H12311

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: H12311

LOCALITY

State: Washington

General Locality: Southern Puget Sound

Sub-locality: Hale Passage

2011

CHIEF OF PARTY
Dan Jacobs (Acting)

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12311**

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**
Sub-Locality:	**Hale Passage**
Scale:	**10000**
Dates of Survey:	**05/13/2011 to 07/07/2011**
Instructions Dated:	**04/07/2011**
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:	***fathoms at Mean lower low water***

Remarks:

All times are UTC. UTM Zone 10N. 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.

Descriptive Report to Accompany Survey H12311

Project: OPR-N360-NRT3-11

Locality: Southern Puget Sound

Sublocality: Hale Passage

Scale: 1:10000

May 2011 - July 2011

Navigation Response Team 3

Chief of Party: Dan Jacobs (Acting)

A. Area Surveyed

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-N360-NRT3-11 signed March 25, 2011 and all other applicable direction, with the exception of deviations noted in this report. The survey area is Hale Passage in Southern Puget Sound, WA. This survey corresponds to sheet "2" in the sheet layout provided with the Project Instructions.

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
47.3029583333 N 122.584958333 W	47.2321055556 N 122.685663889 W

Table 1: Survey Limits

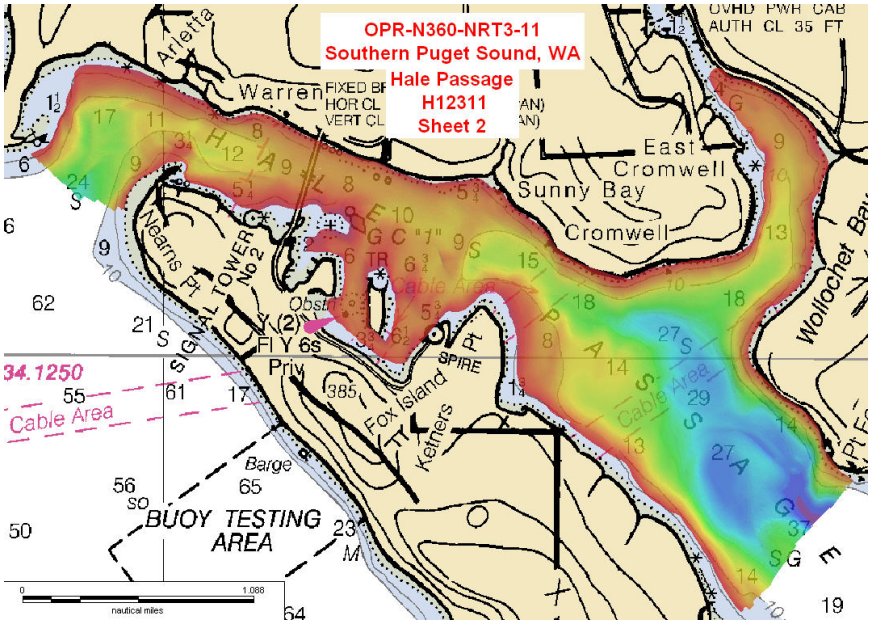


Figure 1: H12311 Coverage Area (chart 18448).

H12311 was expanded into Wollochet Bay, which was not originally included within the assigned survey limits. The field unit (NRT3) identified frequent small boat traffic operating in the bay, and was subsequently given approval to expand the survey, see appendix 5.

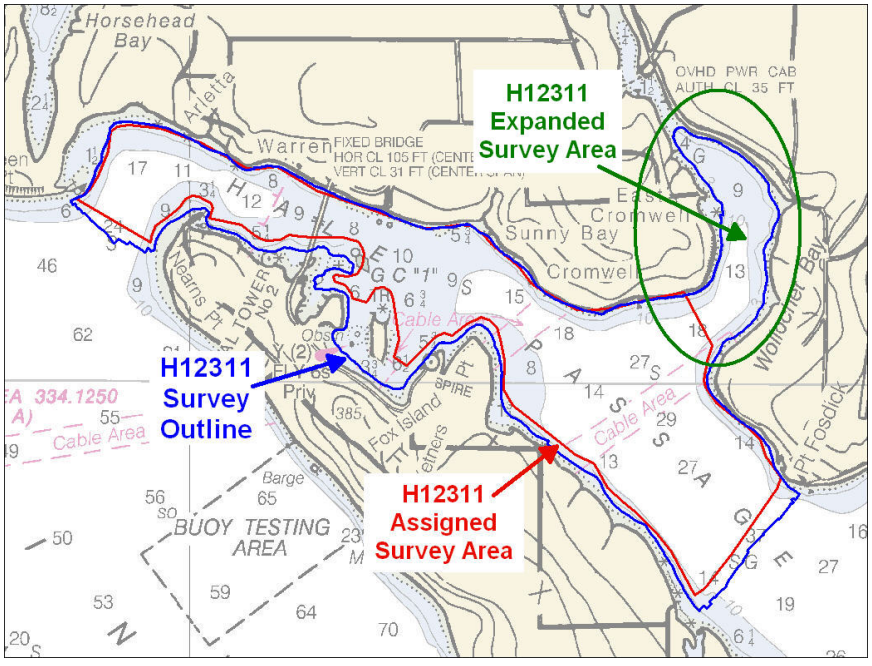


Figure 2: H12311 Survey outline

A.2 Survey Purpose

The Southern Puget Sound area is in need of updated bathymetric 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 survey is complete and no additional work is required.

A.4 Survey Coverage

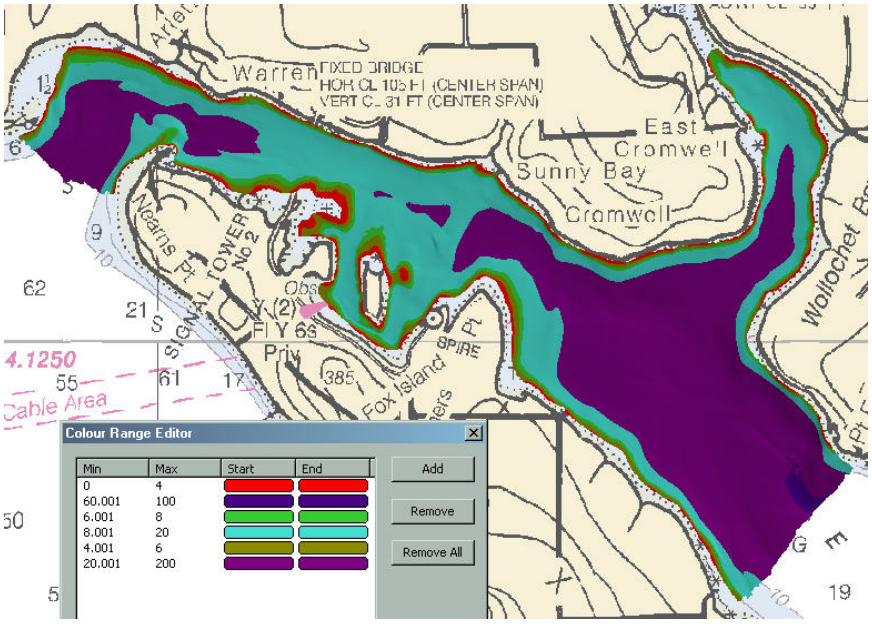


Figure 3: H12311 Survey coverage area and depth ranges

Complete multibeam echo sounder (MBES) coverage was achieved in the assigned survey area in waters four (4) meters and deeper except where the hydrographers deemed it unsafe or not navigationally significant.

A.5 Survey Statistics

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

	HULL ID	*Total*
LNM	**SBES Mainscheme**	0
	MBES Mainscheme	132.82
	Lidar Mainscheme	0
	SSS Mainscheme	0
	SBES/MBES Combo Mainscheme	0
	SBES/SSS Combo Mainscheme	0
	MBES/SSS Combo Mainscheme	0
	SBES/MBES Combo Crosslines	6.42
	Lidar Crosslines	0
Number of Bottom Samples		3
Number of DPs		0
Number of Items Items Investigated by Dive Ops		0
Total Number of SNM		2.92

Table 2: Hydrographic Survey Statistics

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

Survey Dates
05/13/2011
05/16/2011
05/18/2011
05/19/2011
06/06/2011
06/08/2011
06/09/2011
06/13/2011
06/14/2011
06/15/2011
06/20/2011
06/22/2011
06/23/2011
06/24/2011

Table 3: Dates of Hydrography

Shoreline data was collected through 07/07/2011.

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.

All bottom samples are included in the HCell.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the 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:

Hull ID	*S1212*
LOA	30 feet
Draft	0.65 meters

Table 4: Vessels Used

Figure 4: Vessel S1212

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg	EM 3002	MBES
Applanix	POS/MV	Vessel Attitude System
Applanix	POS/MV	Positioning System
Odom	Digibar Pro	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam Echo sounder (MBES) crosslines (XL) totaled 6.42 nautical miles, comprising 4.8% of main scheme (MS) MBES bathymetry. Separate CARIS BASE surfaces of the MS and XL data were created and compared using the cursor information tool in CARIS HIPS and SIPS. One hundred fifty five (155) locations were compared throughout various depth ranges of the survey area; the results are shown in figure 5. 96.1 percent of XL data used in the comparison agreed with MS data within 0.2 meters.

Depth Difference between MS and XL	Number of Measurements	Percent of Total
0	61	39.3
.1 meter	67	43.2
.2 meter	21	13.5
.3 meter	6	3.8

Figure 5: H12311 Crossline comparison statistics

B.2.2 Uncertainty

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 "IHO_1" attribute layer was created for a H12311 finalized combined surface using the following IHO Order 1 formula: ((0.5+((Depth*0.013)^2))^0.5)-Uncertainty. Uncertainty values throughout survey H12311 meet IHO Order 1, shown as green in figure 6.

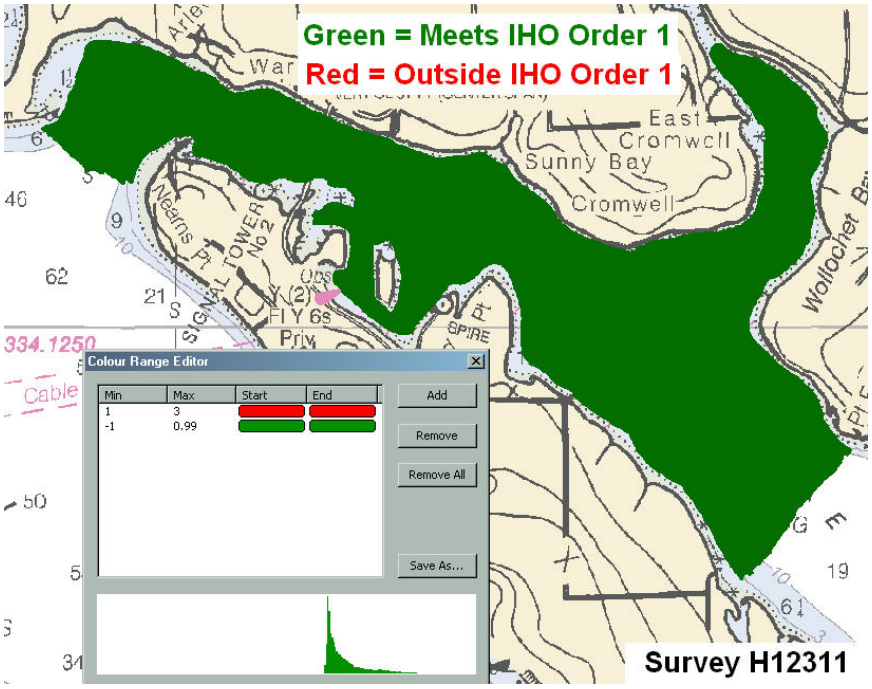


Figure 6: H12311 IHO Compliance

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12051	1:10000	2009	Williamson & Associates, Inc.	SE
H12310	1:10000	2011	Navigation Response Team 3	NW

Table 6: Junctioning Surveys

H12051

To the southeast, H12311 junctions with sheet “B” of the 2009 Williamson & Associates survey H12051, Hyde Point to Point Fosdick, project OPR-N360-KR-09 (figure 7). Thirty one (31) locations across depths ranging from 5 meters to 68 meters were compared using a BASE surface (for H12311) and a BAG (for H12051) and the CARIS cursor information tool. Ninety six percent (96.72%) of soundings agreed within 0.4 meters. One comparison difference of 0.5 meters was observed in 49 meters water depth. Good general agreement between the surveys was observed.

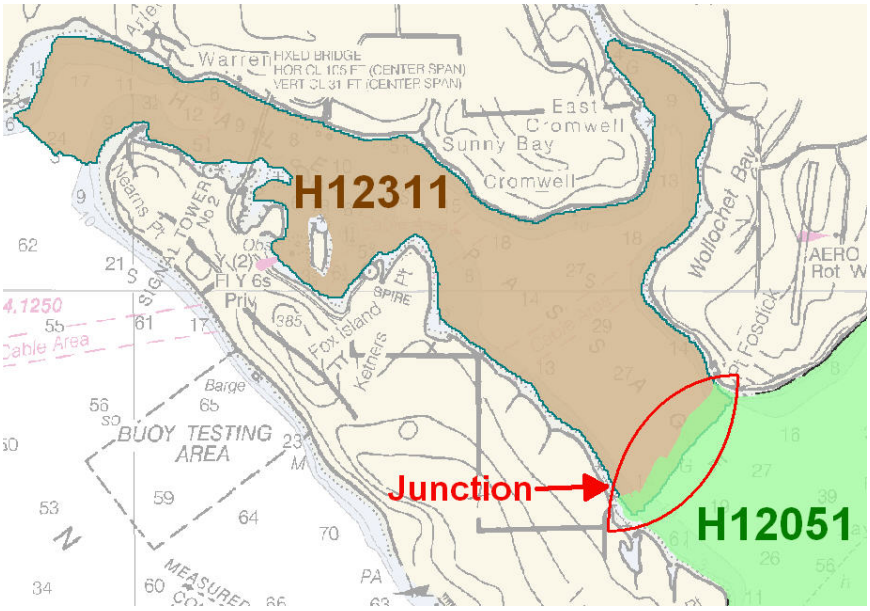


Figure 7: H12311 / H12051 Junction

A common junction was made with this survey.

H12310

To the northwest, H12311 junctions with sheet "1" of contemporary survey H12310, southern Carr Inlet of project OPR-N360-NRT3-11 (figure 8). Twenty four (24) locations across depths ranging from 4 meters to 45 meters were compared using the individual BASE surfaces and the CARIS cursor information tool. Ninety five percent (95.8) of soundings agreed within 0.3 meters, four percent (4.1%) agreed within 0.4 meters. At the time of comparison, final tides were applied to H12311, and preliminary tides were applied to H12310. All H12311 soundings were shoaler than those compared with H12310.

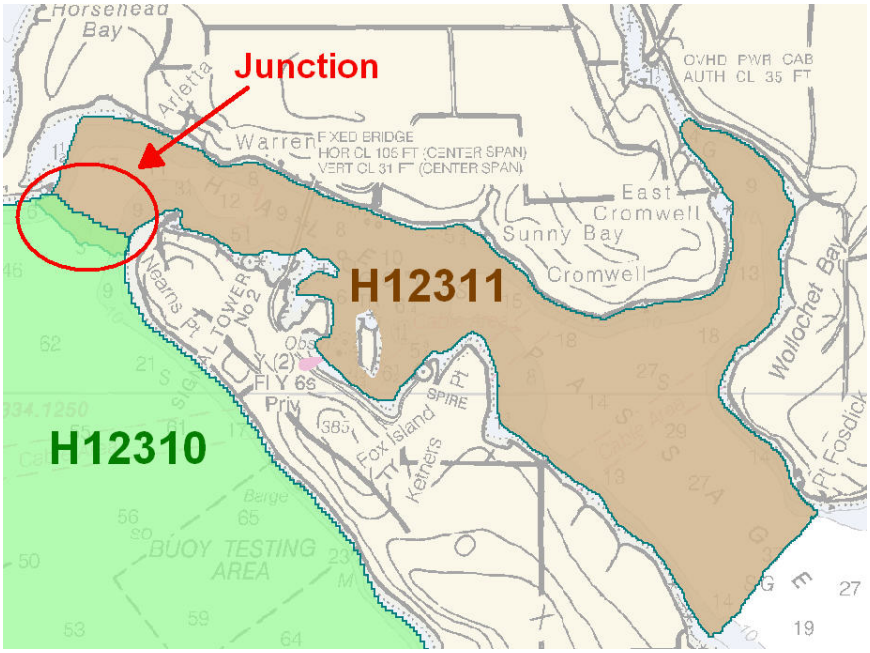


Figure 8: H12311 / H12310 Junction

A common junction will be made with this survey during it's compilation.

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.2.5.1None Exist

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

B.2.6.1 Vertical Offset

Vertical offsets of up to 0.4 meters between different day's data can be found in some areas of the survey. These offsets may be the result of highly complex tidal characteristics of some parts of the survey area and tide correction data inadequate to fully account for them. The offsets were most noticeable in areas with restricted water flow such as in the vicinity of Tanglewood Island, Spire Point and west of the Fox Island bridge. Overlapping data in this area that was acquired on different days often displays vertical offsets such as depicted in figure 9. Similar vertical offsets have also been observed in data acquired along shore near the four meter depth contour.

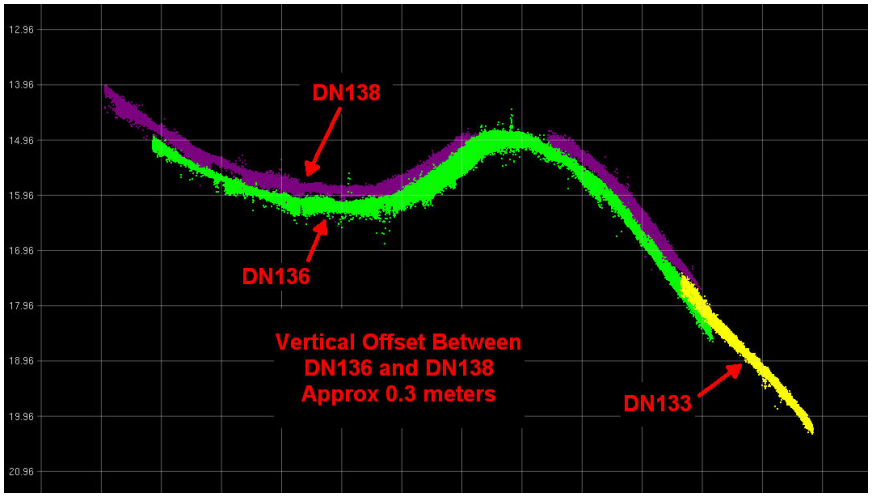


Figure 9: Example of Vertical Offset

The offsets do not exceed spec and the data is adequate for charting.

B.2.6.1 Suboptimal Sound Speed Correction

Due to variations in the water column, thermal layering, tidal influence and other related factors, a distinct demarcation of water masses was sometimes observed in the field. This proved to be problematic in the acquisition and application of sound velocity (SV) correctors. SV data were applied real-time by the Kongsberg EM 3002 multibeam echo sounder during acquisition; no post processing of SV data was performed. Despite the best efforts of the hydrographers to conduct sufficient SV casts, distributed both spatially and temporally, in some areas sound velocity data correction was suboptimal (figure 10). Some data exhibit upward or downward deflection ("smiles" or "frowns") when viewed in CARIS 2D Subset Editor, indicative of inaccurate SV correction. To compensate, some outer-beam soundings obviously in error were flagged as rejected.

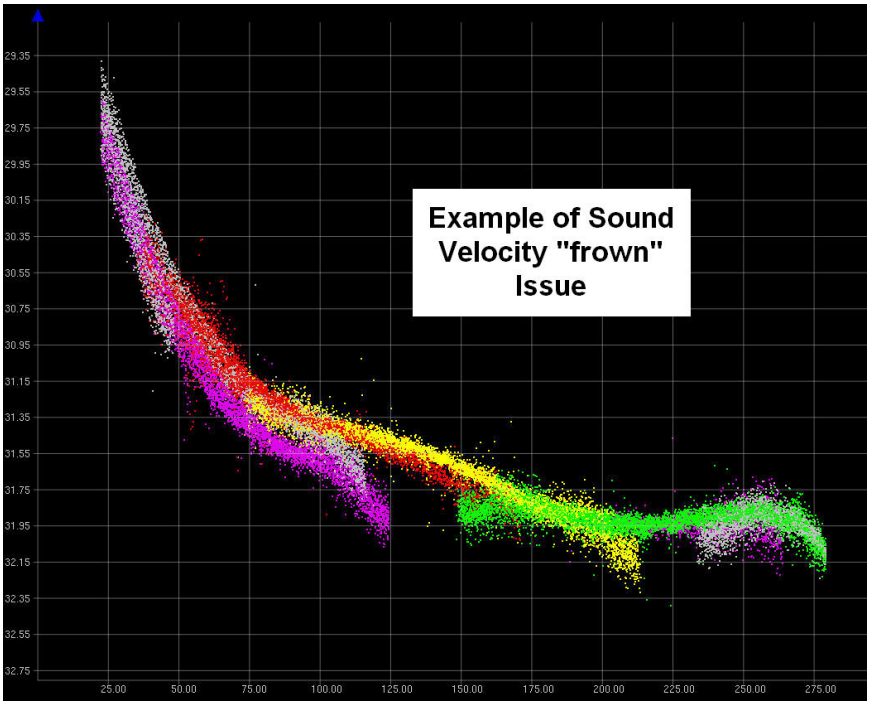


Figure 10: Example of Suboptimal Sound Velocity Correction

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 sound speed values changed significantly (approximately 3 meters per second). 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.2.9 Coverage Holidays

One (1) three meter by eleven meter (3m x 11m) holiday occurred at position 47-16-00.19N, 122-37-37.23W due to a anchored vessel.

The holiday is located near shore in a navigationally insignificant region. The surrounding data show no signs of hazards to mariners.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All Data reductions procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

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	0.10 meters - 71.76 meters	NOAA_1m	Complete MBES
2m	CUBE	2 meters	0.10 meters - 71.68 meters	NOAA_2m	Complete MBES
4m	CUBE	4 meters	0.21 meters - 71.63 meters	NOAA_4m	Complete MBES
1m_Final	CUBE	1 meters	0.10 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 - 71.63 meters	NOAA_4m	Complete MBES

Table 7: CARIS Surfaces

The 4m combined surface H12311_4m_Combined_Office created during the SAR was used for compilation.

B.5.3 Misnamed Lines

Day number (DN) 157 .HSX lines were mistakenly named as from DN159.

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 (944-6484) served as control for datum determination and as the primary source for water level reducers for survey H12311. No tertiary gauge was required.

Preliminary zoning was accepted as the final zoning for survey H12311 (see Appendix IV). All data were reduced to MLLW using the final approved water levels (verified tides) from the Tacoma, WA station (944-6484) by applying tide file 9446484.tid and time and height correctors through the zone corrector file N360NRT32011CORP.zdf. It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey during branch processing.

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 8: NWLON Tide Stations

File Name	Status
9446484.tid	Verified Observed

Table 9: Water Level Files (.tid)

File Name	Status
N360NRT32011CORP.zdf	Final

Table 10: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 06/24/2011. The final tide note was received on 07/08/2011.

C.2 Horizontal Control

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

The following DGPS Stations were used for horizontal control:

DGPS Stations
Robinson Point, WA 323 kHz

Table 11: 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	LNM Date	NM Date
18448	1:80000	34	07/2006	10/18/2011	10/08/2011

Table 12: Largest Scale Raster Charts

18448

H12311 soundings agreed with charted (18448) depths to within one (1) fathom across all depth ranges except as indicated in figure 11. Charted depths circled in green indicate where H12311 soundings are within one (1) fathom of charted depths. Blue circled depths indicate where H12311 soundings are more than one (1) fathom deeper than charted; red circled charted depths indicate where H12311 soundings are more than one (1) fathom shoaler than charted.

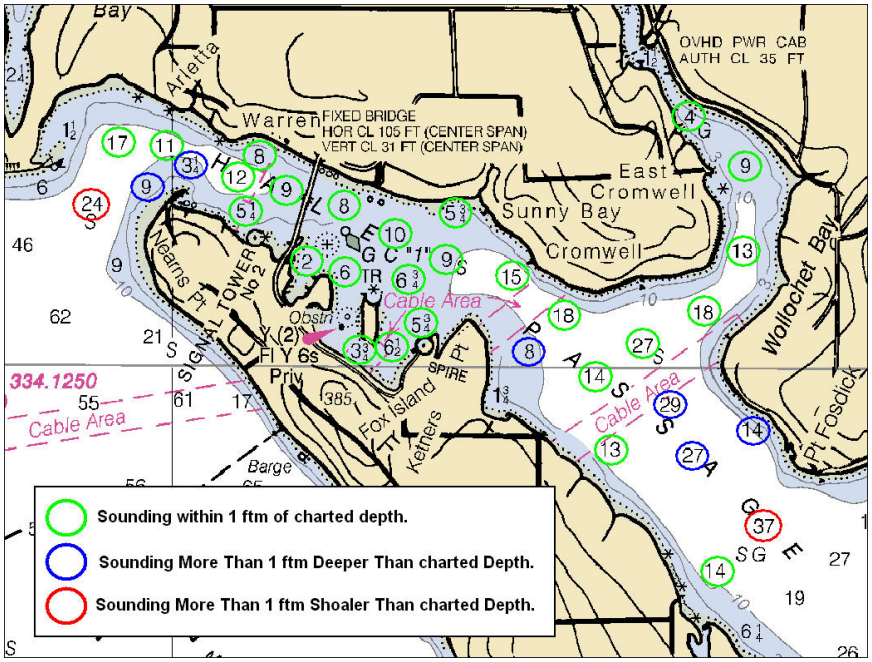


Figure 11: H12311 Depth Comparison

D.1.2 AWOIS Items

Number of AWOIS Items Addressed: 1
Number of AWOIS Items Not Addressed: 0

One (1) AWOIS item was assigned for full investigation within the survey limits of H12311 (figure 12). A description of this AWOIS item (#54004) is included in the H12311 Feature Report in Appendix II.

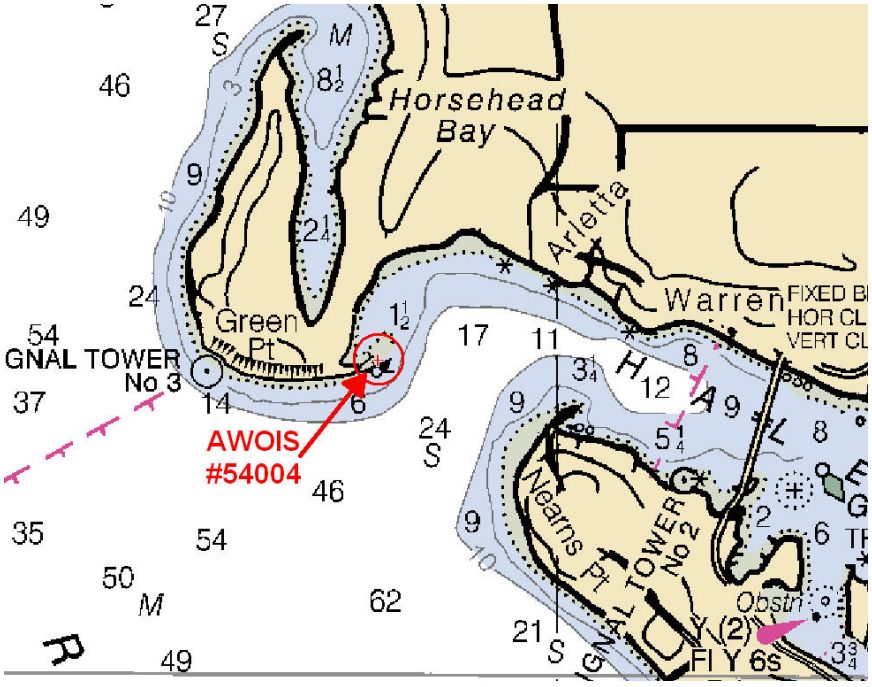


Figure 12: H12311 AWOIS item 54004

The AWOIS section of the feature report is attached. The Survey Feature Report is filed with the hydrographic records. Note: the survey feature report does not include all features from H12311. Additional features were added, some removed, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H12311 have come directly from CARIS Notebook, which is the official features deliverable for this survey.

D.1.3 Charted Features

There are no charted features with the label PA, ED, PD or Rep within the area surveyed.

D.1.4 Uncharted Features

Refer to submitted shoreline file H12311_Field_Verified_AFF.hob.

D.1.5 Dangers to Navigation

The follwing DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
H12311_DTON_1	2011-06-09

Table 13: DTON Reports

One (1) Danger to Navigation (DTON) was found during survey H12311 and reported to the Marine Chart Division via email on June 9, 2011 (figure 13). The original DTON submission package is included in Appendix I of this report. Also see H12311 Feature report in Appendix II.

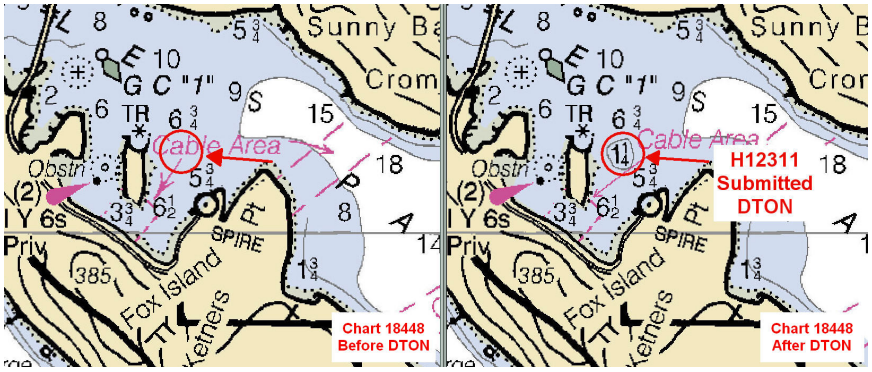


Figure 13: H12311 Submitted Danger To Navigation

The DTON is charted and the DTON report is attached.

D.1.6 Shoal and Hazardous Features

See H12311 Danger to Navigation Report.

D.1.7 Channels

There are no maintained channels within the area surveyed.

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 survey sheet limits as well as 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 the survey. Both PRF and AFF are S-57 attributed datasets in .000 file format.

Limited shoreline verification was conducted near predicted low water in accordance with the pertinent sections of the 2011 NOS Hydrographic Surveys Specifications and Deliverables and Field Procedures Manual. Assigned features seaward of the Navigation Area Limit Line (NALL) were addressed as required, S-57 attributed and recorded in the appropriate CARIS Notebook (v3.0, SP1, HF1) .hob files indicated in figure 14 and submitted with this survey. Also see H12311_Feature_Report.pdf in Appendix II and H12311.pss submitted with this project. Note: features within very restricted areas such as the extreme end

of Wollochet Bay and Fox Island coves east of the bridge, are not represented in H12311 shoreline data. These areas should only be navigated by those with local knowledge.

Shoreline File	Description
H12311_Original_AFF.hob	Original source data (0_1AFF01.000) as provided for project OPR-N360-NRT3-11 and clipped to the limits of survey H12311 and converted to .hob format.
H12311_Field_Verified_AFF.hob	An exact copy of H12311_Original_AFF.hob modified by the field unit to best represent shoreline features at survey scale. This includes addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey.
H12311_Disprovals.hob	Features deleted from H12311_Field_Verified.hob based on survey findings.
0_4PRF01.000	Project Reference File with survey limits and AWOIS item positions and search radii.

Figure 14: List and description of H12311 shoreline files

D.2.2 Prior Surveys

A prior survey comparison was not performed by the field unit.

D.2.3 Aids to Navigation

No ATONS were assigned by the Marine Chart Division (MCD) for positioning on this survey. All aids to navigation (ATONS) appear correctly charted and serve their intended purpose.

Chart according to latest ATONIS information.

D.2.4 Overhead Features

A charted (18488) fixed highway bridge spans Hale Passage connecting Fox Island with the mainland. The bridge's position as charted (18448) was found to be approximately 60 meters west of its actual location observed in the field (figure 15).

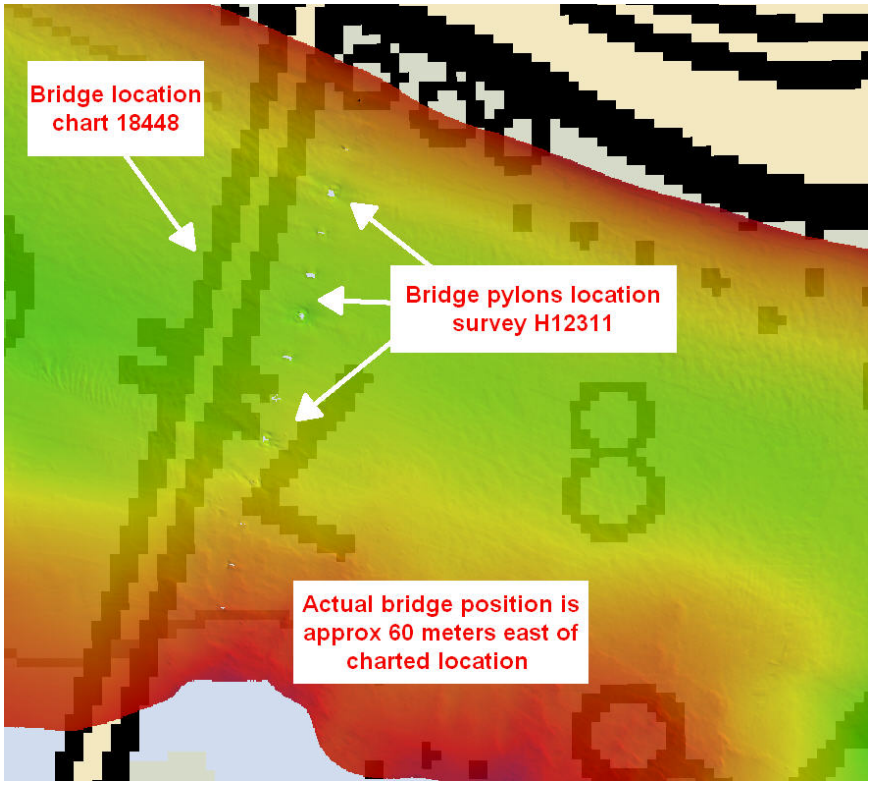


Figure 15: Bridge spanning Hale Passage

D.2.5 Submarine Features

Three (3) separate submerged cable areas fall within the limits of survey H12311 (figure 16). Signs posted along the shoreline indicate the presence of submerged cables, however no evidence of the cables themselves was observed in the multibeam data. Figure 17 indicates the positions of the cable crossing signs that were found to be outside their charted (18448) locations. The northern of the two cable crossing signs indicated in figure 17 is approximately 270 meters from the northern edge of the charted cable area. Refer to shoreline file H12311_Field_Verified_AFF.hob for locations of additional observed posted cable crossing signs.

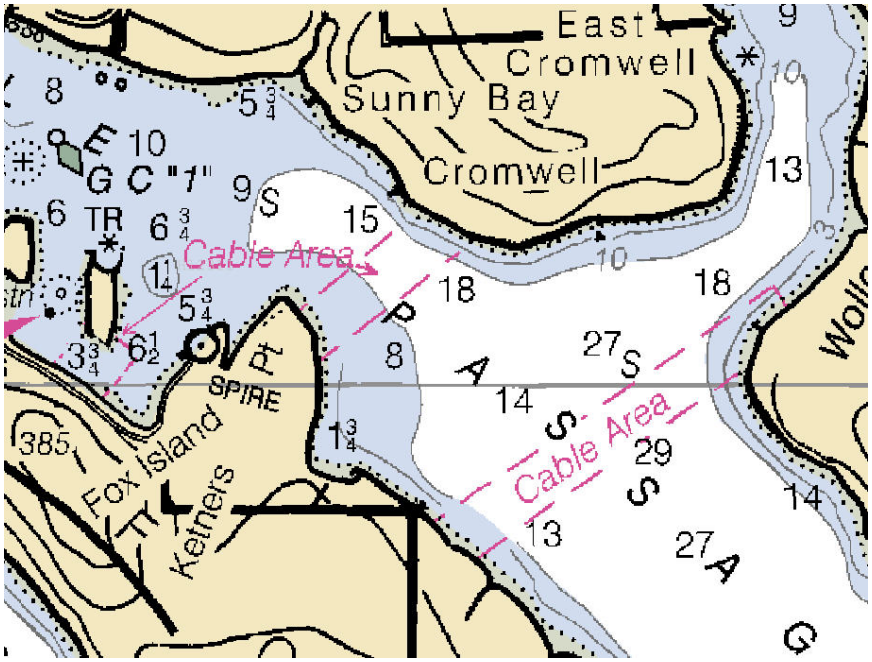


Figure 16: H12311 Charted Cable Areas

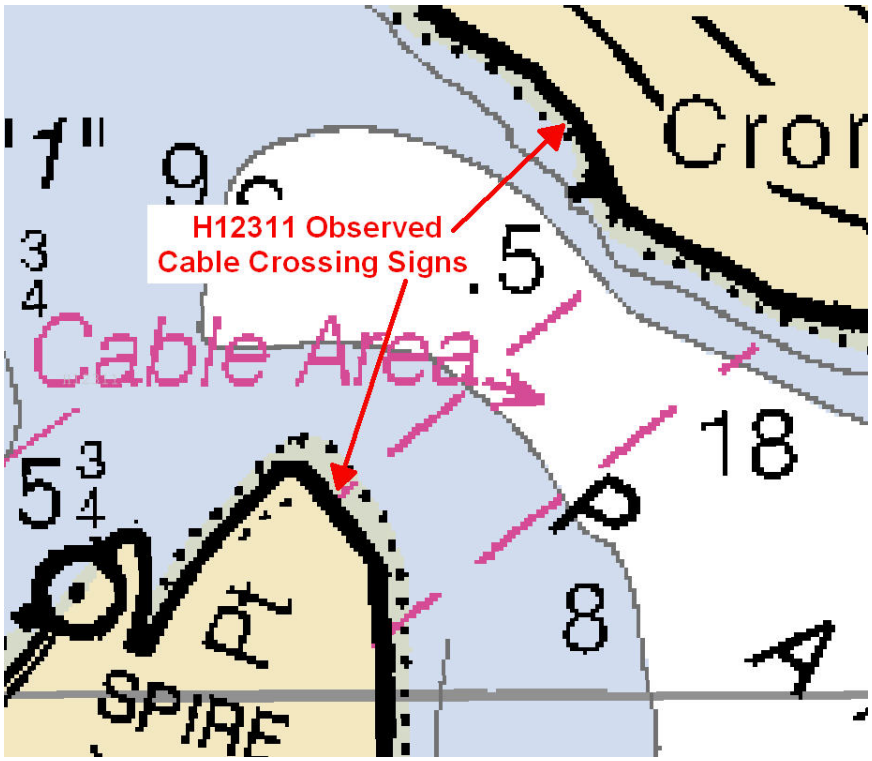


Figure 17: Observed Cable Crossing Signs

D.2.6 Ferry Routes and Terminals

There are no ferry routes charted within the limits of survey H12311 and none were observed to be operating within Hale Passage.

D.2.7 Platforms

No existing platforms were observed in the survey area.

Do not concur. A platform was surveyed at 47-16-02N, 122-38-42W and is included in HCell H12311 as a SLCONS feature.

D.2.8 Significant Features

No new significant features were observed in the survey area.

D.2 Construction and Dredging

No present or planned construction or dredging was observed in the survey area.

D.2.9.1 Coastline Update

The coastline of Tanglewood Island is not well represented on chart 18448 along its norther end (figure 18). The Hydrographer recommends the charted coastline be revised to better represent the actual shape of the land area using approved photogrammetry.

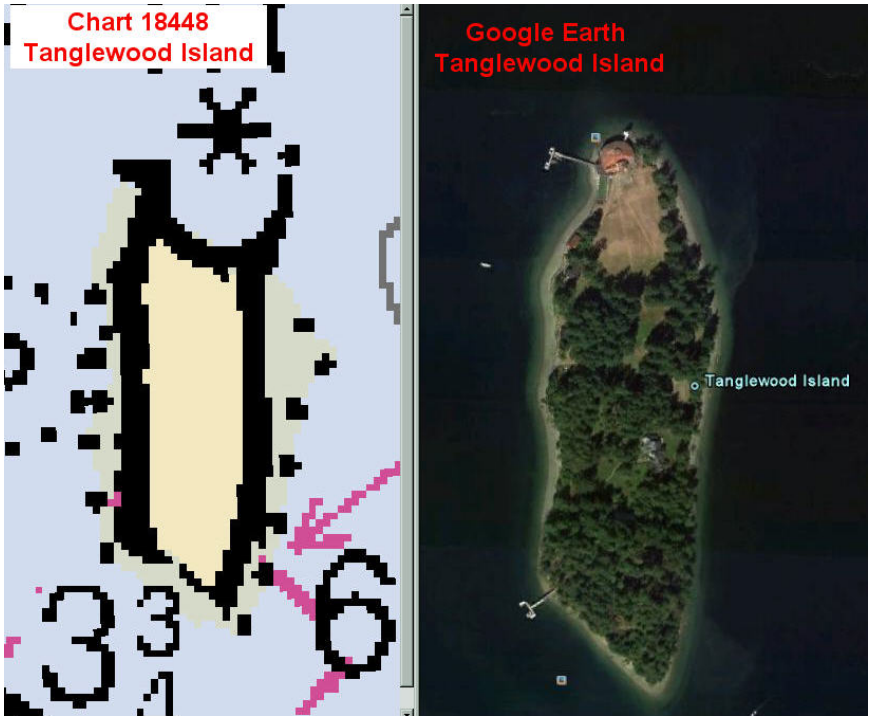


Figure 18: Tanglewood Island Land Area

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	Chief of Party	11/15/2011	Dan Jacobs I have reviewed this document 2011.11.30 11:16:44 -08'00'
B. Jackson	Sheet Manager	11/15/2011	Barry Jackson I am the author of this document 2011.11.30 07:20:13 -08'00'

F. Table of Acronyms

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

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

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

H12311 Danger to Navigation

Registry Number: H12311

State: Washington

Locality: Southern Puget Sound

Sub-locality: Hale Passage

Project Number: OPR-N360-NRT3-11

Survey Date: 06/08/2011

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.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	2.49 m	47° 16' 07.2" N	122° 38' 19.3" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 1509/141 from h12311 / nrt3_2011_em3002 / 2011-159 / dn159000_1627

DANGER TO NAVIGATION

Survey Summary

Survey Position:	47° 16' 07.2" N, 122° 38' 19.3" W
Least Depth:	2.49 m (= 8.18 ft = 1.364 fm = 1 fm 2.18 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.375 m ; **TVU (TPEv)** ±0.300 m
Timestamp:	2011-159.16:28:55.369 (06/08/2011)
Survey Line:	h12311 / nrt3_2011_em3002 / 2011-159 / dn159000_1627
Profile/Beam:	1509/141
Charts Affected:	18474_1, 18445_8, 18448_1, 18440_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Survey H12311 acquired complete multibeam echosounder data over uncharted shoal area. Least depth of 1.3 fathoms (2.5 meters) found between charted (18448) depths of 6.75 fathoms and 6.5 fathoms. The 1.3 fathom shoal area is within the approach to an active moorage area. Many large pleasure craft anchor in and transit this area. Preliminary water level data has been applied but final water level data is not yet available. The S-57 source date of 20110608 is the date the data was acquired, not the end date of the survey, which is ongoing.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12311/nrt3_2011_em3002/2011-159/dn159000_1627	1509/141	0.00	000.0	Primary

Hydrographer Recommendations

Chart (18448) 1.3 fathom (2.5 meter) depth at position Latitude 47-16-07.19N, Longitude 122-38-19.33W.

Cartographically-Rounded Depth (Affected Charts):

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

1fm 2ft (18474_1, 18445_8)

2.5m (501_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes:

EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

SORDAT - 20110608

SORIND - US,US,nsurf,H12311

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

Feature Images

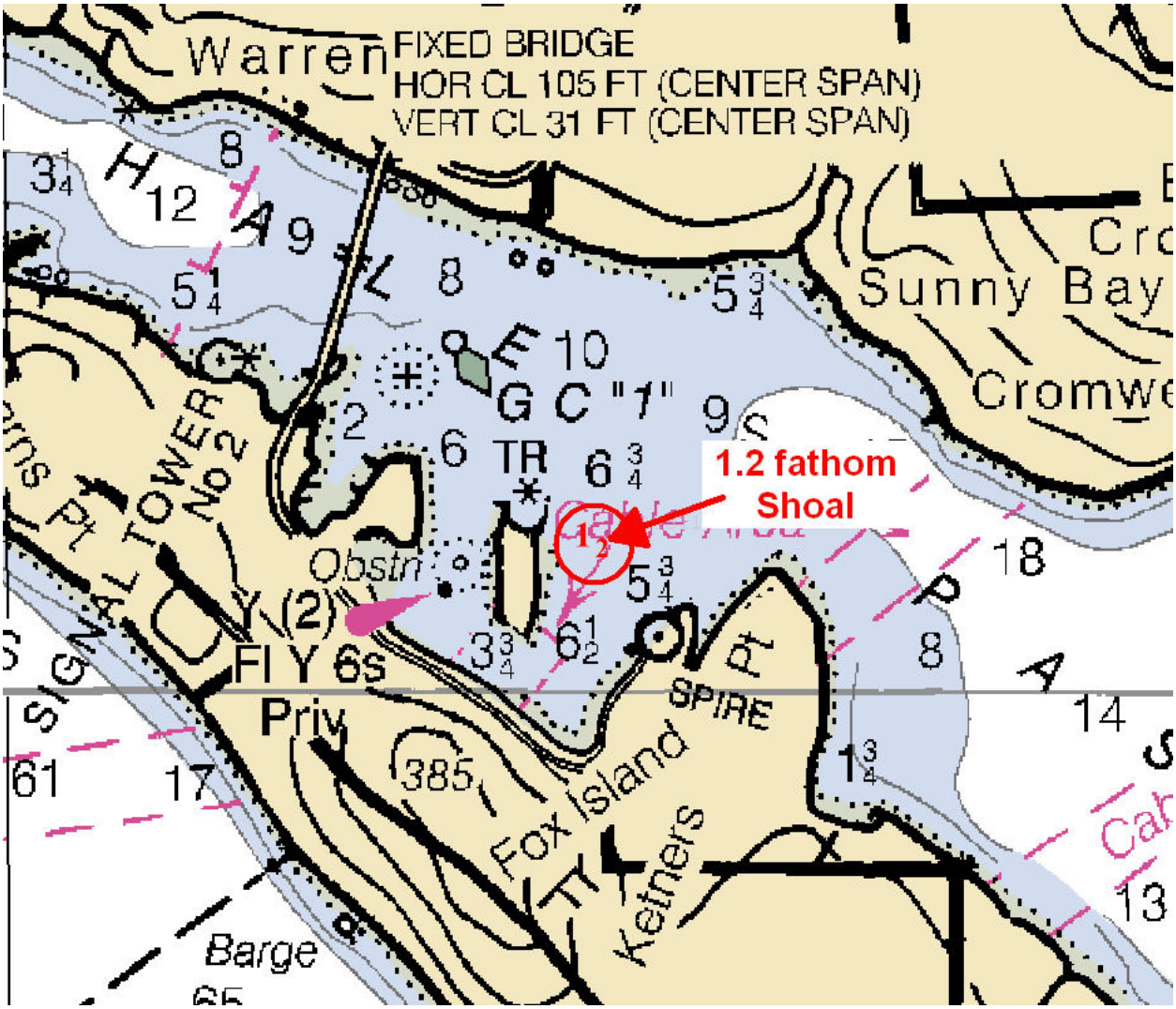


Figure 1.1.1

AWOIS Features

1.1) AWOIS #54004 - UNKNOWN

No Primary Survey Feature for this AWOIS Item

Search Position: 47° 16' 51.6" N, 122° 40' 51.3" W

Historical Depth: [None]

Search Radius: 150

Search Technique: VS, S2, MB

Technique Notes: [None]

History Notes:

**Unknown Source-- A visible wreck was charted at 47/16/51.59 - 122/40/51.32.

Survey Summary

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

Remarks:

Full AWOIS # 54004. **Unknown Source-- A visible wreck was charted at 47/16/51.59 - 122/40/51.32. H12311 visually observed charted (18448) wreck. Feature is not immediately recognizable as a wreck; it appears as a long, low, ruined wooden structure.

Feature Correlation

Address	Feature	Range	Azimuth	Status
AWOIS_EXPORT	AWOIS # 54004	0.00	000.0	Primary

Hydrographer Recommendations

retain as charted (18448).

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: CATWRK - 1:non-dangerous wreck
CONVIS - 1:visual conspicuous
QUASOU - 2:depth unknown
STATUS - 1:permanent
WATLEV - 2:always dry

Office Notes: Concur with hydrographer's recommendation to retain the wreck.

Feature Images

Figure 1.1.1

Figure 1.1.2

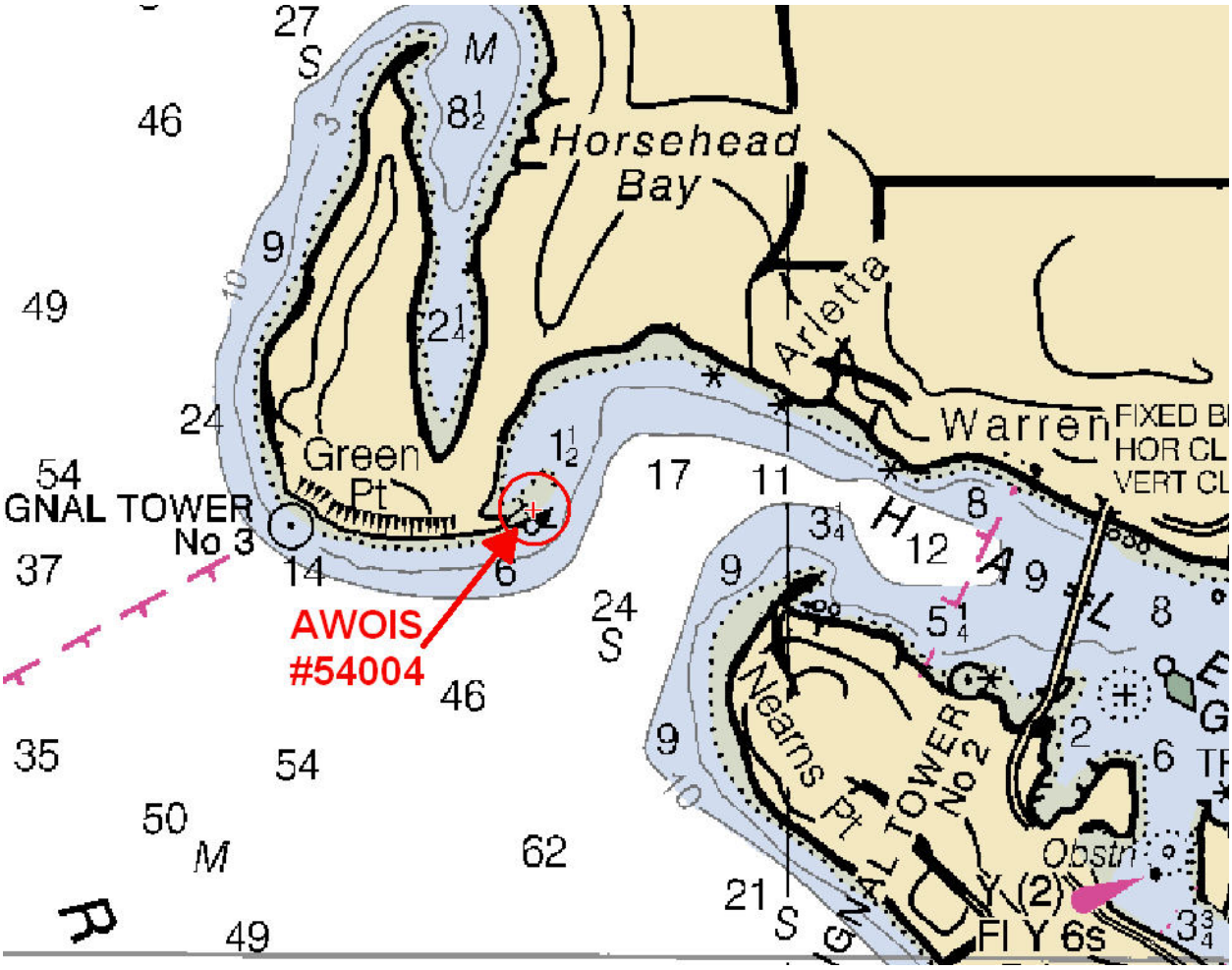

Horsehead Bay
Arletta
Warren
Green Pt
GNAL TOWER No 3
AWOIS #54004
Nearns Pt
Obstn
Y (2)
Fl Y 6s

Figure 1.1.3

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 7, 2011

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-N360-NRT3-2011
HYDROGRAPHIC SHEET: H12311

LOCALITY: Hale Passage,Southern Puget Sound,WA
TIME PERIOD: May 13 - June 24, 2011

TIDE STATION USED: 944-6484 Tacoma, WA
Lat. 47° 16.0'N Long. 122° 24.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.331 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-N360-NRT3-2011, H12311, during the time period between May 13 and June 24, 2011.

Please use the zoning file "N360NRT32011CORP" submitted with the project instructions for OPR-N360-NRT3-2011. Zones PS188, PS190, PS191, and PS193 are the applicable zones for H12311.

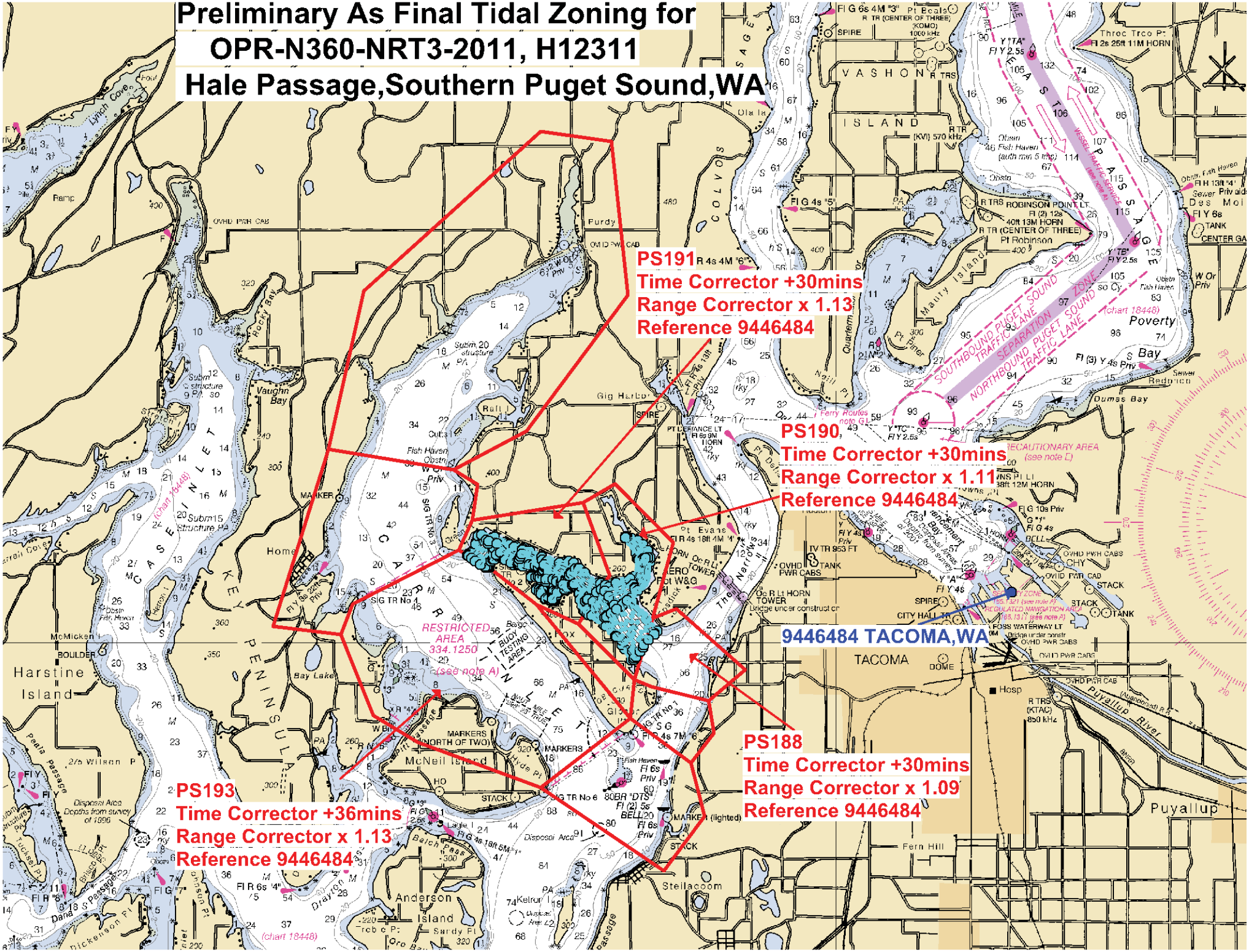
Refer to attachments for zoning information.

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: 2011.07.07 12:09:47 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary As Final Tidal Zoning for
OPR-N360-NRT3-2011, H12311
Hale Passage,Southern Puget Sound,WA
PS191
R 4s 4M "6"
Time Corrector +30mins
Range Corrector x 1.13
Reference 9446484
PS190
Time Corrector +30mins
Range Corrector x 1.11
Reference 9446484
9446484 TACOMA,WA
PS188
Time Corrector +30mins
Range Corrector x 1.09
Reference 9446484
PS193
Time Corrector +36mins
Range Corrector x 1.13
Reference 9446484
RESTRICTED AREA 334.1250 (see note A)
SOUTHBOUND PUGET SOUND TRAFFIC LANE
NORTHBOUND PUGET SOUND TRAFFIC LANE
SEPARATION ZONE
VESSEL TRAFFIC SERVICE (see note A)
CAUTIONARY AREA (see note L)
Fl G 6s 4M "3" Pt Beals
R TR (CENTER OF THREE) (KOMO) 1000 kHz
Three Tree Pt
Fl 2s 25ft 11M HORN
VASHON ISLAND
R TR (KVI) 570 kHz
Fl G 4s "5"
R TRS ROBINSON POINT LT
Fl (2) 12s 40ft 13M HORN
R TR (CENTER OF THREE)
Pt Robinson
Maury Island
Quartermaster Harbor
Colvos Passage
Dumas Bay
Poverty Bay
Gig Harbor
Pt Defiance
Pt Evans
The Narrows
Commencement Bay
TACOMA DOME
Hosp
R TRS (KTAC) 850 kHz
Puyallup River
Puyallup
Fern Hill
Stellacoom
McNeil Island
Harstine Island
Anderson Island
Case Inlet
Carr Inlet
McMicken I
BOULDER
Bay Lake
Home
Vaughn Bay
Rocky Bay
Lynch Cove
Ramp
Furdy
Ola Ia
Fish Haven
Obstn
Subm 20 structure
Subm 15 structure
OVHD PWR CAB
OVHD PWR CABS
SPIRE
CITY HALL TR
FOSS WATERWAY LT
Bridge under construction
MARKERS (NORTH OF TWO)
MARKER (lighted)
STACK
TANK
Disposal Area Depths from survey of 1896
Disposal Area Depths from survey of 1998
Balch Pass
Dana Passage
Drayton Passage
Dickenson Pt
Kelron
Sandy Pt
Ferry Routes note G
(chart 18448)

PHB Compilation Log

General Survey Info

Survey Number	H12311	Field Unit	NRT3	State	Washington	UTM Zone	10N
Project Date	OPR-N360-NRT3-11	Project Name (Locality)	Southern Puget Sound				
Start Date	5/13/2011	Sublocality	Hale Passage				
End Date	7/07/2011	Survey Scale	10000	Compilation Scale	80000		

Affected Raster Charts

Chart	KAPP	Scale	Edition	Date	NTM Date
18448	1712	80000	34th	7/01/2006	3/3/2012

Add Chart | Remove Chart

Affected Electronic Charts

ENC	Scale
US4WA10M	80000

Add ENC | Remove ENC

Spatial Refrence

Horizontal Datum	WGS84
Coordinate System	LLDG
Sounding Datum	MLLW
Vertical Datum	MHW

Junction Surveys

Survey Number	Survey Date	Location Relative to Current Survey
H12051	01/01/2009	SE
H12310	01/01/2011	NW

Add Survey | Remove Survey

Processing Info

SAR Reviewer	Kurt Mueller	**HCell Compiler**	Kurt Brown	**HCell Reviewer**	Pete Holmberg

Source Surfaces

Resolution	File Name
4m	H12311_4m_Combined_Office

Add Surface | Remove Surface

Supporting Documents

Name	Version
Specs and Deleverables	April 2011
HCell Specs	6.1

Add Doc | Remove Doc

PHB Compilation Log

Select Software Used	HydroService, dKart Inspector

Software	Version, Hot Fix	Used For
CARIS HIPS	7.1 HF3	SAR Review. Inspection of Combined BASE Surfaces.
Pydro	12.2	SAR Review. Generation of Features Reports.
CARIS BASE Editor	3.2.2 SP2 HF2	Creation of soundings and bathy-derived features, meta area object, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer	2.2 SP1 HF3	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS	4.4 SP5 HF40	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding. (For Fathoms and Feet chart units only.)
CARIS HOM	3.3 SP3 HF8	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding. (For Fathom and Feet chart units only)
CARIS Plot Composer	5.1 SP1	Generate plots of CARIS Session files used for QC.
HydroService, dKart Inspector	6.0	Validation check of the base cell file.

Reset Table

Product Info

Deleverables	
Survey Scale HCell	H12311_CS.000
HCell Report for MCD	H12311_SS.000
Feature Listing	H12311_HR.pdf
Descriptive Report	H12311_FL.txt
Survey Outline	H12311_DR.pdf
Chart Scale HCell	H12311_Outline.gml and .xsd

Horizontal and Vertical Units

During creation of the HCell 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.

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

Radius Setting

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

Radius (mm)	Min. Depth (m)	Max Depth
2	-4.7	10
3	10	20
3.5	20	50
4	50	100

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. With the exception of the zero contours included in the *_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography.

Charted Contours	Metric Equivalent	Metric NOAA Rounded	Charted NOAA Rounded
0	0	0.2286	0.125
3	5.4864	5.715	3.125
10	18.288	18.5166	10.125

Add Contour | Remove Contour

PHB Compilation Log

Additional Info

Contact Information

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

HCell Compiler	Kurt Brown
Phone Number	206-526-6839
Email	kurt.brown@noaa.gov

Compilation Comments

In addition to the deliverables listed above, a Geospacial PDF file was created and archived for this survey.

APPROVAL SHEET
H12311

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.

Digitally signed by Kurt Brown
DN: cn=Kurt Brown, o=Pacific Hydrographic Branch, ou=NOAA, email=kurt.brown@noaa.gov, c=US
Date: 2012.04.25 14:33:57 -07'00'

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

Digitally signed by Peter S. Holmberg
DN: cn=Peter S. Holmberg, o, ou, email=peter.holmberg@noaa.gov, c=US
Date: 2012.04.26 08:09:44 -07'00'

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

David J Zezula LCDR/NOAA

David Zezula
2012.04.26 09:59:43
-07'00'