

H11859

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. H11859

LOCALITY

State Oregon
General Locality Columbia River
Sublocality Kelley Point to Sellwood

2008 - 2009

CHIEF OF PARTY

..... Jonathan L. Dasler, PE (OR), PLS (OR, CA)
..... David Evans and Associates, Inc.

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DATE

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;">HYDROGRAPHIC TITLE SHEET</p>	<p>REGISTRY No</p> <p style="text-align: center;">H11859</p>
<p>INSTRUCTIONS – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No:</p>
<p>State <u>Oregon</u></p> <hr/> <p>General Locality <u>Columbia River</u></p> <hr/> <p>Sub-Locality <u>Kelley Point to Sellwood</u></p> <hr/> <p>Scale <u>1:10,000</u> Date of Survey <u>August 18, 2008 - May 14, 2009</u></p> <hr/> <p>Instructions dated <u>4/1/2008</u> Project No. <u>OPR-N338-KR-08</u></p> <hr/> <p>Vessel(s) <u>R/V Theory and R/V Preston</u></p> <hr/>	
<p>Chief of party <u>Jonathan L. Dasler, PE (OR), PLS (OR, CA)</u></p> <hr/> <p>Surveyed by <u>David Evans and Associates, Inc.</u></p> <hr/> <p>Soundings by <u>RESON 7125, RESON 8101, CV200</u></p> <hr/> <p>SAR by <u>Annemieke Raymond</u> Compilation by <u>Katie Reser</u></p> <hr/> <p>Soundings compiled in <u>Feet</u> at <u>Columbia River Datum (CRD)</u></p> <hr/>	
<p>REMARKS: <u>All times are UTC. UTM Zone 10N.</u></p> <hr/> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.</u></p> <hr/> <p><u>Revisions and end notes in red were generated during office processing.</u></p> <hr/> <p><u>Page numbering may be interrupted or non sequential.</u></p> <hr/> <p><u>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/.</u></p> <hr/>	
<p>SUBCONSULTANTS: <u>Zephyr Marine, P.O. Box 1575, Petersburg, AK 99833</u></p> <hr/> <p><u>John Oswald and Associates, 2000 E Dowling Road, Suite 10, Anchorage, AK 99507</u></p> <hr/>	

Descriptive Report to Accompany Hydrographic Survey H11859

Project *OPR-N338-KR-08*

Columbia River, Oregon

Kelley Point to Sellwood

Scale 1:10,000

August 2008 – May 2009

David Evans and Associates, Inc.

Lead Hydrographers: Jonathan L. Dasler, Jason C. Creech

A. AREA SURVEYED

David Evans and Associates, Inc. (DEA) conducted hydrographic survey operations on the Columbia River, Oregon. The survey area (Figure 1) extends from the Columbia River Mile 101 to 110; and includes Willamette River Mile 0-17, Multnomah Channel and North Portland Harbor.

Survey H11859 was conducted in accordance with the *Statement of Work* for *OPR-N338-KR-08*; dated April 1, 2008 with the exception of tides and water levels requirements. Due to the Columbia River Datum (CRD), the project chart datum, being a non-tidal gradient datum and the complex hydrodynamics of the Columbia River, *OPR-N338-KR-08* was approved as a pilot project for the use of Global Positioning System (GPS) water levels acquired directly at the survey vessel. This change was approved after the receipt of the Statement of Work.

The project instructions required three categories of multibeam coverage: Complete Object Detection, and Set Line Spacing. In water depths greater than four meters, complete multibeam coverage was required. Automated Wreck and Obstruction Information System (AWOIS) items and the main shipping channel were acquired to meet object detection coverage requirements. Twenty-five (25) meter set line spaced multibeam bathymetry was required from the four meter water depths to the "inshore limit of hydrography". The inshore limit of hydrography was defined as the seaward most extent of either the two meter contour or the equivalent to 0.8 millimeters at the scale of the largest scale nautical chart from the mean high water (MHW) line. Though not required by contract, multibeam side scan data was acquired but not processed

Thirty-one (31) bottom samples were acquired for H11859. Six (6) AWOIS item investigations were assigned to this survey.

Data acquisition was conducted from August 18, 2008 (Day Number 231) to May 14, 2009 (Day Number 134). Table 1 lists specific dates of acquisition.

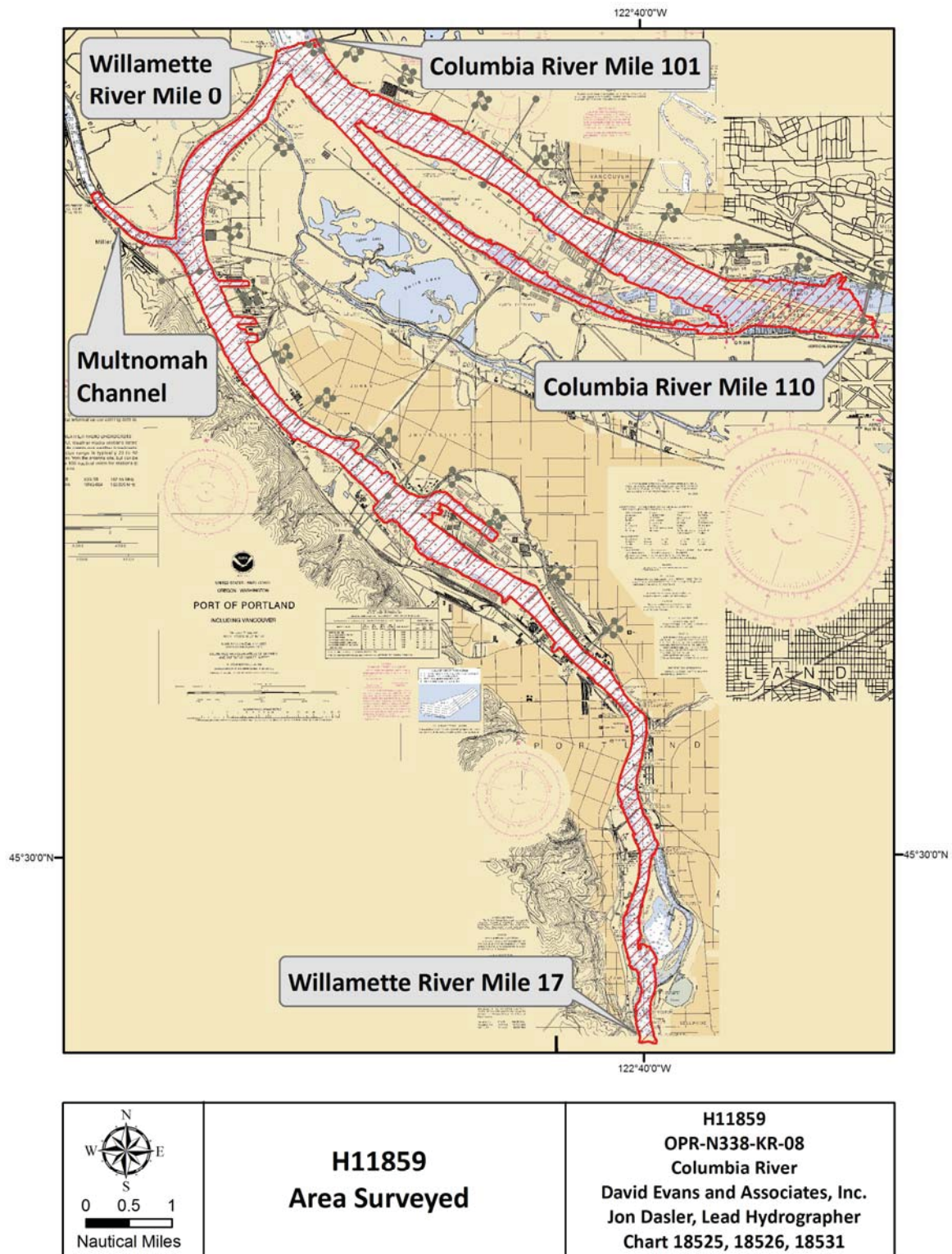


Figure 1. H11859 Survey Area

Table 1. H11859 Days of Acquisition

Dates of Acquisition	
Month	Dates
August 2008	18-21, 23-26, 29
September 2008	2-4, 7, 9-10
December 2008	2-10, 12
January 2009	14-16, 19-20, 22-23
February 2009	3, 5-6, 17
March 2009	10
May	13-14

Detailed survey statistics of H11859 are provided in Table 2.

Table 2. H11859 Survey Statistics

Survey Statistics	Research Vessels (R/V) <i>THEORY</i> and <i>PRESTON</i>
MBES (main scheme nm)	586.79
Crosslines (MBES nm)	35.55
Developments (MBES nm)	69.58
VBES Main scheme (nm)	8.34
VBES Crosslines (nm)	1.21
Number of Item Investigations that required additional survey effort	24
Total number of square nautical miles	7.74

B. DATA ACQUISITION AND PROCESSING

B1. Equipment

Equipment and vessels used for data acquisition and survey operations during this survey are listed below in Tables 3 and 4.

Table 3. R/V Theory Equipment and Vessel Specifications



<i>R/V Theory</i>	
	
Hull Registration Number	IAR34CATA808
Official Number (O/N)	1217549
Builder	Armstrong Marine
Design	Catamaran
Year Built	2008
Length Overall	36'
Beam	13'
Draft, Maximum	3'
Cruising Speed	26 knots
Max Survey Speed	9 knots
Primary Echosounder	RESON 7125-B
Sound Velocity Equipment	Brooke Ocean MVP-30 with AML Smart SV & P Reson SVP-70 Sea-Bird SEACAT SB-19 CTD Profiler
Positioning & Attitude	Applanix POS/MV 320 v4 RTK compatible

Table 4. R/V Preston Equipment and Vessel Specifications

<i>R/V Preston</i>	
	
Hull Registration Number	ABTJOHNB3090
Official Number (O/N)	WN0437NX
Builder	Action Boats Inc.
Design	Custom Monohull Jet
Year Built	1990
Length Overall	31'
Beam	8.5'
Draft, Maximum	1.5'
Cruising Speed	24 knots
Max Survey Speed	7 knots
Primary Echosounder	RESON 8101
Sound Velocity Equipment	Sea-Bird SEACAT SB-19 CTD Profiler AML SV Plus
Positioning & Attitude	Applanix POS/MV 320 v4 RTK compatible

There were no vessel or equipment configurations used during data acquisition that deviated from those described in the *OPR-N338-KR-08 Data Acquisition and Processing Report (DAPR)*.

B2. Quality Control

Quality control is discussed in detail in Section B of the DAPR. The results from the positioning system comparison and bar-to-multibeam comparison is included in Separate I *Acquisition and Processing Logs* and the sound velocity profile sensor weekly evaluation table can be found in Separate II *Sound Speed Data* section of this report. Data were reviewed at multiple levels of data processing including: CARIS Hydrographic Information Processing System (HIPS) conversion, subset editing, and analysis of anomalies revealed in combined uncertainty and bathymetry estimator (CUBE) surfaces. Both baring and submerged significant features identified during survey were noted in the acquisition logs and saved to Hypack target files or

Isis Cursor log files and then displayed during HIPS editing to aid in the interpretation of data and act as a check during feature compilation.

B2.a Crosslines

A total of 35.55 nautical miles of crosslines, or 6% of main scheme lines, were run for analysis of survey accuracy. Crosslines were run in a direction perpendicular to main scheme lines across the entire surveyed area providing a good representation for analysis of consistency. All crosslines were used for crossline comparisons.

Crossline analysis was performed using the CARIS HIPS QC Report tool, which compares crossline data to a gridded surface and reports results by beam number. Crosslines were compared to a 50-centimeter CUBE surface that encompassed the entire survey area. This surface was not included with the deliverables due to its file size. The QC Report tabular output and plots are included in Separate IV *Crossline Comparisons*. The results of the analysis meet the requirements as stated in the National Ocean Service (NOS) *Hydrographic Surveys Specifications and Deliverables* (April 2007).¹

B2.b Uncertainty

The calculated uncertainty values of all nodes within the unfinalized CUBE surfaces range from 0.116 to 0.259 meters.

During HIPS processing, the "greater of the two" option was selected, where the calculated uncertainty from total propagated error (TPE) is compared to the standard deviation of the soundings influencing the node, and the greater value is assigned as the final uncertainty of the node. As a result, the uncertainty of the finalized surface and associated Bathymetric Attributed Grids (BAGs) increased for nodes where the standard deviation of the node was greater than the calculated uncertainty. No area within the survey exceeds International Hydrographic Organization (IHO) Order 1 specifications for depth accuracy.²

B2.c Junctions

H11859 junctions with survey H11858 to the north.³ Junctions were visually reviewed in Caris HIPS subset mode.

In general, the depth differences between H11859 and H11858 are within 15 centimeters, with the greatest differences correlating to the natural migration of sand waves.⁴

B2.d Unusual Conditions or Data Degradation

There is an error in the Reson 7125 bottom tracking algorithm that causes bottom detection (beams 86-115 and 140-168) to lock on to stronger sonar returns bleeding over from more nadir returns. This may be related to the amplitude bottom detection used near nadir and the bottom detection locking on to the strong nadir return signal, rather than the actual bottom return for that designated beam area. These artifacts occur in two areas near nadir and are more prevalent on a hard bottom, when the amplitude of the nadir return is the strongest. The artifacts run along track and can exceed 20 centimeters in the raw soundings, but are reduced to 5 to 10 centimeters in the CUBE surface (Figure 2).⁵ Attempts to remove these artifacts during survey operations with

changes in sonar settings were unsuccessful. Reson is aware of this issue and is working towards a resolution with a different bottom tracking algorithm.

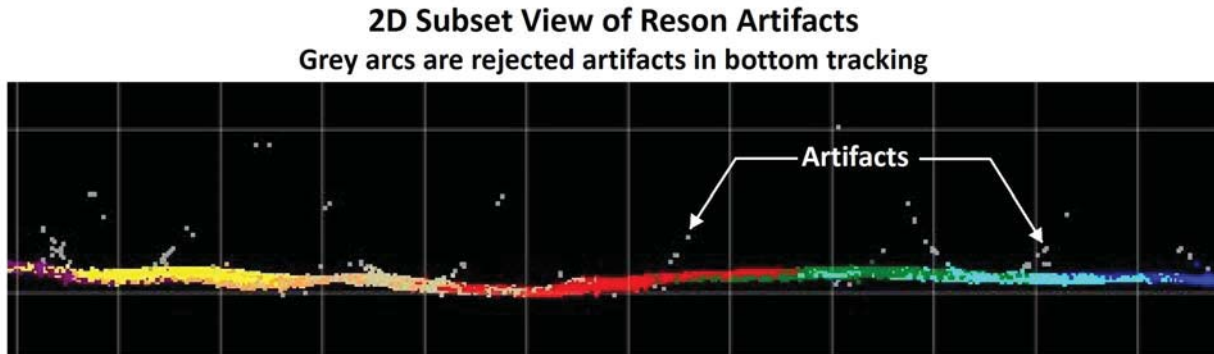


Figure 2. Artifacts in Reson 7125 Bottom Tracking Algorithm

Snags and deadheads are common along the Columbia River. Any feature, submerged or baring that was determined to be seasonal or transient in nature was removed from the data.

B2.e Object Detection and Coverage Requirements

Survey speeds were maintained at less than 9 knots so that object detection requirements were exceeded throughout the survey.⁶

High resolution, 50-centimeter CUBE surfaces were created over the entire survey area.⁷ The disambiguation method selected to create all 50-centimeter CUBE surfaces was “Shoal,” which corresponds to the NOS *Hydrographic Surveys Specifications and Deliverables* (April 2007) Object Detection Coverage requirements. Survey coverage was reviewed to ensure that no data gaps (more than 3 connected open nodes) were present within AWOIS radii and maintained navigation channels.

Outside maintained navigation channels Complete Coverage requirements were demonstrated by creating one meter CUBE surfaces with “Deep” disambiguation method selected, which corresponds to the NOS *Hydrographic Surveys Specifications and Deliverables* (April 2007) Complete Coverage requirements. Survey coverage was reviewed to ensure that no data holidays (more than 3 connected open nodes) were present. In a telephone conversation on January 7, 2009 between the Pacific Hydrographic Branch (PHB) and DEA it was agreed that the one meter surfaces would be created and reviewed by DEA Hydrographers, but not submitted with the delivered dataset in order to reduce data storage needs.

There are holidays in the multibeam coverage in the Columbia River where barges were anchored (Figure 3).⁸ Survey crews attempted to acquire data as close to the barges as possible and returned repeatedly in order to fill in data gaps. In areas where it was not possible to obtain complete coverage a HYPACK target was taken and the area was noted in the log.

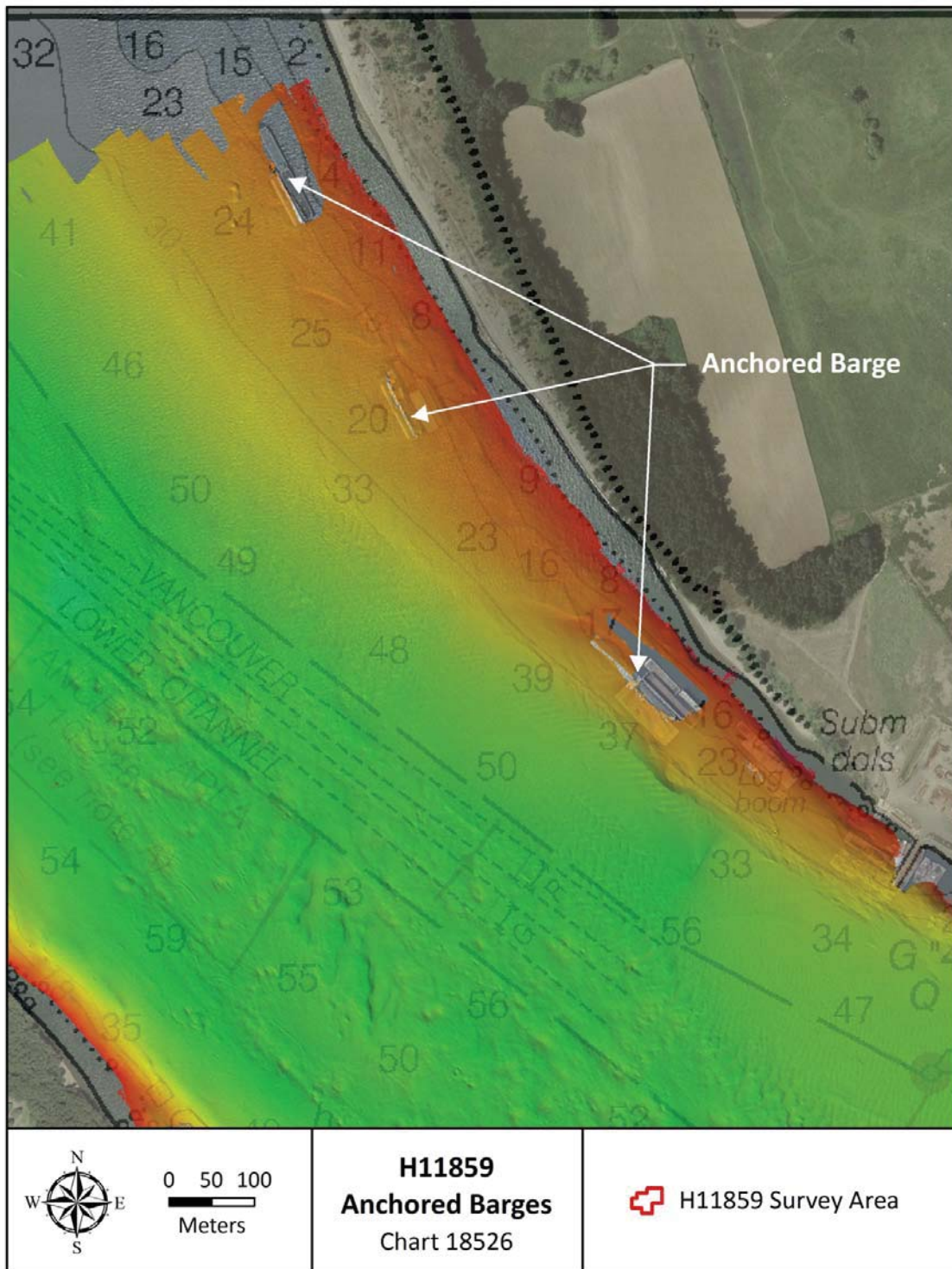


Figure 3. Anchored Vessels in Survey Area

B3. Corrections to Echo Soundings

Data reduction procedures for survey H11859 are detailed in the *OPR-N338-KR-08 DAPR*, submitted under a separate cover. The multibeam swath angle filter that was applied to each survey day varied depending on location, conditions, and sonar type. In general, Reson 7125 survey lines were unfiltered and used the entire 128 degree swath. The exception to this was when the Reson 7125 was run with 200kHz in equal distance mode. This data was filtered to eliminate noise in outer beams. Reson 8101 survey lines were filtered at a 60/60 degree angle from nadir for main scheme hydrography and 60/90 or 60/75 for survey lines along the shoreline. For detailed information pertaining to applied filters please refer to the multibeam processing logs in Separate I *Acquisition and Processing Logs*.

The survey area for H11859 contained numerous baring features. The least depths of baring features were marked as "Examined" and the rest of the structure was flagged as "Rejected" to the mudline. The use of the examined sounding flag to track baring items aided hydrographers during the feature management compilation process. Baring features are not included in the finalized bathymetric sounding set. This was done to ensure that the generated surface represented the true river bottom and submerged features.⁹

B3.a Deviations from DAPR

The post-survey calibration report for Applied Microsystems AML SV Plus (serial number 3591) has not yet been received from the manufacturer. The AML 3591 was compared to another AML SV Plus (Serial Number 3592) as well as both AML Smart SV&Ps (Serial Numbers 5110 and 5111) as part of a weekly confidence check for sound speed determination. All comparisons passed within the National Oceanic and Atmospheric Administration (NOAA) specifications.

Multibeam swath coverage images of sun illuminated depth and uncertainty layers have not been submitted as this requirement has been dropped from recent versions of *NOS Hydrographic Surveys Specifications and Deliverables*. These layers have been submitted in both BAG and CUBE format.¹⁰

There are no other deviations from the *OPR-N338-KR-08 DAPR*.

B3.b Additional Calibration Tests

The initial system calibration tests for the *R/V Theory* and *R/V Preston* were performed on August 15, 2008 (DN228) and August 29, 2008 (DN242), respectively. Additional tests were performed periodically to verify the adequacy of the known system biases and document changes in alignment offsets due to sensor remounting and sonar strikes on submerged objects. Additional discussion on calibration tests can be found in the *OPR-N338-KR-08 DAPR*.

B4. Data Processing (Data Representation)

B4.a Singlebeam

A single, two-meter uncertainty weighted surface of the singlebeam data is delivered with the complete singlebeam data set. There is an error in HIPS that produces erroneous grid node values for depth and uncertainty in the finalized, uncertainty weighted, singlebeam surface. These erroneous grid nodes are outside of the surveyed area, are not in the unfinalized surface, and not supported by any underlying data. CARIS has been informed of this issue and until this has been resolved, the Hydrographer strongly recommends that no products be created from the finalized singlebeam surface.¹¹

B4.b Multibeam

CUBE surface resolutions and depth ranges were set in accordance with the NOS *Hydrographic Surveys Specifications and Deliverables* (April 2007). Final CUBE surfaces were created at a 50-centimeter resolution to meet Object Detection requirements. Some data gaps exist in the 50-centimeter grids; however, the grids still meet coverage requirements for the survey. Near shore coverage, in some areas less than 4 meters used, Set Line spacing and gaps are present between survey lines. Additionally, coverage outside of the maintained channel only required a one meter resolution and small data gaps may be visible in the 50-centimeter surfaces, but still meet requirements in these areas.¹² Complete Coverage requirements were met and all data gaps, three nodes or greater, were filled where possible prior to ceasing survey operations with the exception of areas inaccessible due to anchored barges.

In order to keep CUBE surfaces at a manageable size, the main survey area was broken up into six (6) Field Sheets organized by corresponding Columbia River Mile (CRM) (H11859_CRM101-102, etc.), eight (8) Field Sheets by corresponding Willamette River Mile (H11859_WRM1-2, etc.) and one (1) field sheet for Multnomah Channel (H11859_Mult_Channel_WRM3). When combined the Fields Sheets encompass the entire area of acquired multibeam bathymetry. A BAG was created for each finalized CUBE surface and both the CUBE and BAG surfaces have been included with the digital data.

C. HORIZONTAL AND VERTICAL CONTROL

Due to the CRD, the project chart datum, being a non-tidal gradient datum and the complex hydrodynamics of the Columbia River, the project chart datum, *OPR-N338-KR-08* was approved as a pilot project for the use of GPS water levels acquired directly at the survey vessel. With the exception of tide reduction of baring features, traditional zoning from water level stations was not used for this project though zoning provided by Center for Operational Oceanographic Products and Services (CO-OPS) and verified water level files for the survey have been included with the digital deliverables

Prior to survey acquisition, three GPS base stations with a dual frequency (L1/L2) receiver were established. These sites include the roof top at DEA Corporate office in Portland, Oregon; Port of Portland Terminal 4 in Oregon and on the roof top of David Evans and Associates, Inc. Marine Services office in Vancouver, Washington. The base stations logged raw dual frequency

(L1/L2) GPS observables at one second epochs as well as broadcast real-time kinematic (RTK) corrections to the survey vessels. The base station closest to the area surveyed broadcast the RTK correctors. This base station was later used to post-process the navigation data. Base station positions relative to the North American Datum of 1983 (NAD83) (CORS96) (Epic 2002) were derived from the NGS (National Geodetic Survey) On-line Positioning User Service (OPUS) and were based on a 24- hour data file, with one second-epoch logging prior to commencement of survey operations.

A separation model of CRD relative to NAD83 was created and formatted to allow for direct integration with Hypack and Caris HIPS. The model input used a river profile of CRD relative to North American Vertical Datum of 1988 (NAVD88) provided by the U.S. Army Corps of Engineers (USACE), Portland District (the designated stewards of CRD). GEOID 03 was used to transfer the NAVD88 to CRD relationship directly to the NAD83 ellipsoid, which allowed direct computation of GPS water levels from ellipsoid heights recorded at the survey vessel. The model file (.bin) used to compute GPS water levels in HIPS, has been included with the digital deliverables.

RTK navigation was logged during acquisition and applied during preliminary data processing, but ultimately overwritten with a post-processed Inertially-Aided Kinematic Ambiguity Resolution (IAKAR) navigation solution. The HIPS Load Attitude and Navigation tool was used to load position, GPS height, and attitude data from a smoothed best estimate trajectory (SBET) file create from Applanix POSPac.

A complete description of horizontal and vertical control for survey H11859 can be found in the *OPR-N338-KR-08 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C1. Vertical Control

The vertical datum for this project is the CRD, an adopted low-water gradient datum relative to NAVD88. There are known problems in the NGS level lines between Oregon and Washington due to the long level runs without the ability to run tie lines across the Columbia River. GPS observations have documented large vertical differences in published bench mark elevations across the Columbia River. Whereas CO-OPS water level gauges are located in Oregon and Washington and are directly referenced to NGS published bench mark elevations, and the known issue with the level lines between Oregon and Washington, a decision was jointly made by the US Army Corps of Engineers and NOAA to use NGS OPUS solutions to establish vertical consistency in the relationship of CRD relative to NAVD88. The U. S. Army Corps of Engineers, Portland District (designated stewards of CRD) conducted surveys that established OPUS derived NAVD88 elevations on historic bench marks referencing CRD. A result of these surveys was a profile of Columbia River Datum relative to OPUS derived NAVD 88 elevations which were consistent across the Columbia River. The profile defined CRD relative to NAVD88 for each River Mile (RM) from RM 23 to RM 145 on the Columbia River and RM 0 to RM 26 on the Willamette River. This profile is used by the Portland District for hydrographic surveys and dredging operations to maintain the Federal Channel on the Columbia and Willamette rivers.

To improve vertical accuracy of this survey, soundings were reduced to CRD using GPS water levels measured at the survey vessel. Water levels were derived from post processed GPS heights and application of a separation model of the CRD to NAD83 ellipsoid relationship. Data reduction procedures, including detailed discussions of the CRD model generation and GPS water levels computations, for survey H11859 are detailed in the *OPR-N338-KR-08 DAPR*.

To verify GPS water levels, a comparison was made by vessel static observations adjacent to the CO-OPS water level station 9440083 located in Vancouver, WA and at the contractor installed subordinate gauge 9439221 located at the River Place Marina upriver from the Morrison Bridge on the Willamette River. To obtain water levels at Vancouver, WA (9440083) relative to the CO-OPS defined CRD, the Hydrographer selected Station Datum when downloading data from the CO-OPS web site. This is consistent with obtaining CRD values for any CO-OPS station on the Columbia River above RM 23. Adjustments were required to correct CO-OPS water level data to CRD based on the updated USACE CRD profile used to maintain the Columbia and Willamette rivers. CO-OPS is aware of this issue and is working toward resolving the problem. The subordinate gauge at Morrison Bridge (9439221) output water levels relative to CRD as defined by the USACE therefore requiring no additional corrections during comparisons to vessel static observations. The Primary Bench Mark was changed from KET RM1 to MAR RM1 on January 13, 2009 due to concerns about the accuracy of the posted elevation published for KET RM1. This change was approved by CO-OPS staff. The Morrison Street Bridge station datum elevation was corrected to CRD by subtracting 1.639 meters (NAVD88 to CRD correction based on the river mile at the River Place Marina water level station) from the NGS published NAVD88 height of 10.437 meters.

It should be noted that these adjustments were applied to CO-OPS water level data for comparison purposes of water level data relative to the revised USACE profile relative to OPUS derived NAVD88 elevations. This method was approved for project OPR-N388-KR-08 by the Office of Coast Survey, Hydrographic Surveys Division Chief as it is consistent with the USACE, Portland District, methods for maintaining the Federal Channel in the Columbia and Willamette rivers. Further, CO-OPS should adjust water level stations on Columbia River Datum and part of the Columbia PORTS® system to be consistent with the defined CRD profile by the USACE, Portland District. Table 5 lists corrections to be applied to CO-OPS data in Vancouver to be consistent with the USACE, Portland District CRD profile.

Table 5. Corrections Applied to 9440083 Vancouver, Washington

Description of Adjustment	Adjustment (m)
Revised CRD value to 1.576m from 1.610m NAVD88	0.034
Total Adjustment to CO-OPS Data in Vancouver, WA	0.034

Water level observations and gauge comparison data may be found in Appendix IV *Tides and Water Levels*. No configurations used during data acquisition deviated from those described in the *OPR-N338-KR-08 DAPR*.

C2. Discussion of GPS Tides

The coordinates of the GPS base stations used during acquisition and processing of H11859 are included in Table 6. The reference base stations used for both RTK and post processing are listed in the survey acquisition logs and POSPac processing logs included in Separate I *Acquisition and Processing Logs*.

Table 6. H11859 NAD83 Base Station Positions

RTK Base Station ID	Latitude (N)	Longitude (W)	Ellipsoid Height
DEA ROOF	45/30/24.92647	122/40/21.17159	25.836m
T4	45/35/59.25207	122/46/30.03411	-8.253m
DEMSI	45/36/59.91780	122/38/26.25942	-0.366m

As discussed in the *OPR-N338-KR-08 DAPR*, the use of GPS water levels eliminated large errors associated with discrete zoning and significantly reduced vertical uncertainty for this survey. Typical tide zoning artifacts for the survey area could exceed 30 centimeters, but as a result of using GPS water levels there are no visual tidal artifacts present in this survey.¹³

C3. Horizontal Control

The horizontal datum for this project is the NAD83. Differential GPS (DGPS) and RTK positioning were used simultaneously throughout acquisition with DGPS positions only used for a real-time confidence check. DGPS corrections were received from the U.S. Coast Guard (USCG) beacon at Fort Stevens, Washington (287 kHz) or from the secondary beacon at Appleton, Washington (300 kHz). Some DGPS outages from the primary beacon occurred during survey operations. The system was set up to automatically switch to the secondary beacon when the primary signal was lost. All of the secondary navigation data were collected in DGPS mode.

Navigation and attitude data were post-processed using Applanix POSPac MMS software, which produced an IAKAR navigation solution relative to NAD83. The GPS reference station and position used during post-processing were identical to those used for RTK broadcast during acquisition.

The real-time navigation and attitude logged during acquisition was overwritten with post-processed data during HIPS processing. Post-processed navigation, attitude and GPS heights were applied to all HIPS data unless POSPac processing errors created data outages in the SBET files, which prevented application to some survey lines. These survey lines, which use real-time sensor data, including RTK navigation and GPS heights, are listed in Table 7.

Table 7. Survey Lines Using Real-time Sensor Data

Survey Vessel (R/V)	Day Number (DN)	Survey Line
<i>Theory</i>	233	2331424
<i>Theory</i>	234	2350004 – 2350048
<i>Theory</i>	237	2372227
<i>Theory</i>	238	2381902
<i>Theory</i>	246	2461434 – 2462134
<i>Theory</i>	337	3372342
<i>Theory</i>	341	3412142 - 3412237
<i>Theory</i>	342	3430008
<i>Preston</i>	339	3391802A
<i>Preston</i>	343	3431755
<i>Preston</i>	019	0192205, 0192154
<i>Preston</i>	023	0232011
<i>Preston</i>	037	0371757 - 0371739

Quality checks of RTK navigation procedures and comparison to post processed data discussed in the *OPR-N338-KR-08 DAPR* and *OPR-N338-KR-08 Horizontal and Vertical Control Report* demonstrate that the use of RTK is also a reliable method to obtain GPS water levels. Survey lines using RTK have been thoroughly reviewed and exceed accuracy requirements for the survey.

D. RESULTS AND RECOMMENDATIONS

D1. Chart Comparison

D1.a Survey Agreement with Chart

During the course of data acquisition and processing H11859 was compared to the largest scale raster (RNC) and electronic (ENC) navigation charts. The results of these comparisons are described below, as well as in Sections D1.b through D1.f of this report.

Contours and soundings used during the chart comparison were generated from combined HIPS product surfaces. Soundings and contours were generated from a 5-meter HIPS product surface (1:10,000) of the entire survey area, which was compiled from all finalized CUBE surfaces for the survey. The product surfaces, contours, and soundings were created solely for the chart comparison and have not been submitted as a final deliverable.

H11859 contours and soundings were compared in CARIS HIPS to the depths and contours on the charts listed in Table 8.

Table 8. Charts compared to H11859

Chart	Scale	Edition	Edition Date	Issue Date	Latest LNM	Cleared Through Date
18526	1:20,000	58	09/01/2006	---	17/09	04/28/2009
18527	1:5,000	22	09/01/2005	---	17/09	04/28/2009
18528	1:15,000	11	07/01/2008	---	17/09	04/28/2009
18531	1:40,000	22	09/01/2005	---	17/09	04/28/2009
US5OR15M	---	27	---	03/02/2009	---	---
US5OR16M	---	6	---	02/10/2009	---	---
US5OR17M	---	6	---	01/21/2009	---	---
US5OR19M	---	13	---	04/23/2009	---	---

Survey H11859 depths were compared to the charted soundings on Charts 18526, 18527, 18528 and 18531 and the corresponding ENC's US5OR15M, US5OR16M, US5OR17M and US5OR19M. An apparent water level application error in a June 1, 2009 update for raster chart 18526 resulted in the chart depicting deeper soundings than previous charts and survey H11859.¹⁴ The following differences were observed during the chart comparison.

Columbia River Mile (CRM) 100-112 and Willamette River Mile (WRM) 0-13

The shoal charted down river from Terminal No. 2 on 18526 has been updated with bathymetry deeper than currently charted. Raster chart 18526 (1:20,000) downloaded from NOAA chart server¹ on June 4, 2008 shows an 11-foot sounding; whereas, the same chart downloaded June 27, 2009 depicts a least depth of 13-feet. Upon further inspection, it appears that all of the Columbia River shown on chart 18526 and the Willamette River to Broadway Bascule Bridge at 45-31-56.45N, 122-40-29.59W has been updated with new soundings with the release of Edition 59 of the chart released June 1, 2009. Most of the depths on the updated chart are deeper than this survey (Figure 4). Upon further evaluation, it appears that the updated survey data from 2004 may have inadvertently applied Mean Lower Low Water (MLLW) values from CO-OPS stations in Vancouver and Portland rather than applying Columbia River Datum by downloading Station Datum from the CO-OPS stations. Mean Lower Low Water is approximately 0.51 meters (1.7 feet) above CRD at these stations. Application of MLLW rather than CRD would result in

¹ <http://ocsddata.ncd.noaa.gov/ChartServerV2.0/jsp/index.jsp?type=BSB>

deeper soundings depicted on the chart by 2 feet which is approximately the difference observed in Edition 59 of chart 18526. The hydrographer recommends immediate evaluation of chart 18526, as there are navigationally significant variations between this and previous versions of the chart.¹⁵ The hydrographer also recommends that the current bathymetry for H11859 supersede charted soundings in all common areas.¹⁶ It appears that the largest scale chart 18527 (1:5,000), which shares a common area in the Willamette River around Swan Island has not been updated.

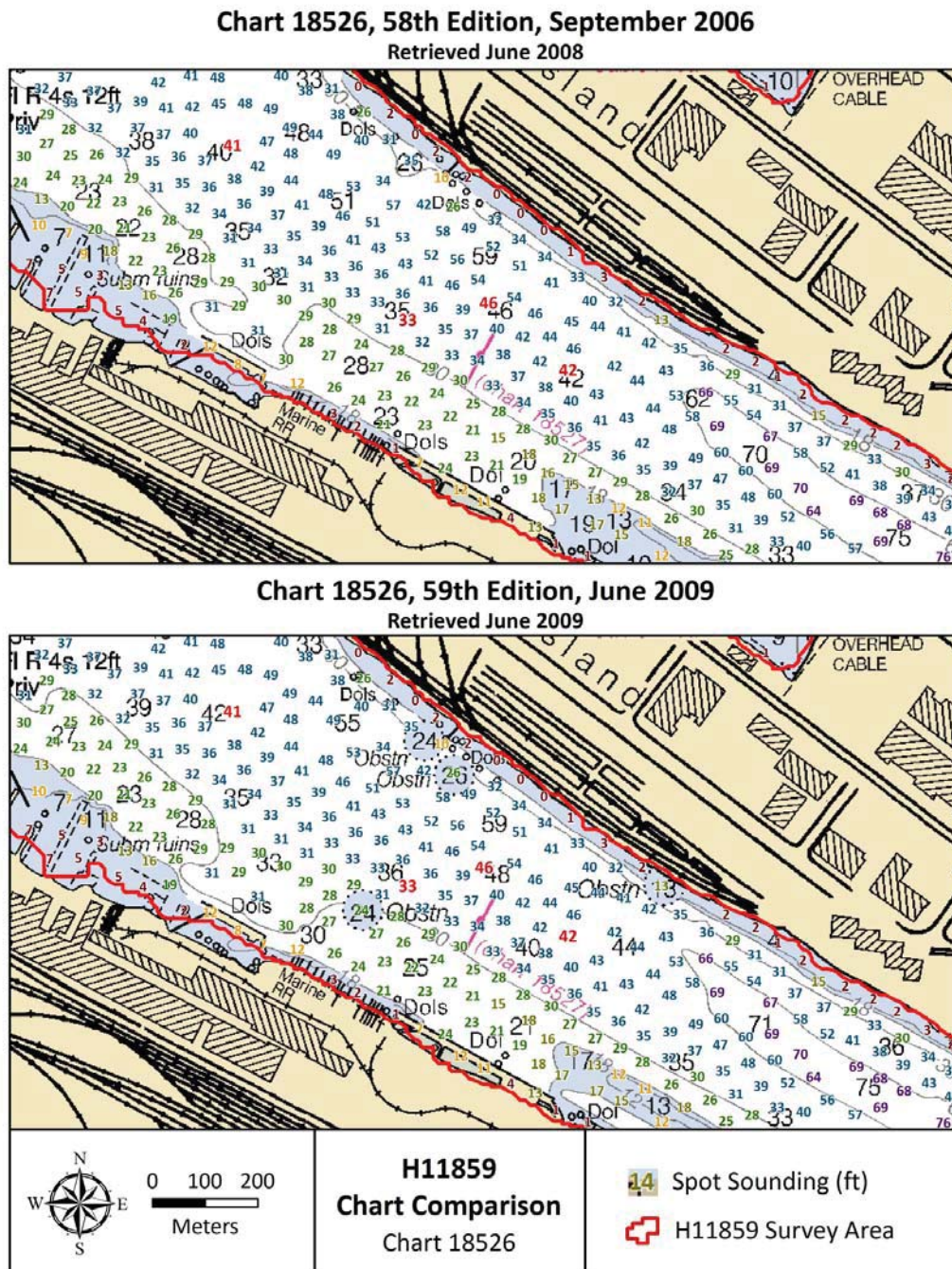


Figure 4. Current Bathymetry on Different Versions of RNC 18526

CRM 101-110

Significant shoaling from sand wave migration has occurred up river of the Burlington Northern Swing Bridge (Figure 5) in North Portland Harbor. The surveyed shoal reduces the depth of the middle of the river, south of Hayden Island, to 2.34 feet (0.71m). Charted depths in this area range from 17 to 30 -feet (5.4 to 9.1m).¹⁷

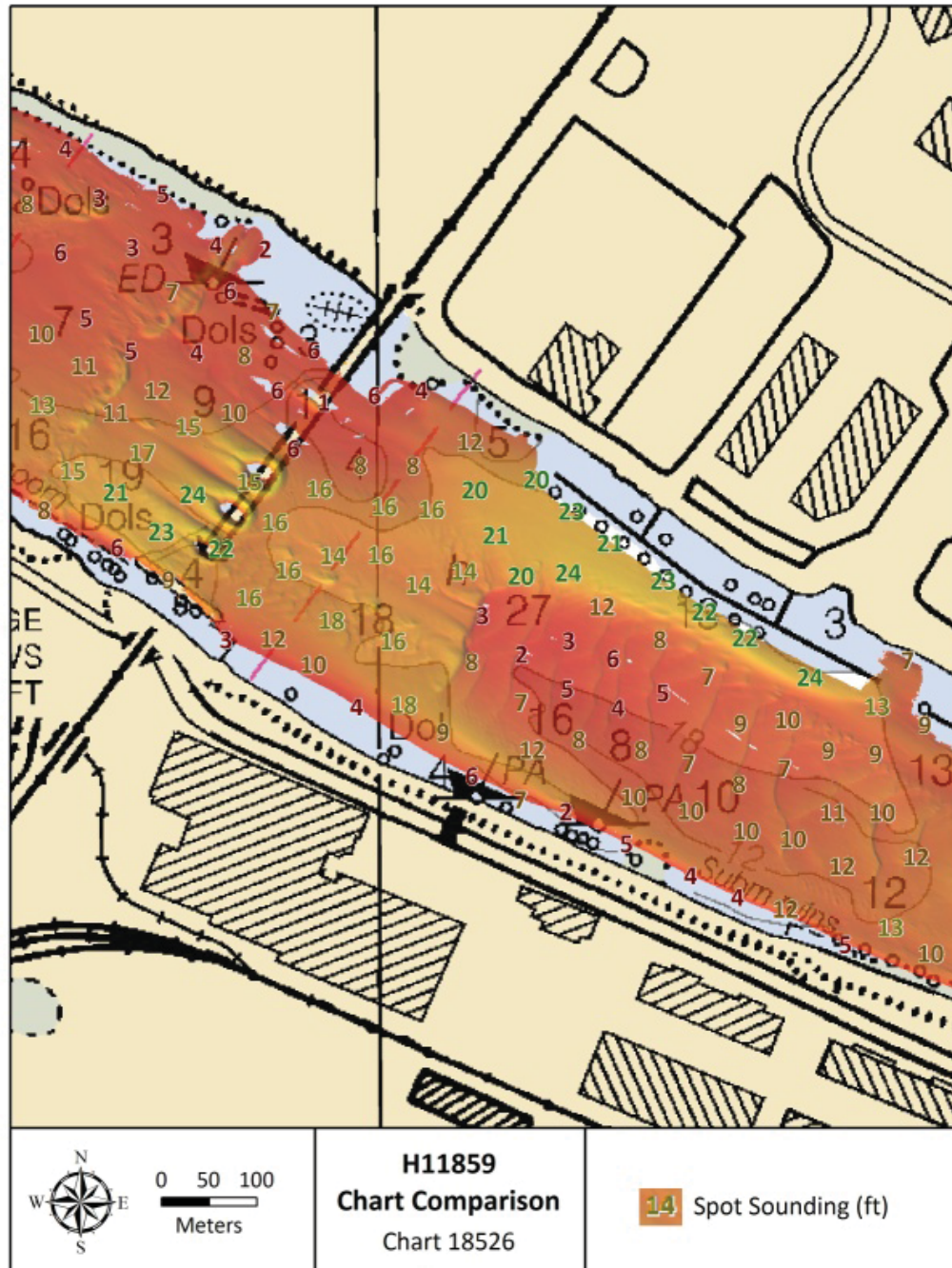


Figure 5. Significant Shoaling in the North Portland Harbor of the Columbia River

D1.b Comparison to Significant Shoals

CRM 106-108

At the charted 17-foot shoal, along Hayden Island upriver of the Interstate 5 Bridge on the Columbia River, current bathymetry located a 14-foot (4.3 m) depth at 45-36-51.86N, 122-40-22.30W (Figure 6).¹⁸

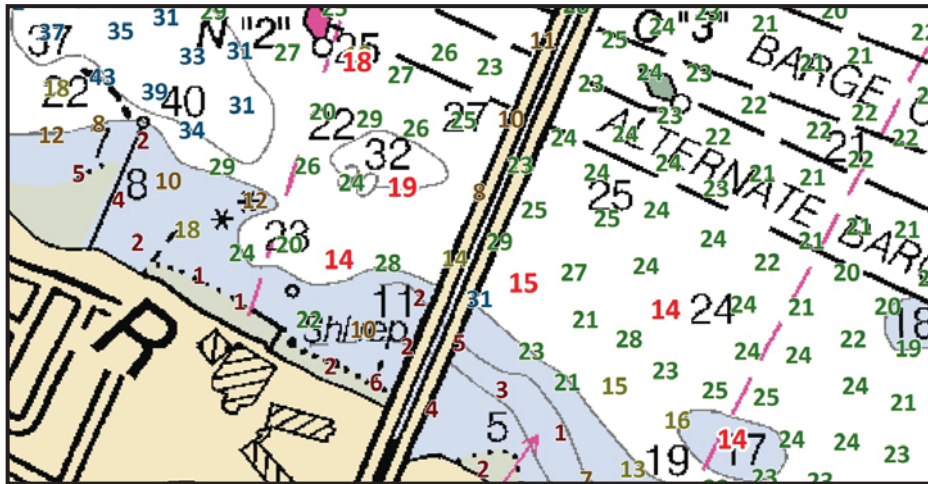


Figure 6. Shoaling Near I-5 Bridge

The charted shoals that lie between the Tomahawk Bar Channel, the Barge Channel, and the Alternative Barge Channel appear to have receded or have been dredged. (Figure 7).¹⁹

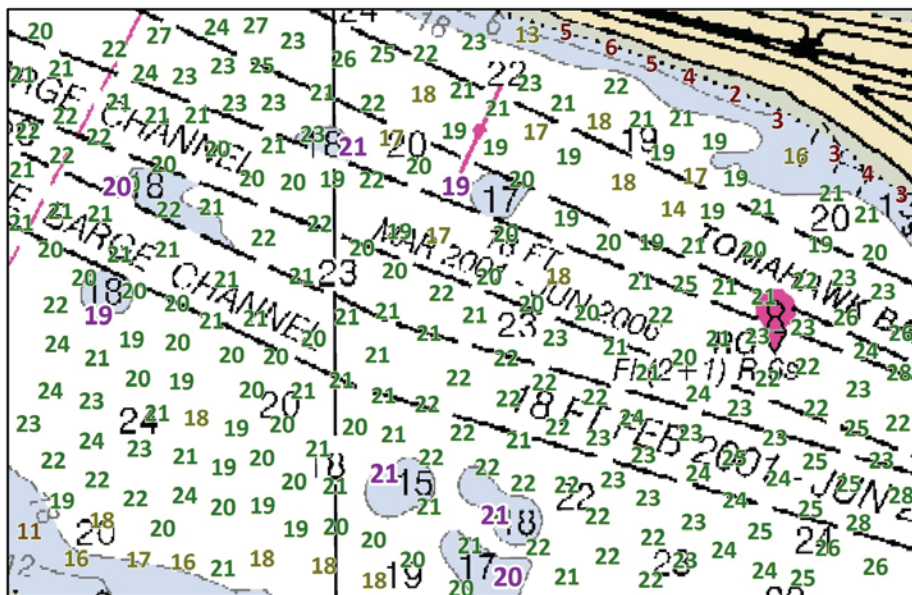


Figure 7. Deepening in Areas of Charted Shoals

The latest electronic and raster versions of the relevant charts were reviewed to ensure that all U.S. Coast Guard Local Notice to Mariners (LNM) issued during survey acquisition, impacting the survey area, were applied and addressed by this survey.

D1.c Comparison to Charted Features

Twelve (12) AWOIS items were located within the limits of survey H11859. Of these, six (6) AWOIS items were assigned for investigation (Figure 8).²⁰ A complete description is available in Appendix II *Survey Feature Report*.²¹

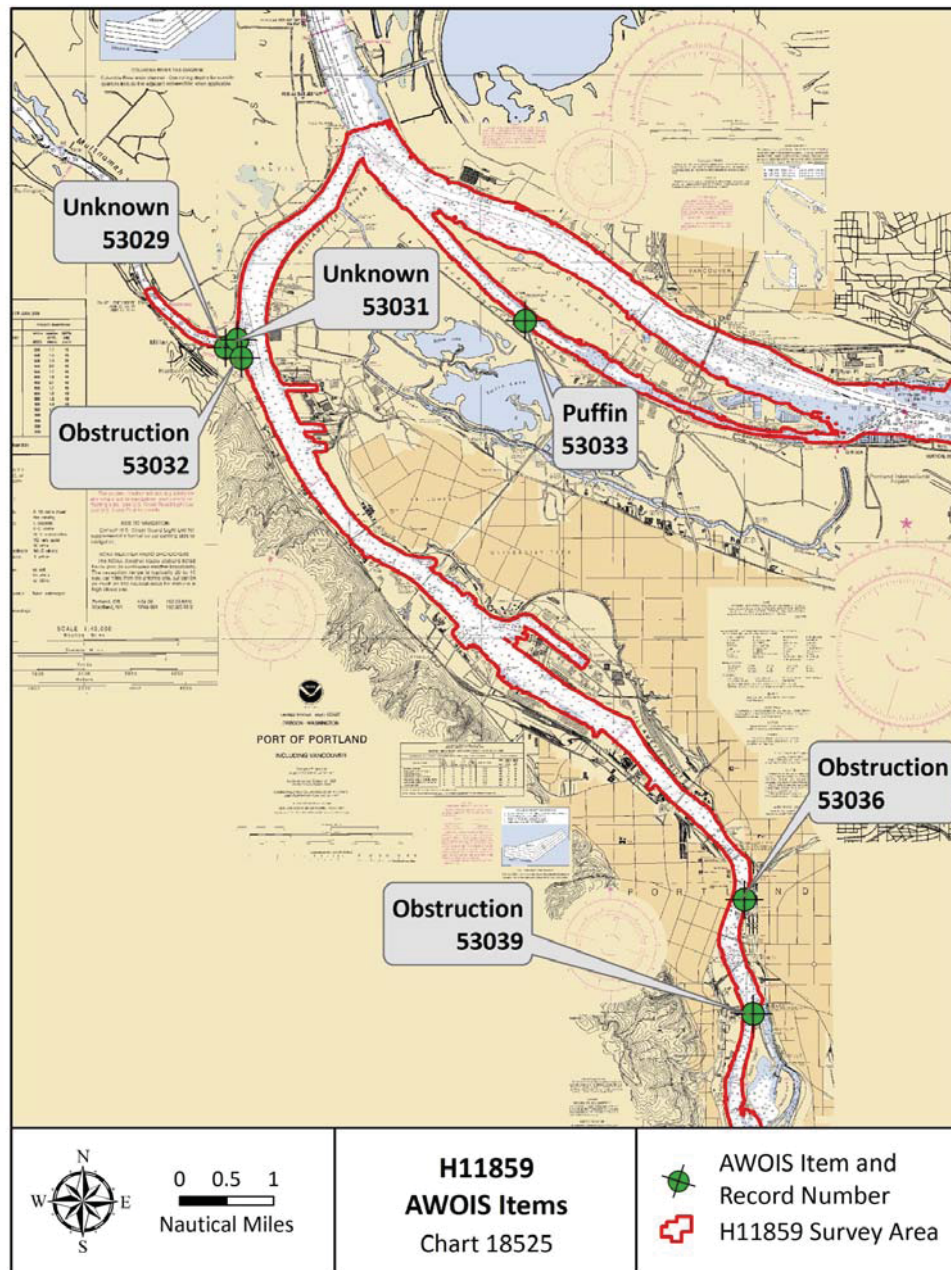


Figure 8. H11859 AWOIS Investigations

Multnomah Channel

Chart 18526 and Inset / US5OR15M

The charted Wreck PA (AWOIS 53029) was not located within H11859 survey limits. Due to the shoal nature of the area the entire AWOIS radius was not surveyed, as such, the hydrographer recommends retaining the wreck as charted.²²

Columbia River Mile (CRM)

Chart 18526 / US5OR15M

Shoreline in the Portland and Vancouver Harbors is complex and numerous changes have taken place. Shoreline is being updated in the area by recent work by NGS but application to the chart has lead to duplicate depiction of features resulting in cluttered and inaccurate representation of baring features on the current chart. Although shoreline verification was not required for survey H11859, many observed discrepancies in the depiction of baring features were noted. The hydrographer strongly recommends shoreline verification be conducted in the Portland and Vancouver Harbors to correct many inaccuracies currently depicted on charts of the area.²³

CRM 101-102 WRM 0-1

A submerged pile at 45-38-42.37N, 122-46-27.95W marks the new (for ENC US5OR15M) extent of the charted Ruins Subm Piles area. The hydrographer recommends extending the obstruction area on US5OR15M to include this seaward most submerged pile.²⁴

CRM 102-104

Numerous sunken logs and snags were located beyond the charted log boom extents at 45-39-05.03N, 122-44-57.43W. Designated soundings mark the most significant least depths in the area.

The charted pile in the Columbia River outside of Vancouver Range at 45-38-41.40N, 122-43-52.48W was disproved with 100% multibeam. All disproved charted features are listed in Appendix II *Survey Feature Report*. Two features (Figure 9) were located nearby; one is likely a sunken log and the other is a snag or submerged pile. The hydrographer recommends charting this area as depicted in the S-57 feature file.²⁵

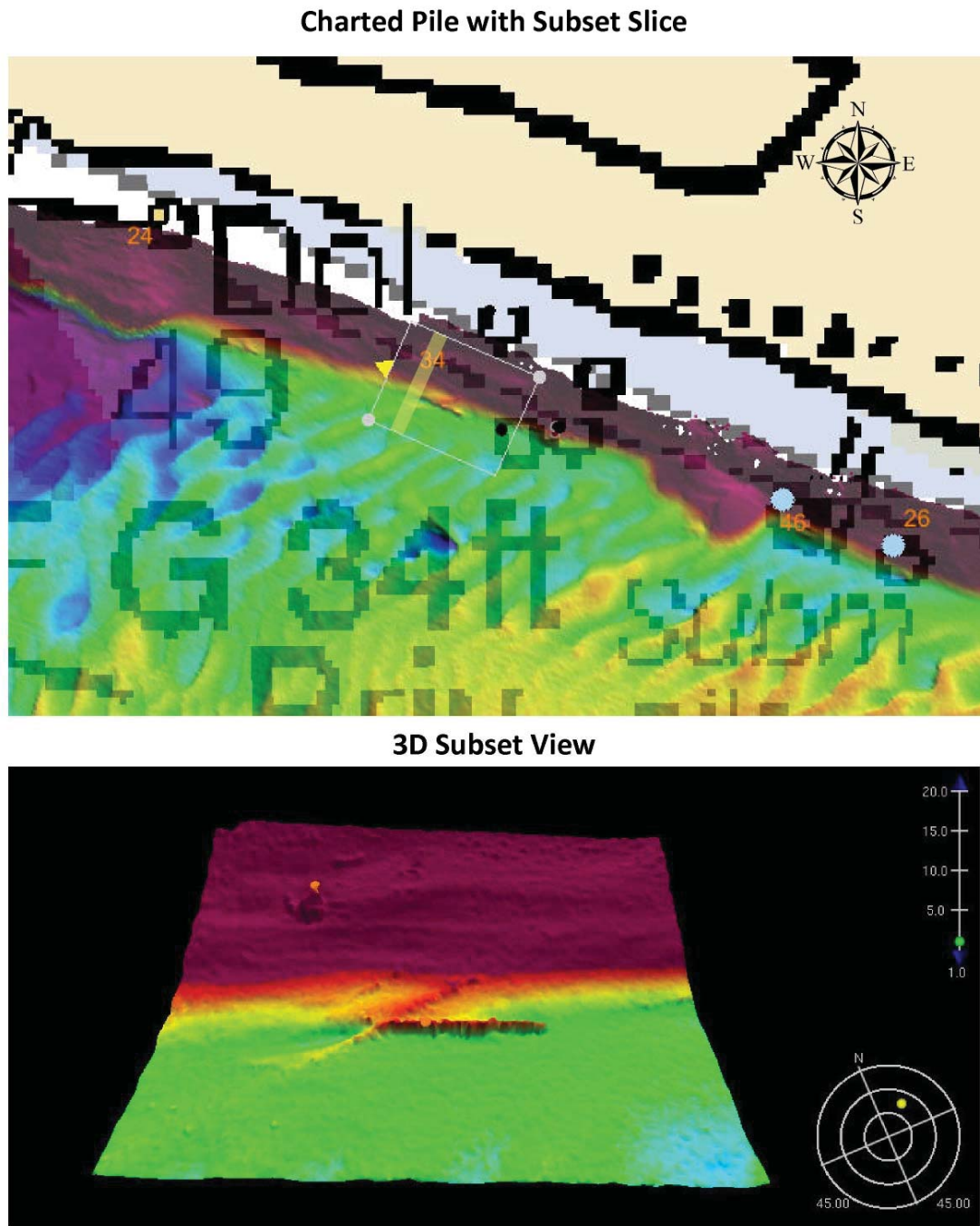


Figure 9. Submerged Features Near Charted Pile (Chart 18526)

Chart 18526 and 18531 / US5OR15M and US5OR19M

CRM 106-108

The row of piles off of Ryan Pt, just above CRM 108 on the Oregon shore, was disproved with 100% multibeam. No indications of baring piles or piles in ruin were noted or are visible in the multibeam data or photogrammetry. The hydrographer recommends removing the charted piles and charting the areas based on current hydrography.²⁶

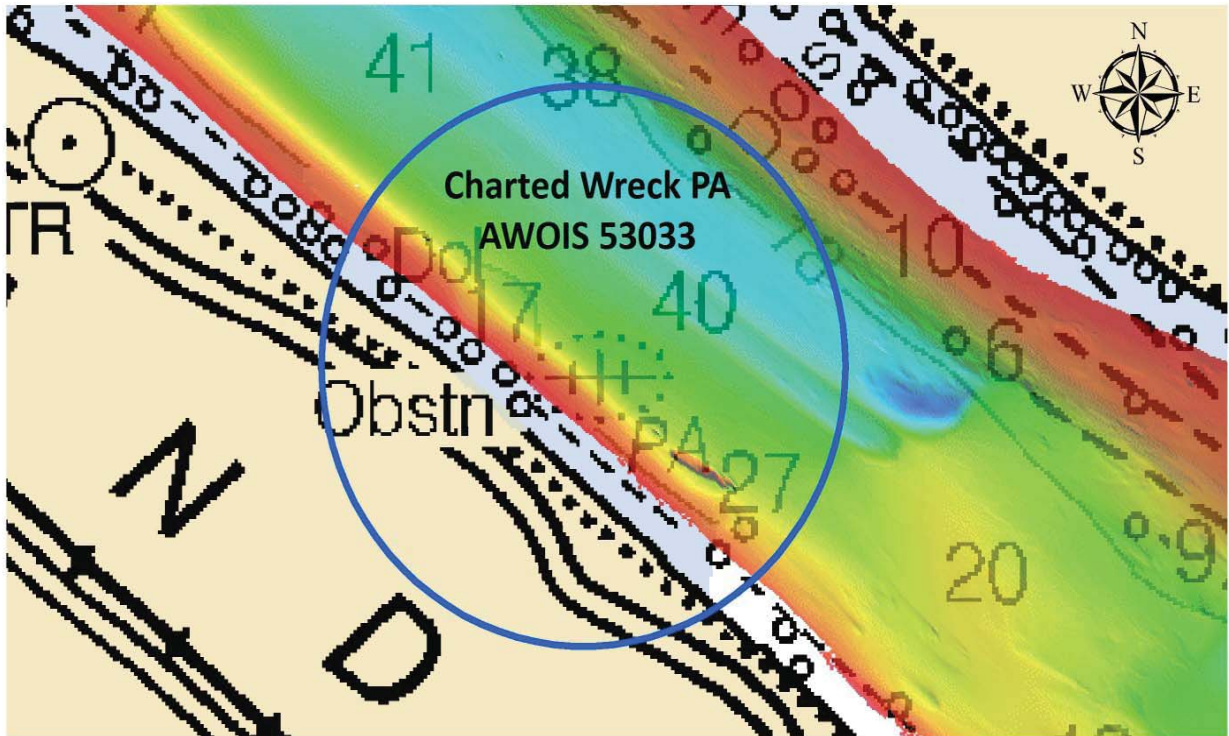
The charted wreck, shown on ENC US5OR15M only, at 45-36-46.50N, 122-38-54.22W was disproved. The charted wreck is attributed as "always dry" and no evidence of the wreck was seen during survey operations or visible in the multibeam data. The least depth of the area is 27 feet (8.2 m). The hydrographer recommends removing the wreck from the ENC.²⁷

CRM 101-108 North Portland Harbor South of Hayden Island

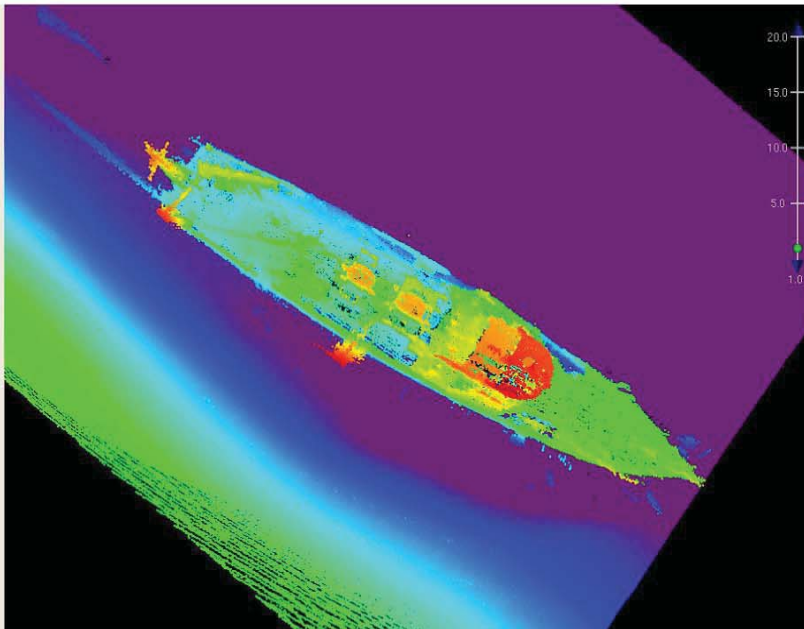
The ED Wreck at 45-37-00.26N, 122-42-07.96W was disproved with 100% multibeam. An uncharted snag or pile ruins was located nearby and is depicted in the S-57 feature file. The hydrographer recommends removing the wreck and ED annotation and charting new obstruction at surveyed location.²⁸

The charted Wreck PA at 45-36-42.73N, 122-41-55.16W is inshore of the two-meter contour and not included in H11859 survey area. However, the ENC lists an obstruction area with the INFORM field stating "Piles." Baring piles were noted in this area. The hydrographer recommends retaining the obstruction area as charted on the ENC and updating the RNC accordingly.²⁹

The PA Wreck (AWOIS 53033) was located with 100% shallow water multibeam coverage at 45-37-20.91N, 122-43-15.7W (Figure 10). Multibeam acquisition on the wreck was done at a high stage of tide, which allowed for an accurate least depth of -3.68 feet (-1.1 meters) above CRD to be obtained. The hydrographer recommends charting the wreck as depicted in the S-57 feature file and removing the PA annotation from the raster chart.³⁰



3D Subset Plan View



2D Subset View

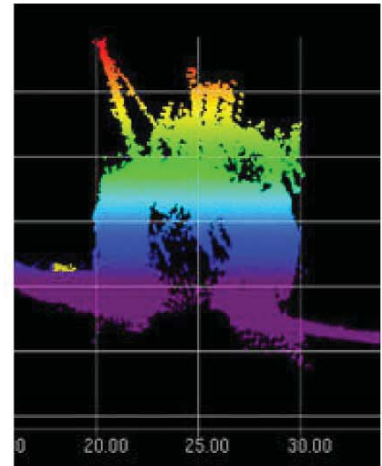


Figure 10. Wreck PA (AWOIS 53033) Located with Shallow Water Multibeam

The charted Wreck PA at 45-36-41.8N, 122-41-49.5W was disproved with 100% multibeam. A wreck area is shown on ENC US5OR15M approximately 100-feet (36m) down river (Figure 11). H11859 located a new seaward extent and least depth of 2.39-feet (0.73 m) on this wreck. The hydrographer recommends removing the charted PA wreck and annotation and charting the surveyed wreck on both versions of the chart as depicted in the S-57 feature file.³¹

Charted Wreck PA, ENC Wreck Area and Surveyed Least Depth



2D Subset Plan View

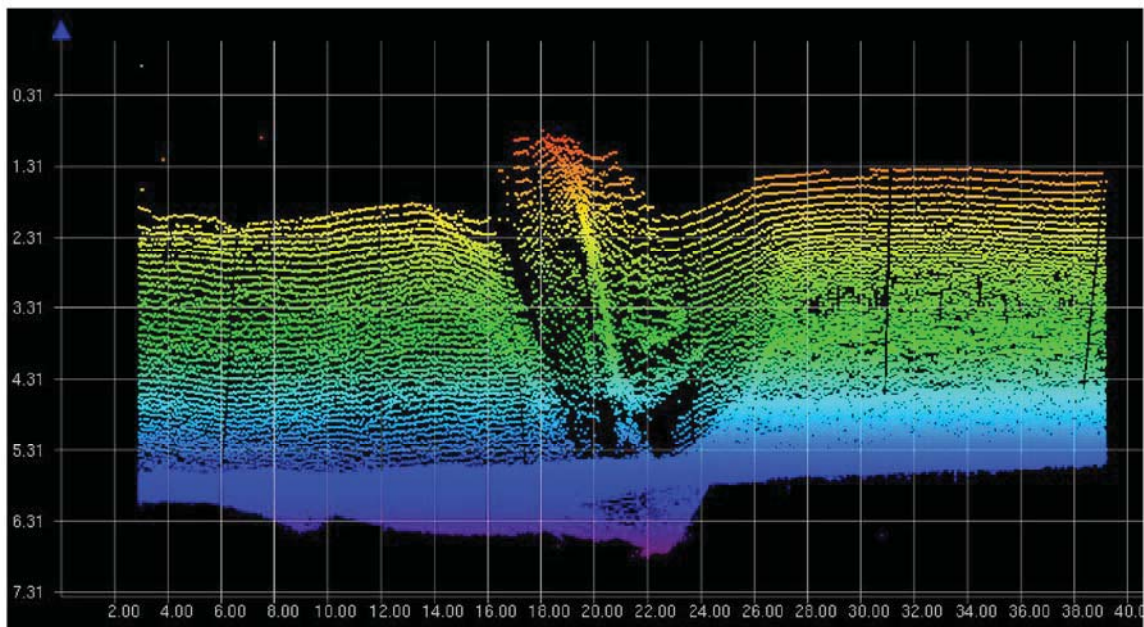


Figure 11. Charted PA Wreck Located by H11859

Chart 18531/ US5OR19M

CRM 108-110

The row of charted piles east of Light 2 on the Oregon shore was disproved with 100% multibeam coverage.³² No indications of baring or submerged piles were noted.

Willamette River Mile (WRM)

Chart 18526 and Inset/ US5OR15M

Shoreline in the Portland Harbor is complex and numerous changes have taken place. Shoreline is being updated in the area by recent work by NGS but application to the chart has lead to duplicate depiction of features resulting in cluttered and inaccurate representation of baring features on the current chart. Although shoreline verification was not required for survey H11859; many observed discrepancies in the depiction of baring features were noted. The hydrographer strongly recommends shoreline verification be conducted in the Portland Harbor to correct many inaccuracies currently depicted on charts of the area.³³

WRM 2-4

The two (2) ENC dolphins and two (2) raster piles were disproved with 100% multibeam south of Ash Grove Lime Dock around 45-37-19N, 122-47-16W. It is likely that the four charted features represent two features. After a meticulous review of the multibeam data, NGS provided updated shoreline data, and Port or Portland terminal drawings, no evidence of baring or submerged piles or dolphins were apparent at this location. A new submerged pile or snag was located 328 feet (100m) offshore of the disproved ENC dolphins and is included in the S-57 feature file. The hydrographer recommends charting the area as depicted in the S-57 feature file.³⁴

The navigable area within the search radius of AWOIS 53031 (charted wreck) was investigated with 100% multibeam. Shallow water and charted dike ruins prevented full investigation of the AWOIS search radius. Two obstructions were located within the AWOIS search radius; however, it was not possible to determine whether either of the obstructions were the charted wreck. The hydrographer recommends retaining the wreck as charted and charting the two new obstructions.³⁵

The charted snags (AWOIS 53032) around 45-36-59.59N, 122-47-38.90W were verified.³⁶

WRM 4-6

The pile at 45-36-14.53N, 122-46-24.39W in Municipal Terminal No. 4 is mischarted. The pile is no longer baring; the multibeam least depth on the submerged pile ruin is 22.4-feet (6.8 m). The hydrographer recommends charting the pile ruins as depicted in the S-57 feature file.³⁷

The pile at 45-35-40.81N, 122-46-23.62W is mischarted. The pile is no longer baring the multibeam least depth on the submerged pile ruin is 49.3-feet (15 m). The hydrographer recommends charting the pile ruins as depicted in the S-57 feature file.³⁸

WRM 6-8

The charted pile, shown on RNC 18526 only, at 45-34-18.70N, 122-44-32.85W was disproved with multibeam. The hydrographer recommends removing this pile from all applicable raster charts.³⁹

The row of charted dolphins around 45-34-46.88N, 122-44-45.66W were disproved with 100% multibeam. The hydrographer recommends charting this area as depicted in the S-57 feature file.⁴⁰

The charted obstruction at 45-34-20.64N, 122-44-35.05W was disproved with 100% multibeam. The obstruction annotation and area is directly in front of a large dock, the hydrographer recommends charting the area based on the current hydrography.⁴¹

Chart 18526 and 18528/ US5OR15M and US5OR17M

WRM 12-15

The charted piles, shown on RNC 18526 only, at 45-31-20.11N, 122-40-08.77W were verified. The seaward most pile in a cluster of piles has been included in the S-57 feature file. The hydrographer recommends adding this pile to all applicable ENC's.⁴²

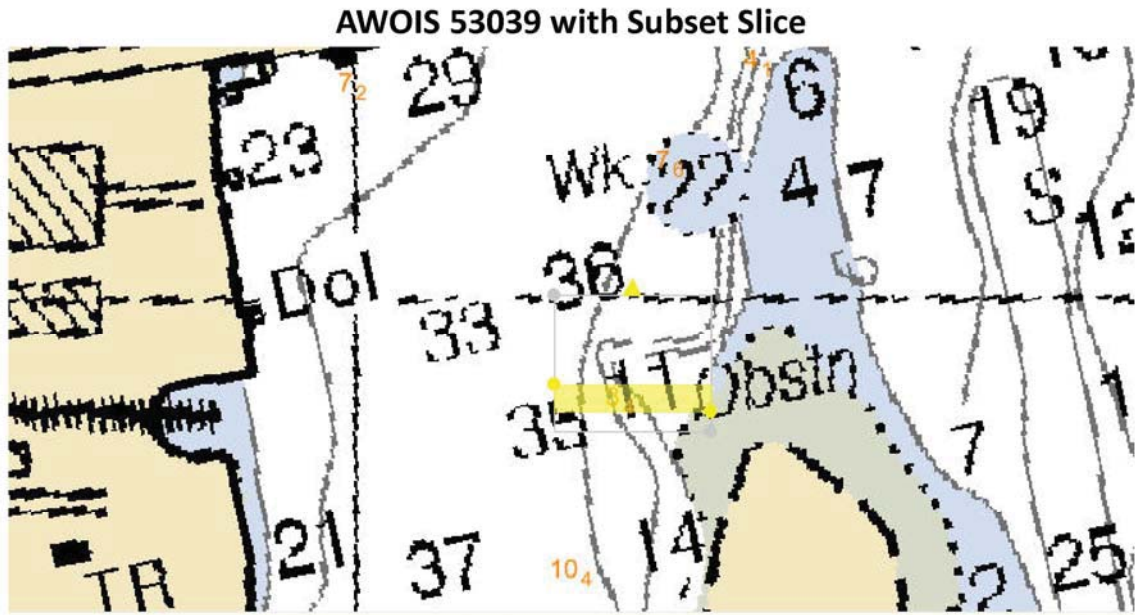
The charted pile, shown on RNC 18526 only, at 45-31-22.03N, 122-40-08.52W was disproved with multibeam. The hydrographer recommends removing this pile from all applicable raster charts.⁴³

The charted Subm Pile (AWOIS 53036) was verified. The surveyed least depth of the pile ruin is 34.5-feet (10.5 m).⁴⁴

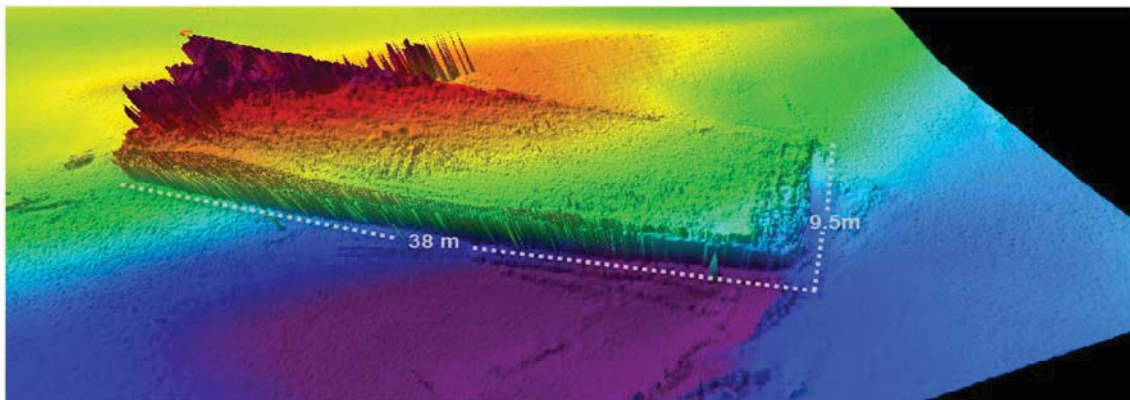
The row of charted piles, shown on RNC 18526 only, from 45-29-52.88N, 122-39-54.23W to 45-29-28.48N, 122-40-02.13W was disproved with multibeam. The hydrographer recommends removing pile symbols and annotation from all applicable raster charts.⁴⁵

The charted Subm Piles, shown on RNC 18526 only (AWOIS 53041) at 45-29-52.89N, 122-39-54.24W were disproved with multibeam. The hydrographer recommends removing the annotation and the pile symbol from all applicable raster charts.⁴⁶

An uncharted Obstrn (AWOIS 53039) was found at 45-29-58.90N, 122-39-54.09W (Figure 12), approximately 33-feet (10 meters) downstream of the AWOIS database position. A recently charted wreck (Dton #2), which is most likely a capsized barge with dimensions similar to AWOIS 53039, is located approximately 300-feet (94 m) down river. Both features stand approximately 9.8-feet (3 m) proud from the river bottom. The survey did not extend far enough inshore to cover the charted obstruction with unknown depth located in the intertidal area at 45-29-59.49N, 122-39-51.278W. The hydrographer recommends charting both the Obstrn (AWOIS 53039) and wreck (Dton #2) as depicted in the S-57 feature file.⁴⁷



3D Subset View of AWOIS 53036



3D Subset View of Charted Wreck

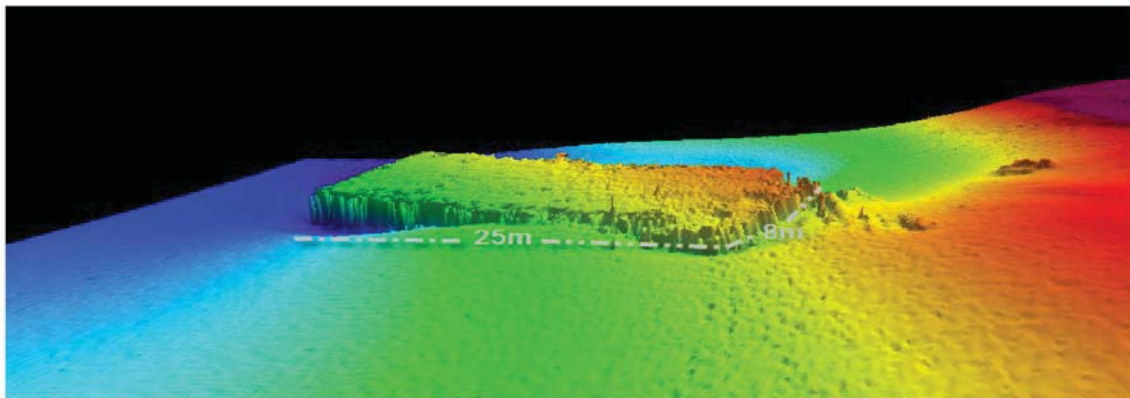


Figure 12. AWOIS 53039 and Charted Wreck

The charted Submerged Piles PA south of the Marquam Fixed Bridge along the east bank were not located. New shoreline construction, possibly a marine conveyor, was observed at 45-30-23.43N, 122-39-56.91W. This feature was installed after the NGS photogrammetry, but is clearly visible in Google Maps©. The hydrographer recommends removing the PA annotations and updating the chart with the latest photogrammetry.⁴⁸

D1.d Comparison of Soundings in Designated Anchorages and Along Channels

Anchorage Area 110.228 is located in H11859 survey area. Depths in the anchorage area range from 33-feet (10 m) to 53-feet (16.2 m). The charted Obstrn PA in the anchorage area was not located. The surveyed least depth in the vicinity is 42-feet (12.8 m).⁴⁹

There are a total of nine named Columbia River Channels within survey H11859. The most recent channel survey is reported to have occurred in September 2008 at which time a minimum depth of 18-feet (5.5 m) was found in the right inside quarter of Tomahawk Bar. Table 9 lists the Columbia River channels affected by survey H11859.

Table 9. Columbia River Channels and Minimum Depths

Name of Channel	Project Depth	Controlling Depth (ft)	H11859 Minimum
Vancouver Lower Channel	40	48	45
Vancouver Range	40	43	39
Vancouver Upper Channel	40	39	39
Vancouver Lower Turning Basin	40	34	40
Vancouver Upper Turning Basin	26	25	21
Tomahawk Bar	27	18	14
Alternative Barge Channel	18	18	20
Barge Channel	18	18	17
East End Range	150	8	4

Five of the nine channels have depths less than the project depth. The following is a list of representative controlling depths for H11859 for those channels.⁵⁰

- Surveyed depth of 39.3-feet (11.89 m) at 3, 122-42-46.81W was located at right outside quarter of Vancouver Upper Channel.
- Surveyed depth of 21.5-feet (6.57 m) at 45-37-10.52N, 122-40-32.81W was located at the right outside quarter of the Vancouver Upper Turning Basin.
- Surveyed depth of 14.6 feet (4.46 m) at 45-36-59.28N, 122-39-39.87W was located mid-channel of Tomahawk Bar.
- Surveyed depth of 17.7 feet (5.38 m) at 45-36-58.22N, 122-39-53.77W was located mid-channel of Barge Channel.
- The charted (RNC 18531) minimum depth for Hayden Island East End Range is reported as 150-feet (Figure 14). The hydrographer believes this is an error and should read 15 feet. The least depth of 4.6-feet (1.4 m) at 45-36-08.61N, 122-38-48.61W was located at the western extent of the range. The hydrographer recommends correcting the channel depths on the raster chart.

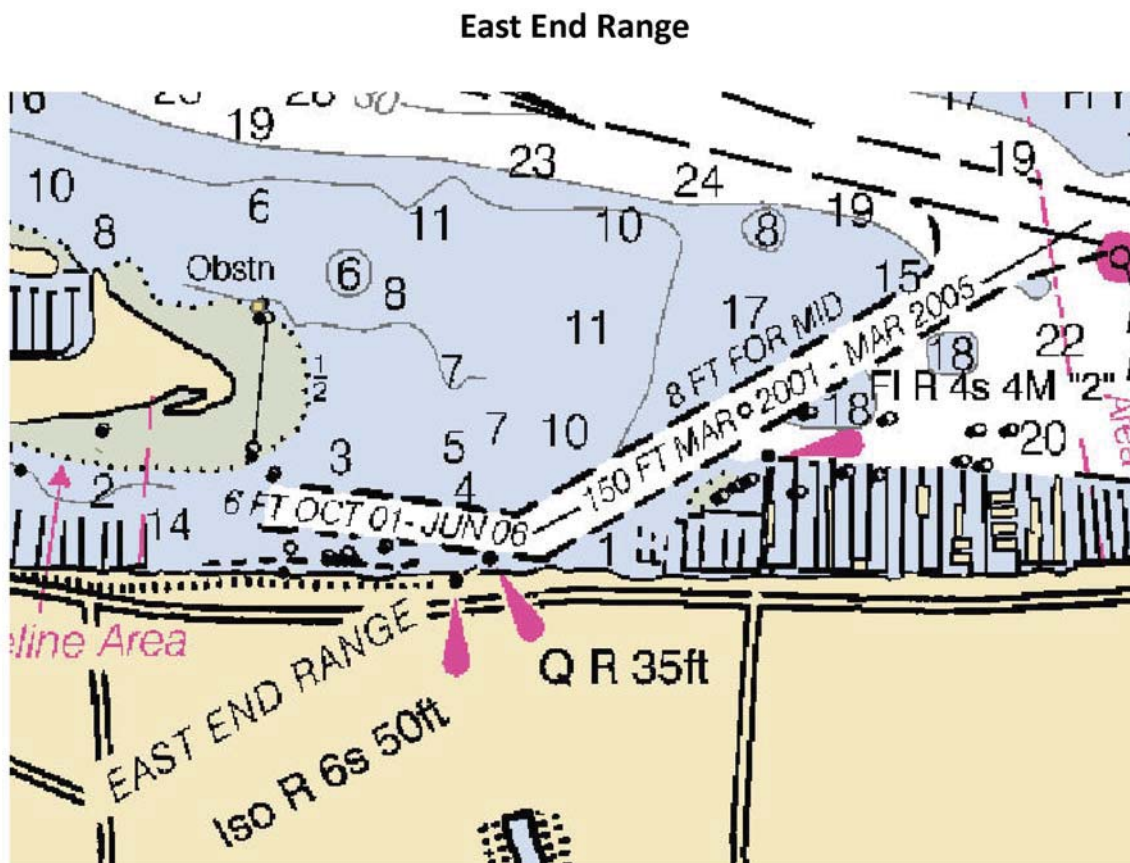


Figure 13. Hayden Island East End Range as Charted on 11831

D1.e New Submerged Features

All new submerged features are listed in tabular format in Appendix II *Survey Feature Report*.⁵¹ Numerous sunken logs and snags were observed in the channels and near shore. Several new items of interest are discussed below.

CRM 106-108

A large wreck was located at 45-36-50.12N, 122-39-02.79W (Figure 14). This linear feature is approximately 40 m long and 13.1 feet (4 m) proud. This wreck is seaward of a charted obstruction area (USOR15M) with a similar shape. The hydrographer can not confirm if this wreck is the charted obstruction area because survey coverage does not extend to the charted obstruction. The hydrographer recommends retaining the charted obstruction area and charting the wreck as depicted in the S-57 feature file.⁵²

3D Subset View

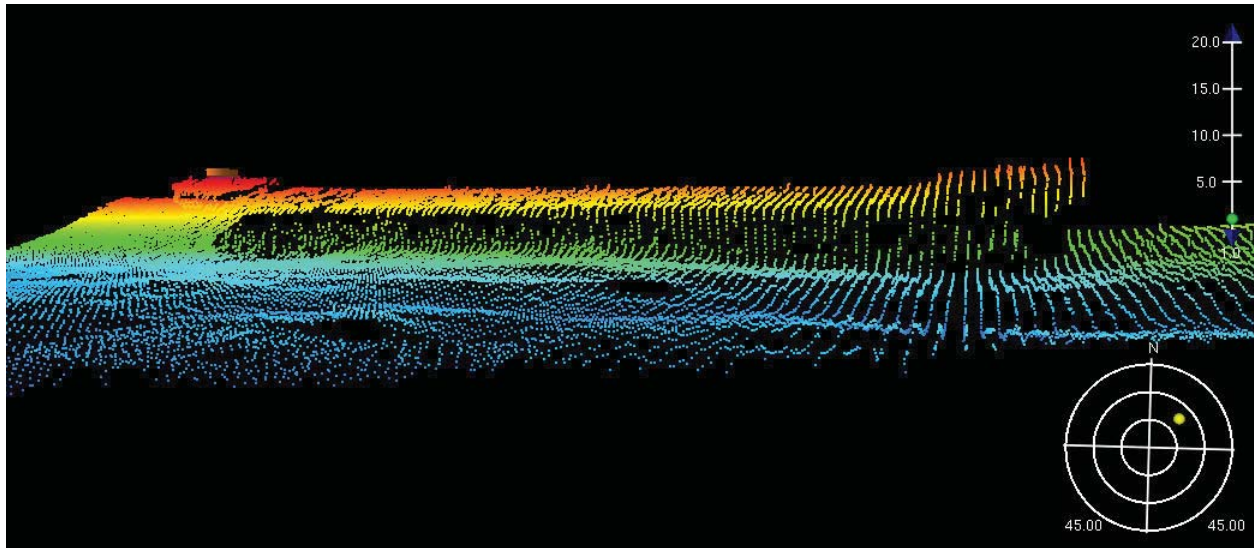


Figure 14. Wreck

WRM 1-2

Numerous submerged dolphin and pile ruins were located southeast of Berth 503 (Figure 15) in the Willamette River in the vicinity of 45-38-10N, 122-46-55W. Survey lines were run in such a way that nadir or near nadir beams allowed for least depths determination on the submerged features. The hydrographer recommends charting this area foul with submerged obstructions.⁵³

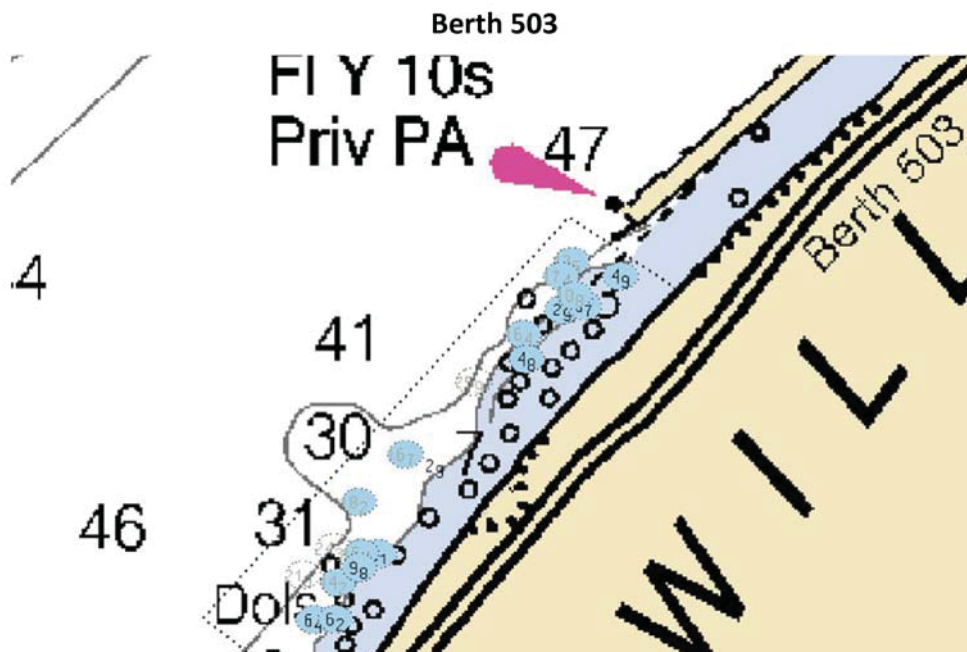


Figure 15. Area Foul with Submerged Dolphins and Piles

WRM 2-4

Submerged piles ruins or snags were located near the approach to Berth 405 (Figure 16) at 45-36-15 N, 122-46-30 W.⁵⁴

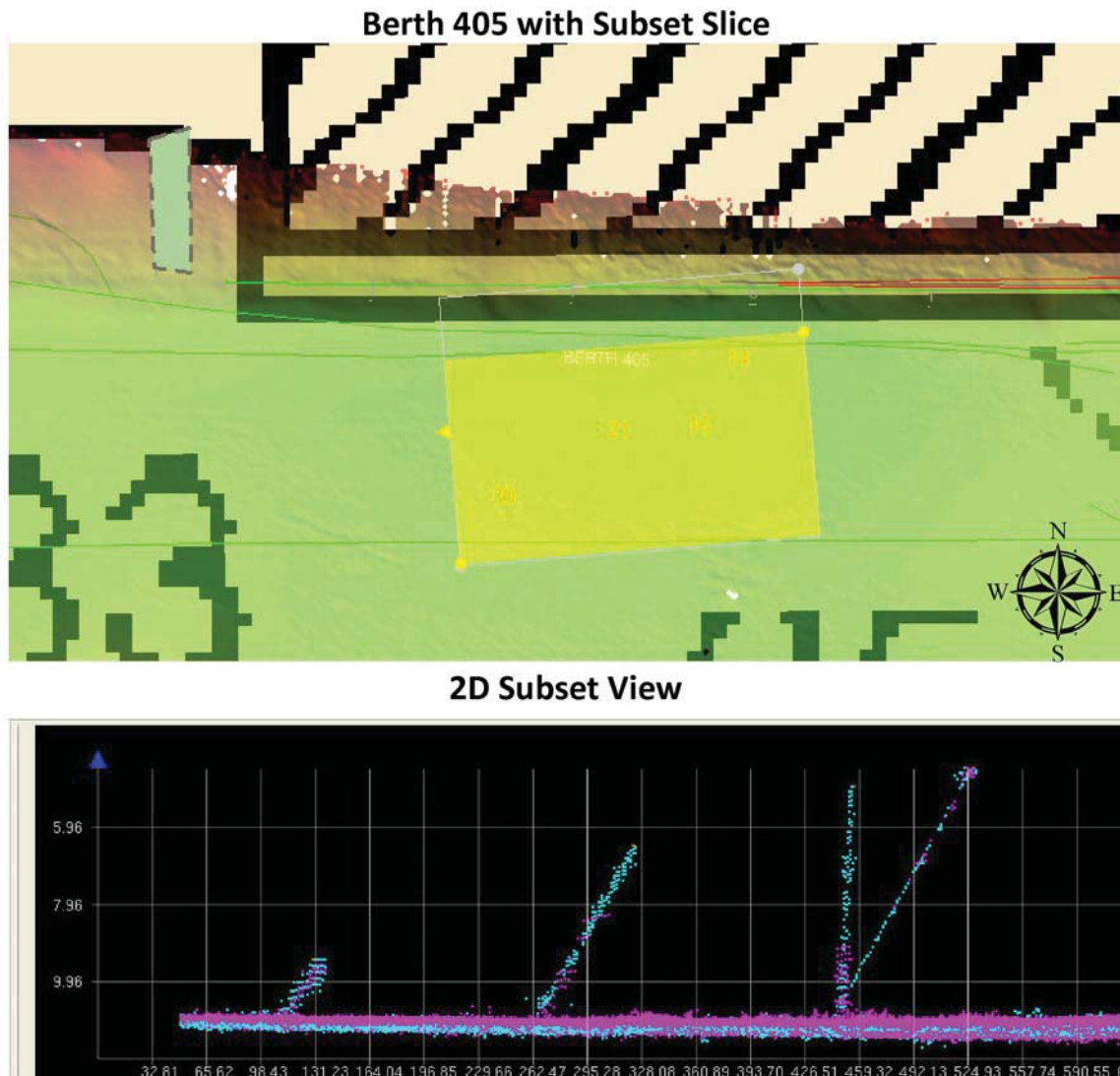


Figure 16. Uncharted Submerged Piles Near the Approach to Berth 405

WRM 4-6

A large rectangular obstruction area was located 45-35-19.22N, 122-45-58.62W. Nearby, a feature that appears to be a marine railway was positioned at 45-35-17.34N, 122-45-57.10W.⁵⁵

WRM 6-8

Numerous submerged features were located in the bay at 45-34-49N, 122-44-51W as shown in Figure 17. The hydrographer believes that the submerged pile ruins are associated with the historic St. John's Shipyard Dock Structure circa 1950. One charted obstruction area and two charted wrecks (point and area) were partially outside of the survey limits and not fully investigated due to the shoal nature of the area. The charted wreck area was surveyed downriver of its charted position and the hydrographer recommends charted as depicted in the S-57 feature file.⁵⁶ Although no indications of the obstruction area or wreck (point) were observed in the multibeam or visually on shore, the Hydrographer recommends retaining these features until disproved by a thorough shoreline feature investigation.⁵⁷ An uncharted obstruction and wreck were also located in the bay and are also included in the S-57 feature file.⁵⁸

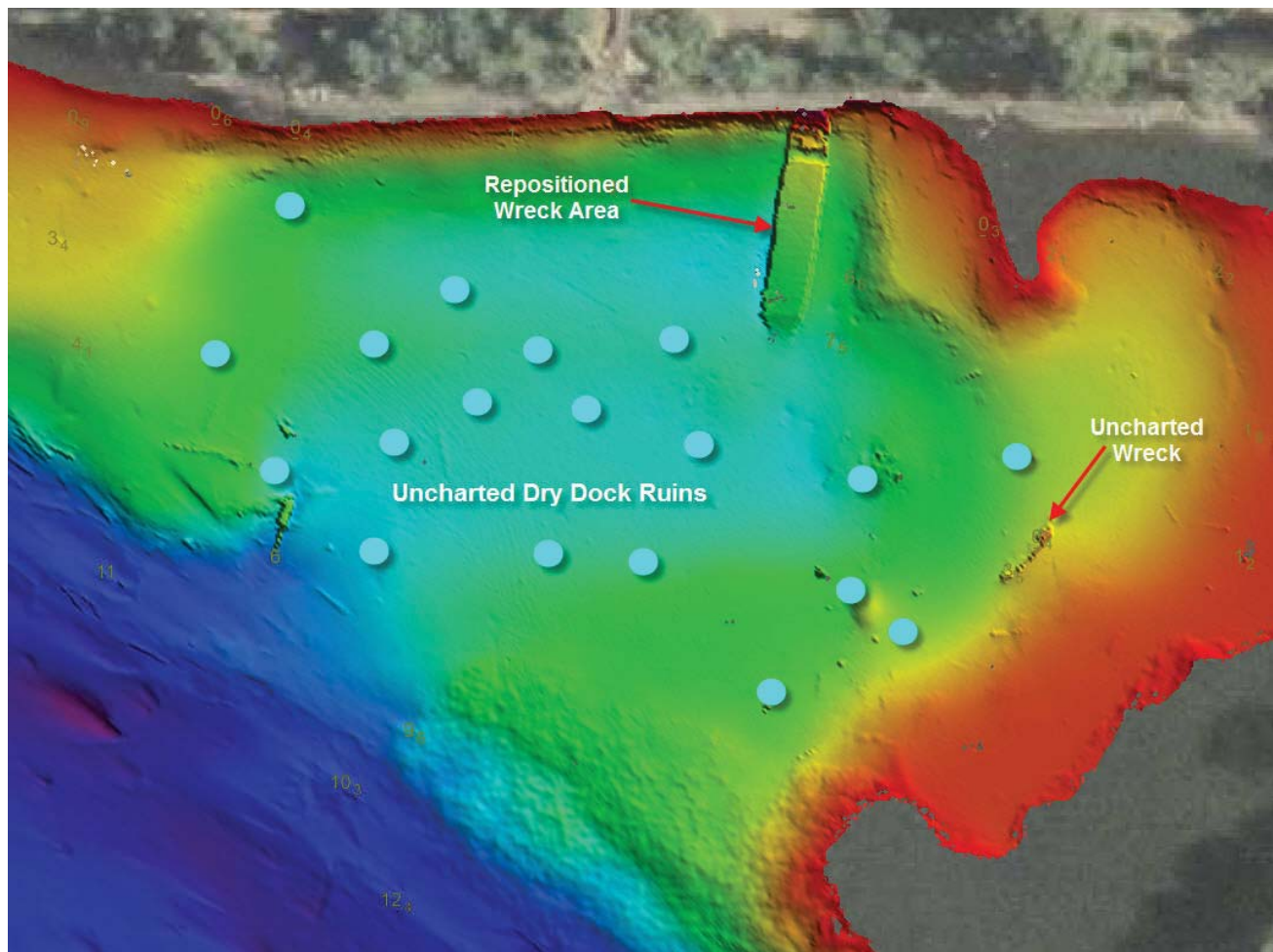


Figure 17. Uncharted Dry Dock Ruins and Wrecks

WRM 8-10

A submerged pick-up truck (Figure 18) was located at 45-33-29.90N, 122-42-38.90W and reported to the Pacific Hydrographic Branch as Danger to Navigation # 5.⁵⁹

3D Subset View

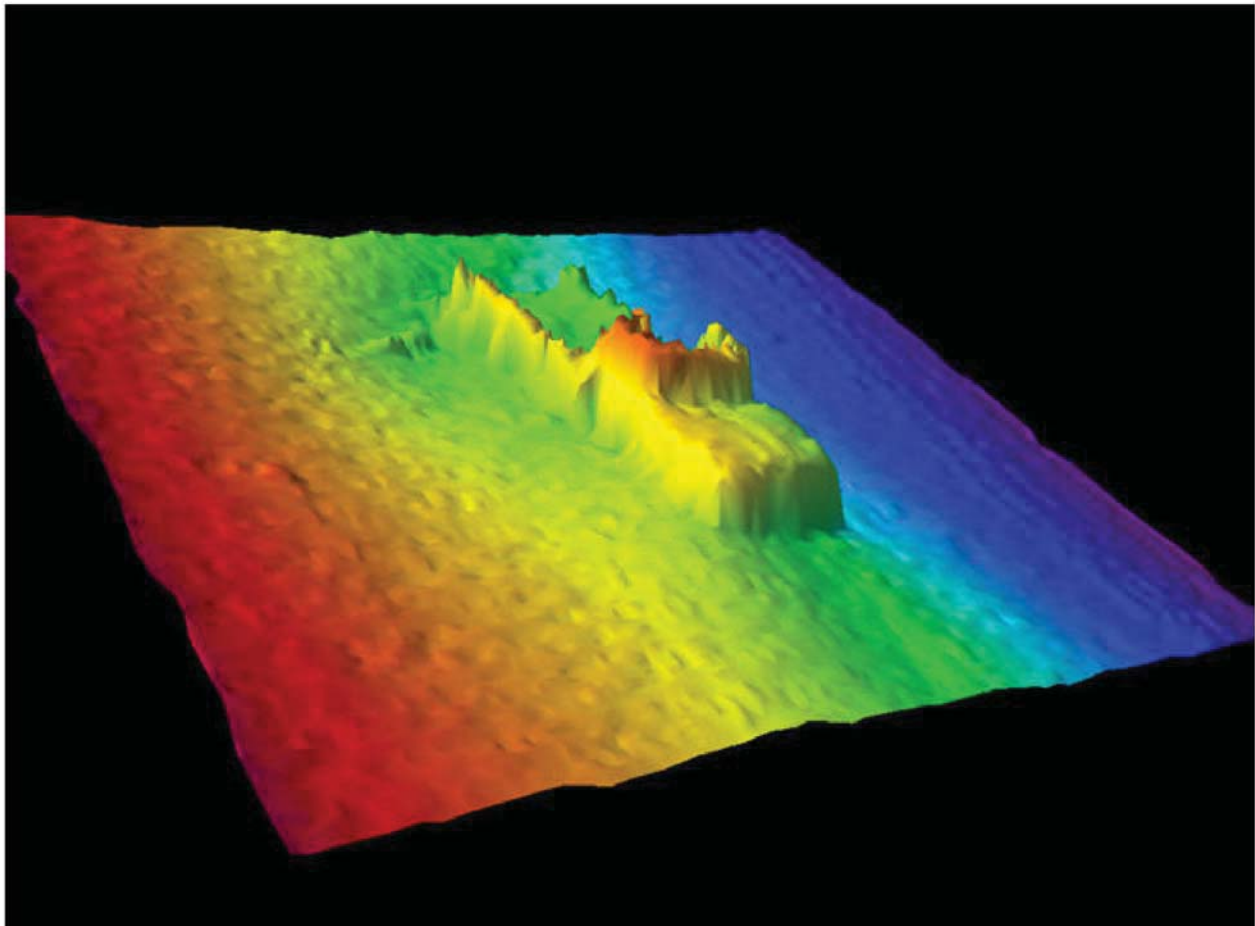


Figure 18. DtoN #5; Submerged Pick-up Truck

WRM 12-15

Two large uncharted pipes and a sailboat wreck (Figure 19) were located at 45-29-51.71N, 122-40-02.32W and are included as obstructions in the S-57 feature file.⁶⁰

Uncharted Pipes and DtoN 3

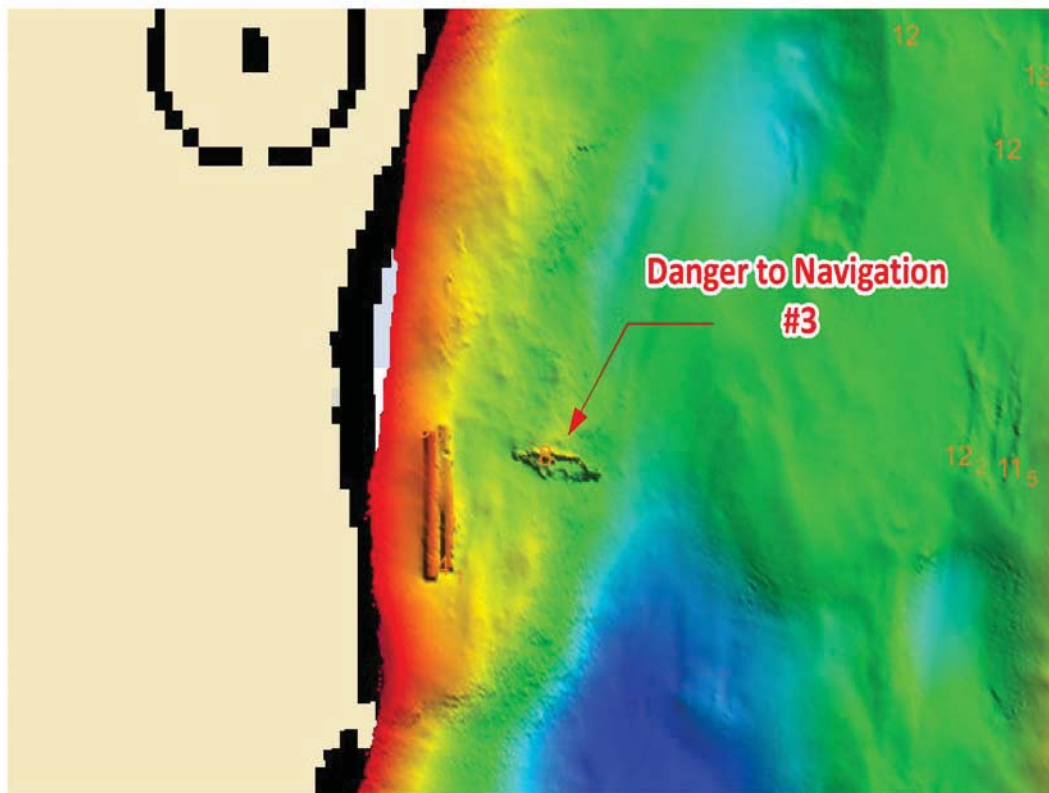


Figure 19. Uncharted Pipes and Wreck Submitted as DtoN #3

D1.f Dangers to Navigation

Twelve (12) DtoN reports were submitted for survey H11859. All DtoNs were reviewed by PHB and those deemed worthy of charting were forwarded on to the Marine Chart Division (MCD).⁶¹

An additional DtoN report was generated by NOAA's Pacific Hydrographic Branch and submitted to MCD after this survey was delivered to PHB. A copy of this report, which includes features 1.1 to 1.5, is included in Appendix I *Danger to Navigation Report*. After these Dangers to Navigation were identified, PHB requested that DEA reevaluate the survey for DtoNs due to the complex nature of the highly developed shorelines littered with numerous derelict piling and transient snags. Due to the high volume of features and inability to fully resolve their significance until compilation, PHB asked DEA to end DtoN submission after 33 additional features were submitted in Danger to Navigation reports 10 – 12 and to include new or hazardous features in the S-57 feature file.

Newer chart editions (Table 10) than those used during the complete chart comparison (Table 8) have been reviewed to determine the charting status of the features submitted under DtoN 10 – 12 and PHB DtoN 1.1 -1.5. All DtoNs are included in the S-57 feature file and should be charted as depicted in the file. The charting status of each Danger to Navigation is included in Table 11.

Table 10. Charts compared to H11859 additional DtoNs

Chart	Scale	Edition	Edition Date	Issue Date	Latest LNM	Cleared Through Date
18526	1:20,000	59	06/01/2009	---	15/10	04/13/2010
18527	1:5,000	22	09/01/2005	---	15/10	04/13/2010
18528	1:15,000	11	07/01/2008	---	15/10	04/13/2010
18531	1:40,000	22	09/01/2005	---	15/10	04/13/2010
US5OR15M	---	31	---	03/31/2010	15/10	04/13/2010
US5OR16M	---	9	---	01/26/2010	15/10	04/13/2010
US5OR17M	---	8	---	03/16/2010	15/10	04/13/2010
US5OR19M	---	17	---	03/24/2010	11/10	03/16/2010

Table 11. H11859 DtoN Charting Status

DtoN	Feature	Applied to Raster Chart	Applied to ENC	PHB Submitted to MCD
DtoN 1.1	Obstruction	Yes	Yes	Yes
DtoN 1.2	Obstruction	Yes	Yes	Yes
DtoN 2.0	Wreck	Yes	Yes	Yes
DtoN 3.0	Wreck	Yes	Yes	Yes
DtoN 4.0	Obstruction	Yes	Yes	Yes
DtoN 5.0	Obstruction	Yes	Yes	Yes
DtoN 6.0	Wreck	Yes	Yes	Yes
DtoN 7.1	Obstruction	Yes	Yes	Yes
DtoN 7.2	Obstruction	Yes	Yes	Yes
DtoN 8.1	Obstruction	Yes	Yes	Yes
DtoN 8.2	Obstruction	Yes	Yes	Yes
DtoN 9.0	Obstruction	Yes	Yes	Yes
DtoN 10.1 ⁶²	Obstruction	No	No	Yes
DtoN 10.2 ⁶³	Obstruction	No	No	Yes

DtoN	Feature	Applied to Raster Chart	Applied to ENC	PHB Submitted to MCD
DtoN 10.3	Obstruction	Yes	Yes	Yes
DtoN 10.4	Obstruction	Yes	Yes	Yes
DtoN 10.5 ⁶⁴	Obstruction	No	No	Yes
DtoN 10.6 ⁶⁵	Obstruction	No	No	Yes
DtoN 10.7	Obstruction	Yes	Yes	Yes
DtoN 10.8	Obstruction	Yes	Yes	Yes
DtoN 10.9 ⁶⁶	Obstruction	No	No	Yes
DtoN 10.10 ⁶⁷	Obstruction	No	No	Yes
DtoN 11.1 ⁶⁸	Obstruction	No	No	Yes
DtoN 11.2	Obstruction	Yes	No	Yes
DtoN 11.3	Obstruction	Yes	No	Yes
DtoN 11.4	Obstruction	Yes	No	Yes
DtoN 11.5	Obstruction	Yes	No	Yes
DtoN 11.6 ⁶⁹	Obstruction	No	No	Yes
DtoN 11.7 ⁷⁰	Obstruction	No	No	Yes
DtoN 11.8 ⁷¹	Obstruction	No	No	Yes
DtoN 12.1 ⁷²	Obstruction	No	No	Yes
DtoN 12.2 ⁷³	Obstruction	No	No	Yes
DtoN 12.3	Obstruction	Yes	No	Yes
DtoN 12.4 ⁷⁴	Obstruction	No	No	Yes
DtoN 12.5	Obstruction	Yes	No	Yes
DtoN 12.6	Obstruction	Yes	No	Yes
DtoN 12.7 ⁷⁵	Obstruction	No	No	Yes
DtoN 12.8	Obstruction	Yes	No	Yes
DtoN 12.9 ⁷⁶	Obstruction	No	No	Yes
DtoN 12.10	Obstruction	Yes	No	Yes
DtoN 12.11	Obstruction	Yes	No	Yes
DtoN 12.12	Obstruction	Yes	No	Yes
DtoN 12.13 ⁷⁷	Obstruction	No	No	Yes
DtoN 12.14	Obstruction	Yes	No	Yes
DtoN 12.15	Obstruction	No (18526) Yes (18527)	No	Yes
PHB DtoN 1.1	Pile	Yes	Yes	Yes
PHB DtoN 1.2	Obstruction	Yes	Yes	Yes
PHB DtoN 1.3	Obstruction	Yes	Yes	Yes
PHB DtoN 1.4	Obstruction	Yes	Yes	Yes
PHB DtoN 1.5	Pile	Yes	Yes	Yes

DEA has reviewed the five Dangers to Navigation that PHB located and feels that two of these items do not warrant charting.

Upon further review and based on several aerial images in both Google Maps© and Bing Maps©, PHB DtoN #1.1 was determined to be a buoy chain that extends from a work platform. Figure 20 shows this feature currently charted as a pile and also includes an oblique perspective of this work platform from Bing Maps© Bird's Eye View. The hydrographer recommends removing this feature from the charts.⁷⁸



Figure 20. PHB DtoN #1.1 Disproved

The feature identified as PHB DtoN #1.2 was originally identified and disproved by multibeam investigation during survey operations (Figure 21). Disproval of this item, which was possibly transient and knocked down by currents, was unclear in the original submission and has been remedied in the revised submission.⁷⁹

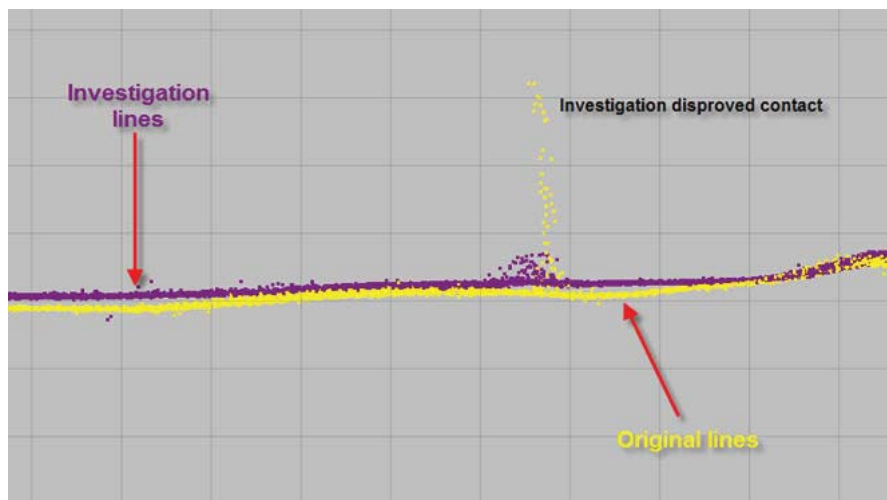


Figure 21. PHB DtoN #1.2 Disproved

PHB Danger to Navigation 1.3 superseded DtoN 7.2. Rejected data over the feature portrayed in DtoN 7.2 were reaccepted during review at the processing branch which resulted in a shoaler least depth on the feature and issuance of a new danger report. Least depths from both danger reports are currently shown on the charts. The hydrographer recommends removing the 26-foot obstruction charted at 45-33-33.90N, 122-42-57.09W, which portrays the original least depth from DtoN 7.2.⁸⁰

Additionally, Dangers to Navigation 12.13 and 12.15 are incorrectly charted on 18526. Blue obstruction circles have been added to the chart without any least depth information (Figure 22). DtoN 12.15 which also falls within the extents of chart 18527 is depicted correctly on the large scale chart of this area.⁸¹

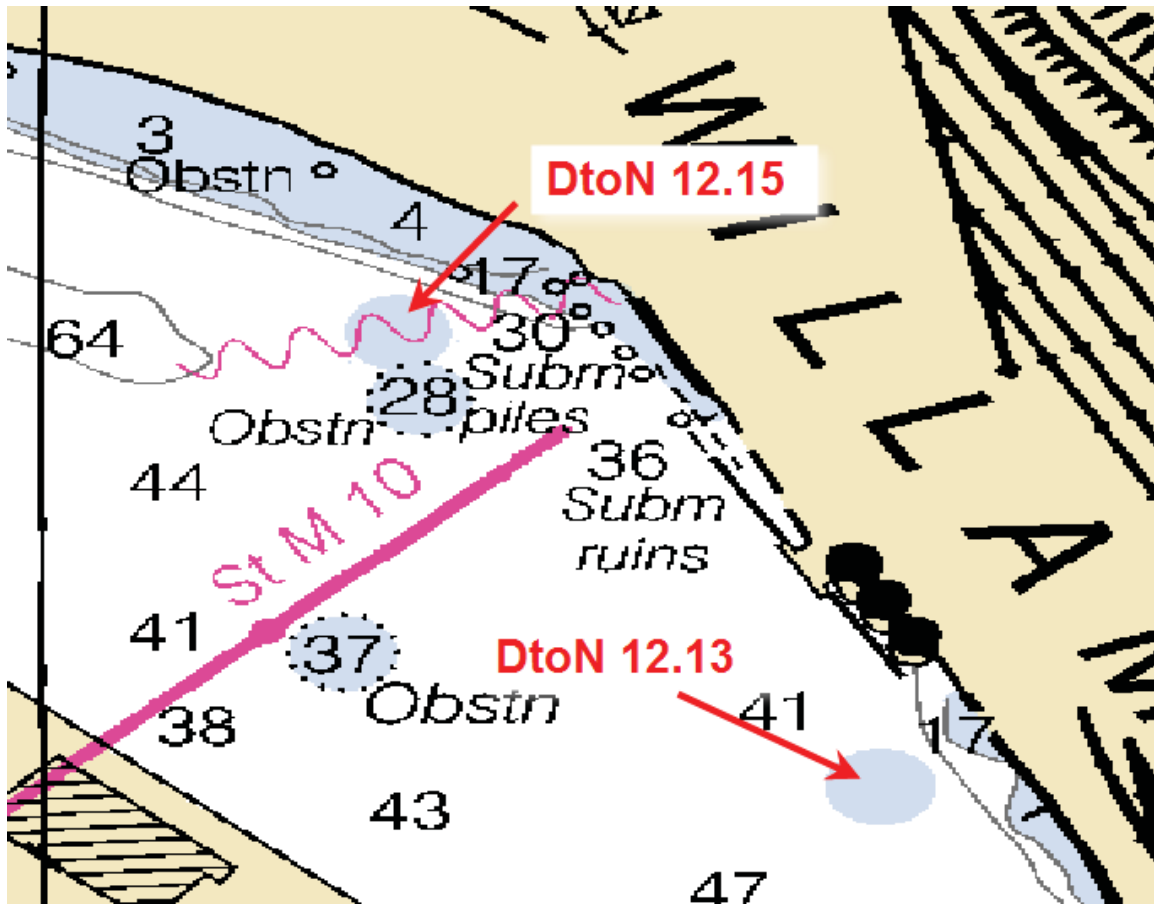


Figure 22. Incorrect Depiction of DtoN 12.13 and 12.15 on Chart 18526

Finally, DEA's Dangers to Navigation report #13 was submitted to PHB on January 28, 2010 but it is unclear whether this report was forwarded to MCD for charting. DtoN 13 has been included in Appendix I *Danger to Navigation Report* and these features are also included in the S-57 feature file and should be charted as depicted in the file.⁸²

D.2 Additional Results

D2.a Shoreline Investigations

Shoreline in the Portland and Vancouver Harbors is complex and numerous changes have taken place. Shoreline is being updated in the area by recent work by NGS but application to the chart has led to duplicate depiction of features and cluttered the current chart. Although shoreline verification was not required for survey H11859; many observations were noted and two new features were located. The hydrographer recommends updating the shoreline with the latest photogrammetry and shoreline verification be conducted in the Portland and Vancouver Harbors.⁸³

- A new, private, floating pier was located between CRM 106-108, up river of Interstate-5 Bridge at 45-36-49N, 122-40-30W. The feature is visible in NGS supplied photogrammetry.⁸⁴
- A new marine conveyor was located between WRM 12-15, up river of the Marquam Fixed Bridge at 45-30-23.43N, 122-39-56.91W. This feature is not visible in NGS supplied photogrammetry, but is visible in Google Maps©.⁸⁵

D2.b Comparison with Prior Surveys

Comparison with prior surveys was not required under this task order.

D2.c Aids to Navigation (AtoN)

All U.S. Coast Guard aid to navigation (AtoN) within the survey limits were found to be correctly charted and serving their intended purpose⁸⁶ with the following exception:

WRM 12-15

Private aids, shown on RNC 18526 only, in the vicinity of 45-30-40N, 122-40-17W are incorrectly charted. The aids are located on the River Place Marina breakwater and are not, as charted, in the Willamette River (Figure 23). The Hydrographer recommends updating the position of these private aids on both the raster and electronic versions of all applicable charts.⁸⁷

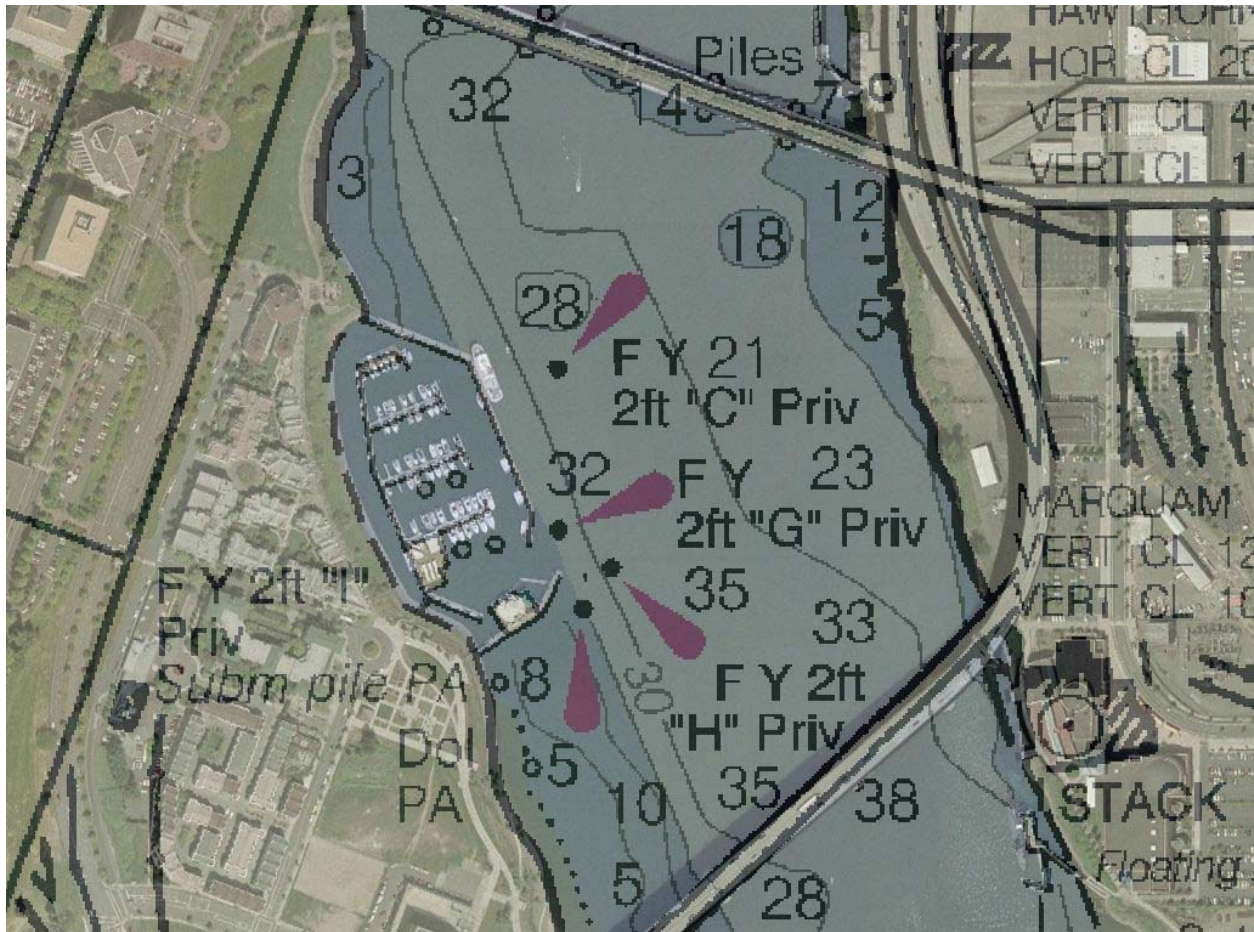


Figure 23. Chart 18526 Overlaid on Google Maps© of River Place Marina; Private Aids on Breakwater

D2.d Overhead Clearance

Multnomah Channel

The old Sauvie Island Fixed Bridge was removed and a new bridge was installed. The hydrographer recommends obtaining new clearance information.⁸⁸

There are no overhead power cables that cross Multnomah Channel in H11859 survey area.

Columbia River

There are three overhead power cables that spans across the Columbia River; from North Portland Harbor to Hayden Island, Hayden Island across the Vancouver Upper Channel, and across the Columbia River east of Interstate-5 Bridge on the southern side of Hayden Island.

Interstate 5 Bridge spans the Columbia River and the North Portland Harbor in H11859 survey area.⁸⁹

Willamette River

There is one overhead power cable that spans the Willamette River in H11859 survey area.

There are a total of nine, fixed or lift bridges that span the width of Willamette River.⁹⁰

D2.e Cables, Pipelines and Offshore Structures

Numerous pipelines and cables were located in the H11859 survey area and are listed in tabular format in Appendix II *Survey Feature Report*.⁹¹

Multnomah Channel

The charted pipeline in Multnomah Channel was not observed in the multibeam.⁹²

Columbia River

CRM 101-102

Two small features oriented perpendicular to the shoreline (Figure 24) were observed in the multibeam data east of Kelly Point. It is possible that these are uncharted old dredge pipe sections for upland disposal; these features are included in the S-57 feature file as obstructions.⁹³

2D Subset View

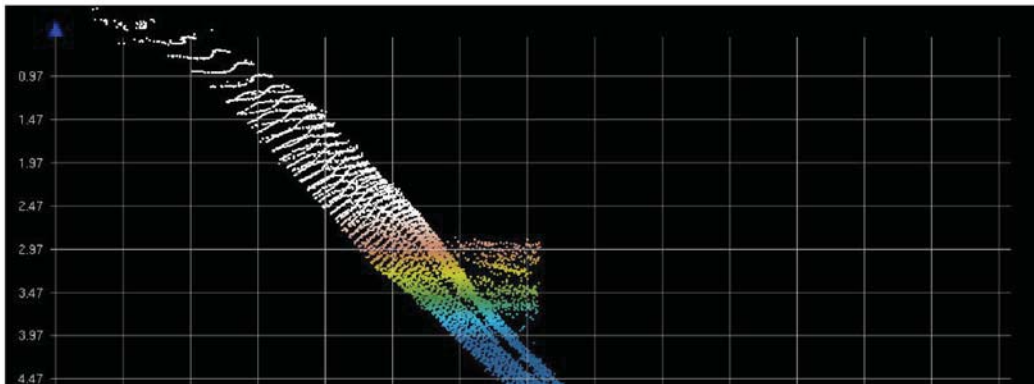


Figure 24. Possible Old Dredge Pipeline Near Kelly Point

CRM 102-104

The charted Sewer PA (Figure 25) was located at 45-38-48.4N, 122-44-18.9W. The hydrographer recommends removing the PA annotation and charting as depicted in the S-57 feature file.⁹⁴

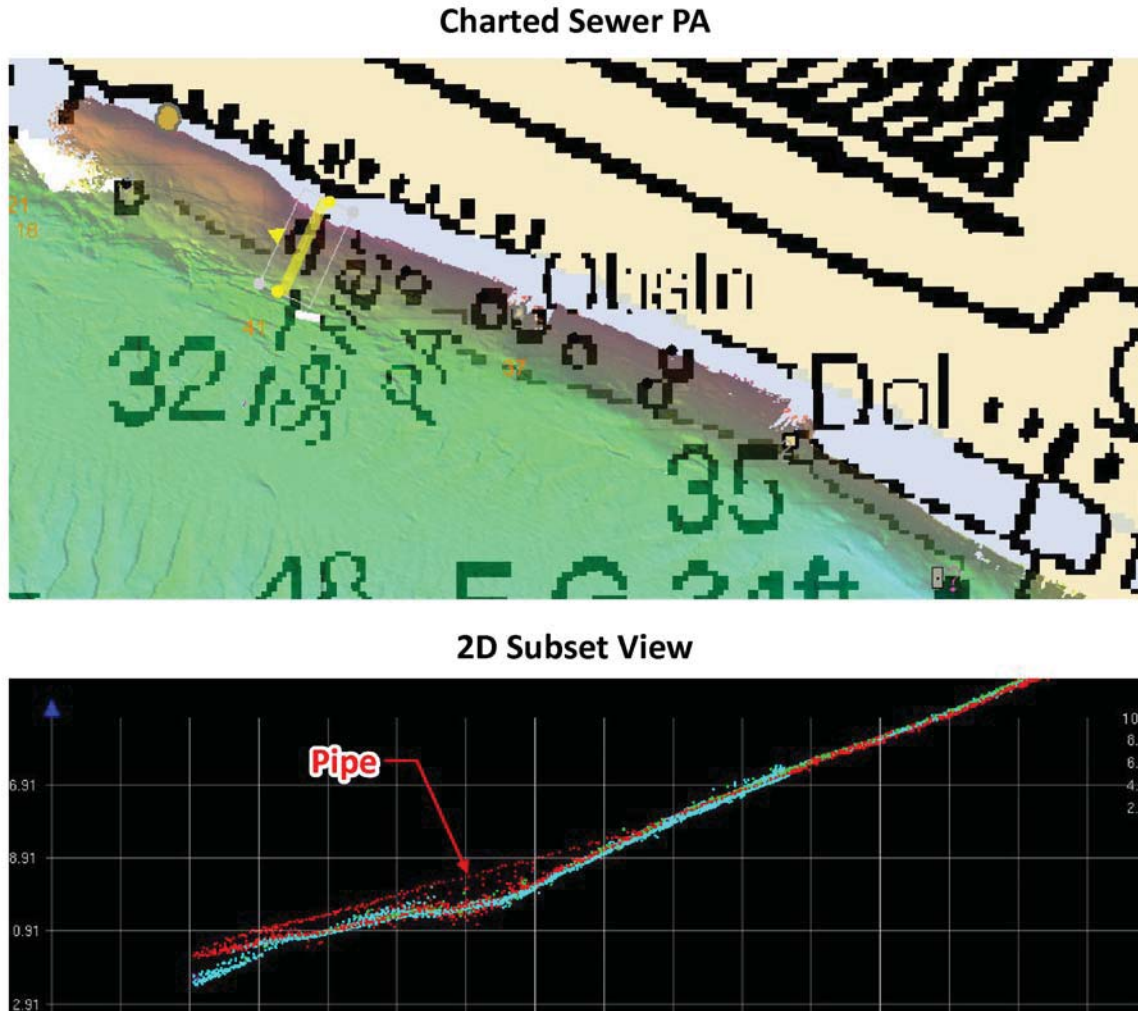


Figure 25. Sewer PA on NOAA Chart 18526

CRM 104-106

The charted sewer pipelines at 45-37-28.36N, 122-41-37.40W and 45-37-25.26N, 122-41-42.54W are properly charted.⁹⁵

CRM 106-108

Pipeline at 45-36-38.38N, 122-41-23.90W was not observed in the multibeam data. Since the pipeline is likely buried, the hydrographer recommends retaining as charted.⁹⁶

A new pipeline was located in the vicinity of a charted pier at 45-37-25.29N, 122-40-55.62W and has been included in the S-57 feature file.⁹⁷

Willamette River

There are numerous charted Cable Areas in the Willamette River. H11859 located most of these features.⁹⁸

WRM 6-8

The charted sewer at 45-34-45.77N, 122-45-21.57W was verified.⁹⁹

The pipelines, shown on ENC USOR15M only, at 45-34-13.913N, 122-44-28.615W, and 45-34-22.66N 122-44-42.67W were verified. An uncharted pipeline was located nearby at 45-34-18.62N, 122-44-33.51W. The shape of this pipeline is identical to the structure of the charted pipeline (Figure 26). The hydrographer recommends charting the pipeline as depicted in the S-57 feature file.¹⁰⁰

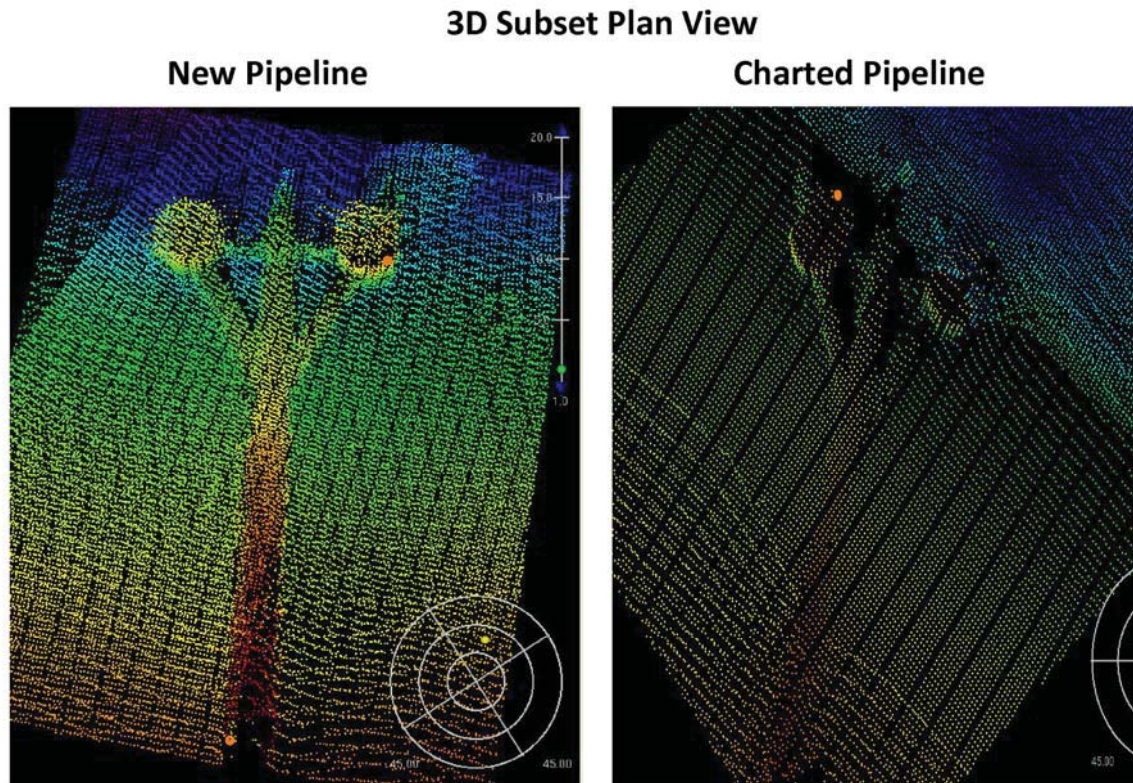


Figure 26. Pipeline Structures

WRM 15-17

The pipeline area at 45-28-11.61N, 122-40-00.21W was verified.¹⁰¹

D2.f Environmental Conditions Impacting the Quality of the Survey

Although the survey exceeds IHO Order 1 accuracy requirements, environmental conditions degraded the quality of the survey data. Due to the dynamic nature of the Columbia River with its heavy sediment transport, sand wave migration (up to one meter of downstream migration per day), has altered the river bottom over time, creating an offset between fill and main scheme data.

The difference in offset varies over the survey, depending upon the local sand wave formation and the time between fill and main scheme data collection. Figure 27 shows an example of downstream sand wave migration impacting agreement between main scheme and fill data.

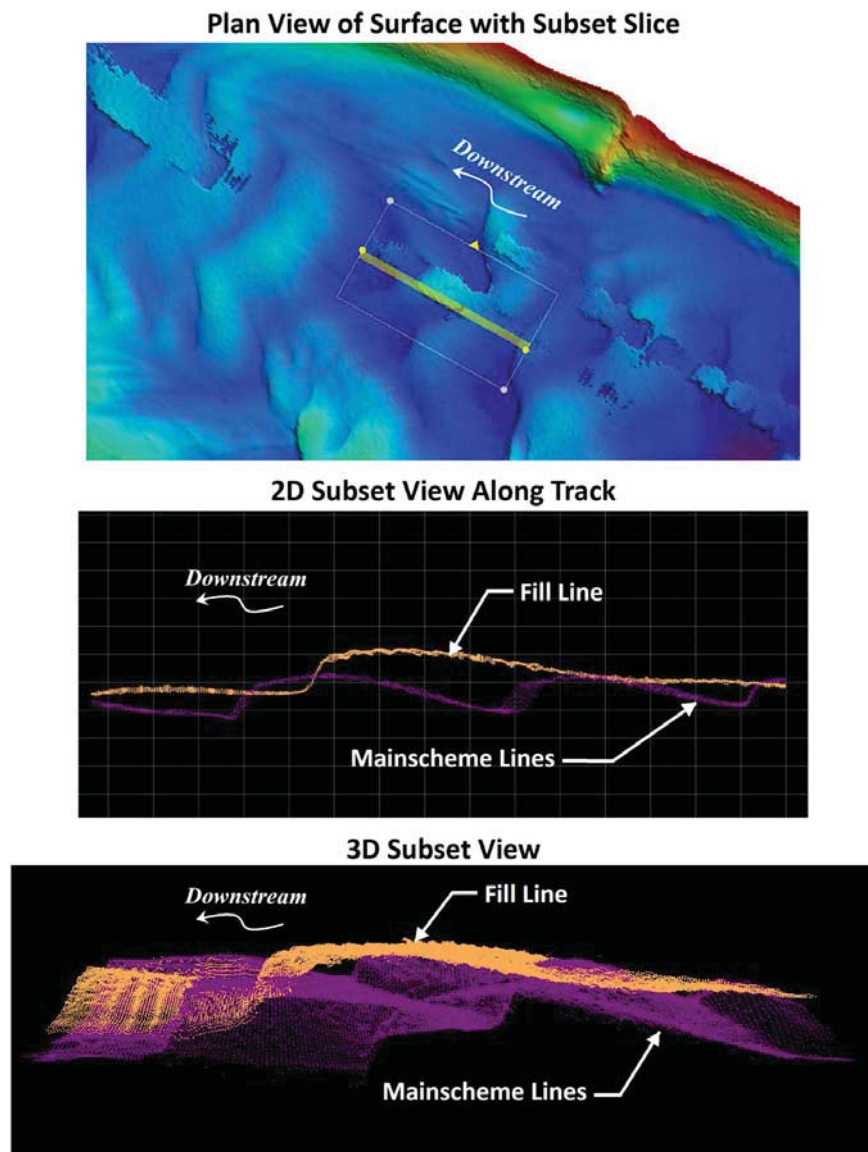


Figure 27. Sand Wave Migration

D2.g Construction Projects

No active construction projects were observed in H11859 survey area.

D2.h Bottom Characteristics

Thirty-one (31) bottom samples were obtained on September 27-28, 2008 (Day Numbers 271 and 272) and are included in the S-57 attributed feature file in the *Supporting Data* folder.¹⁰³ A table listing the position and description of each bottom sample is included in Appendix V *Supplemental Survey Records and Correspondence*, along with photographs of each sample.

E. LETTER OF APPROVAL

The letter of approval for this report and accompanying data follows on the next page.



DAVID EVANS
AND ASSOCIATES INC.

LETTER OF APPROVAL

OPR-N338-KR-08
REGISTRY NO. H11859

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of survey H11859 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and associated data have been closely reviewed and are considered complete and adequate as per the *OPR-N338-KR-08 Statement of Work*, dated April 1, 2008.

Digitally signed by Jon Dasler
DN: cn=Jon Dasler,
email=jld@deainc.com, o=David
Evans and Associates, Inc., c=US
Date: 2010.05.05 13:52:05 -07'00'

Jonathan L. Dasler, PE (OR), PLS (OR, CA)
ACSM/THSOA Certified Hydrographer
Chief of Party

Digitally signed by Jason Creech
DN: cn=Jason Creech,
email=jasc@deainc.com,
o=David Evans and Associates,
Inc., c=US
Date: 2010.05.05 13:52:45 -07'00'

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc.
May 2009

F. SUPPLEMENTAL REPORTS

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

<u>Title</u>	<u>Submittal Date</u>
OPR-N338-KR-08 Data Acquisition and Processing Report	June 17, 2009
OPR-N338-KR-08 Horizontal and Vertical Control Report	July 24, 2009

Revisions and Corrections Compiled During Office Processing and Certification

- ¹ Concur.
- ² Concur. These data are adequate to supersede charted data in the common area.
- ³ A common junction was made with H11858, which has already been compiled.
- ⁴ Concur. Compiler recommends a note be added to the charts stating that mariners use caution when navigating outside the maintained channels.
- ⁵ Despite the artifacts from the bottom tracking algorithm, the data meets specification.
- ⁶ Concur.
- ⁷ Concur with clarification. 50cm CUBE surfaces were submitted, however, due to the size of the survey area, handling and re-computing the surfaces proved time intensive. The SAR reviewer created 1m surfaces, which is in accordance with the latest version of the HSSDM. A 1m combined surface was used as the basis of compilation.
- ⁸ The holidays that were a result of anchored barges are preserved in the HCell coverage.
- ⁹ Concur with clarification. The baring features were rejected from the bathymetric data, but they are included in the field submitted feature file that was used to compile new and updated features to the HCell.
- ¹⁰ Concur.
- ¹¹ Concur. No singlebeam data was used during compilation.
- ¹² Concur.
- ¹³ Concur.
- ¹⁴ As noted in the SAR, this issue has been brought to the attention of MCD.
- ¹⁵ Concur.
- ¹⁶ Concur.
- ¹⁷ Concur. Update charted depths based on the HCell.
- ¹⁸ Concur. Update charted depths based on the HCell.
- ¹⁹ Concur. Update charted depths based on the HCell.
- ²⁰ All investigated AWOIS items are included in the HCell.
- ²¹ See attached Feature Report.
- ²² Concur with clarification.
- ²³ Concur with clarification. Shoreline verification should be conducted as resources allow.
- ²⁴ Concur. Chart updated ruins area as depicted in the HCell.
- ²⁵ Concur with clarification. Chart area as depicted in the HCell.
- ²⁶ Concur. The row of piles has been blue noted to be removed. Chart area as depicted in the HCell.
- ²⁷ Concur. The wreck has been blue noted to be removed. Chart area as depicted in the HCell.
- ²⁸ Concur. The wreck has been blue noted to be removed and the obstruction is included in the HCell.
- ²⁹ Do not concur. There is also a wreck area seaward of the obstruction area that contains the piles on the ENC. The compiler recommends that the area be retained as charted.
- ³⁰ Concur. The wreck is included in the HCell and the charted wreck PA has been blue noted to be removed.
- ³¹ Concur. The wreck is included in the HCell and the charted wreck PA has been blue noted to be removed.
- ³² Concur. The piles have been blue noted to be removed.

- ³³ Concur with clarification. Shoreline verification should be conducted as resources allow.
- ³⁴ Concur. The dolphins have been blue noted to be removed and the new snag is included in the HCell.
- ³⁵ Concur with clarification. The charted wreck has been imported into the HCell to be retained. The two new obstructions are not included in the HCell because they could not be accommodated at chart scale with the wreck and the charted dike ruins. The dike ruins have been blue noted to be retained because full coverage over the ruins was not obtained.
- ³⁶ Concur. The snags are included in the HCell.
- ³⁷ Concur. The ruined pile is included in the HCell.
- ³⁸ Concur. The ruined pile is included in the HCell.
- ³⁹ Concur. The pile has been blue noted to be removed.
- ⁴⁰ Concur. The row of dolphins has been blue noted to be removed.
- ⁴¹ Concur. The wreck area has been blue noted to be removed.
- ⁴² Concur. The pile is included in the HCell.
- ⁴³ Concur. The pile has been blue noted to be removed.
- ⁴⁴ Concur with clarification. The submerged pile was found at 45-31-11.634N, 122-40-01.969W and is included in the HCell.
- ⁴⁵ Concur with clarification. The pile symbols have been blue noted to be removed, however, the charted ruined piers have been blue noted to be retained.
- ⁴⁶ Concur. The submerged pile has been blue noted to be removed.
- ⁴⁷ Concur. Both the wreck and obstruction feature are included in the HCell.
- ⁴⁸ Concur with clarification. The submerged piles have been blue noted to be removed. Recommend possibly charting the new marine conveyor only after proper positioning and verification have been conducted and only if it can be appropriately displayed at chart scale.
- ⁴⁹ Concur. After review of the data, the compiler recommends removal of the charted obstruction PA. The charted obstruction PA has been blue noted to be removed in the HCell.
- ⁵⁰ The US Army Corps of Engineers Portland District has been contacted and have been made aware of the survey results. Given the fact that the Columbia River Channels are continually being dredged, it is recommended that the tabulated depths for each channel be updated with the latest survey information.
- ⁵¹ See attached Feature Report.
- ⁵² Concur. The obstruction area on the ENC is well outside the survey coverage and should be retained. The new wreck area is included in the HCell.
- ⁵³ Concur with clarification. This area is included in the HCell as foul ground with sounding depths and baring features.
- ⁵⁴ The snag with the least depth of those surveyed is included in the HCell.
- ⁵⁵ Both rectangular obstruction features are included in the HCell.
- ⁵⁶ The updated wreck area is included in the HCell and the charted wreck area has been blue noted to be removed.
- ⁵⁷ The dolphins covered by 100% multibeam were blue noted to be removed. The remainder of the features that were not addressed by this survey are either blue noted to be retained or included in the HCell to be retained. During compilation, the entire area was delineated as foul ground and shoal depths are represented by soundings. Chart area as depicted in the HCell.

- ⁵⁸ Concur with clarification. Two uncharted point wreck features are located in this area and are included in the HCell.
- ⁵⁹ The submerged pickup truck has been applied to the charts as an obstruction and is also included in the HCell.
- ⁶⁰ The wreck has been applied to the charts and only the wreck is included in the HCell because it was determined that both features can't be appropriately accommodated at chart scale.
- ⁶¹ See attached DTON Report.
- ⁶² DTON 10.1 is included in the HCell.
- ⁶³ DTON 10.2 is not included in the HCell because there was a shoaler nearby sounding selected.
- ⁶⁴ DTON 10.5 was not included in the HCell because it could not be accommodated at chart scale.
- ⁶⁵ DTON 10.6 is included in the HCell.
- ⁶⁶ DTON 10.9 is included in the HCell.
- ⁶⁷ DTON 10.10 is included in the HCell.
- ⁶⁸ DTON 11.1 was not included in the HCell because it could not be accommodated at chart scale.
- ⁶⁹ DTON 11.6 was not included in the HCell because it could not be accommodated at chart scale.
- ⁷⁰ DTON 11.7 is included in the HCell.
- ⁷¹ DTON 11.8 was not included in the HCell because it could not be accommodated at chart scale.
- ⁷² DTON 12.1 is included in the HCell.
- ⁷³ DTON 12.2 was not included in the HCell because it could not be accommodated at chart scale.
- ⁷⁴ DTON 12.4 is included in the HCell.
- ⁷⁵ DTON 12.7 was not included in the HCell because it could not be accommodated at chart scale.
- ⁷⁶ DTON 12.9 is included in the HCell.
- ⁷⁷ DTON 12.13 has been charted and is included in the HCell.
- ⁷⁸ The pile has been blue noted to be removed.
- ⁷⁹ The obstruction has been blue noted to be removed.
- ⁸⁰ PHB DTON 1.3 is included in the HCell.
- ⁸¹ The latest version of chart 18526 includes the depth within the obstruction symbol.
- ⁸² All DTONs from DTON Report #13 are included in the HCell with the exception of 13.18, which could not be accommodated at chart scale with the nearby shoaler obstruction that was selected.
- ⁸³ Concur.
- ⁸⁴ The private floating bridge is not included in the HCell because there were no geographic extents provided in the feature file. Recommend charting the floating bridge from the NGS imagery if it can be accommodated at chart scale.
- ⁸⁵ The marine conveyor is not included in the HCell because Google Maps is not an accepted tool for positioning new features. Recommend possibly charting the new marine conveyor only after proper positioning and verification have been conducted and only if it can be appropriately displayed at chart scale.
- ⁸⁶ Chart according to latest ATONIS information.
- ⁸⁷ Concur. The private ATONs in this vicinity are not included in the HCell because there was no basis for positioning them. All other private ATONs within the survey area are included in the HCell.

⁸⁸ Concur. The new span has not been updated on chart 18526 inset. The approximate location of the new span is included in the HCell as an area blue note (\$AREAS) and the location of the new pylons are included as blue notes.

⁸⁹ Concur with clarification. The Burlington Northern Railroad Swing Bridge also spans the Columbia River and North Portland Harbor. Pylons for the bridges are identified in the HCell with blue notes.

⁹⁰ Pylons for the bridges are identified in the HCell with blue notes. One bridge pylon for the Ross Island Bridge is evident in the survey data but not charted. The location is included in the HCell as a blue note. Some of the charted pylons for the Ross Island Bridge were found to be mis-aligned on ENC US5OR17M. The correct positions are included in the HCell as blue notes.

⁹¹ See attached Feature Report.

⁹² There are two pipeline areas in Multnomah Channel on Chart 18526 inset that have been blue noted to be retained.

⁹³ Chart obstructions as depicted in the HCell.

⁹⁴ Concur with clarification. The sewer has been blue noted to be retained at the charted position and the "PA" has been blue noted to be removed.

⁹⁵ Retain pipelines as charted.

⁹⁶ Concur.

⁹⁷ Chart new pipeline based on the linear blue notes (\$LINES) included in the HCell.

⁹⁸ Charted cable and pipeline areas have been blue noted to be retained.

⁹⁹ Retain pipeline as charted.

¹⁰⁰ Concur with clarification. Retain charted pipelines and chart new pipelines based on the linear blue notes (\$LINES) included in the HCell.

¹⁰¹ Retain pipeline as charted.

¹⁰² These data are adequate to supersede charted data in the common area despite the shifting nature of the sandwaves. Compiler recommends a note be added to the chart stating that mariners use caution when navigating outside the maintained channels.

¹⁰³ All 31 bottom samples are included in the HCell and all charted bottom samples have been imported into the HCell to be retained.

Appendix 1
Danger To Navigation Records

Danger To Navigation 1

Jason Creech

From: Jason Creech
Sent: Friday, December 12, 2008 1:49 PM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_1 Submission
Attachments: H11859_DTON_1.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_1. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

H11859 Danger to Navigation Report

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelley Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: [None]

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18526	58th	09/01/2006	1:20,000 (18526_1)	USCG LNM: 09/30/2008 (11/18/2008) NGA NTM: None (11/29/2008)
18531	22nd	09/01/2005	1:40,000 (18531_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	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
1.1	GP	11.55 m	45° 31' 44.5" N	122° 40' 14.5" W
1.2	GP	10.82 m	45° 31' 43.4" N	122° 40' 16.2" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11859_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 31' 44.5" N, 122° 40' 14.5" W
Least Depth: 11.55 m (= 37.89 ft = 6.316 fm = 6 fm 1.89 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-342.16:37:34.000 (12/07/2008)
GP Dataset: H11859_dtons.xls
GP No.: 1
Charts Affected: 18526_1, 18531_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Depths were acquired with Multibeam Sonar. Depths are corrected to Columbia River Datum using RTK GPS tides and should be considered preliminary. Positions are referenced from contractor installed real-time kinematic GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon. The two obstructions are large mounds which are remnants of old bridge footings. Both mounds rise approximately 9.5m (31.17ft) above the natural bottom and have approximate dimensions of 34m x 34m x 9.5m. This report was compiled by David Evans and Associated and reviewed by PHB.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

38ft (18526_1, 18531_1)

6 ¼fm (18003_1, 18007_1, 530_1)

11.6m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: SORDAT - 20081207

SORIND - US,US,nsurf,H11859

TECSOU - 3:found by multi-beam

VALSOU - 11.55 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

1.2) GP No. - 2 from H11859_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 31' 43.4" N, 122° 40' 16.2" W
Least Depth: 10.82 m (= 35.50 ft = 5.916 fm = 5 fm 5.50 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-342.16:37:34.000 (12/07/2008)
GP Dataset: H11859_dtons.xls
GP No.: 2
Charts Affected: 18526_1, 18531_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Depths were acquired with Multibeam Sonar. Depths are corrected to Columbia River Datum using RTK GPS tides and should be considered preliminary. Positions are referenced from contractor installed real-time kinematic GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon. The two obstructions are large mounds which are remnants of old bridge footings. Both mounds rise approximately 9.5m (31.17ft) above the natural bottom and have approximate dimensions of 34m x 34m x 9.5m. This report was compiled by David Evans and Associated and reviewed by PHB.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

35ft (18526_1, 18531_1)

5 $\frac{3}{4}$ fm (18003_1, 18007_1, 530_1)

10.8m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: SORDAT - 20081207

SORIND - US,US,nsurf,H11859

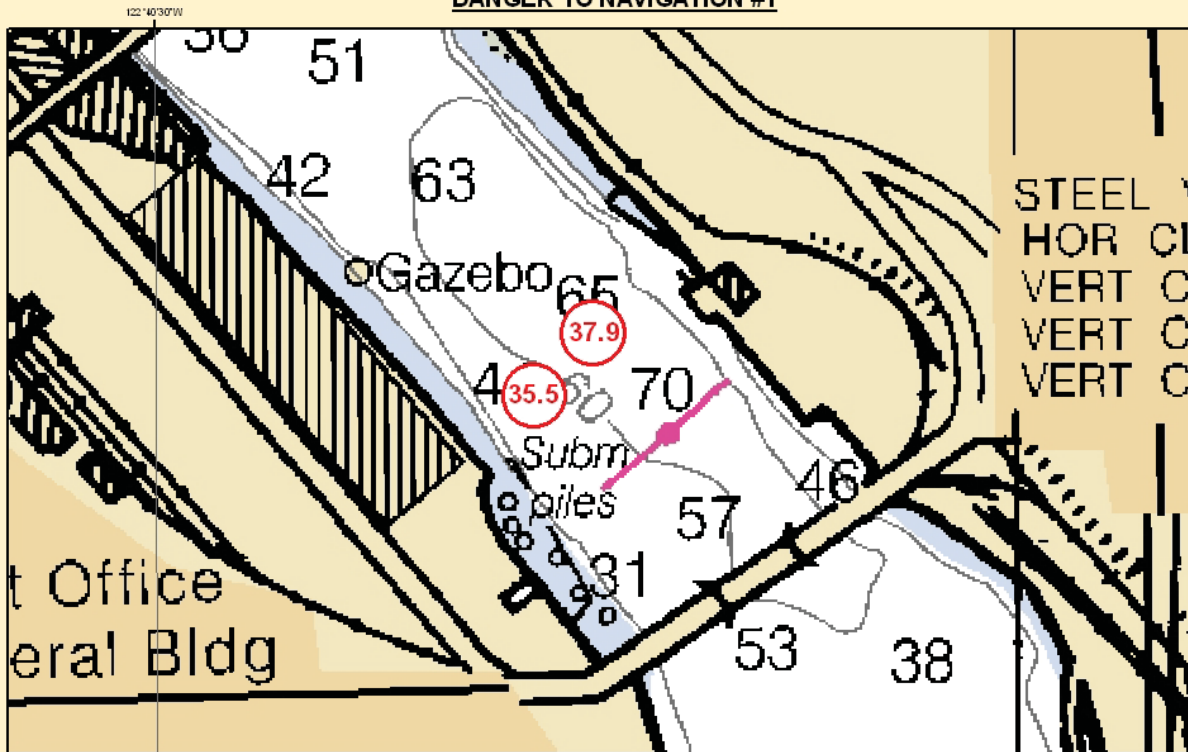
TECSOU - 3:found by multi-beam

VALSOU - 10.82 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #1



Large mounds in highly navigated waters. Approximate dimensions of 34m x 34m x 9.5m

This chartlet has been corrected through Notice to Mariners dated November 29, 2008 NOT FOR NAVIGATION.

Chartlet 1 of 1



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Columbia River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 58th
Chart Scale: 1:20,000

David Evans and
Associates, Inc.

December 9, 2008

Danger To Navigation 2

Jason Creech

From: Jason Creech
Sent: Wednesday, January 07, 2009 12:41 PM
To: gary.nelson@noaa.gov
Cc: Dave.Neander@noaa.gov; Crescent.Moegling@noaa.gov; Jon Dasler
Subject: H11859_DTON_2 Submission
Attachments: H11859_DTON_2.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_2. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

Danger to Navigation for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18528	10th	10/01/2002	1:15,000 (18528_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_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	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
1.1	Wreck	6.71 m	45° 30' 01.7" N	122° 39' 52.8" W
1.2	Wreck	7.92 m	45° 29' 51.5" N	122° 40' 01.1" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11859_2_3_dtons.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 45° 30' 01.7" N, 122° 39' 52.8" W
Least Depth: 6.71 m (= 22.00 ft = 3.667 fm = 3 fm 4.00 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-342.20:56:05.000 (12/07/2008)
GP Dataset: H11859_2_3_dtons.xls
GP No.: 1
Charts Affected: 18528_1, 18526_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

wreck vertical datum: Columbia River Datum

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_2_3_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart 26' wreck

Cartographically-Rounded Depth (Affected Charts):

22ft (18528_1, 18526_1)

3 ½fm (18003_1, 18007_1, 530_1)

6.7m (501_1, 50_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
 CONVIS - 2:not visual conspicuous
 QUASOU - 1:depth known
 SORDAT - 20081207

SORIND - US,US,survey,H11859

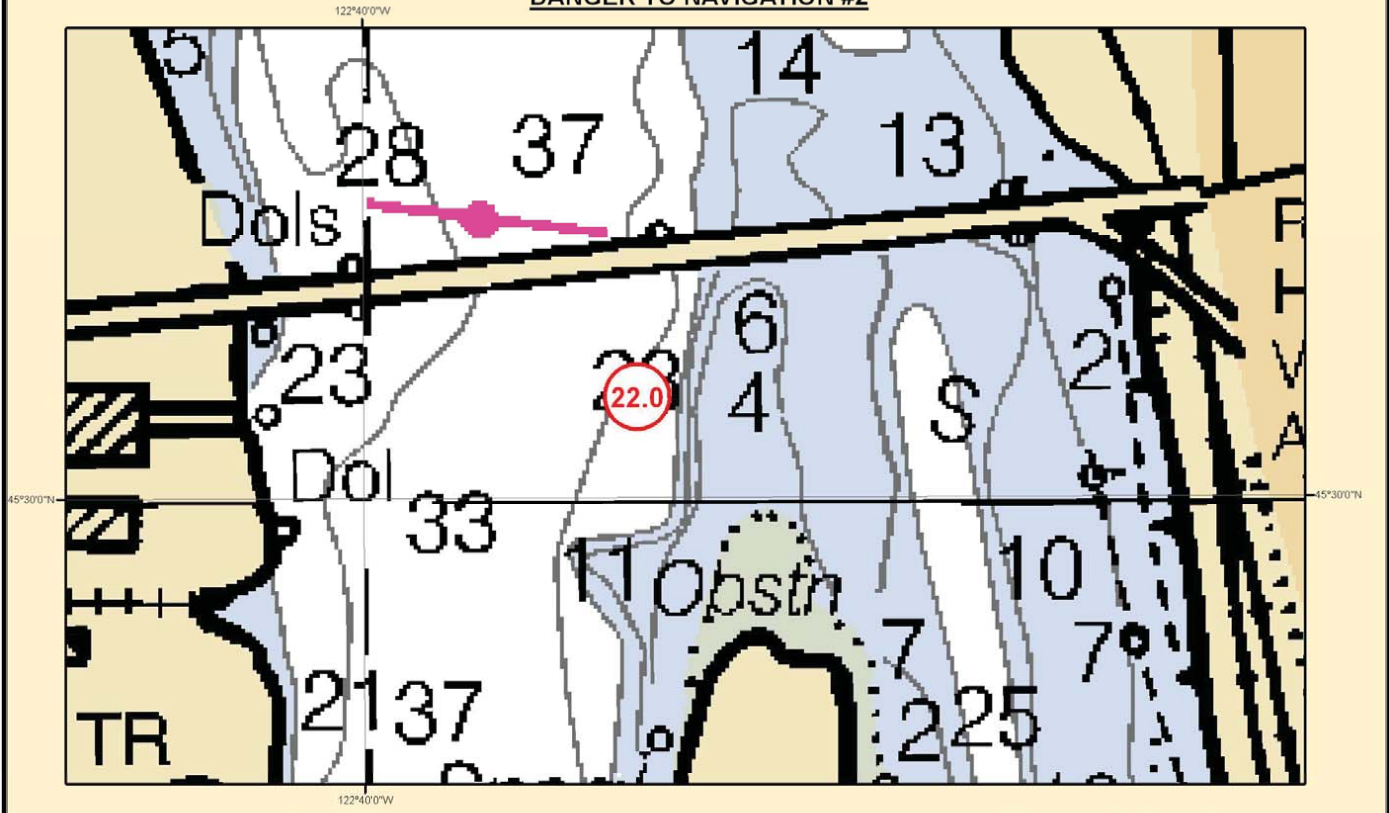
TECSOU - 3:found by multi-beam

VALSOU - 6.7056 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #2



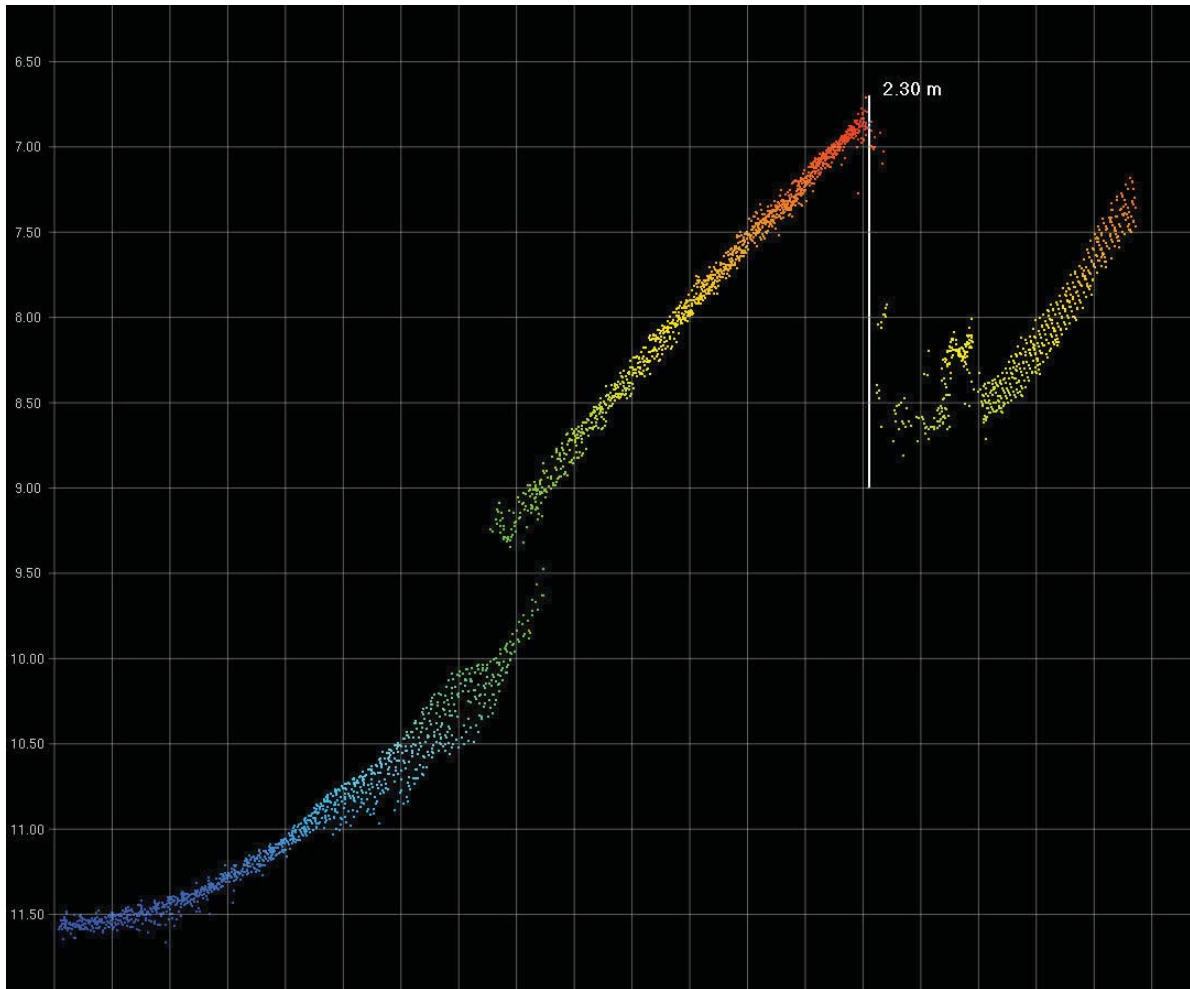
Barge. Approximate dimensions of 25m x 8m x 2.3m.

This chartlet has been corrected through
Notice to Mariners dated December 20, 2008
NOT FOR NAVIGATION.

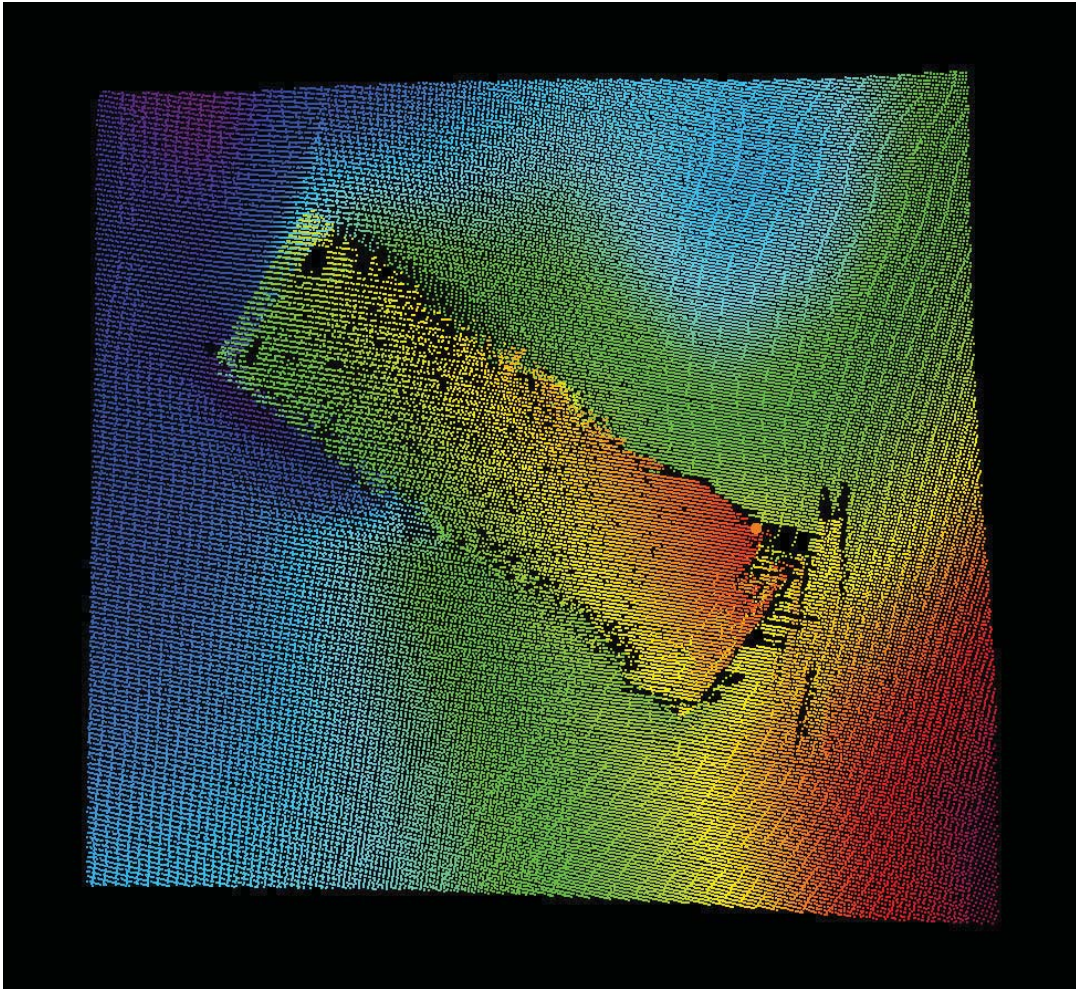
Chartlet 1 of 1

	<p>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE</p>	<p>Project: OPR-N388-KR-08 Survey: H11859 State: Oregon Locality: Columbia River Sub-Locality: Kelley Point to Sellwood Survey Scale: 1:10,000</p>	<p>Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18526_1 Chart Edition: 58th Chart Scale: 1:20,000</p>	<p>David Evans and Associates, Inc. January 6, 2009</p>
---	---	--	--	--

DTON 2 MBES 2D View



DTON 2 MBES 3D View



Danger To Navigation 3

Jason Creech

From: Jason Creech
Sent: Wednesday, January 07, 2009 1:08 PM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_3 Submission with Attachemnt
Attachments: H11859_DTON_3.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_3. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

Danger to Navigation for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18528	10th	10/01/2002	1:15,000 (18528_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_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	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
1.1	Wreck	6.71 m	45° 30' 01.7" N	122° 39' 52.8" W
1.2	Wreck	7.92 m	45° 29' 51.5" N	122° 40' 01.1" W

1 - Danger To Navigation

1.2) GP No. - 2 from H11859_2_3_dtons.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 45° 29' 51.5" N, 122° 40' 01.1" W
Least Depth: 7.92 m (= 26.00 ft = 4.333 fm = 4 fm 2.00 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-342.21:13:18.000 (12/07/2008)
GP Dataset: H11859_2_3_dtons.xls
GP No.: 2
Charts Affected: 18528_1, 18526_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

wreck, Vertical Datum: Columbia River Datum

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_2_3_dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart 26' Wreck

Cartographically-Rounded Depth (Affected Charts):

26ft (18528_1, 18526_1)
 4 ¼fm (18003_1, 18007_1, 530_1)
 7.9m (501_1, 50_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
 CONVIS - 2:not visual conspicuous
 QUASOU - 1:depth known
 SORDAT - 20081207

SORIND - US,US,survey,H11859

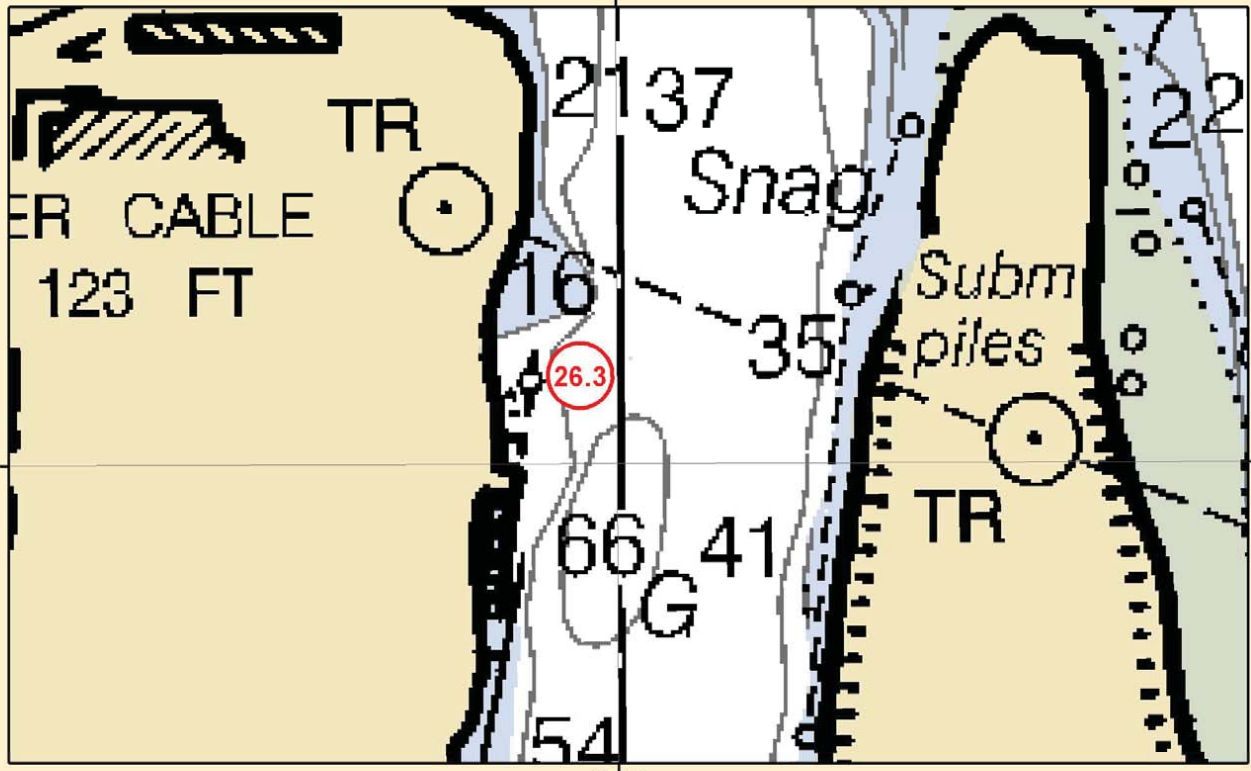
TECSOU - 3:found by multi-beam

VALSOU - 7.9248 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #3



Sailboat. Approximate dimensions of 22m x 20m x 3.6m

Chartlet 1 of 1

This chartlet has been corrected through Notice to Mariners dated December 20, 2008
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

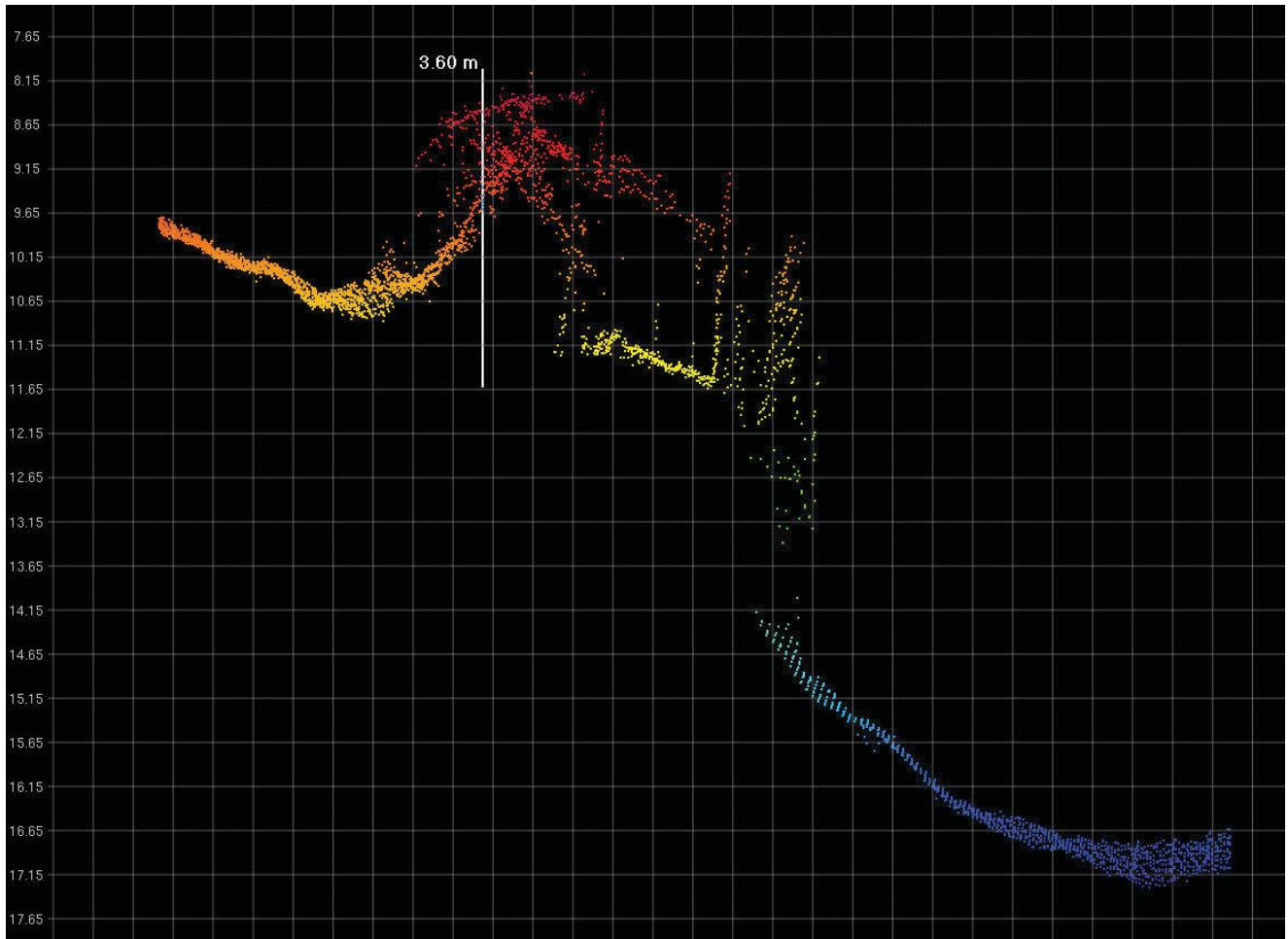
Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Columbia River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 58th
Chart Scale: 1:20,000

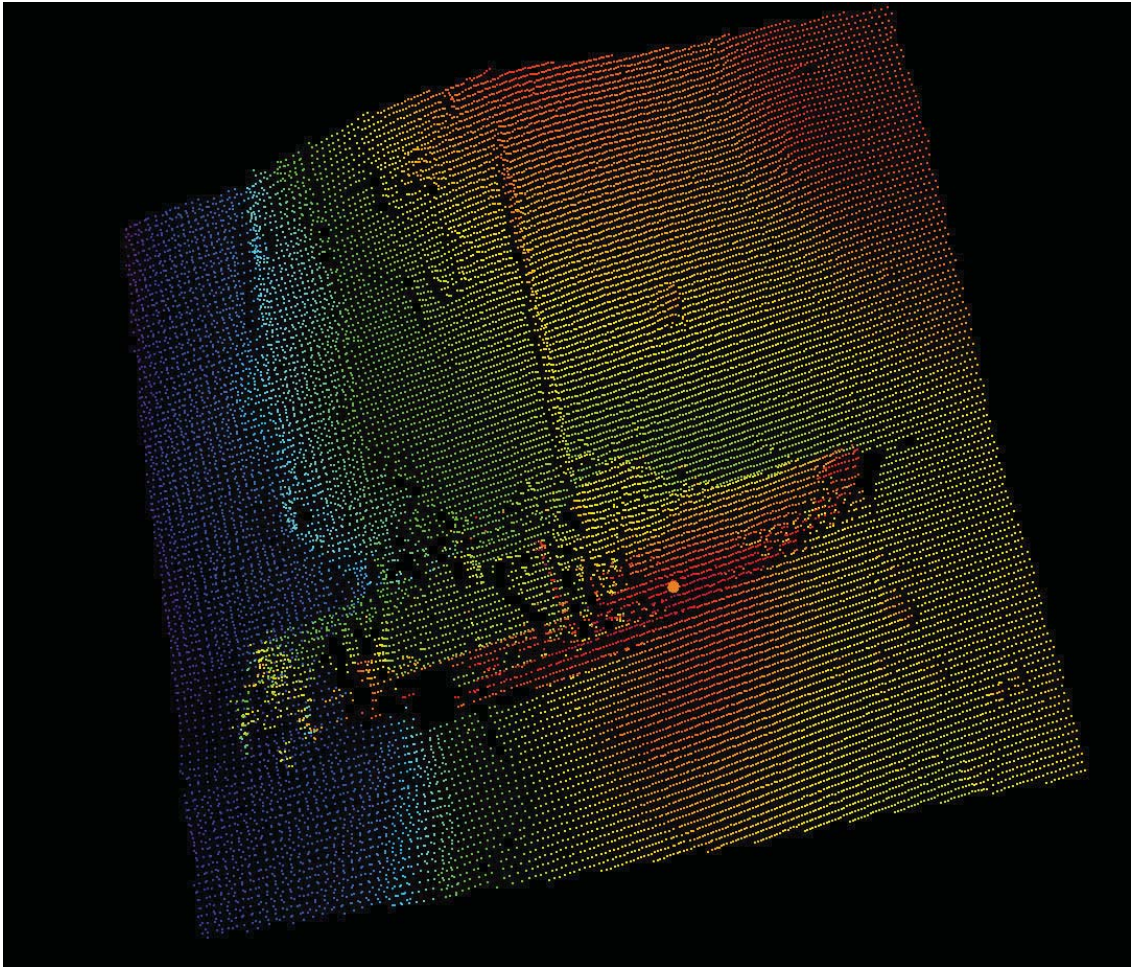
David Evans and
Associates, Inc.

January 6, 2009

DTON 3 MBES 2D View



DTON 3 MBES 3D View



Danger To Navigation 4

Jason Creech

From: Jason Creech
Sent: Friday, January 09, 2009 1:05 PM
To: gary.nelson@noaa.gov
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_4 Submission
Attachments: H11859_DTON_4.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_4. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

DTON Report for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18527	22nd	09/01/2005	1:5,000 (18527_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_1)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	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
1.1	Obstruction	7.43 m	45° 33' 25.5" N	122° 43' 05.3" W
1.2	Obstruction	4.06 m	45° 33' 26.9" N	122° 42' 38.9" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11859_4_5_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 25.5" N, 122° 43' 05.3" W
Least Depth: 7.43 m (= 24.38 ft = 4.063 fm = 4 fm 0.38 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-341.20:21:36.000 (12/06/2008)
GP Dataset: H11859_4_5_dtons.xls
GP No.: 1
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

obstruction Vertical Datum: Columbia River Datum

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_4_5_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart 24' obstruction

Cartographically-Rounded Depth (Affected Charts):

24ft (18527_1, 18526_1, 18525_1)

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

7.4m (501_1, 50_1)

S-57 Data

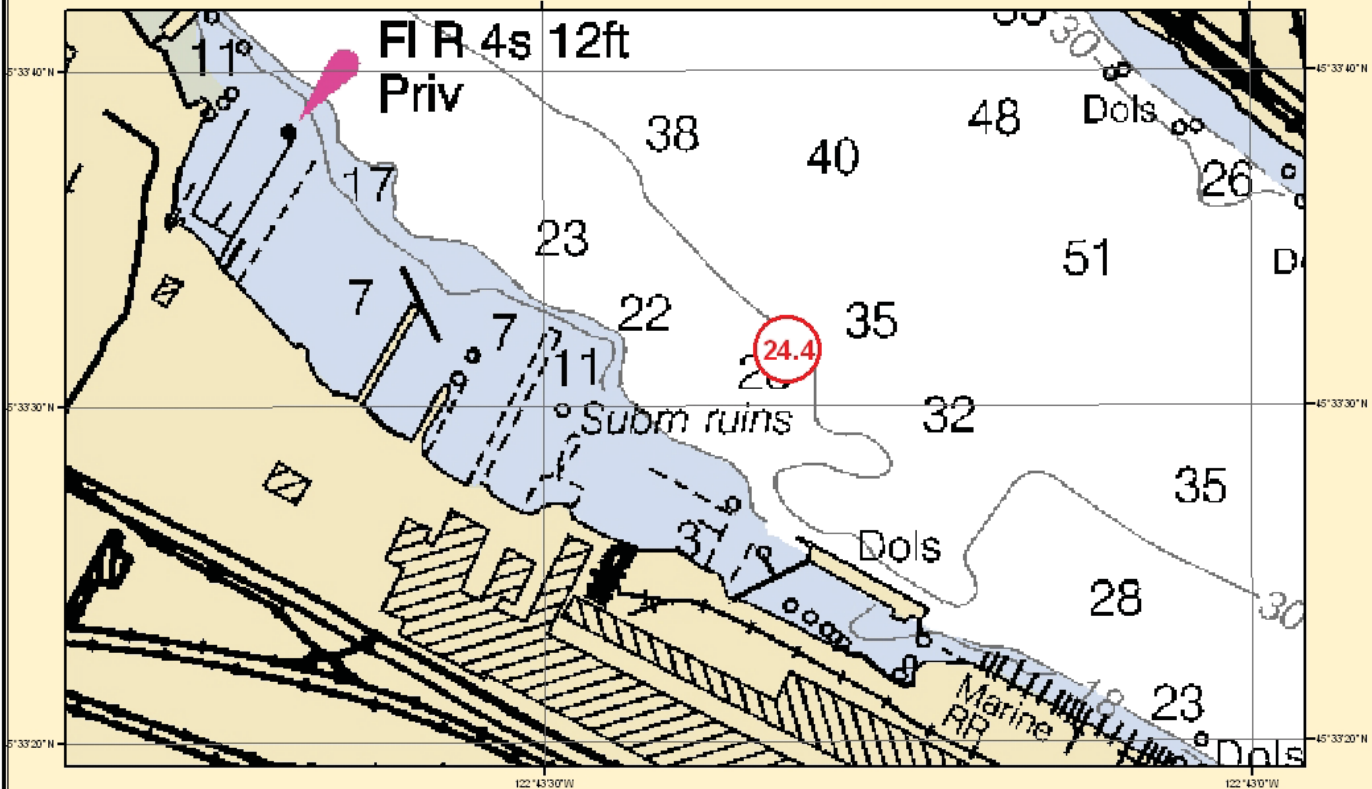
Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 1:depth known
 SORDAT - 20081206
 SORIND - US,US,survey,H11859
 TECSOU - 3:found by multi-beam

VALSOU - 7.43 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #4



Linear object. Approximate dimensions of 10m x 2m x 1m

This chartlet has been corrected through
Notice to Mariners dated December 20, 2008
NOT FOR NAVIGATION.

Chartlet 1 of 1



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

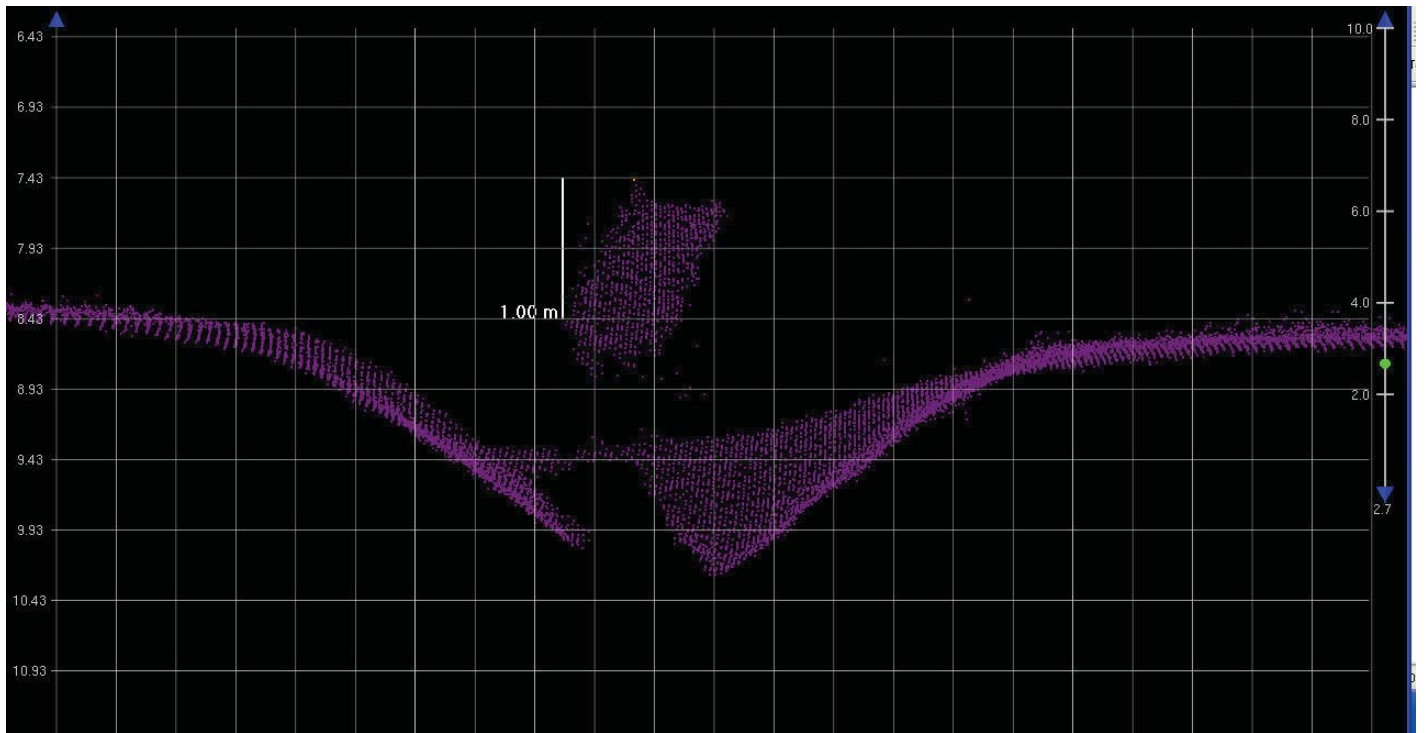
Project: OPR-N389-KR-08
Survey: H11859
State: Oregon
Locality: Columbia River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 58th
Chart Scale: 1:20,000

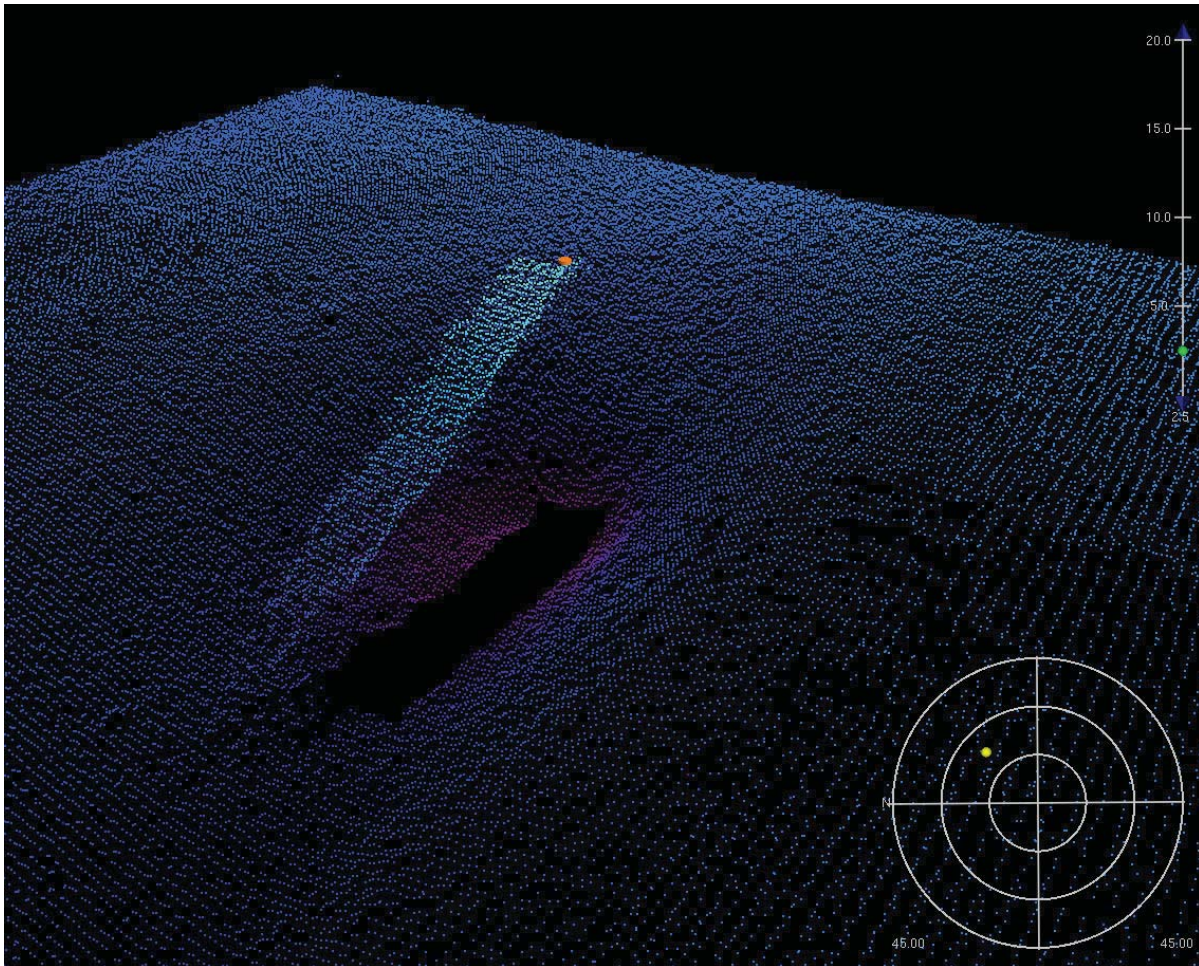
David Evans and
Associates, Inc.

January 9, 2009

DTON 4 MBES 2D View



DTON 4 MBES 3D View



Danger To Navigation 5

Jason Creech

From: Jason Creech
Sent: Friday, January 09, 2009 1:09 PM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_5 Submission
Attachments: H11859_DTON_5.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_5. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

DTON Report for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18527	22nd	09/01/2005	1:5,000 (18527_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_1)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	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
1.1	Obstruction	7.43 m	45° 33' 25.5" N	122° 43' 05.3" W
1.2	Obstruction	4.06 m	45° 33' 26.9" N	122° 42' 38.9" W

1 - Danger To Navigation

1.2) GP No. - 2 from H11859_4_5_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 26.9" N, 122° 42' 38.9" W
Least Depth: 4.06 m (= 13.32 ft = 2.220 fm = 2 fm 1.32 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-342.18:12:14.000 (12/07/2008)
GP Dataset: H11859_4_5_dtons.xls
GP No.: 2
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

obstruction Vertical Datum: Columbia River Datum

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_4_5_dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart 13' Obstruction

Cartographically-Rounded Depth (Affected Charts):

13ft (18527_1, 18526_1, 18525_1)

2 ¼fm (18003_1, 18007_1, 530_1)

4.1m (501_1, 50_1)

S-57 Data

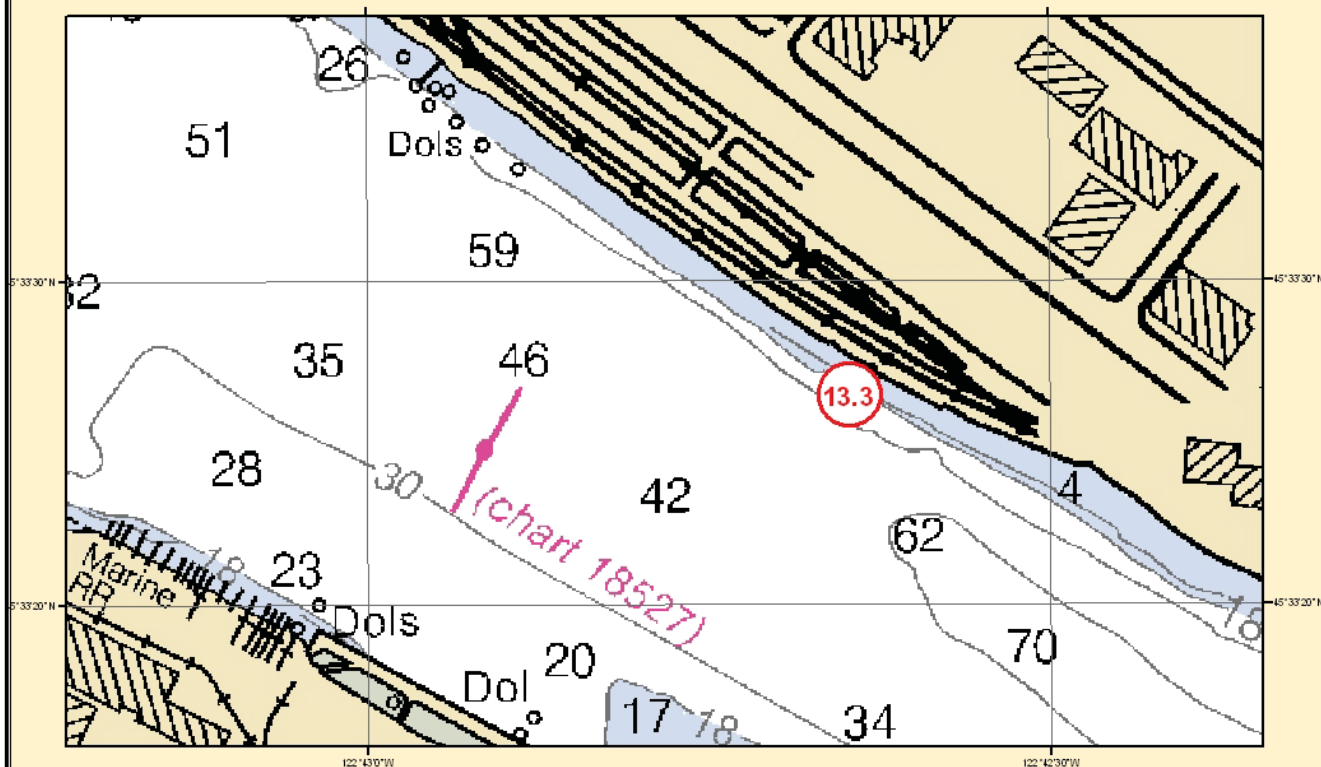
Geo object 1: Obstruction (OBSTRN)
Attributes: INFORM - Sunken Pickup Truck
 QUASOU - 1:depth known
 SORDAT - 20081207
 SORIND - US,US,survey,H11859

TECSOU - 3:found by multi-beam

VALSOU - 4.06 m

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #5



Debris. Approximate dimensions of 5.5m x 2m x 1m

This chartlet has been corrected through
Notice to Mariners dated December 20, 2008
NOT FOR NAVIGATION.

Chartlet 1 of 1



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

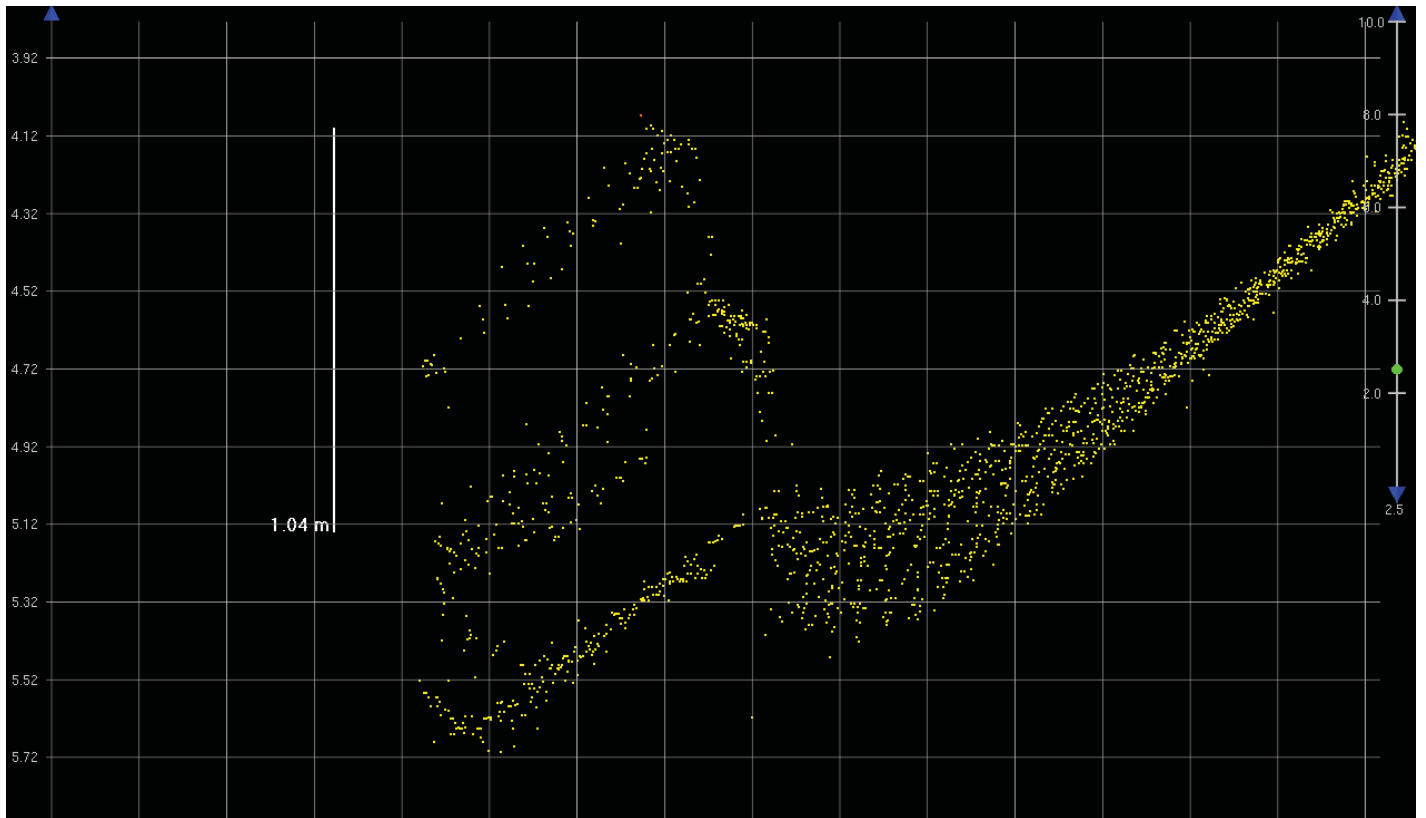
Project: OPR-N389-KR-08
Survey: H11859
State: Oregon
Locality: Columbia River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 58th
Chart Scale: 1:20,000

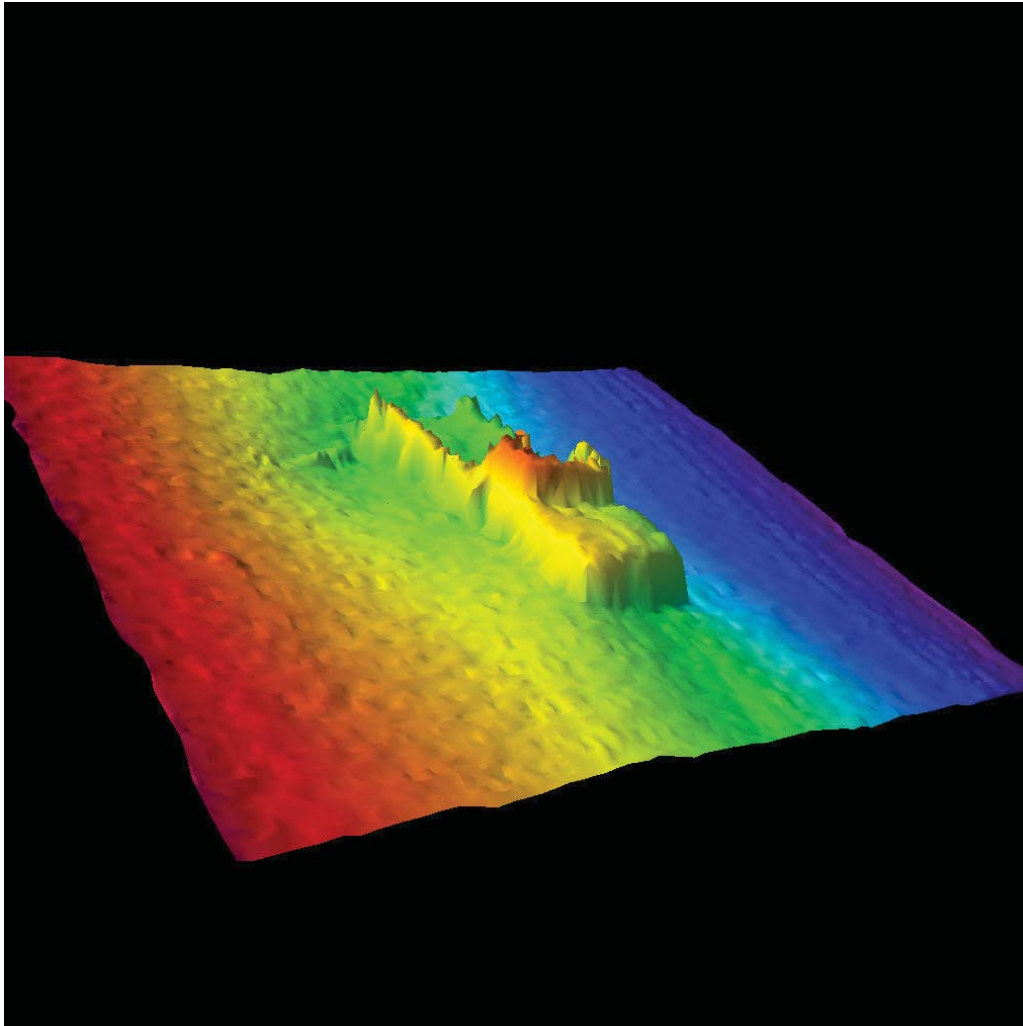
David Evans and
Associates, Inc.

January 9, 2009

DTON 5 MBES 2D View



DTON 5 MBES 3D View



Danger To Navigation 6

Jason Creech

From: Jason Creech
Sent: Friday, January 16, 2009 2:40 PM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_6 Submission
Attachments: H11859_DTON_6.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_6. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

DTON Report for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Dates: September 2008 - December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18526	58th	09/01/2006	1:20,000 (18526_1)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	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
1.1	Wreck	-0.11 m	45° 37' 43.5" N	122° 43' 55.9" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11859_6_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 37' 43.5" N, 122° 43' 55.9" W
Least Depth: -0.11 m (= -0.36 ft = -0.060 fm = 0 fm 5.64 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-253.21:17:36.000 (09/09/2008)
GP Dataset: H11859_6_dtons.xls
GP No.: 1
Charts Affected: 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

wreck Vertical Datum: Columbia River Datum The charted wreck's (18526)bow is awash and lies approximately 50m from the charted shoreline and rises 8.8 m off the bottom.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_6_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Move charted wreck to surveyed location and chart a wreck (awash)

Cartographically-Rounded Depth (Affected Charts):

-1ft (18526_1, 18525_1)

0fm (18003_1, 18007_1, 530_1)

-.1m (501_1, 50_1)

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: CATWRK - 2:dangerous wreck
 QUASOU - 1:depth known
 SORDAT - 20090909

SORIND - US,US,survey,H11859

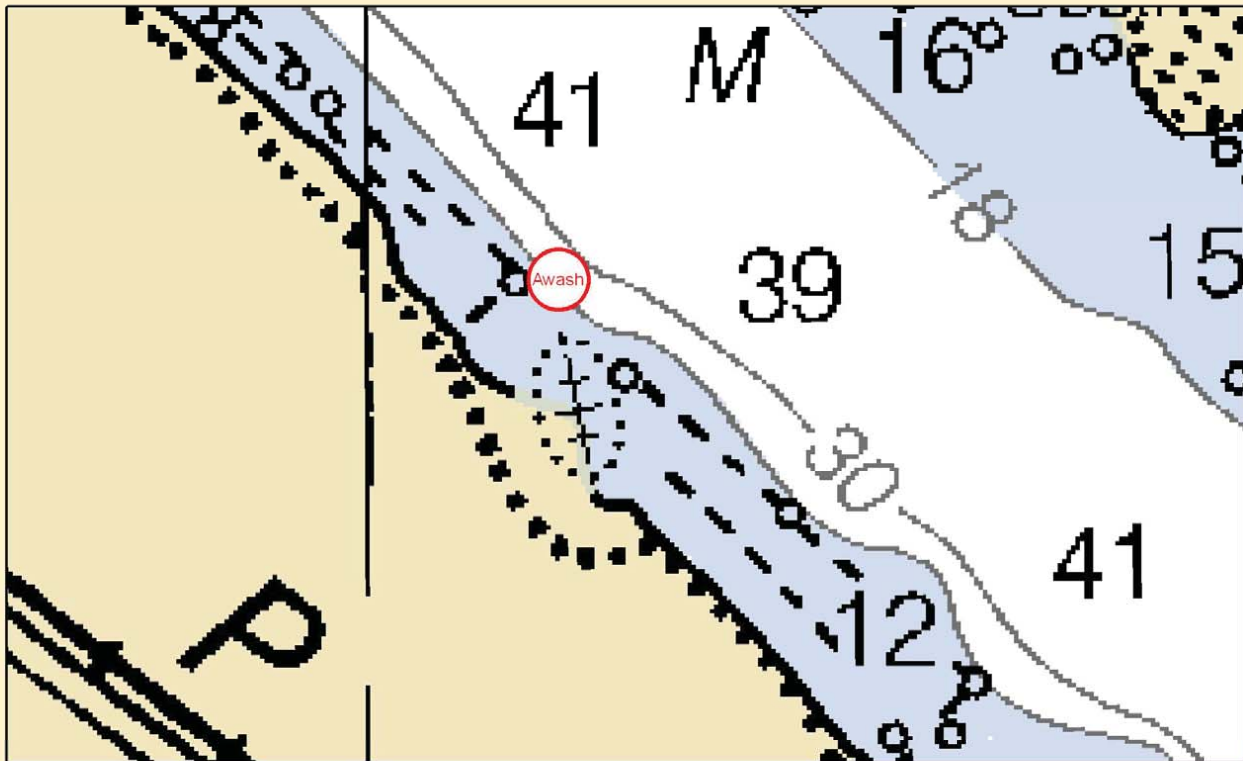
TECSOU - 3:found by multi-beam

VALSOU - -0.11 m

VERDAT - 24:Local datum

WATLEV - 5:awash

DANGER TO NAVIGATION #6



Wreck awash.

Chartlet 1 of 1

This chartlet has been corrected through
Notice to Mariners dated January 10, 2009
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
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NATIONAL OCEAN SERVICE

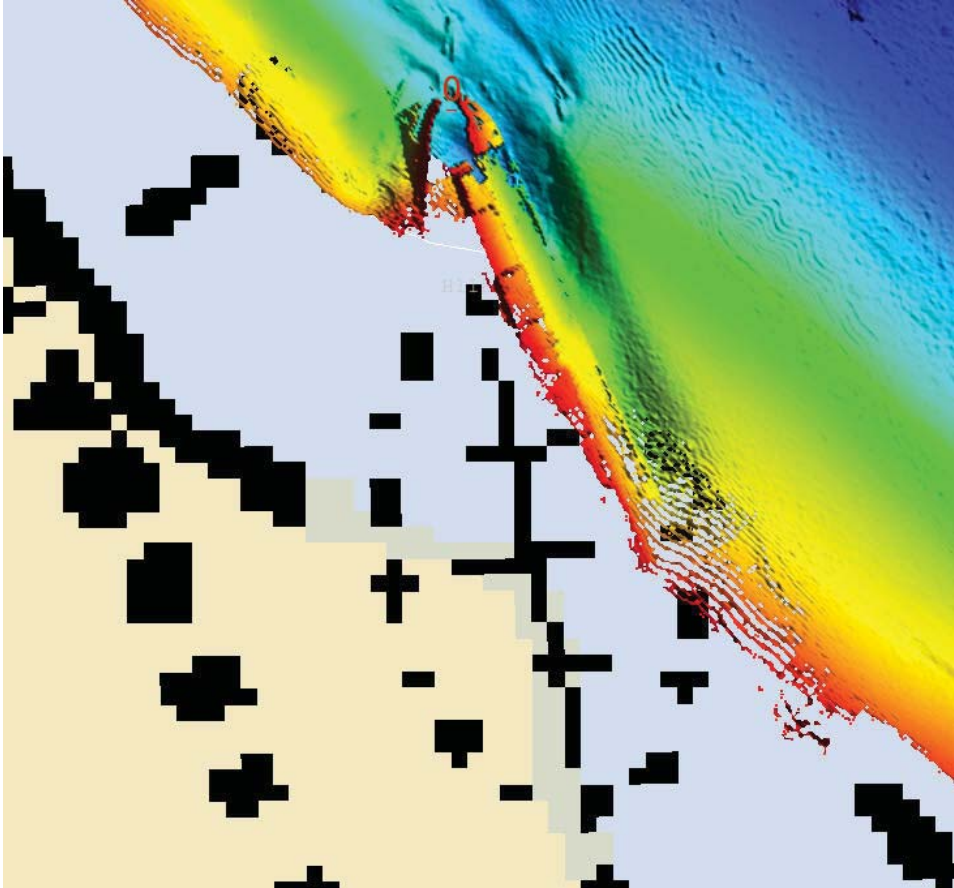
Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Columbia River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 58th
Chart Scale: 1:20,000

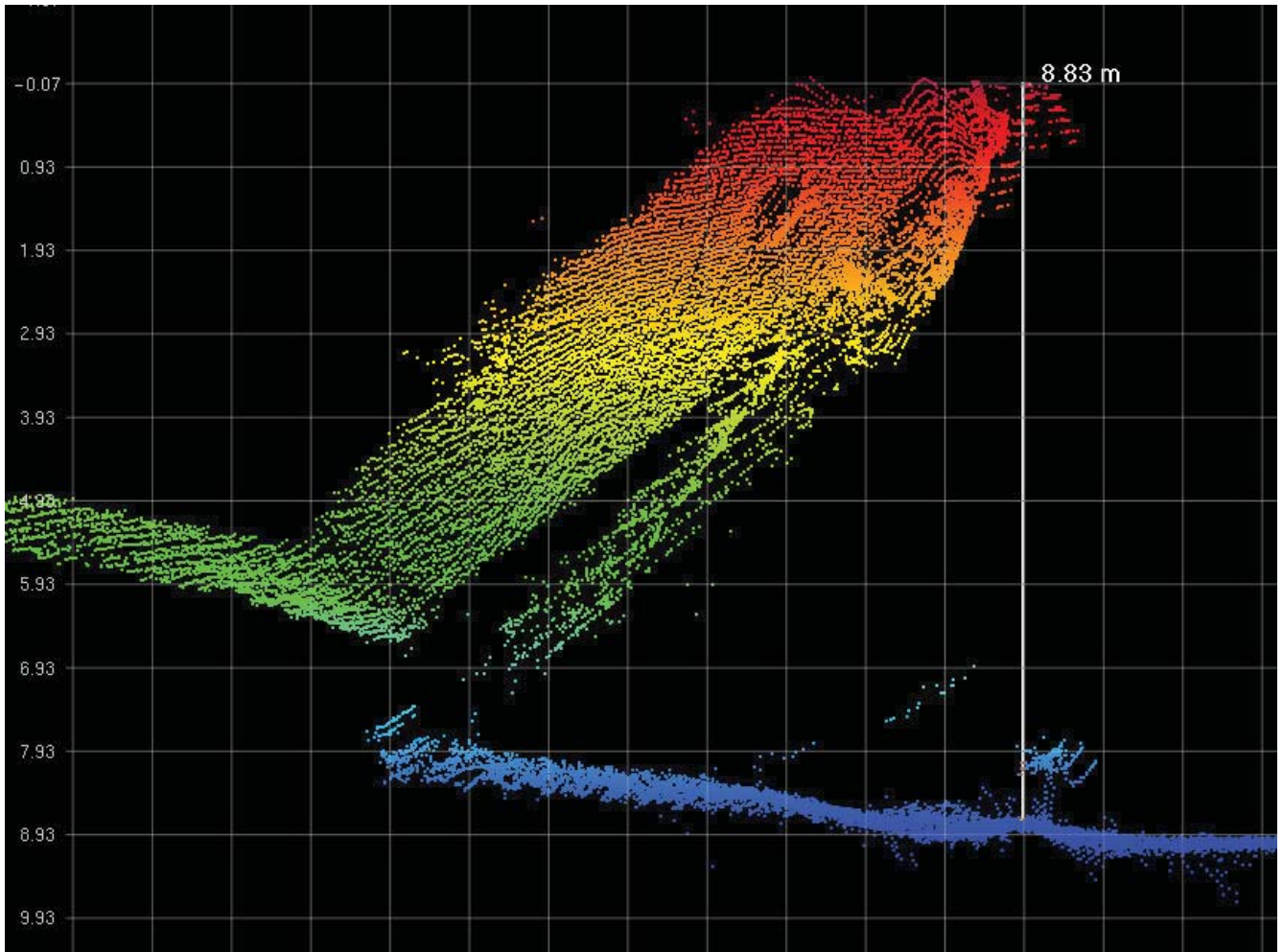
David Evans and
Associates, Inc.

January 16, 2009

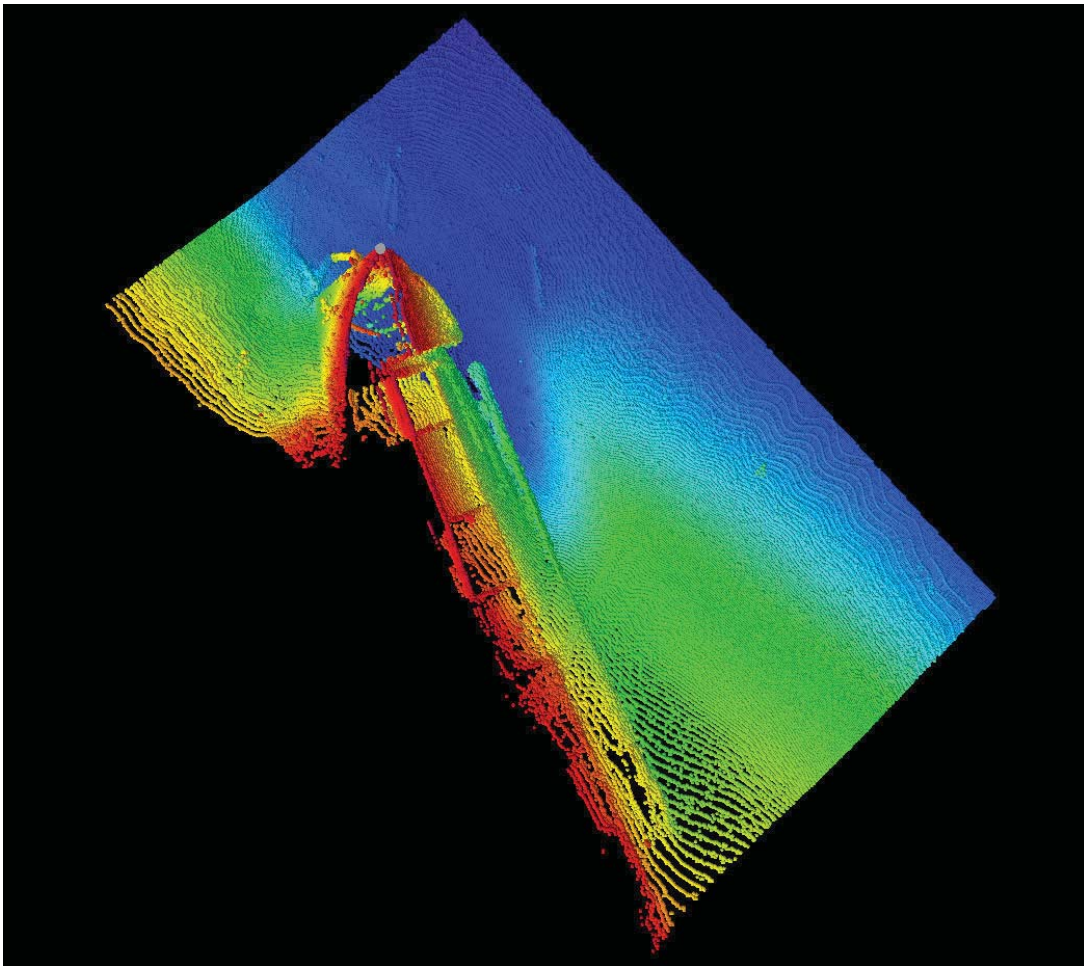
DTON 6 Chart Overlay (25cm CUBE)



DTON 6 MBES 2D View



DTON 6 MBES 3D View



Danger To Navigation7

DTON Report for H11859

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelly Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Dates: September 2008 - December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18527	22nd	09/01/2005	1:5,000 (18527_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_1)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	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
1.1	Obstruction	7.48 m	45° 33' 36.1" N	122° 42' 59.7" W
1.2	Obstruction	7.89 m	45° 33' 33.9" N	122° 42' 57.1" W

Superseded by NOAA PHB Dton 1.3

1 - Danger To Navigation

1.1) GP No. - 1 from H11859_7_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 36.1" N, 122° 42' 59.7" W
Least Depth: 7.48 m (= 24.54 ft = 4.090 fm = 4 fm 0.54 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-340.21:39:17.000 (12/05/2008)
GP Dataset: H11859_7_dtons.xls
GP No.: 1
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

obstruction Vertical Datum: Columbia River Datum

The obstruction represents a significant depth within a debris field. The obstruction rises approximately 12 ft. off the natural bottom. The debris field is approximately 150 m by 90 m. The obstruction is in a high traffic area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_7_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction

Cartographically-Rounded Depth (Affected Charts):

24ft (18527_1, 18526_1, 18525_1)

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

7.5m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 1:depth known
 SORDAT - 20081205

SORIND - US,US,survey,H11859

TECSOU - 3:found by multi-beam

VALSOU - 7.48 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

1.2) GP No. - 2 from H11859_7_dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 33.9" N, 122° 42' 57.1" W
Least Depth: 7.89 m (= 25.89 ft = 4.314 fm = 4 fm 1.89 ft)
TPU (±1.96σ): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2008-340.21:39:17.000 (12/05/2008)
GP Dataset: H11859_7_dtons.xls
GP No.: 2
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

obstruction Vertical Datum: Columbia River Datum

The obstruction is a significant depth within a debris field. The obstruction rises approximately 12 ft off the natural sea floor. The debris field measures approximately 150 m by 90 m. The obstruction is in a high traffic area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859_7_dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction

Cartographically-Rounded Depth (Affected Charts):

26ft (18527_1, 18526_1, 18525_1)

4 ¼fm (18003_1, 18007_1, 530_1)

7.9m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: QUASOU - 1:depth known
 SORDAT - 20081205

SORIND - US,US,survey,H11859

TECSOU - 3:found by multi-beam

VALSOU - 7.89 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

Superseded by NOAA PHB Dton 1.3

Danger To Navigation 8

Jason Creech

From: Jason Creech
Sent: Tuesday, February 03, 2009 1:21 PM
To: Gary Nelson
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_8 Submission
Attachments: H11859_DTON_8.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_8. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer
David Evans and Associates, Inc.
(804) 516-7829

Danger to Navigation

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelley Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: 01/17/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18526	58th	09/01/2006	1:10,000 (18526_2)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	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	7.10 m	45° 37' 39.4" N	122° 49' 01.7" W	---
1.2	Obstruction	7.01 m	45° 37' 40.6" N	122° 48' 59.6" W	---

1 - Danger To Navigation

1.1) GP No. - 1 from H11859.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 45° 37' 39.4" N, 122° 49' 01.7" W
Least Depth: 7.10 m (= 23.29 ft = 3.882 fm = 3 fm 5.29 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2009-017.21:27:27.000 (01/17/2009)
GP Dataset: H11859.xls
GP No.: 1
Charts Affected: 18526_2, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

OBSTRN. Vertical Datum: Columbia River Datum.

The obstructions is a remnant of footings from the Sauvie Island Bridge which has been demolished and replaced with a new bridge which lies approximately 20m upstream from the original alignment. The obstruction is approximately 8x6 meters and rises 1.7 meters off the bottom.

Note that the charted alignment and clearances of the bridge are no longer valid.

Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction with least depth of 23 ft.

Cartographically-Rounded Depth (Affected Charts):

23ft (18526_2, 18525_1)

3 ¾fm (18003_1, 18007_1, 530_1)

7.1m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: RECDAT - 20090117

SORDAT - 20090117

SORIND - US,US,surve,H11859

TECSOU - 3:found by multi-beam

VALSOU - 7.1 m

WATLEV - 3:always under water/submerged

1.2) GP No. - 2 from H11859.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 45° 37' 40.6" N, 122° 48' 59.6" W
Least Depth: 7.01 m (= 23.00 ft = 3.833 fm = 3 fm 5.00 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2009-017.21:27:27.000 (01/17/2009)
GP Dataset: H11859.xls
GP No.: 2
Charts Affected: 18526_2, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

OBSTRN. Vertical Datum: Columbia River Datum.

The obstructions is a remnant of footings from the Sauvie Island Bridge which has been demolished and replaced with a new bridge which lies approximately 20m upstream from the original alignment. The obstruction is approximately 8x6 meters and rises 1.7 meters off the bottom.

Note that the charted alignment and clearances of the bridge are no longer valid.

Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11859.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction with least depth of 23 ft.

Cartographically-Rounded Depth (Affected Charts):

23ft (18526_2, 18525_1)

3 ¾fm (18003_1, 18007_1, 530_1)

7.0m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: RECDAT - 20070117

SORDAT - 20090117

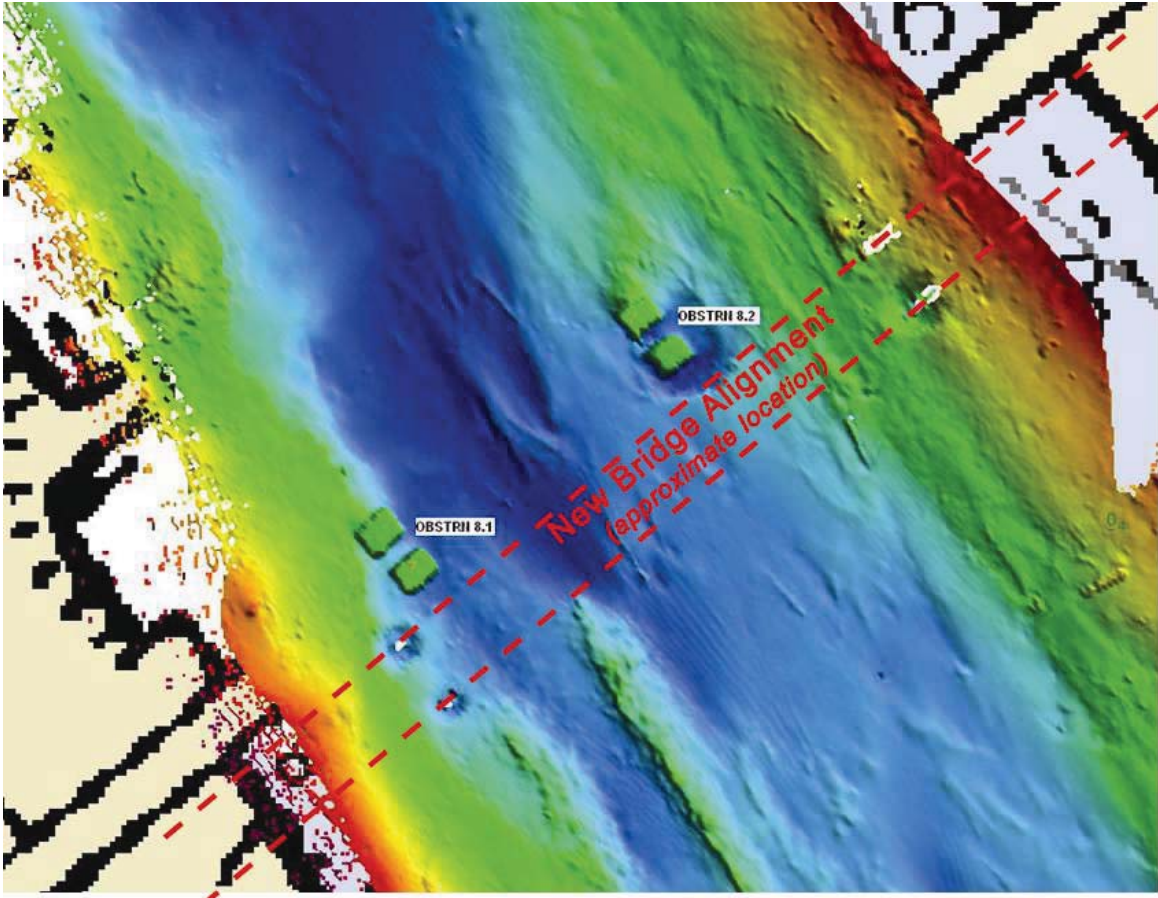
SORIND - US,US,surve,H11859

TECSOU - 3:found by multi-beam

VALSOU - 7.01 m

WATLEV - 3:always under water/submerged

DtoN 8 Reference Surface



Danger To Navigation 9

Jason Creech

From: Jason Creech
Sent: Monday, May 11, 2009 7:47 AM
To: 'Gary Nelson'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11859_DTON_9 Submission
Attachments: H11859_DTON_9.doc

Gary,

Attached is a Danger to Navigation report for H11859_DTON_9. The attached file includes the danger report, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,
Jason

Jason Creech
Lead Hydrographer



David Evans and Associates, Inc. | Marine Services Division
2801 SE Columbia Way, Ste. 130 | Vancouver, WA 98661
Office: 360.314.3200 | Direct: 804.516.7829 | Fax: 360.314.3250
jasc@deainc.com | www.deainc.com

IMPORTANT NOTICE: This message is intended only for the addressee and may contain confidential information. If you are not the intended recipient, you may not use, copy or disclose any information contained in this message. If you have received this message in error, please notify the sender by reply e-mail and delete the message. Thank you.

H11859 - Danger to Navigation Report

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelley Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Date: 12/05/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18527	22nd	09/01/2005	1:5,000 (18527_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_1)	USCG LNM: 09/30/2008 (04/28/2009) CHS NTM: None (03/27/2009) NGA NTM: None (05/02/2009)
18525	35th	07/01/2005	1:40,000 (18525_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	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	2.05 m	45° 34' 13.1" N	122° 43' 55.7" W	---

1 - Danger To Navigation

1.1) GP No. - 1 from dtons.xls**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 34' 13.1" N, 122° 43' 55.7" W
Least Depth: 2.05 m (= 6.73 ft = 1.121 fm = 1 fm 0.73 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 2008-340.18:31:58.000 (12/05/2008)
GP Dataset: dtons.xls
GP No.: 1
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

The obstruction appears to be a submerged pile which rises approximately 8.3m (27.2ft) off the natural bottom.

Depths were acquired with Multibeam Sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Positions are referenced from contractor installed real-time kinematic GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon.

Feature Correlation

Address	Feature	Range	Azimuth	Status
dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

6ft (18527_1, 18526_1, 18525_1)

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

2.1m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: SORDAT - 20081205

SORIND - US,US,survey,H11859

TECSOU - 3:found by multi-beam

VALSOU - 2.05 m

VERDAT - 24:Local datum

WATLEV - 3:always under water/submerged

Feature Images

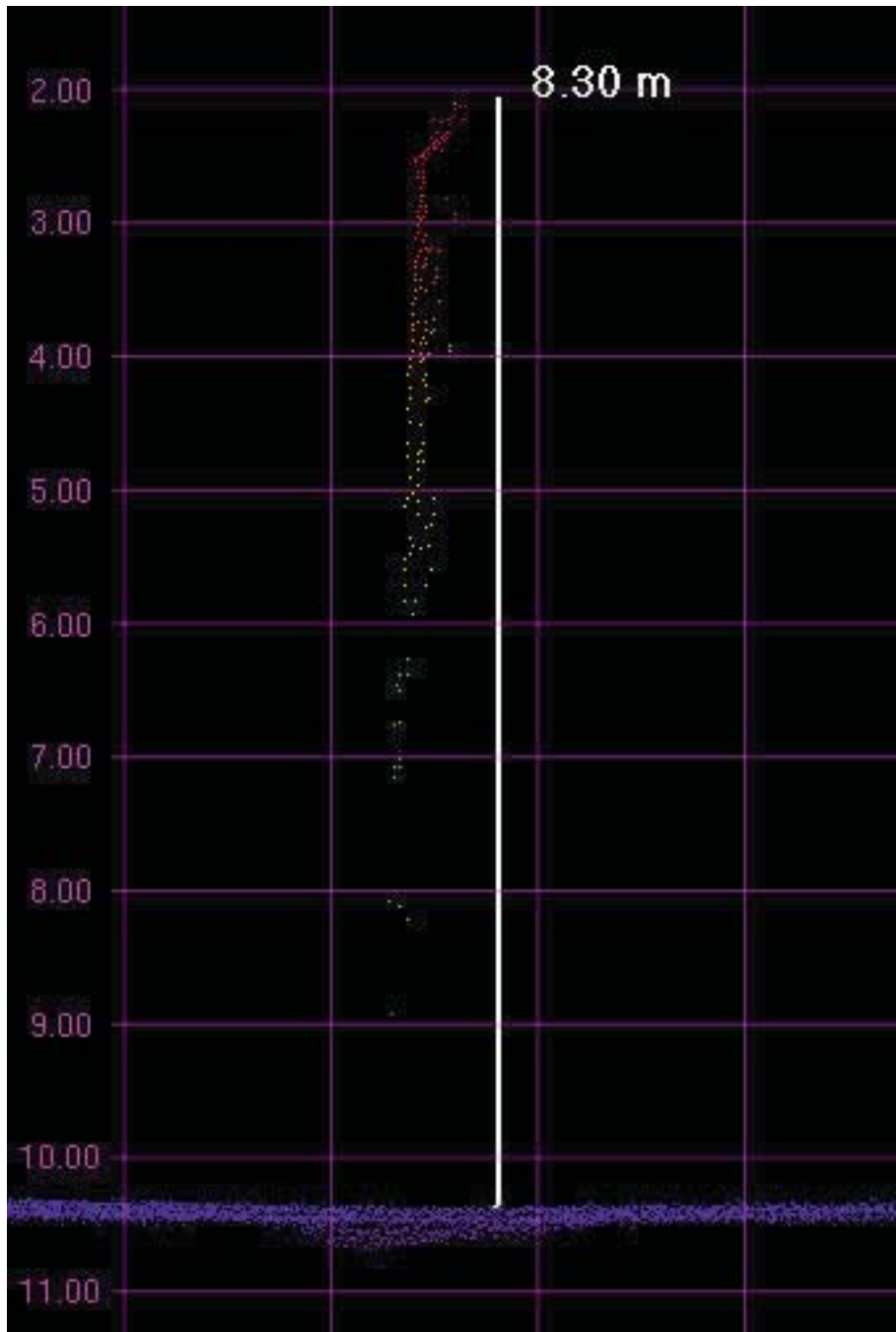


Figure 1.1.1

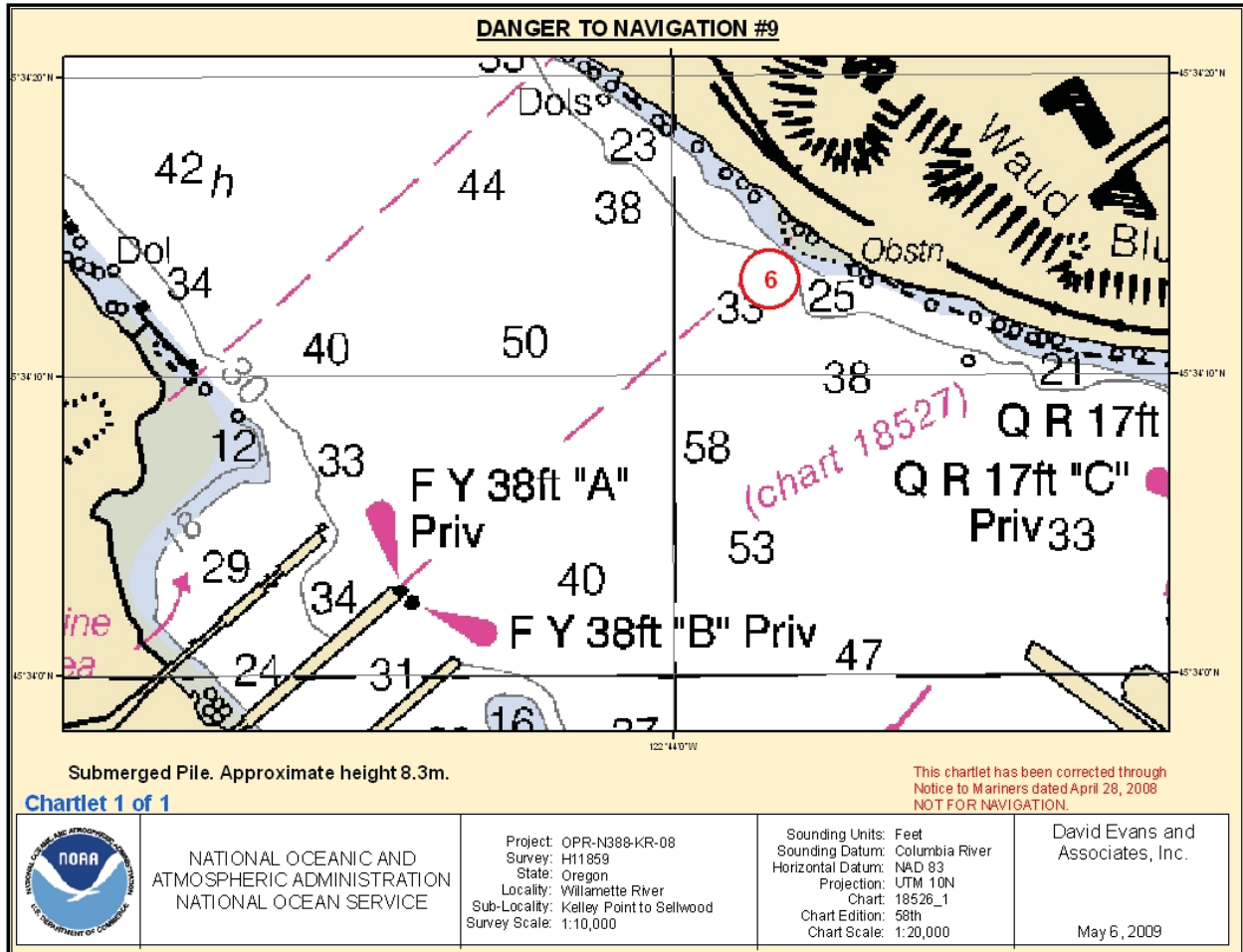


Figure 1.1.2

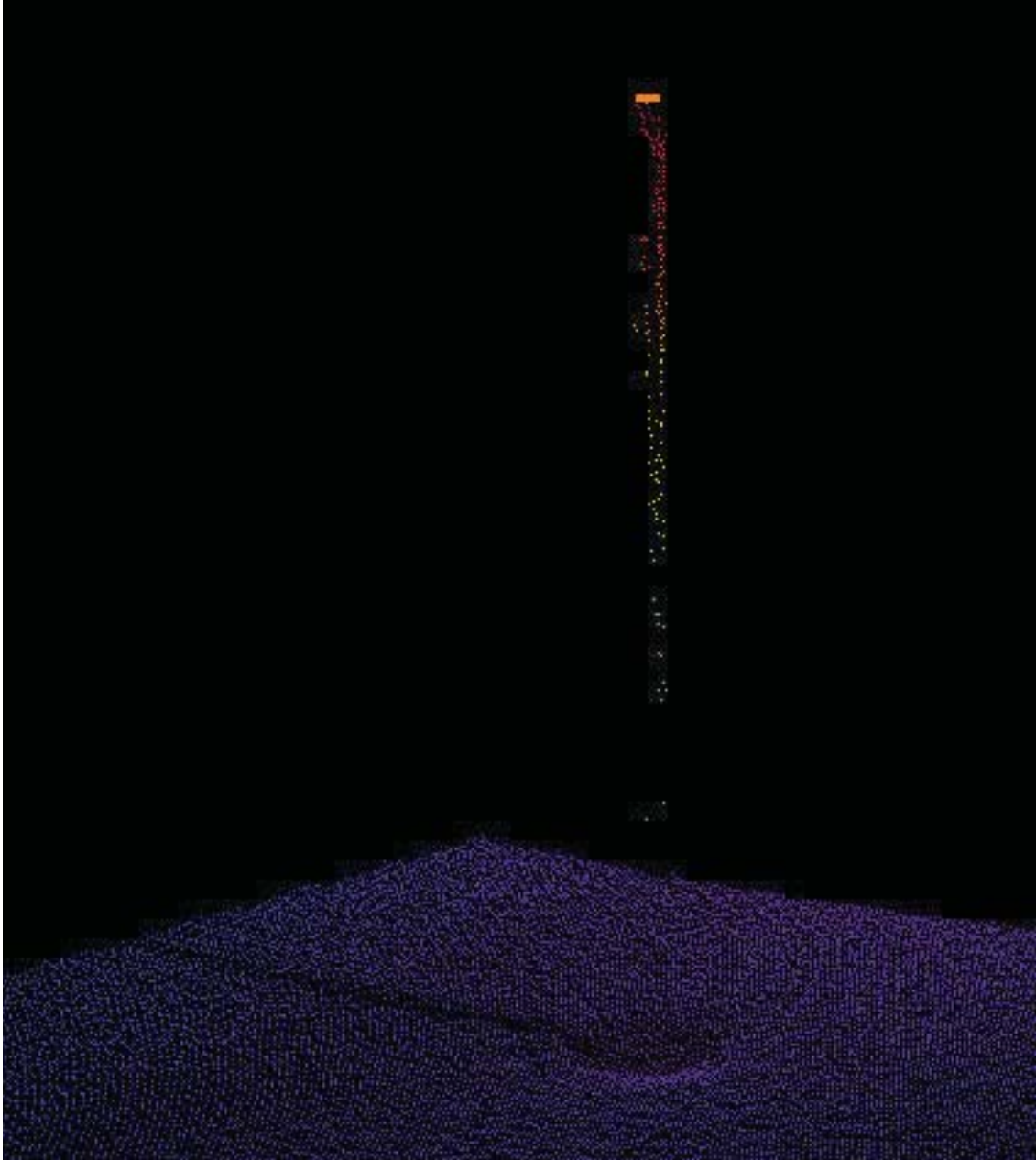





Figure 1.1.3

Danger to Navigation 10

 Attachments can contain viruses that may harm your computer. Attachments may not display correctly.

Jason Creech

From: Jason Creech **Sent:** Wed 12/16/2009 11:12 AM
To: crescent.moegling@noaa.gov
Cc: Gary.Nelson@noaa.gov'; Jon Dasler; Lori.Knell
Subject: H11859_DTON_10 Submission
Attachments:  [H11859_DtoN_10.doc\(1MB\)](#)  [H11859_DtoN_10.txt\(650B\)](#)

Crescent,

Attached is a Danger to Navigation report for H11859_DTON_10 which encompasses Willamette River miles 15-17. The attached files include the danger report, ASCII text file, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,

Jason

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc. | Marine Services Division
2801 SE Columbia Way, Ste. 130 | Vancouver, WA 98661
jasc@deainc.com | Office: 804.516.7829 | Cell: 804.516.7829 | Fax: 360.314.3250

REPORT OF DANGER TO NAVIGATION

H11859 #10

Hydrographic Survey Registry Number: H11859
Survey Title: State: OREGON
General Locality: COLUMBIA RIVER
Sublocality: KELLEY POINT TO SELLWOOD

Project Number: OPR-N338-KR-08
Field Unit: David Evans and Associates, Inc.
Survey Date: December 8, 2008 through December 10, 2008
Survey Time: DtoN 10.1 – 23:29:28 UTC
DtoN 10.2 – 17:08:52 UTC
DtoN 10.3 – 16:31:32 UTC
DtoN 10.4 – 18:26:41 UTC
DtoN 10.5 – 18:11:48 UTC
DtoN 10.6 – 21:10:16 UTC
DtoN 10.7 – 20:48:31 UTC
DtoN 10.8 – 20:16:33 UTC
DtoN 10.9 – 21:39:21 UTC
DtoN 10.10 – 22:12:10 UTC

Depths were acquired with Multibeam Sonar. Depths are corrected using post processed GPS water levels.

Positions are referenced from a contractor installed GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon.

Charts affected:

- 18526 59th Edition/June 1, 2009, 1:20,000 scale
- 18528 11th Edition/July 1, 2008, 1:15,000 scale

The following items were found during hydrographic survey operations.

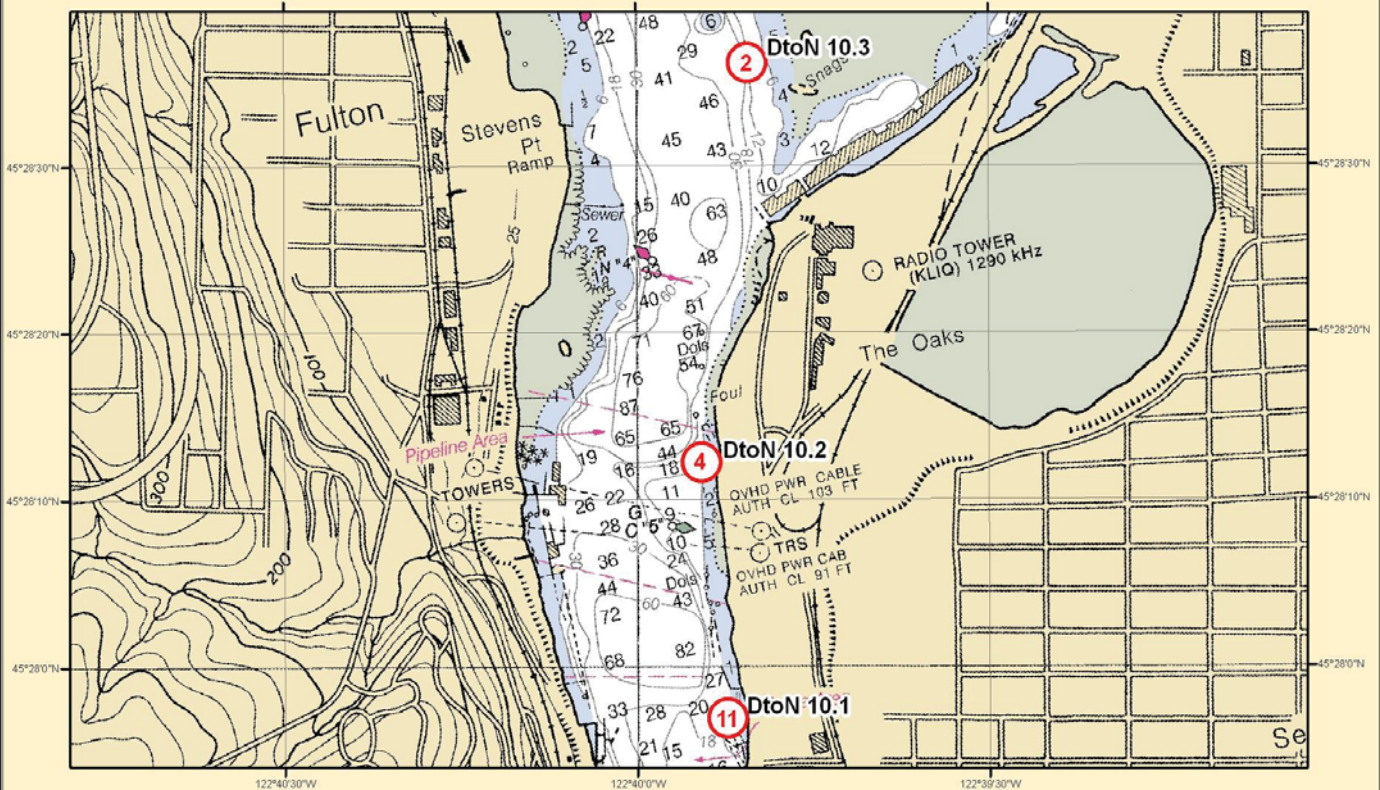
DANGER TO NAVIGATION # 10 (depths adjusted to CRD)

FEATURE	DEPTH (M)	LATITUDE (N)	LONGITUDE (W)
10.1 – OBSTRN	3.520	45/27/56.817	122/39/52.540
10.2 – OBSTRN	1.258	45/28/12.272	122/39/54.508
10.3 – OBSTRN	0.607	45/28/36.159	122/39/50.725
10.4 – OBSTRN	2.578	45/28/47.899	122/39/54.981
10.5 – OBSTRN	5.590	45/28/48.990	122/39/49.530
10.6 – OBSTRN	0.033	45/28/56.708	122/40/16.511
10.7 – OBSTRN	2.697	45/29/03.043	122/40/06.554
10.8 – OBSTRN	10.131	45/29/13.083	122/40/07.191
10.9 – OBSTRN	2.525	45/29/20.679	122/40/03.767
10.10 – OBSTRN	1.257	45/29/24.043	122/40/03.138

DtoN 10.1 appears to be a sunken pier ruin rising 3.0m above the natural bottom.
DtoN 10.2 appears to be a stack of logs (pile ruin) rising 1.6m above the natural bottom.
DtoN 10.3 appears to be a snag/stump rising 3.0m above the natural bottom.
DtoN 10.4 appears to be a snag/stump rising 6.5m above the natural bottom.
DtoN 10.5 appears to be obstructions with a least depth 2.7m above the natural bottom.
DtoN 10.6 appears to be a snag/stump rising 4.2m above the natural bottom.
DtoN 10.7 appears to be a snag/stump rising 8.1m above the natural bottom.
DtoN 10.8 appears to be a snag/stump rising 2.4m above the natural bottom.
DtoN 10.9 appears to be a snag extending from shore with the least depth 3.2m above the natural bottom.
DtoN 10.10 appears to be a snag extending from shore with the least depth 2.0m above the natural bottom.

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 525-6835.

DANGER TO NAVIGATION #10



Obstructions

Chartlet 1 of 2

This chartlet has been corrected through
 Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.



**NATIONAL OCEANIC AND
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 NATIONAL OCEAN SERVICE**

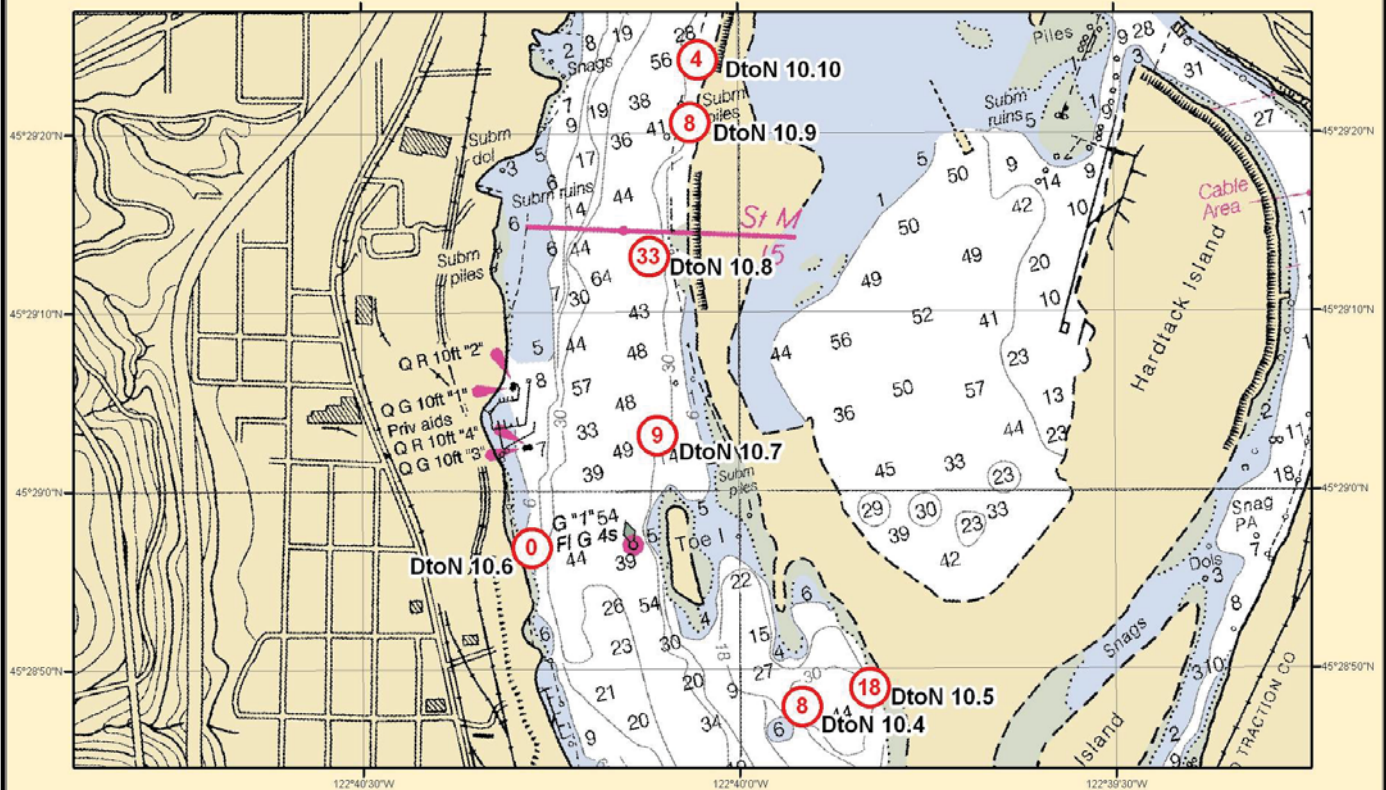
Project: OPR-N388-KR-08
 Survey: H11859
 State: Oregon
 Locality: Willamette River
 Sub-Locality: Kelley Point to Sellwood
 Survey Scale: 1:10,000

Sounding Units: Feet
 Sounding Datum: Columbia River
 Horizontal Datum: NAD 83
 Projection: UTM 10N
 Chart: 18528_1
 Chart Edition: 11th
 Chart Scale: 1:15,000

**David Evans and
 Associates, Inc.**

December 16, 2009

DANGER TO NAVIGATION #10



Obstructions

Chartlet 2 of 2

This chartlet has been corrected through
 Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
 ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SERVICE

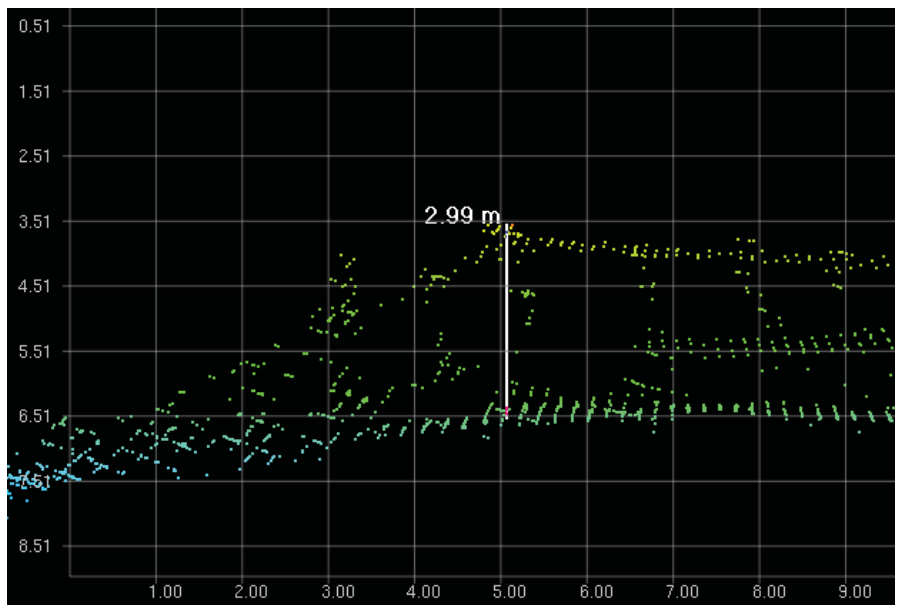
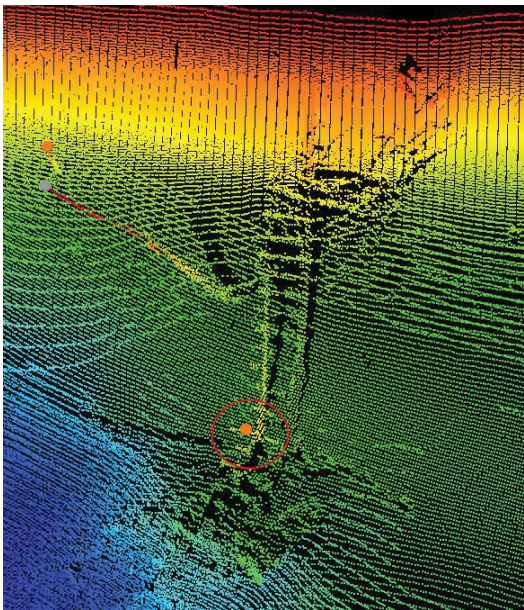
Project: OPR-N388-KR-08
 Survey: H11859
 State: Oregon
 Locality: Willamette River
 Sub-Locality: Kelley Point to Sellwood
 Survey Scale: 1:10,000

Sounding Units: Feet
 Sounding Datum: Columbia River
 Horizontal Datum: NAD 83
 Projection: UTM 10N
 Chart: 18528_1
 Chart Edition: 11th
 Chart Scale: 1:15,000

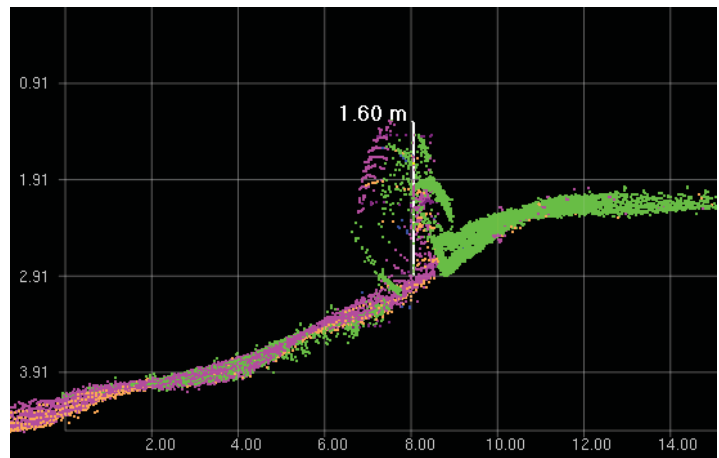
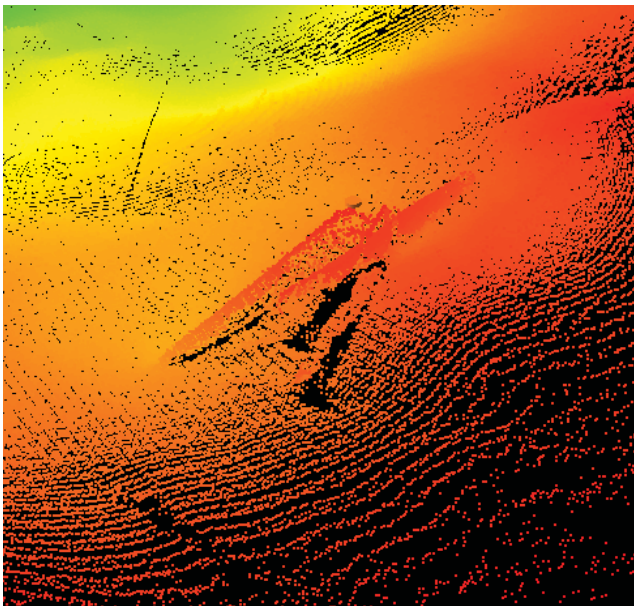
David Evans and
 Associates, Inc.

December 16, 2009

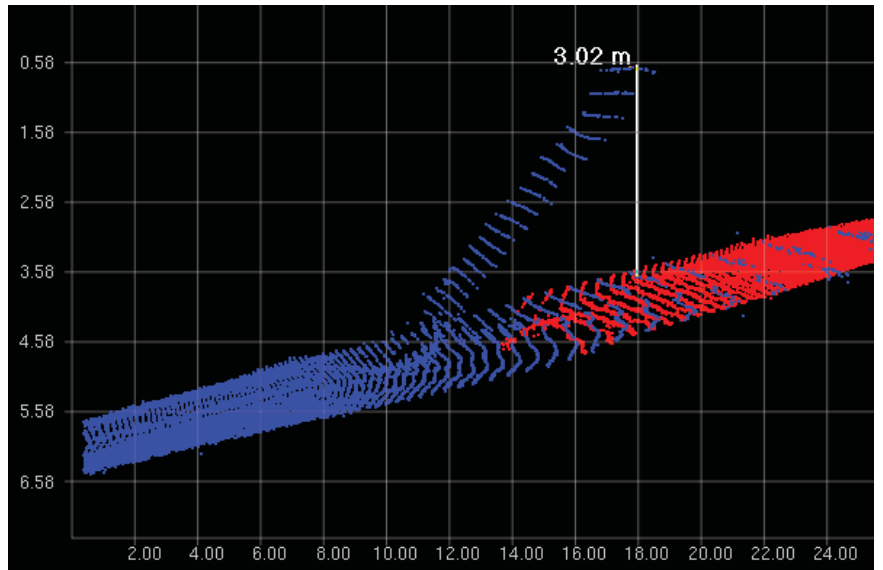
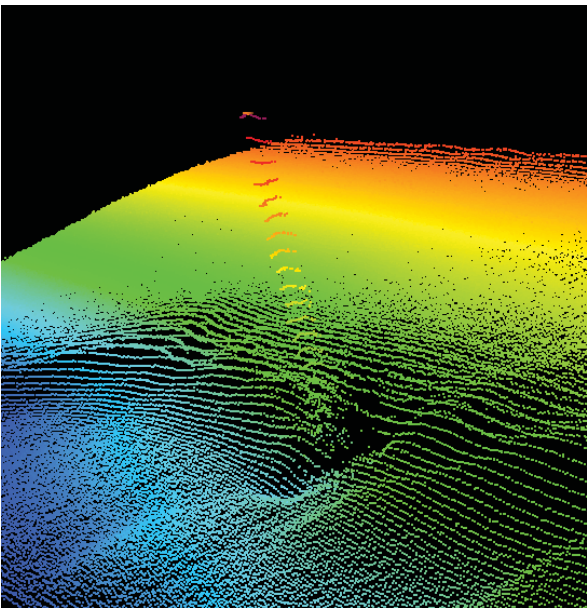
DtoN #10.1 MBES 3d and 2d View



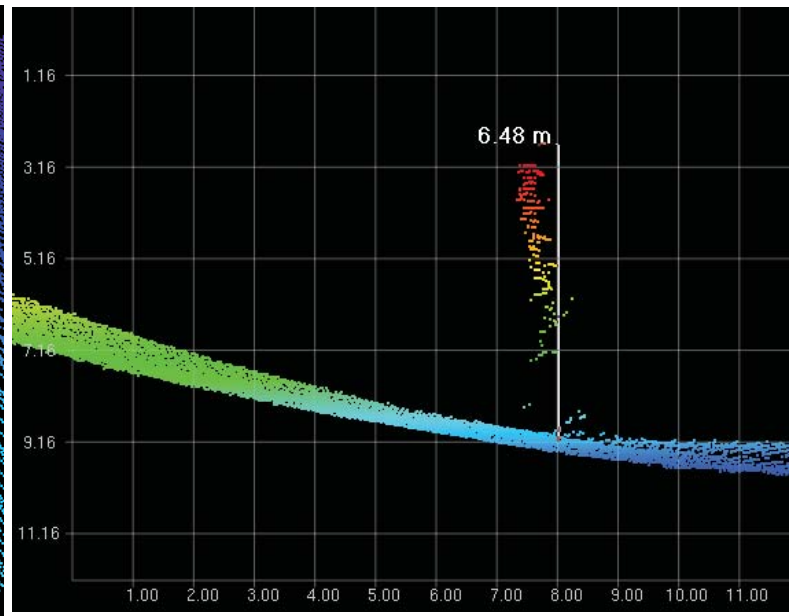
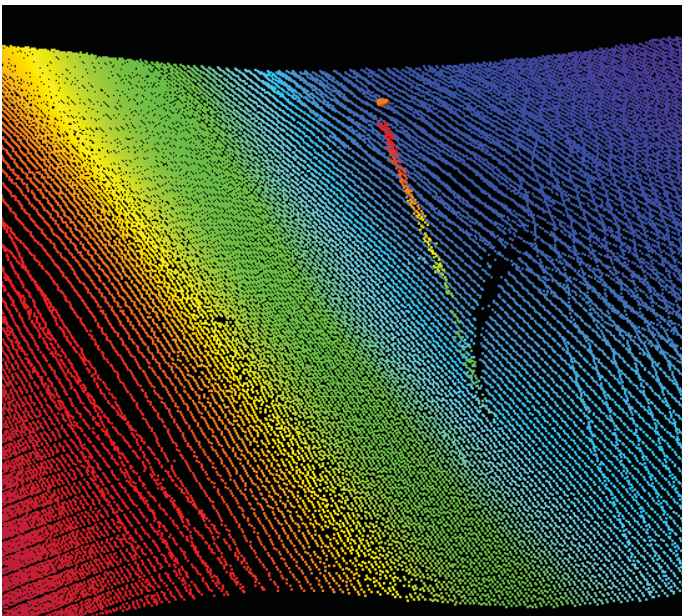
DtoN #10.2 MBES 3d and 2d View



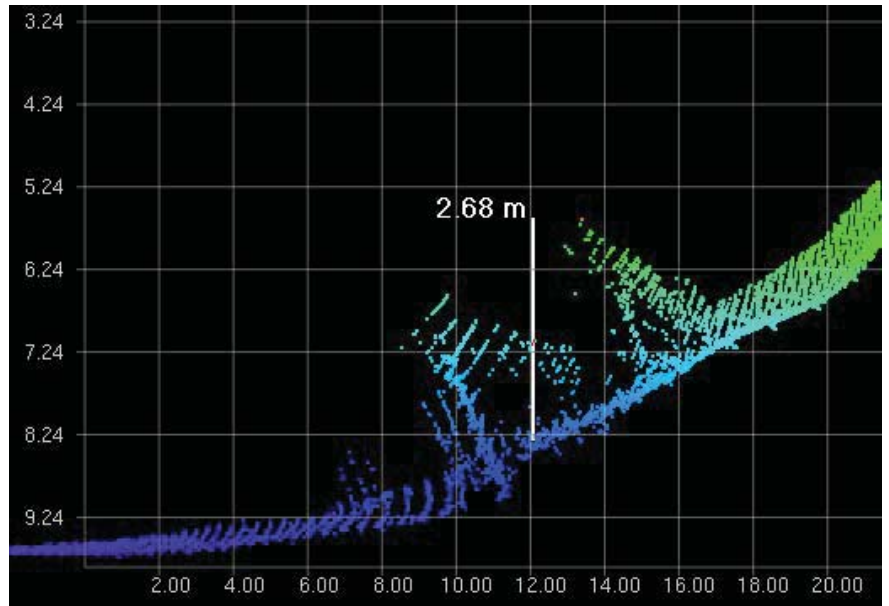
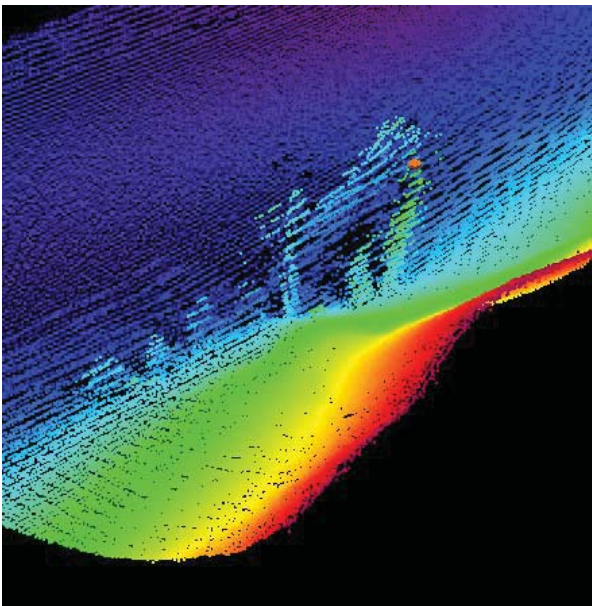
DtoN #10.3 MBES 3d and 2d View



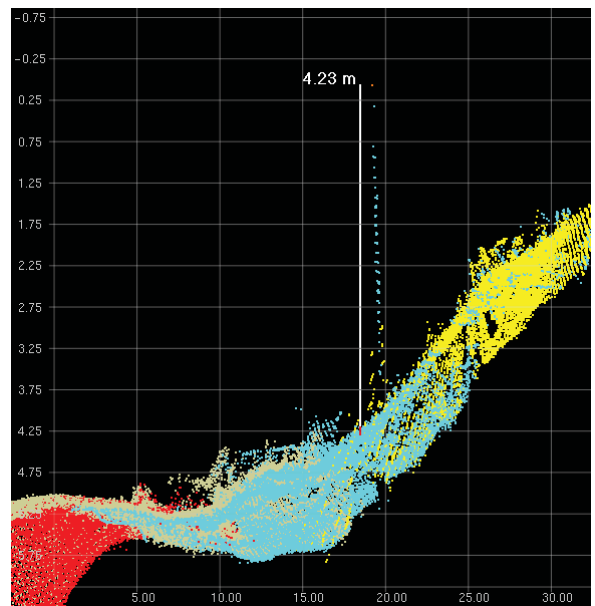
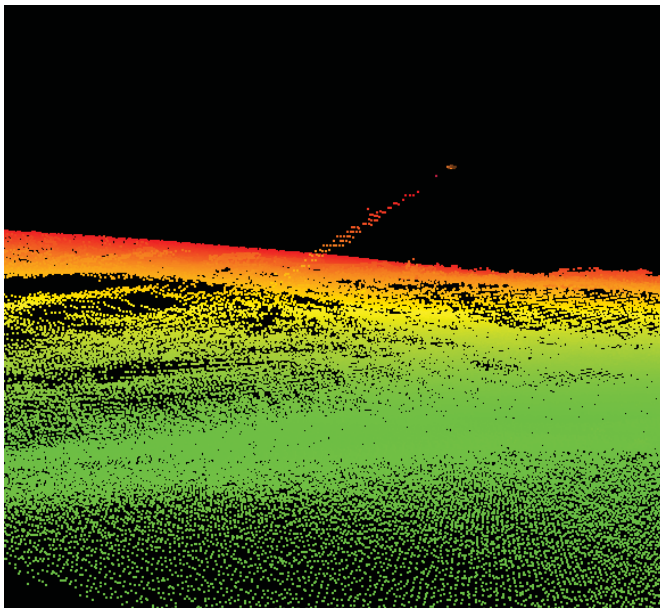
DtoN #10.4 MBES 3d and 2d View



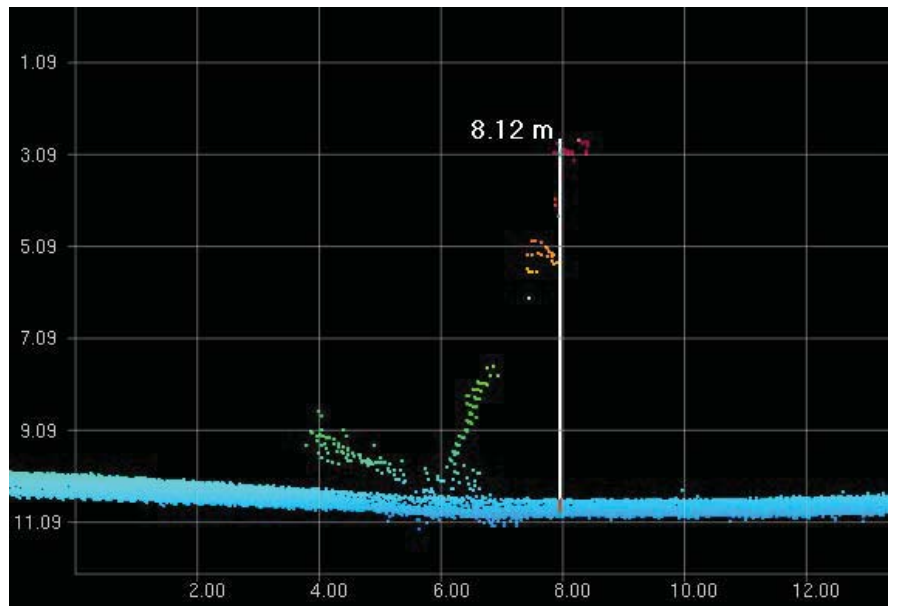
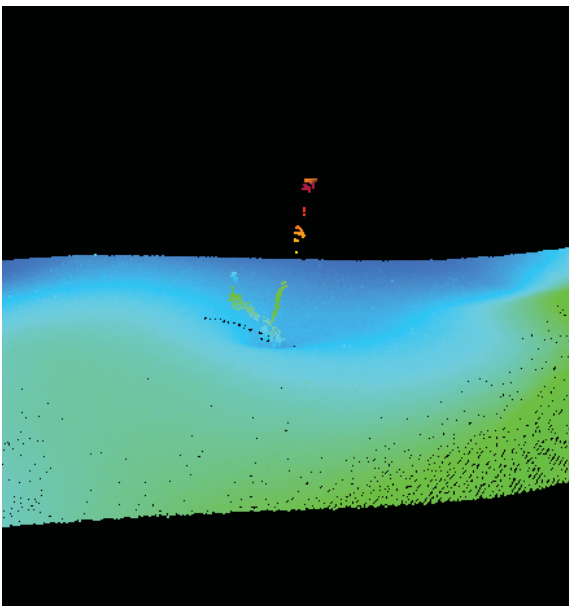
DtoN #10.5 MBES 3d and 2d View



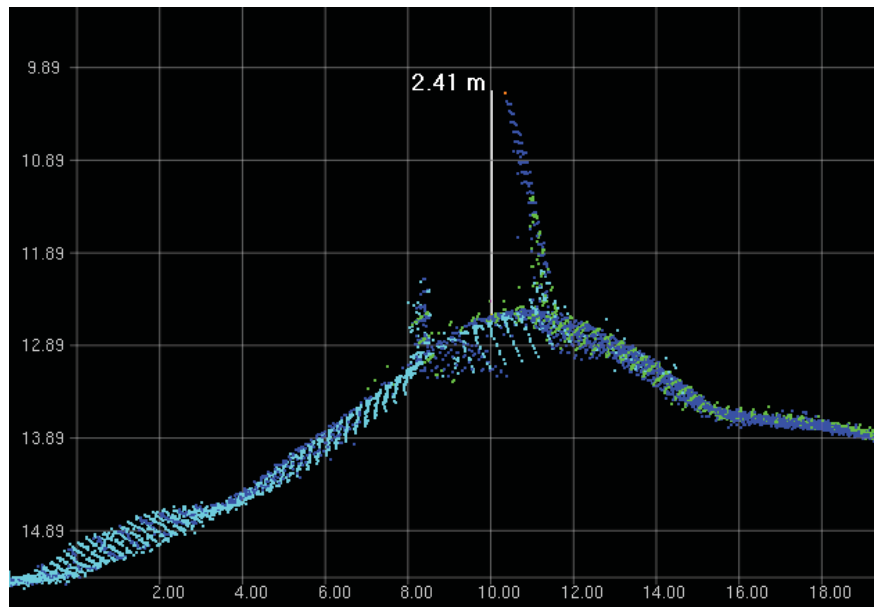
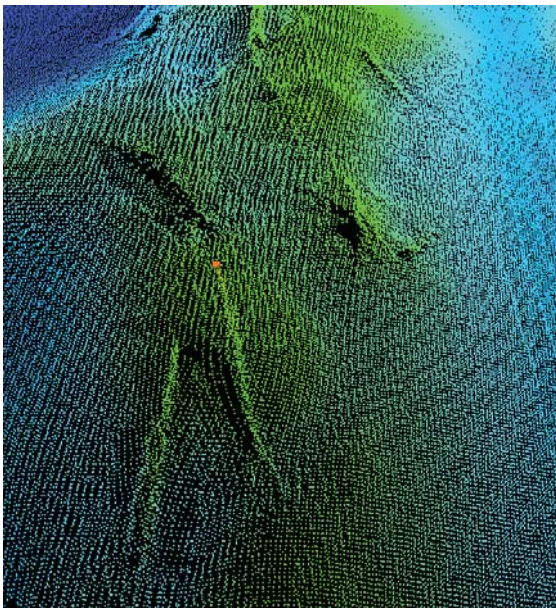
DtoN #10.6 MBES 3d and 2d View



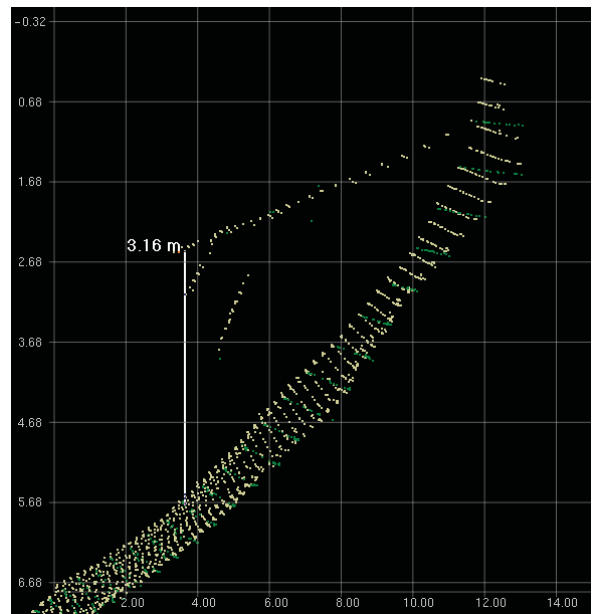
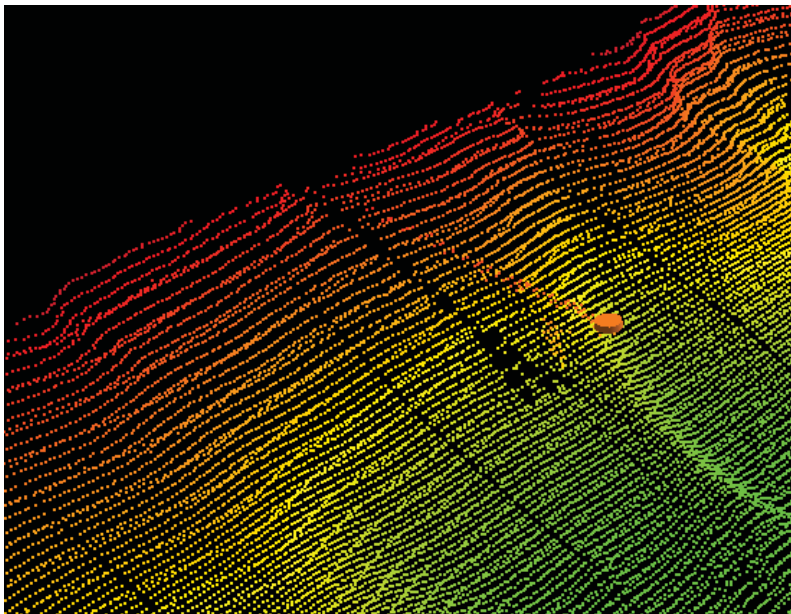
DtoN #10.7 MBES 3d and 2d View



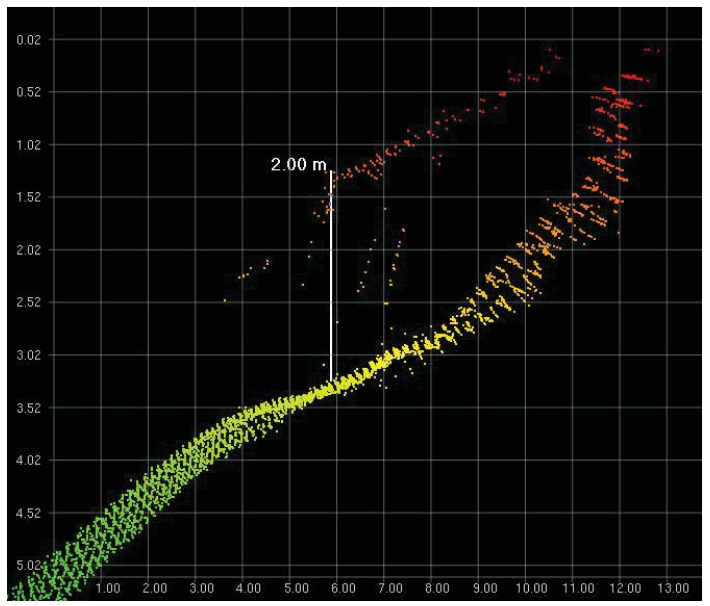
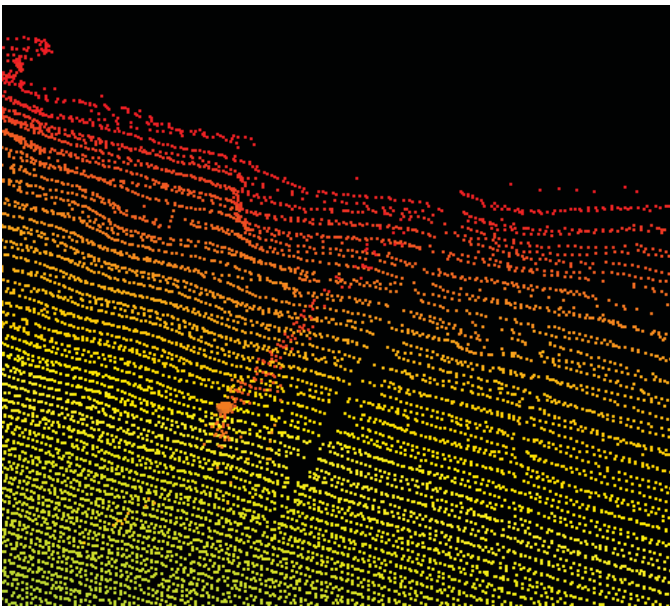
DtoN #10.8 MBES 3d and 2d View



DtoN #10.9 MBES 3d and 2d View



DtoN #10.10 MBES 3d and 2d View



Danger to Navigation 11

Jason Creech

From: Jason Creech
Sent: Tuesday, January 12, 2010 8:02 AM
To: crescent.moegling@noaa.gov
Cc: Gary.Nelson@noaa.gov'; Jon Dasler; Lori.Knell
Subject: H11859_DTON_11 Submission
Attachments: H11859_DtoN_11.txt; H11859_DtoN_11.doc

Crescent,

Attached is a Danger to Navigation report for H11859_DTON_11 which encompasses Willamette River miles 12-15. The attached files include the danger report, ASCII text file, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,

Jason

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc. | Marine Services Division
2801 SE Columbia Way, Ste. 130 | Vancouver, WA 98661
jasc@deainc.com | Phone: 804.516.7829 | Fax: 360.314.3250

www.deainc.com

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REPORT OF DANGER TO NAVIGATION

H11859 #11

Hydrographic Survey Registry Number: H11859
Survey Title: State: OREGON
General Locality: COLUMBIA RIVER
Sublocality: KELLEY POINT TO SELLWOOD

Project Number: OPR-N338-KR-08
Field Unit: David Evans and Associates, Inc.
Survey Date: December 7, 2008 and December 9, 2008
Survey Time: DtoN 11.1 – 19:18:38 UTC
DtoN 11.2 – 20:08:57 UTC
DtoN 11.3 – 22:04:06 UTC
DtoN 11.4 – 18:50:49 UTC
DtoN 11.5 – 20:13:58 UTC
DtoN 11.6 – 17:36:57 UTC
DtoN 11.7 – 17:44:07 UTC
DtoN 11.8 – 20:28:05 UTC

Depths were acquired with Multibeam Sonar. Depths are corrected using post processed GPS water levels.

Positions are referenced from a contractor installed GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon.

Chart affected:

- 18526 59th Edition/June 1, 2009, 1:20,000 scale

The following items were found during hydrographic survey operations.

DANGER TO NAVIGATION # 11 (depths adjusted to CRD)

FEATURE	DEPTH (M)	LATITUDE (N)	LONGITUDE (W)
11.1 – OBSTRN	2.329	45/30/26.236	122/40/12.155
11.2 – OBSTRN	9.243	45/30/33.693	122/40/12.637
11.3 – OBSTRN	8.079	45/30/35.742	122/40/09.119
11.4 – OBSTRN	0.249	45/30/45.634	122/40/23.881
11.5 – OBSTRN	7.870	45/31/02.312	122/40/13.824
11.6 – OBSTRN	1.952	45/31/07.748	122/40/02.190
11.7 – OBSTRN	5.782	45/31/14.379	122/40/00.626
11.8 – OBSTRN	5.666	45/31/26.898	122/40/09.488

DtoN 11.1 appears to be a snag/stump rising 2.2m above the natural bottom.

DtoN 11.2 appears to be snags/stumps with the least depth rising 1.5m above the natural bottom.

DtoN 11.3 appears to be a square obstruction rising 1.3m above the natural bottom.

DtoN 11.4 appears to be a snag/stump rising 1.0m above the natural bottom.

DtoN 11.5 appears to be snags/stumps with the least depth rising 3.3m above the natural bottom.

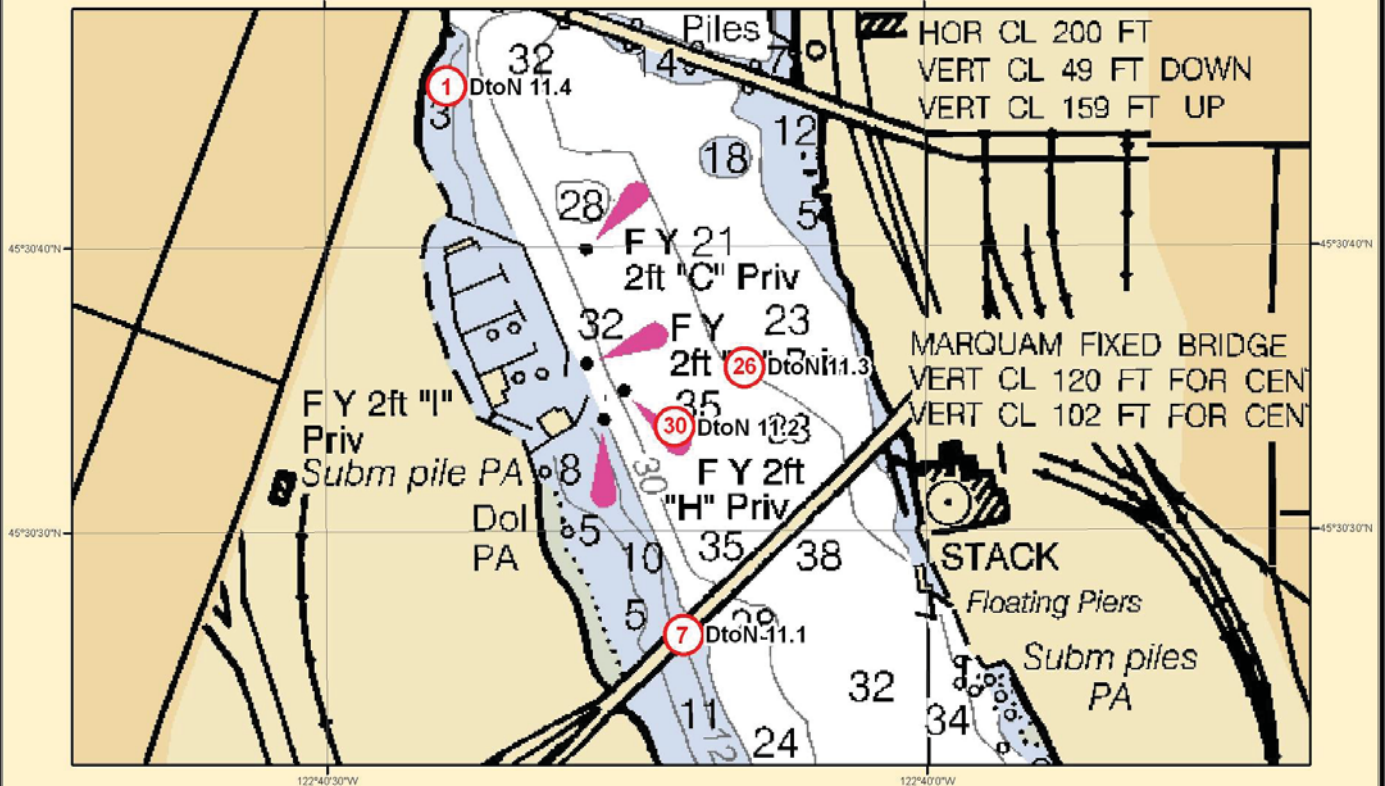
DtoN 11.6 appears to be a snag/stump rising 5.3m above the natural bottom.

DtoN 11.7 appears to be a snag/stump rising 2.2m above the natural bottom.

DtoN 11.8 appears to be a snag/stump rising 2.7m above the natural bottom.

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 525-6835.

DANGER TO NAVIGATION #11



Obstructions

Chartlet 1 of 2

This chartlet has been corrected through
Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

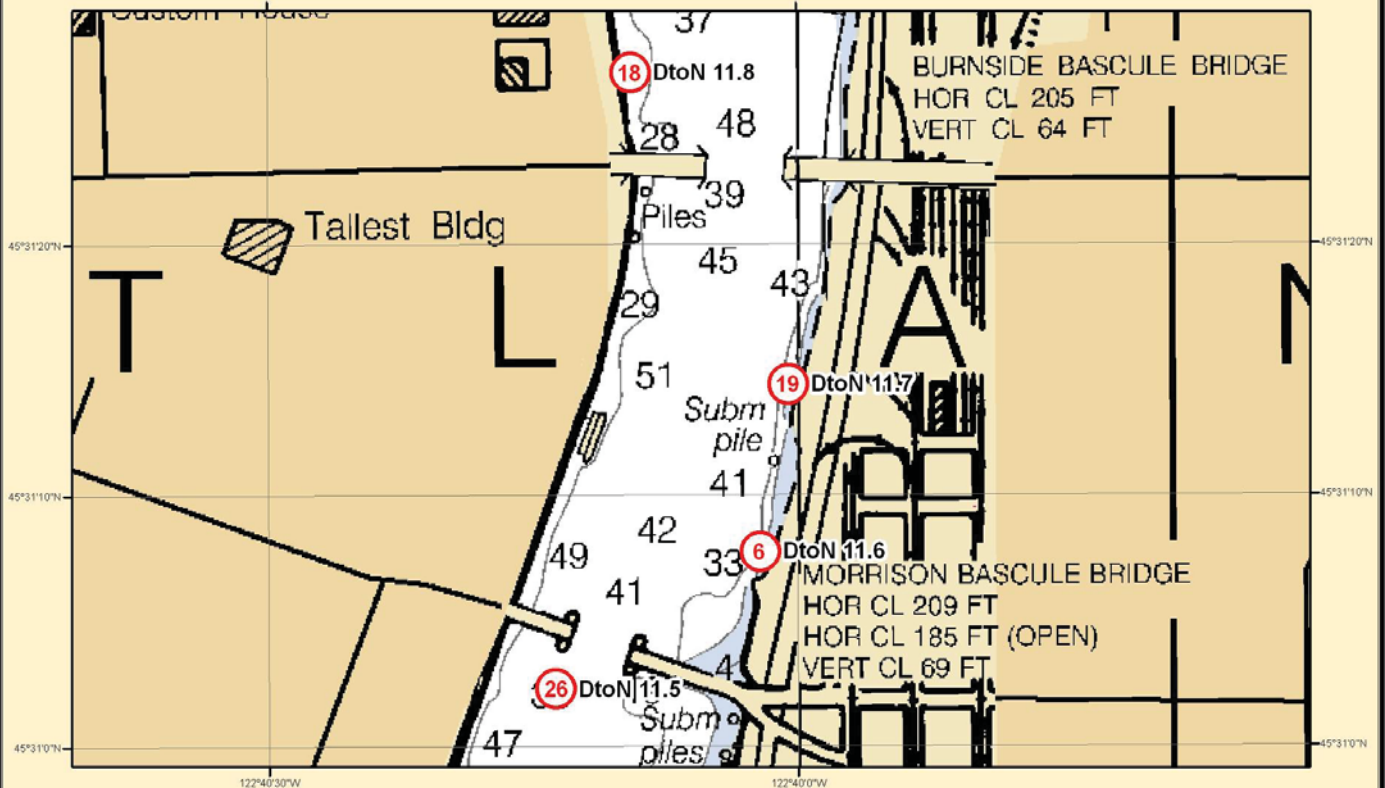
Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Willamette River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 59th
Chart Scale: 1:20,000

David Evans and
Associates, Inc.

January 11, 2010

DANGER TO NAVIGATION #11



Obstructions

Chartlet 2 of 2

This chartlet has been corrected through
Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

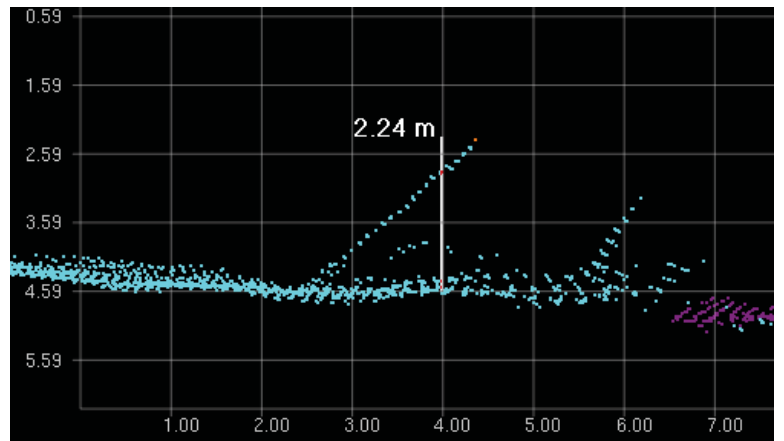
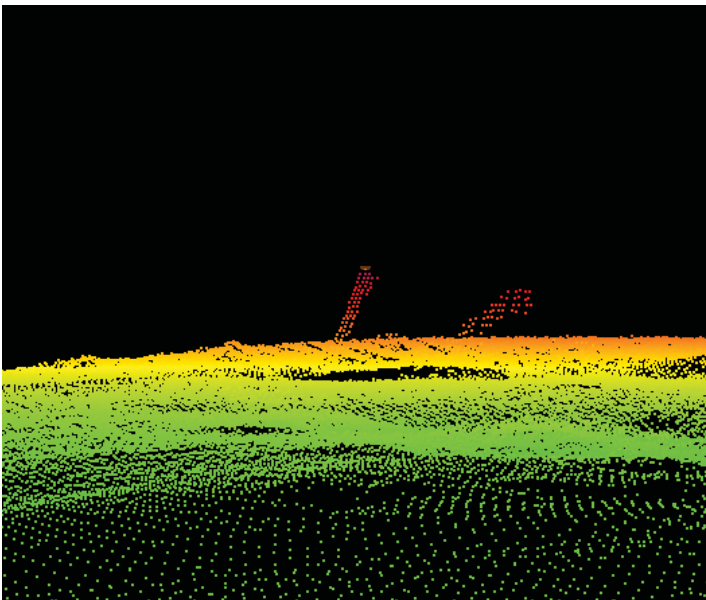
Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Willamette River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18526_1
Chart Edition: 59th
Chart Scale: 1:20,000

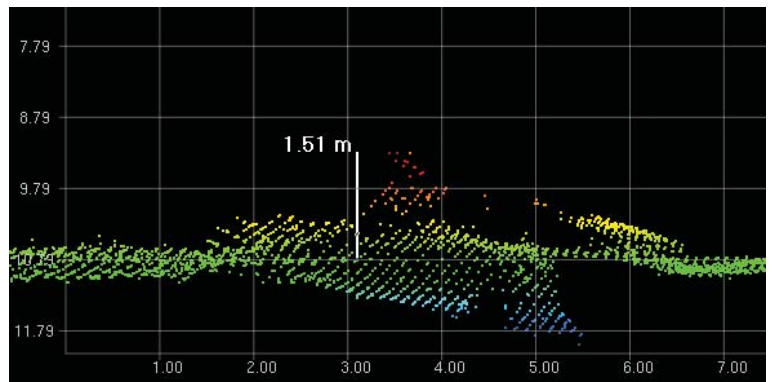
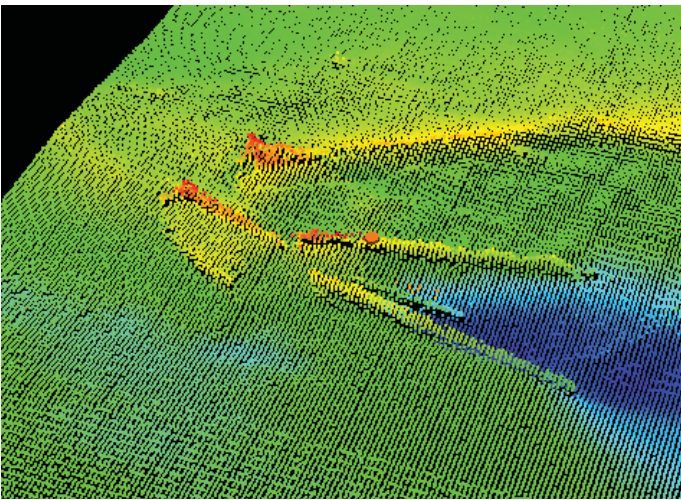
David Evans and
Associates, Inc.

January 11, 2010

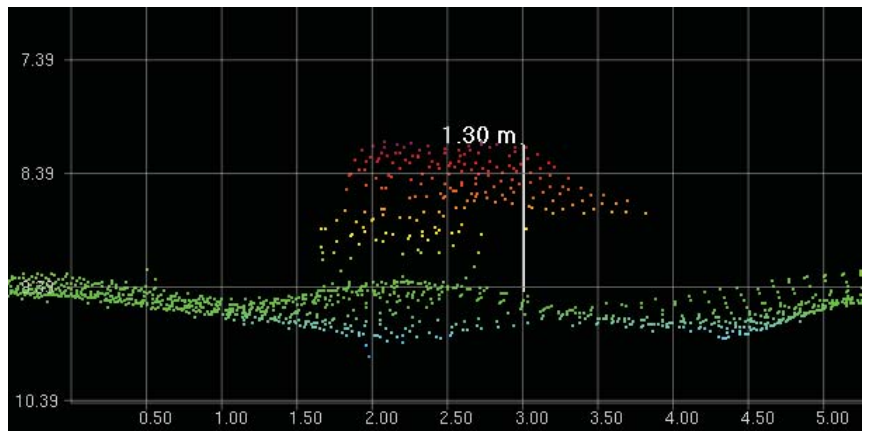
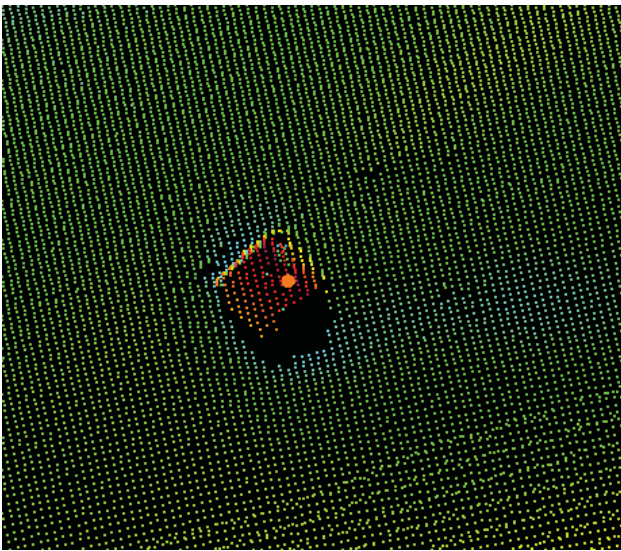
DtoN #11.1 MBES 3d and 2d View



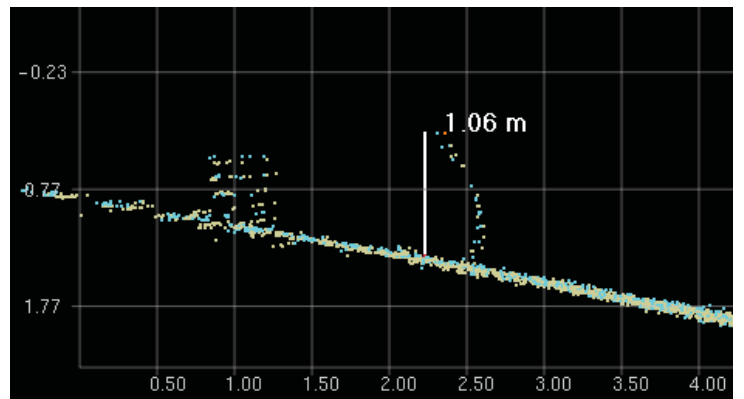
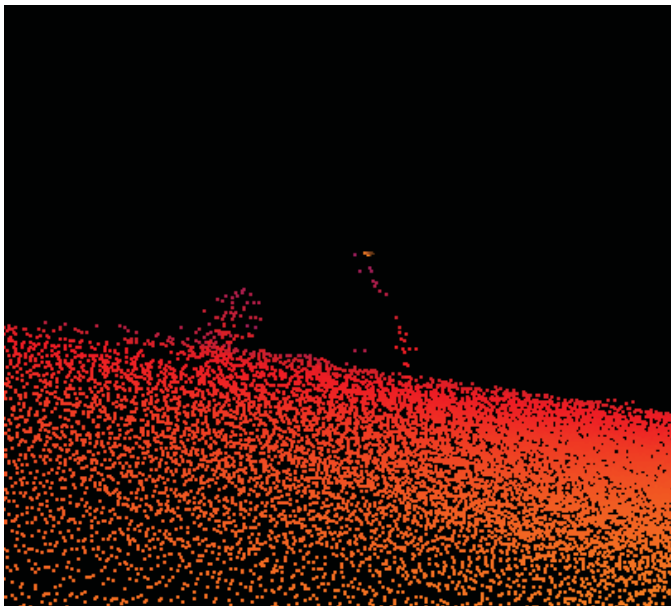
DtoN #11.2 MBES 3d and 2d View



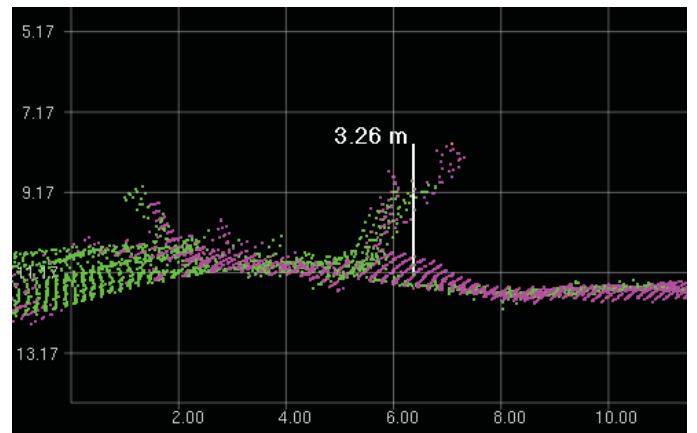
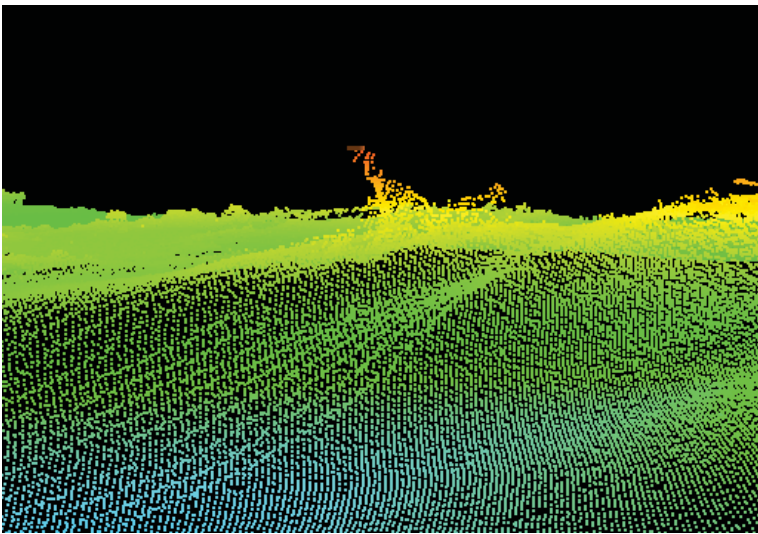
DtoN #11.3 MBES 3d and 2d View



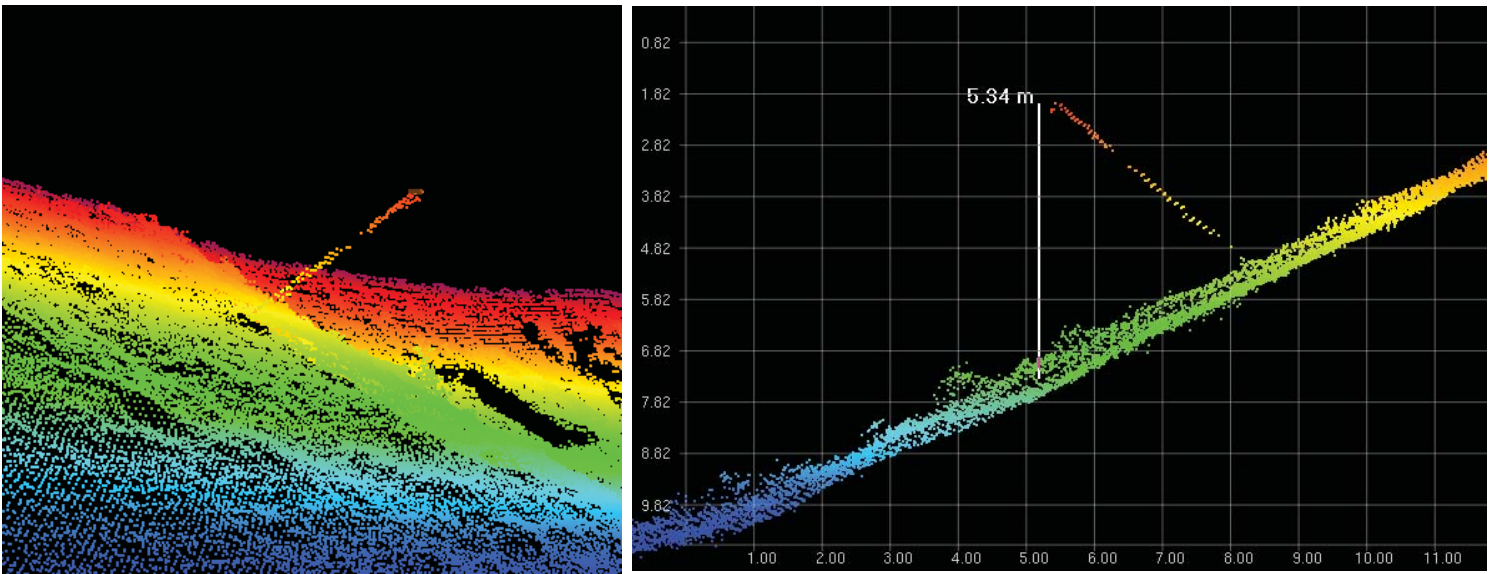
DtoN #11.4 MBES 3d and 2d View



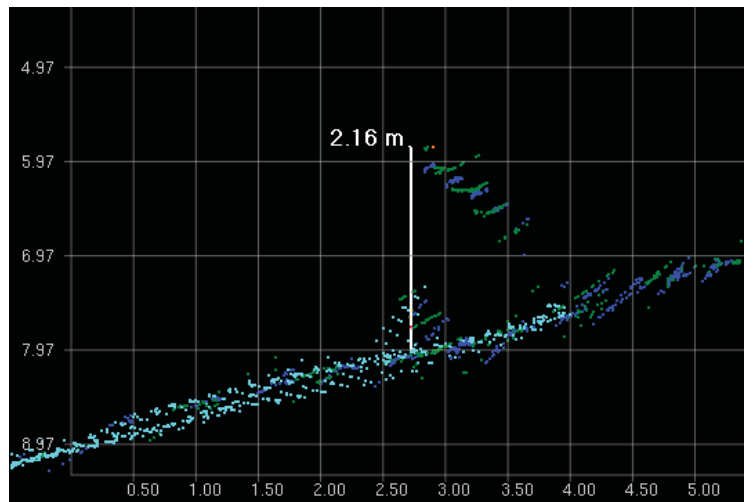
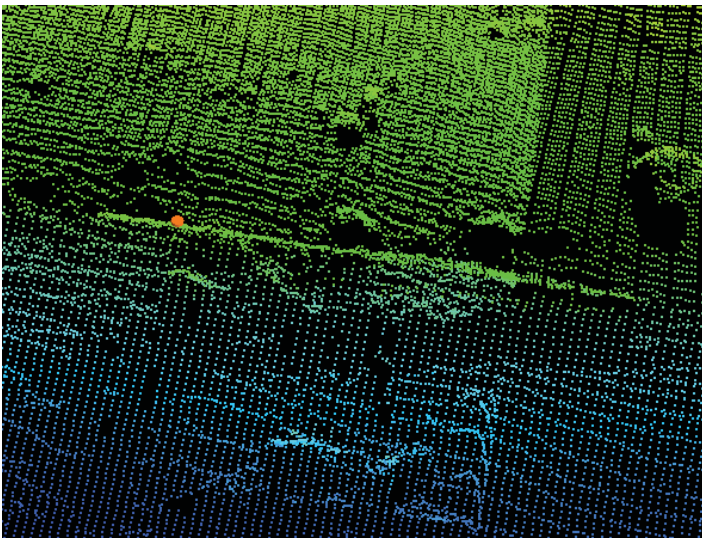
DtoN #11.5 MBES 3d and 2d View



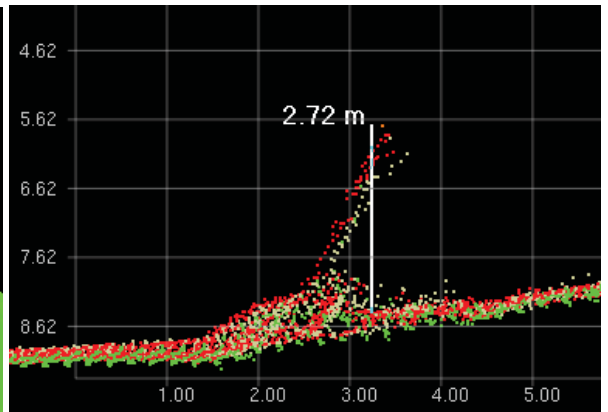
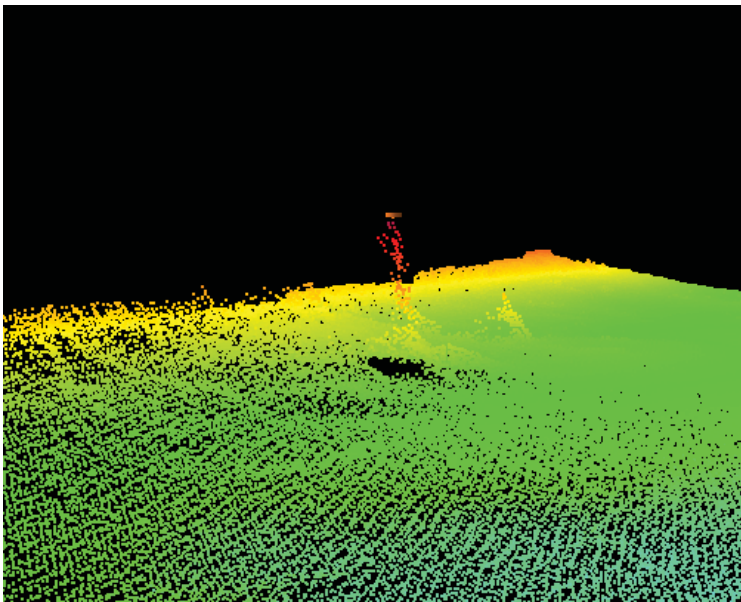
DtoN #11.6 MBES 3d and 2d View



DtoN #11.7 MBES 3d and 2d View



DtoN #11.8 MBES 3d and 2d View



Danger to Navigation 12

Jason Creech

From: Jason Creech
Sent: Tuesday, January 12, 2010 8:22 AM
To: crescent.moegling@noaa.gov
Cc: Gary.Nelson@noaa.gov'; Jon Dasler; Lori.Knell
Subject: H11859_DTON_12 Submission
Attachments: H11859_DtoN_12.txt; H11859_DtoN_12.doc

Crescent,

Attached is a Danger to Navigation report for H11859_DTON_12 which encompasses Willamette River miles 10-12. The attached files include the danger report, ASCII text file, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,

Jason

Jason Creech Lead Hydrographer

David Evans and Associates, Inc. | Marine Services Division
2801 SE Columbia Way, Ste. 130 | Vancouver, WA 98661
jasc@deainc.com | Phone: 804.516.7829 | Fax: 360.314.3250

www.deainc.com

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REPORT OF DANGER TO NAVIGATION

H11859 #12

Hydrographic Survey Registry Number: H11859
Survey Title: State: OREGON
General Locality: COLUMBIA RIVER
Sublocality: KELLEY POINT TO SELLWOOD

Project Number: OPR-N338-KR-08
Field Unit: David Evans and Associates, Inc.
Survey Date: December 6, 2008 and December 7, 2008
Survey Time: DtoN 12.1 – 22:43:01 UTC
DtoN 12.2 – 20:42:39 UTC
DtoN 12.3 – 20:16:07 UTC
DtoN 12.4 – 18:19:38 UTC
DtoN 12.5 – 23:31:17 UTC
DtoN 12.6 – 21:29:33 UTC
DtoN 12.7 – 20:11:13 UTC
DtoN 12.8 – 23:53:59 UTC
DtoN 12.9 – 17:47:51 UTC
DtoN 12.10 – 18:05:19 UTC
DtoN 12.11 – 18:45:28 UTC
DtoN 12.12 – 17:51:21 UTC
DtoN 12.13 – 18:37:45 UTC
DtoN 12.14 – 17:02:54 UTC
DtoN 12.15 – 18:51:39 UTC

Depths were acquired with Multibeam Sonar. Depths are corrected using post processed GPS water levels.

Positions are referenced from a contractor installed GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon.

Chart affected:

- 18526 59th Edition/June 1, 2009, 1:20,000 scale
- 18527 22nd Edition/September 1, 2005, 1:5,000 scale

The following items were found during hydrographic survey operations.

DANGER TO NAVIGATION # 12 (depths adjusted to CRD)

FEATURE	DEPTH (M)	LATITUDE (N)	LONGITUDE (W)
12.1 – OBSTRN	16.277	45/31/46.755	122/40/13.890
12.2 – OBSTRN	1.466	45/31/53.192	122/40/19.496
12.3 – OBSTRN	3.148	45/32/09.107	122/40/55.450
12.4 – OBSTRN	11.352	45/32/15.945	122/40/47.847
12.5 – OBSTRN	9.429	45/32/19.607	122/41/06.426
12.6 – OBSTRN	0.155	45/32/19.307	122/41/12.430
12.7 – OBSTRN	4.541	45/32/24.693	122/41/19.368
12.8 – OBSTRN	9.852	45/32/26.609	122/41/16.858
12.9 – OBSTRN	3.498	45/32/31.413	122/41/10.317
12.10 – OBSTRN	9.243	45/32/35.423	122/41/16.159
12.11 – OBSTRN	7.705	45/32/44.122	122/41/26.353
12.12 – OBSTRN	11.906	45/32/45.739	122/41/32.243
12.13 – OBSTRN	6.853	45/32/52.961	122/41/36.549
12.14 – OBSTRN	11.335	45/32/56.719	122/41/51.615
12.15 – OBSTRN	6.824	45/33/05.666	122/41/49.999

DtoN 12.1 appears to be debris rising 3.0m above the natural bottom.

DtoN 12.2 appears to be a square object rising 1.7m above the natural bottom.

DtoN 12.3 appears to be a snag/stump rising 2.3m above the natural bottom.

DtoN 12.4 appears to be snags/stumps rising 1.5m above the natural bottom.

DtoN 12.5 appears to be a snag/stump rising 5.2m above the natural bottom.

DtoN 12.6 appears to be a snag/stump rising 1.5m above the natural bottom.

DtoN 12.7 appears to be debris rising 2.0m above the natural bottom.

DtoN 12.8 appears to be a snag/stump rising 5.1m above the natural bottom.

DtoN 12.9 appears to be a snag/stump rising 6.7m above the natural bottom.

DtoN 12.10 appears to be debris rising 2.7m above the natural bottom.

DtoN 12.11 appears to be a snag/stump rising 4.4m above the natural bottom.

DtoN 12.12 appears to be a cylinder (possible pipe section) rising 1.4m above the natural bottom.

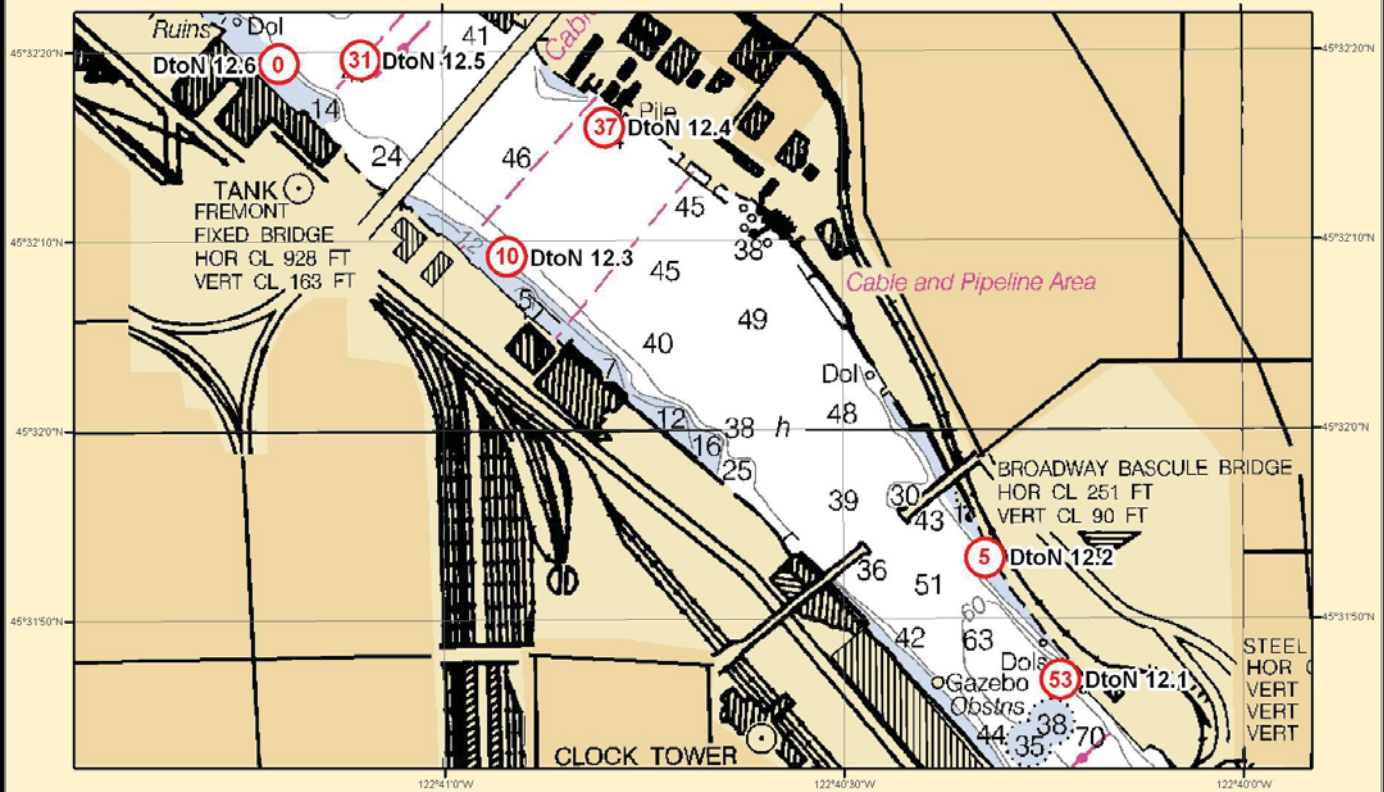
DtoN 12.13 appears to be a snag/stump rising 4.7m above the natural bottom.

DtoN 12.14 appears to be a cylinder (possible pipe section) rising 1.2m above the natural bottom.

DtoN 12.15 appears to be a snag/stump rising 3.4m above the natural bottom.

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 525-6835.

DANGER TO NAVIGATION #12



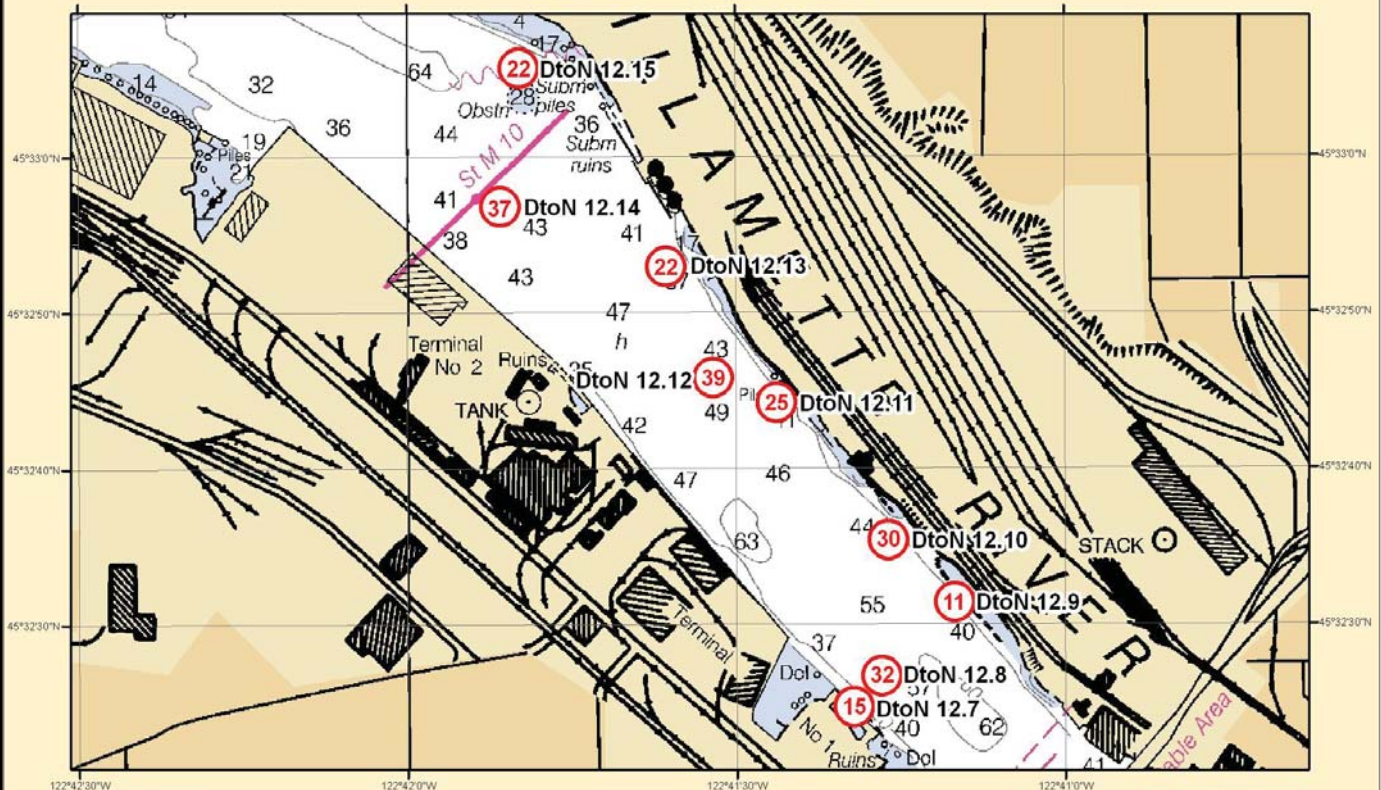
Obstructions

Chartlet 1 of 2

This chartlet has been corrected through
 Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.

 <p>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE</p>	<p>Project: OPR-N388-KR-08 Survey: H11859 State: Oregon Locality: Willamette River Sub-Locality: Kelley Point to Sellwood Survey Scale: 1:10,000</p>	<p>Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18526_1 Chart Edition: 59th Chart Scale: 1:20,000</p>	<p>David Evans and Associates, Inc. January 11, 2010</p>
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DANGER TO NAVIGATION #12



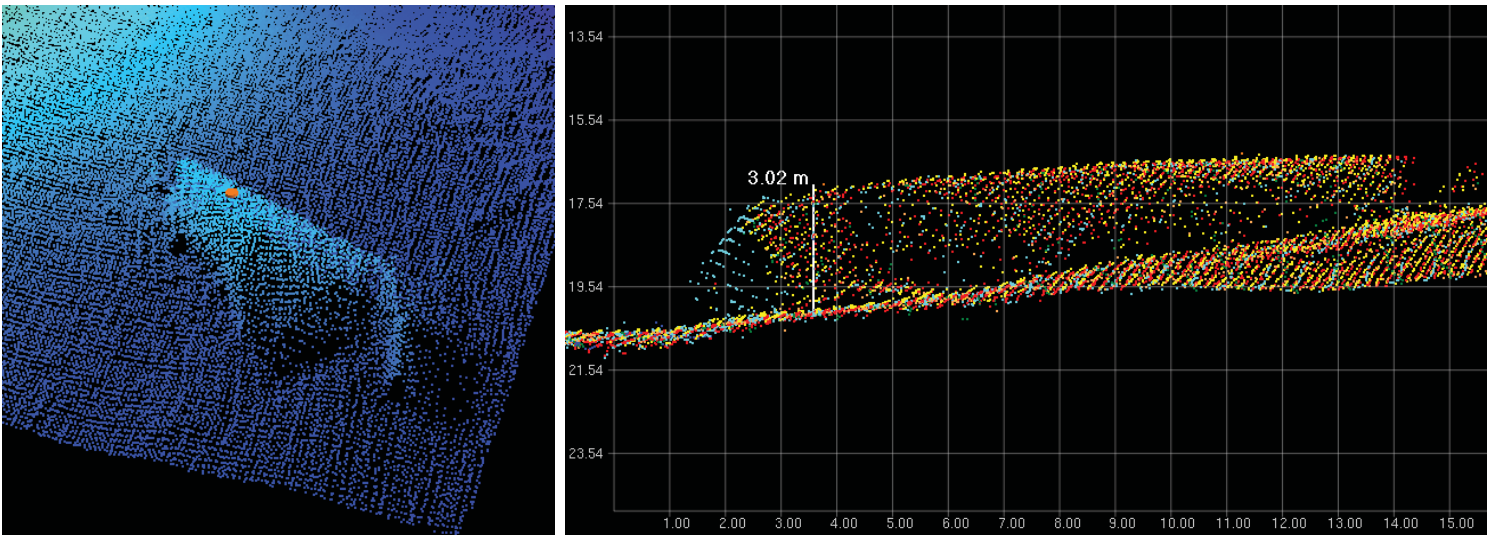
Obstructions

Chartlet 2 of 2

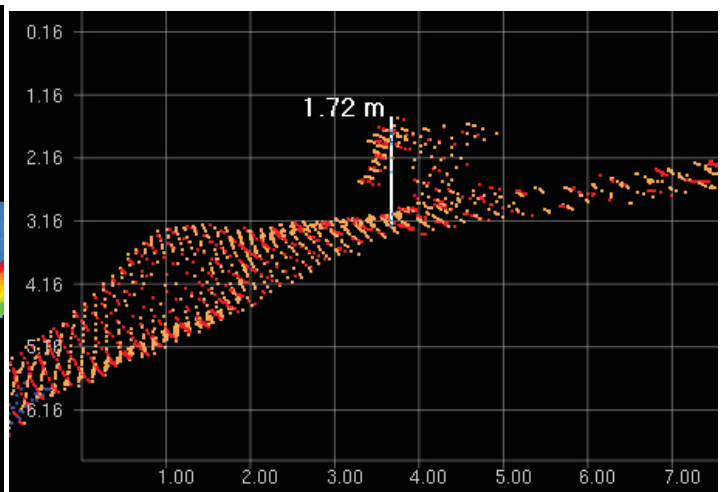
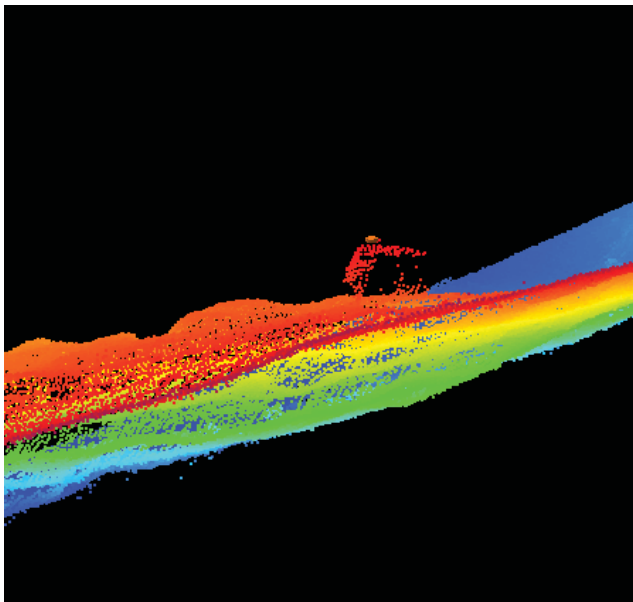
This chartlet has been corrected through Notice to Mariners dated November 24, 2009 NOT FOR NAVIGATION.

	<p>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE</p>	<p>Project: OPR-N388-KR-08 Survey: H11859 State: Oregon Locality: Willamette River Sub-Locality: Kelley Point to Sellwood Survey Scale: 1:10,000</p>	<p>Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18526_1 Chart Edition: 59th Chart Scale: 1:20,000</p>	<p>David Evans and Associates, Inc. January 11, 2010</p>
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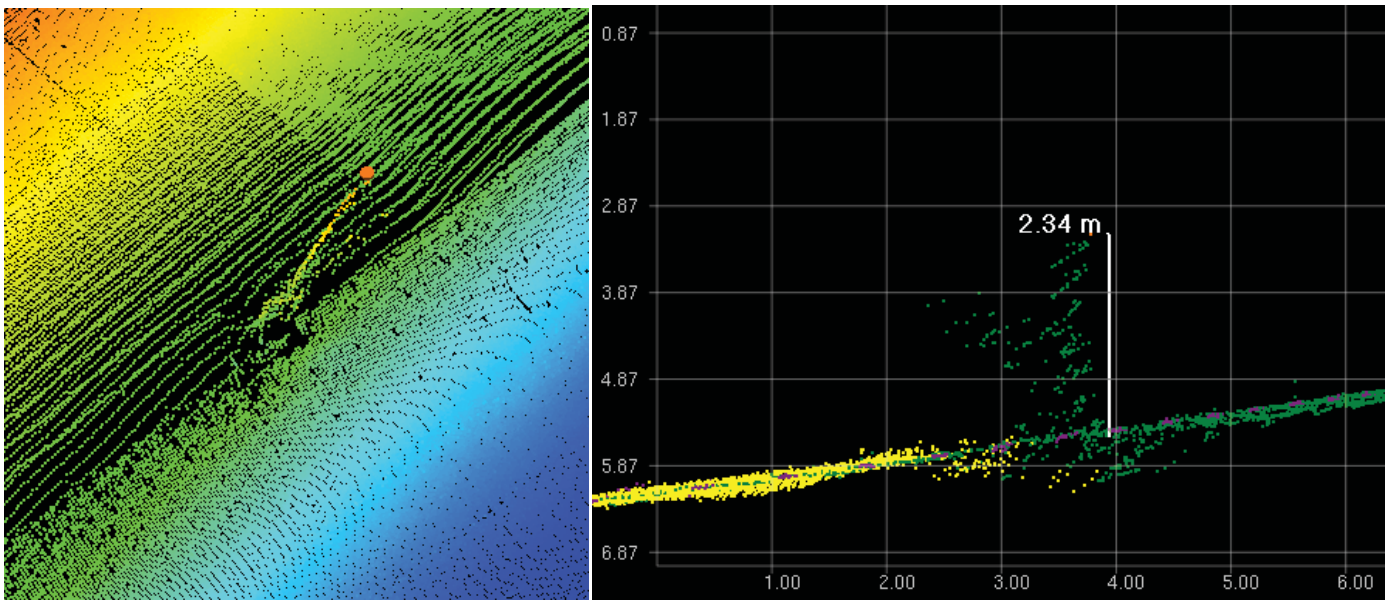
DtoN #12.1 MBES 3d and 2d View



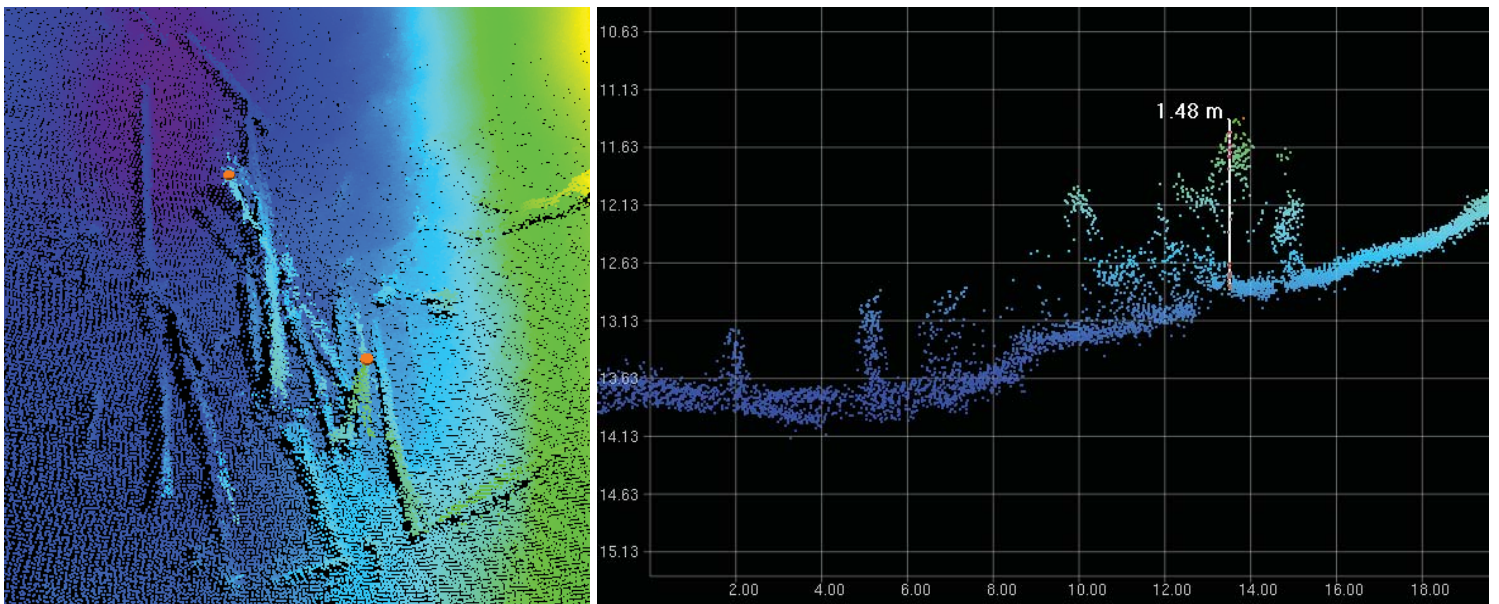
DtoN #12.2 MBES 3d and 2d View



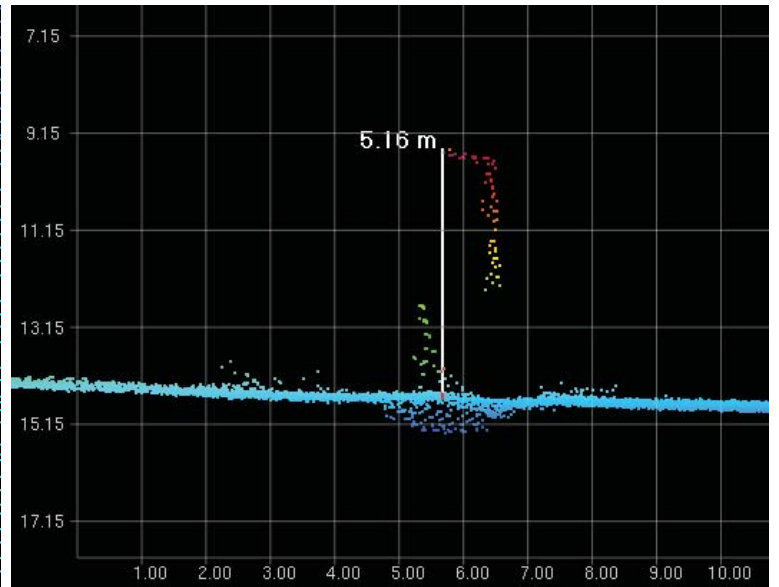
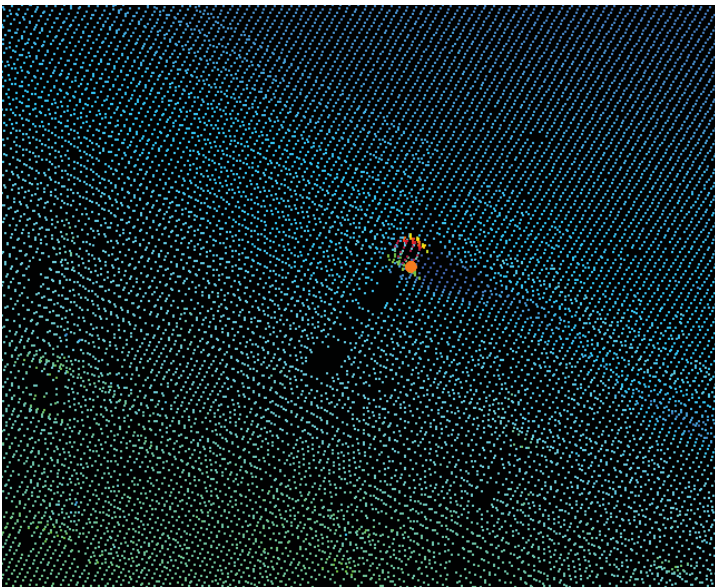
DtoN #12.3 MBES 3d and 2d View



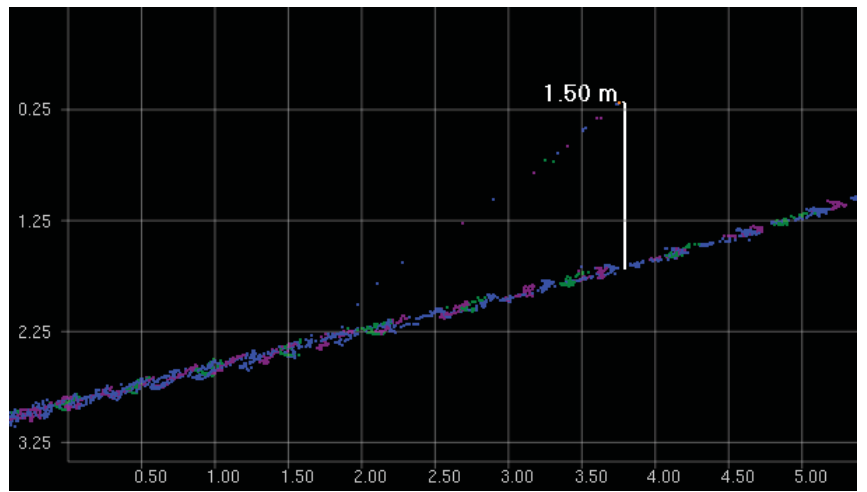
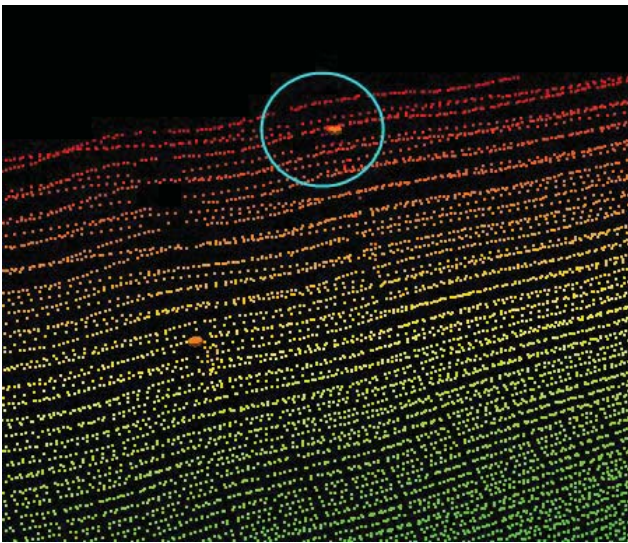
DtoN #12.4 MBES 3d and 2d View



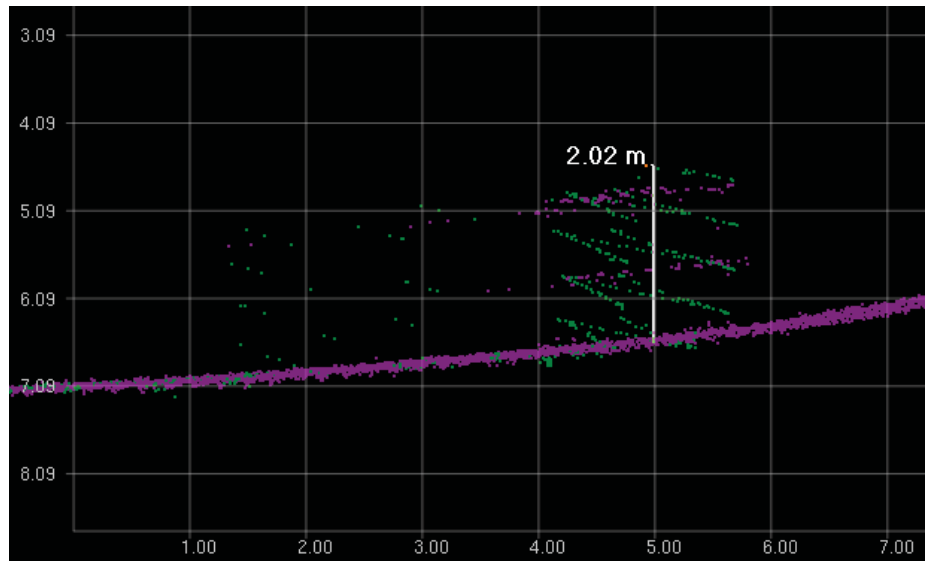
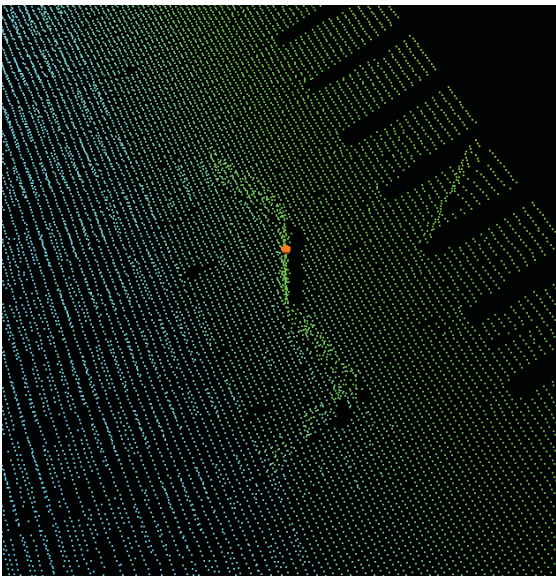
DtoN #12.5 MBES 3d and 2d View



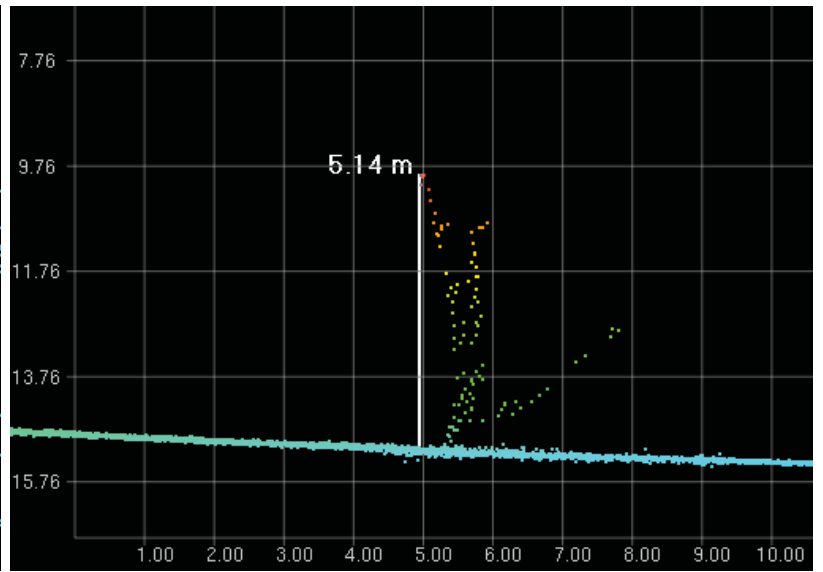
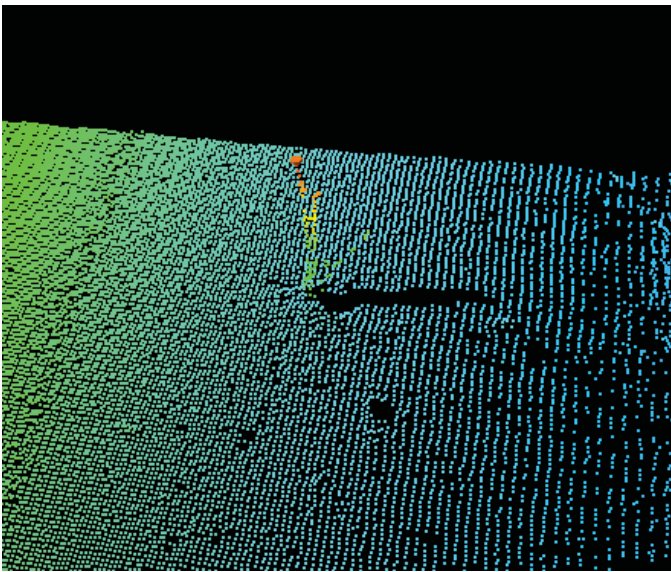
DtoN #12.6 MBES 3d and 2d View



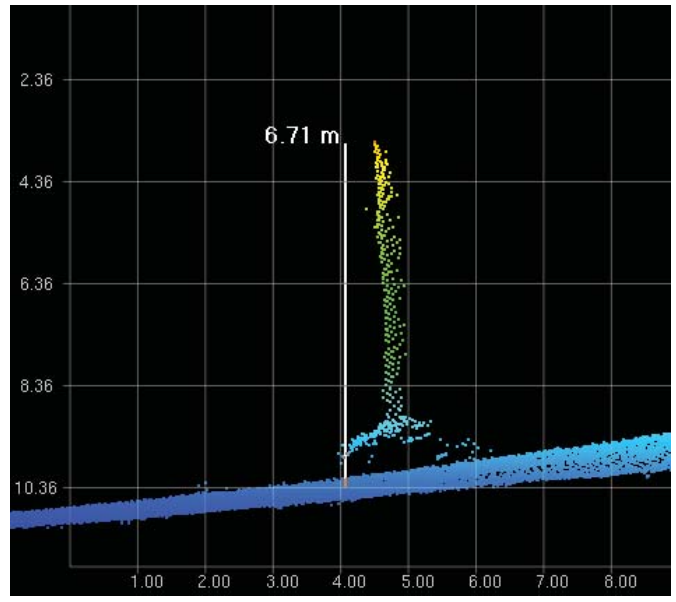
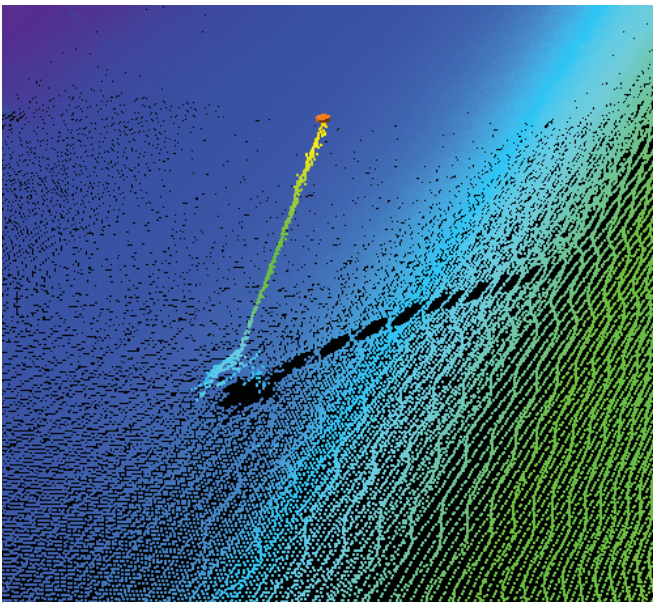
DtoN #12.7 MBES 3d and 2d View



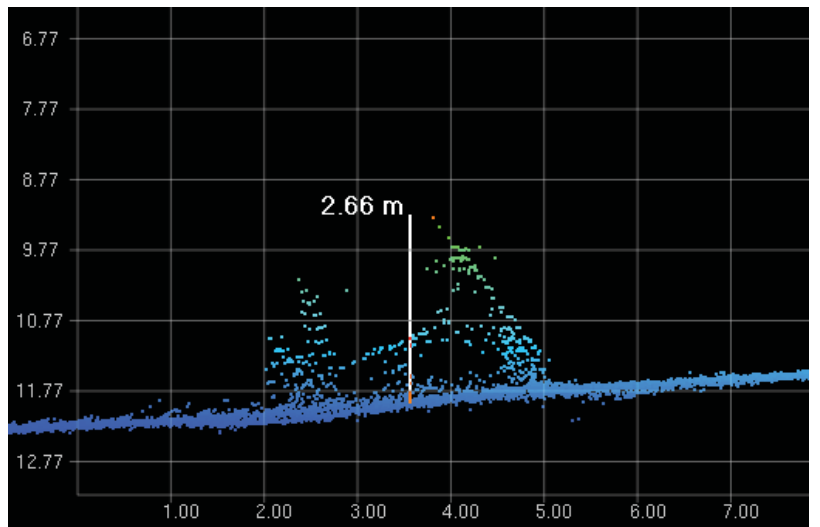
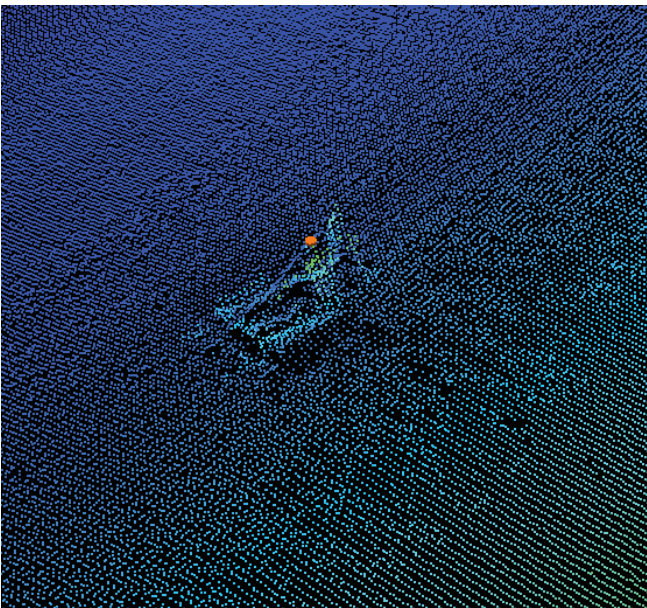
DtoN #12.8 MBES 3d and 2d View



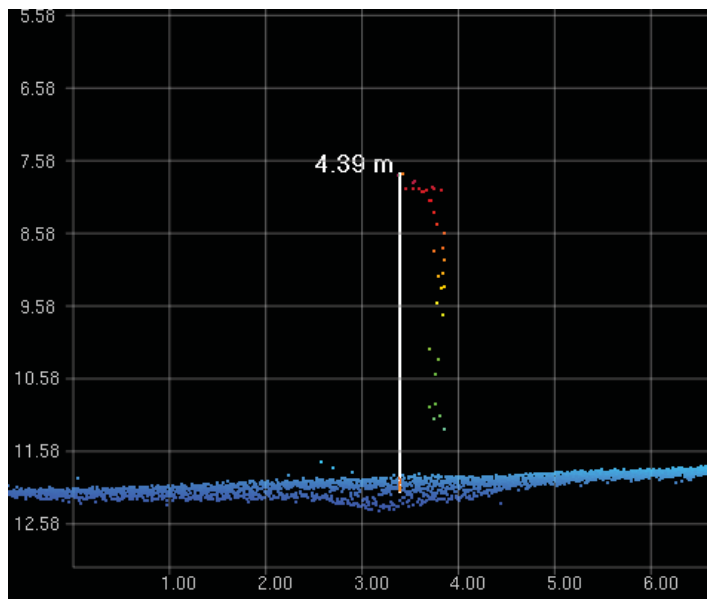
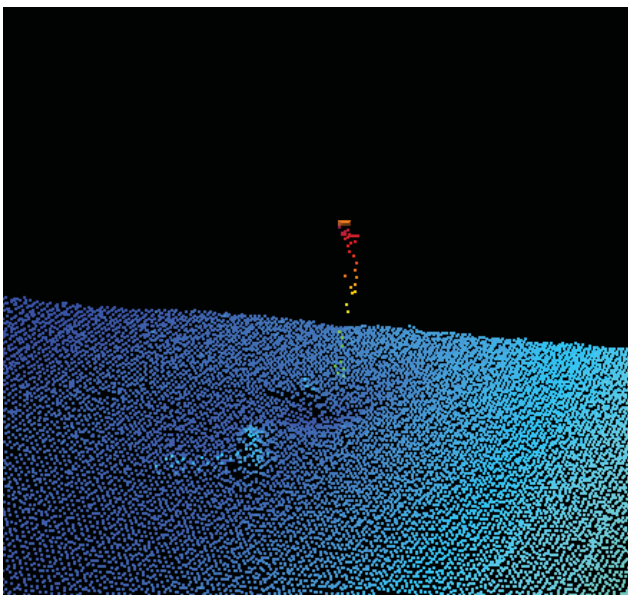
DtoN #12.9 MBES 3d and 2d View



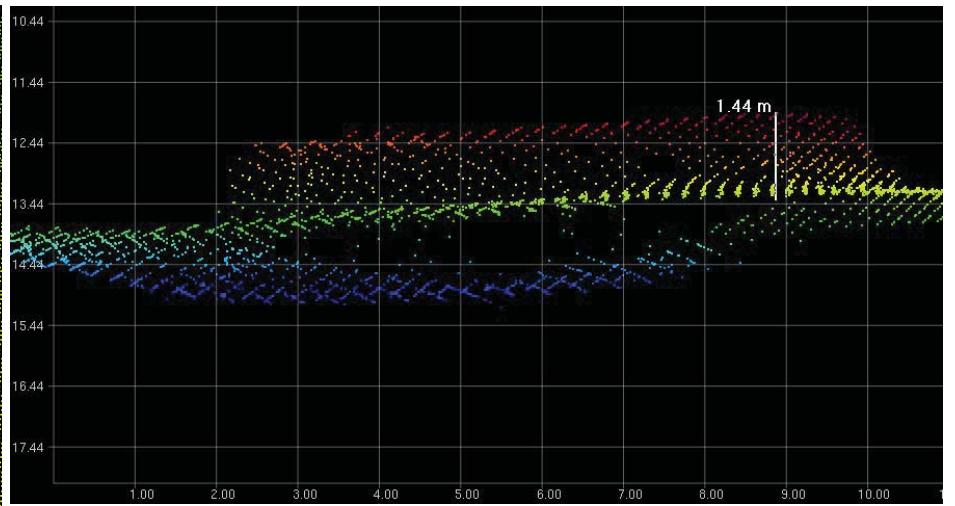
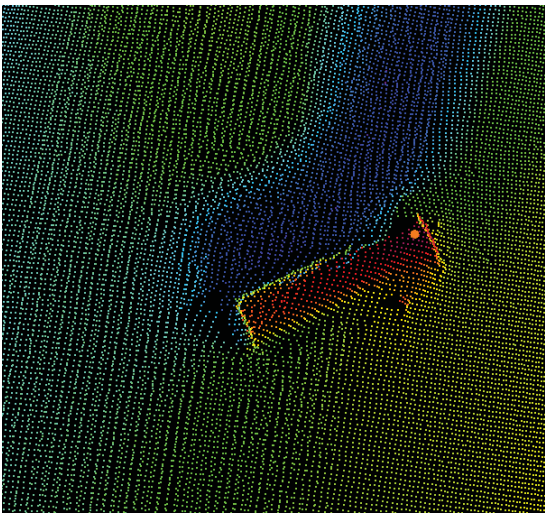
DtoN #12.10 MBES 3d and 2d View



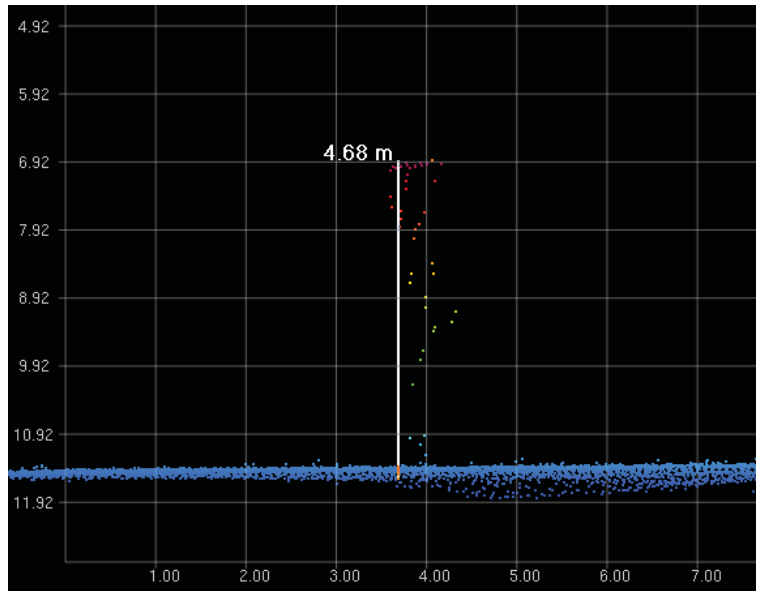
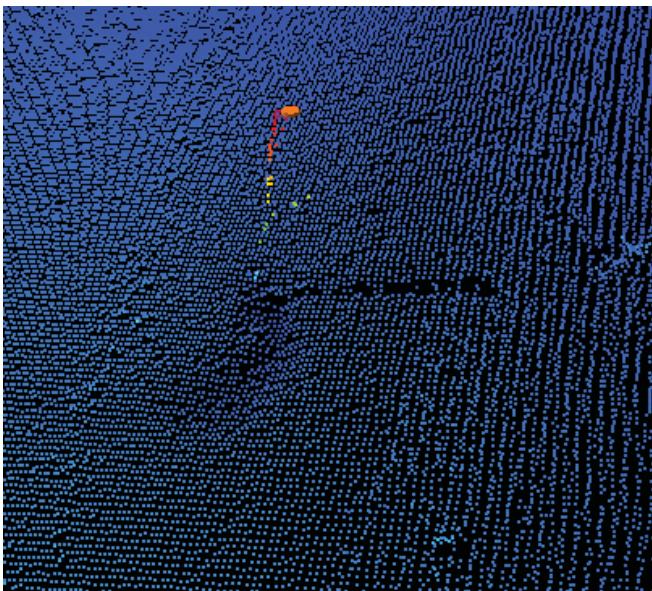
DtoN #12.11 MBES 3d and 2d View



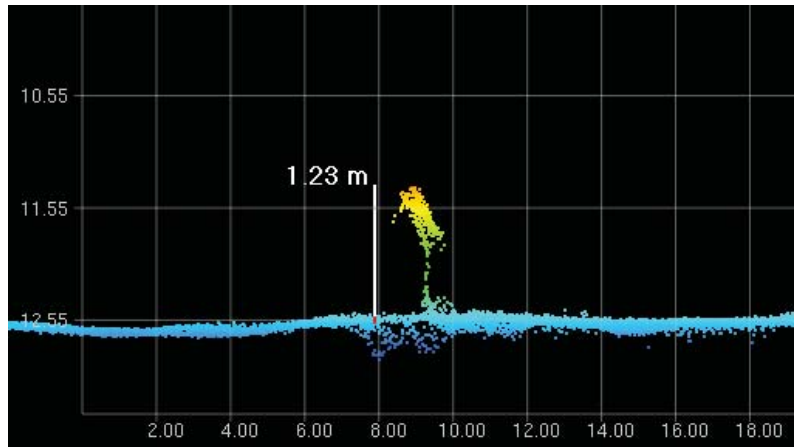
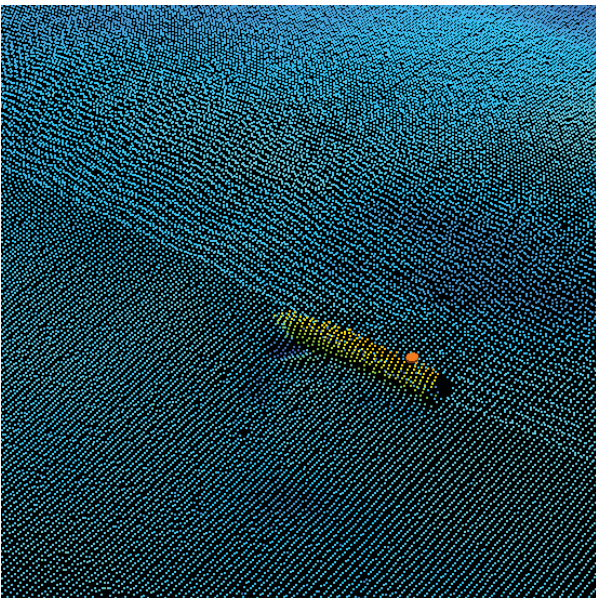
DtoN #12.12 MBES 3d and 2d View



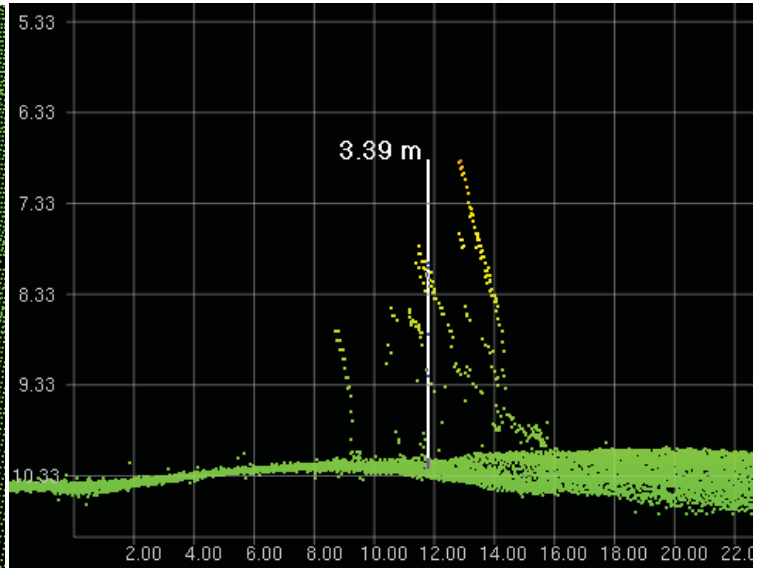
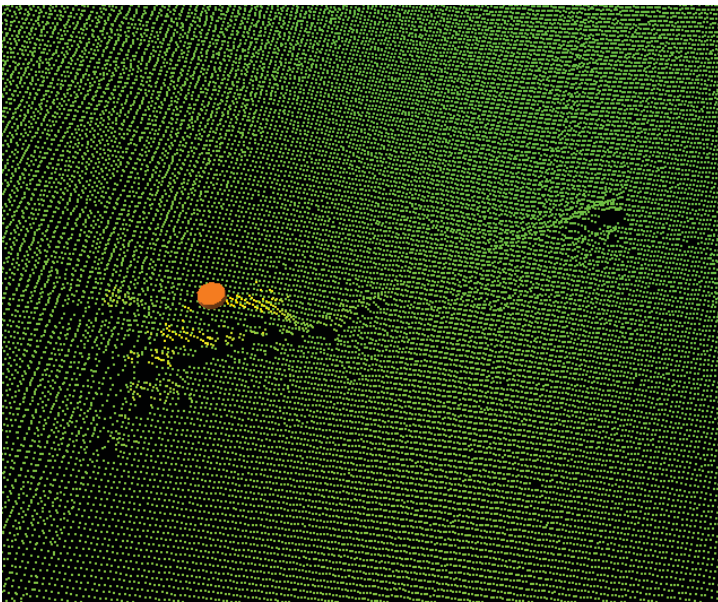
DtoN #12.13 MBES 3d and 2d View



DtoN #12.14 MBES 3d and 2d View





DtoN #12.15 MBES 3d and 2d View



Danger to Navigation 13

 Attachments can contain viruses that may harm your computer. Attachments may not display correctly.

Jason Creech

From: Jason Creech **Sent:** Thu 1/28/2010 2:41 PM
To: crescent.moegling@noaa.gov
Cc: Lori.Knell; Gary Nelson; Jon Dasler
Subject: H11859_DTON_13 Submission
Attachments:  [H11859_DtoN_13.doc\(1MB\)](#)  [H11859_DtoN_13.txt\(1KB\)](#)

Crescent,

Attached is a Danger to Navigation report for H11859_DTON_13 which encompasses the Swan Island Basin on the Willamette River. The attached files include the danger report, ASCII text file, standard chartlet, and supporting images. Please let me know if you have any questions or require any additional information on this danger to navigation.

Thanks,

Jason

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc. | Marine Services Division
2801 SE Columbia Way, Ste. 130 | Vancouver, WA 98661
jasc@deainc.com | Office: 804.516.7829 | Cell: 804.516.7829 | Fax: 360.314.3250

REPORT OF DANGER TO NAVIGATION

H11859 #13

Hydrographic Survey: Registry Number: H11859
Survey Title: State: OREGON
General Locality: COLUMBIA RIVER
Sublocality: KELLEY POINT TO SELLWOOD

Project Number: OPR-N338-KR-08
Field Unit: David Evans and Associates, Inc.
Survey Date & Time (UTC): DtoN 13.1 – December 8, 2008 at 19:17:01
DtoN 13.2 – December 8, 2008 at 18:55:24
DtoN 13.3 – December 6, 2008 at 18:13:02
DtoN 13.4 – December 6, 2008 at 18:28:46
DtoN 13.5 – December 8, 2008 at 18:50:38
DtoN 13.6 – December 6, 2008 at 18:33:34
DtoN 13.7 – December 6, 2008 at 18:17:01
DtoN 13.8 – January 22, 2009 at 20:30:04
DtoN 13.9 – January 22, 2009 at 20:17:45
DtoN 13.10 – December 6, 2008 at 18:24:29
DtoN 13.11 – December 6, 2008 at 17:44:12
DtoN 13.12 – December 6, 2008 at 18:06:44
DtoN 13.13 – December 6, 2008 at 17:29:15
DtoN 13.14 – December 6, 2008 at 17:45:56
DtoN 13.15 – December 6, 2008 at 18:06:14
DtoN 13.16 – December 8, 2008 at 20:02:11
DtoN 13.17 – December 6, 2008 at 19:07:59
DtoN 13.18 – December 6, 2008 at 17:27:51
DtoN 13.19 – December 6, 2008 at 18:42:40
DtoN 13.20 – December 6, 2008 at 19:12:06
DtoN 13.21 – December 8, 2008 at 18:33:56
DtoN 13.22 – December 6, 2008 at 17:25:42
DtoN 13.23 – December 6, 2008 at 17:54:09

Depths were acquired with Multibeam Sonar. Depths are corrected using post processed GPS water levels.

Positions are referenced from a contractor installed GPS network and verified using the USCG DGPS beacon at Fort Stevens, Oregon.

Chart affected:

- 18526 59th Edition/June 1, 2009, 1:20,000 scale
- 18527 22nd Edition/September 1, 2005, 1:5,000 scale

The following items were found during hydrographic survey operations.

DANGER TO NAVIGATION # 13 (depths adjusted to CRD)

FEATURE	DEPTH (M)	LATITUDE (N)	LONGITUDE (W)
13.1 – OBSTRN	0.968	45/33/43.317	122/42/31.049
13.2 – OBSTRN	0.892	45/33/43.672	122/42/32.730
13.3 – OBSTRN	4.085	45/33/46.153	122/42/31.367
13.4 – OBSTRN	5.123	45/33/48.321	122/42/38.597
13.5 – OBSTRN	6.109	45/33/52.029	122/42/46.523
13.6 – OBSTRN	6.377	45/33/53.763	122/42/49.109
13.7 – OBSTRN	7.232	45/33/54.894	122/42/48.880
13.8 – OBSTRN	0.760	45/33/57.493	122/42/48.212
13.9 – OBSTRN	7.537	45/34/01.130	122/43/03.430
13.10 – OBSTRN	6.659	45/34/02.491	122/43/05.256
13.11 – OBSTRN	7.680	45/34/02.797	122/43/00.512
13.12 – OBSTRN	8.057	45/34/06.450	122/43/09.859
13.13 – OBSTRN	5.909	45/34/07.307	122/43/09.040
13.14 – OBSTRN	7.274	45/34/07.853	122/43/10.100
13.15 – OBSTRN	7.475	45/34/08.295	122/43/12.351
13.16 – OBSTRN	1.346	45/34/09.919	122/43/09.455
13.17 – OBSTRN	5.401	45/34/10.700	122/43/12.964
13.18 – OBSTRN	8.070	45/34/10.420	122/43/16.550
13.19 – OBSTRN	4.846	45/34/12.104	122/43/14.192
13.20 – OBSTRN	2.765	45/34/12.622	122/43/18.790
13.21 – OBSTRN	7.685	45/33/57.222	122/43/30.898
13.22 – OBSTRN	5.618	45/34/09.022	122/43/32.177
13.23 – OBSTRN	3.821	45/34/08.985	122/43/39.520

DtoN 13.1 appears to be debris rising 3.3m above the natural bottom.

DtoN 13.2 appears to be a pile ruin rising 4.1m above the natural bottom.

DtoN 13.3 appears to be a log approximately 4m long, rising 1.2m above the natural bottom.

DtoN 13.4 appears to be a log approximately 12m long, rising 1.7m above the natural bottom.

DtoN 13.5 appears to be a snag/stump rising 1.6m above the natural bottom.

DtoN 13.6 appears to be a snag/stump rising 2.7m above the natural bottom.

DtoN 13.7 appears to be debris rising 1.2m above the natural bottom.

DtoN 13.8 appears to be a snag/stump rising 6.8m above the natural bottom.

DtoN 13.9 appears to be a snag/stump rising 2.6m above the natural bottom.

DtoN 13.10 appears to be a snag/stump rising 3.5m above the natural bottom.

DtoN 13.11 appears to be debris rising 1.3m above the natural bottom.

DtoN 13.12 appears to be an 11m long linear feature, rising 2.1m above the natural bottom.

DtoN 13.13 appears to be a snag/stump rising 3.2m above the natural bottom.

DtoN 13.14 appears to be debris rising 1.8m above the natural bottom.

DtoN 13.15 appears to be a log approximately 12m long, rising 2.1m above the natural bottom.

DtoN 13.16 appears to be a snag/stump rising 6.3m above the natural bottom.

DtoN 13.17 appears to be a snag/stump rising 3.7m above the natural bottom.

DtoN 13.18 appears to be a snag/stump rising 1.4m above the natural bottom.

DtoN 13.19 appears to be a snag/stump rising 3.8m above the natural bottom.

DtoN 13.20 appears to be a snag/stump rising 5.6m above the natural bottom.

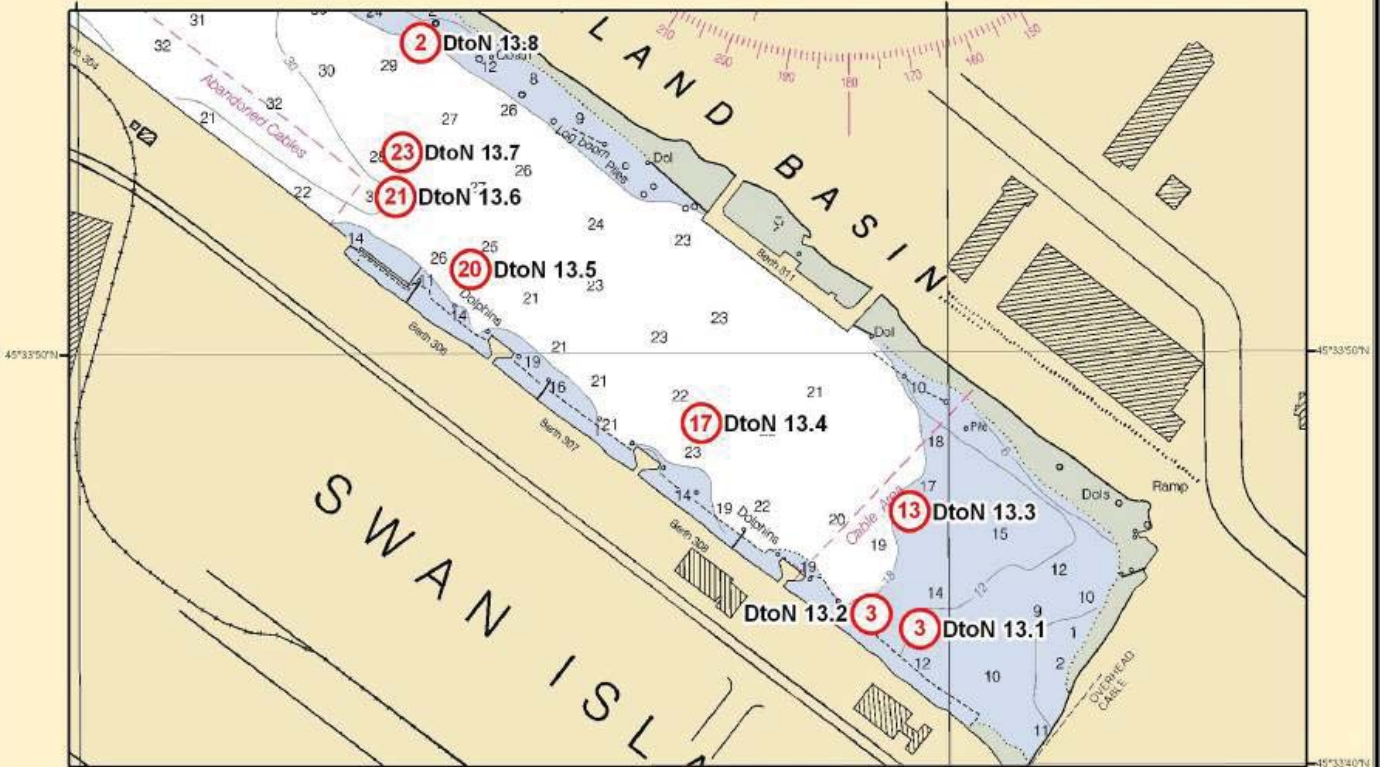
DtoN 13.21 appears to be a tripodal pile ruin rising 9.7m above the natural bottom.

DtoN 13.22 appears to be a snag/stump rising 5.5m above the natural bottom.

DtoN 13.23 appears to be a snag/stump rising 7.4m above the natural bottom.

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 525-6835.

DANGER TO NAVIGATION #13



122°43'0\"/>

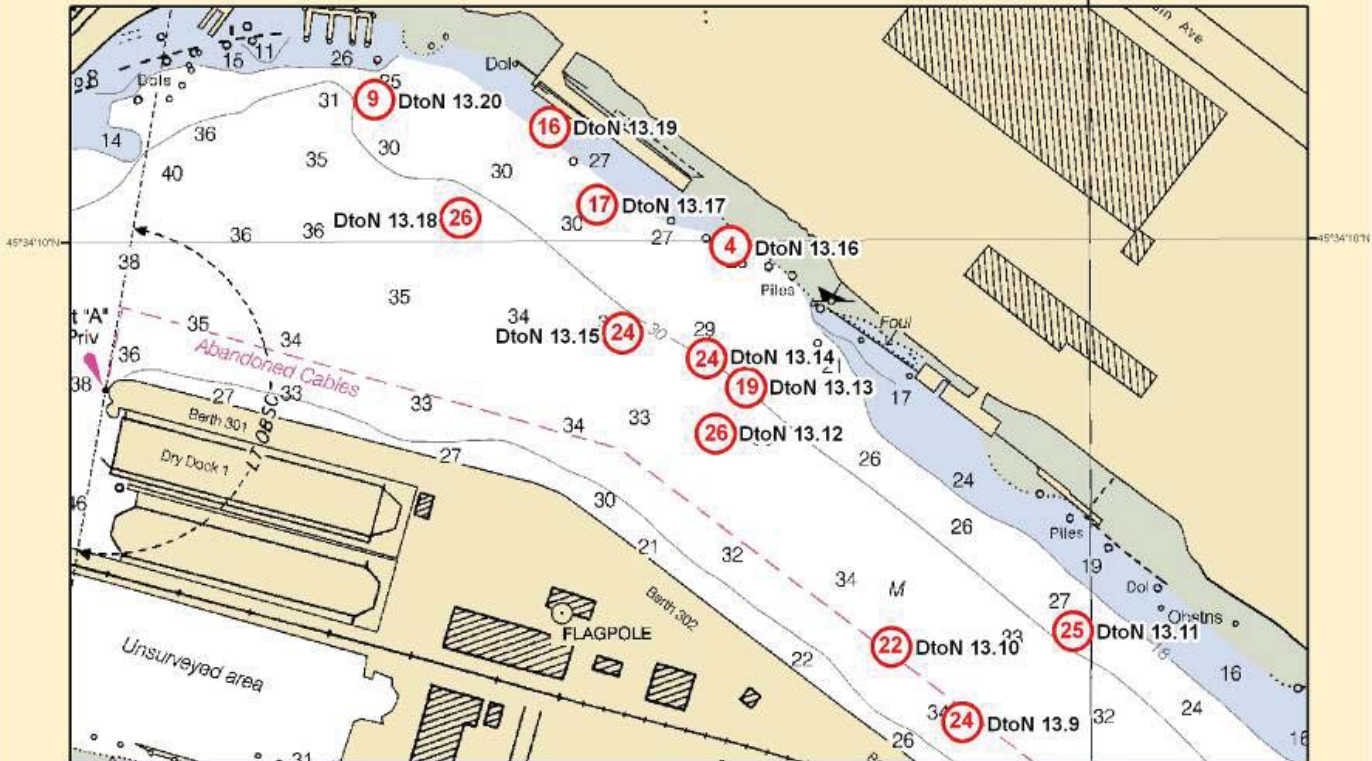
Obstructions

Chartlet 1 of 3

This chartlet has been corrected through
 Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.

	<p>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE</p>	<p>Project: OPR-N388-KR-08 Survey: H11859 State: Oregon Locality: Willamette River Sub-Locality: Kelley Point to Sellwood Survey Scale: 1:10,000</p>	<p>Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18527_1 Chart Edition: 22nd Chart Scale: 1:5,000</p>	<p>David Evans and Associates, Inc.</p> <p>January 22, 2010</p>
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DANGER TO NAVIGATION #13



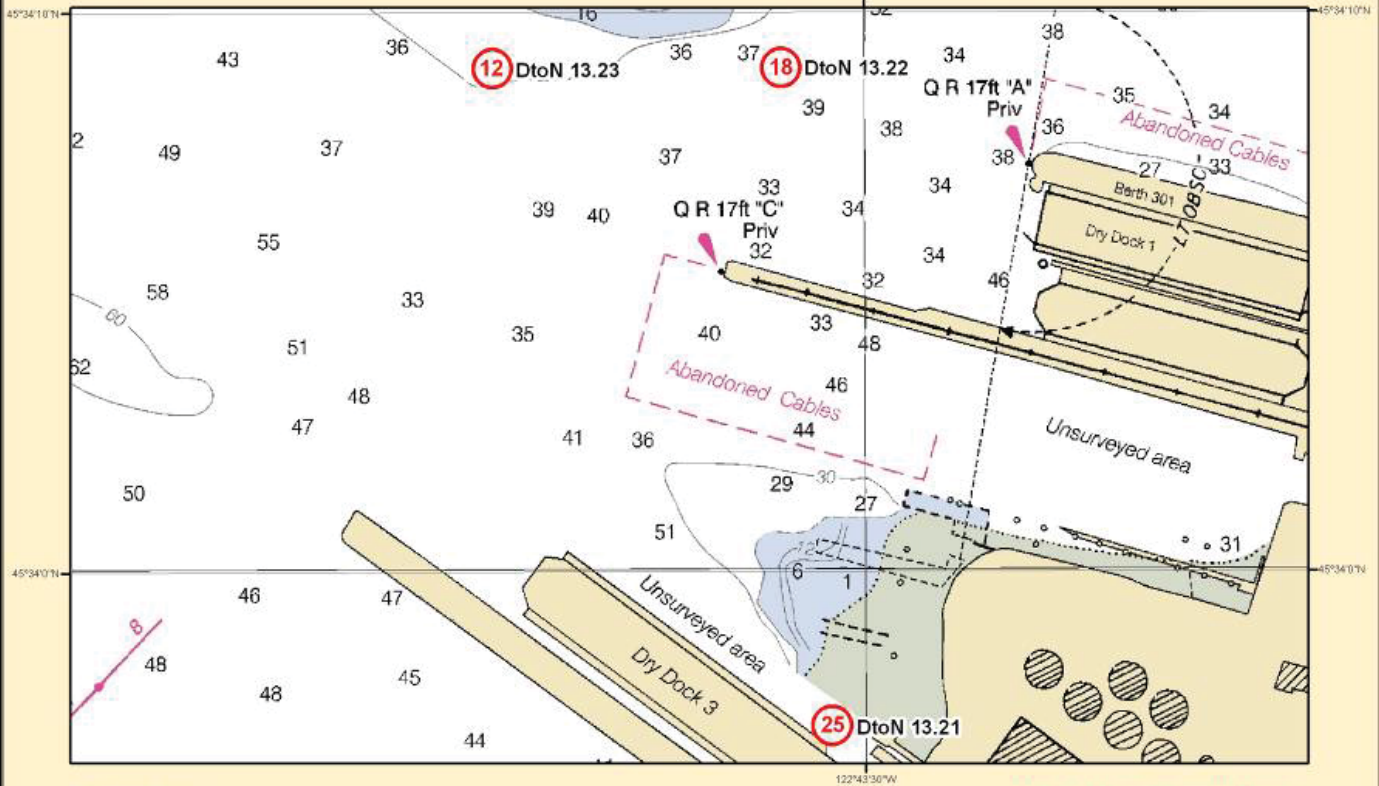
Obstructions

Chartlet 2 of 3

This chartlet has been corrected through
 Notice to Mariners dated November 24, 2009
 NOT FOR NAVIGATION.

	<p>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE</p>	<p>Project: OPR-N388-KR-08 Survey: H11859 State: Oregon Locality: Willamette River Sub-Locality: Kelley Point to Sellwood Survey Scale: 1:10,000</p>	<p>Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18527_1 Chart Edition: 22nd Chart Scale: 1:5,000</p>	<p>David Evans and Associates, Inc. January 22, 2010</p>
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DANGER TO NAVIGATION #13



Obstructions

Chartlet 3 of 3

This chartlet has been corrected through
Notice to Mariners dated November 24, 2009
NOT FOR NAVIGATION.



NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

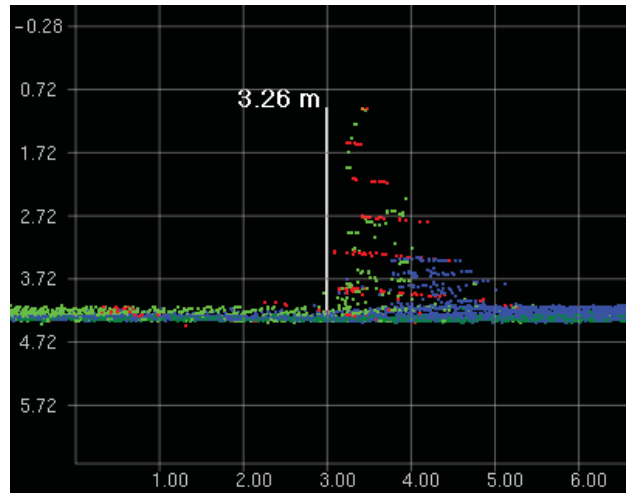
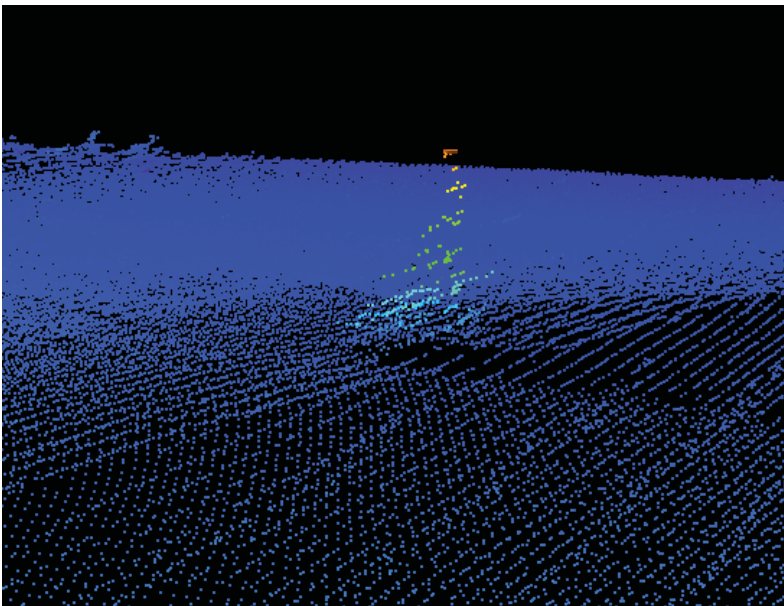
Project: OPR-N388-KR-08
Survey: H11859
State: Oregon
Locality: Willamette River
Sub-Locality: Kelley Point to Sellwood
Survey Scale: 1:10,000

Sounding Units: Feet
Sounding Datum: Columbia River
Horizontal Datum: NAD 83
Projection: UTM 10N
Chart: 18527_1
Chart Edition: 22nd
Chart Scale: 1:5,000

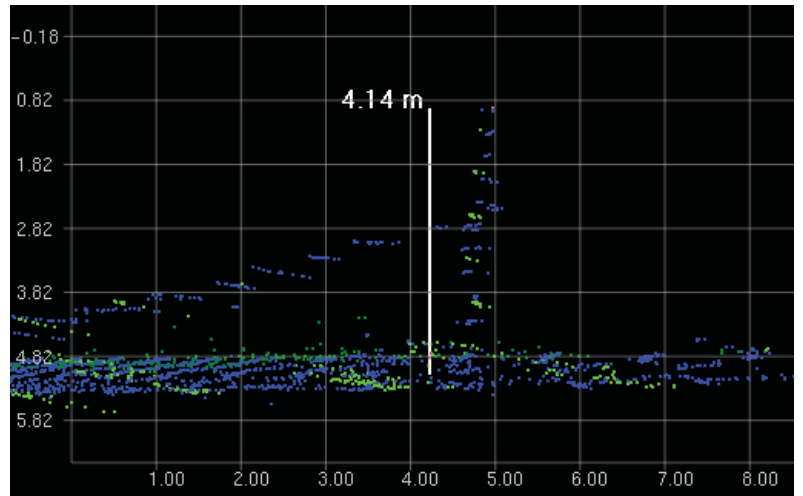
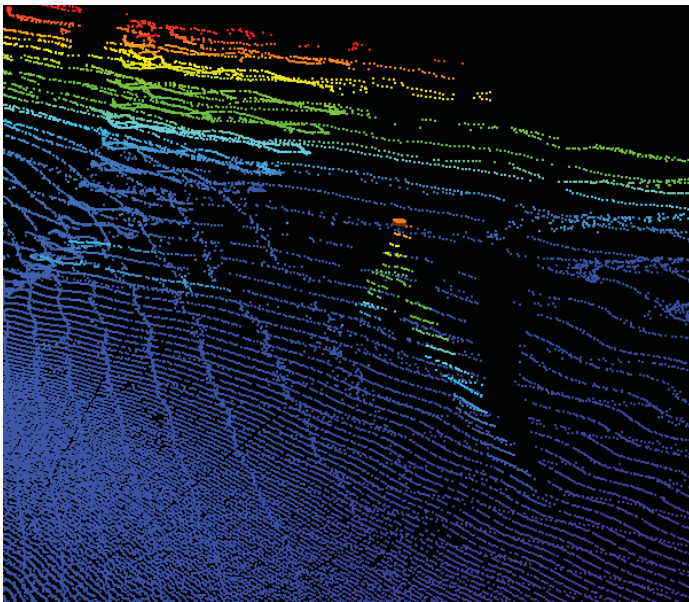
**David Evans and
Associates, Inc.**

January 22, 2010

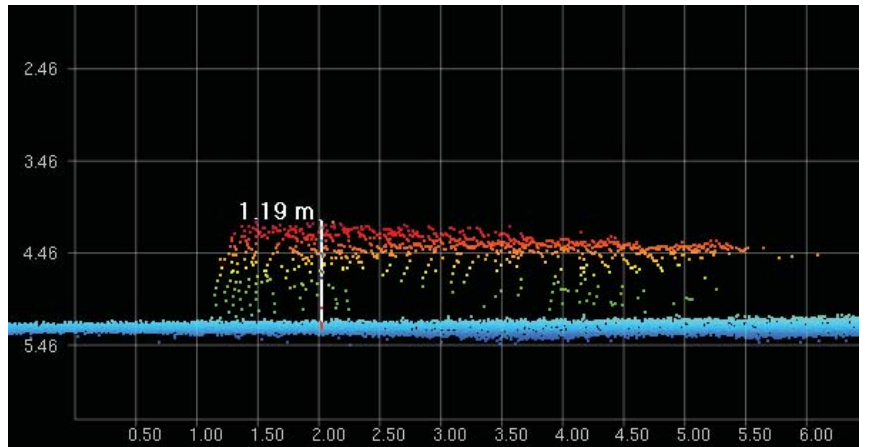
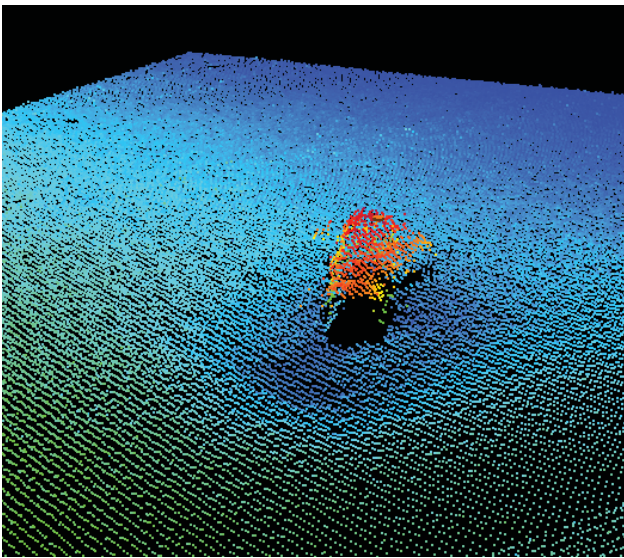
DtoN #13.1 MBES 3d and 2d View



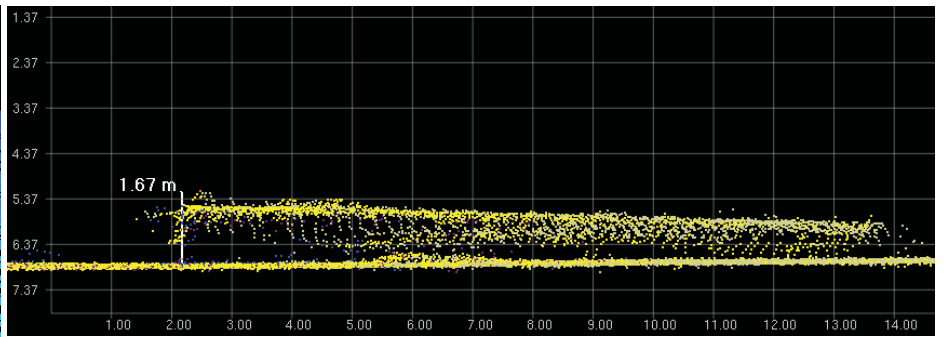
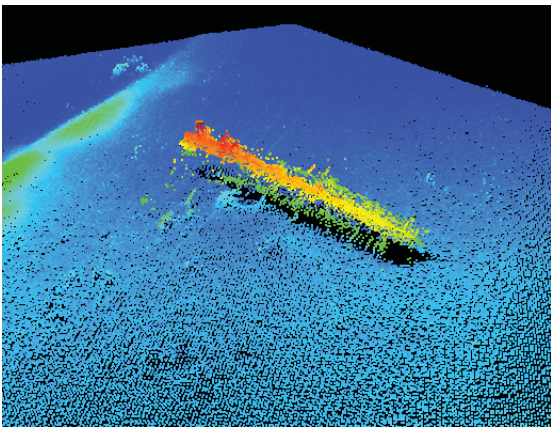
DtoN #13.2 MBES 3d and 2d View



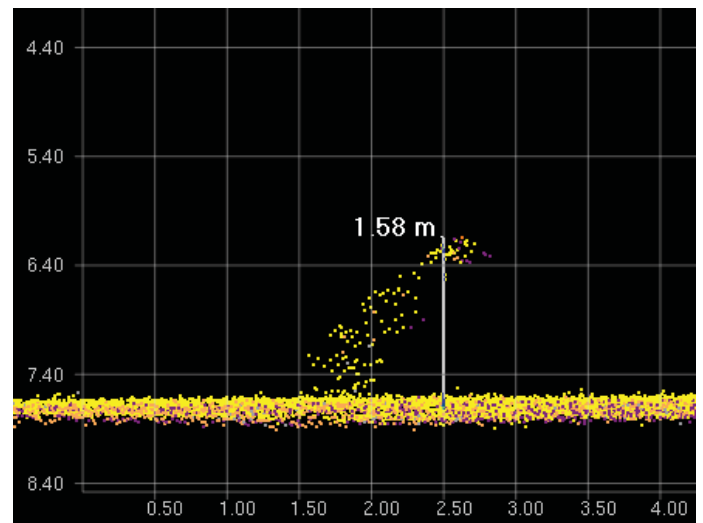
DtoN #13.3 MBES 3d and 2d View



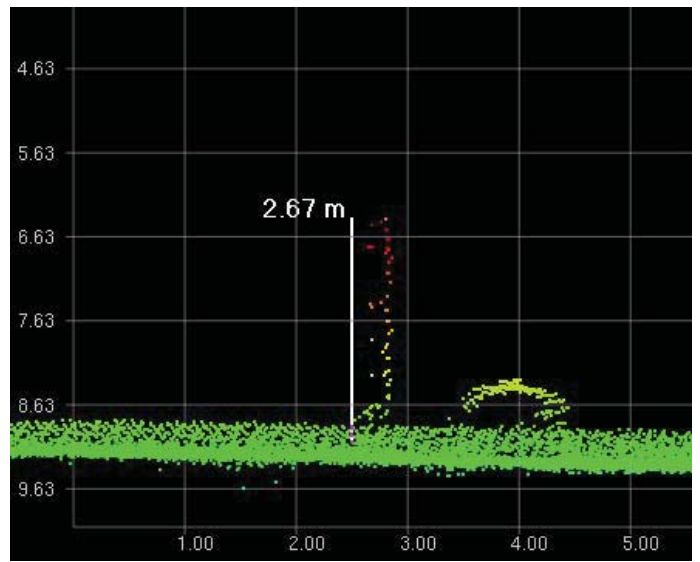
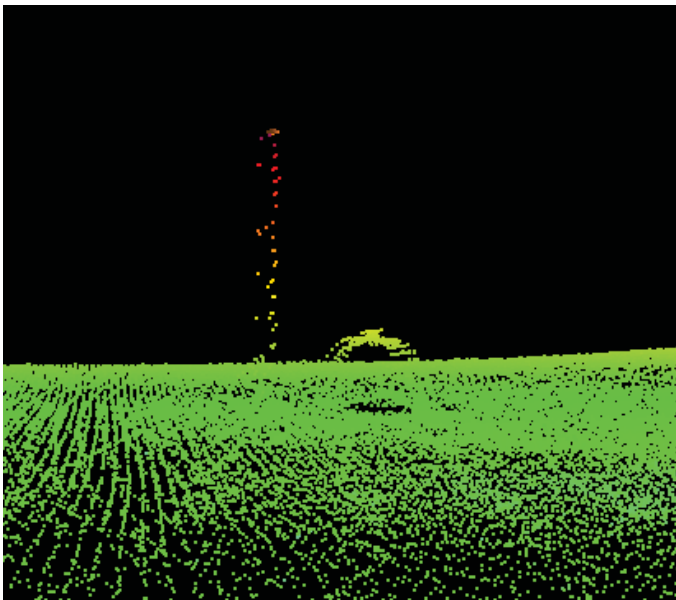
DtoN #13.4 MBES 3d and 2d View



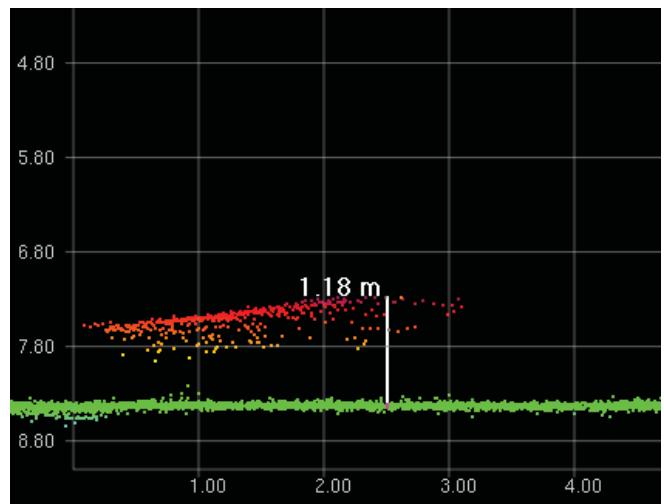
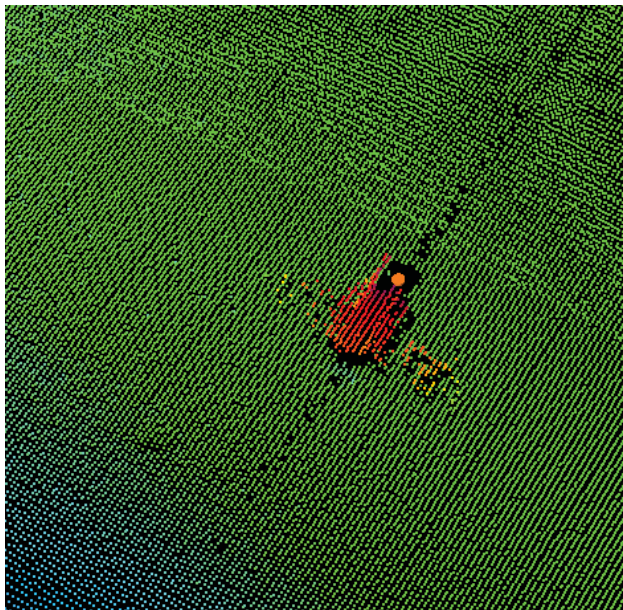
DtoN #13.5 MBES 3d and 2d View



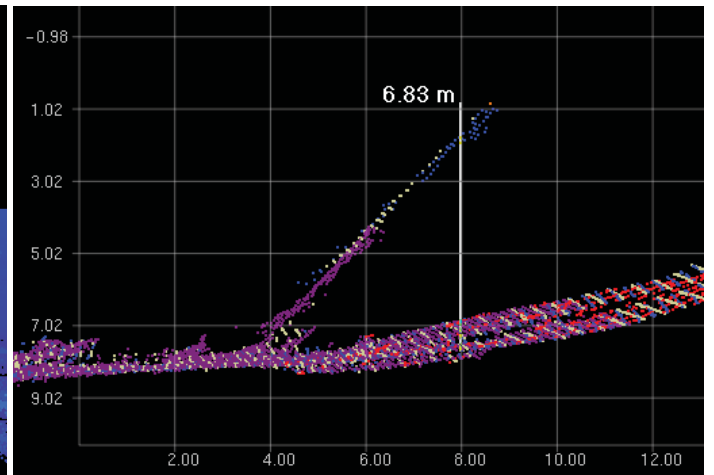
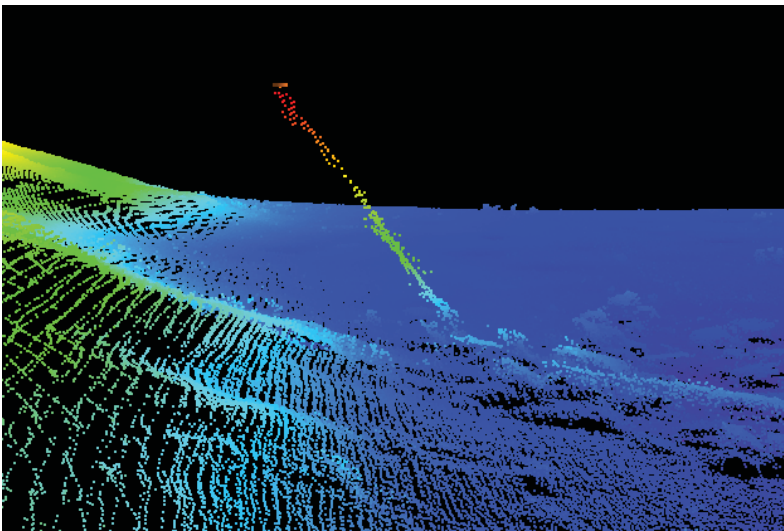
DtoN #13.6 MBES 3d and 2d View



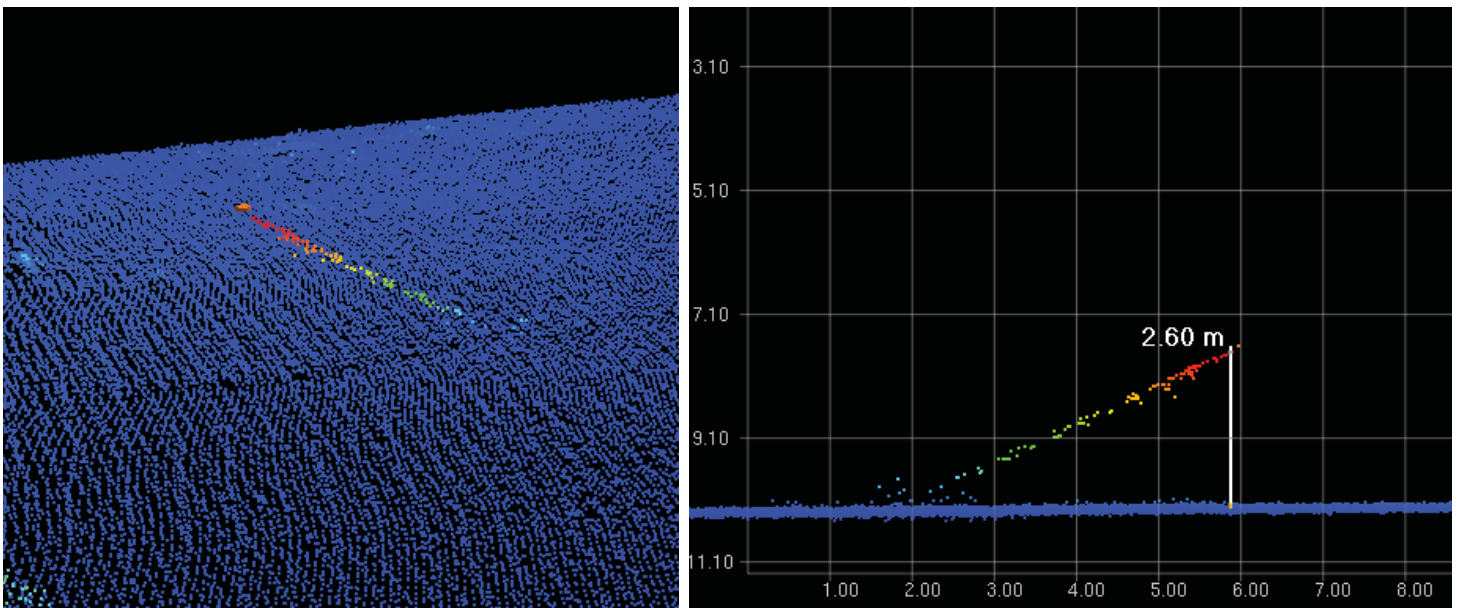
DtoN #13.7 MBES 3d and 2d View



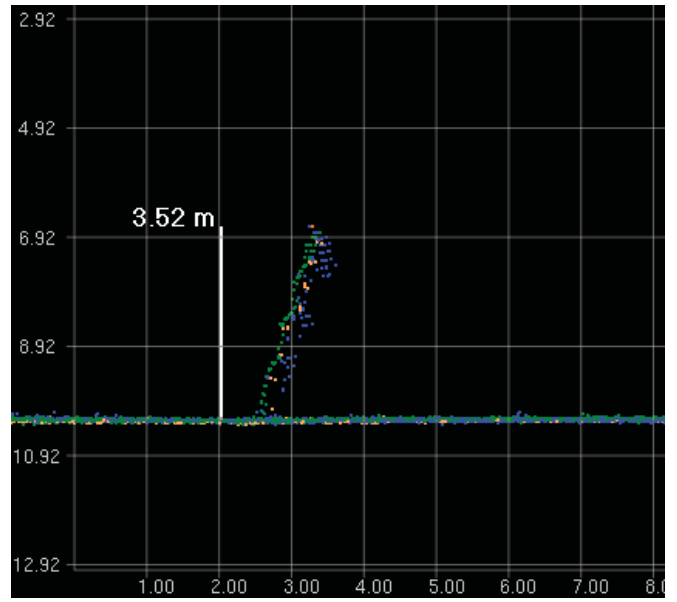
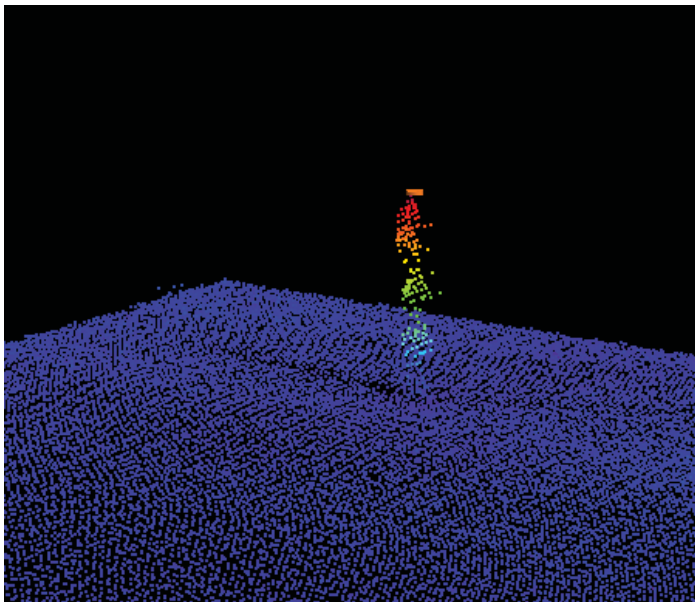
DtoN #13.8 MBES 3d and 2d View



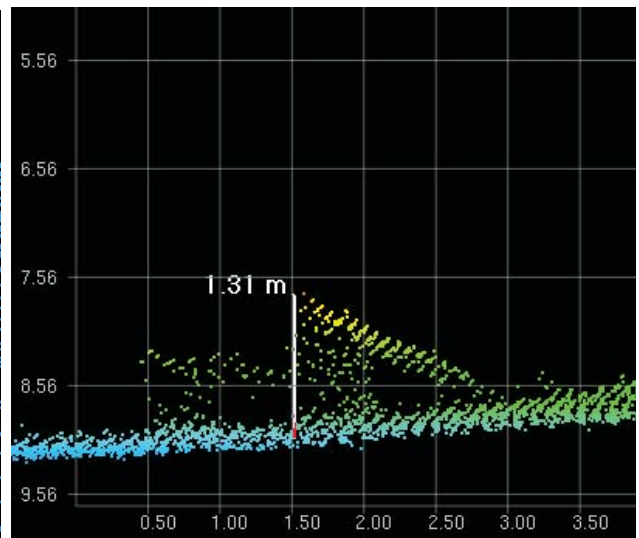
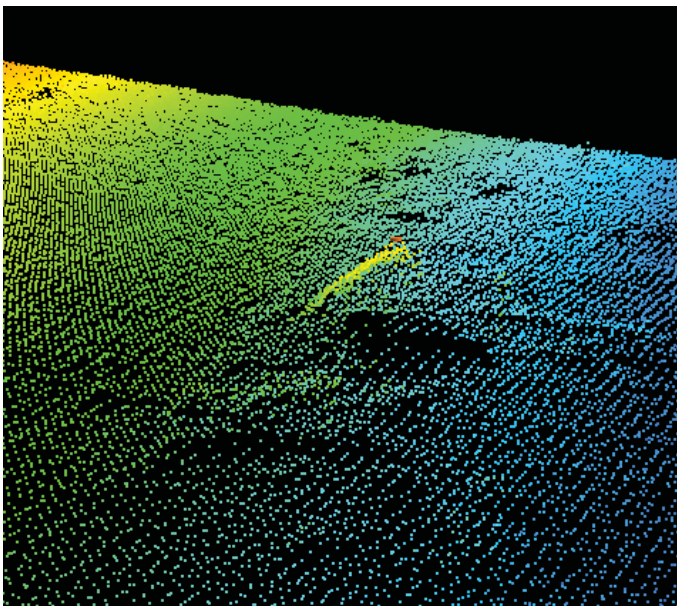
DtoN #13.9 MBES 3d and 2d View



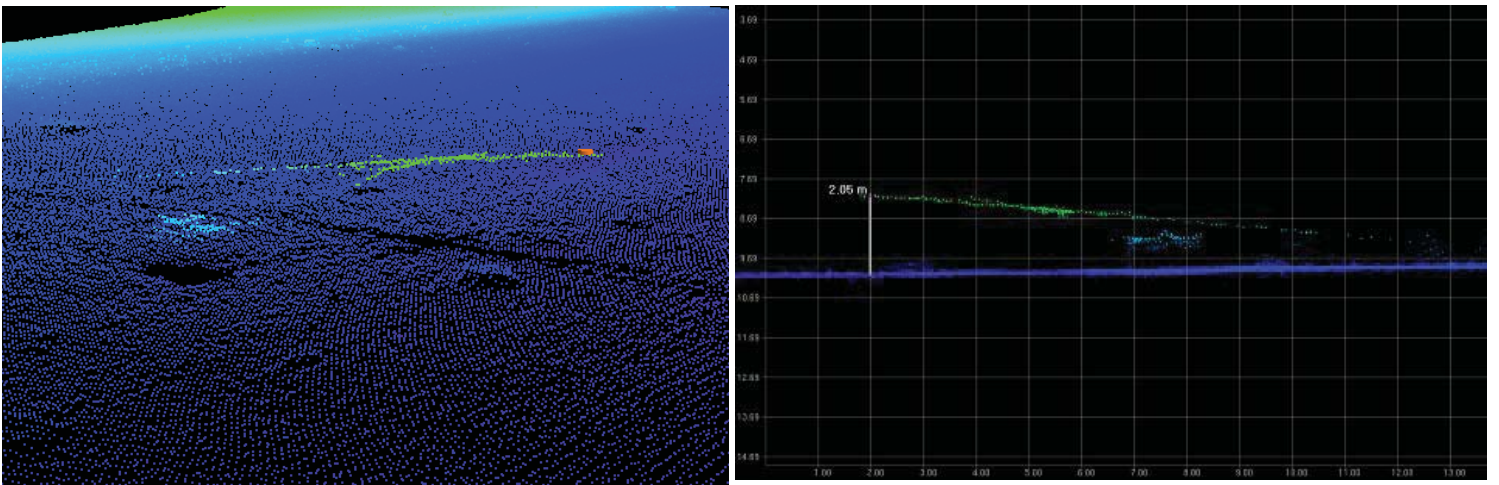
DtoN #13.10 MBES 3d and 2d View



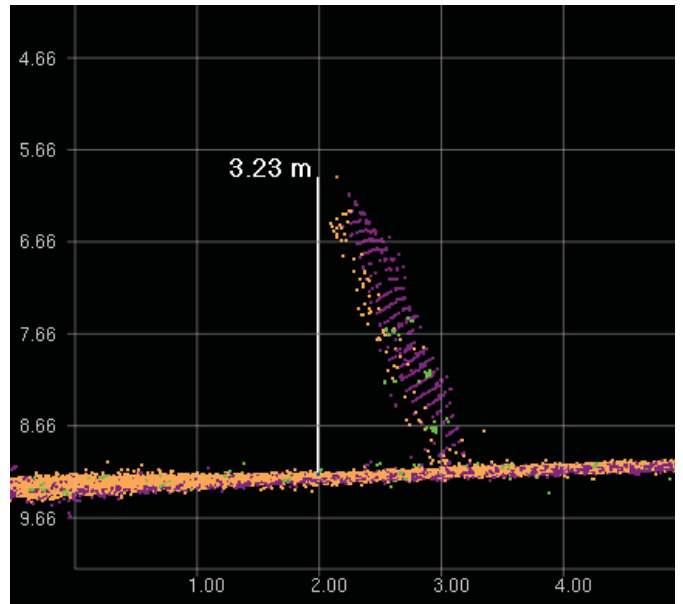
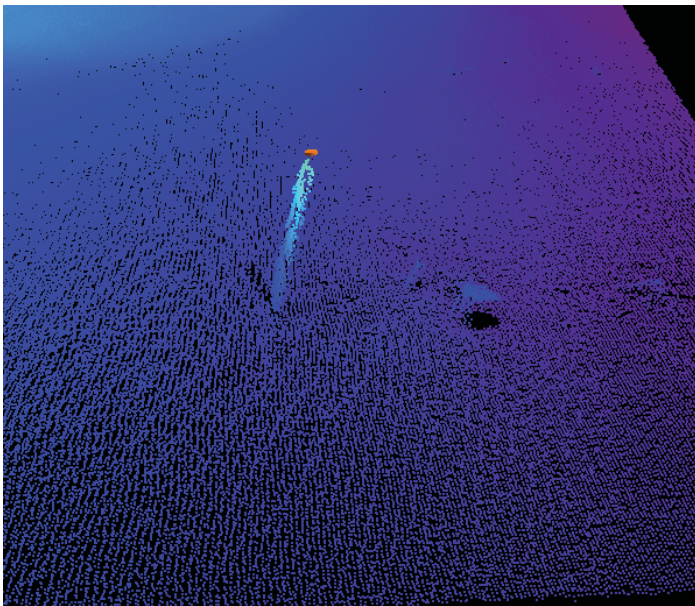
DtoN #13.11 MBES 3d and 2d View



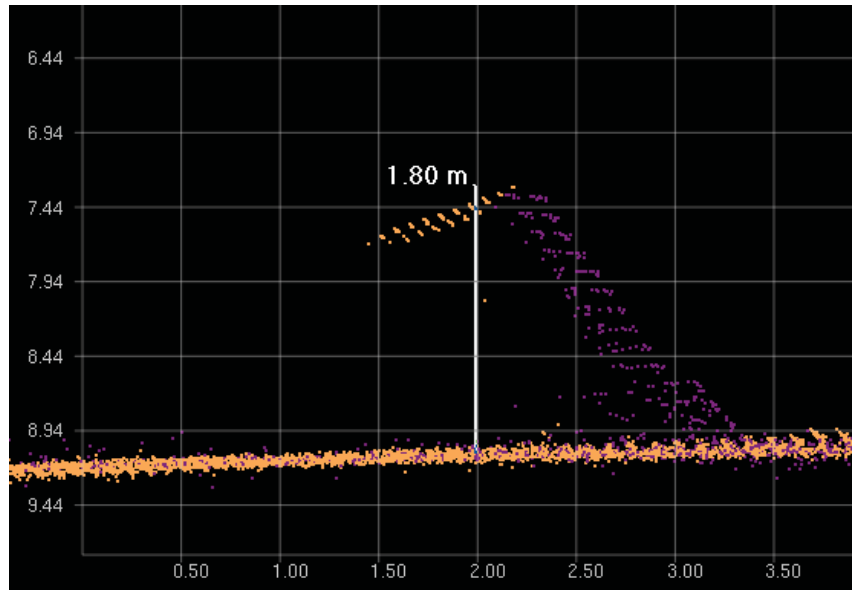
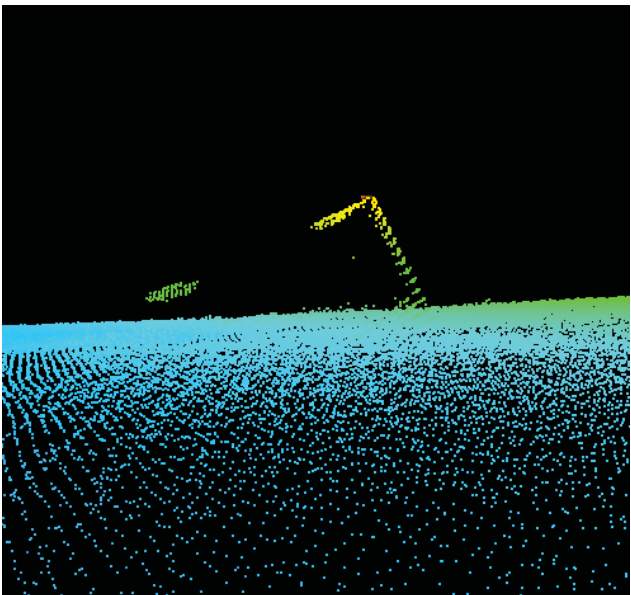
DtoN #13.12 MBES 3d and 2d View



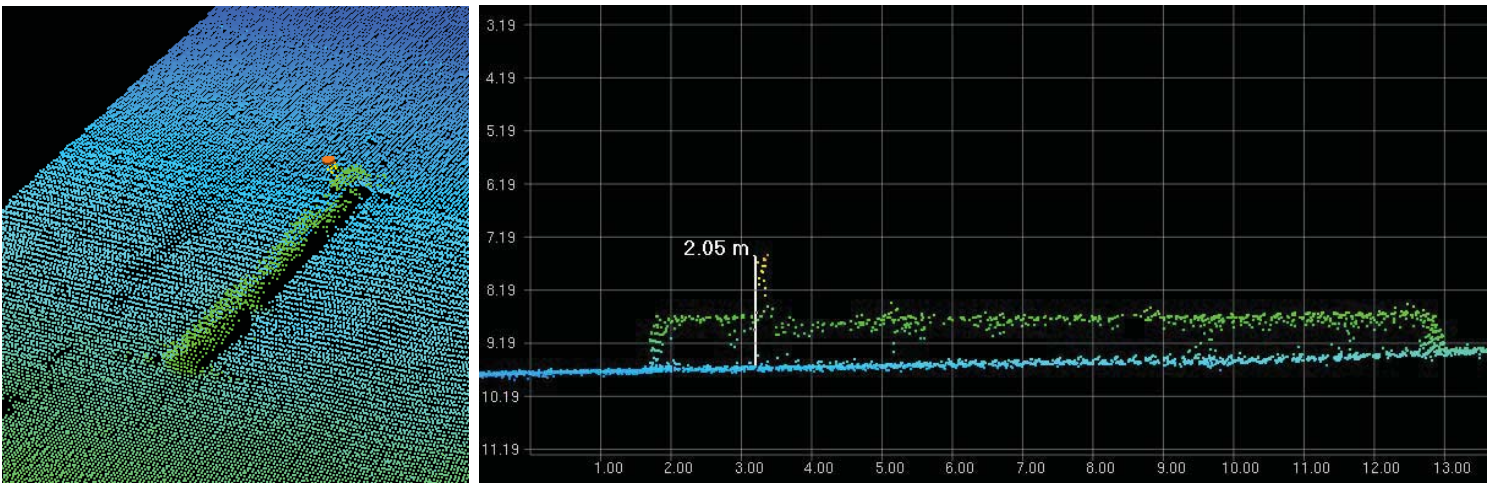
DtoN #13.13 MBES 3d and 2d View



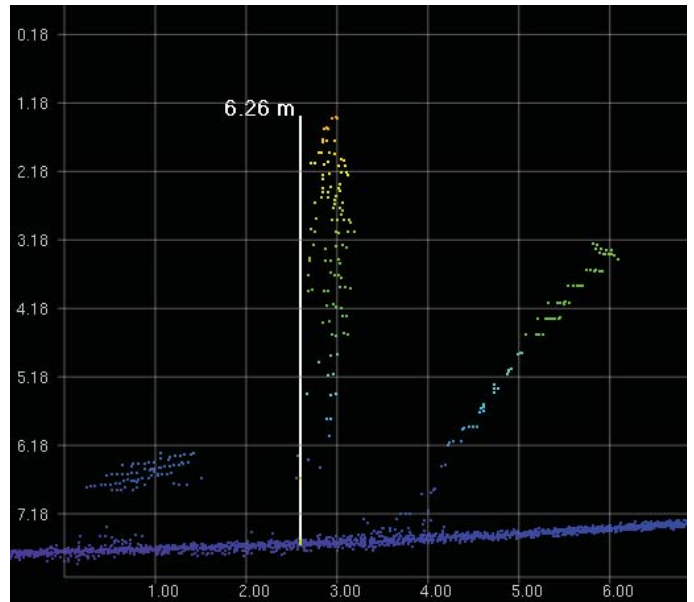
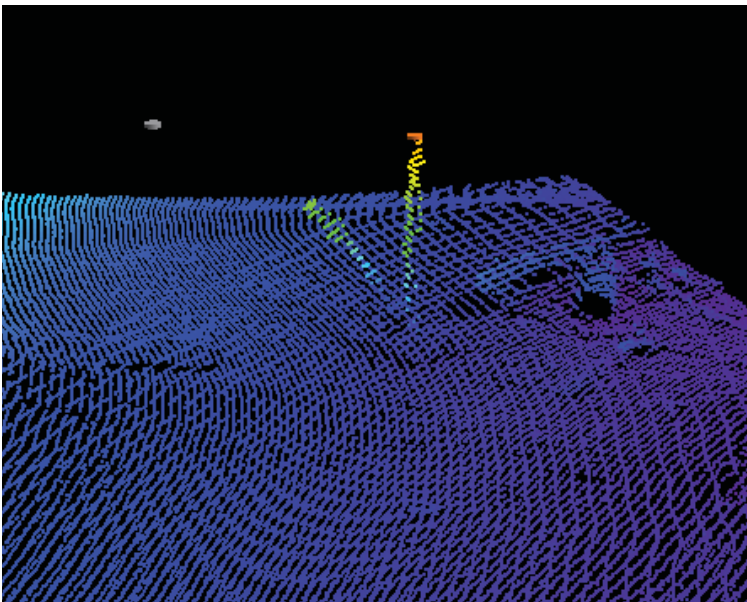
DtoN #13.14 MBES 3d and 2d View



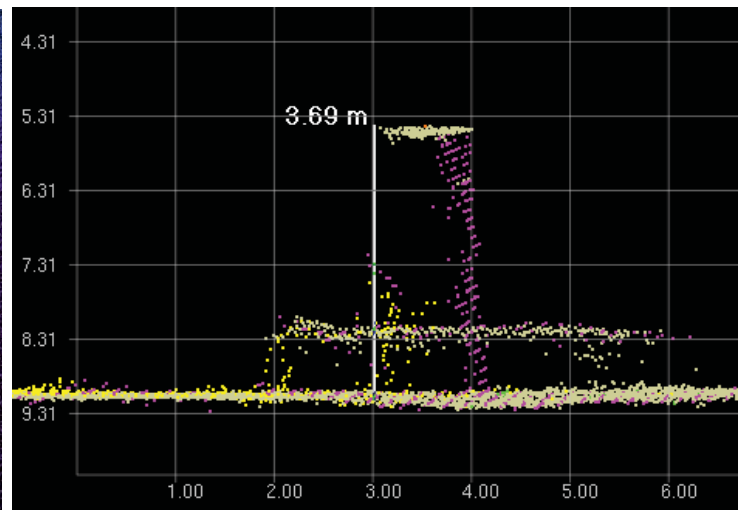
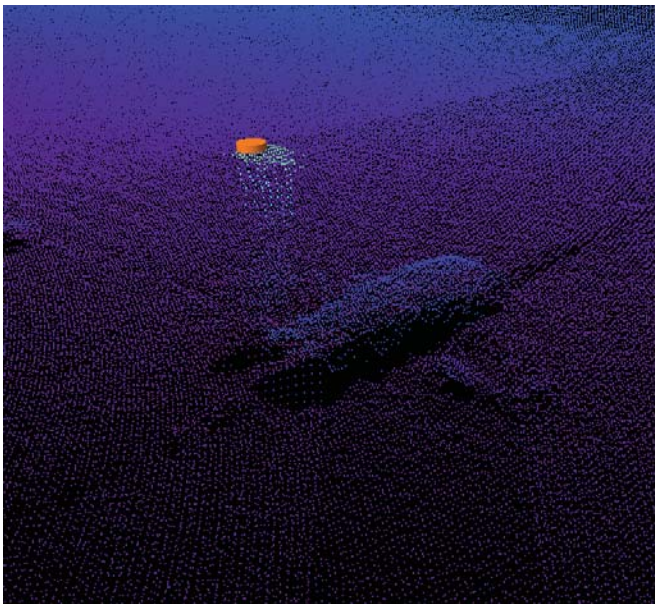
DtoN #13.15 MBES 3d and 2d View



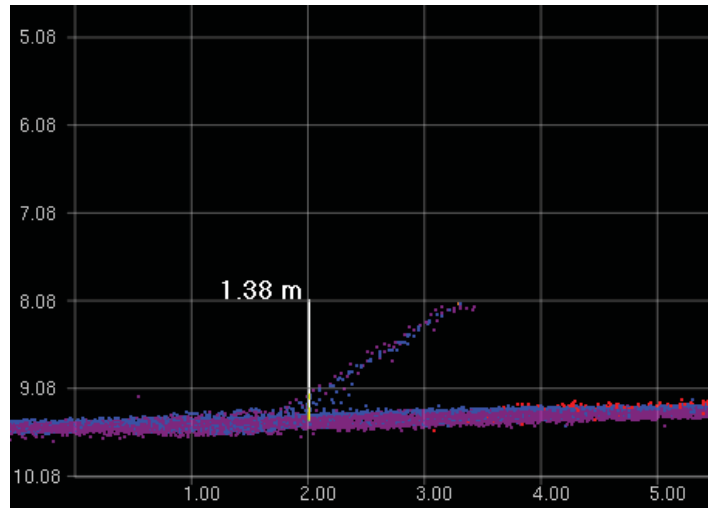
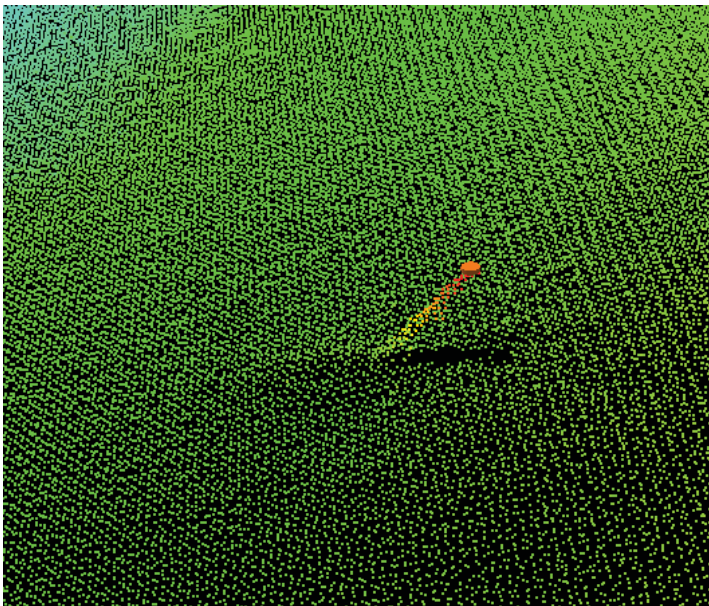
DtoN #13.16 MBES 3d and 2d View



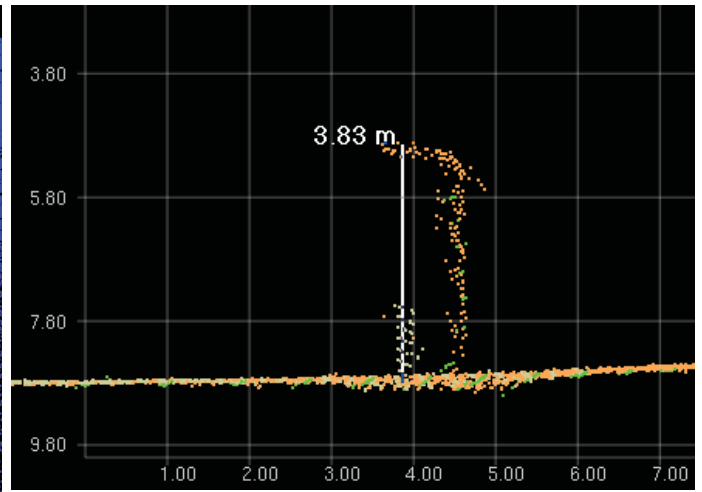
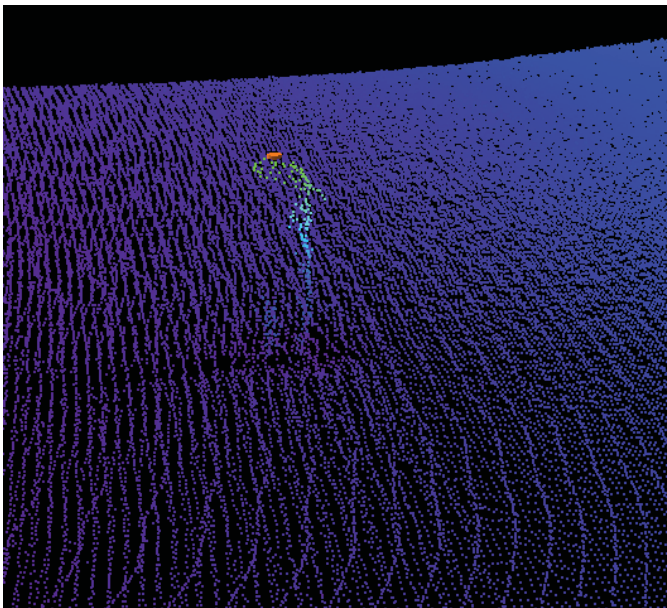
DtoN #13.17 MBES 3d and 2d View



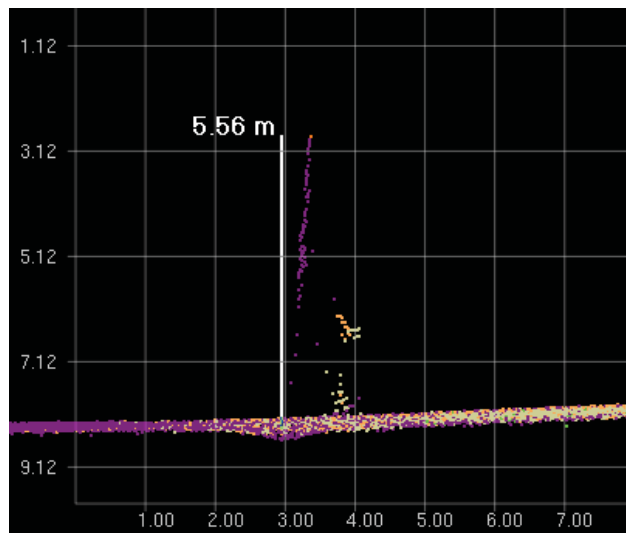
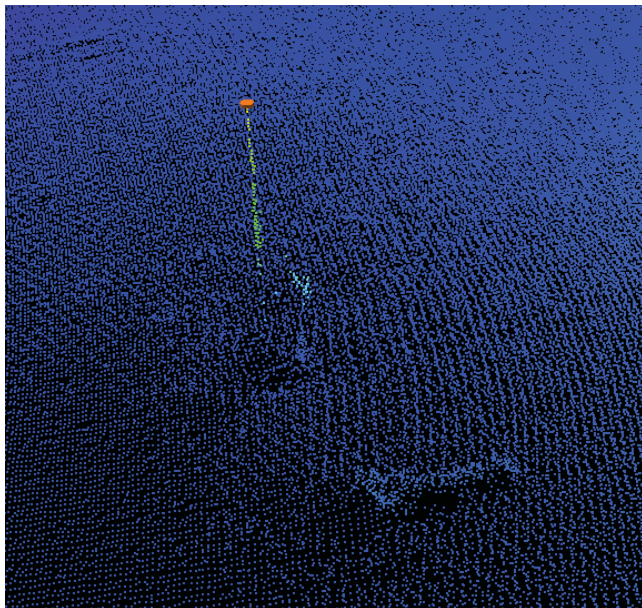
DtoN #13.18 MBES 3d and 2d View



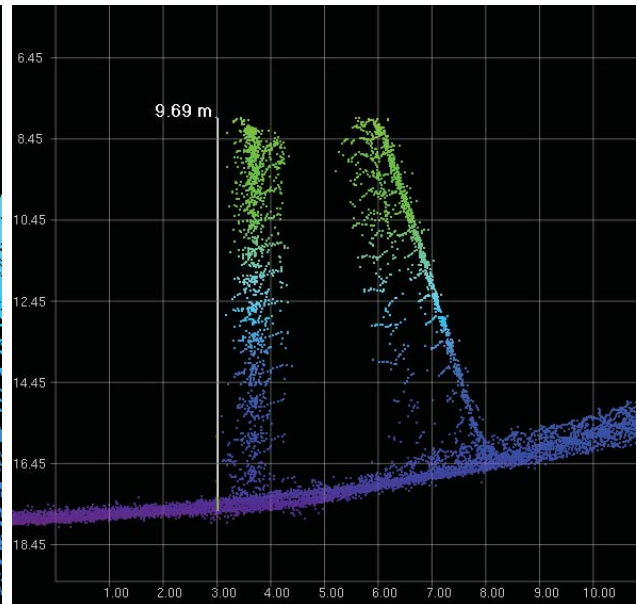
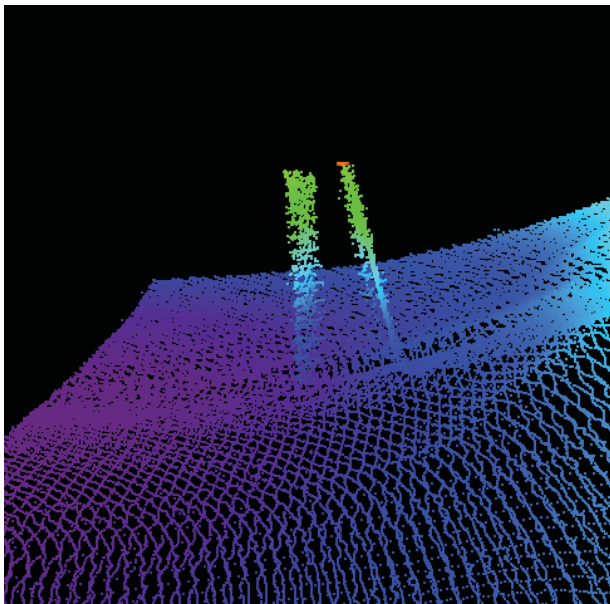
DtoN #13.19 MBES 3d and 2d View



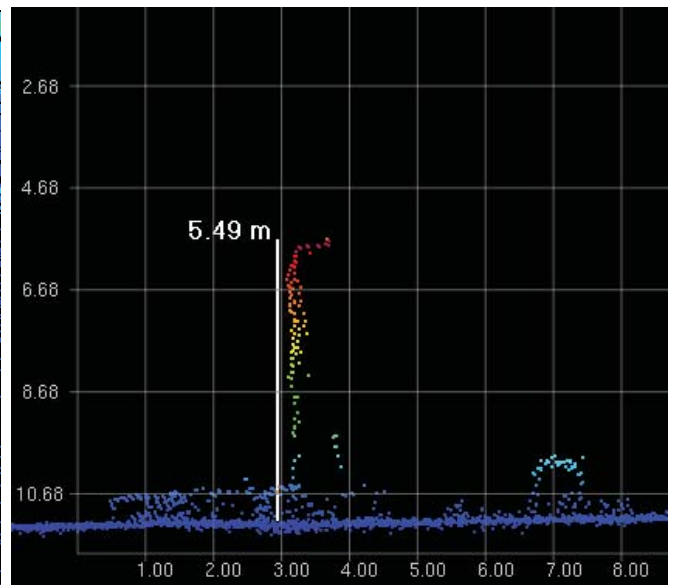
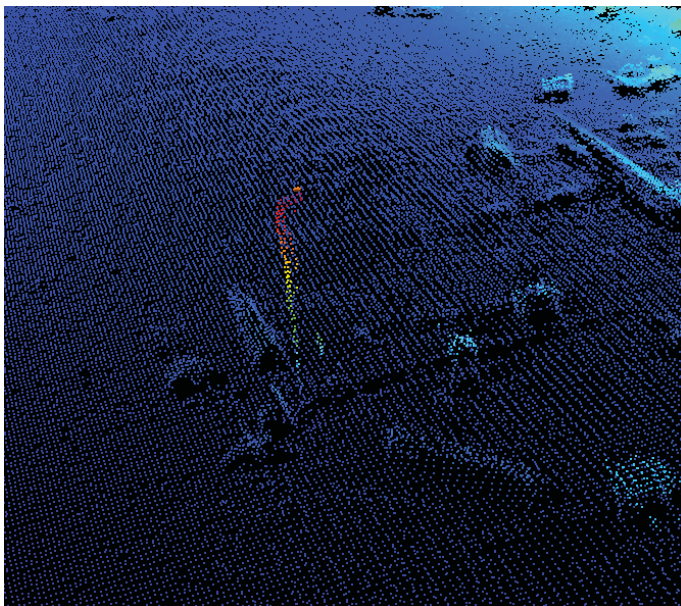
DtoN #13.20 MBES 3d and 2d View



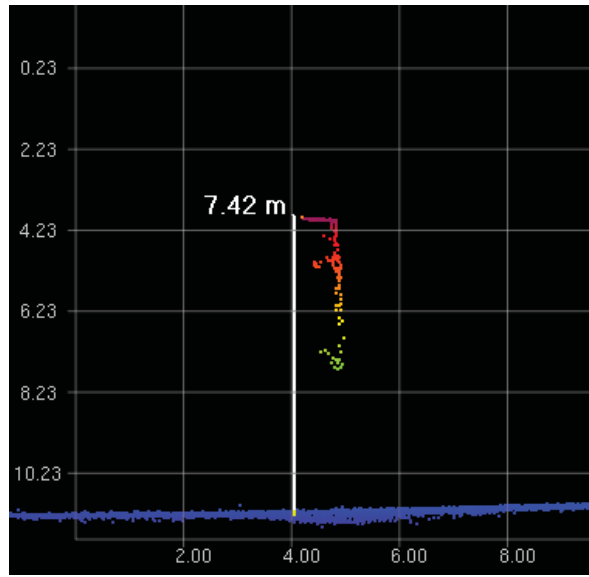
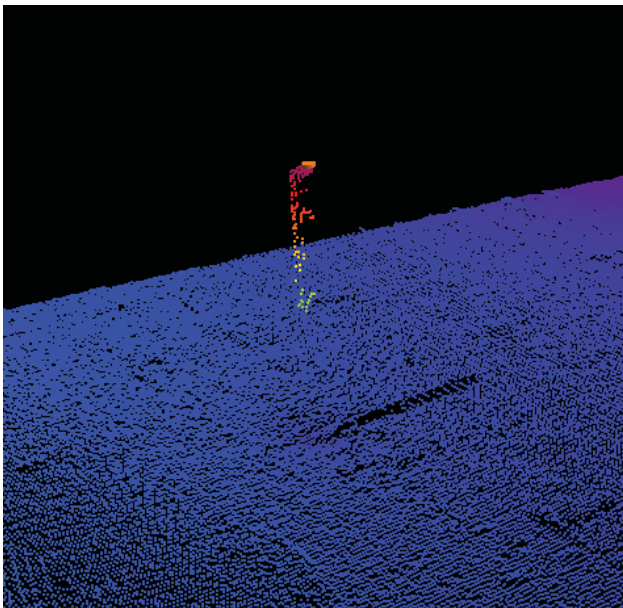
DtoN #13.21 MBES 3d and 2d View



DtoN #13.22 MBES 3d and 2d View



DtoN #13.23 MBES 3d and 2d View



**NOAA – Pacific Hydrographic Branch
Danger to Navigation Records**

H11859 Dangers to Navigation Report

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelley Point to Sellwood
Project Number: OPR-N338-KR-08
Survey Dates: 20080401 - 20090514

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18527	22nd	09/01/2005	1:5,000 (18527_1)	[L]NTM: ?
18526	58th	09/01/2006	1:20,000 (18526_1)	[L]NTM: ?
18525	35th	07/01/2005	1:40,000 (18525_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	Shoal	-0.24 m	45° 33' 48.1" N	122° 42' 29.4" W	---
1.2	Shoal	10.54 m	45° 33' 35.6" N	122° 43' 03.3" W	---
1.3	Shoal	6.48 m	45° 33' 33.6" N	122° 42' 57.1" W	---
1.4	Shoal	4.50 m	45° 33' 19.7" N	122° 42' 53.2" W	---
1.5	Shoal	8.51 m	45° 33' 03.9" N	122° 41' 49.4" W	---

1 - Danger To Navigation

1.1) 886/100**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 48.1" N, 122° 42' 29.4" W
Least Depth: -0.24 m (= -0.78 ft = -0.131 fm = 0 fm 5.22 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.981 m ; **TVU (TPEv)** ± 0.124 m
Timestamp: 2008-343.19:33:21.263 (12/08/2008)
Survey Line: h11859 / n338-kr-08_mbes_preston / 2008-343 / 2008pr3431932
Profile/Beam: 886/100
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

PILPNT

Submerged Pile.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11859/n338-kr-08_mbes_preston/2008-343/2008pr3431932	886/100	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

-1ft (18527_1, 18526_1, 18525_1)

0fm (18003_1, 18007_1, 530_1)

-.2m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20090514
 SORIND - US,US,survey,H11859

Feature Images

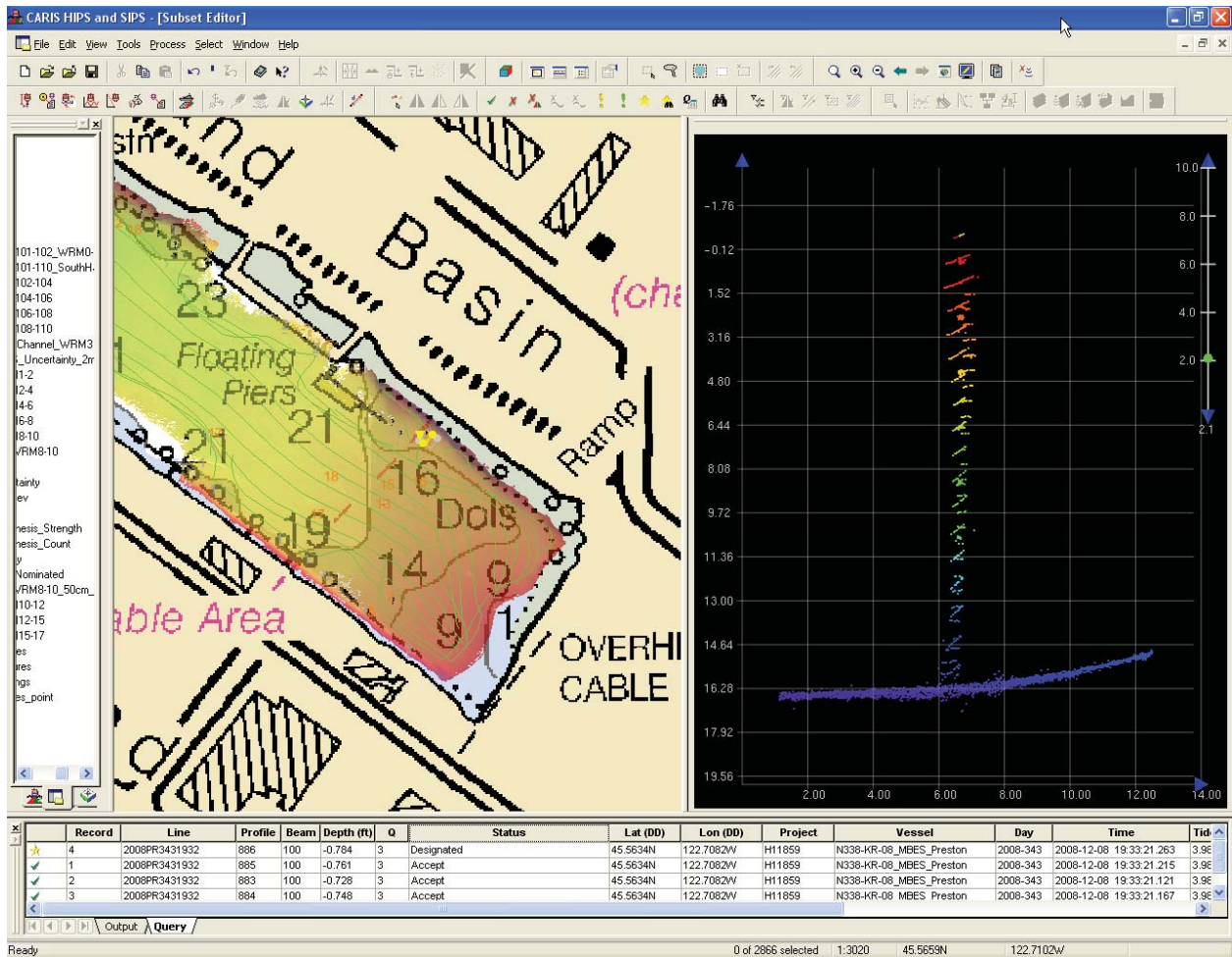


Figure 1.1.1

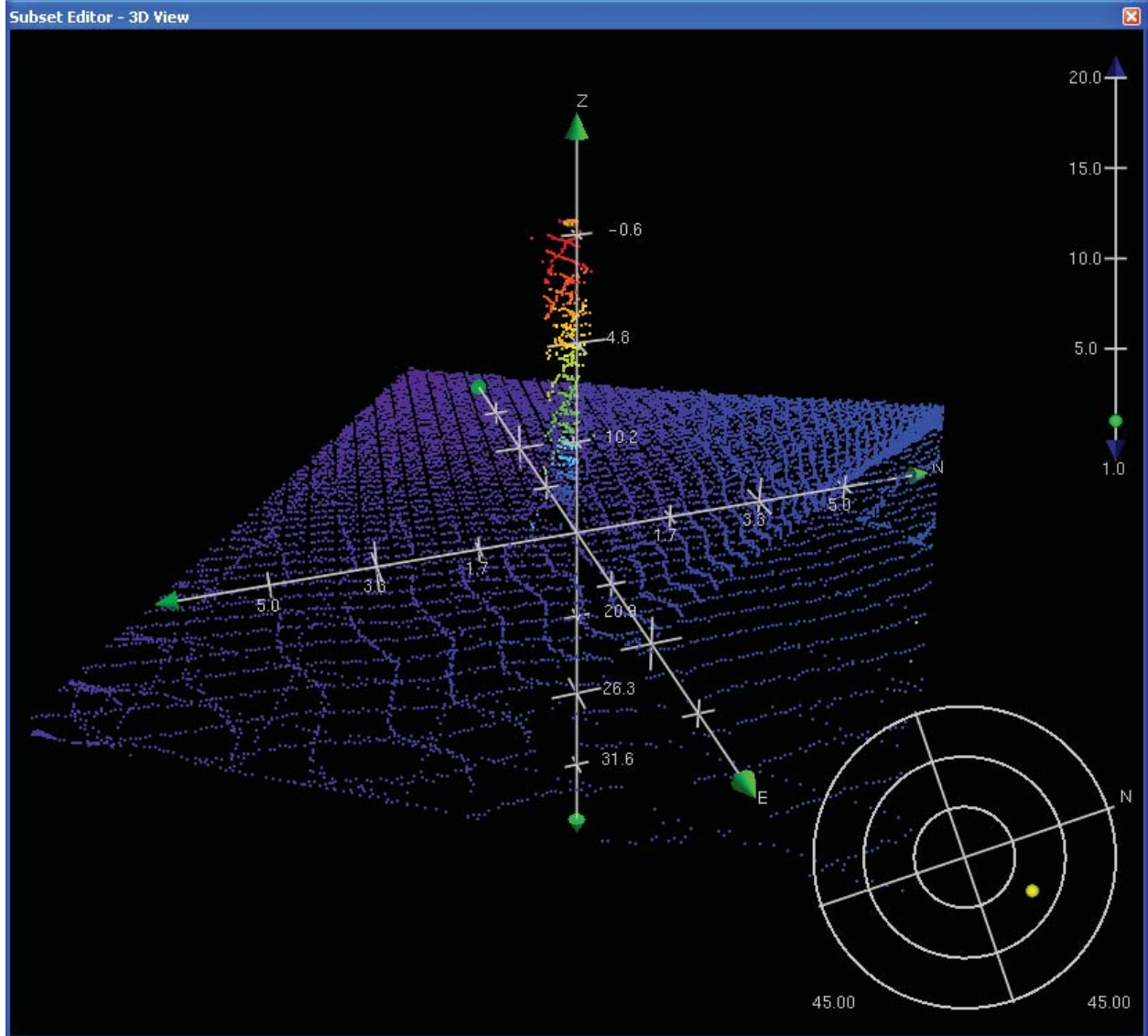


Figure 1.1.2

1.2) 6479/1**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 35.6" N, 122° 43' 03.3" W
Least Depth: 10.54 m (= 34.57 ft = 5.762 fm = 5 fm 4.57 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.982 m ; **TVU (TPEv)** ± 0.121 m
Timestamp: 2008-340.21:02:12.799 (12/05/2008)
Survey Line: h11859 / n338-kr-08_mbes_theory / 2008-340 / 2008th3402053
Profile/Beam: 6479/1
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

PILPNT

Submerged Pile.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11859/n338-kr-08_mbes_theory/2008-340/2008th3402053	6479/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

34ft (18527_1, 18526_1, 18525_1)

5 $\frac{3}{4}$ fm (18003_1, 18007_1, 530_1)

10.5m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20090514
 SORIND - US,US,survey,H11859

Feature Images

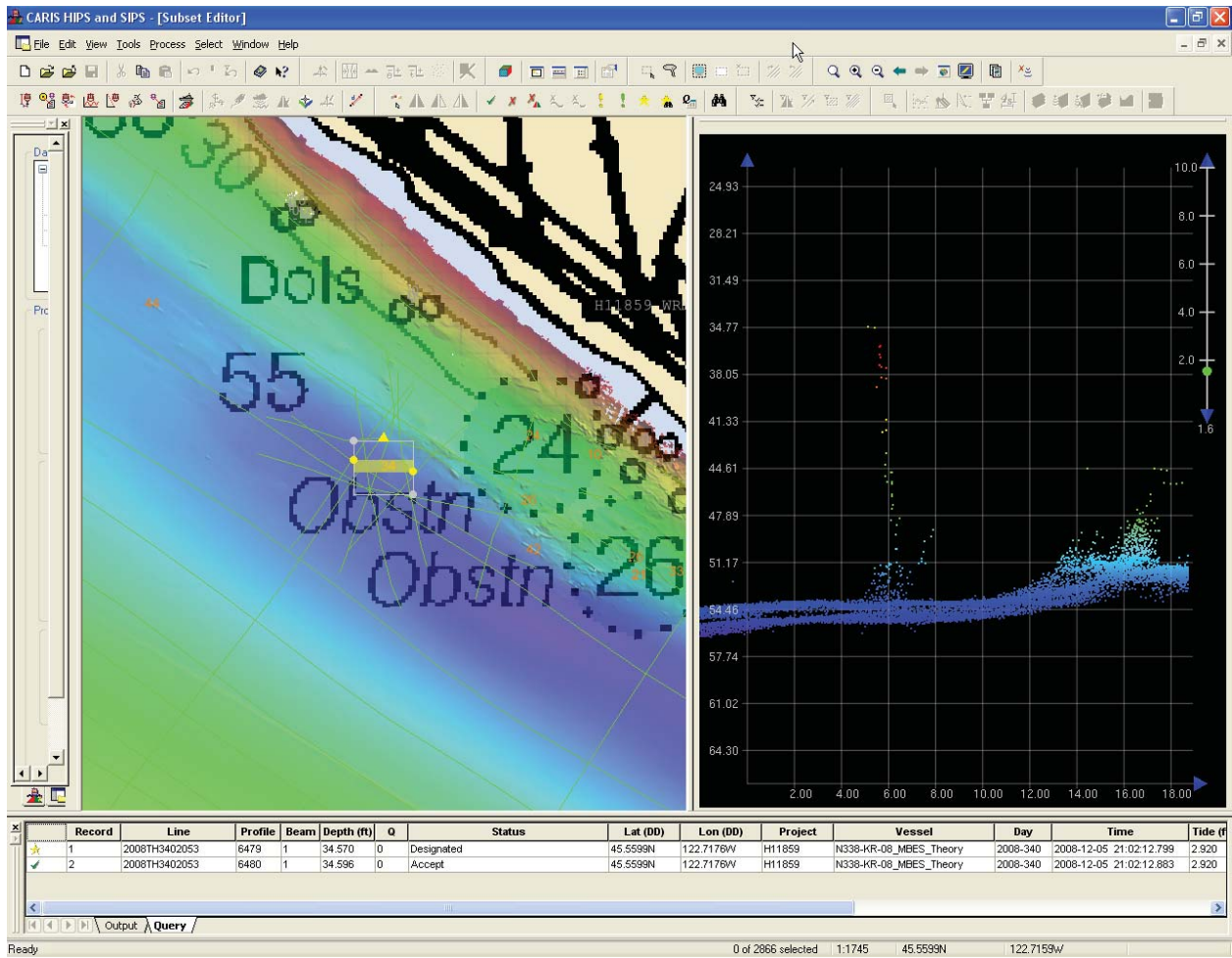


Figure 1.2.1

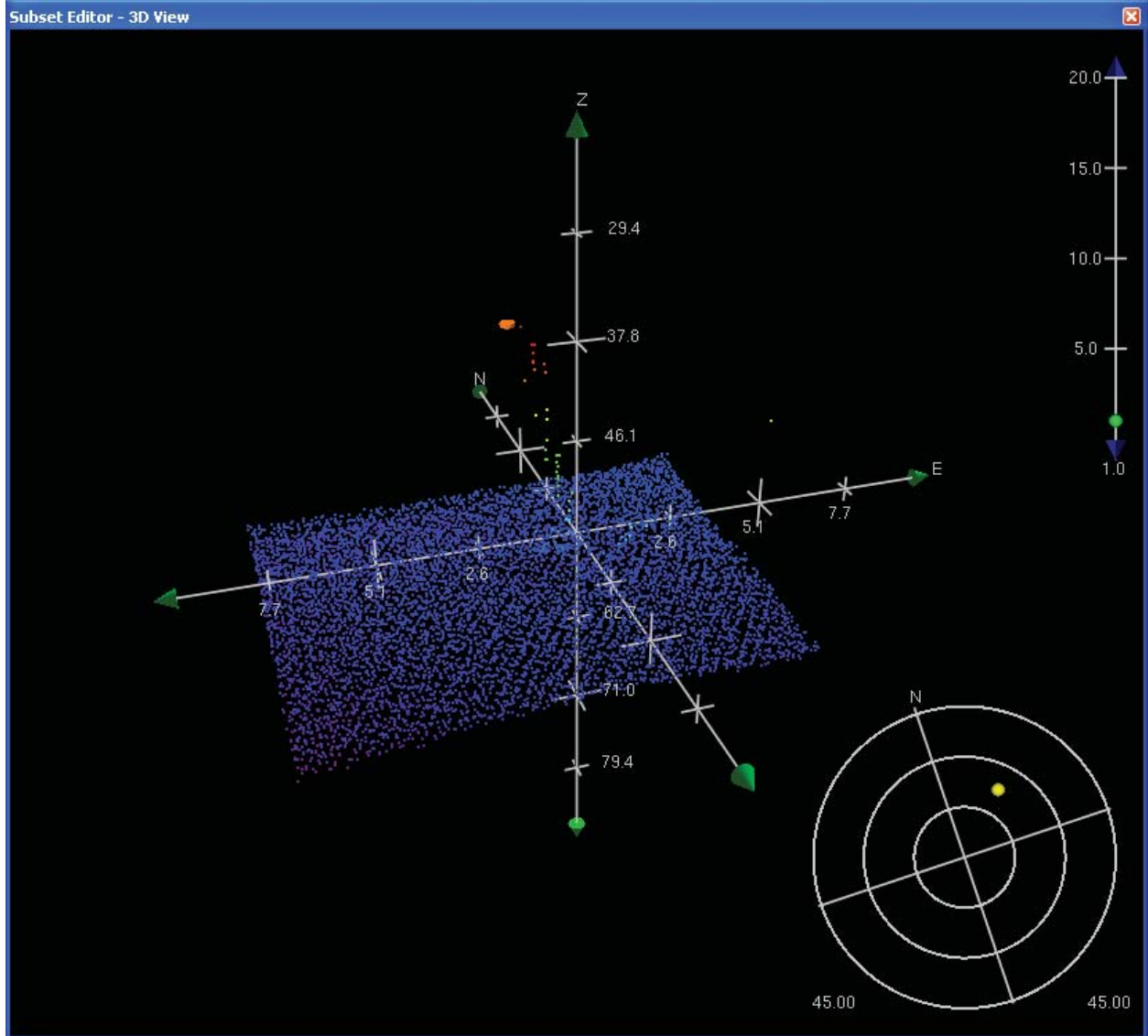


Figure 1.2.2

1.3) 6083/183**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 33.6" N, 122° 42' 57.1" W
Least Depth: 6.48 m (= 21.27 ft = 3.545 fm = 3 fm 3.27 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.981 m ; **TVU (TPEv)** ± 0.118 m
Timestamp: 2008-340.21:39:39.705 (12/05/2008)
Survey Line: h11859 / n338-kr-08_mbes_theory / 2008-340 / 2008th3402131
Profile/Beam: 6083/183
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

PILPNT

Submerged Pile.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11859/n338-kr-08_mbes_theory/2008-340/2008th3402131	6083/183	0.00	000.0	Primary

Hydrographer Recommendations

Chart as surveyed.

Cartographically-Rounded Depth (Affected Charts):

21ft (18527_1, 18526_1, 18525_1)

3 ½fm (18003_1, 18007_1, 530_1)

6.5m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20090514
 SORIND - US,US,survey,H11859

Feature Images

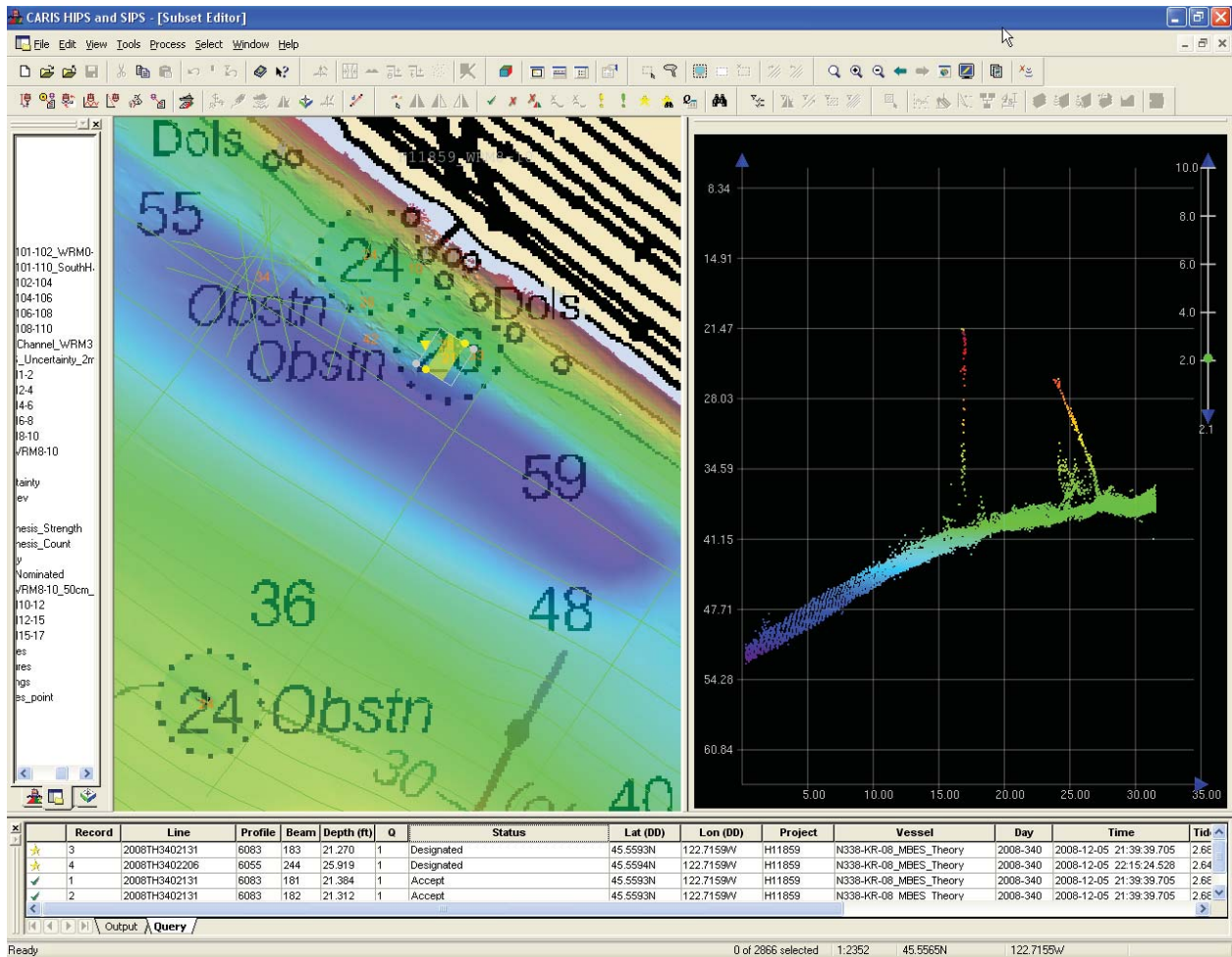


Figure 1.3.1

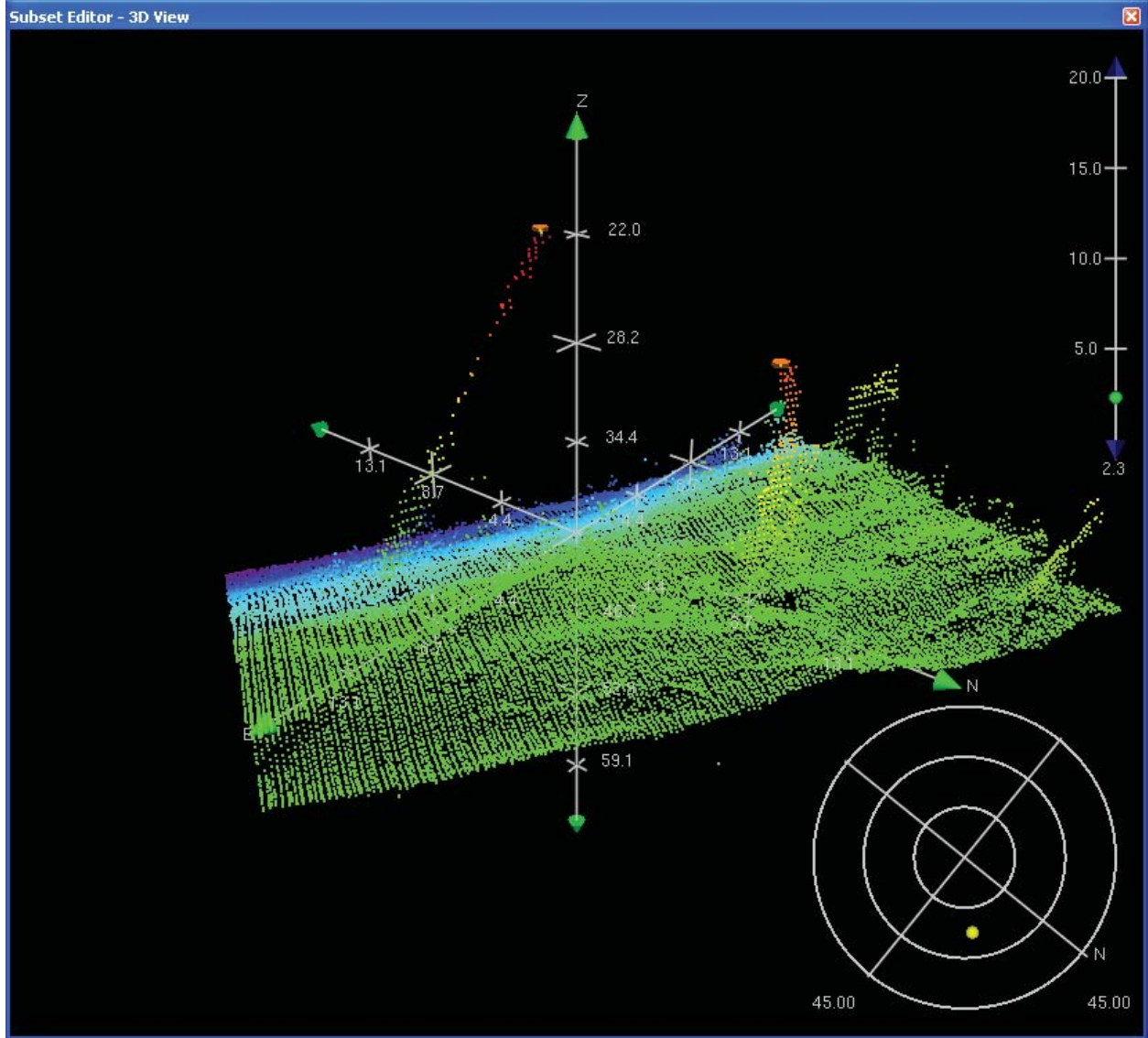


Figure 1.3.2

1.4) 10288/36**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 19.7" N, 122° 42' 53.2" W
Least Depth: 4.50 m (= 14.76 ft = 2.461 fm = 2 fm 2.76 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.981 m ; **TVU (TPEv)** ± 0.117 m
Timestamp: 2008-341.20:41:10.017 (12/06/2008)
Survey Line: h11859 / n338-kr-08_mbes_theory / 2008-341 / 2008th3412031
Profile/Beam: 10288/36
Charts Affected: 18527_1, 18526_1, 18525_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

PILPNT

Submerged Pile

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11859/n338-kr-08_mbes_theory/2008-341/2008th3412031	10288/36	0.00	000.0	Primary

Hydrographer Recommendations

Chart as Surveyed.

Cartographically-Rounded Depth (Affected Charts):

15ft (18527_1, 18526_1, 18525_1)

2 ½fm (18003_1, 18007_1, 530_1)

4.5m (501_1, 50_1)

S-57 Data**Geo object 1:** Pile (PILPNT)**Attributes:** SORDAT - 20090514

SORIND - US,US,survey,H11859

Feature Images

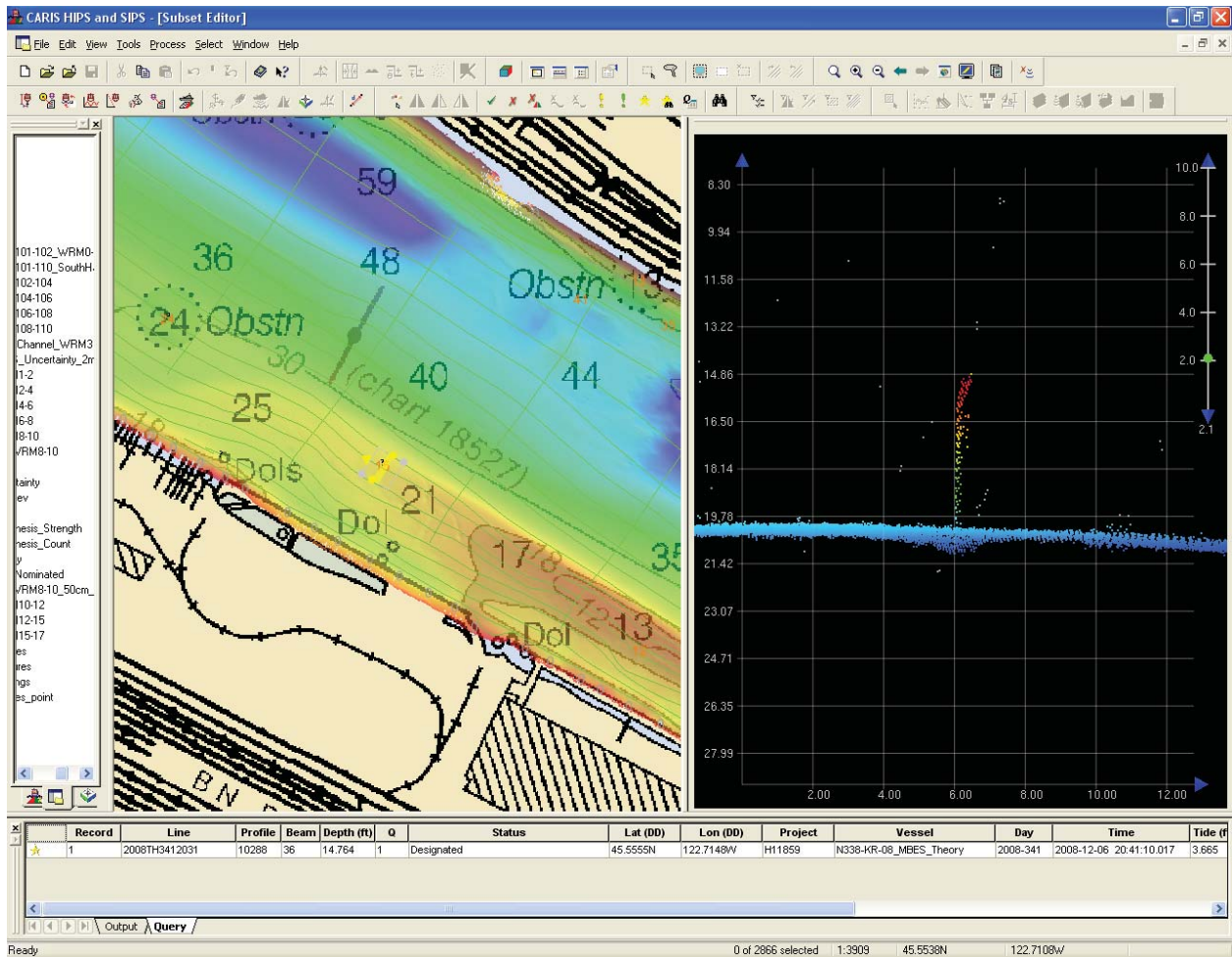


Figure 1.4.1

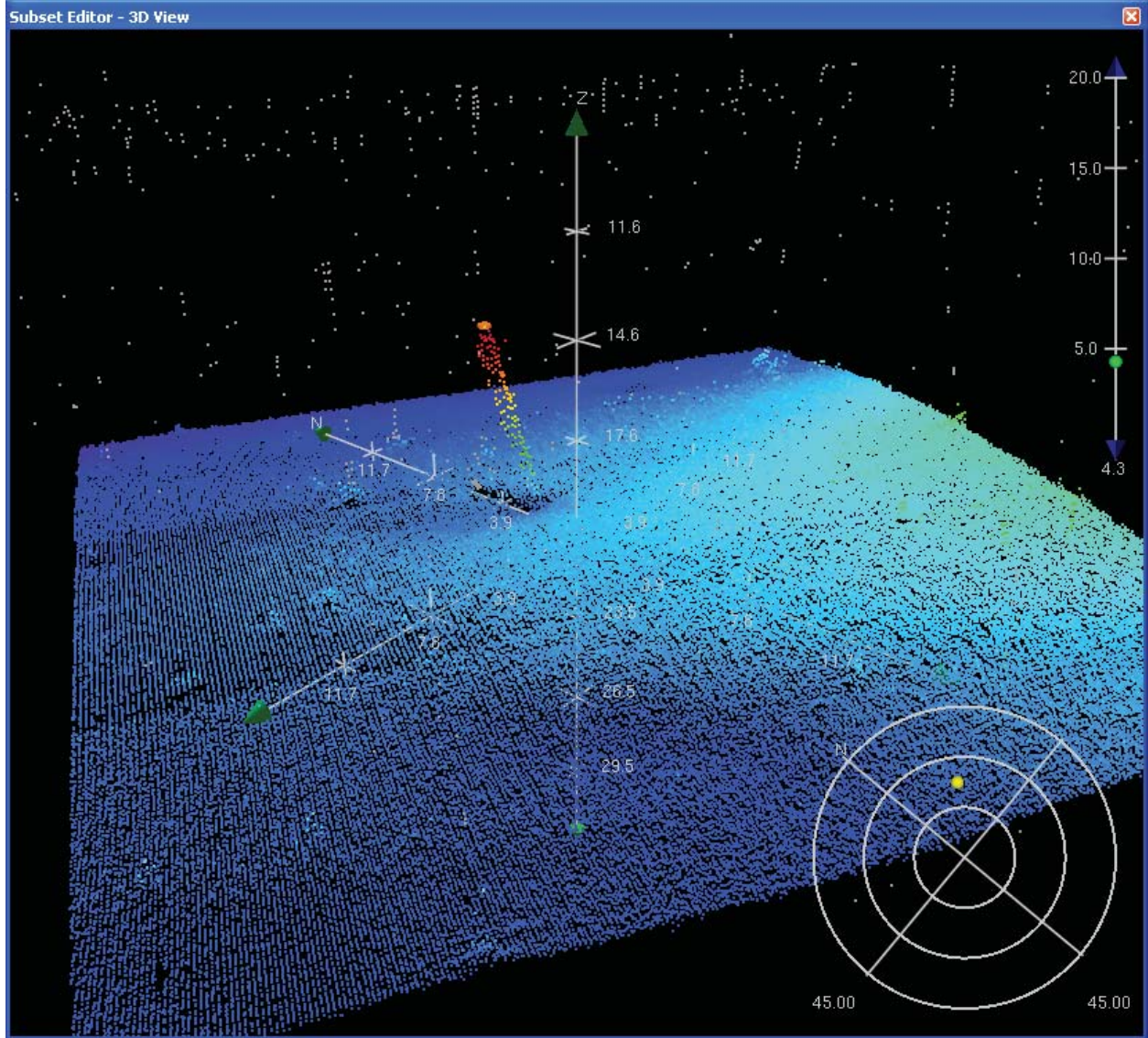


Figure 1.4.2

1.5) 453/252**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 45° 33' 03.9" N, 122° 41' 49.4" W
Least Depth: 8.51 m (= 27.92 ft = 4.653 fm = 4 fm 3.92 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 0.982 m ; **TVU (TPEv)** ± 0.119 m
Timestamp: 2008-343.17:13:20.479 (12/08/2008)
Survey Line: h11859 / n338-kr-08_mbes_theory / 2008-343 / 2008th3431712_xl
Profile/Beam: 453/252
Charts Affected: 18527_1, 18526_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

PILPNT

Submerged Pile

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11859/n338-kr-08_mbes_theory/2008-343/2008th3431712_xl	453/252	0.00	000.0	Primary

Hydrographer Recommendations

Chart as Surveyed

Cartographically-Rounded Depth (Affected Charts):

28ft (18527_1, 18526_1)

4 ½fm (18003_1, 18007_1, 530_1)

8.5m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20090514
 SORIND - US,US,survy,H11859

Feature Images

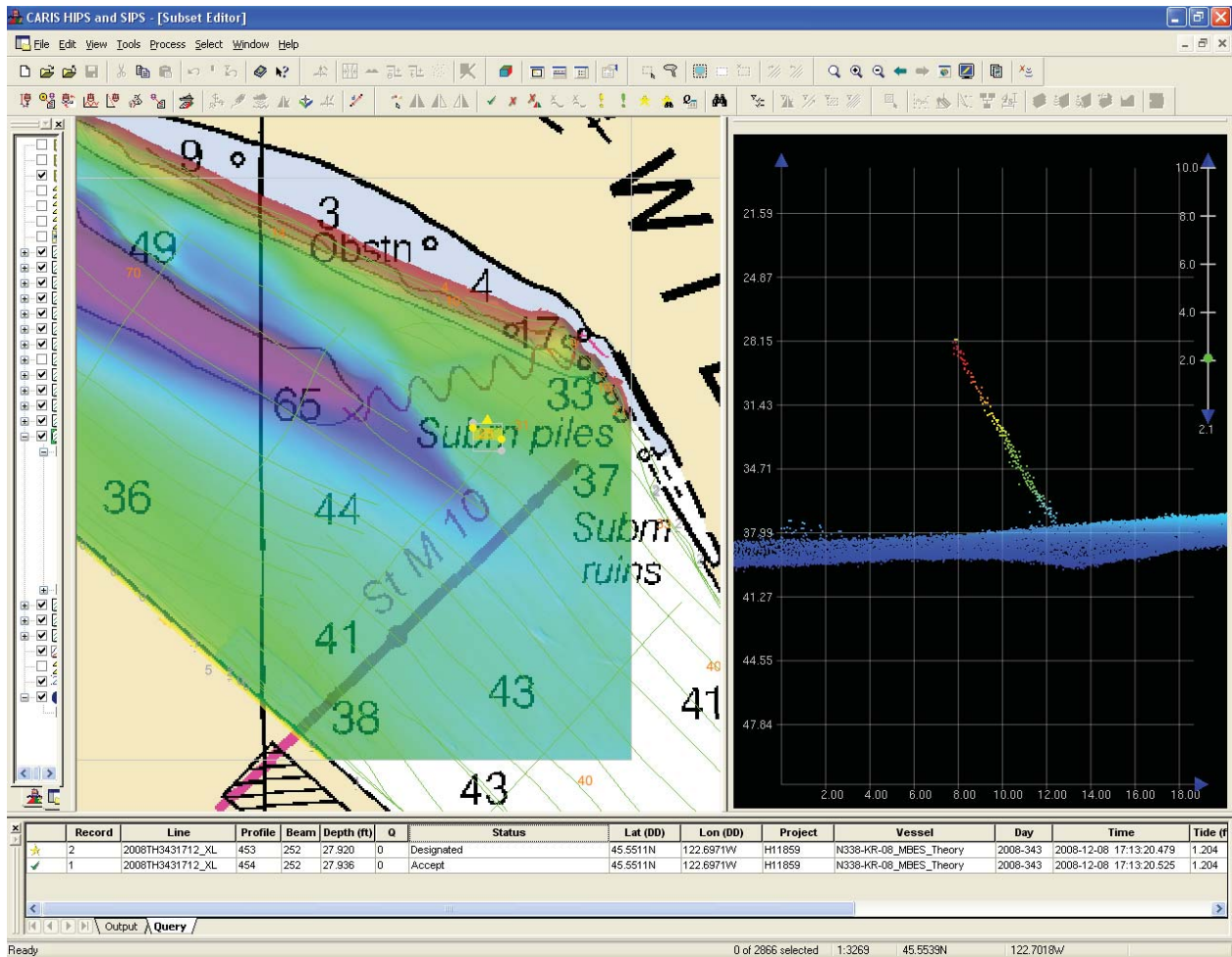


Figure 1.5.1

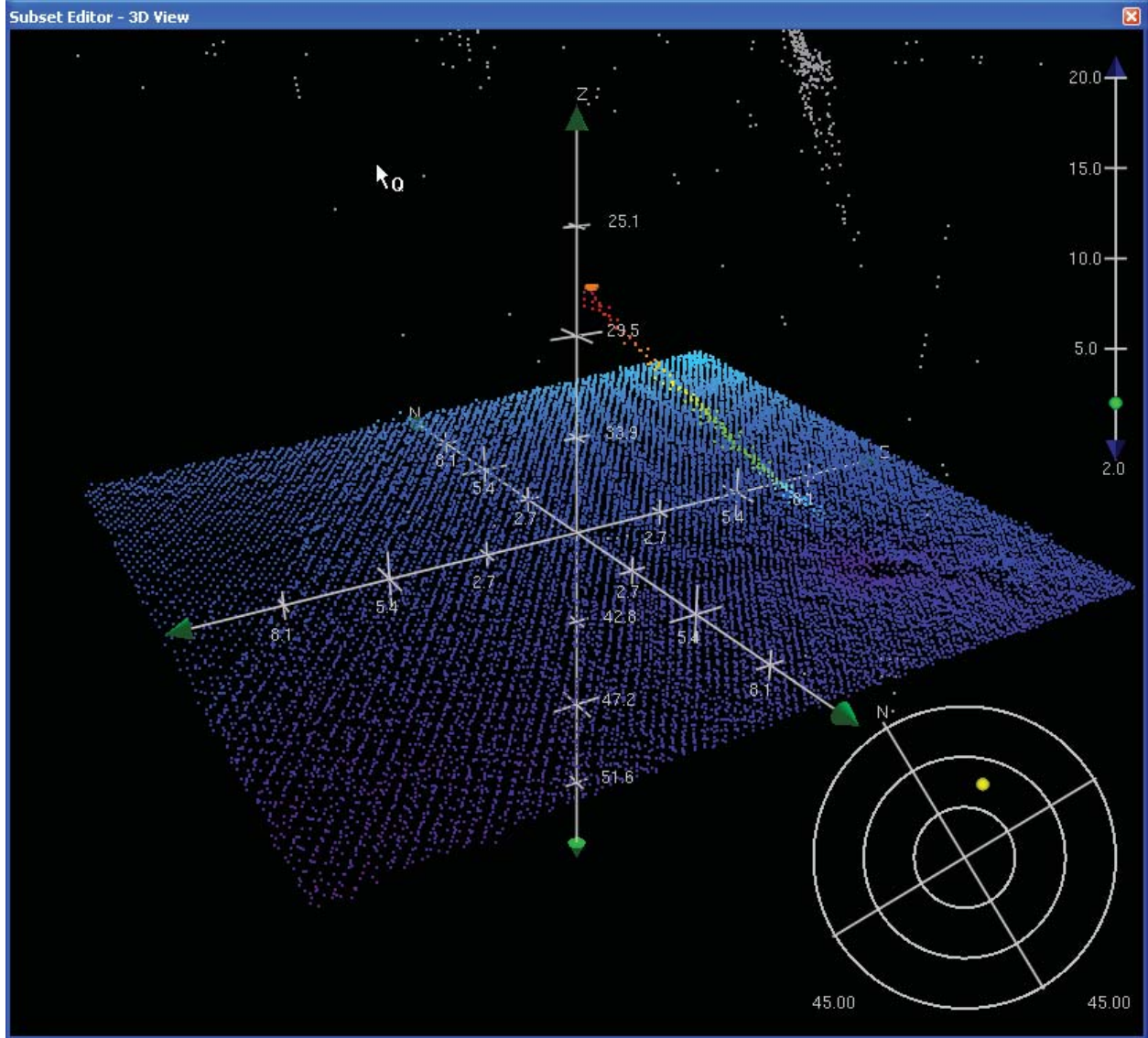


Figure 1.5.2

APPENDIX II
SURVEY FEATURE REPORT

Registry Number: H11859
State: Oregon
Locality: Columbia River
Sub-locality: Kelley Point to Sellwood
Project Number: OPR-E338-KR-08
Survey Date: August 18, 2008 to May 14, 2009

List of Features

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AWOIS 53030	2
AWOIS 53031	3
AWOIS 53032	3
AWOIS 53033	5
AWOIS 53034	5
AWOIS 53035	6
AWOIS 53036	7
AWOIS 53037	8
AWOIS 53038	8
AWOIS 53039	9
AWOIS 53040	9

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AWOIS 53029

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53029	150m	45/37/07	122/47/50

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
N/A	N/A	N/A	N/A

Remarks:

The area inside the AWOIS radius was covered by multibeam up to the 2m curve. No significant features were detected. The wreck is charted inshore of the survey coverage area.

Hydrographer Recommendation:

No action is necessary.

AWOIS 53030

Remarks:

AWOIS Item #53030 was not assigned for investigation.

AWOIS 53031

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53031	75m	45/37/11.2	122/47/40.4

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
OBSTRN	0.28m	45/37/10.446	122/47/40.848
FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
OBSTRN	1.08m	45/37/11.332	122/47/40.477

Remarks:

AWOIS 53031 charted at 45/37/11.2N, 122/47/40.4W was partially covered by multibeam up to the submerged dike and 2m curve. No wreck was located at the charted position; however, several features likely associated with the nearby dike ruins were positioned. The heights of these features range from 0.60m to 2.25m within the AWOIS radius.

Hydrographer Recommendation:

The hydrographer recommends charting the area in accordance with the survey data and retaining AWOIS 53031.

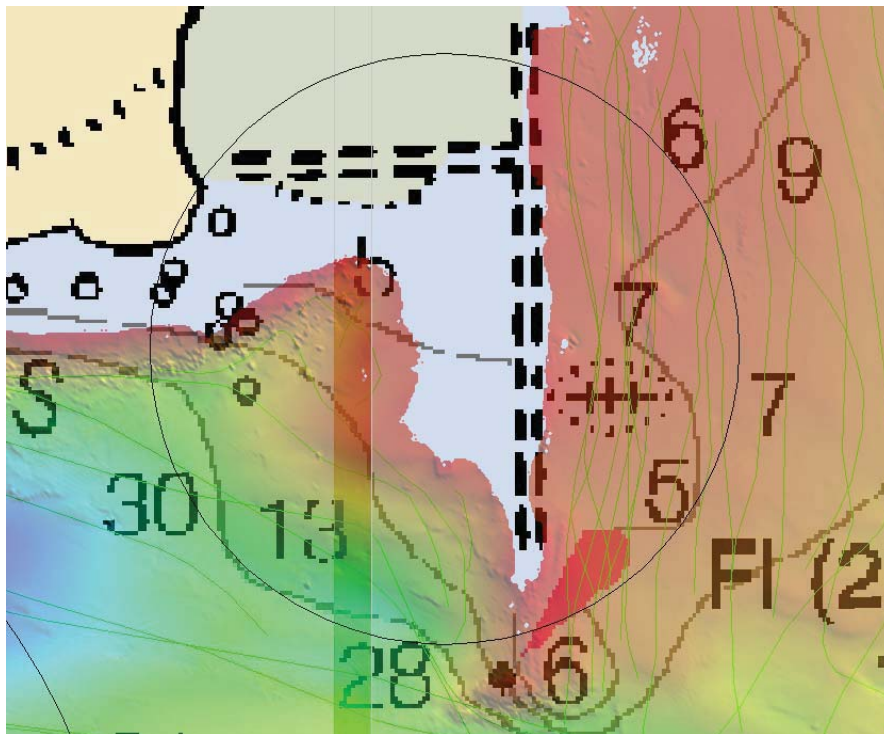


Figure 1. AWOIS search radius, chart 18526_2, MBES coverage.

AWOIS 53032

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53032	0m	45/36/59.3	122/47/39.1

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
N/A	N/A	N/A	N/A

Remarks:

The AWOIS feature is charted correctly as Snags inside a charted obstruction line. The area is foul with snags and is charted as “Snags” and “Log booms” on RNCs 18525, 18526_1, and 18526_2.

Hydrographer Recommendation:

No action is necessary.

AWOIS 53033

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53033	150m	45/37/22.7	122/43/19.2

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
WRECK	-1.12m	45/37/20.917	122/43/15.723

Remarks:

AWOIS 53033 charted at 45/37/22.7N, 122/43/19.2W was found with 100% shallow water multibeam within the AWOIS radius. A least depth was found in the MBES data to be -1.12m (-3.7ft.) at MLLW at position 45/37/20.917N, 122/43/15.723W. The wreck covers and uncovers. It is located approximately 60m southeast of the charted position.

Hydrographer Recommendation:

The hydrographer recommends charting the area in accordance with the survey data.

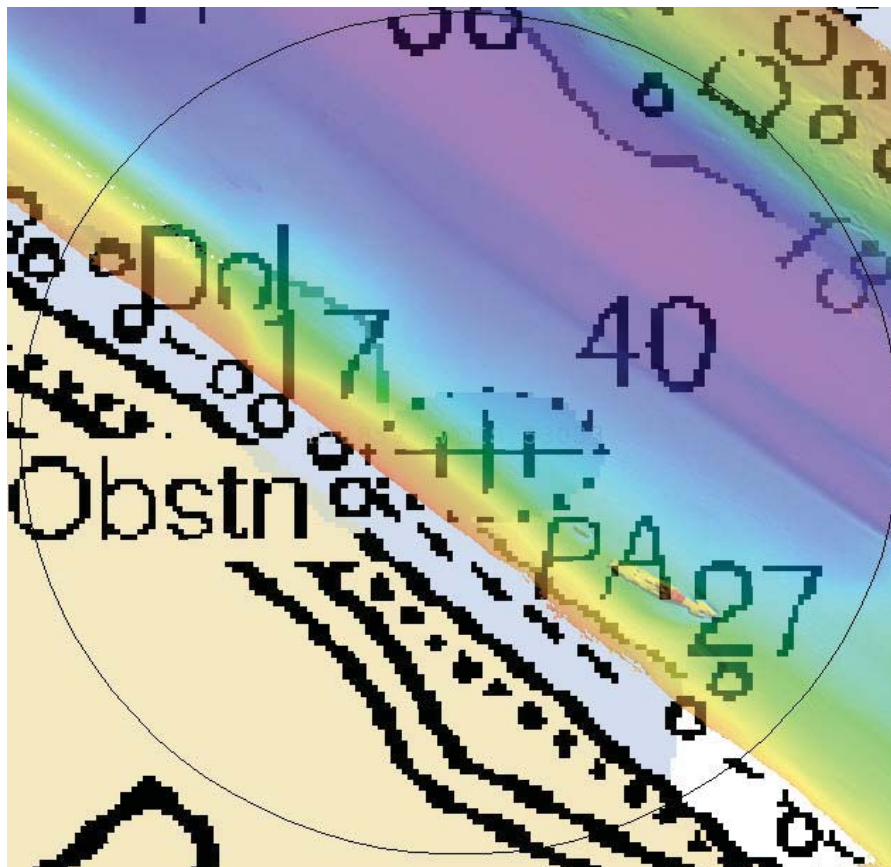


Figure 2. AWOIS search radius, chart 18526_1, MBES coverage.

AWOIS 53034

Remarks:

AWOIS Item #53034 was not assigned for investigation.

AWOIS 53035

Remarks:

AWOIS Item #53035 was not assigned for investigation.

AWOIS 53036

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53036	100m	45/31/11.79	122/40/01.35

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
	10.52m	45/31/11.634	122/40/01.967

Remarks:

AWOIS 53036, charted at 45/31/11.79N, 122/40/01.35W, was investigated with 100% shallow water multibeam. There is a large amount of debris ranging in height from 0.50m to 2.00m within the AWOIS radius. A submerged log lies in front of the charted submerged pile and has a least depth of 10.52m (34.5ft) at position 45/31/11.634N, 122/40/01.967W.

Hydrographer Recommendation:

The hydrographer recommends charting the area in accordance with the survey data.

AWOIS 53037

Remarks:

AWOIS Item #53037 was not assigned for investigation.

AWOIS 53038

Remarks:

AWOIS Item #53038 was not assigned for investigation.

AWOIS 53039

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53039	50m	45/29/58.710	122/39/54.239

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
OBSTRN	3.65m	45/29/58.898	122/39/54.089

Remarks:

An uncharted obstruction was found within the AWOIS radius at 45-29-58.90N, 122-39-54.09W, approximately 33-feet (10 meters) downstream of the AWOIS database position. A least depth was found in the MBES data to be 3.65m (12.0ft) at position 45/29/58.898N, 122/39/54.089W.

Hydrographer Recommendation:

The hydrographer recommends charting the area in accordance with the survey data.

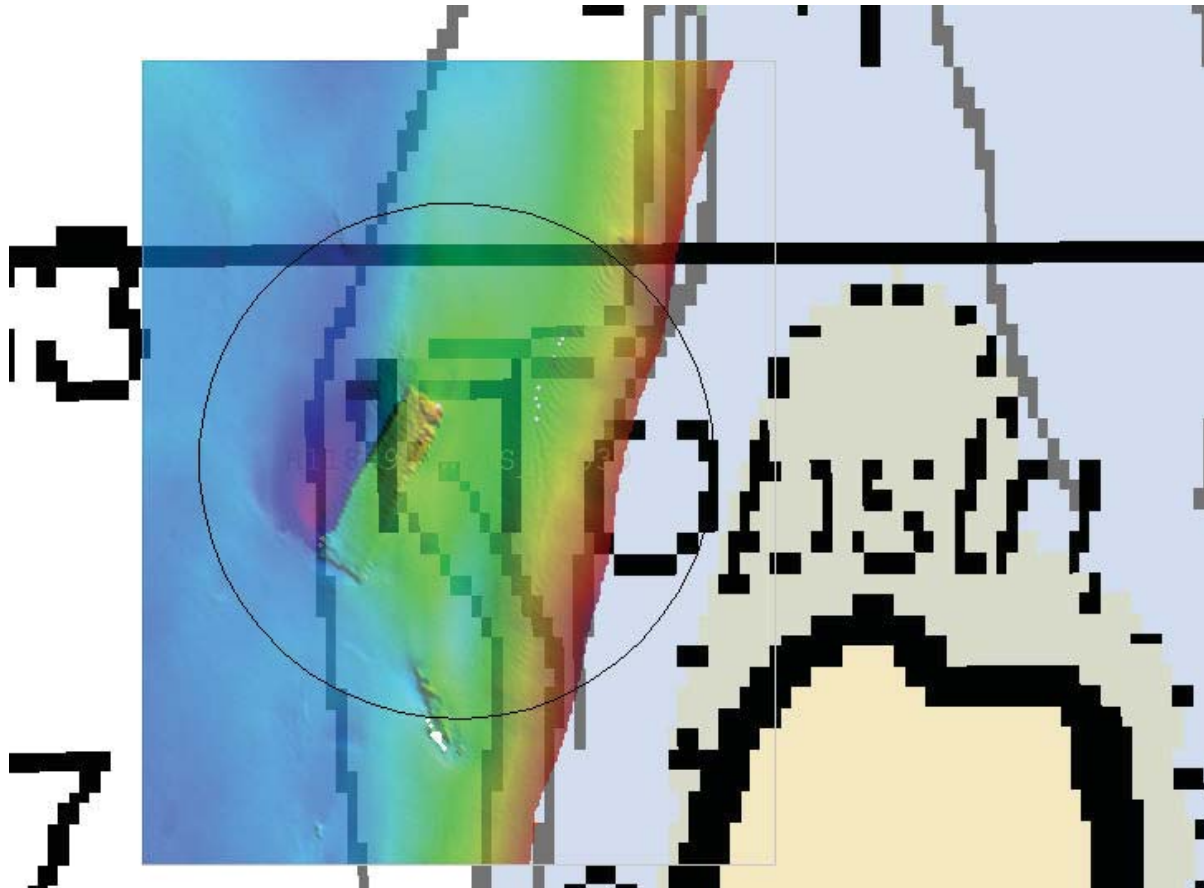


Figure 3. AWOIS search radius, chart 18526_1, MBES coverage.

AWOIS 53040

Remarks:

AWOIS Item #53040 was not assigned for investigation.

Appendix II
S-57 Features

OPR-N338-KR-08
H11859
Survey Features
CBLARE

New Area* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-40-15.244W	45-30-42.482N	Cable Area within charted cable area just south of Hawthorne Bridge
--	--	122-40-08.781W	45-31-07.746N	Cable Area within charted cable area just north of Morrison Bascule Bridge

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

OPR-N338-KR-08
 H11859
 Survey Features
 CBLSUB

New Line* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-42-06.360	45-36-54.456	Cable within charted cable area; just west of BN RR swing bridge, Hayden Island channel
--	--	122-40-27.901	45-36-53.101	Cable within charted cable area; just east of I-5 bridge, off Hayden Island shoreline
--	--	122-40-03.223	45-31-24.179	Cable within charted cable area; connecting Burnside bridge footings
--	--	122-40-08.824	45-30-32.868	Cable within charted cable area; beginning under Marquam Bridge

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

OPR-N338-KR-08
 H11859
 Survey Features
 MORFAC

Disproved Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-37-58.811	122-44-17.196	--	--	Disproved
45-34-45.339	122-44-49.310	--	--	Disproved
45-34-43.037	122-44-46.448	--	--	Disproved
45-38-08.146	122-46-56.176	--	--	Disproved
45-34-44.739	122-44-48.888	--	--	Disproved
45-34-42.280	122-44-45.043	--	--	Disproved
45-38-01.074	122-47-02.454	--	--	Disproved
45-37-50.365	122-47-08.839	--	--	Disproved
45-34-45.305	122-44-49.919	--	--	Disproved
45-34-42.722	122-44-45.799	--	--	Disproved
45-37-24.441	122-47-17.382	--	--	Disproved
45-37-10.132	122-42-56.321	--	--	Disproved
45-36-50.456	122-47-31.344	--	--	Disproved
45-34-48.451	122-44-43.106	--	--	Disproved
45-33-20.246	122-43-02.455	--	--	Disproved
45-37-57.208	122-47-04.903	--	--	Disproved
45-34-44.667	122-44-50.041	--	--	Disproved
45-34-45.786	122-44-47.548	--	--	Disproved
45-28-04.862	122-39-54.231	--	--	Disproved
45-36-09.496	122-39-38.142	--	--	Disproved
45-34-57.652	122-45-50.008	--	--	Disproved
45-34-49.464	122-44-42.019	--	--	Disproved
45-28-05.682	122-39-54.200	--	--	Disproved
45-37-58.395	122-44-17.579	--	--	Disproved
45-36-14.576	122-46-24.557	--	--	Disproved
45-34-48.898	122-44-42.394	--	--	Disproved
45-28-20.225	122-39-54.507	--	--	Disproved

OPR-N338-KR-08
 H11859
 Survey Features
 MORFAC

Disproved Point Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-37-08.888	122-42-37.006	--	--	Disproved
45-36-58.981	122-47-13.010	--	--	Disproved
45-34-46.483	122-44-46.161	--	--	Disproved
45-34-12.843	122-43-23.795	--	--	Disproved
45-36-09.273	122-39-36.241	--	--	Disproved
45-36-42.486	122-47-02.192	--	--	Disproved
45-34-48.089	122-44-43.687	--	--	Disproved
45-33-16.667	122-42-52.973	--	--	Disproved
45-37-26.966	122-43-12.906	--	--	Disproved
45-34-47.721	122-44-44.184	--	--	Disproved
45-34-13.748	122-43-24.329	--	--	Disproved
45-37-04.892	122-42-27.335	--	--	Disproved
45-36-43.407	122-47-03.122	--	--	Disproved
45-34-46.885	122-44-45.655	--	--	Disproved
45-34-12.607	122-43-24.135	--	--	Disproved
45-37-26.834	122-43-16.280	--	--	Disproved
45-37-19.870	122-47-16.195	--	--	Disproved
45-34-45.398	122-44-46.761	--	--	Disproved
45-34-12.587	122-43-24.952	--	--	Disproved
45-37-08.035	122-42-37.908	--	--	Disproved
45-36-49.748	122-47-30.828	--	--	Disproved
45-36-56.652	122-47-12.959	--	--	Disproved
45-34-45.983	122-44-46.864	--	--	Disproved
45-34-08.849	122-44-20.905	--	--	Disproved
45-37-41.969	122-47-14.630	--	--	Disproved
45-34-45.681	122-44-48.110	--	--	Disproved
45-34-10.591	122-43-45.810	--	--	Disproved

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Disproved Point Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-37-26.453	122-43-13.449	--	--	Disproved
45-37-20.303	122-47-16.107	--	--	Disproved
45-34-45.496	122-44-48.654	--	--	Disproved
45-34-13.299	122-43-24.186	--	--	Disproved
45-37-51.086	122-47-09.240	--	--	Disproved
45-34-45.240	122-44-50.500	--	--	Disproved
45-34-47.280	122-44-44.980	--	--	Disproved
45-37-23.972	122-47-17.102	--	--	Disproved
45-36-57.001	122-47-12.425	--	--	Disproved

New Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-35-54.747	122-46-31.174	Charted correctly on ENC US5OR15M; RNC chart 18526 needs updating.
--	--	45-38-05.653	122-44-26.958	Uncharted dolphin is northwest extent of Berth 607
--	--	45-38-04.678	122-44-25.150	Uncharted dolphin is part of Berth 607
--	--	45-37-20.855	122-47-16.060	Uncharted dolphin is part of Ash Grove Lime Dock. 3 additional dolphins behind dock where not surveyed, but are visible on NGS photogramtry.
--	--	45-35-53.836	122-46-30.655	Uncharted dolphin
--	--	45-35-57.277	122-46-32.624	Uncharted dolphin

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Mischarted Point Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-38-14.071	122-46-49.655	Mischarted- charted dolphin is now laying on seafloor
--	--	45-38-13.417	122-46-48.857	Mischarted- charted dolphin is submerged ruins
--	--	45-34-56.052	122-45-17.600	Mischarted- charted dolphins appear to have been cut just above the mudline
--	--	45-34-54.763	122-45-14.414	Mischarted- charted dolphins appear to have been cut just above the mudline
--	--	45-34-10.310	122-43-11.160	Mischarted- charted pile is submerged
--	--	45-33-27.100	122-43-22.060	Mischarted- charted dolphin is submerged 0.75m proud
--	--	45-36-14.894	122-46-24.748	Mischarted- dolphin is now submerged
--	--	45-34-54.585	122-45-12.849	Mischarted- charted dolphins appear to have been cut just above the mudline
--	--	45-34-54.973	122-45-15.059	Mischarted- charted dolphins appear to have been cut just above the mudline
--	--	45-38-14.071	122-46-49.655	Mischarted- charted dolphin is now laying on seafloor
--	--	45-35-40.694	122-46-23.248	Mischarted- pile is now submerged
--	--	45-38-13.417	122-46-48.857	Mischarted- charted dolphin is submerged ruins

Disproved Point Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-30-24.437	122-39-57.641	--	--	Disproved
45-33-57.132	122-42-45.719	--	--	Disproved
45-29-44.515	122-39-55.717	--	--	Disproved
45-31-44.500	122-40-14.500	--	--	Disproved
45-29-36.573	122-39-58.097	--	--	Disproved Subm Piles on RNC 18526
45-31-39.681	122-40-16.035	--	--	Disproved
45-29-32.495	122-39-59.957	--	--	Disproved
45-31-41.037	122-40-17.715	--	--	Disproved Subm Piles on RNC 18526
45-29-37.674	122-39-57.878	--	--	Disproved
45-38-31.889	122-44-01.119	--	--	Disproved
45-29-20.079	122-40-05.749	--	--	Disproved
45-30-22.459	122-39-56.219	--	--	Disproved Subm Piles on RNC 18526

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Disproved Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-29-39.746	122-39-57.338	--	--	Disproved
45-30-24.832	122-39-56.872	--	--	Disproved Subm Piles on RNC 18526
45-29-52.840	122-39-54.201	--	--	Disproved
45-30-24.227	122-39-56.357	--	--	Disproved Subm Piles on RNC 18526
45-29-30.489	122-40-01.254	--	--	Disproved
45-29-45.938	122-39-55.590	--	--	Disproved
45-31-43.400	122-40-16.200	--	--	Disproved Subm Piles on RNC 18526
45-29-35.342	122-39-58.259	--	--	Disproved
45-30-24.702	122-39-58.410	--	--	Disproved Subm Piles on RNC 18526
45-29-36.528	122-39-58.126	--	--	Disproved
45-29-47.160	122-39-55.417	--	--	Disproved
45-36-02.675	122-46-30.024	--	--	Disproved
45-29-23.481	122-40-13.982	--	--	Disproved
45-36-38.678	122-36-45.100	--	--	Disproved
45-29-21.883	122-40-04.594	--	--	Disproved
45-30-23.608	122-39-55.859	--	--	Disproved pile on RNC 18526
45-34-18.687	122-44-32.884	--	--	Disproved
45-36-02.530	122-46-32.798	--	--	Disproved
45-34-17.667	122-43-58.935	--	--	Disproved
45-29-45.288	122-39-55.634	--	--	Disproved
45-36-02.458	122-46-22.669	--	--	Disproved pile on RNC 18526
45-31-21.967	122-40-08.493	--	--	Disproved
45-33-03.304	122-41-42.113	--	--	Disproved Subm Piles on RNC 18526
45-29-28.474	122-40-02.138	--	--	Disproved
45-33-35.600N	122-43-03.300W	--	--	Disproved NOAA DtoN 1.2
45-33-33.900N	122-42-57.100W	--	--	Disproved DtoN 7.2

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Disproved Line* Feature:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
122-44-42.662	45-38-28.620	--	--	Disproved

Disproved Area* Feature:

ENC or RNC Latitude	ENC or RNC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
122-45-34.694	45-35-3.223	--	--	Disproved

New Point Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-36-02.936	122-46-26.433	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-02.845	122-47-41.966	Uncharted snag/obstruction
--	--	45-37-05.855	122-42-22.352	Uncharted snag/obstruction
--	--	45-38-13.361	122-46-49.615	Uncharted snag or pile ruin
--	--	45-37-23.757	122-40-49.871	Uncharted snag/obstruction
--	--	45-32-19.607	122-41-06.426	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.5
--	--	45-36-04.070	122-36-42.604	Uncharted snag/obstruction
--	--	45-38-40.539	122-46-12.072	Uncharted snag/obstruction
--	--	45-37-46.883	122-43-47.042	Uncharted snag/obstruction
--	--	45-37-08.167	122-42-33.275	Uncharted snag/obstruction
--	--	45-30-25.390	122-39-58.238	Charted obstruction updated with new surveyed least depth and position
--	--	45-33-26.676	122-43-19.740	Uncharted snag/obstruction
--	--	45-37-26.354	122-40-56.700	Uncharted snag/obstruction
--	--	45-29-58.898	122-39-54.089	Uncharted rectangular object; AWOIS 53039
--	--	45-36-08.671	122-46-40.184	Uncharted snag/obstruction
--	--	45-29-03.043	122-40-06.554	Submitted DTON has been charted. DtoN # 10.7
--	--	45-36-48.929	122-39-00.913	Uncharted snag/obstruction
--	--	45-36-50.338	122-47-07.710	Uncharted snag/obstruction
--	--	45-37-44.061	122-43-57.172	Uncharted snag/obstruction
--	--	45-36-52.788	122-47-10.759	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-33-04.664	122-41-43.223	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-52.794	122-43-55.834	Uncharted snag/obstruction
--	--	45-37-39.921	122-47-13.882	Uncharted snag/obstruction
--	--	45-36-58.914	122-42-15.127	Uncharted snag or pile ruin near an approach to a pier
--	--	45-38-23.520	122-44-11.708	Uncharted snag/obstruction
--	--	45-34-13.153	122-43-55.686	Submitted DTON has been charted. DtoN # 9
--	--	45-36-04.783	122-38-36.909	Uncharted snag/obstruction
--	--	45-36-40.238	122-46-41.334	Uncharted snag/obstruction
--	--	45-37-30.250	122-43-19.721	Uncharted snag/obstruction
--	--	45-39-05.732	122-45-45.301	Uncharted snag/obstruction
--	--	45-33-26.900	122-42-38.900	Submitted DTON has been charted. DTON # 5
--	--	45-36-54.455	122-47-29.777	Uncharted snag/obstruction
--	--	45-33-38.146	122-43-05.805	Uncharted snag/obstruction
--	--	45-35-10.770	122-46-01.310	Uncharted snag/ pile ruin
--	--	45-38-10.715	122-46-52.120	Uncharted snag/obstruction
--	--	45-28-36.159	122-39-50.725	Submitted DTON has been charted. DtoN # 10.3
--	--	45-37-36.315	122-48-51.724	Uncharted snag/obstruction
--	--	45-36-07.822	122-46-42.300	Uncharted snag/obstruction
--	--	45-37-25.181	122-48-40.238	Uncharted snag/obstruction
--	--	45-36-13.971	122-40-07.441	Uncharted snag/obstruction
--	--	45-31-44.809	122-40-14.572	Submitted DTON has been charted. DTON # 1.1
--	--	45-39-09.949	122-45-52.191	Uncharted snag/obstruction
--	--	45-37-43.622	122-48-59.559	Uncharted snag/obstruction
--	--	45-37-30.682	122-48-51.452	Uncharted snag/obstruction
--	--	45-35-31.603	122-46-11.088	Uncharted snag/obstruction
--	--	45-37-39.033	122-49-01.345	Submitted DTON has been charted. DtoN # 8.1
--	--	45-37-03.638	122-42-20.368	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-41.042	122-45-09.303	Uncharted snag/obstruction
--	--	45-38-04.477	122-47-00.509	Uncharted seaward most extent of row of 2 submerged dolphin ruins
--	--	45-36-56.210	122-40-42.641	Uncharted snag/obstruction
--	--	45-34-48.232	122-44-52.283	Uncharted snag/obstruction
--	--	45-33-54.894	122-42-48.880	Submitted DtoN report; DtoN # 13.7
--	--	45-36-13.296	122-46-28.329	Uncharted snag/obstruction
--	--	45-37-30.627	122-48-48.475	Uncharted snag/obstruction
--	--	45-36-27.757	122-41-02.485	Uncharted snag/obstruction
--	--	45-37-44.038	122-47-37.041	Log 23m long
--	--	45-33-26.686	122-43-20.966	Uncharted snag/obstruction
--	--	45-34-31.048	122-44-25.482	Uncharted snag/obstruction
--	--	45-34-13.040	122-43-17.530	Uncharted large obstruction
--	--	45-37-11.503	122-47-36.298	Uncharted snag/obstruction
--	--	45-34-26.139	122-44-15.182	Uncharted snag/obstruction
--	--	45-32-31.413	122-41-10.317	Submitted DTON has not been charted. DtoN # 12.9
--	--	45-34-48.281	122-44-42.529	Uncharted snag/obstruction
--	--	45-37-58.832	122-44-04.997	Uncharted snag/obstruction
--	--	45-34-35.229	122-44-36.161	Uncharted snag/obstruction
--	--	45-37-48.309	122-47-10.168	Possible transient snag
--	--	45-35-23.781	122-46-04.408	Uncharted snag/obstruction
--	--	45-34-09.087	122-43-10.976	Uncharted snag/obstruction
--	--	45-36-15.224	122-46-29.613	Uncharted snag or pile ruin near approach to Berth 405
--	--	45-37-52.268	122-43-54.952	Uncharted snag/obstruction
--	--	45-37-52.268	122-43-54.952	Uncharted snag/obstruction
--	--	45-34-28.559	122-44-22.062	Uncharted snag/obstruction
--	--	45-31-53.192	122-40-19.496	Submitted DTON has not been charted. DtoN # 12.2
--	--	45-36-54.985	122-40-27.613	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-27.567	122-48-46.857	Long rectangular object
--	--	45-37-27.421	122-48-41.024	Uncharted snag/obstruction
--	--	45-38-26.731	122-44-40.290	Uncharted snag/obstruction
--	--	45-38-08.318	122-46-54.511	Uncharted snag or pile ruin
--	--	45-38-07.231	122-46-56.095	Uncharted snag/obstruction
--	--	45-37-54.902	122-47-06.401	Uncharted snag/obstruction
--	--	45-36-48.826	122-41-43.982	Uncharted snag/obstruction
--	--	45-34-45.897	122-44-52.092	Uncharted snag/obstruction
--	--	45-36-12.429	122-39-57.951	Large geologic feature
--	--	45-33-57.493	122-42-48.212	Submitted DtoN report; DtoN # 13.8
--	--	45-38-05.726	122-46-57.930	Uncharted snag/obstruction
--	--	45-38-28.212	122-44-42.483	Uncharted snag/obstruction
--	--	45-32-17.160	122-41-09.260	Uncharted snag or pile ruin
--	--	45-37-11.416	122-48-07.454	Uncharted snag/obstruction
--	--	45-38-32.536	122-43-14.810	Uncharted snag/obstruction
--	--	45-36-21.808	122-47-12.963	Uncharted snag/obstruction
--	--	45-36-25.767	122-47-02.669	Uncharted snag/obstruction
--	--	45-35-14.069	122-45-52.566	Submerged vehicle
--	--	45-32-52.961	122-41-36.549	Submitted DTON has not been charted. DtoN # 12.13
--	--	45-37-22.006	122-43-16.908	Uncharted snag/obstruction
--	--	45-38-27.665	122-46-26.071	Uncharted snag/obstruction
--	--	45-37-10.988	122-48-16.726	Uncharted small obstruction
--	--	45-37-15.218	122-47-40.284	Uncharted snag/obstruction
--	--	45-38-03.179	122-44-22.507	Uncharted snag/obstruction
--	--	45-36-57.537	122-39-23.310	Uncharted snag/obstruction
--	--	45-38-57.761	122-44-45.529	Uncharted snag/obstruction
--	--	45-34-27.776	122-44-12.711	Pier/dock ruins

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-35-15.075	122-45-54.008	Uncharted snag/obstruction
--	--	45-34-47.625	122-44-57.245	Uncharted snag/obstruction
--	--	45-39-01.626	122-45-42.675	Uncharted snag or pile ruin
--	--	45-36-07.464	122-37-21.259	Uncharted snag/obstruction
--	--	45-34-48.499	122-44-50.091	Uncharted snag/obstruction
--	--	45-38-31.571	122-44-48.026	Uncharted snag/obstruction
--	--	45-38-15.480	122-46-47.312	Uncharted snag/obstruction
--	--	45-37-14.704	122-43-06.297	Possible transient snag
--	--	45-36-07.005	122-46-35.687	Uncharted snag/obstruction
--	--	45-36-40.868	122-46-52.465	Uncharted snag/obstruction
--	--	45-37-05.249	122-42-45.978	Uncharted snag/obstruction
--	--	45-38-12.829	122-46-49.545	Uncharted snag or pile ruin
--	--	45-37-36.117	122-43-29.435	Uncharted snag/obstruction
--	--	45-34-49.937	122-44-45.530	Uncharted snag/obstruction
--	--	45-37-27.472	122-41-01.136	Uncharted snag/obstruction
--	--	45-31-15.604	122-39-59.629	Uncharted snag/obstruction
--	--	45-31-42.266	122-40-17.997	Large vertical cylindrical objects
--	--	45-37-23.370	122-43-04.223	Uncharted snag/obstruction
--	--	45-38-33.765	122-44-32.293	Uncharted snag/obstruction
--	--	45-37-26.715	122-40-58.173	Uncharted snag/obstruction
--	--	45-32-18.020	122-41-10.750	Uncharted snag or pile ruin
--	--	45-38-19.317	122-44-31.736	Uncharted snag/obstruction
--	--	45-34-48.933	122-44-54.320	Uncharted snag/obstruction
--	--	45-36-52.945	122-42-04.018	Uncharted snag/obstruction
--	--	45-38-16.067	122-46-44.683	Uncharted snag/obstruction
--	--	45-34-24.122	122-44-42.128	Part of pipe structure
--	--	45-34-50.594	122-44-57.978	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-31-13.970	122-40-00.522	Uncharted snag/obstruction
--	--	45-36-38.732	122-47-21.756	Uncharted snag/obstruction
--	--	45-36-37.140	122-41-33.021	Uncharted snag or pile ruin 0.9m proud
--	--	45-36-49.967	122-47-30.783	Uncharted snag/obstruction
--	--	45-36-15.190	122-46-38.773	Uncharted snag/obstruction
--	--	45-38-03.210	122-47-30.934	Uncharted snag/obstruction
--	--	45-33-10.540	122-41-59.049	Uncharted snag/obstruction
--	--	45-32-48.301	122-41-29.724	Submerged pickup truck
--	--	45-34-50.665	122-44-50.895	Uncharted snag/obstruction
--	--	45-39-03.117	122-44-54.065	Uncharted snag/obstruction
--	--	45-36-49.956	122-47-30.004	Uncharted snag/obstruction
--	--	45-34-10.890	122-43-13.280	Uncharted snag or pile ruin
--	--	45-38-32.418	122-44-29.856	Uncharted snag/obstruction
--	--	45-38-36.089	122-46-13.203	Uncharted snag/obstruction
--	--	45-36-49.506	122-47-31.174	Uncharted snag/obstruction
--	--	45-37-53.520	122-43-56.366	Uncharted snag/obstruction
--	--	45-30-49.192	122-40-21.838	Cylindrical object
--	--	45-37-36.158	122-43-32.103	Uncharted snag/obstruction
--	--	45-36-06.694	122-37-20.166	Uncharted snag/obstruction
--	--	45-37-04.420	122-42-23.142	Uncharted snag/obstruction
--	--	45-30-33.693	122-40-12.637	Submitted DTON has been charted to RNC not to ENC. DtoN # 11.2
--	--	45-33-55.167	122-42-52.516	Uncharted snag/obstruction
--	--	45-36-58.162	122-39-25.078	Uncharted snag/obstruction
--	--	45-33-07.683	122-42-30.989	Uncharted snag/obstruction
--	--	45-37-53.884	122-47-08.414	Uncharted snag/obstruction
--	--	45-33-19.466	122-43-02.596	Pile ruins
--	--	45-36-38.286	122-47-00.066	Uncharted snag/obstruction

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ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-20.597	122-44-05.286	Uncharted snag/obstruction
--	--	45-31-15.003	122-39-59.648	Uncharted snag/obstruction
--	--	45-31-14.379	122-40-00.626	Submitted DTON has not been charted. DtoN # 11.7
--	--	45-34-49.847	122-44-56.131	Uncharted snag/obstruction
--	--	45-34-18.034	122-44-01.850	Uncharted snag/obstruction
--	--	45-39-07.949	122-45-43.759	Uncharted snag/obstruction
--	--	45-34-36.646	122-44-34.163	Uncharted snag/obstruction
--	--	45-36-56.439	122-40-25.493	Geologic feature
--	--	45-37-06.755	122-47-16.057	Uncharted snag/obstruction
--	--	45-35-28.028	122-46-27.198	Uncharted snag/obstruction
--	--	45-37-15.018	122-47-24.498	Uncharted snag/obstruction
--	--	45-38-11.098	122-44-22.276	Uncharted snag/obstruction
--	--	45-28-48.990	122-39-49.530	Submitted DTON has not been charted. DtoN # 10.5
--	--	45-34-04.617	122-43-47.998	Uncharted snag/obstruction
--	--	45-35-27.581	122-46-07.641	Uncharted snag/obstruction
--	--	45-34-29.178	122-44-21.160	Uncharted snag/obstruction
--	--	45-37-11.332	122-47-40.477	Pile ruins
--	--	45-38-05.481	122-46-57.526	Uncharted snag/obstruction
--	--	45-37-42.983	122-43-39.226	Uncharted snag/obstruction
--	--	45-34-21.588	122-44-13.374	Uncharted snag/obstruction
--	--	45-37-39.952	122-43-37.360	Uncharted snag/obstruction
--	--	45-34-58.300	122-45-49.790	Uncharted pile ruin seaward of a disproved charted dolphin
--	--	45-34-26.413	122-44-14.155	Uncharted snag/obstruction
--	--	45-37-00.411	122-47-21.103	Uncharted snag/obstruction
--	--	45-37-03.924	122-39-37.114	Uncharted snag/obstruction
--	--	45-27-56.817	122-39-52.540	Submitted DTON has not been charted. DtoN # 10.1
--	--	45-34-11.452	122-43-19.133	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-11.207	122-48-04.547	Uncharted snag/obstruction
--	--	45-36-49.172	122-38-59.856	Uncharted snag/obstruction
--	--	45-37-53.273	122-43-55.713	Uncharted snag/obstruction
--	--	45-38-13.417	122-46-48.857	Mischarted; charted dolphin is submerged ruins
--	--	45-38-14.313	122-46-47.930	Uncharted snag or pile ruin
--	--	45-35-26.590	122-46-25.915	Uncharted snag/obstruction
--	--	45-37-38.933	122-48-56.235	Uncharted snag/obstruction
--	--	45-34-47.333	122-44-52.522	Uncharted snag/obstruction
--	--	45-33-43.317	122-42-31.049	Submitted DtoN report; DtoN # 13.1
--	--	45-37-25.564	122-40-55.824	Uncharted snag/obstruction
--	--	45-34-52.151	122-45-05.809	Uncharted snag/obstruction
--	--	45-31-16.304	122-39-59.353	Uncharted snag/obstruction
--	--	45-36-55.485	122-39-17.596	Uncharted snag/obstruction
--	--	45-39-01.673	122-45-43.243	Uncharted snag or pile ruin
--	--	45-35-53.639	122-46-52.194	Uncharted snag/obstruction
--	--	45-39-01.743	122-46-01.956	Uncharted snag/obstruction
--	--	45-38-00.660	122-47-04.235	Uncharted seaward most extent of row of 2 submerged dolphin ruins
--	--	45-37-09.347	122-47-43.629	Uncharted snag/obstruction
--	--	45-38-14.067	122-46-47.612	Uncharted snag or pile ruin
--	--	45-34-10.333	122-43-15.773	Uncharted snag/obstruction
--	--	45-33-46.153	122-42-31.367	Submitted DtoN report; DtoN # 13.3
--	--	45-34-48.997	122-44-55.875	Uncharted snag/obstruction
--	--	45-37-13.341	122-48-09.516	Uncharted snag/obstruction
--	--	45-28-54.267	122-39-55.067	Uncharted snag/obstruction
--	--	45-37-38.640	122-47-15.003	Uncharted snag/obstruction
--	--	45-34-10.256	122-43-20.234	Uncharted submerged obstruction
--	--	45-36-08.184	122-37-18.114	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-25.273	122-44-15.966	Uncharted snag/obstruction
--	--	45-38-24.425	122-47-00.928	Uncharted snag or pile ruin
--	--	45-34-50.732	122-44-53.362	Uncharted snag/obstruction
--	--	45-30-26.236	122-40-12.155	Submitted DTON has not been charted. DtoN # 11.1
--	--	45-34-49.463	122-44-51.589	Uncharted snag/obstruction
--	--	45-34-24.096	122-44-10.193	Uncharted snag/obstruction
--	--	45-37-33.947	122-43-23.242	Uncharted snag/obstruction
--	--	45-31-17.736	122-40-00.197	Uncharted snag/obstruction
--	--	45-31-11.434	122-40-01.404	Charted obstruction updated with new surveyed least depth and position
--	--	45-34-47.901	122-44-46.927	Uncharted snag/obstruction
--	--	45-33-57.924	122-42-50.588	Uncharted snag/obstruction
--	--	45-37-00.400	122-42-07.200	Uncharted snag or pile ruins at charted ED wreck. No wreck located.
--	--	45-34-17.577	122-43-59.606	Uncharted snag/obstruction
--	--	45-34-02.797	122-43-00.512	Submitted DtoN report; DtoN # 13.11
--	--	45-39-25.973	122-45-38.395	Uncharted snag/obstruction
--	--	45-36-14.919	122-40-06.358	Uncharted snag/obstruction
--	--	45-36-33.608	122-41-22.083	Uncharted snag/obstruction
--	--	45-35-00.552	122-45-35.553	Uncharted snag/obstruction
--	--	45-33-25.500	122-43-05.300	Submitted DTON has been charted. DTON # 4
--	--	45-33-49.522	122-43-46.869	Uncharted snag/obstruction
--	--	45-34-20.144	122-44-11.714	Uncharted snag/obstruction
--	--	45-39-00.909	122-45-43.052	Uncharted awash pile
--	--	45-37-24.862	122-41-44.677	Uncharted snag/obstruction
--	--	45-34-02.491	122-43-05.256	Submitted DtoN report; DtoN # 13.10
--	--	45-33-59.913	122-43-34.203	Uncharted snag/obstruction
--	--	45-37-26.398	122-40-57.203	Uncharted snag/obstruction
--	--	45-34-49.005	122-44-57.200	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-25.449	122-44-14.364	Uncharted snag/obstruction
--	--	45-34-28.783	122-44-19.983	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-14.203	122-47-18.900	Uncharted snag/obstruction
--	--	45-36-56.548	122-47-30.243	Uncharted snag/obstruction
--	--	45-33-03.941	122-41-49.436	Submitted DTON has been charted. NOAA DtoN 1.5
--	--	45-34-25.387	122-44-28.282	Uncharted snag/obstruction
--	--	45-37-22.372	122-48-33.674	Uncharted snag/obstruction
--	--	45-38-07.812	122-46-57.037	Uncharted seaward most extent of row of 5 submerged dolphin ruins
--	--	45-38-35.779	122-46-13.688	Uncharted snag/obstruction
--	--	45-37-52.056	122-43-53.356	Uncharted snag/obstruction
--	--	45-34-08.985	122-43-39.520	Submitted DtoN report; DtoN # 13.23
--	--	45-37-15.647	122-41-21.241	Uncharted snag/obstruction
--	--	45-34-30.291	122-44-23.034	Uncharted snag/obstruction
--	--	45-37-25.999	122-40-56.095	Uncharted snag/obstruction
--	--	45-31-43.380	122-40-16.152	Submitted DTON has been charted. DTON # 1.2
--	--	45-37-13.956	122-48-14.314	Uncharted snag/obstruction
--	--	45-35-07.321	122-46-03.929	Uncharted snag/obstruction
--	--	45-37-12.765	122-43-02.237	Uncharted snag or pile ruin 1.23m proud.
--	--	45-34-30.375	122-44-30.373	Uncharted snag/obstruction
--	--	45-37-27.289	122-40-59.721	Uncharted snag/obstruction
--	--	45-32-56.719	122-41-51.615	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.14
--	--	45-37-02.429	122-42-16.159	Uncharted snag/obstruction
--	--	45-28-47.843	122-39-48.484	Uncharted snag/obstruction
--	--	45-37-26.442	122-40-57.609	Uncharted snag/obstruction
--	--	45-37-52.052	122-42-31.627	Pile dike ruins
--	--	45-34-48.942	122-44-50.640	Uncharted snag/obstruction
--	--	45-34-11.197	122-43-55.756	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-36-02.266	122-46-26.992	Uncharted snag or pile ruin
--	--	45-34-50.814	122-45-05.678	Uncharted snag/obstruction
--	--	45-37-36.833	122-43-33.662	Uncharted snag/obstruction
--	--	45-34-07.307	122-43-09.040	Submitted DtoN report; DtoN # 13.13
--	--	45-35-57.778	122-46-33.510	Uncharted snag/obstruction
--	--	45-33-59.005	122-43-30.060	Uncharted snag/obstruction
--	--	45-39-14.157	122-46-03.527	Possible transient snag
--	--	45-36-50.075	122-47-31.260	Uncharted snag/obstruction
--	--	45-33-23.086	122-43-10.874	Uncharted snag/obstruction
--	--	45-38-16.812	122-47-14.151	Uncharted snag or pile ruin
--	--	45-38-13.538	122-44-38.002	Uncharted snag/obstruction
--	--	45-39-03.353	122-45-44.664	Uncharted snag/obstruction
--	--	45-34-46.693	122-44-46.527	Uncharted snag/obstruction
--	--	45-37-00.295	122-47-14.924	Uncharted snag/obstruction
--	--	45-34-18.623	122-44-33.506	Part of pipe structure
--	--	45-33-48.321	122-42-38.597	Submitted DtoN report; DtoN # 13.4
--	--	45-36-39.493	122-46-40.784	Uncharted snag/obstruction
--	--	45-34-47.019	122-44-47.107	Uncharted snag/obstruction
--	--	45-36-03.650	122-47-00.150	Uncharted possible submerged pile dike
--	--	45-38-43.543	122-45-04.794	Uncharted snag/obstruction
--	--	45-34-04.684	122-43-09.436	Uncharted snag/obstruction
--	--	45-36-59.307	122-42-28.591	Uncharted snag/obstruction
--	--	45-33-25.819	122-43-19.738	Uncharted snag/obstruction
--	--	45-37-03.394	122-40-42.229	Geologic feature
--	--	45-32-09.107	122-40-55.450	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.3
--	--	45-37-53.436	122-47-11.215	Uncharted snag/obstruction
--	--	45-38-01.120	122-44-20.142	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-16.384	122-43-59.325	Possible transient snag.
--	--	45-34-50.609	122-45-01.813	Uncharted snag/obstruction
--	--	45-37-09.059	122-47-41.700	Uncharted snag/obstruction
--	--	45-37-41.321	122-48-58.675	Uncharted snag/obstruction
--	--	45-34-47.197	122-44-55.610	Uncharted snag/obstruction
--	--	45-36-10.674	122-39-24.935	Log sticking out into channel from pier
--	--	45-34-30.826	122-44-24.267	Uncharted snag/obstruction
--	--	45-36-07.596	122-46-40.684	Uncharted snag/obstruction
--	--	45-34-47.430	122-44-44.940	Uncharted pile ruin next to uncharted wreck
--	--	45-36-41.574	122-46-59.041	Uncharted snag/obstruction
--	--	45-36-04.517	122-38-35.364	Uncharted snag/obstruction
--	--	45-34-34.114	122-44-53.529	Uncharted snag/obstruction
--	--	45-36-19.042	122-40-36.357	Uncharted snag/obstruction
--	--	45-36-53.884	122-42-19.275	Pile ruins
--	--	45-36-51.768	122-39-08.584	Uncharted snag/obstruction
--	--	45-38-04.150	122-44-10.466	Uncharted snag/obstruction
--	--	45-35-13.840	122-45-53.829	Uncharted snag/obstruction
--	--	45-38-42.356	122-46-27.960	Uncharted snag or pile ruin
--	--	45-34-43.008	122-44-55.054	Uncharted snag/obstruction
--	--	45-37-46.364	122-47-28.105	Uncharted snag/obstruction
--	--	45-36-32.668	122-41-17.608	Uncharted snag/obstruction
--	--	45-38-31.820	122-44-28.696	Uncharted snag/obstruction
--	--	45-37-27.317	122-41-14.428	Stack of logs
--	--	45-37-53.107	122-43-55.219	Uncharted snag/obstruction
--	--	45-37-32.701	122-43-22.735	Uncharted snag/obstruction
--	--	45-37-03.017	122-42-13.411	Uncharted snag/obstruction
--	--	45-37-53.557	122-47-07.106	Uncharted snag or pile ruin

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-57.758	122-42-44.153	Uncharted snag/obstruction
--	--	45-39-02.165	122-44-57.172	Uncharted snag/obstruction
--	--	45-37-40.610	122-48-56.193	Uncharted snag/obstruction
--	--	45-37-24.102	122-48-37.000	Uncharted snag/obstruction
--	--	45-37-05.317	122-40-40.504	Geologic feature
--	--	45-35-34.671	122-46-34.997	Uncharted snag/obstruction
--	--	45-36-32.254	122-41-17.911	Uncharted snag/obstruction
--	--	45-37-39.175	122-43-32.575	Uncharted snag/obstruction
--	--	45-31-52.581	122-40-28.920	Uncharted linear feature. Possible barge
--	--	45-34-33.811	122-44-32.540	Uncharted snag/obstruction
--	--	45-37-03.164	122-47-37.220	Uncharted snag/obstruction
--	--	45-38-31.470	122-44-27.396	Uncharted snag/obstruction
--	--	45-38-39.453	122-45-11.974	Uncharted snag/obstruction
--	--	45-38-02.083	122-44-07.164	Stack of logs
--	--	45-38-57.918	122-45-37.419	Uncharted snag/obstruction
--	--	45-34-00.028	122-44-18.537	Uncharted snag/obstruction
--	--	45-35-07.431	122-46-00.848	Uncharted snag/obstruction
--	--	45-38-26.842	122-43-04.870	Uncharted obstruction
--	--	45-33-31.066	122-42-54.212	Uncharted snag/obstruction
--	--	45-38-03.527	122-43-00.107	Uncharted snag/obstruction
--	--	45-31-16.947	122-39-59.102	Uncharted snag/obstruction
--	--	45-33-50.655	122-43-56.742	Uncharted snag/obstruction
--	--	45-36-10.825	122-39-55.266	Possible wreck
--	--	45-38-26.122	122-44-39.604	Uncharted snag/obstruction
--	--	45-36-36.663	122-47-00.046	Uncharted snag/obstruction
--	--	45-34-13.773	122-44-26.930	Uncharted snag/obstruction
--	--	45-28-12.272	122-39-54.508	Submitted DTON has not been charted. DtoN # 10.2

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-36-44.761	122-41-56.766	Uncharted snag/obstruction
--	--	45-36-58.226	122-47-35.941	Uncharted snag/obstruction
--	--	45-37-26.517	122-41-00.241	Uncharted snag/obstruction
--	--	45-37-26.376	122-40-58.721	Uncharted snag/obstruction
--	--	45-32-16.075	122-41-08.078	Additional snags/stumps within 20m radius.
--	--	45-34-50.265	122-44-49.823	Uncharted snag/obstruction
--	--	45-34-48.288	122-45-11.816	Uncharted snag/obstruction
--	--	45-39-26.001	122-45-19.011	Uncharted snag/obstruction
--	--	45-33-05.666	122-41-49.999	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.15
--	--	45-37-26.600	122-40-57.118	Uncharted snag/obstruction
--	--	45-38-41.019	122-45-15.493	Uncharted snag/obstruction
--	--	45-34-49.003	122-44-47.275	Uncharted snag/obstruction
--	--	45-34-17.789	122-44-30.461	Uncharted snag/obstruction
--	--	45-36-15.452	122-40-16.718	Large geologic feature
--	--	45-36-55.736	122-42-22.001	Uncharted snag/obstruction
--	--	45-38-30.940	122-46-36.575	Uncharted snag/obstruction
--	--	45-37-01.333	122-42-11.810	Uncharted snag/obstruction
--	--	45-33-58.468	122-42-51.003	Uncharted snag/obstruction
--	--	45-34-12.104	122-43-14.192	Submitted DtoN report; DtoN # 13.19
--	--	45-36-58.296	122-47-32.375	Uncharted snag/obstruction
--	--	45-38-17.940	122-43-58.106	Uncharted snag/obstruction
--	--	45-34-25.806	122-44-44.188	Uncharted snag/obstruction
--	--	45-37-10.446	122-47-40.848	Possible wreck
--	--	45-35-30.782	122-46-32.405	Uncharted snag/obstruction
--	--	45-37-02.426	122-42-14.988	Uncharted snag/obstruction
--	--	45-37-25.415	122-48-35.076	Uncharted snag/obstruction
--	--	45-37-07.715	122-47-54.149	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-39.380	122-45-05.110	Uncharted obstruction associated with pier in ruins
--	--	45-36-44.109	122-36-44.313	Uncharted snag/obstruction
--	--	45-37-42.921	122-43-40.116	Uncharted snag/obstruction
--	--	45-36-43.770	122-47-02.467	Uncharted snag/obstruction
--	--	45-30-45.634	122-40-23.881	Submitted DTON has been charted to RNC not to ENC. DtoN # 11.4
--	--	45-37-40.345	122-41-25.454	Uncharted snag/obstruction
--	--	45-34-51.347	122-44-58.570	Uncharted snag/obstruction
--	--	45-36-40.422	122-46-46.318	Uncharted snag/obstruction
--	--	45-36-06.687	122-37-19.498	Uncharted snag/obstruction
--	--	45-38-14.071	122-46-49.655	Mischarted; charted dolphin is now laying on seafloor
--	--	45-36-11.479	122-46-42.860	Uncharted obstruction
--	--	45-36-16.029	122-46-42.796	Uncharted snag/obstruction
--	--	45-38-34.652	122-46-17.490	Uncharted snag/obstruction
--	--	45-38-48.969	122-46-04.873	Uncharted snag/obstruction
--	--	45-38-14.071	122-46-49.655	Mischarted; charted dolphin is now laying on seafloor
--	--	45-33-52.029	122-42-46.523	Submitted DtoN report; DtoN # 13.5
--	--	45-38-39.718	122-46-16.855	Uncharted snag/obstruction
--	--	45-37-22.312	122-43-01.432	Uncharted snag/obstruction
--	--	45-38-46.170	122-45-22.825	Uncharted snag/obstruction
--	--	45-37-12.954	122-48-17.351	Uncharted snag/obstruction
--	--	45-38-07.997	122-46-55.165	Uncharted dolphin ruins
--	--	45-38-00.263	122-44-18.359	Uncharted snag/obstruction
--	--	45-35-32.100	122-46-13.098	Uncharted snag/obstruction
--	--	45-35-40.694	122-46-23.248	Mischarted; pile is now submerged
--	--	45-38-26.882	122-46-30.966	Uncharted snag/obstruction
--	--	45-34-08.295	122-43-12.351	Submitted DtoN report; DtoN # 13.15
--	--	45-33-55.283	122-44-00.050	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-50.112	122-44-53.490	Uncharted snag/obstruction
--	--	45-38-45.852	122-46-07.804	Uncharted snag/obstruction
--	--	45-37-09.788	122-47-16.596	Uncharted snag/obstruction
--	--	45-34-09.919	122-43-09.455	Submitted DtoN report; DtoN # 13.16
--	--	45-37-14.072	122-41-19.243	Uncharted snag/obstruction
--	--	45-35-10.701	122-45-48.812	Uncharted snag/obstruction
--	--	45-37-09.325	122-42-34.339	Uncharted snag/obstruction
--	--	45-36-21.738	122-47-11.071	Uncharted snag/obstruction
--	--	45-33-33.627	122-42-57.084	Submitted DTON has been charted. NOAA DtoN 1.3
--	--	45-37-03.581	122-42-18.817	Uncharted snag/obstruction
--	--	45-38-20.139	122-46-43.542	Uncharted snag/obstruction
--	--	45-36-02.540	122-46-59.190	Uncharted possible submerged pile dike
--	--	45-36-57.350	122-47-34.942	Uncharted snag/obstruction
--	--	45-31-46.755	122-40-13.890	Submitted DTON has not been charted. DtoN # 12.1
--	--	45-35-04.173	122-45-57.186	Uncharted snag/obstruction
--	--	45-34-48.528	122-44-51.370	Uncharted snag/obstruction
--	--	45-38-37.717	122-45-10.684	Uncharted snag/obstruction
--	--	45-37-22.699	122-43-02.510	Uncharted snag/obstruction
--	--	45-31-01.209	122-40-03.927	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-05.326	122-42-19.450	Uncharted snag/obstruction
--	--	45-37-31.128	122-47-27.070	Uncharted snag/obstruction
--	--	45-37-11.920	122-47-16.830	Uncharted snag or pile ruin near an approach to a pier
--	--	45-36-55.134	122-47-31.858	Uncharted snag/obstruction
--	--	45-29-24.043	122-40-03.138	Submitted DTON has not been charted. DtoN # 10.10
--	--	45-37-24.530	122-48-32.185	Uncharted snag/obstruction
--	--	45-35-01.969	122-45-34.488	Uncharted snag/obstruction
--	--	45-37-06.582	122-47-48.082	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-47.268	122-44-42.631	Uncharted snag/obstruction
--	--	45-33-05.920	122-41-43.979	Charted obstruction updated with new surveyed least depth and position
--	--	45-38-31.416	122-43-12.497	Uncharted snag/obstruction
--	--	45-36-43.396	122-36-43.002	Uncharted snag/obstruction
--	--	45-34-27.582	122-44-20.147	Uncharted linear obstruction
--	--	45-34-54.763	122-45-16.970	Uncharted snag/obstruction
--	--	45-31-26.898	122-40-09.488	Submitted DTON has not been charted. DtoN # 11.8
--	--	45-34-47.213	122-45-19.717	Uncharted snag/obstruction
--	--	45-38-28.733	122-46-27.617	Uncharted snag/obstruction
--	--	45-36-28.636	122-47-17.168	Uncharted snag/obstruction
--	--	45-37-26.034	122-43-12.930	Uncharted snag/obstruction
--	--	45-33-36.100	122-42-59.700	Submitted DTON has been charted. DTON # 7.1
--	--	45-37-26.209	122-48-35.061	Uncharted snag/obstruction
--	--	45-38-05.406	122-47-29.161	Uncharted snag/obstruction
--	--	45-36-14.903	122-46-30.410	Uncharted snag or pile ruin near approach to Berth 405
--	--	45-39-08.761	122-46-06.115	Uncharted snag/obstruction
--	--	45-32-17.540	122-41-09.750	Uncharted snag or pile ruin
--	--	45-36-36.410	122-37-09.991	Uncharted snag/obstruction
--	--	45-38-35.779	122-46-13.688	Uncharted snag/obstruction
--	--	45-32-26.609	122-41-16.858	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.8
--	--	45-38-26.156	122-46-58.469	Uncharted snag/obstruction
--	--	45-34-57.828	122-45-26.681	Uncharted snag/obstruction
--	--	45-34-01.249	122-43-03.999	Uncharted snag/obstruction
--	--	45-37-08.114	122-42-37.542	Uncharted submerged obstruction at location of charted dolphin. Dolphin not observed.
--	--	45-39-04.589	122-45-43.550	Uncharted snag/obstruction
--	--	45-39-03.999	122-45-45.077	Uncharted snag/obstruction
--	--	45-37-11.190	122-47-18.360	Uncharted snag or pile ruin near an approach to a pier

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-30-16.302	122-40-07.546	Uncharted snag/obstruction
--	--	45-37-20.498	122-41-28.896	Uncharted snag/obstruction
--	--	45-32-24.693	122-41-19.368	Submitted DTON has not been charted. DtoN # 12.7
--	--	45-38-10.935	122-43-34.271	Uncharted snag/obstruction
--	--	45-31-30.594	122-40-09.293	Uncharted snag/obstruction
--	--	45-37-59.377	122-44-07.765	Uncharted snag/obstruction
--	--	45-35-14.294	122-45-53.292	Possible wreck
--	--	45-36-36.289	122-37-12.612	Uncharted snag/obstruction
--	--	45-38-22.370	122-46-34.325	Uncharted snag/obstruction
--	--	45-35-00.627	122-45-51.996	Uncharted possible dolphin ruins. 3m proud
--	--	45-33-34.948	122-42-59.801	Uncharted snag/obstruction
--	--	45-37-58.336	122-44-14.877	Uncharted snag/obstruction
--	--	45-29-20.679	122-40-03.767	Submitted DTON has not been charted. DtoN # 10.9
--	--	45-34-38.334	122-44-37.196	Uncharted snag/obstruction
--	--	45-37-04.430	122-42-21.873	Uncharted snag/obstruction
--	--	45-37-26.774	122-48-37.798	Uncharted snag/obstruction
--	--	45-34-47.318	122-44-53.669	Remnant pier ruin
--	--	45-38-30.999	122-44-47.109	Uncharted snag/obstruction
--	--	45-37-05.297	122-42-24.441	Uncharted snag/obstruction
--	--	45-38-14.925	122-46-48.227	Uncharted snag or pile ruin
--	--	45-38-19.174	122-46-39.312	Uncharted snag/obstruction
--	--	45-38-16.468	122-46-43.894	Uncharted snag/obstruction
--	--	45-37-03.564	122-47-42.795	Uncharted snag/obstruction
--	--	45-36-43.819	122-36-45.592	Uncharted snag/obstruction
--	--	45-34-18.703	122-44-33.666	Part of pipe structure
--	--	45-32-19.307	122-41-12.430	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.6
--	--	45-37-32.852	122-43-24.893	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-24.985	122-44-13.260	Uncharted snag/obstruction
--	--	45-38-06.784	122-46-56.699	Uncharted seaward most extent of row of 2 submerged dolphin ruins
--	--	45-36-10.530	122-37-53.452	Uncharted snag/obstruction
--	--	45-36-56.058	122-42-21.539	Uncharted snag/obstruction
--	--	45-33-43.686	122-43-44.556	Uncharted snag/obstruction
--	--	45-34-11.705	122-43-46.683	Uncharted snag/obstruction
--	--	45-35-12.991	122-45-51.364	Ruins
--	--	45-34-12.622	122-43-18.790	Submitted DtoN report; DtoN # 13.20
--	--	45-33-18.452	122-42-17.131	Uncharted snag/obstruction
--	--	45-34-05.454	122-43-36.218	Uncharted snag/obstruction
--	--	45-37-10.580	122-47-18.220	Uncharted snag or pile ruin near an approach to a pier
--	--	45-37-33.157	122-48-47.482	Uncharted snag/obstruction
--	--	45-37-20.271	122-42-57.428	Uncharted snag/obstruction
--	--	45-37-09.313	122-42-32.437	Uncharted snag/obstruction
--	--	45-35-03.512	122-45-58.045	Uncharted snag/obstruction
--	--	45-32-16.403	122-41-08.493	Additional snags/stumps within 10m radius.
--	--	45-33-58.489	122-42-58.773	Uncharted snag/obstruction
--	--	45-34-47.264	122-44-49.492	Uncharted snag/obstruction
--	--	45-34-17.060	122-43-59.970	Uncharted snag or pile ruin
--	--	45-34-50.816	122-44-55.895	Uncharted snag/obstruction
--	--	45-37-04.650	122-42-40.626	Uncharted snag/obstruction
--	--	45-38-59.957	122-44-51.444	Uncharted snag/obstruction
--	--	45-38-07.098	122-46-55.636	Uncharted snag/obstruction
--	--	45-34-24.566	122-44-42.003	Part of pipe structure
--	--	45-37-25.829	122-48-34.256	Uncharted snag/obstruction
--	--	45-33-57.280	122-42-55.712	Uncharted snag/obstruction
--	--	45-36-12.271	122-46-43.726	Uncharted snag or pile ruin

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-11.590	122-47-43.679	Uncharted snag/obstruction
--	--	45-37-14.865	122-48-09.637	Uncharted snag/obstruction
--	--	45-34-50.846	122-44-54.268	Uncharted snag/obstruction
--	--	45-34-09.887	122-43-32.374	Uncharted snag/obstruction
--	--	45-34-50.413	122-44-59.283	Pile ruins
--	--	45-34-05.076	122-44-16.036	Uncharted snag/obstruction
--	--	45-36-16.289	122-40-16.507	Uncharted snag/obstruction
--	--	45-37-28.625	122-47-28.395	Uncharted snag/obstruction
--	--	45-38-09.519	122-46-55.173	Uncharted snag or pile ruin
--	--	45-37-06.099	122-47-16.374	Uncharted snag/obstruction
--	--	45-34-25.671	122-44-24.270	Uncharted snag/obstruction
--	--	45-37-22.455	122-48-28.436	Uncharted snag/obstruction
--	--	45-34-26.571	122-44-09.908	Uncharted snag/obstruction
--	--	45-34-27.935	122-44-13.146	Pier/dock ruins
--	--	45-31-16.044	122-40-00.772	Uncharted snag/obstruction
--	--	45-37-35.295	122-43-42.466	Uncharted snag/obstruction
--	--	45-38-22.156	122-46-34.876	Uncharted snag/obstruction
--	--	45-36-03.060	122-46-59.900	Uncharted possible submerged pile dike
--	--	45-38-40.155	122-45-14.619	Uncharted snag/obstruction
--	--	45-37-07.308	122-47-45.795	Uncharted snag/obstruction
--	--	45-34-47.993	122-44-53.668	Uncharted snag/obstruction
--	--	45-37-40.256	122-43-38.907	Uncharted snag/obstruction
--	--	45-36-57.727	122-42-08.689	Possible wreck
--	--	45-34-48.979	122-44-52.520	Uncharted snag/obstruction
--	--	45-37-35.143	122-43-26.128	Uncharted snag/obstruction
--	--	45-36-40.238	122-40-07.147	Uncharted snag/obstruction
--	--	45-38-13.977	122-46-48.319	Uncharted pile ruins

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-35-01.715	122-45-55.426	Uncharted snag/obstruction
--	--	45-36-54.274	122-47-11.990	Uncharted snag/obstruction
--	--	45-38-12.917	122-47-15.775	Uncharted snag/obstruction
--	--	45-37-41.401	122-48-56.994	Uncharted snag/obstruction
--	--	45-39-01.748	122-46-02.595	Large geologic feature 25m X 5m
--	--	45-37-24.257	122-40-50.850	Uncharted snag/obstruction
--	--	45-38-29.109	122-46-27.967	Uncharted snag/obstruction
--	--	45-38-42.368	122-46-28.530	Uncharted snag/obstruction
--	--	45-34-10.420	122-43-16.550	Submitted DtoN report; DtoN # 13.18
--	--	45-36-28.185	122-46-53.257	Uncharted snag/obstruction
--	--	45-34-12.166	122-43-19.383	Uncharted snag/obstruction
--	--	45-31-14.964	122-40-00.723	Uncharted snag/obstruction
--	--	45-38-41.621	122-45-16.708	Uncharted snag/obstruction
--	--	45-34-26.604	122-44-17.316	Possible anchor and line
--	--	45-34-26.618	122-44-16.160	Uncharted snag/obstruction
--	--	45-38-12.327	122-43-39.678	Uncharted snag/obstruction
--	--	45-37-15.454	122-48-11.433	Uncharted snag/obstruction
--	--	45-32-44.122	122-41-26.353	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.11
--	--	45-34-09.212	122-43-34.481	Uncharted snag/obstruction
--	--	45-36-14.788	122-40-05.527	Uncharted snag/obstruction
--	--	45-34-19.190	122-44-33.510	Uncharted snag/obstruction
--	--	45-31-58.562	122-40-24.008	Uncharted snag/obstruction
--	--	45-37-00.764	122-40-38.328	Geologic feature
--	--	45-35-08.230	122-45-43.734	Uncharted snag/obstruction
--	--	45-37-10.444	122-42-42.534	Uncharted snag/obstruction
--	--	45-35-07.501	122-45-43.497	Uncharted snag/obstruction
--	--	45-34-07.853	122-43-10.100	Submitted DtoN report; DtoN # 13.14

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-05.862	122-42-27.403	Uncharted snag/obstruction
--	--	45-36-07.900	122-37-14.252	Uncharted snag/obstruction
--	--	45-37-21.641	122-43-05.189	Uncharted snag/obstruction
--	--	45-35-15.030	122-45-53.632	Submerged vehicle
--	--	45-37-02.629	122-40-43.588	Uncharted snag/obstruction
--	--	45-34-48.085	122-44-45.218	Uncharted snag/obstruction
--	--	45-34-49.151	122-44-58.800	Uncharted snag/obstruction
--	--	45-38-28.540	122-44-42.173	Uncharted snag/obstruction
--	--	45-34-24.120	122-44-38.560	Uncharted obstruction
--	--	45-36-53.825	122-40-18.434	Uncharted snag/obstruction
--	--	45-34-02.153	122-42-59.215	Uncharted snag/obstruction
--	--	45-36-57.802	122-42-11.908	Stack of logs
--	--	45-34-04.411	122-44-24.591	Uncharted snag/obstruction
--	--	45-36-37.221	122-47-01.776	Uncharted submerged snag with scour marks
--	--	45-34-18.493	122-44-02.808	Uncharted snag/obstruction
--	--	45-38-19.333	122-43-59.664	Uncharted snag/obstruction
--	--	45-37-14.567	122-42-50.676	Uncharted snag/obstruction
--	--	45-34-13.225	122-43-20.022	Uncharted snag/obstruction
--	--	45-36-15.573	122-46-28.770	Uncharted snag or pile ruin near approach to Berth 405
--	--	45-36-03.120	122-36-17.643	Uncharted snag/obstruction
--	--	45-36-30.347	122-41-11.667	Uncharted snag/obstruction
--	--	45-34-24.792	122-44-15.852	Uncharted snag/obstruction
--	--	45-34-10.700	122-43-12.964	Submitted DtoN report; DtoN # 13.17
--	--	45-34-08.261	122-43-29.388	Uncharted snag/obstruction
--	--	45-39-12.323	122-45-07.717	Uncharted snag/obstruction
--	--	45-34-49.699	122-44-44.782	Uncharted snag/obstruction
--	--	45-37-14.799	122-47-17.094	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-38-26.464	122-46-51.583	Uncharted obstruction, 8 m long by 1.5 m proud
--	--	45-33-55.045	122-42-43.416	Uncharted snag/obstruction
--	--	45-37-28.154	122-43-21.332	Uncharted snag/obstruction
--	--	45-36-14.894	122-46-24.748	Mischarted; dolphin is now submerged
--	--	45-34-10.308	122-43-42.438	Uncharted snag/obstruction
--	--	45-32-45.739	122-41-32.243	Submitted DTON has not been charted. DtoN # 12.12
--	--	45-34-06.342	122-43-26.051	Uncharted snag/obstruction
--	--	45-36-45.121	122-36-42.301	Uncharted snag/obstruction
--	--	45-39-01.904	122-45-55.652	Uncharted snag/obstruction
--	--	45-35-05.917	122-45-59.099	Uncharted snag/obstruction
--	--	45-38-40.621	122-43-47.299	Uncharted snag or pile ruin
--	--	45-38-58.917	122-46-04.495	Uncharted snag/obstruction
--	--	45-35-00.229	122-45-32.792	Uncharted snag/obstruction
--	--	45-38-15.083	122-46-47.972	Uncharted snag or pile ruin
--	--	45-34-47.310	122-44-50.539	Uncharted snag/obstruction
--	--	45-37-25.424	122-40-54.750	Uncharted snag/obstruction
--	--	45-38-08.337	122-46-55.098	Uncharted dolphin ruins
--	--	45-36-53.583	122-47-32.372	Uncharted snag/obstruction
--	--	45-37-59.573	122-47-02.356	Uncharted dolphin ruins associated charted with jetty ruins
--	--	45-35-11.551	122-45-53.119	Uncharted snag/obstruction
--	--	45-34-23.078	122-44-39.298	Uncharted snag/obstruction
--	--	45-34-46.197	122-44-48.022	Uncharted snag/obstruction
--	--	45-33-35.735	122-42-58.170	Uncharted snag/obstruction
--	--	45-30-32.375	122-40-18.734	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-56.434	122-47-10.292	Uncharted snag/obstruction
--	--	45-36-56.394	122-41-57.613	Uncharted snag/obstruction
--	--	45-36-44.408	122-36-41.786	Uncharted snag or pile ruin

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-01.333	122-42-11.810	Uncharted snag/obstruction
--	--	45-33-43.672	122-42-32.730	Submitted DtoN report; DtoN # 13.2
--	--	45-37-53.688	122-43-55.436	Uncharted snag/obstruction
--	--	45-36-16.218	122-40-14.905	Uncharted snag/obstruction
--	--	45-34-39.764	122-45-06.000	Uncharted snag/obstruction
--	--	45-33-47.156	122-43-22.873	Uncharted snag/obstruction
--	--	45-33-05.287	122-41-43.526	Charted obstruction updated with new surveyed least depth and position
--	--	45-37-09.889	122-42-40.055	Uncharted snag/obstruction
--	--	45-29-22.614	122-40-03.462	Uncharted snag/obstruction
--	--	45-34-07.730	122-43-18.370	Uncharted snag or pile ruin
--	--	45-37-18.179	122-43-09.915	Uncharted snag/obstruction
--	--	45-32-15.945	122-40-47.847	Submitted DTON has not been charted. DtoN # 12.4
--	--	45-30-10.762	122-39-53.212	Uncharted snag/obstruction
--	--	45-37-12.521	122-48-00.971	Uncharted snag/obstruction
--	--	45-38-07.414	122-46-56.226	Uncharted snag/obstruction
--	--	45-37-55.665	122-47-05.522	Uncharted snag/obstruction
--	--	45-33-19.691	122-42-53.250	Submitted DTON has been charted. NOAA DtoN 1.4
--	--	45-38-05.894	122-43-01.454	Uncharted snag/obstruction
--	--	45-36-56.109	122-40-29.473	Uncharted snag/obstruction
--	--	45-38-41.416	122-46-26.579	Uncharted obstruction
--	--	45-33-40.598	122-43-42.452	Uncharted snag/obstruction
--	--	45-33-53.763	122-42-49.109	Submitted DtoN report; DtoN # 13.6
--	--	45-37-25.711	122-48-34.508	Uncharted snag/obstruction
--	--	45-34-32.042	122-44-50.235	Uncharted snag/obstruction
--	--	45-38-21.238	122-44-06.726	Uncharted snag/obstruction
--	--	45-33-31.884	122-42-48.789	Uncharted snag/obstruction
--	--	45-31-02.312	122-40-13.824	Submitted DTON has been charted to RNC not to ENC. DtoN # 11.5

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-05.519	122-47-45.850	Uncharted snag/obstruction
--	--	45-37-33.359	122-43-22.111	Uncharted snag/obstruction
--	--	45-37-13.821	122-47-18.484	Uncharted snag/obstruction
--	--	45-37-40.572	122-48-59.573	Submitted DTON has been charted. DtoN # 8.2
--	--	45-38-46.784	122-46-23.366	Uncharted snag/obstruction
--	--	45-37-04.718	122-42-15.059	Uncharted snag/obstruction
--	--	45-38-05.335	122-47-03.125	Uncharted seaward most extent of row of 2 submerged dolphin ruins
--	--	45-34-48.196	122-44-48.804	Uncharted snag/obstruction
--	--	45-34-29.500	122-44-23.291	Uncharted snag/obstruction
--	--	45-32-35.423	122-41-16.159	Submitted DTON has been charted to RNC not to ENC. DtoN # 12.10
--	--	45-36-48.756	122-47-10.337	Uncharted snag/obstruction
--	--	45-38-33.754	122-44-46.694	Uncharted snag/obstruction
--	--	45-37-27.115	122-40-58.591	Uncharted snag/obstruction
--	--	45-38-03.990	122-44-12.446	Stack of logs
--	--	45-36-45.711	122-47-05.866	Uncharted snag/obstruction
--	--	45-29-38.981	122-39-56.987	Uncharted snag/obstruction
--	--	45-34-15.460	122-44-00.031	Uncharted snag or pile ruin
--	--	45-33-40.544	122-43-43.468	Uncharted snag/obstruction
--	--	45-33-19.232	122-42-19.844	Uncharted snag/obstruction
--	--	45-34-06.450	122-43-09.859	Submitted DtoN report; DtoN # 13.12
--	--	45-34-10.639	122-43-17.616	Uncharted snag/obstruction
--	--	45-37-37.486	122-48-52.724	Uncharted snag/obstruction
--	--	45-36-04.014	122-36-37.115	Uncharted snag/obstruction
--	--	45-36-36.263	122-41-31.296	Cylindrical object
--	--	45-34-29.001	122-44-22.523	Uncharted snag/obstruction
--	--	45-36-36.216	122-47-05.252	Uncharted snag/obstruction
--	--	45-38-14.761	122-46-46.393	Uncharted snag or pile ruin

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-39.933	122-43-34.939	Uncharted snag/obstruction
--	--	45-36-28.584	122-41-07.103	Uncharted snag/obstruction
--	--	45-37-38.867	122-47-37.905	Uncharted snag/obstruction
--	--	45-38-30.590	122-44-31.281	Uncharted snag/obstruction
--	--	45-35-15.225	122-45-54.593	Submerged vehicle
--	--	45-36-10.790	122-38-02.230	Submerged logs
--	--	45-37-01.861	122-47-14.121	Uncharted snag/obstruction
--	--	45-36-05.778	122-36-46.226	Uncharted snag/obstruction
--	--	45-38-19.854	122-47-09.883	Uncharted snag or pile ruin. Additional submerged feature 5 meters shoreward
--	--	45-37-13.430	122-47-21.741	Uncharted snag/obstruction
--	--	45-37-09.990	122-47-16.265	Uncharted snag/obstruction
--	--	45-37-06.980	122-47-43.576	Uncharted snag/obstruction
--	--	45-35-52.524	122-46-51.327	Uncharted snag/obstruction
--	--	45-32-48.609	122-41-30.040	Submerged van
--	--	45-28-56.708	122-40-16.511	Submitted DTON has not been charted. DtoN # 10.6
--	--	45-37-58.222	122-47-04.414	Uncharted snag/obstruction
--	--	45-38-30.446	122-46-25.410	Uncharted snag/obstruction
--	--	45-33-58.316	122-43-59.201	Uncharted snag or pile ruin
--	--	45-34-24.850	122-44-15.035	Uncharted snag/obstruction
--	--	45-38-07.427	122-46-55.688	Uncharted snag/obstruction
--	--	45-33-23.129	122-43-12.623	Uncharted snag/obstruction
--	--	45-36-06.216	122-36-36.416	Uncharted snag/obstruction
--	--	45-37-21.714	122-43-17.362	Large cylindrical object
--	--	45-29-13.083	122-40-07.191	Submitted DTON has been charted. DtoN # 10.8
--	--	45-34-30.874	122-44-34.187	Uncharted snag/obstruction
--	--	45-39-01.575	122-44-52.655	Uncharted snag/obstruction
--	--	45-34-07.610	122-43-17.120	Uncharted snag or pile ruin

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-38-57.937	122-44-43.468	Uncharted snag/obstruction
--	--	45-34-45.481	122-44-52.868	Uncharted snag/obstruction
--	--	45-36-31.576	122-39-33.564	Uncharted snag/obstruction
--	--	45-36-04.694	122-38-45.470	Uncharted snag/obstruction
--	--	45-37-35.579	122-41-15.962	Submerged vehicle or wreck
--	--	45-37-41.051	122-47-36.914	Uncharted snag/obstruction
--	--	45-34-26.756	122-44-15.705	Uncharted snag/obstruction
--	--	45-36-15.250	122-46-29.041	Uncharted snag or pile ruin near approach to Berth 405
--	--	45-36-08.983	122-46-40.841	Uncharted snag/obstruction
--	--	45-36-37.864	122-36-42.750	Uncharted snag/obstruction
--	--	45-35-09.060	122-46-03.806	Uncharted snag/obstruction
--	--	45-36-07.721	122-39-06.313	Uncharted snag/obstruction
--	--	45-27-57.322	122-39-52.157	Possible transient snag
--	--	45-35-02.049	122-45-35.621	Uncharted snag/obstruction
--	--	45-37-11.209	122-47-47.184	Uncharted snag/obstruction
--	--	45-34-06.208	122-44-21.163	Uncharted snag/obstruction
--	--	45-38-10.623	122-46-53.604	Uncharted snag or pile ruin
--	--	45-37-35.063	122-48-49.362	Uncharted snag/obstruction
--	--	45-36-31.656	122-46-57.054	Uncharted snag/obstruction
--	--	45-35-24.419	122-46-21.076	Uncharted snag/obstruction
--	--	45-36-40.375	122-38-20.843	Uncharted snag/obstruction
--	--	45-37-17.579	122-43-11.427	Possible transient snag
--	--	45-33-45.530	122-43-43.726	Uncharted snag/obstruction
--	--	45-35-16.207	122-45-56.999	Uncharted snag/obstruction
--	--	45-37-14.563	122-48-09.919	Uncharted snag/obstruction
--	--	45-38-08.440	122-46-56.008	Uncharted dolphin ruins
--	--	45-34-39.639	122-45-01.180	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-04.857	122-42-59.793	Uncharted snag/obstruction
--	--	45-37-04.943	122-42-27.254	Uncharted snag/obstruction
--	--	45-37-04.273	122-47-17.869	Uncharted snag/obstruction
--	--	45-38-03.551	122-44-11.413	Stack of logs
--	--	45-38-12.607	122-44-36.949	Uncharted snag/obstruction
--	--	45-38-28.319	122-44-18.603	Uncharted snag/obstruction
--	--	45-37-36.657	122-43-32.600	Uncharted snag/obstruction
--	--	45-37-20.198	122-47-17.560	Uncharted snag or pile ruin
--	--	45-37-09.824	122-42-31.642	Uncharted snag/obstruction
--	--	45-33-24.030	122-42-41.321	Uncharted snag/obstruction
--	--	45-36-57.601	122-47-24.829	Uncharted snag/obstruction
--	--	45-36-39.542	122-46-54.749	Uncharted snag/obstruction
--	--	45-36-52.819	122-39-10.908	Possible vehicle
--	--	45-35-07.732	122-45-44.790	Uncharted snag/obstruction
--	--	45-39-06.431	122-45-42.297	Uncharted snag/obstruction
--	--	45-38-45.588	122-45-22.095	Uncharted snag/obstruction
--	--	45-34-09.022	122-43-32.177	Submitted DtoN report; DtoN # 13.22
--	--	45-38-54.259	122-46-15.590	Uncharted snag/obstruction
--	--	45-29-57.259	122-40-02.044	Uncharted snag/obstruction
--	--	45-36-54.041	122-39-16.215	Uncharted snag/obstruction
--	--	45-36-54.340	122-40-25.575	Uncharted snag/obstruction
--	--	45-34-21.838	122-44-38.366	Part of pipe structure
--	--	45-37-35.690	122-43-30.716	Uncharted snag/obstruction
--	--	45-37-19.137	122-47-19.875	Uncharted snag/obstruction
--	--	45-34-49.513	122-44-47.054	Uncharted snag/obstruction
--	--	45-34-01.130	122-43-03.430	Submitted DtoN report; DtoN # 13.9
--	--	45-34-29.096	122-44-21.834	Uncharted snag/obstruction

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-36-40.006	122-47-02.968	Uncharted snag/obstruction
--	--	45-36-56.431	122-42-21.888	Uncharted snag/obstruction
--	--	45-37-07.262	122-47-56.215	Uncharted snag/obstruction
--	--	45-35-14.825	122-45-53.172	Submerged vehicle
--	--	45-36-55.298	122-40-35.235	Uncharted snag/obstruction
--	--	45-33-09.897	122-42-03.745	Uncharted snag/obstruction
--	--	45-34-02.936	122-43-30.753	Uncharted snag/obstruction
--	--	45-31-07.748	122-40-02.190	Submitted DTON has not been charted. DtoN # 11.6
--	--	45-35-06.567	122-45-42.892	Uncharted snag/obstruction
--	--	45-37-01.606	122-47-13.487	Uncharted snag/obstruction
--	--	45-36-23.930	122-36-51.859	Uncharted snag/obstruction
--	--	45-37-02.272	122-47-41.277	Uncharted snag/obstruction
--	--	45-36-57.366	122-40-32.306	Geologic feature
--	--	45-35-08.337	122-45-45.291	Uncharted snag/obstruction
--	--	45-34-10.427	122-43-43.111	Uncharted snag/obstruction
--	--	45-36-43.993	122-36-41.813	Uncharted snag/obstruction
--	--	45-34-03.963	122-43-04.718	Uncharted snag/obstruction
--	--	45-38-42.026	122-43-53.363	Uncharted snag or pile ruin
--	--	45-33-23.224	122-43-12.179	Uncharted snag/obstruction
--	--	45-34-03.100	122-43-06.951	Uncharted snag/obstruction
--	--	45-37-15.676	122-42-53.501	Uncharted snag/obstruction
--	--	45-30-35.742	122-40-09.119	Submitted DTON has been charted to RNC not to ENC. DtoN # 11.3
--	--	45-36-41.182	122-46-54.468	Uncharted snag/obstruction
--	--	45-37-11.815	122-48-01.893	Uncharted snag/obstruction
--	--	45-36-50.147	122-47-07.143	Uncharted snag/obstruction
--	--	45-38-23.054	122-44-35.547	Uncharted snag/obstruction
--	--	45-35-09.660	122-46-06.260	Uncharted snag/ pile ruin near disproved charted pile

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New Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-33-54.495	122-42-42.052	Uncharted snag/obstruction
--	--	45-36-39.628	122-46-35.265	Uncharted snag/obstruction
--	--	45-34-35.865	122-44-41.432	Uncharted snag/obstruction
--	--	45-28-47.899	122-39-54.981	Submitted DTON has been charted. DtoN # 10.4
--	--	45-33-00.464	122-42-07.115	Uncharted snag/obstruction
--	--	45-36-43.609	122-38-44.326	Uncharted snag/obstruction
--	--	45-36-50.047	122-39-03.333	Uncharted snag/obstruction
--	--	45-34-49.031	122-44-49.093	Uncharted snag/obstruction
--	--	45-34-10.310	122-43-11.160	Mischarted; charted pile is submerged
--	--	45-35-51.170	122-46-48.440	Uncharted obstruction
--	--	45-37-00.084	122-39-29.110	Uncharted snag/obstruction
--	--	45-37-58.550	122-47-05.060	Uncharted snag/obstruction
--	--	45-38-13.417	122-46-48.857	Mischarted; charted dolphin is submerged ruins
--	--	45-36-58.920	122-42-14.077	Uncharted snag/obstruction
--	--	45-33-57.222	122-43-30.898	Submitted DtoN report; DtoN # 13.21
--	--	45-37-11.318	122-47-43.724	Uncharted snag/obstruction
--	--	45-37-41.131	122-43-52.969	Uncharted snag/obstruction
--	--	45-36-05.227	122-36-43.802	Uncharted snag/obstruction
--	--	45-34-50.250	122-44-59.893	Uncharted snag/obstruction
--	--	45-29-51.713	122-40-02.320	Uncharted two large pipes approximately 31 meters long. On raster chart as pile. No pile located.
--	--	45-37-10.921	122-47-55.915	Uncharted snag/obstruction
--	--	45-34-49.553	122-44-42.863	Uncharted snag/obstruction
--	--	45-38-06.805	122-46-55.960	Uncharted dolphin ruins
--	--	45-31-44.515	122-40-14.490	Uncharted snag/obstruction

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New Line* Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-47-31.678	45-36-51.470	Linear structure approximately 0.9m tall.
--	--	122-47-31.705	45-36-51.438	Linear structure approximately 0.9m tall.
--	--	122-44-49.115	45-34-40.252	Possible elevated cable
--	--	122-40-31.350	45-31-52.548	Possible elevated cable

New Area* Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-45-59.117	45-35-19.272	Uncharted linear obstruction approximately 25 meters long, 5 meters wide and 2 meters high
--	--	122-45-57.095	45-35-17.345	Uncharted Possible Marine railway
--	--	122-46-52.633	45-38-10.359	Numerous submerged piles and snags located in this area

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

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Disproved Point Features:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-34-35.137	122-44-30.300	--	--	Disproved
45-37-15.183	122-41-15.604	--	--	Disproved
45-36-12.628	122-37-47.462	--	--	Disproved
45-35-13.574	122-46-10.011	--	--	Disproved
45-38-48.727	122-44-14.712	--	--	Disproved
45-37-20.132	122-43-04.717	--	--	Disproved
45-36-42.157	122-38-38.048	--	--	Disproved
45-37-17.712	122-41-19.664	--	--	Disproved
45-36-38.214	122-47-23.388	--	--	Disproved
45-37-20.487	122-41-27.402	--	--	Disproved
45-36-12.310	122-47-06.993	--	--	Disproved
45-35-34.157	122-46-14.835	--	--	Disproved
45-38-10.645	122-47-22.989	--	--	Disproved
45-34-38.917	122-44-38.688	--	--	Disproved
45-38-25.002	122-44-37.962	--	--	Disproved
45-33-55.569	122-42-43.578	--	--	Disproved
45-37-25.590	122-40-55.534	--	--	Disproved
45-32-16.080	122-40-48.887	--	--	Disproved
45-37-17.761	122-41-21.459	--	--	Disproved
45-37-19.161	122-47-15.752	--	--	Disproved pile on RNC 18526
45-37-16.372	122-41-17.966	--	--	Disproved
45-37-18.278	122-41-22.725	--	--	Disproved
45-35-23.421	122-46-03.898	--	--	Disproved
45-34-34.658	122-44-30.732	--	--	Disproved
45-38-41.399	122-43-52.500	--	--	Disproved
45-37-32.896	122-43-24.993	--	--	Disproved
45-37-26.243	122-40-56.593	--	--	Disproved

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Disproved Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-37-17.121	122-41-18.886	--	--	Disproved
45-36-41.046	122-38-02.511	--	--	Disproved
45-35-27.006	122-46-08.405	--	--	Disproved
45-34-37.157	122-44-35.304	--	--	Disproved
45-33-53.976	122-42-40.163	--	--	Disproved
45-29-37.377	122-39-57.965	--	--	Disproved
45-37-14.592	122-48-21.672	--	--	Disproved
45-36-13.348	122-37-55.557	--	--	Disproved
45-36-40.961	122-46-53.985	--	--	Disproved
45-37-16.950	122-41-15.982	--	--	Disproved
45-35-23.884	122-46-24.419	--	--	Disproved
45-36-36.461	122-47-22.464	--	--	Disproved
45-33-54.498	122-42-41.116	--	--	Disproved
45-35-59.982	122-46-57.648	--	--	Disproved
45-33-27.733	122-43-24.114	--	--	Disproved
45-38-36.581	122-46-13.187	--	--	Disproved
45-29-13.578	122-40-05.398	--	--	Disproved
45-38-47.597	122-44-11.706	--	--	Disproved
45-37-42.101	122-41-27.982	--	--	Disproved
45-36-26.116	122-40-49.583	--	--	Disproved
45-37-16.614	122-41-20.958	--	--	Disproved
45-37-21.191	122-41-29.427	--	--	Disproved
45-36-39.469	122-47-23.794	--	--	Disproved
45-34-48.615	122-44-59.560	--	--	Disproved
45-33-53.797	122-42-40.493	--	--	Disproved
45-32-46.030	122-41-26.560	--	--	Disproved Piles
45-27-58.378	122-40-04.584	--	--	Disproved

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Disproved Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-38-22.240	122-47-06.720	--	--	Disproved
45-37-20.351	122-41-25.565	--	--	Disproved
45-36-38.974	122-47-23.127	--	--	Disproved
45-35-02.730	122-45-33.191	--	--	Disproved
45-37-23.381	122-43-09.467	--	--	Disproved
45-37-26.307	122-40-57.546	--	--	Disproved
45-37-17.254	122-41-20.180	--	--	Disproved
45-37-21.954	122-41-28.723	--	--	Disproved
45-36-11.013	122-37-31.589	--	--	Disproved
45-34-58.596	122-45-51.483	--	--	Disproved
45-37-55.117	122-47-06.936	--	--	Disproved
45-34-35.522	122-44-32.316	--	--	Disproved
45-35-14.941	122-46-11.686	--	--	Disproved
45-38-49.056	122-44-16.111	--	--	Disproved
45-33-57.086	122-42-46.130	--	--	Disproved
45-37-34.282	122-43-23.663	--	--	Disproved
45-33-52.326	122-43-59.208	--	--	Disproved
45-36-41.992	122-38-38.725	--	--	Disproved
45-29-37.166	122-39-57.469	--	--	Disproved
45-36-57.288	122-40-43.829	--	--	Disproved
45-37-14.728	122-41-14.688	--	--	Disproved
45-36-38.902	122-47-24.324	--	--	Disproved
45-36-00.529	122-46-58.188	--	--	Disproved
45-38-35.037	122-46-13.634	--	--	Disproved
45-38-48.184	122-44-13.046	--	--	Disproved
45-37-22.213	122-43-04.764	--	--	Disproved
45-37-12.380	122-41-08.239	--	--	Disproved

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 Survey Features
 PILPNT

Disproved Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-33-57.530	122-42-46.884	--	--	Disproved
45-37-17.706	122-41-18.826	--	--	Disproved
45-36-40.955	122-46-44.576	--	--	Disproved
45-35-41.852	122-46-43.356	--	--	Disproved
45-33-28.413	122-43-25.880	--	--	Disproved
45-29-13.267	122-40-05.749	--	--	Disproved
45-37-11.769	122-41-08.989	--	--	Disproved
45-37-19.686	122-41-25.864	--	--	Disproved
45-35-34.836	122-46-13.634	--	--	Disproved
45-37-18.246	122-41-19.324	--	--	Disproved
45-34-37.664	122-44-36.312	--	--	Disproved
45-34-56.460	122-45-47.727	--	--	Disproved
45-33-54.990	122-42-41.860	--	--	Disproved
45-34-36.484	122-44-34.116	--	--	Disproved
45-32-09.983	122-40-35.630	--	--	Disproved
45-38-49.601	122-44-18.077	--	--	Disproved
45-37-19.739	122-47-15.795	--	--	Disproved pile on RNC 18526
45-37-33.539	122-43-24.326	--	--	Disproved
45-37-16.324	122-41-17.556	--	--	Disproved
45-36-41.795	122-38-39.406	--	--	Disproved
45-36-12.628	122-37-44.348	--	--	Disproved
45-36-13.763	122-38-02.809	--	--	Disproved
45-35-14.146	122-46-10.807	--	--	Disproved
45-34-09.633	122-44-22.327	--	--	Disproved
45-33-56.211	122-42-44.688	--	--	Disproved
45-29-38.407	122-39-58.099	--	--	Disproved
45-36-42.347	122-38-37.441	--	--	Disproved

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Survey Features
PILPNT

Disproved Point Features cont:

ENC or RNC Latitude (N)	ENC or RNC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-33-48.100	122-42-29.400	--	--	Disproved NOAA DtoN 1.1

New Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-37-38.111	122-48-54.048	Group of several piles.
--	--	45-36-41.552	122-46-46.933	Uncharted pile dike
--	--	45-36-41.580	122-46-47.652	Uncharted pile dike
--	--	45-36-41.657	122-46-47.135	Uncharted pile dike
--	--	45-27-57.720	122-40-03.820	Uncharted pile
--	--	45-34-31.620	122-44-53.500	Uncharted four (4) piles, seaward most pile attributed
--	--	45-37-39.387	122-48-55.562	Uncharted pile is seaward extent of row of piles
--	--	45-38-25.917	122-46-59.015	Uncharted pile
--	--	45-36-56.451	122-42-22.230	Uncharted pile is connected to charted log boom.
--	--	45-31-20.110	122-40-08.770	Pile charted on raster chart only
--	--	45-37-31.677	122-48-46.233	Uncharted pile is seaward extent of row of piles
--	--	45-32-03.891	122-40-28.617	Uncharted pile
--	--	45-31-59.738	122-40-42.460	Uncharted pile
--	--	45-31-56.005	122-40-36.814	Uncharted pile
--	--	45-33-48.668	122-42-30.775	Uncharted pile
--	--	45-34-01.316	122-44-23.435	Uncharted pile
--	--	45-33-55.842	122-44-12.337	Uncharted pile
--	--	45-35-18.236	122-45-58.523	Uncharted pile
--	--	45-36-08.248	122-46-35.848	Uncharted pile
--	--	45-38-06.170	122-44-13.508	Uncharted pile
--	--	45-32-00.172	122-40-43.249	Uncharted pile
--	--	45-31-55.657	122-40-36.312	Uncharted pile
--	--	45-33-28.832	122-43-28.127	Uncharted pile

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 Survey Features
 PILPNT

New Point Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-45.141	122-45-20.524	Uncharted pile
--	--	45-33-54.847	122-44-16.189	Uncharted pile
--	--	45-35-15.645	122-45-55.786	Uncharted pile
--	--	45-36-08.396	122-46-36.670	Uncharted pile
--	--	45-36-32.823	122-46-56.609	Uncharted pile
--	--	45-32-04.447	122-40-28.996	Uncharted pile
--	--	45-31-56.147	122-40-36.983	Uncharted pile
--	--	45-34-00.361	122-43-21.292	Uncharted pile
--	--	45-34-26.490	122-44-12.606	Uncharted pile
--	--	45-33-55.247	122-44-16.770	Uncharted pile
--	--	45-35-10.772	122-45-46.242	Uncharted pile
--	--	45-36-16.025	122-46-32.844	Uncharted pile
--	--	45-36-07.640	122-46-33.787	Uncharted pile
--	--	45-32-04.137	122-40-28.812	Uncharted pile
--	--	45-31-56.502	122-40-37.490	Uncharted pile
--	--	45-33-58.217	122-43-29.939	Uncharted pile
--	--	45-34-14.259	122-43-52.892	Uncharted pile
--	--	45-34-00.980	122-44-23.803	Uncharted pile
--	--	45-35-07.376	122-45-42.503	Uncharted pile
--	--	45-35-19.052	122-45-59.367	Uncharted pile
--	--	45-36-07.907	122-46-35.148	Uncharted pile

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 Survey Features
 PIPSOL

New Line* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-44-33.764	45-34-18.516	Uncharted pipeline
--	--	122-40-07.715	45-31-23.373	Pipeline within charted pipeline area
--	--	122-40-07.672	45-31-23.755	Pipeline within charted pipeline area
--	--	122-40-01.227	45-31-09.954	Pipeline within charted pipeline area
--	--	122-40-03.265	45-30-22.007	Pipeline within charted pipeline area
--	--	122-40-00.247	45-28-11.553	Pipeline within charted pipeline area
--	--	122-46-47.964	45-36-41.356	Uncharted pipeline
--	--	122-44-42.090	45-34-24.151	Uncharted pipeline
--	--	122-46-47.418	45-36-41.615	Uncharted pipeline
--	--	122-44-38.305	45-34-21.681	Uncharted pipeline
--	--	122-40-02.348	45-29-57.969	Uncharted pipeline
--	--	122-40-55.541	45-37-25.325	Pipeline within charted pipeline area
--	--	122-42-11.189	45-36-57.083	Pipeline within charted pipeline area
--	--	122-41-36.770	45-37-29.088	Pipeline within charted pipeline area
--	--	122-41-27.104	45-37-22.174	Pipeline within charted pipeline area

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

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Survey Features
SLCONS

New Line* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-46-48.581	45-36-39.364	Approximately 90 submerged ruined pier footings with least depths ranging from 7.434m to 7.592m
--	--	122-43-10.589	45-33-22.502	Baring to awash marine slipway. Seaward extent least depth is -0.323m
--	--	122-43-10.281	45-33-22.371	Baring to awash marine slipway. Seaward extent least depth is 0.300m
--	--	122-43-09.935	45-33-22.274	Baring to awash marine slipway. Seaward extent least depth is -0.226m
--	--	122-43-09.040	45-33-21.899	Baring to awash marine slipway. Seaward extent least depth is 0.163m
--	--	122-43-08.705	45-33-21.789	Baring to awash marine slipway. Seaward extent least depth is -0.369m
--	--	122-43-08.434	45-33-21.652	Baring to awash marine slipway. Seaward extent least depth is 0.258m
--	--	122-43-08.102	45-33-21.542	Baring to awash marine slipway. Seaward extent least depth is -0.338m
--	--	122-43-07.790	45-33-21.414	Baring to awash marine slipway. Seaward extent least depth is -0.364m
--	--	122-43-07.488	45-33-21.298	Baring to awash marine slipway. Seaward extent least depth is 0.182m
--	--	122-43-07.187	45-33-21.167	Baring to awash marine slipway. Seaward extent least depth is -0.315m
--	--	122-43-06.877	45-33-21.053	Baring to awash marine slipway. Seaward extent least depth is -0.353m
--	--	122-43-06.594	45-33-20.919	Baring to awash marine slipway. Seaward extent least depth is 0.337m
--	--	122-43-06.272	45-33-20.805	Baring to awash marine slipway. Seaward extent least depth is -0.373m
--	--	122-43-06.016	45-33-20.683	Baring to awash marine slipway. Seaward extent least depth is 0.273m
--	--	122-43-05.646	45-33-20.575	Baring to awash marine slipway. Seaward extent least depth is -0.310m
--	--	122-43-05.037	45-33-20.323	Baring to awash marine slipway. Seaward extent least depth is -0.328m
--	--	122-43-04.442	45-33-20.064	Baring to awash marine slipway. Seaward extent least depth is -0.376m
--	--	122-43-04.143	45-33-19.945	Baring to awash marine slipway. Seaward extent least depth is -0.343m
--	--	122-43-03.831	45-33-19.827	Baring to awash marine slipway. Seaward extent least depth is 0.191m
--	--	122-43-03.507	45-33-19.709	Baring to awash marine slipway. Seaward extent least depth is -0.368m
--	--	122-43-03.002	45-33-19.498	Baring to awash marine slipway. Seaward extent least depth is -0.276m
--	--	122-43-03.348	45-33-19.606	Baring to awash marine slipway. Seaward extent least depth is 0.416m
--	--	122-43-10.913	45-33-22.604	Baring to awash marine slipway. Seaward extent least depth is -0.277m
--	--	122-43-04.753	45-33-20.164	Baring to awash marine slipway. Seaward extent least depth is 0.296m

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New Line* Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-43-09.335	45-33-22.037	Baring to awash marine slipway. Seaward extent least depth is 0.183m
--	--	122-43-11.172	45-33-22.693	Baring to awash marine slipway. Seaward extent least depth is 0.425m
--	--	122-43-05.367	45-33-20.411	Baring to awash marine slipway. Seaward extent least depth is 0.313m
--	--	122-43-09.647	45-33-22.134	Baring to awash marine slipway. Seaward extent least depth is 0.183m

New Area* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-38-15.592	45-36-40.984	Submerged marine slipway ruins. Seaward extent least depth 1.584m
--	--	122-38-17.410	45-36-40.964	Submerged marine slipway ruins. Seaward extent least depth 1.719m
--	--	122-38-19.255	45-36-40.953	Submerged marine slipway ruins. Seaward extent least depth 1.391m
--	--	122-43-28.617	45-33-29.368	Baring to submerged pier ruins. Seaward extent least depth is 1.140m
--	--	122-38-21.077	45-36-40.909	Submerged marine slipway ruins. Seaward extent least depth 2.327m
--	--	122-38-07.876	45-36-40.217	with a shoreward least depth of 1.659m (seaward extents are buried).
--	--	122-46-57.607	45-36-34.740	Submerged marine slipway ruins. Seaward extent least depth 1.716m
--	--	122-46-58.411	45-36-35.936	Submerged marine slipway ruins. Seaward extent least depth 2.178m
--	--	122-46-54.750	45-36-31.196	Submerged marine slipway ruins. Seaward extent least depth 2.281m
--	--	122-46-53.472	45-36-28.831	Submerged marine slipway ruins. Seaward extent least depth is 2.059m
--	--	122-38-24.739	45-36-40.871	Submerged marine slipway ruins. Seaward extent least depth 1.515m
--	--	122-38-28.379	45-36-40.893	Submerged marine slipway ruins. Seaward extent least depth 1.729m
--	--	122-38-22.910	45-36-40.925	Submerged marine slipway ruins. Seaward extent least depth 1.622m
--	--	122-43-30.532	45-34-00.292	Baring to submerged marine slipway ruins. Seaward extent least depth is 1.305m
--	--	122-46-56.395	45-36-33.575	Submerged marine slipway ruins. Seaward extent least depth 3.396m
--	--	122-46-55.577	45-36-32.382	Submerged marine slipway ruins. Seaward extent least depth 2.434m
--	--	122-46-54.167	45-36-30.010	Submerged marine slipway ruins. Seaward extent least depth 2.416m
--	--	122-38-13.792	45-36-40.967	Submerged marine slipway ruins. Seaward extent least depth 1.623m

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New Area* Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-38-26.575	45-36-40.868	Submerged marine slipway ruins. Seaward extent least depth 1.675m
--	--	122-38-30.219	45-36-41.004	Submerged marine slipway ruins. Seaward extent least depth 1.638m

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

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Survey Features
UWTROC

Disproved Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-36-59.775	122-40-47.267	--	--	Disproved
45-37-00.386	122-40-45.983	--	--	Disproved

New Point Feature:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-38-19.332	122-47-12.120	Uncharted submerged rock

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Survey Features
WRECKS

Disproved Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
45-37-10.894	122-47-40.163	--	--	Disproved
45-37-22.725	122-43-18.940	--	--	Disproved
45-36-41.701	122-41-49.400	--	--	Disproved

Disproved Area* Feature:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
122-44-44.072	45-34-50.005	--	--	Disproved

New Point Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-34-47.160	122-44-45.270	Uncharted wreck next to baring pile
--	--	45-30-01.700	122-39-52.800	Submitted DTON has been charted. DTON # 2
--	--	45-36-42.028	122-41-50.769	Charted wreck PA positioned by H11859. Near shore portion of wreck bares at low water.
--	--	45-37-43.500	122-43-55.900	Submitted DTON has been charted. DTON # 6
--	--	45-37-20.917	122-43-15.723	Charted wreck PA located by H11859, least depth from multibeam adjusted to MHW. AWOIS # 53033
--	--	45-29-51.538	122-40-01.101	Submitted DTON has been charted. DTON # 3
--	--	45-36-50.804	122-42-02.084	Uncharted wreck 7m in length just east of BN RR bridge
--	--	45-29-56.717	122-39-53.985	Uncharted wreck 19m in length just south of large rectangular obstruction
--	--	45-31-08.158	122-40-03.334	Uncharted wreck 7m in length; overturned
--	--	45-30-11.724	122-40-02.400	Uncharted wreck 6m in length
--	--	45-36-59.413	122-47-33.895	Uncharted wreck 7m in length
--	--	45-30-47.082	122-40-22.734	Uncharted wreck 6m in length; west shore just south of Hawthorne bridge
--	--	45-37-04.405	122-39-38.259	Uncharted wreck 6m in length
--	--	45-34-48.953	122-45-00.455	Uncharted wreck 10m in length
--	--	45-29-46.738	122-40-02.622	Uncharted wreck; designated sounding is on rudder/keel; length indeterminate
--	--	45-28-55.013	122-39-55.354	Uncharted wreck 6m in length in shallow cove
--	--	45-35-23.929	122-46-04.822	Uncharted wreck 5m in length resting on subm log

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 Survey Features
 WRECKS

New Point Features cont:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	45-33-35.417	122-43-01.655	Uncharted wreck 6m in length
--	--	45-28-19.152	122-40-01.356	Uncharted wreck 5m in length just off of charted reef
--	--	45-36-41.135	122-46-39.527	Uncharted wreck 6m in length; private terminal
--	--	45-36-50.478	122-39-05.316	Uncharted wreck 6m in length; just west of uncharted wreck area

New Area* Features:

ENC Latitude (N)	ENC Longitude (W)	Surveyed Latitude (N)	Surveyed Longitude (W)	Remarks
--	--	122-39-01.971	45-36-49.872	Wreck area roughly 40m in length
--	--	122-44-47.718	45-34-49.981	Wreck area is roughly 58m long by 12m wide.

* Reported positions for line and area features represents the computed centroid and should be used for reference only.

H11859 HCell Report
Katie Reser, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H11859 used:

Office of Coast Survey HCell Specifications: Draft, Version: 4.0, 17 March, 2010.

HCell Reference Guide: Version 2.0, 22 February, 2010.

2. Compilation Scale

Depths and features for HCell H11859 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
18527	1:5,000	22 nd	09/01/2005	06/05/2010
18528	1:15,000	11 th	07/01/2008	06/05/2010
18526	1:20,000	59 th	06/01/2009	06/05/2010
18526 inset	1:10,000	59 th	06/01/2009	06/05/2010
18531	1:40,000	22 nd	09/01/2005	06/05/2010

The following ENC's were also used during compilation:

Chart	Scale
US5OR16M	1:5,000
US5OR17M	1:15,000
US5OR15M	1:20,000
US5OR19M	1:40,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from a 1-meter multibeam combined surface in CARIS BASE Editor. A shoal-biased selection was made at the following survey scales using a Radius Table file with values shown in the table, below:

Chart	Survey Scale
18527	1:2,500
18528	1:6,500
18526	1:10,000
18526 inset	1:5,000
18531	1:20,000

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	500	5

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

4. Depth Contours

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

Chart Contour Intervals in Feet	Metric Equivalent to Chart Feet, Arithmetically Rounded	Metric Equivalent of Chart Feet, with NOAA Rounding Applied	Feet with NOAA Rounding Applied	Feet with NOAA Rounding Removed for Display on H11859_SS.000
0	0.0000	0.2286	0.750	0
6	1.8288	2.0574	6.750	6
12	3.6576	3.8862	12.750	12
18	5.4864	5.715	18.750	18
30	9.144	9.3726	30.750	30
60	18.288	18.5166	60.750	60

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

5. Meta Areas

The following Meta object areas are included in HCell H11859:

M_QUAL
M_CSCL

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

6. Features

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

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

\$AREAS	Area blue note for approximate outline of new bridge
\$CSYMB	Blue notes
\$LINES	Linear blue notes for new pipelines
BCNSPP	Private beacons
BOYSPP	Private buoy
COALNE	Charted coastline
DAYMAR	Private daymark
DEPCNT	Zero contours
LIGHTS	Private lights
MORFAC	Dolphins
M_CSCL	Compilation scale meta object
M_QUAL	Data quality meta object
OBSTRN	Obstruction features
PILPNT	Piles
SBDARE	Bottom samples
SLCONS	Shoreline construction features
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WRECKS	Wreck features

The *_SS HCell contains the following Objects:

DEPCNT	Generalized contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

8. Spatial Framework

8.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, and CRD (1983-2001 NTDE) sounding datums.

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

9. Data Processing Notes

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

10. QA/QC and ENC Validation Checks

H11859 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

H11859_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:5,000; 1:10,000; 1:15,000; 1:20,000 and 1:40,000
H11859_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:2,500; 1:5,000; 1:6,500; 1:10,000 and 1:20,000
H11859_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11859_Outline.gml	Survey outline
H11859_Outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, meta area objects, and blue notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Northport Systems, Inc., Fugawi Marine ENC Ver.3.1.0.435	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

Katie Reser
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6864
katie.reser@noaa.gov

APPROVAL SHEET
H11859

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

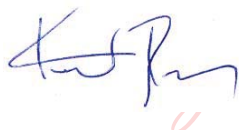
Katie Reser



2011.02.11

12:55:57 -08'00'

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 disapproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.



Digitally signed

by Kurt Brown

Date: 2011.02.14

08:38:24 -08'00'

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



Digitally signed by Gary C. Nelson

DN: cn=Gary C. Nelson, o=NOAA,

ou=Pacific Hydrographic Branch,

email=gary.nelson@noaa.gov,

c=US

Date: 2011.02.11 13:18:32 -08'00'