

H12312

NOAA Form 76-35A

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Ocean Survey

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: H12312

**LOCALITY**

State: Washington

General Locality: Southern Puget Sound, WA

Sub-locality: Northern Carr Inlet

**2011**

CHIEF OF PARTY  
Dan Jacobs (Acting)

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET****H12312**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State: **Washington**

General Locality: **Southern Puget Sound, WA**

Sub-Locality: **Northern Carr Inlet**

Scale: **10000**

Dates of Survey: **07/22/2011 to 11/10/2011**

Instructions Dated: **03/25/2011**

Project Number: **OPR-N360-NRT3-11**

Field Unit: **Navigation Response Team 3**

Chief of Party: **Dan Jacobs (Acting)**

Soundings by: **Multibeam Echo Sounder**

Imagery by:

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean lower low water**

H-Cell Compilation Units: ***meters at Mean lower low water***

## Remarks:

*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. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <http://www.ngdc.noaa.gov/>.*

## Descriptive Report to Accompany Survey H12312

Project: OPR-N360-NRT3-11

Locality: Southern Puget Sound, WA

Sublocality: Northern Carr Inlet

Scale: 1:10000

July 2011 - November 2011

**Navigation Response Team 3**

Chief of Party: Dan Jacobs (Acting)

### A. Area Surveyed

H12312 is located in Carr Inlet, Southern Puget Sound, Washington. It comprises all waters with depths of four meters and deeper. H12312 is situated between Penrose Point and Glen Cove of the Key Peninsula. H12312 is bounded to the north by H12313, Henderson Bay and to the south by H12310, Southern Carr Inlet.

#### A.1 Survey Limits

Data was acquired within the following survey limits:

<b>Northeast Limit</b>	<b>Southwest Limit</b>
47.3413888889 N	47.2480555556 N
122.651388889 W	122.763333333 W

*Table 1: Survey Limits*

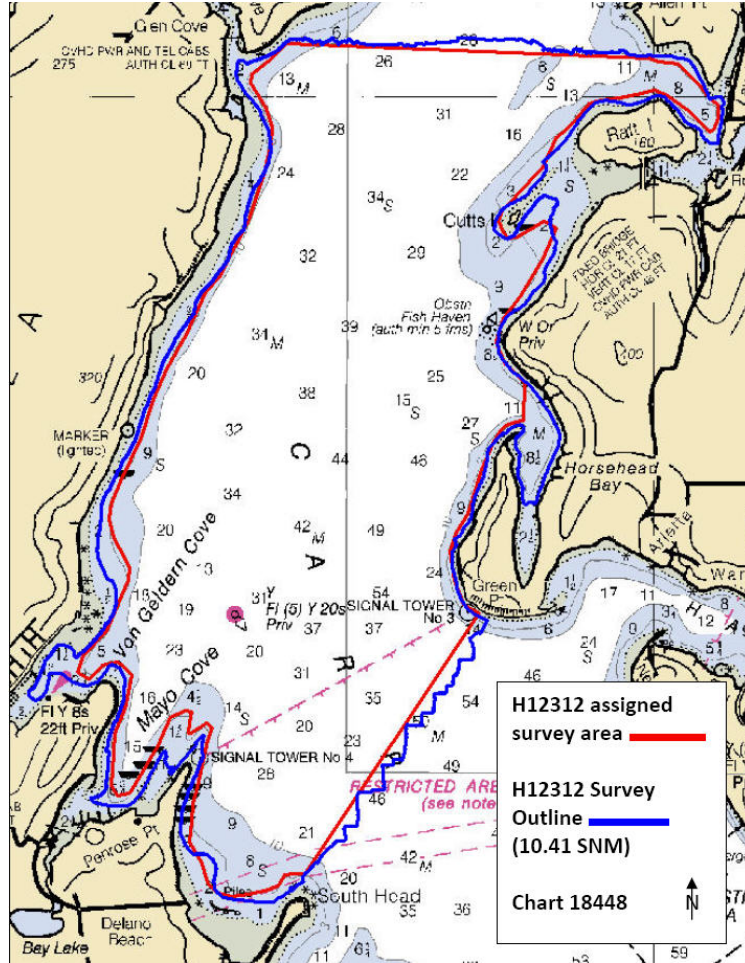
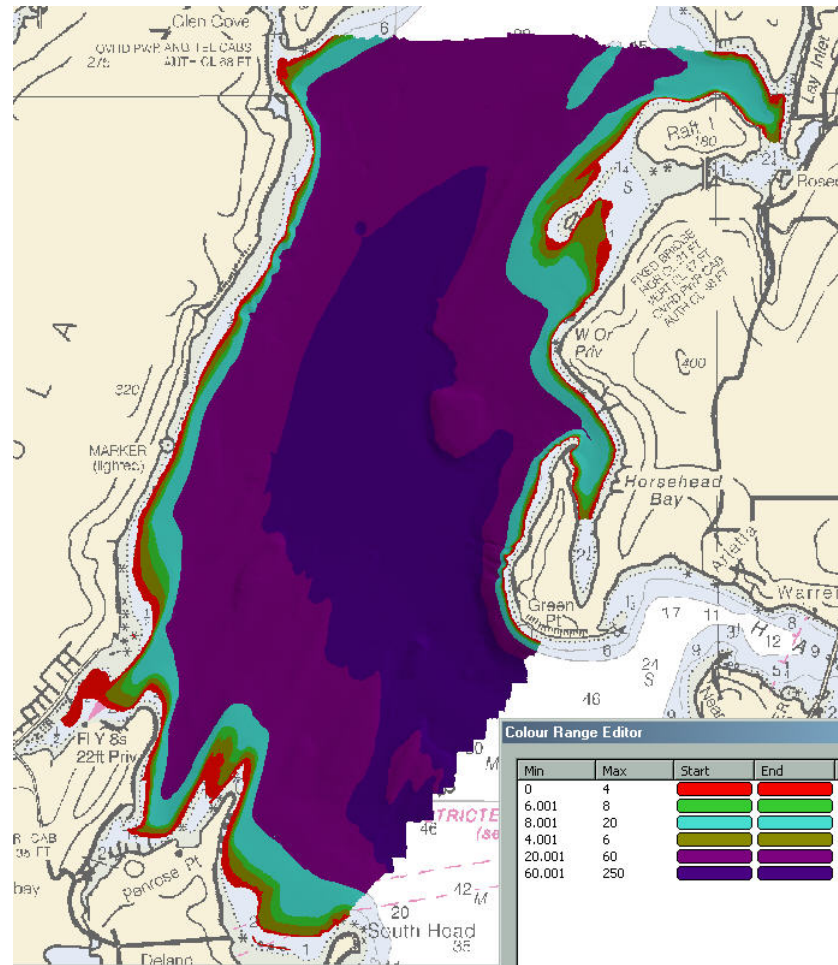


Figure 1: Survey Outline, H12312



*Figure 2: H12312 Depth Ranges*

Complete multibeam echosounder coverage was achieved in the assigned survey area in waters 4 meters and deeper except where the hydrographer deemed it unsafe.

The southern portion of Horse Head Bay was deemed both navigationally insignificant and unsafe for MBES survey operations due to shoal depths and restricted maneuverability. Areas adjacent to the fixed bridge spanning from Raft Island to Kitsap Peninsula were likewise deemed navigationally insignificant and unsafe for survey operations (Figure 3).

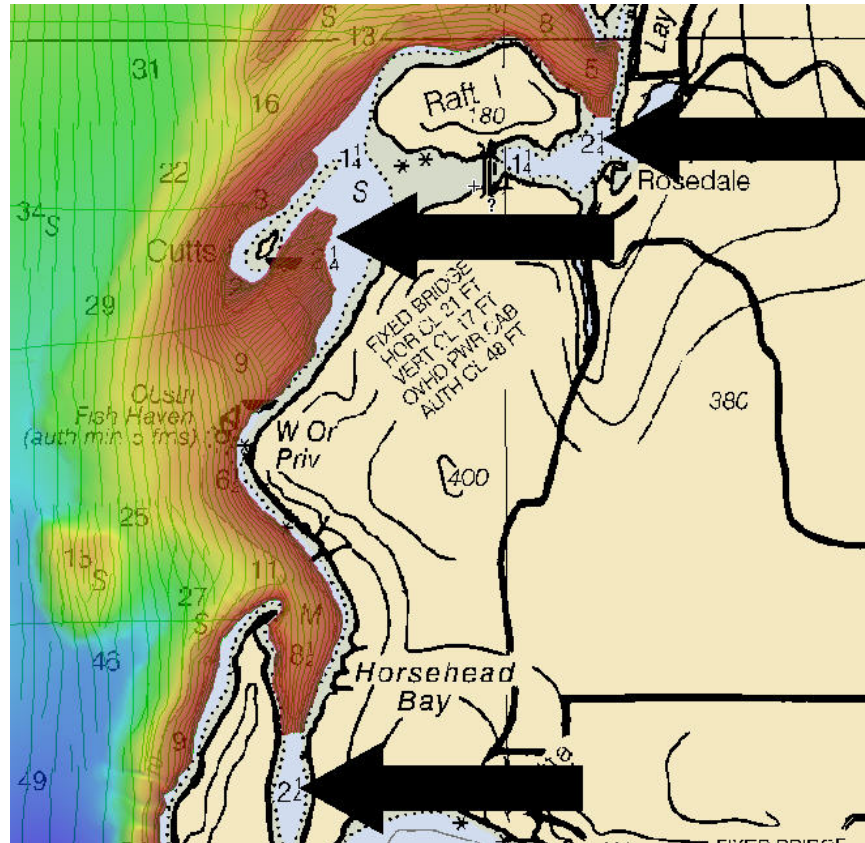


Figure 3: H12312 areas deemed unsafe for MBES operations

## A.2 Survey Purpose

The Southern Puget Sound area is in need of an updated bathymetry survey. The Prior surveys in this area date back to the 1930s. The intent of this priority survey is to supersede all bathymetry, sea floor features, and bottom characteristics within the survey boundaries.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions S-N360-NRT3-11 dated March 25, 2011 and all other applicable direction, with the exceptions noted in this report. The intent of this priority survey is to supersede all bathymetry, sea floor features, and bottom characteristics within the survey boundaries.

## A.4 Survey Coverage

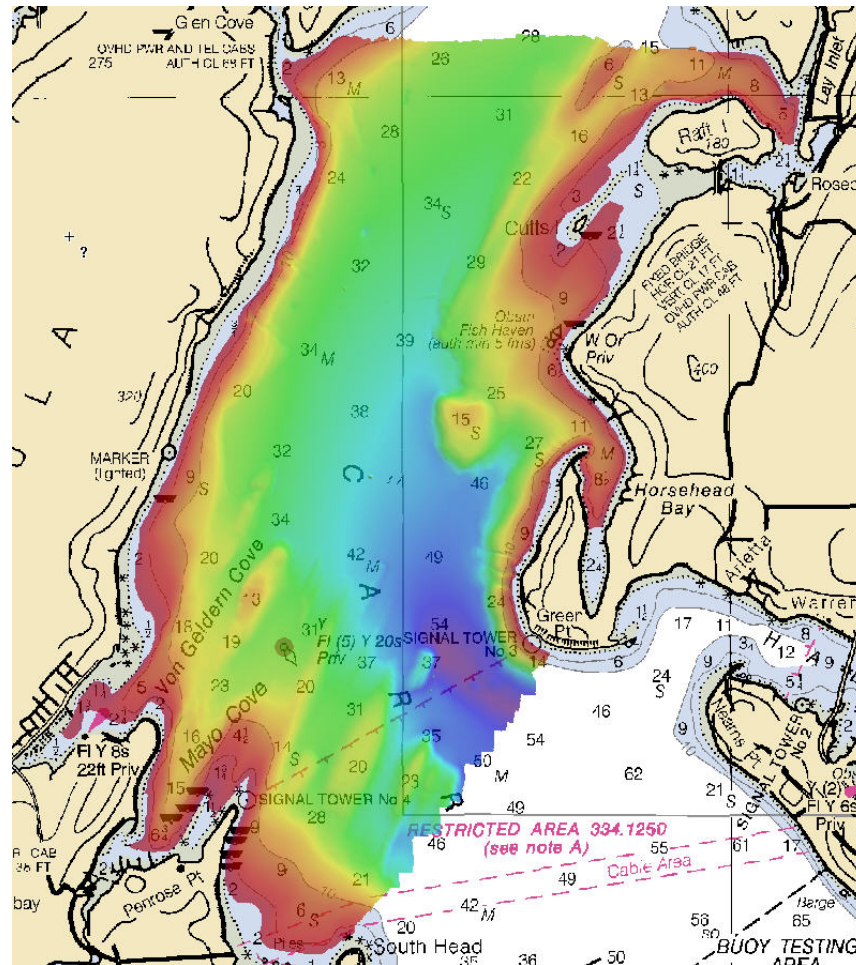


Figure 4: H12312 2-meter CUBE surface (Chart 18448)

Complete multibeam echosounder data coverage was achieved for the entire survey area in waters 4 meters and deeper, except where the hydrographer deemed unsafe. One (1) holiday measuring 13 meters by 4 meters occurred as a result of rejecting data in the 1m CUBE surface. On day number 263, line 1622, S1212's MBES momentarily lost trace with the sea floor when the sonar's transmit setting was inadvertently toggled out of its normal "auto" mode. The resulting sounding errors are located approximately 750 meters NE of Penrose Point, at 47.27N/122.73W. Its horizontal dimensions are 13 meters x 4 meters with surrounding (reliable) depths of 19 meters. The Hydrographer rejected these soundings in CARIS HIPS (Figure 5).

The southern boundary of H12312 has two areas of missed coverage located at 47.25N/122.72W and 47.26N/122.71W. Each is approximately 20 meters by 70 meters, however data from the adjoining sheet H12310, overlaps these two areas (Figure 6).

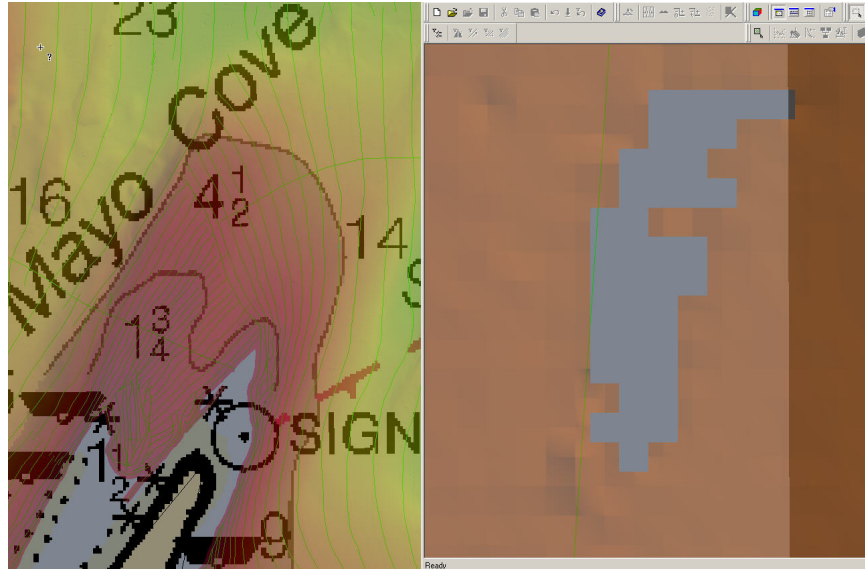


Figure 5: 13 meter x 4 meter holdiaiy, H12312

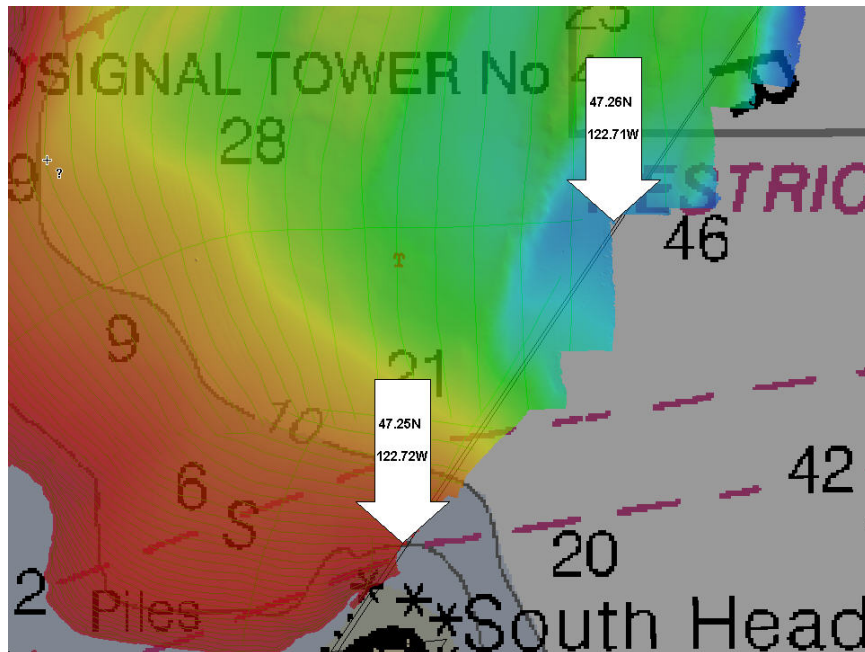


Figure 6: H12312 missing coverage areas



## A.5 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	<b>HULL ID</b>	<b><i>S1212</i></b>	<b><i>Total</i></b>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0
	<b>MBES Mainscheme</b>	341.16	341.16
	<b>Lidar Mainscheme</b>	0	0
	<b>SSS Mainscheme</b>	0	0
	<b>SBES/MBES Combo Mainscheme</b>	0	0
	<b>SBES/SSS Combo Mainscheme</b>	0	0
	<b>MBES/SSS Combo Mainscheme</b>	0	0
	<b>SBES/MBES Combo Crosslines</b>	14.98	14.98
	<b>Lidar Crosslines</b>	0	0
	<b>Number of Bottom Samples</b>		
<b>Number of DPs</b>			0
<b>Number of Items Items Investigated by Dive Ops</b>			0
<b>Total Number of SNM</b>			10.41

*Table 2: Hydrographic Survey Statistics*

The following table lists the specific dates of data acquisition for this survey:

<b><i>Survey Dates</i></b>
07/22/2011
07/25/2011
07/27/2011
08/08/2011
08/15/2011
08/23/2011
08/25/2011
09/01/2011
09/02/2011
09/07/2011
09/12/2011
09/16/2011
09/19/2011
09/20/2011
09/21/2011
09/27/2011
09/30/2011
10/03/2011
10/04/2011
10/06/2011
10/12/2011
10/14/2011
10/18/2011
10/27/2011
10/31/2011
11/03/2011
11/07/2011
11/10/2011

*Table 3: Dates of Hydrography*

## A.6 Shoreline

Shoreline was investigated in accordance with the Project Instructions and the HSSD.

## A.7 Bottom Samples

Bottom Samples were acquired in accordance with the Project Instructions or the HSSD.

*Six bottom samples are included in H12312 to be charted and two bottom samples were imported from the ENC to be retained.*

## B. Data Acquisition and Processing

### B.1 Equipment and Vessels

Refer to NRT3's 2011 Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

#### B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

<b>Hull ID</b>	<i>S1212</i>
<b>LOA</b>	10 meters
<b>Draft</b>	0.5 meters

*Table 4: Vessels Used*



Figure 7: Sea Ark Commander, S1212

## B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Simrad	3002	MBES
Applanix	POS MV4	Positioning System
Seabird	Seacat SBE-19+	Sound Speed System
Odom	Digibar Pro	Sound Speed System

Table 5: Major Systems Used

## B.2 Quality Control

### B.2.1 Crosslines

Multibeam Echosounder (MBES) crosslines (XL) totaled 14.98 nautical miles, comprising 4.2 percent of main scheme (MS) MBES bathymetry. CARIS BASE surfaces of mainscheme and crossline data were created and compared using the cursor information tool in CARIS HIPS. 135 locations were compared; the results are shown in Table Figure 8. 85% of crossline data agreed with mainscheme data, within 0.3 meters.

Difference between H12312 MS and XL	Frequency of Occurrence	% of Total Occurrences
0.0 meters	33	24%
0.1 meters	31	23%
0.2 meters	29	21%
0.3 meters	21	16%
0.4 meters	14	10%
0.5 meters	7	5%
Total	<b>135</b>	

Figure 8: H12312 Crossline Comparison

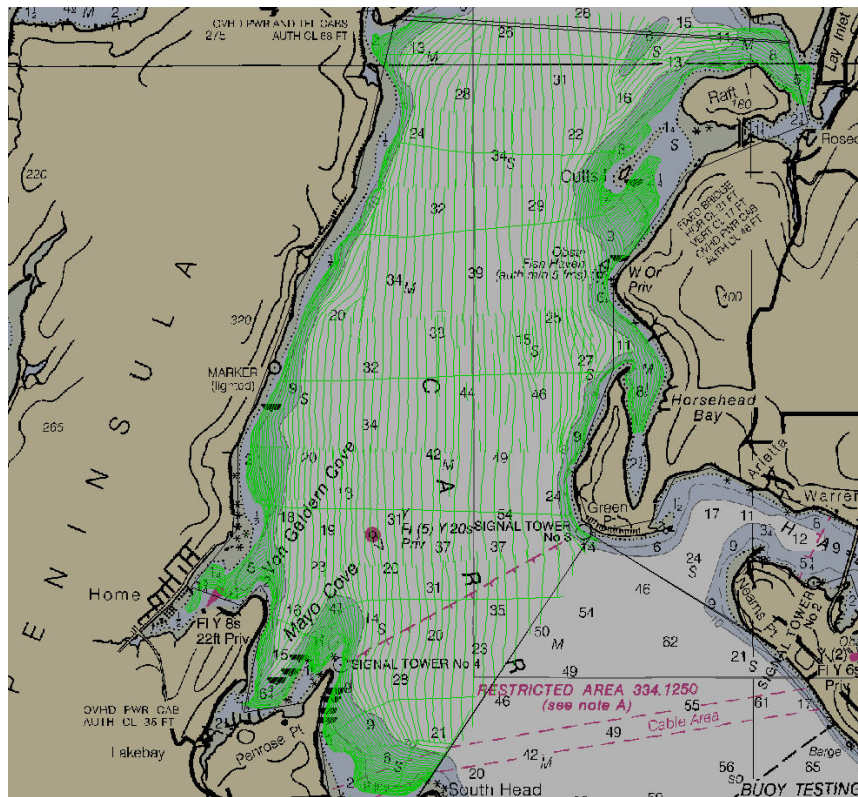


Figure 9: H12312 Mainscheme and Crosslines

**B.2.2 Uncertainty**

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01meters	0.12meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S1212	0.5meters/second		0.3meters/second

Table 7: Survey Specific Sound Speed TPU Values

Uncertainty values of submitted, finalized grids were calculated in CARIS using the "Greater of the Two" of total propagated uncertainty and standard deviation (scaled to 95%). In CARIS HIPS, an "IHOness" attribute layer was created for H12312 finalized combined surface using the following Order 1 formula:  $((0.5^2 + ((\text{Depth} * 0.013)^2))^0.5) - \text{Uncertainty}$ . Passing uncertainty values were color-coded green in the Finalized Surface, IHO\_1 layer. Values which did not conform to the IHO uncertainty budget resulted in values which were color-coded red in that same layer. Uncertainty values throughout H12312 were within IHO Order One specifications except as shown in Figure 9. Areas which exceeded those parameters spatially coincided with a depth area of approximately 93 to 108 meters.

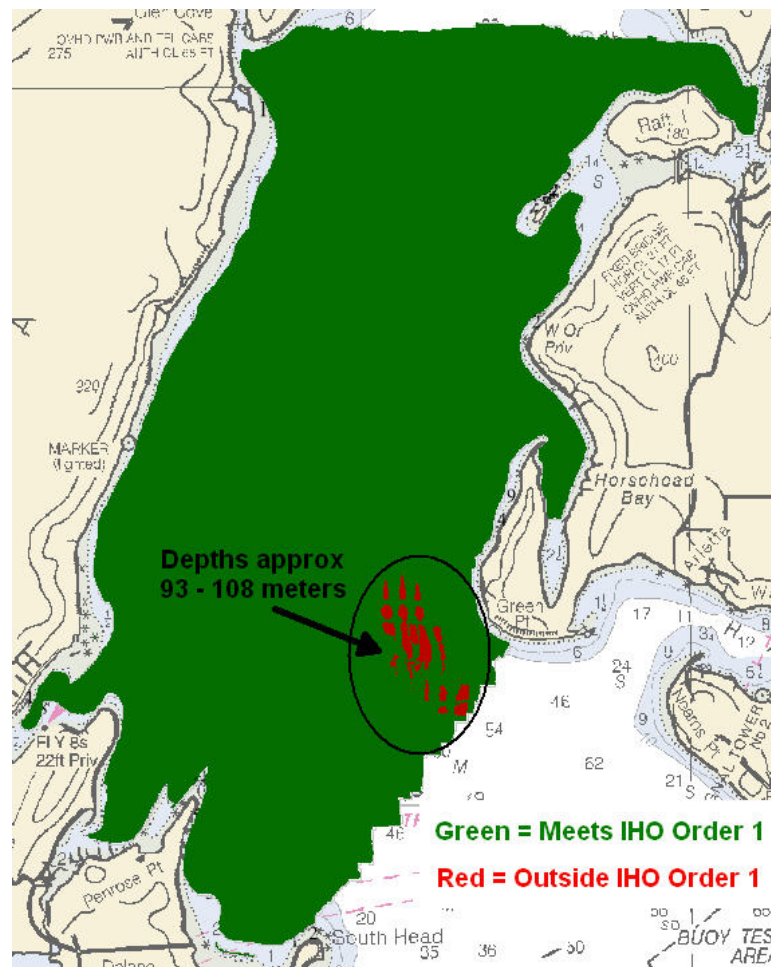


Figure 9: H12312 IHO Compliance

*Data is adequate and within specifications despite the uncertainty values that are in water deeper than 90 meters. It is recommended that the data from H12312 supersede charted data in the common area.*

### B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12310	1:10000	2011	Navigation Response Team 3	SE
H12313	1:10000	2011	Navigation Response Team 3	N

Table 8: Junctioning Surveys

#### H12310

H12312, Northern Carr Inlet junctions to the southeast with H12310, Southern Carr Inlet of the same project, OPR-N360-NRT3-11 (Figure 10). The overlapping region of each sheet's 2-meter BASE surface were compared using the CARIS cursor information tool. Thirty seven (37) of 40 observations, agreed to within .3 meters (93%). Good, general agreement between surveys was observed.

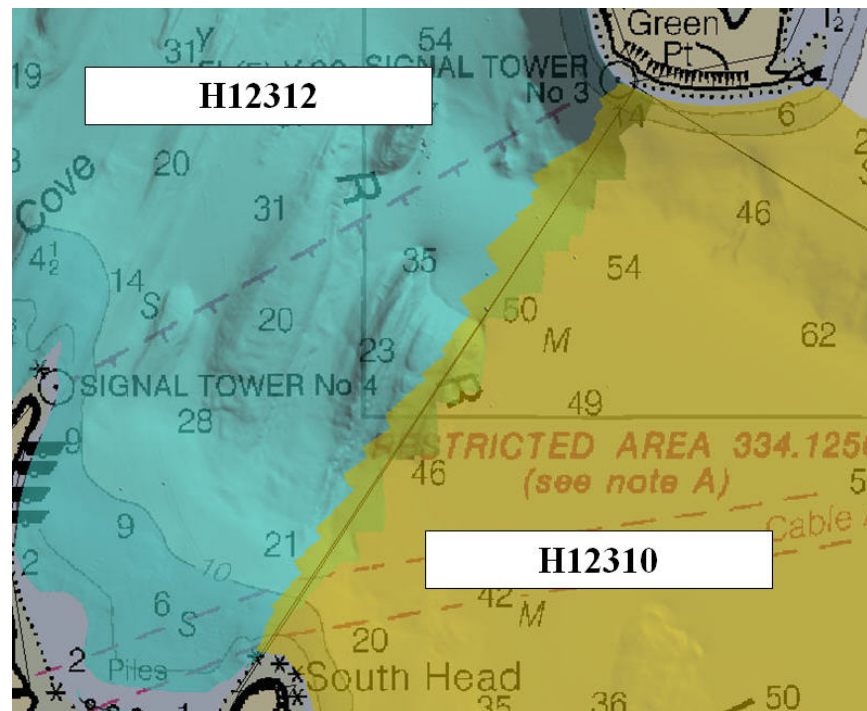


Figure 10: H12312 junction to H12310

#### H12313

H12312, Northern Carr Inlet junctions to the north with H12313, Henderson Bay of the same project, OPR-N360-NRT3-11 (Figure 11). The overlapping region of each sheet's 2-meter BASE surface were compared

using the CARIS cursor information tool. Thirty six (36) of 40 observations, agreed to within .3 meters (90%). Good, general agreement between surveys was observed.

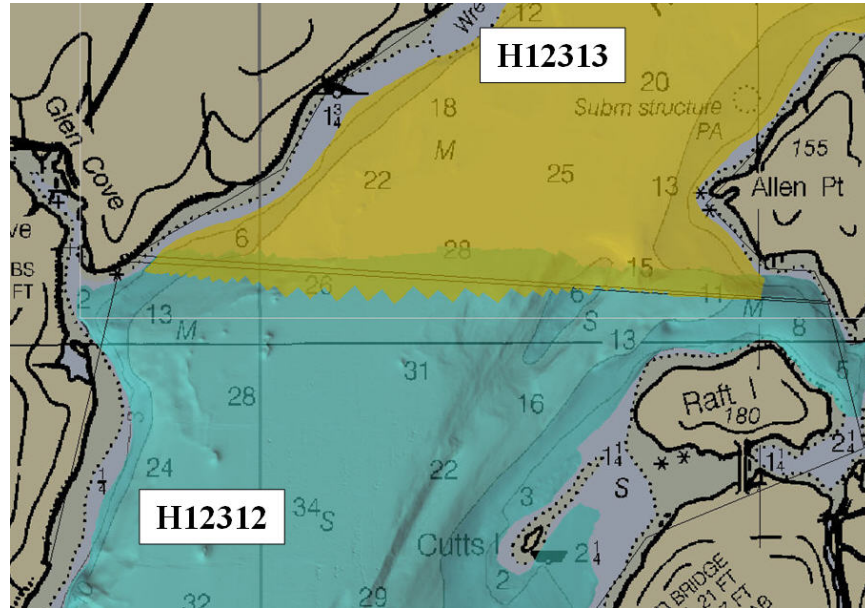


Figure 11: H12312 junction to H12313

***H12312 junctions with survey H12313 to the North and survey H12310 to the South. A common junction was made with adjoining portions of H12313 and H12310.***

#### B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

#### B.2.5 Equipment Effectiveness

##### B.2.5.1 Applanix Inertial Motion Unit (IMU)

The vessel's Inertial Measurement Unit (IMU) (serial number 308) failed on DN 297. The unit was removed and sent to its manufacturer, Applanix, for repair. NRT3 replaced this IMU with one of the same make and model, serial number 371. New GAMs Calibration and Patch Test figures resulting from this IMU replacement can be found in NRT3's DAPR submitted under separate cover and are also reflected in H12312's Vessel Configuration File, DN 298.

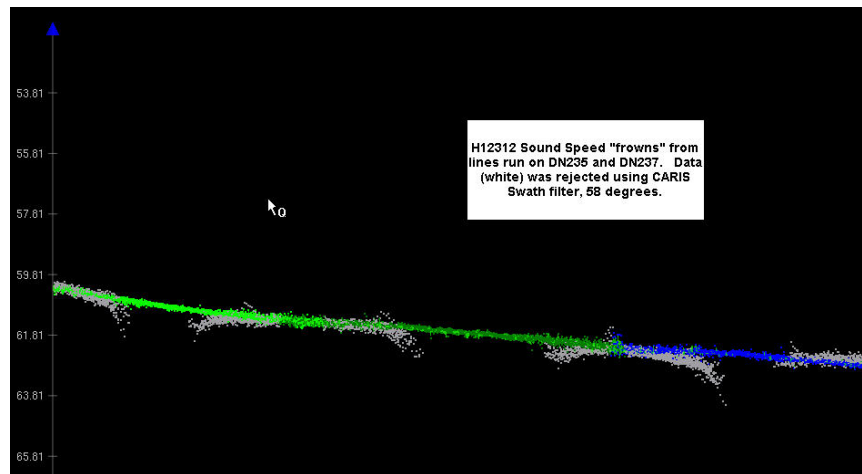
***The Data is adequate and within specifications despite the problem with the vessel's Inertial Measurement Unit.***



## B.2.6 Factors Affecting Soundings

### B.2.6.1 Sound Speed Deficiencies

Despite the Hydrographer's best efforts to ensure otherwise, sound speed errors could not always be held to practical minimums. Sound speed artifacts were evident in MBES data, particularly in depths greater than 60 meters. These artifacts, evidenced by "frowns" in CARIS subset editor are most pronounced in the SIMRAD 3002's outer beams, for day numbers 227-259. A 58 degree swath filter was imposed on these days to mitigate sounding uncertainty which, at times, exceeded one meter.



*Figure 12: Inaccurate Sound Speed , H12312*

*Data is adequate and within specifications to supersede charted data in the common area.*

### B.2.6.1 Vertical Offset from Tide

A vertical offset, typically measuring between 0.1 and 0.3 meters was observed between most days. This vertical offset can likely be attributed to insufficient tide modeling for this tidally dynamic area. The most pronounced vertical offset between days occurred in close proximity to Raft Island and Cutts Island. Vertical offsets measured nearly .5 meters in some instances for this region.

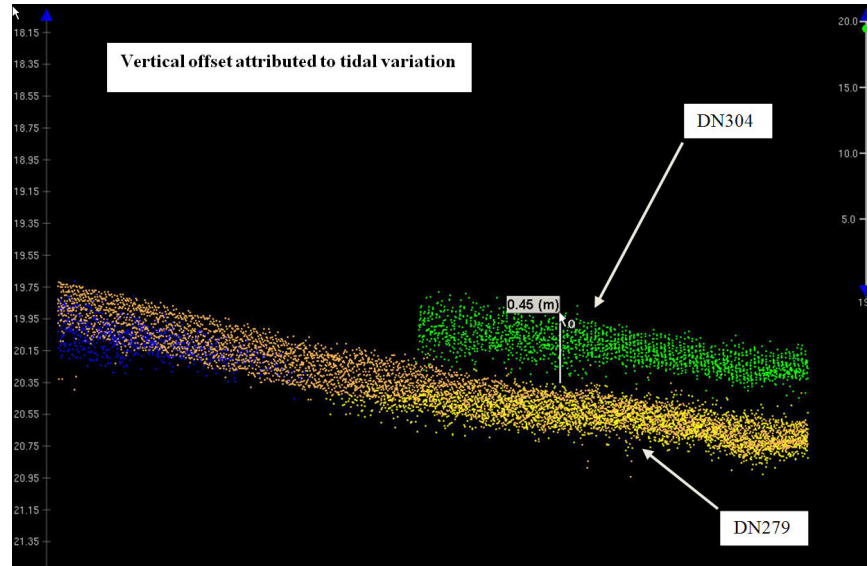


Figure 13: Tide Related Vertical Offset

*Data is adequate and within specifications to supersede charted data in the common area. Despite the vertical offset.*

### B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: CTD casts were performed and the data loaded into the Kongsberg EM 3002 multibeam echo sounder using SIS acquisition software prior to logging data. Additional casts were made at four (4) hour intervals or more frequently when observed surface speed values changed significantly (3 meters per second or more). CTD data was applied real-time during acquisition; no post application of CTD data was performed.

### B.2.8 Coverage Equipment and Methods

All Equipment and survey methods were used as detailed in the DAPR.

## B.3 Echo Sounding Corrections

### B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

### **B.3.2 Calibrations**

The vessel's IMU (serial number 308) failed on DN 297. The unit was removed and sent to its manufacturer, Applanix, for repair. NRT3 replaced this IMU with one of the same make and model, serial number 371. New GAMS Calibration and Patch Test figures resulting from this IMU replacement can be found in NRT3's DAPR submitted under separate cover and are also reflected in H12312's Vessel Configuration File, DN 298.

### **B.4 Backscatter**

Backscatter was not collected for this survey.

### **B.5 Data Processing**

#### **B.5.1 Software Updates**

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: S-57 ENC 3.1

#### **B.5.2 Surfaces**

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
1m	CUBE	1 meters	-1.82 meters - 112.76 meters	NOAA_1m	Complete MBES
2m	CUBE	2 meters	-1.82 meters - 109.27 meters	NOAA_2m	Complete MBES
4m	CUBE	4 meters	-0.45 meters - 109.22 meters	NOAA_4m	Complete MBES
8m	CUBE	8 meters	-0.37 meters - 109.21 meters	NOAA_8m	Complete MBES
1m_Final	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
2m_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
4m_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
8m_Final	CUBE	8 meters	72 meters - 109.21 meters	NOAA_8m	Complete MBES
Half_meter_A	CUBE	0.5 meters	-0.81 meters - 71.78 meters	NOAA_0.5m	Complete MBES
Half_meter_B	CUBE	0.5 meters	0.43 meters - 48.25 meters	NOAA_0.5m	Complete MBES
05m_Final	CUBE	0.5 meters	0 meters - 20 meters	NOAA_0.5m	Complete MBES
05m_Final	CUBE	0.5 meters	0.43 meters - 20 meters	NOAA_0.5m	Complete MBES

*Table 9: CARIS Surfaces*

In addition to the required CUBE surfaces, the Hydrographer deemed it necessary to create two smaller field sheets containing one half (0.5) meter grids named "05\_m." This surface resolution better captured the shoalest points over rocks in depths of four (4) to twenty (20) meters. Notably rocky areas were in the vicinities of Cutt's Island and Delano Beach. The Hydrographer recommends charting depths over these rocky areas as per digital data from the 0.5 meter surfaces, as a .2 meter improvement was often attained at this higher resolution. See Figures 14, 15.

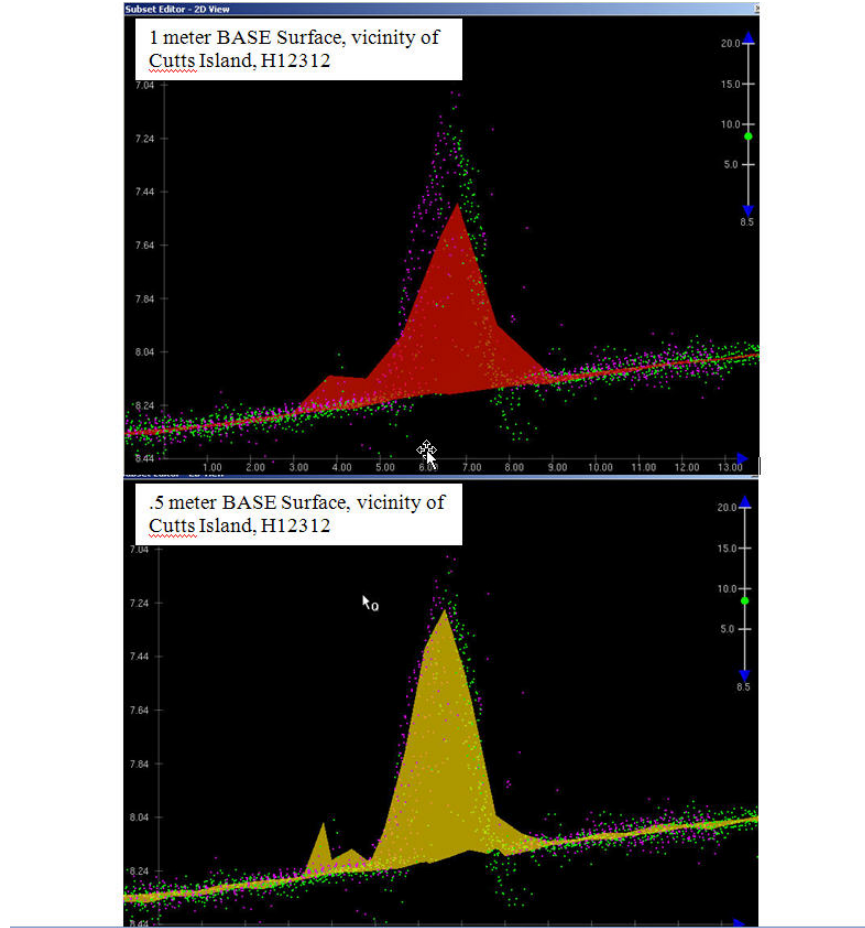


Figure 14: H12312 0.5 meter Surface vs. 1.0 meter Surface

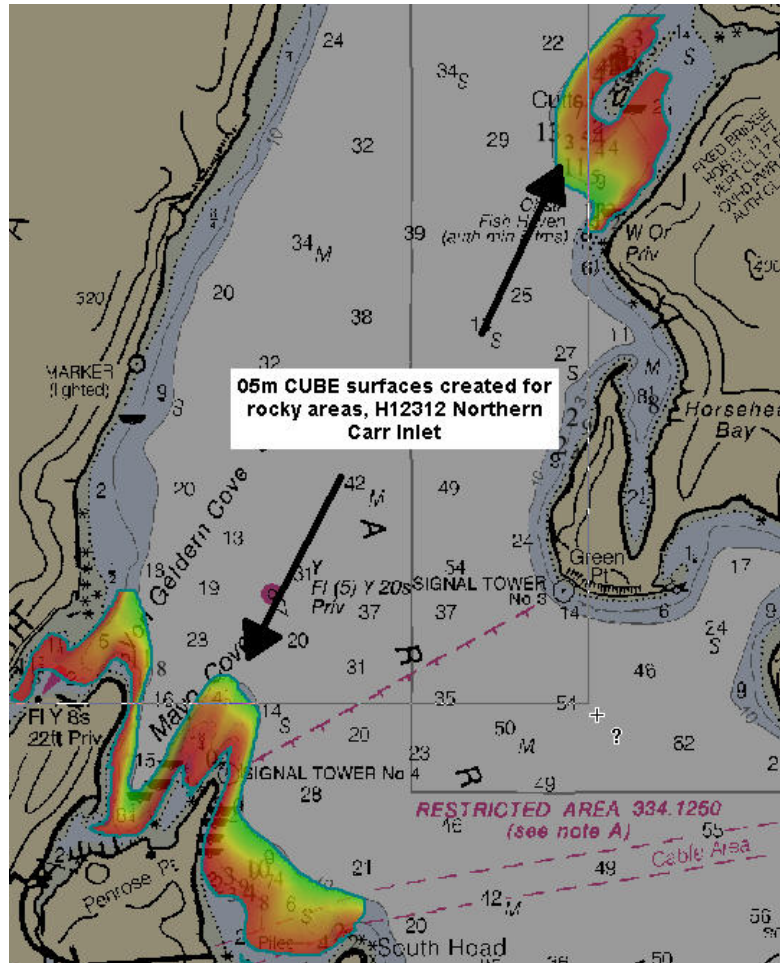


Figure 15: Two additional fieldsheets comprising 0.5meter CUBE surfaces

*A 8 meter base surface was created and used for the compilation of H12312.*

## C. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Tacoma, Washington (944-6468) served as control for datum determination. No tertiary gauge was required.

### C.1 Vertical Control

The vertical datum for this project is Mean lower low water.

Standard Vertical Control Methods Used:

## Discrete Zoning

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Tacoma, WA	944-6484

*Table 10: NWLON Tide Stations*

File Name	Status
9446484.tid	Final Approved

*Table 11: Water Level Files (.tid)*

File Name	Status
N360NRT32011CORP.zdf	Final

*Table 12: Tide Correctors (.zdf or .tc)*

A request for final approved tides was sent to N/OPS1 on 11/16/2011. The final tide note was received on 11/29/2011.

**Tide note is attached to this report.**

## C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

On DN 264 USCG DGPS beacon at Point Robinson (323 kHz) was operating at reduced power. NRT3 switched to USCG on Whidbey Island (302 kHz) for MBES acquisition on this day.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Robinson Point, Washington 323 kHz
Whidbey Island, Washington 302 kHz

Table 13: USCG DGPS Stations

## D. Results and Recommendations

### D.1 Chart Comparison

#### D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNМ Date	NM Date
18448	1:80000	34	07/2006	12/06/2011	12/03/2011

Table 14: Largest Scale Raster Charts

#### 18448

H12312 soundings agreed with charted (18448) depths to within one fathom across all depth ranges except as indicated in Figure 16. Charted depths circled in green indicate where H12312 soundings are within one fathom of charted depths. Blue circled depths indicate where H12312 soundings are more than one fathom deeper than charted. Very good general agreement was noted between this survey and chart 18448 with no shoaling or deepening trends apparent from the data.

A 5 fathom interval contour layer for H12312's final combined surface was generated in CARIS HIPS. Comparison between the charted (18448) ten fathom contour and H12312 data was performed. Results were in good general agreement at the chart's scale of 1:80,000. The ten fathom contour had migrated seaward 40 to 70 meters from its charted position for the NW side of the survey. The eastern portion of H12312's 10 fathom contour exhibited a shoreward trend 40 to 60 meters from charted. Areas where the survey's 10 fathom contour differed noticeably from charted are as follows:

The charted 10 fathom contour offshore of Penrose Point has migrated shoreward, Figure 17. The charted 10 fathom contour at the entrance to Horsehead Bay has migrated into the bay, Figure 18. The charted 10 fathom contour bounding the 6 fathom shoal NW of Raft Island has migrated shoreward, Figure 19.



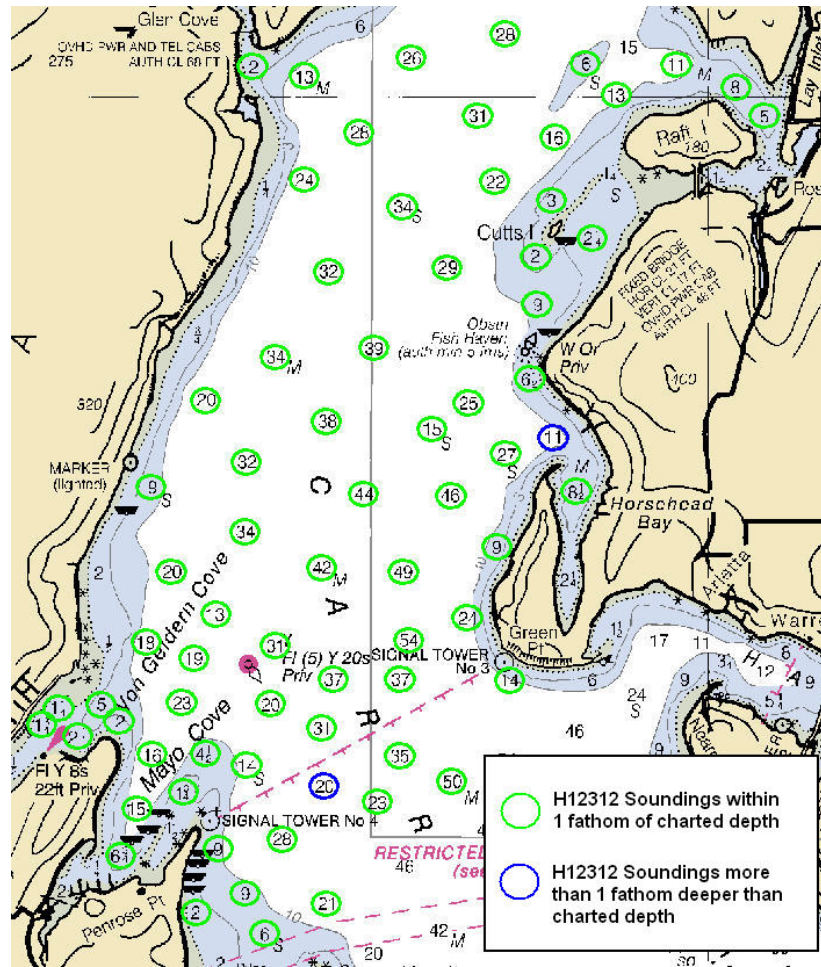


Figure 16: H12312 Depth Comparison

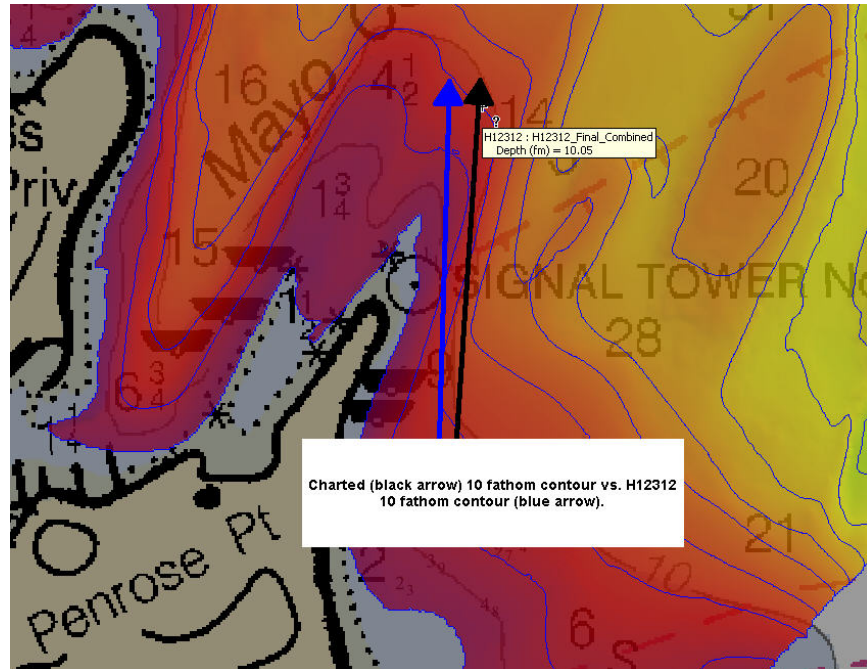


Figure 17: H12312 Ten Fathom Contour Comparison, Penrose Point

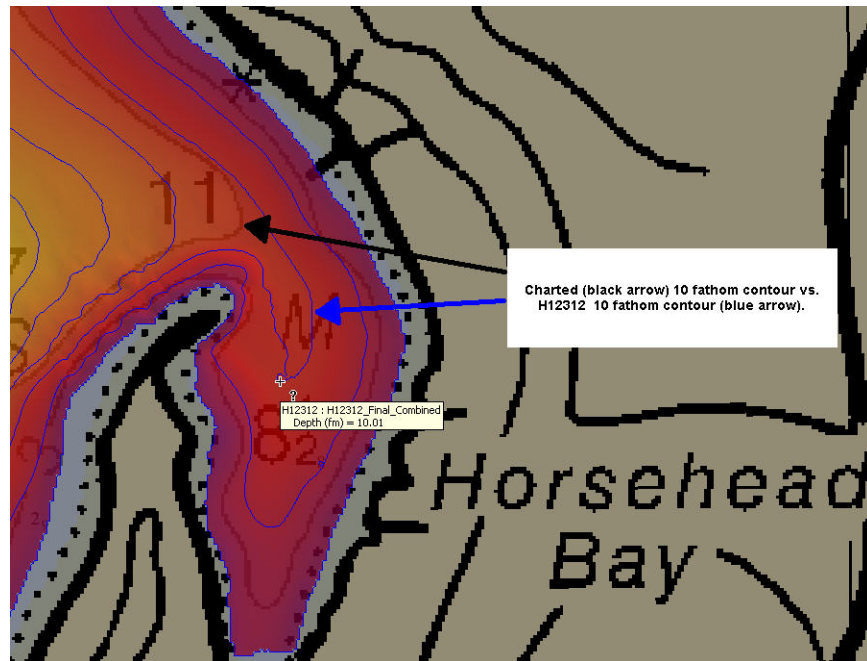


Figure 18: H12312 Ten Fathom Contour Comparison, Horsehead Bay

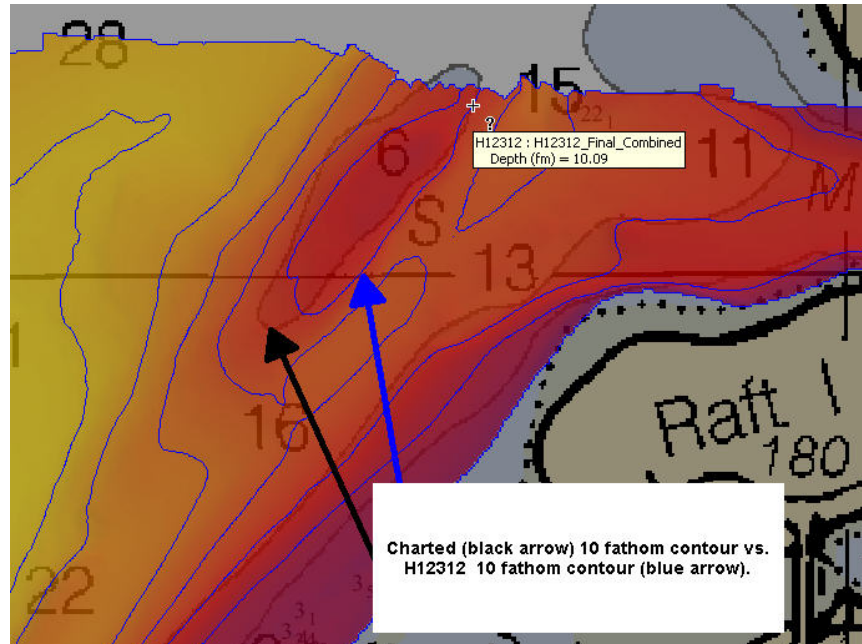


Figure 19: H12312 Ten Fathom Contour NW of Raft Island

### D.1.2 AWOIS Items

Number of AWOIS Items Addressed: 1

Number of AWOIS Items Not Addressed: 0

One (1) Automated Wreck and Obstruction Information System (AWOIS) item (#54005) was assigned for H12312. History column reads "Unknown Source-- a fish haven was added to chart."

AWOIS #54005 .mdb Techniqnote column reads "The obstruction is inside a Scuba Diving Area at Kopachuck State Park.

No significant object(s) found inside AWOIS (#54005) search radius. Found unknown object 220 meters NE of AWOIS (#54005) position with a least depth of 13 meters. Object is 34 meters long, 15 meters wide, and rises 1.3 meters above sea floor. Object lies on charted (18448) mooring buoy.

Least depth and position for AWOIS item is 13.019 meters at 47.31N-122.69W. See H12312 Features Report.

***Two blue notes were added to H12312 to retain charted fish haven AWOIS item 54005 and to update label with least depth of 3 fm 1 ft. For the unknown object 220 meters NE of AWOIS (#54005) an obstruction feature was added to H12312. AWOIS report is attached to this report.***

### D.1.3 Charted Features

No charted features that contain the label PA, ED, PD or Rep exist within the H12312 survey area.

#### **D.1.4 Uncharted Features**

No uncharted wrecks or obstructions not addressed elsewhere in this report, were detected by this survey.

#### **D.1.5 Dangers to Navigation**

An H12312 Danger to Navigation Report is included in Appendix I.

*DTON has been applied to the chart and is included in this report.*

#### **D.1.6 Shoal and Hazardous Features**

No shoals or hazardous features that are not addressed elsewhere in this report, were detected.

#### **D.1.7 Channels**

No maintained channels occur in the survey area.

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

#### **D.2.1 Shoreline**

Limited shoreline verification was accomplished using the Project Reference File (PRF) and the Assigned Feature File (AFF) provided with the project instructions. The PRF contains the limits of the assigned survey area and the Automated Wreck and Obstruction Information Service (AWOIS) features and search radii. The AFF is a subset of the Composite Source File (CSF) which includes those features specifically assigned for investigation by this survey.

Limited shoreline verification was conducted near predicted low water in accordance with the applicable sections of NOAA Specifications and Deliverables and Field Procedures Manual. Assigned features within the limits of the survey were investigated as required, S-57 attributed and recorded in the CARIS Notebook (version 3.1 SP1, HF1) .hob file indicated in Figure 20 and submitted with this survey. Additional features including AWOIS items were processed using Pydro version 11.11 and are included in the H12312 Feature Report found in Appendix II of this report.

H12312 Shoreline File	Description
H12312_Original_AFF.hob	Original source data (0_1AFF01.000) as provided for project OPR-N360-NRT3-11 and “clipped” to the limits of survey H12312 and converted to .hob format.
H12312_Final_Feature_File.hob	An exact copy of H12312_Original_AFF.hob modified by the field unit to best represent shoreline features at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved. Disproved features are flagged as “delete” as an extended attribute entry.
0_4PRF01.000	Project Reference File with survey limits and AWOIS item positions and search radii.

*Figure 20: H12312 Shoreline Files*

*The submitted HOB files were used in the compilation of this survey. During compilation, some modifications were made to accommodate chart scale.*

### D.2.2 Prior Surveys

A prior survey comparison was not performed.

### D.2.3 Aids to Navigation

An H12312 ATON Report was submitted via email on October 14, 2011. Please reference pdf document entitled "OPR-N360\_atons\_memo" in Appendix V of the Descriptive Report.

*The Email correspondence is attached to this report.*

### D.2.4 Overhead Features

A charted (18448) fixed bridge serving Raft Island near Rosedale was not investigated because shoal conditions prevented a safe approach (Figure 21).

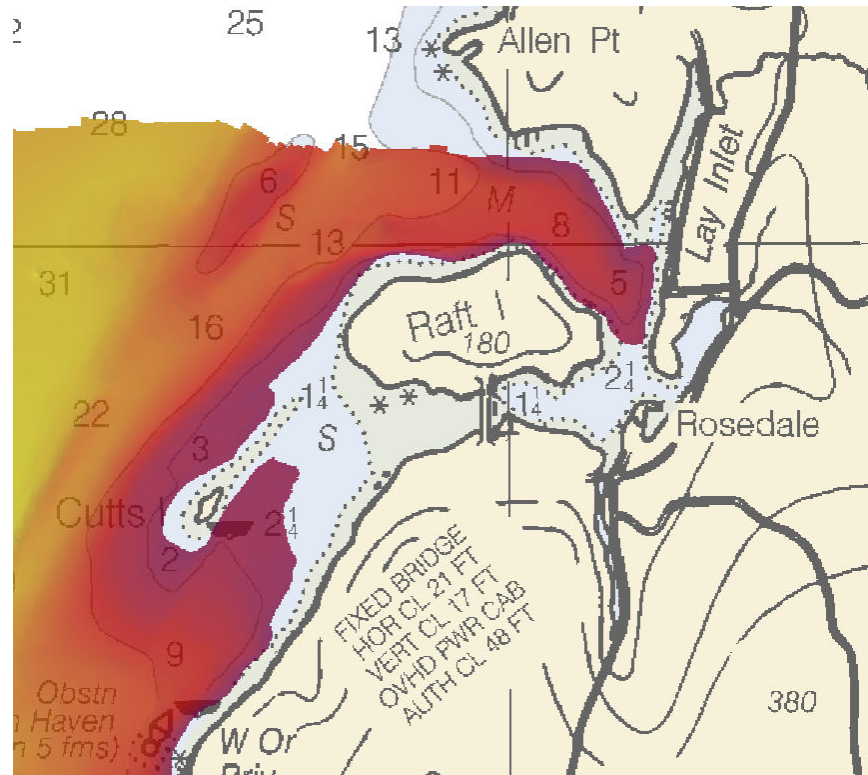


Figure 21: Raft Island Bridge

### D.2.5 Submarine Features

A cable area extends across Carr Inlet from Delano Beach (due north of South Head) to Fox Island (1800 meters southeast of Nearn's Point). An examination of the bathymetric and backscatter data revealed no evidence of cables (Figure 22).

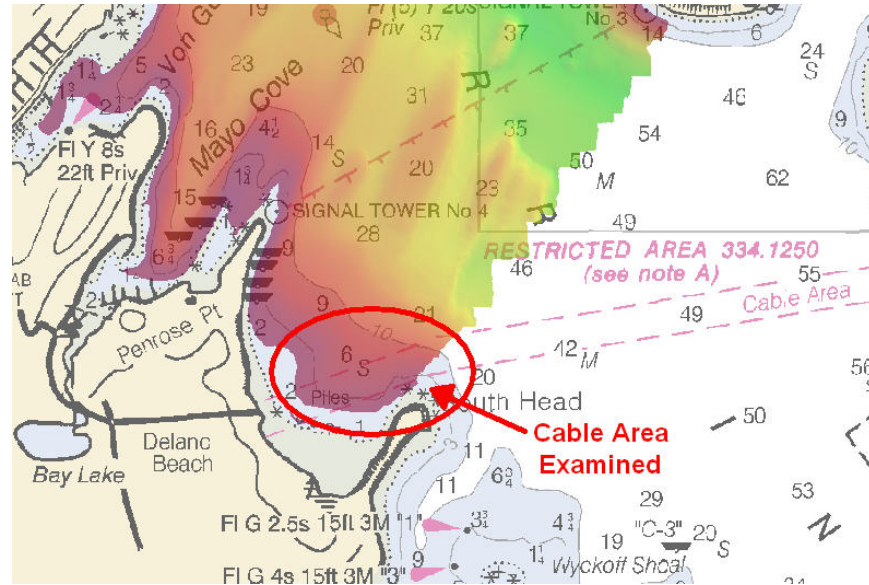


Figure 22: Cable Area

***Cable is recommended to be retained on the chart***

#### D.2.6 Ferry Routes and Terminals

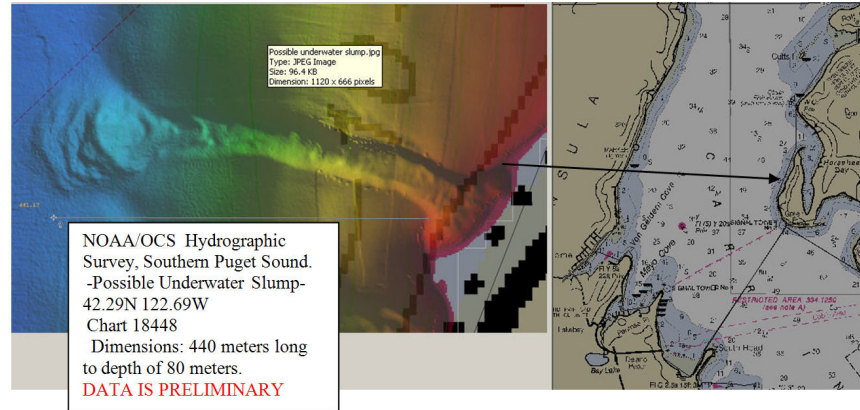
No ferry operations occur in the survey area.

#### D.2.7 Platforms

No platforms exist in the survey area.

#### D.2.8 Significant Features

A feature of possible geologic interest lies approximately 1000 meters NNW of Green Point at 42.29N 122.69W (Figure 23). The trough-like feature is nearly 440 meters long, trends west (seaward) from the shoreline and has a nearly constant width of 50 meters. It terminus lies in 80 meters of water. The feature appears to have been a mass movement of marine sediment. No waterway connecting this feature to the shoreline was observed.



*Figure 23: Trough-like feature*

## D.2 Construction and Dredging

No construction or dredging was observed in the survey area.

### D.2.9.1 Bottom Samples

Bottom sample results are located in CARIS Notebook file H12312\_Final\_Feature\_File.hob submitted with this report.




## E. Approval Sheet

As Chief of Party, Field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Dan Jacobs	NRT3 Team Lead (Acting)	03/02/2012	 Dan Jacobs I am the author of this document 2012.04.13 09:54:05 -07'00'

## F. Table of Acronyms

<b>Acronym</b>	<b>Definition</b>
<b>AFF</b>	Assigned Features File
<b>AHB</b>	Atlantic Hydrographic Branch
<b>AST</b>	Assistant Survey Technician
<b>ATON</b>	Aid to Navigation
<b>AWOIS</b>	Automated Wreck and Obstruction Information System
<b>BAG</b>	Bathymetric Attributed Grid
<b>BASE</b>	Bathymetry Associated with Statistical Error
<b>CO</b>	Commanding Officer
<b>CO-OPS</b>	Center for Operational Products and Services
<b>CORS</b>	Continually Operating Reference Station
<b>CTD</b>	Conductivity Temperature Depth
<b>CEF</b>	Chart Evaluation File
<b>CSF</b>	Composite Source File
<b>CST</b>	Chief Survey Technician
<b>CUBE</b>	Combined Uncertainty and Bathymetry Estimator
<b>DAPR</b>	Data Acquisition and Processing Report
<b>DGPS</b>	Differential Global Positioning System
<b>DP</b>	Discrete Position
<b>DR</b>	Descriptive Report
<b>DTON</b>	Danger to Navigation
<b>ENC</b>	Electronic Navigational Chart
<b>ERS</b>	Ellipsoidal Referenced Survey
<b>ERZT</b>	Ellipsoidally Referenced Zoned Tides
<b>FOO</b>	Field Operations Officer
<b>FPM</b>	Field Procedures Manual
<b>GAMS</b>	GPS Azimuth Measurement Subsystem
<b>GC</b>	Geographic Cell
<b>GPS</b>	Global Positioning System
<b>HIPS</b>	Hydrographic Information Processing System
<b>HSD</b>	Hydrographic Surveys Division
<b>HSSDM</b>	Hydrographic Survey Specifications and Deliverables Manual

<b>Acronym</b>	<b>Definition</b>
<b>HSTP</b>	Hydrographic Systems Technology Programs
<b>HSX</b>	Hypack Hysweep File Format
<b>HTD</b>	Hydrographic Surveys Technical Directive
<b>HVCR</b>	Horizontal and Vertical Control Report
<b>HVF</b>	HIPS Vessel File
<b>IHO</b>	International Hydrographic Organization
<b>IMU</b>	Inertial Motion Unit
<b>ITRF</b>	International Terrestrial Reference Frame
<b>LNM</b>	Local Notice to Mariners
<b>LNM</b>	Linear Nautical Miles
<b>MCD</b>	Marine Chart Division
<b>MHW</b>	Mean High Water
<b>MLLW</b>	Mean Lower Low Water
<b>NAD 83</b>	North American Datum of 1983
<b>NAIP</b>	National Agriculture and Imagery Program
<b>NALL</b>	Navigable Area Limit Line
<b>NM</b>	Notice to Mariners
<b>NMEA</b>	National Marine Electronics Association
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NOS</b>	National Ocean Service
<b>NRT</b>	Navigation Response Team
<b>NSD</b>	Navigation Services Division
<b>OCS</b>	Office of Coast Survey
<b>OMAO</b>	Office of Marine and Aviation Operations (NOAA)
<b>OPS</b>	Operations Branch
<b>MBES</b>	Multibeam Echosounder
<b>NWLON</b>	National Water Level Observation Network
<b>PDBS</b>	Phase Differencing Bathymetric Sonar
<b>PHB</b>	Pacific Hydrographic Branch
<b>POS/MV</b>	Position and Orientation System for Marine Vessels
<b>PPK</b>	Post Processed Kinematic
<b>PPP</b>	Precise Point Positioning
<b>PPS</b>	Pulse per second

<b>Acronym</b>	<b>Definition</b>
<b>PRF</b>	Project Reference File
<b>PS</b>	Physical Scientist
<b>PST</b>	Physical Science Technician
<b>RNC</b>	Raster Navigational Chart
<b>RTK</b>	Real Time Kinematic
<b>SBES</b>	Singlebeam Echosounder
<b>SBET</b>	Smooth Best Estimate and Trajectory
<b>SNM</b>	Square Nautical Miles
<b>SSS</b>	Side Scan Sonar
<b>ST</b>	Survey Technician
<b>SVP</b>	Sound Velocity Profiler
<b>TCARI</b>	Tidal Constituent And Residual Interpolation
<b>TPU</b>	Total Propagated Error
<b>TPU</b>	Topside Processing Unit
<b>USACE</b>	United States Army Corps of Engineers
<b>USCG</b>	United States Coast Guard
<b>UTM</b>	Universal Transverse Mercator
<b>XO</b>	Executive Officer
<b>ZDA</b>	Global Positioning System timing message
<b>ZDF</b>	Zone Definition File



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** November 29, 2011

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-N360-NRT3-2011  
**HYDROGRAPHIC SHEET:** H12312

**LOCALITY:** Northern Carr Inlet, Southern Puget Sound, WA  
**TIME PERIOD:** July 22 - November 10, 2011

**TIDE STATION USED:** 9446484 Tacoma, WA  
Lat. 47° 16.0' N Long. 122° 24.8' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.331 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-N360-NRT3-2011, H12312, during the time period between July 22 and November 10, 2011.

Please use the zoning file "N360NRT32011CORP" submitted with the project instructions for OPR-N360-NRT3-2011. Zones PS193, PS194 and PS195 are the applicable zones for H12312.

**Refer to attachments for zoning information.**

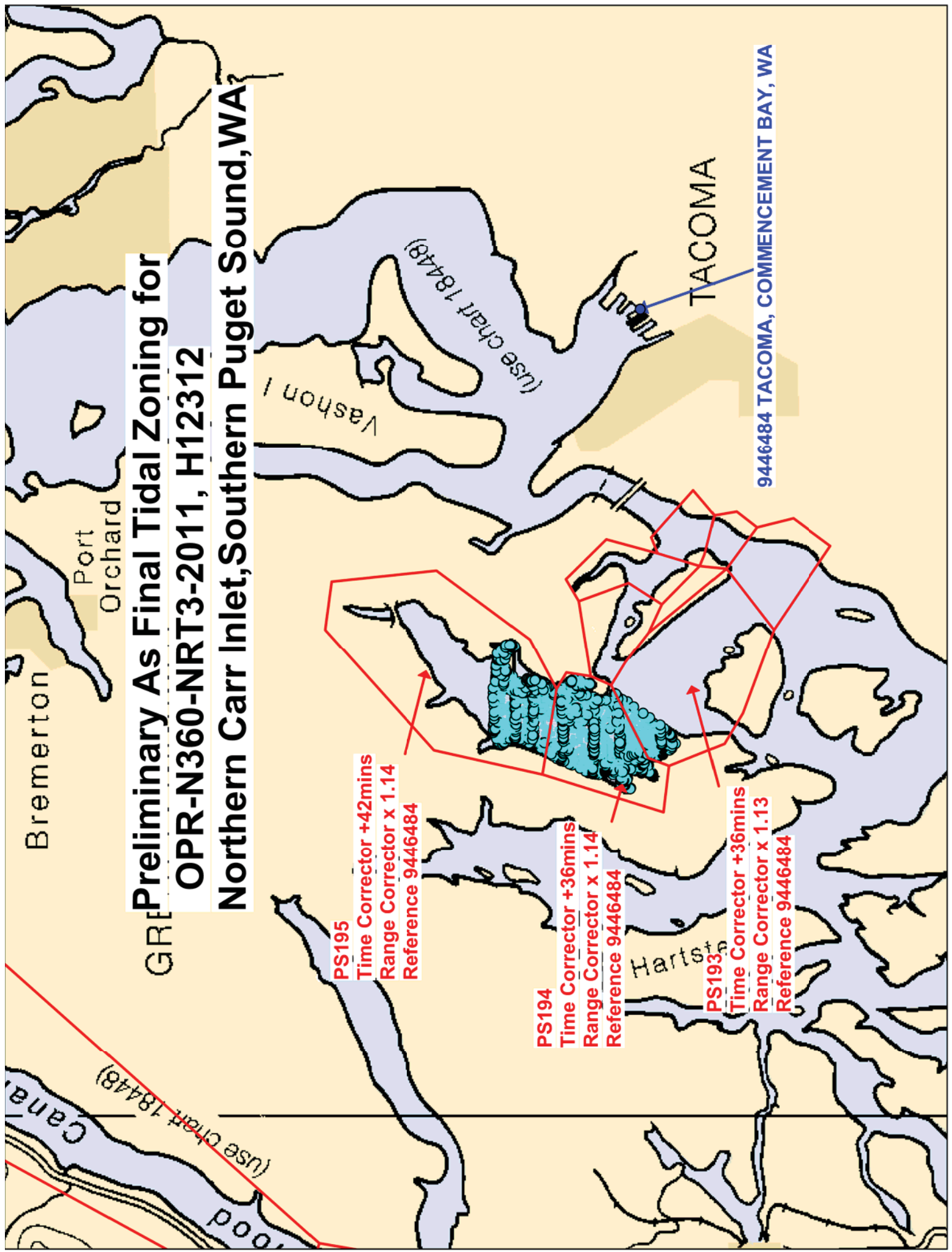
**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

**Gerald  
Hovis**

Digitally signed by Gerald Hovis  
DN: cn=Gerald Hovis, o=Center for  
Operational Oceanographic Products  
and Services, ou=NOAA/NOS/CO-  
OPS/OD/PSB,  
email=gerald.hovis@noaa.gov, c=US  
Date: 2011.12.05 11:56:27 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH





**Preliminary As Final Tidal Zoning for  
OPR-N360-NRT3-2011, H12312  
Northern Carr Inlet, Southern Puget Sound, WA**

9446484 TACOMA, COMMENCEMENT BAY, WA

**PS195**  
Time Corrector +42mins  
Range Corrector x 1.14  
Reference 9446484

**PS194**  
Time Corrector +36mins  
Range Corrector x 1.14  
Reference 9446484

**PS1933**  
Time Corrector +36mins  
Range Corrector x 1.13  
Reference 9446484

Bremerton

Port Orchard

TACOMA

Vashon I

(use chart 18448)

Hartst

(use chart 18448)

# OPR-N360-NRT3-11

**Registry Number:** H12312  
**State:** Washington  
**Locality:** Southern Puget Sound  
**Sub-locality:** Northern Carr Inlet  
**Project Number:** OPR-N360-nrt3-11  
**Survey Date:** 09/20/2011

Uncharted rock discovered in popular moorage area. Deemed DTON. Sounding is per preliminary tides, MLLW.

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18445	32nd	08/01/2007	1:80,000 (18445_8)	[L]NTM: ?
18448	34th	07/01/2006	1:80,000 (18448_1)	USCG LNM: 2/8/2011 (2/8/2011) CHS NTM: None (1/28/2011) NGA NTM: 9/30/2006 (2/19/2011)
18440	29th	09/01/2007	1:150,000 (18440_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	1.13 m	47° 15' 58.9" N	122° 44' 04.1" W	---

# **1 - Dangers To Navigation**



**1.1) Profile/Beam - 4852/126 from config / nrt3\_2011\_em3002 / 2011-263 / 000\_1747**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 47° 15' 58.9" N, 122° 44' 04.1" W  
**Least Depth:** 1.13 m (= 3.72 ft = 0.620 fm = 0 fm 3.72 ft)  
**TPU (±1.96σ):** **THU (TPEh) ±1.375 m ; TVU (TPEv) ±0.300 m**  
**Timestamp:** 2011-263.17:52:06.242 (09/20/2011)  
**Survey Line:** config / nrt3\_2011\_em3002 / 2011-263 / 000\_1747  
**Profile/Beam:** 4852/126  
**Charts Affected:** 18445\_8, 18448\_1, 18440\_1, 18003\_1, 18007\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

OPR-N360\_NRT3\_11 Southern Puget Sound, H12312. Rock with least depth of 1.13m discovered with MBES in popular moorage area 45 degrees/280 meters offshore of penrose point. Numerous pleasure craft and cottages in Mayo Cove suggest area to be a popular vacation destination. Depths surrounding rock are 2.7 meters.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
config/nrt3_2011_em3002/2011-263/000_1747	4852/126	0.00	000.0	Primary

**Hydrographer Recommendations**

Hydrographer recommends charting rock per digital data (sounding or rock symbol), immediately.

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

0 ½fm (18448\_1, 18440\_1, 18003\_1, 18007\_1, 530\_1)

0fm 3ft (18445\_8)

1.1m (501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)

**Attributes:** QUASOU - 1:depth known

SORDAT - 22SEP2011

SORIND - us,us,graph,H12312

TECSOU - 3:found by multi-beam

VALSOU - 1.133 m

WATLEV - 3:always under water/submerged

# H12312 AWOIS REPORT

**Registry Number:** H12312  
**State:** Washington  
**Locality:** Southern Puget Sound  
**Sub-locality:** Northern Carr Inlet  
**Project Number:** OPR-N360-nrt3-11  
**Survey Date:**

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18474	8th	10/01/2003	1:40,000 (18474_1)	[L]NTM: ?
18445	32nd	08/01/2007	1:80,000 (18445_8)	[L]NTM: ?
18448	34th	07/01/2006	1:80,000 (18448_1)	USCG LNM: 2/8/2011 (2/8/2011) CHS NTM: None (1/28/2011) NGA NTM: 9/30/2006 (2/19/2011)
18440	29th	09/01/2007	1:150,000 (18440_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	OBSTRUCTIONS	AWOIS	[no data]	[no data]	[no data]	---

## **1 - Item Data**

## 1.1) AWOIS #54005 - OBSTRUCTIONS

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 47° 18' 35.1" N, 122° 41' 27.7" W  
**Historical Depth:** 9.14 m  
**Search Radius:** 150  
**Search Technique:** [unknown]  
**Technique Notes:** [unknown]

**History Notes:**

[unknown]

### Survey Summary

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

**Remarks:**

AWOIS #54005 .mdb History column reads "Unknown Source-- a fish haven was added to chart."

AWOIS #54005 .mdb Techniqnote column reads "The obstruction is inside a Scuba Diving Area at Kopachuck State Park.

No significant object(s) found inside AWOIS (#54005) search radius. Found unknown object 220 meters NE of AWOIS (#54005) position with a least depth of 13 meters. Object is 34 meters long, 15 meters wide, and 1.3 meters above seafloor. Object lies on charted (18448) mooring buoy.

Least depth and position for AWOIS item is 13.019 meters at 47.31N-122.69W.

### Feature Correlation

Source	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 54005	0.00	000.0	Primary

### Hydrographer Recommendations

Delete current AWOIS (#54005) position and obstruction area for chart 18448. Add new AWOIS and obstruction area position at 47.31N-122.69W.

### S-57 Data

[None]

## Office Notes

Do not concur. Retain charted AWOIS and Update label information.

### Feature Images

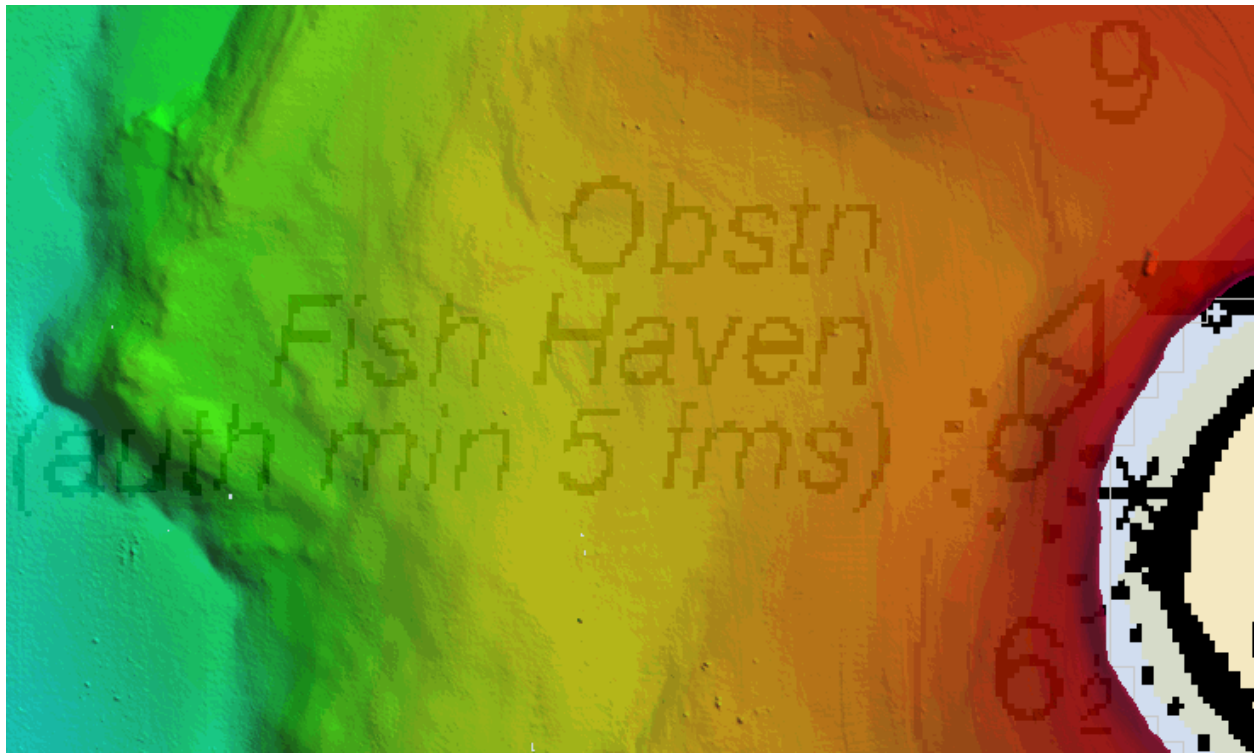


Figure 1.1.1

From <Dan.Jacobs@noaa.gov>

Sent Friday, October 14, 2011 3:36 pm

To [aton.reports@noaa.gov](mailto:aton.reports@noaa.gov)

Cc Christopher Hare <[Christopher.Hare@noaa.gov](mailto:Christopher.Hare@noaa.gov)> , Vitad Pradith <[Vitad.Pradith@noaa.gov](mailto:Vitad.Pradith@noaa.gov)> , CDR Todd Haupt <[Todd.A.Haupt@noaa.gov](mailto:Todd.A.Haupt@noaa.gov)>

Subject OPR-N360\_NRT3\_11\_Fixed\_ATON\_Report

Attachments [OPR-N360\\_NRT3\\_11\\_Fixed\\_ATON\\_Report.xls](#)

442K

Attached are 6 of 7 Navigation Aids which required positioning for OPR-N360\_NRT3\_11.

The seventh navigation aid, the Von Geldern Light (private) was not seen, although it may have sat atop a flag pole at one time in the distant past.

NRT3 had difficulty invoking the MS Excel macro required for ATON submissions per FPM 2011. I have cut and pasted the required items into their appropriate columns on the Fixed ATON Report Template (see attachment).

I have transmitted all data files associated with these ATONs (i.e. trimble files, export files, correction files) in a zipped file named "NRT3.zip" to all recipients of this e mail, earliler this morning, 14OCT2011.

Please call me if you have questions/concerns.

V/R,

Dan Jacobs  
NRT3 Acting Team Lead  
Phone 206.402.2500



APPROVAL PAGE

H12312

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- H12312\_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12312\_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

Approved: \_\_\_\_\_

**Peter Holmberg**  
**Cartographic Team Lead, Pacific Hydrographic Branch**

The survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: \_\_\_\_\_

**LCDR David J. Zezula, NOAA**  
**Chief, Pacific Hydrographic Branch**