H12276

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No.

Registry No. H12276

LOCALITY

State Oregon

General Locality Columbia River

Sublocality Harrington Point to Three Tree Point

2010

CHIEF OF PARTY
Dan Jacobs, NOAA NRT 3

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12276

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 **Oregon**

General Locality **Columbia River**

Sub-Locality **Harrington Point to Three Tree Point**

Scale **1:10,000** Date of Survey **October 7, 2010 - January 23, 2011**

Instructions dated **10/5/2010** Project No. **OPR-N338-NRT3-10**

Vessel **S1212 (NRT 3)**

Chief of party **Dan Jacobs, NOAA NRT 3**

Surveyed by **Dan Jacobs, B. Jackson, Ian Colvert**

Soundings by **Kongsberg EM3002 Multibeam Echosounder**

SAR by **Keith H. Toepfer** Compilation by **Fernando Ortiz**

Soundings compiled in **Feet**

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. The processing branch concurs with all information and recomendations in the DR unless otherwise noted. 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 H12276

Project OPR-N338-NRT3-10
Columbia River Harrington Point to
Three Tree Point Scale 1:10,000
October 2010 to January 2011
NOAA NRT-3 (S1212)

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-N338-NRT3-10 signed October 5, 2010 and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is from Harrington Point to Three Tree Point in the Columbia River. This survey corresponds to sheet "A" in the sheet layout provided with the Project Instructions. Deep draft vessels routinely transit the lower Columbia River en route to various ports upriver. Although the USACE maintains the navigational channels on the river, many changes have occurred outside the channels since the last surveys were conducted in the 1950's. The purpose of project OPR-N388-NRT3-10 is to provide contemporary survey data to update National Ocean Service (NOS) nautical charts.

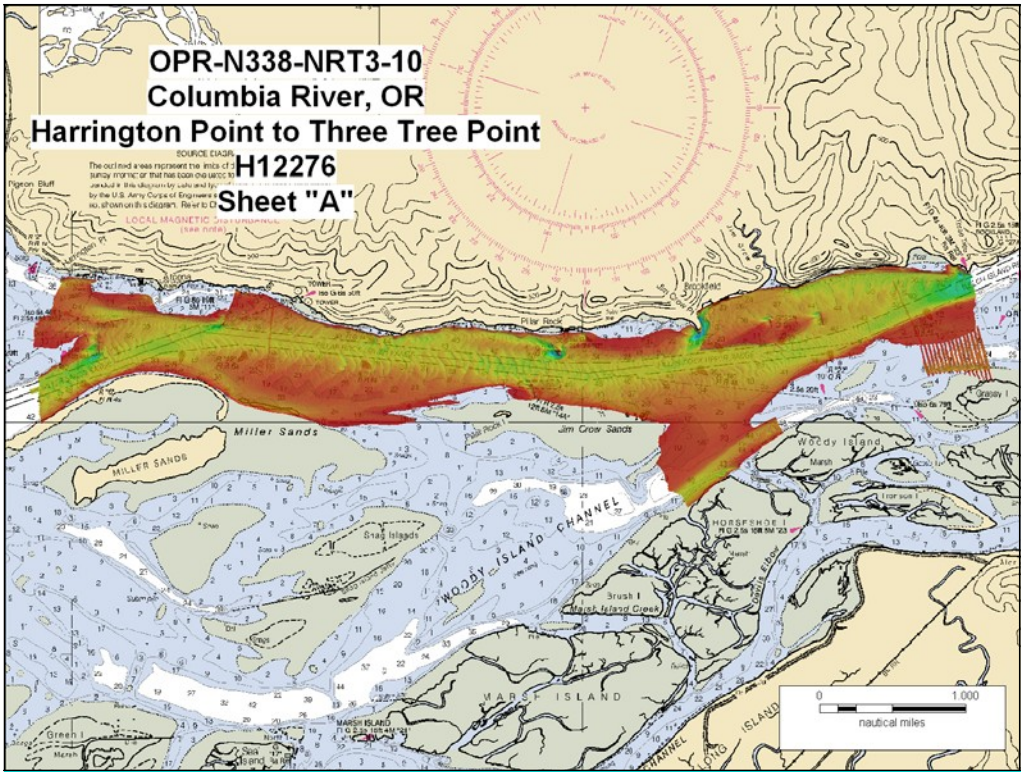

Figure 1: H12276 Survey Area (chart 18523).

[1] NOS Hydrographic Surveys Specifications and Deliverables (April 2010), OCS Field Procedures Manual for Hydrographic Surveying (April 2010), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

Complete multibeam echosounder (MBES) coverage was achieved in the assigned survey area in waters 4 meters and deeper except where the hydrographers deemed it unsafe or not navigationally significant (Figure 1). H12276 survey mileage is referenced in Table 1. This survey was continued approximately 700 meters south of the assigned survey area, using 50 meter line spacing in order to locate the 4 meter contour (Figure 2). H12276 assigned survey area and survey outline are shown in Figure 3.

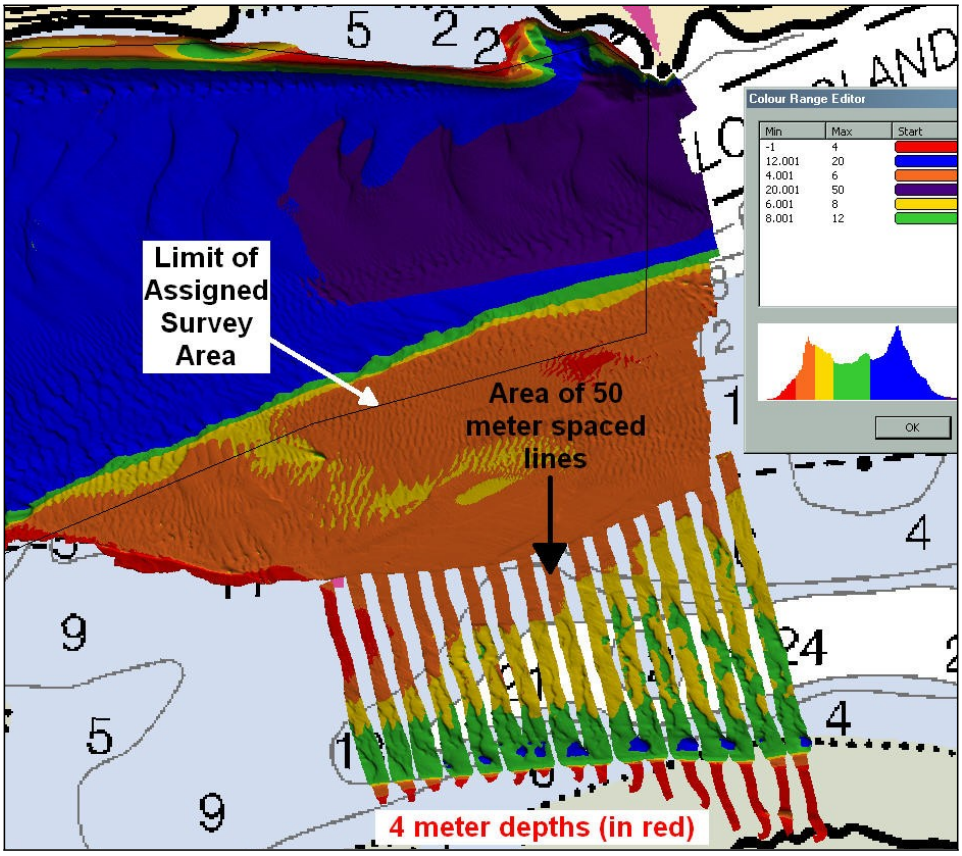

Figure 2: Extended coverage area.

Limited Shoreline Verification was performed seaward of the Navigable Area Limit Line (NALL) within the assigned survey area for H12276, as per section 3.5.5 of the Field Procedures Manual April, 2010 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .hob files, see section D.2.a.

Launch S1212 Data Acquisition Type	Mileage
MBES (mainscheme)	**299.8 (nm)**
Crosslines	**15.3 (nm)**
Total Area Surveyed	**4.21 (sq. nm)**

Table 1: Statistics for survey H12276.

Data acquisition was conducted from October 7, 2010 to January 23, 2011 (DN280 to DN23).

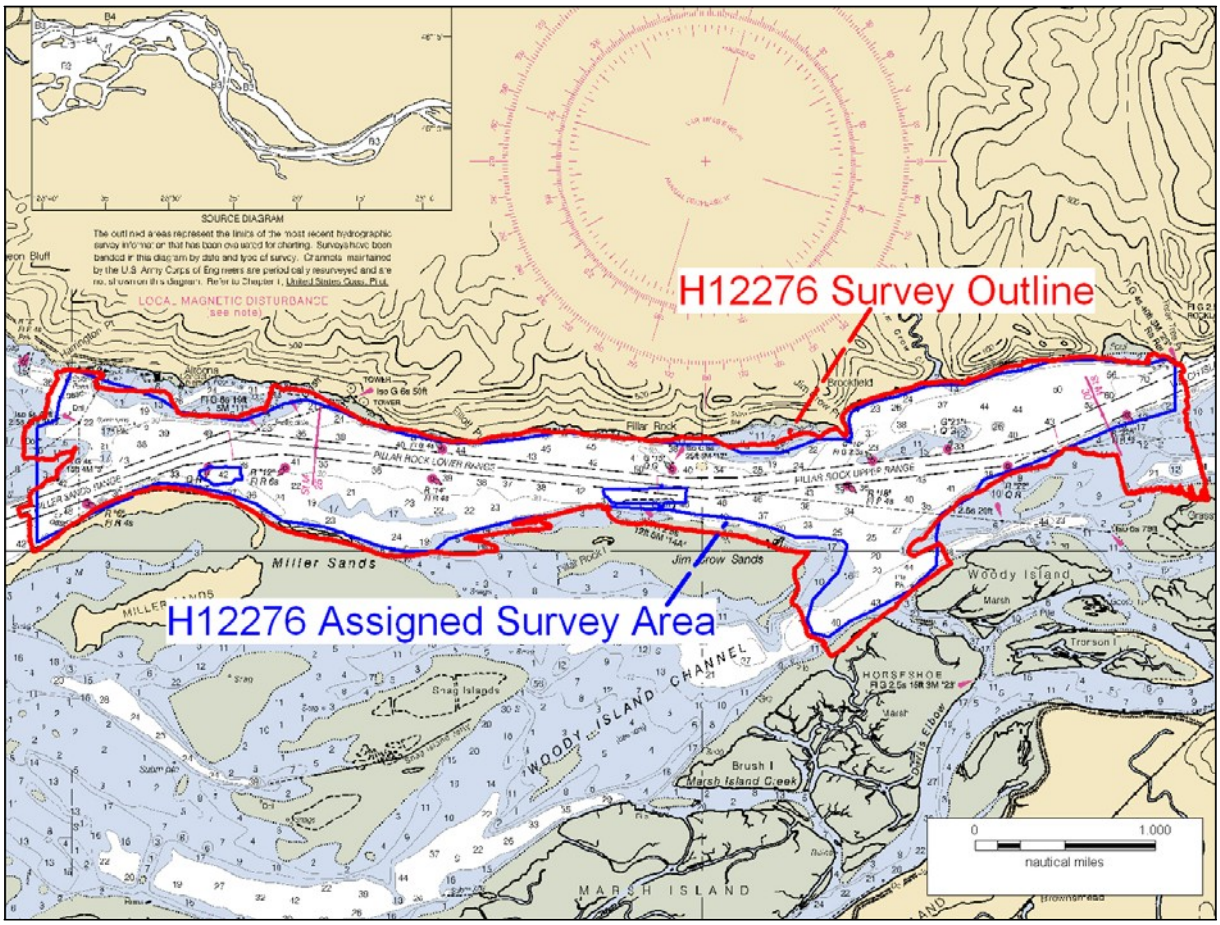

Figure 3: H12276 Survey Outline.

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-N338-NRT3-10 Data Acquisition and Processing Report* (DAPR), submitted with this survey. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

Final Approved Water Levels have been applied to this survey. See Section C. for additional information.

B.1. Equipment and Vessels

Data for this survey were acquired by the following vessel:

Hull Number	Name	Length	Draft	Acquisition Type
S1212	SeaArk	30 ft	.65m	Kongsberg EM 3002 echo sounder.

Table 2: Data acquisition vessel and systems for H12276.

Sound speed profiles were measured in accordance with the Specifications and Deliverables using a SEACAT SBE-19+ profiler.

Multibeam vessel navigation and attitude data were measured and recorded using Applanix POS/MV 320 systems, version 4.

A complete description of survey vessels, hardware, and software systems is included in the *OPR-N338-NRT3-10 DAPR.* No unusual vessel configurations were used for data acquisition.

B.2. Quality Control

Crosslines

Multibeam Echosounder (MBES) crosslines (XL) totaled 15.3 nautical miles, comprising 5% of main scheme (MS) MBES bathymetry. CARIS BASE surfaces of the mainscheme and crossline data were created and compared using the cursor information tool in CARIS HIPS and SIPS. One hundred twenty five (125) locations were compared; the results are shown in Table 3. 92.8% of crossline data agreed with main scheme data within 0.3 meters.

Depth Difference between MS and XL	Number of Measurements	Percent of Total
0	31	24.8
.1m	45	36
.2m	25	20
.3m	15	12
.4m	8	6.4
.5m	1	0.8

Table 3: H12276 Crossline statistics.

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2010 Hydrographic System Readiness Review package submitted separately.

Final Uncertainty

Uncertainty values of submitted, finalized grids were calculated in Caris using the "Greater of the Two" of total propagated uncertainty and standard deviation (scaled to 95%). In CARIS HIPS, an "IHOness" attribute layer was created for the H12276 finalized combined surface using the following Order 1 formula: ((0.5 +((Depth*0.013)^2))^0.5)-Uncertainty. Uncertainty values throughout survey H12276 meet IHO Order 1, shown as green in Figure 4.

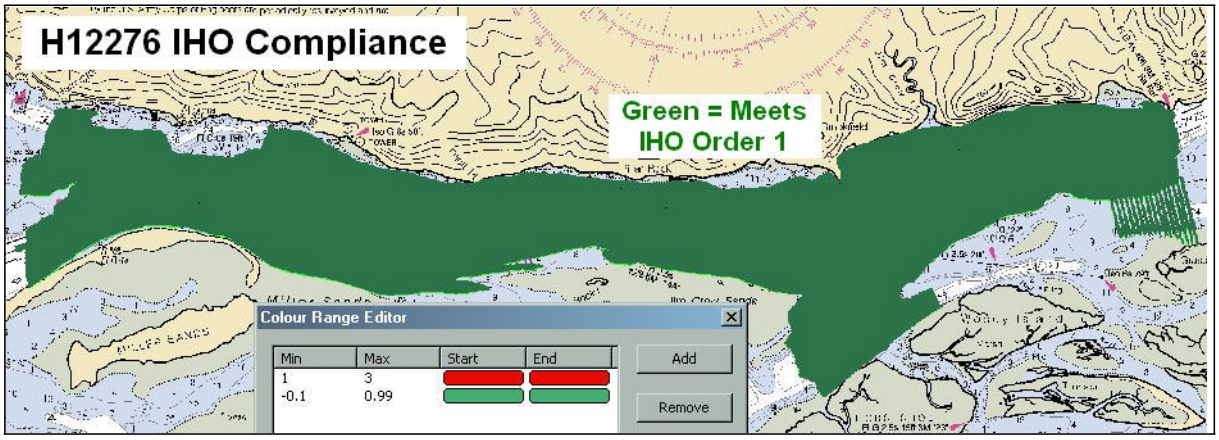

Figure 4: H12276 IHO Compliance.

Junctions

Survey H12276 junctions with H11854 to the East, and with H11927 to the West[1] (Table 4, Figure 5). Bathymetric Attributed Grids (BAG) of H11854 and H11927 were provided by the Navigation Response Branch for junction comparison. The area of overlap between the sheets was reviewed in CARIS HIPS using the cursor information tool. Due to the long time between surveys and to the extremely dynamic nature of the Columbia River bottom, which includes migrating sand waves, scouring and deposition, substantial differences were seen between H12276 and its junction surveys.[2]

Twenty one (21) comparisons were made between H12276 and H11927. Differences ranged from 0.1 to 2.0 meters in water depths between approximately 5 to 30 meters. No general deepening or shoaling trend was seen.

Twenty one comparisons were made between H12276 and H11854. Differences ranged from 0.2 to 2.5 meters in water depths between approximately 4 to 30 meters. Depths varied substantially over sand wave areas and within the dredged channel. Little to no differences were found over Three Tree Point, which is rocky in nature and very resistant to change.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H11854	1:10,000	2008-2009	East of H12276
H11927	1:10,000	2008	West of H12276

Table 4: H12276 Junction surveys.

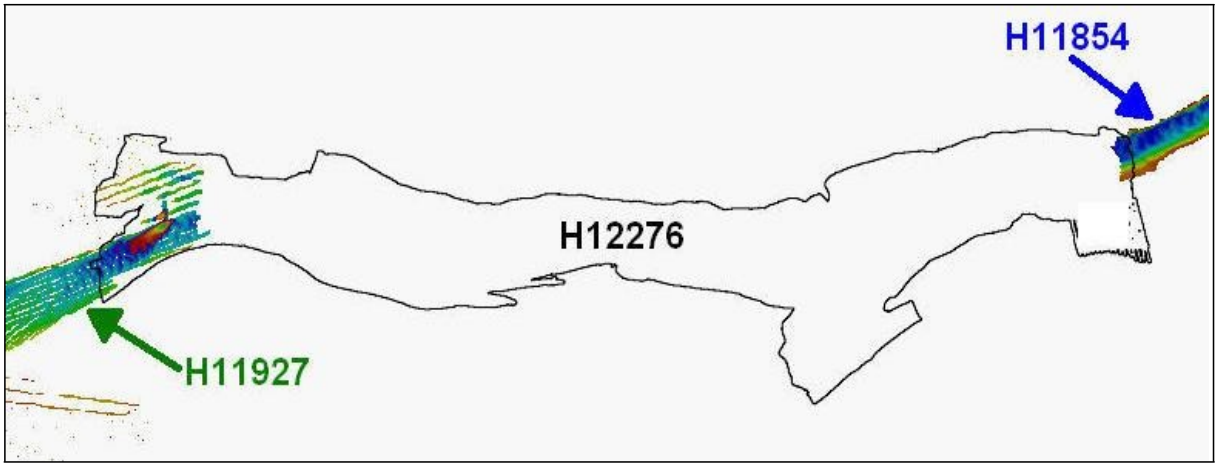

Figure 5: H12276 Junction surveys.

Quality Control Checks

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

Data Quality Factors

Environmental Conditions

Due to the dynamic nature of the Columbia River, strong currents, significant sediment transport, sand wave migration and other related factors, data quality was adversely affected in some areas of the survey. The greatest evidence of this is found where overlapping data was acquired many hours to days apart, as with crosslines. For this reason, crosslines were not incorporated into BASE surfaces but were used for analysis. Figures 6 and 7 illustrate a six-meter horizontal offset and BASE surface artifacts caused by sand wave migration over a nine (9) day period.[3]

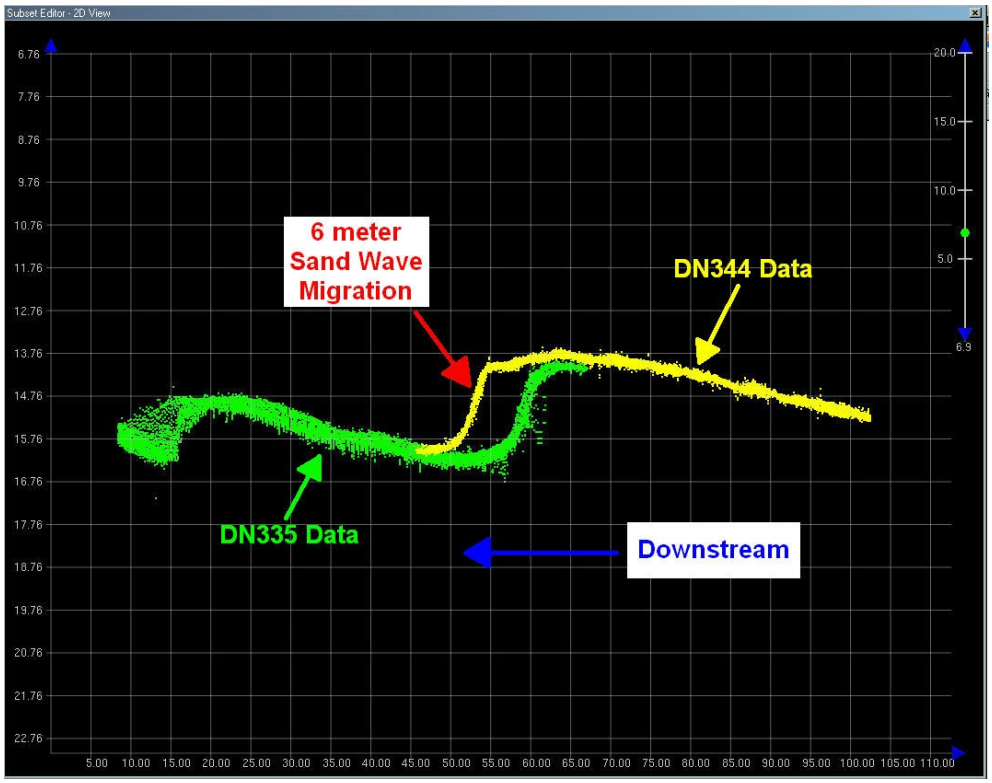

Figure 6: six-meter horizontal sand wave migration.

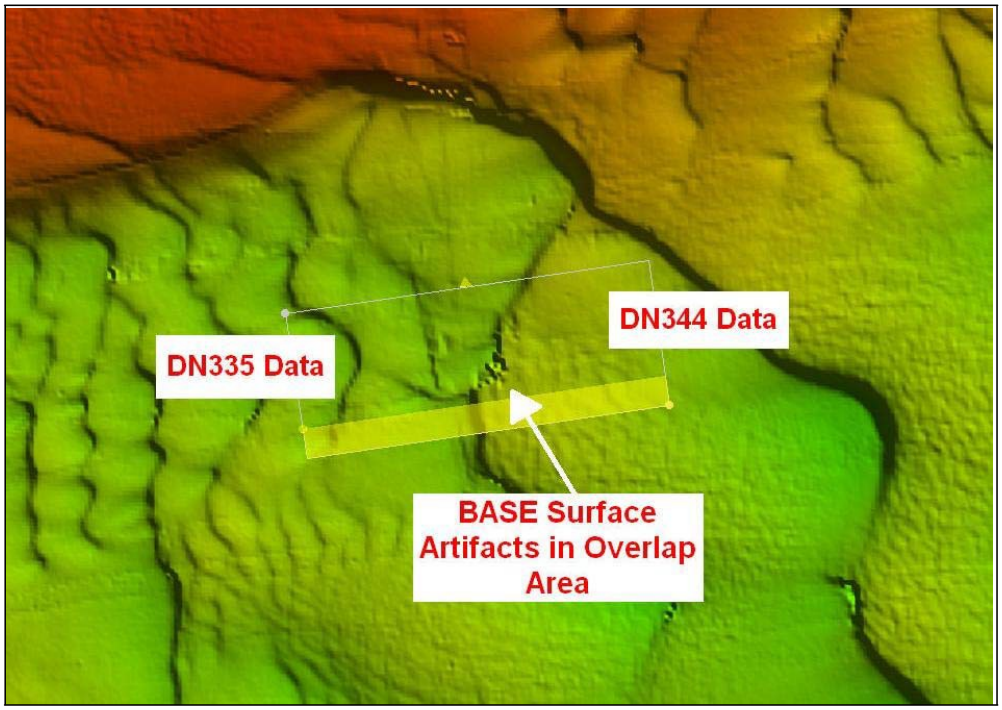

Figure 7: H12276 BASE Surface artifacts.

Every attempt was made to minimize the time between adjacent survey coverage, however, weather delays and other scheduling difficulties sometimes prevented this. Figure 8 is an example, east of Jim Crow Point, of BASE surface artifacts apparent in data acquired eleven (11) days apart.

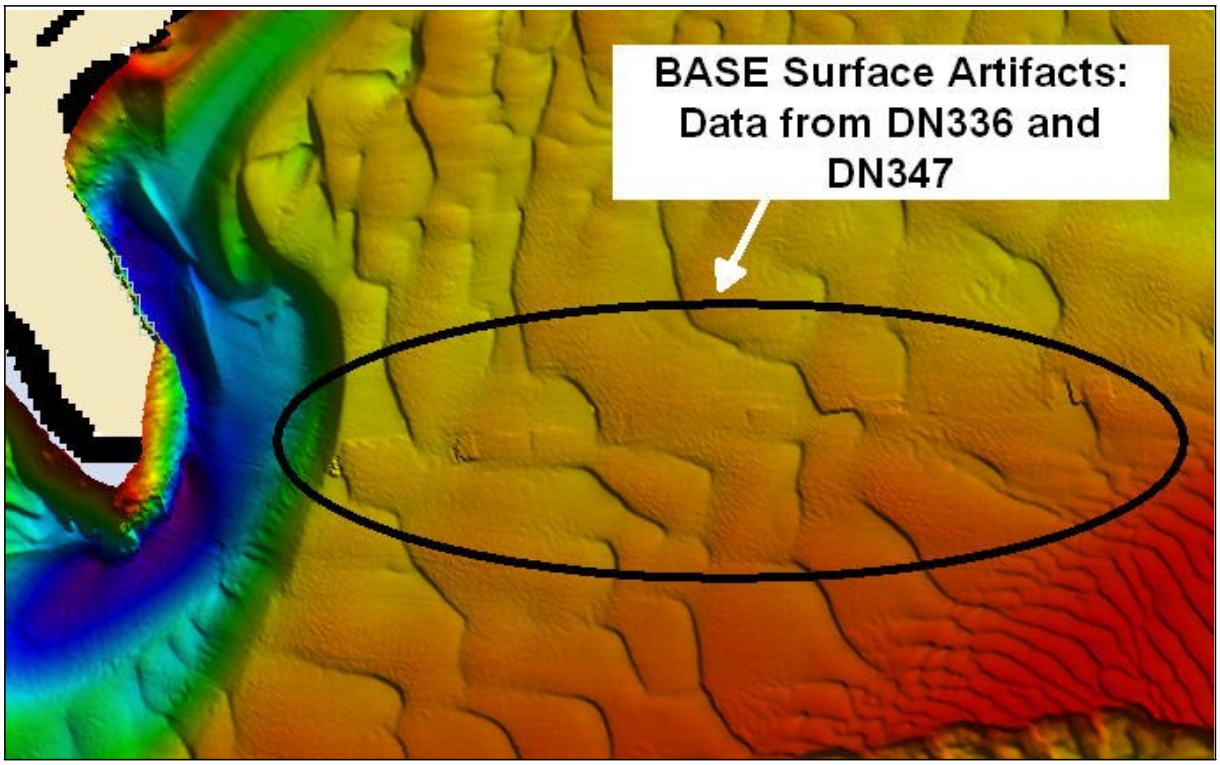

Figure 8: H12276 BASE Surface artifacts from data acquired eleven days apart.

Acquisition System

Occasional instances of suboptimal sonar bottom tracking were noted when acquiring data over the face of sand waves. Examined in CARIS 2D Subset Editor, "clouds" of soundings appear to deviate from the regular slope profile, misdirecting the BASE reference surface as shown in Figure 9. Where possible, the errant soundings were rejected resulting in an artifact free surface. In other cases, holidays resulted from rejecting these errant soundings; therefore they were reaccepted, resulting in artifacts as shown in Figure 10.

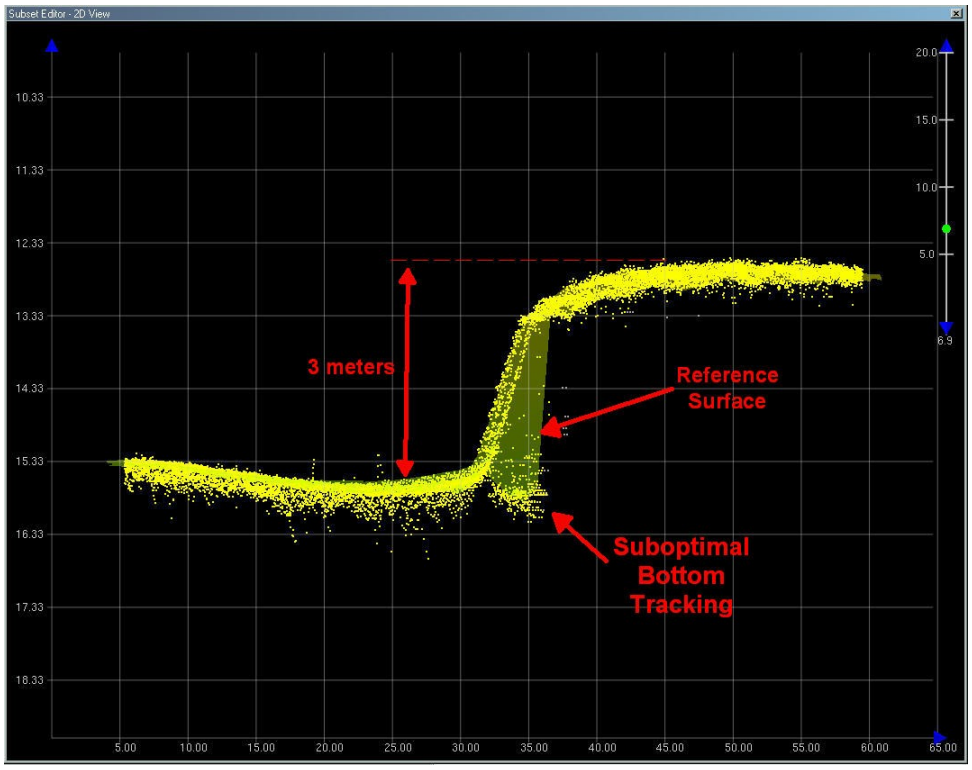

Figure 9: Subset editor view of suboptimal bottom tracking.

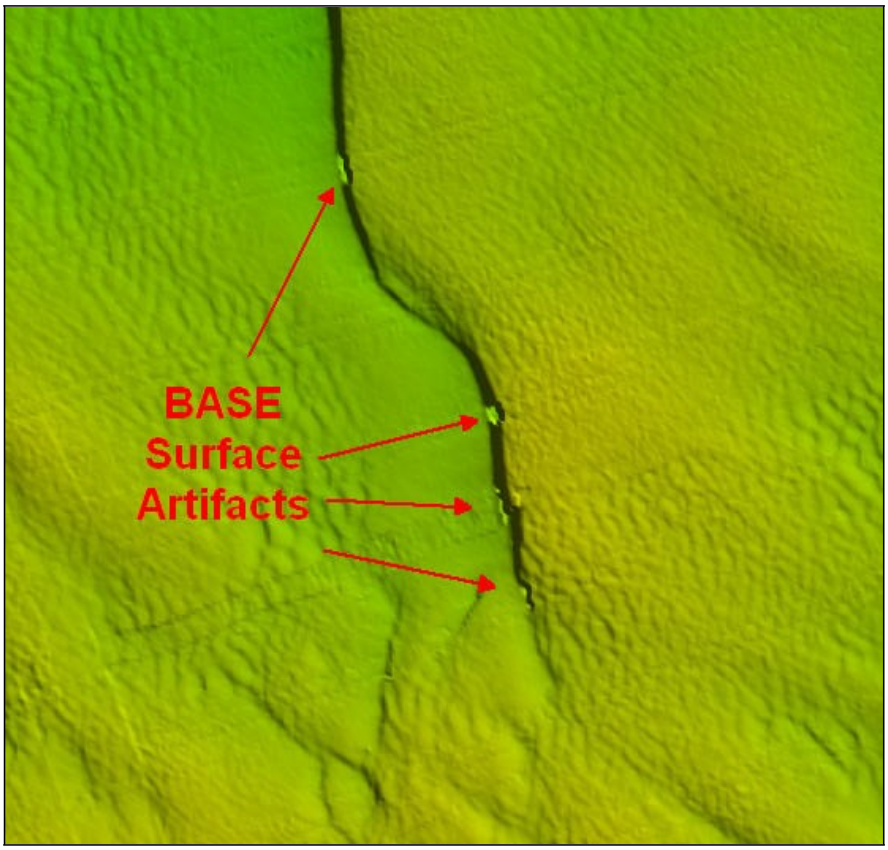

Figure 10: BASE surface artifacts due to suboptimal bottom tracking.

Sound Speed Artifacts

Due to variation in water column temperatures, river currents, tidal influence and other related factors, a distinct demarcation of water masses was sometimes observed in the field. This proved to be problematic in the acquisition and application of sound velocity (SV) correctors. Sound velocity data were applied real-time by the Kongsberg processing unit during acquisition; no post processing of sound velocity data is possible at this time. Despite the best efforts of the Hydrographers to conduct sufficient sound velocity casts distributed both spatially and temporally, in some areas sound velocity data correction was suboptimal. Some lines exhibited upward or downward deflection when viewed in CARIS 2D Subset Editor, indicative of inaccurate SV correction.[4] To compensate, outer-beam soundings obviously in error, were rejected.

Object Detection and Coverage Assessment

Holidays larger than three (3) nodes across were detected at the locations given in Table 5. The corresponding multibeam backscatter data was examined and no navigationally significant items were detected; additionally, the least depths were represented.[5]

Latitude	Longitude
46-15-44.44N	123-31-14.71W
46-15-44.26N	123-33-08.70W
46-15-15.57N	123-35-47.64W
46-15-38.13N	123-39-53.55W
46-15-11.56N	123-35-27.22W

Table 5: H12276 Holidays.

Unusual Conditions

See Data Quality Factors.

B.3. Corrections to Echo soundings

Data reduction procedures for survey H12276 conform to those detailed in the *OPR-N338-NRT3-10 DAPR.*

B.4. Data Processing

Data processing procedures for survey H12276 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v7.0, Service Pack 1, and Hotfix 1-5. On November 10, 2010, CARIS v7.0 Service Pack 2, Hotfix 2-4 was installed; further processing and finalizing of data were performed using this software. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized are discussed below.

TPU VALUES:

The survey specific parameters used to compute TPU in CARIS for H12276 are listed in Table 6.

Tide values:	Measured	0.01 m	Zoning	0.13 m
Sound Speed Values:	Measured	0.50 m/s	Surface	0.3m/s

Table 6: H12276 CARIS TPU Parameters.

One field sheet, two single-resolutions, two finalized and one final combined CARIS BASE surface was created to process this survey.[6] Final BASE surface resolutions and depth ranges were set according to Table 7 below. CUBE surfaces were processed using the file "CUBEParams_2010.xml" which is included with the data deliverables. The submission Field Sheet and BASE Surface structure are shown in Figures 11 and 12. Crosslines were not included in the creation of BASE surfaces but were used for analysis purposes.

Depth Range (m)	Resolution (m)
0-23	1
20-52	2

Table 7: Depth range and surface resolutions for H12276.

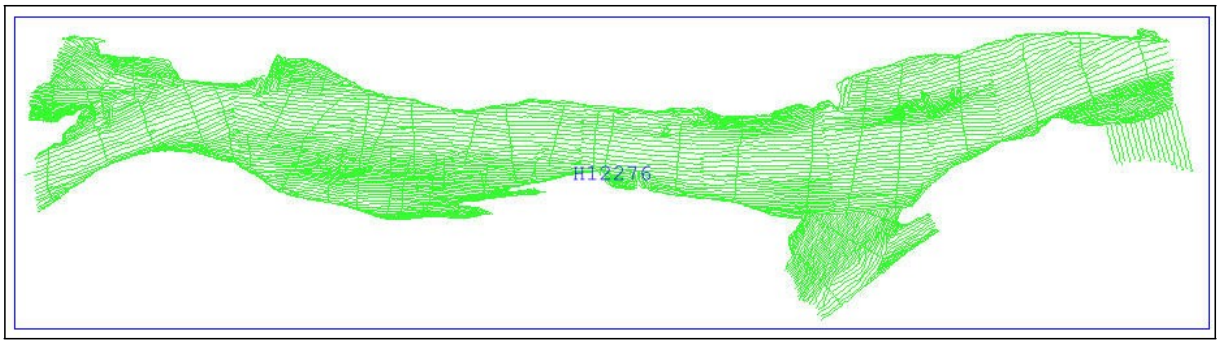

Figure 11: H12276 Field sheet and multibeam track lines.

In areas were multibeam data was acquired on charted cultural features (pilings, piers, etc.) that were above MLLW, all data were rejected on the feature itself to more accurately represent the seafloor below these features.

Contours and soundings were generated in CARIS HIPS from the final combined BASE surface for field unit review purposes. They are included for reference only and are not intended as a deliverable.

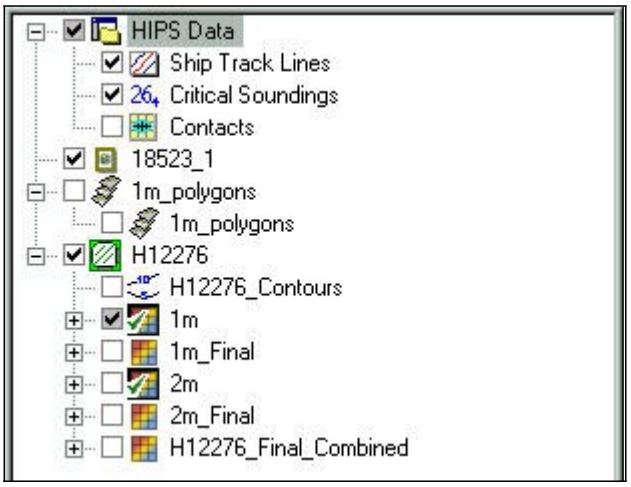

Figure 12: Field sheet and BASE surfaces submitted with H12276.

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N338-NRT3-10 did not require static GPS observations or other horizontal control work, and all tide corrections were generated from CO-OPS maintained tide stations. Thus, no Horizontal and Vertical Control Report has been submitted.

C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacon utilized for this survey is given in Table 8.

Location	Frequency	Operator	Priority
Fort Stevens, OR	287 kHz	USCG	Primary

Table 8: Differential Corrector Source for H12276.

C.2. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Astoria, Oregon (943-9040) served as control for datum determination and as the primary source for water level reducers for survey H12276. No tertiary gauges were required.

Preliminary zoning was accepted as the final zoning for project OPR-N338-NRT3-2010 (see Appendix IV). All data were reduced to MLLW using the final approved water levels (verified tides) from the Astoria, OR station (943-9040) by applying tide file 9439040.tid and time and height correctors through the zone corrector file N338NRT32010CORP.zdf. It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during branch processing.

The request for Final Approved Water Levels for H12276 was submitted to CO-OPS on

January 24, 2011 in accordance with the Field Procedures Manual (FPM), dated April 2010. The Final Tide Note was received on February 9, 2011. This documentation is included in Appendix IV.[7]

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.4-D.1 of the HSSDM, utilizing CARIS HIPS and SIPS software program.

Survey H12276 was compared with ENC US5OR12M (4/6/2011 update) and with the following print on demand charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
18523	1:40,000	57th Ed, May 2010	04/12/2011
18521	1:40,000	74th Ed, Aug 2009	04/12/2011

Table 9: Charts compared with H12276.

Chart 18523

H12276 was compared to the largest scale raster and electronic navigation charts (RNC and ENC). The results of these comparisons are described below and in sections D.1.b through D.2.h.

H12276 soundings are generally deeper than charted. Soundings agreed with charted (18523) depths to within 6 feet across all depth ranges except as indicated in Figures 13 and 14. Green circles in Figures 13 and 14 indicate where H12276 soundings are within 6 feet of charted depths, red circles indicate where soundings are greater than 6 feet shoaler than charted, and blue circles indicate where H12276 soundings were greater than 6 feet deeper than charted.[8]

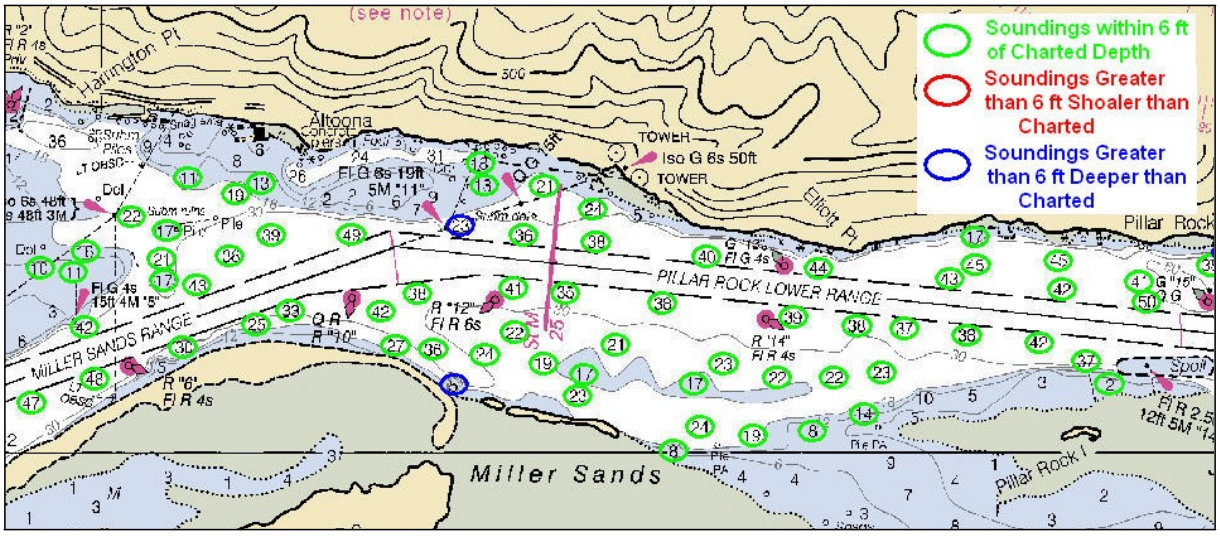

Figure 13: H12276 Sounding comparison, western survey area.

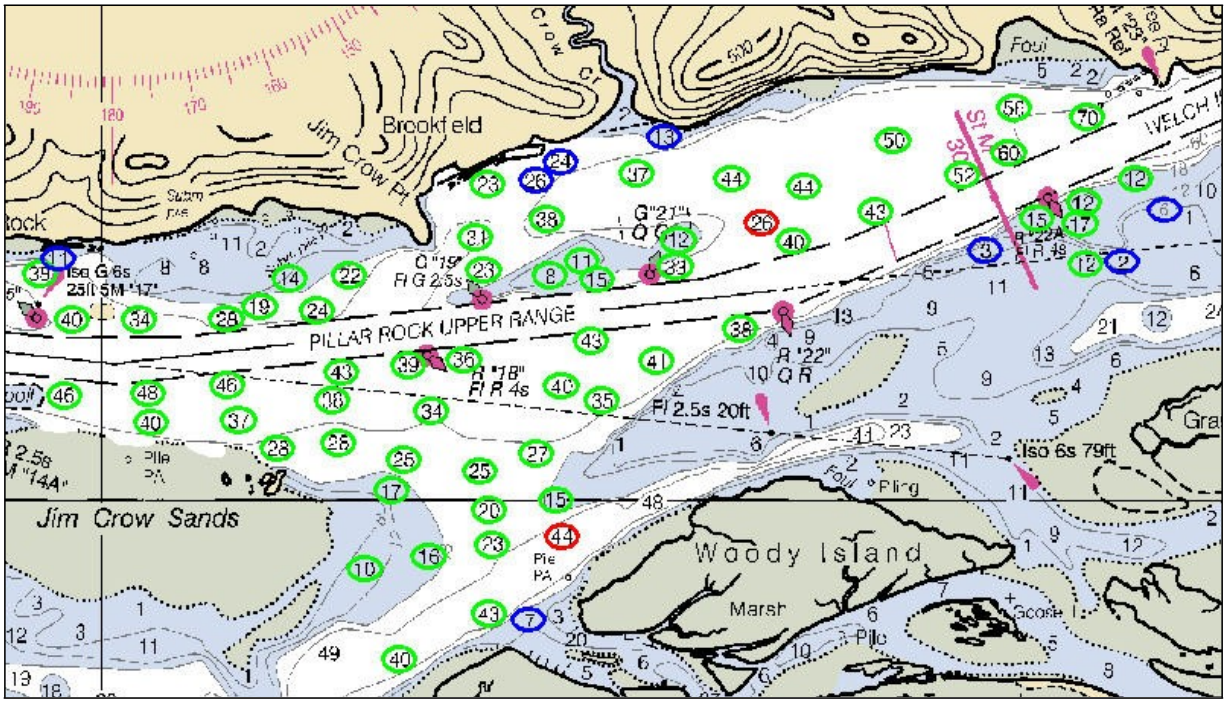

Figure 14: H12276 Sounding comparison, eastern survey area.

The following four U.S. Army Corps of Engineers (USACE) maintained channels are affected by survey H12276: Miller Sands Range, Pillar Rock Lower Range, Pillar Rock Upper Range and Welch Island Range. Except as noted below, H12276 found depths in these channels were deeper than the controlling depths listed on chart 18523 (tabulated from USACE surveys, report of June 10, 2010). Slight shoaling (1-3 feet) was observed at the edge of the channel in the Pillar Rock Upper Range at the right outside quarter, position 46-15-33.31N, 123-32-19.32W.[9]

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.[10]

D.1.b. Automated Wreck and Obstruction Information System (AWOIS) Items

Two (2) AWOIS items fall the within the survey limits of H12276. Of these, one was assigned for full investigation, and one was included for information purposes only. Descriptions of each AWOIS item investigation are included in the H12276 Feature Report in Appendix II.[11]

D.1.c. Other Investigated Features

Additional Items

Additional features investigated within the limits of this survey are described in the H12276 Feature Report in Appendix II.[12]

D.1.d. Dangers to Navigation

Three (3) Dangers to Navigation (DTONs) were found on survey H12276 and reported to the Marine Chart Division via email on April 13, 2011. The original DTON submission package is included in Appendix I.[13] Figures 15 and 16 depict print on demand chart 18523 before and after H12276 DTONs were applied.

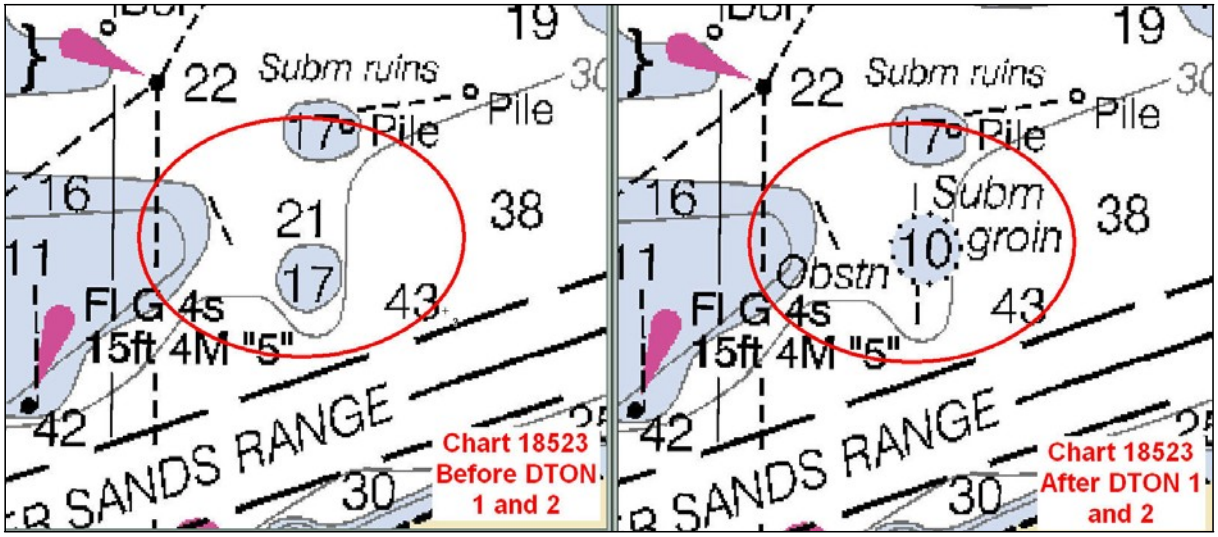

Figure 15: Chart 18523 before and after H12276 DTON 1 and 2 were applied.

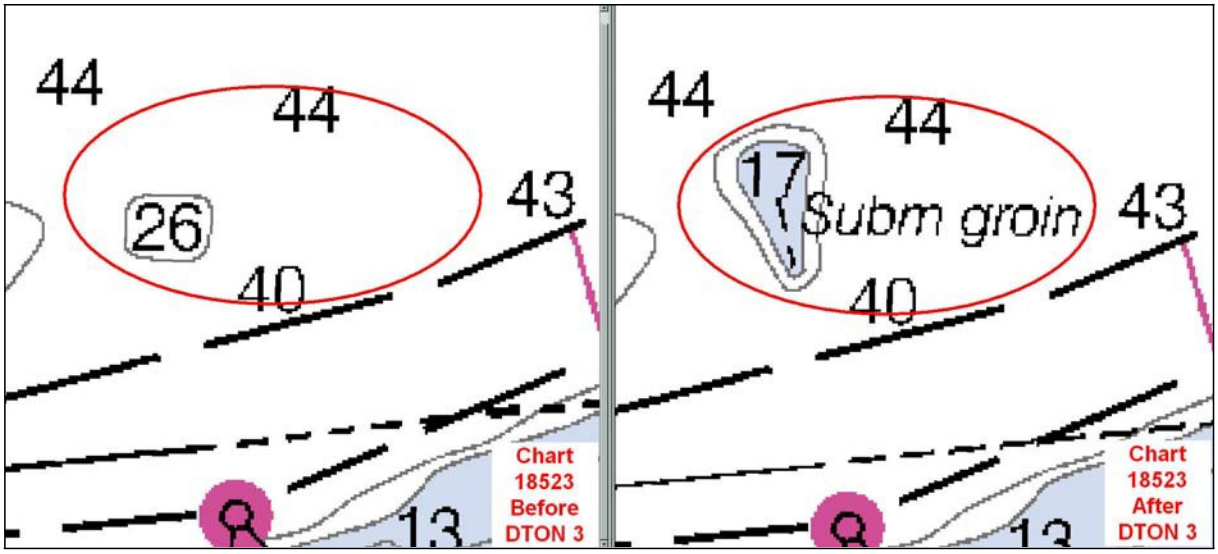

Figure 16: Chart 18523 before and after H12276 DTON 3.

Note: As of April 25, 2011, the submerged groin depicted in figure 16 was not applied to ENC US5OR12M.

D.2. Additional Results

D.2.a. Shoreline Verification

Shoreline Source

Limited shoreline verification was accomplished using the Project Reference File (PRF) and the Assigned Feature File (AFF) provided with the project instructions. The PRF contains the limits of the assigned survey area and the Automated Wreck and Obstruction Information Service (AWOIS) features and search radii. The AFF is a subset of the Composite Source File (CSF) which includes those features specifically assigned for investigation by this survey. Both the PRF and the AFF are S-57 attributed datasets in .000 file format.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM sections 8.2 and 3.5. Assigned features seaward of the Navigation Area Limit Line (NALL) were addressed as required, S-57 attributed and recorded in the appropriate CARIS Notebook (v3.0, SP1, HF1) .hob files indicated in table 10 and submitted with this survey.

Shoreline File	Description
H12276_Original_AFF.hob	Original source data (0_1AFF01.000) as provided for project OPR-N338-NRT3-10 and filtered to the limits of survey H12276 and converted to .hob format.
H12276_Field_Verified_AFF.hob	Original source data converted to .hob format and modified by the field to best represent shoreline features at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey
H12276_Disprovals.hob	Original source data converted to .hob format then deleted or modified based on H12276 survey findings.
0_4PRF01.000	Project Reference File with survey limits and AWOIS item positions and search radii.

Table 10: List and Description of H12276 Notebook files.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .hob files listed in Table 10 supersede and complement the original source data and charts as described above.[14]

D.2.b. Prior Survey Comparison

A prior survey comparison was not performed.

D.2.c. Aids to Navigation

No ATONS were assigned by the Marine Chart Division (MCD) for positioning. All aids to navigation (ATONs) appear correctly charted and serve their intended purpose.[15]

D.2.d. Overhead Features

There are no overhead features within the limits of survey H12276.

D.2.e. Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the limits of H12276, and none were detected by the survey.

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H12276, and none were observed to be operating in the area.

D.2.g. Bottom Samples

There was no bottom sample requirement for this project.[16]

D.2.h. Other Findings

Due to the highly dynamic nature of this section of the Columbia River, including strong currents, sand wave migration, shoaling and USACE dredging operations, H12276 data and representative products are reflective of the dates and time of this survey only.[17]

E. APPROVAL

As Chief of Party, Field operations for hydrographic survey H12276 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2010 edition), Field Procedures Manual (April 2010 edition), Standing and Project Instructions, and all HSD Technical Directives issued through January 2011. 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.

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

Title	Date Sent	Office
Data Acquisition and Processing Report for OPR-N338-NRT3-10	*Submitted with this report*	N/CS34

Approved and Forwarded:

Dan Jacobs
Acting Team Lead, NOAA NRT3

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

NRT3 Team Member:

B. Jackson
Physical Science Technician, NOAA NRT3

NRT3 Team Member:

Ian Colvert
Physical Science Technician, NOAA NRT3

Revisions and corrections performed during office processing and certification.

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[1] H12276 junctions with H11854 to the East, and H11927 to the West. A common junction was made with the adjoining portion of these surveys.
[2] Due to the dynamic nature of the seabed and constant changes along the Columbia River, the compiler recommends adding a cautionary note to the chart. Use caution when navigating outside of maintained channels.
[3] Data is adequate to supersede charted data in the common area despite the nature of the sand wave migration. Shoalest soundings are depicted in the HCell. See endnote 2.
[4] Data is within specifications and adequate to supersede charted data in the common area, despite the sound velocity data correction.
[5] Holidays were examined in Caris HIPS and SIPS and no navigationally significant features were found. Chart per HCell.
[6] A two meter combined surface submitted by the field was used for cartographic compilation of this survey.
[7] Tide note is appended to this document.
[8] Concur with clarification. Chart soundings as shown in the HCell.
[9] The channel depths at this location are within the range of the tabulated depths.
[10] Concur with clarification. Chart soundings as shown in the HCell.
[11] AWOIS report is appended to this report. Concur with the hydrographers recommendations.
[12] Feature report is attached to this report. Do not concur with the hydrographers recommendation of charting the 3.3m rock at position 46-15-27.91N, 123-35-13.34W. At chart scale the rock symbol will not fit on the chart because the rock is between the charted Pillar Rock (islet) and the charted G "15" buoy.
[13] DTON report is attached to this report and all DTONS have been applied to the latest chart. For DTON # 3, an obstruction feature was added to the HCell to supersede the charted 17 ft. at 46-15-44.034N, 123-32-39.191W.
[14] Concur with clarification. The submitted hob files were used in the compilation of HCell H12276. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.
[15] Chart ATONs per latest ATONIS information.
[16] There were no charted bottom samples to be retained.
[17] Use latest USACE information for depth tabulations within the mentioned channel.

H12276 Dangers To Navigation

Registry Number: H12276

State: Oregon

Locality: Columbia River

Sub-locality: Harrington Point to Three Tree Point

Project Number: OPR-N338-NRT3-10

Survey Dates: 10/07/2010 - 12/10/2010

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18523	57th	05/01/2010	1:40,000 (18523_1)	USCG LNM: 8/31/2010 (9/21/2010) CHS NTM: None (8/27/2010) NGA NTM: 3/4/2000 (10/2/2010)
18521	73rd	04/01/2008	1:40,000 (18521_1)	[L]NTM: ?
18520	26th	10/01/2005	1:185,238 (18520_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: ?
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	Obstruction	3.12 m	46° 15' 33.0" N	123° 39' 43.2" W	---
1.2	Shoal	4.15 m	46° 15' 32.8" N	123° 39' 43.6" W	---
1.3	Shoal	5.37 m	46° 15' 44.0" N	123° 32' 39.2" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 955/59 from h12276 / nrt3_s1212_em3002 / 2010-280 / h12276000_1653

DANGER TO NAVIGATION

Survey Summary

Survey Position:	46° 15' 33.0" N, 123° 39' 43.2" W
Least Depth:	3.12 m (= 10.23 ft = 1.705 fm = 1 fm 4.23 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.378 m ; **TVU (TPEv)** ±0.307 m
Timestamp:	2010-280.16:54:05.759 (10/07/2010)
Survey Line:	h12276 / nrt3_s1212_em3002 / 2010-280 / h12276000_1653
Profile/Beam:	955/59
Charts Affected:	18521_1, 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

H12276 Complete multibeam coverage on uncharted obstruction at position 46-15-32.97N, 123-39-43.22W. least depth 3.12 meters (10.23 ft) at the edge of charted (18523) 17 ft depth area. Object is alongside uncharted underwater groin. Object is approx 215 meters from the edge of maintained channel (Miller Sands Range).

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-280/h12276000_1653	955/59	0.00	000.0	Primary

Hydrographer Recommendations

Chart (18523) 10.2 foot obstruction at position Lat 46-15-32.97N, Long 123-39-43.22W

Cartographically-Rounded Depth (Affected Charts):

10ft (18521_1, 18523_1)

1 ¾fm (18520_1, 18003_1, 18007_1, 530_1)

3.1m (501_1, 50_1)

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 1:depth known
	SORDAT - 20110123

SORIND - US,US,nsurf,H12276

TECSOU - 3:found by multi-beam

VALSOU - 3.119 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

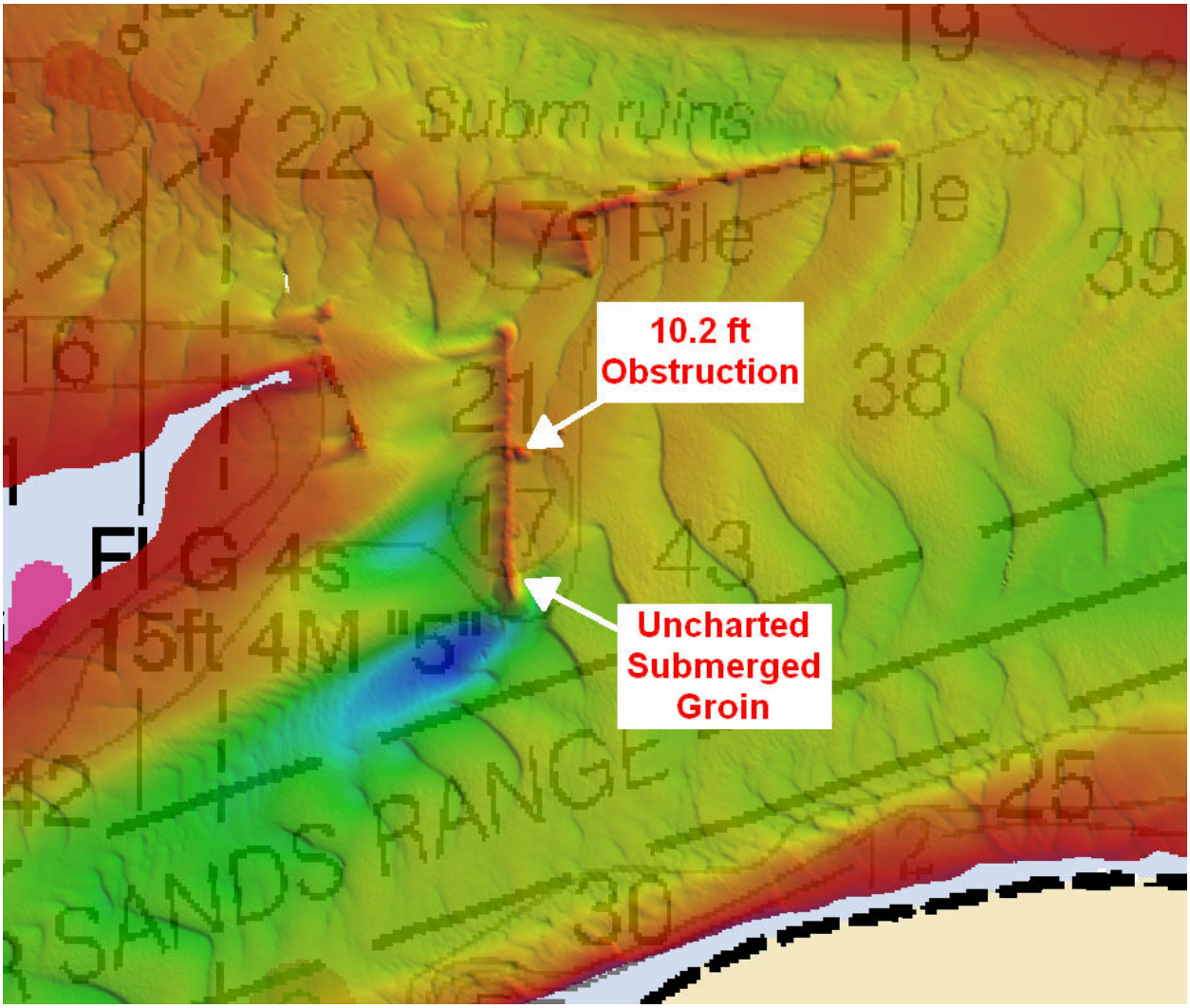


Figure 1.1.1

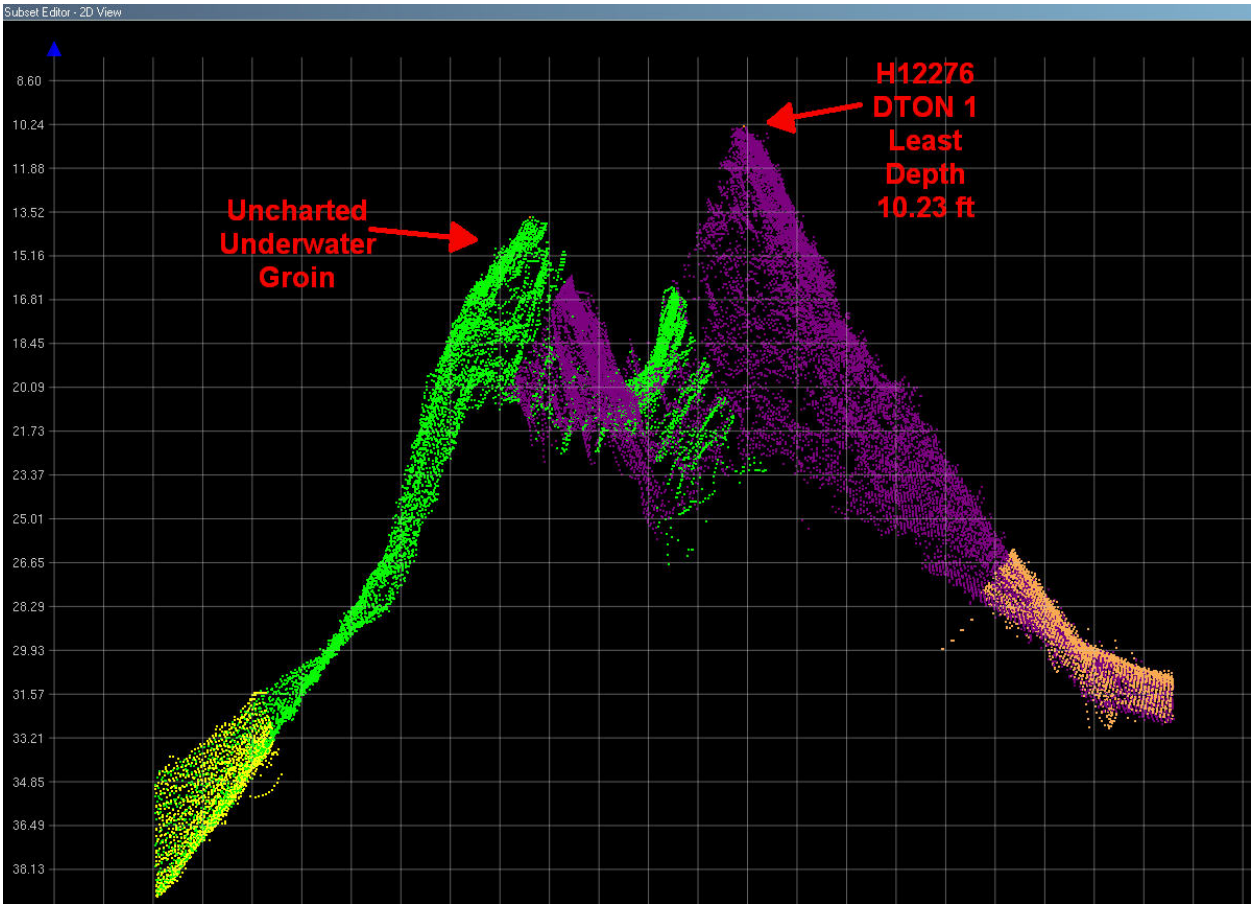

Subset Editor - 2D View
8.60
10.24
11.88
13.52
15.16
16.81
18.45
20.09
21.73
23.37
25.01
26.65
28.29
29.93
31.57
33.21
34.85
36.49
38.13
H12276
DTON 1
Least
Depth
10.23 ft
Uncharted
Underwater
Groin

Figure 1.1.2

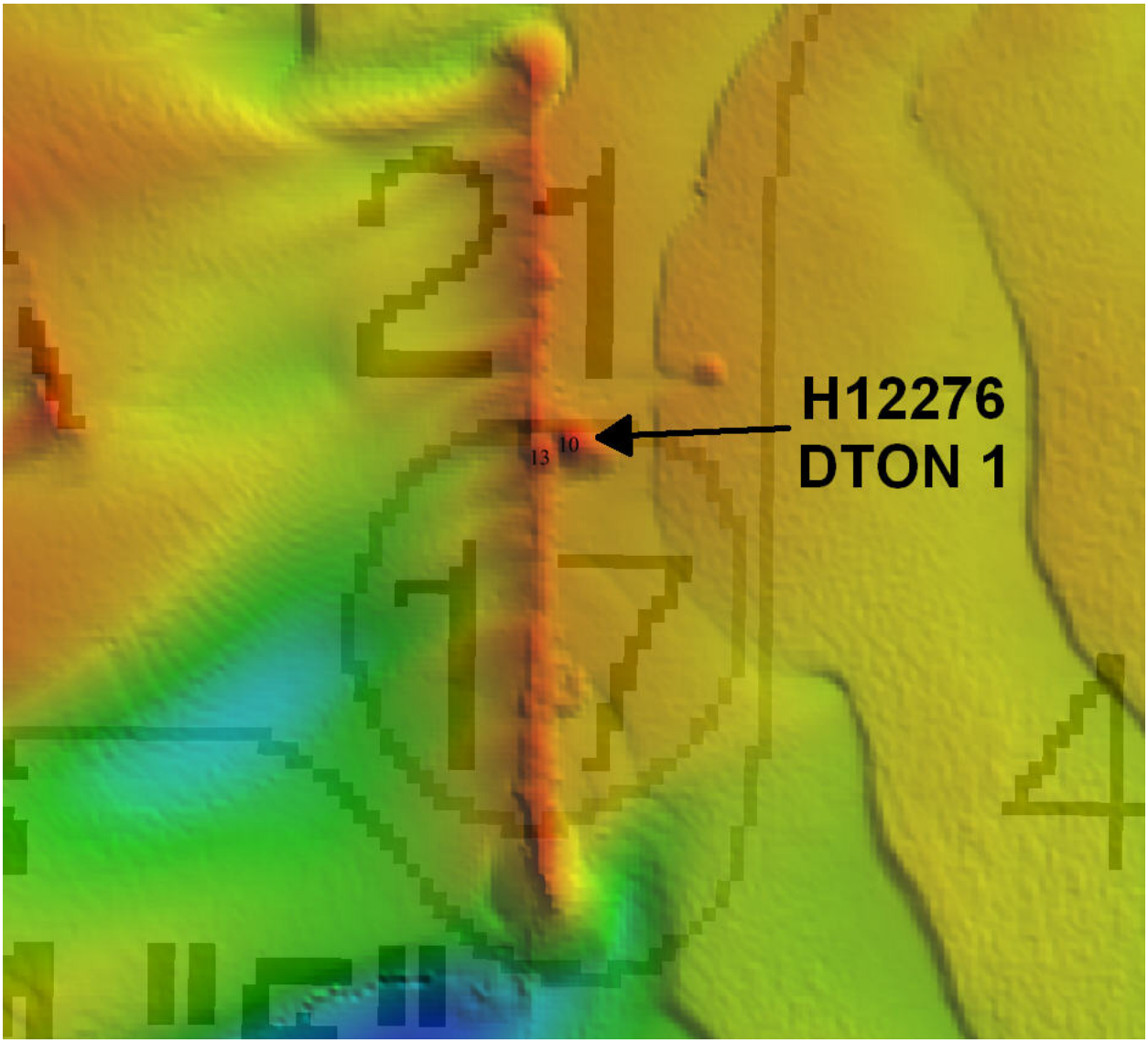


Figure 1.1.3

1.2) Profile/Beam - 335/209 from h12276 / nrt3_s1212_em3002 / 2010-280 / h12276000_1723

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 15' 32.8" N, 123° 39' 43.6" W

Least Depth: 4.15 m (= 13.60 ft = 2.267 fm = 2 fm 1.60 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.382 m ; **TVU (TPEv)** ±0.306 m

Timestamp: 2010-280.17:24:05.025 (10/07/2010)

Survey Line: h12276 / nrt3_s1212_em3002 / 2010-280 / h12276000_1723

Profile/Beam: 335/209

Charts Affected: 18521_1, 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

H12276 Complete multibeam coverage on uncharted (18523) underwater groin. Feature is approx 250 meters long. South end of groin is approx 90 meters from channel, Miller Sands Range. North end of groin at position: 46-15-36.79N, 123-39-43.78W. South end of groin at position: 46-15-28.72N, 123-39-43.40W. Least depth of 4.15 meters of groin found near middle of feature at position: 46-15-32.85N, 123-39-43.62W.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-280/h12276000_1723	335/209	0.00	000.0	Primary

Hydrographer Recommendations

Chart (18523) Underwater Groin. north end of underwater groin at position: 46-15-36.79N, 123-39-43.78W. Chart south end of underwater groin at position: 46-15-28.72N, 123-39-43.40W.

Cartographically-Rounded Depth (Affected Charts):

13ft (18521_1, 18523_1)

2 ¼fm (18520_1, 18003_1, 18007_1, 530_1)

4.1m (501_1, 50_1)

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes:

CATSLC - 2:groyne (groin)

CONDTN - 2:ruined

OBJNAM - groin

SORDAT - 20110123

SORIND - US,US,nsurf,H12276

WATLEV - 3:always under water/submerged

Feature Images

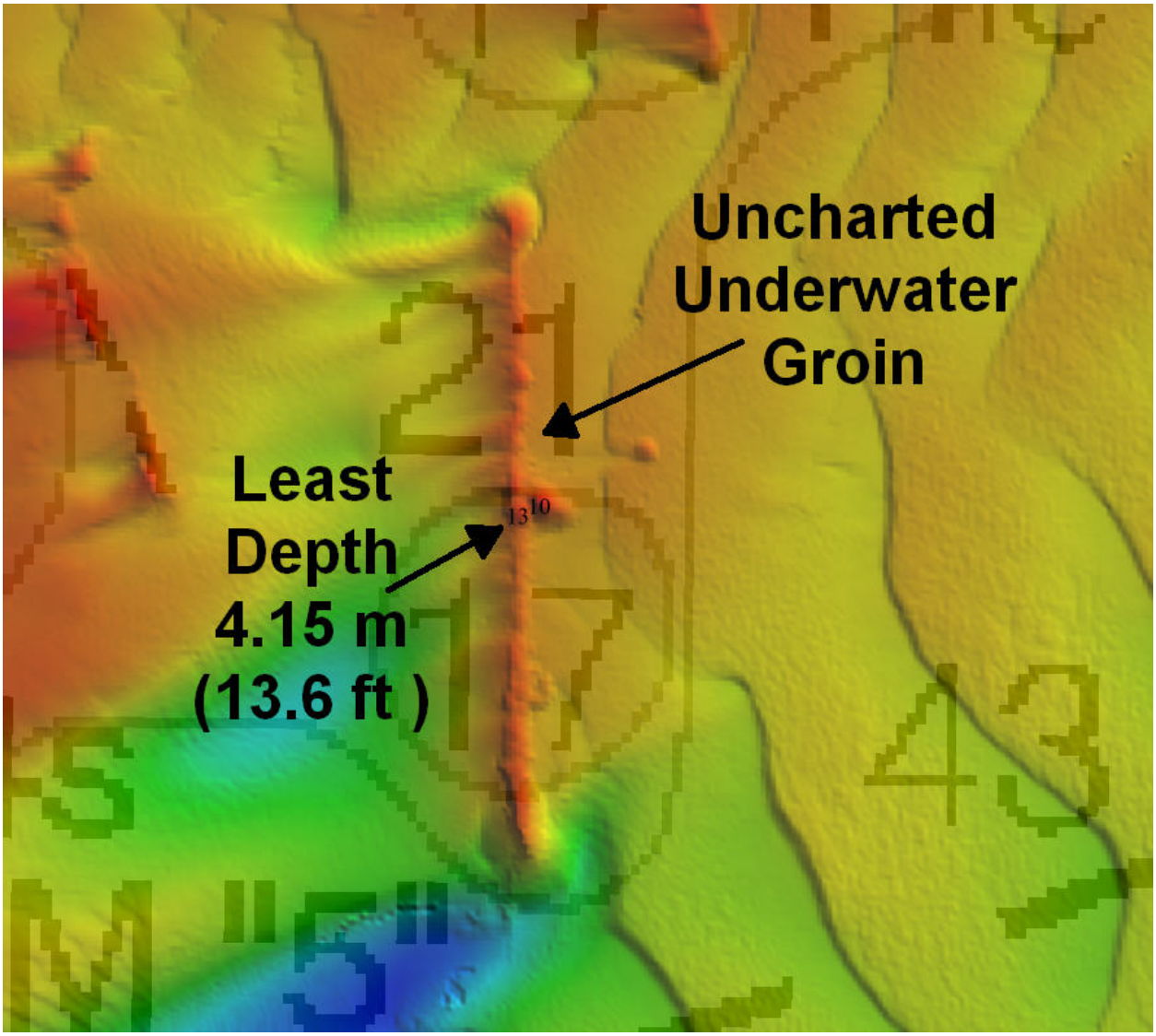


Figure 1.2.1

1.3) Profile/Beam - 2101/1 from h12276 / nrt3_s1212_em3002 / 2010-344 / h12276000_1913

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 15' 44.0" N, 123° 32' 39.2" W

Least Depth: 5.37 m (= 17.61 ft = 2.935 fm = 2 fm 5.61 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.393 m ; **TVU (TPEv)** ±0.306 m

Timestamp: 2010-344.19:15:37.926 (12/10/2010)

Survey Line: h12276 / nrt3_s1212_em3002 / 2010-344 / h12276000_1913

Profile/Beam: 2101/1

Charts Affected: 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

H12276 complete multibeam coverage over uncharted (18523) underwater groin. Least depth of 5.37 meters at position: 46°15'44.034" N , -123°32'39.191" W. North end of underwater groin at position: 46-15-44.63N, 123-32-39.42W. South end of underwater groin at position: 46-15-39.79N, 123-32-37.69W. Underwater groin approx 160 meters long.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-344/h12276000_1913	2101/1	0.00	000.0	Primary

Hydrographer Recommendations

chart north end of underwater groin at position: 46-15-44.63N, 123-32-39.42W. chart south end of underwater groin at position: 46-15-39.79N, 123-32-37.69W.

Cartographically-Rounded Depth (Affected Charts):

17ft (18523_1)

2 ¾fm (18520_1, 18003_1, 18007_1, 530_1)

5.4m (501_1, 50_1)

S-57 Data

Geo object 1: Shoreline Construction (SLCONS)

Attributes: CATSLC - 2:groyne (groin)
SORDAT - 20110123
SORIND - US,US,nsurf,H12276
WATLEV - 3:always under water/submerged

Feature Images

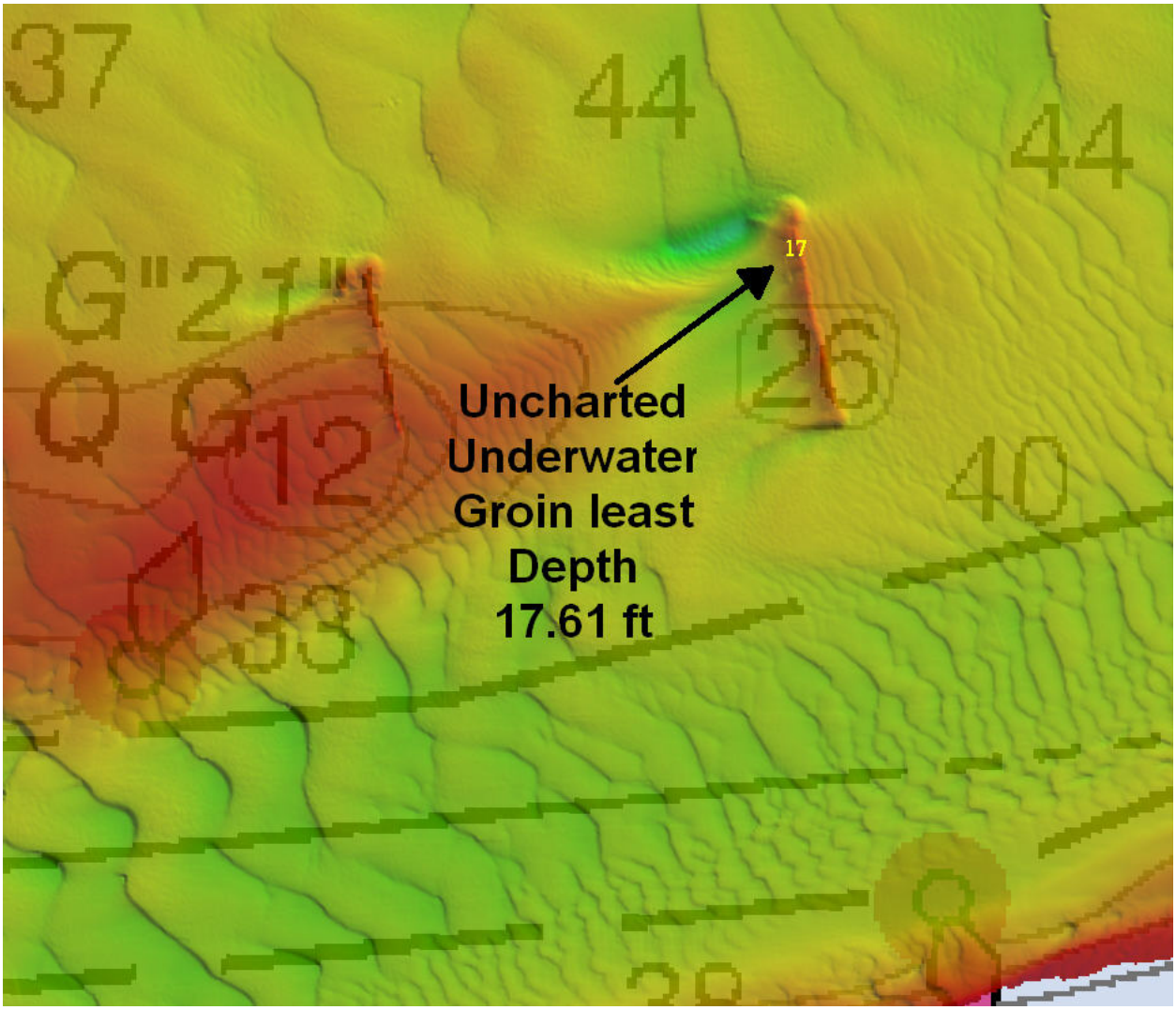


Figure 1.3.1

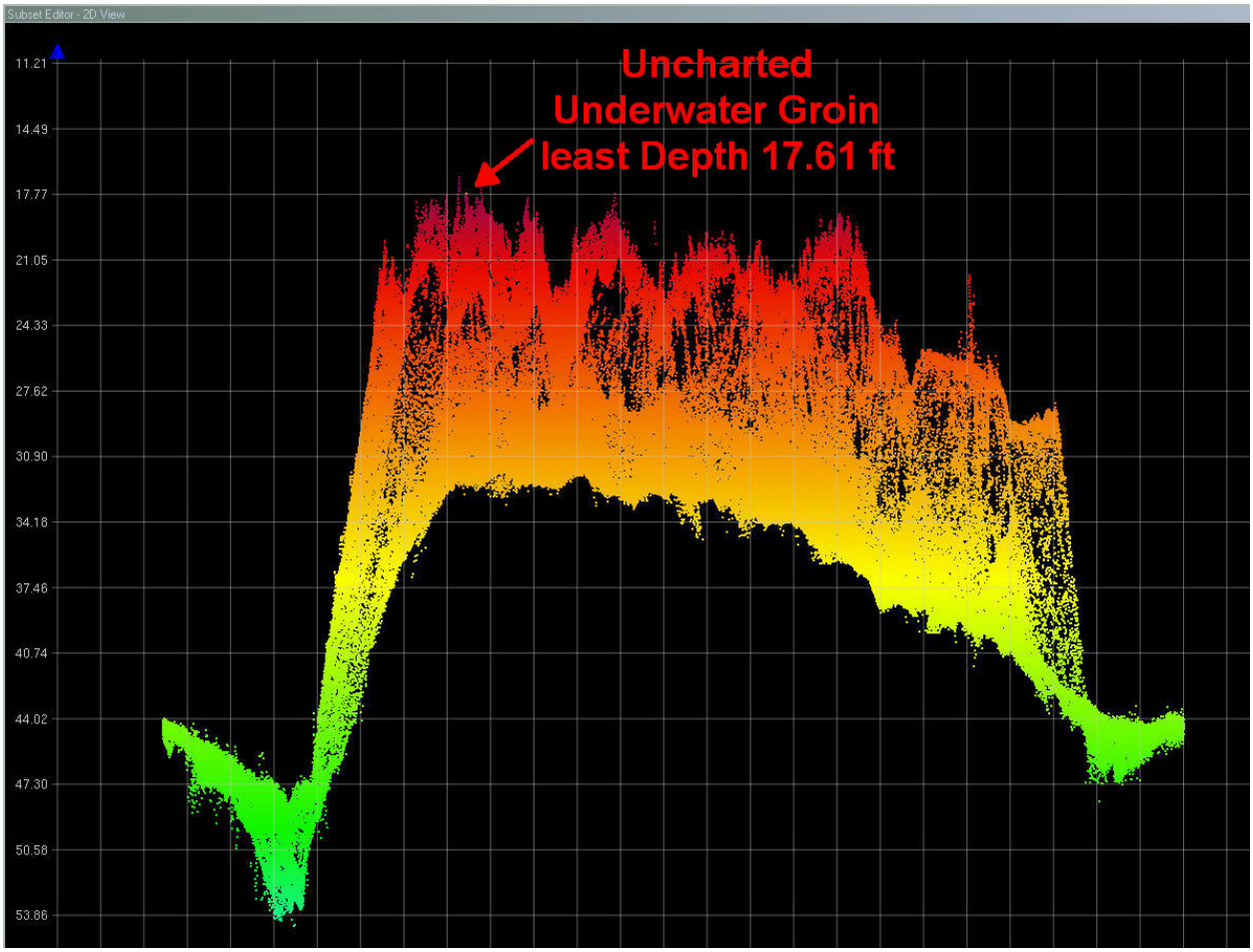

Subset Editor - 2D View
Uncharted
Underwater Groin
least Depth 17.61 ft
11.21
14.49
17.77
21.05
24.33
27.62
30.90
34.18
37.46
40.74
44.02
47.30
50.58
53.86

Figure 1.3.2

3 - AWOIS Features

3.1) AWOIS #52977 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 46° 15' 15.6" N, 123° 35' 25.1" W

Historical Depth: [None]

Search Radius: 0

Search Technique: MB, ES, S2

Technique Notes: SEARCH 100M OUT FROM AN AXIS RU8NNING FROM POS.46-15-15.53 N 123-35-39.38 W AND 46-15-15.76 N 123-35-10.39 W

History Notes:

BP55735/1958--USACE; DISPOSAL AREA SHOWN AND CHARTED AS SPOIL AREA. CENTRAL POSITION SCALED FROM CURRENT EDITION OF CHART 18523 IN 46-15-15.6 N 123-35-25.1 W NAD 83. ENTERED 4/02 MCR■ FE486/02--OPR-N438-NRB; NO OBSTRUCTION WAS OBSERVED WITH 200% SIDE SCAN SONAR. AFTER EMAILS WITH MCD (FEB 17,2005), EVALUATOR DID NOT CONCUR WITH DELETING SPOIL AREA. RETAIN SPOIL AREA. (UPDATED 3/05 CEH)

Survey Summary

Charts Affected: 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

BP55735/1958--USACE; DISPOSAL AREA SHOWN AND CHARTED AS SPOIL AREA. CENTRAL POSITION SCALED FROM CURRENT EDITION OF CHART 18523 IN 46-15-15.6 N 123-35-25.1 W NAD 83. ENTERED 4/02 MCR FE486/02--OPR-N438-NRB; NO OBSTRUCTION WAS OBSERVED WITH 200% SIDE SCAN SONAR. AFTER EMAILS WITH MCD (FEB 17,2005), EVALUATOR DID NOT CONCUR WITH DELETING SPOIL AREA. RETAIN SPOIL AREA. (UPDATED 3/05 CEH)

H12276 acquired object detection multibeam data within 100 meter radius around AWOIS 52977. No obstructions were dectected other than the charted (18523)groin with light (FL R 2.5s 12ft 5M "14A"

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 52977	0.00	000.0	Primary

Hydrographer Recommendations

Delete charted (18523) Spoil Area.

Feature Images

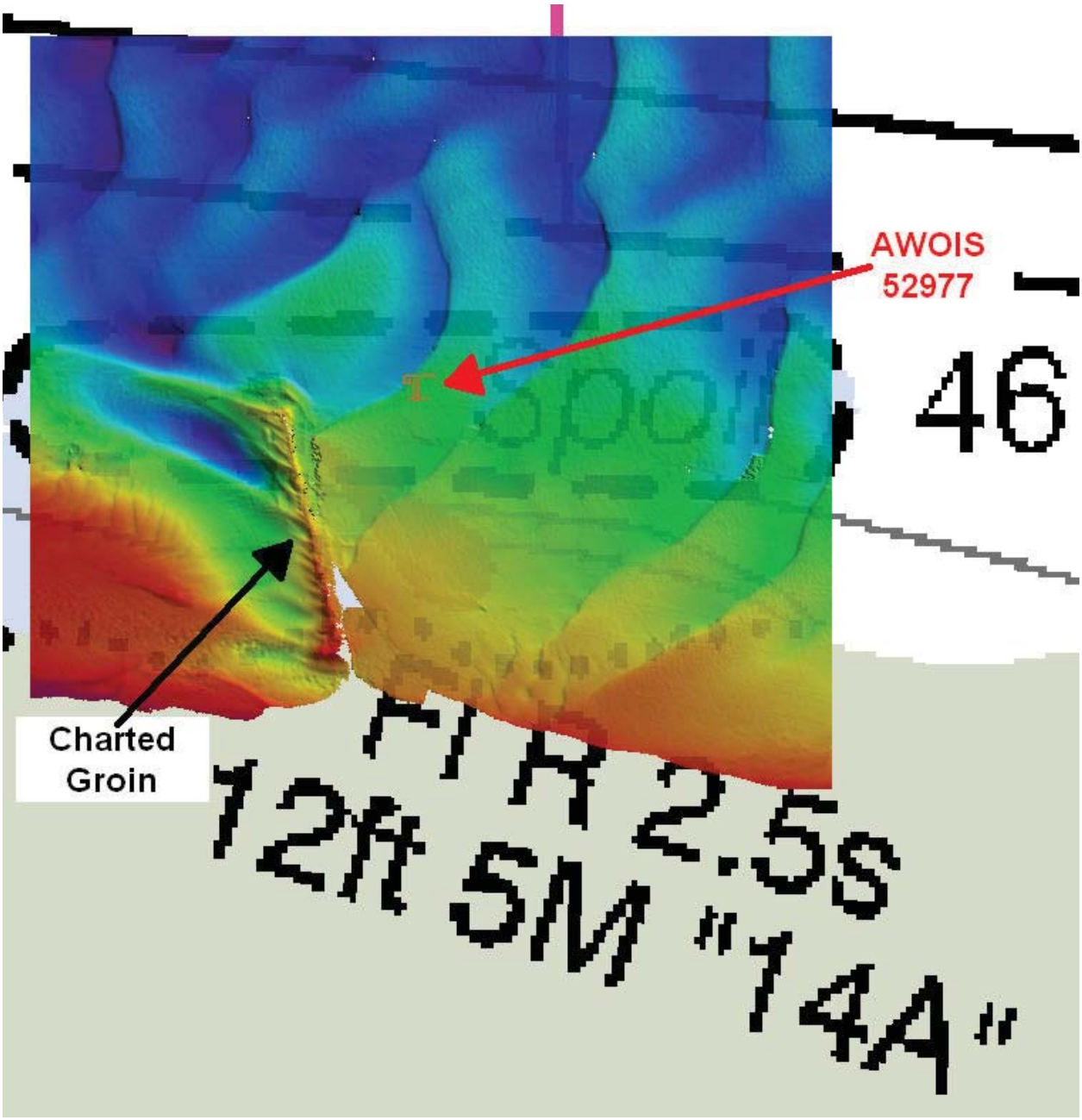


Figure 3.1.1

3.2) AWOIS #52978 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position:	46° 15' 28.9" N, 123° 35' 13.7" W
Historical Depth:	[None]
Search Radius:	100
Search Technique:	VS,ES,S2,MB
Technique Notes:	[None]

History Notes:

H7817/50- 13 FT SOUNDING OBTAINED IN POS. 46 15 30N, 123 35 09.3W NAD 27, CONVERTS TO 46 15 29.4N, 123 35 13.8 NAD 83. THE FEATURE IS APPARENTLY PILLAR, ALTHOUGH NO GEOGRAPHIC NAME IN SHOWN.■ BP125013/1985--USACE SURVEY; PREVIOUSLY APPLIED SOUNDING UPDATED TO 11 FT.■ CL1251/2001--USCG BUOY TENDER BLUEBELL ADVISED TO DELETE 11 FT SOUNDING CHARTED EAST OF PILLAR ROCK LIGHT. REPEATED CROSSINGS OVER THE AREA HAVE REVEALED NO DEPTHS LESS THAN 40 FT IN THIS LOCATION ■ **** NEARBY "RK" LABEL CHARTED WITHOUT FEATURE SYMBOL OR SOUNDING IN POS.46-15-28.4 N 123-35-00 W NAD 83. APPEARED ON 1971 EDITION OF CHART 6152 (18523). THE LABEL IS LIKELY THE LABEL FOR PILLAR ROCK WHICH IS MARKED BY PILLAR ROCK LIGHT 17.■ FE486/02--OPR-N438-NRB; A VISUAL INSPECTION WAS DONE OF PILLAR ROCK. PILLAR ROCK IS A VERY LARGE, DISTINCTIVE ROCK APPROXIMATELY 30 FT IN DIAMETER. EVALUATOR CONCURS WITH CHARTING OF ISLET AT LAT. 46.15/28.93N, LONG. 123/35/13.72W. LIGHT 17 IS ON TOP OF PILLAR ROCK. (UPDATED 3/05 CEH)■■-

Survey Summary

Charts Affected:	18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

AWOIS 52978 (For Information)

H7817/50- 13 FT SOUNDING OBTAINED IN POS. 46 15 30N, 123 35 09.3W NAD 27, CONVERTS TO 46 15 29.4N, 123 35 13.8 NAD 83. THE FEATURE IS APPARENTLY PILLAR, ALTHOUGH NO GEOGRAPHIC NAME IN SHOWN. BP125013/1985--USACE SURVEY; PREVIOUSLY APPLIED SOUNDING UPDATED TO 11 FT. CL1251/2001--USCG BUOY TENDER BLUEBELL ADVISED TO DELETE 11 FT SOUNDING CHARTED EAST OF PILLAR ROCK LIGHT. REPEATED CROSSINGS OVER THE AREA HAVE REVEALED NO DEPTHS LESS THAN 40 FT IN THIS LOCATION **** NEARBY "RK" LABEL CHARTED WITHOUT FEATURE SYMBOL OR SOUNDING IN POS.46-15-28.4 N 123-35-00 W NAD 83. APPEARED ON 1971 EDITION OF CHART 6152 (18523). THE LABEL IS LIKELY THE LABEL FOR PILLAR ROCK WHICH IS MARKED BY PILLAR ROCK LIGHT 17. FE486/02--OPR-N438-NRB; A VISUAL INSPECTION WAS DONE OF PILLAR ROCK. PILLAR ROCK IS A VERY LARGE, DISTINCTIVE ROCK APPROXIMATELY 30 FT IN DIAMETER. EVALUATOR CONCURS WITH CHARTING OF ISLET AT LAT. 46.15/28.93N, LONG. 123/35/13.72W. LIGHT 17 IS ON TOP OF PILLAR ROCK. (UPDATED 3/05 CEH)

H12276 determined Pillar Rock is located at position: LAT 46/15/29.00N, LONG 123/35/13.71W. Light 17 is on top of Pillar Rock.

H12276 estimated height of Pillar Rock was 6 meters above level of the tide at UTC time 20:56:10 on January 18 2011.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 52978	0.00	000.0	Primary

Hydrographer Recommendations

Chart (18523) islet at position: LAT 46/15/29.00N, LONG 123/35/13.71W. Chart Light 17 at (same) position: LAT 46/15/29.00N, LONG 123/35/13.71W.

S-57 Data

Geo object 1: Land area (LNDARE)

Attributes: SORDAT - 20110123

SORIND - US,US,survy,H12276

STATUS - 1:permanent

Feature Images

Figure 3.2.1

Figure 3.2.2

1 - Charted Features

1.1) Profile/Beam - 1720/254 from h12276 / nrt3_s1212_em3002 / 2010-306 / h12276000_1716

Survey Summary

Survey Position: 46° 15' 42.3" N, 123° 38' 08.9" W

Least Depth: 5.29 m (= 17.35 ft = 2.892 fm = 2 fm 5.35 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.403 m ; **TVU (TPEv)** ±0.308 m

Timestamp: 2010-306.17:17:37.322 (11/02/2010)

Survey Line: h12276 / nrt3_s1212_em3002 / 2010-306 / h12276000_1716

Profile/Beam: 1720/254

Charts Affected: 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

H12276 designated sounding on charted (18523)Subm dol. Least depth 5.29 meters. Feature located approx 18m west of current charted position.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-306/h12276000_1716	1720/254	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per digital data.

Cartographically-Rounded Depth (Affected Charts):

17ft (18523_1)

2 ¾fm (18520_1, 18003_1, 18007_1, 530_1)

5.3m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: QUASOU - 1:depth known

SORDAT - 20110123

SORIND - US,US,nsurf,H12276

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 5.288 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

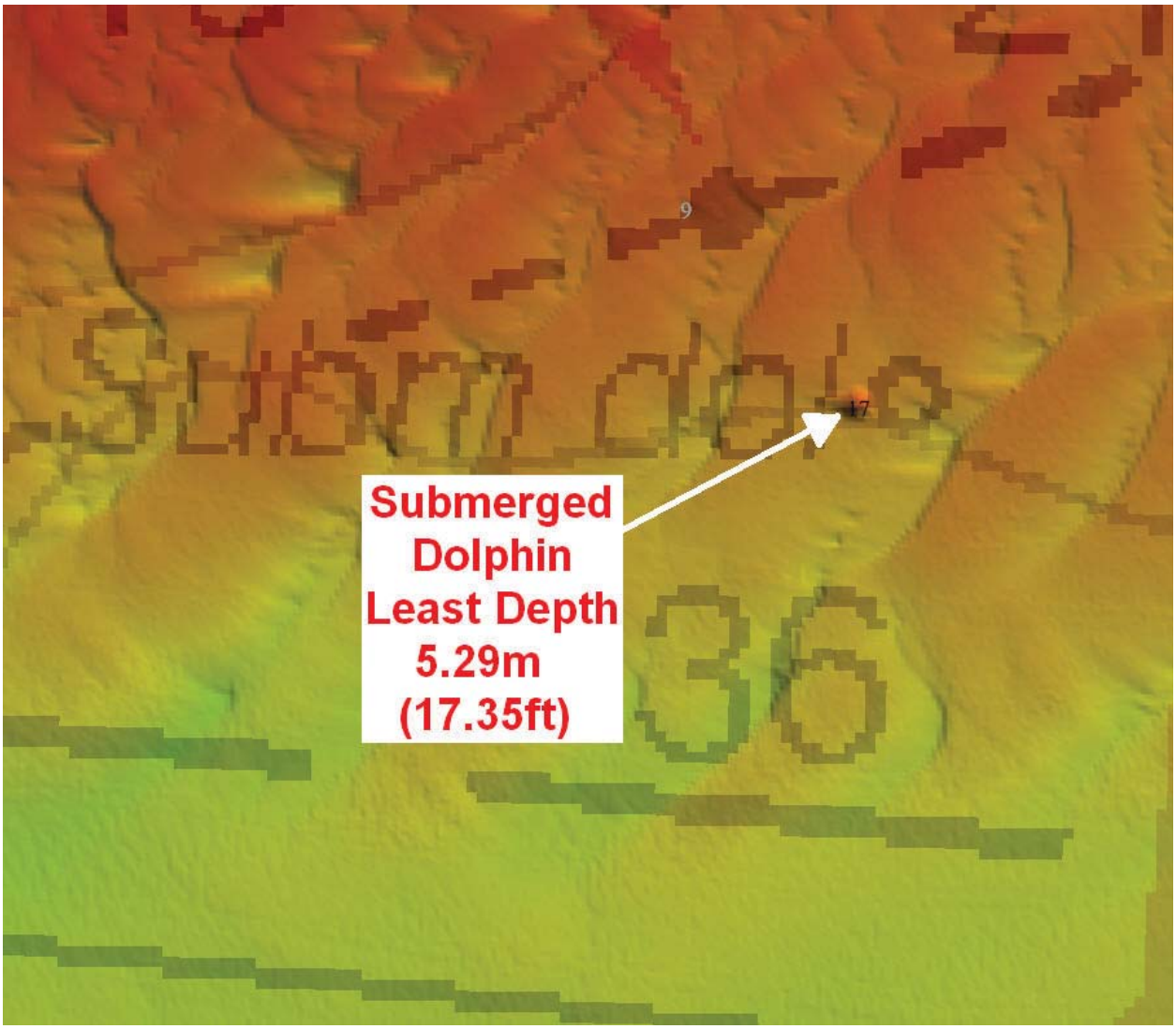


Figure 1.1.1

2 - New Features

2.1) Profile/Beam - 970/217 from h12276 / nrt3_s1212_em3002 / 2010-312 / h12276000_2047

Survey Summary

Survey Position: 46° 15' 13.3" N, 123° 36' 22.5" W

Least Depth: 6.79 m (= 22.26 ft = 3.710 fm = 3 fm 4.26 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.396 m ; **TVU (TPEv)** ±0.309 m

Timestamp: 2010-312.20:47:49.523 (11/08/2010)

Survey Line: h12276 / nrt3_s1212_em3002 / 2010-312 / h12276000_2047

Profile/Beam: 970/217

Charts Affected: 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

H12276 complete multibeam coverage on unknown object. Least depth 6.79m. length approx 8m, width approx 1.7m Object appears wreck-like in shape.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-312/h12276000_2047	970/217	0.00	000.0	Primary

Hydrographer Recommendations

chart as per digital data.

S-57 Data

[None]

Feature Images

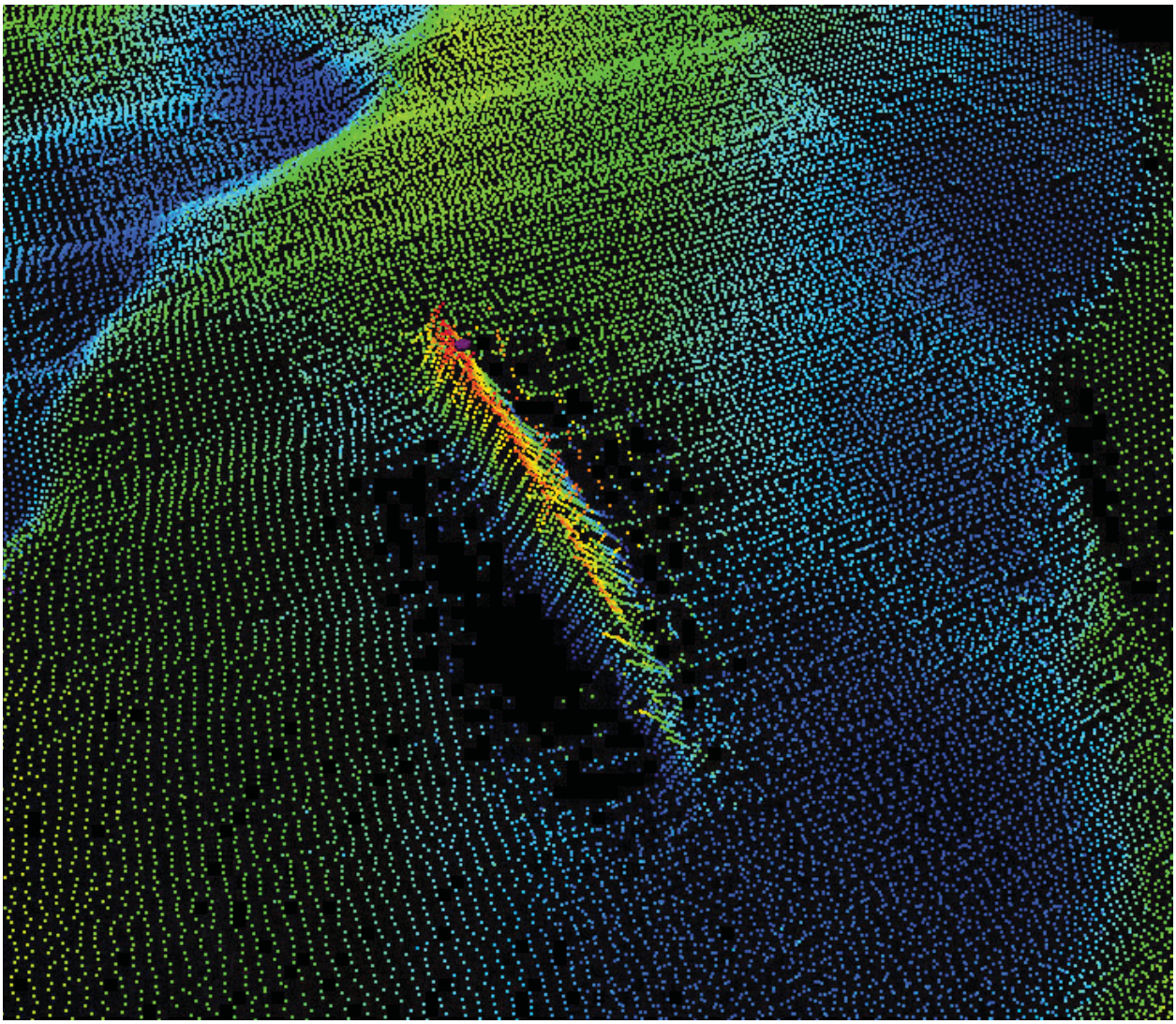


Figure 2.1.1

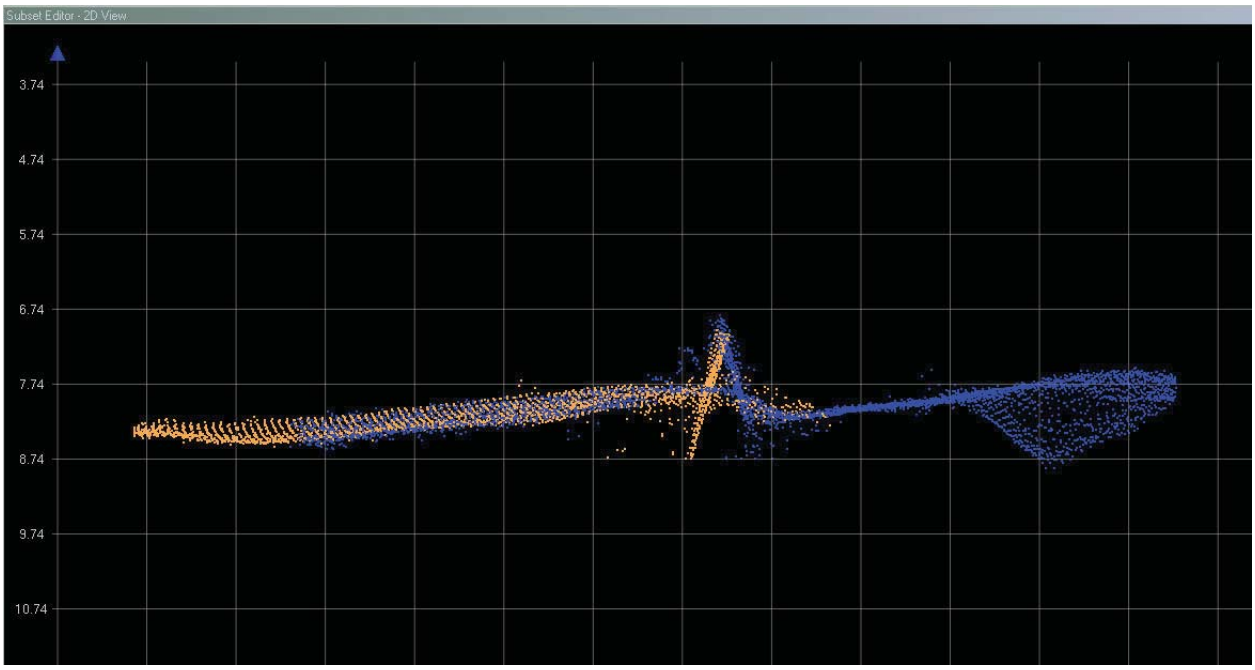


Figure 2.1.2

2.2) Profile/Beam - 4839/2 from h12276 / nrt3_s1212_em3002 / 2010-319 / h12276000_1918

Survey Summary

Survey Position: 46° 15' 27.9" N, 123° 35' 13.3" W

Least Depth: 3.36 m (= 11.02 ft = 1.837 fm = 1 fm 5.02 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.386 m ; **TVU (TPEv)** ±0.304 m

Timestamp: 2010-319.19:24:31.527 (11/15/2010)

Survey Line: h12276 / nrt3_s1212_em3002 / 2010-319 / h12276000_1918

Profile/Beam: 4839/2

Charts Affected: 18523_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

3.3m rock at position 46-15-27.91N, 123-35-13.34W. Approx 28 meters south of Pillar Rock. Shoal point is within the 60 foot depth contour on chart 18523. 3.3m rk is between Pillar Rock (islet) and the G "15" buoy. Although outside the channel, some vessels could attempt to pass between Pillar Rock and the G "15" buoy since there is no indication on chart 18523 that a 3.3 meter rock exists in the vicinity.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12276/nrt3_s1212_em3002/2010-319/h12276000_1918	4839/2	0.00	000.0	Primary

Hydrographer Recommendations

Chart (18523) 3.3 meter rk at position 46-15-27.91N, 123-35-13.34W.

Cartographically-Rounded Depth (Affected Charts):

11ft (18523_1)

1 ¾fm (18520_1, 18003_1, 18007_1, 530_1)

3.4m (501_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20110123

SORIND - US,US,nsurf,H12276

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 3.359 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

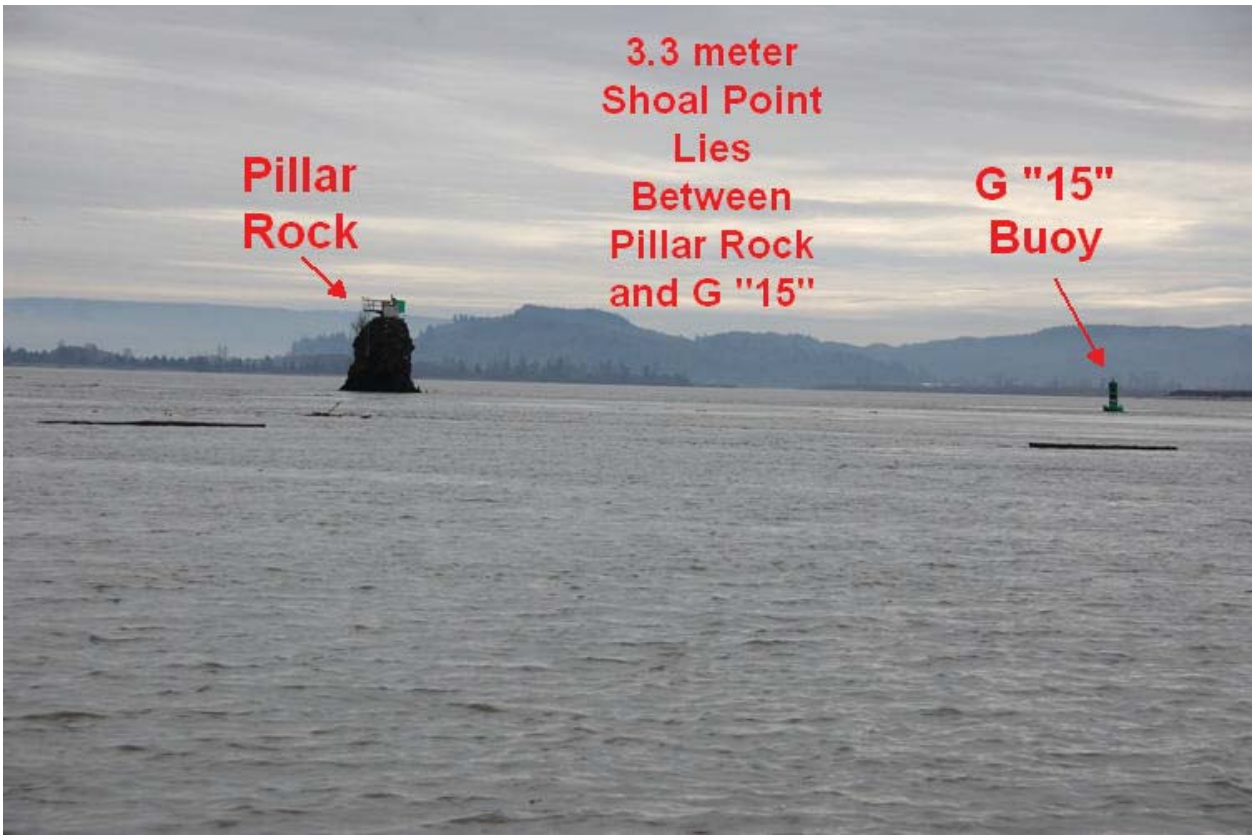


Figure 2.2.1

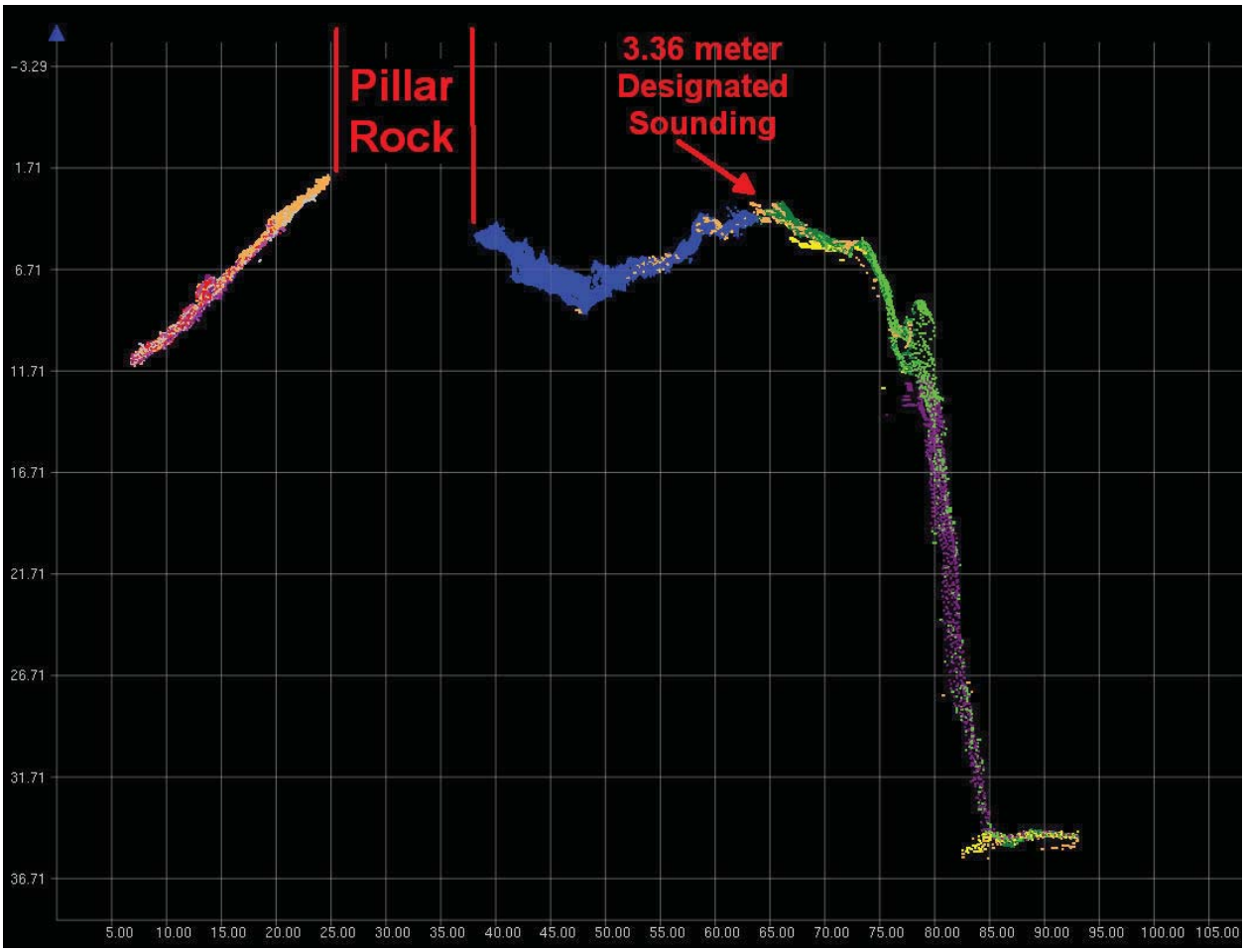

Pillar Rock
3.36 meter Designated Sounding
-3.29
1.71
6.71
11.71
16.71
21.71
26.71
31.71
36.71
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00

Figure 2.2.2

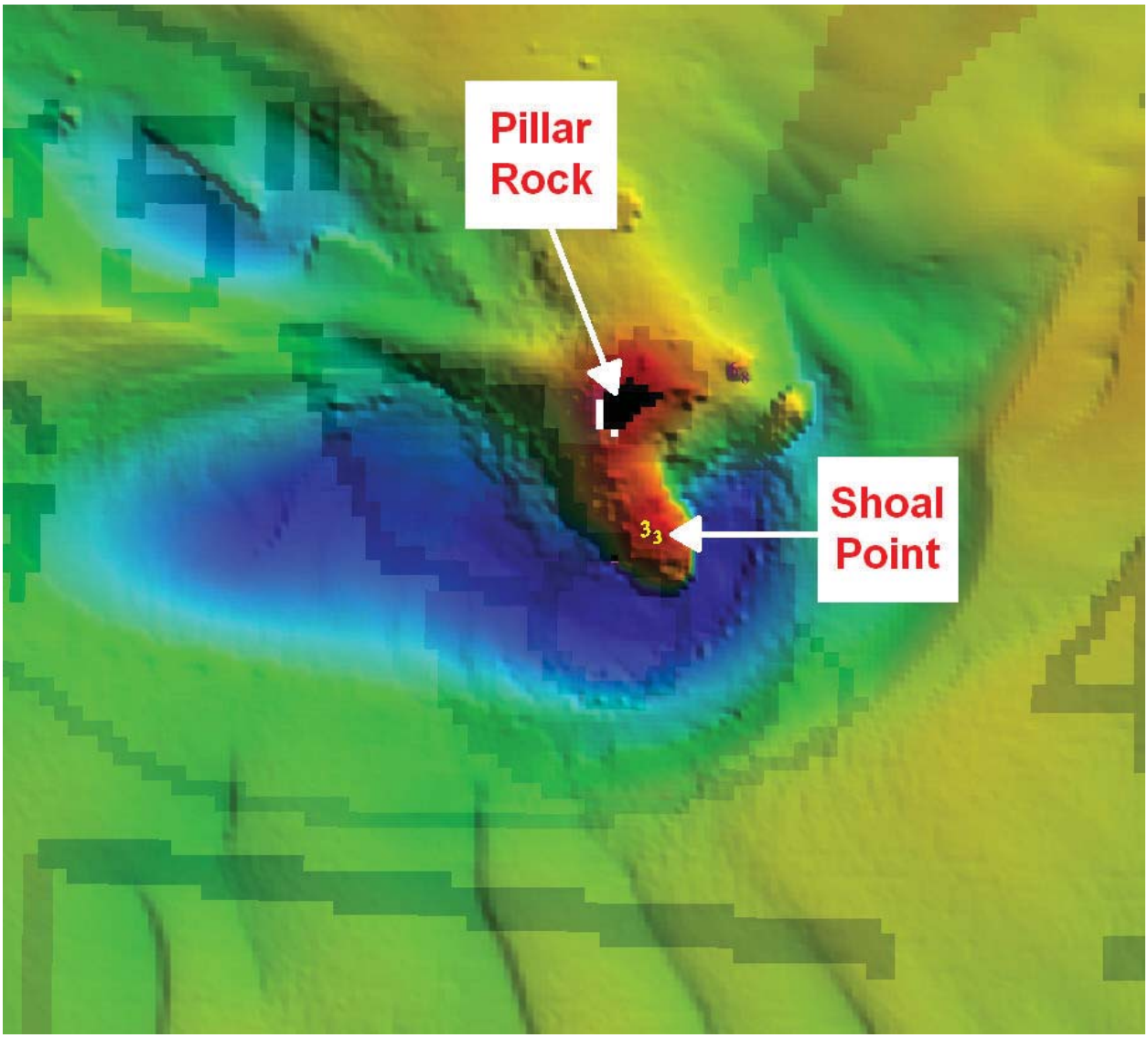


Figure 2.2.3

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : February 07, 2011

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N338-NRT3-2010
HYDROGRAPHIC SHEET: H12276

LOCALITY: Harrington Pt. to Three Tree Pt., Columbia River, OR
TIME PERIOD: October 7, 2010 - January 18, 2011

TIDE STATION USED: 943-9040 Astoria, OR
Lat. 46° 12.4'N Long. 123° 46.1' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.418 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-N338-NRT3-2010, H12276 during the time period between October 7, 2010 and January 18, 2011.

Please use the zoning file "N338NRT32010CORP" submitted with the project instructions for OPR-N338-NRT3-2010. Zones CR18, CR19, CR20, CR21 and CR22 are the applicable zones for H12276.

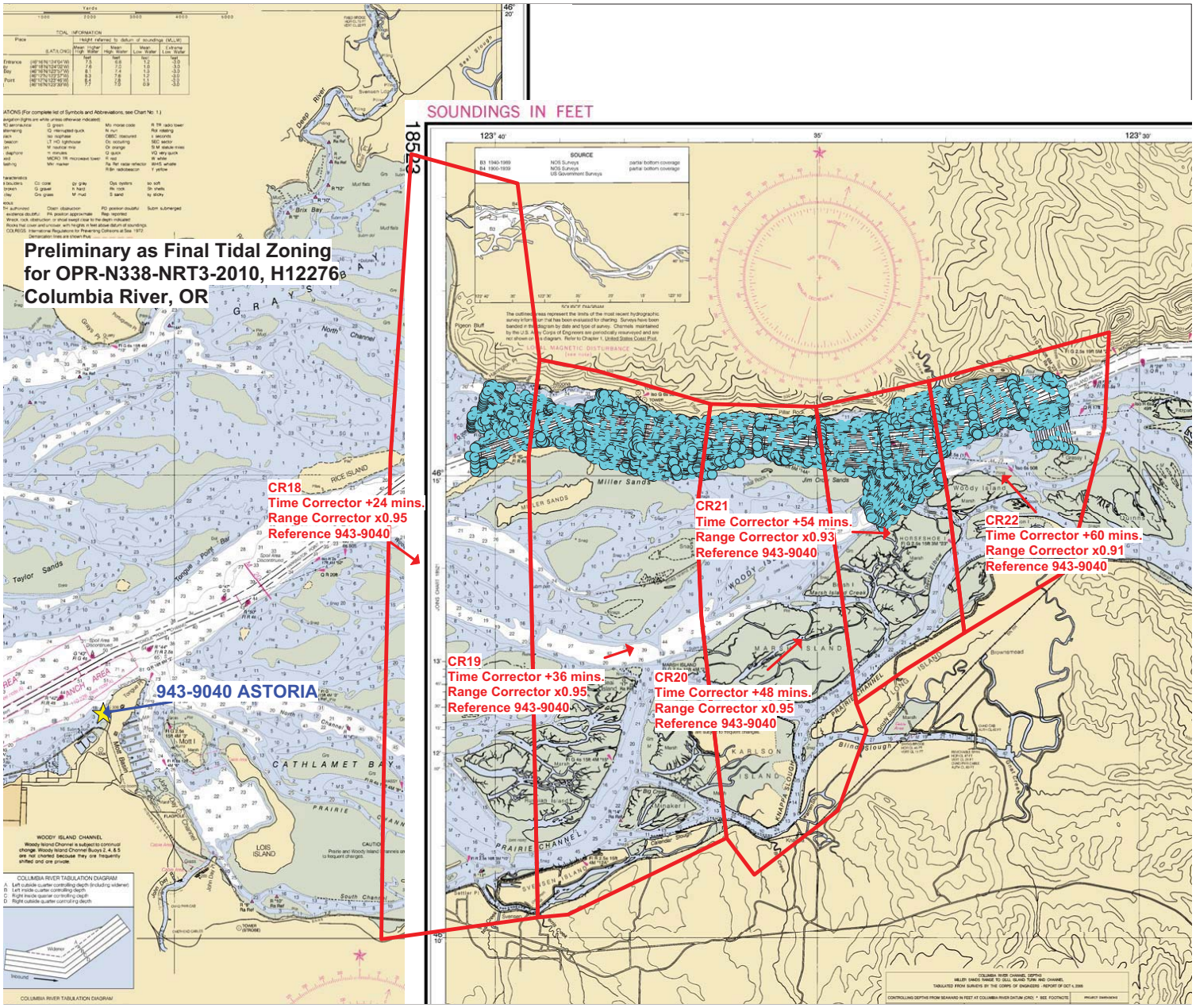
Refer to attachments for zoning information.

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=NOAA/NOS/CO-OPS, ou=Oceanographic Division, email=peter.stone@noaa.gov, c=US
Date: 2011.02.07 11:14:18 -05'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary as Final Tidal Zoning
for OPR-N338-NRT3-2010, H12276
Columbia River, OR
SOUNDINGS IN FEET
18523
CR18
Time Corrector +24 mins.
Range Corrector x0.95
Reference 943-9040
CR19
Time Corrector +36 mins.
Range Corrector x0.95
Reference 943-9040
CR20
Time Corrector +48 mins.
Range Corrector x0.95
Reference 943-9040
CR21
Time Corrector +54 mins.
Range Corrector x0.93
Reference 943-9040
CR22
Time Corrector +60 mins.
Range Corrector x0.91
Reference 943-9040
943-9040 ASTORIA

PHB Compilation Log

General Survey Info

Survey Number	H12276	Project Area	Columbia River		
Project Number	OPR-N338-NRT3-10	Field Unit	NRT 3		
Start Date	Oct 7, 2010	Survey Scale	1:10,000	Compilation Scale	1:40,000
End Date	Jan 23, 2011	UTM Zone	10		

Raster Charts

Chart	KAPP	Scale	Edition	Date	NTM Date
18523	1739	1:40,000	57	05/01/2010	09/03/2011

Add Chart | Remove Chart

Electronic Charts

ENC	Scale
US5OR11M	1:40,000
US5OR11M	1:40,000

Add ENC | Remove ENC

Spatial Reference

Horizontal Datum	WGS84
Coordinate System	LLDG
Sounding Datum	MLLW
Vertical Datum	MHW

Junction Surveys

Survey Number	Survey Date	Location Relative to Current Survey
H11854	Mar 5, 2010	East
H11927	Sep 23, 2008	West

Add Survey | Remove Survey

HCell Compiler	Fernando Ortiz	QC Reviewer	Martha Herzog	SAR Reivewer	Keith Toepfer

Source Surfaces

Resolution	File Name
2m	H12276_Final_Combined

Add Surface | Remove Surface

Specs and Standards Used

Name	Version
Specs and Deliverables	April 2011
HCell Specs	6.1

Add Spec | Remove Spec

PHB Compilation Log

Processing Info

Software Used		
Software	Version, HF	Used For
CARIS HIPS	7.0 SP2 HF3	SAR Review. Inspection of Combined BASE Surfaces.
Pydro	11.8	SAR Review. Generation of Features Reports.
CARIS BASE Editor	3.2 HF2	Creation of soundings and bathy-derived features, meta area object, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer	2.2 HF4	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. (For Fathoms and Feet chart units only.)
CARIS HOM	3.3 SP3 HF8	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding. (For Fathom and Feet chart units only)
CARIS Plot Composer	5.1 SP 2	Generate plots of CARIS Session files used for QC.
HydroService, dKart Inspector		Validation check of the base cell file.
Fugawi View ENC	1.0.0.3	Independent inspection of final HCells using COTS viewer.

Product Info

Deliverables	
Chart Scale HCell	H12276_CS.000
Survey Scale HCell	H12276_SS.000
HCell Report for MCD	H12276_HR.pdf
Feature Listing	H12276_FL.txt
Descriptive Report	H12276_DR.pdf
Survey Outline	H12276_Outline.gml and .xsd

Horizontal and Vertical Units

During creation of the HCell 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 MLLWand heights on islets above MHW are typically measured with range finder, so precision is less.

Depth Units (DUNI)	Feet
Height Units (HUNI)	Feet
Positional Units (PUNI)	Meters

Radius Setting

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

Radius (mm)	Min. Depth (m)	Max Depth (m)
2	-4.7	10
3	10	20
3.5	20	50
4	50	500

Contours

Depth contours at the intervals on the largest scale chart are included in the SS HCell for MCD raster charting division to use for guidance in creating chart contours. With the exception of the zero contours included in the *_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography.

Charted Contours	Metric Equivalent	Metric- NOAA Rounded	Chart Contours - NOAA Rounded
6ft	1.8288m	2.0574m	6.75ft
12ft	3.6576m	3.8862m	12.75
18ft	5.4864m	5.4864m	18.75
30ft	9.144m	9.3726m	30.75
60ft	18.288m	18.5166m	60.75

PHB Compilation Log

Add Contour | Remove Contour

Additional Info

Contact Information

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

HCell Compiler	Fernando Ortiz
Phone Number	206-526-1111
Email	fernando.ortiz@noaa.gov

Compilation Comments

APPROVAL SHEET
H12276

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

Fernando Ortiz
2011.10.11
10:39:19 -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.

Martha Herzog
2011.10.11
10:57:38 -07'00'

I have reviewed the HCell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.

Gary C. Nelson
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: 2011.10.11 12:57:42 -07'00'