in this area. The HCell data is adequate to supersede charted data.
[9] Shoaler depths were achieved in the surrounding area. The HCell data is adequate to supersede charted data.
[10] Least depth has been achieved in this area. The HCell data is adequate to supersede charted data.
[11] Shoaler depths were achieved in the surrounding area. The HCell data is adequate to supersede charted data.
[12] Concur.
[13] Concur.
[14] Concur.
[15] Concur.
[16] Concur.
[17] Concur.
[18] Concur.
[19] Concur.
[20] Concur.
[21] The surface H12219_2m_Final_Combined_2m was used for compilation.
[22] Concur.
[23] The Final Tide Note is appended to this report.
[24] Concur with clarification. Significant differences occur in areas less than 10 fathoms deep.
[25] The DTON Report is appended to this report.
[26] Concur.
[27] Concur with clarification. Significant differences occur in areas less than 10 fathoms deep.
[28] Concur.
[29] The AWOIS report is appended to this report. This AWOIS item was disproven in the given location and an Anti-DTON Report (appended to this report) was submitted. A DTON Report submitted with Survey H12221 with a rock located approximately 0.5km to the southwest was submitted. The chart and ENC have been updated with this information.
[30] The DTON Report is appended to this report.
[31] Concur. The chart and ENC have been updated with this information.
[32] Concur. These rocks are included in the HCell.
[33] Concur.
[34] Concur.
[35] Concur.
[36] Concur.
[37] Concur. Eighteen bottom types were imported from the ENC into the HCell.

H12219 Danger to Navigation Report #1

Registry Number: H12219

State: Washington

Locality: OCNMS

Sub-locality: Point of Arches

Project Number: OPR-N324-FA-10

Survey Dates: 06/06/2010 - 06/08/2010

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18485	16th	03/01/2007	1:40,000 (18485_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 12/25/1999 (05/15/2010)
18460	13th	10/01/2006	1:100,000 (18460_1)	[L]NTM: ?
18480	31st	10/01/2006	1:176,253 (18480_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 10/17/2009 (05/15/2010)
18400	48th	12/01/2008	1:200,000 (18400_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_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.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	1944/235	Rock	3.83 m	48° 12' 32.0" N	124° 42' 13.9" W	---
1.2	4638/155	Rock	4.33 m	48° 13' 27.1" N	124° 42' 21.3" W	---
1.3	255/230	Rock	2.13 m	48° 13' 42.6" N	124° 42' 25.0" W	---
1.4	86/336	Rock	4.44 m	48° 14' 57.9" N	124° 42' 51.6" W	---
1.5	3332/109	Rock	10.51 m	48° 14' 44.5" N	124° 42' 53.9" W	---
1.6	851/496	Rock	6.12 m	48° 14' 48.6" N	124° 42' 42.0" W	---

1.7	133/488	Rock	6.17 m	48° 14' 23.4" N	124° 42' 43.4" W	---
1.8	340/88	Rock	8.16 m	48° 14' 16.1" N	124° 42' 43.5" W	---
1.9	3316/505	Rock	3.12 m	48° 13' 55.5" N	124° 42' 32.5" W	---
1.10	150/114	Rock	2.42 m	48° 14' 03.5" N	124° 42' 33.2" W	---
1.11	62/104	Rock	2.70 m	48° 12' 49.2" N	124° 42' 47.3" W	---
1.12	48/419	Rock	8.78 m	48° 13' 19.9" N	124° 43' 26.9" W	---

1 - Danger To Navigation

1.1) 1944/235

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 12' 32.0" N, 124° 42' 13.9" W

Least Depth: 3.83 m (= 12.58 ft = 2.096 fm = 2 fm 0.58 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.983 m ; **TVU (TPEv)** ±0.246 m

Timestamp: 2010-158.22:28:42.122 (06/07/2010)

Survey Line: h12219 / fa_2805_400khz_rsn7125_512bms_2010 / 2010-158 / 2010__1582226

Profile/Beam: 1944/235

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2805_400khz_rsn7125_512bms_2010/2010-158/2010__1582226	1944/235	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

2fm 0ft (18460_1, 531_1)

3.8m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 3.833 m

WATLEV - 3:always under water/submerged

Feature Images

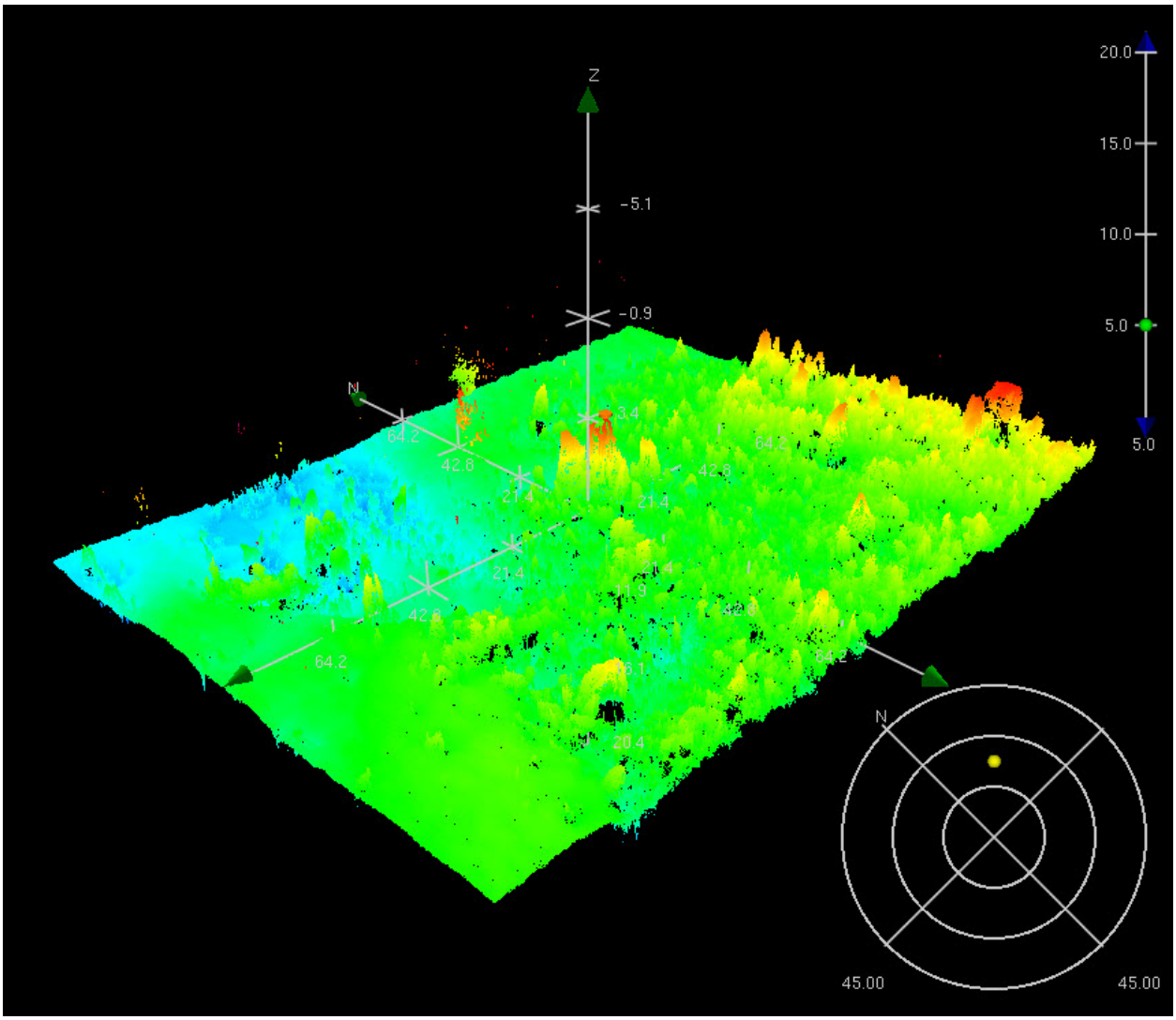


Figure 1.1.1

1.2) 4638/155

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 13' 27.1" N, 124° 42' 21.3" W

Least Depth: 4.33 m (= 14.19 ft = 2.365 fm = 2 fm 2.19 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.981 m ; **TVU (TPEv)** ±0.423 m

Timestamp: 2010-158.21:07:04.173 (06/07/2010)

Survey Line: h12219 / fa_2806_400khz_rsn7125_512bms_2010 / 2010-158 / 2010m_1582101

Profile/Beam: 4638/155

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2806_400khz_rsn7125_512bms_2010/2010-158/2010m_1582101	4638/155	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

2fm 2ft (18460_1, 531_1)

4.3m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 4.326 m

WATLEV - 3:always under water/submerged

Feature Images

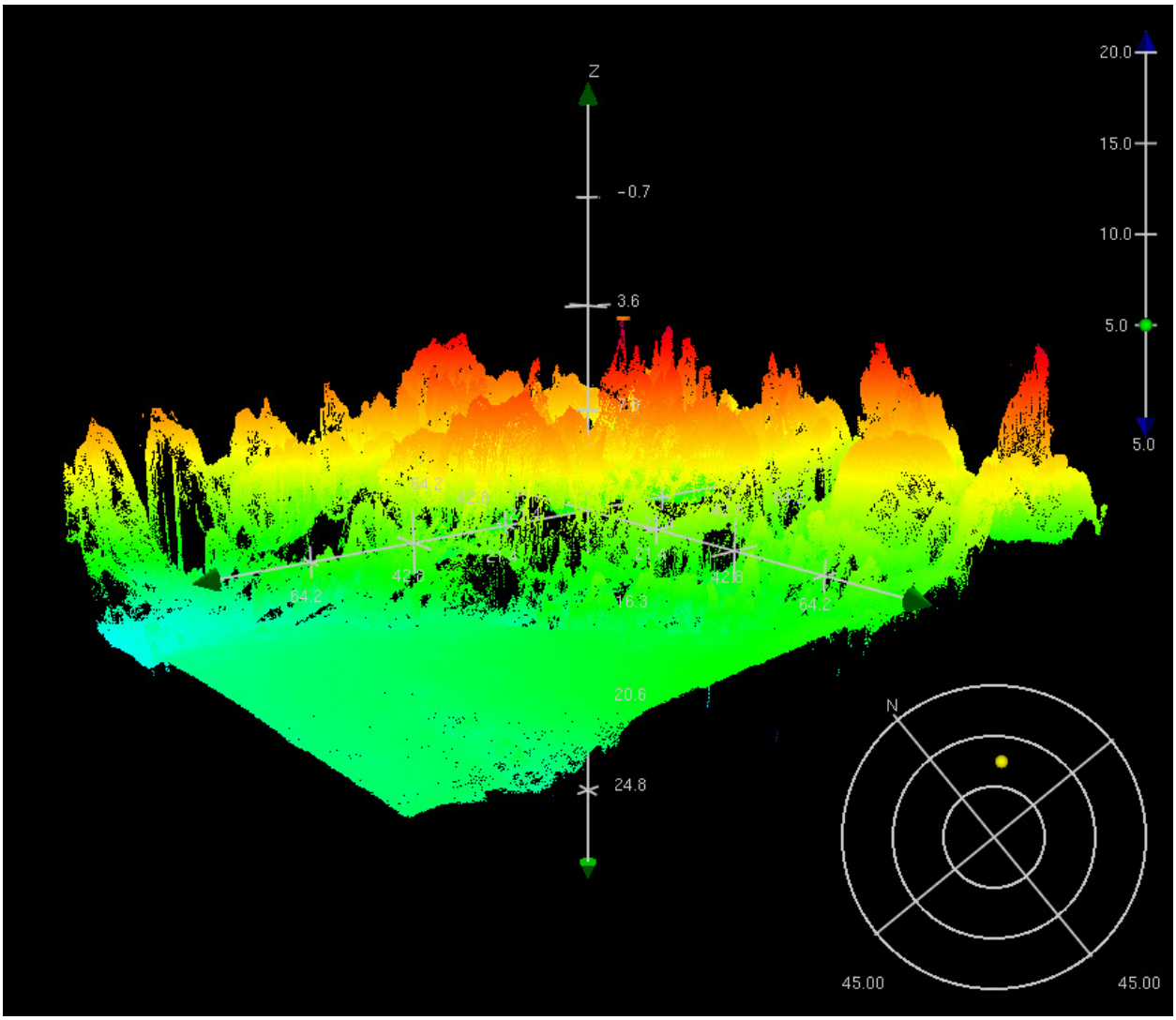


Figure 1.2.1

1.3) 255/230

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 13' 42.6" N, 124° 42' 25.0" W

Least Depth: 2.13 m (= 7.00 ft = 1.166 fm = 1 fm 1.00 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.980 m ; **TVU (TPEv)** ±0.423 m

Timestamp: 2010-158.21:19:42.795 (06/07/2010)

Survey Line: h12219 / fa_2806_400khz_rsn7125_512bms_2010 / 2010-158 / 2010m_1582119

Profile/Beam: 255/230

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2806_400khz_rsn7125_512bms_2010/2010-158/2010m_1582119	255/230	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 1ft (18460_1, 531_1)

2.1m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 2.133 m

WATLEV - 3:always under water/submerged

Feature Images

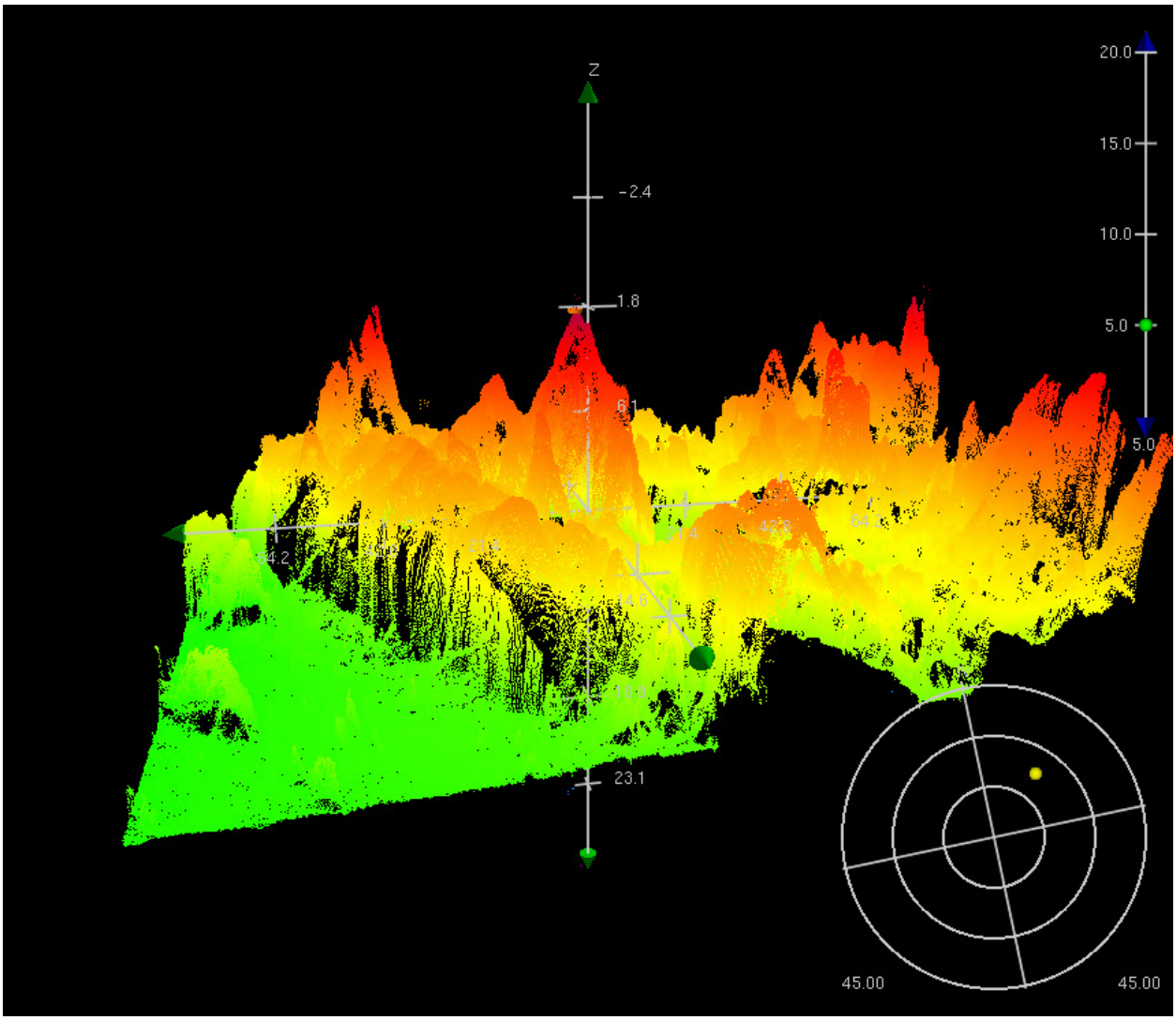


Figure 1.3.1

1.4) 86/336

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 57.9" N, 124° 42' 51.6" W

Least Depth: 4.44 m (= 14.56 ft = 2.427 fm = 2 fm 2.56 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.981 m ; **TVU (TPEv)** ±0.423 m

Timestamp: 2010-157.18:34:27.006 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1571834

Profile/Beam: 86/336

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1571834	86/336	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

2fm 2ft (18460_1, 531_1)

4.4m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 4.438 m

WATLEV - 3:always under water/submerged

Feature Images

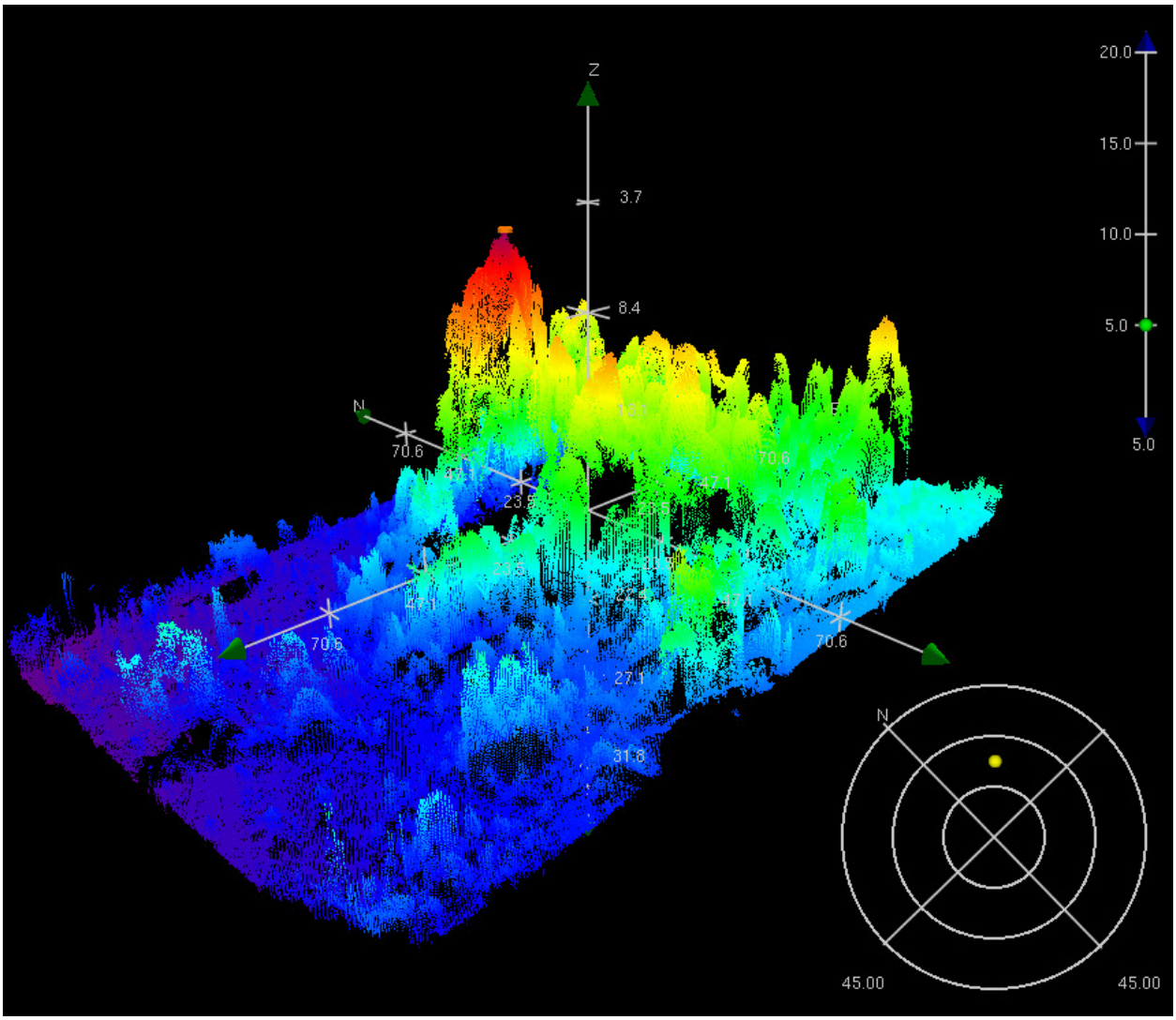


Figure 1.4.1

1.5) 3332/109

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 44.5" N, 124° 42' 53.9" W

Least Depth: 10.51 m (= 34.47 ft = 5.745 fm = 5 fm 4.47 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.985 m ; **TVU (TPEv)** ±0.424 m

Timestamp: 2010-157.18:45:09.004 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1571839

Profile/Beam: 3332/109

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1571839	3332/109	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5 ¾fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

5fm 4ft (18460_1, 531_1)

10.5m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 10.507 m

WATLEV - 3:always under water/submerged

Feature Images

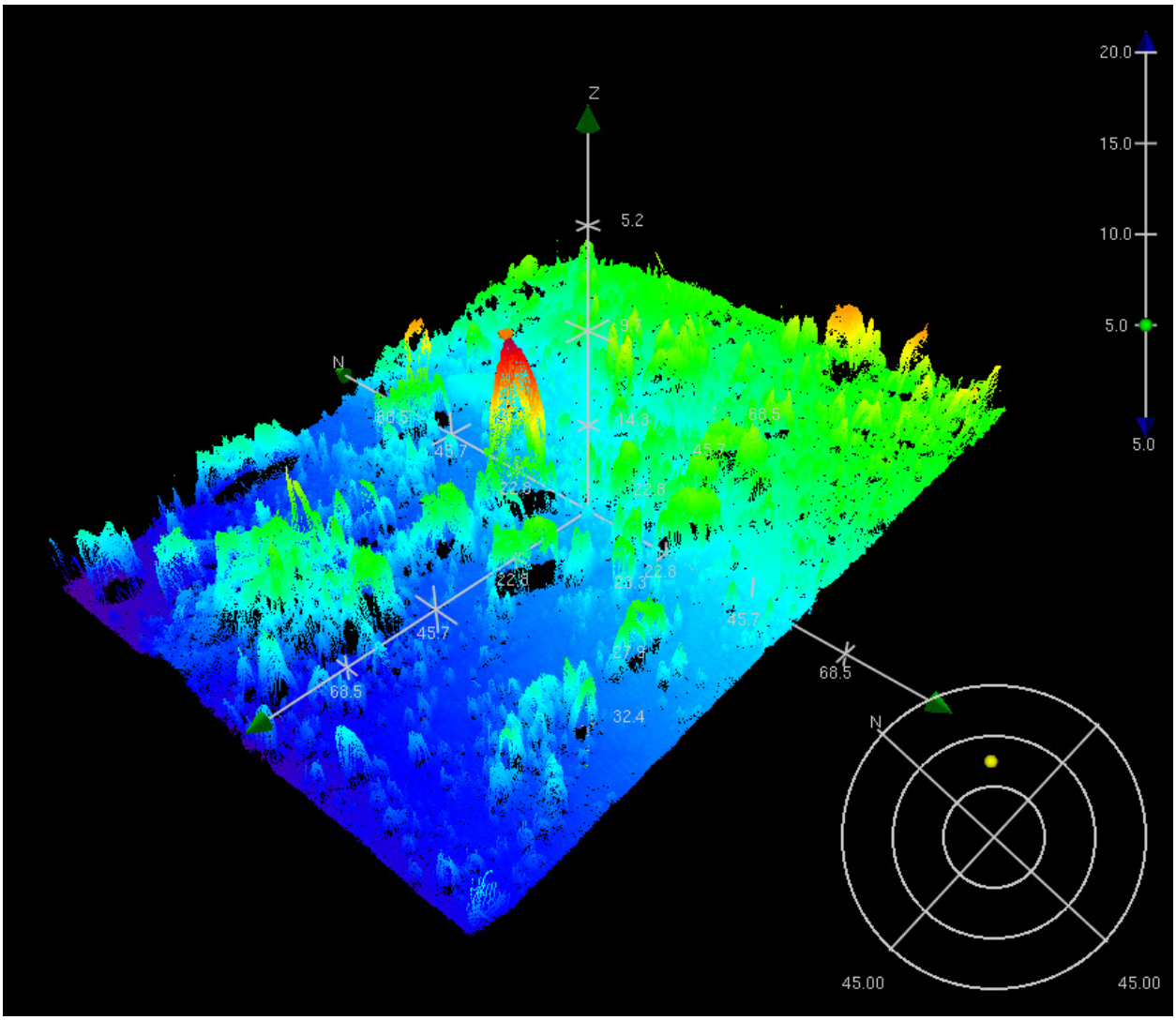


Figure 1.5.1

1.6) 851/496

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 48.6" N, 124° 42' 42.0" W

Least Depth: 6.12 m (= 20.09 ft = 3.349 fm = 3 fm 2.09 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.984 m ; **TVU (TPEv)** ±0.424 m

Timestamp: 2010-157.19:13:36.649 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1571912

Profile/Beam: 851/496

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1571912	851/496	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ¼fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

3fm 2ft (18460_1, 531_1)

6.1m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 6.124 m

WATLEV - 3:always under water/submerged

Feature Images

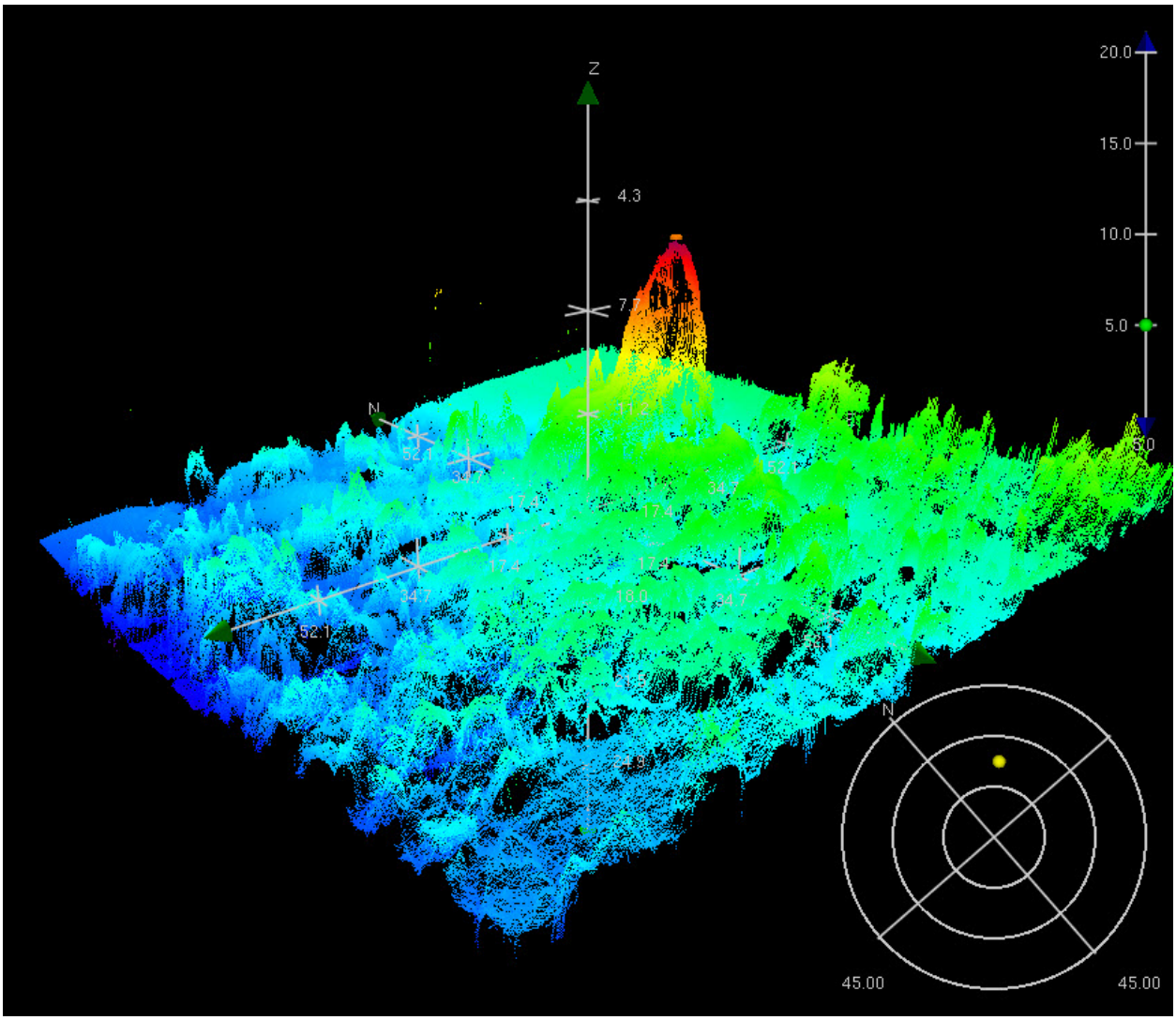


Figure 1.6.1

1.7) 133/488

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 23.4" N, 124° 42' 43.4" W

Least Depth: 6.17 m (= 20.23 ft = 3.371 fm = 3 fm 2.23 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.984 m ; **TVU (TPEv)** ±0.424 m

Timestamp: 2010-157.20:15:00.863 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1572014

Profile/Beam: 133/488

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1572014	133/488	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ¼fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

3fm 2ft (18460_1, 531_1)

6.2m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 6.165 m

WATLEV - 3:always under water/submerged

Feature Images

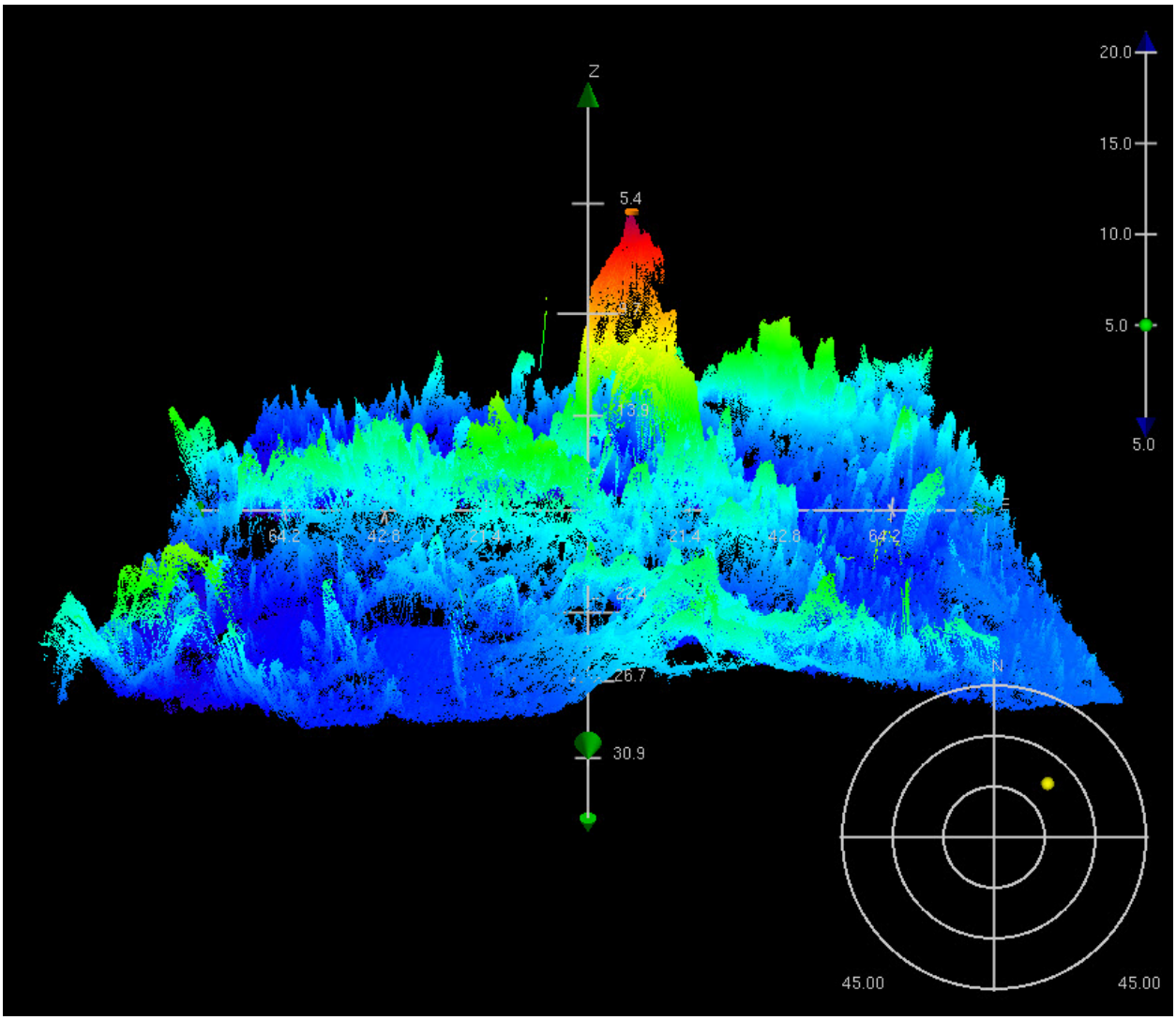


Figure 1.7.1

1.8) 340/88

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 16.1" N, 124° 42' 43.5" W

Least Depth: 8.16 m (= 26.79 ft = 4.465 fm = 4 fm 2.79 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.985 m ; **TVU (TPEv)** ±0.424 m

Timestamp: 2010-157.21:29:46.283 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1572129

Profile/Beam: 340/88

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1572129	340/88	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4 ½fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

4fm 3ft (18460_1, 531_1)

8.2m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 8.165 m

WATLEV - 3:always under water/submerged

Feature Images

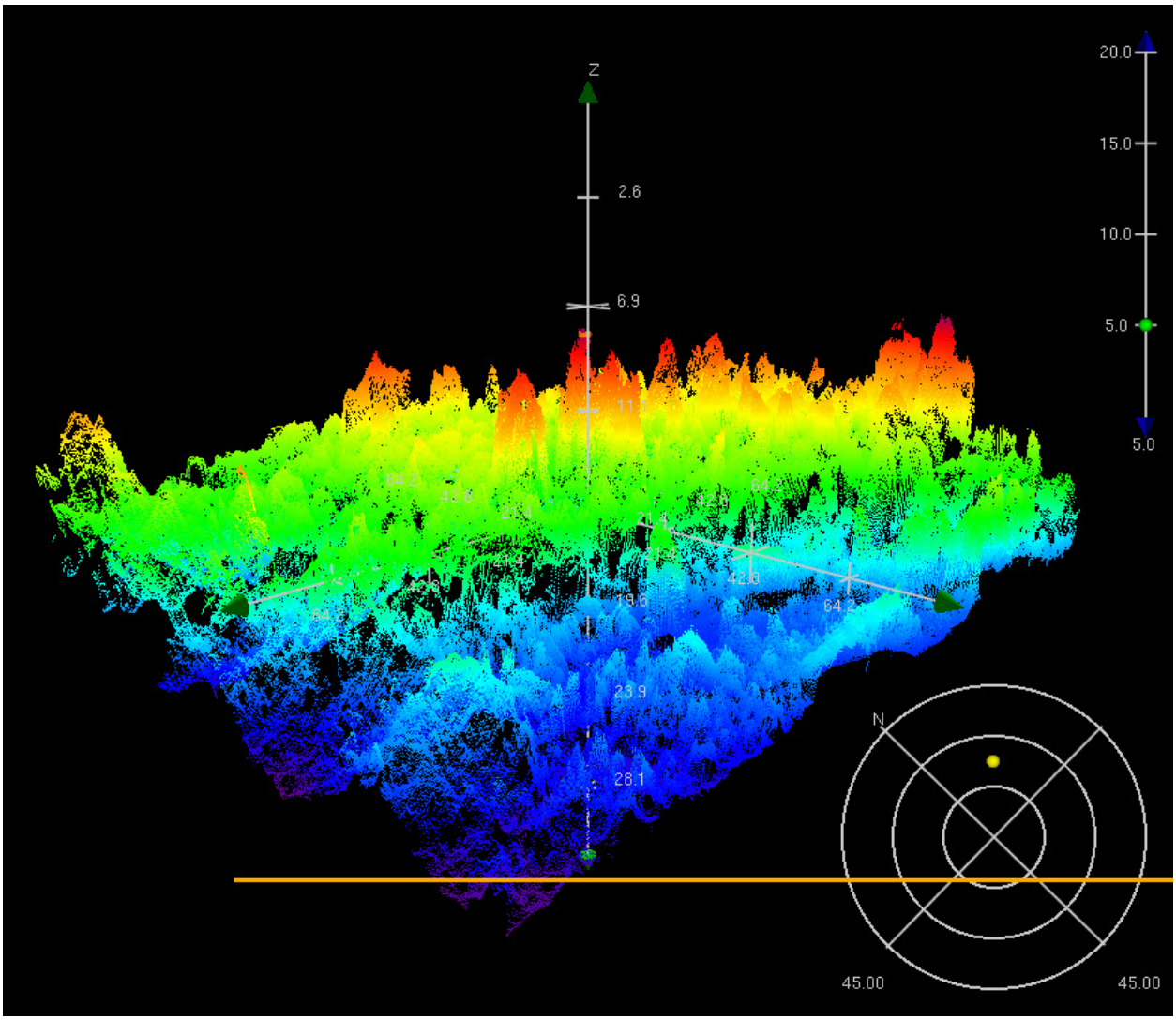


Figure 1.8.1

1.9) 3316/505

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 13' 55.5" N, 124° 42' 32.5" W

Least Depth: 3.12 m (= 10.23 ft = 1.704 fm = 1 fm 4.23 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.983 m ; **TVU (TPEv)** ±0.423 m

Timestamp: 2010-157.22:09:05.218 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1572204

Profile/Beam: 3316/505

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1572204	3316/505	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1 ¾fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 4ft (18460_1, 531_1)

3.1m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 3.117 m

WATLEV - 3:always under water/submerged

Feature Images

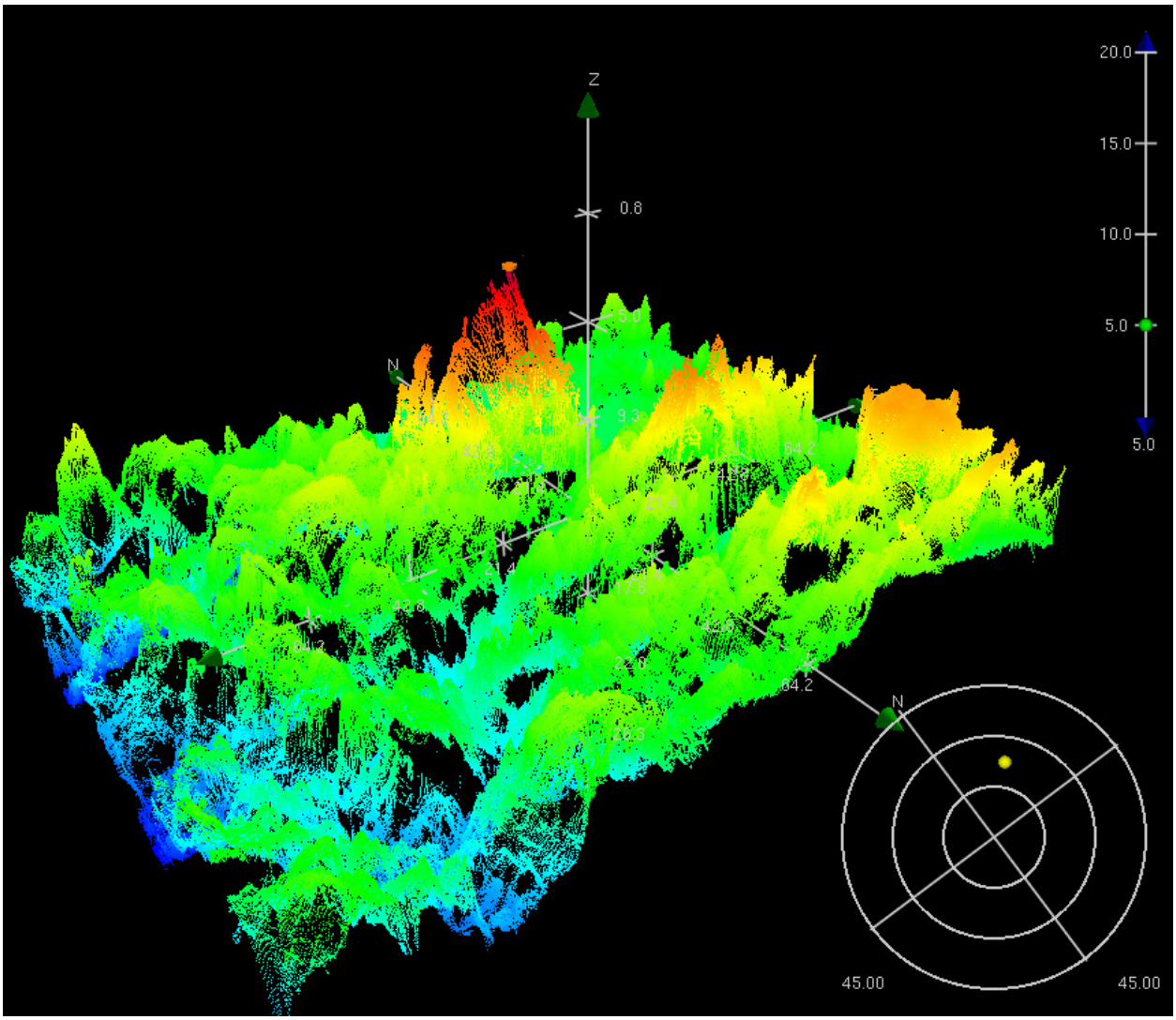


Figure 1.9.1

1.10) 150/114

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 14' 03.5" N, 124° 42' 33.2" W

Least Depth: 2.42 m (= 7.94 ft = 1.323 fm = 1 fm 1.94 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.981 m ; **TVU (TPEv)** ±0.423 m

Timestamp: 2010-157.22:38:33.811 (06/06/2010)

Survey Line: h12219 / fa_2807_400khz_rsn7125_512bms_2010 / 2010-157 / 2010__1572238

Profile/Beam: 150/114

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2807_400khz_rsn7125_512bms_2010/2010-157/2010__1572238	150/114	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 2ft (18460_1, 531_1)

2.4m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 2.419 m

WATLEV - 3:always under water/submerged

Feature Images

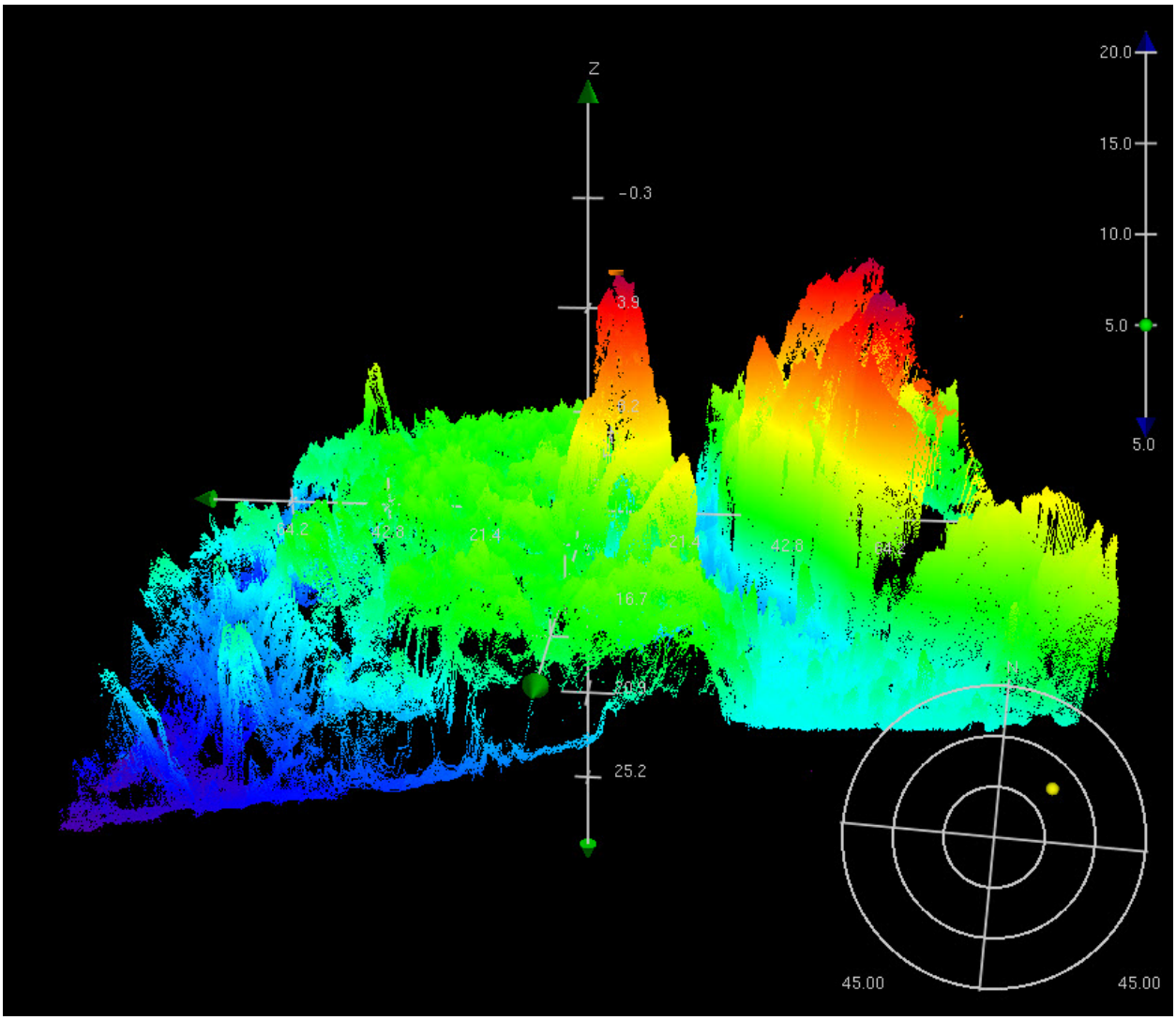


Figure 1.10.1

1.11) 62/104

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 12' 49.2" N, 124° 42' 47.3" W

Least Depth: 2.70 m (= 8.87 ft = 1.479 fm = 1 fm 2.87 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.981 m ; **TVU (TPEv)** ±0.244 m

Timestamp: 2010-157.21:54:55.864 (06/06/2010)

Survey Line: h12219 / fa_2808_400khz_rsn7125_512bms_2010 / 2010-157 / 2010m_1572154

Profile/Beam: 62/104

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2808_400khz_rsn7125_512bms_2010/2010-157/2010m_1572154	62/104	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 3ft (18460_1, 531_1)

2.7m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 2.704 m

WATLEV - 3:always under water/submerged

Feature Images

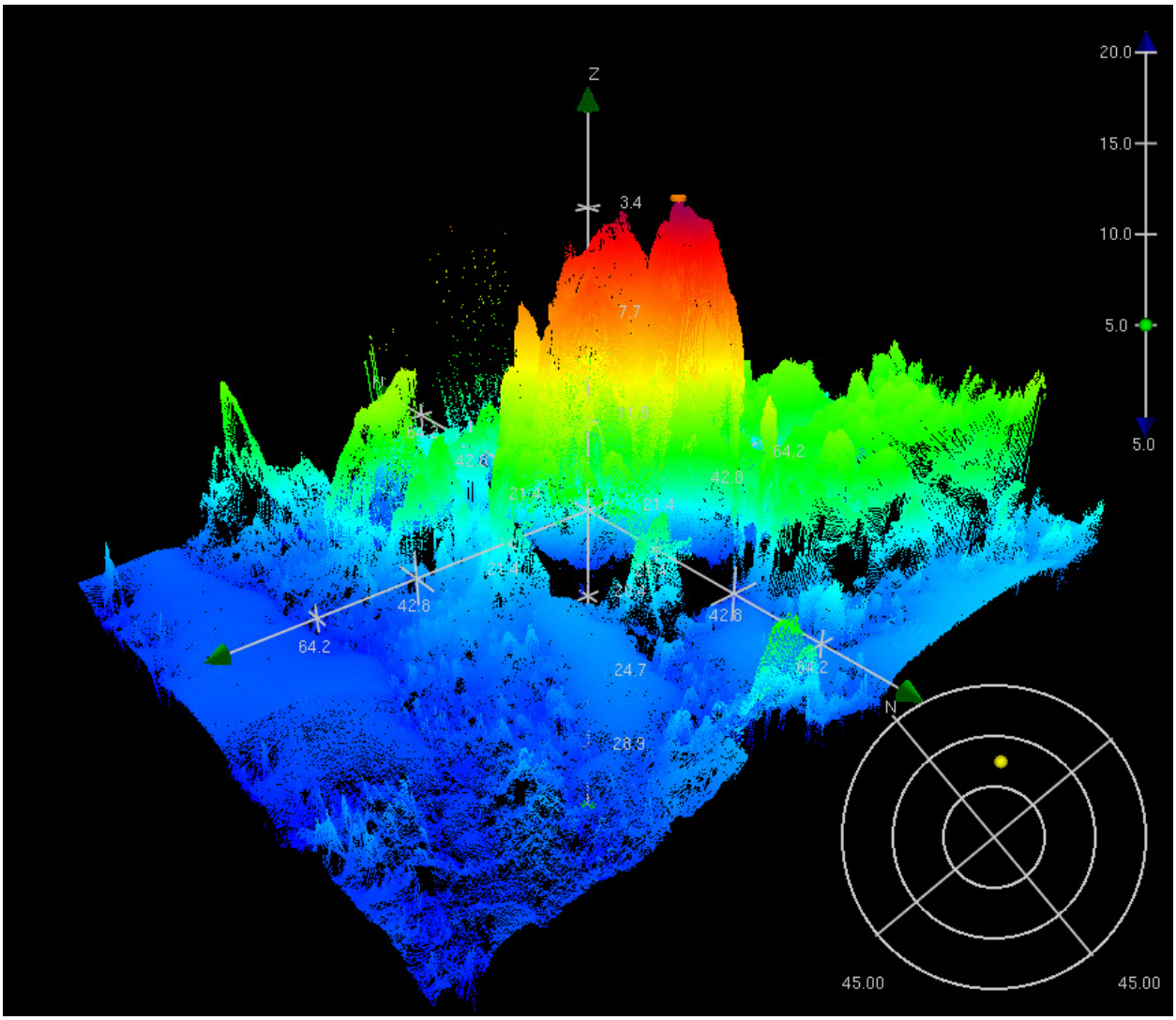


Figure 1.11.1

1.12) 48/419

DANGER TO NAVIGATION

Survey Summary

Survey Position: 48° 13' 19.9" N, 124° 43' 26.9" W

Least Depth: 8.78 m (= 28.82 ft = 4.803 fm = 4 fm 4.82 ft)

TPU (±1.96σ): **THU (TPEh)** ±0.982 m ; **TVU (TPEv)** ±0.245 m

Timestamp: 2010-159.20:50:47.311 (06/08/2010)

Survey Line: h12219 / fa_2808_400khz_rsn7125_512bms_2010 / 2010-159 / 2010m_1592050a

Profile/Beam: 48/419

Charts Affected: 18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Rock shoaler than charted soundings.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2808_400khz_rsn7125_512bms_2010/2010-159/2010m_1592050a	48/419	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4 ¾fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

4fm 5ft (18460_1, 531_1)

8.8m (501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20100627

SORIND - US,US,graph,H12219

TECSOU - 3:found by multi-beam

VALSOU - 8.784 m

WATLEV - 3:always under water/submerged

Feature Images

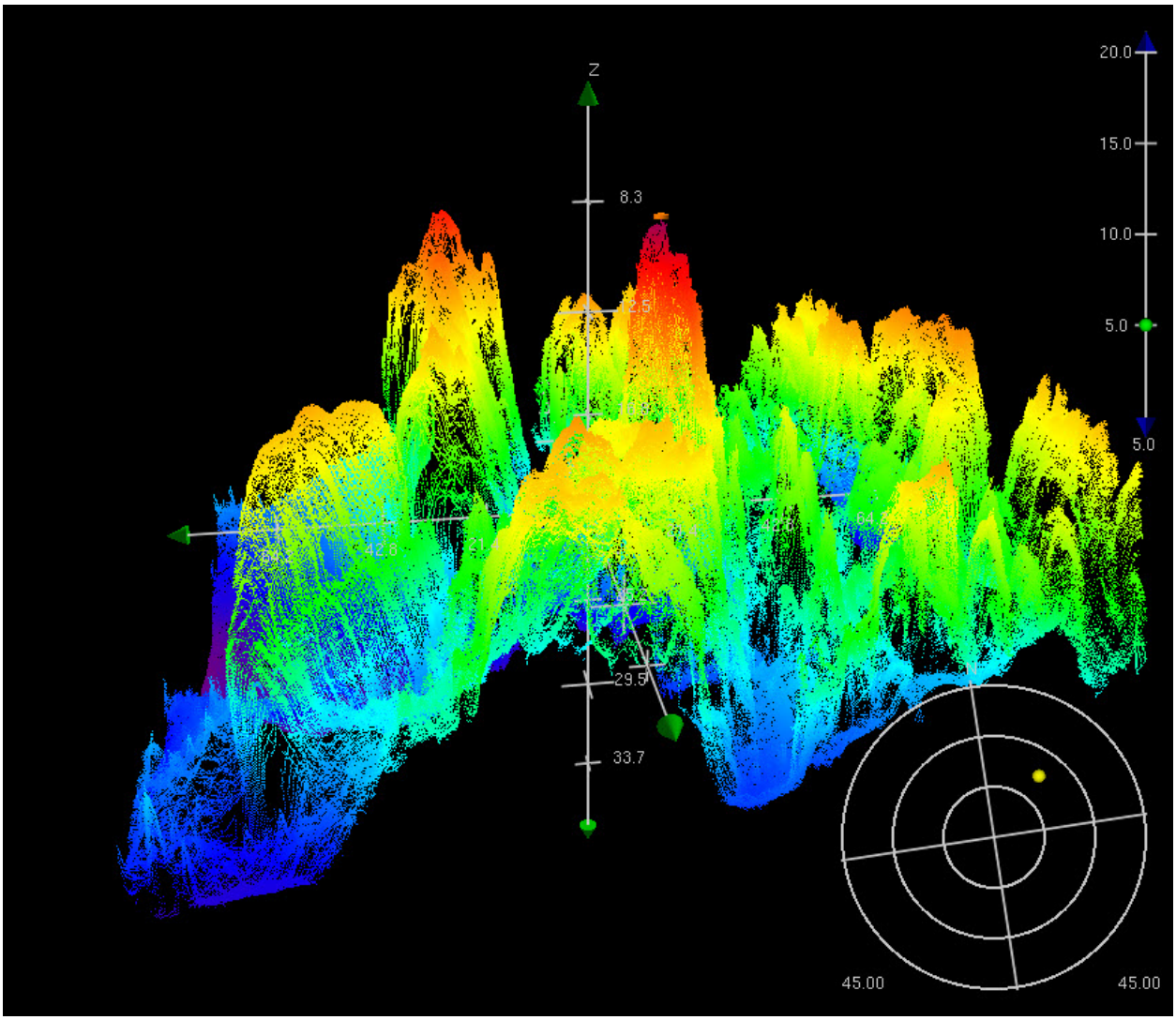


Figure 1.12.1

H12219 Anti - Danger to Navigation Report #1

Registry Number: H12219

State: Washington

Locality: OCNMS

Sub-locality: Point of Arches

Project Number: OPR-N324-FA-10

Survey Date: 06/06/2010

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18485	16th	03/01/2007	1:40,000 (18485_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 12/25/1999 (05/15/2010)
18460	13th	10/01/2006	1:100,000 (18460_1)	[L]NTM: ?
18480	31st	10/01/2006	1:176,253 (18480_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 10/17/2009 (05/15/2010)
18400	48th	12/01/2008	1:200,000 (18400_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_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.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	1379/355	Shoal	31.13 m	48° 12' 01.0" N	124° 46' 11.5" W	---

1 - Danger To Navigation

1.1) 1379/355

DANGER TO NAVIGATION

Survey Summary

Survey Position:	48° 12' 01.0" N, 124° 46' 11.5" W
Least Depth:	31.13 m (= 102.14 ft = 17.024 fm = 17 fm 0.14 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.984 m ; **TVU (TPEv)** ±0.252 m
Timestamp:	2010-157.17:50:49.278 (06/06/2010)
Survey Line:	h12219 / fa_2808_400khz_rsn7125_512bms_2010 / 2010-157 / 2010m_1571746
Profile/Beam:	1379/355
Charts Affected:	18485_1, 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Investigation with complete coverage multibeam echosounder of AWOIS item 53141 found no shoal. Underwater rock from H12221 is likely AWOIS item 53141 'Breaker rep' from chart (18480). See H12221 DTON Report 1 item 1.1.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12219/fa_2808_400khz_rsn7125_512bms_2010/2010-157/2010m_1571746	1379/355	0.00	000.0	Primary

Hydrographer Recommendations

Remove obstruction symbol and associated text, replace with surveyed sounding.

Cartographically-Rounded Depth (Affected Charts):

17fm (18485_1, 18480_1, 18400_1, 18003_1, 18007_1, 530_1)

17fm (18460_1, 531_1)

31m (501_1, 50_1)

S-57 Data

[None]

Feature Images

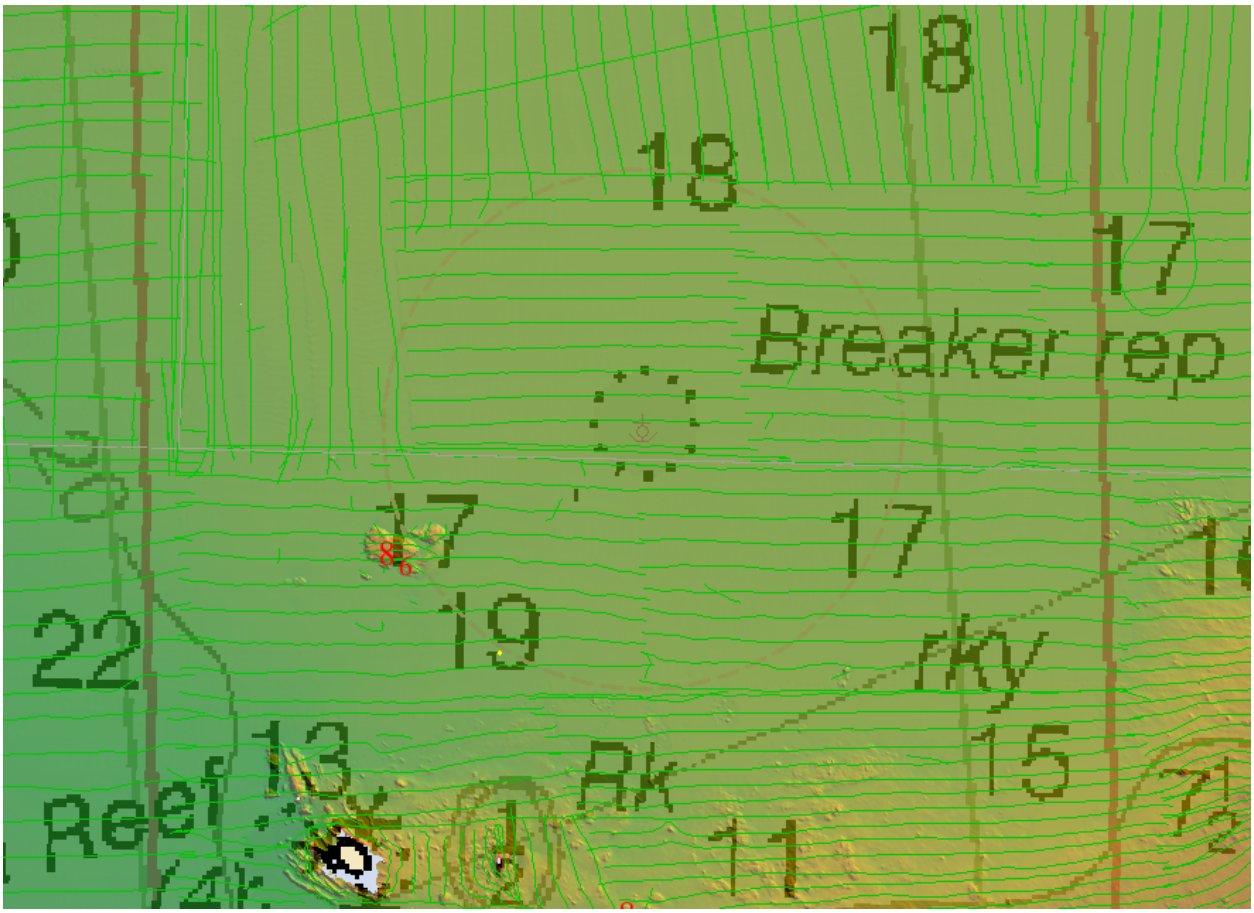


Figure 1.1.1

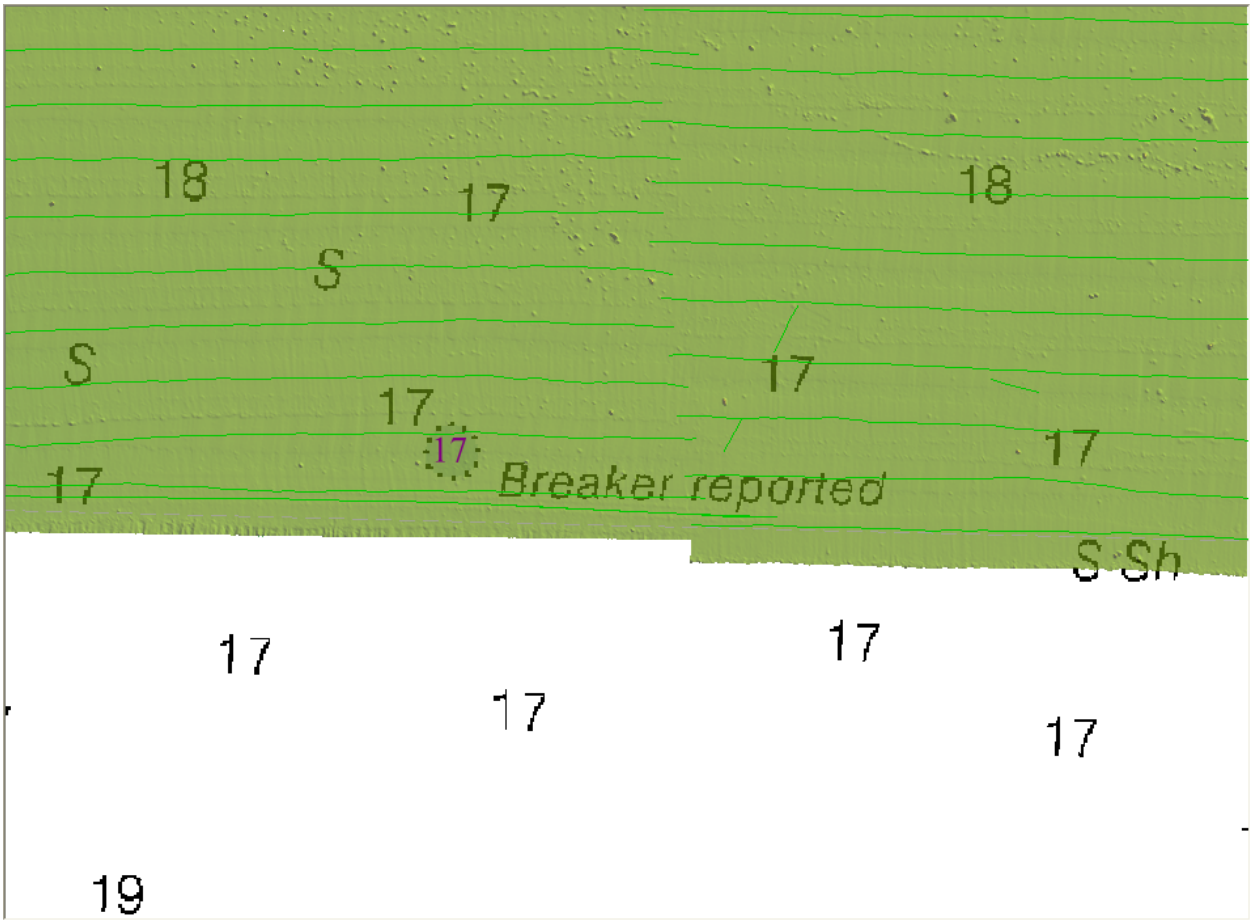


Figure 1.1.2

RECRD	**53141**	VESSLTERMS	OBSTRUCTION	CHART	18485	AREA	N
		CARTOCODE	067	SNDINGCODE		DEPTH	

LAT83	48/12/.7	LONG83	124/46/11.6	NATIVDATUM	31
LATDEC:	48.200194	LONDEC:	-124.769889	GPQUALITY	Low
				GPSOURCE	Scaled

PROJECT	OPR-N324-FA-10	ITEMSTATUS	Assigned	SEARCHTYPE	Full
RADIUS	1000	INIT	MCR	ASSIGNED	9/27/2001
TECNIQ	VS,MB				
Techniqnote	Remark: AWOIS 53141 Charted breakers/obstruction disproved by complete MBES. New rock found 1000 meters to the Southwest on sheet H12221 of same project. Recomendation: Remove Breaker Obstruction Symbol, replace with surveyed soundings. Chart (H12221-Feature ID 0000005023 00001) rock found to the Southwest.				

History	**** SOURCE UNKNOWN; ITEM APPEARS ON THE 1ST ED OF CHART 6102 (NOW 18480) IN 1918. POS SCALED FROM LARGEST SCALE CAHRT, 18485. ENTERED 9/04 MCR

Proprietary

Office notes: This item has been disproved in the location above and and Anti-DTON report was submitted the the FAIRWEATHER. A DTON was submitted with Survey H12221 with a rock located at 48-11-44.09N, 124-46-57W. This update has been applied to the chart and ENC.

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 7, 2010

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N324-FA-2010
HYDROGRAPHIC SHEET: H12219

LOCALITY: Point of Arches, OCNMS
TIME PERIOD: June 2 - June 22, 2010

TIDE STATION USED: 944-2396 La Push, WA
Lat. 47° 54.8'N Long. 124° 38.1' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.357 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-N324-FA-2010, H12219, during the time period between June 2 to June 22, 2010.

Please use the zoning file "N324FA2010CORP" submitted with the project instructions for OCNMS. Zones PAC220 and PAC222 are the applicable zones for H12219.

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

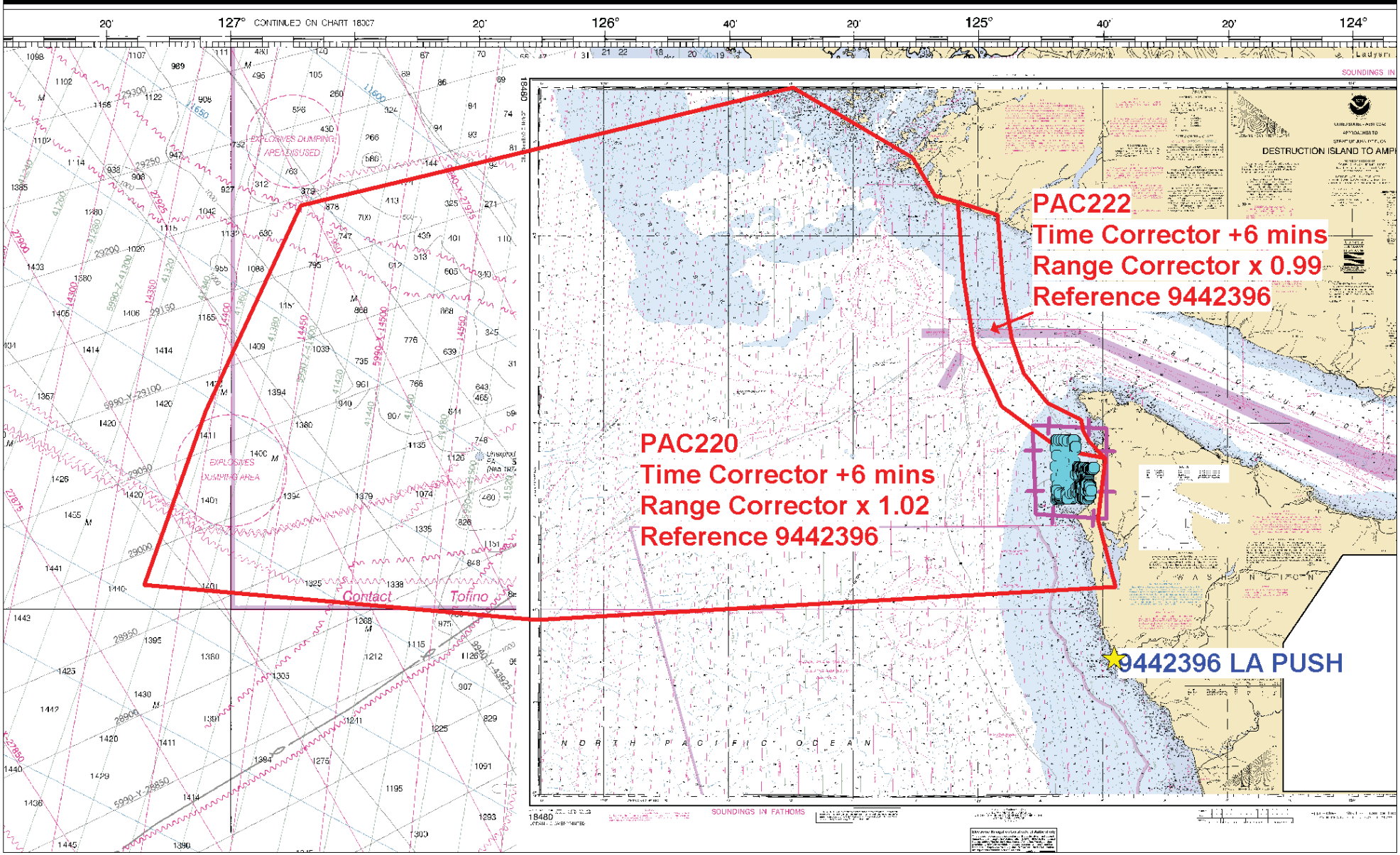
Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2010.07.08 12:42:26 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION

Preliminary As Final Tidal Zoning for OPR-N324-FA-2010, H12219
Point of Arches, OCNMS, WA

te navigat on. The National
dditions, or comments for
(N/CS2), Nationa Ocean



Subject:
From:
Date:
To:
CC:

I don't have any concerns with the new layout. If this is the most efficient for the ship, considering the conditions, then go forward.

Megan.Greenaway@noaa.gov wrote:

> Jim,
>
> As a result of a constant westerly swell the FA has requested to modify the OCNMS sheet layout to a more conducive East-West direction to run ship hydro. Please see attached current coverage and updated layout.
> The priorities will remain the same. The FA will start in the northern section of H12221 and work south. They will survey down to the division between H12222 and H12223 (magenta line on chart) and then move to H12222 and then H12223. Once finished with all other sheets they will finish the southern section of H12221 and square it off.
> The OCNMS office has agreed to the new layout. Please let us know if we can move forward with these updates.
>
> Thanks,
> Megan
>
> ---

H12219 HCell Report

Martha Herzog, Physical Scientist
Pacific Hydrographic Branch

1.0 Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12219 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.
HCell Reference Guide: Version 2.0, 2 June, 2010.

2. 0 Compilation Scale

Depths and features for HCell H12219 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
18485	1:40,000	16th	3/01/2007	05/28/2011

The following ENCs were also used during compilation:

Chart	Scale
US5WA04M	1:40,000

3. 0 Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 2-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	200	5

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

4.0 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H12219_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 18485	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H12219_SS.000
1	1.8288	2.0574	1.125	1
2	3.6576	3.8862	2.125	2
3	5.4864	5.715	3.125	3
10	18.288	18.517	10.125	10

With the exception of the zero contours included in the H12219_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the H12219_CS file and soundings in the H12219_SS have been. This may result in conflicts between the H12219_SS file contours and HCell features at or near the survey limits. Conflicts with M_QUAL and SBDARE objects should be expected. HCell features should be honored over H12219_SS.000 file contours in all cases where conflicts are found.

5.0 Meta Areas

The following Meta object areas are included in HCell H12219:

M_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography.

6.0 Features

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

7.0 Spatial Framework

7.1 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.

7.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

Depth Units (DUNI):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

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

BASE Editor and S-57 Composer Units:

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

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

7.3 S-57 Object Classes

The CS HCell contains the following Object Classes:

$CSYMB	Blue Notes (points) —Notes to the MCD chart Compiler
M_QUAL	Data quality Meta object
SBDARE	Rocky seabed areas and bottom samples retained from the chart
OBSTRN	Obstruction area objects
SOUNDG	Soundings at chart scale density
UWTROC	Rock features

The M_QUAL is adequate for NDB product searches except for features in these object classes which reside outside the M_QUAL limits.

The SS HCell contains the following Object Classes:

DEPCNT	Generalized contours at chart scale intervals (See table under section 4.)
SOUNDG	Soundings at the survey scale density (See table under section 3.)

8.0 Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

9.0 QA/QC and ENC Validation Checks

H12219 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to 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 are MCD approved as inherent to and acceptable for HCells.

10.0 Products

10.1 HSD, MCD and CGTP Deliverables

H12219_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H12219 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12219 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12219 _outline.gml	Survey outline
H12219 _outline.xsd	Survey outline

11.0 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.1	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. 2.2	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, SP 1	Validation of the base cell file.

12.0 Contacts

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

Martha Herzog
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6841
Martha.herzog@noaa.gov

APPROVAL SHEET
H12219

Initial Approvals:

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

Digitally signed by Martha Herzog
DN: cn=Martha Herzog, o=NOAA, ou=Pacific Hydrographic Branch, email=martha.herzog@noaa.gov, c=US
Date: 2011.07.25 16:02:55 -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.

Digitally signed by Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2011.07.26 08:18:45 -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.

Digitally signed by NELSON.GARY.C.1365885318
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=NELSON.GARY.C.1365885318
Date: 2011.07.27 12:00:05 -07'00'