H12222

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H12222

LOCALITY

State Washington

General Locality Olympic Coast National Marine Santuary

Sublocality Central Offshore Portion of Cape Flattery

2010

CHIEF OF PARTY

CAPT David O. Neander, NOAA

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12222

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: N/A

State Washington

General Locality Olympic Coast National Marine Sanctuary

Sub-Locality Central Offshore Portion of Cape Flattery

Scale 1:20,000 **Date of Survey** June 07 - June 22, 2010

Instructions dated 5/11/2010 **Project No.** OPR-N324-FA-10

Vessel NOAA Ship Fairweather

Chief of party CAPT David O. Neander, NOAA

Surveyed by Fairweather Personnel

Soundings by Multibeam Echo Sounder

SAR by Adam Argento Compilation by Russ Davies

Soundings compiled in Fathoms

REMARKS: All times are UTC. UTM Zone 10

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.

All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

Descriptive Report
H12222

OPR-N324-FA-10
OCNMS, WA

Scale: 1:20,000
07 June 2010 - 22 June 2010
NOAA Ship *Fairweather*
CAPT David O. Neander

A. Area Surveyed

A1. Survey Purpose

This project is being conducted in collaboration with the National Ocean Service - Office of Coast Survey (OCS) and the Olympic Coast National Marine Sanctuary (OCNMS) and their partners in order to provide contemporary hydrographic data to update the nautical charts and products in and surrounding the OCNMS. The data from this project will provide seafloor habitat information to support fishery and resource protection mandates, complete a section of the sanctuary for which there is no existing seafloor data, complete the permitting process for 24 permanent long-term moorings, and is a site of numerous historical shipwrecks (see Appendix II OCNMS Project Instructions for further details).

A2. Area Description

The survey area is located in Olympic Coast National Marine Sanctuary, WA, within the sub-locality of Central Offshore Portion of Cape Flattery, see Figure 1.

A3. Survey Statistics

Main scheme and crossline mileage for MBES and shoreline acquisition were calculated and are displayed in Table 1. For vessel S220, dual acquisition of both Reson 7111 and Reson 8160 data was conducted throughout the entire survey area of H12222. For linear nautical mileage (LNM) reporting purposes, only the Reson 7111 data were used for the following table.

MAIN SCHEME - Mileage		CROSSLINE - Mileage	
0	Single Beam MS	0	Single Beam XL
389.69	Multibeam MS mileage	24.23	Multibeam XL
389.69	FAIRWEATHER S-220	24.23	FAIRWEATHER S-220
0.00	Launch 2805	0.00	Launch 2805
0.00	Launch 2806	0.00	Launch 2806
0.00	Launch 2807	0.00	Launch 2807
0.00	Launch 2808	0.00	Launch 2808
0	SideScan MS		
		24.23	Total XL
389.69	Total MS		

OTHER	
0	Developments/AWOIS - Mileage
0	Shoreline/Nearshore Investigation - Mileage
1	Total # of Investigated Items
0	Total Bottom Samples
31.6	Total SNM

DATES	
June 7-9, 12, 16-18, 22	Specific Dates of Acquisition
158, 159, 160, 163, 167, 168, 169, 173	Specific Dn#s of Acquisition

Table 1: H12222 Survey Statistics

A4. Survey Quality

The entire survey is adequate to supersede previous data. [1]

A5. Survey Limits

Survey Limits were amended as discussed below:

Change Explanation	Documentation
During the course of OPR-N324-FA-10 the sheet layouts were modified several times in order to efficiently and safely operate S220 in the highly dynamic sea conditions famous on the Olympic Coast. The predominant weather during the course of OPR-N324-FA-10 came from wind and seas from the west, forcing S220 to occasionally run lines with a general	See correspondence in Appendix V, "Updated Sheet Layout Proposal OPR-N324-FA-10 OCNMS, WA," dated May 25, 2010.

Change Explanation	Documentation
east-west azimuth to minimize roll despite being perpendicular to depth contours. When seas and swell were down, S220 ran lines with a north-south azimuth parallel to the depth contours. Modifications to the sheet layout were made in cooperation and with approval from HSD Ops.	

A6. Survey Coverage

Coverage Area or Water Depth	Coverage Required
> 4 meters water depth	Complete MB and Complete Backscatter

Survey coverage was completed as assigned.[2]

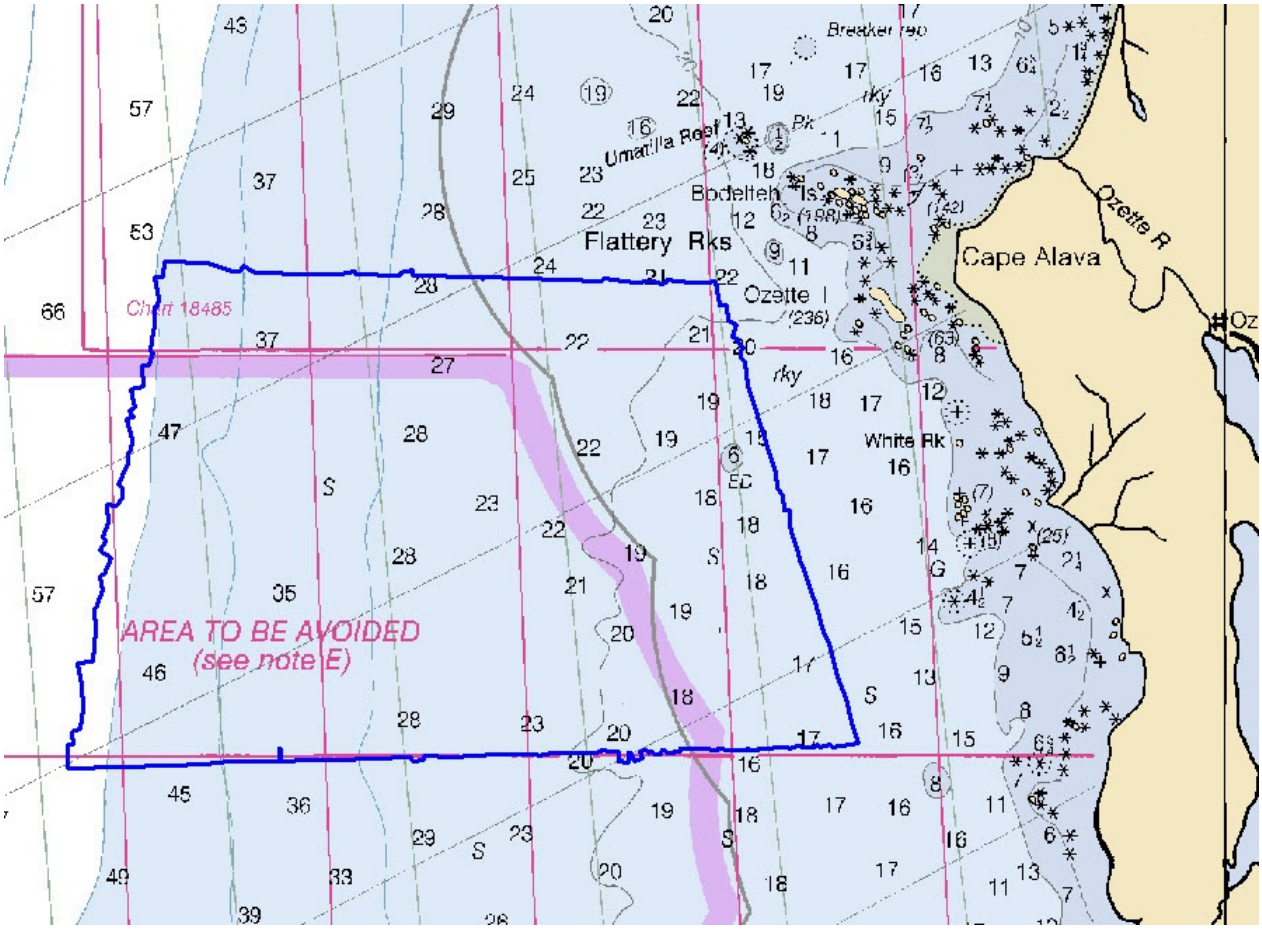

Figure 1: H12222 Survey Outline

A7. Shoreline Requirements

Shoreline was not assigned and no composite source file (CSF) was provided for this survey.[3]

A8. Bottom Samples

Bottom Samples were not fulfilled as assigned. [4]

Change Explanation	Documentation
Bottom samples were not collected due to time constraints. OCNMS personnel have plans for an extensive bottom sampling project after further data analysis.	

B. Data Acquisition and Processing

B1. Equipment

	FAIRWEATHER
Hull Registration Number	S220
Builder	Aerojet-General Shipyard
Length Overall	231 feet
Beam	42 feet
Draft, Maximum	15' 6"
Cruising Speed	12.5 knots
Max Survey Speed	8 knots
Primary Echo-sounder(s)	RESON 7111 & RESON 8160
Sound Velocity Equipment	SBE 19plus, MVP 200, SVP70
Attitude & Positioning Equipment	POS/MV V4
Type of operation	MBES

Table 2: Vessel Inventory

B2. Quality Control

Crosslines

Percentage of crossline miles as compared to mainscheme miles: 6.2%

Surface differencing in CARIS Bathy DataBASE was used to assess crossline agreement with main scheme lines. Figure 2 depicts a difference surface between an 8-meter surface made with main scheme lines only and an 8-meter surface made with crosslines only. This difference surface is submitted digitally in the Separates IV folder. Ninety-five percent of nodes common between the two surfaces agree within plus or minus 0.33 meters, therefore crosslines agree with main scheme lines within the total allowable vertical and horizontal uncertainty in their common areas.[5]

The only areas of apparent disagreement occur between lines where "frowning" data is affecting the surface due to slightly wider line spacing. Those areas most affected by the "frowning" data are highlighted in red below in Figure 2.

Due to a combination of time constraints and weather conditions not all lines were crossed by the crosslines.

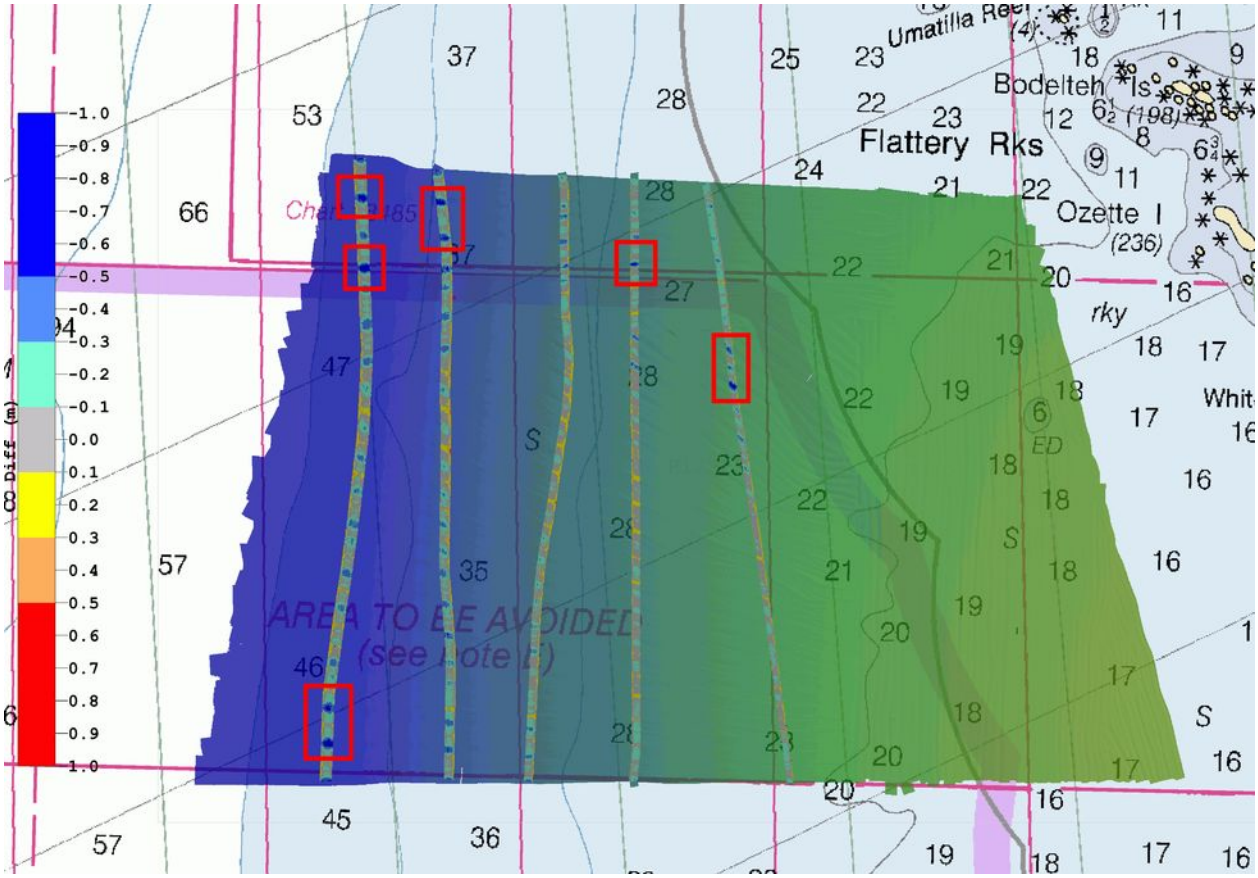

Figure 2: Crossline and main scheme differences (white indicates agreement, cool colors indicate a XLs shoaler than mainscheme and warm colors indicate XLs are deeper).

Uncertainty Values

Tide Values

Measured	Zoning
0.01	0.1

Sound Speed Values

Vessel	Instrument	Measured (m/s)	Surface (m/s)	Comments
S220	MVP	0.5	0.5	

Junctions [6]

Registry Number:	H12220
Scale:	20000
Year:	2010
Platform:	NOAA Ship *Fairweather*
Relative Location:	N
Comments:	The areas of overlap between the sheets were reviewed in CARIS Subset Editor for consistency and data were found to be in agreement within half a meter. See Figure 3 for area of overlap.

Registry Number:	H12221
Scale:	20000
Year:	2010
Platform:	NOAA Ship *Fairweather*
Relative Location:	E
Comments:	The areas of overlap between the sheets were reviewed in CARIS Subset Editor for consistency and data were found to be in agreement within half a meter. See Figure 3 for area of overlap.

Registry Number:	H12223
Scale:	20000
Year:	2010

Platform:	NOAA Ship *Fairweather*
Relative Location:	S
Comments:	The areas of overlap between the sheets were reviewed in CARIS Subset Editor for consistency and data were found to be in agreement within half a meter. See Figure 3 for area of overlap.

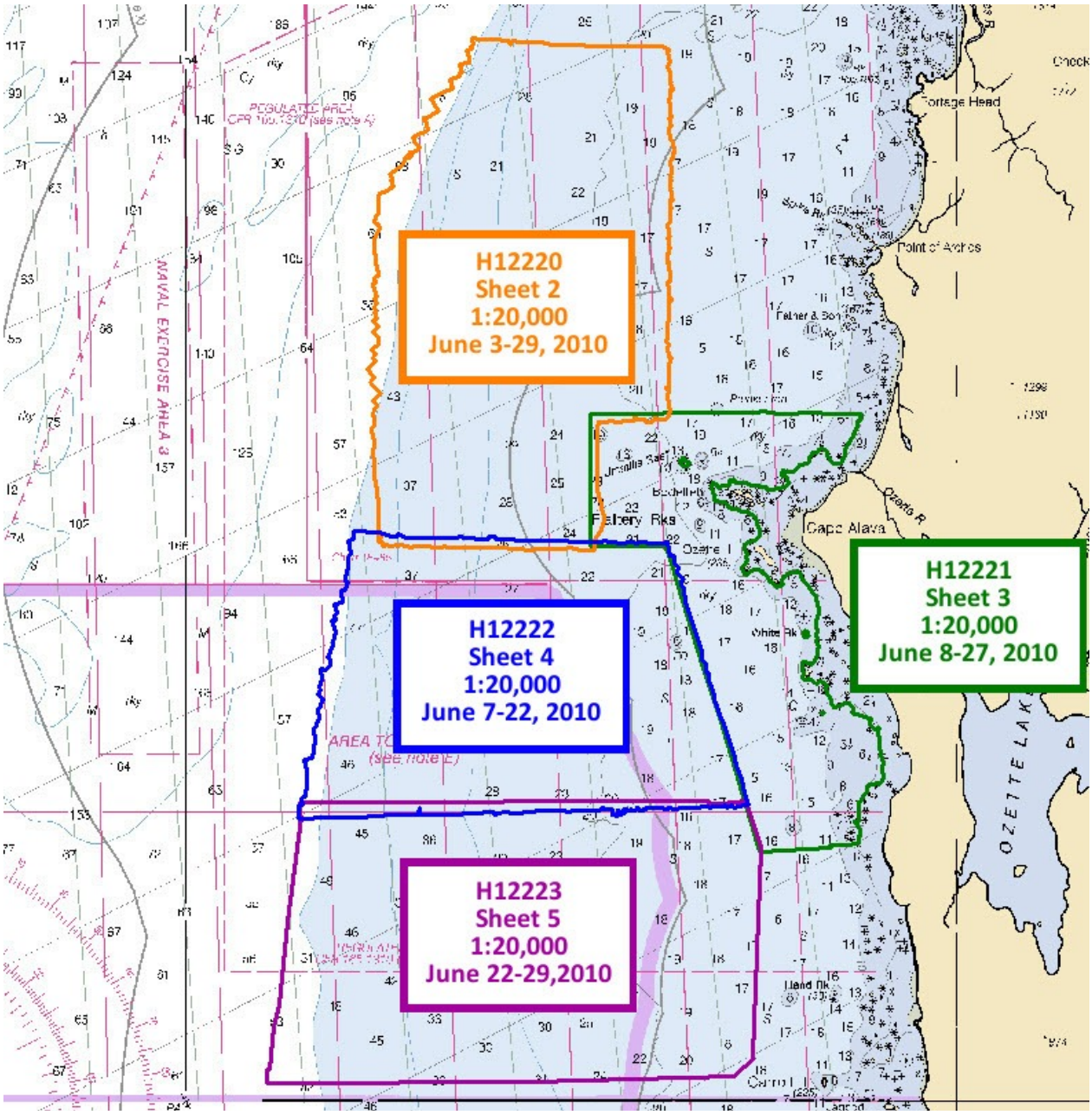

Figure 3: Junctions between H12220, H12221, H12222, and H12223

Sonar System Quality Control Checks

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

Equipment Operational Effectiveness

Surface Sound Speed Sensor

Due to the rough sea surface conditions in the project area, S220 experienced "pounding" or hard pitching when surveying into seas and swell. As a result, brief periods of apparent extreme refraction, or profile bending, occurred throughout H12222 when air or bubbles flowed down the hull causing erroneous measurements in the Surface Sound Velocimeter. An example of the erroneous measurements in Surface Sound Speed and the bent profiles can be found at 48/08/49.21N 124/53/03.65W and can be seen in Figures 4 & 5. The spikes in Surface Sound Speed caused by pounding were removed and the gaps were interpolated across.[7]

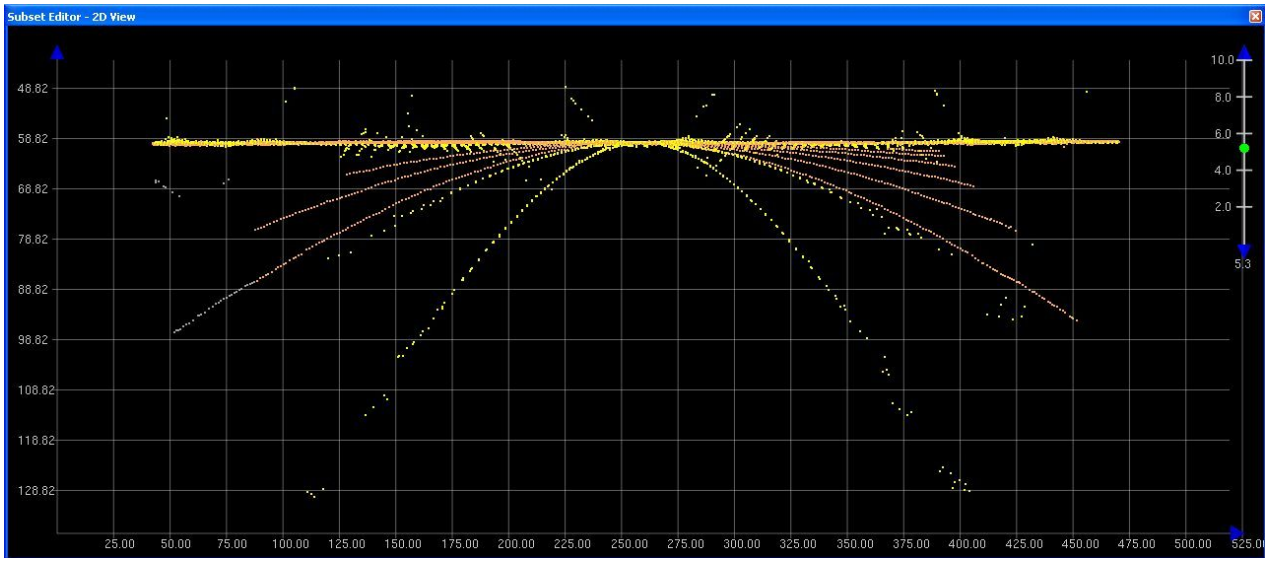

Figure 4: Example of bent profiles due to erroneous SSP measurements

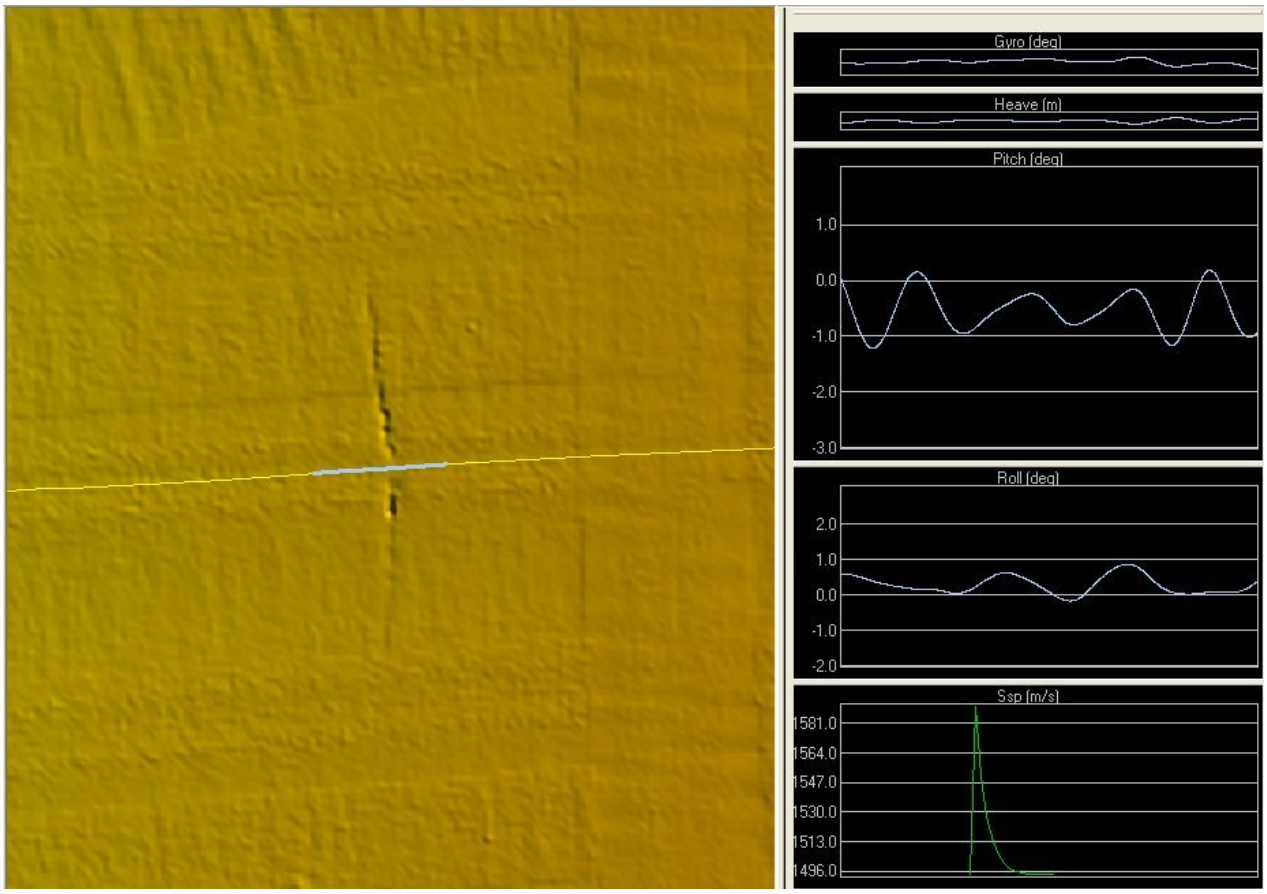

Figure 5: Example of bent beams affecting cube surface (left) and SSP spike (lower right)

Reson 7111

Project OPR-N324-FA-10 was the first project during the 2010 field season in which the Reson 7111 was used for MBES acquisition. During the Hydrographic Survey Readiness Review (HSRR) of S220 in the months prior to the start of OPR-N324-FA-10, the Reson 7111 stopped receiving acoustic returns and the transceiver was diagnosed by Reson engineers to have a number of failed cards in the transceiver box. Ultimately, a senior engineer from Reson sailed with NOAA Ship *Fairweather* to repair the Reson 7111 and troubleshoot data quality issues observed during the 2009 field season (see Project Correspondence). Despite replacement of several components of the transceiver and a software update containing the first release of the IFREMER (French Research Institute for Exploration of the Sea) bottom detection algorithm, Fairweather personnel continued to observe nadir gaps and errant outer beam artifacts difficult to attribute to oceanographic conditions or systematic biases. Due to the suspect performance of the Reson 7111, Reson 7111 and Reson 8160 data were acquired simultaneously with tighter line spacing during H12222. [8]

Roll

Possible roll artifacts were investigated in the Reson 7111 data throughout H12222. However, the apparent roll artifacts fall within allowable total vertical uncertainty (TVU) set by the HSSDM dated April 2010 for the depth ranges in which they occur. [9]

Environmental and Other Factors Affecting Sounding Corrections

Large Swell

During acquisition on H12222 multiple weather events orred off the coast of Washington causing large swell conditions in the working area. All MBES data for H12222 were collected in three to nine-foot sea surface swells. Due to the swell, significant pitching with a peak magnitude of 4 to 6 degrees was experienced. In many cases, the pitching caused the Reson 8160 to entirely lose bottom tracking, see Figure 6. While the Reson 7111 did not lose bottom tracking entirely the outer beams appeared to be of unreliable quality as compared with adjacent data. The data were cleaned out where they affected the surfaces. [10]

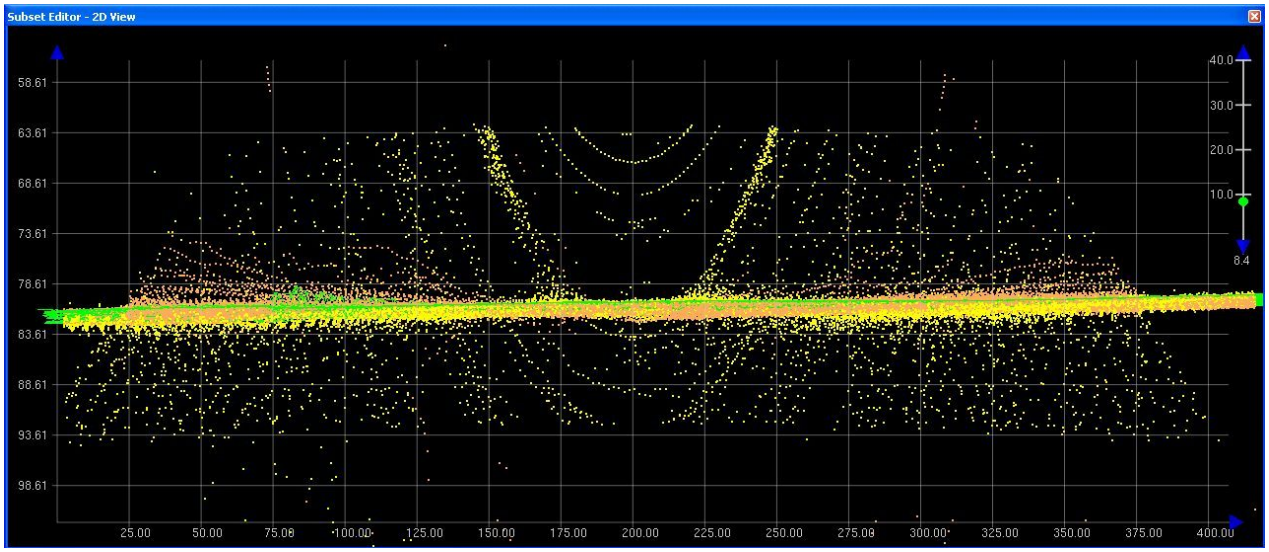

Figure 6: Blowout of data due to swell (Reson 7111 is orange and Reson 8160 is yellow) (48/08/07.69N, 124/55/02.70W)

Sound Speed Methods

Frequency of Casts and Methodology:

Sound speed measurements were conducted and applied as discussed in the Corrections to Echo Soundings section of the DAPR.

Equipment and Methods

There are no survey specific object detection methods or deviations from specifications. See DAPR.

Additional Quality Control Discussion

Holiday Assessment

Complete multibeam coverage was obtained within the limits of H12222 with the exception of several small holidays. For holidays larger than three surface grid nodes, the corresponding multibeam backscatter side scan was examined and no navigationally significant items were found. The least depths of all navigationally significant features are represented by H12222. [11]

One holiday, shown in Figure 7, due to size and character could not be addressed with multibeam backscatter side scan. The holiday resulted from a brief data gap due to an unknown issue during acquisition. [12]

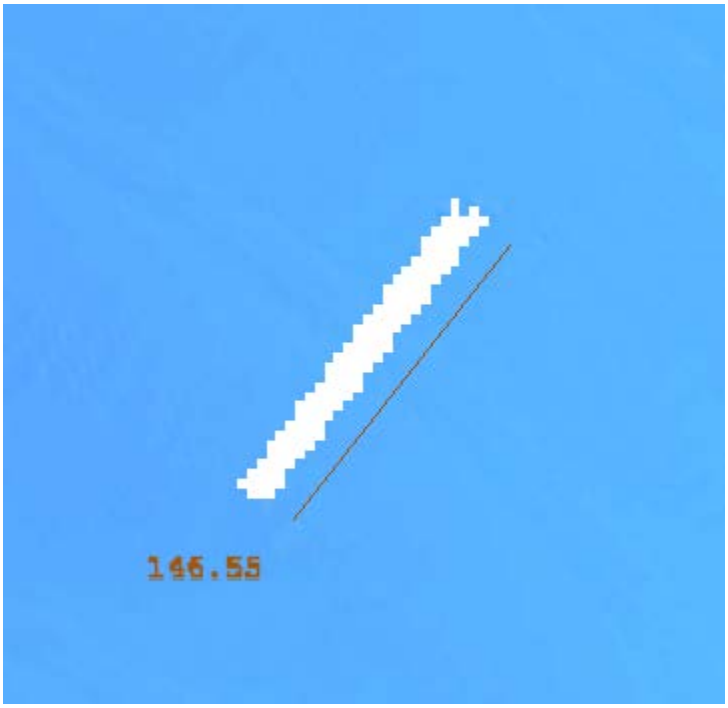

Figure 7: 4m surface holiday (48° 8' 14.72" N, 124° 49' 58.05" W)

IHO Uncertainty

It was found that 99.9% of nodes in the combined 8-meter grid meet or exceed IHO Order 1 specifications for all depths of survey H12222. [13] To assess vertical accuracy standards, a child layer titled “IHO1” was created for each of the 2-meter, 4-meter, and 8-meter finalized surfaces using the equation as stated in section 2.1 of the DAPR. "IHO1" layers are included in the deliverable H12222_QC fieldsheet for each surface.

Density

Density requirements for H12222 were achieved with at least 95% of finalized surface nodes containing five or more soundings, see sounding count analysis in Appendix V.

B3. Corrections to Echo Soundings

Echo Sounding Correction DAPR Deviations

Data reduction procedures for survey H12222 conform to those detailed in the DAPR except where noted in this report.

Sounding System Calibration DAPR Deviations

There are no survey specific sounding system calibration deviations. See DAPR.

B4. Data Processing

Processing Software

Software Used	Version	Service Pack	Hotfix	Used For
Caris Notebook	3.1		2	AWOIS features
Caris HIPS/SIPS	7.0	1	5	Conversion, TrueHeave, SVP, Tides, Compute TPU, Load Attitude/Navigation, Load Error
Caris HIPS/SIPS	7.0	2	3	Additional cleaning, Computing Surfaces

NOAA FieldSAR version 2 feature object catalog was used for feature management.

Generated Surfaces and Mosaics

Surface Name	Type	Resolution	Depth Range	Parameter	Purpose
H12222_2m	CUBE	2	N/A	NOAA_2m	Complete MBES
H12222_4m	CUBE	4	N/A	NOAA_4m	Complete MBES
H12222_8m	CUBE	8	N/A	NOAA_8m	Complete MBES
H12222_2m_Final_20to44	CUBE	2	20-44	NOAA_2m	Complete MBES
H12222_4m_Final_40to88	CUBE	4	40-88	NOAA_4m	Complete MBES
H12222_8m_Final_80to176	CUBE	8	80-176	NOAA_8m	Complete MBES
H12222_8m_Ellipsoid	CUBE	8	N/A	NOAA_8m	

All fieldsheet extents were adjusted using the Base 16 Calculator tool to ensure coincident nodes among all bathymetric surfaces regardless of the field sheet in which they are contained given the standard surface resolutions of 2, 4, and 8 meters. The NOAA CUBE parameters prescribed by the 2010 HSDDM were used for the creation of all CUBE BASE surfaces in survey H12222. [14]

Additional Data Processing

Data Logs

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound velocity application is noted in the H12222_Data_Log spreadsheet. All data logs are submitted digitally in the Separates I folder.

Data Processing Deviations

Data collection methods were altered to account for inconsistencies in the bottom detection algorithm for the Reson 7111, as discussed in the section on Equipment Operational Effectiveness. As a result, the some processing methods for dealing with the suspect data deviate from the DAPR.

All Reson 8160 and 7111 data were filtered to 65 degrees off nadir on both Port and starboard to remove poor quality data. Data were reaccepted in several locations to fill gaps created by filtering.

Large schools of fish were occasionally ensonified near the seafloor. Though these fish masses or "bait balls," as commonly referenced by the field, were noted in acquisition logs, they were

difficult to differentiate between real features. Adjacent lines overlapping possible features near the seafloor were further evaluated in side scan editor to separate out noise from bait balls and actual features. If a possible bait ball could not be unequivocally attributed to fish in the water column then data were not rejected in CARIS HIPS.[15]

Post-Processed Kinematic Data and Ellipsoidally-Referenced Surfaces

Vessel kinematic data were post-processed using Applanix POSPac Precise Point Positioning (PPP) processing software methods as described in the DAPR and in Applanix's POSPac manual. Single Best Estimate of Trajectory (SBET) files and post processed solution accuracy files named SMRMSG files are applied to all data.

For more information about the processing of horizontal control data, see section C. Figure 8 & 9 below demonstrates how the SBET and SMRMSG files were applied to the data.

A single 8-meter ellipsoidally-referenced surface is submitted with H12222 for experimental and evaluation purposes as part of the Office of Coast Survey's initiative to survey to the ellipsoid. This surface was created while the soundings were reduced to the ellipsoid after merging with "GPS Tides" applied in CARIS HIPS & SIPS. GPS Tides were computed by the parameters selected in Figure 10. After the ellipsoidal surface was created, the soundings were referenced back to Mean Lower Low Water (MLLW) during the CARIS merge process by unselecting the "Apply GPS tide" option. The traditional MLLW-vertically referenced finalized surfaces were then created as described in the DAPR according the HSSD and FPM. The ellipsoidal surface will appear out of date because the soundings used to create them have been moved back to MLLW.

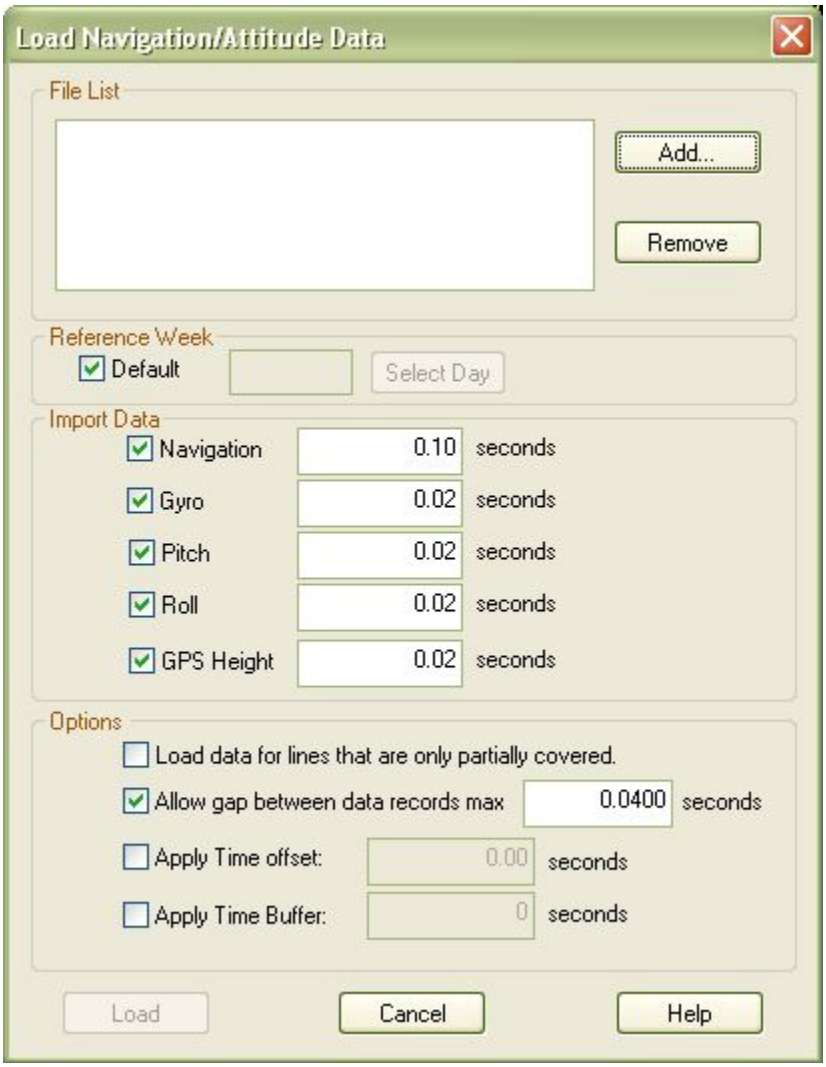

Figure 8: Application parameters for SBET files used in CARIS

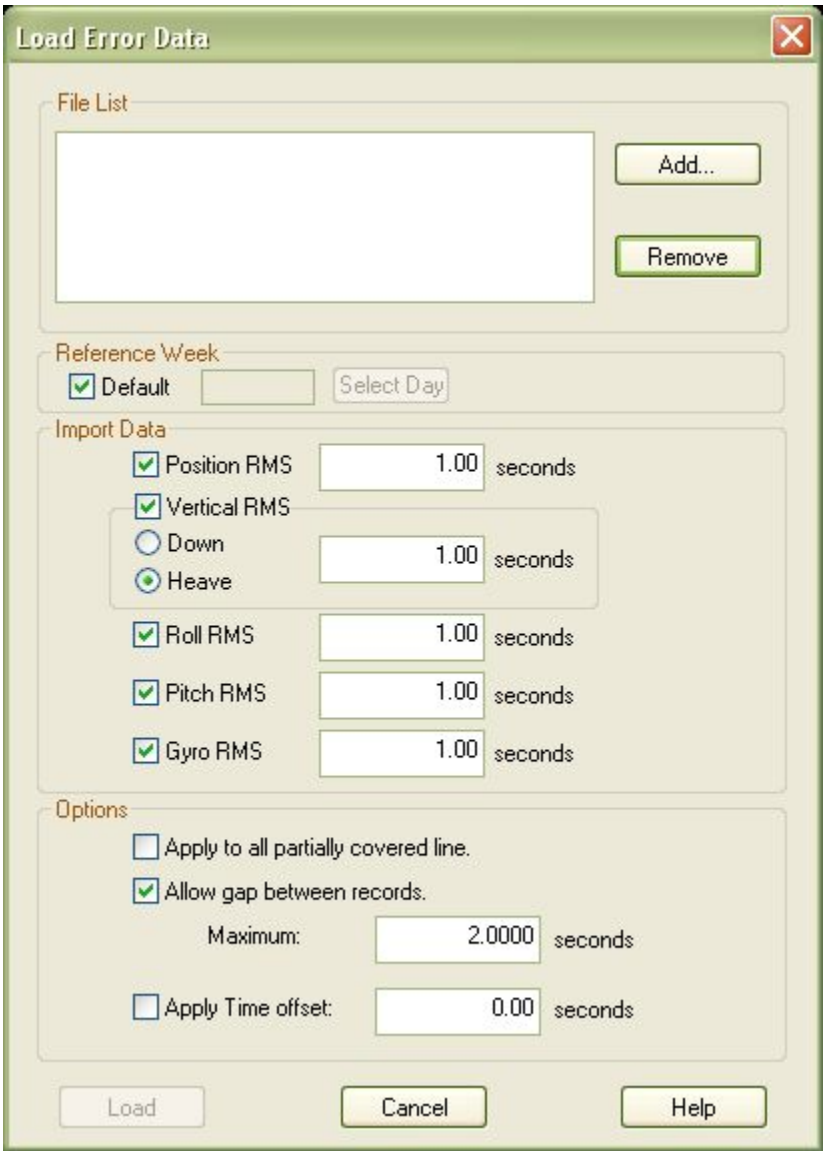

Figure 9: Application parameters for SMRMSG files used in CARIS

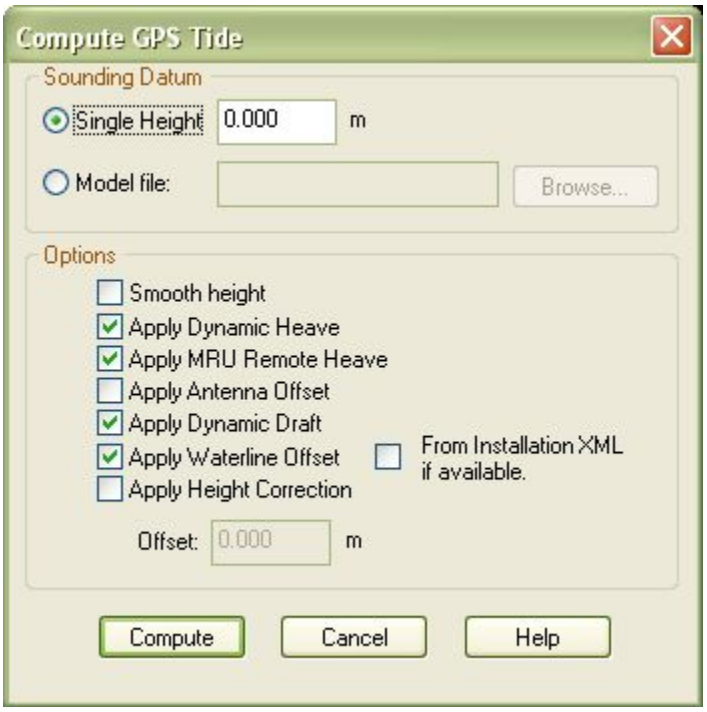

Figure 10: GPS Tide computation parameters

TrueHeave

To enable the application of TrueHeave some POS/MV files were "fixed" using the fixTrueHeave.exe utility from CARIS. Fixed files were assigned an additional *.fixed suffix. This was performed for first of two TrueHeave file logged on S220, DN 167.

C. Vertical and Horizontal Control

C1. Summary of Vertical Control Methods

Vertical Datum:	Mean Lower Low Water (MLLW)
Vertical Resolution:	0.01
Vertical Units:	meters

Tide Stations

Station Number:	944-2396
Station Type:	Primary (NWLON)
Used for Corrections:	Yes

Water Levels Used for Correction:	Final Approved
Tide File(s) Used for Correction:	9442396.tid
Time and Height Correctors:	Final
Zone Corrector File:	N324FA2010CORP.zdf

Tides Submitted	Tides Received
06 / 30 / 2010	07 / 13 / 2010

A request for delivery of final approved (smooth) tides for survey H12222 was forwarded to N/OPS1 on June 30, 2010 in accordance with the Field Procedures Manual (FPM), dated April 2010. A copy of the request is included in Appendix IV.

As per the final Tide Note for Hydrographic Survey dated July 7, 2010, and received July 13, 2010, all data were reduced to MLLW using the final approved water levels (smooth tides) from La Push, WA (9442396) by applying the tide file 9442396.tid in addition to time and height correctors through the zone corrector file N324FA2010CORP.zdf. [16]

It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.

C2. Summary of Horizontal Control Methods

Horizontal Coordinate System:	UTM 10
Horizontal Datum:	North American Datum of 1983 (NAD83)
Horizontal Resolution:	0.1
Horizontal Units:	meters

Positioning Method	Positioning Station Name
PPP	NEAH - Neah Bay, WA

Differential correctors from the U.S. Coast Guard beacon at Fort Stevens (287 kHz) served as the sole method of real-time positioning during MBES data acquisition. Precise Point Positioning (PPK) is the sole method of horizontal positioning of MBES soundings for H12222.

Smoothed Best Estimate of Trajectory (SBET) files were created using the PPP method. The SBET files and their associated error files (SMRMSG) files were applied to the CARIS HDCS data in HIPS & SIPS for improved positioning accuracy. For further detail regarding the processing method used and quality control checks performed see the H12222_POSPAC_Processing_Log.xls spreadsheet located in the SBET folder of GNSS_Data.

D. Results and Recommendations

D1. Chart Comparison

Chart Comparison Methods

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSD, utilizing CARIS HIPS & SIPS software program.

Raster Comparison

Number:	18485		
Scale:	40000		
Edition:	16th Ed		
Edition Date:	03 / 2007		
Notices:	LNM	30	07 / 27 / 2010

Recommendation: Depths from survey H12222 generally agree within one fathom with depths on chart 18485 with the exception of the disproved sounding discussed elsewhere in the report. [17]

Raster Comparison

Number:	18460		
Scale:	100000		
Edition:	13th Ed		
Edition Date:	10 / 2009		
Notices:	LNM		04 / 27 /
	NM		05 / 15 / 2010

Recommendation: Depths from survey H12222 generally agree within one fathom with depths on chart 18460 with the exception of the disproved sounding discussed elsewhere in the report. [18]

The surveyed contours are shoreward of the charted contours. The 20 fathom contour is 600-1500 meters shoreward, and the 30 fathom is 200-300 meters shoreward, see Figure 12.[19]

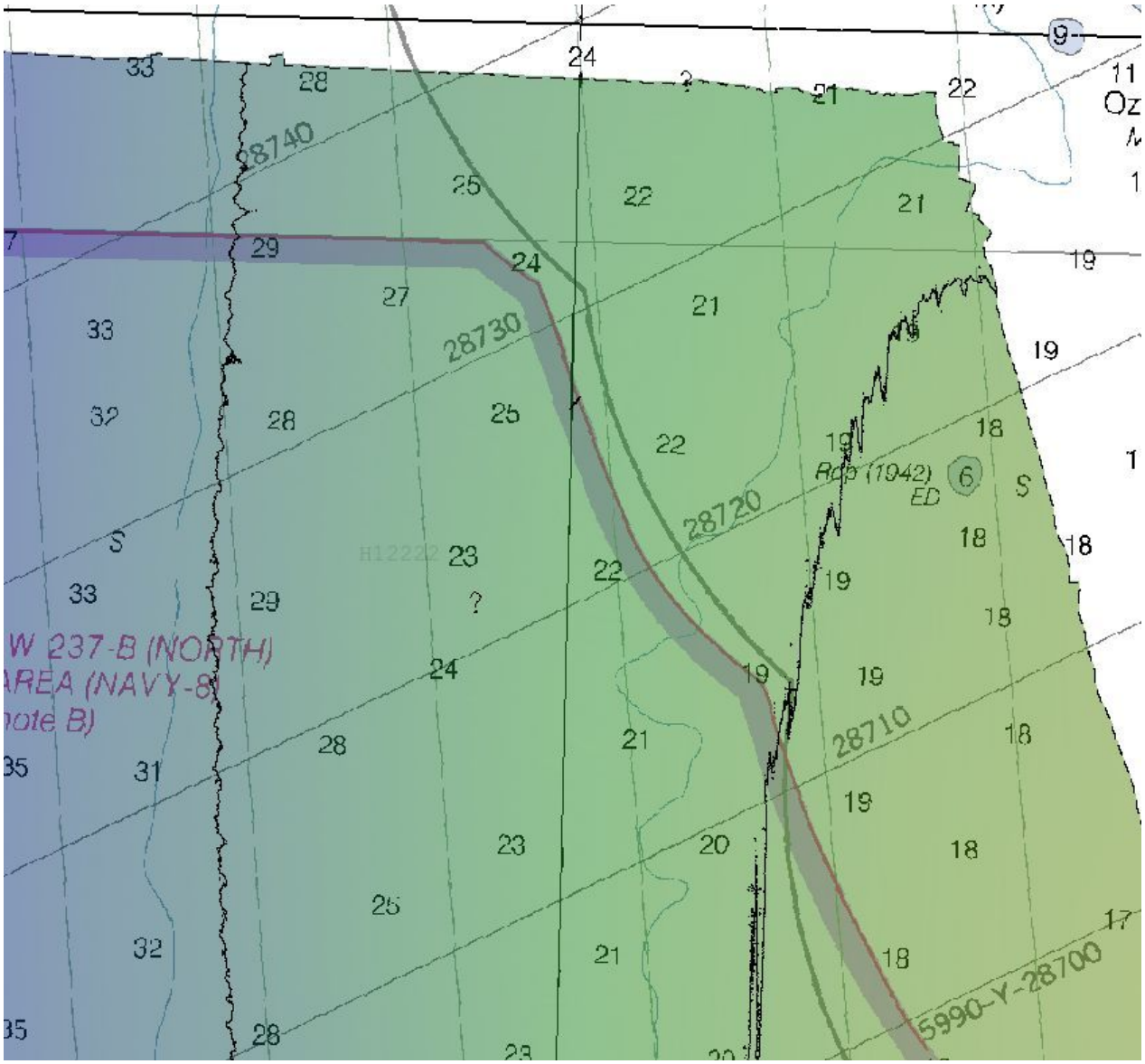

Figure 12: Comparison of contours from H12222 and chart 18460

ENC Comparison

ENC Comparison not addressed.

Recommendation: [20]

Disproved Soundings

Disproved Sounding	Sounding Position	Discussion
6 fathom	48 07 56.50 N 124 47 14.80 W	See Figure 11

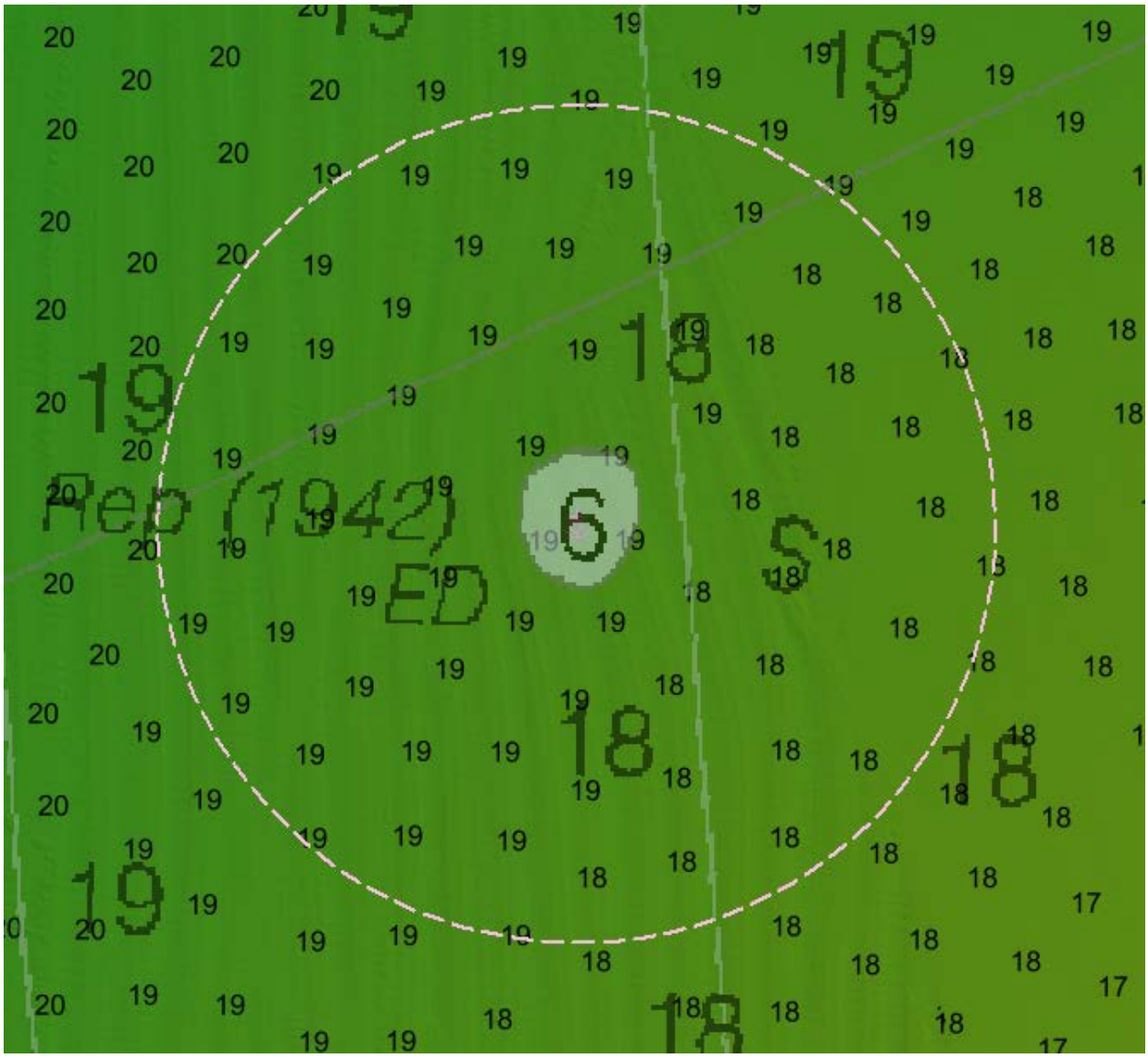

Figure 11: AWOIS item 53142 1000m radius and surrounding surveyed soundings

AWOIS Items

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

There was one AWOIS item located within the limits of H12222. All AWOIS items were addressed and are included in the H12222_Final_Feature_File.hob and this report. [21]

The AWOIS radii extended beyond the sheet limits, to fully assess the search area the adjacent survey, H12221, was reviewed and no features were identified.

Charted Features (Non-AWOIS)

No non-AWOIS charted features addressed.

Uncharted Features

No uncharted features addressed.

Dangers to Navigation (DTON)

A report was submitted.

Report Date	Report Name
2010-06-28	H12222 Anti-DTON Report #1

One anti-danger to navigation was found and reported under the title H12222 Anti-DTON Report #1 to the Marine Chart Division on June 28, 2010. [22]

Charted Shoals and Hazardous Features

A 6 fathom shoal was addressed as an AWOIS item, see the section on Chart Comparison for further discussion. No further shoals or hazards are within the extents of H12222. [23]

Channels

No channels addressed.

D2. Additional Results

Shoreline Investigation Results

No shoreline investigation addressed. [24]

Aids to Navigation (ATONs)

There were no USCG aids to navigation within the survey limits.[25]

There were no private aids to navigation within the survey limits. [26]

Overhead Features (bridges, overhead cables, overhead pipelines)

No overhead features addressed. [27]

Submarine Features

No submarine features addressed. [28]

Ferry Routes

No ferry routes addressed. [29]

Drilling Structures, Production Platforms, and Well Heads

No drilling structures, production platforms, or well heads addressed. [30]

Unusual or Scientifically Significant Features

No unusual or scientifically significant features addressed. [31]

Construction or Dredging

No constructions or dredging addressed. [32]

New Surveys

No new surveys suggested. [33]

Insets

No insets suggested. [34]

E. Approval Sheet

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Survey's Division Field Procedures Manual, and NOS Hydrographic Surveys Specifications and Deliverables. Field Operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy. This survey is complete and no additional work is required.

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 Pacific Hydrographic Branch.

Survey H12222 is adequate to supersede charted soundings in their common areas.

The Data Acquisition and Processing Report for OPR-N324-FA-10 is submitted separately and contains additional information relevant to the survey.

Approved and Forwarded By:

Approver Name	Approver Title	Approval Date	Digital Signature
CAPT David O. Neander, NOAA	Chief of Party	09 / 08 / 2010	David O. Neander 2010.09.09 06:11:28 -08'00'
HSST Weston J Renoud	Sheet Manager	09 / 08 / 2010	Weston Renoud 2010.09.09 06:48:55 Z
CST Lynnette Morgan	Chief Survey Technician	09 / 08 / 2010	Digitally signed by Lynnette V. Morgan Date: 2010.09.09 07:09:53 Z
LT Briana Welton	Field Operations Officer	09 / 08 / 2010	Digitally signed by Briana Welton DN: cn=Briana Welton, o=NOAA Ship Fairweather, ou=NOAA, email=briana.welton@noaa.gov, c=US Date: 2010.09.09 07:34:16 Z

Additional Reports:

Report Name	Date Sent	Recipient
Hydrographic Systems Readiness Review	2010-04-09	N/CS34
Data Acquisition and Processing Report	2010-08-15	N/CS34
Horizontal and Vertical Control Report	2010-08-15	N/CS34

Revisions Compiled During Office Processing and Certification:

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[1] Concur
[2] Concur
[3] Concur
[4] Retain all charted bottom samples within the common area.
[5] Concur
[6] Common junctions will be made with the following surveys when they are compiled.
[7] The data is adequate for charting after the surface sound speed spikes were removed.
[8] The data used in the compilation of the HCell is adequate to supersede charted data in the common area.
[9] Concur
[10] Concur, the data is adequate for charting
[11] Concur, chart depths as depicted in the HCell.
[12] Despite the holiday, H12222 is adequate to supersede this area
[13] Concur
[14] The office generated 8 m resolution combined surface, H12222_8M_Combined, was used for cartographic compilation.
[15] Concur, chart as shown in the HCell
[16] See attached Tide Note dated July 7, 2010
[17] Concur
[18] Concur
[19] Update charted contours based on survey data.
[20] AWOIS item 53142 was investigated and disproved by 100 % multibeam. Remove charted 6 Rep (1942) ED. Chart area according to this survey
[21] See attached Anti-DTON Report
[22] The anti-DTON references the 6 fathom shoal which is AWOIS item 53142. The shoal has been removed from the charts.
[23] Concur
[24] Concur
[25] Concur
[26] Concur
[27] Concur with clarification, there are no overhead features in the survey area.
[28] Concur with clarification, there are no submarine features in the survey area.
[29] Concur with clarification, there are no ferry routes in the survey area.
[30] Concur with clarification, there are no platforms or wells in the survey area.
[31] Concur
[32] Concur
[33] Concur
[34] Concur

H12222 Anti-DTON Report #1

Registry Number: H12222

State: Washington

Locality: OCNMS

Sub-locality: Central Offshore Portion of Cape Flattery

Project Number: OPR-N324-FA-10

Survey Date:

Investigated AWOIS item disproved.

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
18460	13th	10/01/2006	1:100,000 (18460_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 05/05/2007 (05/15/2010)
18480	31st	10/01/2006	1:176,253 (18480_1)	USCG LNM: 03/02/2010 (04/27/2010) NGA NTM: 10/17/2009 (05/15/2010)
18400	48th	12/01/2008	1:200,000 (18400_1)	[L]NTM: ?
18003	20th	11/01/2006	1:736,560 (18003_1)	[L]NTM: ?
18007	33rd	02/01/2009	1:1,200,000 (18007_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_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	AWOIS	[no data]	[no data]	[no data]	---

1 - Danger To Navigation

1.1) AWOIS #53142 - OBSTRUCTION

DANGER TO NAVIGATION

No Primary Survey Feature for this AWOIS Item

Search Position: 48° 07' 56.5" N, 124° 47' 15.5" W

Historical Depth: [None]

Search Radius: 1000

Search Technique: MB, ES

Technique Notes: [None]

History Notes:

CL414/42-- THE CO OF U.S. NAVY PATROL VESSEL "BLACK DOUGLAS" REPORTED A ROCK WITH 35 TO 45 FT OF WATER. POSITION OBTAINED BY BEARINGS. A FATHOMETER WAS USED. POS. RECORDED BY CARTOGRAPHER ON A HAND NOTE STATES 48-07-56N, 124-47-10 ("10" IS BEST GUESS-DOCUMENT ILLEGIBLE). POSITION FOR ITEM IS SCALED FROM THE LARGEST SCALE CHART, 18460 IN POS. 48-07-56.5 N 124-47-15.5 W. ENTERED 9/04 MCR

Survey Summary

Charts Affected: 18460_1, 18480_1, 18400_1, 18003_1, 18007_1, 531_1, 501_1, 530_1, 50_1

Remarks:

Investigation with complete coverage multibeam echosounder of AWOIS item 53142 found no shoal within the search radius of 1000 m.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12222 AWOIS	AWOIS # 53142	0.00	000.0	Primary

Hydrographer Recommendations

Remove 6 fathom sounding and associated text from chart.

S-57 Data

[None]

Feature Images

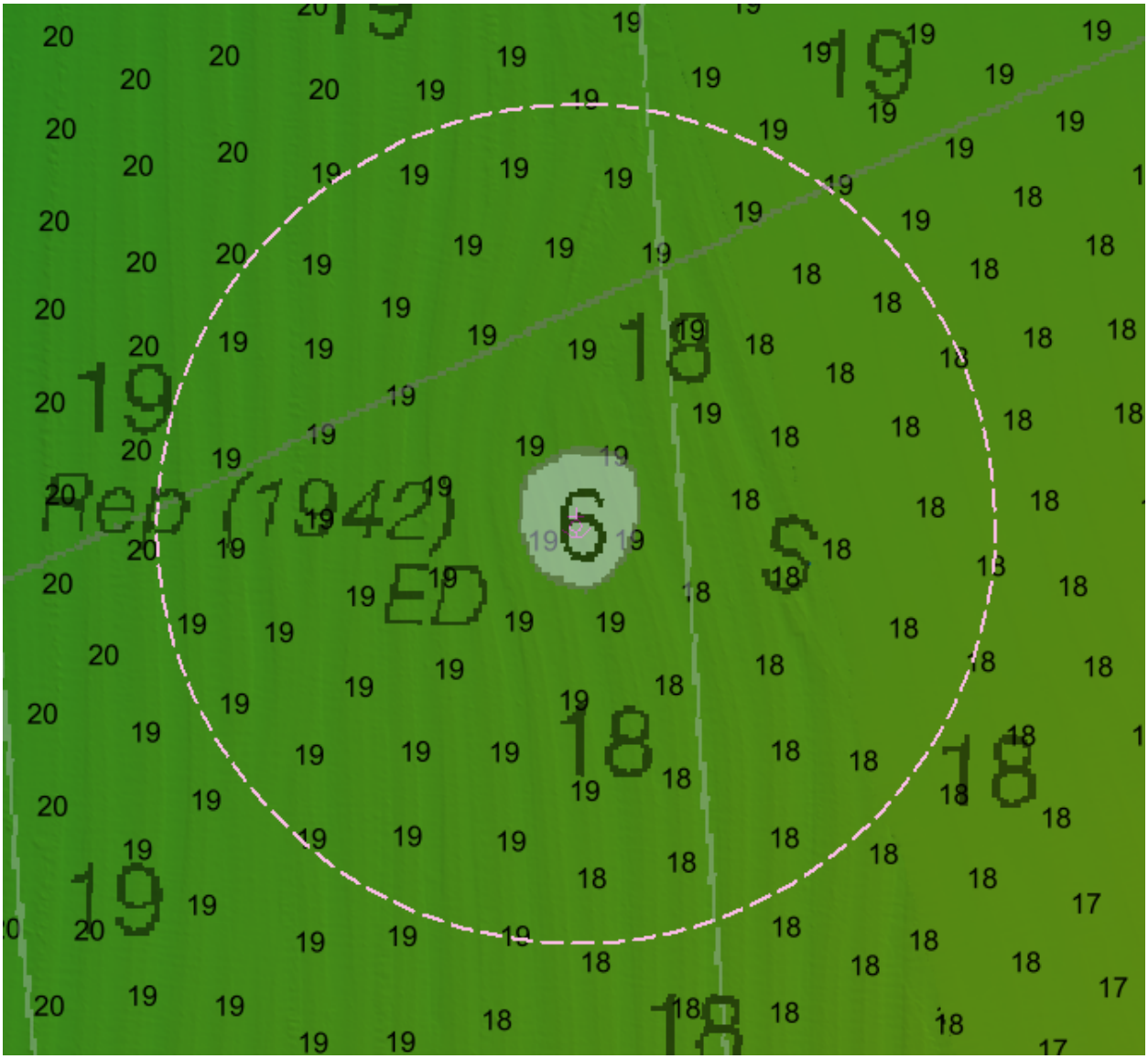


Figure 1.1.1

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, 2010

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-N324-FA-2010
HYDROGRAPHIC SHEET: H12222

LOCALITY: Central Offshore Portion of Cape Flattery, OCNMS
TIME PERIOD: June 7 - June 22, 2010

TIDE STATION USED: 944-2396 La Push, WA
Lat. 47° 54.8'N Long. 124° 38.1' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.357 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-N324-FA-2010, H12222, during the time period between June 7 to June 22, 2010.

Please use the zoning file "N324FA2010CORP" submitted with the project instructions for OCNMS. Zone PAC220 is the applicable zone for H12222.

Refer to attachments for zoning information.

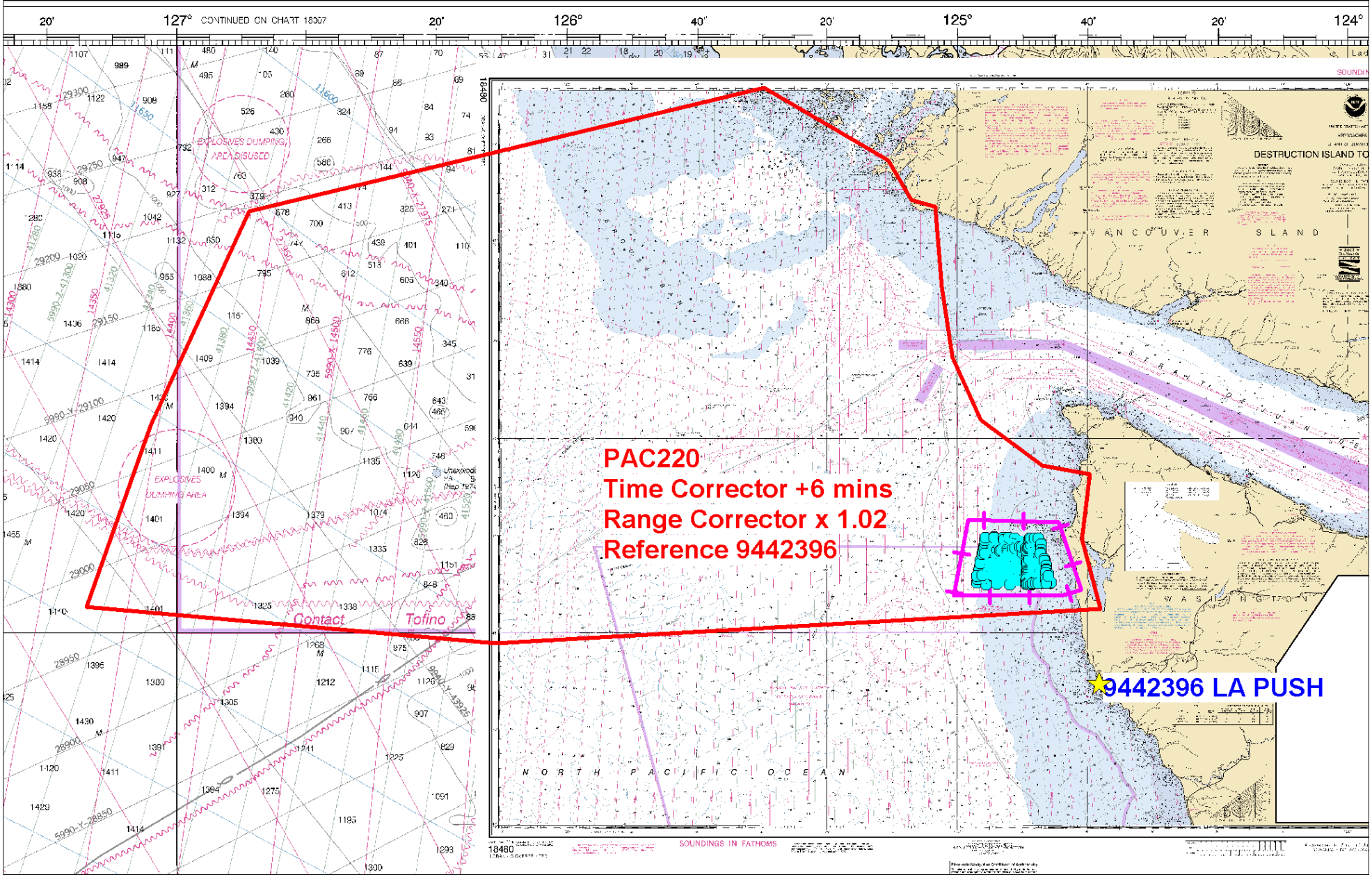
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2010.07.08 12:43:34 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION

Preliminary As Final Tidal Zoning for OPR-N324-FA-2010, H12222
Central Offshore Portion of Cape Flattery, OCNMS, WA



H12222 HCell Report

Russ Davies, Cartographer
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12222 used:

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

2. Compilation Scale

Depths and features for HCell H12222 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NM Date
18460	1:100,000	13th	10/2006	10/02/2010
18485	1:40,000	16th	03/2007	10/02/2010

The following ENC was not used during compilation:

Chart	Scale
US3WA01M	1:100,000
US4WA36M	1:40,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 8-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:20000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0.0	10	3
10	20	4
20	50	4.5
50	100	5

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

4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the *_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 18485	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H12222_SS.000
20	36.576	37.9476	20.750	20
30	54.864	56.2356	30.750	30
40	73.152	74.5236	40.750	40
50	91.44	92.8116	50.750	50

5. Meta Areas

The following Meta object area is included in HCell H12222.

M_QUAL
M_CSCL

This Meta area object was constructed on the basis of the limits of the hydrography.

6. Features

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

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

$CSYMB	Blue Notes-Notes to the MCD chart Compiler
M_QUAL	Data quality Meta object
M_CSCL	Compilation Scale of Data
SBDARE	Bottom samples
SOUNDG	Soundings at the chart scale density

The *_SS HCell contains the following Objects:

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

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

9. Data Processing Notes

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

10. QA/QC and ENC Validation Checks

H12222 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

H12222_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000 and 100,000
H12222_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:20,000
H12222 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12222_outline.gml	Survey outline
H12222_outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.1	Creation of soundings and bathy-derived features, meta area object, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.2	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

Russ Davies
Cartographer
Pacific Hydrographic Branch
Seattle, WA
206-526-6854
Russ.Davies@NOAA.GOV

APPROVAL SHEET
H12222

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 Russ Davies
DN: cn=Russ Davies, o=ocs, ou=PHB, email=Russ.Davies@noaa.gov, c=US
Date: 2011.05.25 14:15:28 -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.

Katie Reser
2011.05.25
14:24:58 -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.

Digitally signed by NELSON.GARY.C.1365885318
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=NELSON.GARY.C.1365885318
Date: 2011.05.25 12:32:22 -07'00'