

F00762

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: F00762

LOCALITY

State(s): Oregon

General Locality: Yaquina River outlet, Newport, Oregon

Sub-locality: Approaches to Yaquina Bay

2018

CHIEF OF PARTY
Benjamin K. Evans, CDR/NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00762

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

State(s): **Oregon**

General Locality: **Yaquina River outlet, Newport, Oregon**

Sub-Locality: **Approaches to Yaquina Bay**

Scale: **5000**

Dates of Survey: **11/08/2018 to 11/08/2018**

Instructions Dated: **11/08/2018**

Project Number: **S-M955-RA-18**

Field Unit: **NOAA Ship Rainier**

Chief of Party: **Benjamin K. Evans, CDR/NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <http://www.ncei.noaa.gov/>.

Table of Contents

A. Area Surveyed.....	1
A.1 Survey Limits.....	1
A.2 Survey Purpose.....	2
A.3 Survey Quality.....	2
A.4 Survey Coverage.....	3
A.6 Survey Statistics.....	4
B. Data Acquisition and Processing.....	5
B.1 Equipment and Vessels.....	5
B.1.1 Vessels.....	5
B.1.2 Equipment.....	6
B.2 Quality Control.....	6
B.2.1 Crosslines.....	6
B.2.2 Uncertainty.....	6
B.2.3 Junctions.....	8
B.2.4 Sonar QC Checks.....	8
B.2.5 Equipment Effectiveness.....	9
B.2.6 Factors Affecting Soundings.....	9
B.2.7 Sound Speed Methods.....	9
B.2.8 Coverage Equipment and Methods.....	10
B.3 Echo Sounding Corrections.....	10
B.3.1 Corrections to Echo Soundings.....	10
B.3.2 Calibrations.....	10
B.4 Backscatter.....	10
B.5 Data Processing.....	10
B.5.1 Primary Data Processing Software.....	10
B.5.2 Surfaces.....	11
C. Vertical and Horizontal Control.....	11
C.1 Vertical Control.....	11
C.2 Horizontal Control.....	12
D. Results and Recommendations.....	12
D.1 Chart Comparison.....	12
D.1.1 Electronic Navigational Charts.....	12
D.1.2 Maritime Boundary Points.....	14
D.1.3 Charted Features.....	14
D.1.4 Uncharted Features.....	14
D.1.5 Shoal and Hazardous Features.....	15
D.1.6 Channels.....	15
D.1.7 Bottom Samples.....	15
D.2 Additional Results.....	15
D.2.1 Shoreline.....	15
D.2.2 Aids to Navigation.....	15
D.2.3 Overhead Features.....	16
D.2.4 Submarine Features.....	16

D.2.5 Platforms.....	16
D.2.6 Ferry Routes and Terminals.....	17
D.2.7 Abnormal Seafloor and/or Environmental Conditions.....	17
D.2.8 Construction and Dredging.....	17
D.2.9 New Survey Recommendation.....	17
D.2.10 Inset Recommendation.....	17
E. Approval Sheet.....	18
F. Table of Acronyms.....	19

List of Tables

Table 1: Survey Limits.....	1
Table 2: Survey Coverage.....	3
Table 3: Hydrographic Survey Statistics.....	4
Table 4: Dates of Hydrography.....	5
Table 5: Vessels Used.....	5
Table 6: Major Systems Used.....	6
Table 7: Survey Specific Tide TPU Values.....	6
Table 8: Survey Specific Sound Speed TPU Values.....	7
Table 9: Submitted Surfaces.....	11
Table 10: ERS method and SEP file.....	11
Table 11: Largest Scale ENC.....	12

List of Figures

Figure 1: F00762 survey coverage (Chart 18581).....	2
Figure 2: Pydro derived histogram plot showing HSSD density compliance of F00762 finalized variable-resolution MBES data.....	3
Figure 3: Pydro derived plot showing TVU compliance of F00762 finalized multi-resolution MBES data.....	8
Figure 4: F00762 sound speed cast locations.....	9
Figure 5: OSU pier survey area overlaid with 1, 2, and 3 fathom survey contours derived from F00762.....	13
Figure 6: Buoy 3 survey area off overlaid with 8.3 fathom survey contour derived from F00762.....	14
Figure 7: Submerged buoy shaped object 20 meters south of charted position.....	16

Descriptive Report to Accompany Survey F00762

Project: S-M955-RA-18

Locality: Yaquina River outlet, Newport, Oregon

Sublocality: Approaches to Yaquina Bay

Scale: 1:5000

November 2018 - November 2018

NOAA Ship Rainier

Chief of Party: Benjamin K. Evans, CDR/NOAA

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instruction S-M955-RA-18.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
44° 37' 41" N 124° 5' 36" W	44° 36' 19" N 124° 2' 27" W

Table 1: Survey Limits

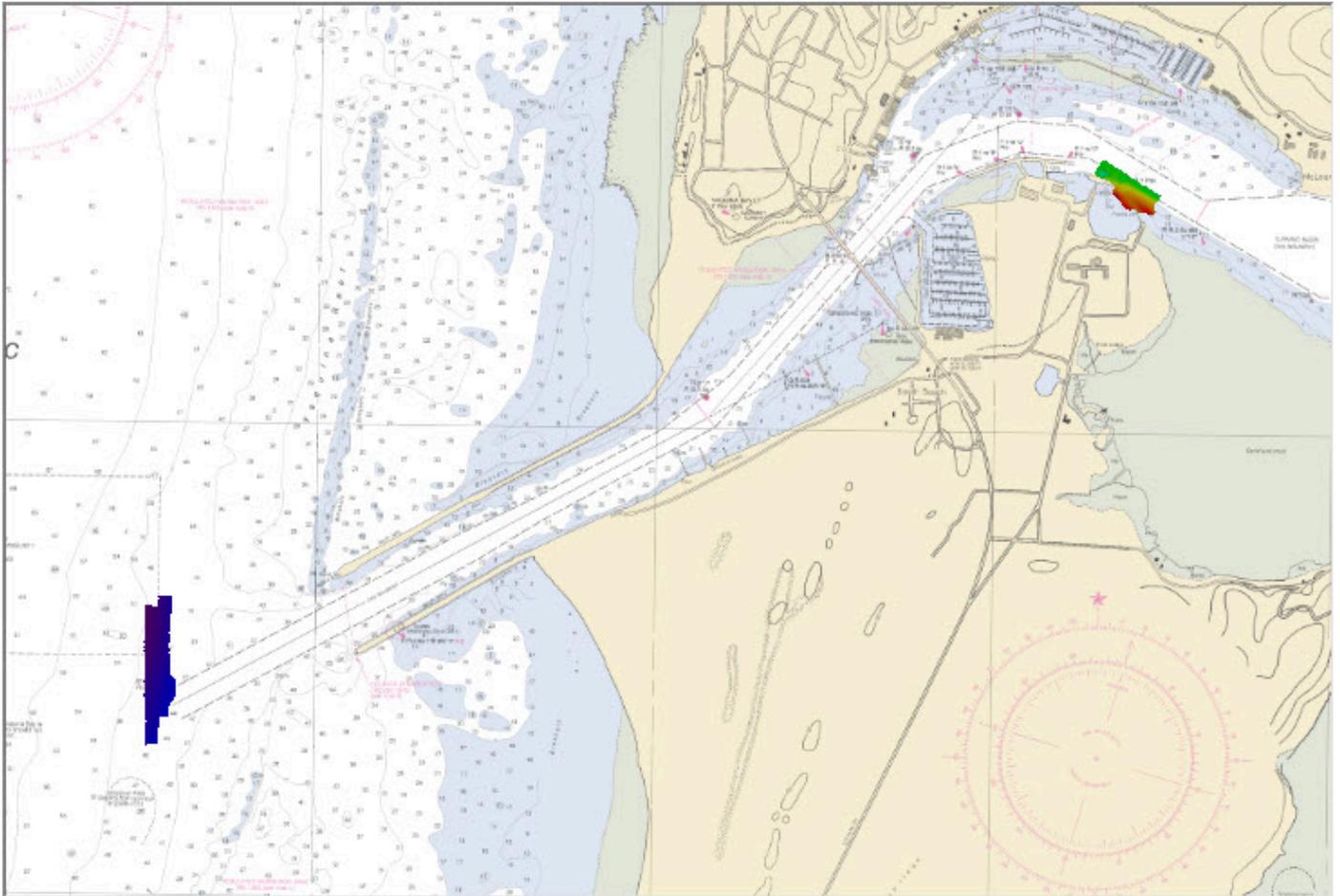


Figure 1: F00762 survey coverage (Chart 18581).

Data were acquired within the assigned survey limits as required in the Project Instructions and HSSD.

A.2 Survey Purpose

This survey is in response to a request from the United States Coast Guard to locate the missing Yaquina Bay Entrance Lighted Buoy 3 offshore of the Yaquina River. This survey is also a response to a request from Oregon State University (OSU) to survey a pier area on the Yaquina River. Data from this project are intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Pydro QC Tools 2 Grid QA was used to analyze F00762 multibeam echosounder (MBES) data density. The submitted F00762 variable-resolution (VR) surface met HSSD density requirements as shown in the histograms below.

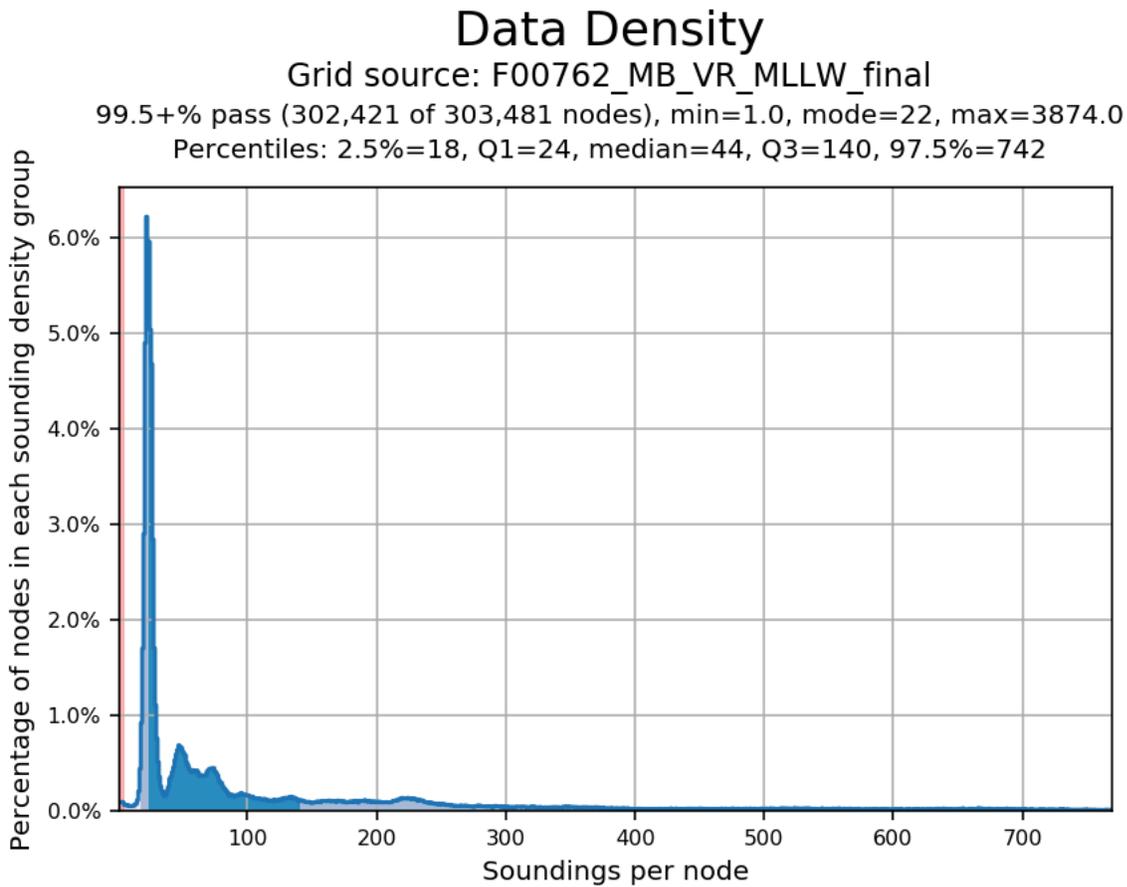


Figure 2: Pydro derived histogram plot showing HSSD density compliance of F00762 finalized variable-resolution MBES data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Object Detection Coverage
All waters in survey area	Acquire backscatter data during all multibeam data acquisition

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements listed above and in the HSSD.

A.6 Survey Statistics

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

	HULL ID	<i>2801</i>	<i>2803</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0	2.11
	MBES Mainscheme	1.53	0.58	0
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0	0
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	0	0	0
	SBES/MBES Crosslines	0	0	0
	Lidar Crosslines	0	0	0
Number of Bottom Samples				0
Number Maritime Boundary Points Investigated				0
Number of DPs				5
Number of Items Investigated by Dive Ops				0
Total SNM				0.03

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
11/08/2018	312

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

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

B.1.1 Vessels

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

Hull ID	2801	2803
LOA	8.8 meters	8.8 meters
Draft	1.1 meters	1.1 meters

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning System
Kongsberg Maritime	EM 2040	MBES
Sea-Bird Scientific	SBE 19plus	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 70	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 0.00% of mainscheme acquisition.

Crosslines were not acquired for this survey.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.195 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
2801,2803	3 meters/second	N/A meters/second	.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey F00762 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal uncertainty was provided in the metadata accompanying the NOAA vertical datum transformation model used for this survey. The uncertainty value of NOAA's Vertical Datum (VDatum) transformation model was documented in metadata that accompanied the VDatum model.

In addition to the usual a priori estimates of uncertainty, some real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Kongsberg MBES sonars were recorded and applied in post-processing. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were applied during post-processing. Finally, the postprocessed uncertainties associated with vessel roll, pitch, yaw and position were applied in Caris HIPS using SBET and RMS files generated using POSpac MMS software.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools 2 was used to analyze F00762 TVU compliance, a histogram plot of the results is shown below.

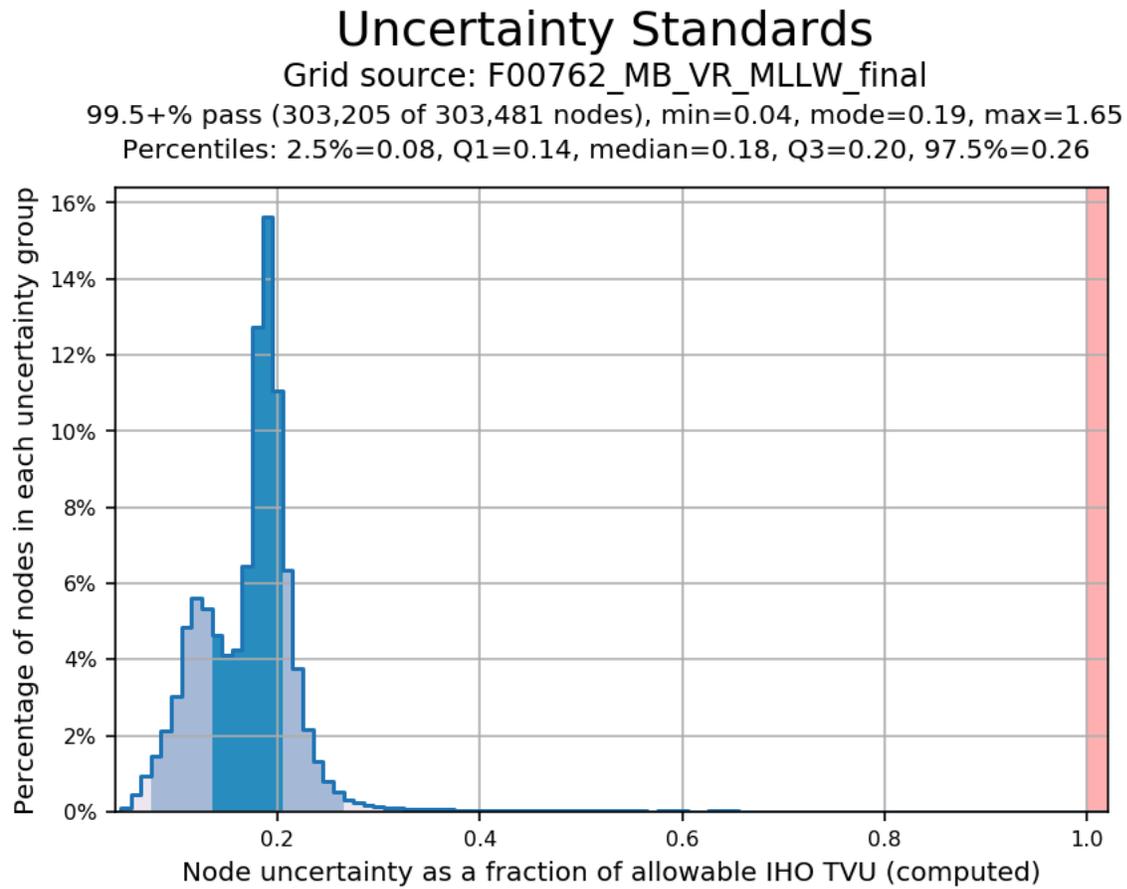


Figure 3: Pydro derived plot showing TVU compliance of F00762 finalized multi-resolution MBES data.

B.2.3 Junctions

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

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

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: 3

Sound speed profiles were acquired for this survey at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when operating in a new area. Sound speed profiles were obtained using Sea-Bird 19plus SEACAT Profilers. All casts were concatenated into a master file and applied to MBES data using the "Nearest distance within time" (4 hours) profile selection method.



Figure 4: F00762 sound speed cast locations.

B.2.8 Coverage Equipment and Methods

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter data were acquired as .all files and submitted to NOAA's Pacific Hydrographic Branch. Backscatter data were processed by the field unit and mosaics generated. One mosaic per vessel per frequency has been delivered with this report. All backscatter processing procedures utilized follow those detailed in the DAPR. Software used to process and produce backscatter mosaics were Fledermaus Geocoder Toolbox version 7.8.1.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile V_5_7.

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00762_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	0.7 meters - 15.5 meters	NOAA_VR	Object Detection
F00762_MB_VR_MLLW_final	CARIS VR Surface (CUBE)	Variable Resolution	0.7 meters - 15.5 meters	NOAA_VR	Object Detection

Table 9: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for depth-based (Ranges) Caris variable-resolution bathymetric grids as specified in HSTD 2017-2.

Pydro QC Tools 2 Detect Fliers was used with default settings to find fliers in a finalized VR surface. Obvious noise was rejected by the hydrographer in Caris Subset Editor. After data cleaning, Detect Fliers was run again and found 2 certain fliers; these were investigated and found to be false positives. The results of the Detect Fliers tool are included as a .000 files in the Separates section of this report.

C. Vertical and Horizontal Control

All MBES bathymetry were acquired relative to the ellipsoid and reduced to MLLW via VDATUM.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	S-M955-RA-18_VDatum_xyNAD83-MLLW_geoid12b.csar

Table 10: ERS method and SEP file

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 10.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between F00762 survey data and Electronic Navigation Chart (ENC) US5OR44M using CUBE finalized VR surfaces, selected soundings and contours created in Caris HIPS.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5OR44M	1:10000	16	07/18/2018	10/18/2018	NO

Table 11: Largest Scale ENCs

US5OR44M

The ENC's charted depth curves show general agreement with F00762's derived survey contours. Data acquired during the search for Buoy 3 offshore the Yaquina River entrance revealed no significant differences in the the chart. Around the OSU pier the 1, 2 and 3 fathom contours were found to be slightly inshore of their charted position.

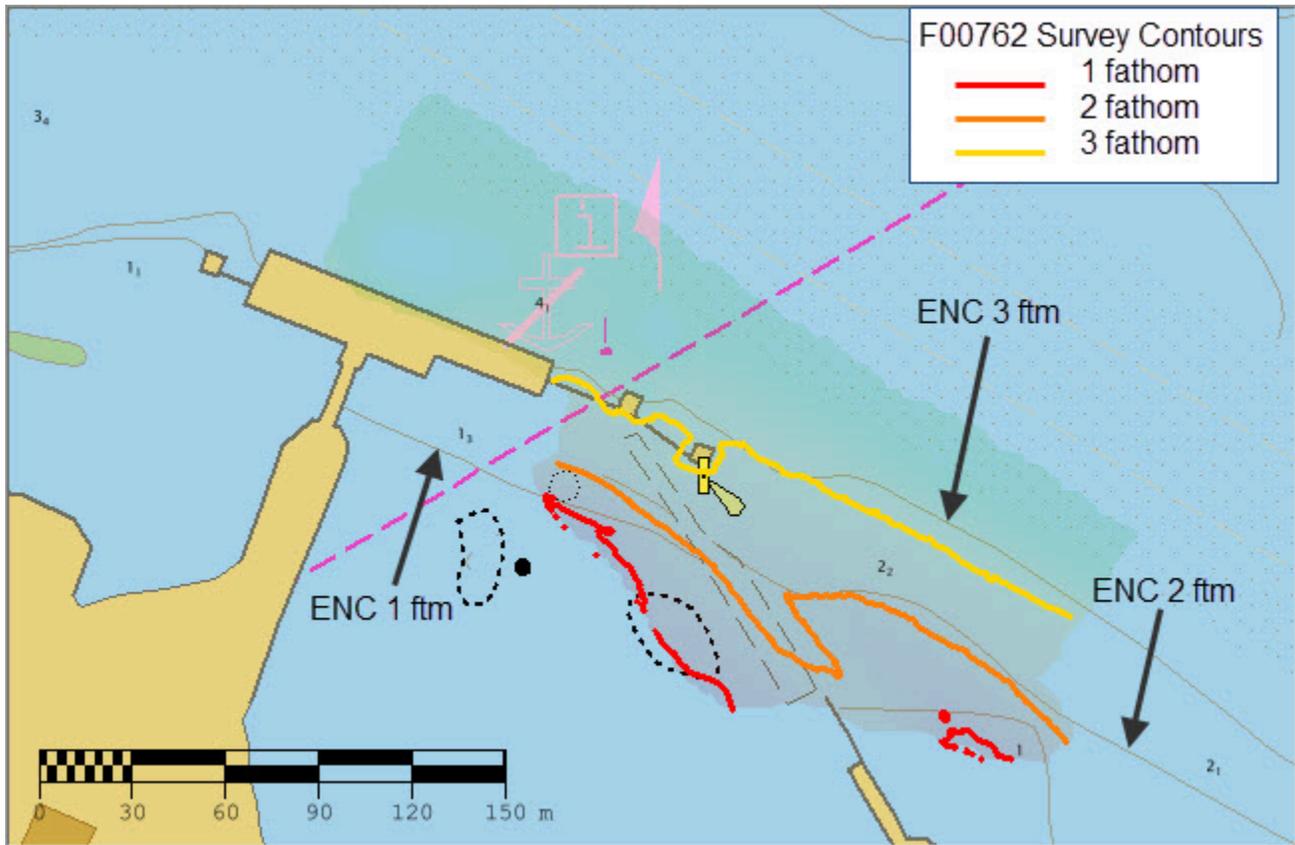


Figure 5: OSU pier survey area overlaid with 1, 2, and 3 fathom survey contours derived from F00762.

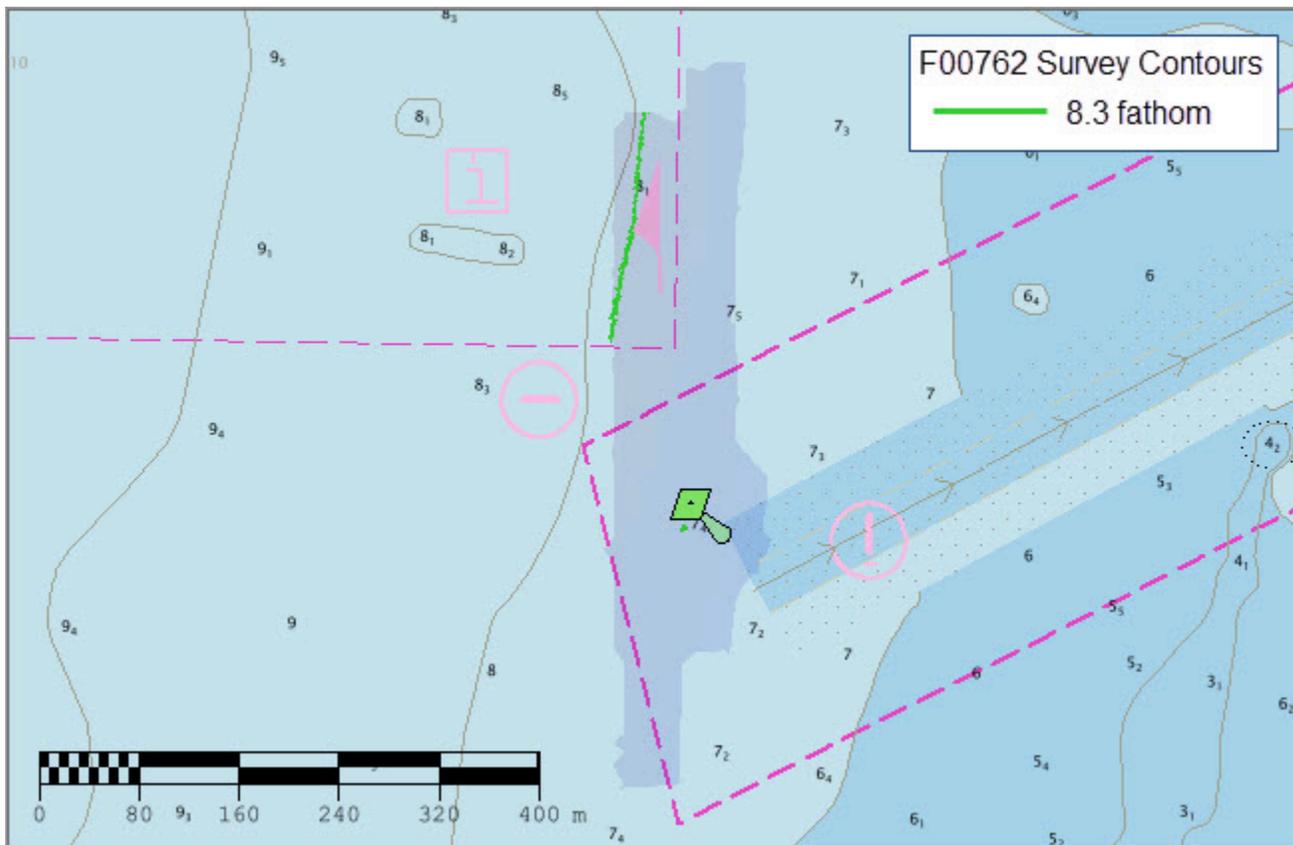


Figure 6: Buoy 3 survey area off overlaid with 8.3 fathom survey contour derived from F00762.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.6 Channels

Channels, designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, and/or channel and range lines exist within the survey limits, but were not investigated.

D.1.7 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

Limited shoreline verification was conducted in accordance with applicable sections of NOAA HSSD and FPM using the Project Reference File (PRF) and Composite Source File (CSF) provided with the Project Instructions. In the field, all assigned features that were safe to approach, were addressed as required with S-57 attribution and recorded in the F00762_FFF to best represent the features at chart scale. This file also includes new features found in the field as well as recommendations to update, retain or delete assigned features.

D.2.2 Aids to Navigation

Yaquina Bay Entrance Lighted Buoy 3 is off station and not serving its intend purpose. The hydrographer believes the buoy to be resting on the seafloor approximately 20 meters south from its charted location.

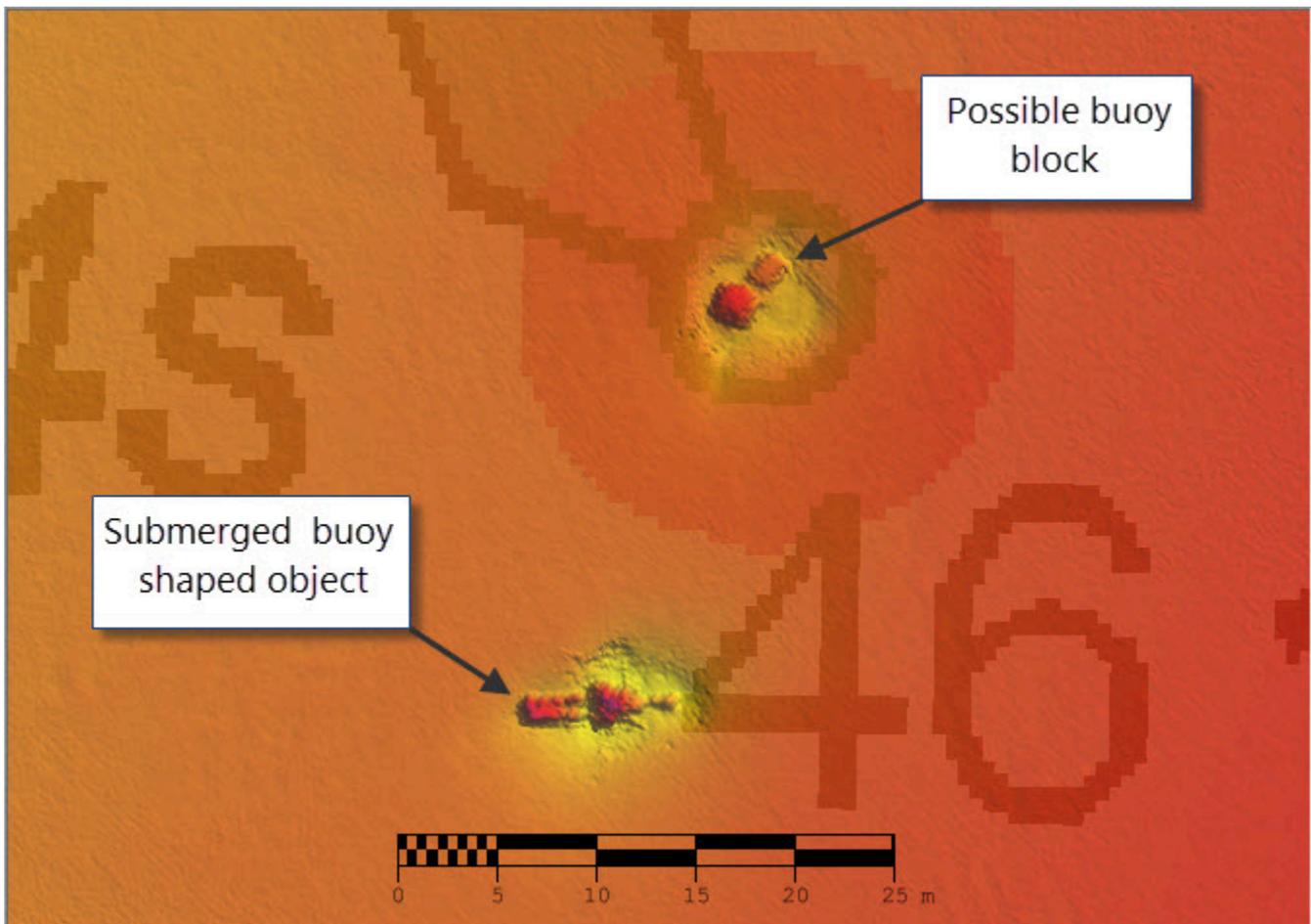


Figure 7: Submerged buoy shaped object 20 meters south of charted position.

The buoy is not simply off station, but was missing entirely at the time of survey, most likely sunken to the seafloor.

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

No submarine features exist for this survey.

D.2.5 Platforms

No platforms exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.9 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

D.2.10 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

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

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

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

Approver Name	Approver Title	Approval Date	Signature
Benjamin K. Evans, CDR/NOAA	Commanding Officer	03/15/2019	 Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2019.03.15 14:05:40 -07'00'
Hadley A. Owen, LT/NOAA	Field Operations Officer	03/15/2019	 Digitally signed by OWEN.HADLEY.ANNE.1410967070 DN: c=US, o=U.S. Government, ou=DoD, ou=PMO, ou=NOAA, cn=OWEN.HADLEY.ANNE.1410967070 Date: 2019.03.13 12:42:56 -07'00'
James B. Jacobson	Chief Survey Technician	03/15/2019	 JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2019.03.14 08:31:21 -07'00'
Audrey E. Jerauld	Sheet Manager	03/15/2019	 JERAULD.AUDREY.ELIZABETH.11704 96260 2019.03.13 12:26:44 -07'00'



OPS Rainier - NOAA Service Account <ops.rainier@noaa.gov>

The Search for Buoy #3

OPS Rainier - NOAA Service Account <ops.rainier@noaa.gov>

Fri, Nov 9, 2018 at 8:53 AM

To: Joseph.G.Wineke@uscg.mil

Cc: Thomas.P.Molloy@uscg.mil, Brian.C.Schneider@uscg.mil, Jason.W.Haag@uscg.mil, _OMAO MOP CO Rainier <CO.Rainier@noaa.gov>

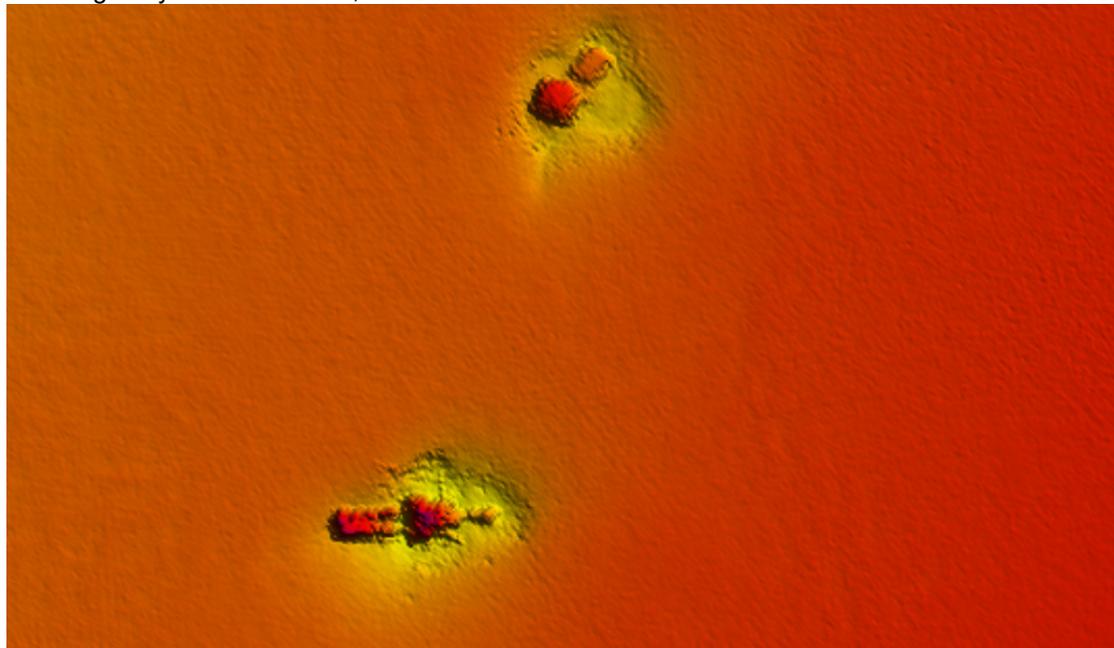
Good Morning Everyone,

We were successful in locating the buoy block and buoy yesterday and as suspected they were almost exactly at the location of the charted buoy. I have attached a three images that show how the buoy lays on the seafloor. I don't see any evidence of buoy chain on laying on the seafloor between the block and buoy (a distance of about 65 feet), so it might be buried or it is possible our sonars can't quite pick it up.

Rainier makes a weekly blog post to social media outlets and we'd like to discuss this search and share these images on some social media outlets. We would also use this as an opportunity to discuss the success of our inter-agency collaboration. Does this sound agreeable to you? Here's an example of the types of posts we typically make:
https://www.facebook.com/NOAAShipRainier/?ref=br_rs

Lat/Long buoy block: 44d 36.4387'N, 124d 05.4578'W

Lat/Long buoy: 44d 36.4277'N, 124d 05.4627'W

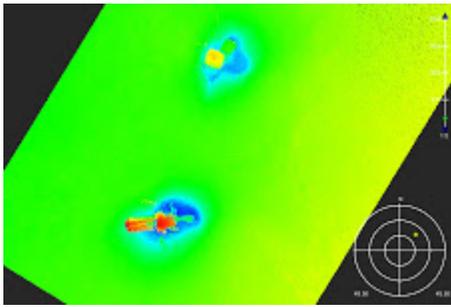


V/R,
LT Andrew Clos
Operations Officer
NOAA Ship *Rainier*
2002 SE Marine Science Drive
Newport, OR 97365

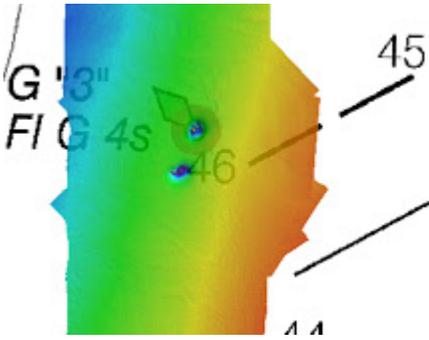
Ship Cell: (541) 272-9430
Iridium: (808) 659-0049
Email: Ops.Rainier@noaa.gov

[Quoted text hidden]

2 attachments



Buoy3_3D_Subset.jpg
176K



F00762_DN312_50cm.tif
3162K

F. Table of Acronyms

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

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

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File

APPROVAL PAGE

F00762

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

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch