

H11757

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. RA-10-13-07

Registry No. H11757

LOCALITY

State Oregon

General Locality Approaches to Warrenton

Sublocality Cliff Pt. to Tongue Pt.

2007

CHIEF OF PARTY

..... CDR Donald W. Haines, NOAA

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DATE

NOAA FORM 77-28 (11-72) <div style="text-align: center; margin-top: 10px;"> U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION </div> <div style="text-align: center; margin-top: 20px;"> HYDROGRAPHIC TITLE SHEET </div>	REGISTRY No <div style="text-align: center; font-size: 1.2em; font-weight: bold;">H11757</div>
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 <div style="text-align: center; font-weight: bold;">RA-10-13-07</div>
<div style="margin-bottom: 5px;">State <u>Oregon</u></div> <div style="margin-bottom: 5px;">General Locality <u>Approaches to Warrenton</u></div> <div style="margin-bottom: 5px;">Sub-Locality <u>Cliff Pt. to Tongue Pt.</u></div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Scale <u>1:10,000</u> Dates of Survey <u>8/23/2007 - 10/2/2007</u> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Instructions dated <u>6/22/2007</u> Project No. <u>OPR-N338-RA-07</u> </div> <div style="margin-bottom: 5px;">Vessel <u>RA6 (1015_Elac1180), RA6 (1015 Klein), RA4 (1016), RA3 (1021), RA1 (1101), RA2 (1103)</u></div> <div style="margin-bottom: 5px;">Chiefs of party <u>Commander Donald W. Haines, NOAA</u></div> <div style="margin-bottom: 5px;">Surveyed by <u>RAINIER Personnel</u></div> <div style="margin-bottom: 5px;">Soundings by echo sounder, hand lead, pole <u>Reson 8101, Seabeam/Elac 1180, Reson 8125, Knudsen 320M</u></div> <div style="margin-bottom: 5px;">Graphic record scaled by <u>N/A</u></div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Graphic record checked by <u>N/A</u> Automated Plot <u>N/A</u> </div> <div style="margin-bottom: 5px;">Verification by <u>Fernando Ortiz, Peter Holmberg</u></div> <div style="margin-bottom: 5px;">Soundings in <u>Feet at MLLW</u></div>	
REMARKS: <u>All times are UTC. UTM Projection (zone #10).</u> <u>Revisions and annotations appearing as endnotes were generated during office processing. As a result, page numbering may be interrupted or non-sequential.</u> <u>All separates are filed with the hydrographic data.</u> 	

Descriptive Report to Accompany Hydrographic Survey H11757

Project OPR-N338-RA-07
Approaches to Warrenton, Oregon

Cliff Pt. to Tongue Pt.

Scale 1:10,000

August – October, 2007

NOAA Ship RAINIER (s221)

Chief of Party: Commander Donald W. Haines, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-N338-RA-07 dated June 22 and all other applicable direction¹, with the exception of deviations noted in this report. The survey area is the Cliff Pt. to Tongue Pt. This survey corresponds to sheet “E” in the sheet layout provided with the Letter Instructions.

The lower Columbia River is subject to extreme conditions, from winter storms that pound the west entrance to high spring run-off which flood and cause silting in the eastern portion. Deep draft vessels routinely transit the lower Columbia River enroute to various ports up river, such as Portland, Vancouver and Longview. In addition, two separate sites along the Lower Columbia are pursuing an LNG terminal, which may have the potential for up to 10 LNG vessel port calls each month. Although the USACE maintains the navigational channels, many changes have occurred outside the navigational channels since the last surveys were conducted in the 1950’s. Charted sounding data outside the USACE maintained channels is unreliable, as proven by an NRT reconnaissance survey conducted in 2004. OPR-N338-RA-07 has been assigned to collectively address the issues above.

Complete multibeam echosounder (MBES) coverage was obtained in the survey area in waters 8 meters and deeper, but not in the US Army Corps of Engineers maintained Columbia River Main Channel. Complete object detection multibeam coverage was obtained in the anchorage areas. The Columbia River Main Channel coverage was obtained with 200% Side Scan Sonar (SSS). In depths less than 8 meters additional MBES coverage was obtained to acquire least depths over significant features or shoals, as appropriate for this survey. Vertical beam echo sounder (VBES) data were acquired in depths from approximately 4 to 20 meters to define the navigable area limit, aid in the planning of SWMB data acquisition, and provide inshore bathymetry in navigationally significant areas. A shoreline buffer was run with Side Scan Sonar to look for new features. Total mileage acquired by each vessel and system is referenced in Table 1.

Due to limited resources and time constraints, survey coverage was "blocked off" to maximize coverage of the navigationally significant area of the Columbia River. Survey

¹ NOS Hydrographic Surveys Specifications and Deliverables (April 2007), OCS Field Procedures Manual for Hydrographic Surveying (March 2007), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

operations were limited to the southern third of the assigned sheet area and did not extend North beyond the Taylor Sands (see Figure 1).

Shoreline verification was conducted on the southern border of the survey sheet.

200% side scan sonar (SSS) coverage was acquired in the Astoria Range of the Columbia River main channel to improve probability of detection of submerged hazards in navigationally critical areas. No obstructions were found.

Data Acquisition Type	Hull Number with Mileage (lnm)				Total
	1101	1015	1016	1021	
VBES (mainscheme)	58.44	-	-	-	58.44
MBES (mainscheme)	-	15.06	145.77	100.56	261.39
SSS (mainscheme)	-	17.23	-	-	17.23
MBES + SSS	-	-	-	-	-
Shoreline	-	4.38	-	-	4.38
Crosslines	-	4.27	10.05	-	14.32
Holidays and Developments	-	-	1.41	-	1.41
Bottom Samples	-	-	-	-	-
Total Number of Items Investigated	-	-	-	-	-
Total Area Surveyed (lnm)	-	-	-	-	357.17
Total Area Surveyed (sq. nm)	-	-	-	-	5.182

Table 1: Survey Statistics for Survey H11757

Data acquisition was conducted from August 23, and September 28 - October 2 (DN235, DN271-DN275).

H11727 Survey Limits

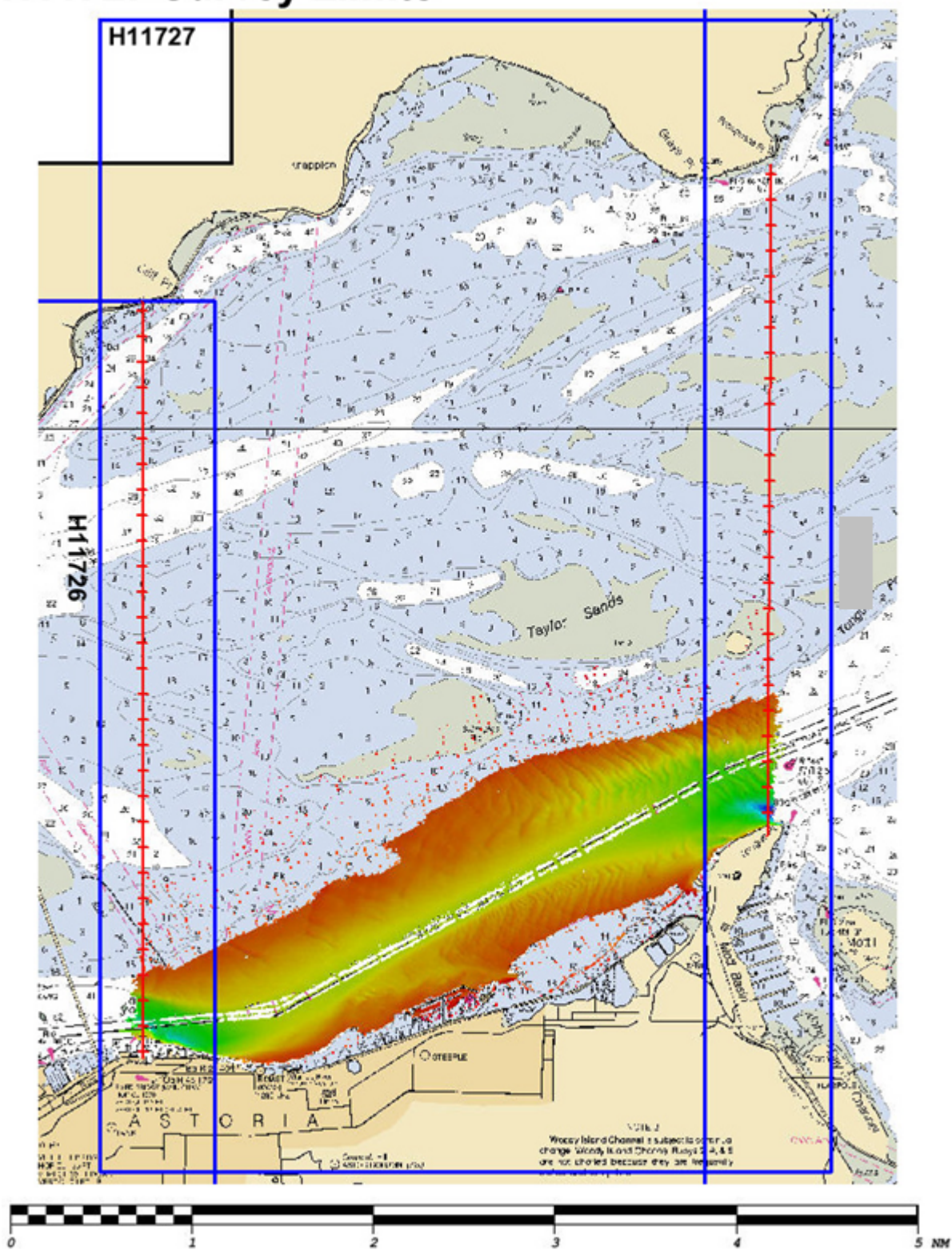


Figure 1. H11757 Survey Limits, junction with H11726 and mainscheme bathymetry overlaid on Chart 18521.¹

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-RA-07 Data Acquisition and Processing Report*² (DAPR), submitted under separate cover. 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.

B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101	RA-1	Vertical Beam Echosounder Side Scan Sonar
1021	RA-3	Multibeam Echosounder
1016	RA-4	Multibeam Echosounder Side Scan Sonar
1015	RA-6	Multibeam Echosounder Side Scan Sonar Phase Differencing Bathymetric Sonar

Table 2. Data Acquisition Vessels for H11757

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

As a result of problems encountered with select survey systems during this project, vessel configurations were modified in the course of the survey. The resulting configurations for each survey system are detailed in the Data Acquisition and Processing Report submitted under separate cover.

B2. Quality Control

Crosslines

Multibeam Echosounder (MBES) crosslines totaled 14.32 nautical miles, comprising 5.47% of mainscheme MBES hydrography. The mainscheme bathymetry was manually compared to the crosslines nadir beams in CARIS subset mode and agreed well with differences averaging approximately 0.3 meter.³

Launch 1016 (RA-4) Reson crossline data on day 275 produced poor outer beam quality that suffered from sound velocity errors (see Figure 2). However, at nadir, Launch 1016 (RA-4) data agree within approximately 0.3 meters with the mainscheme bathymetry.

Launch 1015 (RA-6) Elac data contain minimal sound velocity errors and agree within approximately 0.3 m with the mainscheme bathymetry.⁴

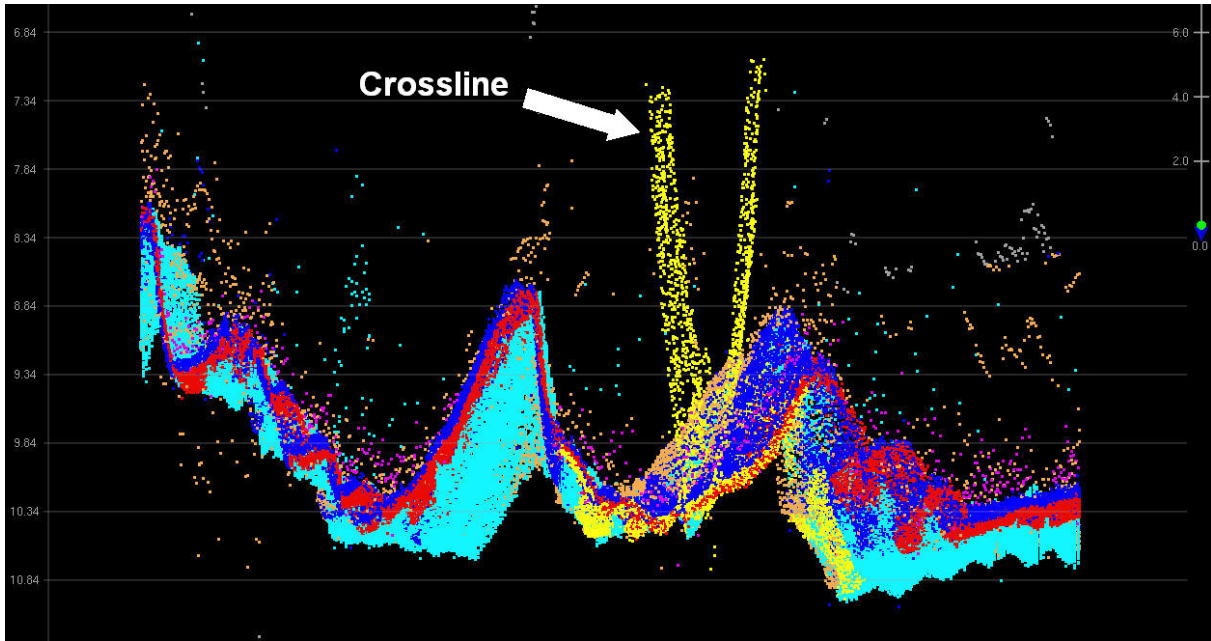


Figure 2. H11757 crossline comparison with poor sound velocity from launch 1015 crossline data. Note that at nadir, crossline agrees strongly with mainscheme bathymetry.

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 2007 RAINIER Hydrographic System Readiness Review package submitted with this survey.⁵

Junctions

No prior junction surveys were assigned for project OPR-N338-RA-07. H11757 junctioned with survey H11726, Chinook Point to Young's Bay (see Figure 1). H11726 bathymetry was manually compared to H11757 bathymetry using CARIS subset mode. The surveys agree well with differences not exceeding 0.5 m.⁶

Data Quality Factors

Limited coverage

Due to limited time and resources, multibeam coverage does not extend to the 4 meter curve (see Figure 3).⁷ RAINIER surveyed the navigationally critical anchorages north and south of the maintained channels, as per consultation with the Local Navigation Manager and Operations Branch.

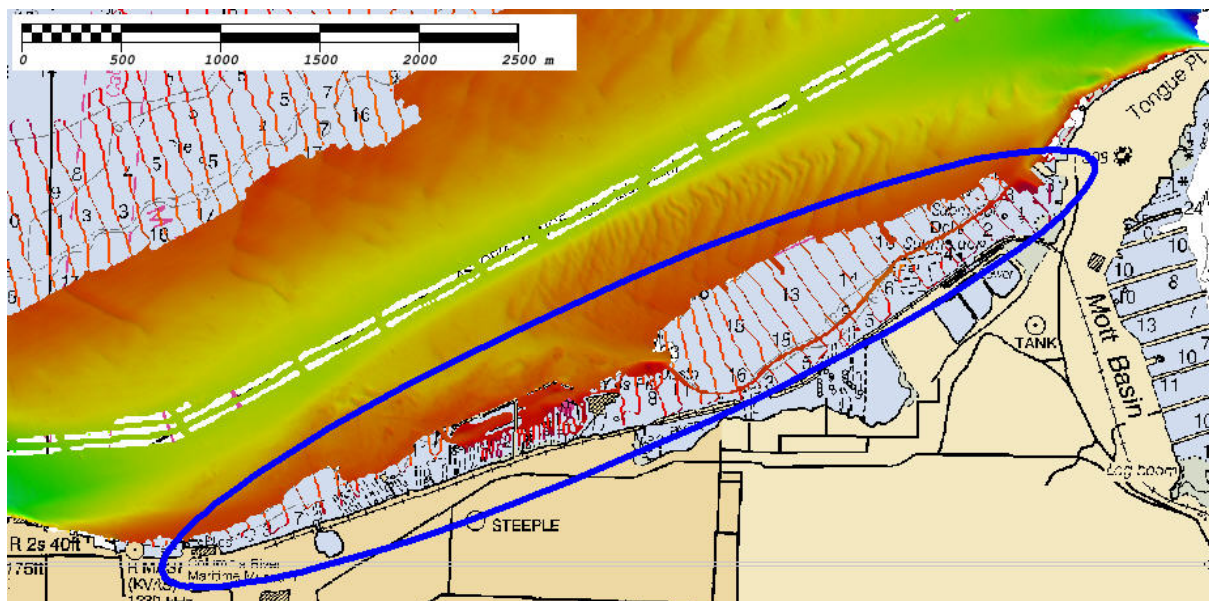


Figure 3. Multibeam coverage does not extend to the 4 meter curve (circled).

Elac offset problem

An upgrade of the Elac Hydrostar acquisition software inadvertently produced roll errors. Unlike the previous version of the software, the values in the ship file failed to persist when the new version of Hydrostar is started. The vessel file contains offset measurements and roll bias values. This vessel file, along with SV cast data and real-time velocity measurements at the transducer face are used for both the transducer-water interface and the water column beam-steering calculations. Because the vessel file values did not persist without reselecting the vessel file before acquisition, Hydrostar assumed the offset and roll values to be zero. This problem was particularly prevalent on DN 274, vessel 1015.

To correct for this roll bias error, roll offset values were calculated individually for each affected day in CARIS using the calibration tool. An average roll offset was computed for each transducer and applied in post processing to the specific lines affected. Although this method greatly improved the data, artifacts are still evident in some places. Since ray-tracing and beam-forming were performed during data acquisition with incorrect roll values, correcting for the biases in post-processing is not possible.

However, H11757 contains only Reson 8101 and 8125 multibeam coverage in the common areas. Elac was used for crosslines east of the small boat basin. The Elac crosslines were consistent with the Reson 8101 and 8125 surfaces. Elac was used in conjunction with side scan sonar in the U.S. Army Corps of Engineers maintained Columbia River Channel for object detection purposes.⁸

Dynamic Time Offset between POS MV and Reson 8125

A number of lines acquired with Launch 1016 (RA-4) have a dynamic roll error. This error was caused by a drift in the Reson clock. Although Launch 1016 is configured for precise timing, a setup whereby data is time-stamped on creation vice arrival to the data logging software, the Reson clock drifted ahead of the POS M/V clock by up to 0.07 s. (For more information on precise timing, please see the vessel wiring diagrams submitted with the Hydrographic Systems Readiness Review, 2007 and the Field Procedures Manual dated March 2007).

During these times, the clock drifted away from synchronization and after drifting 0.06 to 0.07 seconds from the POS clock, reset itself. The cause of this clock drift was determined to be incorrect wiring and has since been corrected.

Due to the dynamic nature of operating a small survey vessel on the Columbia River, the small timing difference between the multibeam and the attitude sensor created a roll error (see Figure 4.) Four lines (420_2014, 400_2012, 905_2007, and 342_1637) with errors were analyzed in Caris' Calibration Mode. A timing offset for each line was calculated, analogous to finding the timing offset in a patch test.

After finding the appropriate timing offset for each line, a new entry was made in the Caris HIPS Vessel File (HVF) at 0.01 s timing offset intervals. Each HVF entry was time-stamped to match the time of the lines with the appropriate offset. Since the multibeam head was not physically changed, no other HVF values were modified; the timing offset was the only variable that needed to be corrected. After the timing offsets were correctly entered into the HVF, roll errors were minimal and well within IHO S-44 depth accuracy limits.⁹

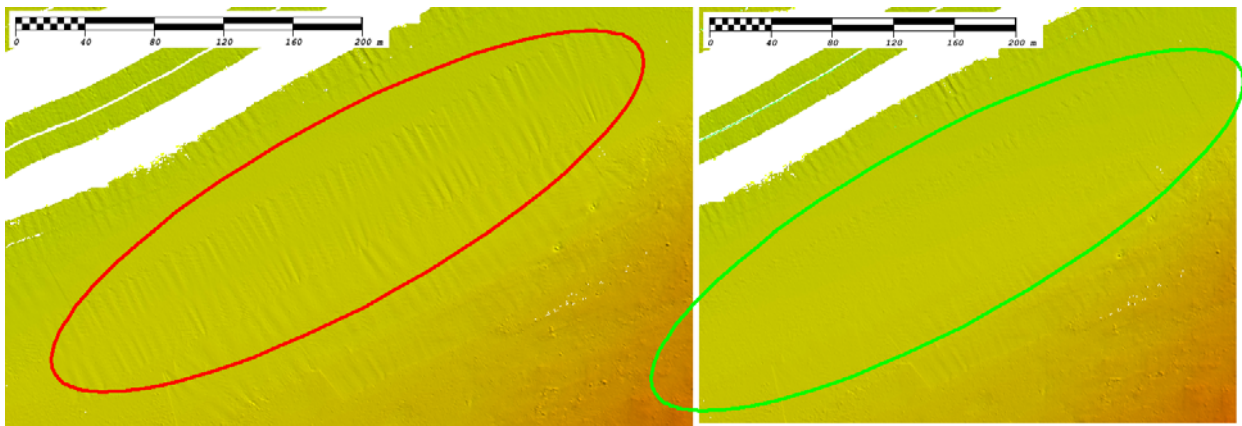


Figure 4. Line 420_2014 before (red) and after (green) timing offset correction.

Holidays

Holidays exist throughout BASE surfaces submitted with survey H11757. The main causes of these holidays are line spacing, shallow survey depths, and unpredictable and sporadically rough weather conditions caused by strong currents opposing the wind. Although line spacing was planned conservatively, the large amount of roll and pitch led to sparse data in outer beams resulting in occasionally poor coverage.

Holiday lines were run in an attempt to fill in as many coverage gaps as time would allow. Numerous holidays are within the specification of less than 3 nodes, and those that are larger do not exist over any shoal features (see Figures 5).

Holidays do not cover any charted obstruction or AWOIS item, and bathymetry near the holidays does not show any shoaling or other evidence of possible dangers.¹⁰

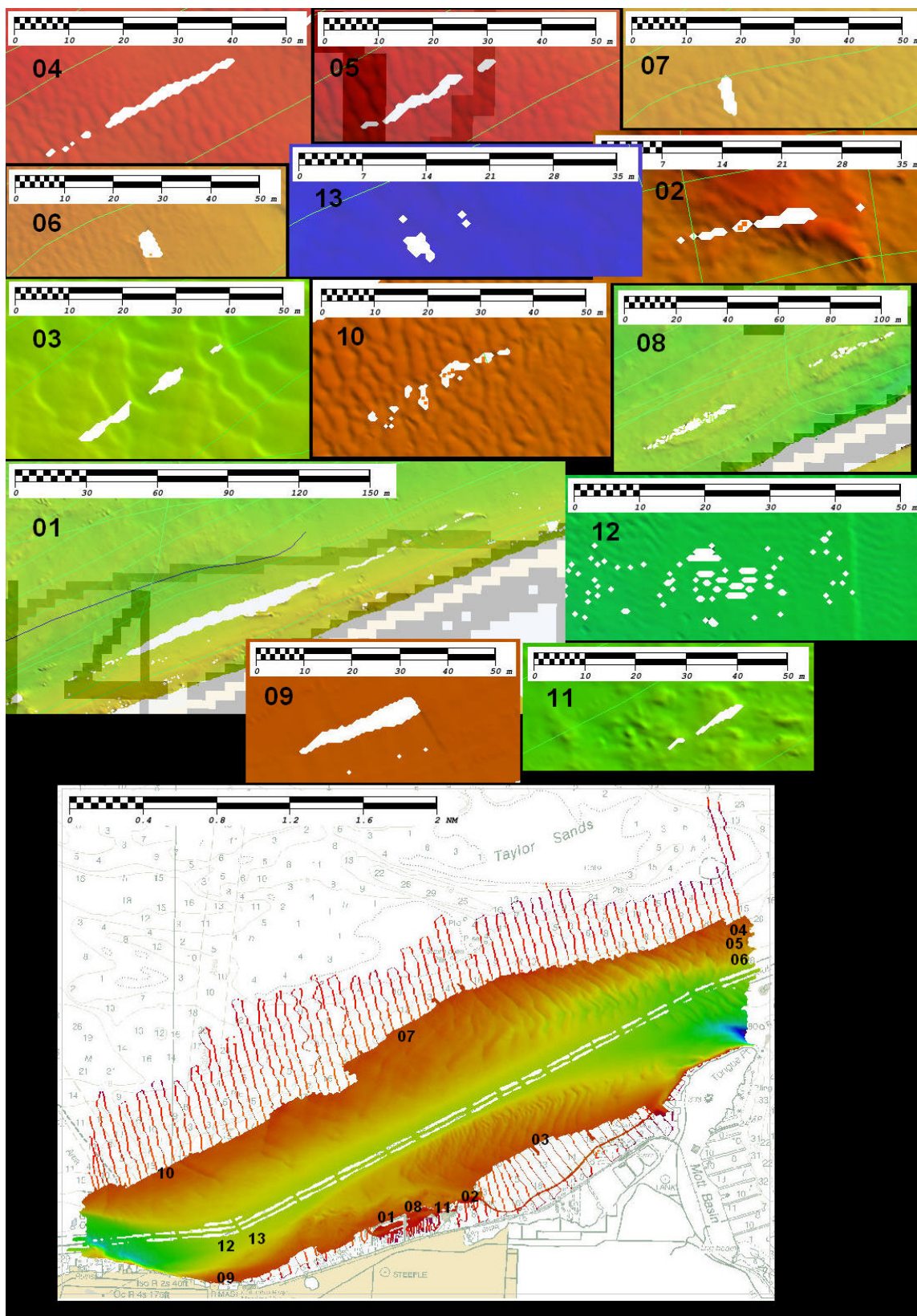


Figure 5. Example of the type of holidays found on survey H11757.

B3. Data Reduction

Data reduction procedures for survey H11757 conform to those detailed in the *OPR-N338-RA-07 DAPR*.

B4. Data Representation

Half meter BASE surfaces were used in processing H11757 (see Figures 6 and 7). Considering the shoal nature of the entire project area, the decision was made to calculate the entire survey area as half meter BASE surfaces. Since the coverage of the mainscheme bathymetry was dense enough to support this resolution through the survey, cleaning the entire survey to the half meter surface had the added benefit of eliminating the fliers produced when combining surface of different resolutions.

Field sheets have a grid resolution of at least 10% of the depth and are smaller than 25×10^6 nodes.

Soundings and contours 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.¹¹

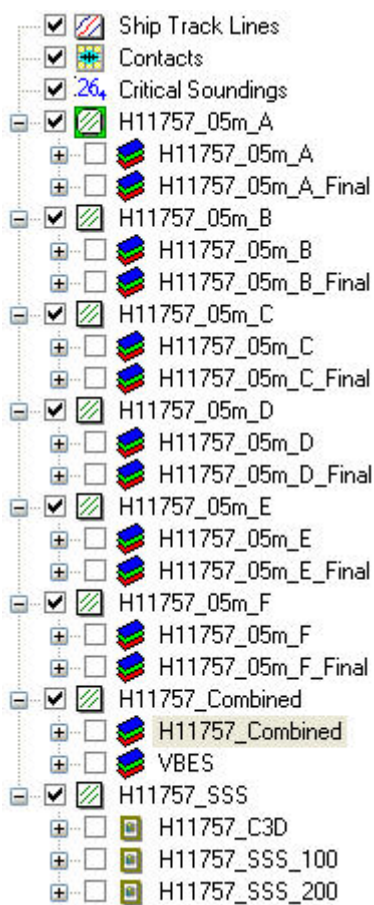


Figure 6: Field sheets and BASE surfaces submitted with H11757

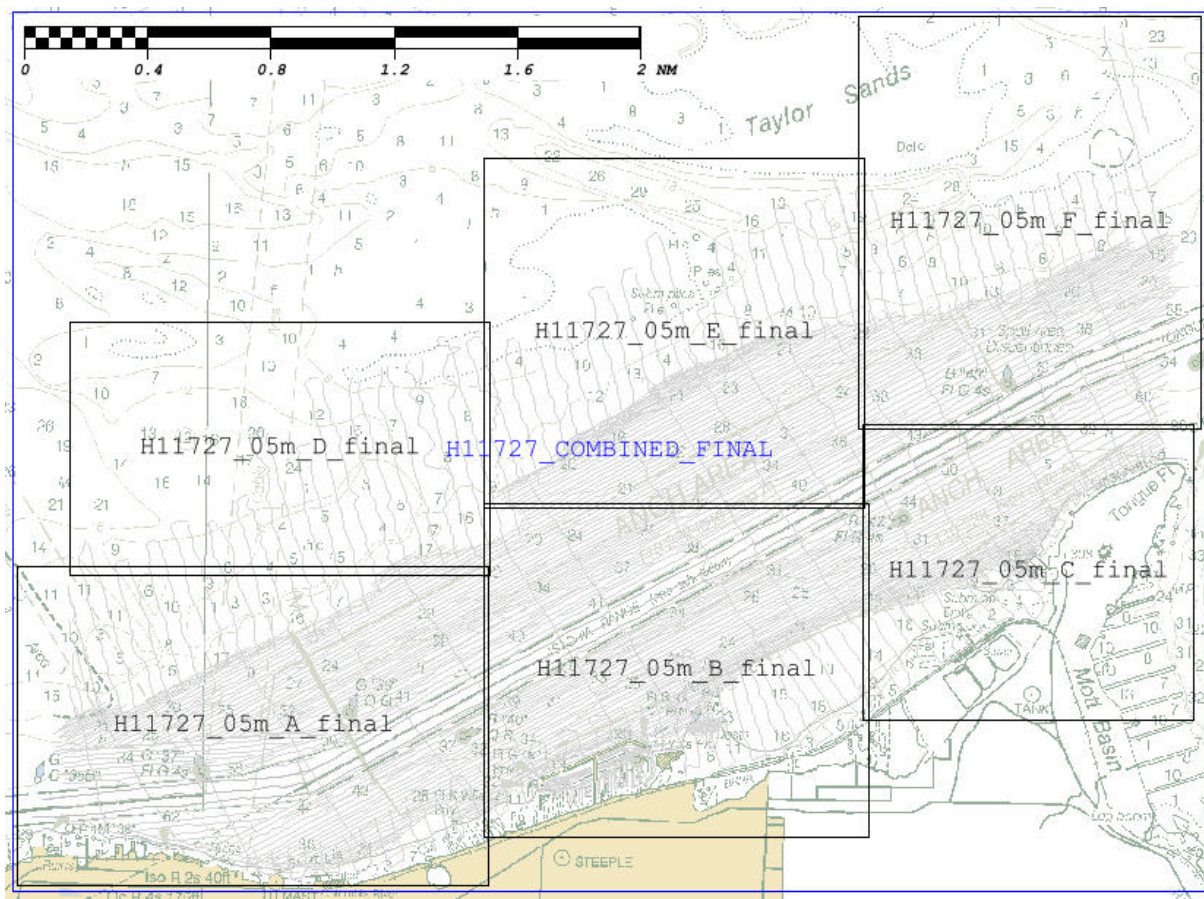


Figure 7: Layout of field sheets and ship track lines for H11757, overlaid on NOAA Chart 18521.

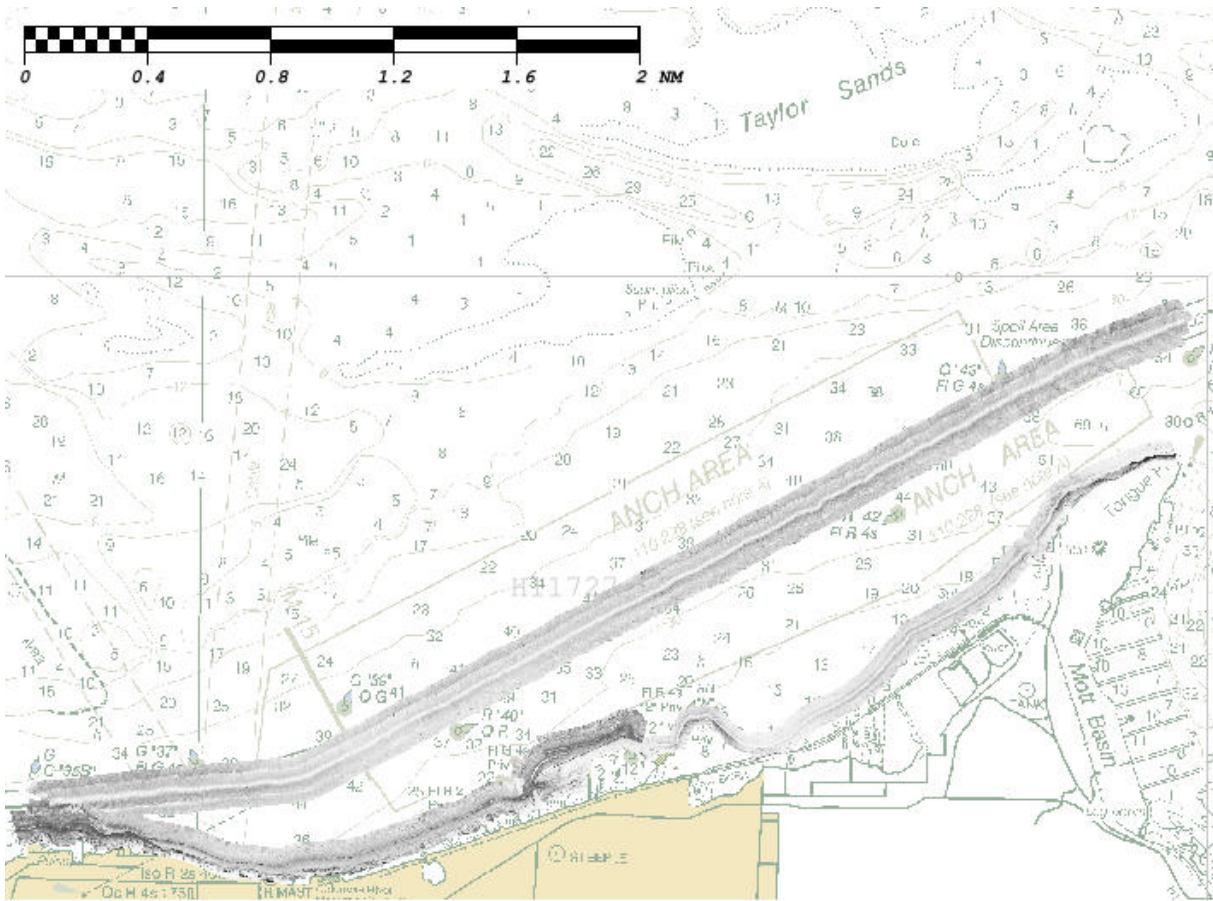


Figure 8: Layout of Side Scan Sonar for H11757, overlaid on NOAA Chart 18521.

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N338-RA-07 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 will be submitted.¹²

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 beacons utilized for this survey are given in Table 3.

Location	Frequency	Operator	Distance	Priority
Fort Stevens, OR	287 KHz	USCG	14.5nm	Primary

Table 3: Differential Corrector Sources for H11757.

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, OR (943-9040) served as control for datum determination and as the primary source for water level reducers for survey H11723.

No tertiary gauges were required.

All data were reduced to MLLW using **final approved water levels** from station Astoria, OR (943-9040) using the tide file 9439040.tid and **final** time and height correctors using the zone corrector file N338RA2007CORP_rev.zdf.

The request for Final Approved Water Levels for H11757 was submitted to CO-OPS on October 14, 2007 and the Final Tide Note was received on October 16, 2007. This documentation is included in Appendix IV.¹³

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11757 was compared with NOAA chart 18521.

Main channel depths surveyed were generally in agreement with depths on chart. In areas along and within the main channel soundings generally agreed within 3 feet, with outlying soundings as much as 5 feet, but exhibited no trends.¹⁴

Due to the shifting nature of sand waves, the northern shoal sandy areas of survey H11757 were dramatically different than charted. Differences up to 15 feet were observed but no defining trend was evident.¹⁵ DTONs were submitted where appropriate.

Soundings agreed within a half meter of the tabulated depths within the US Army Corps of Engineers maintained Astoria Range.¹⁶

The small boat harbor boat launch sounding is approximately 9 feet deeper than charted (see figure 9). The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.¹⁷

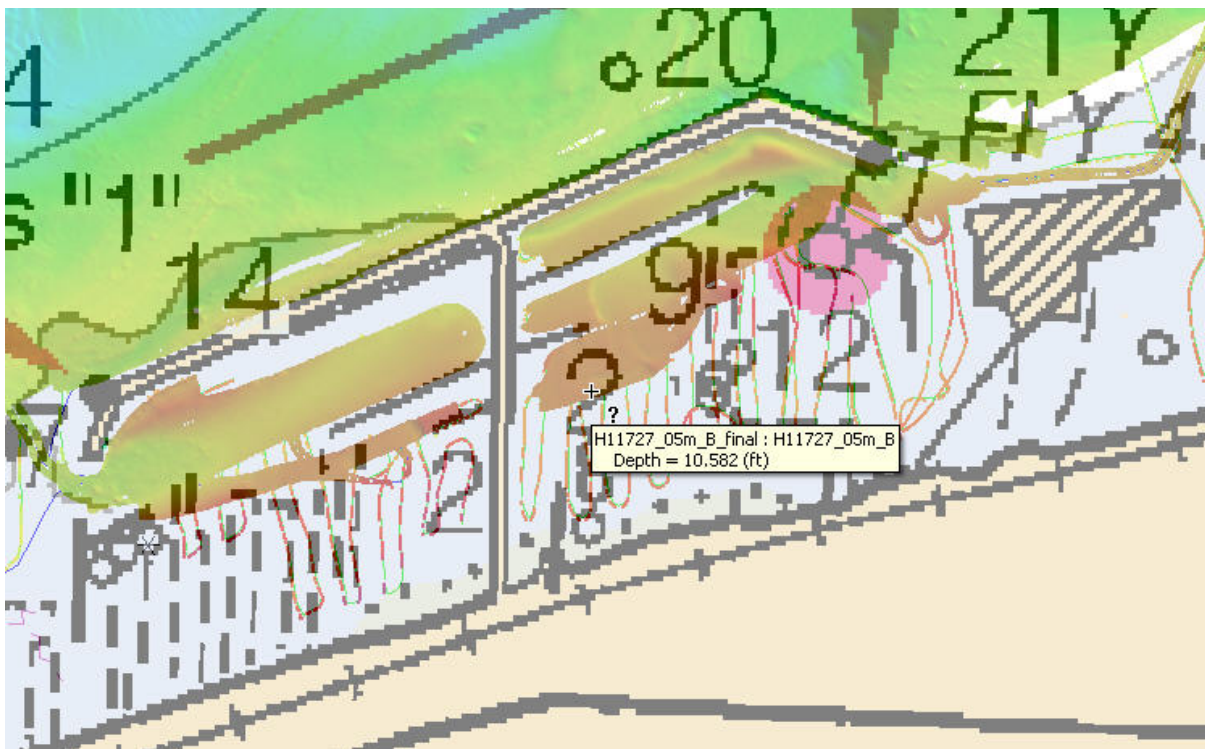


Figure 9: Eight and a half foot sounding difference between charted depth at small boat launch.

D.1.b. Dangers to Navigation

Eleven (11) Dangers to Navigation (DTONs) were found on survey H11757, and reported to the Marine Chart Division via email on April 15, 2008.¹⁸ The original DTON submission package is included in Appendix IV. Descriptions of each DTON are included in the Survey Feature Report in Appendix I.¹⁹

Six (6) DTONs are the shoalest soundings on sound waves (see Figure 10 - 16).

Five (5) DTONs represent a shifted 18 foot depth contour (see Figure 17).

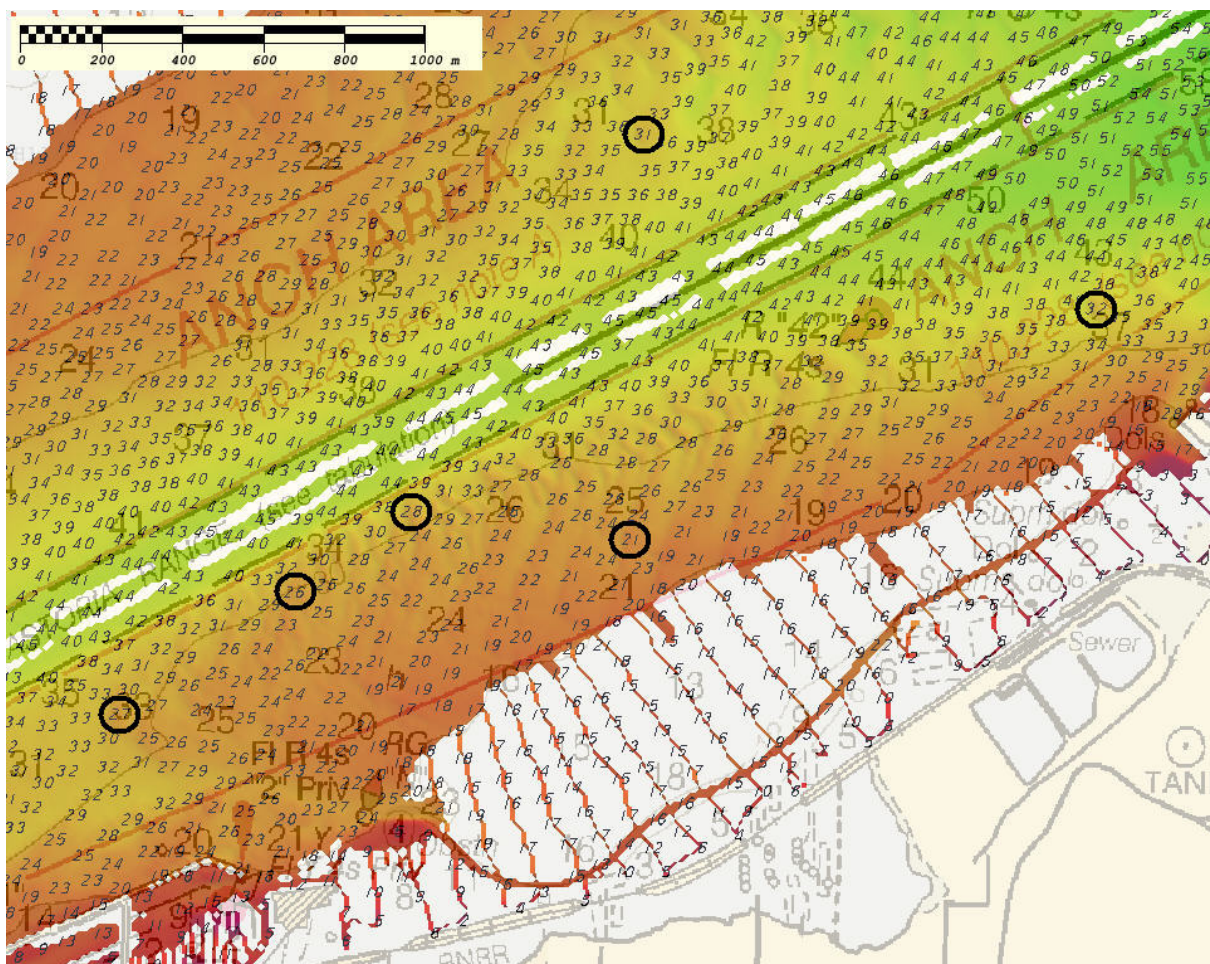


Figure 10: Six soundings (circled) from sand waves produced DTONs.

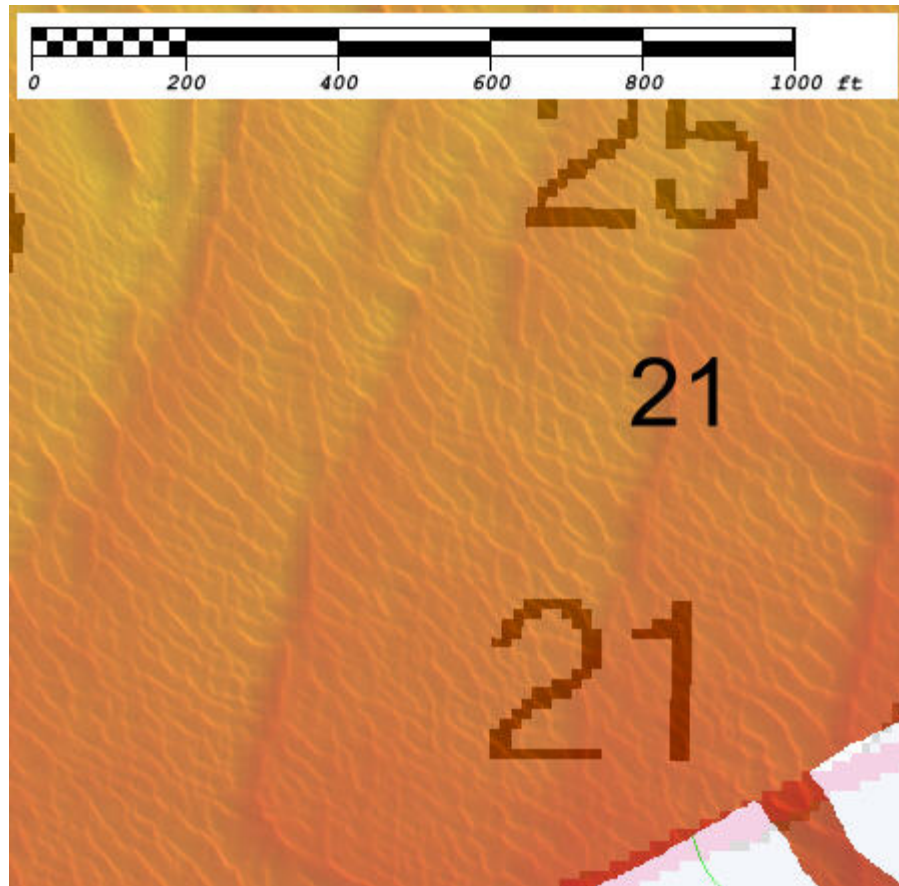


Figure 11: This DTON is a 21 foot sounding on a sand wave..

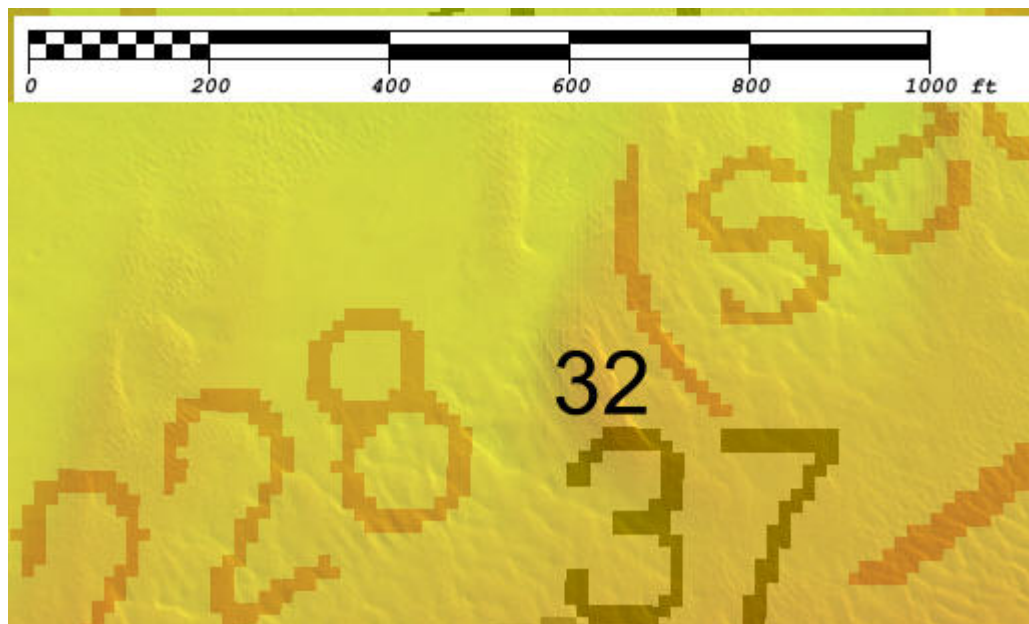


Figure 12: This DTON is a 32 foot sounding on a sand wave.

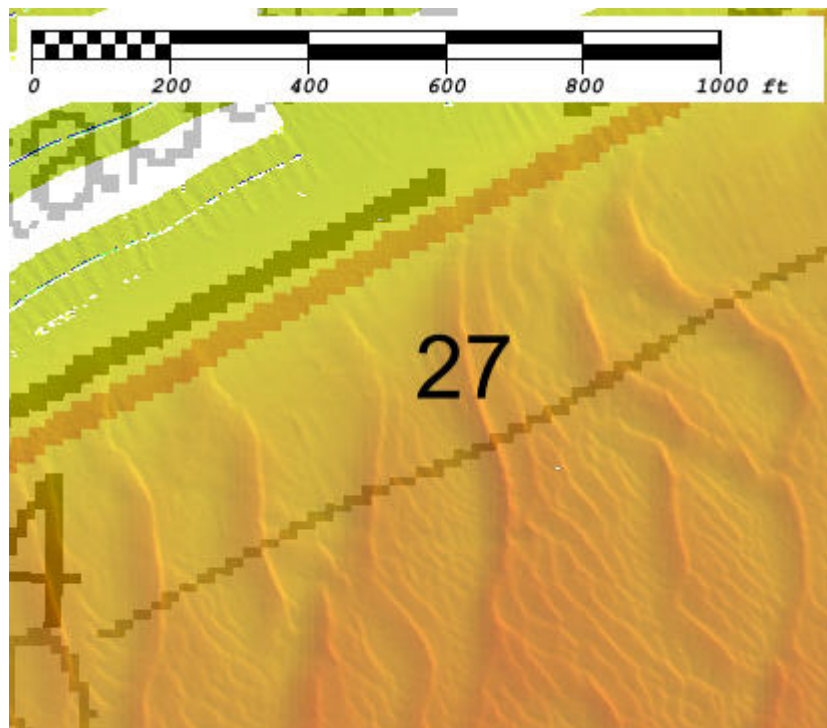


Figure 13: This DTON is a 27 foot sounding on a sand wave..

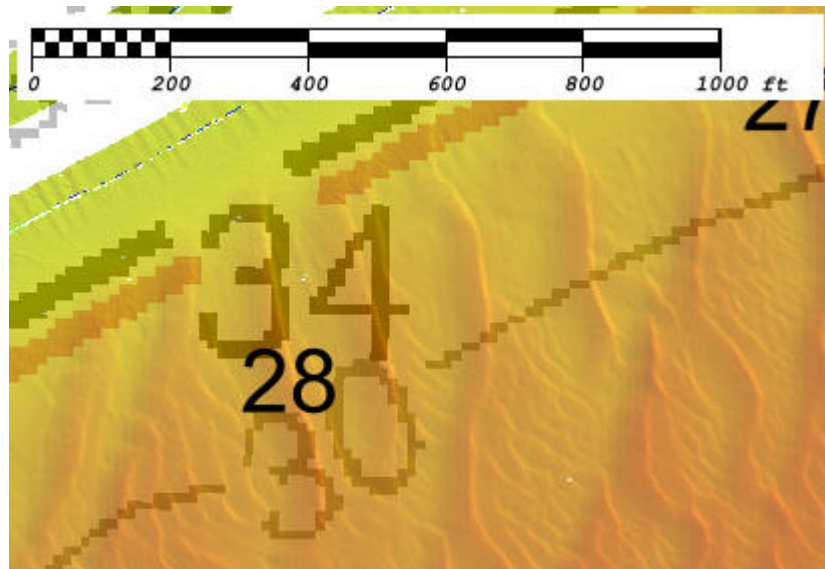


Figure 14: This DTON is a 28 foot sounding on a sand wave.

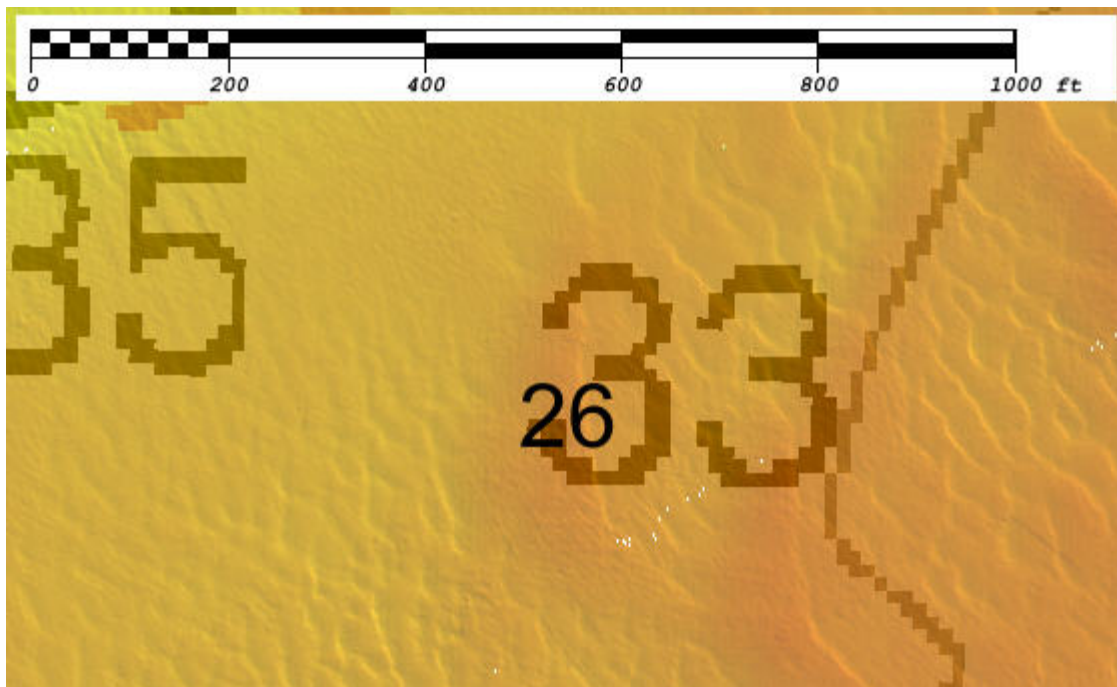


Figure 15: This DTON is a 26 foot sounding on a sand wave.

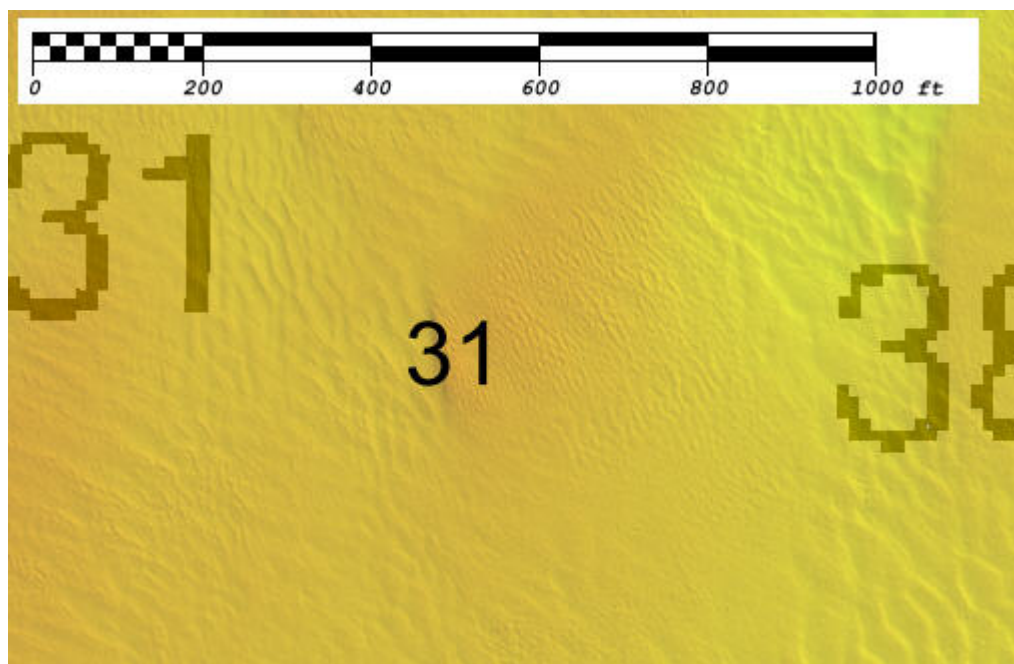


Figure 16: This DTON is a 31 foot sounding on a sand wave.

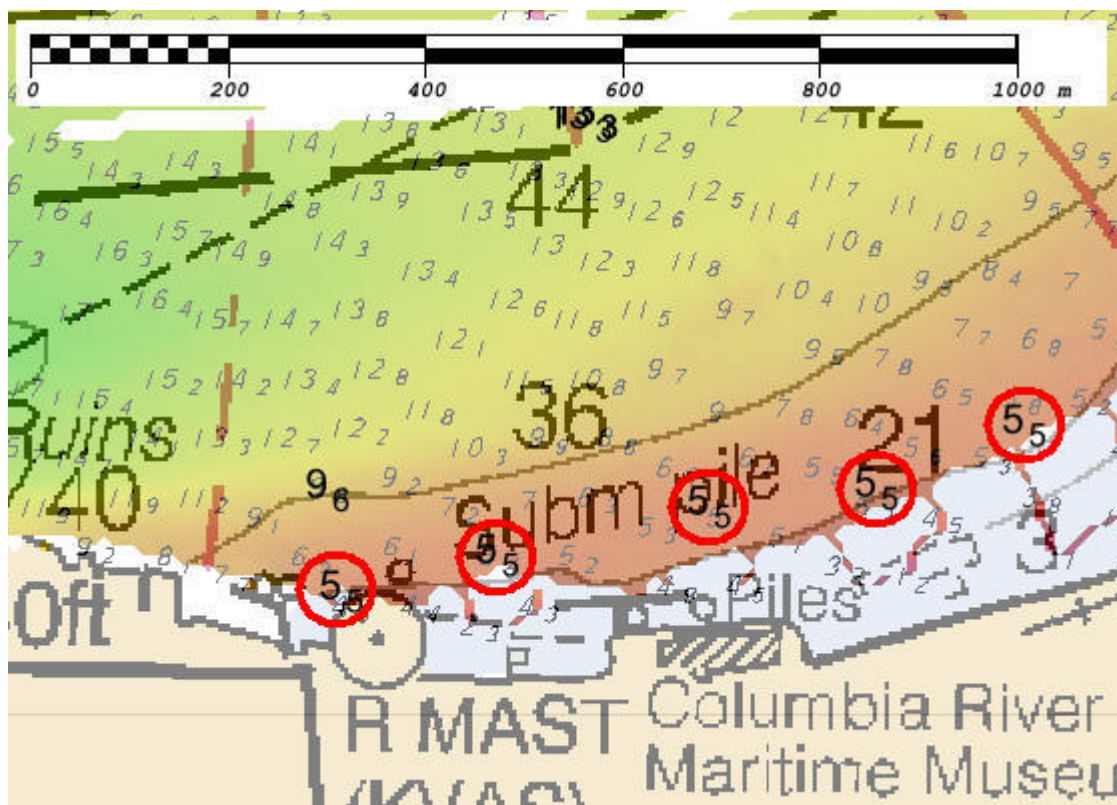


Figure 17: Five soundings, in meters (circled), represent the shifted 18 foot curve.

D.1.c. Other Features

Additional Items

Charted rock

One AWOIS item was investigated at location east of the small boat harbor (46°11'52.9" N 123°47'32.75" W ; (438858.8 , 5116355.09). Although the area was too shoal for safe multibeam investigation, VBES and side scan sonar were used.

A VBES line ran less than six meters away from the possible AWOIS item. After examining the VBES data, it was proven that the AWOIS item is cartographically insignificant due to the prevailing shoaling in the area (see Figure 18). Further investigation with side scan sonar revealed the AWOIS item's shoal height of 1.06 meters (see Figure 19). No shoal depth was obtained.²⁰

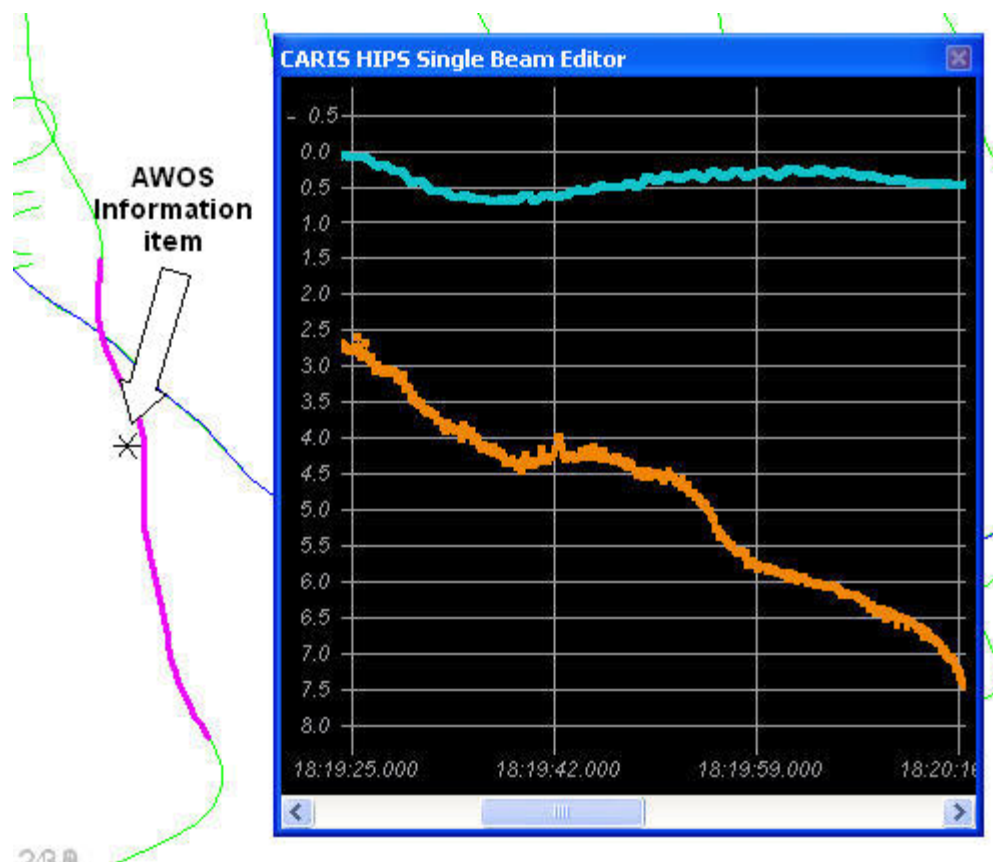


Figure 18: VBES data shows shoaling trend that near AWOIS item ($46^{\circ}11'52.9''$ N $123^{\circ}47'32.75''$ W ; (438858.8 , 5116355.09).

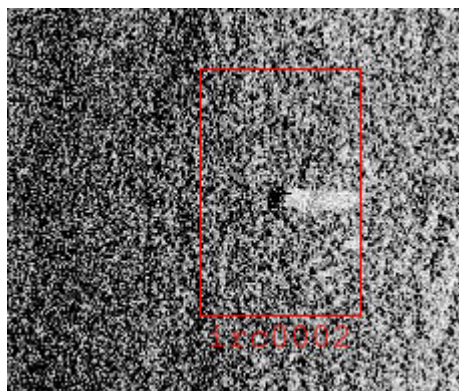


Figure 19: Side scan sonar shows AWOIS item with a height of 1.06 meters. ($46^{\circ}11'52.9''$ N $123^{\circ}47'32.75''$ W ; (438858.8 , 5116355.09).

New wreck

A wreck was found north east of the small boat harbor ($46^{\circ}12'09.38''$ N $123^{\circ}47'48.36''$ W ; (438519.02 , 5116865.88) (see Figure 20). The wreck is a small pleasure craft 7.5 meters

length, 3.5 meters width, with shoalest point 7.02 meters depth. The wreck is over 80% imbedded in the sediment, with 3 feet cresting above the seafloor.²¹

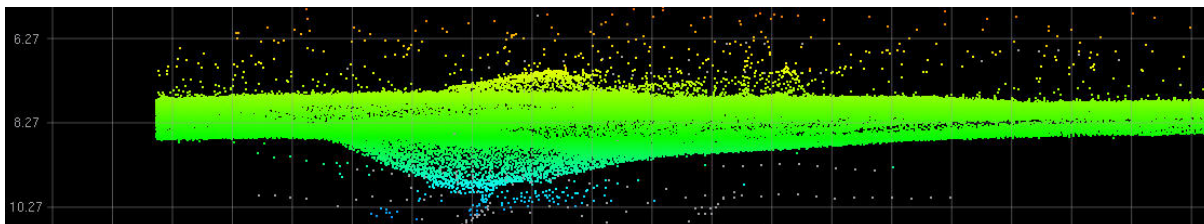


Figure 20: This wreck is over 80% imbedded in the sediment, with 3 feet cresting above the seafloor, located. (46°12'09.38" N 123°47'48.36" W ; (438519.02 , 5116865.88)

D.2. Additional Results

D.2.a. Prior Survey Comparison

Prior survey comparison was not performed.

D.2.b. Shoreline Verification

Shoreline Source

The source shoreline for project OPR-N338-RA-07 is a composite source file compiled from photogrammetric survey project OR0201, charted features from the digital Electronic Navigational Chart (ENC) GC-10542, and prior survey features. Features shown on the current edition of chart 18521 but not included in the composite source file provided with the project instructions were manually digitized in CARIS Notebook by RAINIER personnel, and added to a composite shoreline source file. Finally, a copy of this RAINIER modified project wide composite source file was trimmed down to include only the shoreline and features that applied to each individual survey.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM sections 6.1 and 6.2. Detached positions (DPs) acquired during shoreline verification were recorded in HYPACK, on DP forms, and processed in Pydro. These indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline. DP forms are included in the *Separates to be Included with Survey Data*.²²

All shoreline data is submitted in Caris Notebook .hob files.²³ Table 4 lists and describes the files contained in H11757_notebook.wrk:

HOB File	Purpose and Contents
H11757_Comp_Source.hob	Original Source Data as trimmed from composite source file OPRN338.000
H11757_Field_Verified.hob	Field verified source features and shoreline, including edits and updates not requiring DPs.
H11757_Pydro_Updates.hob	New or modified items processed through Pydro.
H11757_Pydro_Disprovals.hob	Deleted items processed through Pydro.

Table 4. List and Description of Notebook HOB files.

The combination of H11757_Field_Verified.hob and H11757_Pydro_Updates.hob files depict the shoreline as surveyed.²⁴

Source Shoreline Changes and New Features

Items for survey H11757 that require further discussion and are associated with a detached position, have been flagged “Report” in Pydro in H11757.pss. Investigation methods and recommendations are listed in the Remarks and Recommendation tabs. These features are included in the Survey Feature Report in Appendix I.²⁵

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above.²⁶

D.2.c. Aids to Navigation

All Coast Guard aids to navigation (ATONs) were found to be correctly charted and serve their intended purpose. One additional private ATON was found during survey operations. See feature report for more information.²⁷

D.2.d. Overhead Features

There are no overhead features within the limits of survey H11757.²⁸

D.2.e. Submarine Cables and Pipelines

Survey H11757 includes two charted abandoned cable areas. No evidence of cable was found in the bathymetry. The Hydrographer recommends retaining the cable areas as charted.²⁹

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H11757, and none were observed to be operating in the area.

D.2.g. Bottom Samples

Due to time constraints, no bottom samples were collected for survey H11757.³⁰

D.2.h. Other Findings

Sand Waves

The edge of the linear sand waves migrated as much as a half meter per day on the Columbia River due to the strong currents in the area. Comparison of survey lines, two days apart, on the same features show the leeward edge of sand waves migrating (see Figure 21).

Comparison of a piling and the migrating sand waves disproves possible horizontal control error (see Figure 22).³¹

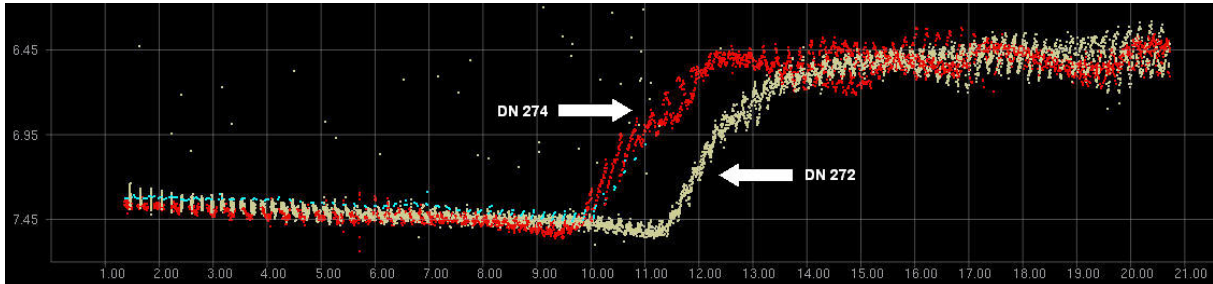


Figure 21: Sand waves migrated as much as one meter per two days on the Columbia River.

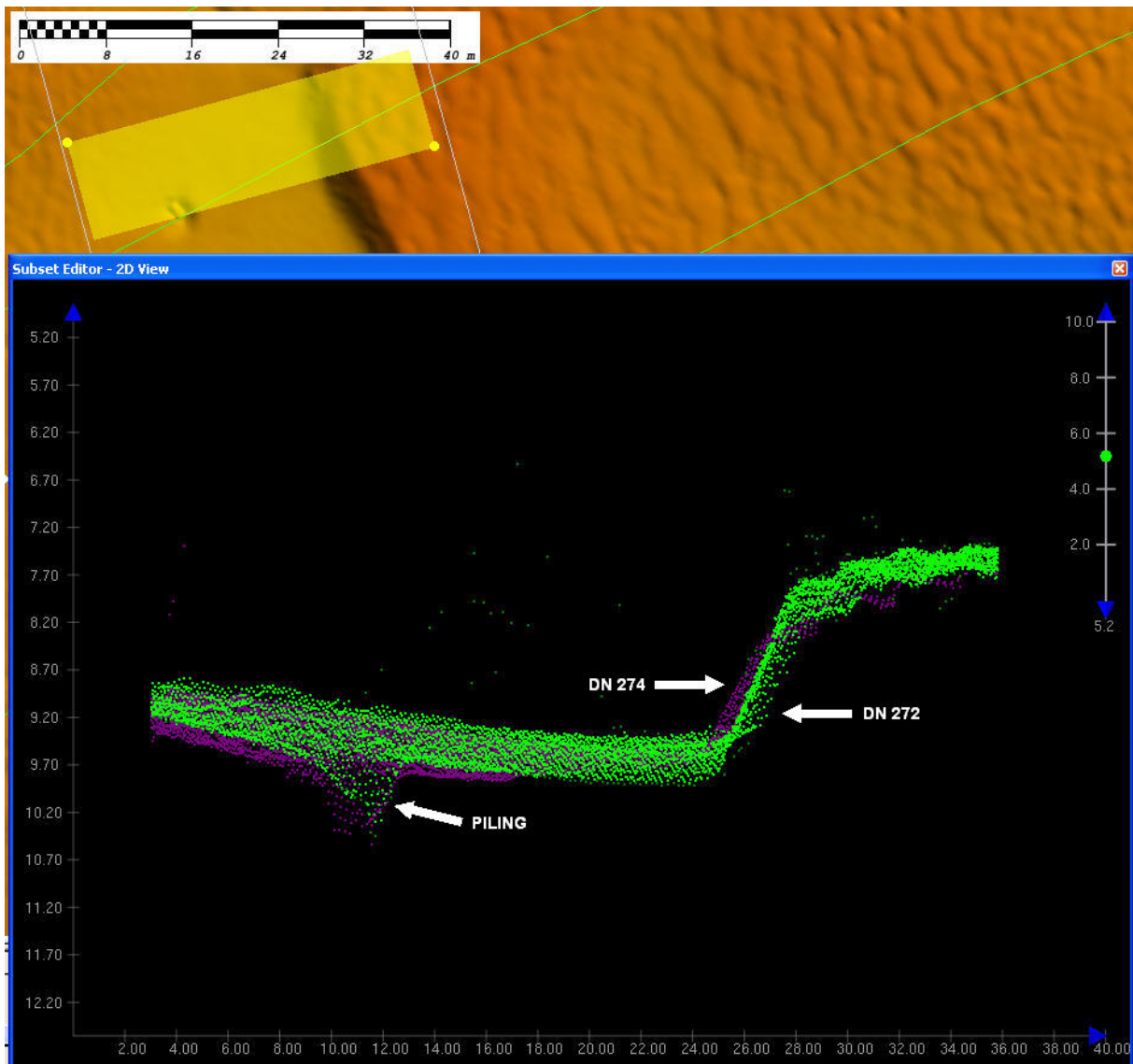


Figure 22: Comparison of a piling with the migrating sand wave disproves possible horizontal control error between two survey lines, two days apart (DN 272 and DN 274).

E. APPROVAL

As Chief of Party, Field operations for hydrographic survey H11757 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 2007 edition), Field Procedures Manual (March 2007 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through October 2007. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report. 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:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-N338-RA-07	11/7/2007	N/CS34
Coast Pilot Report for OPR-N338-RA-07	TBD	N/CS26

Approved and Forwarded:



 J CDR/NOAA

Digitally signed by Donald W. Haines, CDR/NOAA
 DN: cn=Donald W. Haines, CDR/NOAA, c=US, o=NOAA/NMAO/
 MOC-P, ou=NOAA Ship RAINIER, email=co.rainier@noaa.gov
 Reason: I am approving this document
 Date: 2008.04.17 21:27:33 -07'00'

Donald W. Haines
 Commander, NOAA
 Commanding Officer

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

Survey Sheet Manager:



Ian Colvert
 I am the author of this document
 2008.04.18 02:31:07 Z

Ian Colvert
 Survey Technician, NOAA

Chief Survey Technician:



James B. Jacobson
 I have reviewed this document
 2008.04.18 02:34:02 Z

James B. Jacobson
 Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:



Charles Yoos
 I have reviewed this document
 2008.04.17 20:42:33 -07'00'

Charles J. Yoos
 Lieutenant, NOAA

¹ Label at top of figure one should read H11757, not H11727.

² Filed with project reports.

³ Concur.

⁴ The Survey Acceptance Review (SAR) conducted at the Pacific Hydrographic Branch (PHB) did not discover any data that exceeded IHO order 1. All bathymetry submitted for H11757 is adequate for charting.

⁵ Filed with project records.

⁶ Concur.

⁷ Bathymetry from singlebeam coverage in this area is sufficient to update the chart and is used to generate updated soundings in this region.

⁸ All correctors are adequate. The Survey Acceptance Review (SAR) conducted at the Pacific Hydrographic Branch (PHB) all data met or exceeded IHO order 1. All bathymetry submitted for H11757 is acceptable for charting.

⁹ Concur.

¹⁰ Concur. Holidays are so small in size they are not represented in the DEPART of US511757_CS.000.

¹¹ These files are included with the digital hydrographic records.

¹² Concur.

¹³ Tide note is appended to this report.

¹⁴ Concur.

¹⁵ Concur.

¹⁶ Concur.

¹⁷ Concur.

¹⁸ One additional DTON was submitted during office processing on July 7, 2008. The DTON is listed as feature 1.1 in the DTON report appended to this report.

¹⁹ DTON report is appended to this report.

²⁰ AWOIS Item 52,973 was assigned as an investigational item only. It is charted obstruction on RNC 18521 and as a rock on ENC USOR11M with a least depth of 4 feet at 46-11-55.07N, 123-47-38.97W. H11757 did not acquire a least depth on the feature, but was able to determine it is a rock by using side scan sonar. The feature is included in US511757_CS.000 as a rock with a least depth of 4 feet at 46-11-55.07N, 123-47-38.97W as it is on the ENC.

²¹ Wreck is not included in US511757_CS.000 due to its small size and non-significance to navigation. The least depth of this small wreck is deeper than shoaler soundings in the immediate vicinity that have been selected for charting.

²² Paper plots and DP forms are filed with hydrographic records.

²³ .HOB files are filed with hydrographic records.

²⁴ Features from these files were used in the creation of US511757_CS.000.

²⁵ The Survey Feature Report is filed with the hydrographic records. Note: the survey feature report does not include all features from H11757. Additional features were added, some removed, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H11757 have come directly from CARIS Notebook, which is the official features deliverable for this survey.

²⁶ Concur.

²⁷ Concur. ATON is included in US511757_CS.000.

²⁸ Concur.

²⁹ Concur.

³⁰ All charted bottom samples from US5OR11M.000 within the limits of US511757.000 were retained.

³¹ The shoalest depths from the migrating sand waves were selected from the hydrographic data collected from H11757 to compile US511757.000.

H11757 Dangers to Navigation

Registry Number: OPR-N338-RA-07
State: Oregon
Locality: Approaches to Warrington, Oregon
Sub-locality: Cliff Pt. to Tongue Pt.
Project Number: H11757
Survey Dates: 09/30/2007 - 10/01/2007

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18521	72nd	12/01/2005	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	32nd	07/01/2005	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	31st	06/01/2005	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	5.46 m	46° 11' 43.9" N	123° 48' 39.3" W	---
1.2	Shoal	6.52 m	46° 12' 18.6" N	123° 47' 12.7" W	---
1.3	Shoal	5.49 m	46° 11' 28.9" N	123° 49' 23.6" W	---
1.4	Shoal	9.87 m	46° 12' 37.6" N	123° 46' 18.9" W	---
1.5	Shoal	5.47 m	46° 11' 29.6" N	123° 49' 15.7" W	---
1.6	Shoal	8.36 m	46° 12' 20.4" N	123° 47' 37.6" W	---
1.7	Shoal	8.66 m	46° 12' 16.3" N	123° 47' 47.9" W	---
1.8	Shoal	8.09 m	46° 12' 04.5" N	123° 48' 11.2" W	---
1.9	Shoal	5.48 m	46° 11' 26.0" N	123° 49' 41.0" W	---
1.10	Shoal	9.51 m	46° 12' 51.3" N	123° 47' 11.8" W	---
1.11	Shoal	5.53 m	46° 11' 31.7" N	123° 49' 08.8" W	---

1.12	Shoal	5.48 m	46° 11' 27.3" N	123° 49' 33.7" W	---
------	-------	--------	-----------------	------------------	-----

1 - Danger To Navigation

1.1) Profile/Beam - 1473/36 from h11757 / 1016_reson8125_hvf / 2007-273 / 416_2010

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 43.9" N, 123° 48' 39.3" W
Least Depth: 5.46 m (= 17.93 ft = 2.988 fm = 2 fm 5.93 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.300 m
Timestamp: 2007-273.20:11:43.010 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 416_2010
Profile/Beam: 1473/36
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

18 ft. sounding over charted 22 ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/416_2010	1473/36	0.00	000.0	Primary

Hydrographer Recommendations

Chart 18 ft. sounding. Delete charted 22 ft. sounding.

Cartographically-Rounded Depth (Affected Charts):

18ft (18521_1)

3fm (18520_1, 18003_1, 18007_1, 530_1)

5.5m (501_1, 50_1)

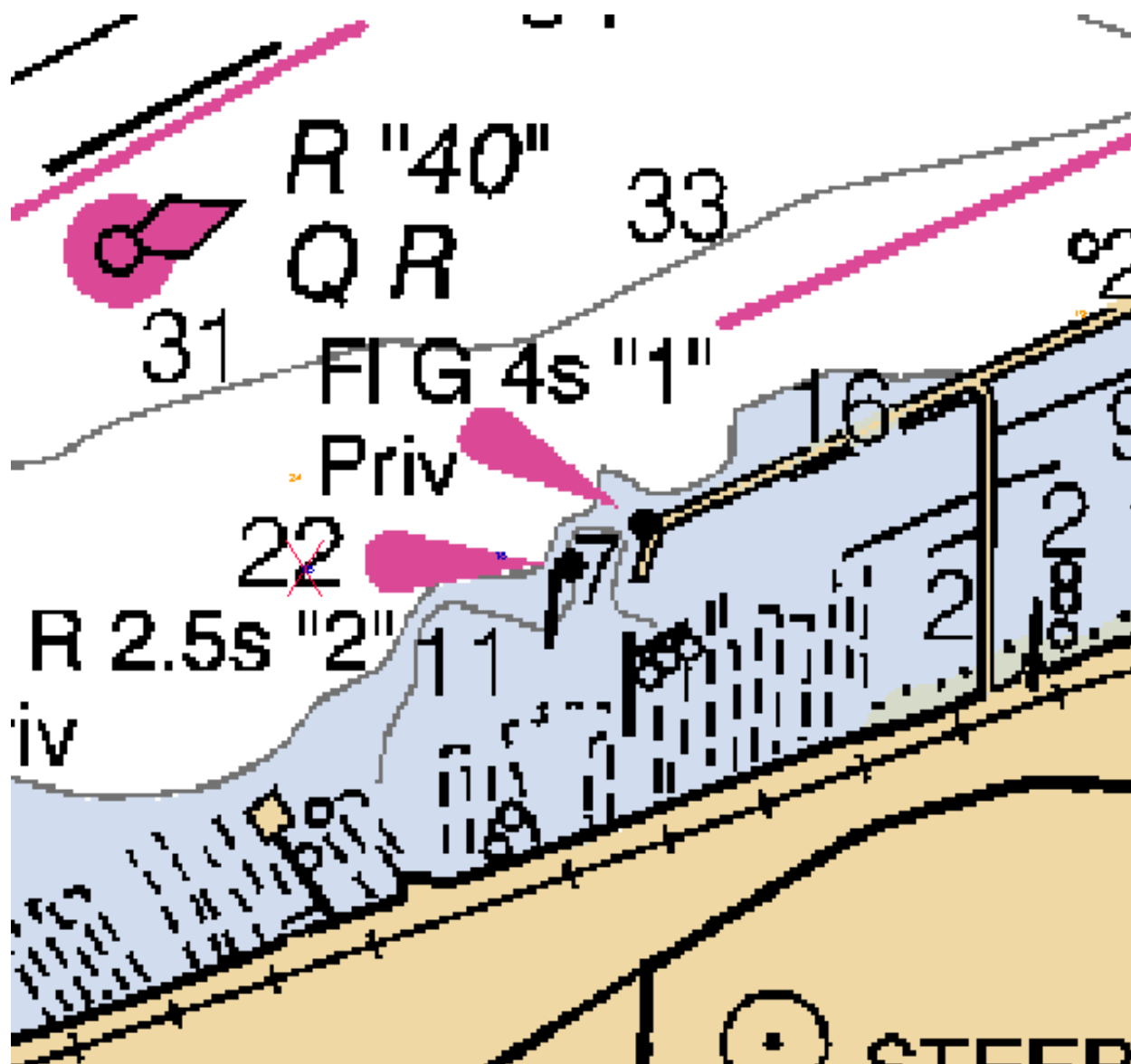
S-57 Data

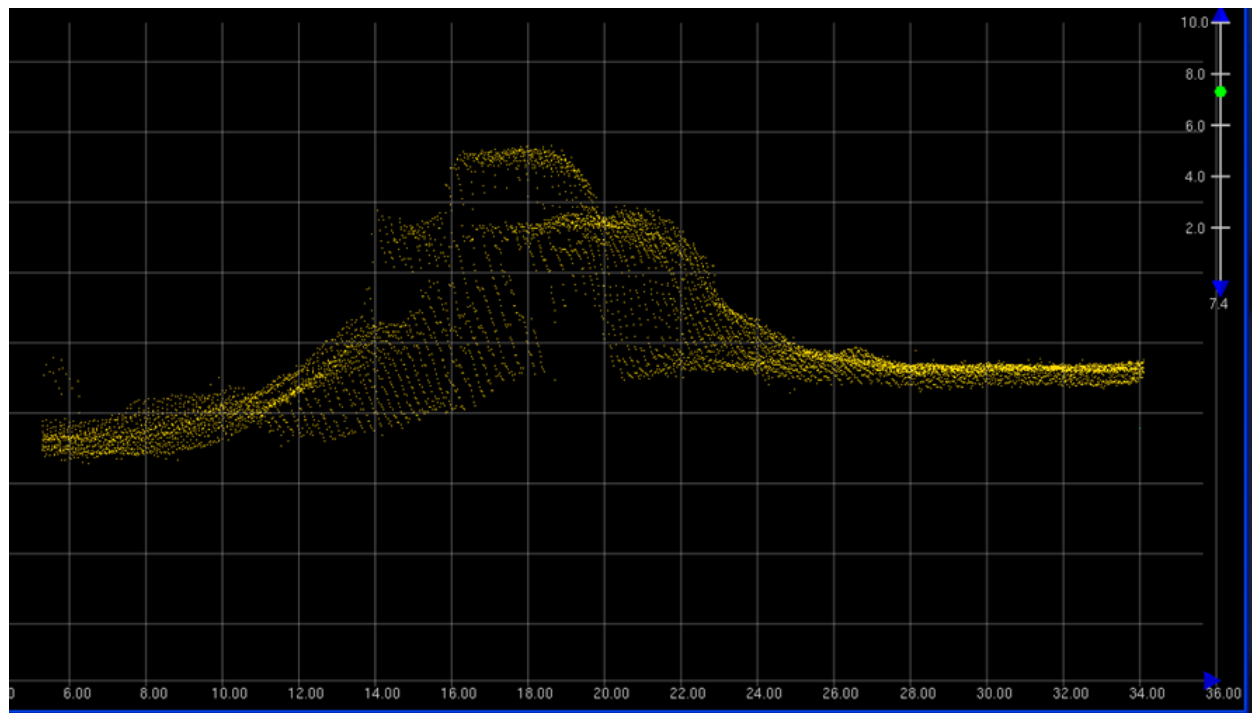
Geo object 1: Sounding (SOUNDG)
Attributes: SORDAT - 20071002
 SORIND - US, US, surve, H11757

Office Notes

Concur. Chart 18 ft. sounding.

Feature Images

*Figure 1.1.1*

*Figure 1.1.2*

1.2) Profile/Beam - 11351/28 from h11757 / 1016_reson8125_hvf / 2007-273 / 414_2111

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 18.6" N, 123° 47' 12.7" W
Least Depth: 6.52 m (= 21.40 ft = 3.567 fm = 3 fm 3.40 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.964 m ; TVU (TPEv) ± 0.300 m
Timestamp: 2007-273.21:23:50.694 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 414_2111
Profile/Beam: 11351/28
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoalest point of sand wave.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/414_2111	11351/28	0.00	000.0	Primary

Hydrographer Recommendations

Chart as bathymetry.

Cartographically-Rounded Depth (Affected Charts):

21ft (18521_1)

3 ½fm (18520_1, 18003_1, 18007_1, 530_1)

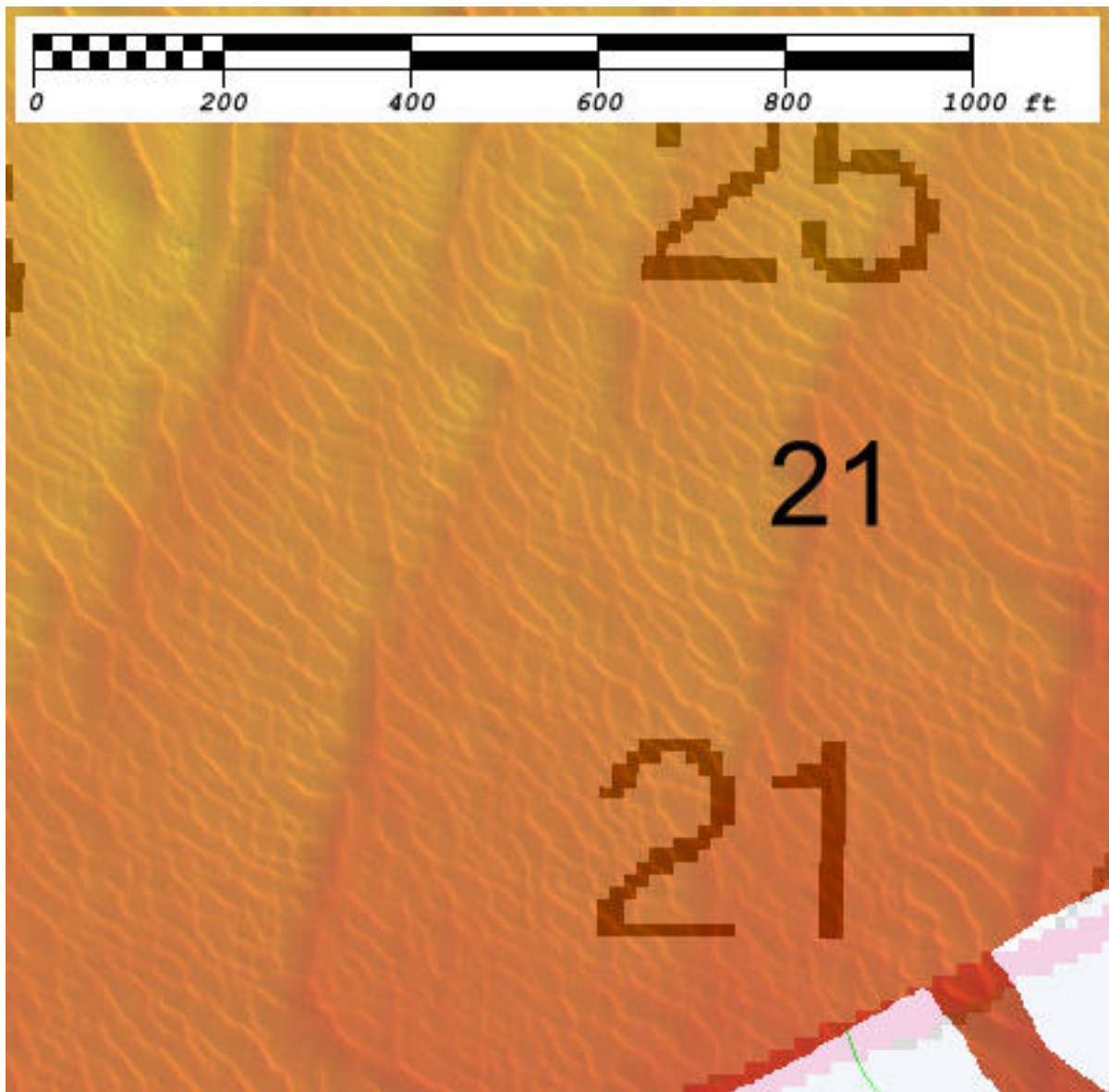
6.5m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur. Chart 21 sounding.

Feature Images*Figure 1.2.1*

1.3) Profile/Beam - 527/38 from h11757 / 1016_reson8125_hvf / 2007-273 / 414_2111

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 28.9" N, 123° 49' 23.6" W
Least Depth: 5.49 m (= 18.01 ft = 3.002 fm = 3 fm 0.01 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.300 m
Timestamp: 2007-273.21:11:46.040 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 414_2111
Profile/Beam: 527/38
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shifted 18 foot curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/414_2111	527/38	0.00	000.0	Primary

Hydrographer Recommendations

Chart as 18 foot curve.

Cartographically-Rounded Depth (Affected Charts):

18ft (18521_1)

3fm (18520_1, 18003_1, 18007_1, 530_1)

5.5m (501_1, 50_1)

S-57 Data

Geo object 1: Depth contour (DEPCNT)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur.

Feature Images

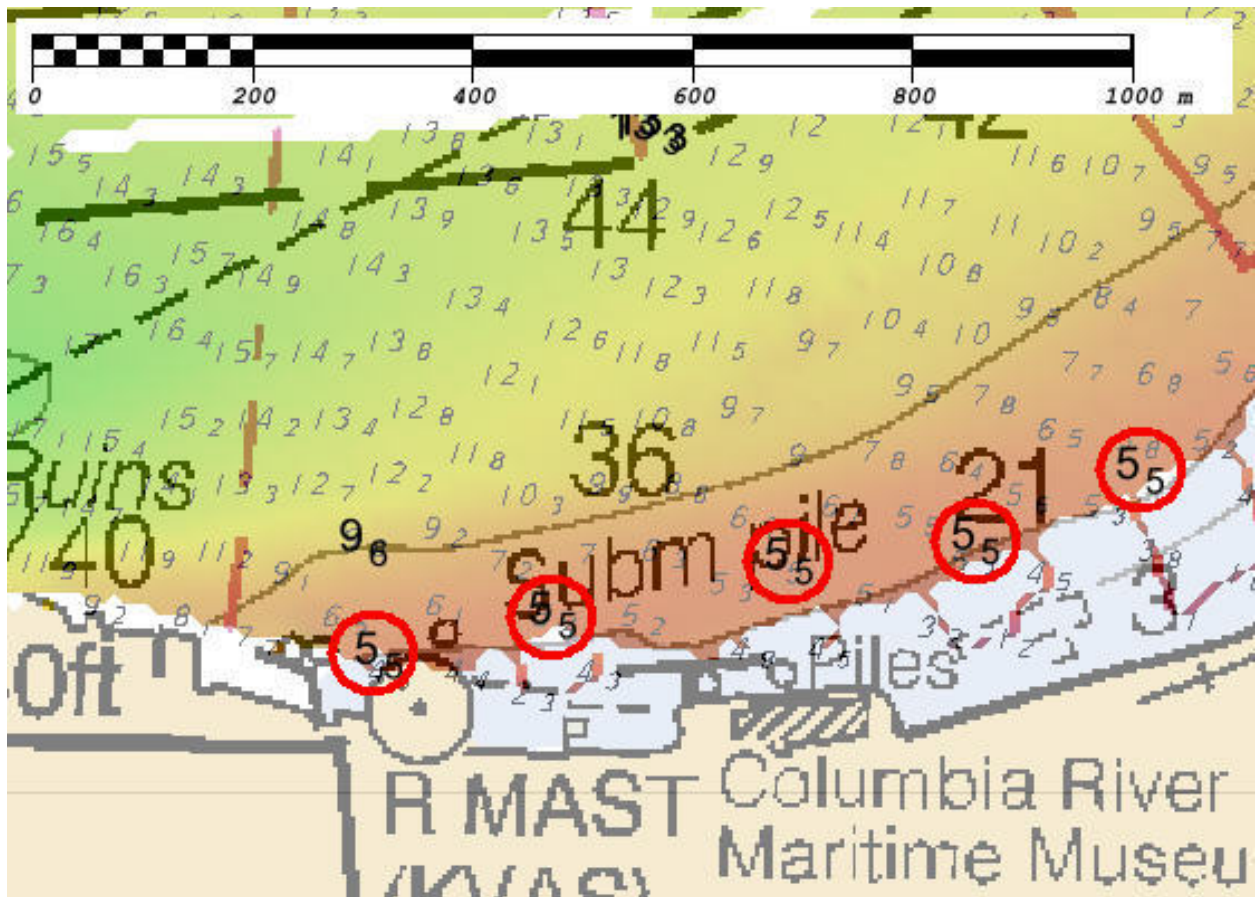


Figure 1.3.1

1.4) Profile/Beam - 2488/133 from h11757 / 1016_reson8125_hvf / 2007-273 / 415_2032

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 37.6" N, 123° 46' 18.9" W
Least Depth: 9.87 m (= 32.40 ft = 5.399 fm = 5 fm 2.40 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.299 m
Timestamp: 2007-273.20:38:15.903 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 415_2032
Profile/Beam: 2488/133
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoalest point of sand wave.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/415_2032	2488/133	0.00	000.0	Primary

Hydrographer Recommendations

Chart as bathymetry.

Cartographically-Rounded Depth (Affected Charts):

32ft (18521_1)

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

9.9m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur. Chart 32 ft. sounding.

Feature Images

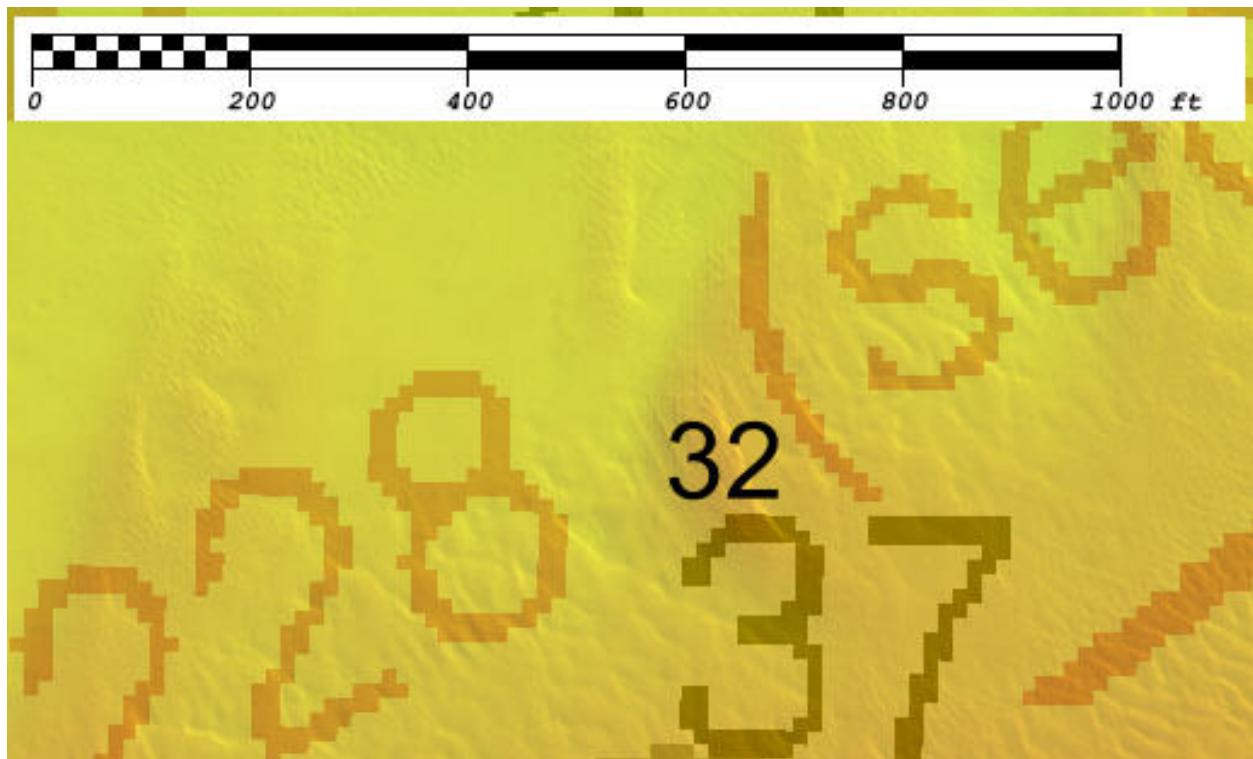


Figure 1.4.1

1.5) Profile/Beam - 821/208 from h11757 / 1016_reson8125_hvf / 2007-273 / 438_2059

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 29.6" N, 123° 49' 15.7" W
Least Depth: 5.47 m (= 17.96 ft = 2.993 fm = 2 fm 5.96 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.300 m
Timestamp: 2007-273.20:59:46.122 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 438_2059
Profile/Beam: 821/208
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shifted 18 foot curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/438_2059	821/208	0.00	000.0	Primary

Hydrographer Recommendations

Chart as 18 foot curve.

Cartographically-Rounded Depth (Affected Charts):

18ft (18521_1)

3fm (18520_1, 18003_1, 18007_1, 530_1)

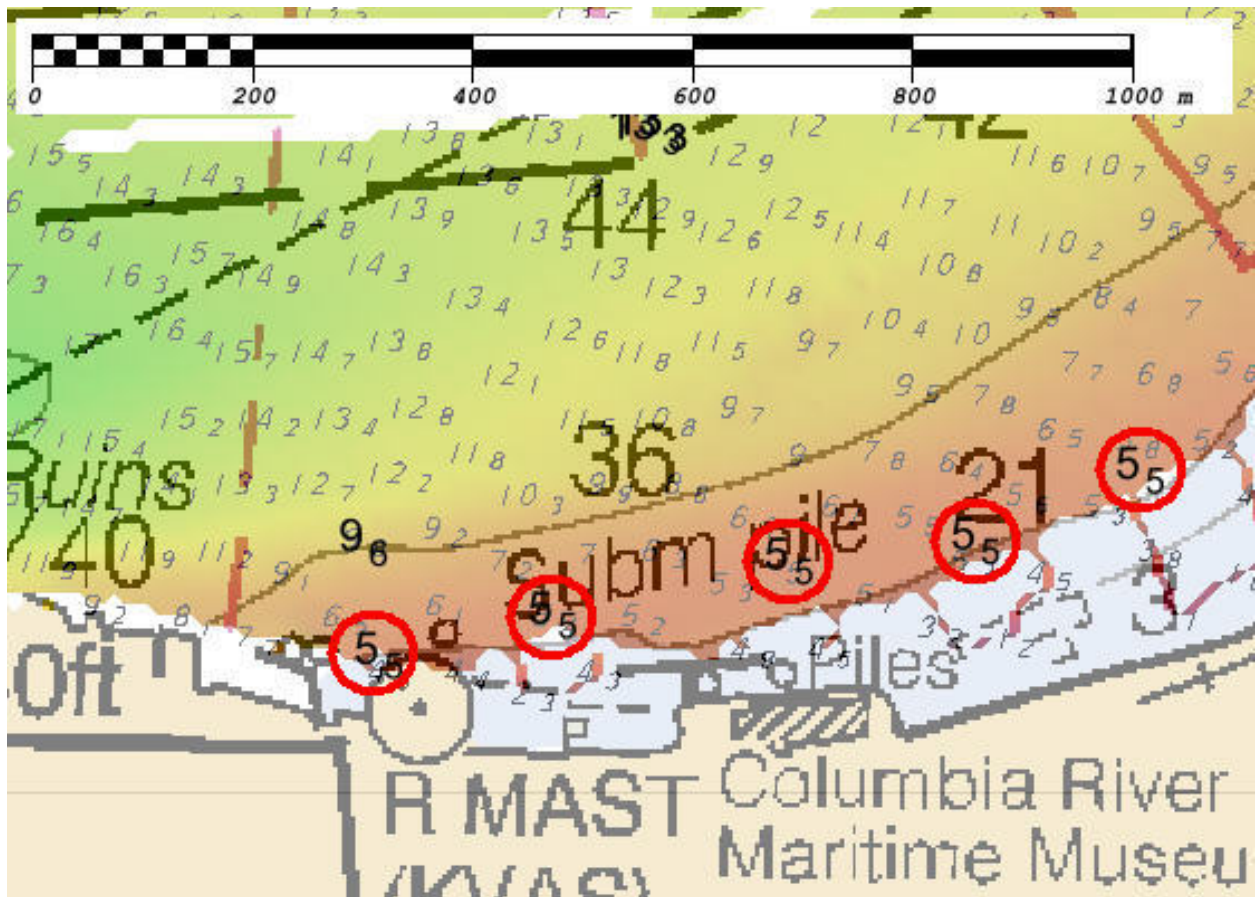
5.5m (501_1, 50_1)

S-57 Data

Geo object 1: Depth contour (DEPCNT)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur.

Feature Images*Figure 1.5.1*

1.6) Profile/Beam - 10677/91 from h11757 / 1021_reson8101_hvf / 2007-273 / 402_1636

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 20.4" N, 123° 47' 37.6" W
Least Depth: 8.36 m (= 27.43 ft = 4.572 fm = 4 fm 3.43 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.377 m ; TVU (TPEv) ± 0.317 m
Timestamp: 2007-273.16:51:49.009 (09/30/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-273 / 402_1636
Profile/Beam: 10677/91
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoalest point of sand wave.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-273/402_1636	10677/91	0.00	000.0	Primary

Hydrographer Recommendations

Chart as bathymetry.

Cartographically-Rounded Depth (Affected Charts):

27ft (18521_1)

4 ½fm (18520_1, 18003_1, 18007_1, 530_1)

8.4m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur. Chart 27 ft. sounding.

Feature Images

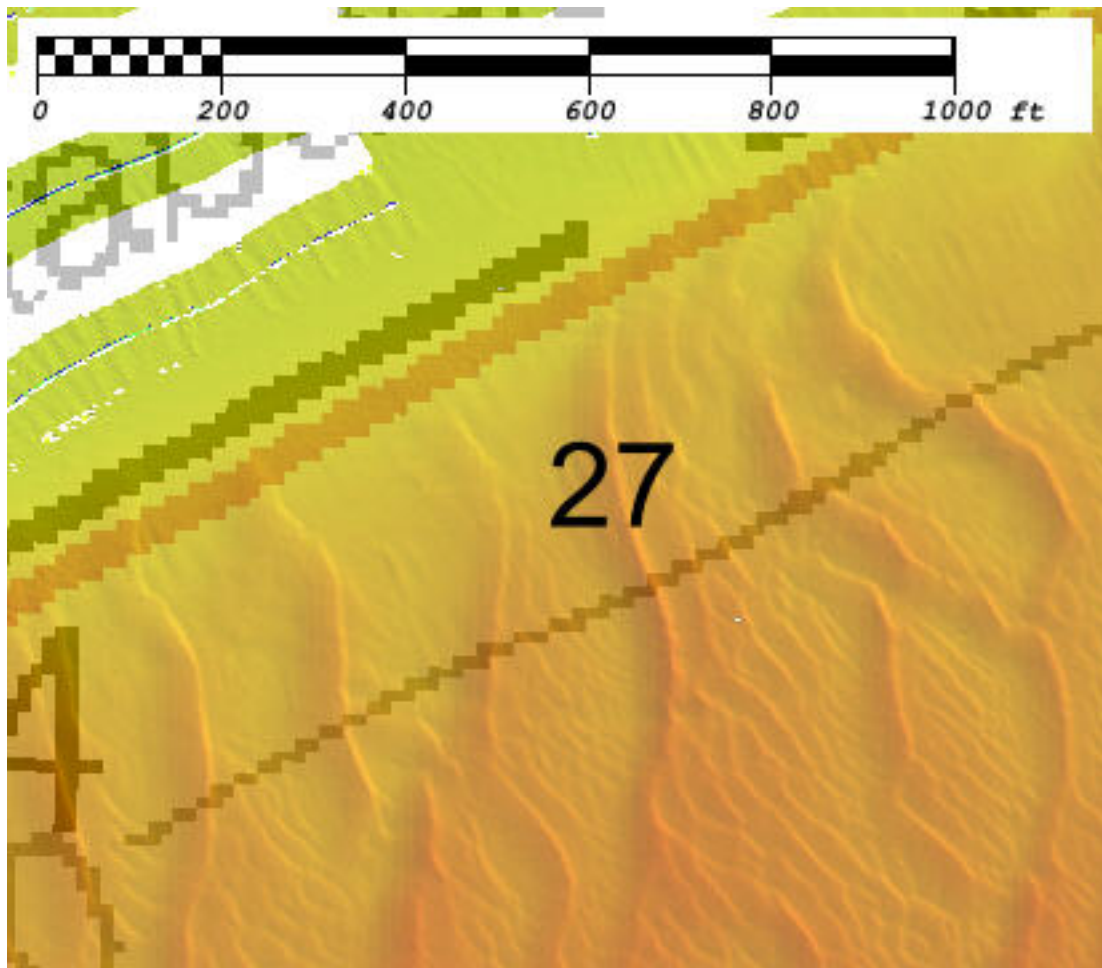


Figure 1.6.1

1.7) Profile/Beam - 9490/91 from h11757 / 1021_reson8101_hvf / 2007-273 / 403_1720

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 16.3" N, 123° 47' 47.9" W
Least Depth: 8.66 m (= 28.41 ft = 4.735 fm = 4 fm 4.41 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.377 m ; TVU (TPEv) ± 0.317 m
Timestamp: 2007-273.17:34:32.415 (09/30/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-273 / 403_1720
Profile/Beam: 9490/91
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoalest point of sand wave.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-273/403_1720	9490/91	0.00	000.0	Primary

Hydrographer Recommendations

Chart as bathymetry.

Cartographically-Rounded Depth (Affected Charts):

28ft (18521_1)

4 $\frac{3}{4}$ fm (18520_1, 18003_1, 18007_1, 530_1)

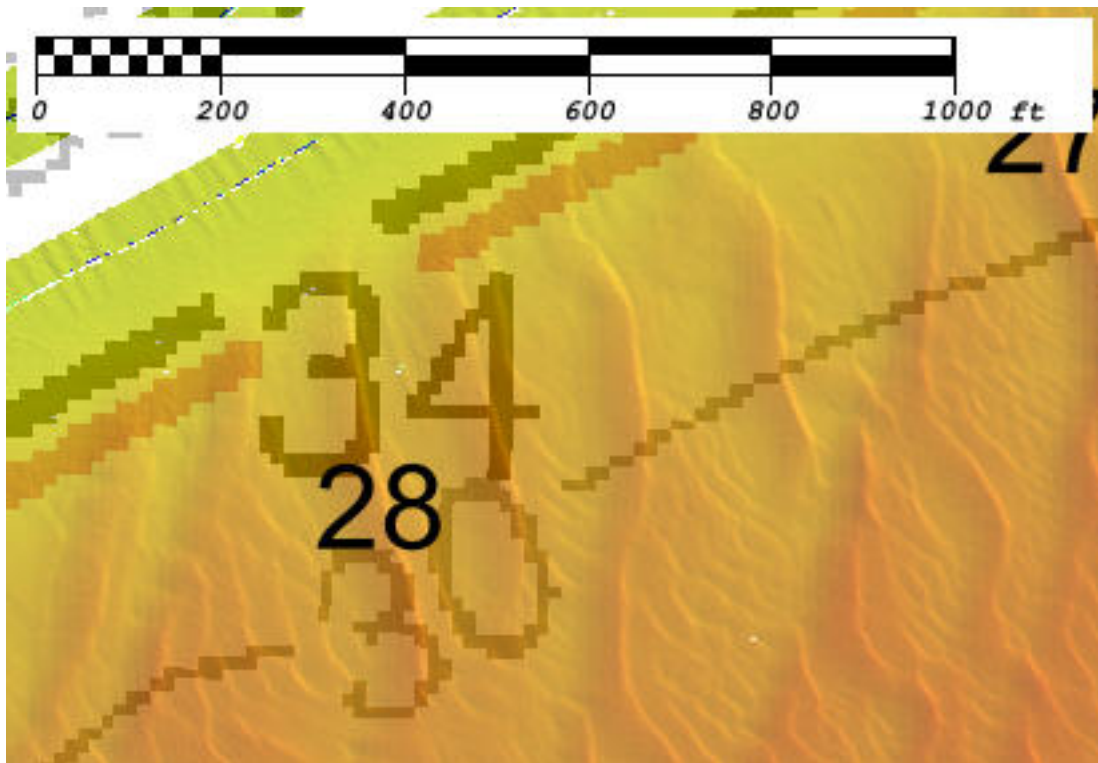
8.7m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur. Chart 28 ft. sounding.

Feature Images*Figure 1.7.1*

1.8) Profile/Beam - 7712/100 from h11757 / 1021_reson8101_hvf / 2007-273 / 404_1817

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 04.5" N, 123° 48' 11.2" W
Least Depth: 8.09 m (= 26.54 ft = 4.423 fm = 4 fm 2.54 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.377 m ; TVU (TPEv) ± 0.320 m
Timestamp: 2007-273.18:28:03.551 (09/30/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-273 / 404_1817
Profile/Beam: 7712/100
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shoalest point of sand wave.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-273/404_1817	7712/100	0.00	000.0	Primary

Hydrographer Recommendations

Chart as bathymetry.

Cartographically-Rounded Depth (Affected Charts):

26ft (18521_1)

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

8.1m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur. Chart 26 ft. sounding.

Feature Images

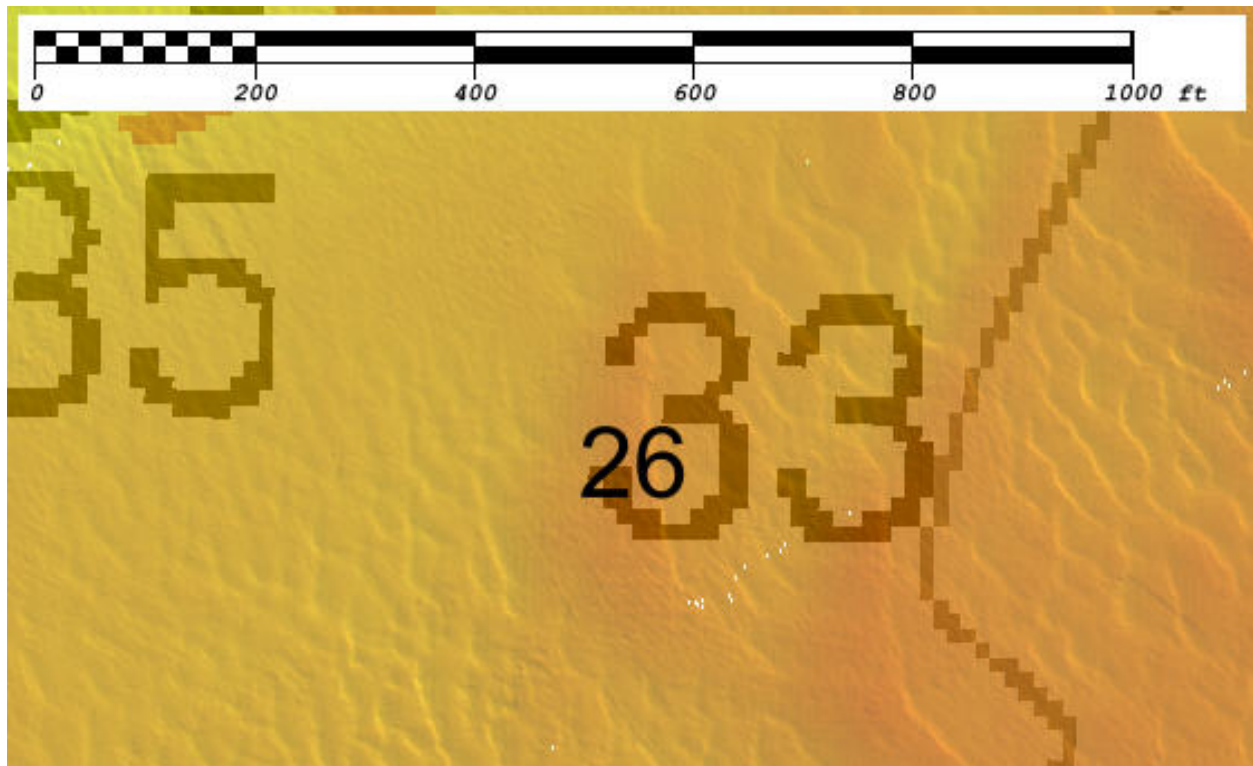


Figure 1.8.1

1.9) Profile/Beam - 532/1 from h11757 / 1021_reson8101_hvf / 2007-273 / 436_2037

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 26.0" N, 123° 49' 41.0" W
Least Depth: 5.48 m (= 17.98 ft = 2.996 fm = 2 fm 5.98 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.377 m ; TVU (TPEv) ± 0.318 m
Timestamp: 2007-273.20:37:49.341 (09/30/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-273 / 436_2037
Profile/Beam: 532/1
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shifted 18 foot curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-273/436_2037	532/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as 18 foot curve.

Cartographically-Rounded Depth (Affected Charts):

18ft (18521_1)

3fm (18520_1, 18003_1, 18007_1, 530_1)

5.5m (501_1, 50_1)

S-57 Data

Geo object 1: Depth contour (DEPCNT)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur.

Feature Images

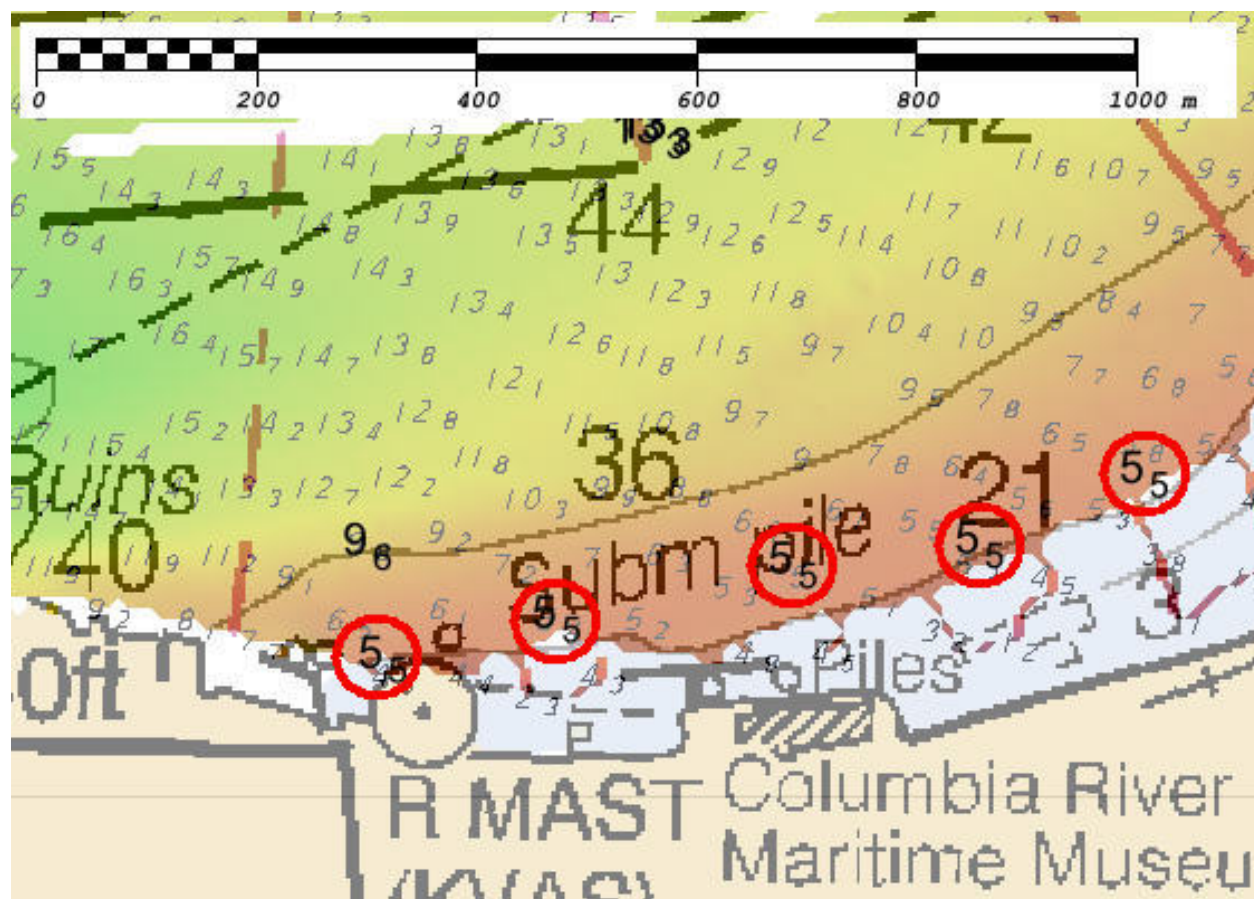


Figure 1.9.1

1.10) Profile/Beam - 14066/101 from h11757 / 1021_reson8101_hvf / 2007-274 / 322_1938

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 51.3" N, 123° 47' 11.8" W
Least Depth: 9.51 m (= 31.21 ft = 5.202 fm = 5 fm 1.21 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.378 m ; TVU (TPEv) ± 0.321 m
Timestamp: 2007-274.19:54:24.628 (10/01/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-274 / 322_1938
Profile/Beam: 14066/101
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

shoalest point of sandwave

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-274/322_1938	14066/101	0.00	000.0	Primary

Hydrographer Recommendations

chart as bathymetry

Cartographically-Rounded Depth (Affected Charts):

31ft (18521_1)

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

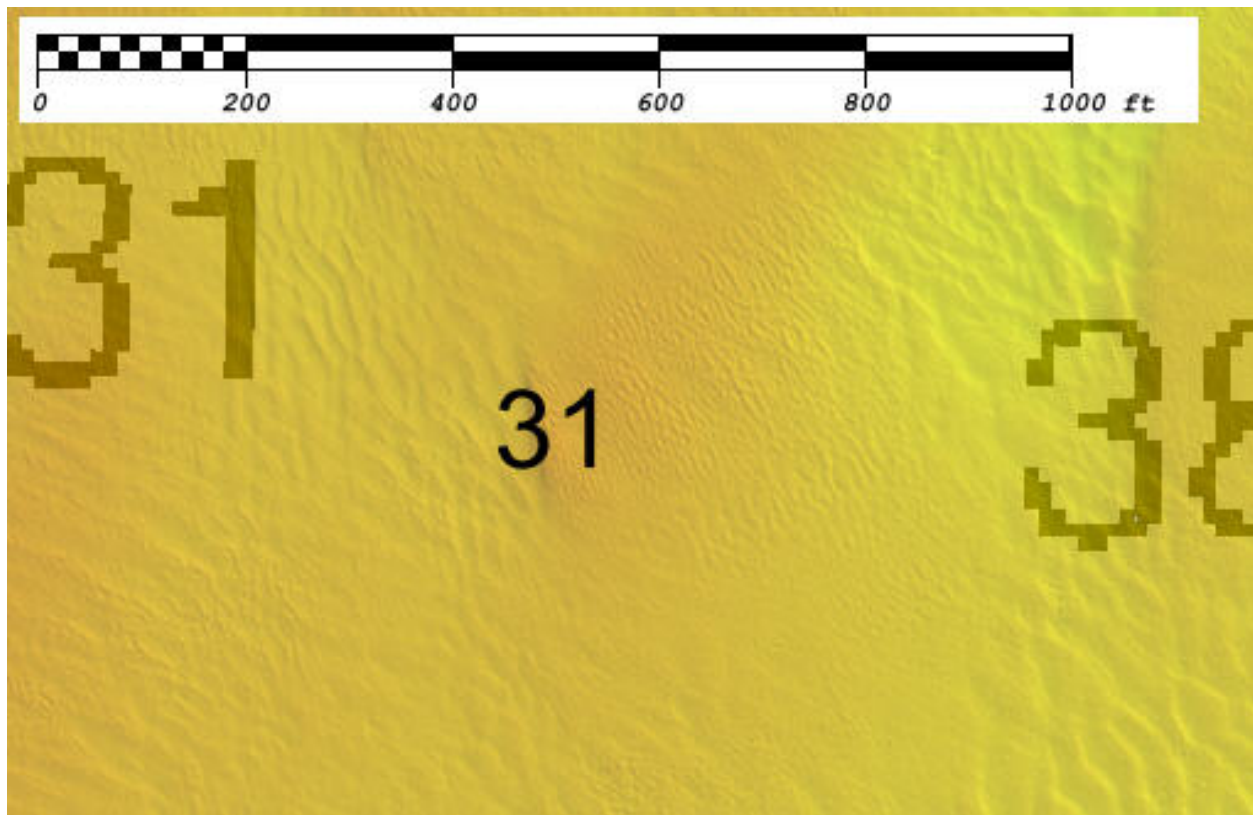
9.5m (501_1, 50_1)

S-57 Data

Geo object 1: Sand waves (SNDWAV)
Attributes: SORDAT - 20071001
 SORIND - US, US, graph, H11757

Office Notes

Concur with clarification. Final office processing has determined the shoalest point to be 32 feet. Chart 32. ft. sounding.

Feature Images*Figure 1.10.1*

1.11) Profile/Beam - 570/152 from h11757 / 1016_reson8125_hvf / 2007-273 / 439_2102

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 31.7" N, 123° 49' 08.8" W
Least Depth: 5.53 m (= 18.13 ft = 3.022 fm = 3 fm 0.13 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.299 m
Timestamp: 2007-273.21:03:27.810 (09/30/2007)
Survey Line: h11757 / 1016_reson8125_hvf / 2007-273 / 439_2102
Profile/Beam: 570/152
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shifted 18 foot curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1016_reson8125_hvf/2007-273/439_2102	570/152	0.00	000.0	Primary

Hydrographer Recommendations

Chart as 18 foot curve.

Cartographically-Rounded Depth (Affected Charts):

18ft (18521_1)

3fm (18520_1, 18003_1, 18007_1, 530_1)

5.5m (501_1, 50_1)

S-57 Data

Geo object 1: Depth contour (DEPCNT)
Attributes: SORDAT - 20070930
 SORIND - US, US, graph, H11757

Office Notes

Concur.

Feature Images

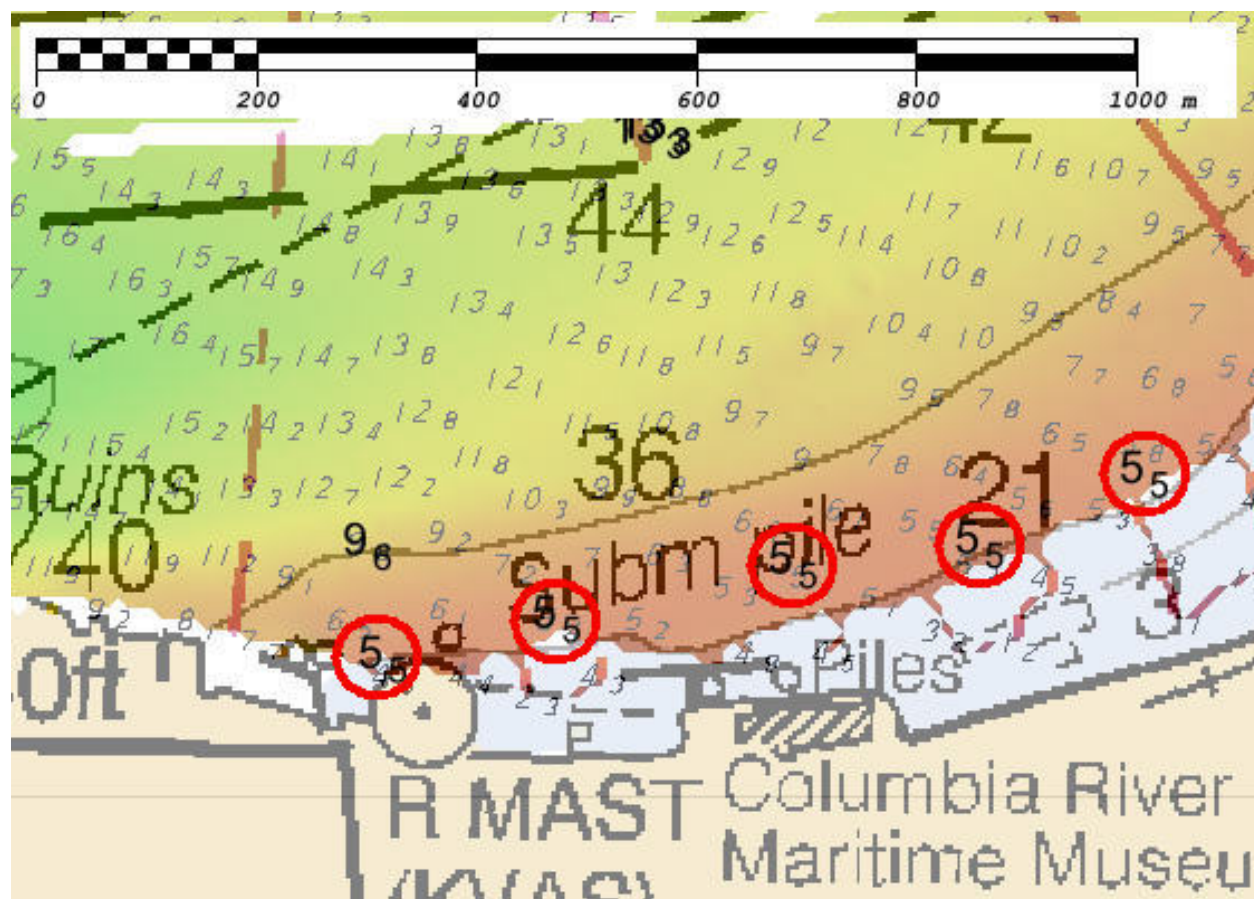


Figure 1.11.1

1.12) Profile/Beam - 3144/62 from h11757 / 1021_reson8101_hvf / 2007-273 / 442_2029

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 27.3" N, 123° 49' 33.7" W
Least Depth: 5.48 m (= 17.99 ft = 2.999 fm = 2 fm 5.99 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.376 m ; TVU (TPEv) ± 0.317 m
Timestamp: 2007-273.20:34:52.113 (09/30/2007)
Survey Line: h11757 / 1021_reson8101_hvf / 2007-273 / 442_2029
Profile/Beam: 3144/62
Charts Affected: 18521_1, 18520_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Shifted 18 foot curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11757/1021_reson8101_hvf/2007-273/442_2029	3144/62	0.00	000.0	Primary

Hydrographer Recommendations

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Cartographically-Rounded Depth (Affected Charts):

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Geo object 1: Depth contour (DEPCNT)
Attributes: SORDAT - 20070930
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Office Notes

Concur.

Feature Images

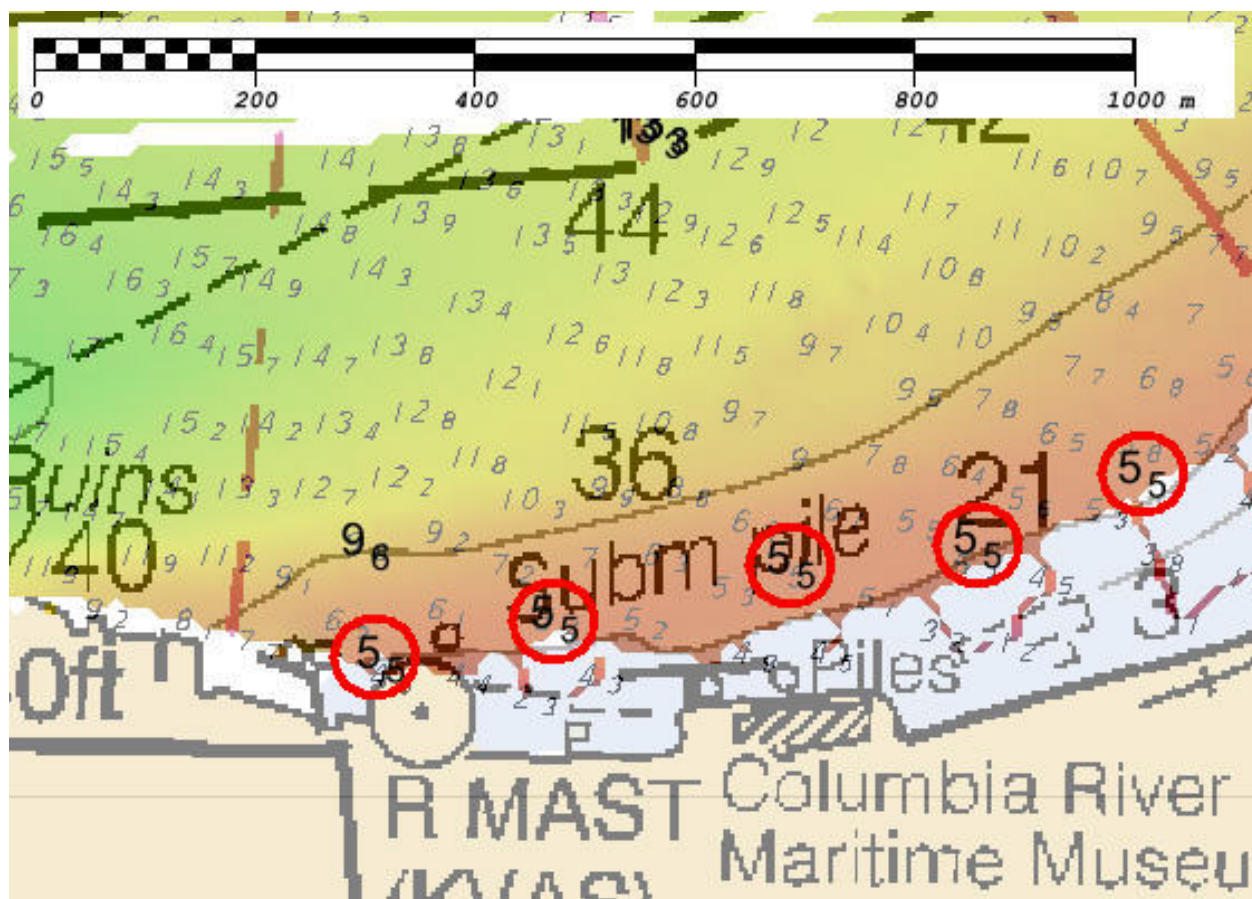


Figure 1.12.1



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 16, 2007

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N338-RA-2007
HYDROGRAPHIC SHEET: H11727

LOCALITY: Cliff Point to Tongue Point, OR
TIME PERIOD: August 18 - October 2, 2007

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-RA-2007, H11727, during the time period between August 18 and October 2, 2007.

Please use the zoning file "N338RA2007CORP_Rev" submitted with the project instructions for Approaches to Warrenton, OR. Zones CR13, CR14, CR15, & CR16 are the applicable zones for H11727.

Refer to attachments for zoning information.

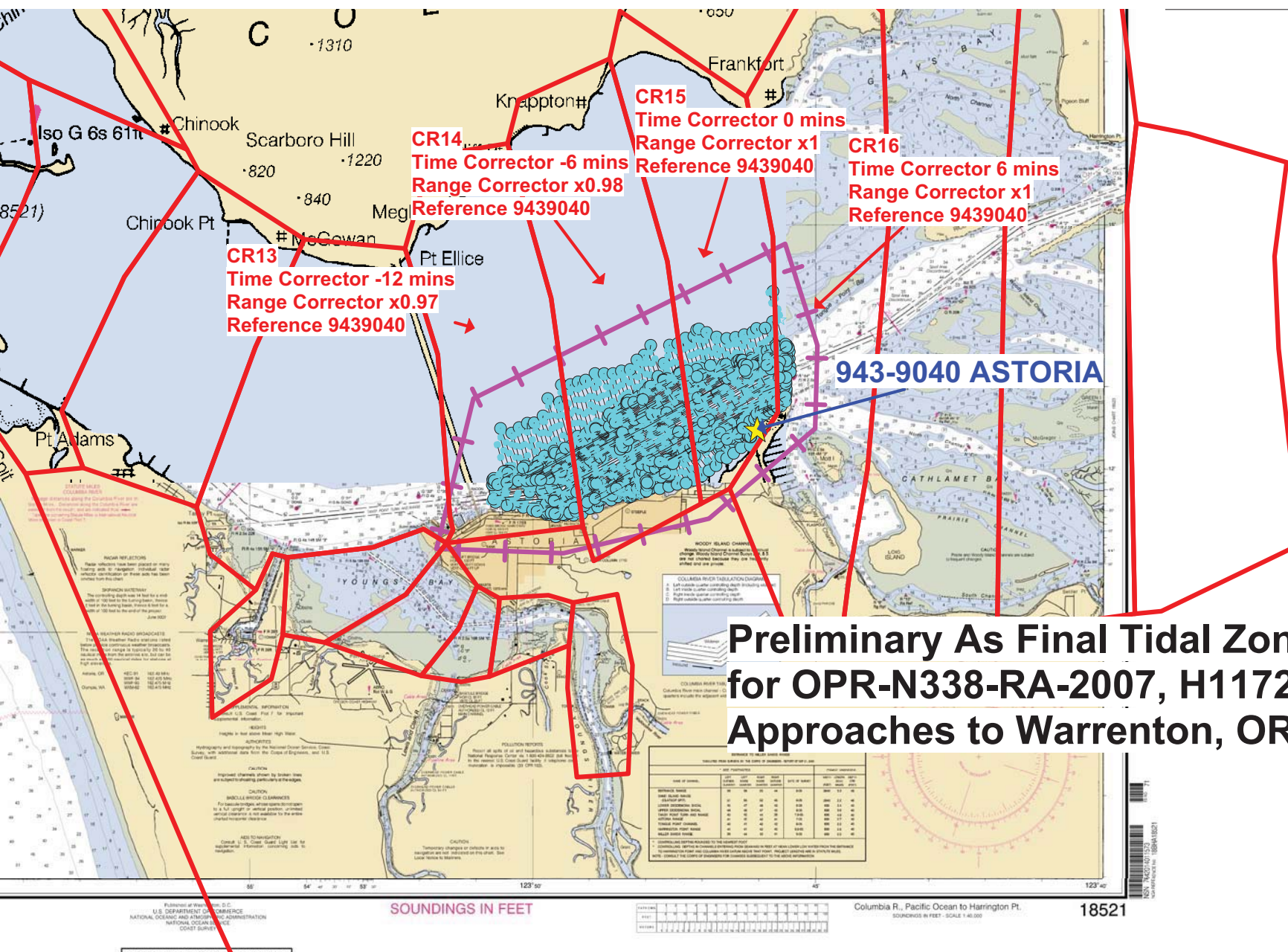
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

**Peter J.
Stone**

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, c=US, o=CO-
OPS, ou=NOAA/NOS, email=peter.
stone@noaa.gov
Reason: I am approving this document
Date: 2007.10.23 07:17:28 -04'00'

CHIEF, PRODUCT AND SERVICES DIVISION





H11757 HCell Report
Peter Holmberg, Physical Scientist
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to directly update NOAA ENC's with new survey information in International Hydrographic Organization (IHO) format S-57. HCell compilation of survey H11757 utilized Office of Coast Survey HCell Specifications Version 3.0, May 2008 and Hcell User Guide Version 1.1, June 2008. HCell H11757 will be used to update charts 18521, 1:40,000 (73rdth Ed.; April 2008, NM 11/04/2008), and US5OR11M.

1. Compilation Scale

The density of soundings in the HCell are compiled as appropriate to emulate those soundings of Chart 18521, 1:40,000. Position and density of non-bathymetric features included in the HCell have not been generalized from the scale of the hydrographic survey H11757.

2. Soundings

2.1 Source Data

One half meter resolution Combined BASE surface, **H11757_Combined** was used as the basis for HCell production following Branch certification.

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11757_Combined** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a radius table with values shown in **Table 1**.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	60	4.5

Table 1

2.2 Sounding Feature Objects

In CARIS BASE Editor soundings were manually selected from the high density sounding layer from H11757 and imported into a new layer created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that more closely represents the seafloor morphology and that emulates density and distribution of soundings on chart 18521 than is possible using automated methods. See

section 10.1, Data Processing Notes, for details about the use of manual sounding selection for H11757. The sounding feature object source layer was imported into the **H11757_Features.hob** file, which was used as a template to create the S-57 Composer product **H11757_CS.prd**.

3. Depth Areas

3.1 Source Data

Using the combined BASE surface **H11757_Combined** and areas delineated extents of the mean lower low water line, one depth areas were generated. No depth contours were delivered per OCS HCell Specifications ver.3.0 and Hcell User Guide ver. 1.1.

3.2 Depth Area Feature Objects

One depth range, 60 meters to 0 meters, was used for all depth area objects. Upon conversion to NOAA charting units, this depth range is 197 feet to 0 feet.

4. Meta Areas

The following Meta object areas are included in HCell 11757:

M_QUAL
M_COVR

Meta area objects were constructed on the basis of perimeter lines delineating the surveyed limits and extents of data gaps inside the survey area. These perimeters were first used to create the Skin of The Earth (SOTE) layer, then were duplicated to the Meta object layers and attributed per the H-Cell Specifications, ver. 3.0 and Hcell User Guide ver. 1.1.

5. Survey Features

All features from H11757 in .HOB format have been fully reviewed and addressed. Features were included, excluded, modified, or blue noted in the HCell. Shoreline features for H11757 were delivered in three different files.

- H11757_Field_Verified_CompSource.hob
- H11757_Pydro_Disprovals.hob
- H11757_Pydro_Updates.hob

6. Shoreline / Tide Delineation

Depth areas (DEPARE) were created for all SOTE features.

7. Attribution

All S-57 Feature Objects have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with OCS HCell Specifications, ver. 3.0 and Hcell User Guide ver. 1.1.

8. Layout

8.1 CARIS S-57 Composer Scheme

\$CSYMB	Blue notes
BCNLAT	ATON
BOYSAW	ATON
BOYSPP	ATON
BUISGL	Sheriff's boat house
DEPARE	Group 1 objects (Skin of the Earth)
LNDARE	Group 1 SOTE object to support BUISGL
MORFAC	Mooring Dolphins
M_COVR	Data coverage meta object
M_QUAL	Data quality meta object
OBSTRN	Point and area obstructions, some foul areas
PILPNT	Pilings
PONTON	Pontoons
SBDARE	Bottom samples
SLCONS	Shoreline construction features
SOUNDG	Chart scale soundings
UWTROC	Rocks

8.2 Blue Notes

Notes regarding data sources are in S-57 Composer as a \$CSYMB feature with the blue note located in the INFORM field and the survey registry number, chart number, chart edition and edition date located in the NINFOM field. The blue notes are included in the HCell when it is exported to .000. The blue notes are also included as a separate ASCII file **H11757_Bluenotes.txt**.

9. Spatial Framework

9.1 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.

9.2 Horizontal and Vertical Units

During creation of sounding sets in CARIS BASE Editor, and creation of the HCell in CARIS S-57 Composer, units are maintained as metric with millimeter resolution. NOAA rounding is applied at the same time that conversion to chart units is made to the metric HCell base cell file, at the end of the HCell compilation process.

A CARIS environment variable, `uslXsounding_round`, controls the depth at which rounding occurs. Setting this variable to NOAA feet displays all soundings as whole units.

In an ENC viewer feet display in whole feet. Soundings round to the deeper foot if the decimals of the foot are .75000 or greater.

HOM Units

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

Chart Unit Base Cell Units

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

10. QA/QC

10.1 Data Processing Notes

Manual chart scale sounding selections were made for this survey. Experience has shown that in areas where bathymetry is varied, as in the case of shifting sand waves and shoals, automated sounding selection is impractical. None of the default sounding suppression options offered in CARIS BASE Editor or S-57 Composer yields an acceptable density and distribution of depths, generally bunching soundings nearshore with too sparse coverage seaward. While the customized options are more practical for this type of terrain, an inordinate amount of time must be spent in experimentation with variations on the algebraic terms in order to devise the most suitable formula, and manual adjustments are still required to the resulting sounding set.

10.2 ENC Validation Checks

H11757 was subjected to QA and Validation checks in S-57 Composer prior to exporting to the HCell base cell (000) file. Full millimeter precision was retained in the export of the metric S-57 base cell data set. This data set was converted to a chart unit 000 file. dKart Inspector 5.1 was then used to further check the data set for conformity using the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11757 Base Cell File, Chart Units, Soundings compiled to 1:40,000
- H11757 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11757 Descriptive Report including end notes compiled during office processing and certification
- H11757 HCell Supplemental Report
- Blue Notes ASCII file

11.2 File Naming Conventions

S-57 Composer Product prefix: *H11757_CS.prd and H11757_SS.prd*

MCD Chart units base cell file: *US511757_CS.000*

MCD Chart units base cell file, survey scale soundings: *US511757_SS.000*

11.3 Software

HIPS 6.1:	Management and inspection of Combined BASE surfaces
BASE Editor 2.1:	Combination of Product Surfaces and initial creation of the S-57 bathymetry-derived features
CARIS Notebook 3.0:	Management and inspection of shoreline files
S-57 Composer 2.0:	Assembly of the HCell, S-57 products export, QA
HOM 3.3:	Assembly of the HCell, S-57 products unit conversion and sounding rounding
GIS 4.4a:	Setting the sounding rounding variable
Pydro v7.3 (r2252)	Creation of AWOIS and DTON reports
dKart Inspector 5.1:	Validation of the base cell file

12. Contacts

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

Peter Holmberg, Physical Scientist, PHB, Seattle, WA; 206-526-6843;
Peter.Holmberg@noaa.gov.

APPROVAL SHEET
H11757

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.

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 disproof 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.

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.