

H12159

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* Hydrographic

*Field No.*

*Registry No.* H12159

### LOCALITY

*State* Washington

*General Locality* Anacortes

*Sublocality* Guemes Channel

2010

### CHIEF OF PARTY

Dan Jacobs, NOAA

### LIBRARY & ARCHIVES

DATE

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;"><b>HYDROGRAPHIC TITLE SHEET</b></p>	<p>REGISTRY No</p> <p style="text-align: center;"><b>H12159</b></p>
<p><b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No: RA-20-06-09</p>
<p>State <u>Washington</u></p> <hr/> <p>General Locality <u>Anacortes</u></p> <hr/> <p>Sub-Locality <u>Guemes Channel</u></p> <hr/> <p>Scale <u>1:10,000</u> Date of Survey <u>03/19/2010 - 06/24/2010</u></p> <hr/> <p>Instructions dated <u>03/08/2010, Change #1 6/25/2010</u> Project No. <u>S-N902-NRT3-10</u></p> <hr/> <p>Vessel <u>S1212 (NRT-3)</u></p> <hr/> <hr/> <p>Chief of party <u>Dan Jacobs</u></p> <hr/> <p>Surveyed by <u>Dan Jacobs, B. Jackson</u></p> <hr/> <p>Soundings by <u>Kongsberg EM3002 Multibeam Echosounder</u></p> <hr/> <p>SAR by <u>Adam Argento</u> Compilation by <u>Russ Davies</u></p> <hr/> <p>Soundings compiled in <u>Fathoms and Feet</u></p> <hr/>	
<p><b>REMARKS:</b> <u>All times are UTC. UTM Zone 10</u></p> <hr/> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.</u></p> <hr/> <hr/> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u></p> <hr/>	

# Descriptive Report to Accompany Hydrographic Survey 12159

Project S-N902-NRT3-10  
Guemes Channel, Washington  
Scale 1:10,000  
March 19 – June 24, 2010  
NOAA NRT3 (S1212)

## A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions S-N902-NRT3-10 dated March 8, 2010 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is Guemes Channel in the state of Washington (Figure 1). This survey corresponds to sheet “A” in the sheet layout provided with the Project Instructions. S-N902-NRT3-10 responds to a request from the regional Navigation Manager to resurvey the area regularly due to Anacortes oil refineries that rely on deep draft tanker access through Guemes Channel. The area was last surveyed in 2003 and Anacortes, WA is #37 on the MTS 175 Ports List.

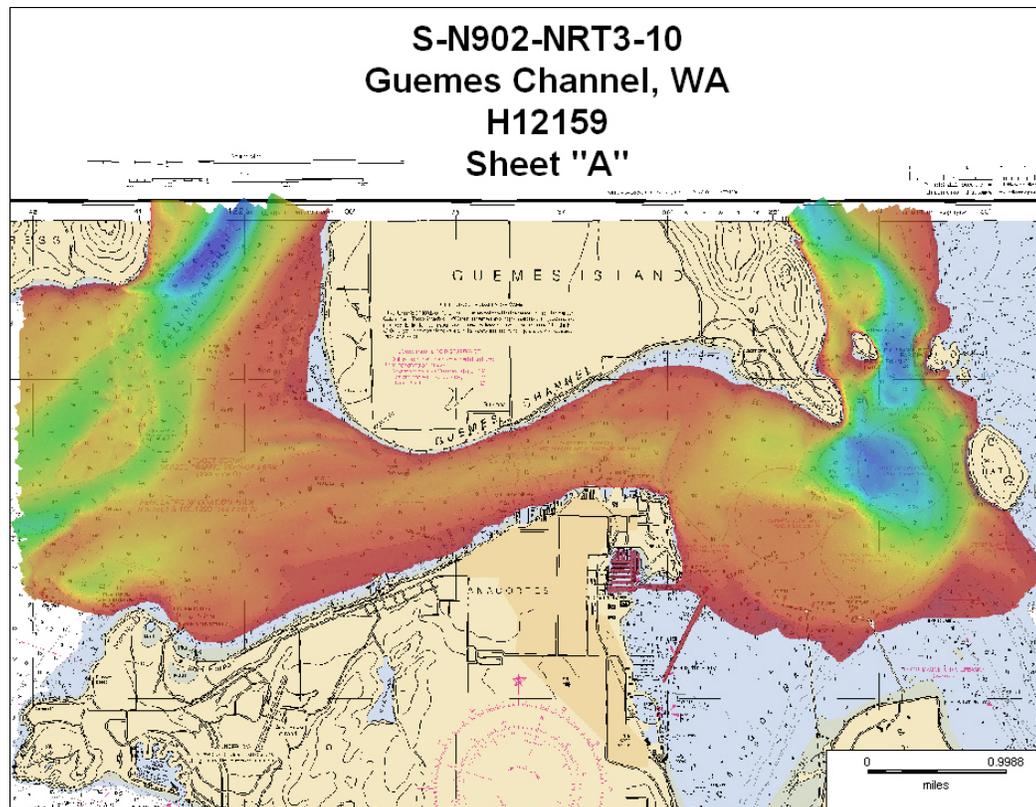


Figure 1: H12159 survey area (chart 18427).

<sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (April 2010), OCS Field Procedures Manual for Hydrographic Surveying (April 2010), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

Complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 4 meters and deeper. Additionally, in 4-20 meter water depths, 100% side scan sonar (SSS) coverage was acquired as per H12159 project instructions dated 8 March 2010. Change No. 1 to H12159 project instructions dated 25 June 2010 (refer to Appendix V) dropped the SSS requirement. Because data acquisition concluded prior to receipt of Change No. 1, the SSS data is included for reference only and is not intended as a deliverable. Although outside the assigned area, bathymetry (but not shoreline data) was acquired in the Cap Sante marina and into the channel south of the Cap Sante Waterway; both areas receive substantial amounts of vessel traffic.

Limited Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12159, as per section 3.5.5 of the Field Procedures Manual April, 2010 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .hob files.

<b>Data Acquisition Type on Survey Launch S1212</b>	<b>Mileage (nm)</b>	<b>Total</b>
MBES (mainscheme)	<b>402.45</b>	<b>402.45</b>
SSS (mainscheme)	<b>74.41</b>	<b>74.41</b>
Crosslines	<b>22.98</b>	<b>22.98</b>
Bottom Samples	-	-
Total Area Surveyed (sq. nm)	-	<b>10.04</b>

*Table 1: Statistics for survey H12159*

Data acquisition was conducted from March 19 to June 24, 2003 (DN 78 to 175) in Guemes Channel, Washington.

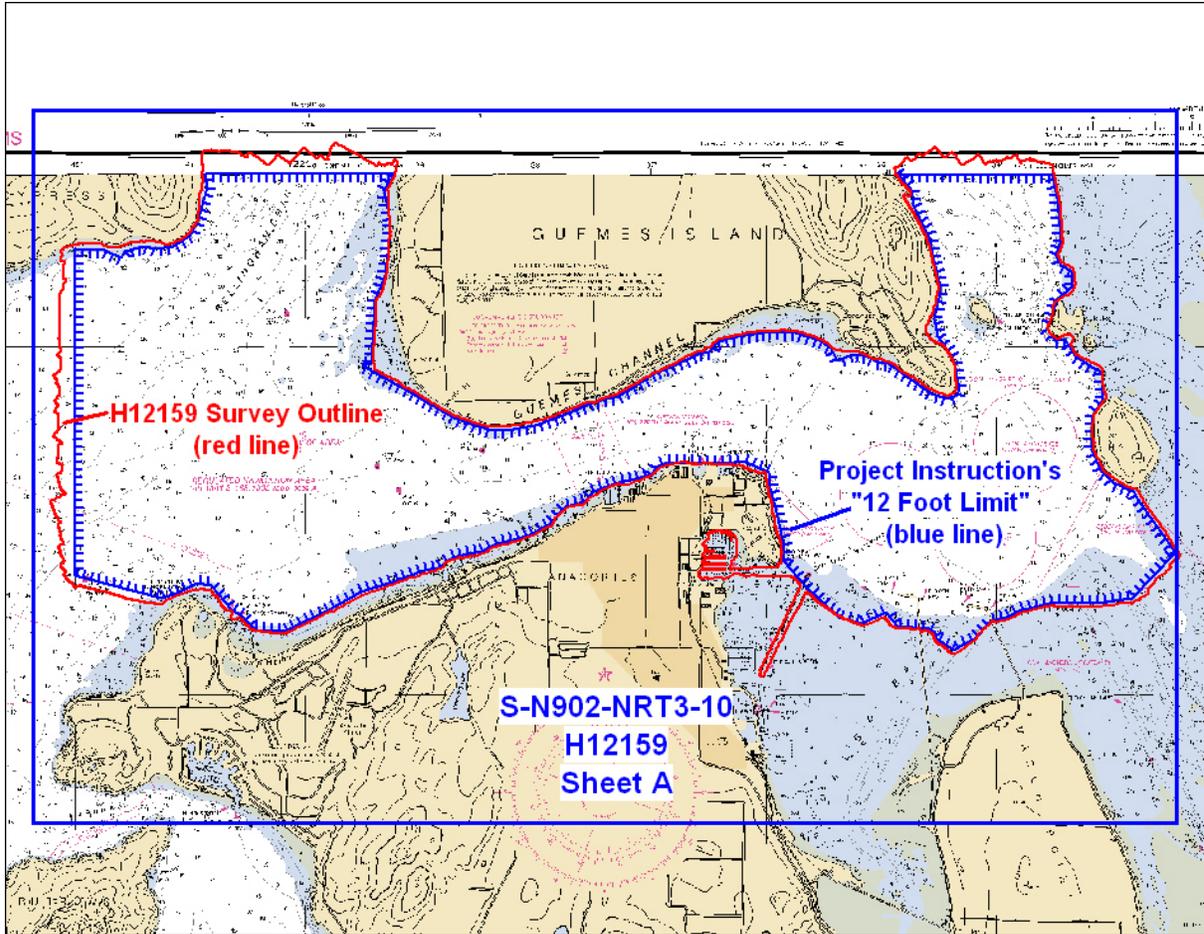


Figure 2: H12159 Survey limits and outline (chart 18427).

## B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *S-N902-NRT3-10 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

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

### B.1. Vessel and Equipment

Data for this survey were acquired by the following vessel:

Hull Number	Name	Length	Draft	Acquisition Type
S1212	SeaArk	30 ft	.65m	Kongsberg EM 3002 echo sounder, Klein 3000 side scan sonar.

*Table 2: Data acquisition vessel and systems for H12159.*

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

Multibeam vessel navigation and attitude data were measured and recorded using Applanix POS/MV 320 system, version 4. The Kongsberg EM 3002 does not allow for post processing (loading) true heave data.

A complete description of survey vessels, hardware, and software systems is included in the *S-N902-NRT3 DAPR*.

No unusual vessel configurations were used for data acquisition.

### B.2. Quality Control

#### Crosslines

Multibeam Echosounder (MBES) crosslines (XL) totaled 22.98 nautical miles, comprising 5.7% of main scheme MBES hydrography. A CARIS BASE surface of the mainscheme bathymetry was compared to a BASE surface the XL data using the curser information tool in CARIS HIPS and SIPS. In water depths up to 20 meters, XL and mainscheme nadir depths agreed within 0.14 meters. In water depths between 21-50 meters, nadir depths agreed within 0.13 meters. In depths between 51-100 meters, XL and mainscheme nadir depths agreed within 0.17 meters. <sup>1</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 2010 NRT3 Hydrographic System Readiness Review package submitted with this survey.

### Final Uncertainty

Uncertainty values of submitted, finalized grids are calculated in Caris using the “Greater of the Two” of total propagated uncertainty and standard deviation (scaled to 95%). An “IHOness” attribute layer was created for the H12159 finalized combined surface in CARIS HIPS for analysis. Uncertainty values throughout the survey meet IHO Order 1 with the exception of those areas shown in red (Figure 3). Areas with data outside IHO Order 1, shown in red, generally occur in water depths of 80 meters or deeper.<sup>2</sup>



Figure 3: H12159 IHO Compliance.

### Junctions

No contemporary surveys junction with H12159.<sup>3</sup>

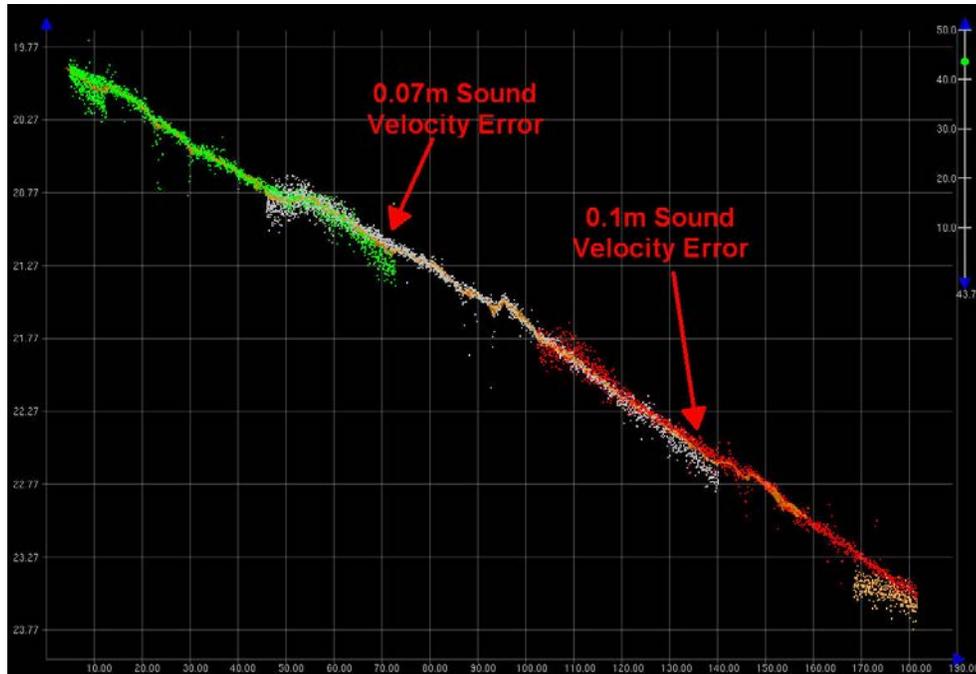
### Quality Control Checks

MBES quality control checks were conducted as discussed in the quality control section of the DAPR.

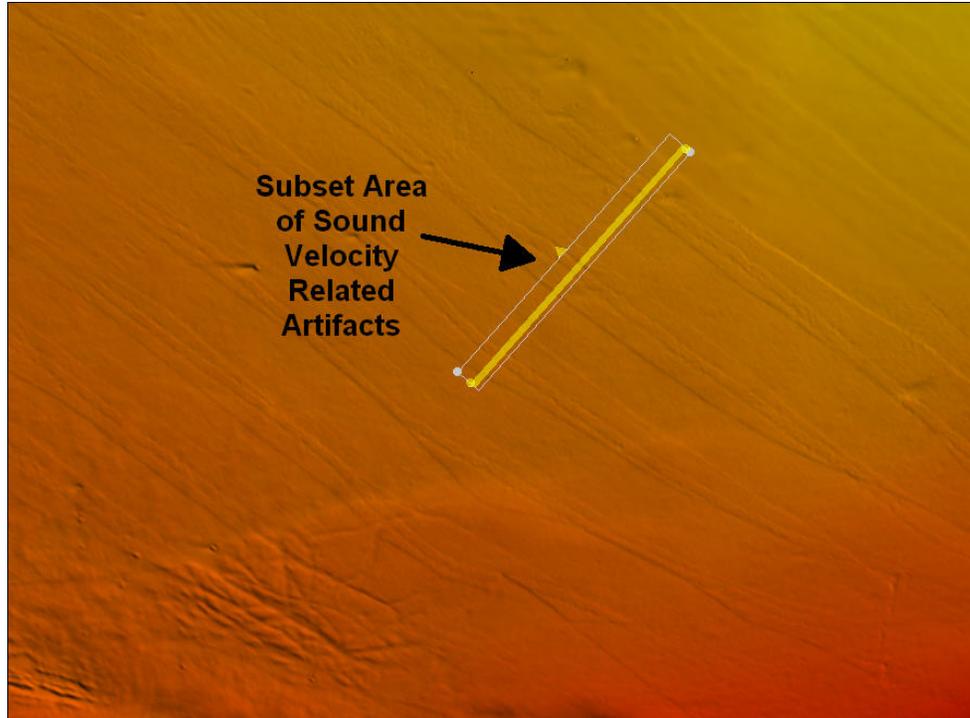
### Data Quality Factors

Due to the effects of tidal currents, surface heating and other related conditions, a significant demarcation of water masses was sometimes observed in the field. This proved to be problematic in the acquisition and application of sound velocity correctors. Sound velocity data were applied real-time by the Kongsberg processing unit during acquisition; no post

processing of sound velocity data is possible at this time. Despite the best efforts of the Hydrographer to conduct sufficient sound velocity casts distributed both spatially and temporally, in some areas, sound velocity data correction was suboptimal. Some lines exhibited upward and downward deflection of their outer-beams indicative of inaccurate sound velocity correction. To compensate, the Hydrographer, where possible, rejected soundings obviously in error on the outer beams.<sup>4</sup> Figures 4-5 illustrates a representative example of sound velocity error located approximately 300 meters north of the eastern most March Point refinery pier.



*Figure 4: Example of sound velocity error.*



*Figure 5: Sound velocity artifacts (vertical exaggeration 3).*

A noticeable difference in dynamic draft was encountered when steering into, or with, the tidal currents in Guemes Channel, which can exceed six (6) knots. When steering into a strong current, engine speeds of as much as 2500 RPM were required to maintain approximately four to five (4-5) knots headway. In the reverse direction, steering with the current, engines were run at near idle with a resultant speed over ground of approximately eight (8) knots speed. The acquisition system's HVF dynamic draft model was inadequate to correct all vertical inconsistencies related to these differences in dynamic draft. As a result, artifacts are noticeable in some areas of the survey. <sup>5</sup> Figures 6-7 illustrate a dynamic draft related artifact (BASE surface 1m\_final, vertical exaggeration 3) in the vicinity of the charted (18427) G "3" buoy in Guemes Channel.

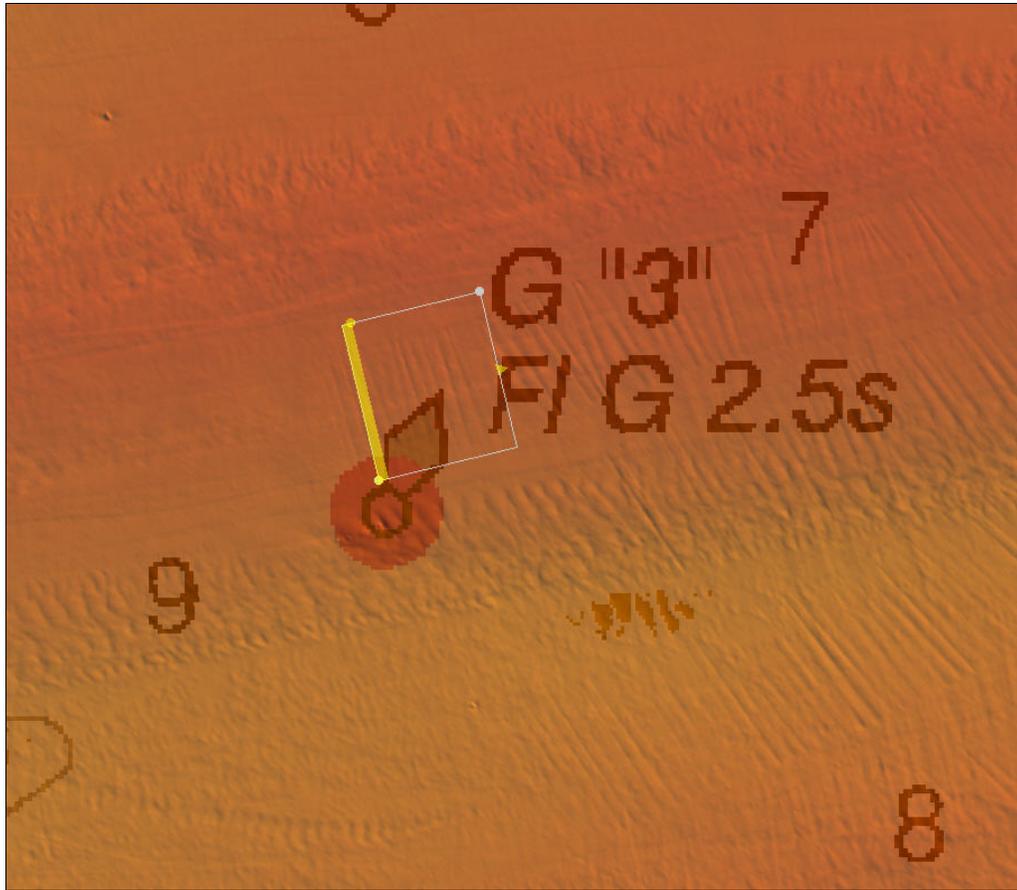


Figure 6: Suspected dynamic draft artifact (chart 18427).

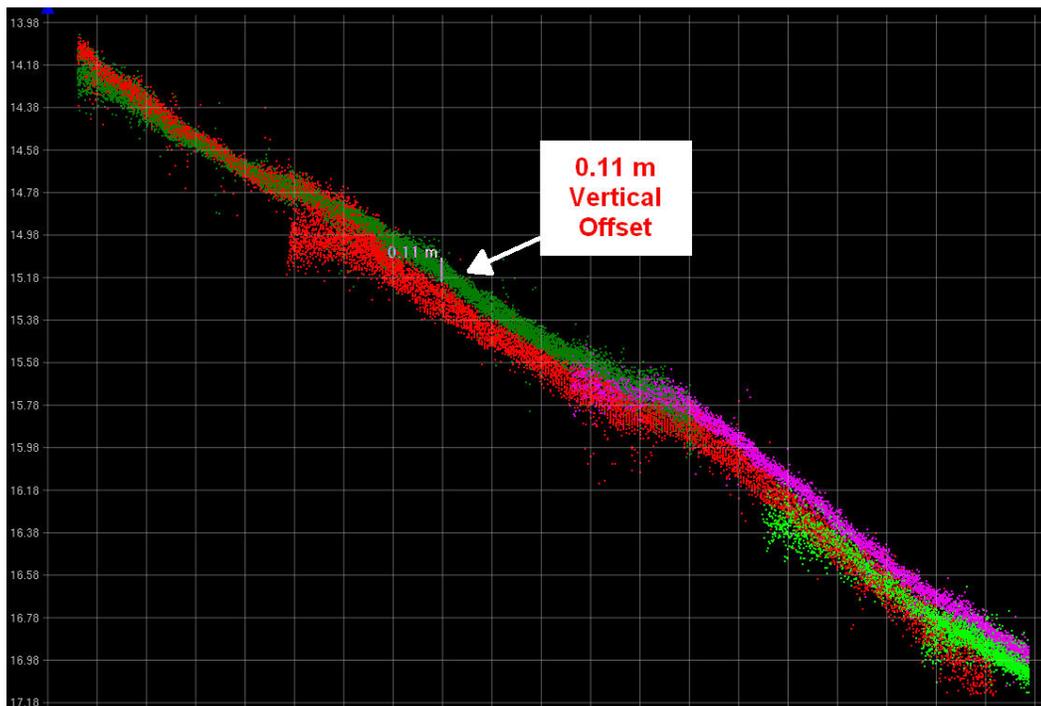


Figure 7: Subset view of dynamic draft vertical offset.

An additional vertical offset was noted near the south end of Huckleberry Island (Figures 8-9). The observed offset is as much as 0.3 meters in approximately 15 meters water depth. The exact source of the offset is unclear but may include inadequate sound velocity, tide and/or dynamic draft correction. The data falls within allowable IHO depth accuracy limits.<sup>6</sup>

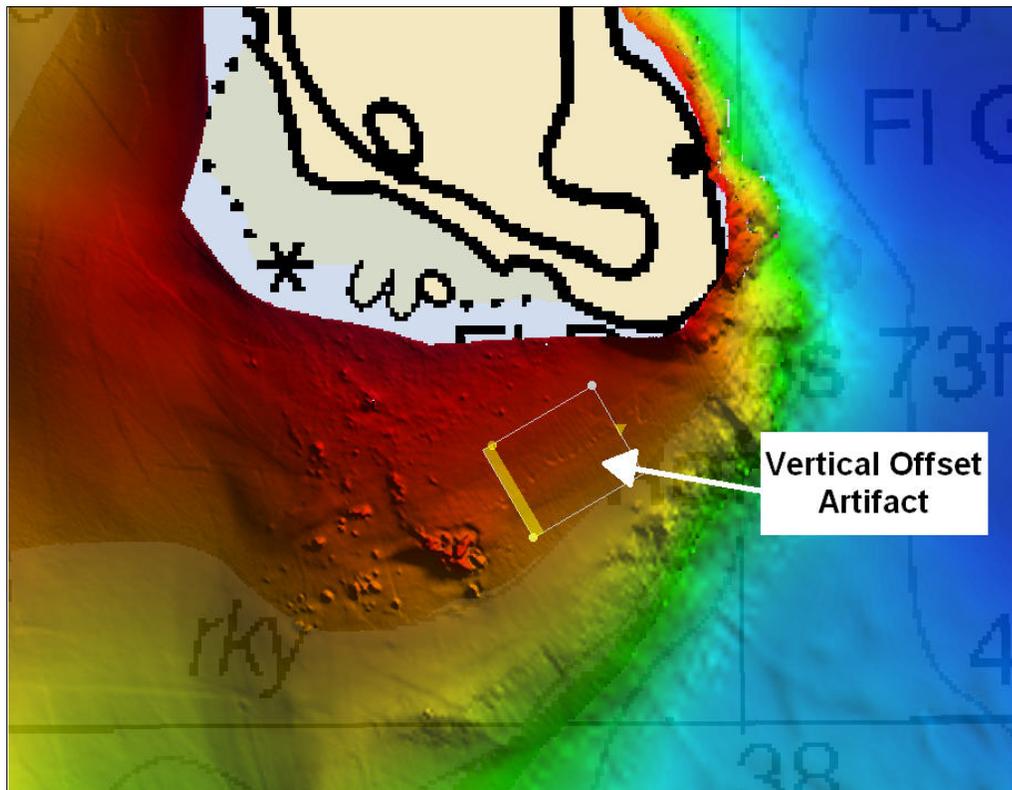


Figure 8: Additional vertical offset (chart 18427).

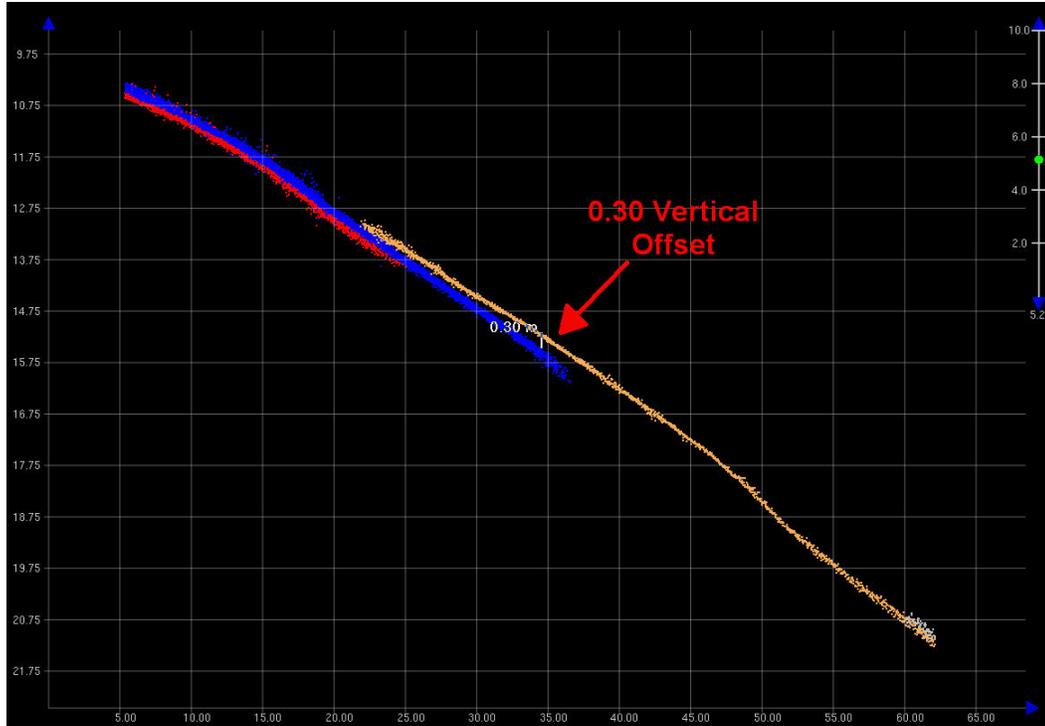
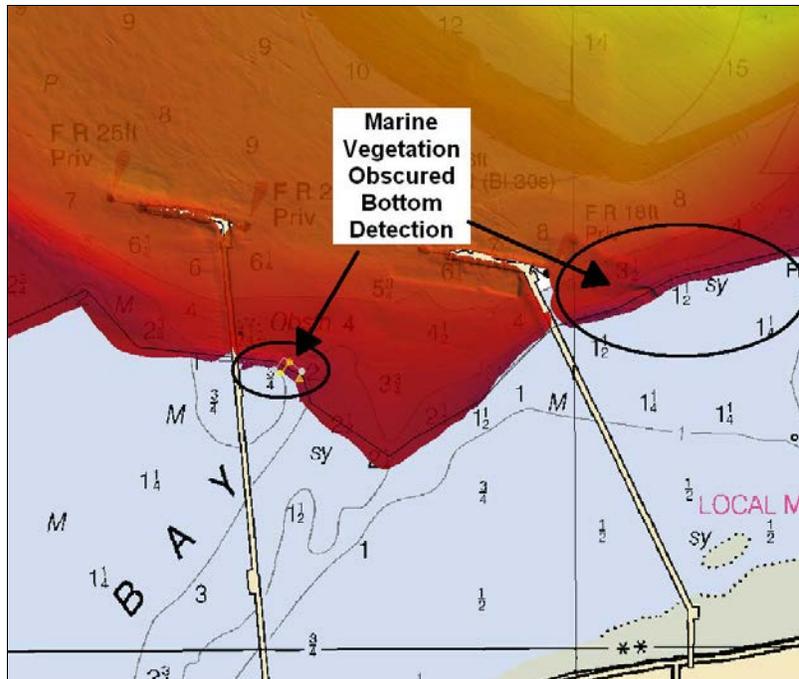


Figure 9: Huckleberry Island vertical offset.

#### Mid Water Column Acoustic Scatters

In the vicinity of the two charted (18427) oil terminal piers extending north from March Point, marine vegetation inhibited detection of the bottom (Figures 10-11). This condition is limited to extreme inshore areas, generally in water depths of less than 4 meters. In some areas, it was possible to discern the true bottom from disconnected appearing soundings associated with marine vegetation. In these instances soundings of apparent vegetation were rejected. However when unable to clearly distinguish between the bottom and vegetation, no soundings were rejected. <sup>7</sup>



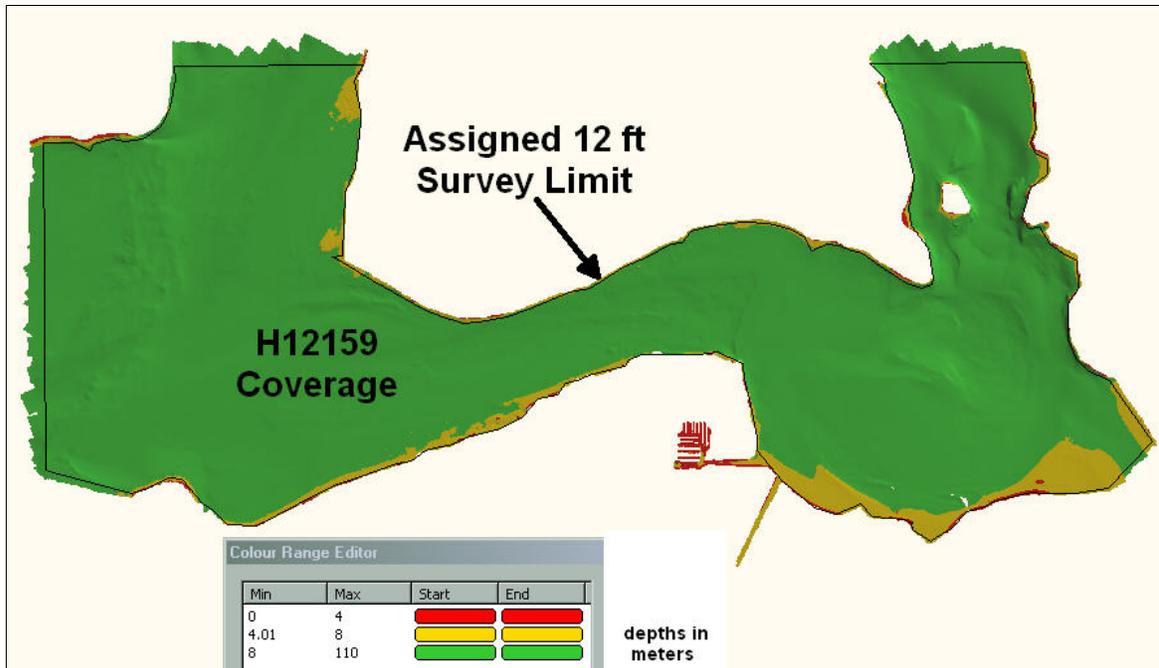


Figure 12: H12159 Coverage.

A data holiday, approximately 1 meter wide by 50 meters long, exists due to inappropriately wide line spacing during acquisition (Figure 13). The corresponding multibeam backscatter side scan was examined and no navigationally significant items were found.<sup>9</sup>

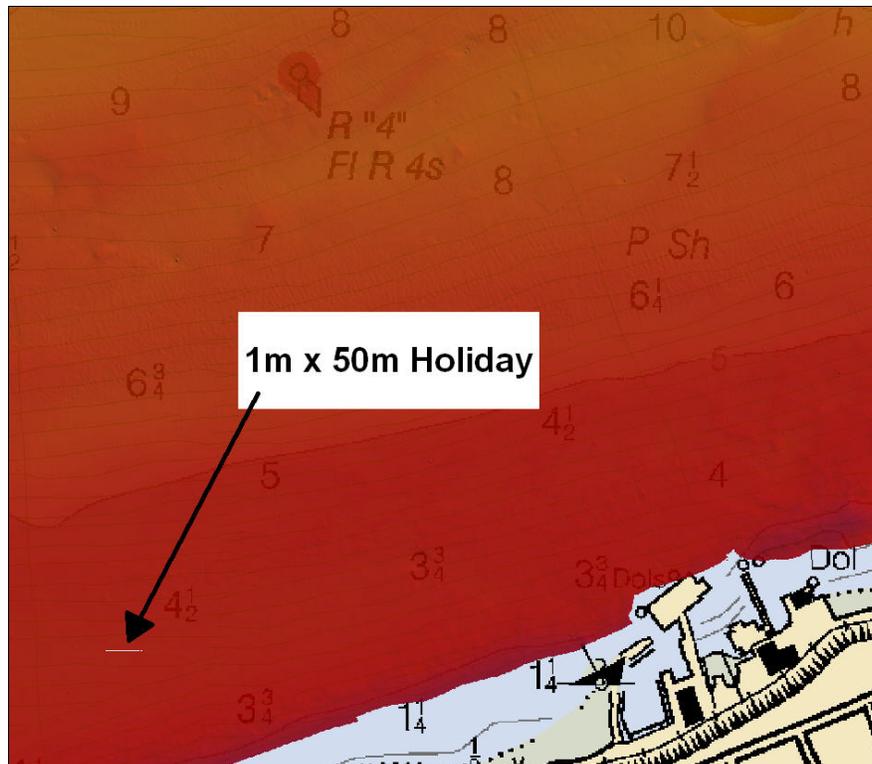


Figure 13: Holiday location

### Unusual Conditions

No unusual conditions were encountered during the survey that affected the expected accuracy and quality of survey data.

### B.3. Corrections to Echo soundings

Data reduction procedures for survey H12159 conform to those detailed in the *S-N902-NRT3-10 DAPR*.

### B.4. Data Processing

Data processing procedures for survey H12159 conform to those detailed in the DAPR. Data were processed using CARIS HIPS & SIPS v7.0, Service Pack 1, Hotfix 4, updated to Hotfix 5 when released. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, are discussed below.

#### TPU VALUES:

The survey specific parameters used to compute TPU in CARIS for H12159 are listed in Table 3.

<b>Tide values:</b>	Measured	0.01 m	Zoning	0.07 m
<b>Sound Speed Values:</b>	Measured	0.50 m/s	Surface	0.3 m/s

*Table 3: H12159 CARIS TPU Parameters*

One field sheet, three single resolution and three finalized BASE surfaces were created to process H12159. Final BASE surface resolutions and depth ranges were set according to Table 4 below. CUBE BASE surfaces were processed with parameters specific to each resolution specified in the file CUBEParams\_NOAA.xml submitted with the project. Submission Field Sheet and BASE Surface structure are shown in figures 14-15. <sup>10</sup>

<b>Depth Range (m)</b>	<b>Resolution (m)</b>
0-23	1
20-52	2
46-115	4

*Table 4: Depth range and BASE surface resolutions for H12159.*

In areas where multibeam data was acquired on charted cultural features (pilings, piers, etc) that were above MLLW, all data were rejected on the feature itself to more accurately represent the seafloor below these features.

Contours were generated in CARIS HIPS from the H12159\_Outline BASE

Surface (8m) for field unit review purposes. They are included for reference only and are not intended as a deliverable. <sup>11</sup>

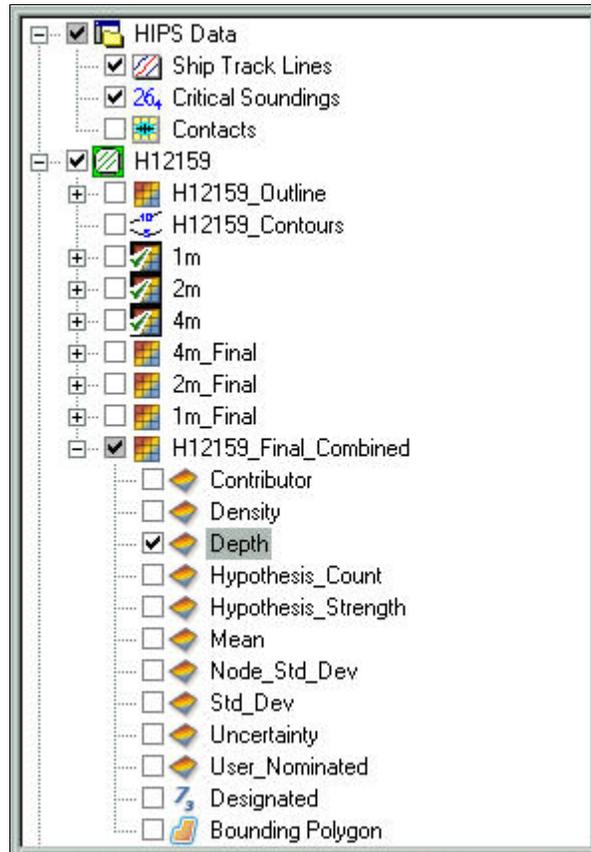


Figure 14: Field sheet and BASE surfaces submitted with H12159.

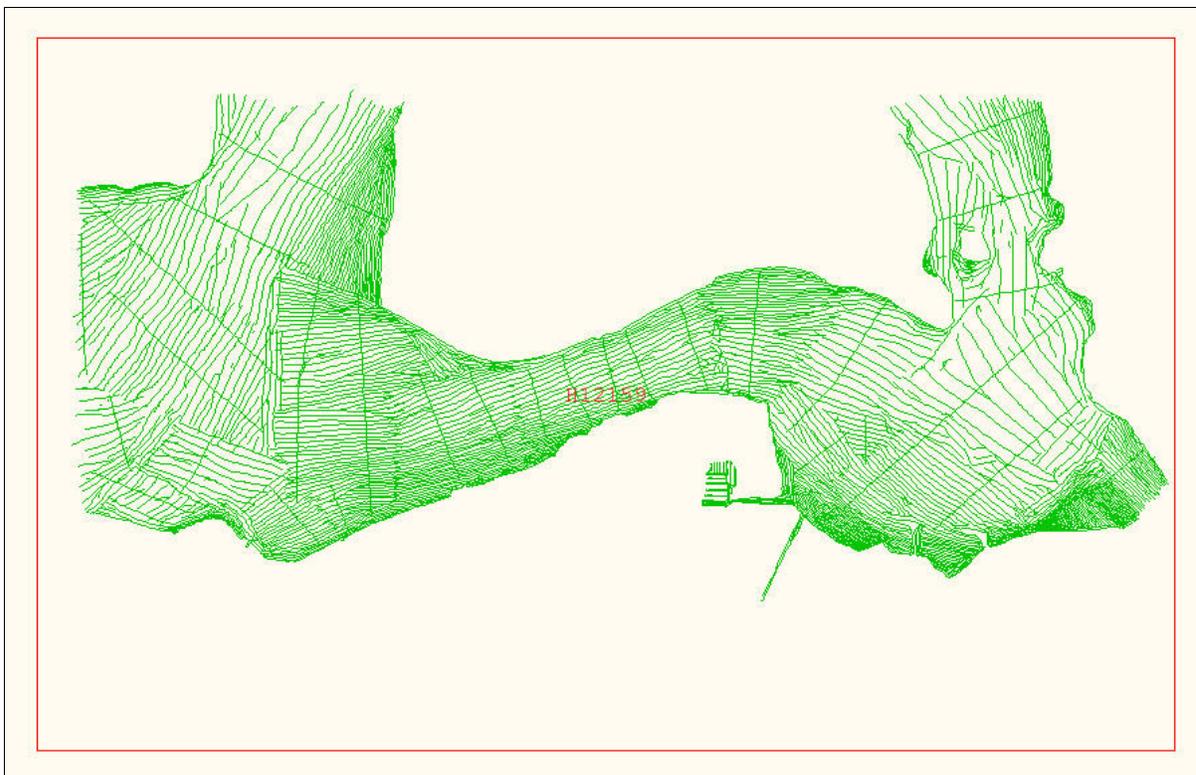


Figure 15: H12159 Field Sheet and multibeam track lines.

## C. VERTICAL AND HORIZONTAL CONTROL

Project S-N902-NRT3-10 did not require static GPS observations or other horizontal control work, and all tide corrections were generated from CO-OPS maintained tide stations. Thus, no Horizontal and Vertical Control Report will be submitted.

### C.1. 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 5.

Location	Frequency	Operator	Priority
Whidbey Island, WA	302 kHz	USCG	Primary

Table 5: Differential Corrector Sources for H12159.

### C.2. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Friday Harbor, WA (944-9880) serves as datum control for the survey area including determination at each subordinate station.

No tertiary gauges were required.

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels (smooth tides) from the Friday Harbor, WA station (944-9880) by applying tide file 9449880.tid and time and height correctors through the zone corrector file N902NRT32010CORP\_Rev.zdf. Preliminary zoning was accepted as the final zoning for the project. It will not be necessary for the Atlantic Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.

The request for Final Approved Water Levels for H12159 was submitted to CO-OPS on June 25, 2010 in accordance with the Field Procedures Manual (FPM), dated April, 2010. The Final Tide Note was received on July 9, 2010.<sup>12</sup> This documentation is included in this report.

## D. RESULTS AND RECOMMENDATIONS

### D.1. Chart Comparison

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

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.4-D.1 of the HSSDM, utilizing CARIS HIPS and SIPS 7.0 software program.

Survey H12159 was compared with the following chart:<sup>13</sup>

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
18427	1:25,000	23rd Ed, Sept /06	6/22/2010

*Table 6: Chart compared with H12159*

#### Chart 18427

H12159 soundings were generally deeper than charted. Soundings agreed with charted (18427) depths to within approximately one (1) fathom across all depth ranges except as indicated in figure 16. Green circles in figure 16 indicate where H12159 soundings were within 1 fathom of charted depths, blue circles indicate where soundings were more than 1 fathom deeper than charted, a red circle indicates the one instance where H12159 soundings were more than 1 fathom shoaler than charted.<sup>14</sup>

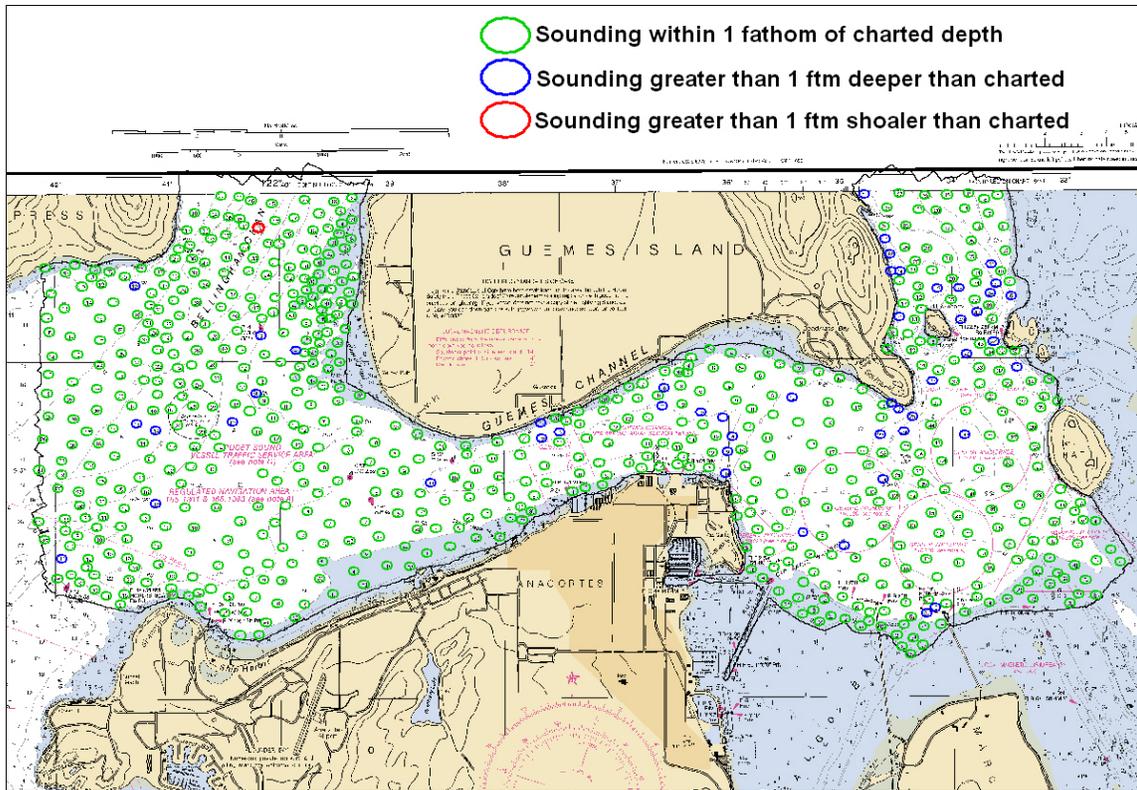


Figure 16: H12159 charted depth / sounding comparison (chart 18427).

A visual comparison was made between contour layer H12159\_10m\_Contours (generated from the CARIS BASE surface H12159\_Final\_Combined) and chart 18427. The contour layer and chart showed good general agreement.<sup>15</sup> In the vicinity of the G “3” and R “4” buoys, this survey found a continuous 10 fathom contour area and not two separate 10 fathom areas as depicted on chart 18427 (Figure 17).

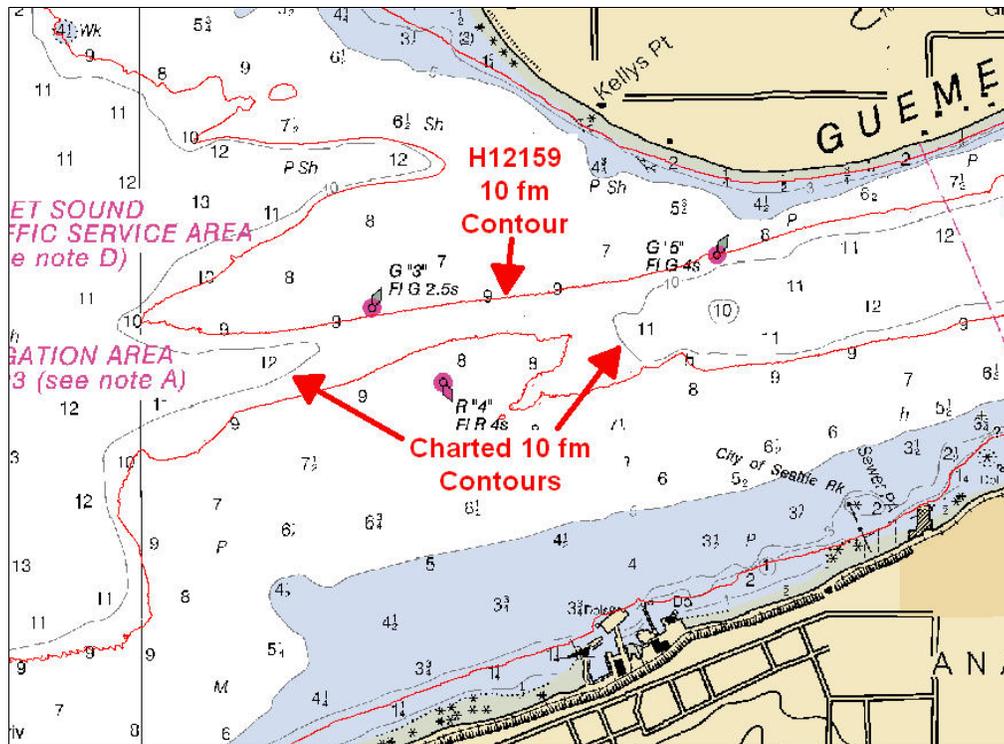


Figure 17: Separate 10 fathom contour areas joined chart 18427).

In the vicinity of the Cap Sante Waterway, the extent of a charted 10 fathom area has constricted and migrated inshore approximately 150 meters (Figure 18).<sup>16</sup>

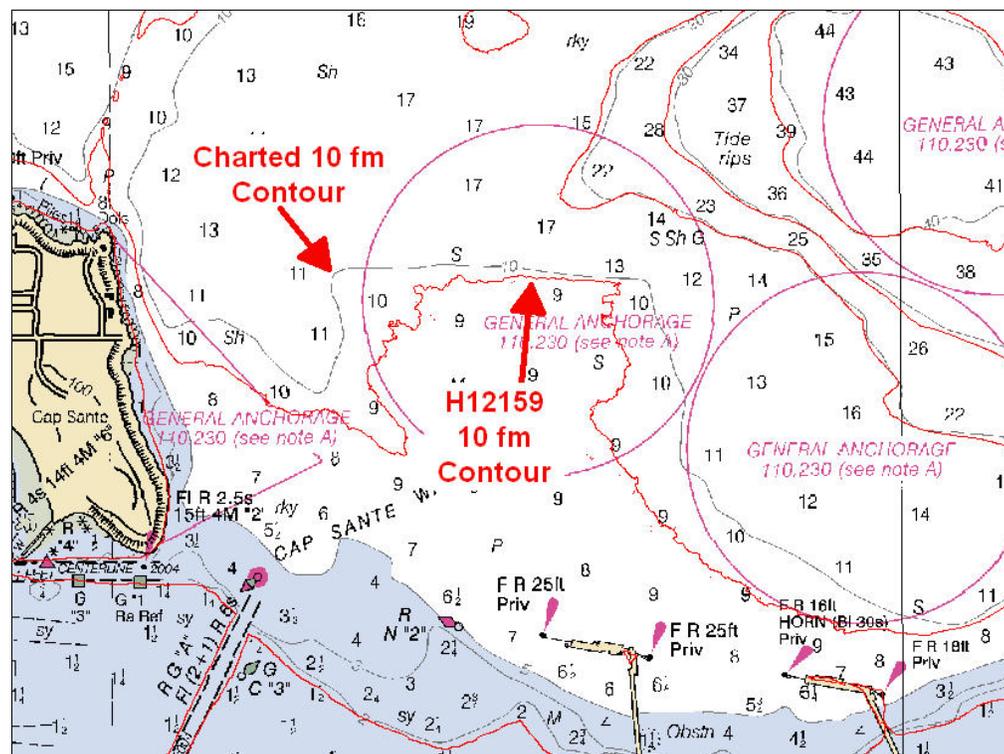


Figure 18: 10 fathom area constricted and shifted inshore (chart 18427).

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area. <sup>17</sup>

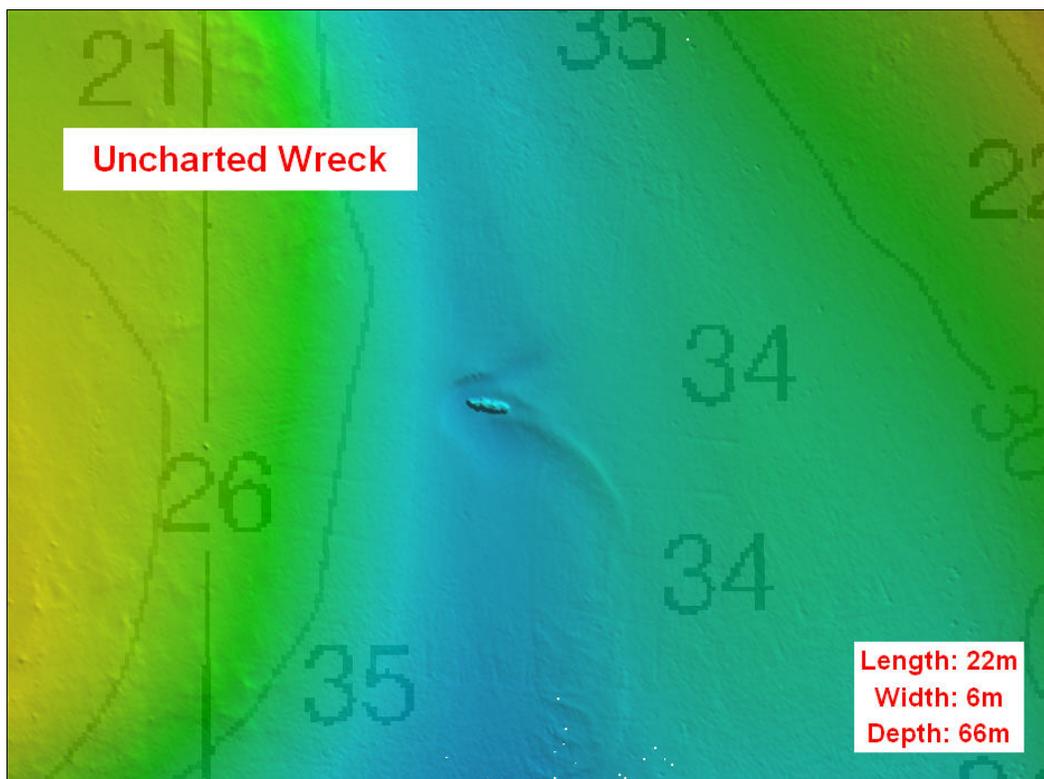
#### **D.1.b. Automated Wreck and Obstruction Information System (AWOIS) Items**

Fifteen (15) AWOIS items fall the within the survey limits of H12159. Of these, six were assigned for full investigation, and nine were included for information only. Descriptions of each AWOIS investigation item are included in the file H12159\_Field\_Verified\_CSF.hob. <sup>18</sup>

#### **D.1.c. Other Investigated Features**

##### Additional Items

An uncharted (18427) wreck was detected approximately 0.25 NM northeast of Huckleberry Island off the eastern shore of Guemes Island (Figures 19-20). The wreck is approximately 22 meters long, 6 meters wide and 66 meters deep. The Washington state archaeologist was notified of the feature to assess any potential cultural or historical significance. <sup>19</sup>



*Figure 19: H12159 Uncharted wreck (chart 18427).*

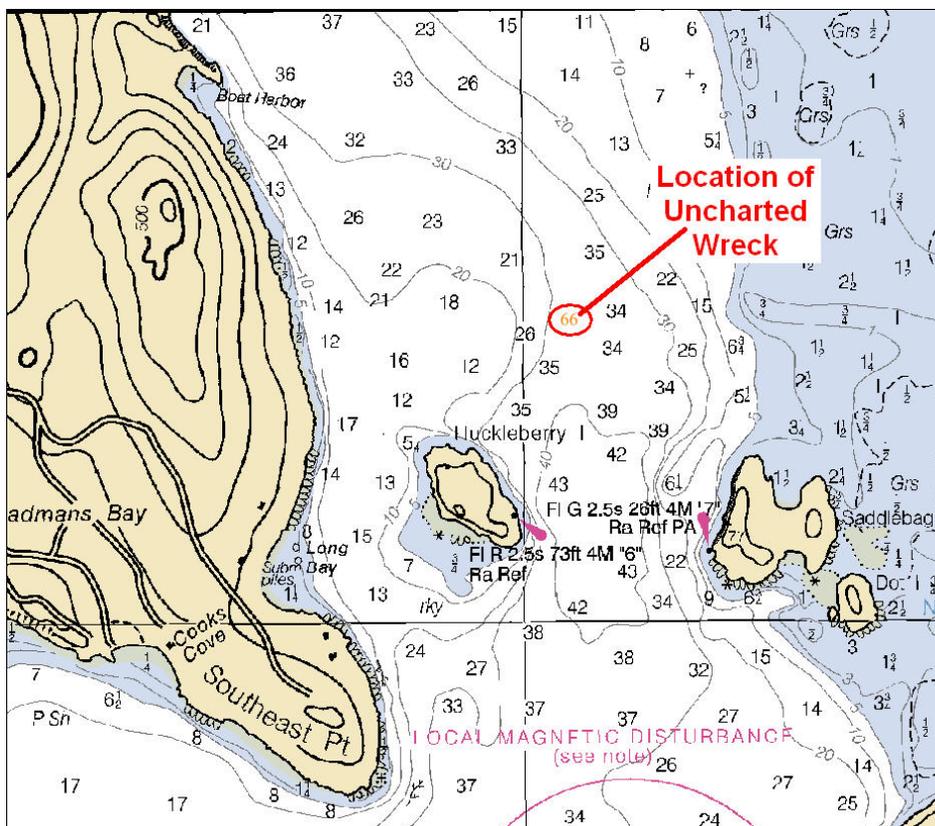


Figure 20: Location of uncharted wreck (chart 18427).

Additional features investigated within the limits of H12159 are described in the file H12159\_Field\_Verified\_CSF.hob.

#### D.1.d. Dangers to Navigation

One (1) Danger to Navigation (DTON) was found on survey H12159, and reported to the Marine Chart Division via email on May 25, 2010. The original DTON submission package is included in Appendix I. A description of the DTON is included in the Survey Feature Report attached to this report. The DTON, a 1.75 fathom wreck, was accepted by MCD and added to the Print on Demand raster chart 18427 (Figure 21).<sup>20</sup>

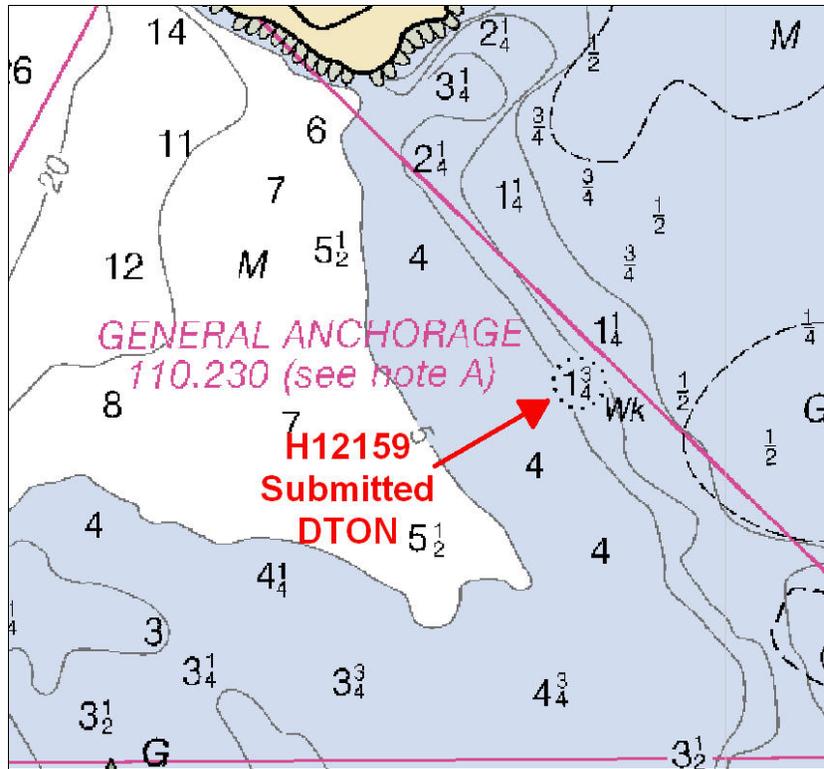


Figure 21: H12159 Submitted DTON applied to chart 18427.

**D.2. Additional Results**

**D.2.a. Shoreline Verification**

Shoreline Source

Limited shoreline verification was accomplished using the composite source file (CSF) and project reference file (PRF) provided with the project instructions. The CSF is an S-57 attributed dataset in .000 file format, compiled from the largest scale electronic navigation charts (ENC). The PRF is an S-57 attributed dataset containing reference layers (i.e. sheets and junctions) and features which are specifically targeted for further investigation such as items from the Automated Wreck and Obstruction Information Service (AWOIS) database.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM sections 8.2 and 3.5. Features seaward of the NALL were addressed as required, S-57 attributed and recorded in the appropriate CARIS Notebook (v3.0, SP1, HF1) .hob files indicated below (Table 7).

Notebook Files	Purpose and Contents
H12159_Original_CSF.hob	Original Composite Source Data provided by Navigation Response Branch for project S-N902-NRT3-10, clipped to H12159 survey area.
0_4PRF01.000	Survey outline and limit lines, and AWOIS item

	positions provided by Navigation Response Branch for project S-N902-NRT3-10.
H12159_Field_Verified_CSF.hob	Composite source data modified by the field to best represent the shoreline at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey.
H12159_Disprovals.hob	Composite source features that were deleted or modified in position or geographic type.

*Table 7: List and Description of Notebook .hob files.*

### Recommendations

The Hydrographer recommends that the shoreline as depicted in the delivered Notebook .hob files supersede and complement shoreline information compiled on the composite source file and charts as described above. <sup>21</sup> Note: Features within the Cap Sante marina, which lie outside the assigned 12-foot limit of this survey, are not addressed in notebook file H12159\_Field\_Verified\_CSF.hob.

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

A prior survey comparison was not performed.

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

Per H12159 Project instructions, seven (7) Aids to Navigation (ATON) were positioned using a dual band Trimble GeoXH 2008 Series handheld GPS (Table 8). In addition, when conditions dictated a detached position, a TruPulse 360B (Blue Tooth-enabled) laser range finder was used in tandem with the GeoXH. Code and carrier (L1/L2) positions were post processed in Trimble Pathfinder Office via 3 CORS base stations in the vicinity of Anacortes, WA. These stations included Whidbey Island #5, Sedro Wooley, and Friday Harbor. When and where conditions permitted, the assigned ATONs were occupied for 10 minutes (FPM section 3.5.3.3) either directly or remotely using a laser-calculated offset.

Technical guidance from NRB office personnel was sought concerning those ATONs which could not be occupied for such long periods on account of sea state, remoteness, or service ladders being fixed too high overhead to permit access. In the interest of crew safety, it was determined that shorter occupations would suffice for these ATONs. This was achieved by “bowing up” on those features while a technician logged several seconds of data at the point of contact. Official correspondence on this matter as well as the pipe delimited text file submitted to [aton.reports@noaa.gov](mailto:aton.reports@noaa.gov) on June 23, 2010 can be found in Appendix V.

Light List Name	Light List Number
Shannon Point Light	18960
Cap Sante Waterway Light 5	19010
Cap Sante Waterway Light 6	19015

Saddle Bag Island Light 7	19035
Swinomish Entrance Light 6	19085
Cap Sante Waterway Day Beacon 1	18990
Cap Sante Waterway Light 2	18995

*Table 8: H12159 Assigned ATONs*

#### ATON Comparisons

Comparison of published ATON positions (USCG Light List, 2010) vs. ATON field observations are tabulated in Appendix V. (See MS Word Document entitled *Light List Comparison*). Six of the seven ATONs were in good, general agreement with published positions. The Cap Sante Waterway Light 5 however was found to have an approximate difference of 68 meters from its charted position (Figure 22). Two factors may have influenced this significant disparity:

1. Heavy construction in the immediate vicinity of the detached position might have registered a local magnetic disturbance in the range finder's azimuth sensor.
2. The ATON may have been temporarily moved off station to facilitate the construction of a rock jetty and boat ramp. Specific information of the construction site was obtained from the Port of Anacortes. Refer to Appendix V for more information.

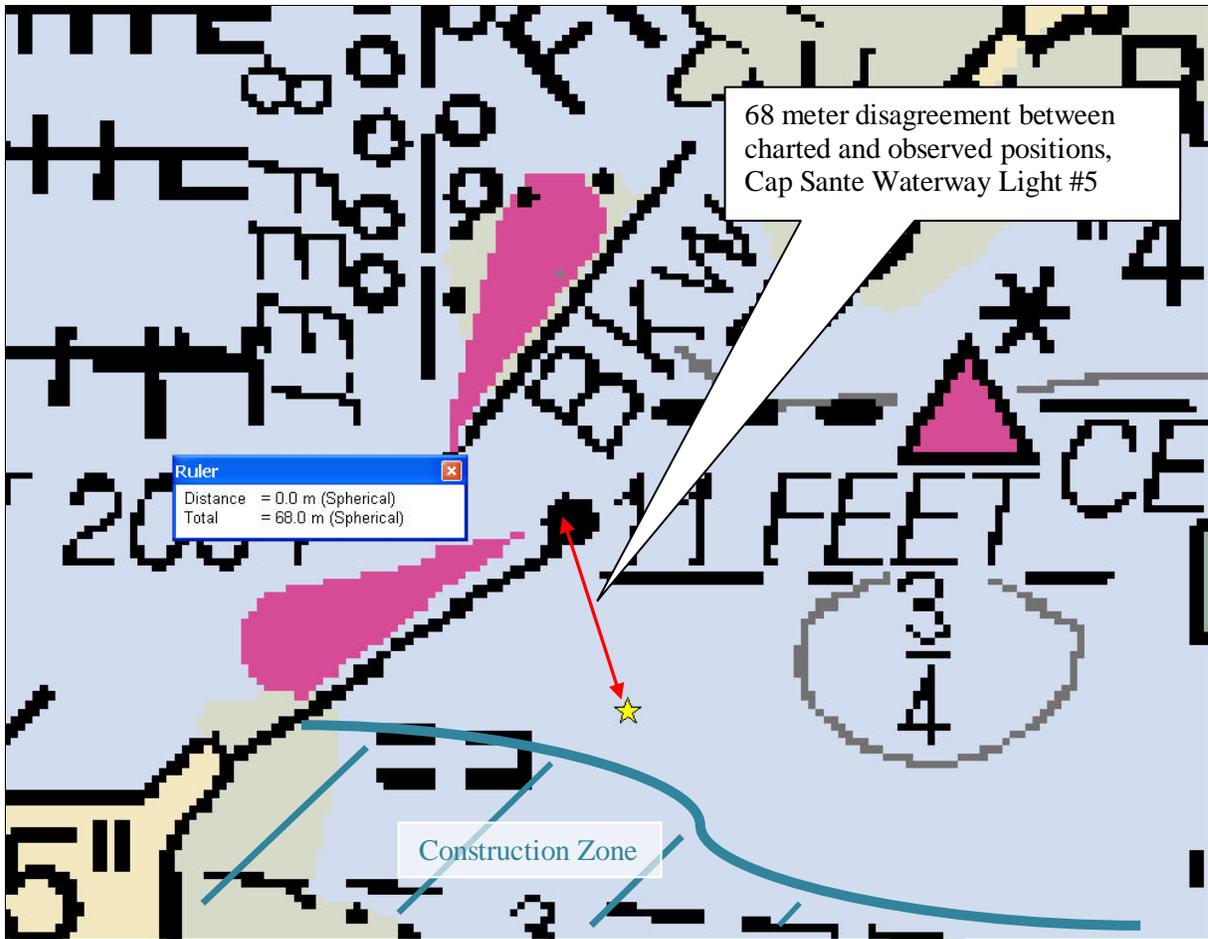


Figure 22: ATON Disagreement (chart 18427).

ATON Recommendations

The Hydrographer recommends all ATON field data to supersede published locations with the exception of the Cap Sante Waterway Light 5. (Section D.2.c by D. Jacobs)<sup>22</sup>

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

There are no overhead features within the limits of survey H12159. <sup>23</sup>

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

Survey H12159 includes two (2) charted (18427) sewer lines PA (position approximate) and one (1) cable area as shown in figure 23.

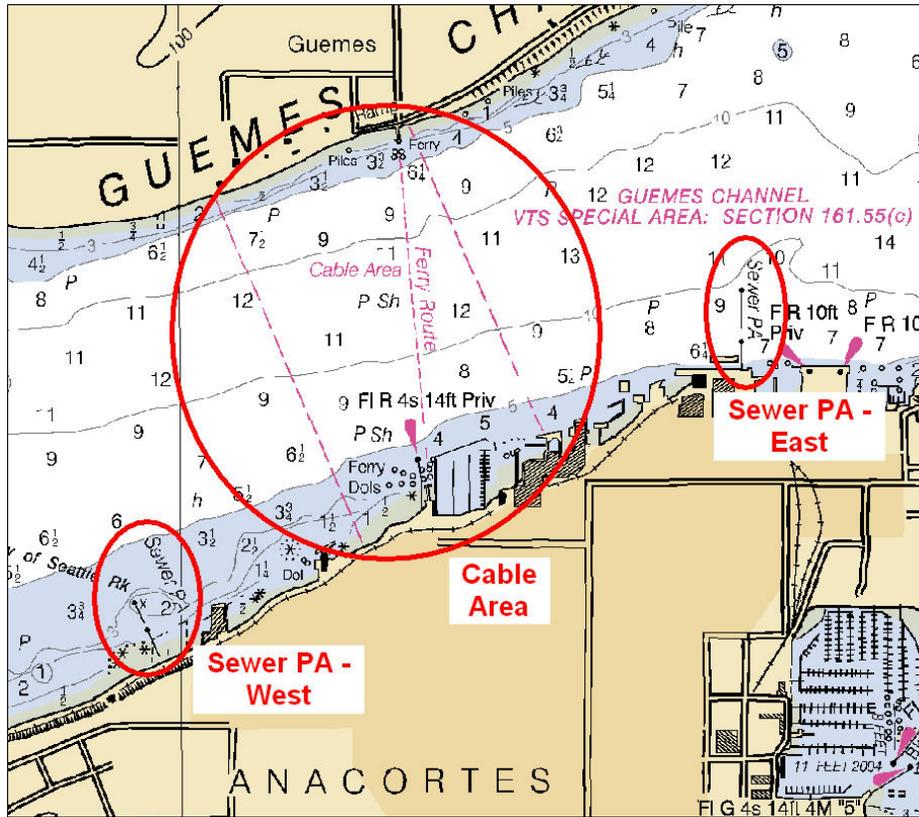


Figure 23: H12159 Cable area and Pipelines (chart 18427).

A trench with an approximately 1.5 meter tall, 30 meter long feature was detected 40 meter east of the charted (18427) position of the eastern most “Sewer PA” (Figure 24). An examination of H12159 multibeam and side scan sonar data revealed no evidence of the charted western “Sewer PA.” The Hydrographer recommends retaining both sewer lines as charted. <sup>24</sup>

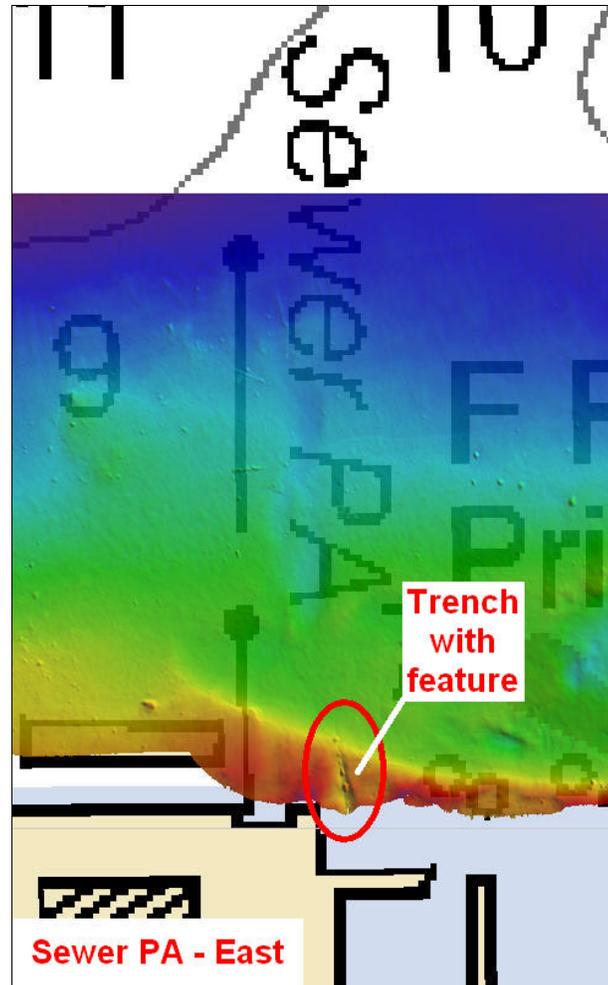


Figure 24: Possible sewer line (chart 18427).

The existence of the charted (18427) cable area in Guemes Channel is confirmed by shoreline signage, however no evidence of cables is apparent in the MB or SSS data. The Hydrographer recommends retaining the cable area as charted (Figure 23).<sup>25</sup>

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

Two very active ferry terminals are located within the H12159 survey area; frequent scheduled ferry traffic was observed. Both ferry terminals and routes are correctly charted (Figures 25-26).<sup>26</sup>

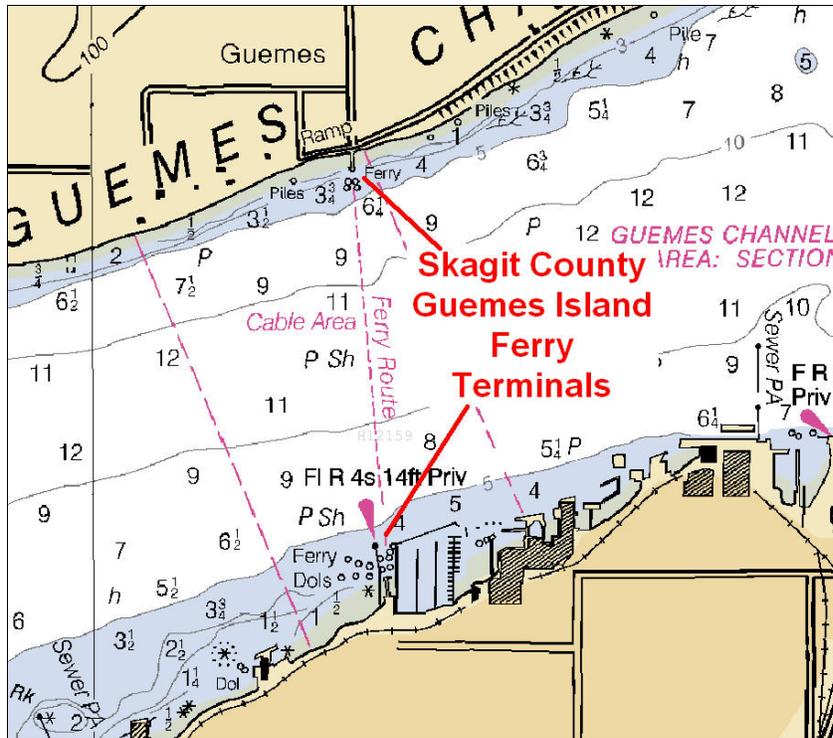


Figure 25: Guemes Island ferry terminals (chart 18427).

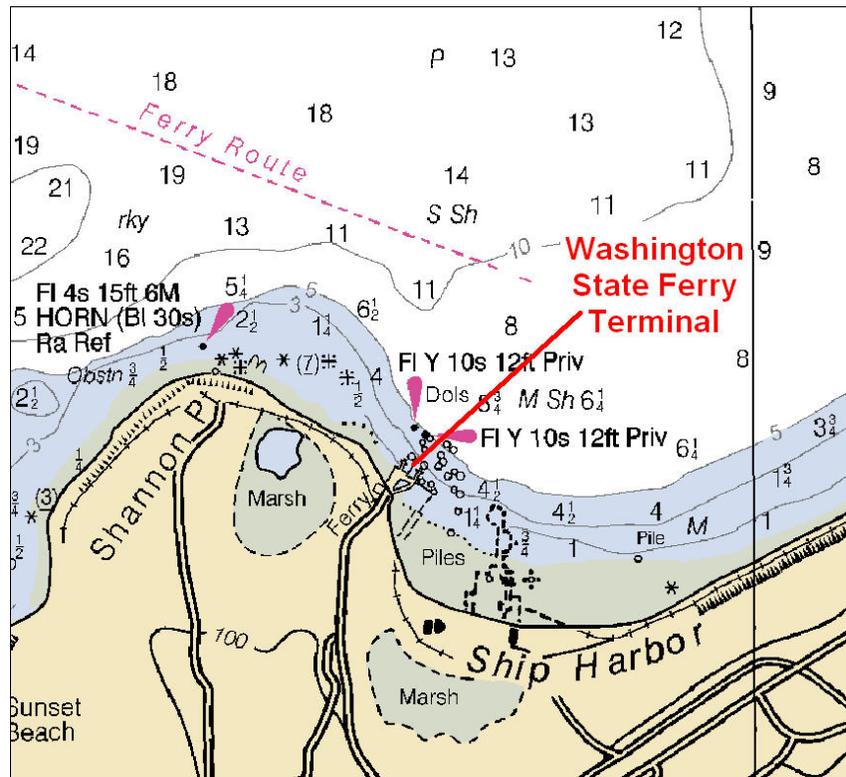


Figure 26: Washington State ferry terminal (chart 18427).

### D.2.g. Bottom Samples

Due to lack of equipment, bottom samples were not performed for survey H12159. <sup>27</sup>

### D.2.h. Other Findings

At the time of survey H12159, work was underway on a three-year, \$28 million project near the entrance to the Cap Sante marina (Figure 27). The project, scheduled for completion in the Summer of 2011, includes shoreline remedial excavations, offshore dredging, wave attenuators, replacement of small craft facilities and other work that will effect navigation in the area. The Hydrographer recommends resurveying the affected area once construction is complete. <sup>28</sup> Former Scott Paper Mill Cleanup Project contact: Bob Elsner, Port of Anacortes, 360/293-7053.

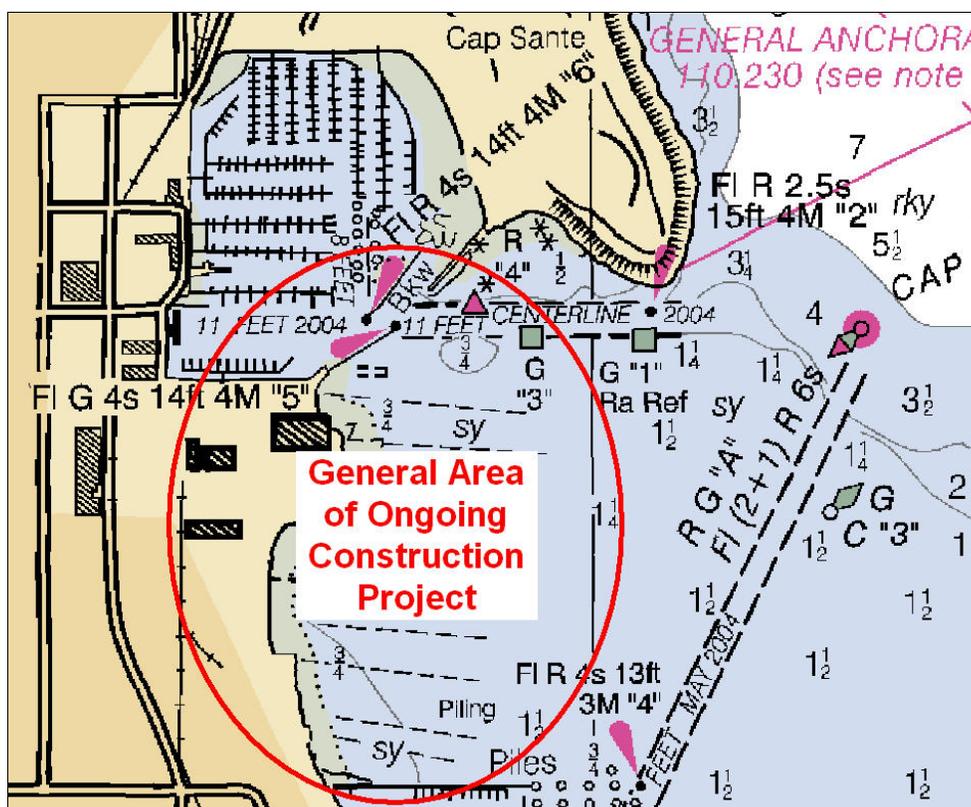


Figure 27: Location of Former Scott Paper Mill Cleanup Project.

**E. APPROVAL**

As Chief of Party, field operations for hydrographic survey H12159 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2010 edition), Field Procedures Manual (April 2010 edition), Standing and Project Instructions, and all HSD Technical Directives issued through June 2010. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required, except as noted in section D.2.h of this report. All data and reports are respectfully submitted to N/CS33, Atlantic Hydrographic Branch.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for S-N902-NRT3-10	<i>Submitted with this report</i>	N/CS33
Coast Pilot Report for S-N902-NRT3-10	07/14/2010	N/CS26

Approved and Forwarded:



Dan Jacobs  
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document  
2010.08.25 14:19:41 -07'00'

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Dan Jacobs  
Acting Team Lead, NOAA NRT3

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



Barry Jackson  
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document  
2010.08.25 14:13:37  
-07'00'

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B. Jackson  
Physical Science Technician, NOAA NRT3

## Revisions Compiled During Office Processing and Certification:

---

<sup>1</sup> Concur

<sup>2</sup> Concur, Areas where data falls outside IHO Order 1 are not navigationally significant due to depth. Data is adequate for charting

<sup>3</sup> Concur

<sup>4</sup> The data is adequate to supersede charted data after the outer beams were rejected to account for the SV errors.

<sup>5</sup> Concur with clarification, the SAR review found that the offsets were within IHO Order 1 specifications. The data is adequate for charting.

<sup>6</sup> Concur

<sup>7</sup> See HCell in the area for charting recommendations

<sup>8</sup> Concur

<sup>9</sup> Concur

<sup>10</sup> The office generated 4 m resolution combined surface, H12159\_Final\_Combined, was used for cartographic compilation.

<sup>11</sup> See H12159\_SS HCell for depth contours.

<sup>12</sup> See attached Tide Note, dated July 9, 2010.

<sup>13</sup> Two small portions of H12159 fall onto chart 18424 (1:40,000). There is good agreement between the survey and chart in the common area.

<sup>14</sup> Concur, chart depths as depicted in the HCell.

<sup>15</sup> Concur

<sup>16</sup> Update charted contours based on survey data.

<sup>17</sup> Concur

<sup>18</sup> The six AWOIS items are listed in this report. One AWOIS item was located during the survey and is included in the HCell. No significant features were located within the search radius of the remaining five items.

<sup>19</sup> It is recommended that the new wreck at latitude 48/32/29.2N, longitude 122/33/52.0W be added to the AWOIS database.

<sup>20</sup> See attached DTON report. The reported DTON has been applied to the chart and is included in the HCell.

<sup>21</sup> Concur with clarification, the submitted .hob file was used in the compilation, some modifications were made to features to accommodate chart scale. Chart features as depicted in HCell H12159

<sup>22</sup> Use the latest ATONIS information for the Aids to Navigation.

<sup>23</sup> Concur

<sup>24</sup> Concur

<sup>25</sup> Concur, retain as charted

<sup>26</sup> Concur, retain as charted

<sup>27</sup> Concur; retain all bottom samples as charted.

<sup>28</sup> Concur with clarification. Resurvey area as time and resources permit.

# H12159 AWOIS Report

**Registry Number:** H12159  
**State:** Washington  
**Locality:** Guemes Channel  
**Sub-locality:** Guemes Channel  
**Project Number:** S-N902-NRT3-10  
**Survey Dates:** March 19, 2010 - June 24, 2010

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18429	10th	01/01/2007	1:25,000 (18429_1)	[L]NTM: ?
18430	8th	10/01/2003	1:25,000 (18430_1)	[L]NTM: ?
18423	36th	07/01/2007	1:80,000 (18423_1) 1:40,000 (18423_7) 1:25,000 (18423_3)	[L]NTM: ?
18427	23rd	09/01/2006	1:25,000 (18427_1)	USCG LNM: 06/01/2010 (06/15/2010) NGA NTM: 05/20/1995 (07/03/2010)
18424	27th	12/01/2006	1:40,000 (18424_1)	[L]NTM: ?
18421	49th	02/01/2008	1:80,000 (18421_1)	[L]NTM: ?
18400	48th	12/01/2008	1:200,000 (18400_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
AWOIS	15.53 m	48° 31' 10.4" N	122° 39' 03.0" W	---
AWOIS	14.69 m	48° 31' 09.5" N	122° 38' 12.3" W	---
AWOIS	16.43 m	48° 30' 36.0" N	122° 34' 29.0" W	---
AWOIS	17.33 m	48° 30' 35.0" N	122° 34' 23.0" W	---

AWOIS	27.75 m	48° 31' 44.9" N	122° 41' 16.3" W	---
AWOIS	15.11 m	48° 31' 48.5" N	122° 40' 12.9" W	---
Shoal	15.53 m	48° 31' 10.4" N	122° 39' 03.0" W	52037
Shoal	14.69 m	48° 31' 09.5" N	122° 38' 12.3" W	52038
Shoal	17.33 m	48° 30' 35.0" N	122° 34' 23.0" W	52043
Shoal	16.43 m	48° 30' 36.0" N	122° 34' 29.0" W	52042
Wreck	15.11 m	48° 31' 48.5" N	122° 40' 12.9" W	52625
Shoal	27.75 m	48° 31' 44.9" N	122° 41' 16.3" W	52581
Shoal	12.81 m	48° 31' 10.7" N	122° 37' 57.0" W	---
Shoal	12.73 m	48° 31' 41.0" N	122° 37' 08.8" W	---
Shoal	15.53 m	48° 31' 10.4" N	122° 39' 03.0" W	52037
Shoal	14.69 m	48° 31' 09.5" N	122° 38' 12.3" W	52038
Obstruction	7.69 m	48° 30' 51.9" N	122° 39' 01.9" W	---
Shoal	7.79 m	48° 30' 52.8" N	122° 38' 50.0" W	---
Rock	7.44 m	48° 30' 47.1" N	122° 39' 02.4" W	---
Shoal	11.31 m	48° 30' 53.4" N	122° 39' 38.8" W	---
Rock	6.22 m	48° 31' 54.7" N	122° 35' 22.1" W	---
Rock	9.68 m	48° 31' 53.9" N	122° 36' 29.0" W	---
Rock	12.76 m	48° 30' 41.7" N	122° 40' 50.0" W	---
Shoal	17.33 m	48° 30' 35.0" N	122° 34' 23.0" W	52043
Shoal	16.43 m	48° 30' 36.0" N	122° 34' 29.0" W	52042
Shoal	12.43 m	48° 31' 37.4" N	122° 37' 23.8" W	---
Shoal	12.42 m	48° 31' 37.4" N	122° 37' 23.8" W	---
Shoal	15.43 m	48° 31' 40.2" N	122° 39' 30.6" W	---
Shoal	13.39 m	48° 31' 39.7" N	122° 39' 14.9" W	---
Wreck	15.11 m	48° 31' 48.5" N	122° 40' 12.9" W	52625
Shoal	27.75 m	48° 31' 44.9" N	122° 41' 16.3" W	52581
Shoal	11.90 m	48° 30' 57.8" N	122° 39' 31.6" W	---
Wreck	3.51 m	48° 30' 55.5" N	122° 32' 32.6" W	---
Wreck	66.28 m	48° 32' 29.2" N	122° 33' 52.9" W	---
Obstruction	2.66 m	48° 30' 24.7" N	122° 34' 38.9" W	---
Shoal	15.84 m	48° 30' 39.6" N	122° 41' 05.5" W	---
Wreck	3.51 m	48° 30' 55.5" N	122° 32' 32.6" W	---

**1 - AWOIS**

## 1.1) AWOIS #52037 - SOUNDING

### Primary Survey Feature is Profile/Beam - 3230/64 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811

**Search Position:** 48° 31' 10.0" N, 122° 39' 03.0" W  
**Historical Depth:** 12.80 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427, ISSUE DATE SEPT. 9, 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 10.4" N, 122° 39' 03.0" W  
**Least Depth:** 15.53 m (= 50.94 ft = 8.491 fm = 8 fm 2.94 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.413$  m ; TVU (TPEv)  $\pm 0.232$  m  
**Timestamp:** 2010-095.18:16:18.357 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811  
**Profile/Beam:** 3230/64  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52037: HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427 ISSUE DATE SEPT. 9 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MB over AWOIS 52037 search area, least depth found to be 15.5m. No significant features were found within the search radius.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-095/hypack_nav000_1811	3230/64	0.00	000.0	Primary

AWOIS_Guemes	AWOIS # 52037	13.52	357.4	Secondary
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## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
SORIND - US,US,graph,H12159  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.2) AWOIS #52038 - SOUNDING

### Primary Survey Feature is Profile/Beam - 399/109 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019

**Search Position:** 48° 31' 11.0" N, 122° 38' 17.0" W  
**Historical Depth:** 10.97 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART 18427, ISSUE DATE JUNE 13, 1981. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 09.5" N, 122° 38' 12.3" W  
**Least Depth:** 14.69 m (= 48.19 ft = 8.032 fm = 8 fm 0.19 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.379$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-095.20:20:12.447 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019  
**Profile/Beam:** 399/109  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52038 HISTORY SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART 18427 ISSUE DATE JUNE 13 1981. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MBES data over the AWOIS 52038 search radius, least depth at AWOIS point location is 16.65m. No significant features were found within the search radius. Designated a sounding on 14.7m rk, approx 7m outside search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/mrt3_s1212_em3002/2010-095/hypack_nav000_2019	399/109	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52038	106.92	116.5	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
SORIND - US,US,graph,H12159  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

### Office Notes

[None]

### 1.3) AWOIS #52042 - SOUNDING

#### Primary Survey Feature is Profile/Beam - 945/87 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810

**Search Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1, 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Least Depth:** 16.43 m (= 53.90 ft = 8.984 fm = 8 fm 5.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.391$  m ; TVU (TPEv)  $\pm 0.230$  m  
**Timestamp:** 2010-105.18:12:08.183 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810  
**Profile/Beam:** 945/87  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,042

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

Complete MBES was collected within the search radius for AWOIS #52042. H12159 survey designated a 16.4m sounding at the location of AWOIS item 52042. The shoalest point within the search radius is approx 15.2m located approx 90m West of this AWOIS item. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1810	945/87	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52042	0.08	000.0	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.4) AWOIS #52043 - SOUNDING

### Primary Survey Feature is Profile/Beam - 4605/213 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804

**Search Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) ■ H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Least Depth:** 17.33 m (= 56.86 ft = 9.476 fm = 9 fm 2.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.441$  m ; TVU (TPEv)  $\pm 0.240$  m  
**Timestamp:** 2010-105.18:09:45.544 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804  
**Profile/Beam:** 4605/213  
**Charts Affected:** 18427\_1, 18423\_7, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,043

HISTORY SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 survey designated a 17.3m sounding at the location of AWOIS item 52,043. The shoalest point within the search radius is approx 15.5m located approx 90m south of AWOIS item 52043. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1804	4605/213	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52043	0.20	321.0	Secondary

## Hydrographer Recommendations

Chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.5) AWOIS #52581 - OBSTRUCTION

### Primary Survey Feature is Profile/Beam - 605/73 from h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642

**Search Position:** 48° 31' 45.0" N, 122° 41' 14.8" W  
**Historical Depth:** 23.77 m  
**Search Radius:** 150  
**Search Technique:** S2,MB,ES  
**Technique Notes:** REDUCE LINE SPACING TO ACCOMPLISH 100% ECHO SOUNDER  
 COVERAGE

#### History Notes:

HISTORY ■ H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N, 122 41 10.2W NAD 27. ENTERED 4/00 MCR ■ H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N, LONG.122°41'09.70"W, LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

### Survey Summary

**Survey Position:** 48° 31' 44.9" N, 122° 41' 16.3" W  
**Least Depth:** 27.75 m (= 91.06 ft = 15.176 fm = 15 fm 1.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.449$  m ; TVU (TPEv)  $\pm 0.247$  m  
**Timestamp:** 2010-118.16:43:40.564 (04/28/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642  
**Profile/Beam:** 605/73  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52581 HISTORY H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N 122 41 10.2W NAD 27. ENTERED 4/00 MCR H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N LONG.122°41'09.70"W LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

H12159 acquired complete MB echosounder data within search radius of AWOIS 52581, with a least depth of 27.8m. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-118/hypack_nav000_1642	605/73	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52581	28.85	268.3	Secondary

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
SORIND - US,US,graph,H12159  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.6) AWOIS #52625 - WRECK

### Primary Survey Feature is Profile/Beam - 6273/187 from h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841

**Search Position:** 48° 31' 48.3" N, 122° 40' 12.0" W  
**Historical Depth:** 7.68 m  
**Search Radius:** 75  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N, LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH, RECORDED AT THE TOP OF THE MAST, OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) ■■ H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A DIVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2 FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

### Survey Summary

**Survey Position:** 48° 31' 48.5" N, 122° 40' 12.9" W  
**Least Depth:** 15.11 m (= 49.59 ft = 8.264 fm = 8 fm 1.59 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.406$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-111.18:48:10.899 (04/21/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841  
**Profile/Beam:** 6273/187  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,625 HISTORY H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH RECORDED AT THE TOP OF THE MAST OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A DIVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2

FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

H12159 acquired complete MB echosounder data over search radius and wreck, known least depth 15.1m. MBES investigation could not verify historical least depth of 4.2 fathoms.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-111/hypack_nav000_1841	6273/187	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52625	19.67	292.0	Secondary

### Hydrographer Recommendations

chart wreck as per digital data.

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous  
 QUASOU - 6:least depth known  
 SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 15.114 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

### Office Notes

[None]

## 1.7) Profile/Beam - 3230/64 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811

### Primary Feature for AWOIS Item #52037

**Search Position:** 48° 31' 10.0" N, 122° 39' 03.0" W  
**Historical Depth:** 12.80 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427, ISSUE DATE SEPT. 9, 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 10.4" N, 122° 39' 03.0" W  
**Least Depth:** 15.53 m (= 50.94 ft = 8.491 fm = 8 fm 2.94 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.413$  m ; TVU (TPEv)  $\pm 0.232$  m  
**Timestamp:** 2010-095.18:16:18.357 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811  
**Profile/Beam:** 3230/64  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52037: HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427 ISSUE DATE SEPT. 9 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MB over AWOIS 52037 search area, least depth found to be 15.5m. No significant features were found within the search radius.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-095/hypack_nav000_1811	3230/64	0.00	000.0	Primary

AWOIS_Guemes	AWOIS # 52037	13.52	357.4	Secondary
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## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
SORIND - US,US,graph,H12159  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.8) Profile/Beam - 399/109 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019

### Primary Feature for AWOIS Item #52038

**Search Position:** 48° 31' 11.0" N, 122° 38' 17.0" W  
**Historical Depth:** 10.97 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART ■ 18427, ISSUE DATE JUNE 13, 1981. (ENTERED 1/28/94 MBH) ■ H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN ■ THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF ■ THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. ■ (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 09.5" N, 122° 38' 12.3" W  
**Least Depth:** 14.69 m (= 48.19 ft = 8.032 fm = 8 fm 0.19 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.379$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-095.20:20:12.447 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019  
**Profile/Beam:** 399/109  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52038 HISTORY SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART 18427 ISSUE DATE JUNE 13 1981. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MBES data over the AWOIS 52038 search radius, least depth at AWOIS point location is 16.65m. No significant features were found within the search radius. Designated a sounding on 14.7m rk, approx 7m outside search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/mrt3_s1212_em3002/2010-095/hypack_nav000_2019	399/109	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52038	106.92	116.5	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.9) Profile/Beam - 4605/213 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804

### Primary Feature for AWOIS Item #52043

**Search Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) ■ H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN ■ THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF ■ THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. ■ (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Least Depth:** 17.33 m (= 56.86 ft = 9.476 fm = 9 fm 2.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.441$  m ; TVU (TPEv)  $\pm 0.240$  m  
**Timestamp:** 2010-105.18:09:45.544 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804  
**Profile/Beam:** 4605/213  
**Charts Affected:** 18427\_1, 18423\_7, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,043

HISTORY SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 survey designated a 17.3m sounding at the location of AWOIS item 52,043. The shoalest point within the search radius is approx 15.5m located approx 90m south of AWOIS item 52043. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1804	4605/213	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52043	0.20	321.0	Secondary

## Hydrographer Recommendations

Chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.10) Profile/Beam - 945/87 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810

### Primary Feature for AWOIS Item #52042

**Search Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1, 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Least Depth:** 16.43 m (= 53.90 ft = 8.984 fm = 8 fm 5.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.391$  m ; TVU (TPEv)  $\pm 0.230$  m  
**Timestamp:** 2010-105.18:12:08.183 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810  
**Profile/Beam:** 945/87  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,042

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

Complete MBES was collected within the search radius for AWOIS #52042. H12159 survey designated a 16.4m sounding at the location of AWOIS item 52042. The shoalest point within the search radius is approx 15.2m located approx 90m West of this AWOIS item. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1810	945/87	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52042	0.08	000.0	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.11) Profile/Beam - 6273/187 from h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841

### Primary Feature for AWOIS Item #52625

**Search Position:** 48° 31' 48.3" N, 122° 40' 12.0" W  
**Historical Depth:** 7.68 m  
**Search Radius:** 75  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N, LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH, RECORDED AT THE TOP OF THE MAST, OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) ■■ H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A DIVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2 FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

### Survey Summary

**Survey Position:** 48° 31' 48.5" N, 122° 40' 12.9" W  
**Least Depth:** 15.11 m (= 49.59 ft = 8.264 fm = 8 fm 1.59 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.406$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-111.18:48:10.899 (04/21/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841  
**Profile/Beam:** 6273/187  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,625 HISTORY H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH RECORDED AT THE TOP OF THE MAST OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A DIVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2

FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

H12159 acquired complete MB echosounder data over search radius and wreck, known least depth 15.1m. MBES investigation could not verify historical least depth of 4.2 fathoms.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-111/hypack_nav000_1841	6273/187	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52625	19.67	292.0	Secondary

### Hydrographer Recommendations

chart wreck as per digital data.

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous  
 QUASOU - 6:least depth known  
 SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 15.114 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

### Office Notes

[None]

## 1.12) Profile/Beam - 605/73 from h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642

### Primary Feature for AWOIS Item #52581

**Search Position:** 48° 31' 45.0" N, 122° 41' 14.8" W  
**Historical Depth:** 23.77 m  
**Search Radius:** 150  
**Search Technique:** S2,MB,ES  
**Technique Notes:** REDUCE LINE SPACING TO ACCOMPLISH 100% ECHO SOUNDER COVERAGE

#### History Notes:

HISTORY ■ H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N, 122 41 10.2W NAD 27. ENTERED 4/00 MCR ■ H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N, LONG.122°41'09.70"W, LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

### Survey Summary

**Survey Position:** 48° 31' 44.9" N, 122° 41' 16.3" W  
**Least Depth:** 27.75 m (= 91.06 ft = 15.176 fm = 15 fm 1.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.449$  m ; TVU (TPEv)  $\pm 0.247$  m  
**Timestamp:** 2010-118.16:43:40.564 (04/28/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642  
**Profile/Beam:** 605/73  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52581 HISTORY H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N 122 41 10.2W NAD 27. ENTERED 4/00 MCR H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N LONG.122°41'09.70"W LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

H12159 acquired complete MB echosounder data within search radius of AWOIS 52581, with a least depth of 27.8m. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-118/hypack_nav000_1642	605/73	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52581	28.85	268.3	Secondary

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

**1.13) Profile/Beam - 1945/233 from h12159 / nrt3\_s1212\_em3002 / 2010-090 / hypack\_nav000\_1641**

**Survey Summary**

**Survey Position:** 48° 31' 10.7" N, 122° 37' 57.0" W  
**Least Depth:** 12.81 m (= 42.01 ft = 7.002 fm = 7 fm 0.01 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.436$  m ; **TVU (TPEv)**  $\pm 0.236$  m  
**Timestamp:** 2010-090.16:43:20.232 (03/31/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-090 / hypack\_nav000\_1641  
**Profile/Beam:** 1945/233  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

1.25m tall object, designated to make BASE surface honor least depth.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-090/hypack_nav000_1641	1945/233	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

## 1.14) Profile/Beam - 3957/207 from h12159 / nrt3\_s1212\_em3002 / 2010-090 / hypack\_nav000\_2033

### Survey Summary

**Survey Position:** 48° 31' 41.0" N, 122° 37' 08.8" W  
**Least Depth:** 12.73 m (= 41.76 ft = 6.959 fm = 6 fm 5.76 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.408$  m ; **TVU (TPEv)**  $\pm 0.227$  m  
**Timestamp:** 2010-090.20:37:47.609 (03/31/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-090 / hypack\_nav000\_2033  
**Profile/Beam:** 3957/207  
**Charts Affected:** 18423\_3, 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

insignificant

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-090/hypack_nav000_2033	3957/207	0.00	000.0	Primary

### Hydrographer Recommendations

chart as per digital data.

### S-57 Data

[None]

### Office Notes

[None]

## 1.15) Profile/Beam - 3230/64 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811

### Primary Feature for AWOIS Item #52037

**Search Position:** 48° 31' 10.0" N, 122° 39' 03.0" W  
**Historical Depth:** 12.80 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427, ISSUE DATE SEPT. 9, 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 10.4" N, 122° 39' 03.0" W  
**Least Depth:** 15.53 m (= 50.94 ft = 8.491 fm = 8 fm 2.94 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.413$  m ; TVU (TPEv)  $\pm 0.232$  m  
**Timestamp:** 2010-095.18:16:18.357 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_1811  
**Profile/Beam:** 3230/64  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52037: HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE 11TH EDITION OF CHART 18427 ISSUE DATE SEPT. 9 1978. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.2 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MB over AWOIS 52037 search area, least depth found to be 15.5m. No significant features were found within the search radius.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-095/hypack_nav000_1811	3230/64	0.00	000.0	Primary

AWOIS_Guemes	AWOIS # 52037	13.52	357.4	Secondary
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## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
SORIND - US,US,graph,H12159  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.16) Profile/Beam - 399/109 from h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019

### Primary Feature for AWOIS Item #52038

**Search Position:** 48° 31' 11.0" N, 122° 38' 17.0" W  
**Historical Depth:** 10.97 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART ■ 18427, ISSUE DATE JUNE 13, 1981. (ENTERED 1/28/94 MBH) ■ H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN ■ THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF ■ THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. ■ (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 31' 09.5" N, 122° 38' 12.3" W  
**Least Depth:** 14.69 m (= 48.19 ft = 8.032 fm = 8 fm 0.19 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.379$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-095.20:20:12.447 (04/05/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-095 / hypack\_nav000\_2019  
**Profile/Beam:** 399/109  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52038 HISTORY SOURCE UNKNOWN -- FIRST APPEARS ON THE 12TH EDITION OF CHART 18427 ISSUE DATE JUNE 13 1981. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 13.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 acquired complete MBES data over the AWOIS 52038 search radius, least depth at AWOIS point location is 16.65m. No significant features were found within the search radius. Designated a sounding on 14.7m rk, approx 7m outside search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/mrt3_s1212_em3002/2010-095/hypack_nav000_2019	399/109	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52038	106.92	116.5	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

**1.17) Profile/Beam - 6803/187 from h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1647**

**Survey Summary**

**Survey Position:** 48° 30' 51.9" N, 122° 39' 01.9" W  
**Least Depth:** 7.69 m (= 25.24 ft = 4.207 fm = 4 fm 1.24 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.387 m ; **TVU (TPEv)** ±0.223 m  
**Timestamp:** 2010-096.16:53:15.797 (04/06/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1647  
**Profile/Beam:** 6803/187  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

Possible cultural feature. least depth: 7.7m height: 1.3m length:5m width:1.5m

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-096/hypack_nav000_1647	6803/187	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 TECSOU - 3:found by multi-beam  
 VALSOU - 7.693 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

**1.18) Profile/Beam - 5953/254 from h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1704**

**Survey Summary**

**Survey Position:** 48° 30' 52.8" N, 122° 38' 50.0" W  
**Least Depth:** 7.79 m (= 25.56 ft = 4.260 fm = 4 fm 1.56 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.418$  m ; **TVU (TPEv)**  $\pm 0.227$  m  
**Timestamp:** 2010-096.17:09:04.391 (04/06/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1704  
**Profile/Beam:** 5953/254  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**  
 insignificant.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-096/hypack_nav000_1704	5953/254	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

**1.19) Profile/Beam - 1836/244 from h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1730**

**Survey Summary**

**Survey Position:** 48° 30' 47.1" N, 122° 39' 02.4" W  
**Least Depth:** 7.44 m (= 24.40 ft = 4.066 fm = 4 fm 0.40 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.409$  m ; **TVU (TPEv)**  $\pm 0.224$  m  
**Timestamp:** 2010-096.17:31:41.924 (04/06/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_1730  
**Profile/Beam:** 1836/244  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

2.2m tall rk, least depth 7.4m.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-096/hypack_nav000_1730	1836/244	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 7.436 m  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

**1.20) Profile/Beam - 3501/1 from h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_2031**

**Survey Summary**

**Survey Position:** 48° 30' 53.4" N, 122° 39' 38.8" W  
**Least Depth:** 11.31 m (= 37.09 ft = 6.182 fm = 6 fm 1.09 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.443$  m ; **TVU (TPEv)**  $\pm 0.238$  m  
**Timestamp:** 2010-096.20:36:06.332 (04/06/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-096 / hypack\_nav000\_2031  
**Profile/Beam:** 3501/1  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**  
 insignificant.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-096/hypack_nav000_2031	3501/1	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

## 1.21) Profile/Beam - 5014/68 from h12159 / nrt3\_s1212\_em3002 / 2010-102 / hypack\_nav000\_2026

### Survey Summary

**Survey Position:** 48° 31' 54.7" N, 122° 35' 22.1" W  
**Least Depth:** 6.22 m (= 20.42 ft = 3.404 fm = 3 fm 2.42 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.382$  m ; TVU (TPEv)  $\pm 0.222$  m  
**Timestamp:** 2010-102.20:32:11.912 (04/12/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-102 / hypack\_nav000\_2026  
**Profile/Beam:** 5014/68  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

3.2m tall rk, least depth 6.2m

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-102/hypack_nav000_2026	5014/68	0.00	000.0	Primary

### Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 6.225 m  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

## 1.22) Profile/Beam - 12093/18 from h12159 / nrt3\_s1212\_em3002 / 2010-102 / hypack\_nav000\_2026

### Survey Summary

**Survey Position:** 48° 31' 53.9" N, 122° 36' 29.0" W  
**Least Depth:** 9.68 m (= 31.77 ft = 5.294 fm = 5 fm 1.77 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.417$  m ; TVU (TPEv)  $\pm 0.228$  m  
**Timestamp:** 2010-102.20:39:46.780 (04/12/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-102 / hypack\_nav000\_2026  
**Profile/Beam:** 12093/18  
**Charts Affected:** 18423\_3, 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

rk 9.7m least depth approx 40m SW of charted (18427) 4 3/4 fm depth area.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-102/hypack_nav000_2026	12093/18	0.00	000.0	Primary

### Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 9.682 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

**1.23) Profile/Beam - 314/185 from h12159 / nrt3\_s1212\_em3002 / 2010-103 / hypack\_nav000\_1559**

**Survey Summary**

**Survey Position:** 48° 30' 41.7" N, 122° 40' 50.0" W  
**Least Depth:** 12.76 m (= 41.86 ft = 6.977 fm = 6 fm 5.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.394$  m ; **TVU (TPEv)**  $\pm 0.227$  m  
**Timestamp:** 2010-103.16:00:17.447 (04/13/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-103 / hypack\_nav000\_1559  
**Profile/Beam:** 314/185  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

5m tall rk, least depth 12.8m

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-103/hypack_nav000_1559	314/185	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 12.760 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

## 1.24) Profile/Beam - 4605/213 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804

### Primary Feature for AWOIS Item #52043

**Search Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) ■ H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN ■ THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF ■ THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. ■ (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 35.0" N, 122° 34' 23.0" W  
**Least Depth:** 17.33 m (= 56.86 ft = 9.476 fm = 9 fm 2.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.441$  m ; TVU (TPEv)  $\pm 0.240$  m  
**Timestamp:** 2010-105.18:09:45.544 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1804  
**Profile/Beam:** 4605/213  
**Charts Affected:** 18427\_1, 18423\_7, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,043

HISTORY SAME AS AWOIS ITEM 52042. (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.5 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

H12159 survey designated a 17.3m sounding at the location of AWOIS item 52,043. The shoalest point within the search radius is approx 15.5m located approx 90m south of AWOIS item 52043. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1804	4605/213	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52043	0.20	321.0	Secondary

## Hydrographer Recommendations

Chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

## 1.25) Profile/Beam - 945/87 from h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810

### Primary Feature for AWOIS Item #52042

**Search Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Historical Depth:** 12.25 m  
**Search Radius:** 100  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1, 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

### Survey Summary

**Survey Position:** 48° 30' 36.0" N, 122° 34' 29.0" W  
**Least Depth:** 16.43 m (= 53.90 ft = 8.984 fm = 8 fm 5.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.391$  m ; TVU (TPEv)  $\pm 0.230$  m  
**Timestamp:** 2010-105.18:12:08.183 (04/15/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-105 / hypack\_nav000\_1810  
**Profile/Beam:** 945/87  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,042

HISTORY SOURCE UNKNOWN--FIRST APPEARS ON THE JUNE 1 1959 REVISION OF THE CHART. IT APPEARS THAT THIS SOUNDING MAY HAVE BEEN ERRONEOUSLY CHARTED FROM ADVANCE AND UNVERIFIED INFORMATION FROM H-8431WD (1958). (ENTERED 1/28/94 MBH) H10534/94--OPR-N264-PHP-94; THE SHOALEST SOUNDING FOUND WITHIN THE SEARCH AREA WAS 15.7 METERS (MLLW). RECOMMENDED DELETION OF THE CHARTED SOUNDING AND REPLACE WITH PRESENT SURVEY SOUNDINGS. (UPDATED 10/94 MBH)

Complete MBES was collected within the search radius for AWOIS #52042. H12159 survey designated a 16.4m sounding at the location of AWOIS item 52042. The shoalest point within the search radius is approx 15.2m located approx 90m West of this AWOIS item. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-105/hypack_nav000_1810	945/87	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52042	0.08	000.0	Secondary (grouped)

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

**1.26) Profile/Beam - 1247/212 from h12159 / nrt3\_s1212\_em3002 / 2010-110 / hypack\_nav000\_1703**

**Survey Summary**

**Survey Position:** 48° 31' 37.4" N, 122° 37' 23.8" W  
**Least Depth:** 12.43 m (= 40.76 ft = 6.794 fm = 6 fm 4.76 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.420$  m ; **TVU (TPEv)**  $\pm 0.232$  m  
**Timestamp:** 2010-110.17:05:05.270 (04/20/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-110 / hypack\_nav000\_1703  
**Profile/Beam:** 1247/212  
**Charts Affected:** 18423\_3, 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**  
 insignificant.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-110/hypack_nav000_1703	1247/212	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

**1.27) Profile/Beam - 1248/212 from h12159 / nrt3\_s1212\_em3002 / 2010-110 / hypack\_nav000\_1703**

**Survey Summary**

**Survey Position:** 48° 31' 37.4" N, 122° 37' 23.8" W  
**Least Depth:** 12.42 m (= 40.76 ft = 6.794 fm = 6 fm 4.76 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.420$  m ; **TVU (TPEv)**  $\pm 0.232$  m  
**Timestamp:** 2010-110.17:05:05.342 (04/20/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-110 / hypack\_nav000\_1703  
**Profile/Beam:** 1248/212  
**Charts Affected:** 18423\_3, 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

insignificant.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-110/hypack_nav000_1703	1248/212	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

## 1.28) Profile/Beam - 3415/166 from h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1539

### Survey Summary

**Survey Position:** 48° 31' 40.2" N, 122° 39' 30.6" W  
**Least Depth:** 15.43 m (= 50.61 ft = 8.435 fm = 8 fm 2.61 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.392$  m ; **TVU (TPEv)**  $\pm 0.230$  m  
**Timestamp:** 2010-111.15:44:36.430 (04/21/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1539  
**Profile/Beam:** 3415/166  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

insignificant.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-111/hypack_nav000_1539	3415/166	0.00	000.0	Primary

### Hydrographer Recommendations

chart as per digital data.

### S-57 Data

[None]

### Office Notes

[None]

**1.29) Profile/Beam - 636/36 from h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1627**

**Survey Summary**

**Survey Position:** 48° 31' 39.7" N, 122° 39' 14.9" W  
**Least Depth:** 13.39 m (= 43.92 ft = 7.321 fm = 7 fm 1.92 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.434$  m ; **TVU (TPEv)**  $\pm 0.236$  m  
**Timestamp:** 2010-111.16:28:12.739 (04/21/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1627  
**Profile/Beam:** 636/36  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

2m tall rk, least depth 13.4m

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-111/hypack_nav000_1627	636/36	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

### 1.30) Profile/Beam - 6273/187 from h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841

#### Primary Feature for AWOIS Item #52625

**Search Position:** 48° 31' 48.3" N, 122° 40' 12.0" W  
**Historical Depth:** 7.68 m  
**Search Radius:** 75  
**Search Technique:** S2,MB,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N, LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH, RECORDED AT THE TOP OF THE MAST, OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) ■■ H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A IVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2 FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

#### Survey Summary

**Survey Position:** 48° 31' 48.5" N, 122° 40' 12.9" W  
**Least Depth:** 15.11 m (= 49.59 ft = 8.264 fm = 8 fm 1.59 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.406$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2010-111.18:48:10.899 (04/21/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-111 / hypack\_nav000\_1841  
**Profile/Beam:** 6273/187  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52,625 HISTORY H10792/98-99--OPR-N368-PHP; AN APPARENT WRECK WAS FOUND BY ECHO SOUNDER DEVELOPMENT AND CONFIRMED BY DIVE INVESTIGATION. A WOODEN FISHING VESSEL WITH NO IDENTIFYING MARKINGS AND WITH INDICATIONS OF SCUTTLING WAS FOUND IN LAT. 48/31/48.27N LONG. 122/40/12.00W (NAD83). THE WRECK WAS ESTIMATED TO BE 130 FEET IN LENGTH WITH A BEAM OF 20 FEET. A LEAST DEPTH RECORDED AT THE TOP OF THE MAST OF 4.2 FATHOMS (MLLW) WAS OBTAINED. (ENTERED 9/00 BY MBH) H11268/2003--OPR-N161-RA; THE WRECK WAS VERIFIED WITH 100% SWMB. THE LEAST DEPTH OBTAINED WITH TIDE CORRECTORS APPLIED WAS 7.6 FATHOMS. A IVE INVESTIGATION COULD NOT VERIFY THE LEAST DEPTH OF 4.2

FATHOMS BECAUSE OF STRONG CURRENTS IN THE AREA. RECOMMENDED TO BE RETAINED AS CHARTED. (ENTERED 6/1/06 BY JCA)

H12159 acquired complete MB echosounder data over search radius and wreck, known least depth 15.1m. MBES investigation could not verify historical least depth of 4.2 fathoms.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-111/hypack_nav000_1841	6273/187	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52625	19.67	292.0	Secondary

### Hydrographer Recommendations

chart wreck as per digital data.

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous  
 QUASOU - 6:least depth known  
 SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 15.114 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

### Office Notes

[None]

### 1.31) Profile/Beam - 605/73 from h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642

#### Primary Feature for AWOIS Item #52581

**Search Position:** 48° 31' 45.0" N, 122° 41' 14.8" W  
**Historical Depth:** 23.77 m  
**Search Radius:** 150  
**Search Technique:** S2,MB,ES  
**Technique Notes:** REDUCE LINE SPACING TO ACCOMPLISH 100% ECHO SOUNDER COVERAGE

#### History Notes:

HISTORY ■ H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N, 122 41 10.2W NAD 27. ENTERED 4/00 MCR ■ H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N, LONG.122°41'09.70"W, LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

#### Survey Summary

**Survey Position:** 48° 31' 44.9" N, 122° 41' 16.3" W  
**Least Depth:** 27.75 m (= 91.06 ft = 15.176 fm = 15 fm 1.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.449$  m ; TVU (TPEv)  $\pm 0.247$  m  
**Timestamp:** 2010-118.16:43:40.564 (04/28/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-118 / hypack\_nav000\_1642  
**Profile/Beam:** 605/73  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 52581 HISTORY H9283WD/72--HANG OCCURRED AT 83 FT AND WAS CLEARED BY 78 FT IN POS.48 31 45.6N 122 41 10.2W NAD 27. ENTERED 4/00 MCR H10792/98--A FEATURE (100M SE OF AWOIS ITEM) WITH A HEIGHT OF 2.7METERS WAS LOCATED AT LAT. 48°31'43.64"N LONG.122°41'09.70"W LEAST DEPTH IS 101 FEET/16.8 FATHOMS/31.0 METERS. OFFICE PROCESSING LOCATED A 14.8M (88.8FT) CLOSER TO THE HANG POSITION. ENTERED 4/00 MCR

H12159 acquired complete MB echosounder data within search radius of AWOIS 52581, with a least depth of 27.8m. No significant features were found within the search radius.

## Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-118/hypack_nav000_1642	605/73	0.00	000.0	Primary
AWOIS_Guemes	AWOIS # 52581	28.85	268.3	Secondary

## Hydrographer Recommendations

chart as per digital data.

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20100624  
 SORIND - US,US,graph,H12159  
 TECSOU - 3:found by multi-beam  
 VERDAT - 12:Mean lower low water

### Office Notes

[None]

**1.32) Profile/Beam - 6610/127 from h12159 / nrt3\_s1212\_em3002 / 2010-130 / hypack\_nav911\_1929**

**Survey Summary**

**Survey Position:** 48° 30' 57.8" N, 122° 39' 31.6" W  
**Least Depth:** 11.90 m (= 39.04 ft = 6.507 fm = 6 fm 3.04 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.377$  m ; **TVU (TPEv)**  $\pm 0.233$  m  
**Timestamp:** 2010-130.19:37:40.565 (05/10/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-130 / hypack\_nav911\_1929  
**Profile/Beam:** 6610/127  
**Charts Affected:** 18427\_1, 18429\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**  
 insignificant.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-130/hypack_nav911_1929	6610/127	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

[None]

**Office Notes**

[None]

### 1.33) Profile/Beam - 723/212 from h12159 / nrt3\_s1212\_em3002 / 2010-131 / hypack\_nav000\_1918

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 48° 30' 55.5" N, 122° 32' 32.6" W  
**Least Depth:** 3.51 m (= 11.50 ft = 1.917 fm = 1 fm 5.50 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.379$  m ; **TVU (TPEv)**  $\pm 0.218$  m  
**Timestamp:** 2010-131.19:18:31.223 (05/11/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-131 / hypack\_nav000\_1918  
**Profile/Beam:** 723/212  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

Wreck found with multibeam sonar within charted (18427) general anchorage area in vicinity of active petroleum processing terminal. Least depth 3.5 meters. Field unit verifies vessels using anchorage area. Wreck poses anchor fouling hazard. H12159 submitted as DTON on May 25, 2010. Applied to print on demand chart 18427.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-131/hypack_nav000_1918	723/212	0.00	000.0	Primary

### Hydrographer Recommendations

Retain charted (18427) 1 3/4 ftm wk.

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

1 3/4fm (18427\_1, 18421\_1, 18400\_1, 18003\_1, 18007\_1, 530\_1)  
 1fm 5ft (18423\_1)  
 3.5m (501\_1, 50\_1)

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 2:dangerous wreck  
 CONVIS - 2:not visual conspicuous

QUASOU - 1:depth known

SORDAT - 20100624

SORIND - us,us,nsurf,H12159

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 3.506 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Office Notes

[None]

### 1.34) Profile/Beam - 185/126 from h12159 / nrt3\_s1212\_em3002 / 2010-133 / hypack\_nav000\_2054

#### Survey Summary

**Survey Position:** 48° 32' 29.2" N, 122° 33' 52.9" W  
**Least Depth:** 66.28 m (= 217.46 ft = 36.243 fm = 36 fm 1.46 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.406$  m ; **TVU (TPEv)**  $\pm 0.237$  m  
**Timestamp:** 2010-133.20:55:44.101 (05/13/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-133 / hypack\_nav000\_2054  
**Profile/Beam:** 185/126  
**Charts Affected:** 18427\_1, 18424\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

uncharted wreck. length 22m, width 6m, depth 66m.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-133/hypack_nav000_2054	185/126	0.00	000.0	Primary

#### Hydrographer Recommendations

chart as appropriate.

#### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 CONVIS - 2:not visual conspicuous  
 QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 66.281 m  
 VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Office Notes

[None]

**1.35) Profile/Beam - 7767/68 from h12159 / nrt3\_s1212\_em3002 / 2010-137 / hypack\_nav000\_1827**

**Survey Summary**

**Survey Position:** 48° 30' 24.7" N, 122° 34' 38.9" W  
**Least Depth:** 2.66 m (= 8.73 ft = 1.455 fm = 1 fm 2.73 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.376 m ; **TVU (TPEv)** ±0.223 m  
**Timestamp:** 2010-137.18:32:45.151 (05/17/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-137 / hypack\_nav000\_1827  
**Profile/Beam:** 7767/68  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

Charted (18427) obstruction.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-137/hypack_nav000_1827	7767/68	0.00	000.0	Primary

**Hydrographer Recommendations**

chart as per digital data.

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20100624  
 SORIND - us,us,nsurf,H12159  
 STATUS - 1:permanent  
 TECSOU - 3:found by multi-beam  
 VALSOU - 2.660 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

## Office Notes

[None]

## 1.36) Profile/Beam - 639/254 from h12159 / nrt3\_s1212\_em3002 / 2010-139 / hypack\_nav000\_1721

### Survey Summary

**Survey Position:** 48° 30' 39.6" N, 122° 41' 05.5" W  
**Least Depth:** 15.84 m (= 51.97 ft = 8.661 fm = 8 fm 3.97 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.500$  m ; **TVU (TPEv)**  $\pm 0.261$  m  
**Timestamp:** 2010-139.17:22:20.420 (05/19/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-139 / hypack\_nav000\_1721  
**Profile/Beam:** 639/254  
**Charts Affected:** 18427\_1, 18429\_1, 18430\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

insignificant.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-139/hypack_nav000_1721	639/254	0.00	000.0	Primary

### Hydrographer Recommendations

chart as per digital data.

### S-57 Data

[None]

### Office Notes

[None]

## 1.37) Profile/Beam - 723/212 from h12159 / nrt3\_s1212\_em3002 / 2010-131 / hypack\_nav000\_1918

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 48° 30' 55.5" N, 122° 32' 32.6" W  
**Least Depth:** 3.51 m (= 11.50 ft = 1.917 fm = 1 fm 5.50 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.379$  m ; TVU (TPEv)  $\pm 0.218$  m  
**Timestamp:** 2010-131.19:18:31.223 (05/11/2010)  
**Survey Line:** h12159 / nrt3\_s1212\_em3002 / 2010-131 / hypack\_nav000\_1918  
**Profile/Beam:** 723/212  
**Charts Affected:** 18427\_1, 18421\_1, 18423\_1, 18400\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

Wreck found with multibeam sonar within charted (18427) general anchorage area in vicinity of active petroleum processing terminal. Least depth 3.5 meters. Field unit verifies vessels using anchorage area. Wreck poses anchor fouling hazard. H12159 submitted as DTON on May 25, 2010. Applied to print on demand chart 18427.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12159/nrt3_s1212_em3002/2010-131/hypack_nav000_1918	723/212	0.00	000.0	Primary

#### Hydrographer Recommendations

Retain charted (18427) 1 3/4 ftm wk.

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

1 3/4fm (18427\_1, 18421\_1, 18400\_1, 18003\_1, 18007\_1, 530\_1)  
 1fm 5ft (18423\_1)  
 3.5m (501\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 2:dangerous wreck  
 CONVIS - 2:not visual conspicuous

QUASOU - 1:depth known

SORDAT - 20100624

SORIND - us,us,nsurf,H12159

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 3.506 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Office Notes

[None]



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** July 9, 2010

**HYDROGRAPHIC BRANCH:** Atlantic  
**HYDROGRAPHIC PROJECT:** S-N902-NRT3-2010  
**HYDROGRAPHIC SHEET:** H12159

**LOCALITY:** Guemes Channel, WA  
**TIME PERIOD:** March 19 - June 24, 2010

**TIDE STATION USED:** 944-9880 Friday Harbor, WA  
Lat. 48° 32.8'N Long. 123° 0.6' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.167 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project S-N902-NRT3-2010, H12159, during the time period between March 19 and June 24, 2010.

Please use the zoning file "N902NRT32010CORP\_Rev" submitted with the project instructions for Guemes Channel, WA. Zones PS234, PS235, PS236, PS237, PS238, PS240, and PS242 are the applicable zones for H12159.

**Refer to attachments for zoning information.**

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

**Peter J. Stone**

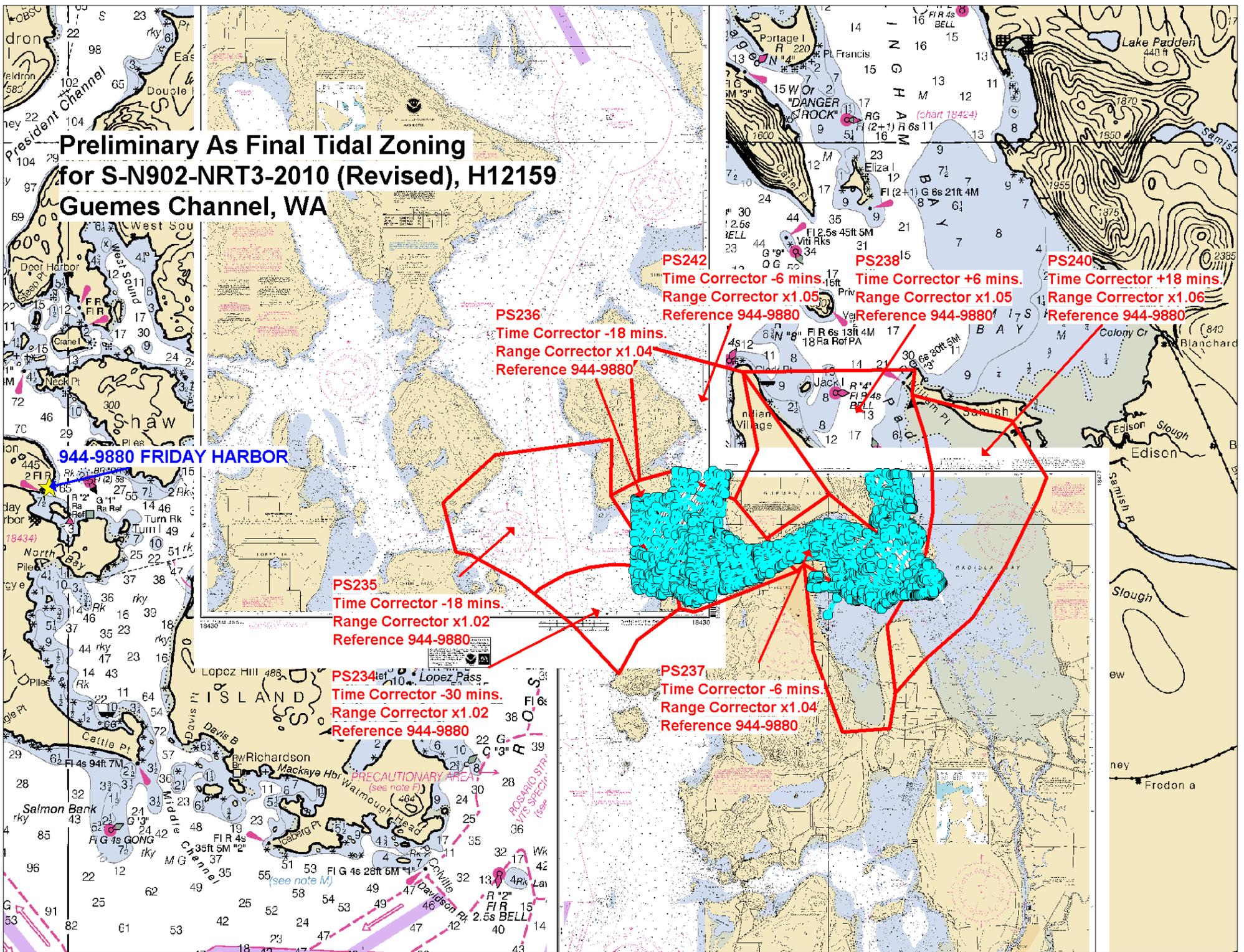
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=NOAA/NOS/CO-OPS, ou=Oceanographic  
Division, email=peter.stone@noaa.gov, c=US  
Date: 2010.07.09 13:47:00 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION



# Preliminary As Final Tidal Zoning for S-N902-NRT3-2010 (Revised), H12159 Guemes Channel, WA

944-9880 FRIDAY HARBOR



**H12159 HCell Report**  
Russ Davies, Cartographer  
Pacific Hydrographic Branch

**1. Specifications, Standards and Guidance Used in HCell Compilation**

HCell compilation of survey H12159 used:

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

**2. Compilation Scale**

Depths and features for HCell H12159 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NM Date
18427	1:25,000	23rd	09/2006	<a href="#">02/26/2011</a>
18424	1:40,000	28th	02/2011	<a href="#">03/16/2011</a>

The following ENC was not used during compilation:

Chart	Scale
US5WA31M	1:25,000
US5WA45M	1:40,000

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 4-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0.0	10	3
10	50	4
50	100	4.5
100	220	5

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

#### 4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the \*\_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 18427	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 H12159_SS.000
1	1.8288	2.0574	1.125	1
2	3.6576	3.8862	2.125	2
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.5166	10.125	10
20	36.576	37.9476	20.750	20
30	54.864	56.2356	30.750	30
40	73.152	74.5236	40.750	40
50	91.44	92.8116	50.750	50

#### 5. Meta Areas

The following Meta object areas are included in HCell H12159

M\_QUAL  
M\_CSCL

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

#### 6. Features

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

#### 7. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue Notes-Notes to the MCD chart Compiler
M_QUAL	Data quality Meta object
M_CSCL	Compilation scale of data (1:40,000)
SBDARE	Bottom samples, rocky sea bed area
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
OBSTRN	Obstructions

WRECKS                      Wrecks

The \*\_SS HCell contains the following Objects:

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

## **8. Spatial Framework**

### **8.1 Coordinate System**

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

### **8.2 Horizontal and Vertical Units**

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

## **9. Data Processing Notes**

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

## **10. QA/QC and ENC Validation Checks**

H12159 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**

H12159_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:25,000 and 1:40,000
H12159_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12159_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12159_outline.gml	Survey outline
H12159_outline.xsd	Survey outline

**11.2 Software**

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.3	Creation of soundings and bathy-derived features, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

**12. Contacts**

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

Russ Davies  
 Cartographer  
 Pacific Hydrographic Branch  
 Seattle, WA  
 206-526-6854  
[Russ.Davies@NOAA.GOV](mailto:Russ.Davies@NOAA.GOV)

APPROVAL SHEET  
H12159

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

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.