H11854

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. H11854

LOCALITY

State Oregon

General Locality Columbia River

Sublocality Three Tree Point to Wallace Island

2008 - 2009

CHIEF OF PARTY

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

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H11854

INSTRUCTIONS - The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO.

State: Oregon

General Locality: Columbia River

Sublocality: Three Tree Point to Wallace Island

Scale: 1:10,000

Date of Survey: October 21, 2008 - March 5, 2009

Instructions Dated: 4/1/2008

Project No.: OPR-N338-KR-08

Vessel: R/V Theory, R/V Preston

Chief of Party: Jonathan L. Dasler, PE (OR), PLS (OR, CA)

Surveyed by: David Evans and Associates, Inc.

Soundings taken by echo sounder: RESON 7125, RESON 8101, Odom Cv100

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: G. Froelich

Automated plot by: N/A

Verification by: G. Froelich, K. Reser

Soundings in: Feet at Columbia River Datum (CRD)

REMARKS: Time in UTC. UTM Projection Zone 10

Revisions and annotations appearing as endnotes were generated during office processing.

As a result, page numbering may be interrupted or non-sequential

All separates are filed with the hydrographic data.

Subconsultants: Zephyr Marine, P.O. Box 1575, Petersburg, AK 99833

Descriptive Report to Accompany Hydrographic Survey H11854
Project *OPR-N338-KR-08*
Columbia River, Oregon
Three Tree Point to Wallace Island
Scale 1:10,000
August 2008 – March 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 30.4 to 48.3, including Cathlamet Channel.

Survey H11854 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.[1]

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.

Twenty (20) bottom samples were also acquired for this survey. There were five (5) Automated Wreck and Obstruction Information System (AWOIS) items investigations assigned to this project.

Data acquisition was conducted from October 21, 2008 (DN 295) to March 5, 2009 (DN 064). Table 1 lists specific dates of acquisition.

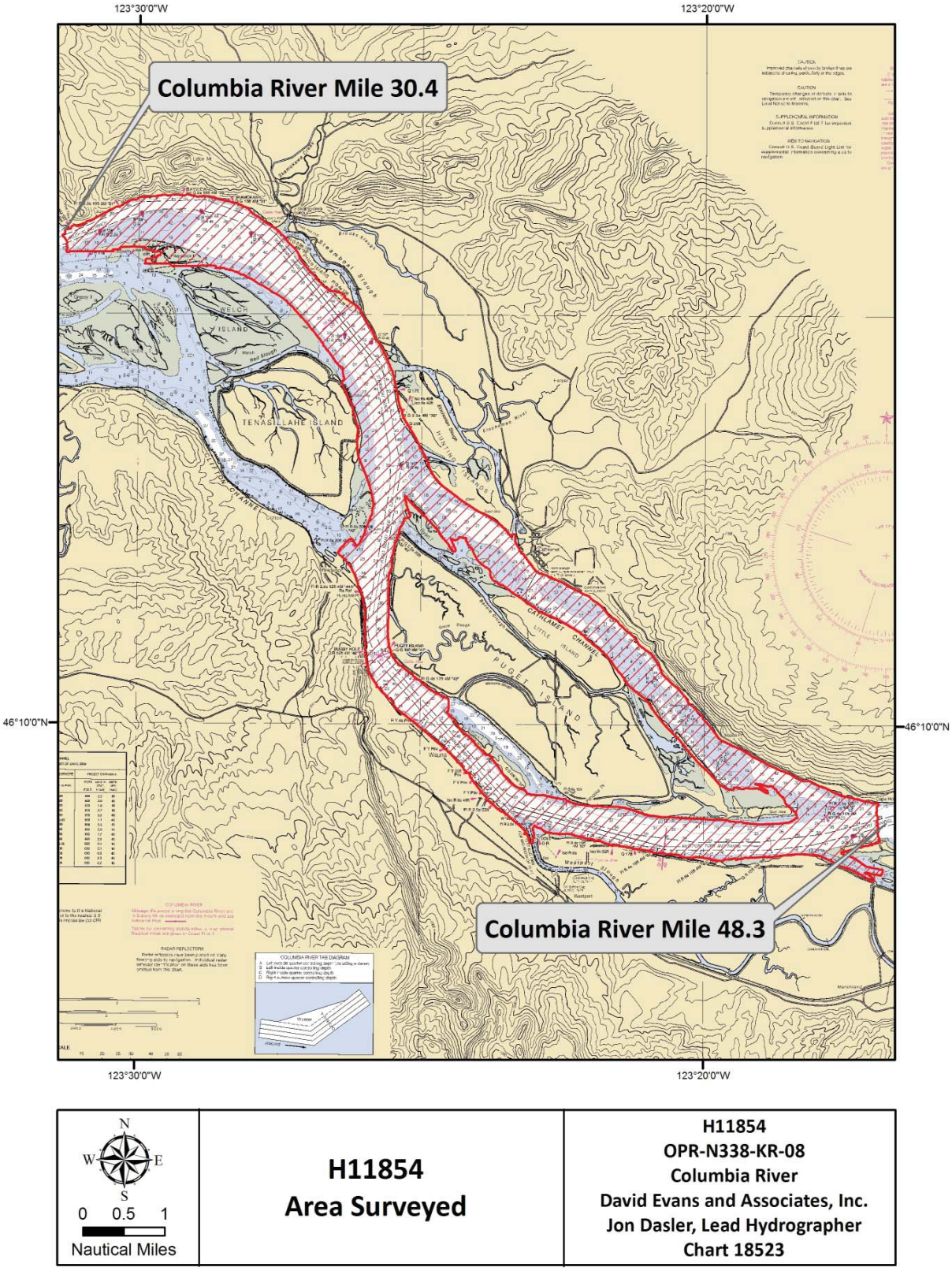


Figure 1. H11854 Survey Area

Table 1. H11854 Days of Acquisition

Dates of Acquisition	
Month	**Dates**
October 2008	21-25, 27-29
November 2008	1-11, 13-16
March 2009	4, 5

Detailed survey statistics of H11854 are provided in Table 2.

Table 2. H11854 R/V Survey Statistics

Survey Statistics	***Research Vessels (R/V) THEORY and PRESTON***
MBES Mainscheme (nm)	769.95
MBES Crosslines (nm)	78.06
VBES Mainscheme (nm)	46.77
VBES Crosslines (nm)	8.61
Number of Item Investigations that required additional survey effort	28
Total number of square nautical miles	10.23 nm

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

R/V Theory	
	
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

R/V Preston	
	
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	16”
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).[2]

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 are 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.[3] 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 78.1 nautical miles of crosslines, or 10.14% of mainscheme lines, were run for analysis of survey accuracy. Crosslines were run in a direction perpendicular to mainscheme lines across the entire surveyed area providing a good representation for analysis of consistency.

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 was not included with the deliverables due to its large file size. The QC Report tabular output and plots are included in Separate IV *Crossline Comparisons*.[4] The results of the analysis exceed the requirements as stated in the National Ocean Service (NOS) *Hydrographic Surveys Specifications and Deliverables* (May 2008).[5]

B2.b Uncertainty

The calculated uncertainty values of all nodes within the unfinalized CUBE surfaces range from 0.116 meters to 0.352 meters.

During HIPS processing, the "greater of the two" option was selected, where the calculated uncertainty from total propagated uncertainty (TPU) 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.[6]

B2.c Junctions

H11854 junctions with survey H11855 to the east. Junctions were visually reviewed in Caris HIPS subset mode and a difference analysis was performed using Caris Bathy DataBASE.

In general, the depth differences between H11854 and H11855 are within 10 centimeters with the greatest differences correlating to the natural migration of sand waves mid-channel of the river.[7] Due to the dynamic shifting of sand waves, data acquired significantly later than the majority of the mainscheme bathymetry, specifically fill from March 4, 2009 (DN064), were not used in the junction analysis.

B2.d Unusual Conditions or Data Degradation

Artifacts in Reson 7125 Bottom Tracking Algorithm

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).[8] 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.

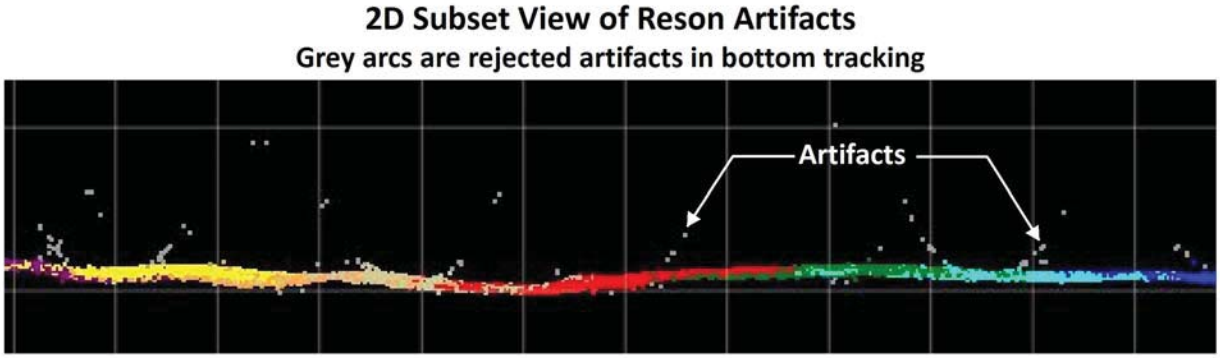


Figure 2. Artifacts in Reson 7125 bottom tracking algorithm

Snags and Deadheads

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.[9]

High resolution, 50-centimeter CUBE surfaces were created over the entire survey area. 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.

B3. Corrections to Echo Soundings

Data reduction procedures for survey H11854 are detailed in the *OPR-N338-KR-08* DAPR, submitted under 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. Reson 8101 survey lines were filtered at a 60/60-degree angle from nadir for mainscheme 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.*[10]

The survey area for H11854 contained numerous bearing 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.

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.[11]

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.[12]

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 Single Beam

A single, two-meter uncertainty weighted surface of the single beam data is delivered with the complete single beam data set.

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.[13] Complete Coverage requirements were met and all data gaps, three nodes or greater, were filled prior to ceasing survey operations.

In order to keep CUBE surfaces at a manageable size, the main survey area was broken up into eight Field Sheets organized by corresponding Columbia River mile (H11854_CRM_30-32, etc.). 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, two GPS base stations with a dual frequency (L1/L2) receiver were established in Washington at Cathlamet and in Oregon at the Beaver Army Terminal. 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 H11854 can be found in the *OPR-N338-KR-08 Horizontal and Vertical Control Report*, submitted under separate cover.[14] 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 USACE and NOAA to use NGS OPUS solutions to establish vertical consistency in the relationship of CRD relative to NAVD88. The USACE, 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 CRD relative to OPUS derived NAVD88 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 USACE, 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 H11854 are detailed in the *OPR-N338-KR-08* DAPR.

To verify GPS water levels, a comparison was made by vessel static observations in the vicinity of the CO-OPS water level station 9440569 located in Skamokawa, WA, and CO-OPS water level station 9439099 located in Wauna, OR. To obtain water levels 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.

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 CRD and part of the Columbia PORTS® system to be consistent with the defined CRD profile by the USACE, Portland District. Tables 5 and 6 list corrections to be applied to CO-OPS data to be consistent with the USACE, Portland District CRD profile.

Table 5. Corrections Applied to 9440569 Skamokawa, Washington

Description of Adjustment	Adjustment (m)
Revised CRD Value to 0.286m NAVD88 from CO-OPS 0.371m NAVD88	-0.085
Adjustment to OPUS elevation for Tidal Bench Mark No 3 1940	0.103
Total Adjustment to CO-OPS Data in Skamokawa, WA	**0.018**

Table 6. Corrections Applied to 9439099 Wauna, Oregon

Description of Adjustment	Adjustment (m)
Revised CRD Value to 0.398m NAVD88 from CO-OPS 0.469m NAVD88	0.071
Adjustment to OPUS elevation for Tidal Bench Mark 9099H 1994	-0.033
Total Adjustment to CO-OPS Data in Wauna, OR	**0.038**

Water level observations, OPUS position results and gauge comparison data may be found in Appendix IV. 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 H11854 are included in Table 7. 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 7. H11854 NAD83 Base Stations Positions

RTK Base Station	Latitude (N)	Longitude (W)	Ellipsoid Height
BEVR	46 10 13.97257	123 09 26.40353	-15.766 m
CATH	46 11 27.70015	123 25 24.15551	-12.127 m

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.

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, so 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 8.

Table 8. Survey Lines Using Real-time Sensor Data

Survey Vessel (S/V)	Day Number (DN)	Survey Line
Theory	301	2008TH3011841 2008TH3012159
Theory	318	2008TH3181850
Theory	319	2008TH3192343
Theory	320	2008TH3202214

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, H11854 was compared to the largest scale raster and electronic navigation charts (RNC and ENC). 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 quality assurance and chart comparison and have not been submitted as a final deliverable.

H11854 contours and soundings were compared in Caris HIPS to the depths and contours on the charts listed in Table 9.

Table 9. Charts compared to H11854

Chart	Scale	Edition	Edition Date	Issue Date	Latest LNM	Cleared Through Date
18523	1:40,000	56	10/01/2006	5/23/2009	18/09	05/02/2009
US5OR12M	1:40,000	35	04/28/2009	04/28/2009	19/09	05/12/2009

Survey H11854 depths were compared to the charted soundings on Charts 18523 and the corresponding ENC US5OR12M. H11854 located significant discrepancies between the chart and the current bathymetry in the area around Fitzpatrick Island and in the Cathlamet Channel, which are discussed below. Based on the distribution of the differences, the Hydrographer believes that the changes are the result of natural shoaling.

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

The extents of Fitzpatrick Island are not charted correctly as shown in Figure 3. Single-beam data were acquired outside of H11854 survey limits to better define the new extents of the island. Currently, the least depth on the charted location of Fitzpatrick Island is 17-feet (5.2 m). Fitzpatrick Island is actually located west of the charted position, as shown on Figure 3, overlaid aerial photogrammetry data available from the Oregon Imagery Explore[1] on NOAA chart 18523. The Hydrographer recommends updating charted shoreline with the latest photogrammetry.[15]

[1] http://oregonexplorer.info/imagery/

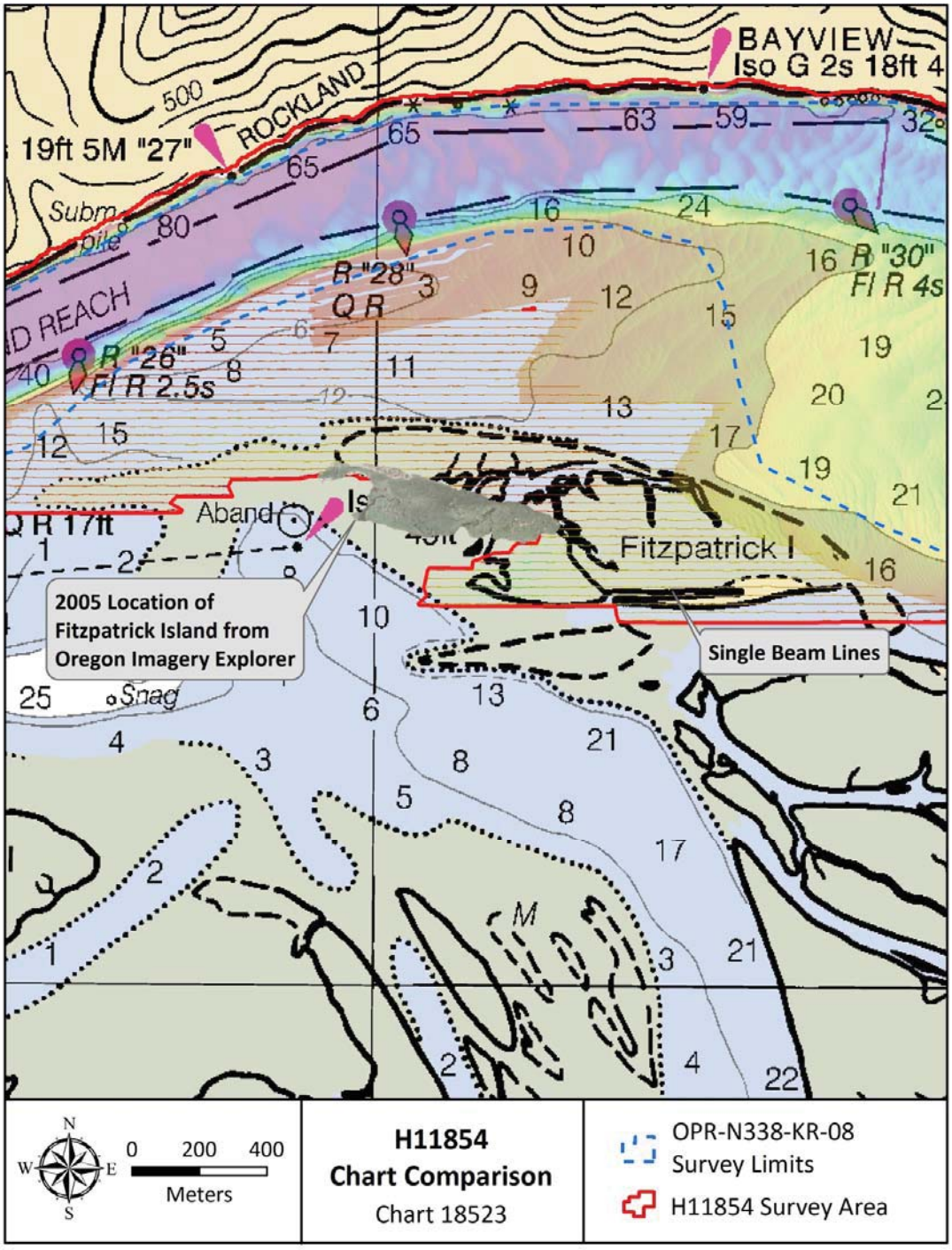


Figure 3. Photogrammetry of Fitpatrick Island and H11854 Overlay

DEA reported least depths from two migrating shoals in Cathlamet Channel in the vicinity of Little Island (Figure 4) as DtoN #3 to the Pacific Hydrographic Branch in November 2008. The Hydrographer recommends updating the chart with current hydrography.[16]

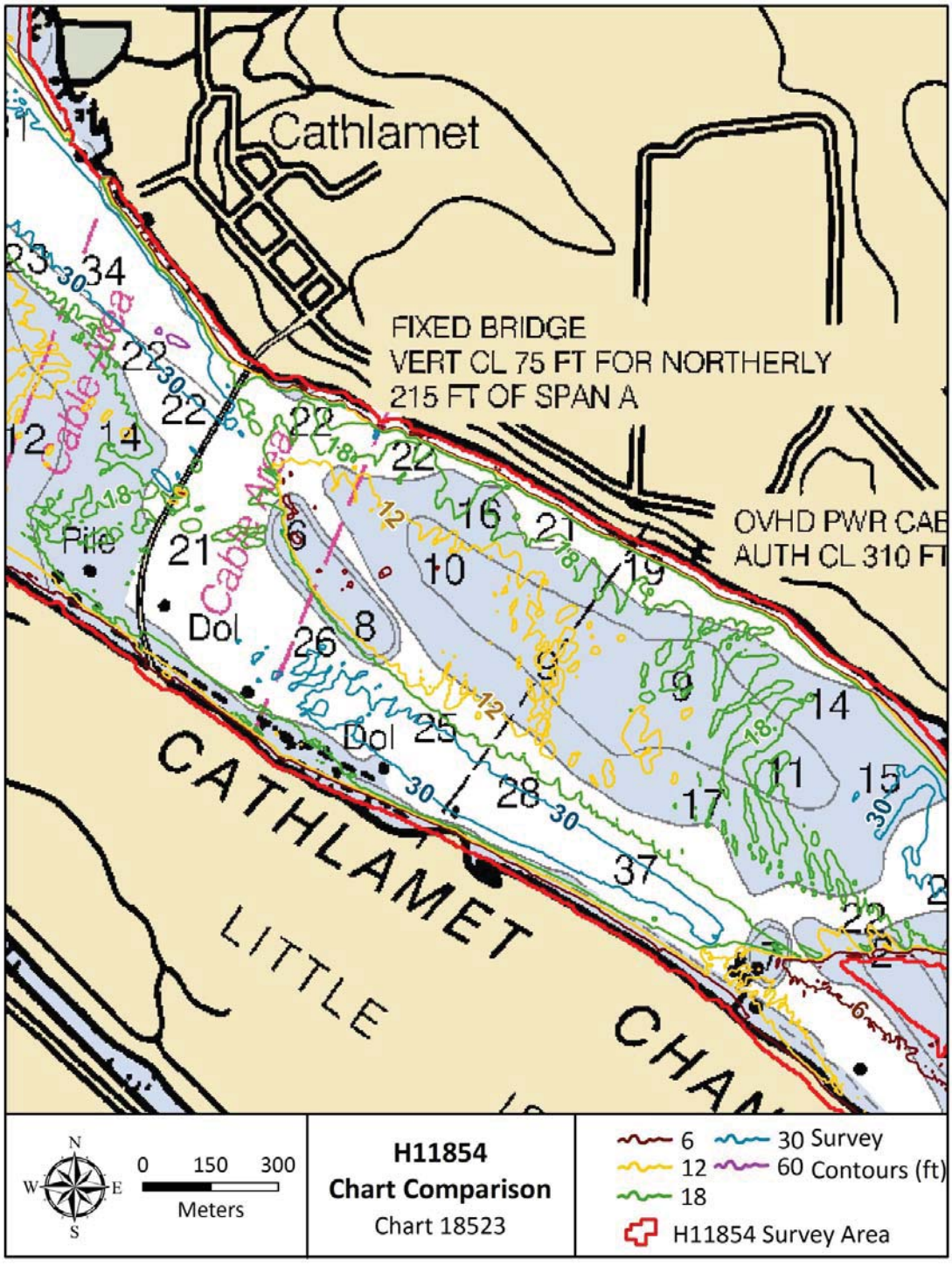


Figure 4. Migrating Shoalings in Cathlamet Channel

D1.b Comparison to Significant Shoals

DEA reported shoals depths in Cathlamet Channel (Figure 5) in the vicinity of the Red "6" buoy and charted Shoal Rep 2001 (AWOIS 52980) notation as DtoN #1 to the Pacific Hydrographic Branch in November 2008. A sailboat grounded on this shoal and was pulled free by *R/V Theory* during survey operations. The Hydrographer recommends updating the chart with current hydrography and removing the Shoaling Rep 2001 annotation.[17]

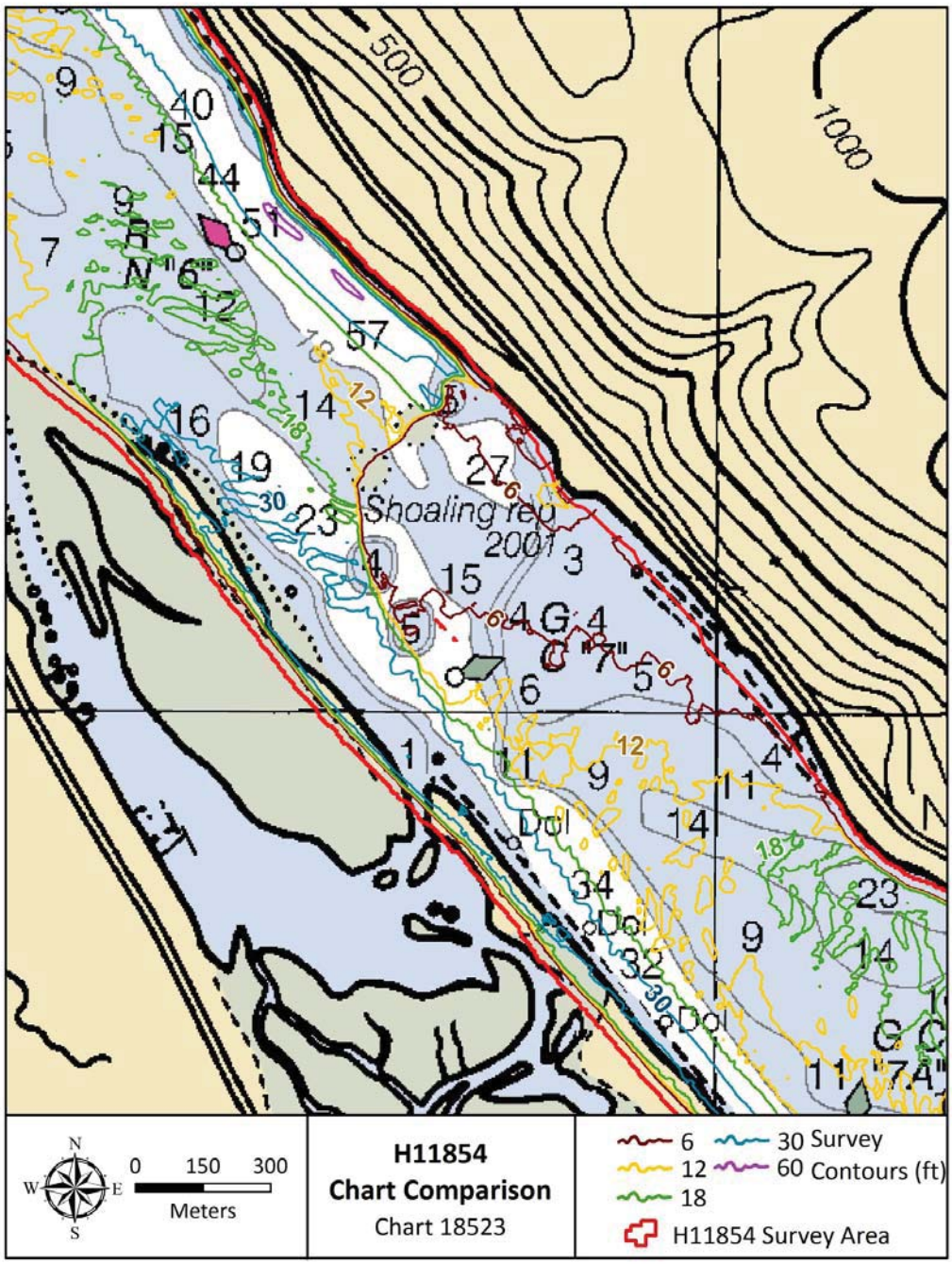


Figure 5. AWOIS 52980 Shoaling in Cathlamet Channel

D1.c Comparison to Charted Features

Five (5) AWOIS items were located within the limits of survey H11854 (Figure 6) and are listed below. A complete description is available in Appendix II *Survey Feature Report*.

- The charted submerged pile (AWOIS 53008) at 046/16/13.000N, 123/30/35.000W, was disproved with 100% shallow water multibeam. There were no significant features detected within the AWOIS radius. The Hydrographer recommends removing the obstruction and charting the area in accordance with the survey data.[18]

- The charted line of submerged piles (AWOIS 53009) extending from 48/14/08.800N, 123/26/21.000W to 46/13/58.100N, 123/26/13.700W was investigated with 100% shallow water multibeam. One significant feature was detected within the AWOIS linear feature at position 46/13/59.37N, 123/26/14.52W, corresponding to the second charted pile from the south. The Hydrographer recommends charting the area in accordance with the survey data.[19]

- The charted submerged pile (AWOIS 53010) at 46/12/22.400N, 123/25/54.800W was disproved with 100% shallow water multibeam. There were no significant features detected within the AWOIS radius. The Hydrographer recommends charting the area in accordance with the survey data.[20]

- The obstruction (AWOIS 52979) was noted by the NOAA Contracting Officer as "no investigation required" in December 1, 2008 correspondence to the Chief of Party.[21] Documentation is located in Appendix V *Correspondence*.[22]

- The charted Shoal Rep 2001 (AWOIS 52980) is discussed in section D1.b of this report.[23]

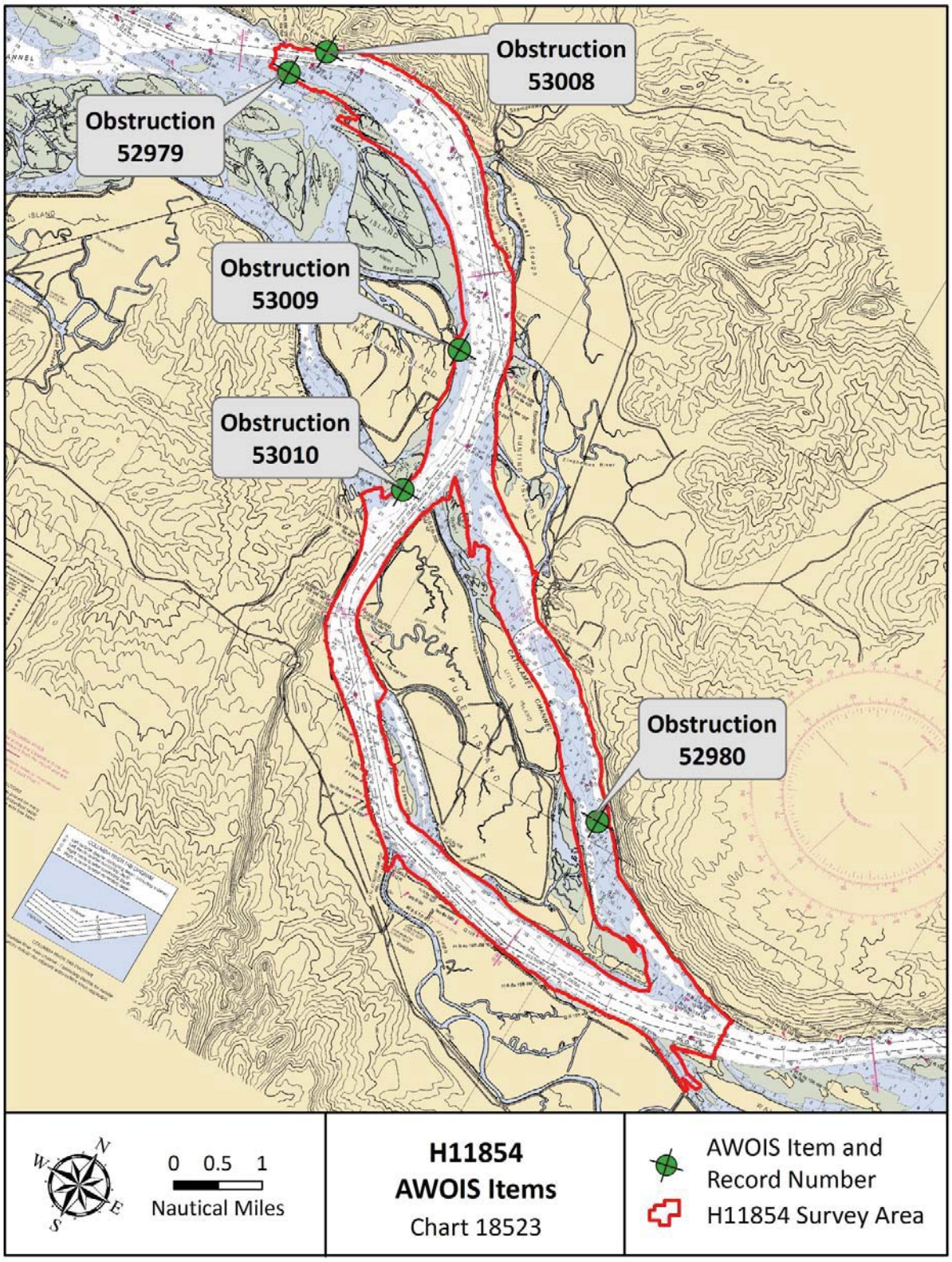


Figure 6. H11854 AWOIS Investigations

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

There are no designated anchorage grounds in survey H11854.[24]

There are eight named Columbia River Channel sections within survey H11854. The project depth is 40 feet for all eight channels and survey H11854 depths are generally deeper. The most recent channel survey is reported to have occurred in February 2009. At that time, a minimum depth of 37 feet was found in the right outside quarter of the Puget Island Range and Turn and in the right outside quarter of the Wauna Range. Table 10 lists the Columbia River channels affected by survey H11854.

Table 10. Columbia River Channels and Minimum Depths

Name of Channel	Project Depth (ft)	Controlling Depth (ft)	H11854 Minimum Survey Depth (ft)
Welch Island Reach	40	39	41
Skamokawa Range	40	44	37
Steamboat Reach	40	44	44
Puget Island Range and Turn	40	37	38
Wauna Range	40	37	37
Driscoll Range	40	40	38
Westport Turn and Range	40	40	38
Westport Channel	40	38	37

Six (6) of the eight channels have depths less than the project depth. The following is a list of representative controlling depths for H11854 for those channels[25]:

- Surveyed depth of 38 feet (11.58 m) was found in the right outside quarter of Puget Island Range and Turn at 46/12/39.277N, 123/25/36.372W.
- Surveyed depth of 37 feet (11.28 m) was found in the right inside quarter of Wauna Range at 46/10/06.031N, 123/24/50.418W.
- Surveyed depth of 38 feet (11.58 m) was found in the left outside quarter of Driscoll Range at 46/08/45.488N, 123/21/48.016W.
- Surveyed depth of 38 feet (11.58 m) was found in the left outside quarter of Westport Turn and Channel at 46/08/34.383N, 123/19/36.496W.
- Surveyed depth of 37 feet (11.28 m) was found in the right outside quarter of Westport Channel at 46/08/30.662N, 123/18/36.345W.
- Surveyed depth of 37 feet (11.28 m) was found in the left outside quarter of Skamokawa Range at 46/16/02.160N, 123/27/41.468W.

D1.e New Submerged Features

New submerged features are listed in tabular format in Appendix II *Survey Feature Report.*[26] Two new items of interest are discussed below and are depicted in Figure 7.[27]

- At CRM 44-46 there is a flat, rectangular object approximately 8 meters long and 5 meters wide with a least depth 19.35-feet (5.90 m)located near the charted submerged dolphins in Cathlamet Channel at 46/10/18.445N, 123/20/55.014W;

- At CRM 40-43 there is a rectangular object approximately 13 meters long and 7 meters with a multibeam least depth of 8.07-feet (2.46 m) at 46/11/59.055N, 123/23/06.848W

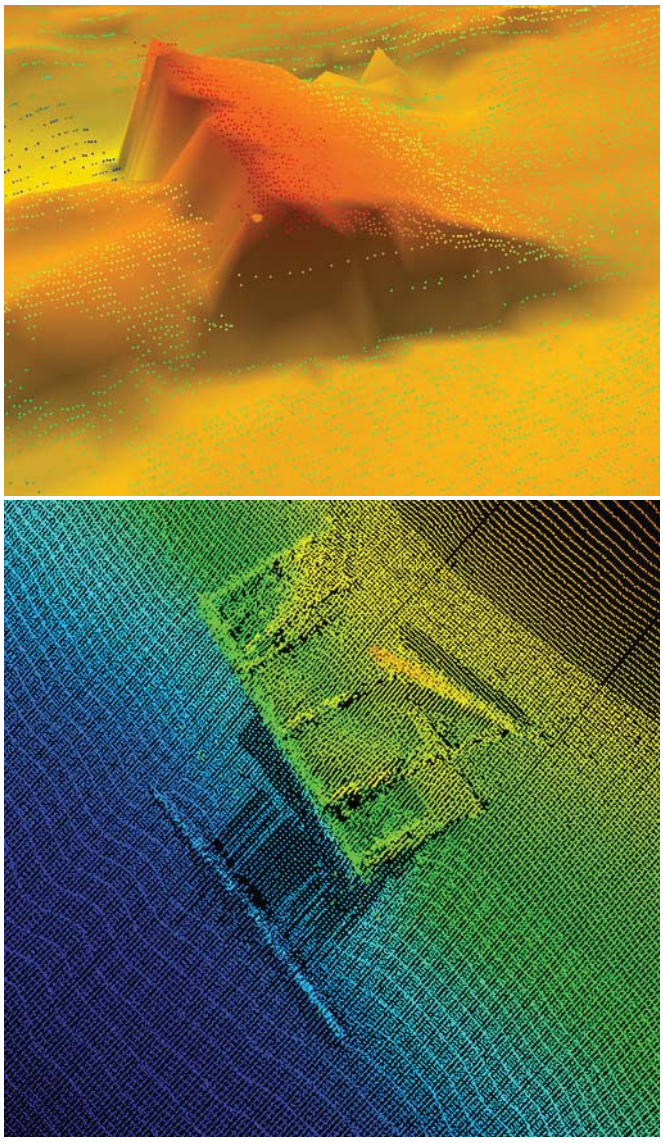


Figure 7. 3-D Subset views of submerged rectangular features.

D1.f Dangers to Navigation

Three (3) DtoNs were located during survey H11854 and have been submitted to PHB. All DtoNs were reviewed by PHB and those deemed worthy of charting were forwarded to the Marine Chart Division (MCD).[28] Table 11 indicates charting status for each DtoN. Copies of the DEA DtoN submissions are included in Appendix I *Danger to Navigation Reports*.[29]

- DtoNs 1.1 to 1.6 are the least depths of a migrating shoal in Cathlamet Channel.
- DtoNs 2.1 and 2.2 are possible submerged logs in Cathlamet Channel
- DtoNs 3.1 to 3.12 are the least depths of a migrating shoal in Cathlamet Channel.

Table 11. DtoN Charting Status

DtoN	Feature	Applied to Raster Chart	Applied to ENC	PHB Submitted to MCD
DtoN 1.1 – 1.6	Migrating Shoal	Yes	Yes	Yes
DtoN 2.1 and 2.2	Obstruction	Yes	Yes	Yes
DtoN 3.1 – 3.12	Shoal Soundings	Yes	Yes	Yes

D.2 Additional Results

D2.a Shoreline Investigations

Shoreline verification was not required for survey H11854.[30]

D2.b Comparison with Prior Surveys

Comparison with prior surveys was not required under this task order.[31]

D2.c Aids to Navigation (AtoN)

A new USCG aid to navigation (AtoN), Green Can Buoy "5", was positioned in Cathlamet Channel (Figure 8) at 46/10/18.052N, 123/20/36.964W.[32] All other AtoNs, in H11854 survey limits, were found to be correctly charted and serving their intended purpose.[33]

Figure 8. Uncharted Green Can Buoy "5"

D2.d Overhead Clearance

The fixed overhead bridge, located between the city of Cathlamet and Little Island, has reduced overhead clearance at the southern end of the bridge. The charted vertical clearance for the northern section of the bridge is 75 feet.

Two (2) charted overhead power cables, located at CRM 39.9 of Columbia Channel and approximately CRM 41.5 of Cathlamet Channel with reduced overhead clearance. Investigation of overhead clearance was not required under this task order.[34]

D2.e Cables, Pipelines and Offshore Structures

A charted cable area spanning 1,148 feet (750 m) was observed parallel to the fixed overhead bridge between the city of Cathlamet and Little Island.

A charted cable area spanning 1,033 feet (315 m) was observed perpendicular to the main channel 902 feet (275m) at CRM 40.1.

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 mainscheme data.[35]

The difference in offset varies over the survey, depending upon the local sand wave formation and the time between fill and mainscheme data collection. Figure 9 shows an example of downstream sand wave migration impacting agreement between mainscheme and fill data.

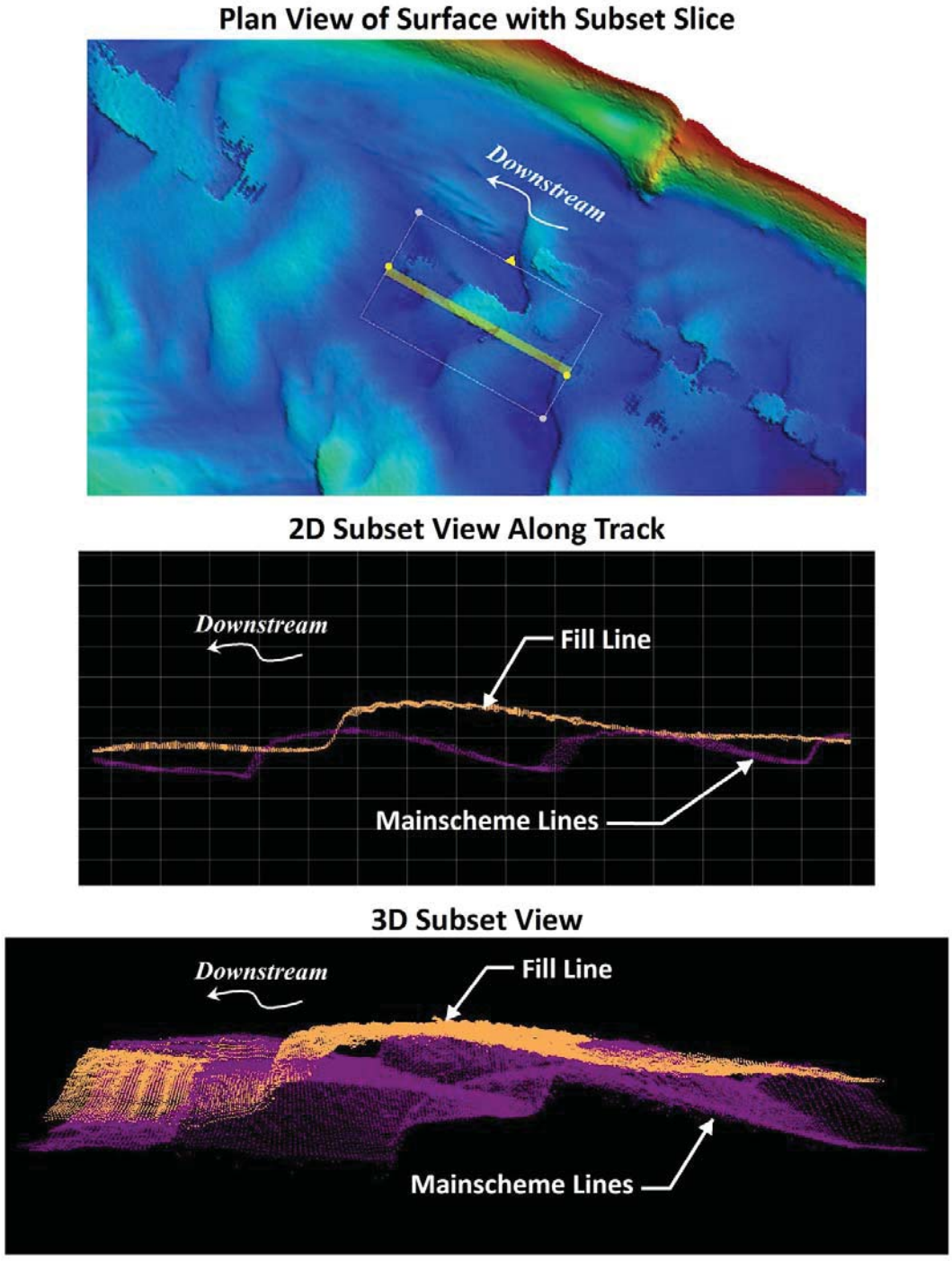


Figure 9. Sand Wave Migration

D2.g Construction Projects

Dredging operations were observed within the ship navigation channel between CRM 42-46 on October 29 and November 2, 2008.

D2.h Bottom Characteristics

Twenty (20) bottom samples were obtained on September 29, 2008 and November 15, 2008 (Day Numbers 273 and 320) and are included in the S-57 attributed feature file in the *Supporting Data* folder.[36] 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.[37]

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. H11854

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of survey H11854 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: 2009.07.09 08:54:01 -07'00'

Jonathan L. Dasler, PE (OR), PLS (OR, CA)
Lead Hydrographer

Digitally signed by Jason Creech
DN: cn=Jason Creech, email=jasc@deainc.com, o=David Evans and Associates, Inc., c=US
Date: 2009.07.09 08:54:38 -07'00'

Jason Creech
Lead Hydrographer

David Evans and Associates, Inc.
March 2009

F. SUPPLEMENTAL REPORTS

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

Title	**Submittal Date**
OPR-N338-KR-08 Data Acquisition and Processing Report	June 17, 2009
OPR-N338-KR-08 Horizontal and Vertical Control Report	TBD[38]

Revisions and Corrections Compiled During Office Processing and Certification

[1] See the Horizontal and Vertical Control Report filed with project records.
[2] Filed with project records.
[3] Separates are filed with hydrographic records.
[4] Filed with hydrographic records.
[5] Concur.
[6] Concur. These data are adequate to supersede charted data in the common area.
[7] Concur. Compiler recommends a note be added to the chart stating that mariners use caution when navigating outside the maintained channels.
[8] Despite the artifacts from the bottom tracking algorithm, the data meets specification.
[9] Concur.
[10] Filed with hydrographic records.
[11] Concur.
[12] Concur.
[13] Concur.
[14] Filed with project records.
[15] Concur. Refer to cartographic line features and blue notes in HCell H11854.
[16] Concur.
[17] Concur.
[18] Concur.
[19] Concur.
[20] Concur.
[21] Concur. No action is required.
[22] See attached correspondance.
[23] Concur with clarification. The "Shoaling rep 2001" notation is blue noted to be removed in HCell H11854.
[24] Concur.
[25] 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.
[26] See attached feature report.
[27] Both submerged features discussed are included in the HCell as OBSTRN features.
[28] There were twenty-four DTONs reported from survey H11854 and 23 DTONs have been applied to the charts. The 23 applied DTONs applied to the charts are either included in HCell H11854 as reported or have been replaced with a shoaler sounding. DTONs are indicated in the HCell by the NINFOM field of the feature or a blue note on the sounding.
[29] See attached DTON reports.
[30] Concur.
[31] Concur.
[32] Position of uncharted buoy corresponds to a shoal reported as a DTON. Recommend retaining reported shoal and charting Cathlamet Channel Buoy 5 per latest ATONIS information.
[33] Chart ATONs according to the latest ATONIS information.
[34] Concur.

[35] 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.
[36] Twenty bottom samples were collected during H11854 and all are included in the HCell. No charted bottom samples were retained.
[37] Filed with hydrographic records.
[38] The Horizontal and Vertical Control Report was submitted July 22, 2009.

APPENDIX I
DANGER TO NAVIGATION RECORDS

DANGER TO NAVIGATION 1

Jason Creech

From: Jason Creech
Sent: Wednesday, November 19, 2008 11:54 AM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent Moegling'; Jon Dasler
Subject: H11854_DTON_1 Submission
Attachments: H11854_DTON_1.doc

Gary,

Attached is a Danger to Navigation report for H11854_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

Jason Creech

From: Gary Nelson [Gary.Nelson@noaa.gov]
Sent: Friday, November 21, 2008 11:31 AM
To: Jason Creech
Subject: DTON Report submitted

Attachments: H11854_dton1.zip

H11854_dton1.zip
(972 KB)

Jason,

I have attached the DTON report we submitted to MCD. Feel free to include it in your DR.

Regards,

Gary

Dangers to Navigation Report for Survey H11854

Registry Number: H11854

State: Oregon

Locality: Columbia River

Sub-locality: Three Tree Point to Wallace Island

Project Number: OPR-N338-KR-08

Survey Date: [None]

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18523	56th	10/01/2006	1:40,000 (18523_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	1.67 m	46° 10' 06.1" N	123° 20' 31.8" W
1.2	GP	0.14 m	46° 10' 17.4" N	123° 20' 36.1" W
1.3	GP	1.35 m	46° 10' 10.6" N	123° 20' 35.6" W
1.4	GP	3.34 m	46° 09' 56.4" N	123° 20' 20.8" W
1.5	GP	0.20 m	46° 10' 20.6" N	123° 20' 31.2" W
1.6	GP	1.61 m	46° 10' 22.3" N	123° 20' 27.9" W
1.7	GP	9.40 m	46° 09' 59.8" N	123° 20' 26.4" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 06.1" N, 123° 20' 31.8" W

Least Depth: 1.67 m (= 5.48 ft = 0.913 fm = 0 fm 5.48 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 1

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

Remarks:

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
H11854_dton_pydro.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

5ft (18523_1)

0 ¾fm (18003_1, 18007_1, 530_1)

1.7m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.2) GP No. - 2 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 17.4" N, 123° 20' 36.1" W

Least Depth: 0.14 m (= 0.46 ft = 0.077 fm = 0 fm 0.46 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 2

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

Remarks:

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
H11854_dton_pydro.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

0ft (18523_1)

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

.1m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.3) GP No. - 3 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 10.6" N, 123° 20' 35.6" W

Least Depth: 1.35 m (= 4.43 ft = 0.738 fm = 0 fm 4.43 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 3

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

Remarks:

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
H11854_dton_pydro.xls	3	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

4ft (18523_1)

0 ¾fm (18003_1, 18007_1, 530_1)

1.4m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.4) GP No. - 4 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 09' 56.4" N, 123° 20' 20.8" W

Least Depth: 3.34 m (= 10.96 ft = 1.826 fm = 1 fm 4.96 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 4

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

Remarks:

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
H11854_dton_pydro.xls	4	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

11ft (18523_1)

1 ¾fm (18003_1, 18007_1, 530_1)

3.3m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.5) GP No. - 5 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 20.6" N, 123° 20' 31.2" W

Least Depth: 0.20 m (= 0.66 ft = 0.109 fm = 0 fm 0.66 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 5

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

Remarks:

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
H11854_dton_pydro.xls	5	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

0ft (18523_1)

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

.2m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.6) GP No. - 6 from H11854_dton_pydro.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 22.3" N, 123° 20' 27.9" W

Least Depth: 1.61 m (= 5.28 ft = 0.880 fm = 0 fm 5.28 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-309.00:00:00.000 (11/04/2008)

GP Dataset: H11854_dton_pydro.xls

GP No.: 6

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

Remarks:

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
H11854_dton_pydro.xls	6	0.00	000.0	Primary

Hydrographer Recommendations

The soundings represent the most significant least depths of a migrating shoal which has encroached upon Cathlamet Channel. The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary to show the shoaling.

Cartographically-Rounded Depth (Affected Charts):

5ft (18523_1)

0 ¾fm (18003_1, 18007_1, 530_1)

1.6m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20081104

SORIND - US,US,nsurf,H11854

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.7) GP No. - Depth 1 from ChartGPs - ENC US5OR12M

ANTI - DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 09' 59.8" N, 123° 20' 26.4" W

Least Depth: 9.40 m (= 30.84 ft = 5.140 fm = 5 fm 0.84 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC US5OR12M

GP No.: Depth 1

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

Remarks:

Shoaler soundings were found in the vicinity by multibeam.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC US5OR12M	Depth 1	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends removing the 31-foot sounding.

Cartographically-Rounded Depth (Affected Charts):

31ft (18523_1)

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

9.4m (501_1, 50_1)

S-57 Data

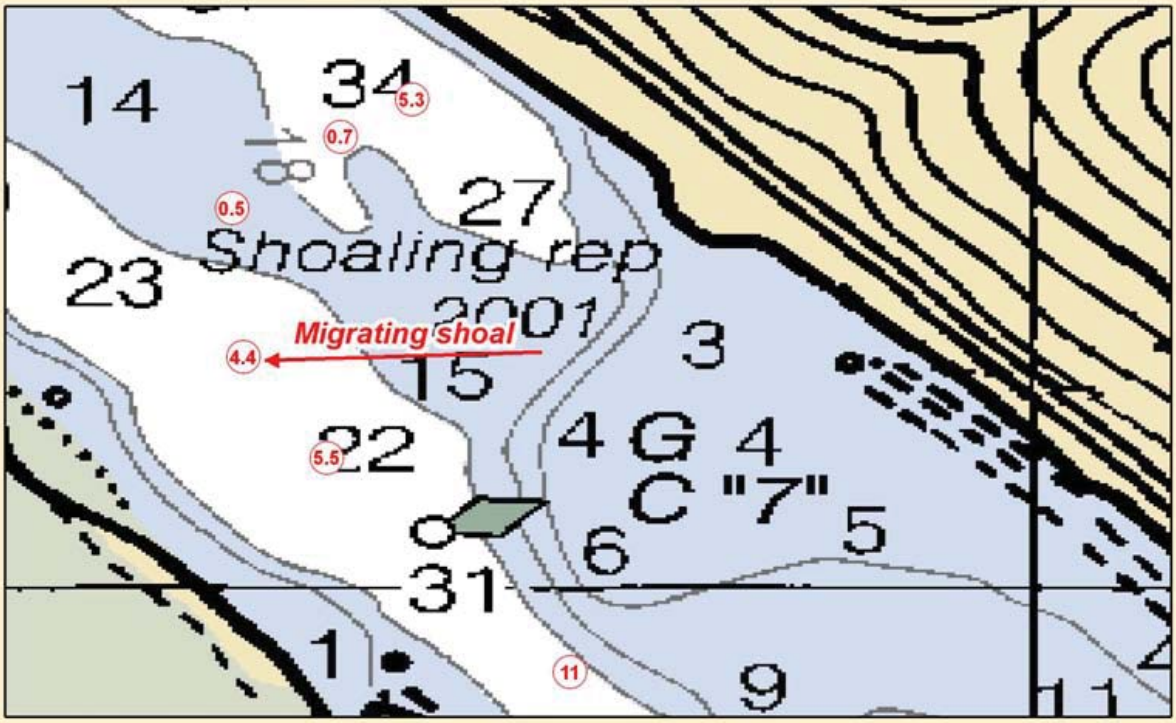
Geo object 1: Sounding (SOUNDG)

Attributes: EXPSOU - 3:deeper than range of depth of the surrounding depth area

SORDAT - 20061007

SORIND - US,US,graph,chart 18523

DANGER TO NAVIGATION #1



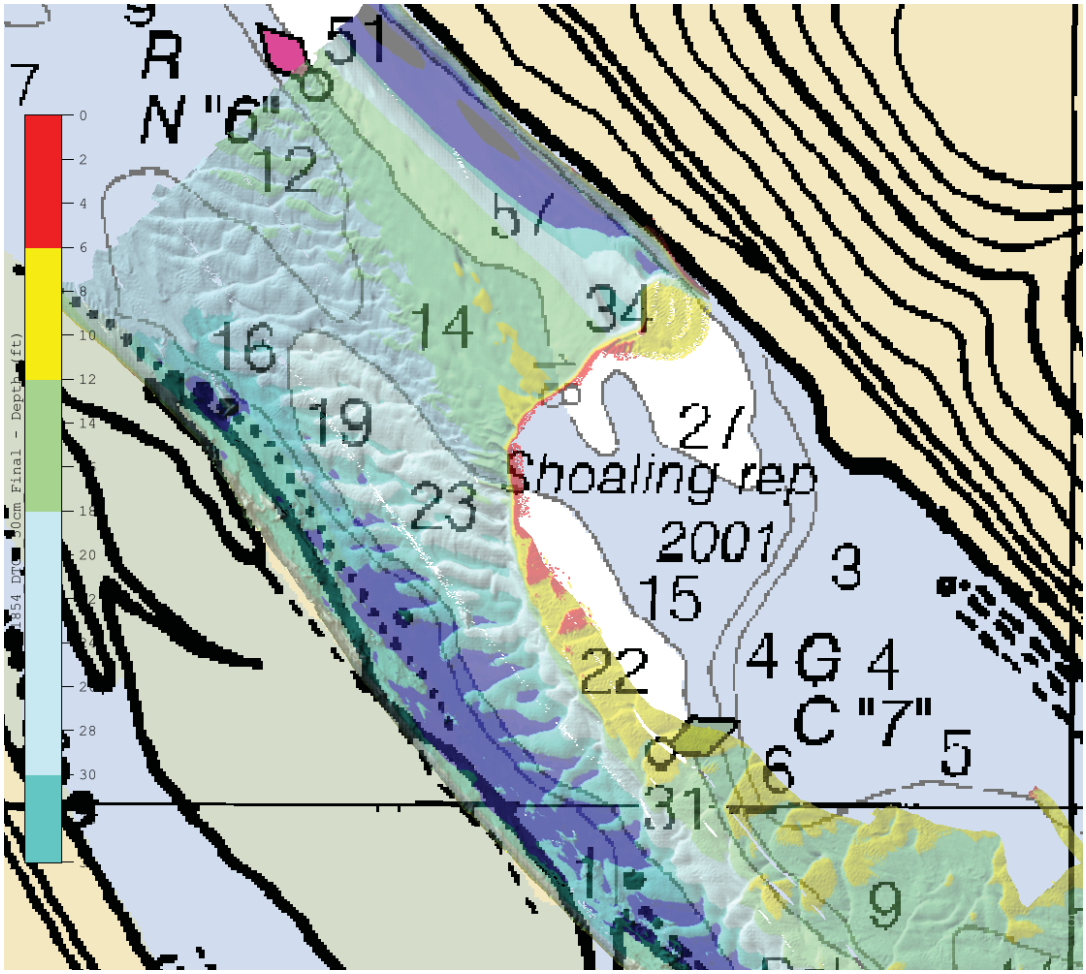
Migrating shoal encroaching upon Cathlamet Channel.

This chartlet has been corrected through Notice to Mariners dated November 11, 2008
NOT FOR NAVIGATION.

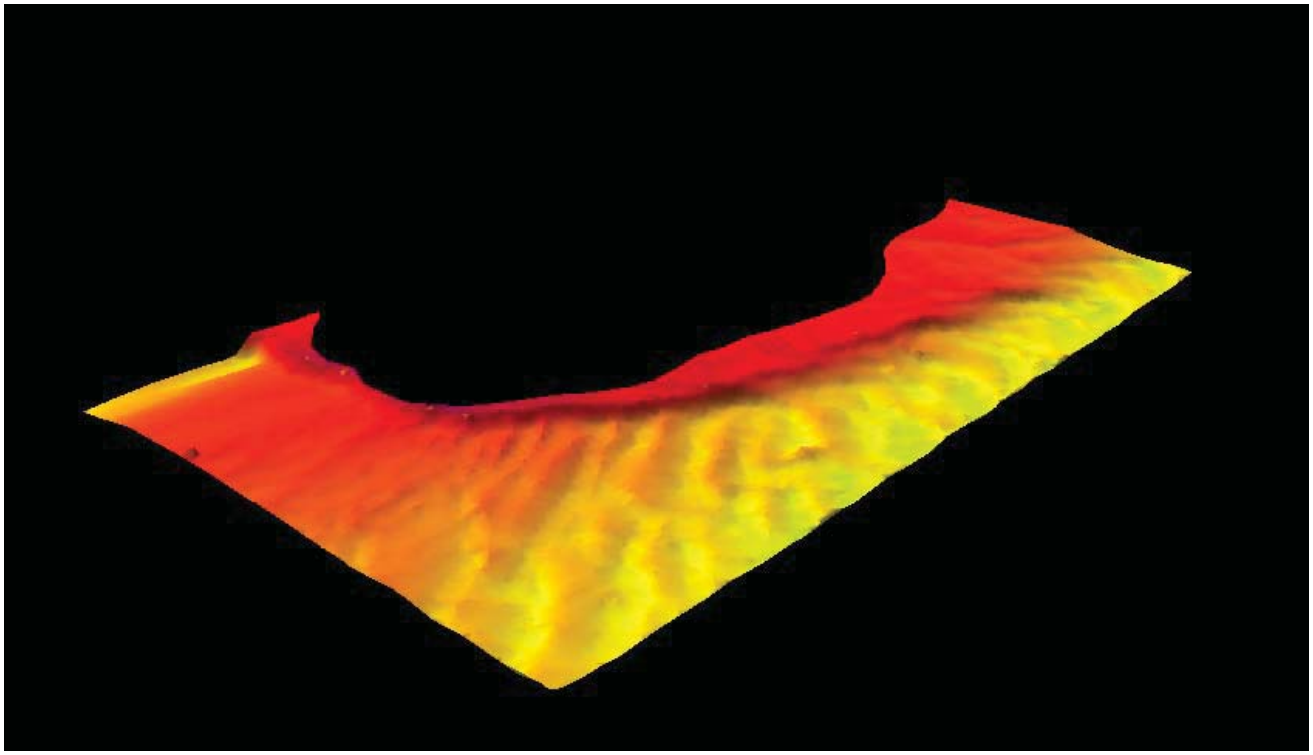
Chartlet 1 of 1

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE	Project: OPR-N388-KR-08 Survey: H11854 State: Oregon Locality: Columbia River Sub-Locality: Three Tree Point to Wallace Island Survey Scale: 1:40,000	Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18523_1 Chart Edition: 35th Chart Scale: 1:40,000	David Evans and Associates, Inc. November 19, 2008

H11854 DTON Hillshade View



DTON 1.1 MBES 3D View



DANGER TO NAVIGATION 2

Jason Creech

From: Jason Creech
Sent: Tuesday, January 20, 2009 7:12 AM
To: 'gary.nelson@noaa.gov'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11854_DTON_2 Submission
Attachments: H11854_DTON_2.doc

Gary,

Attached is a Danger to Navigation report for H11854_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

DTON Report for H11854

Registry Number: H11854

State: Washington

Locality: Columbia River

Sub-locality: Three Tree Point to Wallace Island

Project Number: OPR-N338-KR-08

Survey Dates: September 2008 - December 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18523	56th	10/01/2006	1:40,000 (18523_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	0.83 m	46° 12' 42.4" N	123° 24' 15.3" W
1.2	Obstruction	1.71 m	46° 12' 45.3" N	123° 24' 30.0" W

1 - Danger To Navigation

1.1) GP No. - 1 from H11854_2_dtons.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 42.4" N, 123° 24' 15.3" W

Least Depth: 0.83 m (= 2.72 ft = 0.454 fm = 0 fm 2.72 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.23:36:00.000 (11/10/2008)

GP Dataset: H11854_2_dtons.xls

GP No.: 1

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

Remarks:

obstruction Vertical Datum: Columbia River Datum Possible submerged log rising 3.59 m off the bottom

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854_2_dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart obstruction covers 2 feet

Cartographically-Rounded Depth (Affected Charts):

2ft (18523_1)

0 ½fm (18003_1, 18007_1, 530_1)

.8m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US, survy,H11854

TECSOU - 3:found by multi-beam

VALSOU - 0.83 m

WATLEV - 4:covers and uncovers

1.2) GP No. - 2 from H11854_2_dtons.xls

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 12' 45.3" N, 123° 24' 30.0" W

Least Depth: 1.71 m (= 5.61 ft = 0.935 fm = 0 fm 5.61 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.23:36:00.000 (11/10/2008)

GP Dataset: H11854_2_dtons.xls

GP No.: 2

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

Remarks:

obstruction Verticle Datum: Columbia River Datum Possible pile or log rising 4.09 m off of the bottom

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854_2_dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

Chart 5' obstruction

Cartographically-Rounded Depth (Affected Charts):

5ft (18523_1)

0 ¾fm (18003_1, 18007_1, 530_1)

1.7m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: CATOBS - 1:snag / stump

QUASOU - 1:depth known

SORDAT - 20081110

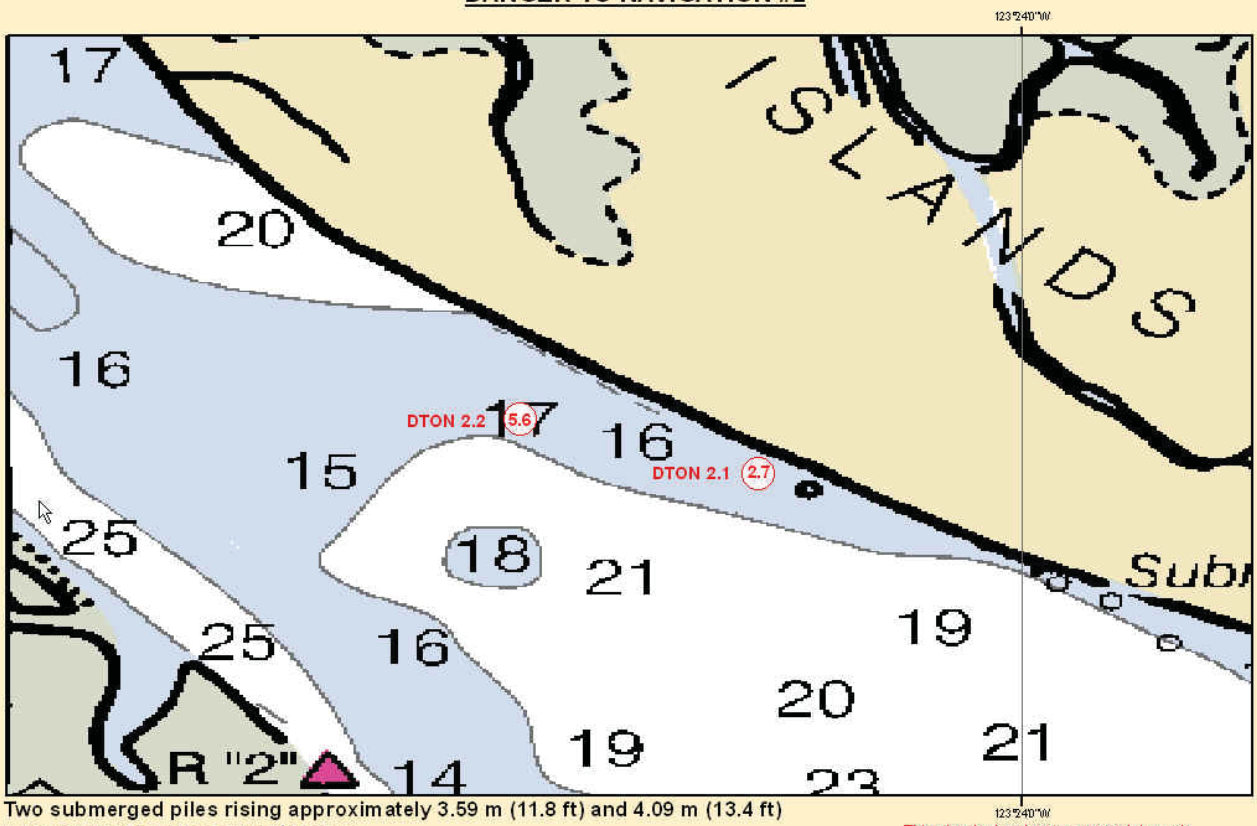
SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VALSOU - 1.71 m

WATLEV - 3:always under water/submerged

DANGER TO NAVIGATION #2



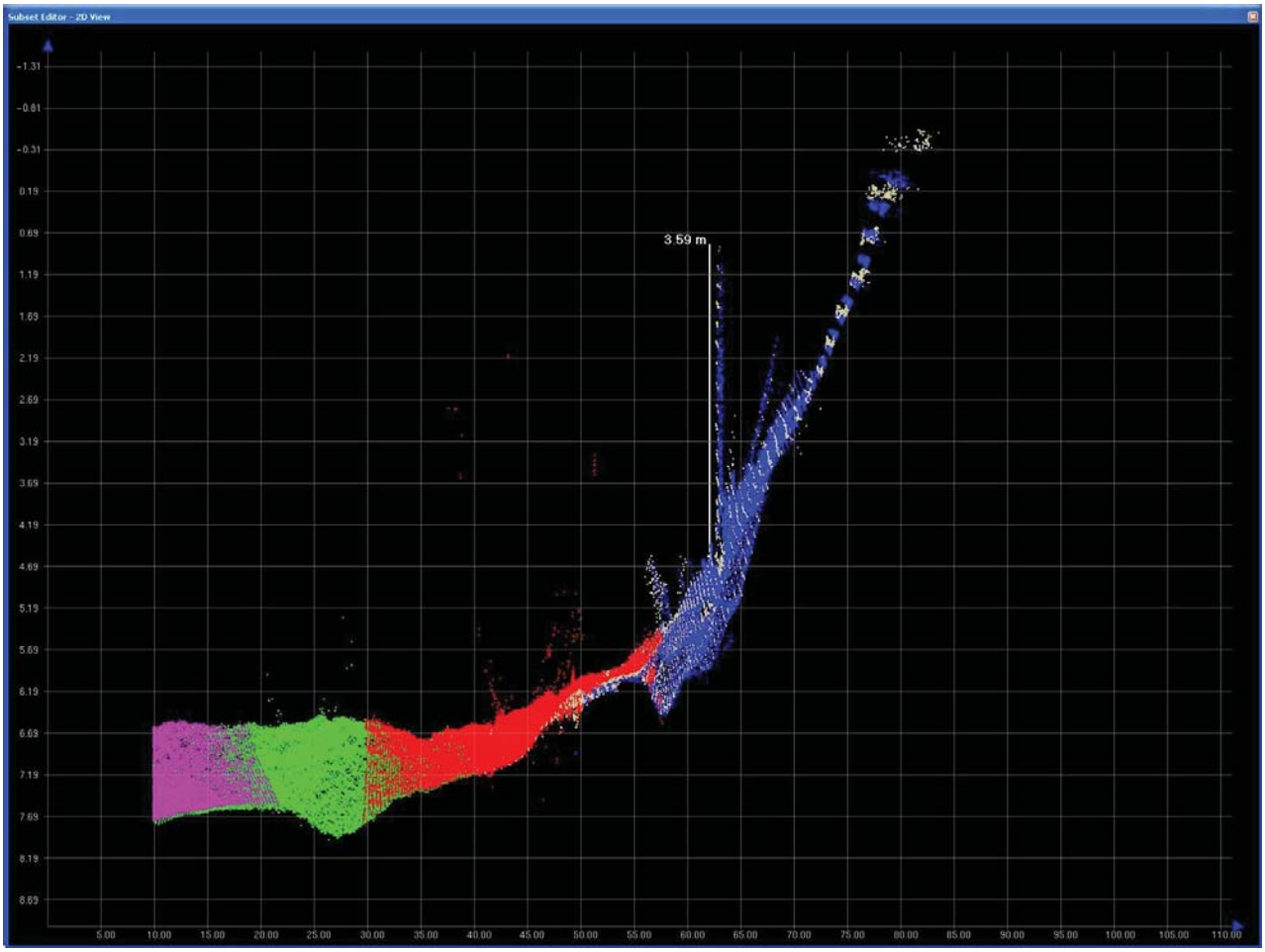
Two submerged piles rising approximately 3.59 m (11.8 ft) and 4.09 m (13.4 ft) repectively, from the natural bottom.

Chartlet 1 of 1

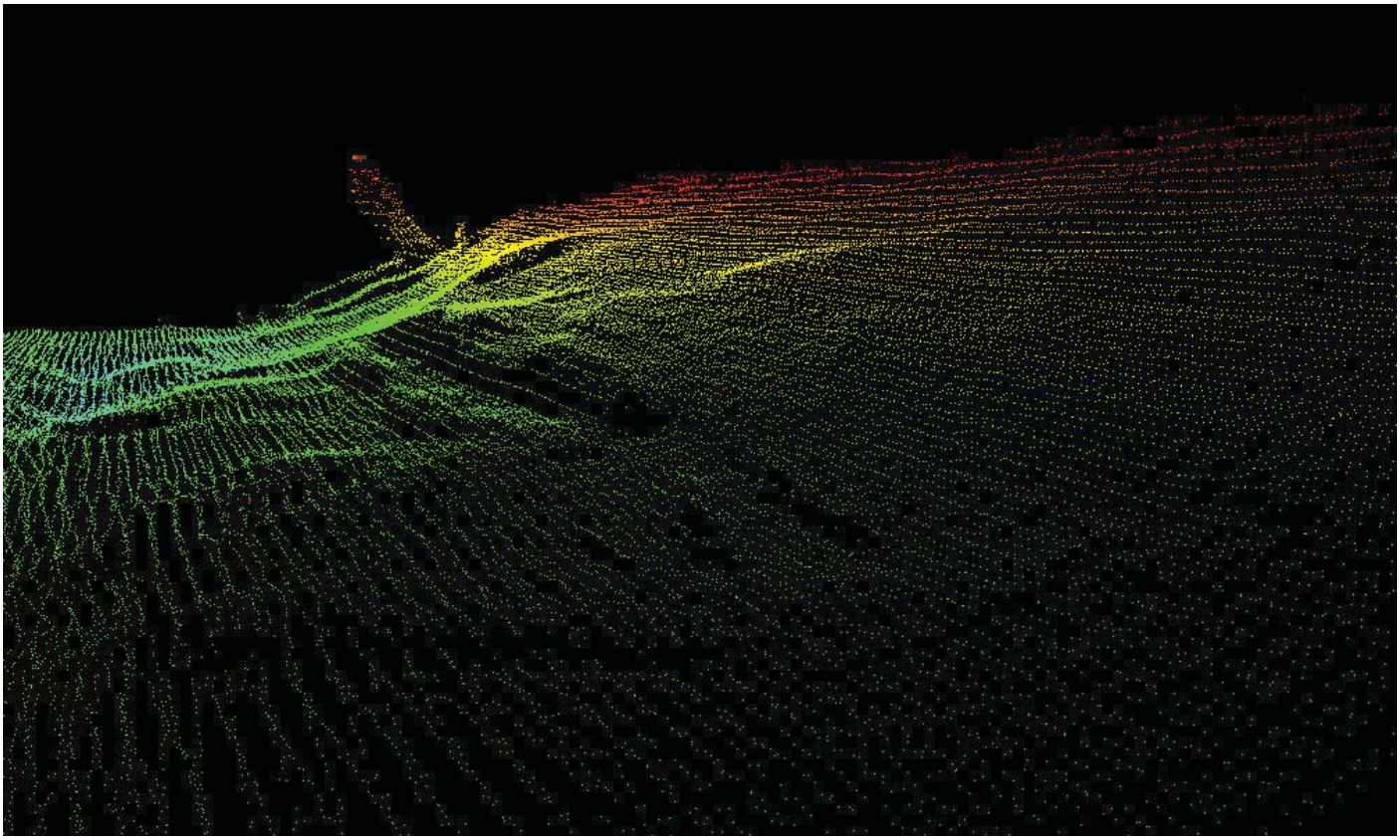
This chartlet has been corrected through Notice to Mariners dated January 10, 2009
NOT FOR NAVIGATION.

NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE	Project: OPR-N388-KR-08 Survey: H11854 State: Oregon Locality: Columbia River Sub-Locality: Three Tree Point to Wallace Island Survey Scale: 1:40,000	Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18523_1 Chart Edition: 56th Chart Scale: 1:40,000	David Evans and Associates, Inc. January 16, 2009

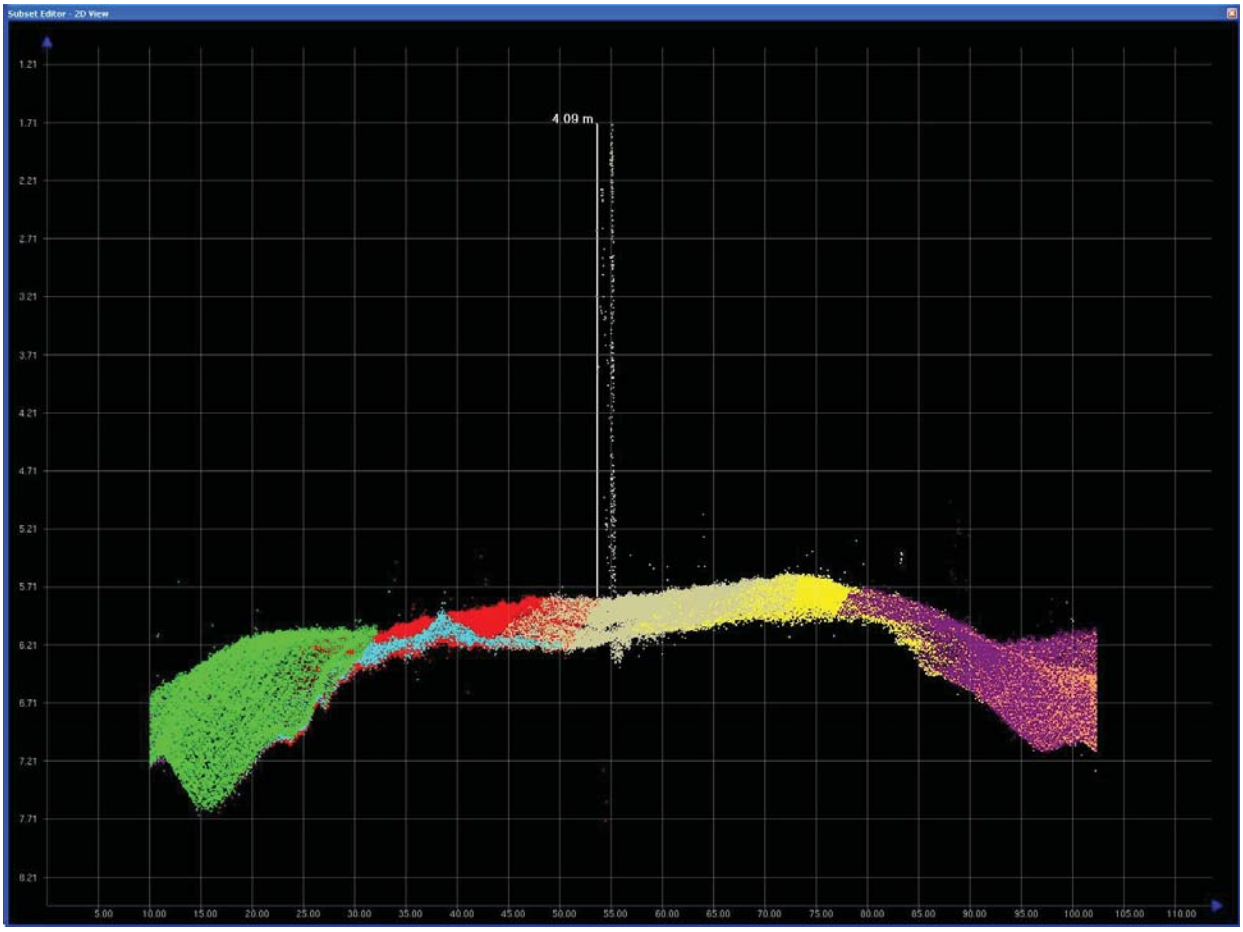
DTON 2.1 MBES 2D View



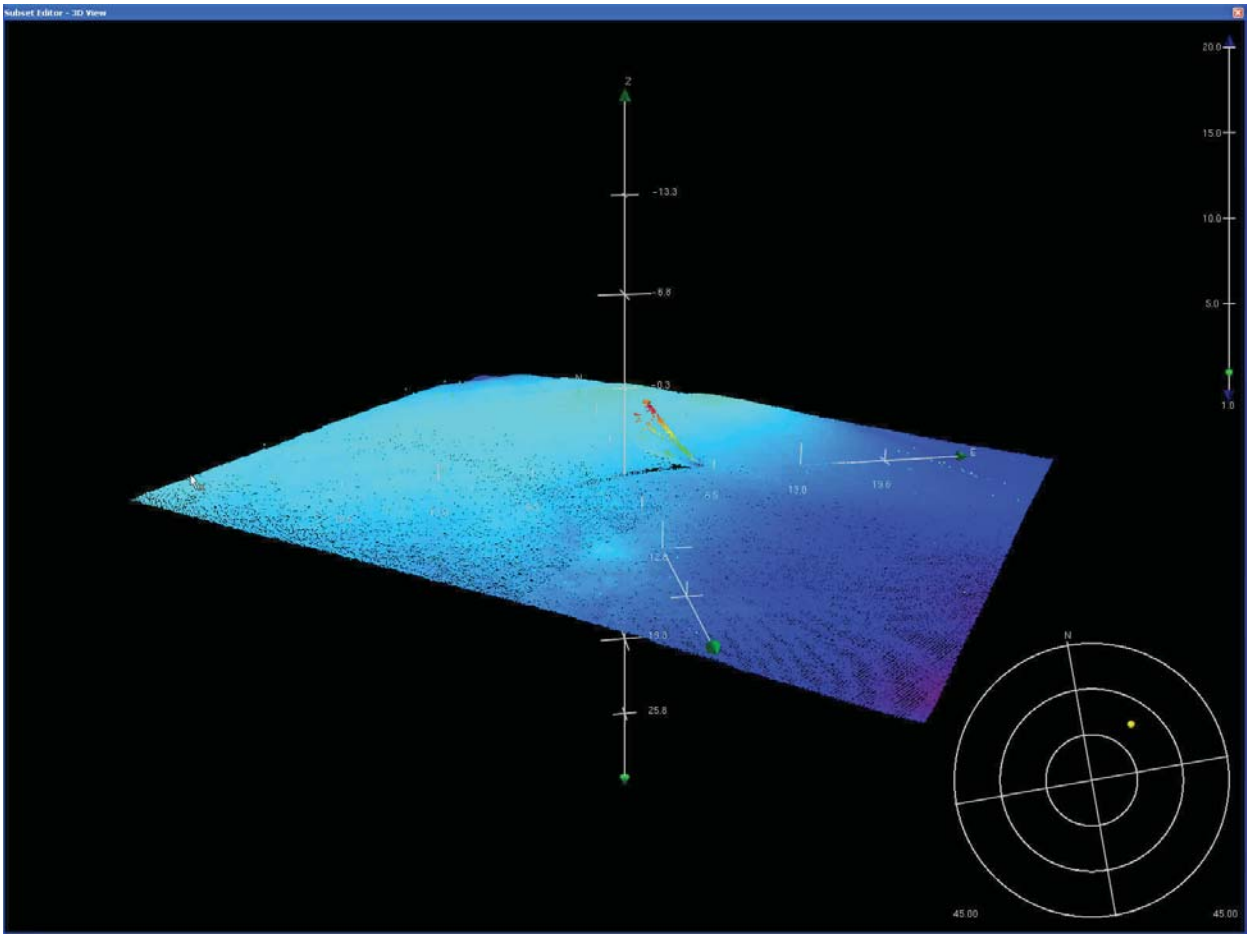
DTON 2.1 MBES 3D View



DTON 2.2 MBES 2D View



DTON 2.2 MBES 3D View


Subset Editor - 3D View
Z
-13.3
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10.0
5.0
1.0
13.0
19.0
25.8
N
45.00
45.00

DANGER TO NAVIGATION 3

Jason Creech

From: Jason Creech
Sent: Thursday, February 26, 2009 1:52 PM
To: 'Gary Nelson'
Cc: 'Dave.Neander@noaa.gov'; 'Crescent.Moegling@noaa.gov'; Jon Dasler
Subject: H11854_DTON_3 Submission
Attachments: H11854_DTON_3.doc

Gary,

Attached is a Danger to Navigation report for H11854_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.

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

H11854 Dangers to Navigation Report

Registry Number: H11854
State: Oregon
Locality: COLUMBIA RIVER
Sub-locality: THREE TREE POINT TO WALLACE ISLAND
Project Number: OPR-N338-KR-08
Survey Date: November 10, 2008

12 DtoNs to be charted, 3 Anti-DtoNs to be removed from chart.

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18523	56th	10/01/2006	1:40,000 (18523_1)	USCG LNM: 12/02/2008 (02/03/2009) NGA NTM: None (02/14/2009)
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	Shoal	2.20 m	46° 11' 09.5" N	123° 22' 03.3" W	---
1.2	Shoal	2.66 m	46° 10' 57.3" N	123° 21' 21.6" W	---
1.3	Shoal	1.80 m	46° 11' 09.1" N	123° 21' 41.9" W	---
1.4	Shoal	0.81 m	46° 11' 09.8" N	123° 21' 51.8" W	---
1.5	Shoal	4.02 m	46° 10' 51.4" N	123° 21' 09.3" W	---
1.6	Shoal	4.60 m	46° 10' 41.4" N	123° 20' 56.7" W	---
1.7	Shoal	1.27 m	46° 11' 02.8" N	123° 21' 44.4" W	---
1.8	Shoal	2.88 m	46° 11' 02.6" N	123° 21' 29.2" W	---
1.9	Shoal	1.77 m	46° 11' 39.7" N	123° 22' 52.7" W	---
1.10	Shoal	2.37 m	46° 11' 33.2" N	123° 22' 45.5" W	---

1.11	Shoal	2.46 m	46° 10' 56.3" N	123° 21' 27.2" W	---
1.12	Shoal	2.03 m	46° 10' 57.2" N	123° 21' 38.2" W	---
1.13	Shoal	6.40 m	46° 11' 05.6" N	123° 21' 37.9" W	---
1.14	Shoal	7.30 m	46° 11' 32.8" N	123° 22' 42.2" W	---
1.15	Shoal	4.80 m	46° 11' 07.0" N	123° 21' 48.0" W	---

2 - Anti Danger To Navigation

1.1) 3.1

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 09.5" N, 123° 22' 03.3" W

Least Depth: 2.20 m (= 7.22 ft = 1.203 fm = 1 fm 1.22 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 1

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

7ft (18523_1)

1 ¼fm (18003_1, 18007_1, 530_1)

2.2m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.2) 3.2

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 57.3" N, 123° 21' 21.6" W

Least Depth: 2.66 m (= 8.73 ft = 1.455 fm = 1 fm 2.73 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 2

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

8ft (18523_1)

1 ½fm (18003_1, 18007_1, 530_1)

2.7m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.3) 3.3

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 09.1" N, 123° 21' 41.9" W

Least Depth: 1.80 m (= 5.91 ft = 0.984 fm = 0 fm 5.91 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 3

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	3	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

6ft (18523_1)

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

1.8m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.4) 3.4

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 09.8" N, 123° 21' 51.8" W

Least Depth: 0.81 m (= 2.66 ft = 0.443 fm = 0 fm 2.66 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 4

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	4	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

2ft (18523_1)

0 ½fm (18003_1, 18007_1, 530_1)

.8m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.5) 3.5

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 51.4" N, 123° 21' 09.3" W

Least Depth: 4.02 m (= 13.19 ft = 2.198 fm = 2 fm 1.19 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 5

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	5	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

13ft (18523_1)

2 ¼fm (18003_1, 18007_1, 530_1)

4.0m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.6) 3.6

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 41.4" N, 123° 20' 56.7" W

Least Depth: 4.60 m (= 15.09 ft = 2.515 fm = 2 fm 3.09 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 6

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	6	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

15ft (18523_1)

2 ½fm (18003_1, 18007_1, 530_1)

4.6m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.7) 3.7

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 02.8" N, 123° 21' 44.4" W

Least Depth: 1.27 m (= 4.17 ft = 0.694 fm = 0 fm 4.17 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 7

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	7	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

4ft (18523_1)

0 ¾fm (18003_1, 18007_1, 530_1)

1.3m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.8) 3.8

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 02.6" N, 123° 21' 29.2" W

Least Depth: 2.88 m (= 9.45 ft = 1.575 fm = 1 fm 3.45 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 8

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	8	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

9ft (18523_1)

1 ½fm (18003_1, 18007_1, 530_1)

2.9m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.9) 3.9

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 39.7" N, 123° 22' 52.7" W

Least Depth: 1.77 m (= 5.81 ft = 0.968 fm = 0 fm 5.81 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 9

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	9	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

6ft (18523_1)

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

1.8m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.10) 3.10

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 33.2" N, 123° 22' 45.5" W

Least Depth: 2.37 m (= 7.78 ft = 1.296 fm = 1 fm 1.78 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 10

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	10	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

8ft (18523_1)

1 ¼fm (18003_1, 18007_1, 530_1)

2.4m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.11) 3.11

DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 10' 56.3" N, 123° 21' 27.2" W

Least Depth: 2.46 m (= 8.07 ft = 1.345 fm = 1 fm 2.07 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-315.11:60:00.000 (11/10/2008)

GP Dataset: H11854Dton.xls

GP No.: 11

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

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	11	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

8ft (18523_1)

1 ¼fm (18003_1, 18007_1, 530_1)

2.5m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

SORDAT - 20081110

SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

1.12) 3.12

DANGER TO NAVIGATION

Survey Summary

Survey Position:	46° 10' 57.2" N, 123° 21' 38.2" W
Least Depth:	2.03 m (= 6.66 ft = 1.110 fm = 1 fm 0.66 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2008-315.11:60:00.000 (11/10/2008)
GP Dataset:	H11854Dton.xls
GP No.:	12
Charts Affected:	18523_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

SOUNDING, Depths were acquired with multibeam sonar. Depths are corrected using RTK GPS tides and should be considered preliminary.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11854Dton.xls	12	0.00	000.0	Primary

Hydrographer Recommendations

The hydrographer recommends charting these shoal soundings which were derived from a BASE surface and adjusting the depth curves as necessary.

Cartographically-Rounded Depth (Affected Charts):

6ft (18523_1)

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

2.0m (501_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 1:depth known
	SORDAT - 20081110
	SORIND - US,US,survy,H11854

TECSOU - 3:found by multi-beam

VERDAT - 24:Local datum

2.1) Anti-DtoN 1

ANTI DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 05.6" N, 123° 21' 37.9" W

Least Depth: 6.40 m (= 21.00 ft = 3.500 fm = 3 fm 3.00 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)**[None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC US5OR12M

GP No.: Depth 49

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

Remarks:

Shoaler soundings found in near vicinity by multibeam survey H11854.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC US5OR12M	Depth 49	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted sounding.

Cartographically-Rounded Depth (Affected Charts):

21ft (18523_1)

3 ½fm (18003_1, 18007_1, 530_1)

6.4m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20061007

SORIND - US,US,graph,chart 18523

2.2) Anti-DtoN 2

ANTI DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 32.8" N, 123° 22' 42.2" W

Least Depth: 7.30 m (= 23.95 ft = 3.992 fm = 3 fm 5.95 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)**[None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC US5OR12M

GP No.: Depth 75

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

Remarks:

Shoaler soundings found in near vicinity by multibeam survey H11854.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC US5OR12M	Depth 75	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted sounding.

Cartographically-Rounded Depth (Affected Charts):

24ft (18523_1)

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

7.3m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20061007

SORIND - US,US,graph,chart 18523

2.3) Anti-DtoN 3

ANTI DANGER TO NAVIGATION

Survey Summary

Survey Position: 46° 11' 07.0" N, 123° 21' 48.0" W

Least Depth: 4.80 m (= 15.75 ft = 2.625 fm = 2 fm 3.75 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)**[None]

Timestamp: [None]

GP Dataset: ChartGPs - ENC US5OR12M

GP No.: Depth 135

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

Remarks:

Shoaler soundings found in near vicinity by multibeam survey H11854.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC US5OR12M	Depth 135	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted sounding.

Cartographically-Rounded Depth (Affected Charts):

15ft (18523_1)

2 ½fm (18003_1, 18007_1, 530_1)

4.8m (501_1, 50_1)

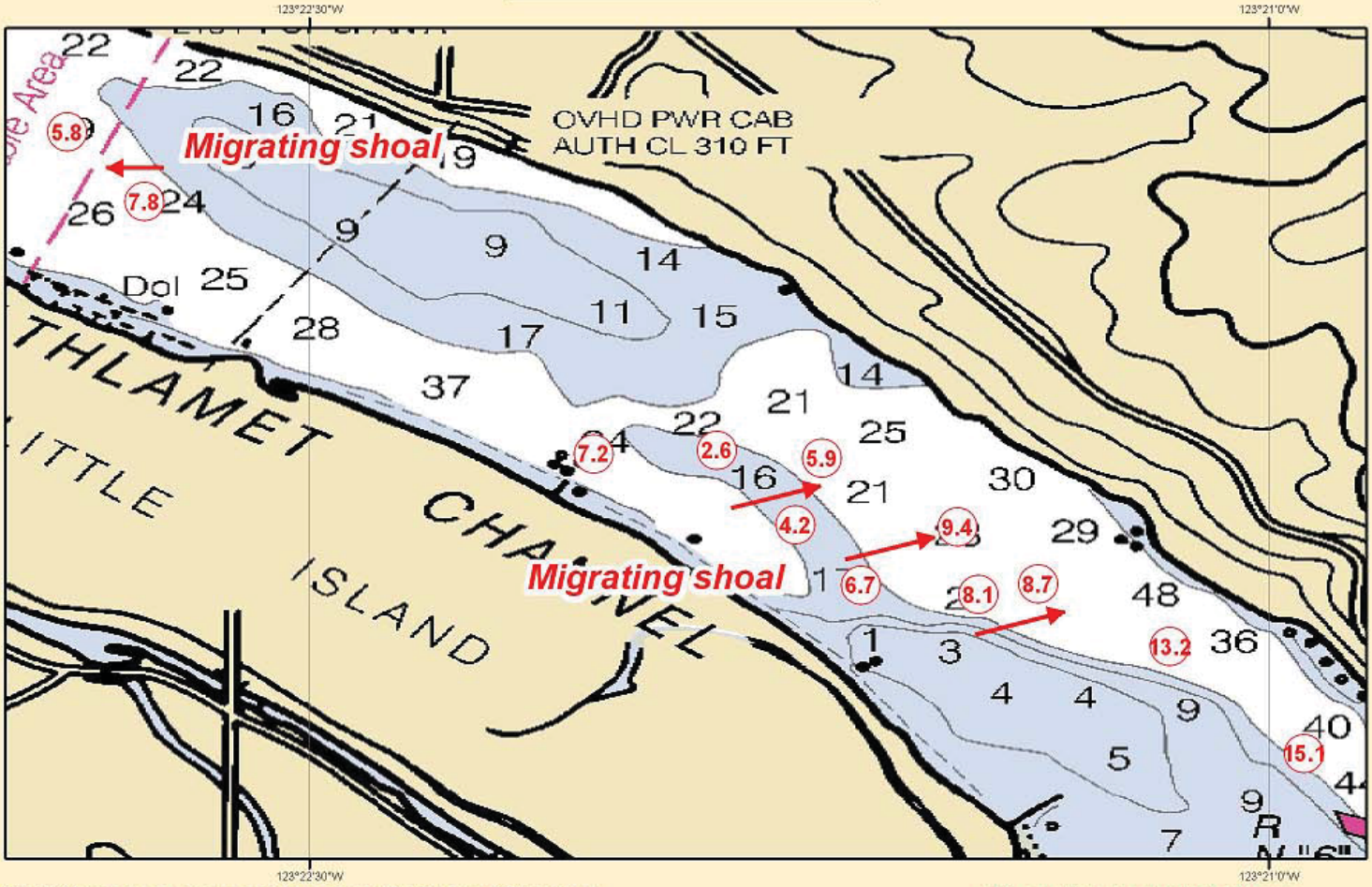
S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: SORDAT - 20061007

SORIND - US,US,graph,chart 18523

DANGER TO NAVIGATION #3



Migrating shoal encroaching upon Cathlamet Channel.

This chartlet has been corrected through Notice to Mariners dated February 7, 2009
NOT FOR NAVIGATION.

Chartlet 1 of 1

NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE	Project: OPR-N388-KR-08 Survey: H11854 State: Oregon Locality: Columbia River Sub-Locality: Three Tree Point to Wallace Island Survey Scale: 1:40,000	Sounding Units: Feet Sounding Datum: Columbia River Horizontal Datum: NAD 83 Projection: UTM 10N Chart: 18523_1 Chart Edition: 35th Chart Scale: 1:40,000	David Evans and Associates, Inc. February 26, 2009

APPENDIX II
SURVEY FEATURE REPORT

Registry Number: H11854
State: Oregon
Locality: Colum bia River
Sub-locality: Three Tree Point to Wallace Island
Project Number: OPR-E338-KR-08
Survey Date: October 21, 2008 to March 5, 2009

List of Features

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Table 1. Charts Affected

Chart Number	RNC Scale	Edition	RNC Edition Date	ENC Issue Date
18523	1:40,000	56	10/01/2006	---
US5OR12M	---	7	---	12/09/2008

AWOIS 53008

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53008	100m	46/16/13.000	123/30/35.000

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
DISPROVAL 28.4ft	(8.66m)	46/16/12.629	123/30/34.687

Remarks:
AWOIS 53008 charted at 46/16/13.00 N, 123/30/ 35.00 W was disproved with 100% shallow water multibeam. There were no significant featur es detected in the MB ES within the AW OIS radius. The AWOIS radius m arks a cliff; therefor e a leas t depth is representative of the cliff face. The 0.0ft (0.00m) depth contour was reached due to high river levels and sonar angle. See Figure 1.

Hydrographer Recommendation:
The hydrographer recommends removing the obstructi on and charting the area in accordance with the survey data.

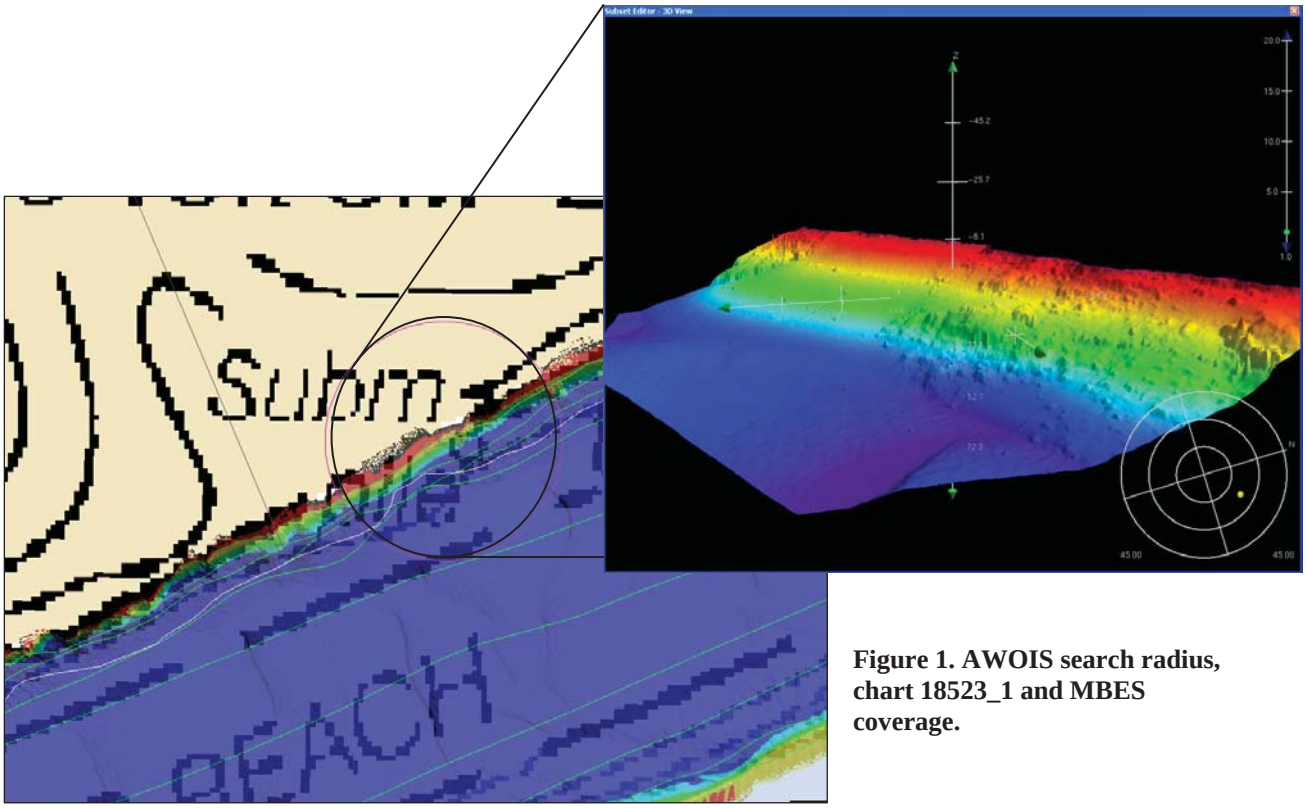


Figure 1. AWOIS search radius, chart 18523_1 and MBES coverage.

AWOIS 53009

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53009 extent	Linear feature	48/14/08.800	123/26/21.000
extent		46/13/58.100	123/26/13.700

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
AWOIS 53009	6.9ft (2.10 m)	46/13/59.370	123/26/14.520

Remarks:
AWOIS 53009 featuring a line of piles charted between positions 48/14/08.800N, 123/26/21.00 W and 46/13/58.10N, 123/26/13.700W was investigated with 100% shallow water multibeam. One significant feature was detected within the AWOIS linear feature at position 46/13/59.37N, 123/26/14.52W, corresponding to the second charted pile from the south. A least depth was found in the MBES data to be 6.9ft (2.10 m) at this position (See inset below). No other significant features were detected within the AWOIS radius.

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

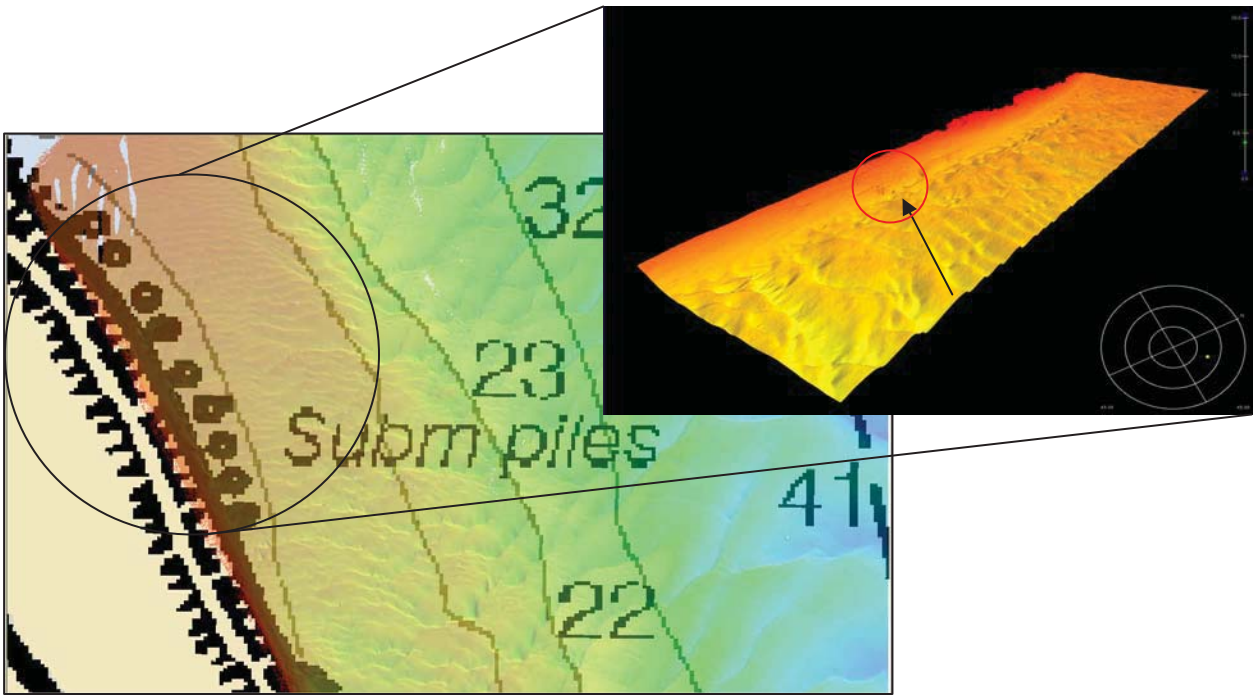


Figure 2. AWOIS search area, chart 18523_1 and MBES coverage.

AWOIS 53010

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 53010	50m	46/12/22.400	123/25/54.800

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
DISPROVAL	9.4 ft (2.86 m)	46/12/22.738 N	123/25/55.129 W

Remarks:
AWOIS 53010 charted at 46/12/22.400 N, 123/25 /54.800 W was disproved with 100% shallow water multibeam. There were no significant featur es detected in the MB ES within the AW OIS radius. A least depth was found in the MBES data to be 9.4 ft (2.86 m) at position 46/12/22.738N, 123/25/55.129W (See inset below).

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

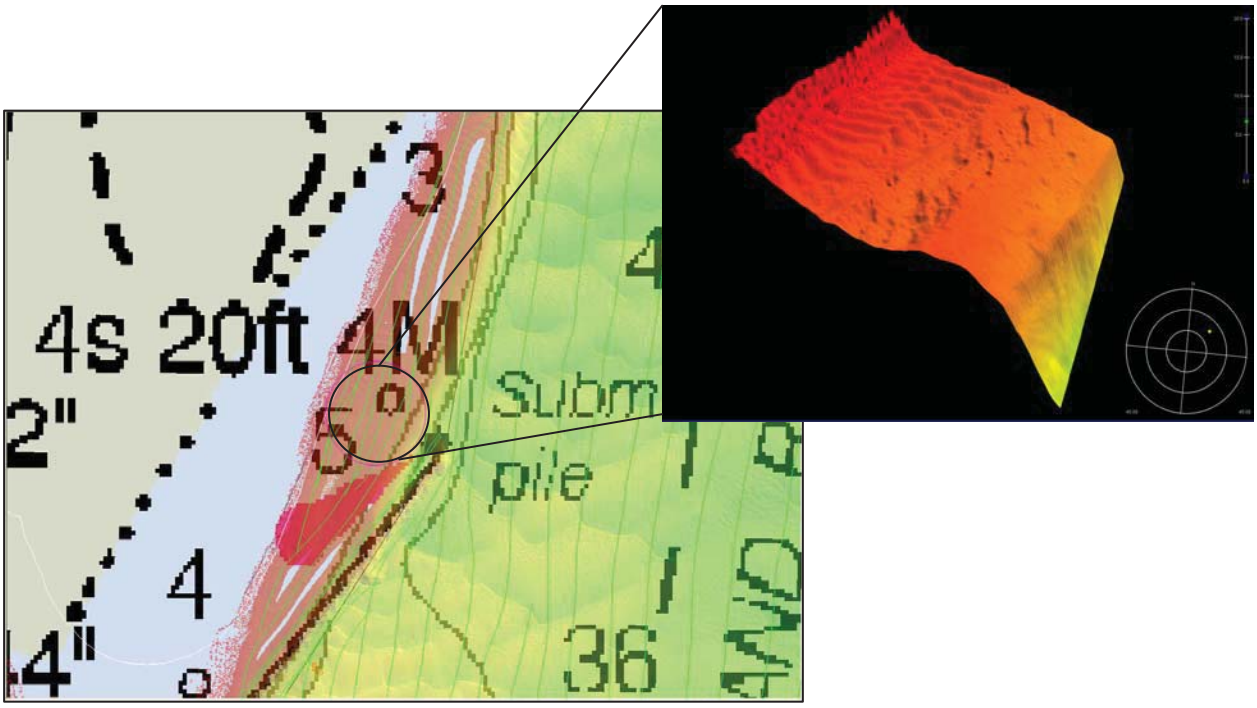


Figure 3. AWOIS search radius, chart 18523_1 and MBES coverage.

AWOIS 52979

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 52979	100m	46/15/47.880	123/30/56.610

SURVEYED

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

Remarks:
The obstruction (AWOIS 52979) previously charted at position 46/15/47.880N 123/30/56.610W was a submerged dolphin. A previous survey conducted by the NOAA Navigational Response Team (NRT) disproved the dolphin using 200% side scan sonar. The item is not charted. It was noted by the NOAA Contracting Officer as "no investigation required" in December 1, 2008 correspondence to the Chief of Party. Documentation is located in *Appendix V. Correspondence*.

Hydrographer Recommendation:
No action is necessary.

AWOIS 52980

REPORTED

FEATURE	RADIUS	LATITUDE (N)	LONGITUDE (W)
AWOIS 52980	200m	46/16/33.600N	123/20/27.600W

SURVEYED

FEATURE	LEAST DEPTH	LATITUDE (N)	LONGITUDE (W)
OBSTRUCTION	0.7 ft (0.2m)	46/10/20.619	123/20/31.161

Remarks:
AWOIS 52980 charted at 46/16/33.600N, 123/20/27.600W was investigated with 25 m spacing VBES. A Danger to Navigation Report (H1 1854_DTON_1) was submitted on Wednesday, November 19, 2008 11:54 AM, indicating significant shoaling. A least depth 0.7 ft (0.2m) was found in the VBES data representing a migrating shoal which has encroached upon Cathlamet Channel (See inset below).

Hydrographer Recommendation:
The hydrographer recommends charting these shoal soundings and adjusting the depth curves as necessary.

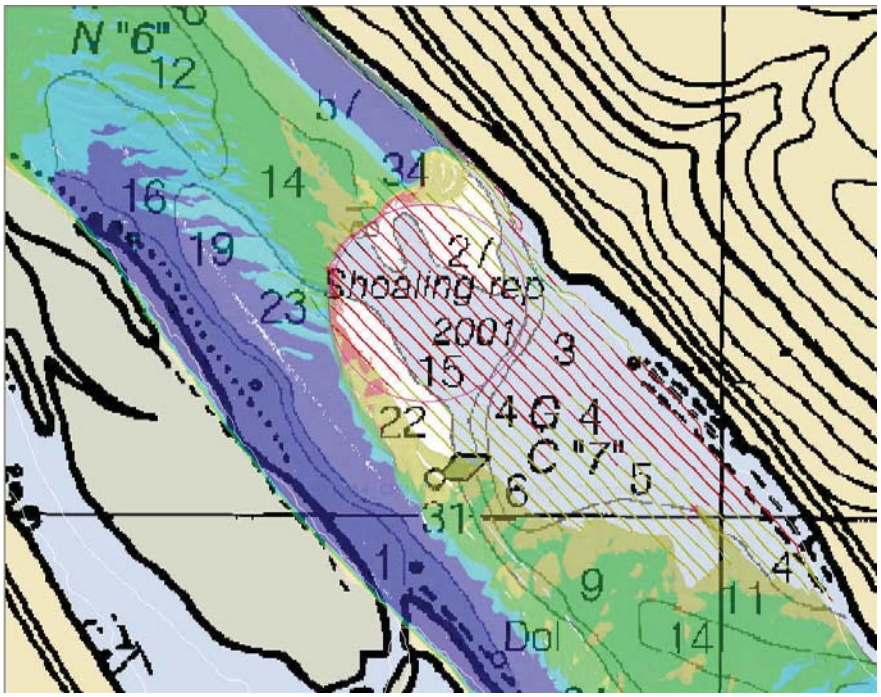


Figure 4. AWOIS search radius, chart 18523_1, MBES coverage.

Appendix II
S-57 Features

OPR-N338-KR-08
H11854
Survey Features
PILPNT

Disproved:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-08-17.196N	123-17-28.896W	--	--	Disproved
46-08-31.992N	123-21-23.706W	--	--	Disproved
46-08-26.736N	123-18-06.318W	--	--	Disproved
46-08-21.804N	123-17-40.668W	--	--	Disproved
46-12-40.824N	123-24-12.708W	--	--	Disproved
46-10-34.374N	123-21-20.376W	--	--	Disproved
46-11-08.556N	123-22-04.710W	--	--	Disproved
46-16-17.922N	123-28-12.774W	--	--	Disproved
46-09-17.154N	123-23-56.364W	--	--	Disproved
46-16-20.118N	123-28-16.374W	--	--	Disproved
46-10-43.842N	123-25-24.564W	--	--	Disproved
46-09-12.564N	123-23-49.668W	--	--	Disproved
46-08-57.138N	123-23-28.680W	--	--	Disproved
46-08-23.532N	123-19-30.972W	--	--	Disproved
46-08-20.202N	123-17-38.562W	--	--	Disproved
46-08-18.042N	123-17-31.254W	--	--	Disproved
46-11-05.802N	123-22-04.890W	--	--	Disproved
46-10-18.984N	123-20-57.444W	--	--	Disproved
46-11-09.240N	123-22-06.564W	--	--	Disproved
46-16-23.358N	123-28-42.276W	--	--	Disproved
46-14-24.270N	123-25-39.414W	--	--	Disproved
46-10-43.068N	123-25-23.196W	--	--	Disproved
46-09-11.682N	123-23-48.804W	--	--	Disproved
46-09-14.238N	123-23-52.080W	--	--	Disproved
46-11-01.356N	123-21-54.054W	--	--	Disproved
46-08-29.454N	123-21-05.706W	--	--	Disproved
46-08-22.164N	123-17-42.828W	--	--	Disproved

OPR-N338-KR-08
H11854
Survey Features
PILPNT

Disproved:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-08-18.870N	123-17-33.216W	--	--	Disproved
46-09-45.918N	123-24-35.856W	--	--	Disproved
46-10-19.524N	123-20-59.208W	--	--	Disproved
46-11-08.394N	123-22-07.104W	--	--	Disproved
46-11-36.942N	123-23-13.938W	--	--	Disproved
46-16-16.770N	123-28-07.302W	--	--	Disproved
46-12-03.438N	123-26-21.588W	--	--	Disproved
46-16-23.520N	123-28-39.216W	--	--	Disproved
46-09-15.048N	123-23-53.178W	--	--	Disproved
46-08-57.786N	123-23-31.146W	--	--	Disproved
46-10-08.688N	123-20-44.124W	--	--	Disproved
46-08-32.226N	123-21-21.510W	--	--	Disproved
46-08-22.164N	123-17-45.240W	--	--	Disproved
46-08-19.500N	123-17-36.402W	--	--	Disproved
46-08-42.558N	123-23-07.692W	--	--	Disproved
46-09-56.754N	123-20-28.860W	--	--	Disproved
46-11-07.656N	123-22-06.006W	--	--	Disproved
46-11-28.302N	123-22-57.558W	--	--	Disproved
46-16-18.444N	123-28-11.568W	--	--	Disproved
46-14-02.850N	123-25-30.198W	--	--	Disproved
46-16-20.028N	123-28-15.168W	--	--	Disproved
46-09-13.392N	123-23-51.072W	--	--	Disproved
46-09-16.128N	123-23-54.330W	--	--	Disproved
46-16-24.835N	123-29-55.186W	--	--	Disproved
46-16-24.750N	123-29-41.616W			Disproved
46-10-36.776N	123-25-50.418W			Disproved

OPR-N338-KR-08
H11854
Survey Features
PILPNT

New:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
--	--	46-11-26.819N	123-25-35.360W	new pile
--	--	46-11-08.322N	123-22-10.009W	new pile
--	--	46-11-26.110N	123-25-35.029W	new pile
--	--	46-11-09.791N	123-22-13.778W	new pile
--	--	46-09-18.310N	123-19-43.144W	new pile
--	--	46-11-11.000N	123-22-16.273W	new pile
--	--	46-11-15.554N	123-25-36.030W	new pile
--	--	46-12-20.268N	123-24-38.574W	new pile
--	--	46-10-40.940N	123-25-19.906W	new piles
--	--	46-16-25.939N	123-29-41.604W	new pile
--	--	46-11-28.525N	123-25-35.162W	new pile
--	--	46-11-16.112N	123-25-35.980W	new pile
--	--	46-09-16.603N	123-23-59.870W	new pile
--	--	46-12-05.341N	123-23-15.319W	new pile
--	--	46-12-13.673N	123-24-31.473W	new pile
--	--	46-12-06.547N	123-23-16.613W	new pile
--	--	46-12-04.532N	123-23-14.051W	new pile
--	--	46-11-03.844N	123-22-03.252W	new pile
--	--	46-12-42.624N	123-25-08.393W	new pile
--	--	46-11-01.410N	123-21-58.410W	new pile
--	--	46-10-36.476N	123-21-24.473W	new pile
--	--	46-10-59.768N	123-21-55.735W	new pile
--	--	46-11-12.199N	123-22-18.872W	new pile
--	--	46-10-53.767N	123-21-46.051W	new pile
--	--	46-11-16.782N	123-22-31.235W	new pile
--	--	46-10-41.416N	123-21-31.298W	new pile
--	--	46-11-02.598N	123-22-00.196W	new pile
--	--	46-16-21.713N	123-28-23.743W	new pile
--	--	46-11-27.636N	123-25-35.299W	new pile

OPR-N338-KR-08
H11854
Survey Features
OBSTRN

Disproved:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-16-12.934N	123-30-35.382W	--	--	Disproved
46-14-01.938N	123-26-15.818W	--	--	Disproved
46-14-00.561N	123-26-15.110W	--	--	Disproved
46-14-03.262N	123-26-16.824W	--	--	Disproved
46-14-06.028N	123-26-18.720W	--	--	Disproved
46-14-04.931N	123-26-17.921W	--	--	Disproved
46-14-08.658N	123-26-21.213W	--	--	Disproved
46-14-07.560N	123-26-20.129W	--	--	Disproved
46-13-58.126N	123-26-14.019W	--	--	Disproved
46-12-22.723N	123-25-54.820W	--	--	Disproved
46-13-59.373N	123-26-14.526W	--	--	Disproved
46-12-34.286N	123-23-54.823W	--	--	Disproved
46-12-31.800N	123-23-51.349W	--	--	Disproved
46-12-35.319N	123-23-57.946W	--	--	Disproved
46-12-42.400N	123-24-15.300W	--	--	Disproved
46-12-45.300N	123-24-30.000W	--	--	Disproved
46-10-27.199N	123-25-41.582W	--	--	Disproved

OPR-N338-KR-08
H11854
Survey Features
OBSTRN

New:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
--	--	46-16-17.116N	123-30-25.438W	Obstrn
--	--	46-16-20.060N	123-28-16.140W	Charted pile is snag
--	--	46-16-20.170N	123-28-15.540W	Charted pile is snag.
--	--	46-12-45.305N	123-24-29.963W	DTON 2.2
--	--	46-08-24.461N	123-20-00.906W	Subm dol
--	--	46-11-59.057N	123-23-06.850W	Obstruction
--	--	46-16-23.350N	123-28-42.240W	Snag
--	--	46-13-59.538N	123-26-15.479W	AWOIS 53009
--	--	46-12-34.297N	123-23-55.892W	snag
--	--	46-12-42.379N	123-24-15.307W	DTON 2.1
--	--	46-12-32.548N	123-23-51.767W	rectangular object
--	--	46-10-26.756N	123-25-40.746W	submerged log
--	--	46-10-43.820N	123-25-22.462W	Pile ruins
--	--	46-10-17.033N	123-20-30.005W	Snag
--	--	46-08-09.996N	123-17-09.132W	Pile ruins
--	--	46-08-58.117N	123-23-31.481W	Pile ruins
--	--	46-10-12.958N	123-20-18.960W	Snag
--	--	46-12-35.039N	123-23-59.281W	dolphin ruins
--	--	46-16-23.221N	123-30-04.302W	Pile ruins
--	--	46-16-17.350N	123-30-23.461W	line of awash pile ruins
--	--	46-08-54.092N	123-23-25.094W	pile ruins
--	--	46-08-14.690N	123-17-17.045W	Pile ruins
--	--	46-09-14.746N	123-19-34.961W	Pile ruins
--	--	46-12-31.529N	123-23-52.082W	Dolphin ruins
--	--	46-09-51.332N	123-19-46.816W	Pile ruins
--	--	46-10-25.295N	123-21-11.628W	Pile ruins
--	--	46-08-57.206N	123-23-29.540W	Pile ruins
--	--	46-09-56.725N	123-20-30.901W	Pile ruins

OPR-N338-KR-08
H11854
Survey Features
MORFAC

Disproved:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-08-34.798N	123-17-23.542W	--	--	Disproved
46-11-34.411N	123-23-06.212W	--	--	Disproved
46-08-24.013N	123-19-56.295W	--	--	Disproved
46-15-22.350N	123-26-49.138W	--	--	Disproved
46-09-18.857N	123-19-41.758W	--	--	Disproved

OPR-N338-KR-08
H11854
Survey Features
UWTROC

Disproved:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-16-24.750N	123-29-41.616W	--	--	Disproved
46-10-36.776N	123-25-50.418W	--	--	Disproved

New:

ENC Latitude	ENC Longitude	Surveyed Latitude	Surveyed Longitude	Remarks
46-10-36.979N	123-25-51.039W	--	--	charted awash rock
46-16-23.689N	123-28-38.759W			new rock

Jason Creech

From: Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Monday, December 01, 2008 8:31 AM
To: Jason Creech
Subject: Re: FW: Columbia River AWOIS Question

Jason,

Sorry for not getting back on this one. Actually, if the AWOIS item is not investigated on the entire search area it cannot be disproved. Given that, I did look at the current database and it seems to have been disproved as you said by NRT. It is not necessary to address this item aside from mentioning in the DR that it was previously disproven by NRT and mistakenly assigned to DEA - no investigation required. It doesn't seem to be charted on the current chart either.

Crescent

Jason Creech wrote, On 12/1/2008 11:09 AM:

> Hey Crescent
>
> I sent the attached email a few weeks back. I think you were out of the office and I got an auto reply. We've moved on to another sheet and are wondering how to handle this item when we return to run fill.
>
> Thanks,
>
> Jason
>
> **From:** Jason Creech
> **Sent:** Monday, November 17, 2008 7:00 AM
> **To:** 'Crescent Moegling'
> **Subject:** Columbia River AWOIS Question
>
> Hey Crescent
>
> Thanks again for everything last week. I think Jon's presentation was well received and we got some good feedback afterwards.

We have a question about an AWOIS item for our Columbia River project. AWOIS 52979 is just outside of our survey boundary and is listed as disproved by a recent survey (200% SSS). This must be from when the NRTs were on the Columbia a few years back. Are we still required to collect 100% MBES within the 100m radius? Image attached.

Thanks,

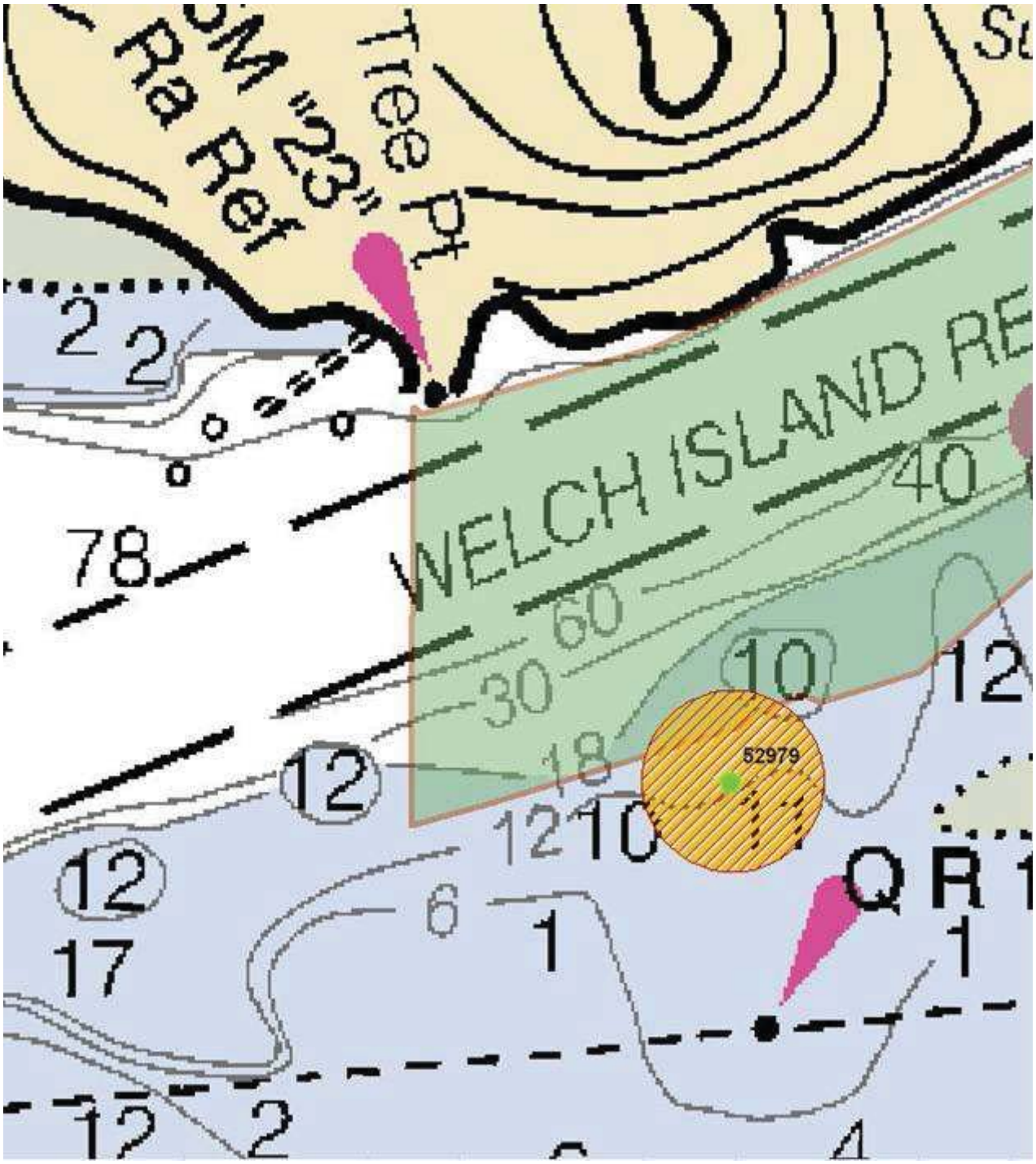
Jason

Jason Creech

Lead Hydrographer

David Evans and Associates, Inc.

(804) 516-7829



--
Crescent Moegling
NOAA Hydrographic Surveys Division
Branch Chief - Data Acquisition Control
301.713.2700 x111

H11854 HCell Report

Katie Reser, Physical Scientist
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC and RNC in the region: NOAA ENC US5OR12M and NOAA RNC 18523.

HCell compilation of survey H11854 used Pacific Hydrographic Branch HCell Reference Guide Version 2.0-Draft.

1. Compilation Scale

Depths for HCell H11854 were compiled to the largest scale chart in the region, 18523 (56th Ed., October 2006, 1:40,000). The density and distribution of soundings from H11854 were selected to emulate the distribution on the chart. Non-bathymetric features have been generalized to chart scale.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 0.5-meter combined surface, **H11854_50cm_Combined**, and the 2-meter VBES surface, **H11854_VBES_Uncertainty_2m_Final**, in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 scale for the main chart area using a Radius Table file with values shown in the table, below.

Upper limit (m)	Lower 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 and imported into a new layer created to accommodate chart and inset density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

3. Depth Contours

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

Chart Contours in Feet	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0 0.00		0.2286	0.75
6 1.829		2.0574	6.75
12 3.658		3.8862	12.75
18 5.486		5.715	18.75
30 9.144		9.3726	30.75
60 18.288		18.5166	60.75

Contours delivered in the *_SS file 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 results in conflicts between the *_SS file contours and HCell features at or near the survey limits. HCell features should be honored over *_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell 11854:

M_QUAL

Meta area objects were constructed on the basis of the limits of the hydrography. Due to the complexity of the extents generated during contour creation from the **H11854_50cm_Combined** and **H11854_VBES_Uncertainty_2m_Final** surfaces, the limits of the coverage area were hand digitized.

5. Features

Shoreline features for H11854 were delivered from the field in one S-57 file defining new features and modification to GC or charted features. The features included in the HCell were de-conflicted against the chart and hydrography during office processing.

There were twenty-four DTONs reported from survey H11854 and 23 DTONs have been applied to the charts. The 23 applied DTONs applied to the charts are either included in HCell H11854 as reported or replaced with a shoaler sounding. DTONs are indicated in the HCell by the NINFOM field of the feature or a blue note on the sounding.

There were five AWOIS items in the limits of H11854 and four items were assigned and investigated by the field. Two AWOIS items were disproved by the field and are blue noted in the HCell to be removed. The remaining two items investigated are included in the HCell as recommended by the hydrographer.

Twenty bottom samples were collected during H11854 and all are included in the HCell. No charted bottom samples were retained.

The source of all features included in the H11854 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
UWTROC	Rock features
OBSTRN	Foul areas and obstructions
PILPNT	Piles
MORFAC	Dolphins
SLCONS	Line of post pilings
SBDARE Bottom	samples
M_QUAL	Data quality Meta object
$CSYMB	Blue notes
$LINES	Linear blue note features

The *_SS HCell contains the following Objects:

SOUNDG	Soundings at the survey scale density
DEPCNT	NOAA rounded contours at chart scale intervals

All S-57 Feature Objects in the *_CS HCell have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with current guidance and the PHB HCell Reference Guide.

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as $CSYMB features with the blue note information and charting disposition located in the NINFOM field. In this HCell, linear blue notes were also submitted as $LINES to indicate areas where charted shoreline or linear features require modification based on new survey data. Blue note information and charting disposition for the linear features are also located in the NINFOM field.

8. Spatial Framework

8.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and 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, and therefore have lower precision. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

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

Conversion to charting units and application of NOAA rounding is completed in the same step, at the end of the HCell compilation process.

Conversion to feet charting units with NOAA rounding ensures that:

- All depths display as whole feet.
- All height units (HUNI) which have been converted to charting units, and that are 2.0 feet above MHW and greater, are shown in feet.

9. Data Processing Notes

9.1 Junctions

H11854 junctions with survey H11855. A common junction will be made between the surveys when H11855 is compiled.

9.2 Conflicts between Shoreline and Hydrography

There are instances of charted shoreline in conflict with hydrography. These were examined using the highest resolution Surfaces. Conflicts were given a blue note with a recommendation to adjust the charted shoreline using the new survey data.

10. QA/QC and ENC Validation Checks

H11854 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they have been approved by MCD as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11854 Base Cell File, Chart Units, Soundings compiled to 1:40,000
- H11854 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11854 Base Cell File, Metric Units, Features compiled to 1:10,000
- H11854 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11854 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11854_CS.000
- Chart units base cell file, survey scale soundings H11854_SS.000
- Metric base cell file, survey scale features H11854_Features.000
- Descriptive Report package H11854_DR.pdf
- Survey outline H11854_Outlin e.gml & *xsd

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to

	NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

Katie Reser, Physical Scientist, PHB, Seattle, WA; 206-526-6864;
Katie.Reser@noaa.gov.

APPROVAL SHEET
H11854

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
2010.05.04
09:20:10 -07'00'

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

Digitally signed
by Russ Davies
Date: 2010.05.04
13:39:49 -07'00'

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

Gary C. Nelson
2010.05.04
09:51:23 -07'00'