

H11751

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H11751

LOCALITY

State Washington

General Locality Approaches to Puget Sound

Sublocality Port Angeles to Green Point

2007

CHIEF OF PARTY

..... Commander Donald W. Haines, NOAA

LIBRARY & ARCHIVES

DATE

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;">HYDROGRAPHIC TITLE SHEET</p>	<p>REGISTRY No</p> <p style="text-align: center;">H11751</p>
<p>INSTRUCTIONS – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No: N/A</p>
<p>State <u>Washington</u></p> <p>General Locality <u>Approaches to Puget Sound</u></p> <p>Sub-Locality <u>Port Angeles to Green Point</u></p> <p>Scale <u>1:10,000</u> Date of Survey <u>10/17/2007 - 11/13/2007</u></p> <p>Instructions dated <u>8/24/2007</u> Project No. <u>OPR-N372-RA-07</u></p> <p>Vessel <u>RA6 (1015_Elac1180), RA6 (1015_Klein), RA6 (1015_Reson8101), RA4 (1016_Reson8125),</u> <u>RA5 (1021)_Reson8101), RA1 (1101), RAINIER (S221)</u></p> <p>Chief of party <u>Commander Donald W. Haines, NOAA</u></p> <p>Surveyed by <u>RAINIER Personnel</u></p> <p>Soundings by <u>Seabeam/Elac 1180, Klein 5000, Reson SeaBat 8101, Reson SeaBat 8125, Knudsen 320M,</u></p> <p>SAR by <u>Grant Froelich</u> Compilation by <u>Martha Herzog</u></p> <p>Soundings compiled in <u>Fathoms at MLLW</u></p>	
<p>REMARKS: <u>All times are UTC. UTM Projection Zone 10.</u></p> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.</u></p> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.</u></p>	

Descriptive Report to Accompany Hydrographic Survey H11751

Project OPR-N372-RA-07
Approaches to Puget Sound, Washington
Port Angeles to Green Point
Scale 1:10,000
October – November, 2007
NOAA Ship RAINIER (s221)
Chief of Party: Commander Donald W. Haines, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-N372-RA-07 dated August 24, 2007 and all other applicable direction¹, with the exception of deviations noted in this report. The survey area is on the southern shore of the Strait of Juan de Fuca from Port Angeles to Green Point. This survey corresponds to sheet “L” in the sheet layout provided with the Letter Instructions. OPR-N372-RA-07 has been designated as a resurvey area due to its propensity for shoaling and its relative shoal depth near the traffic lanes. The survey area is depicted in Figure 1.

Complete multibeam echosounder (MBES) coverage, except as noted below, was obtained in the survey area in waters 8 meters and deeper. In depths less than 8 meters additional MBES coverage was obtained to acquire least depths over significant features or shoals, as appropriate for this survey. Vertical beam echo sounder (VBES) data were acquired in depths from approximately 4 to 20 meters to define the navigable area limit, aid in the planning of MBES data acquisition, and provide inshore bathymetry in navigationally significant areas.¹ Total mileage acquired by each vessel and system is referenced in Table 1.

Several areas on H11751 were not completely surveyed (Figure 2). Side Scan Sonar (SSS) was planned in shoal waters North of Ediz Hook, however time constraints, a hydraulic leak on the SSS winch, and seasonal kelp prevented completion of 200% SSS lines. Also, due to log booming within far inner harbor, several areas did not receive full MBES coverage. Two larger areas, one just South of Ediz Hook and the other along the southern shore of Port Angeles, were not covered with full MBES due to time constraints. Several areas, as indicated in accompanying HOB files, were foul with kelp and prevented full bottom coverage. The Hydrographer recommends retaining charted depths and features in areas not surveyed on H11751.²

Limited Shoreline Verification was performed for the survey area.

¹ Standing Instructions for Hydrographic Surveys (January 2006), NOS Hydrographic Surveys Specifications and Deliverables (April 2007), OCS Field Procedures Manual for Hydrographic Surveying (March 2007), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

Data Acquisition Type	Hull Number with Mileage (nm)					Total
	1101	1015	1016	1021	S221	
VBES (mainscheme)	51.57	-	-	-	-	51.57
MBES (mainscheme)	-	55.94	193.47	203.64	36.28	489.33
SSS + MBES (mainscheme)	-	14.88	-	-	-	80.55
SSS + VBES (mainscheme)	13.98	-	-	-	-	13.98
Crosslines	-	36.01	-	10.87	-	46.88
Shoreline	30.84	-	-	-	-	30.84
Bottom Samples	-	-	-	-	4	4
Total Number of Items Investigated	6	-	-	-	-	6
Total Area Surveyed (sq. nm)	-	-	-	-	-	21.81

Table 1: Statistics for survey H11751

Data acquisition was conducted from October 17th to November 13th, 2007 (DN 290 to 317).

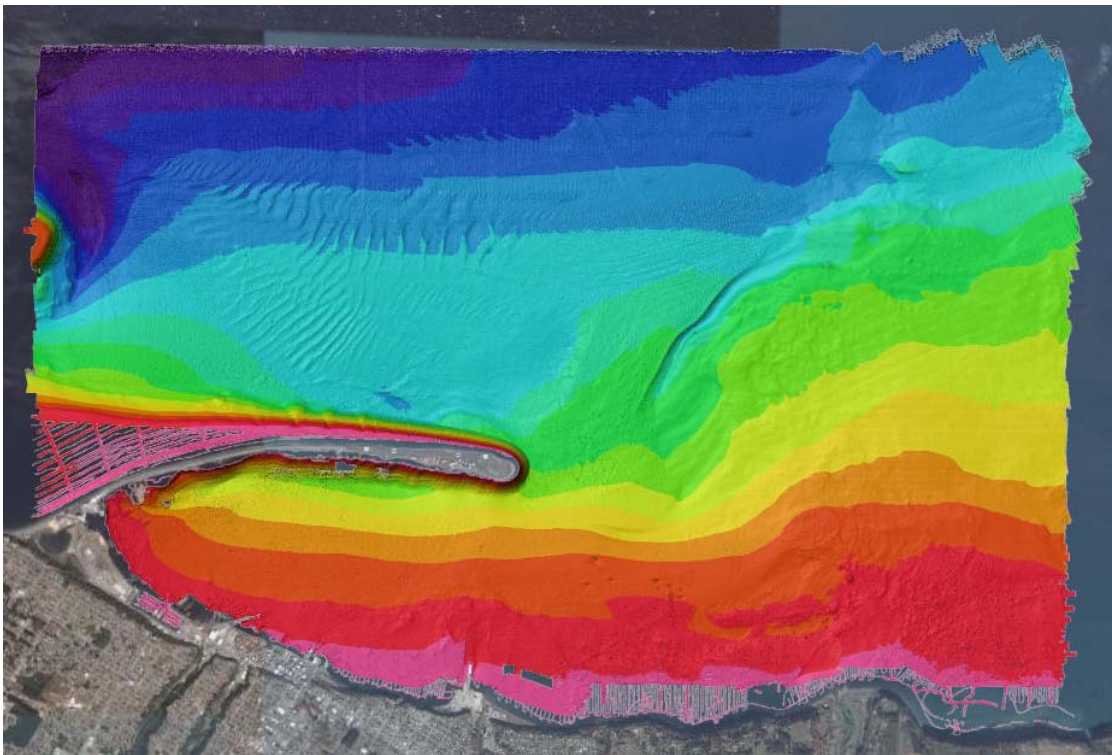


Figure 1: H11751 survey limits overlaid on satellite imagery.

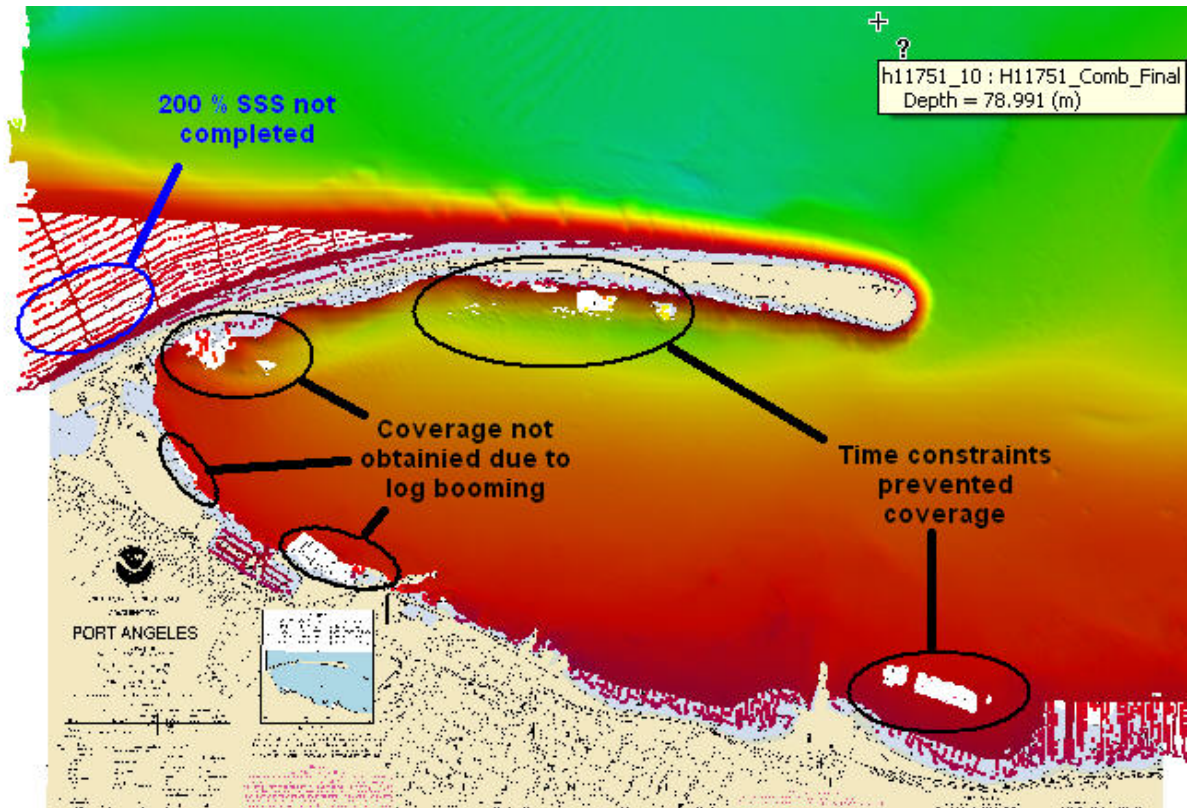


Figure 2: Areas of incomplete data acquisition on survey H11751.

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-N372-RA-07 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

Final Approved Water Levels with TCARI zoning have been applied to this survey.³
See Section C. for additional information.

B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
s221	RAINIER	Multibeam Echosounder Bottom Samples
1101	RA-1	Vertical Beam Echosounder Detached Positions Side Scan Sonar
1021	RA-3	Multibeam Echosounder
1016	RA-4	Multibeam Echosounder
1015	RA-6	Multibeam Echosounder Side Scan Sonar

Table 2: Vessels used for data acquisition on survey H11751.

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

No unusual vessel configurations were used for data acquisition.

B2. Quality Control

Crosslines (XL)

Vertical Beam Echo Sounder (VBES) crosslines were not run on Survey H11751.

Multi-Beam Echo sounder (MBES) crosslines totaled 46.88 nautical miles, comprising 9.58% of main scheme MBES hydrography. The mainscheme BASE surface was statistically compared to the XL BASE surface using the Fledermaus surface differencing tool and agreed well with differences averaging 0.14 meter. Maximum differences occurred on steep slopes along north side of Ediz Hook where maximum difference was 1.86 meters - most likely due to unmatched node positions.

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2007 RAINIER Hydrographic System Readiness Review package submitted with this survey.

Junctions

The following contemporary survey junction with H11751 (Figure3):

Registry #	Scale	Date	Junction side
H11750	1:10,000	2007	East
H11748	1:10,000	2007	West

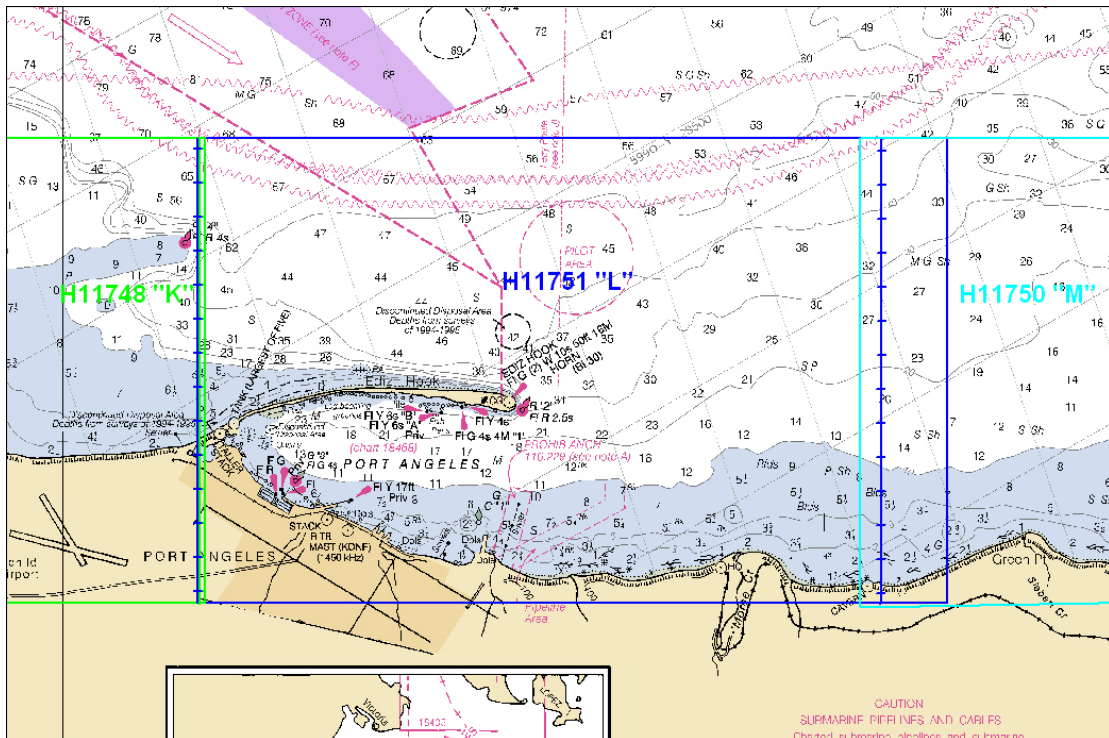


Figure 3: Survey H11751 sheet layout and junction surveys, overlaid on Chart 18468.

Survey junctions were compared using the Fledermaus surface differencing tool. In both cases, the junction BASE surface was subtracted from the H11751 5m Combined Finalized BASE surface to give surface difference statistics.

H11750 junctioned very well, having average differences of 0.07 meter and a maximum of 0.20 meter.⁴

H11748 junctioned well, with average differences of 0.38 meters in depths greater than 50 meters over steep slopes.⁵ Maximum differences of 1.85 meters occurred near the shoal marked by lighted R “4” buoy and are likely due to unmatched node positions combined with sudden dropoffs. Gradual sloping areas, in depths less than 50 meters, showed average differences of 0.15 meter.

Data Quality Factors

SV errors

Sound speed anomalies were observed from Launch 1021 on DN300, DN313 and from Launch 1015 on DN313 and DN 314 (Figure 4). CTD casts were only taken at either end of the survey lines. The affected area has no relevant casts within the extents of the survey lines. Outer beams with sound speed errors were rejected.⁶

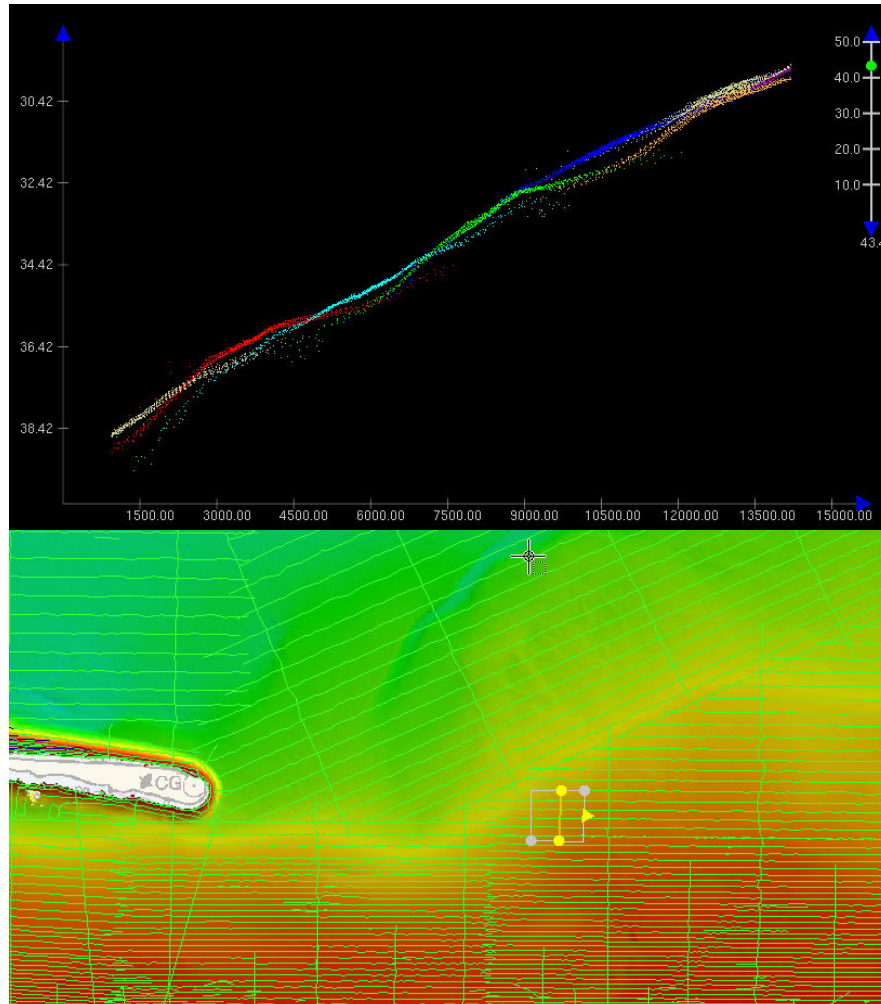


Figure 4: Sound speed errors East of Ediz Hook on survey H11751.

Roll errors

Launch 1015 ELAC crosslines, from DN300, had roll artifacts due to an incorrect ship file loaded into the Hydrostar software. Roll errors were corrected by calculating the average roll offset, for each transducer, using the CARIS calibration tool. The offsets were then applied in post processing greatly reducing, but not eliminating, the roll artifacts (Figure 5).⁷

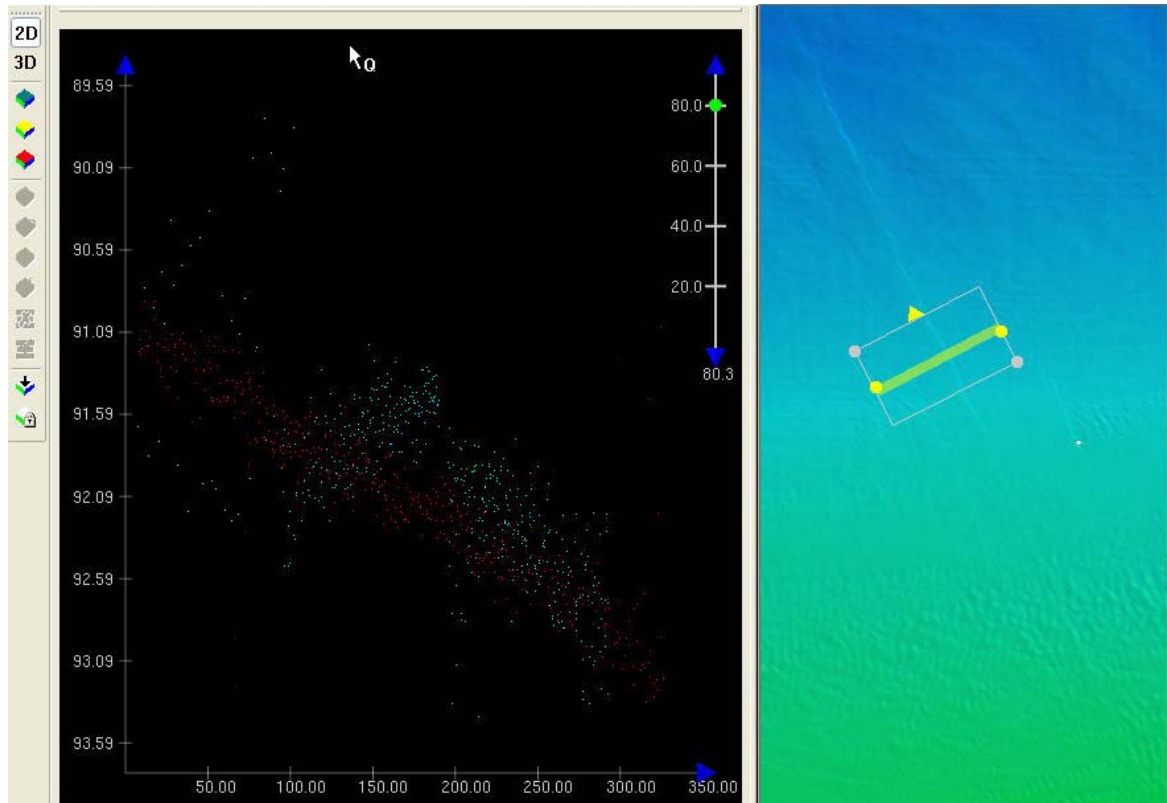


Figure 5: Roll errors caused by no Hydrostar ship file being loaded.

Tide errors

Tide errors were apparent on lines, from DN 317, run along the southern shore of Port Angeles (Figure 6). Tide errors averaged approximately 0.2 meter with the most extreme being 0.35 meter. Errors were less than the allowable tide error budget outline in the 2007 *Specs and Deliverables*.⁸

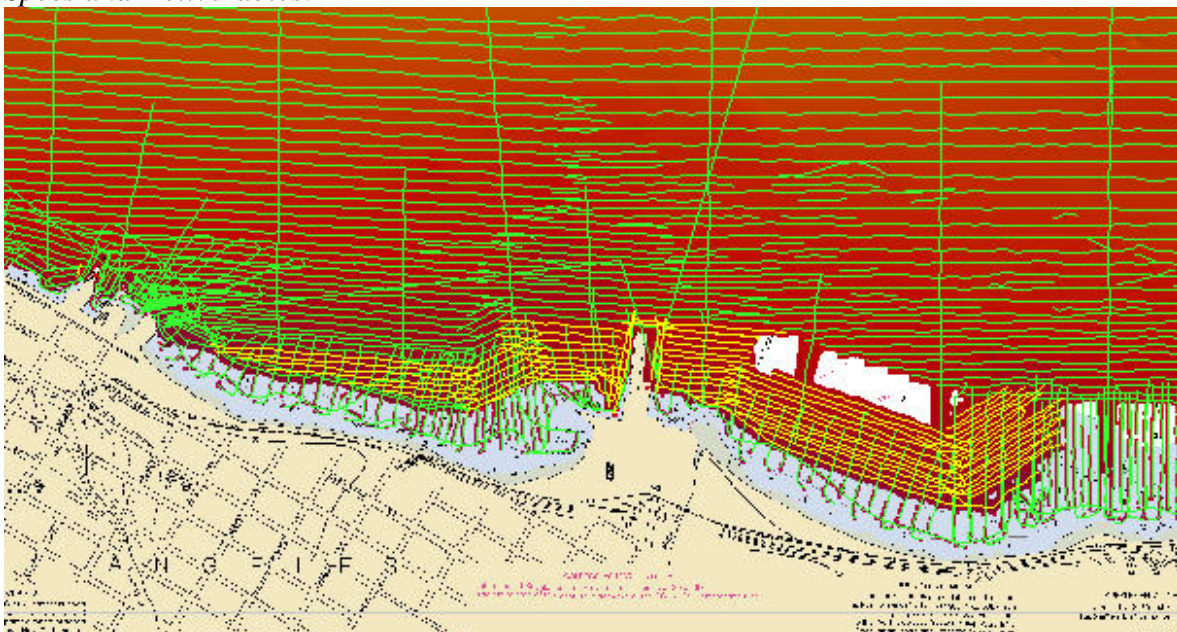


Figure 6: H11751 survey lines showing tidal errors, overlaid on chart 18468.

Holidays

Small holidays exist from lines run on DN317 (Figure 6 above). Holidays are in depths of two to five fathoms and appeared on last day of acquisition thus so no splits were run to fill in gaps.⁹

B3. Data Reduction

Data reduction procedures for survey H11751 conform to those detailed in the *OPR-N372-RA-07 DAPR*.

B4. Data Representation

Many BASE surfaces were used in processing H11751. Final BASE surface resolutions and depth ranges were set in accordance with RAINIER’s standard in the Table 3 below. The submission Field Sheet and BASE Surface structure are shown in Figure 7. The layout of fieldsheets is shown in Figure 8 though 11.

Depth Range (m)	Resolution (m)	CUBE Parameter Disambiguation Method Advanced Option
0-16	0.5	Shallow
14-31.5	1	Shallow
28.5-63	2	Deep
57-158	5	Deep
143 +	10	Deep

Table 3: Resolutions utilized for H11751.

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

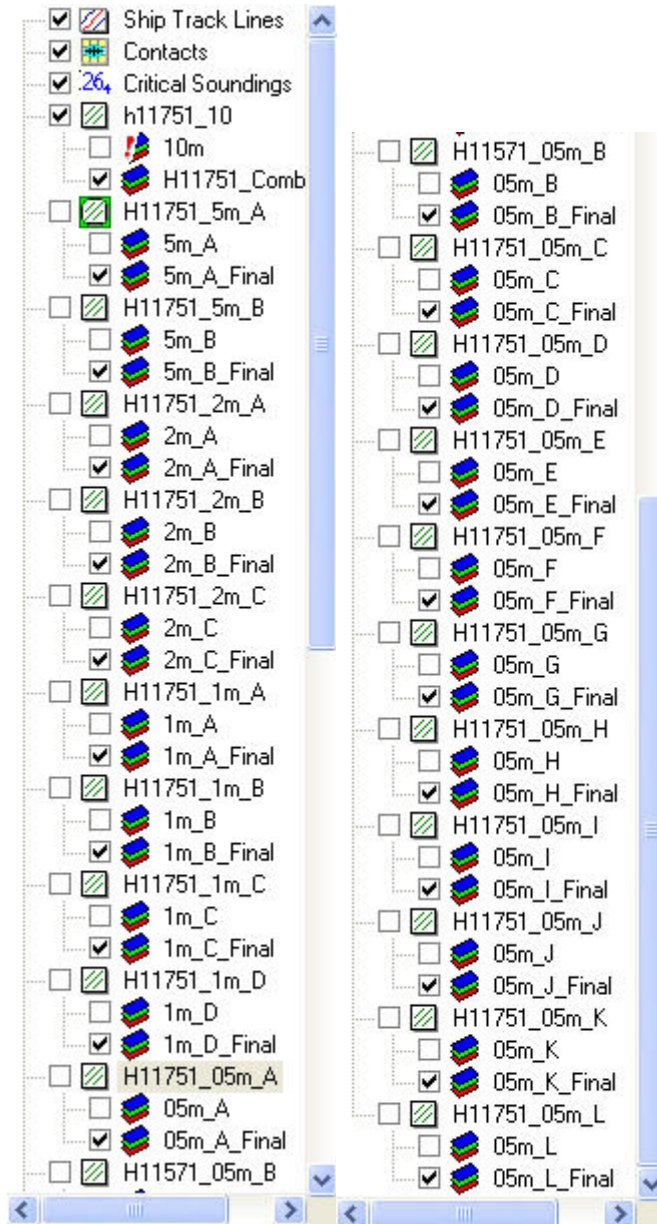


Figure 7: Field sheets and BASE surfaces submitted with H11751.

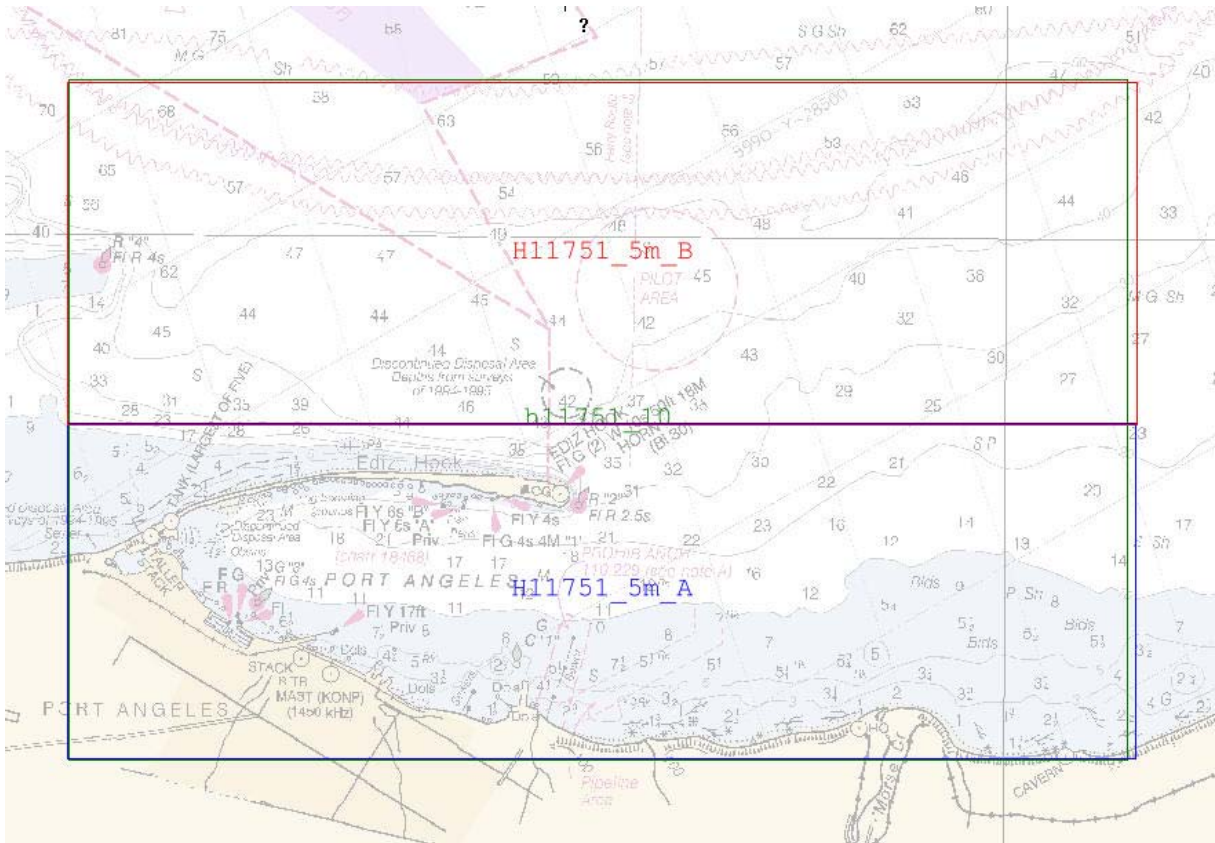


Figure 8: Layout of 10 and 5 meter field sheets, overlaid on Chart 18465.

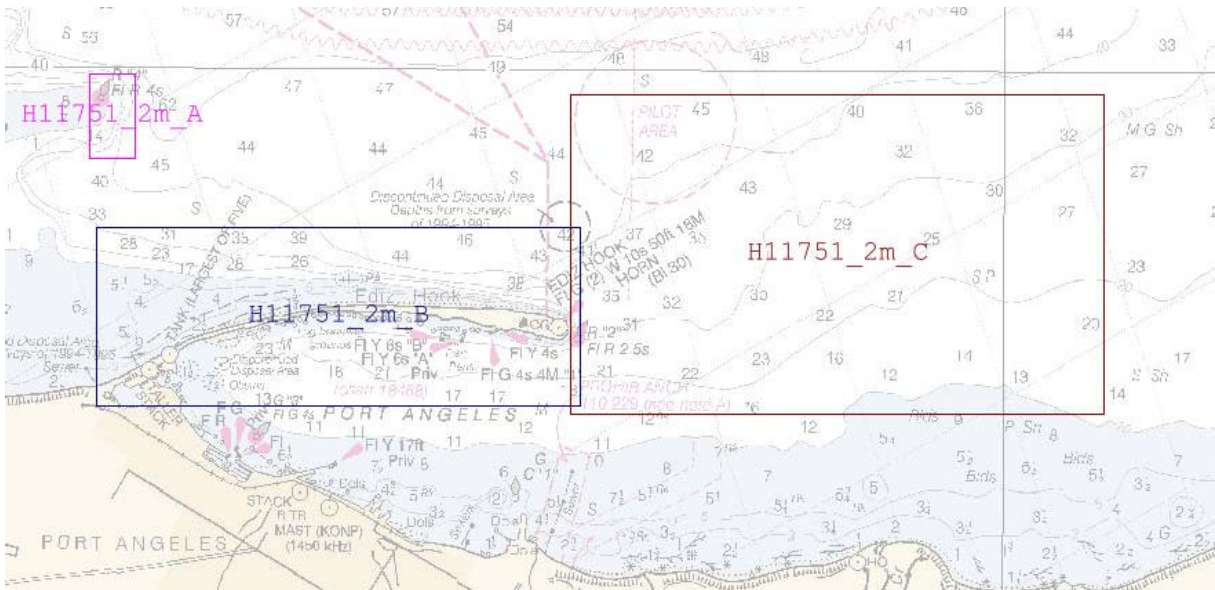


Figure 9: Layout of 2 meter field sheets, overlaid on Chart 18465.

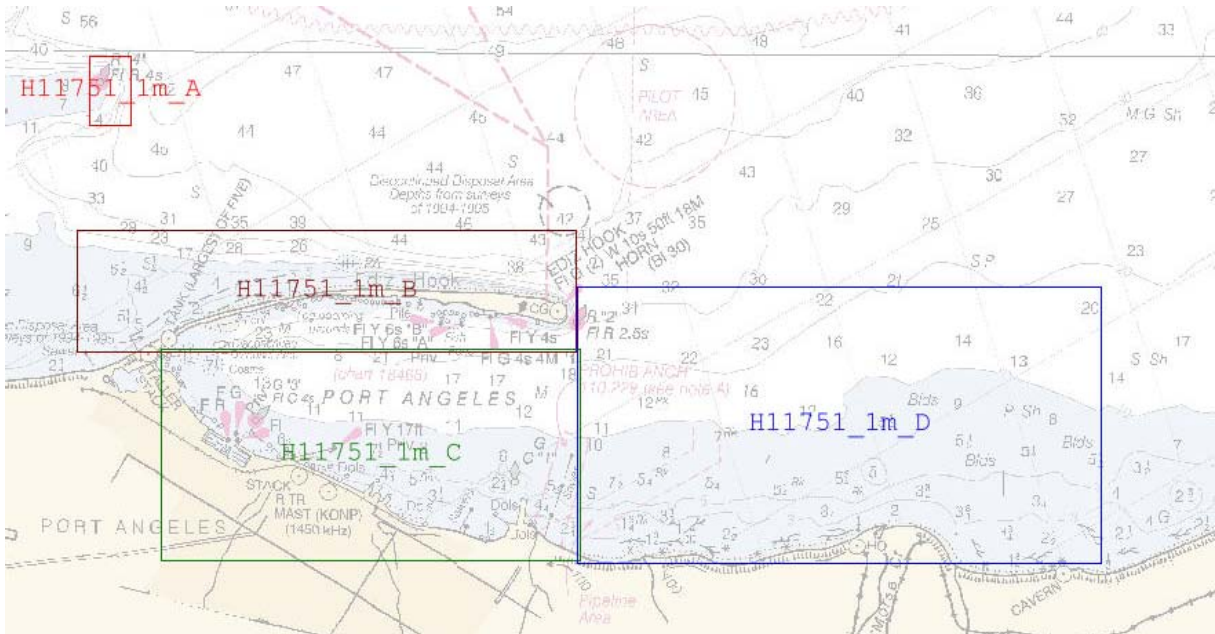


Figure 10: Layout of 1 meter field sheets, overlaid on Chart 18465.

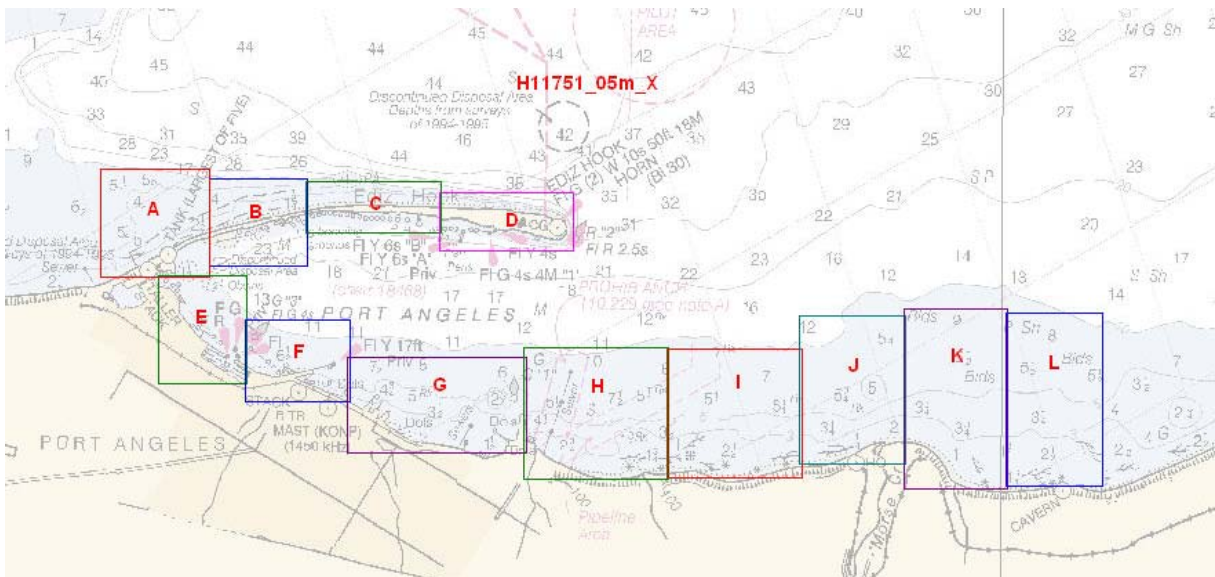


Figure 11: Layout of 0.5 meter field sheets, overlaid on Chart 18465.

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N372-RA-07 did not require static GPS observations or other horizontal control work, and all tide corrections were generated from CO-OPS maintained tide stations. Thus, no Horizontal and Vertical Control Report will be submitted for this project.

Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacons utilized for this survey are given in Table 4.

Location	Frequency	Operator	Distance	Priority
Whidbey Island	302 kHz	USCG	35 nm	Primary
Robinson Point	323 kHz	USCG	65 nm	Secondary

Table 4: Differential Corrector Sources for H11751.

Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide stations at Port Angeles, WA (944-4090), Port Townsend, WA (944-4900) and Friday Harbor, WA (944-9880) served as control for datum determination and as the primary source for water level reducers for survey H11751.

No tertiary gauges were required.

All data were reduced to MLLW using **final approved water levels** from station Port Angeles, WA (944-4090), Port Townsend, WA (944-4900) and Friday Harbor, WA (944-9880) using the tide files 9444090_verified_MSL_thru_20071113.txt, 9444900_verified_MSL_thru_20071113.txt, and 9449880_verified_MSL_thru_20071114.txt and **final** time and height correctors using the Tidal Constituent And Residual Interpolator (TCARI) corrector file N372RA2007-TCARI.tc.¹⁰

The request for Final Approved Water Levels for H11751 was submitted to CO-OPS on November 14, 2007 and the Final Tide Note was received on December 06, 2007.¹¹ This documentation is included in Appendix IV.

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11751 was compared with the following charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
18465	1:80,000	37 th Ed. May 2005	September 15 th , 2007
18468	1:10,000	18 th Ed. Apr 2006	September 15 th , 2007
18440	1:150,000	12 th Ed. Dec. 2005	July 27 th , 2007

Table 5: Charts compared with H1175

General comments applicable to all charts: ¹²

1. All charts listed above show a PA wreck just north of the Ediz Hook. The wreck, assigned for AWOIS investigation, (see section D.1.c) was not seen in the bathymetry and should be removed from the charts.
2. Heavy kelp on southern shore, east of the prohibited anchorage area, was observed and found to be slightly more extensive than charted. Kelp was also noted, and prevented complete SSS operations, NW of Ediz Hook. The Hydrographer recommends charting kelp based on appropriate Field Verified HOB file extents.
3. Bathymetry data shows all disposal areas are clear of dangerous obstructions within their limits and charted depths are within half a fathom of H11751 soundings.
4. Charted pipelines and sewers were noted in bathymetry and charted properly.
5. Charted piles, for the most part, are accurate or could not be fully disproved. Hydrographer recommends retaining as charted unless disproved as indicated Field Verified HOB.

Chart 18440

Overall, charted depths compare well with the soundings from H11751 with differences less than 1 fm, most notably in deeper waters. Just west of the disproved PA wreck, a submerged dolphin is charted (Figure 12). The dolphin was not seen in SSS data or in any bathymetry of the area. The Hydrographer recommends removing dolphin from the chart. ¹³

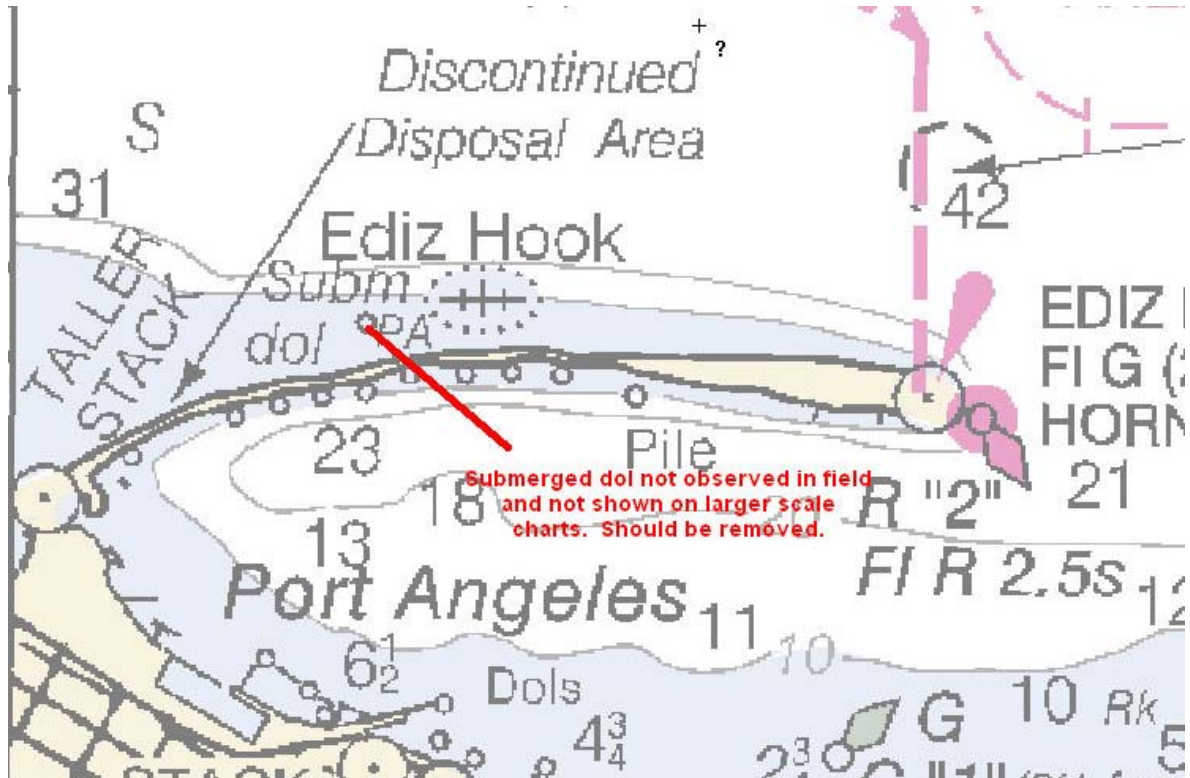


Figure 12: Charted dolphin and wreck to be removed from Chart 18440.

Chart 18465

Charted depths represent H11751 survey data within 1 fm. As discussed below in more detail, a 1 ½ fm shoal at far west end of Port Angeles that was not seen in survey data and should be removed from the chart. The City Pier extents and tower, located 1,500 meters west of eastern most pier, are not properly portrayed and should be modified to match those on Chart 18468. Also discussed below are similar mischartings of the fish pen area and the private lights marking the limits of the fish pens. Some soundings close to south eastern shore were deeper than charted depths, but this only occurred in areas where there were holidays and sparse VBES data. The Hydrographer recommends retaining shoaler charted soundings where data gaps exist.¹⁴

Chart 18468

Charted depths matched up well with differences less than 1 fm, and less in shallow waters.¹⁵

The following are additional discrepancies on Chart 18468:¹⁶

1. The 1 ½ fm obstruction at the far west of Port Angeles harbor should be removed. The 4 ½ fm shoal just to the north of the obstruction should be removed as well and superseded with depths from H11751 (Figure 13).
2. The 1 ¾ charted rock approximately 1,250 meters East of southeastern most pier in Port Angeles is mischarted. The actual location of the rock is approximately 75 meters north of charted position (Figure 14).

3. South of Ediz Hook near the USCG station is a fish pen area and several lights that appear to be mischarted (Figure 15). Correct positions of pen extents and lights are illustrated in Figure 16 and documented in supporting PSS and HOB files.
4. The charted "Obstn" near the eastern booming grounds was not observed. The Hydrographer recommends removing this obstruction from chart and charting a submerged 2.2 fm rock located at end of sewer line, approximately 75 meters to the East (Figure 17).
5. Some soundings close to south eastern shore were deeper than charted depths, but this only occurred in areas where there were holidays and sparse VBES data. The Hydrographer recommends retaining shoaler charted soundings where data gaps exist.

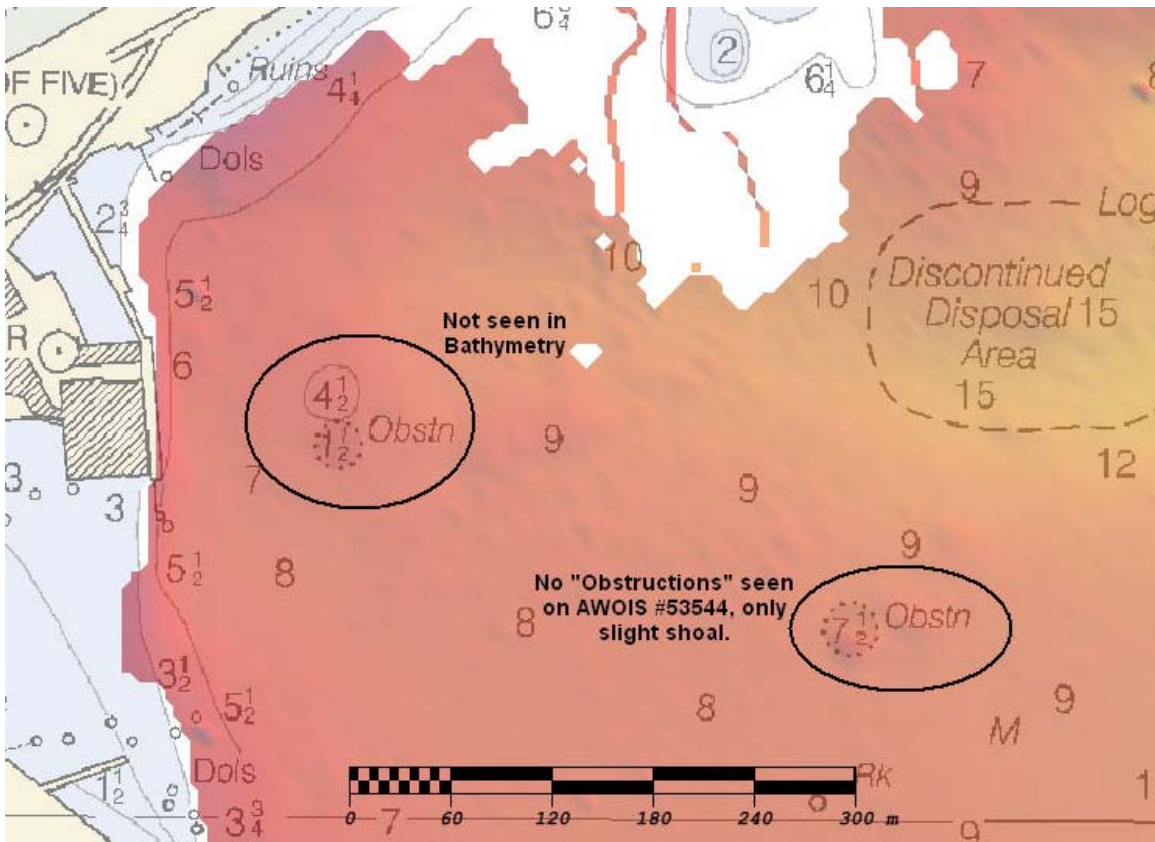


Figure 13: Disproved charted shoals at West end of Port Angeles.

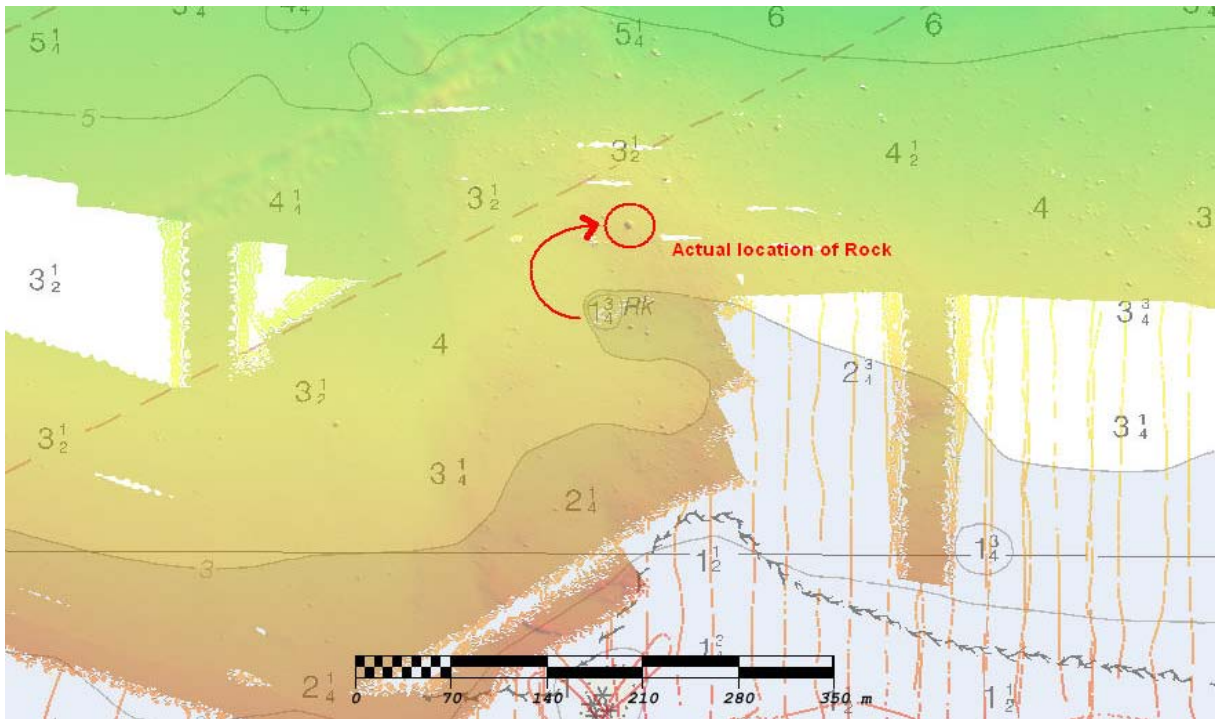


Figure 14: Mischarted rock along southern shore Port Angeles shown on Chart 18468.

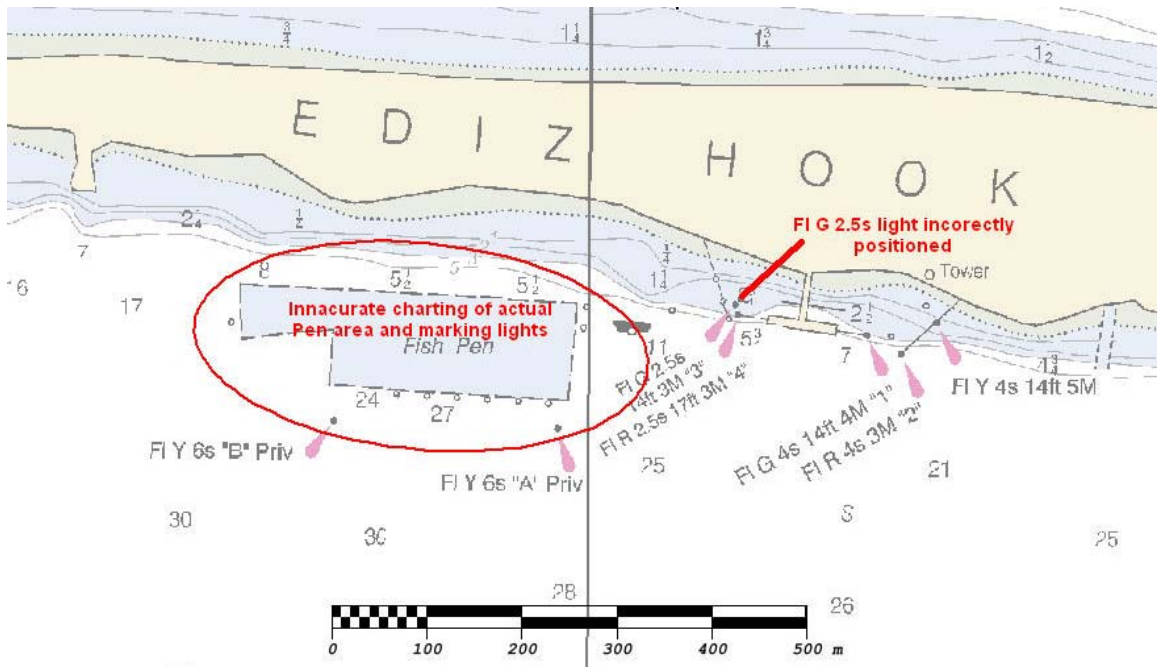


Figure 15: Mischarted fish pen and marking lights on Chart 18468.

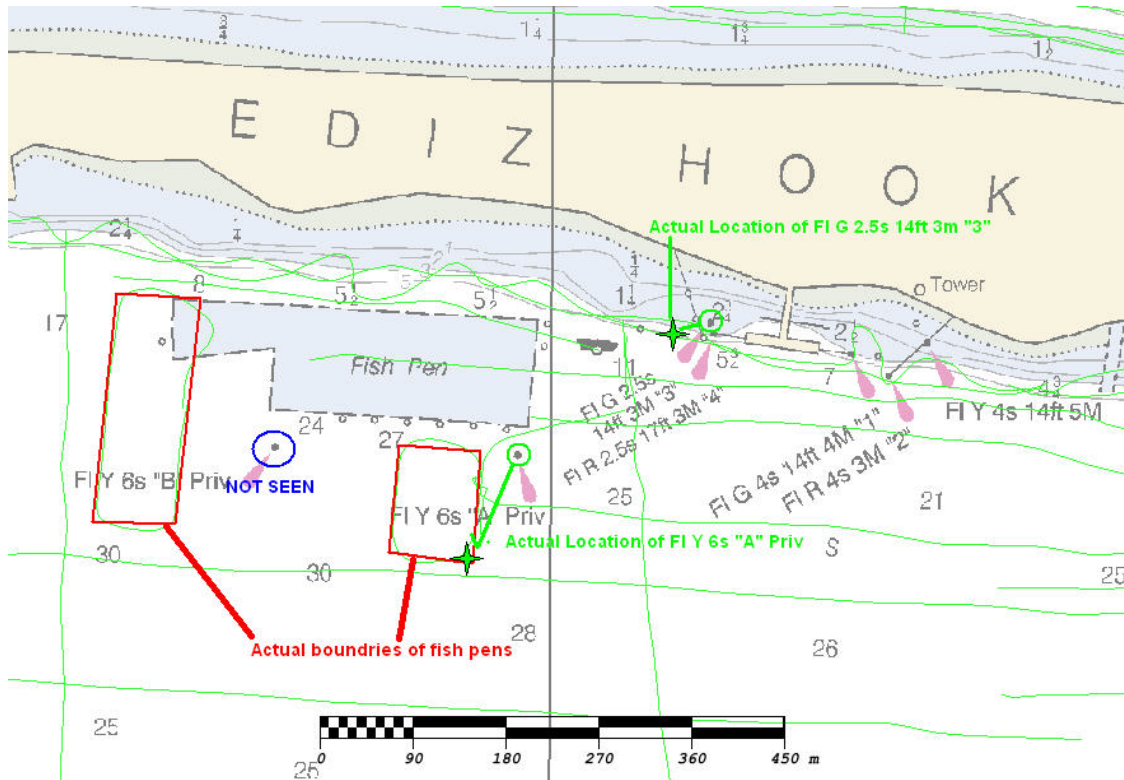


Figure 16: Correct positions of fish pen extents and lights on Chart 18468.

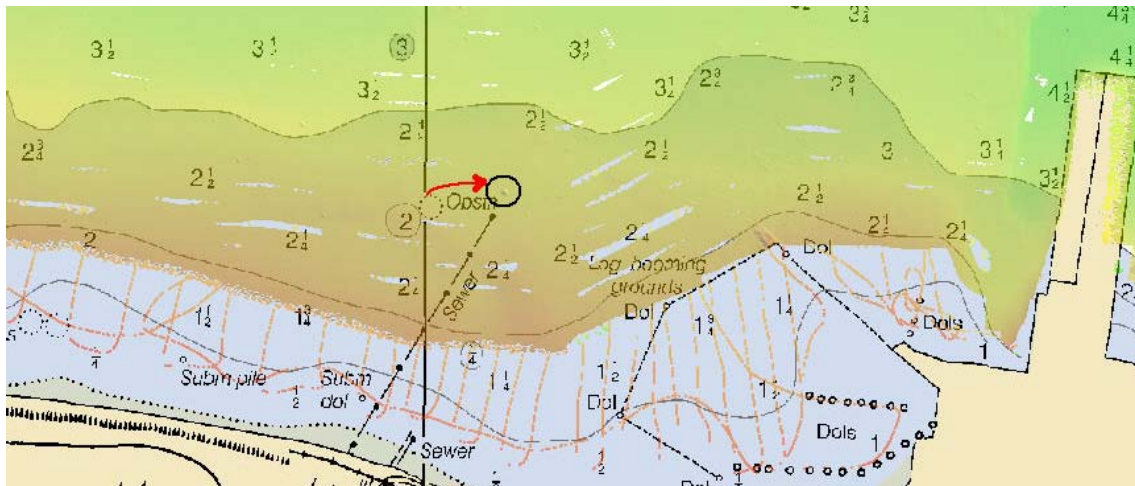


Figure 17: Mischarted obstruction on Chart 18468.

The Ediz Hook land mass is accurately charted and does not appear to be migrating towards the traffic lanes.¹⁷

The Hydrographer recommends using the H11751 digital hob files to update charted features as indicated therein.¹⁸

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths with the exception of areas containing holiday and sparse VBES data. In these areas the Hydrographer recommends retaining the shoaler depths from chart.¹⁹

D.1.b. Dangers to Navigation

There were no Dangers To Navigation (DTOns) found on Survey H11751.²⁰

D.1.c. Other Features

Automated Wreck and Obstruction Information System (AWOIS) Investigations

Nine (9) AWOIS items fell within the survey limits of H11751. AWOIS items 52057, 52059, 52072, 52302, and 52304 were all disproved with multibeam and are recommended for removal from the chart.²¹ The other items are discussed below. More information for all AWOIS items can be found in the survey features report.²²

1. AWOIS #52084 was not investigated due to position within logging boom (Figure 18).²³
2. AWOIS #52101 was partially investigated visually and with VBES. Some piles were noted in area but a full investigation could not be conducted due to the shallow depths. The Hydrographer recommends retaining charted features for further investigation (Figure 19).²⁴
3. AWOIS #53544 was investigated with VBES and complete MBES. Some shoaling due to debris was noted however no dangerous features or obstructions were found (Figure 13 above). The Hydrographer recommends retaining “Obstn” designation from Chart 18468 and updating with least depth from survey H11751.²⁵
4. AWOIS #52303 was investigated with VBES and MBES (Figure 20). The wreck is accurately charted and is included in supporting PSS files. Update with least depth from H11751 data.²⁶

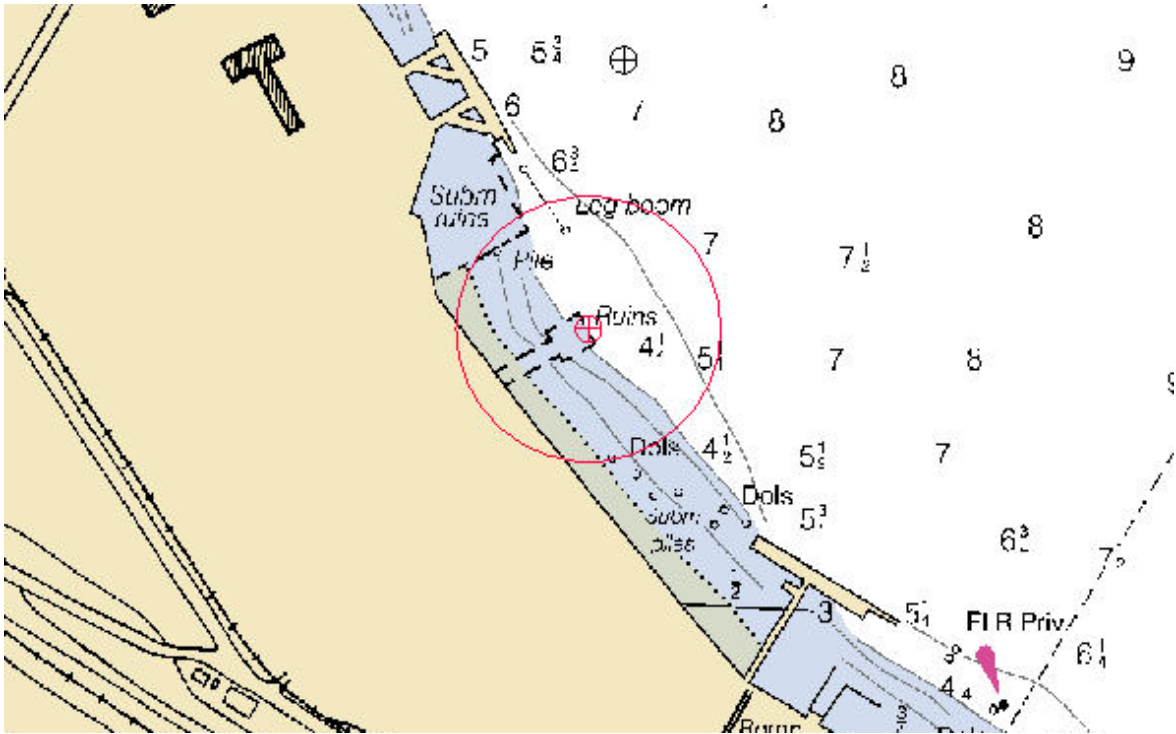


Figure 18: AWOIS #52084, not investigated due to logging booms.

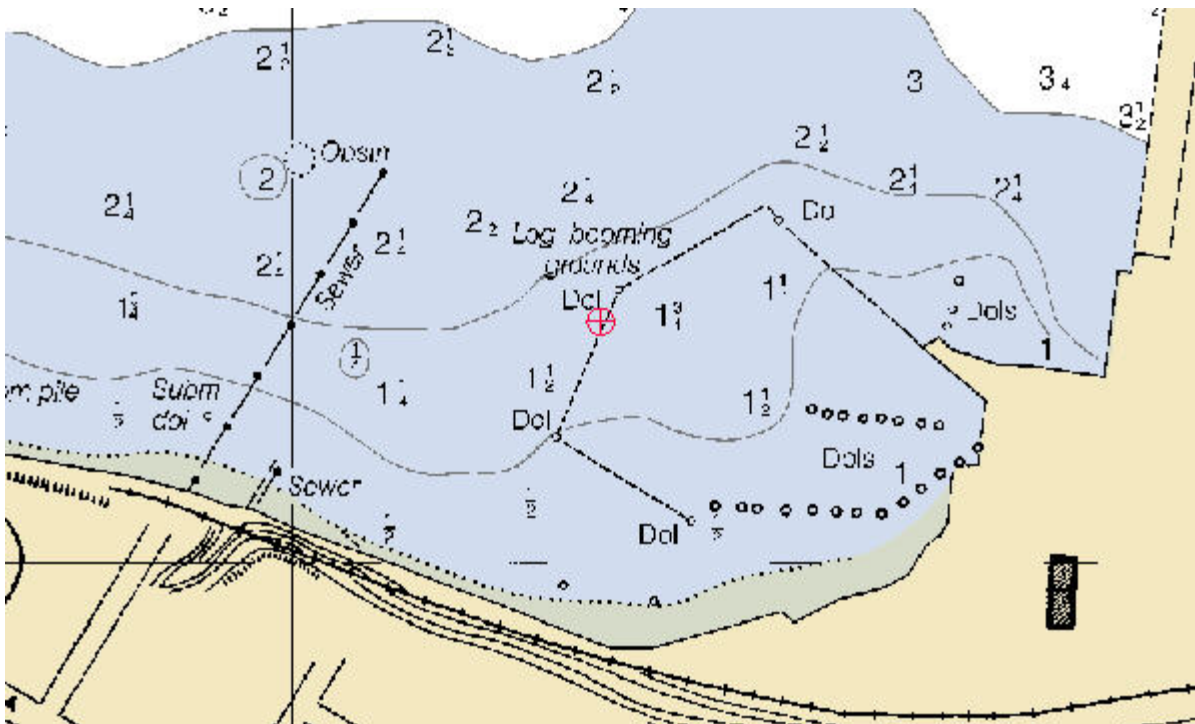


Figure 19: AWOIS #52101, to be retained as charted.

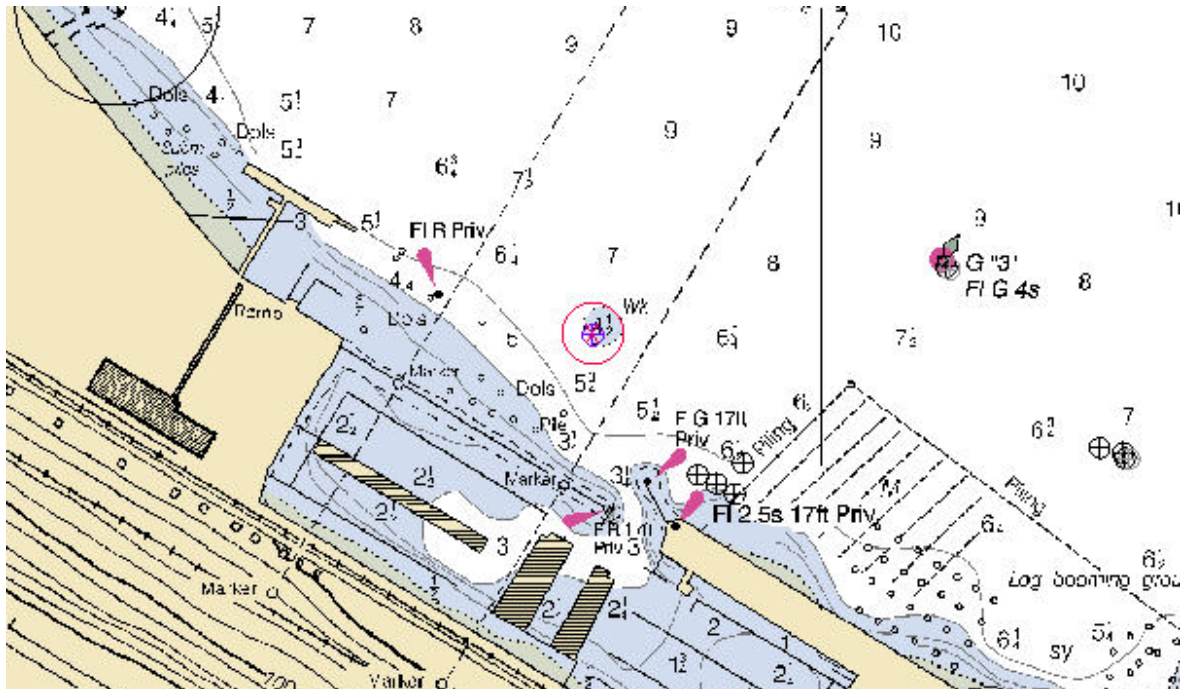


Figure 20: AWOIS #53544, charted wreck verified.

Additional Items

Additional features investigated within the limits of H11751 are described in the Survey Feature Report in Appendix II.

D.2. Additional Results

D.2.a. Prior Survey Comparison

Prior survey comparison was not performed.

D.2.b. Shoreline Verification

Shoreline Source

A composite source file 0-1N_372.000 was provided with the project instructions. This composite source was trimmed to the sheet boundaries and printed on paper “boat sheets” and displayed in Hypack for field verification.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water on DN302 and DN305 in accordance with the Specifications and Deliverables and FPM sections 6.1 and 6.2.

Detached positions (DPs) acquired during shoreline verification were recorded in HYPACK and on DP forms, and processed in Pydro. These indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were

recorded on hard copy plots of digital shoreline. DP forms are included in the *Separates to be Included with Survey Data*.

All shoreline data are submitted in Caris Notebook .hob files. The session H11751_Notebook.wrk contains the following:

HOB File	Purpose and Contents
H11751_original_comp_source.hob	Original Source Data as filtered from ENC cell US4WA34M
H11751_reference.hob	Survey outline and limit lines
H11751_Delete.hob	Features to be removed.
H11751_Field_Verified_Comp_Source.hob	Field verified source features and shoreline, including edits and updates not requiring DPs.
H11751_Pydro_Updates.hob	New, modified, and no action items processed through Pydro.

Table 6. List and Description of Notebook HOB files.

The combination of H11751_Field_Verified_Comp_Source.hob and H11751_Pydro_Updates.hob files depict the shoreline as surveyed.

Source Shoreline Changes and New Features

Items for survey H11751 that require further discussion and are associated with a detached position, have been flagged “Report” in Pydro in H11751_PSS.pss. Investigation methods and recommendations are listed in the Remarks and Recommendation tabs. These features are included in the Survey Feature Report in Appendix II.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above.²⁷

D.2.c. Aids to Navigation

Survey H11751 included nineteen (19) Aids To Navigation (ATONs) (Figures 21). All buoys were verified with DP’s and lights on land or dolphins were verified visually with the following exceptions:

1. The Fl G 2.5s 14ft 3M “3” entrance light at the USCG is mischarted. Correct position is shown in Figure 16 above and is depicted in the field verified hob file.²⁸
2. The Fl Y 17ft Priv light off large pier 1000 meters East of the small boat harbor is charted on the wrong dolphin. Correct location is depicted in the field verified hob file.²⁹

The ATONs were found to serve their intended purpose. No GPS static surveys were conducted for Survey H11751.

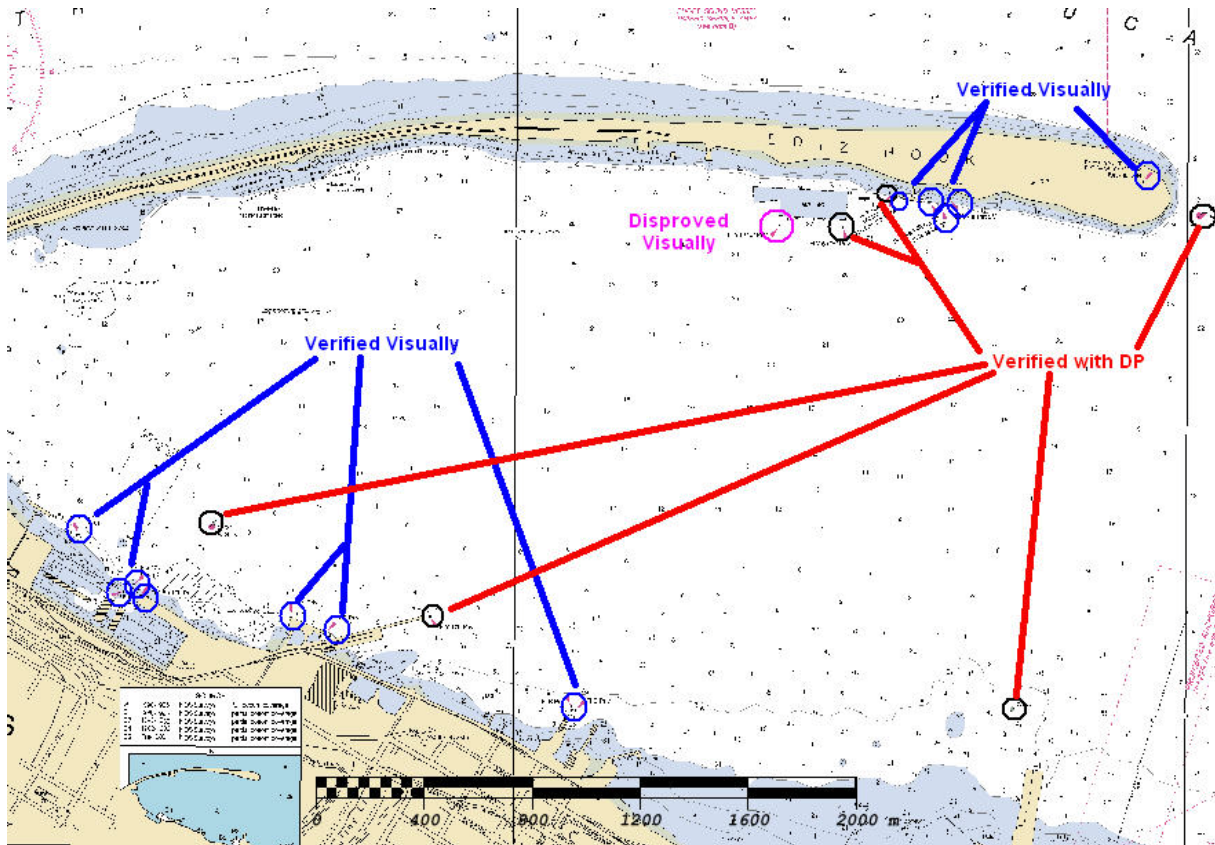


Figure 21: H11751 ATONS, showing verification method and locations as Charted on 18468.

D.2.d. Overhead Features

There are no overhead features within the limits of survey H11751.³⁰

D.2.e. Submarine Cables and Pipelines

Survey H11751 includes three (3) charted sewer areas on both Charts 18465 and 18468. Trench disturbances were visible in bathymetric data corresponding to the charted locations. Hydrographer recommends retaining the charted sewer areas as charted. Four (4) cable areas are charted approximately 5,000 meters north of Ediz Hook. Due to the depth of water, bathymetry data did not show any signs of cable network. The Hydrographer recommends retaining cable areas as charted.³¹

D.2.f. Ferry Routes

One ferry route lies within the limits of survey H11751. The ferry COHO operates daily to and from Victoria, BC. No route is charted within inner harbor and, however there is notation on the small scale chart 18465. The Hydrographer corresponded with NW Navigation Manager regarding proper notation. Refer to supplemental correspondence in Appendix V.

D.2.g. Bottom Samples

Within the area of Survey H11751 four (4) bottom samples were obtained. Priority was placed on charted bottom characteristics on Chart 18465, and the potential anchorage areas for large cargo ships. Within these locations bottom samples were spaced no more than 2000 meters apart in accordance with the NOS Hydrographic Surveys Specifications and Deliverables (April 2007) and OCS Field Procedures Manual for Hydrographic Surveying (March 2007). All bottom samples are included in H11751.PSS file and in the H11751_Pydro_Updates.hob file.³²

D.2.h. Other Findings

There are no other findings on survey H11751.

E. APPROVAL

As Chief of Party, Field operations for hydrographic survey H11751 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2007 edition), Field Procedures Manual (March 2007 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through November 2007. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-N372-RA-07	2/29/2008	N/CS34
Coast Pilot submission for OPR-N372-RA-07	TBD	N/CS34

Approved and Forwarded:

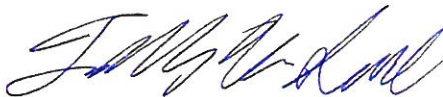


Digitally signed by Donald W. Haines, CDR/NOAA
 DN: cn=Donald W. Haines, CDR/NOAA, c=US, o=NOAA/NMAO/
 MOC-P, ou=NOAA Ship RAINIER, email=co.rainier@noaa.gov
 Reason: I am approving this document
 Date: 2008.05.23 14:56:58 -08'00'

Commander Donald W. Haines, NOAA
 Commanding Officer, NOAA Ship RAINIER

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

Survey Sheet Manager:



Digitally signed by Timothy M Smith
 DN: cn=Timothy M Smith, c=US, o=NOAA, ou=NOAA Ship
 RAINIER, email=timothy.m.smith@noaa.gov
 Reason: I am the author of this document
 Date: 2008.05.23 22:04:05 Z

Ensign Timothy M. Smith, NOAA
 Junior Officer, NOAA Ship RAINIER

Chief Survey Technician:



I have reviewed this document
 2008.05.23 22:00:22 Z

James B. Jacobson
 Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:



I have reviewed this document
 2008.05.23 14:55:15 -08'00'

Lieutenant Charles J. Yoos, NOAA
 Field Operations Officer, NOAA Ship RAINIER

Revisions Compiled During Office processing and Certification

- ¹ Concur.
- ² Concur. Chart as depicted in H11751_CS.000
- ³ Concur.
- ⁴ Concur. A common junction has been made with H11750.
- ⁵ Concur. H11748 has not been compiled.
- ⁶ Concur.
- ⁷ Concur.
- ⁸ Concur.
- ⁹ Concur. In areas of holidays, soundings were blue noted to be either retained or removed.
- ¹⁰ Concur.
- ¹¹ The Final Tide Note is appended to this report
- ¹² Concur with observations of discrepancies for all charts, chart per H11751_CS.000.
- ¹³ Concur.
- ¹⁴ Concur with observations of discrepancies for chart 18465, chart per H11751_CS.000.
- ¹⁵ Concur.
- ¹⁶ Concur with observations of discrepancies for chart 18468, chart per H11751_CS.000.
- ¹⁷ Concur. ENC US5WA29M displays the updated shoreline position from GC10642, whereas chart 18469 shoreline does not appear to have been updated.
- ¹⁸ Concur. H11751 digital .hob files were used in the compilation of the HCell. Chart as depicted in H11751_CS.000
- ¹⁹ Concur.
- ²⁰ Concur.
- ²¹ Concur.
- ²² Survey Features Report is appended to report.
- ²³ Concur.
- ²⁴ Concur.
- ²⁵ Concur.
- ²⁶ Concur.
- ²⁷ Concur. H11751 digital .hob files were used in the compilation of the HCell. Chart as depicted in H11751_CS.000
- ²⁸ Chart aid according to latest ATONIS information.
- ²⁹ Concur. Updated light position is in the HCell.
- ³⁰ Concur.
- ³¹ Concur. Retain all charted pipelines and cables.
- ³² Concur. In addition to the 4 surveyed bottom samples, 31 bottom samples were imported into the HCell from the ENC to be retained. Retain all bottom samples in the common area.

H11751 Feature Report

Registry Number: H11751
State: Washington
Locality: Approaches to Puget Sound, WA
Sub-locality: Port Angeles to Green Point
Project Number: OPR-N372-RA-07
Survey Dates: 10/29/2007 - 04/28/2008

Charts Affected

Number	Version	Date	Scale
18468	18th Ed.	04/01/2006	1:10000
18465	37th Ed.	05/01/2005	1:80000
18440	28th Ed.	12/01/2005	1:150000
18400	47th Ed.	10/01/2006	1:200000
18003	20th Ed.	11/01/2006	1:736560
18007	32nd Ed.	07/01/2005	1:1200000
501	12th Ed.	11/01/2002	1:3500000
530	31st Ed.	06/01/2005	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	9997.80 m	48° 07' 32.572" N	123° 26' 12.650" W	---
1.2	Lighted structure	[None]	48° 08' 22.774" N	123° 24' 54.466" W	---
1.3	Sounding	[None]	48° 08' 16.028" N	123° 25' 04.209" W	---
2.1	Sounding	-1.97 m	48° 07' 09.826" N	123° 24' 25.604" W	---
2.2	Sounding	-2.33 m	48° 07' 15.000" N	123° 25' 39.584" W	---
2.3	Pile	9997.68 m	48° 07' 34.681" N	123° 27' 09.955" W	---
2.4	Mooring buoy	9997.66 m	48° 07' 36.486" N	123° 26' 45.636" W	---
2.5	Pile	-2.45 m	48° 07' 26.280" N	123° 26' 24.715" W	---
2.6	Sounding	[None]	48° 08' 21.700" N	123° 25' 12.556" W	---
2.7	Sounding	[None]	48° 08' 14.056" N	123° 27' 12.929" W	---

2.8	Sounding	[None]	48° 08' 08.490" N	123° 26' 59.793" W	---
2.9	Sounding	[None]	48° 08' 18.364" N	123° 27' 15.806" W	---
2.10	SSS	[None]	48° 08' 30.385" N	123° 27' 09.144" W	---
2.11	SSS	[None]	48° 08' 36.838" N	123° 25' 13.532" W	---
3.1	AWOIS	[no data]	[no data]	[no data]	---
3.2	AWOIS	[no data]	[no data]	[no data]	---
3.3	AWOIS	[no data]	[no data]	[no data]	---
3.4	AWOIS	[no data]	[no data]	[no data]	---
3.5	AWOIS	[no data]	[no data]	[no data]	---
3.6	AWOIS	[no data]	[no data]	[no data]	---
3.7	AWOIS	[no data]	[no data]	[no data]	---
3.8	AWOIS	[no data]	[no data]	[no data]	---
3.9	AWOIS	[no data]	[no data]	[no data]	---

1 - Charted Features

1.1) Profile/Beam - 5/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 32.572" N, 123° 26' 12.650" W
Least Depth: 9997.80 m
Timestamp: 2007-302.20:48:41.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 5/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

lighted dolphin

The private yellow light charted on the dolphin ~45 meters to the west is actually on this dolphin

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	5/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart the private yellow light on this dolphin on all charts Remove the charted yellow light on the dolphin ~45 meters too the west.

Cartographically-Rounded Depth (Affected Charts):

5467fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)

9998m (501_1, 50_1)

S-57 Data

Geo object 1: Light (LIGHTS)
Attributes: COLOUR - 6:yellow
 SORDAT - 20071113
 SORIND - US,US,survey,H11751

Feature Images



Figure 1.1.1

1.2) Profile/Beam - 1/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 22.774" N, 123° 24' 54.466" W
Least Depth: [None]
Timestamp: 2007-305.17:42:09.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 1/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Coast Gaurd western entrance light. Green Light is actually located on this Dolphin.

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	1/1	0.00	000.0	Primary

Hydrographer Recommendations

Delete charted (18468) green light and chart as new green ligh at this DP'd location

S-57 Data

Geo object 1: Light (LIGHTS)
Attributes: COLOUR - 4:green
 SORDAT - 20071113
 SORIND - us,us,survy,H11751

Feature Images



Figure 1.2.1

1.3) Profile/Beam - 2/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 16.028" N, 123° 25' 04.209" W
Least Depth: [None]
Timestamp: 2007-305.17:50:45.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 2/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

yellow Light on SE corner of fish pen

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	2/1	0.00	000.0	Primary

Hydrographer Recommendations

Remove charted (18468) 'Fl Y 6s "A" Priv' light from charted position and rechart in this new DP position as private yellow light

S-57 Data

Geo object 1: Light (LIGHTS)
Attributes: SORIND - us,us,graph,H11751

Feature Images



Figure 1.3.1

2 - New Features

2.1) Profile/Beam - 2/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 09.826" N, 123° 24' 25.604" W
Least Depth: -1.97 m
Timestamp: 2007-302.18:56:26.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 2/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

broken pile

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	2/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as obstruction on 18468

Cartographically-Rounded Depth (Affected Charts):

-1fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)
 -2.0m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: NATCON - 6:wooden
 SORDAT - 20071113
 SORIND - us,us,survy,H11751
 VALSOU - -1.965 m
 WATLEV - 4:covers and uncovers

Feature Images



Figure 2.1.1

2.2) Profile/Beam - 4/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 15.000" N, 123° 25' 39.584" W
Least Depth: -2.33 m
Timestamp: 2007-302.20:26:00.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 4/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

deadhead in moorage area

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	4/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as obstruction

Cartographically-Rounded Depth (Affected Charts):

-1 ¼fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)

-2.4m (501_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: SORDAT - 20071113
 SORIND - US,US,survy,H11751
 VALSOU - -2.326 m
 WATLEV - 4:covers and uncovers

Feature Images



Figure 2.2.1

2.3) Profile/Beam - 6/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 34.681" N, 123° 27' 09.955" W
Least Depth: 9997.68 m
Timestamp: 2007-302.21:43:44.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 6/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Yellow metal Pile with reflectors west end of of small boat hbr curtain wall.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	6/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart yellow marker as pile on 18468

Cartographically-Rounded Depth (Affected Charts):

5467fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)

9997m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: CATPLE - 3:post
 SORDAT - 20071113
 SORIND - US,US,survey,H11751

Feature Images



Figure 2.3.1



Figure 2.3.2

2.4) Profile/Beam - 8/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 36.486" N, 123° 26' 45.636" W
Least Depth: 9997.66 m
Timestamp: 2007-302.22:01:47.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 8/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

white mooring buoy

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	8/1	0.00	000.0	Primary
h11751/1016_reson8125_hvf/2007-314/702_2351	257/240	5.94	160.5	Secondary
h11751/1016_reson8125_hvf/2007-314/702_2351	189/196	26.63	112.1	Secondary

Hydrographer Recommendations

Add mooring buoy to chart (18468)

Cartographically-Rounded Depth (Affected Charts):

5467fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)

9997m (501_1, 50_1)

S-57 Data

Geo object 1: Mooring/warping facility (MORFAC)

Attributes: BOYSHP - 3:spherical

CATMOR - 7:mooring buoy

COLOUR - 1:white

SORDAT - 20071113

SORIND - US,US,survey,H11751

Feature Images



Figure 2.4.1

2.5) Profile/Beam - 9/1 from h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp

Survey Summary

Survey Position: 48° 07' 26.280" N, 123° 26' 24.715" W
Least Depth: -2.45 m
Timestamp: 2007-302.22:10:58.000 (10/29/2007)
DP Dataset: h11751 / 1101_nonechosounder_dp / 2007-302 / 1101-302-dp
Profile/Beam: 9/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

pile

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_nonechosounder_dp/2007-302/1101-302-dp	9/1	0.00	000.0	Primary

Hydrographer Recommendations

chart as submerged pile on chart 18468

Cartographically-Rounded Depth (Affected Charts):

-1 ¼fm (18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 530_1)

-2.5m (501_1, 50_1)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20071113
 SORIND - US,US,survey,H11751

Feature Images



Figure 2.5.1

2.6) Profile/Beam - 3/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 21.700" N, 123° 25' 12.556" W
Least Depth: [None]
Timestamp: 2007-305.18:01:50.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 3/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Mooring Buoy

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	3/1	0.00	000.0	Primary

Hydrographer Recommendations

Add moorage buoy to chart 18468 at this DP location

S-57 Data

Geo object 1: Mooring/warping facility (MORFAC)
Attributes: CATMOR - 7:mooring buoy
 SORDAT - 20071113
 SORIND - us,us,survy,H11751

Feature Images



Figure 2.6.1

2.7) Profile/Beam - 4/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 14.056" N, 123° 27' 12.929" W
Least Depth: [None]
Timestamp: 2007-305.18:35:34.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 4/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

moring buoy

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	4/1	0.00	000.0	Primary
h11751/1016_reson8125_hvf/2007-315/444_1813	206/1	2.60	197.7	Secondary

Hydrographer Recommendations

Add mooring buoy to chart (18468)

S-57 Data

Geo object 1: Mooring/warping facility (MORFAC)
Attributes: CATMOR - 7:mooring buoy
 SORDAT - 20071113
 SORIND - us,us,survy,H11751

Feature Images



Figure 2.7.1

2.8) Profile/Beam - 5/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 08.490" N, 123° 26' 59.793" W
Least Depth: [None]
Timestamp: 2007-305.18:44:07.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 5/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

mooring buoy

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	5/1	0.00	000.0	Primary

Hydrographer Recommendations

Add mooring buoy to chart (18468)

S-57 Data

Geo object 1: Mooring/warping facility (MORFAC)
Attributes: SORDAT - 20071113
 SORIND - us,us,survy,H11751

Feature Images



Figure 2.8.1

2.9) Profile/Beam - 6/1 from vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305

Survey Summary

Survey Position: 48° 08' 18.364" N, 123° 27' 15.806" W
Least Depth: [None]
Timestamp: 2007-305.18:48:24.000 (11/01/2007)
DP Dataset: vesselconfig / 1101_nonechosounder_dp / 2007-305 / dp_1101_305
Profile/Beam: 6/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

new pile

Feature Correlation

Address	Feature	Range	Azimuth	Status
vesselconfig/1101_nonechosounder_dp/2007-305/dp_1101_305	6/1	0.00	000.0	Primary

Hydrographer Recommendations

Add pile to chart (18468)

S-57 Data

Geo object 1: Pile (PILPNT)
Attributes: SORDAT - 20071113
 SORIND - us,us,survey,H11751

Feature Images



Figure 2.9.1

2.10) Contact/Point - 0001/1 from h11751 / 1101_towedsss_hvf / 2007-317 / sd071112193300

Survey Summary

Survey Position: 48° 08' 30.385" N, 123° 27' 09.144" W
Least Depth: [None]
Timestamp: 2007-318.05:15:20 (11/14/2007)
Survey Line: h11751 / 1101_towedsss_hvf / 2007-317 / sd071112193300
Contact/Point: 0001/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

unknown feture seen in SSS. not fully investigated due to time constraints

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_towedsss_hvf/2007-317/sd071112193300	0001	0.00	000.0	Primary

Hydrographer Recommendations

[None]

S-57 Data

[None]

Feature Images

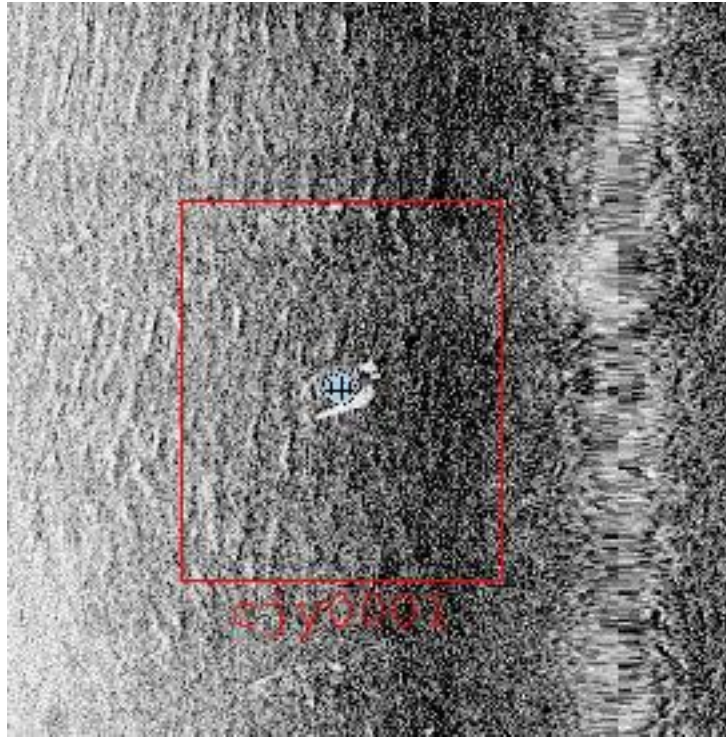


Figure 2.10.1

2.11) Contact/Point - 0001/1 from h11751 / 1101_towedsss_hvf / 2007-317 / sd071112224400

Survey Summary

Survey Position: 48° 08' 36.838" N, 123° 25' 13.532" W
Least Depth: [None]
Timestamp: 2008-119.05:19:48 (04/28/2008)
Survey Line: h11751 / 1101_towedsss_hvf / 2007-317 / sd071112224400
Contact/Point: 0001/1
Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

unknown feture seen in SSS. not fully investigated due to time constraints

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11751/1101_towedsss_hvf/2007-317/sd071112224400	0001	0.00	000.0	Primary

Hydrographer Recommendations

[None]

S-57 Data

[None]

Feature Images

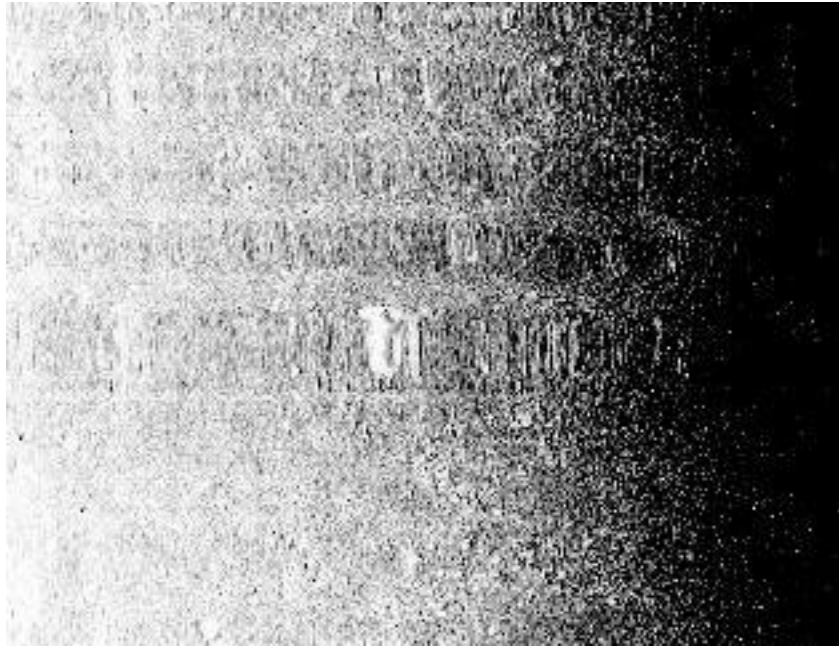


Figure 2.11.1

3 - AWOIS Features

3.1) AWOIS #50356 - UNKNOWN

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 41.320" N, 123° 26' 04.660" W
Historical Depth: [None]
Search Radius: 200
Search Technique: MB, S2, ES
Technique Notes: [None]

History Notes:

LN49/76--13TH CGD; REPORTS AN UNIDENTIFIED 40-FT F/V SUNK IN APPROX. 30 FT. OF WATER, P.A.. CHARTED AS A DANGEROUS SUNKEN WRECK, P.A.. THIS WRECK WAS MARKED BY AN ORANGE AND WHITE BANDED OIL DRUM. (ENTERED 4/1/94 MBH) H10583/95--NOS PHP; WRECK DISPROVED BY INVESTIGATION. (ENTERED 5/16/96)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Investigated with complete MBES 100 % SSS. No sign wreck.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 50356	0.00	000.0	Primary

Hydrographer Recommendations

Remove from all charts.

S-57 Data

Geo object 1: Wreck (WRECKS)
Attributes: SORIND - us,us,graph,chart18468

3.2) AWOIS #52057 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 59.320" N, 123° 24' 04.660" W
Historical Depth: [None]
Search Radius: 300
Search Technique: MB, ES, SSS
Technique Notes: Survey area for new lest depths.

History Notes:

CL936/71--NOT AVAILABLE; CHARTED AS A DISPOSAL AREA MEASURING îAPPROX. 0.3 NAUTICAL MILE IN DIAMETER. THE AWOIS POSITION IS THE îAPPROX. CENTER. (ENTERED 4/1/94 MBH)
 H10583/95--NOS PHP; NO EVIDENCE WAS FOUND OF DISPOSAL OF îMATERIALS IN THE AREA TO DATE. AREA REMAINS AS AN ACTIVE îDISPOSAL AREA. RETAINED AS A DISPOSAL AREA ON THE CHARTS. î(ENTERED 5/16/96 MBH)

Survey Summary

Charts Affected: 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

No features found

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52057	0.00	000.0	Primary

Hydrographer Recommendations

No action required

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORIND - us,us,graph,chart18468

3.3) AWOIS #52059 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 26.000" N, 123° 27' 22.000" W
Historical Depth: [None]
Search Radius: 0
Search Technique: MB, S2,
Technique Notes: Obtain least depths within the limits of the survey.

History Notes:

CL936/71--NOT AVAILABLE; CHARTED AS A DISPOSAL AREA. THE AWOIS POSITION IS THE APPROX. CENTER. (ENTERED 4/1/94 MBH) H10587/94-95--NOS PHP; NO SIGNIFICANT SHOALING AND NO SIGNIFICANT CONTACTS WERE FOUND. AREA REMAINS AS AN ACTIVE DISPOSAL AREA. RETAINED AS A DISPOSAL AREA ON THE CHARTS. (ENTERED 5/16/96 MBH)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Investigated with VBES star search and 100% SSS. No significant features observed.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52059	0.00	000.0	Primary

Hydrographer Recommendations

No action required

S-57 Data

[None]

3.4) AWOIS #52072 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 09.000" N, 123° 27' 16.000" W
Historical Depth: [None]
Search Radius: 100
Search Technique: MB, S2, ES,
Technique Notes: Obtain least depths within the limits of the survey.

History Notes:

UNKNOWN SOURCE--DISPOSAL AREA, FIRST APPEARS ON THE 10TH EDITION OF CHART 6303 (PRESENT #18468), DATED 11/9/64. THE AWOIS POSITION IS THE APPROX. CENTER. (ENTERED 4/1/94 MBH) H10587/94-95--NOS PHP; NO SIGNIFICANT SHOALING AND NO SIGNIFICANT CONTACTS WERE FOUND. AREA REMAINS AS AN ACTIVE DISPOSAL AREA. RETAINED AS A DISPOSAL AREA ON THE CHARTS. (ENTERED 5/16/96 MBH)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

no significant features detected

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52072	0.00	000.0	Primary

Hydrographer Recommendations

retain as charted

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORIND - us,us,graph,chart18468

3.5) AWOIS #52084 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 07' 50.800" N, 123° 27' 33.100" W
Historical Depth: [None]
Search Radius: 100
Search Technique: MB, S2, DI,
Technique Notes: Conduct search within the limits of hydrography

History Notes:

T2906/13--SOURCE FOR THE ORIGINAL PIER STRUCTURE. T7054/48--SOURCE FOR THE PIER IN RUINS. THE AWOIS POSITION IS ìTHE OFFSHORE END. (ENTERED 4/1/94 MBH) H10587/94-95--NOS PHP; INVESTIGATION INSUFFICIENT FOR ìDISPROVAL. RETAIN ON THE CHART AS SUBMERGED RUINS. (ENTERED ì5/16/96 MBH)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Area not investigated. AWOIS 52084 is contained within log booming grounds.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52084	0.00	000.0	Primary

Hydrographer Recommendations

retain as charted

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORIND - us,us,graph,chart18468

3.6) AWOIS #52101 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 07' 05.800" N, 123° 24' 48.900" W
Historical Depth: [None]
Search Radius: 0
Search Technique: MB, S2, ES, SD,
Technique Notes: Within the limits of the survey, position extents of the log boom.

History Notes:

PHOTO REVISION (1954)--ROW OF SIX DOLPHINS EXTENDING FROM LAT 48/07/05.8, LONG 123/24/48.9 TO LAT 48/07/02.7, LONG 123/24/50.5. THE AWOIS POSITION IS THE OFFSHORE END. (ENTERED 4/1/94 MBH) H10587/94-95--NOS PHP; NOT RESOLVED BY THIS SURVEY. THE AREA OF THIS ITEM WAS NOT ACCESSIBLE AS IT WAS A FULL LOG BOOMING AREA DURING THE TIME OF THIS SURVEY.

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Area partially investigated with VBES, inshore piles noted, recommend for further MBES investigation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52101	0.00	000.0	Primary

Hydrographer Recommendations

No action required

S-57 Data

[None]

3.7) AWOIS #52303 - PROSPER

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 07' 40.410" N, 123° 27' 10.690" W
Historical Depth: 8.20 m
Search Radius: 30
Search Technique: MB, SSS, DI
Technique Notes: Conduct search to get updated height and position.

History Notes:

H10587/94-95--NOS PHP; LOCATED THE SUNKEN WRECK OF THE F/V "PROSPER" WHICH SANK APPROX. 3 YEARS PRIOR. THE VESSEL IS 45' IN LENGTH, LYING UPRIGHT, AND ORIENTED 120 DEGREES TRUE. A LEAST DEPTH OF 8.2 METERS (MLLW) WAS OBTAINED ON THIS WRECK. (ENTERED 15/16/96 MBH)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

wreck confirmed with VBES and full MBES

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52303	0.00	000.0	Primary
h11751/1016_reson8125_hvf/2007-315/450_1745	140/43	1.93	004.4	Secondary

Hydrographer Recommendations

retain as charted, with new least depth of 8.36 meters

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORIND - us,us,graph,chart18468

3.8) AWOIS #52304 - UNKNOWN

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 05.790" N, 123° 26' 57.750" W
Historical Depth: 25.10 m
Search Radius: 30
Search Technique: MB, SSS, DI
Technique Notes: Conduct search to get updated height and position

History Notes:

H10587/94-95--NOS PHP; LOCATED THE SUNKEN WRECK OF AN UNKNOWN 145' F/V. THE WRECK IS LYING IN AN UPRIGHT POSITION. A LEAST 1 DEPTH OF 25.1 METERS (MLLW) WAS OBTAINED ON THIS WRECK. (ENTERED 15/16/96 MBH)

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

investigated with VBES and full MBES, no features detected.

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 52304	0.00	000.0	Primary

Hydrographer Recommendations

remove "wk" from chart 18468

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORIND - us,us,graph,chart18468

3.9) AWOIS #53544 - Obstruction

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 08' 03.680" N, 123° 27' 21.110" W
Historical Depth: [None]
Search Radius: 50
Search Technique: MB, SSS
Technique Notes: Confirm position and height of charted obstruction

History Notes:

H10587, 1994; Reports an obstruction in Lat. 48/08/03.68 N, Lon. 123/27/21.11 W(NAD83).

Survey Summary

Charts Affected: 18468_1, 18465_1, 18440_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

slight debris shoal indicated

Feature Correlation

Address	Feature	Range	Azimuth	Status
OPR-N372-RA-07_Awois	AWOIS # 53544	0.00	000.0	Primary

Hydrographer Recommendations

remove 'Obstn' and modify depth from bathy.

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: SORDAT - 20071113
 SORIND - us,us,graph,chart18468

Supplemental correspondence with Northwest Navigational Manager concerning proper notation for the COHO on charts 18468 and 18465.

----- Original Message -----

Subject: Re: Port Angeles Ferry Route
Date: Thu, 22 May 2008 15:36:58 -0700
From: David Neander <Dave.Neander@noaa.gov>
To: Timothy Smith <Timothy.M.Smith@noaa.gov>
CC: CO.Rainier@noaa.gov, FOO.Rainier@noaa.gov
References: <ce41a74a.a74ace41@pmc.noaa.gov>

Good question. I'll bring it up with the Puget Sound Pilots, but can probably guess at the answer. The ferry route is included on the smaller scale charts for depiction across the traffic lanes in the Strait. Once the COHO transits onto the large scale chart, a defined ferry route may become confusing due to the nature of traffic in the area. Although magenta arrows depicting the ferry terminus would be helpful.

Thanks,
Dave

Timothy Smith wrote:

> CDR Neander,
>
> I am the sheet manager for the Port Angeles survey H11751. RAINIER will
> be submitting the survey upon arrival in Juneau, but in the mean time we
> had a question regarding ferry traffic in the area. In your capacity as
> navigation manager, could you contact the COHO ferry operators and
> investigate if they would like their route added to the chart (18468)?
> A ferry route appears near the traffic lanes north of Ediz Hook, but
> nothing on the approach to the docks. Thanks.
>
> VR,
> ENS Tim mith
> NOAAS RAINIER
>



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : November 16, 2007

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N372-RA-2007
HYDROGRAPHIC SHEET: H11751

LOCALITY: Port Angeles to Green Point, Puget Sound, WA
TIME PERIOD: October 17 - November 14, 2007

TIDE STATION USED: 944-4090 Port Angeles, WA
Lat. 48° 07.5'N Long. 123° 26.5' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.987 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: PS47, PS48, PS57, PS58, PS60, & PS61

Refer to attachments for zoning information.

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

**Peter J.
Stone**

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, c=US, o=CO-
OPS, ou=NOAA/NOS, email=peter.
stone@noaa.gov
Reason: I am approving this document
Date: 2007.11.28 16:04:29 -05'00'

CHIEF, PRODUCTS AND SERVICES DIVISION



This nautical chart has been designed to promote safe navigation. The National Ocean Service encourages users to submit corrections, additions, or comments for improving this chart to the Chief, Marine Chart Division (NCS2), National Ocean Service, NOAA, Silver Spring, Maryland 20910 - 3282.

Final Tidal Zoning for OPR-N372-RA-2007, H11751 Approaches to Puget Sound, WA

PS48
Time Corrector -12 mins.
Range Corrector x0.95
Reference 944-4090

PS57
Time Corrector +6 mins.
Range Corrector x0.95
Reference 944-4090

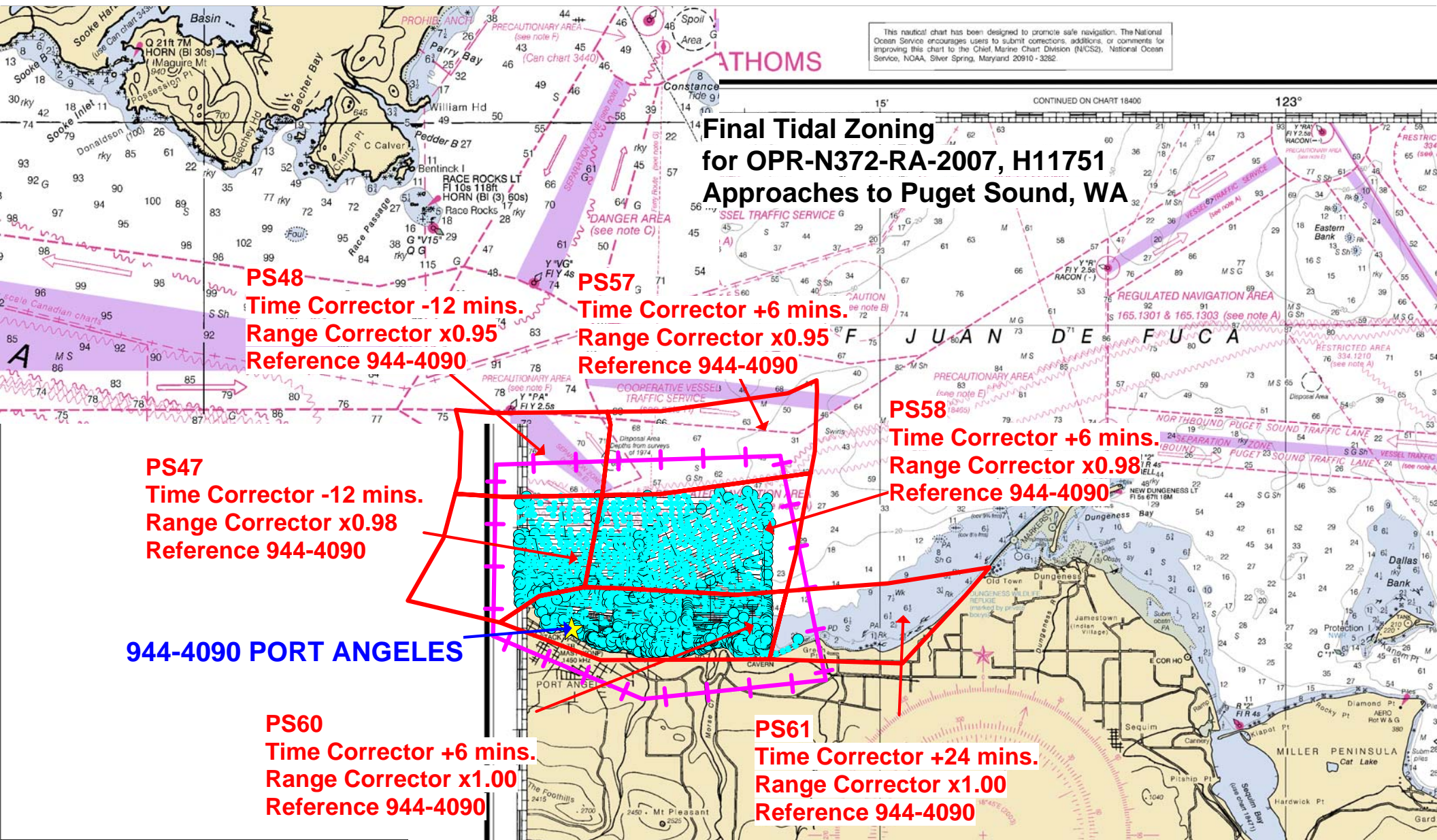
PS47
Time Corrector -12 mins.
Range Corrector x0.98
Reference 944-4090

PS58
Time Corrector +6 mins.
Range Corrector x0.98
Reference 944-4090

944-4090 PORT ANGELES

PS60
Time Corrector +6 mins.
Range Corrector x1.00
Reference 944-4090

PS61
Time Corrector +24 mins.
Range Corrector x1.00
Reference 944-4090



H11751 HCell Report
Martha Herzog, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H11751 used:

Office of Coast Survey HCell Specifications: Draft, Version: 4.0, 17 March, 2010.
HCell Reference Guide: Version 2.0, 22 February, 2010.

2. Compilation Scale

Depths and features for HCell H11751 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
18468	1:10,000	18th	04/01/2006	08/07/2010
18465	1:80,000	38th	05/01/2008	08/07/2010
18440	1:150,000	29th	09/01/2007	08/07/2010

The following ENC's were also used during compilation:

Chart	Scale
US4WA35M	1:80,000
USW5A29M	1:10,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 5-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

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

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

4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11751_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Charts 18468 and 18465	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H11751_SS.000
0	0	.2286	0	0
1	1.8288	2.0574	1.125	1
2	3.6576	3.8862	2.125	2
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.5166	10.125	10
20	36.576	37.9476	20.75	20
30	54.864	56.2356	30.750	30
40	73.152	74.5236	40.75	40
50	91.44	92.8116	50.75	50

With the exception of the zero contours included in the H11751_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the H11751_CS file and soundings in the H11751_SS have been. This may result in conflicts between the H11751_SS file contours and HCell features at or near the survey limits. Conflicts with M_QUAL, COALNE and SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over H11751_SS.000 file contours in all cases where conflicts are found.

5. Meta Areas

The following Meta object areas are included in HCell H11751:

M_QUAL
M_CSCL

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

6. Features

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

7. S-57 Objects and Attributes

The H11751_CS HCell contains the following Objects:

\$CSYMB	Blue Notes-Notes to the MCD chart Compiler
DEPCNT	Zero Contours or MLLW
FSHFAC	Fish pens
LIGHTS	Private aids
LOGPON	Log booms
M_CSCL	Compilation scale Meta area to define a different chart scale
M_QUAL	Data quality Meta object
MORFAC	Buoys
OBSTRN	Obstruction area object
PILPNT	Piles
SBDARE	Bottom samples
SLCONS	Human made coastline
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features
WEDKLP	New and retained kelp areas
WRECKS	Wrecks

The H11751_SS HCell contains the following Objects:

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

8. Spatial Framework

8.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (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):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

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

BASE Editor and S-57 Composer Units:

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

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

9. Data Processing Notes

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

10. QA/QC and ENC Validation Checks

H11751 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

H11751_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:10,000
H11751_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11751_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11751_outline.gml	Survey outline
H11751_outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.3	Creation of soundings and bathy-derived features, creation of the meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.

12. Contacts

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

Martha Herzog
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6730
martha.herzog@noaa.gov

APPROVAL SHEET
H11751

Initial Approvals:

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

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

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