	NOAA FORM 76-35A
	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE
	DESCRIPTIVE REPORT
CC	Type of Survey Hydrographic Survey Field No. N/A Registry No. H11551
	LOCALITY         State       Washington         General Locality       Colvos Passage and Vicinity         Sublocality       Quartermaster Harbor         2007       CHIEF OF PARTY         Commander Guy T. Noll, NOAA
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NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COM NATIONAL OCEANIC AND ATMOSPHERIC ADMINIST	MERCE REGISTER NO. TRATION
	HYDROGRAPHIC TITLE SHEET	H11551
INSTRUCTIONS - filled in as complete	The hydrographic sheet should be accompanied by this form, ly as possible, when the sheet is forwarded to the office.	FIELD NO. n/a
State	Washington	
General Locality	Colvos Passage and Vicinity	
Sublocality	Quartermaster Harbor	1
Scale	1:10,000 Date of Survey 4/10/2	2007-4/14/2007
Instructions Dated	3/14/2007 Project No. OPR-	N395-RA-07
Vessel	_RA1(1101), RA2(1103), RA3(1021), RA4(1016), RA5(1006), RA6(1015_C3L	D), RA9(1905)
Chief of Party	Commander Guy T. Noll, NOAA	
Surveyed by	RAINIER Personnel	
Graphic record scale Graphic record chec	Reson 8125, Knudsen 320M, Ceeducer       ed by     N/A       ked by     N/A	
SAR by	Martha Herzog/Kurt Brown Automated plot by N/A	
Compilation by	Tyanne Faulkes	
Soundings in	Fathoms and Feet at MLL	W
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-s All separates are filed with the hydrographic data.	equential

# **Descriptive Report to Accompany Hydrographic Survey H11551**

Project OPR-N395-RA-07 Colvos Passage and Vicinity, Washington Vicinity of Quartermaster Harbor Scale 1:10,000 April, 2007 **NOAA Ship RAINIER (s221)** Chief of Party: Commander Guy T. Noll, NOAA

#### A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-N395-RA-07 dated March 14, 2007 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is Puget Sound, in the vicinity of Quatermaster Harbor. This survey corresponds to sheet "D" in the sheet layout provided with the Letter Instructions. The purpose of this project is to provide contemporary hydrography with full-bottom multibeam coverage for Colvos Passage, WA and vicinity as per the request of the Puget Sound Pilots Association. Colvos Passage serves as an alternate route for medium-sized vessels departing Tacoma, and Quartermaster Harbor is occasionally used as an anchorage for these vessels. Based upon the volume of traffic, age of sounding data, and seismic activity, it has been recommended that this area be categorized as an Emerging Critical Area.<sup>1</sup> This project was also used to facilitate operational testing of the Teledyne Benthos C3D phase differencing (interferometric) bathymetric sonar and the composite source shoreline file.

The area surveyed is shown in Figure 1. The survey was not extended east of Piner Point, and the head of Quartermaster Harbor was not addressed due to the inefficiency of utilizing RAINIER to survey this shallow and shoreline feature-rich area. Within these limits, RAINIER defined the Navigable Area Limit Line (NALL) in accordance with field hydrographer observations, approximately following the farthest offshore of (1) the 4-meter depth contour, and (2) the line defined by the distance seaward from the MHW line which is equivalent to 0.8 millimeters at the scale of the largest scale nautical chart (32m for chart 18474). The survey area offshore of the NALL was surveyed with Complete Multibeam or Object Detection Multibeam coverage as required in the Project Instructions, with the exception of the areas described in Section B.<sup>2</sup>

Vertical-beam echo sounder (VBES) data were acquired in depths from approximately 4 meters and seaward to define the navigable area limit, aid in the planning of SWMB data acquisition, and provide inshore bathymetry in navigationally significant areas.

<sup>&</sup>lt;sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (June 2006), OCS Field Procedures Manual for Hydrographic Surveying (March 2007), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

The Teledyne Benthos C3D was introduced in the Quartermaster Harbor survey. During the survey, the C3D was used to acquire 200% side scan sonar (SSS) coverage around the perimeter of the survey area in addition to known shipwreck locations to improve the probability of detection of submerged hazards in navigationally critical areas. The C3D's SSS data was processed as traditional SSS and used for feature identification while the bathymetric data acquired was used for testing purposes only.

Data Acquisition Type	Hull Number with Mileage (nm)				Total		
Data Acquisition Type	1101	1103	1021	1016	1006	1015	Total
MBES (mainscheme) (nm)	-	-	91.83	71.44	15.67	9.09	188.03
SSS (mainscheme) (nm)**	-	-	I	-	-	24.33	24.33
Crosslines (nm)	-	-	5.67	4.53	0.54	1.76	12.5
Developments (nm)	-	-	9.74	7.82	2.69	4.5	24.75
Shoreline (nm)	11.42	-	I	-	-	-	11.42
Bottom Samples	-	14	I	-	-	-	14
Total Number of Items Investigated	14	6	-	-	-	-	20
Total Area Surveyed (sq. nm)	*	*	*	*	*	*	4.96

Limited Shoreline Verification was performed for the survey area.

\* Total Area Surveyed was not tracked by individual launch.

\*\* SSS acquired from Benthos C3D was used for feature detection during the project but C3D bathymetry will be submitted separately.

Table 1: Statistics for survey H11551

Data acquisition was conducted from April 10 to April 14, 2007 (DN100 to 104).<sup>3</sup>



Figure 1. H11551 bathymetric data displayed on chart 18474.



Figure 2. H11551 Side Scan Sonar mosaic from the Teledyne Benthos C3D Interferometric sonar displayed on chart 18474.

# **B. DATA ACQUISTION 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-N395-RA-07 Data Acquisition and Processing Report* (DAPR)<sup>4</sup>, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

# **Preliminary water levels with Tidal Constituent and Residual Interpolation (TCARI) correctors have been applied to this survey.** See Section C. for additional information.

#### **B1.** Equipment and Vessels

Hull Number	Name	Acquisition Type
1101	RA-1	Vertical-Beam Echosounder
		Detached Positions
1103	RA-2	Dive Investigation
		Bottom Samples
1021	RA-3	Multi-Beam Echosounder
1016	RA-4	Multi-Beam Echosounder
1006	RA-5	Multi-Beam Echosounder
1015	RA-6	Multi-Beam Echosounder
		Interferometric Sonar

Data for this survey were acquired by the following vessels:

Table 2. Data Acquisition Vessels for H11551.

Sound speed profiles were measured with SEACAT SBE-19 and 19+ profilers in accordance with the Specifications and Deliverables. During the survey, RA-2 and the skiff RA-9 were utilized as dedicated sound speed profiling platforms. This allowed for denser temporal and spatial sampling of sound speed in the survey area, and improved survey efficiency by freeing the survey launches from the need to take casts.

No unusual vessel configurations were used for data acquisition.

# **B2.** Quality Control

#### Crosslines

Vertical Beam Echo Sounder (VBES) crosslines were not run on H11551.

Multi-Beam Echosounder (MBES) crosslines totaled 12.5 nautical miles, comprising 6.64% of main scheme MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences averaging approximately 0.25 meters, with the exception of Elac data in deep water where differences averaged approximately 0.5 meters.<sup>5</sup>

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.<sup>6</sup>

#### Junctions

No contemporary surveys junction with H11551.7

#### **Data Quality Factors**

#### Isis Data Dropout

Intermittent data was acquired from launch 1016 on the first day of acquisition (DN100) in Quartermaster Harbor (see Figure 3). Subsequent trouble shooting traced the problem to a new version of the Triton Isis data acquisition software (ver 7.1.428.53) installed during the 2006-2007 winter import. This version of ISIS features a "True 3D" window displaying three-dimensional bathymetry as it is acquired. When this display is enabled, load on the acquisition computer increases to the point that Ethernet packets from the Reson processor are dropped. Disabling the "True 3D" and returning to the traditional "Scroll 3D" view eliminated the problem. The affected lines were rerun, but the data from DN100 was determined to be otherwise acceptable and retained as well.



Figure 3: Data acquired by launch 1016 on day number 100.

#### Minor Coverage Gaps

Multiple small holidays exist throughout survey H11551, with the majority in the northern part of the survey. Some of these coverage gaps are greater than 3 nodes across. The gaps in coverage result from two sources:

- In some areas, complete multibeam echsounder coverage was not achieved in waters between 8 meters depth and the inshore limit of the survey (see Figure 4). However, in all cases these gaps were covered by 200% side scan sonar, and are free of significant features. The hydrographer recommends that coverage be considered complete across these gaps, and that the survey supersede all prior survey and charted data in the common area.<sup>8</sup>
- Multiple resolution BASE surfaces were used for daily processing and coverage assessment of this survey, as described in the *OPR-N395-RA-07 Data Acquisition and Processing Report.* After RAINIER had left the survey area, it was discovered that CARIS HIPS 6.1 was not honoring the selected CUBE parameters for multiple resolution grids. Although RAINIER personnel selected the "Shallow" CUBE parameters, HIPS applied the default parameters. This resulted in small gaps in the final, single resolution BASE surfaces created after the survey was complete (See Figure 6). These areas had been free of holidays in the multiple resolution grids (See Figure 5). Although many of the gaps are larger than the 3 node maximum allowed under the NOS Hydrographic Surveys Specifications and Deliverables, the hydrographer considers the coverage adequate and recommends that H11551 supersede all prior survey and charted data in the common area. As of this writing, CARIS has issued a preliminary fix for this issue, and an official software update is expected soon.<sup>9</sup>



Figure 4: Holidays on the edge of the sheet. 200% SSS was acquired around the perimeter and covered these holiday areas.

2

7



Figure 5: No apparent holidays appear in the multi-resolution BASE surface.



Figure 6: Holidays apparent in a single resolution BASE surface of the same area.

# **B3.** Data Reduction

Data reduction procedures for survey H11551 conform to those detailed in the *OPR-N395-RA-07 DAPR*.

# **B4.** Data Representation

Many BASE surfaces were used in processing H11551. Final BASE surface resolutions were set as given in Table 3. Field sheets were sized to be smaller than  $25 \times 10^6$  nodes, with the exception of H11551\_50cm\_A. The submission Field Sheet and BASE Surface structure are shown in Figures 7 - 10.<sup>10</sup>

Depth Range of Finalized Surface	Resolution
0.0 - 16.0  m	0.5 m
14.0 – 31.5 m	1.0 m
28.5 – 63.0 m	2.0 m
57 – 158 m	5 m
> 143 m	10 m

 Table 3: Finalized BASE surface resolutions and depth ranges.

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



Figure 7: Field sheets and BASE surfaces submitted with H11551.



Figure 8: Layout of 10 meter and 0.5 meter resolution field sheets and BASE surfaces for H11551.



Figure 9: Layout of 5 meter and 1 meter resolution field sheets and BASE surfaces for H11551.



Figure 10: Layout of 2meter and the Combined Final field sheets for H11551.

# C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N395-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. No Horizontal and Vertical Control Report will be submitted.<sup>11</sup>

# **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	
Robinson Point	323 kHz	USCG	4 nm	Primary	
Table 4: Differential Corrector Sources for H11551.					

#### 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 Tacoma, WA (944-6484) and Seattle, WA (944-7130) served as control for datum determination and as the primary source for water level reducers for survey H11551.

No tertiary gauges were required.

All data were reduced to MLLW using **preliminary water levels** from stations Tacoma, WA (944-6484) and Seattle, WA (944-7130) using tide files 9446484\_Observed\_MSL.txt and 9447130\_Observed\_MSL.txt, with TCARI grid N395RA2007.tc supplied with the Project Instructions.<sup>12</sup>

# D. RESULTS AND RECOMMENDATIONS

#### **D.1.** Chart Comparison

#### **D.1.a. Survey Agreement with Chart**

Survey H11551 was compared with the following chart:

Chart	Scale	Edition and Date	Cleared Through		
18474	1:40,000	8 <sup>th</sup> Ed, Oct 2003	3/31/2007		
Table 5: Charts compared with H11551 <sup>13</sup>					

Bathymetry from survey H11551 generally agreed well with depths depicted on chart 18474. All charted depth curves agree well with survey contours. Survey soundings agreed with

charted depths to within 0.5 fathoms in depths less than 30 fathoms (with the exception of the DTONs discussed below), and within 1 fathom in deeper areas.<sup>14</sup>

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area. Final chart comparisons will be made at the Pacific Hydrographic Branch after the application of final approved water levels.

# **D.1.b.** Dangers to Navigation

Three (3) Dangers to Navigation (DTONs) were found on survey H11551, and reported to the Marine Chart Division via email on April 21, 2007. The original DTON submission package is included in Appendix I. Descriptions of each DTON are included in the Survey Feature Report in Appendix II.<sup>15</sup>

The DTON report submitted for feature "522/1" was based on a preliminary least depth which should be revised when this survey is compiled. The feature is a wreck in position 47° 22' 24" N, 122° 27' 23" W. Although the wreck was investigated by divers, the Diver's Least Depth Gauge (DLDG) data could not be immediately processed due to a problem with the Velociwin software. In the interest of notifying mariners of the hazard as quickly as possible, the DTON was submitted with the multibeam least depth. Subsequent processing of the DLDG data and reassessment of the MBES bathymetry revealed that the MBES depth was a sounding on an antenna on the wreck which was lowered by the divers during the investigation. The DLDG reading was taken at the highest point on the sunken vessel itself (see Figure 11). The hydrographer recommends that the MBES least depth submitted with the DTON be superseded by the deeper DLDG depth when the survey is compiled.<sup>16</sup>



*Figure 11: The antenna was lowered by divers and a diver's least depth gauge depth was taken on the highest point of the sunken vessel. The soundings in the bubbles have been rejected in the data.* 

# D.1.c. Other Features<sup>17</sup>

<u>Automated Wreck and Obstruction Information System (AWOIS) Investigations</u> Three (3) AWOIS items fall within the limits of survey H11551, and were assigned for full investigation. Of these, two (53318 and 53319) were fully addressed by a combination of VBES, MBES and 200% SSS. AWOIS 53322 is at the head of Quartermaster Harbor, outside the area surveyed by RAINIER, and was only partially investigated by SSS. Descriptions of each AWOIS item investigation are included in the Survey Feature Report in Appendix II.<sup>18</sup>

# Additional Items

Multiple wrecks were found within the limits of H11551. These wrecks were further developed using the Reson 8125 system, and five wreck sites were chosen for dive investigations. A separate wreck report was prepared and submitted to the Washington State Historic Preservation Office. The State determined that none of the wrecks reported should be considered culturally significant. The Wreck Report and associated correspondence are included in Appendix V.<sup>19</sup>

Additional features investigated within the limits of H11551 are described in the Survey Feature Report in Appendix II.<sup>20</sup>

# **D.2. Additional Results**

# **D.2.a.** Prior Survey Comparison

Prior survey comparison was not performed.

# **D.2.b.** Shoreline Verification

# Shoreline Source

Composite Source Shoreline file US4n395R.000 was compiled by N/CS31 and supplied with the project instructions. This source file was converted to a hydrographic object binary (HOB) file aboard RAINIER for use in CARIS Notebook. The composite source was then filtered to reduce clutter by removing features not required for nearshore feature verification. The resulting shoreline source data was printed on paper "boat sheets" and loaded in Hypack for field verification.

# Shoreline Verification

Limited shoreline verification was conducted at the lowest available stage of tide in accordance with FPM Section 3.4.6.1.2. A zero or negative tide window did not occur during daylight hours while RAINIER was in the OPR-N395-RA-07 project area. Shoreline verification was performed during the lowest available daylight tides. See table below for tidal heights of shoreline verification.

Day Number	Date	Times of acquisition (UTC)	Highest Tide	Lowest Tide		
102	April 12 <sup>th</sup> , 2007	1557 - 1948	2.45 m	2.36 m		
Table 6: Dates, times, and tidal heights of shoreline verification acquired on H11551.						

Detached positions (DPs) were recorded in HYPACK and logged on DP forms, processed in Pydro, and then translated into CARIS Notebook. These DPs 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, and transferred to the "remarks" attribute on the corresponding features in Notebook. DP forms are included in the Detached Positions subdirectory Separates I.<sup>21</sup>

All shoreline data is submitted in Caris Notebook .hob files. The session H11551\_NTBK contains the following:

HOB File	Purpose and Contents
H11551_CompSource.hob	Original Source Data filtered from Composite Source file
	US4n395R.000
H11551_Field_Verified.hob	Field verified source features and shoreline, including
	edits and updates not requiring DPs.
H11551_Pydro_Updates.hob	New or modified items processed through Pydro.
H11551_Delete.hob	Items recommended for removal from the chart, and
	therefore deleted from H11551_Field_Verified.

Table 7: List and Description of Notebook HOB files.

The combination of *Pydro\_Updates.hob* and *Field\_Verified.hob* layers depict the shoreline as surveyed. *Pydro\_Updates.hob* is the combination of *modify, add,* and *none* layers exported from Pydro. The *Field\_Verified.hob* reflects unchanged features that were noted in the field and updates that were not processed through Pydro.<sup>22</sup>

# Source Shoreline Changes and New Features

Items for survey H11551 that require further discussion and are associated with a detached position have been flagged "Report" in Pydro in H11551.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 GC, raster charts, and ENCs as described above.<sup>23</sup>

# **D.2.c.** Aids to Navigation

Quartermaster Harbor Shoal Buoy 2 (Light List #17095) is the only aid to navigation within the H11551 survey limits. The buoy was verified by DP during field operations and found to be correctly charted and serving its intended purpose.<sup>24</sup>

# **D.2.d.** Overhead Features

There are no overhead features within the limits of survey H11551.<sup>25</sup>

# **D.2.e.** Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the limits of H11551, and none were detected by the survey.<sup>26</sup>

# **D.2.f. Ferry Routes**

Survey H11551 includes one charted ferry route between Tahlequah and Point Defiance. Ferry traffic observed during acquisition did not noticeably differ from the charted route. The hydrographer recommends retaining the ferry route as charted.<sup>27</sup>

The ferry pier was visually observed to be correctly charted, with the exception of one offshore dolphin which was positioned during shoreline verification. The ferry pier itself was not investigated by RAINIER personnel, as the Washington State Department of Transportation will supply "as built" diagrams of these facilities directly to the Marine Chart Division (see related correspondence in Appendix V).<sup>28</sup>

# **D.2.g.** Bottom Samples

A total of fourteen (14) bottom samples were collected within the limits of survey H11551 in accordance with the Field Procedures Manual. The samples were taken approximately 1200 m apart within Quartermaster Harbor and in potential anchorage areas, and 2000 m apart at the mouth of the harbor where the survey intersects the traffic lane. Four bottom samples were taken in locations with charted bottom types. Of these four samples, three matched the charted description and the fourth was slightly different.<sup>29</sup>

# D.2.h. Other Findings

A sand ridge was found in the southeast corner of H11551 extending 200 meters off Piner Point (see Figure 12). The ridge suggests the occurrence of long shore transport moving sediments south, towards the traffic lanes and may be of geological interest in the area.



Figure 12: Sand ridge located in the Southeast corner of survey H11551 off of Piner Point.

# **E. APPROVAL**

As Chief of Party, Field operations for hydrographic survey H11551 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 (June 2006 edition), Field Procedures Manual (May 2007 edition), Project Instructions, and all HSD Technical Directives issued through 14 April 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>	Date Sent	<b>Office</b>
Data Acquisition and Processing Report for OPR-O-RA-07	14 May 2007	N/CS34
Coast Pilot Report for OPR- N395-RA-07	9 May 2007	N/CS26

Approved and Forwarded:

Title

2007.05.11 15:57:54 -08'00'

Guy T. Noll Commander, NOAA **Commanding Officer** 

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

Survey Sheet Manager:

Nicholar J. Diamontson

Nicholas Gianoutsos Hydrographic Survey Technician, NOAA Ship RAINIER

Chief Survey Technician:

James B Jacobson Guobson I have reviewed this document 2007.05.14 16:02:07 Z

James B. Jacobson Chief Survey Technician, NOAA Ship RAINIER

Men Kan

LT Benjamin K. Evans, NOAA I have reviewed this document 2007.05.11 23:54:09 Z

Field Operations Officer:

Benjamin K. Evans Lieutenant, NOAA

# Addendum Report to Accompany Hydrographic Survey H11551

Project OPR-N395-RA-07 Colvos Passage and Vicinity, Washington Vicinity of Quartermaster Harbor Scale 1:10,000 October, 2007 **NOAA Ship RAINIER (s221)** Chief of Party: Commander Donald W. Haines, NOAA

#### A. Background

Upon review of the previously submitted hydrographic survey H11551, the Pacific Hydrographic Branch recommended four items for further field investigation. Specifically, 3 multibeam contacts were identified during the survey review that the reviewer felt could be possible piles. All three contacts are in the vicinity of a mooring field and the reviewer indicated that although the contacts are probably returns from a mooring buoy anchor line, they could not be discounted without further investigation. Additionally, during survey acquisition of H11551, AWOIS item 53322 was not fully investigated due to its location outside completed survey area. Due to fueling logistics, RAINIER was near the H11551 survey area on October 24, 2007 and was able to use a survey launch to carry out field investigations on these items as requested by the processing branch. See figure 1 for an overview of the items investigated.<sup>30</sup>

Data acquisition for this addendum was conducted on October 24, 2007 (DN 297).



Figure 1. H11551 Addendum items overview displayed on chart 18474.

# C. DATA ACQUISTION 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-N395-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.

Verified water levels with Tidal Constituent and Residual Interpolation (TCARI) correctors have been applied to this survey.<sup>31</sup> See Section C. for additional information.

#### **B1.** Equipment and Vessels

All data for this addendum were acquired by launch 1021 (RA-3) configured with a Reson 8101 multibeam sonar. One dive was conducted from launch 1021 to search for a possible pile.

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

No unusual vessel configurations were used for data acquisition.

# **B2.** Quality Control

#### Crosslines

Vertical Beam Echo Sounder (VBES) crosslines were not run for this addendum.

Due to the item investigation nature of this addendum, no multibeam echosounder (MBES) crosslines were acquired.

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

No junction comparison was made for this addendum.

# **B3.** Data Reduction

Data reduction procedures for this addendum conform to those detailed in the *OPR-N395-RA-07 DAPR*.

#### **B4.** Data Representation

Two field sheets, each with a half-meter, single resolution, finalized grid, are being submitted with this addendum. See figure 2 for Field Sheet names and locations.



Figure 2: Field sheets and BASE surfaces submitted with H11551\_addendum.

Although no wreck meeting the AWOIS description was found within the search radius, after reviewing the processed data, a smaller, 11-ft long wreck-shaped object was found in the multibeam data. The least depth of this wreck has been designated in the HDCS data. The hydrographer recommends deleting the dangerous wreck symbol and charting the wreck designated as per the digital data.<sup>34</sup>

#### **D.2. Additional Results**

Three possible piles were investigated in response to comment 3 in the Survey Acceptance Review Checklist for H11551, see appendix. The investigations are at the positions listed in Table 2 below and are numbered for convenience.

Item Investigation Number	Latitude	Longitude
1	47/22/26.6N	122/27/28W
2	47/22/25.1N	122/27/28W
3	47/22/29.5N	122/27/24.1W

Table 2: Possible Piling Investigations

Mooring balls were visually confirmed at the positions of items 2 and 3; the multibeam data from the mooring line resemble the data from the original survey. No other obstructions were detected in the area. The hydrographer recommends rejecting the data in the original survey data set.<sup>35</sup>

Although there was a mooring buoy in the general vicinity of item 1, it was not clearly responsible for the questionable multibeam data so a dive was conducted to verify that there were no obstructions in the area. Divers LT Charles Yoos and PS Matt Foss conducted a circle search with radius 20 m around the position of item 1 described in Table 2. No pilings were found during the dive investigation and the hydrographer recommends rejecting the data in the original survey. A sunken tree was discovered approximately 25 m north of the position above; the tree sits approximately 1 m proud of the seafloor. The tree has a small diameter line attached to a small float that is approximately 3 m below the waters surface. The tree is well represented in the multibeam and its least depth has been designated in Caris. The Hydrographer recommends charting the least depth with the annotation "Snag" to warn boaters of its presence.<sup>36</sup>

# C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N395-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. No Horizontal and Vertical Control Report will be submitted.<sup>32</sup>

# **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 1.

Location	Frequency	Operator	Distance	Priority	
Robinson Point	323 kHz	USCG	4 nm	Primary	
Table 1: Differential Corrector Sources for H11551.					

#### 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 Tacoma, WA (944-6484) and Seattle, WA (944-7130) served as control for datum determination and as the primary source for water level reducers for survey H11551.

No tertiary gauges were required.

All data were reduced to MLLW using verified water levels from stations Tacoma, WA (944-6484) and Seattle, WA (944-7130) using tide files 9446484\_verified\_MSL.txt and 9447130\_verified\_MSL.txt included with this addendum report, with TCARI grid N395RA2007.tc supplied with the Project Instructions. A final approved water levels request was not generated due to the limited scope of these investigations.

# E. RESULTS AND RECOMMENDATIONS

# **D.1.** Chart Comparison

#### Automated Wreck and Obstruction Information System (AWOIS) Investigations

AWOIS item 53322 was investigated with a multibeam echosounder. According to the online AWOIS database, this AWOIS item corresponds to a 40 ft cabin cruiser that sunk in the area. With the side scan coverage run during regular survey operations and the multibeam coverage obtained for this addendum, the search radius for this item has been completely surveyed with item detection techniques. No wreckage was seen during data acquisition and no dive investigation was made.<sup>33</sup>

# E. APPROVAL

As Chief of Party, Field operations for this addendum to hydrographic survey H11551 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 (June 2006 edition), Field Procedures Manual (May 2007 edition), Project Instructions, and all HSD Technical Directives issued through 14 April 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>

Date Sent Office

14 May 2007

N/CS34 N/CS34

Approved and Forwarded:

Descriptive Report for H11551

Donald W. Haines Commander, NOAA Commanding Officer

Data Acquisition and Processing Report for OPR-N395-RA-07 14 May 2007

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

COR/NOAA

Jumes B Jurobson

James B Jacobson I have reviewed this document 2007.12.06 20:12:54 Z

Digitally signed by Donald W. Haines, CDR/NOAA DN: on=Donald W. Haines, CDR/NOAA, c=US, o=NOAANMAOMOC-P, ou=NOAA Ship RAINIER, email=cortainer@noaa.gov Reason:1 am approving file document Date: 2007.12.06 12:16:34 -08'00'

Chief Survey Technician:

James B. Jacobson Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:

Charles Yoos I am the author of this document 2007.12.05 16:44:41 -08'00'

Charles J. Yoos Lieutenant, NOAA Field Operations Officer <sup>4</sup> Filed with Project Records.

<sup>5</sup> Concur.

<sup>6</sup> HSRR field with project records.

<sup>7</sup> Concur with clarification. Contemporary surveys were performed after H11551 was completed. The compiler junctioned with H11646, H11550, and H12052.

<sup>8</sup> Concur.

<sup>9</sup> Concur.

<sup>10</sup> Concur with clarification. New surfaces were created during office review using the depth ranges used by the field. H11551\_Office\_Combined was used for cartographic compilation.

<sup>11</sup> Concur.

<sup>12</sup> Tide note has been appended to this document.

<sup>13</sup> Chart 18474, 8<sup>th</sup> Edition dated October 2003, Local Notice to Mariners dated 3/13/2010 was used for chart comparison and compilation.

<sup>14</sup> Concur.

<sup>15</sup> DTONs have been appended to this report. All DTONs submitted by the field during office review have been updated on the chart. Compiler did not chart the DTON obstruction located at 47-22-29.25N, 122-27-34.298 W. Compiler charted two adjacent obstructions due to their perceived danger and the scale of the chart. Chart as shown in the HCell.

<sup>16</sup> Concur. The diver's least depth gauge depth is reflected in the HCell.

<sup>17</sup> During the 2007 field season, RAINIER surveyed Quartermaster Harbor. When departing the project area a derelict tug, strongly suspected of being this wreck, was observed being towed into the harbor (Figure 1). When anchored in Quartermaster Harbor to continue the project for the 2008 field season, this new wreck was observed by passing launches. On DN 104, launch 1101 made several passes around this wreck using her tilted Reson 8125 system and obtained complete overage.



Figure 1: A derelict tugboat in tow to Quartermaster Harbor.

The compiler obtained the data from RAINIER personnel during the compilation of this survey (Figure 2). While researching this wreck a representative from the Coast Guard mentioned the possibility that the wreck was removed. The compiler contacted the Coast Guard and subsequently the Washington State Department of Natural Resources' Derelict Vessel Removal Program to verify that the wreck was still present. These emails have been submitted with the HCell as supplemental correspondence.

<sup>&</sup>lt;sup>1</sup> Concur.

<sup>&</sup>lt;sup>2</sup> Concur.

<sup>&</sup>lt;sup>3</sup> After feedback during the Survey Acceptance Review *Rainier* personnel investigated three piles and an AWOIS item. The result of this additional data collection has been appended to the DR. All data deliverables have been updated to reflect the additional data.

The wreck is located at 47-21-12.90 N, 122-29-14.92 W and has a least depth of -0.098 fathoms. The cartographer used the SORIND and SORDAT from the survey from 2008 (H11550) because the data was collected in junction with that data. Additional information about this wreck is attached to this document in the "Wreck Report" (See below).



Figure 2: New wreck (red arrow) at 47° 21′ 12.90″ N 122° 29′ 14.92″ W in Quartermaster Harbor.

<sup>18</sup> Concur. AWOIS report is appended to this document.

<sup>19</sup> An additional report has been created to reflect all wrecks that appear on H11551 except those found in the AWOIS and DTON reports and has been appended to this report to provide additional information for the AWOIS database.

<sup>20</sup> The Survey Feature Report is filed with hydrographic records. Note: the survey feature report does not include all features from H11551. Additional features were added, some removed, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H11551 have come directly from CARIS Notebook, which is the official features deliverable for this survey.
<sup>21</sup> Filed with hydrographic records.

<sup>22</sup> During cartographic compilation a hob file was created to combine the two hob files into one archival file. It is called H11551\_Features.000.

<sup>23</sup> Concur with clarification. Chart data as depicted in HCell.

<sup>24</sup> Use the latest ATONIS listing.

<sup>25</sup> Concur.

<sup>26</sup> Concur.

<sup>27</sup> Concur.

<sup>28</sup> "As built" diagrams were not submitted with this survey. Correspondence is filed with hydrographic records.

<sup>29</sup> Chart bottom samples as depicted in the HCell.

<sup>30</sup> All data has been appended to the initial deliverables and has been taken into account during the compilation

of H11551.

 $^{31}_{32}$  Concur.

 $^{32}$  Concur.

 $^{33}_{34}$  Concur.

<sup>34</sup> Concur.

<sup>35</sup> Concur.

<sup>36</sup> Concur.

# H11551 DTON Report 1

<b>Registry Number:</b>	H11551		
State:	Washington		
Locality:	Quartermaster Harbor		
Sub-locality:			
Project Number:	OPR-N395-RA-07		
Survey Dates:	04/12/2007 - 04/13/2007		

Number	Version	Date	Scale
18474	8th Ed.	10/01/2003	1:40000
18445	31st Ed.	04/01/2006	1:80000
18448	34th Ed.	07/01/2006	1:80000
18440	28th Ed.	12/01/2005	1:150000
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

# **Charts Affected**

# Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	2.24 m	047° 23' 10.159" N	122° 26' 26.798" W	
1.2	Sounding	2.53 m	047° 22' 24.325" N	122° 27' 23.139" W	
1.3	Sounding	6.49 m	047° 22' 29.250" N	122° 27' 34.298" W	

**1 - Danger To Navigation** 

# 1.1) Profile/Beam - 123/152 from h11551 / 1016\_reson8125\_hvf / 2007-103 / 332\_1727

# **DANGER TO NAVIGATION**

# **Survey Summary**

Survey Position:	047° 23' 10.159" N, 122° 26' 26.798" W
Least Depth:	2.24 m
Timestamp:	2007-103.17:27:43.479 (04/13/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-103 / 332_1727
Profile/Beam:	123/152
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on submerged piling.

# **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-103/332_1727	123/152	0.00	000.0	Primary

# Hydrographer Recommendations

Chart submerged piling with MBES least depth

#### Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1)

1fm 1ft (18474\_1, 18445\_8)

2.2m (501\_1, 50\_1)

# S-57 Data

Geo object 1: Obstruction (OBSTRN) Attributes: CATOBS - 1:snag / stump QUASOU - 1:depth known TECSOU - 3:found by multi-beam VALSOU - 2.238 m
WATLEV - 3:always under water/submerged



Figure 1.1.1



Figure 1.1.2

# 1.2) Profile/Beam - 5221/1 from h11551 / 1021\_reson8101\_hvf / 2007-102 / 381\_2109

## **DANGER TO NAVIGATION**

## **Survey Summary**

Survey Position:	047° 22' 24.325" N, 122° 27' 23.139" W
Least Depth:	2.53 m
Timestamp:	2007-102.21:16:09.496 (04/12/2007)
Survey Line:	h11551 / 1021_reson8101_hvf / 2007-102 / 381_2109
Profile/Beam:	5221/1
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of ~35' power yacht. Dive report: ~35 foot power yacht sunk on its mooring. The vessel's superstructure was of wood construction. The age of the electronic equipment aboard and relatively light marine growth suggests that the vessel sank relatively recently (within the last 5 years). No identifying markings were found. Depth will be revised with diver least depth gauge depth when available.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1021_reson8101_hvf/2007-102/381_2109	5221/1	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/258_1742	0008	1.17	325.4	Secondary
h11551/1015_c3d_hvf/2007-103/109_1558	0004	2.91	029.5	Secondary

## **Hydrographer Recommendations**

Chart dangerous wk with MBES sounding.

#### Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 1fm 2ft (18474\_1, 18445\_8) 2.5m (501\_1, 50\_1)

# S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck TECSOU - 3:found by multi-beam VALSOU - 2.530 m WATLEV - 3:always under water/submerged



Figure 1.2.1



Figure 1.2.2

# 1.1) Profile/Beam - 4376/96 from h11551 / 1021\_reson8101\_hvf / 2007-103 / 344\_1708

# **DANGER TO NAVIGATION**

## **Survey Summary**

Survey Position:	47° 22' 29.2" N, 122° 27' 34.3" W
Least Depth:	6.44 m (= 21.13 ft = 3.521 fm = 3 fm 3.13 ft)
TPU (±1.96σ):	THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp:	2007-103.17:13:09.472 (04/13/2007)
Survey Line:	h11551 / 1021_reson8101_hvf / 2007-103 / 344_1708
Profile/Beam:	4376/96
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on unknown obstruction standing ~3m above seabed.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1021_reson8101_hvf/2007-103/344_1708	4376/96	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-103/109_1558	0009	6.24	101.6	Secondary

# Hydrographer Recommendations

Chart obstruction with MBES least depth.

### Cartographically-Rounded Depth (Affected Charts):

3 ½fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 3fm 3ft (18474\_1, 18445\_8) 6.4m (501\_1, 50\_1)

## S-57 Data

Geo object 1:	Obstruction (OBSTRN)		
Attributes:	QUASOU - 1:depth known		
	SORDAT - 20070414		

SORIND - US,US,surve,H11551 TECSOU - 3:found by multi-beam VALSOU - 6.440 m WATLEV - 3:always under water/submerged

## **Office Notes**

DtoN was not charted but replaced by a shoaler obstruction.



Figure 1.3.1



Figure 1.3.2

# H11551 AWOIS Report

Registry Number:H11551State:WashingtonLocality:Quartermaster HarborSub-locality:OPR-N395-RA-07Survey Date:Variable State Stat

AWOIS Report from H11551.

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18474	8th	10/01/2003	1:40,000 (18474_1)	[L]NTM: ?
18445	31st	04/01/2006	1:80,000 (18445_8) 1:80,000 (18445_1)	[L]NTM: ?
18448	34th	07/01/2006	1:80,000 (18448_1)	[L]NTM: ?
18440	28th	12/01/2005	1:150,000 (18440_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	32nd	07/01/2005	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	31st	06/01/2005	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

## **Charts Affected**

\* 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	AWOIS	[no data]	[no data]	[no data]	
1.2	AWOIS	[no data]	[no data]	[no data]	
1.3	AWOIS	[no data]	[no data]	[no data]	

**1 - AWOIS Features** 

## 1.1) AWOIS #53319 - OBSTRUCTION

## No Primary Survey Feature for this AWOIS Item

Search Position:47° 21' 47.4" N, 122° 28' 22.5" WHistorical Depth:[None]Search Radius:100Search Technique:VS,SWMB,S2Technique Notes:[None]

#### **History Notes:**

CL-111/87 -- USPS; ROCK IDENTIFIED BY VS ABT 2.5 FT ABOVE WATER SURFACE. ROCK IS SUBM AT HIGH TIDE. LOCATED ABT 70FT FROM SHORE AT HIGH TIDE AT 47/21.8N 122/28.3W (ENTERED 01/17/06, SME)

## **Survey Summary**

Charts Affected: 18474\_1, 18445\_8, 18448\_1, 18440\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### **Remarks:**

Investigated with VBES star pattern, 100% MB coverage to 3.5m curve and 200% side scan sonar. The only feature observed was in SSS which fell on the inshore side of the rock symbol but within the AWOIS search radius. Although the contact was spotted, the shadow went off the screen and the height cannot be determined.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
OPR-N395-RA-07_Awois	AWOIS # 53319	0.00	000.0	Primary

## **Hydrographer Recommendations**

Remove Charted rock and replace with an obstruction of unknown depth in the surveyed position

## S-57 Data

[None]

# **Office Notes**

Chart rock at new position.

# **1.2) AWOIS #53322 - UNKNOWN**

## No Primary Survey Feature for this AWOIS Item

 Search Position:
 47° 23' 49.4" N, 122° 27' 44.5" W

 Historical Depth:
 [None]

[None]

Search Radius:100Search Technique:[None]

#### **History Notes:**

**Technique Notes:** 

LNM 15/73; A 40FT CABIN CRUISER HAS BEEN REPORTED SUNK IN APPROX POSITION 47/23/50N 122/27/40W IN QUARTERMASTER HARBOR. THE SUNKEN WK IS NOT VISIBLE AT HIGH TIDE. CHARTED AS VIS WK PA. CL-121/79 -- USPS; VS FOUND NO WRECKAGE ABOVE OR BELOW WATER. CHART CHANGED TO SUBM WK PA (ENTERED 01/17/06, SME)

## **Survey Summary**

Charts Affected: 18474\_1, 18445\_1, 18445\_8, 18448\_1, 18440\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### **Remarks:**

SSS was run over the charted wreck but a 10m gap occurred between swath widths. The wreck was not found but 100% SSS was not achieved.

With the side scan coverage run during regular survey operations and the multibeam coverage obtained and documented in the addendum, the search radius for this item has been completely surveyed with item detection techniques. No wreckage was seen during data acquisition and no dive investigation was made.

Although no wreck meeting the AWOIS description was found within the search radius, after reviewing the processed data, a smaller, 11-ft long wreck-shaped object was found in the multibeam data. The least depth of this wreck has been designated in the HDCS data.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
OPR-N395-RA-07_Awois	AWOIS # 53322	0.00	000.0	Primary

## **Hydrographer Recommendations**

Delete the dangerous wreck symbol and chart the wreck using the least depth and position of the designated sounding.

# S-57 Data

[None]

## **Office Notes**

Chart wreck at new location.

# 1.3) AWOIS #53318 - OBSTRUCTION

## No Primary Survey Feature for this AWOIS Item

Search Position:47° 20' 31.4" N, 122° 27' 26.4" WHistorical Depth:[None]Search Radius:100

Search Technique: VS, SWMB, S2 Technique Notes: [None]

#### History Notes:

CL-1304/86--USPS; ROCK COVERED WHEN HEIGHT OF TIDE IS 4.1FT ABOVE LLW LOCATED WITH COMPASS BEARINGS: FROM ROCK TO KMO RADIO TOWER 133DEG T, ROCK TO BROWNS PT LIGHTS 166DEG T, FROM ROCK TO STACK 216DEG T.■ LNM 52/86; SUBM ROCK REP 1986 ADDED AT 47/20/32N 122/27/22W (ENTERED 01/17/06, SME)

## **Survey Summary**

Charts Affected: 18474\_1, 18445\_8, 18448\_1, 18440\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### **Remarks:**

Investigated with VBES star pattern, 100% MB coverage to the 2.5m curve and 200% SSS coverage. No features were detected in the data.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
OPR-N395-RA-07_Awois	AWOIS # 53318	0.00	000.0	Primary

## Hydrographer Recommendations

Remove rk from chart

S-57 Data

[None]

# **Office Notes**

Remove rock from chart.

# H11551 Wreck Report

<b>Registry Number:</b>	H11551
State:	Washington
Locality:	Colvos Passage and Vicinity
Sub-locality:	Quartermaster Harbor
Project Number:	OPR-N395-RA-07
Survey Dates:	04/10/2007 - 10/24/2007

The purpose of this document is to provide information to the Hydrographic Surveys Division for updating the AWOIS database. These wrecks have been fully investigated with 100% multibeam. There is no need to re-investigate these items.

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18474	8th	10/01/2003	1:40,000 (18474_1)	[L]NTM: ?
			1:80,000 (18445_8)	
18445	31st	04/01/2006	1:80,000 (18445_1)	[L]NTM: ?
18448	34th	07/01/2006	1:80,000 (18448_1)	[L]NTM: ?
18440	28th	12/01/2005	1:150,000 (18440_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	32nd	07/01/2005	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	31st	06/01/2005	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

## **Charts Affected**

\* 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	Wreck	-4.33 m	47° 22' 20.2" N	122° 27' 22.9" W	
1.2	Wreck	13.43 m	47° 22' 57.5" N	122° 26' 56.4" W	
1.3	Wreck	11.30 m	47° 22' 20.3" N	122° 29' 03.7" W	
1.4	Wreck	8.44 m	47° 22' 24.6" N	122° 29' 05.1" W	
1.5	Wreck	9.22 m	47° 22' 56.3" N	122° 26' 49.0" W	
1.6	Wreck	9.67 m	47° 22' 22.3" N	122° 29' 03.8" W	

Generated by Pydro v9.10 (r2824) on Mon Mar 22 16:43:48 2010 [UTC]

1.7	Wreck	5.16 m	47° 22' 21.4" N	122° 27' 24.4" W	
1.8	Wreck	11.29 m	47° 22' 29.2" N	122° 28' 02.9" W	
1.9	Wreck	16.04 m	47° 20' 59.5" N	122° 29' 01.0" W	
1.10	Wreck	2.94 m	47° 23' 48.9" N	122° 27' 43.2" W	

1 - New Features

# 1.1) Profile/Beam - 12/1 from h11551 / 1101\_nonechosounder\_dp / 2007-102 / h11551\_1101\_dn102

## **Survey Summary**

Survey Position:	47° 22' 20.2" N, 122° 27' 22.9" W		
Least Depth:	-4.33 m (= -14.20 ft = -2.367 fm = -2 fm 2.20 ft)		
TPU (±1.96σ):	THU (TPEh) [None] ; TVU (TPEv) [None]		
Timestamp:	2007-102.18:29:55.000 (04/12/2007)		
DP Dataset:	h11551 / 1101_nonechosounder_dp / 2007-102 / h11551_1101_dn102		
Profile/Beam:	12/1		
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1		

#### **Remarks:**

HP of sunken sail boat with pole containing streamer tape on top.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1101_nonechosounder_dp/2007-102/h11551_1101_dn102	12/1	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/248_1835	0003	3.17	332.0	Secondary
h11551/1015_c3d_hvf/2007-103/108_1613	0002	7.00	299.6	Secondary

## **Hydrographer Recommendations**

Chart wreck.

#### **Cartographically-Rounded Depth (Affected Charts):**

-2<sup>1</sup>/<sub>4</sub>fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1)

-2fm 2ft (18474\_1, 18445\_8)

-4.3m (501\_1, 50\_1)

## S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck SORDAT - 20070414 SORIND - US,US,surve,H11551 VALSOU - -4.328 m WATLEV - 3:always under water/submerged

# **Office Notes**

Do not chart wreck. Chart obstruction area and seaward most wreck.

# 1.2) Profile/Beam - 360/55 from h11551 / 1006\_reson8101\_hvf / 2007-104 / 003\_1603

## **Survey Summary**

Survey Position:	47° 22' 57.5" N, 122° 26' 56.4" W
Least Depth:	13.43 m (= 44.06 ft = 7.343 fm = 7 fm 2.06 ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.964 m ; <b>TVU (TPEv)</b> ±0.251 m
Timestamp:	2007-104.16:04:15.437 (04/14/2007)
Survey Line:	h11551 / 1006_reson8101_hvf / 2007-104 / 003_1603
Profile/Beam:	360/55
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MB least depth on wreck of ~35' sailboat.

Dive Notes: No mast or rigging, looks like the vessel was stripped and then sank. LD is on FWD STBD corner of Pilot house. Fiberglass construction is delaminating in places. No identifying markings.

Diver's least depth gauge depth measured 13.58m at preliminary TCARI tides. The diver's least depth is deeper than SWMB least depth over the feature, therefore chart the MB sounding.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1006_reson8101_hvf/2007-104/003_1603	360/55	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/247_1848	0002	1.98	325.2	Secondary

## **Hydrographer Recommendations**

Chart wreck with MBES least depth.

#### **Cartographically-Rounded Depth (Affected Charts):**

7 ¼fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 7fm 2ft (18474\_1, 18445\_8) 13.4m (501\_1, 50\_1)

## S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck

SORDAT - 20070414 SORIND - US,US,surve,H11551 VALSOU - 13.429 m WATLEV - 3:always under water/submerged

## **Office Notes**

Chart wreck.

# 1.3) Profile/Beam - 2789/239 from h11551 / 1016\_reson8125\_hvf / 2007-102 / 524\_1929

### **Survey Summary**

Survey Position:	47° 22' 20.3" N, 122° 29' 03.7" W
Least Depth:	11.30 m (= 37.09 ft = 6.181 fm = 6 fm 1.09 ft)
TPU (±1.960):	<b>THU (TPEh)</b> ±1.969 m ; <b>TVU (TPEv)</b> ±0.255 m
Timestamp:	2007-102.19:34:10.276 (04/12/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-102 / 524_1929
Profile/Beam:	2789/239
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck.

Dive Notes: MBES least depth on wreck of ~35' power yacht. Wk is a chris craft type cruiser - app.; 32 ft long, blue bottom, white hull. LD on STBD FWD part of cabin. No masts or antennae seen. Mostly stripped with engine parts visible through hatch.

MBES least depth is shoaler than diver's least depth gauge depth.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-102/524_1929	2789/239	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/236_1611	0002	3.85	014.7	Secondary

## **Hydrographer Recommendations**

Chart wreck using MBES least depth.

#### **Cartographically-Rounded Depth (Affected Charts):**

6fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 6fm 1ft (18474\_1, 18445\_8) 11.3m (501\_1, 50\_1)

## S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 2:dangerous wreck

SORDAT - 20070414 SORIND - US,US,surve,H11551 VALSOU - 11.304 m WATLEV - 3:always under water/submerged

## **Office Notes**

Chart wreck area encompassing the three wrecks in this area.

# 1.4) Profile/Beam - 2525/216 from h11551 / 1016\_reson8125\_hvf / 2007-102 / 525\_1938

## **Survey Summary**

Survey Position:	47° 22' 24.6" N, 122° 29' 05.1" W
Least Depth:	8.44 m (= 27.70 ft = 4.617 fm = 4 fm 3.70 ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.964 m ; <b>TVU (TPEv)</b> ±0.249 m
Timestamp:	2007-102.19:41:52.124 (04/12/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-102 / 525_1938
Profile/Beam:	2525/216
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of skiff.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-102/525_1938	2525/216	0.00	000.0	Primary

## **Hydrographer Recommendations**

Chart soundings only.

## S-57 Data

Geo object 1:	Wreck (WRECKS)
---------------	----------------

Attributes: CATWRK - 1:non-dangerous wreck

SORDAT - 20070414

SORIND - US, US, surve, H11551

TECSOU - 3: found by multi-beam

VALSOU - 8.443 m

WATLEV - 3:always under water/submerged

# **Office Notes**

Chart wreck area encompassing the three wrecks in this area.

# 1.5) Profile/Beam - 1304/3 from h11551 / 1016\_reson8125\_hvf / 2007-103 / 331\_1749

## **Survey Summary**

Survey Position:	47° 22' 56.3" N, 122° 26' 49.0" W
Least Depth:	9.22  m (= 30.25  ft = 5.042  fm = 5  fm 0.25  ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.966 m ; <b>TVU (TPEv)</b> ±0.252 m
Timestamp:	2007-103.17:50:44.543 (04/13/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-103 / 331_1749
Profile/Beam:	1304/3
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of ~35' sailboat.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-103/331_1749	1304/3	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/247_1848	0001	2.83	259.8	Secondary

## **Hydrographer Recommendations**

Chart wreck using MBES least depth.

#### **Cartographically-Rounded Depth (Affected Charts):**

5fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1)

5fm 0ft (18474\_1, 18445\_8)

9.2m (501\_1, 50\_1)

## S-57 Data

Geo object 1: Wreck (WRECKS) Attributes: CATWRK - 2:dangerous wreck SORDAT - 20070414 SORIND - US,US,surve,H11551 VALSOU - 9.220 m WATLEV - 3:always under water/submerged

# **Office Notes**

Chart wreck.

# 1.6) Profile/Beam - 363/154 from h11551 / 1016\_reson8125\_hvf / 2007-104 / 440\_1718

## **Survey Summary**

Survey Position:	47° 22' 22.3" N, 122° 29' 03.8" W
Least Depth:	9.67 m (= 31.73 ft = 5.288 fm = 5 fm 1.73 ft)
<b>TPU</b> (±1.96σ):	THU (TPEh) $\pm 1.962$ m ; TVU (TPEv) $\pm 0.247$ m
Timestamp:	2007-104.17:18:57.581 (04/14/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-104 / 440_1718
Profile/Beam:	363/154
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of ~35' power yacht.

Dive Notes: Wk is a chris craft like cruiser lying slightly on its port side. LD on the STBD, FWD part of the top of the cabin. Vessel has a wooden hull with fiberglass top - both old and deteriorated. App 10 ft off the seafloor.

MBES least depth is shoaler than diver's least depth gauge depth.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-104/440_1718	363/154	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-102/236_1611	0001	3.77	019.1	Secondary

## **Hydrographer Recommendations**

Chart wreck using MBES least depth.

#### **Cartographically-Rounded Depth (Affected Charts):**

5 ¼fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 5fm 1ft (18474\_1, 18445\_8) 9.7m (501\_1, 50\_1)

## S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck

SORDAT - 20070414 SORIND - US,US,surve,H11551 TECSOU - 3:found by multi-beam VALSOU - 9.671 m WATLEV - 3:always under water/submerged

## **Office Notes**

Chart wreck area encompassing the three wrecks in this area.

# 1.7) Profile/Beam - 1120/149 from h11551 / 1016\_reson8125\_hvf / 2007-104 / 467\_1629

## **Survey Summary**

Survey Position:	47° 22' 21.4" N, 122° 27' 24.4" W
Least Depth:	5.16 m (= 16.94 ft = 2.823 fm = 2 fm 4.94 ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.962 m ; <b>TVU (TPEv)</b> ±0.246 m
Timestamp:	2007-104.16:31:01.034 (04/14/2007)
Survey Line:	h11551 / 1016_reson8125_hvf / 2007-104 / 467_1629
Profile/Beam:	1120/149
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of small runabout.

## **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1016_reson8125_hvf/2007-104/467_1629	1120/149	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-103/108_1613	0003	5.42	262.3	Secondary

## **Hydrographer Recommendations**

Chart soundings only.

## S-57 Data

- Geo object 1: Wreck (WRECKS)
- Attributes: CATWRK 2:dangerous wreck

SORDAT - 20070414

SORIND - US,US,Surve,H11551

TECSOU - 3: found by multi-beam

VALSOU - 5.162 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

# **Office Notes**

Do not chart wreck. Chart obstruction area and seaward most wreck.
# **Feature Images**



Figure 1.7.1

# 1.8) Profile/Beam - 1238/49 from h11551 / 1021\_reson8101\_hvf / 2007-102 / 331\_2040

# **Survey Summary**

Survey Position:	47° 22' 29.2" N, 122° 28' 02.9" W
Least Depth:	11.29 m (= $37.04$ ft = $6.174$ fm = $6$ fm 1.04 ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.964 m ; <b>TVU (TPEv)</b> ±0.251 m
Timestamp:	2007-102.20:43:03.195 (04/12/2007)
Survey Line:	h11551 / 1021_reson8101_hvf / 2007-102 / 331_2040
Profile/Beam:	1238/49
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

## **Remarks:**

MBES least depth on wreck of small skiff standing ~2.5m above seabed

# **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1021_reson8101_hvf/2007-102/331_2040	1238/49	0.00	000.0	Primary

# **Hydrographer Recommendations**

Chart Wreck using MBES least depth.

#### **Cartographically-Rounded Depth (Affected Charts):**

6fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 6fm 1ft (18474\_1, 18445\_8)

11.3m (501\_1, 50\_1)

# S-57 Data

Geo object 1: Wreck (WRECKS) Attributes: CATWRK - 2:dangerous wreck SORDAT - 20070414 SORIND - US,US,surve,H11551 TECSOU - 3:found by multi-beam VALSOU - 11.291 m WATLEV - 3:always under water/submerged

# **Office Notes**

Chart wreck.

# 1.9) Profile/Beam - 419/84 from h11551 / 1006\_reson8101\_hvf / 2007-100 / 307\_2238

# **Survey Summary**

Survey Position:	47° 20' 59.5" N, 122° 29' 01.0" W
Least Depth:	16.04  m (= 52.62  ft = 8.770  fm = 8  fm 4.62  ft)
TPU (±1.96 <b>5</b> ):	<b>THU</b> ( <b>TPEh</b> ) ±1.968 m ; <b>TVU</b> ( <b>TPEv</b> ) ±0.261 m
Timestamp:	2007-100.22:39:38.461 (04/10/2007)
Survey Line:	h11551 / 1006_reson8101_hvf / 2007-100 / 307_2238
Profile/Beam:	419/84
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

#### **Remarks:**

MBES least depth on wreck of ~80' working/fishing boat.

Dive Notes: Divers found a wooden fishing vessel. Least Depth was off a mast sticking app. 6 ft above the deck. The vessel had no superstructure, and the deck was open in some places revealing machinery below. No identifying markings were found.

Diver's least depth gauge was slightly deeper than MBES depth.

# **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1006_reson8101_hvf/2007-100/307_2238	419/84	0.00	000.0	Primary
h11551/1015_c3d_hvf/2007-101/101-2128	0002	2.25	165.7	Secondary

# **Hydrographer Recommendations**

Chart non-dangerous wreck with MBES sounding.

#### **Cartographically-Rounded Depth (Affected Charts):**

8 <sup>3</sup>/<sub>4</sub>fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1) 8fm 4ft (18474\_1, 18445\_8) 16.0m (501\_1, 50\_1)

# S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck

SORDAT - 20070414 SORIND - US,US,surve,H11551 TECSOU - 3:found by multi-beam VALSOU - 16.038 m WATLEV - 3:always under water/submerged

# **Office Notes**

Chart wreck.

# 1.10) Profile/Beam - 902/101 from h11551 / 1021\_reson8101\_hvf / 2007-297 / 816\_1901

# **Survey Summary**

Survey Position:	47° 23' 48.9" N, 122° 27' 43.2" W
Least Depth:	2.94  m (= 9.65  ft = 1.609  fm = 1  fm 3.65  ft)
TPU (±1.96σ):	<b>THU (TPEh)</b> ±1.376 m ; <b>TVU (TPEv)</b> ±0.266 m
Timestamp:	2007-297.19:02:14.086 (10/24/2007)
Survey Line:	h11551 / 1021_reson8101_hvf / 2007-297 / 816_1901
Profile/Beam:	902/101
Charts Affected:	18474_1, 18445_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

## **Remarks:**

Designated least depth on small 11-ft long wreck-shaped object in multibeam data.

# **Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11551/1021_reson8101_hvf/2007-297/816_1901	902/101	0.00	000.0	Primary

# **Hydrographer Recommendations**

Delete dangerous wreck symbol and chart the wreck using the least depth and position of the designated sounding.

# S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 1:non-dangerous wreck
	SORDAT - 20071024
	SORIND - US,US,surve,H11551
	VALSOU - 2.942 m
	WATLEV - 3:always under water/submerged

# **Office Notes**

## Chart new wreck.

Survey Position:	47-21-12.90N, 122-29-14.92 W
Least Depth:	-0.18 m
S-57 Attributes:	Wreck (WRECKS)
Attributes:	CATWRK: 2:dangerous wreck
TECSOU:	3:found by multibeam
WATLEV:	5: awash
SORDAT:	20080428
SORIND:	US,US,graph,H11550

Remarks:MBES least depth on wreck of ~36 meter tug. Sunken vessel is the "Murph" USCG<br/>document number 960287, formally the Navy's tug "Wingina" YTM 395.

**Office Notes:** Charted wreck. Wreck is should be added to the AWOIS database.





Subject: Quartermaster Harbor Wreck From: tyanne faulkes <tyanne.faulkes@noaa.gov> Date: Thu, 18 Mar 2010 11:30:10 -0700 To: timothy.westcott@uscg.mil

Hello Timothy,

I am working on updating the chart in Quartermaster Harbor (18474) and it was brought to my attention by NOAA Officers that there was a tug that was sunk in the harbor when they were leaving the survey grounds in 2007. I know that the tug was present in 2008 when the /Rainier/ was surveying an adjacent area. The tug was marked by buoys and /Rainier/ personnel did get some data on the tug. Unfortunately that data has been misplaced and I am trying to recover as much information as possible because I will not sleep well at night if I update a chart knowing that there is a wreck that we know about. Any information that you have would be greatly appreciated. Thank you so much for your help.

Sincerely,

Tyanne Faulkes

Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office) Subject: FW: Quartermaster Harbor Wreck... From: "Westcott, Timothy" <Timothy.L.Westcott@uscg.mil> Date: Wed, 07 Apr 2010 14:36:06 -0700 To: "Tyanne Faulkes (NOAA)" <Tyanne.Faulkes@noaa.gov>

Tyanne,

```
Have you been able to resolved this matter?
```

r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/dl3/dpw.asp "Boating Safety, Its everyone's responsibility!"

Document.pdf	<b>Content-Description:</b>	Document.pdf
	<b>Content-Type:</b>	application/pdf
	<b>Content-Encoding:</b>	base64

Subject: [Fwd: Quartermaster Harbor Wreck] From: tyanne faulkes <tyanne.faulkes@noaa.gov> Date: Thu, 25 Mar 2010 11:30:43 -0700 To: Gary Nelson <Gary.Nelson@noaa.gov>

Here is the email that I sent to the USCG.

For the DtoN, if there was one submitted it could have been submitted between 4/10/2008-4/28/2008. That is when they were surveying in the Southern portion of Colvos Passage.

Tyanne

Subject: Quartermaster Harbor Wreck From: tyanne faulkes <tyanne.faulkes@noaa.gov> Date: Thu, 18 Mar 2010 11:30:10 -0700 To: timothy.westcott@uscg.mil

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Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office)

Quantanmastan Hanhan Wrock am	<b>Content-Type:</b>	message/rfc822
Quartermaster marbor wreck.em	<b>Content-Encoding:</b>	7bit

Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update!
From: "Westcott, Timothy" <Timothy.L.Westcott@uscg.mil>
Date: Wed, 07 Apr 2010 15:14:10 -0700
To: MELISSA.MONTGOMERY@dnr.wa.gov
CC: Tyanne.Faulkes@noaa.gov, "McCann, Rebecca E. ENS" <Rebecca.E.McCann@uscg.mil>, "Keefauver, Richard BMC" <Richard.D.Keefauver@uscg.mil>

Melissa,

Long time no e-mail. I guess that's good in many ways.

Could you please tell us what the status is on the Tug Murf, which sunk in Quartermaster Harbor?

We the Coast Guard marked it with buoys and Tyanne with NOAA would like to know if the vessel has been removed? She is working on charting this vessel if it still is on the bottom of the bay.

Isn't this vessel one that is on the Trash Compactor list?

Thank you in advance for your help with this matter!

r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/d13/dpw.asp "Boating Safety, Its everyone's responsibility!"

----Original Message----From: <u>Tyanne.Faulkes@noaa.gov</u> [<u>mailto:Tyanne.Faulkes@noaa.gov</u>] Sent: Wednesday, April 07, 2010 2:59 PM To: Westcott, Timothy Subject: Re: FW: Quartermaster Harbor Wreck...

I just wanted to verify that this wreck has not been removed or salvaged. If you have not heard anything we will go ahead and apply the data to the chart.

Thanks,

Tyanne Faulkes

Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office)

Westcott, Timothy wrote: Tyanne, Have you been able to resolved this matter? r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager
Private Aids to Navigation Manager
Seattle, Washington
(206) 220-7285 / Fax 7265
timothy.l.westcott@uscg.mil
http://www.uscg.mil/d13/dpw.asp
"Boating Safety, Its everyone's responsibility!"

Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update!
From: "FERRIS, MELISSA (DNR)" <MELISSA.FERRIS@dnr.wa.gov>
Date: Wed, 07 Apr 2010 15:19:16 -0700
To: Timothy.L.Westcott@uscg.mil
CC: Tyanne.Faulkes@noaa.gov, "McCann, Rebecca E. ENS" <Rebecca.E.McCann@uscg.mil>, "Keefauver, Richard BMC" <Richard.D.Keefauver@uscg.mil>

Hi Timothy, The vessel is still cruising the shallow depths of Quartermaster. We are unlikely to have the funding to remove it anytime soon. Next chance will be the 11-13 budget cycle.

On the positive side, I hear it is a great dive site (and well-marked!)

Melissa Ferris Program Manager Derelict Vessel Removal Program, Aquatic Resources Division Washington State Department of Natural Resources (360) 902-1574 melissa.ferris@dnr.wa.gov www.dnr.wa.gov

-----Original Message-----From: <u>Timothy.L.Westcott@uscg.mil</u> [<u>mailto:Timothy.L.Westcott@uscg.mil</u>] Sent: Wednesday, April 07, 2010 3:14 PM To: FERRIS, MELISSA (DNR) Cc: <u>Tyanne.Faulkes@noaa.gov</u>; McCann, Rebecca E. ENS; Keefauver, Richard BMC Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update!

Melissa,

Long time no e-mail. I guess that's good in many ways.

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Isn't this vessel one that is on the Trash Compactor list?

Thank you in advance for your help with this matter!

r/ Timothy L. Westcott
13th Coast Guard District
Prevention Division (dp)
Waterways Management Branch (dpw)
Federal ATON Damage Claim Manager
Private Aids to Navigation Manager
Seattle, Washington
(206) 220-7285 / Fax 7265
timothy.l.westcott@uscg.mil
http://www.uscg.mil/d13/dpw.asp
"Boating Safety, Its everyone's responsibility!"

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I just wanted to verify that this wreck has not been removed or salvaged. If you have not heard anything we will go ahead and apply the data to the chart. Thanks, Tyanne Faulkes Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office) Westcott, Timothy wrote: Tyanne, Have you been able to resolved this matter? r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/d13/dpw.asp "Boating Safety, Its everyone's responsibility!" -----------

Subject: Re: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update!
From: tyanne faulkes <tyanne.faulkes@noaa.gov>
Date: Wed, 07 Apr 2010 15:33:30 -0700
To: "FERRIS, MELISSA (DNR)" <MELISSA.FERRIS@dnr.wa.gov>
CC: Timothy.L.Westcott@uscg.mil, "McCann, Rebecca E. ENS" <Rebecca.E.McCann@uscg.mil>, "Keefauver, Richard BMC" <Richard.D.Keefauver@uscg.mil>

Alright. Thanks everyone for their help. I will make sure that this gets onto the chart and updated to NOAA's AWOIS database.

#### Tyanne

FERRIS, MELISSA (DNR) wrote: Hi Timothy, The vessel is still cruising the shallow depths of Quartermaster. We are unlikely to have the funding to remove it anytime soon. Next chance will be the 11-13 budget cycle. On the positive side, I hear it is a great dive site (and well-marked!) Melissa Ferris Program Manager Derelict Vessel Removal Program, Aquatic Resources Division Washington State Department of Natural Resources (360) 902-1574 melissa.ferris@dnr.wa.gov www.dnr.wa.gov ----Original Message-----From: Timothy.L.Westcott@uscg.mil [mailto:Timothy.L.Westcott@uscg.mil] Sent: Wednesday, April 07, 2010 3:14 PM To: FERRIS, MELISSA (DNR) Cc: Tyanne.Faulkes@noaa.gov; McCann, Rebecca E. ENS; Keefauver, Richard BMC Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update! Melissa, Long time no e-mail. I guess that's good in many ways. Could you please tell us what the status is on the Tuq Murf, which sunk in Quartermaster Harbor? We the Coast Guard marked it with buoys and Tyanne with NOAA would like to know if the vessel has been removed? She is working on charting this vessel if it still is on the bottom of the bay. Isn't this vessel one that is on the Trash Compactor list? Thank you in advance for your help with this matter! r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp)

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"Boating Safety, Its everyone's responsibility!"

----Original Message-----

From: Tyanne.Faulkes@noaa.gov [mailto:Tyanne.Faulkes@noaa.gov] Sent: Wednesday, April 07, 2010 2:59 PM To: Westcott, Timothy Subject: Re: FW: Quartermaster Harbor Wreck... I just wanted to verify that this wreck has not been removed or salvaged. If you have not heard anything we will go ahead and apply the data to the chart. Thanks, Tyanne Faulkes Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office) Westcott, Timothy wrote: Tyanne, Have you been able to resolved this matter? r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/d13/dpw.asp "Boating Safety, Its everyone's responsibility!" \_\_\_\_\_

Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update! From: "FERRIS, MELISSA (DNR)" <MELISSA.FERRIS@dnr.wa.gov> Date: Wed, 07 Apr 2010 15:51:43 -0700 **To:** tyanne faulkes <Tyanne.Faulkes@noaa.gov> CC: Timothy.L.Westcott@uscg.mil, "McCann, Rebecca E. ENS" <Rebecca.E.McCann@uscg.mil>, "Keefauver, Richard BMC" <Richard.D.Keefauver@uscg.mil> So your charts are correct: the sunken vessel is the "Murph" USCG document number 960287, formerly the Navy's tug "Wingina" YTM 395. Melissa Ferris Program Manager Derelict Vessel Removal Program, Aquatic Resources Division Washington State Department of Natural Resources (360) 902-1574 melissa.ferris@dnr.wa.gov www.dnr.wa.gov ----Original Message-----From: tyanne faulkes [mailto:Tyanne.Faulkes@noaa.gov] Sent: Wednesday, April 07, 2010 3:34 PM To: FERRIS, MELISSA (DNR) Cc: Timothy.L.Westcott@uscg.mil; McCann, Rebecca E. ENS; Keefauver, Richard BMC Subject: Re: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update! Alright. Thanks everyone for their help. I will make sure that this gets onto the chart and updated to NOAA's AWOIS database. Tyanne FERRIS, MELISSA (DNR) wrote: Hi Timothy, The vessel is still cruising the shallow depths of Quartermaster. We are unlikely to have the funding to remove it anytime soon. Next chance will be the 11-13 budget cycle. On the positive side, I hear it is a great dive site (and well-marked!) Melissa Ferris Program Manager Derelict Vessel Removal Program, Aquatic Resources Division Washington State Department of Natural Resources (360) 902-1574 melissa.ferris@dnr.wa.gov www.dnr.wa.gov ----Original Message-----From: <u>Timothy.L.Westcott@uscg.mil [mailto:Timothy.L.Westcott@uscg.mil]</u> Sent: Wednesday, April 07, 2010 3:14 PM To: FERRIS, MELISSA (DNR) Cc: Tyanne.Faulkes@noaa.gov; McCann, Rebecca E. ENS; Keefauver, Richard BMC Subject: RE: FW: Quartermaster Harbor Wreck... (Tug Murf?)... request update! Melissa, Long time no e-mail. I guess that's good in many ways. Could you please tell us what the status is on the Tug Murf, which sunk in Quartermaster Harbor? We the Coast Guard marked it with buoys and Tyanne with NOAA would like to know if the vessel has been removed? She is working on charting this vessel if it still is on the bottom of the bay.

Isn't this vessel one that is on the Trash Compactor list? Thank you in advance for your help with this matter! r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/d13/dpw.asp "Boating Safety, Its everyone's responsibility!" \_\_\_\_\_ ----Original Message-----From: Tyanne.Faulkes@noaa.gov [mailto:Tyanne.Faulkes@noaa.gov] Sent: Wednesday, April 07, 2010 2:59 PM To: Westcott, Timothy Subject: Re: FW: Quartermaster Harbor Wreck... I just wanted to verify that this wreck has not been removed or salvaged. If you have not heard anything we will go ahead and apply the data to the chart. Thanks, Tyanne Faulkes Contracted Physical Scientist, Pacific Hydrographic Branch Office of Coast Survey National Oceanic & Atmospheric Administration Tyanne.Faulkes@noaa.gov 206-526-6883 (Office) Westcott, Timothy wrote: Tyanne, Have you been able to resolved this matter? r/ Timothy L. Westcott 13th Coast Guard District Prevention Division (dp) Waterways Management Branch (dpw) Federal ATON Damage Claim Manager Private Aids to Navigation Manager Seattle, Washington (206) 220-7285 / Fax 7265 timothy.l.westcott@uscg.mil http://www.uscg.mil/d13/dpw.asp "Boating Safety, Its everyone's responsibility!"



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

#### TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : April 25, 2007

HYDROGRAPHIC BRANCH: Pacific HYDROGRAPHIC PROJECT: OPR-N395-RA-2007 HYDROGRAPHIC SHEET: H11551

LOCALITY: Quartermaster Harbor, WA TIME PERIOD: April 10-14, 2007

TIDE STATION USED: 944-7130 Seattle, WA Lat. 47° 36.2' N Long. 122° 20.4' W PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.199 meters

TIDE STATION USED: 944-6484 Tacoma, WA

Lat. 47 16.0' N Long. 122 24.8' W PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.336 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-N395-RA-2007, H11551, during the time between April 10 and April 14, 2007.

Please use the zoning file "N395RA2007CORP" submitted with the project instructions for Colvos Passage and Vicinity, WA. Zones PS178, PS179, PS180, & PS182 are the applicable zones for H11551.

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).



Digitally signed by Stephen K. Gill DN: cn=Stephen K. Gill, c=US, I=Silver Spring, st=Maryland, o=National Oceanic and Atmospheric Administration, ou=Center for Operational Oceanographic Products & Serv., email=Stephen, Gil@noaa gov Reason: 1 attest to the accuracy and integrity of this document Date: 2007 05 08 12:36:33 -04'00'

CHIEF, PRODUCTS AND SERVICES DIVISION





## H11551 HCell Report

Tyanne Faulkes, ERT Associate 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 ENCs and RNCs in the region: NOAA RNC, 18474 (1:40,000) and corresponding NOAA ENC, US5WA18M. (See section 4. Meta Areas.)

HCell compilation of survey H11551 utilized Office of Coast Survey DRAFT HCell Specifications Version 4.0. For additional information on the standards and protocols used for HCell Compilation, see the DRAFT A/PHB HCell Reference Guide, version 2.0, 22 February, 2010.

#### **1.** Compilation Scale

Depths and features for HCell H11551 were compiled to the largest scale chart in the region, 18474, 1:40,000. (See section 4. Meta Areas.)

#### 2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 10-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1: 7,500 survey scale using a Radius Table file with values shown in the table, below. The resultant sounding layer contains 13,284 depths ranging from 0 to 180.172 meters.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-4.7	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 and imported into a new layer created to accommodate chart 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 metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 18474	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 H11551_SS.000
0	0	0.000	0.000	0
1	1.8288	2.0574	1.125	1
3	5.4864	5.715	3.125	3
10	18.288	18.517	10.125	10
20	36.576	37.9476	20.750	20
30	54.864	56.236	30.750	30
40	73.152	74.5236	40.750	40
50	91.44	92.812	50.750	50

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

Some modifications made to GC shoreline MLLW contours, to bring the GC shoreline into agreement with H11551 hydrography, necessitated inclusion of several "0" DEPCNT features in the HCell. These 0 value contours have been generalized per the chart above. See 9.2 *Conflicts between Shoreline and Hydrography*.

## 4. Meta Areas

The following Meta object areas are included in HCell H11551:

# M\_QUAL

Meta area objects were constructed on the basis of the limits of the hydrography. (See 3.1 *Depth Areas*.)

## 5. Features

## 5.1 Generalization of Features to Chart Scale

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 is modified to emulate chart scale.

Feature generalization to emulate chart scale is accomplished primarily through reduction in the number of features included in the HCell, and in some cases generalizing area features to point objects. Some instances of reduction of area features to point objects is entrusted to the RNC division, for example rocky seabed areas that will display as point features on the RNC. Where

line and area objects are included in the HCell, complexity of the lines and edges comprising the features have been smoothed to commensurate with chart scale.

## 5.2 Compilation of Features to the HCell

Shoreline features for H11551 were delivered from the field in four different hob files defining new features, modification to GC or charted features, and disprovals. These were deconflicted against GC shoreline, the chart and hydrography during office processing.

The source of all features included in the H11551 HCell can be determined by the SORIND field.

## 5.2 Mean High Water Used for HCells

For the purposes of determining the height at which a rock becomes an islet, the CO-OPS "*Tide Note for Hydrographic Survey*", "*Height of High Water Above the Plane of Reference*" is used.

## 6. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue Notes
BOYSPP	Private mooring buoy
MARCUL	Marine culture, farm
MORFAC	Mooring facility
M_QUAL	Data quality Meta object
OBSTRN	Obstruction area and point objects
PILPNT	Piles
SBDARE	Bottom samples
SLCONS	Shoreline construction, piers, docks
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WRECKS	Wreck areas and point objects

The \*\_SS HCell contains the following Objects:

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

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 OCS HCell Specifications.

## 7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features. By agreement with MCD, the NINFOM field is populated with an abbreviated version of the Blue Note (30 characters or less), describing the chart disposition, to be used by MCD in generating their Chart History spreadsheet.

#### 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

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 fathoms and feet charting units with NOAA rounding ensures that:

- All depths deeper or equal to 11 fathoms display as whole fathoms.
- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units above 0 fathoms (MLLW) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet above that. (This is a deviation from the traditional 'fathoms and feet' charting rule that requires that all depths above MLLW will be shown in feet. The display in fathoms and feet for depths between MLLW and 2 feet above MHW accommodates S-57 rules that require the same charting units to be used for all depth units (DUNI) in an ENC.)
- All height units (HUNI) which have been converted to charting units, and that are 2.00 feet above MHW and greater, are shown in feet.

In an ENC viewer fathoms and feet depth units (DUNI) display in the format X.YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. In an ENC viewer, heights (HUNI) display as whole feet.

## 9. Data Processing Notes

## 9.1 Junction with H11551

H11551 junctions with H11550, submitted in March 2010. A common junction was made between the two surveys which have not been compiled, H11646 to the East and H12052 to the South.

# 10. QA/QC and ENC Validation Checks

H11551 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

H11551_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H11551_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11551_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11551_outline.gml	Survey outline to populate SURDEX

# 11.3 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 depth area, 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	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC	Independent inspection of final HCells using a
Ver.1.0.0.3	COTS viewer.

# 12. Contacts

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

Tyanne Faulkes ERT Associate Pacific Hydrographic Branch Seattle, WA 206-526-6883 <u>Tyanne.Faulkes@noaa.gov</u>

# APPROVAL SHEET H11551

## 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 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.

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.