H11419

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. RA-10-23-05

Registry No. H11419

LOCALITY

State Washington

General Locality Approaches to Anacortes and Bellingham

Sublocality Bellingham Bay Vendovi Island to Post Point

2005

CHIEF OF PARTY

CDR Guy T. Noll, NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H11419

INSTRUCTIONS The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO. RA-10-22-05

State: Washington

General Locality: Approaches to Anacortes and Bellingham

Sublocality: Bellingham Bay Vendovi Island to Post Point

Scale: 1:10,000

Date of Survey: 10/15/2005 - 11/7/2005

Instructions Date: 3/15/2005

Project No.: OPR-N161-RA-05

Vessel: NOAA Ship Rainier launches 1006, 1016, 1015, 1021, 1101

Chief of Party: CDR Guy T. Noll, NOAA

Surveyed by: NOAA Ship Rainier Personnel

Soundings taken by echo sounder: Reson 8101 and 8125, Seabeam/Elac 1180, Knudsen 320M

Graphic record scaled by: NOAA Ship Rainier Personnel

Graphic record checked by: NOAA Ship Rainier Personnel

Evaluation by: Kurt Brown, Russ. Davies

Automated plot by:

Verification by: Russ Davies

Soundings in: Fathoms and feet at MLLW

REMARKS: Time in UTC. UTM Projection Zone 10

Revisions and annotations appearing as endnotes were generated during office processing.

All separates are filed with the hydrographic data.

As a result, page numbering may be interrupted or non-sequential

Descriptive Report to Accompany Hydrographic Survey H11419

Project OPR-N161-RA-05
Approaches to Anacortes and Bellingham, WA
Bellingham Bay Vendovi Island to Post Point
Scale 1:10,000
October – November 2005
NOAA Ship RAINIER (s221)
Chief of Party: Commander Guy T. Noll, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-N161-RA-05, dated March 15, 2005, and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is Bellingham Bay, from Vendovi Island to Post Point. This survey corresponds to sheet "C" in the sheet layout provided with the Letter Instructions. (Figure 1)

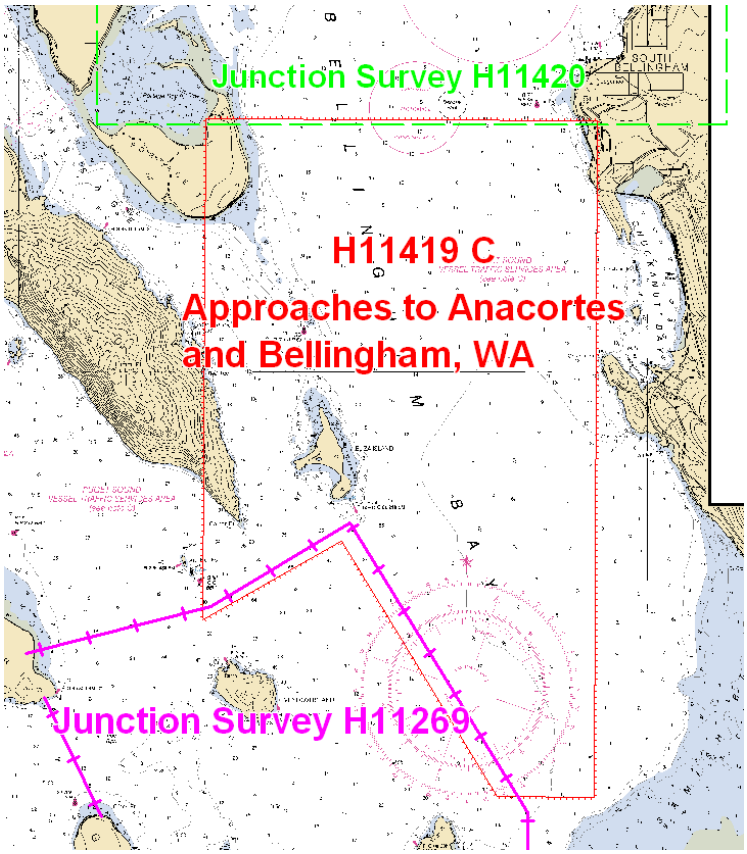


Figure 1: H11419 Survey Limits with Junction Surveys (Chart 18424)

[1] Standing Instructions for Hydrographic Surveys (March 2004), NOS Hydrographic Surveys Specifications and Deliverables (March 2004), OCS Field Procedures Manual for Hydrographic Surveying (March 2005), and all Hydrographic Surveys Technical Directives issued through November 2005.

The area seaward of the 8m curve was surveyed with a combination of 100% multi-beam echousounder (MBES) and 200% side scan sonar (SSS) coverage, as described below. In depths less than 8 meters additional MBES coverage was obtained to acquire least depths over significant features or shoals, as appropriate for this survey. In most cases, MBES coverage extended up to the 4m contour. In near shore areas between 8 and 4m deep, vertical beam echosounder (VBES) data were acquired to define the navigable area limit, aid in the planning of SWMB data acquisition, and provide inshore bathymetry in navigationally significant areas.

Sounding coverage reached the 4m curve in all areas except the western coast of Lummi Island. The steep bathymetry around this shoreline precluded safe launch operations inshore of approximately 10m depths.

Limited shoreline verification was accomplished for survey H11419.

Data acquisition was conducted from October 15 to November 7, 2005 (DN 288 to 311).

B. DATA ACQUISTION AND PROCESSING

RAINIER employed a mix of 200% side scan sonar and 100% multi-beam echosounder coverage to most efficiently acquire 100% bottom coverage of the survey area. The depth regimes in which each technique was used are given in Table 1 and the approximate boundaries of the regions covered with each acquisition system are shown in Figure 2. This change was initiated by the Chief of Party and approved via email (included in Appendix V) by the Chief, Operations Branch, and Hydrographic Surveys Division. [1]

Acquisition System	Depth Regime
200% Side Scan Sonar, with “skunk stripe” MBES bathymetry	Under 18.3m (under 10ftm)
100% Shallow Water Multibeam	Over 18.3m (over 10ftm)

Table 1: H11419 Depth regime for data acquisition

As a general rule, the above mentioned depth regime was adhered to. However, some areas which were shoaler than 10ftms required further development due to their rocky or diverse terrain and were therefore covered with 100% SWMB, to ensure least depths were acquired on all features hazardous to navigation.

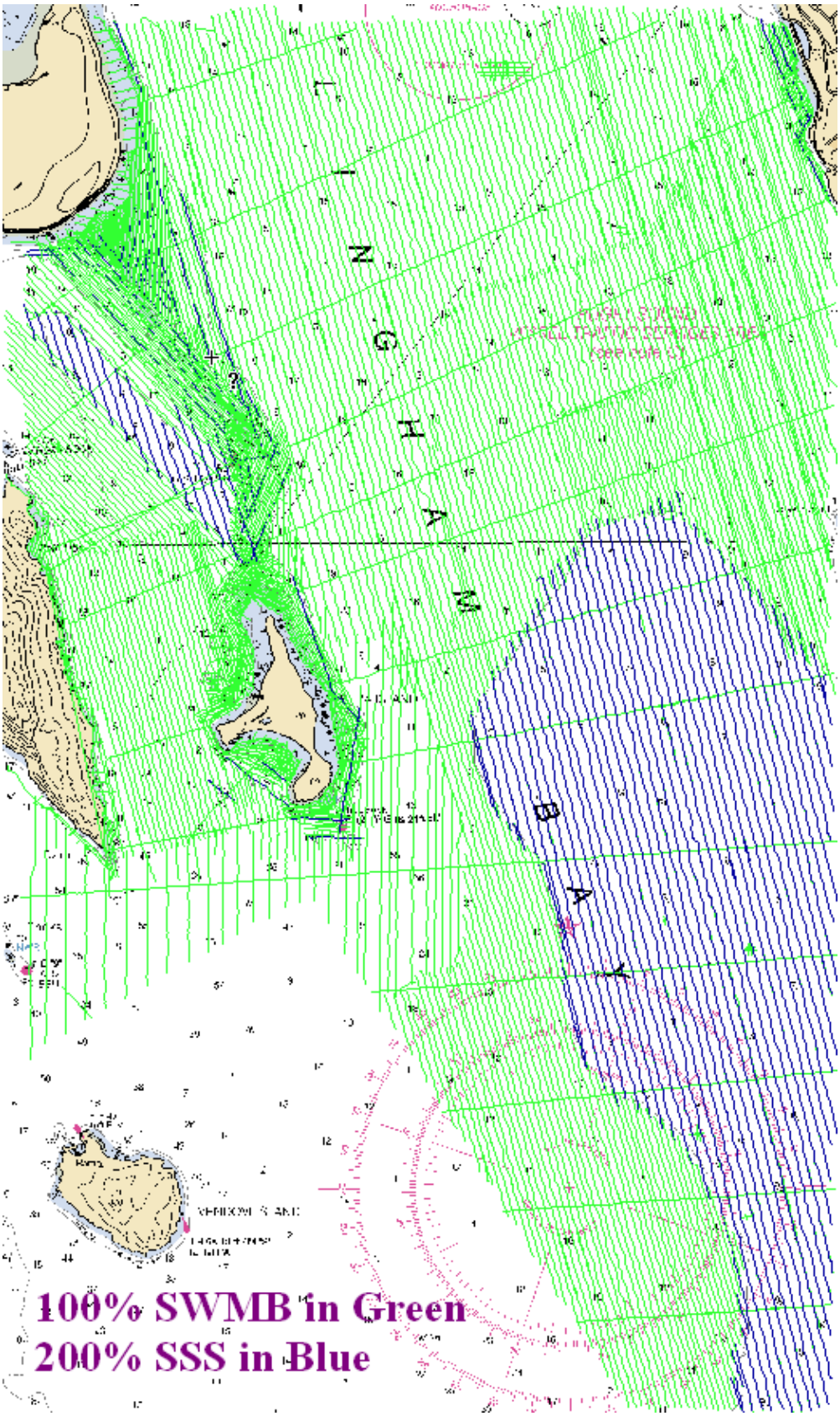


Figure 2: H11419 Acquisition system boundaries (Chart 18424)

A complete description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods can be found in the *OPR-N161-RA-05 Data Acquisition and Processing Report* (DAPR), which is submitted under separate cover. [2] Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections.

Final Approved Water Levels have been applied to this survey. See Section C for additional information. [3]

B1. Equipment and Vessels

Data for this survey were acquired by the following vessels and acquisition systems:

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

Table 2: Data Acquisition Vessels for H11419

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

No unusual vessel configurations were used for data acquisition.

B2. Quality Control

Crosslines

Shallow-Water Multibeam (SWMB) crosslines totaled 40.1 nautical miles, comprising 4.65% of SWMB hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences averaging less than 0.5 meter.

A statistical Quality Control Report has been conducted on data representative data collected with each system used on this survey and is included in the *OPR-N161-RA-05 DAPR.*

Junctions

The following contemporary surveys junction with H11419 (See Figure 1):

Registry #	Scale	Date	Junction side
H11420	1:10,000	2005	North
H11269	1:10,000	2004	Southwest

Survey H11420 junctions well with this survey; an opening comparison indicates differences are generally less than one-quarter meter.[4] Survey H11269 also junctions well with this survey; an initial comparison indicates differences are generally less than one half meter. [5] Both survey sheet comparisons were accomplished using Caris subset mode.

Data Quality Factors

Data for survey H11419 exhibited no major deficiencies other than those mentioned below:

Vertical Offset, DN 288

On DN 288, a cross line from 1006 (RA-5) line 902_2227, showed a vertical offset from the main scheme lines. The vertical distance between the cross line and the main scheme lines varied from 0.3m to 0.8m (IHO standards limit the depth accuracy to under 0.5m). The other cross lines run by 1006 on the same day did not show a similar vertical offset. All corrector values (sound velocity, heave, tide and draft) were examined and no abnormalities in the corrector data were found. Wind conditions remained under 5 kts throughout the survey day. The hydrographer is unable to determine the cause of the vertical offset; however the best estimate is a heave problem. [6]

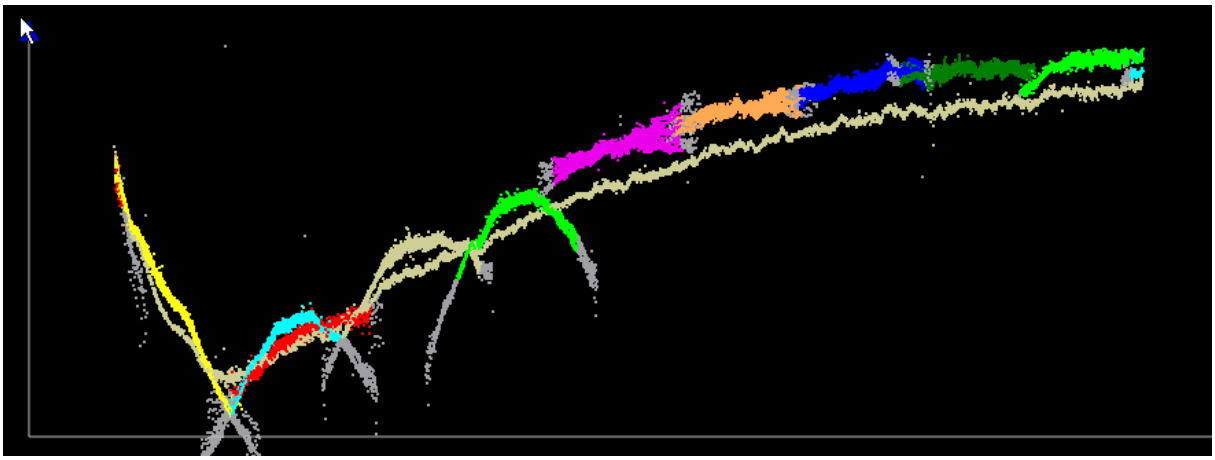


Figure 3: Cross line 902_2227 from DN 288, 1006 (RA-5) showing vertical offset. The SV refraction issues are discussed later.

Vertical Offset, DN 301

On DN 301, 1006 (RA-5), five development lines were run to obtain complete bathymetric coverage over a wreck found by SWMB. These development lines did not agree (a 1m discrepancy) with the main scheme lines. The lines were rerun using another boat (1016 (RA-

4) on DN 306). The 5 development lines from DN 301, 1006, were deleted from the processed data directory, but remain on the raw data directory. The lines were deleted from the base surface and a note was put in the acquisition log.

Roll Bias, DN 299, Vessel 1021

The transducer on 1021 (RA-3) is mounted on a retractable arm. In the previous project area 1021, (RA-3), was unused. On DN 299, data from 1021 (RA-3) showed evidence of roll bias. On DN 287 (before acquisition) the hydrographer redefined the roll bias value in the 1021_8101_HVF file from 1.175 to 0.99, which mitigated the roll bias. The change in the HVF file was verified with an end of the season patch test on DN 310.

Surface Sound Speed Measurement Outage

Vessel 1016 (RA-4) experienced a problem with the Digibar Pro surface sound speed instrument on DN305. The launch crew reported that the surface sound speed value appeared "stuck", and subsequent data processing revealed "frown" patterns characteristic of inaccurate sound speed correction (see Figure 4). The magnitude of the error was as much as 0.75m in 30m of water. However, overlap between swathes was sufficient to reject the most heavily affected outer beams, bringing the magnitude of error in accepted data within IHO Order I limits. The cause of the problem is likely due to kelp or floating grass surrounding the Digibar device.

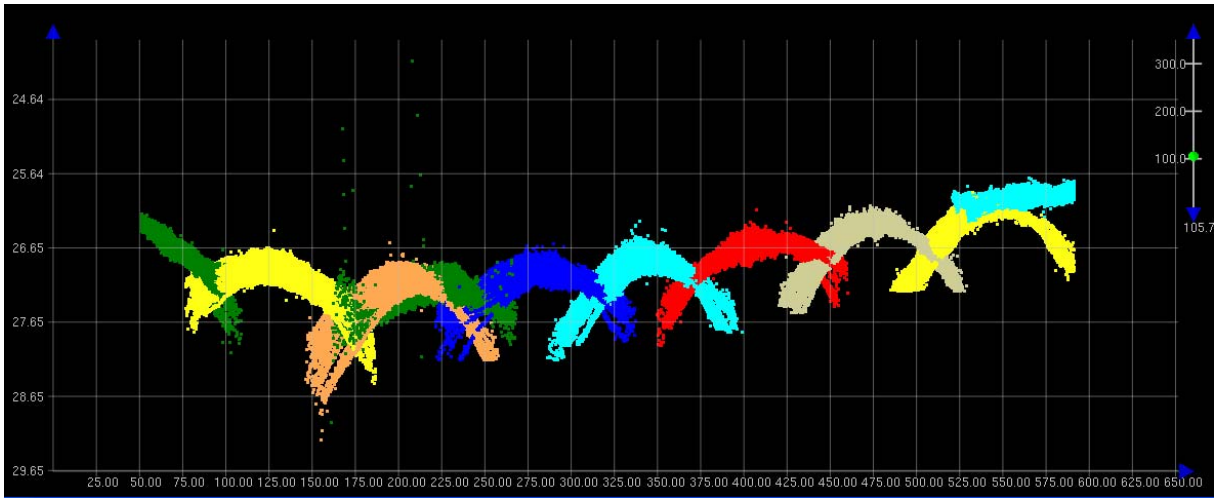


Figure 4: DN 305, 1016 (RA-4) showing SV artifacts, before rejection of outer beams.

Holidays

There are numerous small holidays in the 100% main scheme coverage. Attempts were made to re-accept data to fill in the holidays, but not all could be appropriately filled in. The holidays varied in length but were on average 6m wide and up to 170m long, most fell in between 0 and 15m. The hydrographer found no evidence of shoaling in the areas affected (see Figure 5). [7]

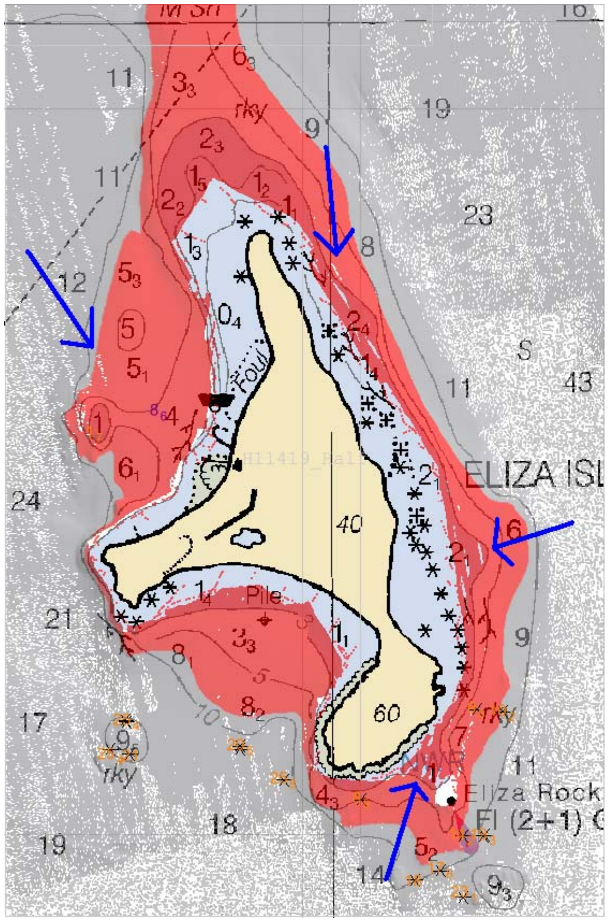


Figure 5: Holidays found in a half meter base surface, arrows highlight the holidays.

B3. Data Reduction

Data reduction procedures for survey H11419 conform to those detailed in the *OPR-N161-RA-05 DAPR.*

B4. Data Representation

Though many BASE surfaces were used for the processing of H11419, the final submission is shown in Figures 6, 7, 8 and 9. The submission field sheets have fewer than $25\text{x}10^6$ nodes. The finalized, combined surface "H11419_5m_Combined" was inserted into Pydro.

Side Scan Sonar data was split into two complete coverage mosaics to demonstrate 200% coverage by this technique. These mosaics were created at 2m resolution and named "H11419_100" and "H11419_200"; in the field sheet "H11419_SSS".

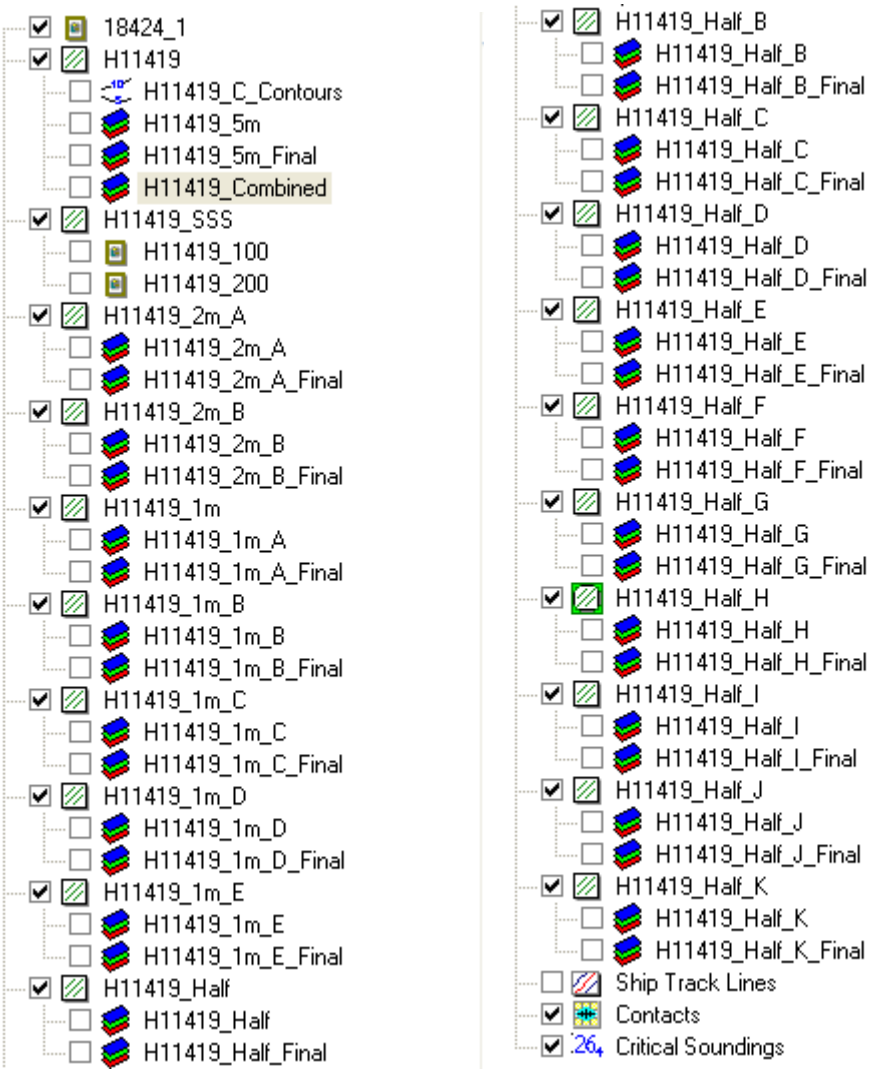


Figure 6: Field sheets, mosaics and BASE surfaces submitted with H11419.

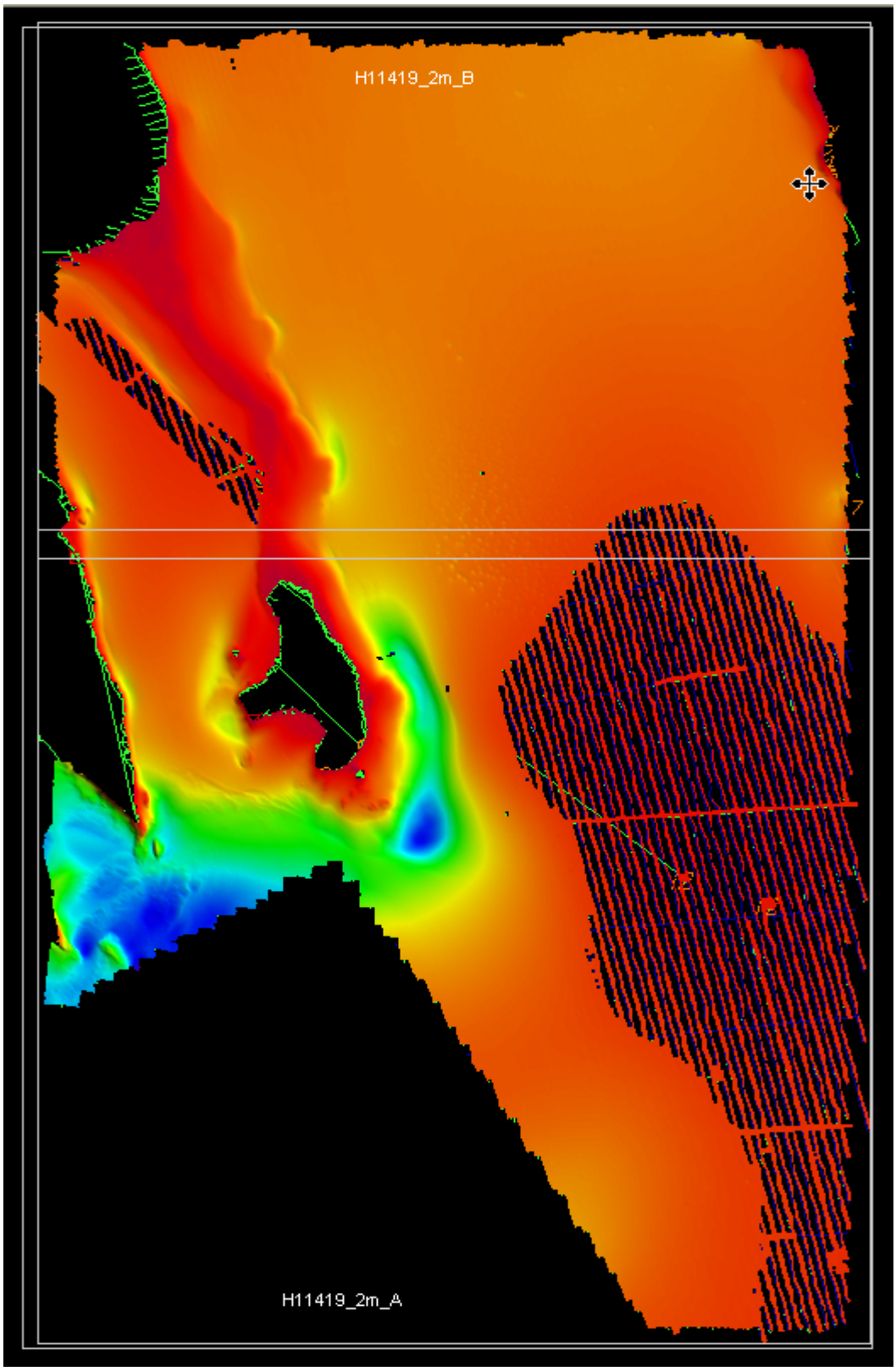


Figure 7: Layout of 2m resolution field sheets and BASE surfaces of H11419.

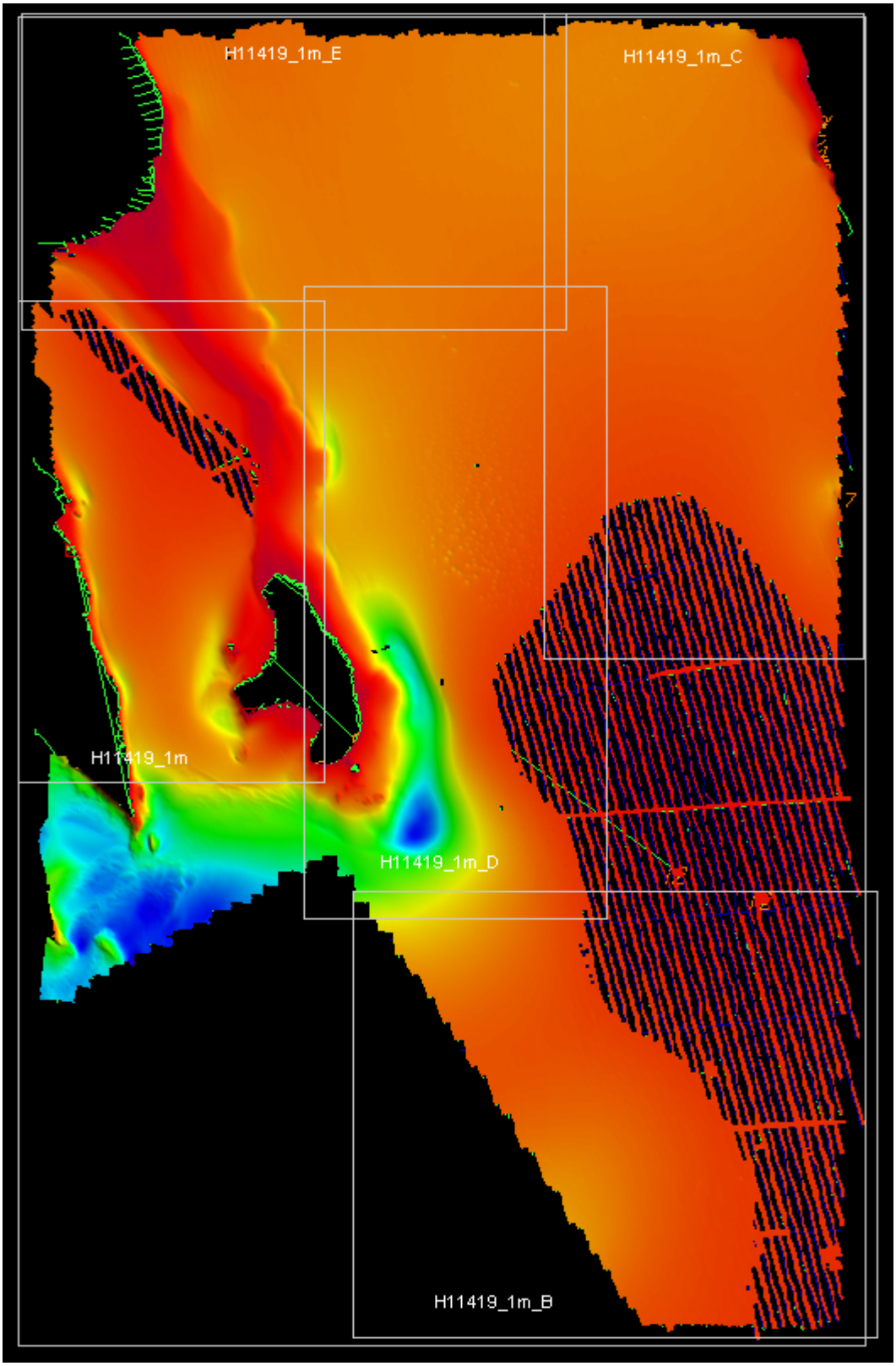


Figure 8: Layout of 1m resolution field sheets and BASE surfaces of H11419.

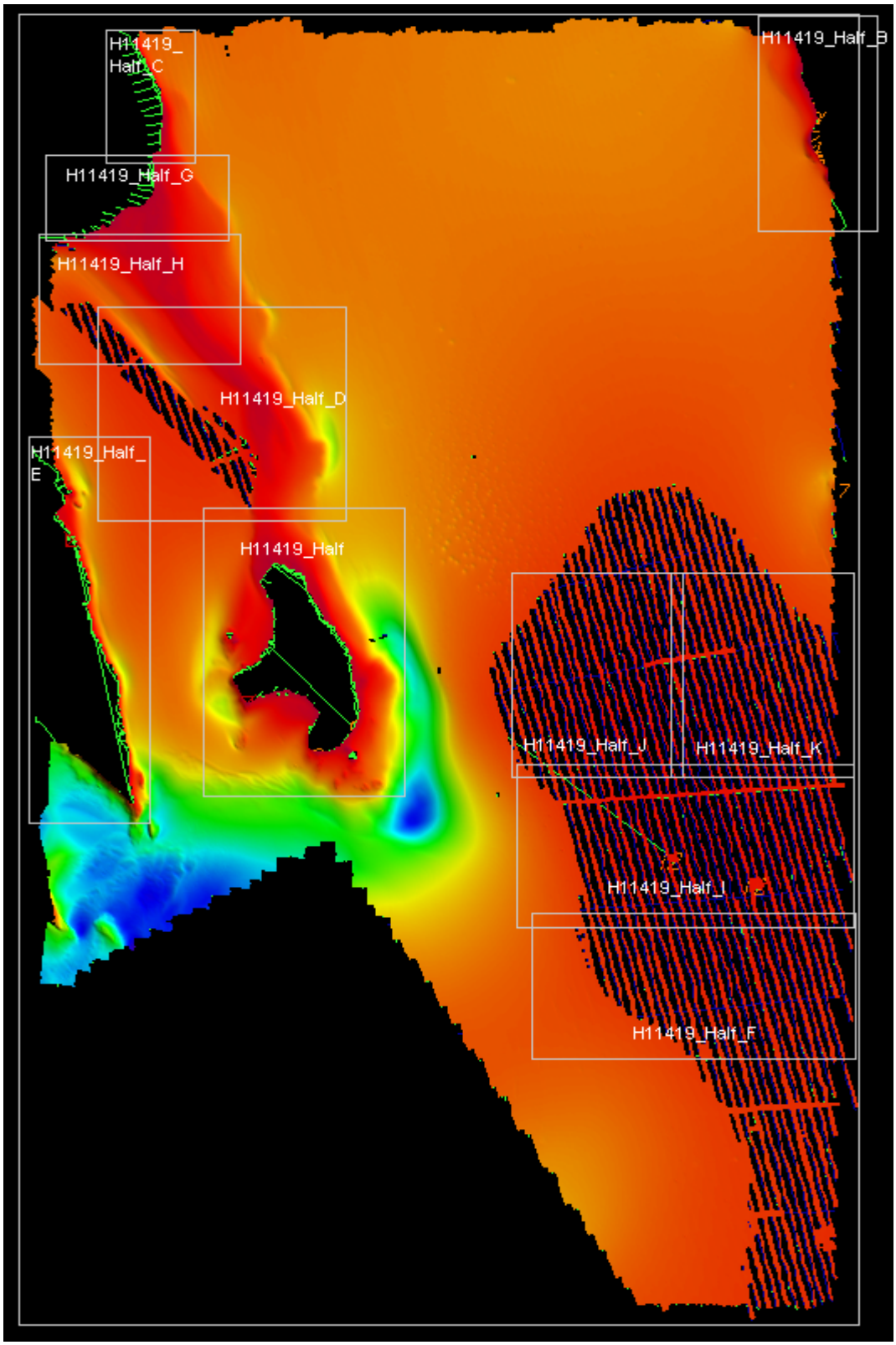


Figure 9: Layout of .5m resolution field sheets and BASE surfaces of H11419.

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-N161-RA-05 required neither horizontal control work nor subordinate tide station installation, and thus no Horizontal and Vertical Control Report will be submitted.

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 beacon utilized for this survey is given in Table 3.

Location	Frequency	Custodian	Distance	Priority
Whidbey Island, WA	302 kHz	USCG	20nm	Primary

Table 3: Differential Corrector Sources for H11419.

Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) stations at Cherry Point, WA (944-9424) and Friday Harbor, WA (944-9880) served as control for datum determination and as the primary source for water level reducers for survey H11419.

No tertiary gauges were required.

All data were reduced to MLLW using **Final Approved Water Levels** from stations Cherry Point, WA (944-9424) using the tide file 9449424.tid and Friday Harbor, WA (944-9880) using the tide file 9449880.tid, and final time and height correctors using the zone corrector file N161RA2005CORP.zdf

The request for Final Approved Water Levels for H11419 was submitted to CO-OPS on November 15, 2005, and the Final Tide Note was received on January 6, 2006. This documentation is included in this report.

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11419 was compared with the following charts:

Chart	Scale	Edition and Date	Cleared Through
18400	1:200,000	46th Ed, May 2005	March 24, 2006
18421	1:80,000	47th Ed, May 2005	March 24, 2006
18424	1:40,000	26th Ed, Aug 2004	March 24, 2006

Table 4: Charts compared with H11419

Soundings from survey H11419 generally agreed with chart 18400, however the scale of the chart does not depict the survey area with sufficient detail for meaningful comparison.

Soundings from survey H11419 generally agreed within 1 to 3 fathoms on charts 18424 and 18421. Differences between survey soundings and charted depths were greatest on the west side of the survey area where the seabed has more varied bathymetry.

The hydrographer recommends that survey soundings supersede all charted depths in the common areas. [8]

Final chart comparisons will be made at the Pacific Hydrographic Branch. [9]

D.1.b. Dangers to Navigation

There was one Danger to Navigation (DTON) found on survey H11419. The DTON is a rock in shoal area south of Point Francis and was reported to the Marine Chart Division via email on November 30, 2006. The rock was discovered with SSS and developed with 100% SWMB. The one DTON is included in this report. This rock is charted on the most recent edition of chart 18424 and should be retained as charted on future editions. [10]

D.1.c. Other Features

Automated Wreck and Obstruction Information System (AWOIS) Investigations
There were four (4) AWOIS items assigned for full investigation on survey H11419. AWOIS items 53187 and 53190 correctly identified shoal sounding around the general vicinity of Eliza Island. AWOIS items 53188 and 53189 were not fully addressed. AWOIS item 53188, a private mooring buoy, was not observed. Many private mooring buoys exist in this area and launch crews had trouble identifying one from another. The 1.5 foot diameter metal barrel attached by a chain was not observed in 6.5m of water. Full bottom coverage in this area was not obtained due to shoal conditions. AWOIS item #53189 was not specifically addressed. However, 100% SWMB was obtained in the area surrounding the charted pile and no indication of the pile was seen in the bathymetry. All are fully discussed in the Pydro PSS and Survey Feature Report filed in this survey.

Additional Items
Additional features investigated within the limits of H11419 are described in the Survey Feature Report attached to this report.

D.2. Additional Results

D.2.a. Prior Survey Comparison

Prior survey comparison with H11419 was not performed.

D.2.b. Shoreline Verification

Shoreline Source

Vector photogrammetric project WA-0402 was supplied by N/NGS3 in the form of cartographic feature file GC-10566 (CFF). RAINIER conducted limited shoreline verification of the CFF. In addition, features shown on the current edition of chart 18424 that were not depicted on the shoreline source document were digitized in MapInfo by RAINIER personnel and displayed in Hypack for field verification.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Standing Project Instructions and FPM sections 6.1 and 6.2. Detached positions (DPs) taken during shoreline verification were recorded in HYPACK, on DP forms, and processed in Pydro. These indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline. DP forms are included in the *Separates to be Included with Survey Data*.[11]

All shoreline data is submitted in Caris Notebook .hob files. The session H11419_C_NTBK contains the following:

H11419_C_CFF_SHORELINE.HOB (original source data)
H11419_C_CHD_SHORELINE. HOB (digitized charted shoreline not in CFF)
H11419_C_CHD_ShorelineHOB marker layer
H11419_ADD_NOTEBOOK.HOB (new features digitized in Notebook using DPs or VBES)
H11419_MODIFY_NOTEBOOK.HOB (features modified in Notebook using DPs or VBES)
H11419_DELETE_NOTEBOOK.HOB (original source or charted features that have been modified and disprovals not needing Pydro DPs, e.g. 100% SWMB)
H11419_ADD_PYDRO.HOB (new features or bottom samples processed in Pydro)
H11419_MODIFY_PYDRO.HOB (modified features or bottom samples processed in Pydro)
H11419_NONE_PYDRO.HOB (verified charted or CFF source features processed in Pydro)
H11419_C_SheetLimits.HOB (survey limits)
H11419_C_AWOIS (AWOIS items)

The combination of *modify*, *add*, and *none* layers depict the shoreline as surveyed. The *delete* tables depict all disproved or modified features. The CFF and charted shoreline tables reflect unchanged features that were noted in the field. [12]

Source Shoreline Changes and New Features

Items for survey H11419 that require further discussion and are associated with a detached position, have been flagged “Report” in Pydro in H11419.pss. Investigation methods and recommendations are listed in the Remarks and Recommendation tabs. These features are included in the Survey Feature Report in this report.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above. [13]

D.2.c. Aids to Navigation

Survey H11419 included two aids to navigation (ATONs). The ATONs' positions were visually checked in the field against the digital raster chart. Detached positions were taken on both ATONs. Full descriptions of the ATONs can be found in the feature report. [14] The ATONs were found to serve their intended purposes. [15]

D.2.d. Overhead features

There is a low bridge in the northeast corner of survey H11419, sheet C. The feature was not in the CFF source. A bridge was manually digitized in Caris Notebook, joining the unconnected lines in the source and a photo was taken (see below). The narrow passage under the causeway may only be navigated by a small craft. [16]

Figure 10: Image of railroad causeway just south of Post Point

D.2.e. Submarine Cables and Pipelines

No submarine cables or pipelines are charted within the limits of H11419, and none were noted during review of survey bathymetry and imagery. [17]

D.2.f. Ferry Routes

There are no charted ferry routes within the limits of survey H11419. The Alaska Marine Highway System operates ferry service between Bellingham and ports in southeast Alaska which crosses the H11419 survey area. Daily service to/from Friday Harbor, San Juan Island, is provided at Fairhaven Terminal, just north of survey area.

D.2.g. Bottom Samples

A total of twenty (20) bottom samples were collected in sheet "C". The spacing and location of the bottom samples follows the guidelines outlined in NOS Field Procedures Manual for Hydrographic Surveying dated March 2005. In all but four bottom samples the findings agreed with the charted bottom characteristics. (See the Survey Feature Report in Appendix II for a complete description of bottom samples). BS6 (south of Eliza Island) had shells in addition to the mud charted. BS16 (south of Pt. Francis) had an addition of shells to the mud description charted. BS17 (northwest corner of sheet) had the color description of black in addition to the mud description charted. [18]

D.2.h Miscellaneous

Symmetrical pits were discovered on this sheet; on average they were 2.5 meters deep with a width of 30 meters. These pits were previously uncharted and are of significant interest due to the uniform shape and their unexplained formation. See Figure 11 (vertically exaggerated).

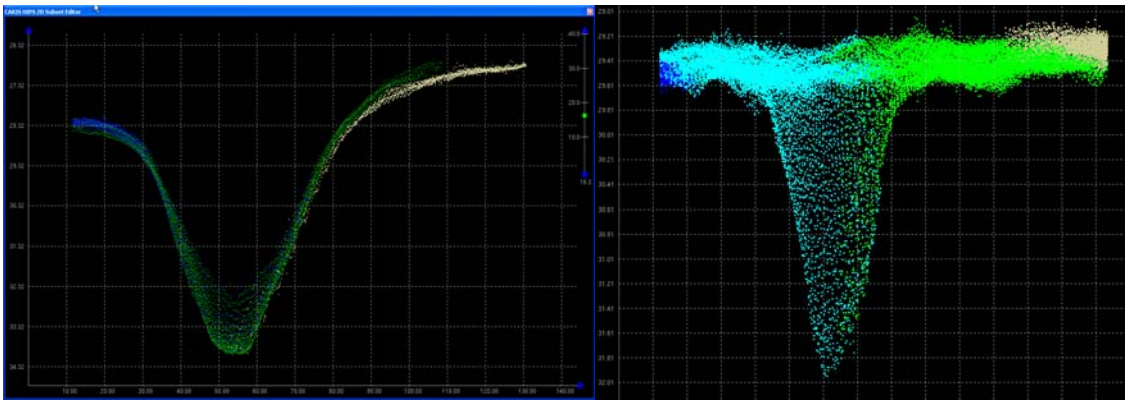


Figure 11: Image of a large depression in the waters northeast of Eliza Island

Two wrecks were found within the limits of survey H11419. Both wrecks are not dangerous to mariners and full descriptions can be found in the feature report. [19]

E. ADDITIONAL DOCUMENTATION

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

Title	Date Sent	Office
Data Acquisition and Processing Report for OPR-N161-RA-05	11/13/2006	N/CS34
Tides and Water Levels Package for OPR-N161-RA-05	11/16/2005	N/OPS1
Coast Pilot Report for OPR-N161-RA-05	5/19/2006	N/CS26

Revisions Compiled During Office Processing and Certification

[1] See attached email
[2] Filed with the project records
[3] See attached Tide Note dated December 20 2005
[4] Concur
[5] Concur
[6] The data for this survey is acceptable despite not meeting specifications. See the SAR which is filed with the hydrographic records for more information and recommendations to accept this survey despite its problems.
[7] Concur
[8] Concur
[9] A chart comparison with chart 18424 was made, no significant changes were found.
[10] Concur
[11] Filed with the hydrographic records.
[12] Chart according to this survey otherwise retain as charted.
[13] Concur
[14] Attached to this report
[15] Concur, retain as charted
[16] This feature is charted on the Electronic Navigational Chart but not on the Raster Nautical Chart. Retain charted feature as portrayed on the ENC and chart this feature on the Raster Nautical Chart according to the ENC.
[17] Concur
[18] All bottom samples collected during H11419 are included in the HCell H11419.
[19] Only one wreck is shown on this survey at latitude 48/40/30.1N, longitude 122/36/49.3W. The other feature did not have enough evidence to recommend charting a wreck.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Marine and Aviation Operations
NOAA Ship RAINIER (S221)
1801 Fairview Ave E, Seattle, WA 98102

December 04, 2006

MEMORANDUM FOR: CDR Donald W. Haines, NOAA
Chief, Pacific Hydrographic Branch

FROM: CDR Guy T. Noll, NOAA
Commanding Officer

SUBJECT: Approval of Hydrographic Survey H11419

Field operations for hydrographic survey H11419 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, Field Procedures Manual, Standing and Letter Instructions, and HSD Technical Directives. These data are adequate to supersede charted data in their common. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

Survey Sheet Manager: Laurel K. Jennings
Laurel K. Jennings
Ensign, NOAA

Chief Survey Technician: James B. Jacobson
James B. Jacobson
Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:
Benjamin K. Evans
Lieutenant, NOAA

Subject: N161 SSS coverage
Resent-Date: Tue, 25 Oct 2005 20:13:41 GMT
Resent-From: FOO.Rainier@noaa.gov
Date: Tue, 25 Oct 2005 16:13:37 -0400
From: Corey Allen <Corey.Allen@noaa.gov>
To: Kathryn Simmons <Kathryn.Simmons@noaa.gov>, _OMAO MOP FOO RAINIER <FOO.Rainier@noaa.gov>
CC: Christopher Hare <Christopher.Hare@noaa.gov>, Michael Riddle <Michael.Riddle@noaa.gov>

Ben and Kathryn,
Mike Riddle informed me Kathryn had gotten in touch with him regarding the offshore extents of SSS coverage in the original assigned NRT SSS polygon. I will leave it up to you two how best you want to delineate a
new offshore junction line of SSS and MBES, but I see no need to have SSS coverage beyond 11fms. The remainder of the original assigned area from 11-16fms will need to be covered with 100% or a combination or MBES
and SSS if the RA has greater SSS depth capability. The two of you please stay in touch and coordinate as best you can, and feel free to contact us if additional questions arise.

Regard, Corey

--
LT Ben Evans, NOAA
Field Operations Officer
NOAA Ship RAINIER (s221)
NOAA Marine Operations Center, Pacific
1801 Fairview Ave. E
Seattle, WA 98102

H11419 Features

Registry Number: H11419

State: WA

Locality: Bellingham Bay

Sub-locality: Bellingham Bay Vendovi Island to Post Point

Project Number: OPR-N161-RA-05

Survey Dates: 10/15/2005 - 11/09/2005

Charts Affected

Number	Version	Date	Scale
18424	26th Ed.	07/01/2004	1:40000
18421	46th Ed.	10/01/2003	1:80000
18423	34th Ed.	12/01/2003	1:80000
18400	45th Ed.	12/01/2004	1:200000
18003	19th Ed.	03/01/2003	1:736560
18007	31st Ed.	03/31/2001	1:1200000
501	12th Ed.	11/01/2002	1:3500000
530	30th Ed.	03/23/2002	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Sounding	999.65 m	048° 40' 25.814" N	122° 35' 27.468" W
Lighted structure	-8.01 m	048° 38' 37.176" N	122° 34' 40.629" W
Rock	-0.13 m	048° 38' 38.317" N	122° 34' 41.913" W
AWOIS	2.15 m	048° 40' 35.523" N	122° 35' 24.788" W
Sounding	999.76 m	048° 39' 29.638" N	122° 36' 48.432" W
Sounding	18.50 m	048° 40' 30.146" N	122° 36' 49.338" W
Sounding	11.09 m	048° 37' 52.967" N	122° 31' 25.489" W
SSS	[None]	048° 37' 52.897" N	122° 31' 25.496" W
Sounding	19.54 m	048° 40' 30.297" N	122° 36' 49.261" W
AWOIS	[no data]	[no data]	[no data]

Generated by Pydro v7.1.0 (r1940) on Mon Sep 07 18:23:14 2009 [UTC]

AWOIS	[no data]	[no data]	[no data]
Sounding	2.15 m	048° 40' 35.523" N	122° 35' 24.788" W
Sounding	1.68 m	048° 39' 16.210" N	122° 35' 37.934" W
Sounding	3.69 m	048° 41' 07.270" N	122° 35' 59.469" W

1 - Charted Features

1.1) Profile/Beam - 1/1 from h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288

Survey Summary

Survey Position:	048° 40' 25.814" N, 122° 35' 27.468" W
Least Depth:	999.65 m
Timestamp:	2005-288.15:41:38.000 (10/15/2005)
DP Dataset:	h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288
Profile/Beam:	1/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

RG Bouy, Fl (2+1) R 6s

Hydrographer Recommendations

ATON found to serve intended purpose.

Cartographically-Rounded Depth (Affected Charts):

546fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

546fm (18424_1, 18423_1)

999m (501_1, 50_1)

S-57 Data

Geo object 1:	Buoy, lateral (BOYLAT)
Attributes:	INFORM - RG Bouy, Fl (2+1) R 6s

Office Notes

Retain as charted

1.2) Profile/Beam - 6/1 from h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288

Survey Summary

Survey Position:	048° 38' 37.176" N, 122° 34' 40.629" W
Least Depth:	-8.01 m
Timestamp:	2005-288.17:46:33.000 (10/15/2005)
DP Dataset:	h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288
Profile/Beam:	6/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Eliza Rock Light

Hydrographer Recommendations

ATON found to serve intended purpose.

Cartographically-Rounded Depth (Affected Charts):

-4 ¼fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

-4fm 2ft (18424_1, 18423_1)

-8.0m (501_1, 50_1)

S-57 Data

Geo object 1:	Light (LIGHTS)
Attributes:	INFORM - Eliza Rock Light

Office Notes

Retain as charted

1.3) Profile/Beam - 7/1 from h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288

Survey Summary

Survey Position:	048° 38' 38.317" N, 122° 34' 41.913" W
Least Depth:	-0.13 m
Timestamp:	2005-288.17:50:53.000 (10/15/2005)
DP Dataset:	h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288
Profile/Beam:	7/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

New Rock

Hydrographer Recommendations

Hydrographer recommends updating the chart with the new rock.

Cartographically-Rounded Depth (Affected Charts):

0fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

0fm 0ft (18424_1, 18423_1)

-.2m (501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	INFORM - New Rock
	VALSOU - -0.126 m

Office Notes

Concur

1.4) AWOIS #53190 - OBSTRUCTION

Primary Survey Feature is Profile/Beam - 316/47 from h11419 / 1006_reson8101_hvf / 2005-311 / 317_2327

Search Position:	048° 40' 36.280" N, 122° 35' 25.220" W
Historical Depth:	2.74 m
Search Radius:	50
Search Technique:	MB, ES,
Technique Notes:	[None]

History Notes:

H8319, 1967; REPORTS A 1.5 FATHOM SHOAL IN LAT. 48/40/36.9N, LON. 122/35/20.6 W(NAD27). Sounding was retained from H1887.

Survey Summary

Survey Position:	048° 40' 35.523" N, 122° 35' 24.788" W
Least Depth:	2.15 m
Timestamp:	2005-311.23:27:26.821 (11/07/2005)
Survey Line:	h11419 / 1006_reson8101_hvf / 2005-311 / 317_2327
Profile/Beam:	316/47
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Designated sounding is the shoal sounding mentioned in the AWOIS database, matches AWOIS report #53190

Hydrographer Recommendations

Hydrographer recommends the use of bathy data for AWOIS shoal depth.

Cartographically-Rounded Depth (Affected Charts):

1fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 1ft (18424_1, 18423_1)

2.1m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Concur

2 - New Features

2.1) Profile/Beam - 3/1 from h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288

Survey Summary

Survey Position:	048° 39' 29.638" N, 122° 36' 48.432" W
Least Depth:	999.76 m
Timestamp:	2005-288.16:24:48.000 (10/15/2005)
DP Dataset:	h11419 / 1101_echosounder_dp / 2005-288 / dp-1101-288
Profile/Beam:	3/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Public Sailboat Mooring bouy

Hydrographer Recommendations

Hydrographer recommends updating the chart with the new mooring buoy.

Cartographically-Rounded Depth (Affected Charts):

546fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

546fm (18424_1, 18423_1)

1000m (501_1, 50_1)

S-57 Data

Geo object 1:	Mooring/warping facility (MORFAC)
Attributes:	CATMOR - 7:mooring buoy
	COLOUR - 5:blue
	INFORM - Public Sailboat Mooring bouy

Office Notes

Concur

2.2) Profile/Beam - 1/1 from h11419 / 1103_nonechosounder_dp / 2005-312 / dp_1103_dn312

Survey Summary

Survey Position:	048° 40' 30.146" N, 122° 36' 49.338" W
Least Depth:	18.50 m
Timestamp:	2005-312.18:21:04.000 (11/08/2005)
DP Dataset:	h11419 / 1103_nonechosounder_dp / 2005-312 / dp_1103_dn312
Profile/Beam:	1/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Wreck 1 Divers investigated on 11-08-2005

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

10fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

10fm 0ft (18424_1, 18423_1)

18.5m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Chart submerged wreck at survey position

2.3) Profile/Beam - 2/1 from h11419 / 1103_nonechosounder_dp / 2005-312 / dp_1103_dn312

Survey Summary

Survey Position:	048° 37' 52.967" N, 122° 31' 25.489" W
Least Depth:	11.09 m
Timestamp:	2005-312.19:37:31.000 (11/08/2005)
DP Dataset:	h11419 / 1103_nonechosounder_dp / 2005-312 / dp_1103_dn312
Profile/Beam:	2/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Wreck 2 Divers investigated on 11-08-2005, purse seiner

Hydrographer Recommendations

See dive report.

Cartographically-Rounded Depth (Affected Charts):

6fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

6fm 0ft (18424_1, 18423_1)

11.1m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Not enough evidence to chart. Chart soundings from this survey in the area.

2.4) Contact/Point - 0001/1 from h11419 / 1015_k5k_200_hvf / 2005-306 / k5k_051102231700

Survey Summary

Survey Position:	048° 37' 52.897" N, 122° 31' 25.496" W
Least Depth:	[None]
Timestamp:	2005-307.03:06:02 (11/03/2005)
Survey Line:	h11419 / 1015_k5k_200_hvf / 2005-306 / k5k_051102231700
Contact/Point:	0001/1
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

obstruction with small depressions, will dive to investigate

Hydrographer Recommendations

See dive report. attached to this report

S-57 Data

[None]

Office Notes

Not enough evidence to chart. Chart soundings from this survey in the area

Feature Images

[Image file k:/projects/2005_projects/opr-n161-ra-05, bellingham/surveys/h11419/pss/photos/depression with small objects.bmp does not exist.]

2.5) Profile/Beam - 67/90 from h11419 / 1016_reson8125_hvf / 2005-306 / 425_2250

Survey Summary

Survey Position:	048° 40' 30.297" N, 122° 36' 49.261" W
Least Depth:	19.54 m
Timestamp:	2005-306.22:50:24.167 (11/02/2005)
Survey Line:	h11419 / 1016_reson8125_hvf / 2005-306 / 425_2250
Profile/Beam:	67/90
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Wreck 1, divers investigated on 11-08-2005

Hydrographer Recommendations

See dive report.

Cartographically-Rounded Depth (Affected Charts):

10 ½fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

10fm 4ft (18424_1, 18423_1)

19.5m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Chart submerged wreck

3 - AWOIS Features

3.1) AWOIS #53188 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position:	048° 39' 18.590" N, 122° 35' 18.620" W
Historical Depth:	[None]
Search Radius:	100
Search Technique:	VS, DI, MB
Technique Notes:	[None]

History Notes:

CL 448 (1981) REPORTS THE PLANS TO CONSTRUCT A PRIVATE MOORING BOUY IN LAT. 48/39/19.21 N, LON. 122/35/14 W.(NAD27). THE PROPOSED BUOY IS A 1.5 FOOT DIAMETER METAL BARREL ATTACHED BY A CHAIN TO A CEMENT ANCHOR. A CALCULATED DISTANCE OF UPTO 30 FEET FROM CENTER AT MLLW.

Survey Summary

Charts Affected: 18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

AWOIS item 53188, a private mooring bouy, was not observed. Many private mooring bouys exist in this area and launch crews had trouble identifying one from another. The 1.5 foot diameter metal barrel attached by a chain was not observed in 6.5m of water. Full bottom coverage in this area was not obtained due to shoal conditions.

Hydrographer Recommendations

Hydrographer recommends removal of marker from chart.

S-57 Data

[None]

Office Notes

Concur, chart area labeled as priv buoys, see Hcell.

3.2) AWOIS #53189 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position:	048° 38' 57.100" N, 122° 35' 09.870" W
Historical Depth:	[None]
Search Radius:	50
Search Technique:	VS, MB, ES, DI
Technique Notes:	[None]

History Notes:

CL 25, 1957, REPORTS THE TRIANGULATION STATION "ELIZA ISLAND, BEACON, 1942 (N.D.)" as no longer maintained in position LAT. 48/38/57.72 N, LON. 122/35/05.25 W (NAD27). The feature is now plotted as a pile in the same location.

Survey Summary

Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

AWOIS item #53189 was not specifically addressed. However, 100% SWMB was obtained in the area surrounding the charted pile and no indication of the pile was seen in the bathymetry.

Hydrographer Recommendations

[None]

S-57 Data

[None]

Office Notes

Remove charted pile

3.3) Profile/Beam - 316/47 from h11419 / 1006_reson8101_hvf / 2005-311 / 317_2327

Primary Feature for AWOIS Item #53190

Search Position:	048° 40' 36.280" N, 122° 35' 25.220" W
Historical Depth:	2.74 m
Search Radius:	50
Search Technique:	MB, ES,
Technique Notes:	[None]

History Notes:

H8319, 1967; REPORTS A 1.5 FATHOM SHOAL IN LAT. 48/40/36.9N, LON. 122/35/20.6 W(NAD27). Sounding was retained from H1887.

Survey Summary

Survey Position:	048° 40' 35.523" N, 122° 35' 24.788" W
Least Depth:	2.15 m
Timestamp:	2005-311.23:27:26.821 (11/07/2005)
Survey Line:	h11419 / 1006_reson8101_hvf / 2005-311 / 317_2327
Profile/Beam:	316/47
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Designated sounding is the shoal sounding mentioned in the AWOIS database, matches AWOIS report #53190

Hydrographer Recommendations

Hydrographer recommends the use of bathy data for AWOIS shoal depth.

Cartographically-Rounded Depth (Affected Charts):

1fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

1fm 1ft (18424_1, 18423_1)

2.1m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Concur

3.4) Profile/Beam - 170/89 from h11419 / 1006_reson8101_hvf / 2005-311 / 304_2313

Primary Feature for AWOIS Item #53187

Search Position:	048° 39' 15.870" N, 122° 35' 38.370" W
Historical Depth:	[None]
Search Radius:	75
Search Technique:	MB, ES, DI
Technique Notes:	[None]

History Notes:

H8319, 1956; REPORTS THE EXISTANCE OF A 1 FATHOM SHOAL IN LAT. 48/39/16.49 N, LON. 122/35/03.3 W(NAD27).

Survey Summary

Survey Position:	048° 39' 16.210" N, 122° 35' 37.934" W
Least Depth:	1.68 m
Timestamp:	2005-311.23:13:24.153 (11/07/2005)
Survey Line:	h11419 / 1006_reson8101_hvf / 2005-311 / 304_2313
Profile/Beam:	170/89
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Designated sounding is the shoal sounding mentioned in the AWOIS database, matches AWOIS report #53187

Hydrographer Recommendations

Hydrographer recommends the use of bathy data for AWOIS shoal depth.

Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

0fm 5ft (18424_1, 18423_1)

1.7m (501_1, 50_1)

S-57 Data

[None]

Office Notes

Concur

4 - Dangers to Navigation

4.1) Profile/Beam - 5099/42 from h11419 / 1016_reson8125_hvf / 2005-298 / 510_1853

DANGER TO NAVIGATION

Survey Summary

Survey Position:	048° 41' 07.270" N, 122° 35' 59.469" W
Least Depth:	3.69 m
Timestamp:	2005-298.18:59:14.177 (10/25/2005)
Survey Line:	h11419 / 1016_reson8125_hvf / 2005-298 / 510_1853
Profile/Beam:	5099/42
Charts Affected:	18424_1, 18421_1, 18423_1, 18400_1, 18003_1, 18007_1, 501_1, 530_1, 50_1

Remarks:

Rock found with SSS, developed with 100% SWMB. The rocks stands approx. 2m height and 15m wide.

Hydrographer Recommendations

Recommend charting submerged rock as a sounding only.

Cartographically-Rounded Depth (Affected Charts):

2fm (18421_1, 18400_1, 18003_1, 18007_1, 530_1)

2fm 0ft (18424_1, 18423_1)

3.7m (501_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	TECSOU - 3:found by multi-beam

Office Notes

Concur with clarification, chart sounding as found on this survey.

LEAST DEPTH REPORT, VELOCITY PROGRAM, Version 8.75

PROJECT: OPR-N161-RA-05 SURVEY: H11419 DATE OF DIVE: 11-08-2005

NOAA UNIT: YEAR 2005
AWOIS NUMBER: NONE FIX NUMBER: 1 CONTACT NUMBER: 1

CAST INSTRUMENT: SBE19PLUS SEACAT S/N:4039
CD:10/8/2004
DAY OF CAST (UTC): 312 TIME OF CAST (UTC): 17:20

DIVER GAUGE SERIAL NUMBER: 68332
DAY OF DIVE (UTC): 312 TIME OF LD MEASUREMENT (UTC): 18:21
LATITUDE OF DIVE: 48/40/30.30 N
LONGITUDE OF DIVE: 122/36/49.26 W
PREDIVE GAUGE PRESSURE (psia): 14.83
GAUGE PRESSURE AT DESIGNATED LEAST DEPTH (psia): 45.47

RESULTS
COMPUTED LEAST DEPTH (m): 21.13
TIDE CORRECTOR (m): 0.00
CORRECTED LEAST DEPTH (m): 21.13

COMMENTS AND RECOMMENDATIONS:
Wrecked barge in Lummi Island Strait

LEAST DEPTH REPORT, VELOCITY PROGRAM, Version 8.75

PROJECT: OPR-N161-RA-05 SURVEY: H11419 DATE OF DIVE: 11-08-2005

NOAA UNIT: RAINIER - LAUNCH #5
YEAR 2005
AWOIS NUMBER: NONE FIX NUMBER: 2 CONTACT NUMBER: 2

CAST INSTRUMENT: SBE19PLUS SEACAT S/N:4039
CD:10/8/2004
DAY OF CAST (UTC): 312 TIME OF CAST (UTC): 17:20

DIVER GAUGE SERIAL NUMBER: 68332
DAY OF DIVE (UTC): 312 TIME OF LD MEASUREMENT (UTC): 1937
LATITUDE OF DIVE: 48/37/53.12 N
LONGITUDE OF DIVE: 112/31/25.41 W
PREDIVE GAUGE PRESSURE (psia): 14.83
GAUGE PRESSURE AT DESIGNATED LEAST DEPTH (psia): 34.85

RESULTS
COMPUTED LEAST DEPTH (m): 13.83
TIDE CORRECTOR (m): 0.00
CORRECTED LEAST DEPTH (m): 13.83

COMMENTS AND RECOMMENDATIONS:
Dive #2, Wreck of possible tender boat for purse seiner

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : December 20, 2005

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N161-RA-2005
HYDROGRAPHIC SHEET: H11419

LOCALITY: Bellingham Bay Vendovi Island to Post Point, WA
TIME PERIOD: October 15 - November 8, 2005

TIDE STATION USED: 944-9880 Friday Harbor, WA
Lat. 48° 32.7'N Long. 123° 00.7' 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 OPR-N161-RA-2005, H11419, during the time period between October 15 to November 8, 2005.

Please use the zoning file "N161RA2005CORP" submitted with the project instructions for Bellingham Bay, WA. Zones PS243, PS244, PS245, PS246, PS247, PS248, & PS254 are the applicable zones for H11419.

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).

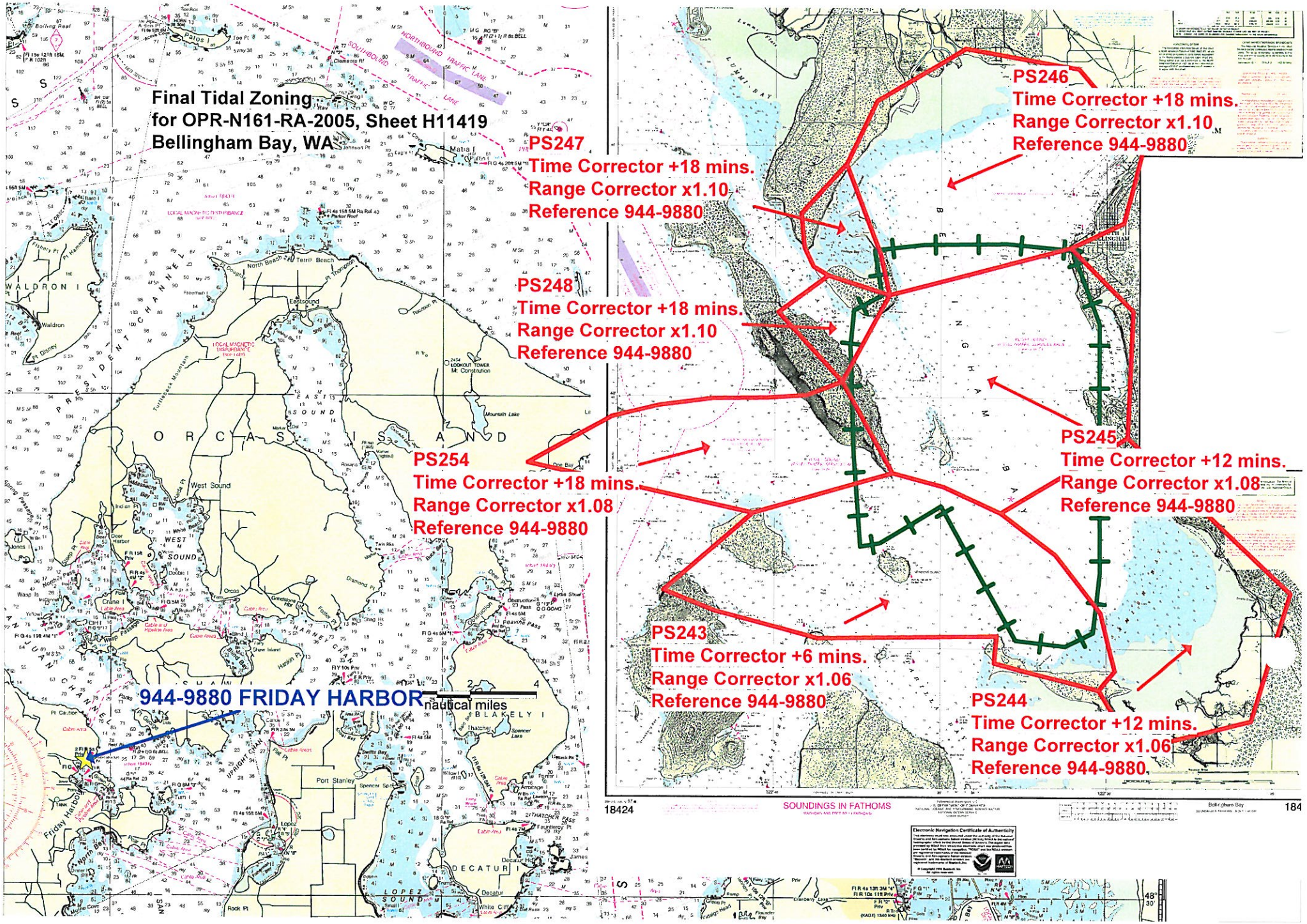
for _____
CHIEF, PRODUCTS AND SERVICES DIVISION

Final tide zone node point locations for OPR-N161-RA-2005, H11419

Format: Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction
Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees

	Tide Station Order	AVG Time Correction	Range Correction
PS243	944-9880	+6	x1.06
-122.696467 48.595664			
-122.722385 48.602606			
-122.702652 48.613914			
-122.677626 48.628255			
-122.607529 48.641504			
-122.58199 48.637064			
-122.553165 48.628482			
-122.525522 48.614831			
-122.502884 48.595524			
-122.495707 48.576101			
-122.503656 48.569645			
-122.556259 48.578596			
-122.554886 48.587542			
-122.645035 48.586641			
-122.696467 48.595664			
PS244	944-9880	+12	x1.06
-122.553165 48.628482			
-122.489376 48.653514			
-122.407262 48.602322			
-122.42701 48.559609			
-122.485565 48.549867			
-122.503656 48.569645			
-122.495707 48.576101			
-122.502884 48.595524			
-122.525522 48.614831			
-122.553165 48.628482			
PS245	944-9880	+12	x1.08
-122.489376 48.653514			
-122.486617 48.695651			
-122.518053 48.716593			
-122.609231 48.700738			
-122.632858 48.671748			
-122.607529 48.641504			
-122.58199 48.637064			

-122.553165 48.628482			
-122.489376 48.653514			
PS246	944-9880	+18	x1.10
-122.518053 48.716593			
-122.491299 48.724836			
-122.481112 48.750386			
-122.514203 48.776164			
-122.570979 48.782785			
-122.615489 48.765001			
-122.630736 48.743966			
-122.613594 48.714308			
-122.609231 48.700738			
-122.518053 48.716593			
PS247	944-9880	+18	x1.10
-122.609231 48.700738			
-122.613594 48.714308			
-122.630736 48.743966			
-122.653521 48.727603			
-122.651934 48.716457			
-122.647411 48.710129			
-122.63994 48.7072			
-122.609231 48.700738			
PS248	944-9880	+18	x1.10
-122.609231 48.700738			
-122.63994 48.7072			
-122.665008 48.694922			
-122.632858 48.671748			
-122.609231 48.700738			
PS254	944-9880	+18	x1.08
-122.607529 48.641504			
-122.632858 48.671748			
-122.650739 48.66724			
-122.670676 48.666329			
-122.697259 48.666153			
-122.724951 48.663778			
-122.748495 48.659948			
-122.790731 48.644557			
-122.677626 48.628255			
-122.607529 48.641504			


Final Tidal Zoning
for OPR-N161-RA-2005, Sheet H11419
Bellingham Bay, WA
PS247
Time Corrector +18 mins.
Range Corrector x1.10
Reference 944-9880
PS248
Time Corrector +18 mins.
Range Corrector x1.10
Reference 944-9880
PS254
Time Corrector +18 mins.
Range Corrector x1.08
Reference 944-9880
944-9880 FRIDAY HARBOR
nautical miles
PS246
Time Corrector +18 mins.
Range Corrector x1.10
Reference 944-9880
PS245
Time Corrector +12 mins.
Range Corrector x1.08
Reference 944-9880
PS243
Time Corrector +6 mins.
Range Corrector x1.06
Reference 944-9880
PS244
Time Corrector +12 mins.
Range Corrector x1.06
Reference 944-9880
SOUNDINGS IN FATHOMS
18424
184

H11419 HCell Report

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Introduction

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC and RNC in the region: NOAA ENC US5WA45M and RNC 18424.

HCell compilation of survey H11419 used Office of Coast Survey HCell Specifications Version 3.0 and HCell Reference Guide Version 1.0.

1. Compilation Scale

Depths for HCell H11419 were compiled to the largest scale chart in the region, 18428, 1:40,000. The density and distribution of soundings from H11419 were selected to emulate the distribution on chart 18424. Non-bathymetric features have been generalized.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from 5-meter combined surface, **H11419_Office_combined**, in CARIS BASE Editor. A shoal-based selection was made at 1:10,000 for chart 18424. The resultant sounding layer contains depths ranging from 0.0 to 128.4 meters.

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

3. Depth Areas and Depth Contours

3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize area (DEPARE). A depth range from 1.8 meters to 120 meters was used for depth area objects. Upon conversion to NOAA charting units, the depth range is 1.0 to 65.9 fathoms.

3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11419_SS HCell for MCD Raster Charting Division to use for guidance in creating chart contours. The generalized metric and fathom equivalent contour values are shown in the table below.

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0	0.0	0.2286	0.75
1	1.8288	2.0574	1.75
2	3.6576	3.8862	2.75
3	5.4864	5.715	3.75
5	9.144	9.376	5.75
10	18.288	18.5166	10.75

Contours delivered in the H11419_SS file have not been deconflicted against shoreline features, soundings and hydrography as all other features in the H11419_CS file and soundings in the H11419_SS have been. These results on conflicts between the H11419_SS file contours and HCell features at or near the survey limits. Conflicts with M_COVR, M_QQUAL, DEPARE, COALINE and SBDARE objects, and DEPCNT objects representing MLLW, should be expected. HCELL features should be honored over H11419_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell 11419:

M_QUAL
M_COVR

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

5. Features

Shoreline features for H11419 were delivered from the field in several .hob files described in the DR. The files contained new features, modification to CFF or charted features, and disprovals. These were deconflicted against CFF shoreline, the chart and hydrography during office processing.

There was one DTON reported from survey H11419. The DTON is charted adequately and reflected in the HCell.

There were four AWOIS items on survey H11419. They are adequately discussed in the features report attached to this survey and the Descriptive report.

The source of all features included in the H11419 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The H11419_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
DEPARE	All-encompassing depth area and intertidal areas
UWTROC	Rock features
SBDARE	Bottom samples
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
$CSYMB	Blue notes
WEDKLP	Eel Grass
MORFAC	Buoys
SLCONS	Dock
ACHARE	Anchorage area

The H11419_SS HCell contains the following Objects:

DEPCNT	NOAA rounded contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

All S-57 Feature Objects in the H11419_CS HCell have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with current guidance and the OCS HCell Specifications.

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as $CSYMB features with the Blue Note information located in the INFORM field. The NINFOM field is populated with the charting disposition

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

During creation of sounding sets in CARIS BASE Editor, and creation of the HCell in CARIS S-57 Composer, units are maintained as metric with millimeter resolution. NOAA rounding is applied at the same time that conversion to chart units is made to the metric HCell base cell file, at the end of the HCell compilation process.

A CARIS environment variable, uslXsounding_round, controls the depth at which

rounding occurs. Setting this variable to NOAA fathoms and feet displays all soundings equal to or greater than 11 fathoms as whole units. Depths shoaler than 11 fathoms are shown in fathoms and feet.

In an ENC viewer fathoms and feet display in the format X**.**YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. For fathoms and feet between 0 and 10 fathoms 4.5 feet (10.75 fms), soundings round to the deeper foot if the decimals of the foot are X**.**Y75000 or greater. For fathoms and feet deeper or equal to 11 fathoms, soundings round to the deeper fathom if feet and decimals of the foot are X**.**45000 (X**.**Y75000) or greater. Drying heights are in feet and are rounded using arithmetic methods. In an ENC viewer, heights greater than 6 feet will register in fathoms and feet using the above stated rules.

S-57 Composer Units
Sounding Units: Meters rounded to the nearest millimeter
Spot Height Units: Meters rounded to the nearest meter

Chart Unit Base Cell Units
Depth Units (DUNI): Fathoms and feet
Height Units (HUNI): Feet (or fathoms and feet above 6 feet)
Positional Units (PUNI): Meters

9. Data Processing Notes

9.1 Junctions

Survey H11419 junctions with survey H11420 to the north and H11269 to the south.

10. QA/QC and ENC Validation Checks

H11419 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a 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 have been approved by MCD as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11419 Base Cell File, Chart Units, Soundings compiled to 1:40,000.
- H11419 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items.
- H11419 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11419_CS.000
- Chart units base cell file, survey scale soundings H11419_SS.000
- Descriptive Report package H11419_DR.pdf
- Survey outline H11419_Outline.gml & *xsd

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC 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:

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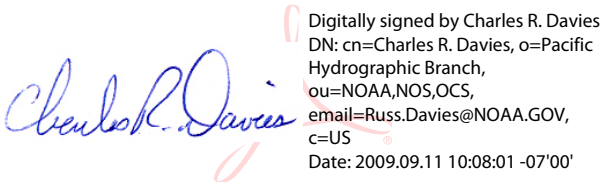
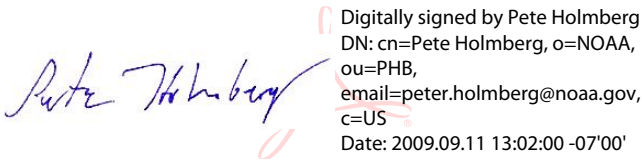
APPROVAL SHEET
H11419

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



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



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

David Neander
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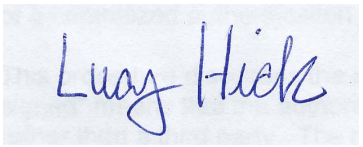
13:56:54 -07'00'



Lucy Hick
AWOIS & SURF
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