

H11335

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. H11335

LOCALITY

State Alaska

General Locality Behm Canal

Sublocality Western Rudyerd Bay

2004

CHIEF OF PARTY

..... Commander John Lowell, NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72) <p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;">HYDROGRAPHIC TITLE SHEET</p>	REGISTRY No <p style="text-align: center;">H11335</p>
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. NA
<p>State <u>Alaska</u></p> <p>General Locality <u>Behm Canal</u></p> <p>Sub-Locality <u>Western Rudyerd Bay</u></p> <p>Scale <u>1:10,000</u> Date of Survey <u>10/12/2004 – 11/03/2004</u></p> <p>Instructions dated <u>5/12/2004</u> Project No. <u>OPR-O193-FA04</u></p> <p>Vessel <u>FAIRWEATHER S220, 1010, 2302, 1701</u></p> <p>Chief of party <u>CDR John E. Lowell, Jr., NOAA</u></p> <p>Surveyed by <u>LT Mark Van Waes, LT Mark A. Wetzler, CST Lynnette V. Morgan, FA Personnel</u></p> <p>Soundings by echo sounder, lead line, pole <u>Reson 8111ER, ERSON 8101ER Multibeam Echosounder</u></p> <p>Graphic record scaled by <u>N/A</u></p> <p>Graphic record checked by <u>N/A</u> Automated Plot <u>N/A</u></p> <p>Verification by <u>Sarah Wolfskehl</u> Evaluation By <u>Shyla Allen</u></p> <p>Soundings in fathoms feet at MLW MLLW <u>Meters at MLLW</u></p>	
<p>REMARKS:</p> <hr/> <p>All times recorded in UTC. The purpose of this survey was 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.</p> <hr/>	

Descriptive Report to Accompany Hydrographic Survey H11335

Project OPR-O193-FA

Behm Canal, Alaska

Scale 1:10,000

October-November 2004

NOAA Ship FAIRWEATHER

Chief of Party: Commander John Lowell, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by the Hydrographic Survey Letter Instructions for OPR-O193-FA, dated May 12, 2004, and changes dated August 6, 2004 and September 22, 2004, as well as the Draft Standing Project Instructions dated March 21, 2002¹. The survey area was located in Behm Canal, within the sub-locality of Western Rudyerd Bay. This survey corresponds to Sheet B in the sheet layout provided with the Letter Instructions. The lakes and rivers within the survey limits were not surveyed, because there were no accessible navigable waters from Rudyerd Bay.

One hundred percent Multibeam Echosounder (MBES) coverage was obtained in the survey area in waters 8 meters and deeper. In waters from 4 meters to 8 meters, MBES data were obtained where possible due to safety of crew and vessel concerns as well as time limitations.

Shoreline data were acquired for H11335. These data were attributed as S-57 objects for submittal.

Data acquisition was conducted from October 12 to November 3, 2004 (DN 286 to 308).

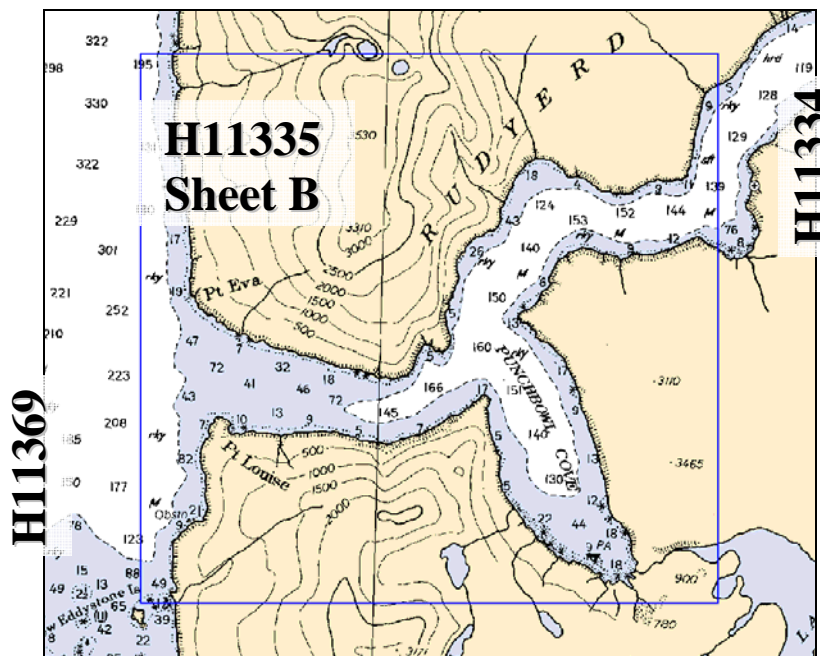


Figure 1 – H11335 Survey Limits and Junctions

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *FAIRWEATHER Data Acquisition and Processing Report – 2004 (DAPR)*², submitted under separate cover. Items specific to this survey, and any deviations from the aforementioned report are discussed in the following sections.

B.1 Equipment and Vessels

NOAA Ship FAIRWEATHER (S220) is a 231' hydrographic survey vessel, equipped with a Reson 8111ER multibeam echosounder (MBES) system. The FAIRWEATHER's survey launch 1010 is a high speed, 29' aluminum Jensen survey launch. It is equipped with Reson 8101ER MBES system. Launch 2302 is an AMBAR 700, used during shoreline acquisition. Skiff 1701 is a MonArk built by SeaArk, used during shoreline acquisition.

FAIRWEATHER (S220), and Launch 1010 are each equipped with an Applanix Position and Orientation System for Marine Vessels (POS MV) 320 version 3. They are also equipped with Applanix TrueHeave and Precise Timing. Sound velocity correctors were acquired on all platforms with a SeaBird SeaCat SBE 19plus sound velocity profiler.

Data were acquired by FAIRWEATHER and her survey launches (vessel numbers 1010, and 2302) and skiff 1701. Vessel 1010 was used to acquire shallow-water multibeam (SWMB) soundings and sound velocity profiles. Vessel 2302 was used to collect bottom samples and detached positions (DPs). FAIRWEATHER was used to acquire mid-water multibeam (MWMB) soundings and sound velocity profiles.

The DAPR indicates that the "MRU Align StdDev Gyro" and "MRU Align StdDev Roll/Pitch" values are unknown, but these fields are defined as 0.000 in 1010_8101.hvf and 1018_8101.hvf, and S220_8111.hvf. The values are unknown and also undocumented in Caris' Vessel Editor Help Manual.

According to Dr. Brian Calder from UNH, the error values stated above are defined as the standard deviation of the error estimates for the "gyro" and "roll/pitch" patch test values, as calculated from the compilation of these values from all of the individuals evaluating the patch test data. These standard deviations were not documented when processing the patch tests used for this project. Future patch test processing will include documentation and reporting of the standard deviation of the error estimates for the "gyro" and "roll/pitch" patch test values.

Initial entry dates in each vessel HVF do not correspond with the dates noted in each vessel report. The dates entered precede the dates of the patch tests. As no data was collected before the initial patch tests by any of the FAIRWEATHER's vessels data quality is not affected.

The sensor latency value noted in the vessel reports can either be entered into each sensor (Navigation, Gyro, Heave, Pitch and Roll) Time Error field or the inverse value can be entered once into the Swath Time Error field. This is seen in the S220_8111.hvf.

No other unusual vessel configurations were encountered during this survey.

B.2 Quality Control

Crosslines

Multibeam Echosounder (MBES) crosslines totaled 2.3 nautical miles, comprising 3.0% of MBES hydrography. The hydrographer has determined, through manual examination of the data, that the accuracy standards have been met and crossline agreement is good³.

Junctions

Survey H11335 junctions with surveys H11334 and H11369 (sheets A and C of this project, respectively – See *Figure 1*). The area of overlap between the sheets was reviewed in CARIS Subset Editor for consistency and data was found to be in good agreement to within one meter⁴.

Accuracy Standards

There were several systematic errors associated with some of the data that affect accuracy. These problems are discussed individually in the Data Quality Factors and Corrections to Echo Sounding sections of this descriptive report. The Accuracy Standards section is intended to explain how the problem data were processed and why the Hydrographer believes that the data still meet accuracy requirements.

Total propagated error (TPE) filters were applied in CARIS HIPS to all HDCS data from the survey. Only those soundings that satisfied the International Hydrographic Organization (IHO) requirements for horizontal and vertical accuracy were accepted, as specified in the *NOS Hydrographic Surveys Specifications and Deliverables Section 5.2*.

The function of TPE is to track the effect of systematic errors on individual soundings. Soundings that pass through the TPE filter have a calculated error value that is within IHO specifications. Physical errors, such as changing water mass, are not accounted for within the TPE model. Therefore, soundings with acceptable systematic error values may not be in agreement with soundings on adjacent lines, because physical errors in the measurements were not accounted for.

The main sources of error in the data from this survey were roll bias and GPS positioning errors.

The roll bias intensified over time as the sonar mount bolts loosened. The bias is most visible in the later launch survey data in the outer beams and areas with steep slopes. In some near shore areas, surveyed by the launches, with depths of 30 meters or less, the roll bias between lines has created a discrepancy of as much as 1.2 meters. The data were not rejected. Because of the nature of roll bias errors the largest errors for a given swath exist in

the outer beams. The vertical error for the outer beams exceeds IHO Order 1 accuracy standards for these depths, but it meets or exceeds IHO Order 2⁵.

The algorithms used to generate BASE surfaces weight nadir soundings more heavily than those from outer beams. The hydrographer has determined, through reviewing the BASE surface in subset editor, that the BASE surface improves the representation of the bottom. There are a limited number of circumstances where areas of coverage are composed of data affected by roll and SVP errors and are composed of outer beam data exhibiting depth discrepancies. Therefore, the BASE surface for the launch data cannot be defended as meeting IHO Order 1 for the entirety of the survey. Through visual inspection of the BASE surface generated from launch multibeam data it is estimated that a minimum of 90% of that surface meets IHO Order 1 specifications⁶.

Multibeam data acquired by NOAA Ship FAIRWEATHER (S220) for survey H11335 meets IHO Order 1. Multibeam data acquired by Launch 1010 meet IHO Order 2⁷.

Data Quality Factors

Three issues affecting data quality presented themselves during the course of the H11335: GPS positioning and heading problems, instability in Launch 1010's transducer mount which created variable roll bias values and corrupt TrueHeave files.

GPS Positioning and Heading

Due to the fjord topography of Rudyerd Bay, it was difficult to continually receive signals from enough GPS satellites to give precise positioning and heading with the POS MV. The POS MV occasionally indicated that GPS Azimuth Measurement Subsystem (GAMS) was in "Not Ready" status. The tall surrounding cliffs also frequently blocked the signal for DGPS correctors in some areas. Many days of data acquisition were hampered by these problems. In the interest of efficiency, data was acquired when GAMS was in "Not Ready" status as long as the Horizontal Dilution of Precision (HDOP) remained less than four and the GAMS Heading Accuracy was less than 0.5°. The lines on which these problems were encountered are noted in the daily acquisition logs.

An example of the positioning issue appears to have evidenced itself is along the southern edge of the entrance to Rudyerd Bay. The steep shoreline degraded the positioning accuracy, in some cases, to a point where data was affected. On day 294, line 294_2319 in Launch 1010, Position Dilution of Precision (PDOP) jumped between 7 to 12. At the western end of the line a vertical difference between it and line 294_2308 (just inshore) ranges between 1 and 3.5 meters. This was initially thought to be a tide and/or sound velocity issue, but upon investigation of both the tides and sound velocity, it has been determined that it is most likely due to positioning errors. *Figure 4* shows a small portion of the area in question.

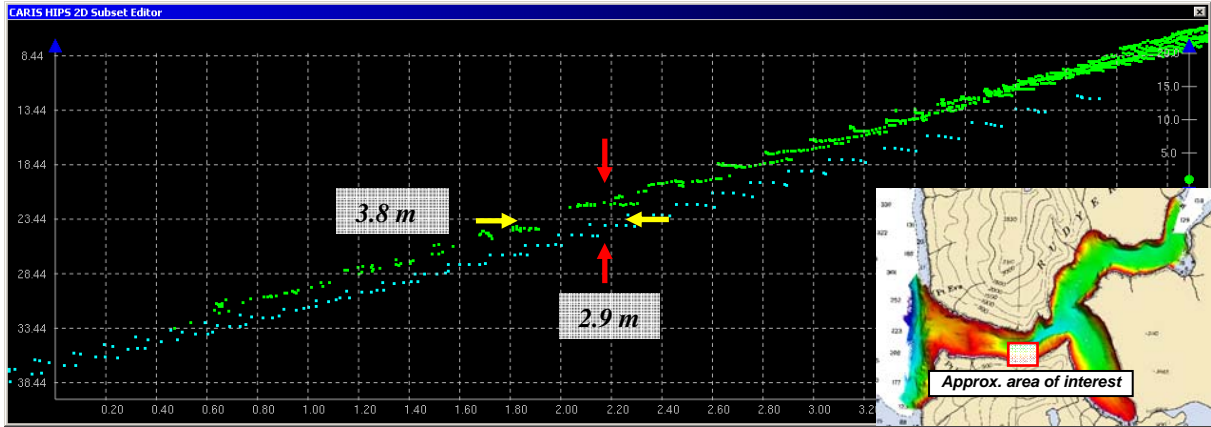


Figure 4 – Line 294_2319 (blue, left) and line 294_2308 (green, right)

The hydrographer believes that the vertical discrepancy is caused by the combination of an error in horizontal positioning and a steep slope of approximately 38.4° . In *Figure 4*, the two lines are offset approximately 2.9 m vertically and 3.8 m horizontally. In *Figure 5*, the geometric relationship for a 3.8 m horizontal offset with a 38.4° slope is shown. The resulting vertical offset is mathematically 3.0 m. Taking into account the horizontal positioning error the vertical error is only 0.1 m between the two lines. This is well within IHO Order 1 specification for vertical error. The allowable horizontal error for IHO Order 1 specifications is $5\text{ m} + 5\%$ of the water depth. All data affected by just DGPS positioning problems meet IHO Order 1 specification both horizontally and vertically⁸.

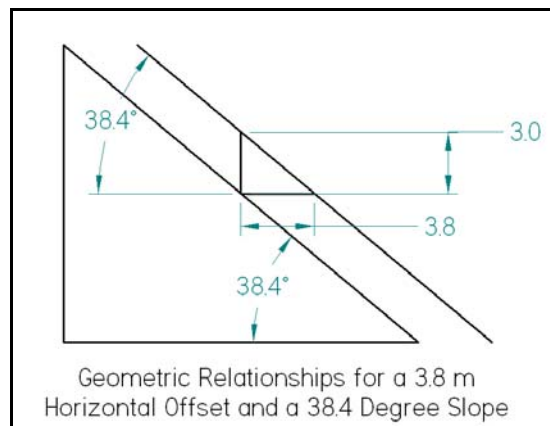


Figure 5 – The geometric relationship between slope and horizontal and vertical offsets.

Roll Error

On November 7th (DN 312), it was discovered that bolts in vessel 1010's transducer mount were coming loose. The affected bolts were re-tightened and a roll patch test was conducted on November 8th (DN 313) before and after data acquisition. It was determined by this test that the mount is not retaining its position over time. The morning and afternoon roll patch results differed by 0.13° and differed from the previous roll patch test (DN 293) by 0.91° . An average of DN 313's roll patch results were entered into the 1010_8101 HVF for that day. Modifications will be made to the mount system for Launch 1010 during the winter inport.

TrueHeave

It was not possible to apply TrueHeave to data from November 6th (DN 311) due to a corrupt TrueHeave file. Real time heave correctors, recorded in the .XTF format in Triton Imaging's Isis software, were used in place of TrueHeave data. Data from that day conforms to the standards prescribed by *NOS Hydrographic Surveys Specifications and Deliverables (NHSSD)*, as updated for March 2003⁹.

B.3 Corrections to Echo Soundings

Data reduction procedures for survey H11335 conform to those detailed in the *FAIRWEATHER Data Acquisition and Processing Report - 2004*.

Slight data gaps appear in some of the shoaler areas surveyed. An attempt was made to fill in these gaps, but due to mechanical difficulties with the launches at the end of the project, they could not be filled. There are a total of 7 gaps. The smallest gap measures 4x4m and the largest of these gaps is 10x5m long. The majority of the gaps (5 of 7) measured 4x4m. In the vicinity of these gaps the survey did not meet the multibeam coverage requirements as defined by the Letter Instructions and the NOS Hydrographic Surveys Specifications and Deliverables. From examination of corresponding multibeam backscatter no navigationally significant items were found and therefore there is no additional need for MBES coverage¹⁰.

B.4. BASE Surfaces

BASE surfaces were created and examined on a daily basis during acquisition. All child layers were checked for flyers, systematic errors, and significant features. When data acquisition was complete, BASE surfaces with the appropriate resolutions were created. These BASE surfaces were named to include the survey registry number, depth range, and resolution. The surfaces were finalized in the field to include designated soundings and allow the hydrographer to examine coverage at the appropriate resolution. The finalized surfaces will be recreated at the Pacific Hydrographic Branch after verified (smooth) tides have been applied. Overlap was included in the finalized surfaces to show BASE surface coverage in areas of steep slope. These values should be used in finalization.

BASE surface	Resolution (m)	Range (m)
H11335_0-45_0p8m	0.8	0 to 45
H11335_15-80_2m	2	15 to 80
H11335_50-180_5m	5	50 to 180
H11335_140-310_12m	12	140 to 310
H11335_270-560_22m	22	270 to 560

Designated soundings were selected in subset for Dangers to Navigation and significant features that had soundings more than one-half meter shoaler than the BASE surface.

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H11335 can be found in the *OPR-O193-FA-04 Horizontal and Vertical Control Report*¹¹, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C.1 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. Differential corrections from the U.S. Coast Guard beacon at Annette Island (323 kHz) were utilized during this survey.

C.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Ketchikan, AK (945-0460) served as control for datum determination and as the primary source for water level reducers for survey H11335.

FAIRWEATHER personnel installed a Sutron 8210 “bubbler” tide gauge at the tertiary station listed below. The gauge was installed in order to provide information to Center for Operational Oceanographic Products and Services (CO-OPS N/OPS1) for the determination of time and height correctors, in accordance with the Project Instructions.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Rudyard Bay	945-0651	30 Day	October 19, 2004	November 6, 2004

Gauge #9 (S/N 002332) was initially installed on October 10, 2004 (DN 284). However, subsequent pressure sensor and time failure of this gauge necessitated replacement of the gauge. The data acquired by gauge #9 was not usable.

The replacement gauge (#14, S/N 024444) was installed on October 19, 2004 (DN 293) and acquired usable data until November 4, 2004 (DN 309). A landslide at the site of the tide gauge destroyed most of the equipment and severed the tubing from the gauge to the orifice. No further water level data were acquired. Remnants of the station and equipment were removed on November 6, 2004 (DN 311).

Refer to the Horizontal and Vertical Control Report for this project for further information about the tide station.

Multibeam data for H11335 were acquired from October 20th through November 3rd. Shoreline features, acquired prior to October 20th and requiring vertical correctors, were reacquired after October 20th.

All data were reduced to MLLW using unverified observed tides from station Ketchikan, AK by applying tide file 9450460.tid and time and height correctors through the revised zone corrector file O193FA2004CORP_rev.zdf.

The Pacific Hydrographic Branch will apply final approved (smooth) tides to the survey data during final processing¹². A request for delivery of final approved (smooth) tides for survey H11335 was forwarded to N/OPS1 on Nov 15th, 2004 in accordance with FPM 4.8. A copy of the request is included in Appendix V.

D. RESULTS AND RECOMMENDATIONS

D.1 Automated Wreck and Obstruction Information System (AWOIS) Investigations

A total of two (2) AWOIS items were located within the limits of H11335 and investigated during this survey. Investigation methods, results, and charting recommendations have been entered into the Pydro session for the sheet, H11335.pss and will be submitted with the digital data. A report titled H11335_AWOIS was generated and is included in Appendix 3 of this report.

D.2 Chart Comparison

Survey H11335 was compared with charts 17424 (6th ed.; October 13, 1990, 1:80,000), and 17420 (26th ed.; September 22, 2001, 1:229,376)¹³. The charts were corrected through NTM 52/04 dated 25 December 2004.

Chart 17424

Depths from survey H11335 generally did not agree with the depths on chart 17424. In many instances the survey found deeper depths than what is charted, particularly close to shore¹⁴. This may be attributed to cartographic license in the preparation of the chart (shoal soundings moved offshore). In many other instances, the survey found shoaler depths within the area of the sounding characters, as well as between soundings. Increased bottom coverage using modern multibeam equipment may account for these discrepancies.

Chart 17420

Depths from survey H11335 generally did not agree with the depths on chart 17420. Several depths from the survey were significantly shoaler, and several were significantly deeper¹⁵. This is not unexpected given the relatively small scale of the chart.

Recommendations

Multibeam data acquired by NOAA Ship FAIRWEATHER (S220) for survey H11335 meets IHO Order 1. Multibeam data acquired by Launch 1010 meet IHO Order 2. The Hydrographer has determined that bottom coverage requirements have been met and survey data are adequate to supersede charted depths in their common areas¹⁶.

D.3 Shoreline

Shoreline Source

There were two sources of shoreline provided for this project. The Mean High Water (MHW) line was provided in vector format from photogrammetric survey CM-8314 (NAD 27) at the scale of 1:20,000. The Mean Lower Low Water (MLLW) line was provided in vector format from project AK0307 (NAD 83) GC-10557 at the scale of 1:20,000.

MapInfo was used to translate the source shoreline files to shape files for editing. The shape files were then translated to .hob file format in CARIS Notebook 2.2 Beta. The process for translating from a shape file to .hob file is included in the *FAIRWEATHER Data Acquisition and Processing Report – 2004*. Charted shoreline, when used for reference purposes or when source data were not available, was digitized with S57 attribution into the Notebook H11335_CHD_Shoreline.hob file.

Shoreline Verification

FAIRWEATHER personnel conducted limited verification of the Cartographic Feature File (CFF) and charted shoreline using vessels 2302 and 1701. Operations were conducted at times near predicted low water, in accordance with the Standing Project Instructions and FPM, sections 6.1 and 6.2.

Detached positions (DPs) and generic positions (GPs) acquired during shoreline verification indicate revisions to features, or features not found in the field. They were recorded in the shoreline acquisition software TerraSync and on DP forms, then processed through GPS Pathfinder. Scanned copies of the DP forms¹⁷ are included in the digital Separates folder and hard copies can be found with the Separates to be included with Survey Data. In addition, annotations describing shoreline were recorded on hard copy plots of the digital shoreline, or boat sheets.

Terminology used during shoreline verification followed standards agreed upon between the Pacific Hydrographic Branch and FAIRWEATHER personnel. The term “Noted” indicates that the feature is correctly located within the scale of the chart or source, as confirmed from a distance. The term “Verified” was used when the existence of the feature was confirmed in close proximity and the feature is correctly located within the scale of the survey.

In several cases charted rocks were noted at the scale of the chart during shoreline. Subsequently the charted rock locations were covered by multibeam. The charted rocks do exist inshore of the multibeam data.

Shoreline Data Processing

In an effort to streamline the data pipeline from the field to the processing branch, MapInfo tables and workspaces were not used for shoreline processing by FAIRWEATHER personnel. Instead, Pydro and CARIS Notebook were used exclusively.

Positions acquired during shoreline verification operations were brought from GPS Pathfinder into Pydro using the Generic GPs/DPs Import tool. Investigation or survey methods were listed under the Remarks tab in Pydro. Features were flagged as Primary, unless there were multiple DPs/GPs taken on the same feature. In that case, the most important DP was marked Primary and the associated DPs/GPs were flagged Secondary. A Carto Action of Add, Modify or Delete was assigned to each item in Pydro, and all features were S57 attributed.

Items for survey H11335 associated with a detached or generic position that needed further discussion were flagged Report in Pydro. Along with the investigation methods provided in the Remarks tab, the Hydrographer included recommendations to the cartographer in the Recommendations tab when appropriate. A report with these items was generated and saved as H11335_Shoreline_Report.pdf in Appendix 4¹⁸.

All primary detached positions were imported from the Pydro .xml to CARIS Notebook 2.2 Beta. Three separate stand alone .hob files were created for the features, based on the Carto Action assigned in Pydro. The separated files were named H11335_Add_Features.hob, H11335_Modify_Features.hob, H11335_Delete_Features.hob. Remarks and recommendations from Pydro were imported to the “remrks” and “recomd” fields associated with each feature in CARIS Notebook. A file name H11335_Delete.hob contains charted items which are to be deleted.

There were no new HW/MLLW features or changes to the source shoreline. Any comments made on the boat sheet from observations made in the field, including field notes made by the Hydrographer regarding verification of features, were added to the associated features in CARIS Notebook. Remarks pertaining to point features were added directly to the “remrks” field of the feature in the .hob file. Marker layers were used to add comments to line features that did not have an associated DP or GP.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the CARIS Notebook files and final sounding files supersede and complement shoreline information compiled on the CFF and charts¹⁹.

D.4 Dangers to Navigation

There were no Dangers to Navigation (DTONs) found during this survey²⁰.

D.5 Aids to Navigation

Survey H11335 included no aids to navigation (ATONs)²¹.

D.6 Miscellaneous

Survey H11335 included one mooring buoy. The mooring buoy was positioned by DP and SWMB and is included in Pydro H11335.pss and Caris Notebook H11335_Modify_Features.hob.

Bottom samples were collected and are included as seabed classifications in Pydro H11335.pss and Caris Notebook H11335_Add_Features.hob.

The relevant chapter of *Coast Pilot 8*; 26th Ed., 2004, has been edited and submitted in digital form to the Coast Pilot Branch.

D.7 Supplemental Reports

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
FAIRWEATHER Data Acquisition and Processing Report - 2004	05/03/05	N/CS34
Horizontal and Vertical Control Report for OPR-O193-FA	07/15/05	N/CS34 & N/OPS1

Revisions Compiled During Office Processing and Certification

¹ Filed with Project Records

² Filed with Project Records

³ Concur with clarification. Insufficient crosslines were acquired; however main scheme and crossline agreement meet accuracy standards.

⁴ Concur. H11334 and H11369 have been compiled to HCells. At the junction of HCell H11335 and H11334 a shoaler 19 fathom sounding will replace a 30 fathom sounding from H11334.

⁵ Concur

⁶ Concur

⁷ Concur

⁸ Concur

⁹ Concur

¹⁰ Do not concur. No gaps in data coverage were found in the combined 22m surface or the 12m surface. The higher resolution surfaces do not create full bottom coverage models. This exact paragraph exists in the DR for H11369, for which it holds true. This paragraph may have been included in this DR by accident.

¹¹ Filed with Project Records

¹² Concur. Final tides were applied by the Pacific Hydrographic Branch during the Survey Acceptance Review. A tide note is attached to this report.

¹³ Chart comparison was performed with the most recent edition of chart 17424 (8th Ed., May 1, 2007, NM May 12, 2007) and 17420 (28th Ed., March 2007, NM March 3, 2007). No ENC exists for this area.

¹⁴ Concur

¹⁵ Concur

¹⁶ Concur

¹⁷ Filed with Hydrographic Records

¹⁸ Filed with Hydrographic Records

¹⁹ Concur

²⁰ Concur

²¹ Concur



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
NOAA Ship FAIRWEATHER S-220
1010 Stedman Street
Ketchikan, AK 99901

August 22, 2005

MEMORANDUM FOR: CDR Don Haines, NOAA
Chief, Pacific Hydrographic Branch

FROM: CAPT John E. Lowell, Jr, NOAA *John E. Lowell Jr.*
Commanding Officer

TITLE: Approval of Hydrographic Survey ~~H11369~~, H11335
OPR-O193-FA

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H11335 in accordance with the Hydrographic Manual, Fourth Edition; Hydrographic Survey Guidelines; Field Procedures Manual, January 2005 Preliminary Version 1.0; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for March, 2003. Exceptions to standard field surveying and processing procedures are noted in the Descriptive Report, the Data Acquisition and Processing Report and the Horizontal and Vertical Control Report. Additional guidance was provided by applicable Hydrographic Technical Directives. This survey is complete within its limits. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

I acknowledge that all of the information contained in this report is complete and accurate to the best of my knowledge.

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

Mark Van Waes

For LT Mark Van Waes
Survey Manager

Mark A. Wetzler

LT Mark A. Wetzler
Field Operations Officer

Attachment



H11335 Shoreline Report

Registry Number: H11335
State: AK
Locality: Behm Canal
Sub-locality: Western Rudyerd Bay
Project Number: OPR-O193-FA
Survey Dates: 10/12/2004 - 11/03/2004

Items for survey H11335 associated with a detached or generic position that needed further discussion were flagged Report in Pydro. Investigation methods and recommendations were provided in the Remarks and Recommendations tabs.

Charts Affected

Number	Version	Date	Scale
17424	7th Ed.	03/01/2004	1:80000
17420	26th Ed.	09/22/2001	1:229376
16016	20th Ed.	11/01/2003	1:969756
531	22nd Ed.	03/01/2004	1:2100000
530	30th Ed.	03/23/2002	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
8427/9	Sounding	0.76 m	55° 31' 40.222" N	130° 46' 59.610" W
146/11	Sounding	1.70 m	55° 34' 38.377" N	130° 47' 39.441" W
128803	Sounding	12.10 m	55° 31' 52.752" N	130° 46' 36.687" W
128802	Sounding	1.11 m	55° 31' 59.573" N	130° 46' 47.089" W
128801	Sounding	4.12 m	55° 32' 03.604" N	130° 46' 52.072" W
23012	Sounding	-2.08 m	55° 34' 10.134" N	130° 48' 28.250" W
12863	Sounding	-2.15 m	55° 34' 10.122" N	130° 48' 28.331" W
23011	Sounding	0.53 m	55° 33' 04.400" N	130° 50' 37.067" W
chd (17424) rk swmb disproval	GP	[None]	55° 32' 36.429" N	130° 51' 47.942" W
OBSTRUCTION	AWOIS	[no data]	[no data]	[no data]

128705	AWOIS	[None]	55° 31' 39.276" N	130° 46' 54.763" W
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1 - Features from Bathymetry

1.1) 8427/9

Survey Summary

Survey Position: 55° 31' 40.222" N, 130° 46' 59.610" W
Least Depth: 0.76 m
Timestamp: 2004-295.17:45:31.269 (10/21/2004)
Survey Line: h11335 / 1010_8101 / 2004-295 / 295-1728
Profile/Beam: 8427/9
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

[None]

Hydrographer Recommendations

[None]

S-57 Data

[None]

Office Notes

Chart 0fm 2ft sounding as rock

1.2) 146/11

Survey Summary

Survey Position: 55° 34' 38.377" N, 130° 47' 39.441" W
Least Depth: 1.70 m
Timestamp: 2004-308.20:53:00.373 (11/03/2004)
Survey Line: h11335 / 1010_8101 / 2004-308 / 308-2052
Profile/Beam: 146/11
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

[None]

Hydrographer Recommendations

[None]

S-57 Data

[None]

Office Notes

Do not chart. A shoaler 0fm 4ft sounding was found in the area and will be charted as a rock.

2 - Detached Positions (DPs)

2.1) 128803

Survey Summary

Survey Position: 55° 31' 52.752" N, 130° 46' 36.687" W
Least Depth: 12.10 m
Timestamp: 2004-288.15:37:53.000 (10/14/2004)
DP Dataset: h11335 / trb1_dpne / 2004-288 / tr1_288_\$csymb.shp
Profile/Beam: 1/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

128803 chd (17424) rk swmb disproval

The charted (17424) rock in position 55°31'52.862"N , 130°46'37.745"W (387831.92E , 6155356.51N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Hydrographer Recommendations

The Hydrographer recommends removal of the charted rock.

Cartographically-Rounded Depth (Affected Charts):

6 ½fm (17424_1, 17420_1, 16016_1, 530_1)

6fm 3ft (531_1)

12.1m (50_1)

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)

Attributes: INFORM - 128803 chd (17424) rk swmb disproval The charted (17424) rock in position 55°31'52.862"N , 130°46'37.745"W (387831.92E , 6155356.51N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Office Notes

Concur. Remove charted rock at position 55°31'52.862"N , 130°46'37.745"W.

2.2) 128802

Survey Summary

Survey Position: 55° 31' 59.573" N, 130° 46' 47.089" W
Least Depth: 1.11 m
Timestamp: 2004-288.15:32:42.000 (10/14/2004)
DP Dataset: h11335 / trb1_dpne / 2004-288 / tr1_288_uwtroc.shp
Profile/Beam: 2/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

128802 chd (17424) rk swmb disproval

The charted (17424) rock in position 55°31'59.332"N , 130°46'50.306"W (387616.85E , 6155562.14N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Hydrographer Recommendations

The Hydrographer recommends removal of the charted rock.

Cartographically-Rounded Depth (Affected Charts):

0 ½fm (17424_1, 17420_1, 16016_1, 530_1)

0fm 3ft (531_1)

1.1m (50_1)

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)

Attributes: INFORM - 128802 chd (17424) rk swmb disproval The charted (17424) rock in position 55°31'59.332"N , 130°46'50.306"W (387616.85E , 6155562.14N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Office Notes

Concur. Remove charted rock at position 55°31'59.332"N , 130°46'50.306"W.

2.3) 128801

Survey Summary

Survey Position: 55° 32' 03.604" N, 130° 46' 52.072" W
Least Depth: 4.12 m
Timestamp: 2004-288.15:25:43.000 (10/14/2004)
DP Dataset: h11335 / trb1_dpne / 2004-288 / tr1_288_uwtroc.shp
Profile/Beam: 1/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

128801 chd (17424) rk swmb disproval

The charted (17424) rock in position 55°32'04.830"N , 130°46'56.760"W (387508.07E , 6155734.96N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Hydrographer Recommendations

The Hydrographer recommends removal of the charted rock.

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (17424_1, 17420_1, 16016_1, 530_1)

2fm 1ft (531_1)

4.1m (50_1)

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)

Attributes: INFORM - 128801 chd (17424) rk swmb disproval The charted (17424) rock in position 55°32'04.830"N , 130°46'56.760"W (387508.07E , 6155734.96N) was not located during shoreline verification (visual and VBES search). SWMB data was gathered over the entirety of the area encompassed by the rock symbol and no evidence of the rock was found.

Office Notes

Concur. Remove charted rock at position 55°32'04.830"N , 130°46'56.760"W.

2.4) 23012

Survey Summary

Survey Position: 55° 34' 10.134" N, 130° 48' 28.250" W
Least Depth: -2.08 m
Timestamp: 2004-301.16:48:39.000 (10/27/2004)
DP Dataset: h11335 / trb2_dpne / 2004-301 / tr2_301_uwtroc.shp
Profile/Beam: 2/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

new rk

This DP was taken to provide height data for the new rock DP #12863. See remarks for DP #12863.

Use DP #12863 for position; use DP #23012 for height.

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

-1fm (17424_1, 17420_1, 16016_1, 530_1)

-1fm 1ft (531_1)

-2.1m (50_1)

S-57 Data

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

Attributes: INFORM - new rk This DP was taken to provide height data for the new rock DP #12863. See remarks for DP #12863. Use DP #12863 for position; use DP #23012 for height.

OBJNAM - 23012

VALSOU - -2.076 m

WATLEV - 4:covers and uncovers

Office Notes

Chart height of DP #23012 at the position of DP #12863. See remarks.

Feature Images



Figure 2.4.1

2.5) 12863

Survey Summary

Survey Position: 55° 34' 10.122" N, 130° 48' 28.331" W
Least Depth: -2.15 m
Timestamp: 2004-286.16:55:39.000 (10/12/2004)
DP Dataset: h11335 / trb1_dpne / 2004-286 / tr1_286_uwtroc.shp
Profile/Beam: 2/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

new rk

This DP was taken during a period where tide data was not available, though good GPS data was. DP #23012 was taken to replace this DP, but only an uncorrected GPS position was acquired.

Use DP #12863 for position; use DP #23012 for height.

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

-1fm (17424_1, 17420_1, 16016_1, 530_1)

-1fm 1ft (531_1)

-2.2m (50_1)

S-57 Data

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

Attributes: INFORM - new rk This DP was taken during a period where tide data was not available, though good GPS data was. DP #23012 was taken to replace this DP, but only an uncorrected GPS position was acquired. Use DP #12863 for position; use DP #23012 for height.

OBJNAM - 12863

VALSOU - -2.148 m

WATLEV - 4:covers and uncovers

Office Notes

Chart new rock, use height from DP #23012

2.6) 23011

Survey Summary

Survey Position: 55° 33' 04.400" N, 130° 50' 37.067" W
Least Depth: 0.53 m
Timestamp: 2004-301.16:38:51.000 (10/27/2004)
DP Dataset: h11335 / trb2_dpne / 2004-301 / tr2_301_uwtroc.shp
Profile/Beam: 1/1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

new rk

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

0 ¼fm (17424_1, 17420_1, 16016_1, 530_1)

0fm 1ft (531_1)

.5m (50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: INFORM - new rk
OBJNAM - 23011
QUASOU - 1:depth known
VALSOU - 0.527 m
WATLEV - 4:covers and uncovers

Office Notes

Chart new rock

3 - Geographical Positions (GPs)

3.1 chd (17424) rk swmb disproval

Survey Summary

Survey Position: 55° 32' 36.429" N, 130° 51' 47.942" W
Least Depth: [None]
Timestamp: 2005-039.00:51:04 (02/08/2005)
GP Dataset: ChartGPs - Digitized
GP No.: 1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

chd (17424) rk swmb disproval

The charted (17424) rock in position 55°32'36.410"N , 130°51'48.050"W (382428.30E , 6156845.00N) was not located during shoreline verification (visual and VBES search). Additionally, SWMB data was gathered over the area encompassed by the rock symbol up to the 4 m curve and no evidence of the rock was found.

Hydrographer Recommendations

The Hydrographer recommends removal of the charted rock.

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)
Attributes: INFORM - chd (17424) rk swmb disproval The charted (17424) rock in position 55°32'36.410"N , 130°51'48.050"W (382428.30E , 6156845.00N) was not located during shoreline verification (visual and VBES search). Additionally, SWMB data was gathered over the area encompassed by the rock symbol up to the 4 m curve and no evidence of the rock was found.

Office Notes

Concur. Remove charted rock at position 55°32'36.410"N , 130°51'48.050"W.

4 - AWOIS Database Items

4.1) AWOIS #53118 - OBSTRUCTION

No Primary Survey Feature for this AWOIS Item

Search Position: 55° 31' 53.300" N, 130° 52' 31.300" W
Historical Depth: [None]
Search Radius: 100
Search Technique: VS,ES,S2,MB,DI
Technique Notes: SEARCH ONLY REQUIRED WITHIN THE SAFE NAVIGABLE WATERS FOR DISPROVAL.

History Notes:

TP-01272/86--CLASS III; CHARTED OBSTRUCTION AWASH IDENTIFIED FROM PHOTOGRAPHS.
(ENTERED 5/04 BY JCA.)

Survey Summary

Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

Charted obstruction disproval, AWOIS #53118

INVESTIGATION METHOD: 100% SWMB

INVESTIGATION SUMMARY: The charted (17424) obstruction was disproved with 100% SWMB coverage over the entire area of investigation in to the 4m curve. The shoreline was visually inspected by the hydrographer with no obstruction found. Thorough review of the SWMB data in subset mode, and utilizing BASE tools showed no sign of the obstruction.

Hydrographer Recommendations

Recommend removal of the charted (17424) obstruction and charting the area with depths from this survey, H11335 OPR-O193-FA-04.

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)

Attributes: INFORM - Charted obstruction disproval, AWOIS #53118 INVESTIGATION METHOD: 100% SWMB INVESTIGATION SUMMARY: The charted (17424) obstruction was disproved with 100% SWMB coverage over the entire area of investigation in to the 4m curve. The shoreline was visually inspected by the hydrographer with no obstruction found. Thorough review of the SWMB data in subset mode, and utilizing BASE tools showed no sign of the obstruction.

Office Notes

Concur. Remove charted obstruction.

4.2) AWOIS #53102 - OBSTRUCTION

Primary Survey Feature is GP No. - 1 from ChartGPs - TR1287_MORFAC.shp

Search Position: 55° 31' 40.780" N, 130° 47' 02.120" W
Historical Depth: [None]
Search Radius: 200
Search Technique: VS,ES,S2,MB,DI,SD
Technique Notes: SEARCH ONLY REQUIRED WITHIN THE SAFE NAVIGABLE WATERS FOR DISPROVAL.

History Notes:

CL260/77--FOREST SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE. WITH THE APPROVAL OF THE USCOE THE USFS PLACED AN ANCHOR BUOY IN BEHM CANAN AT PUNCHBOWL COVE, RUDYERD BAY, ALASKA, TONGASS NATIONAL FOREST, ABOUT 30 MILES ENE OF KETCHIKAN AT POSITION 55/31/42N, 130/46/56W(NAD 27). (ENTERED 1/04 BY JCA)

Survey Summary

Survey Position: 55° 31' 39.276" N, 130° 46' 54.763" W
Least Depth: [None]
Timestamp: 2004-287.17:28:32.000 (10/13/2004)
GP Dataset: ChartGPs - TR1287_MORFAC.shp
GP No.: 1
Charts Affected: 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

Mooring buoy position (AWOIS item #53102)

INVESTIGATION METHOD: Visual

INVESTIGATION SUMMARY: The charted (17424) mooring buoy was located approximately 155m east-southeast of the charted position, and within the search radius for AWOIS item #53102.

Hydrographer Recommendations

Recommend the position of the mooring buoy (AWOIS #53102) be updated to reflect position associated with GP#128705.

S-57 Data

Geo object 1: Mooring/warping facility (MORFAC)

Attributes: CATMOR - 7:mooring buoy

INFORM - Mooring buoy position (AWOIS item #53102) INVESTIGATION METHOD: Visual INVESTIGATION SUMMARY: The charted (17424) mooring buoy was located approximately 155m east-southeast of the charted position, and within the search radius for AWOIS item #53102.

Office Notes

Concur. Chart new position of mooring buoy

Feature Images



Figure 4.2.1



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: May 5, 2005

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-0193-FA-2004
HYDROGRAPHIC SHEET: H11335

LOCALITY: Western Rudyerd Bay
Behm Canal, AK

TIME PERIOD: October 12 - November 3, 2004

TIDE STATION USED: 945-0460 Ketchikan, AK
Lat. 55° 20.0'N Lon. 131° 37.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.433 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SA78, SA79 & SA80

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 new 1983-2001 National Tidal Datum Epoch (NTDE).

Note 2: The Fairweather was unable to conduct closing levels at the subordinate gauge, Rudyerd Bay (945-0651). Therefore Rudyerd Bay cannot be used for tide correction. The control water level station at Ketchikan (945-0460) is used as the reference station for the purpose of providing tide correction. The gauge at Rudyerd Bay was used for final zoning.

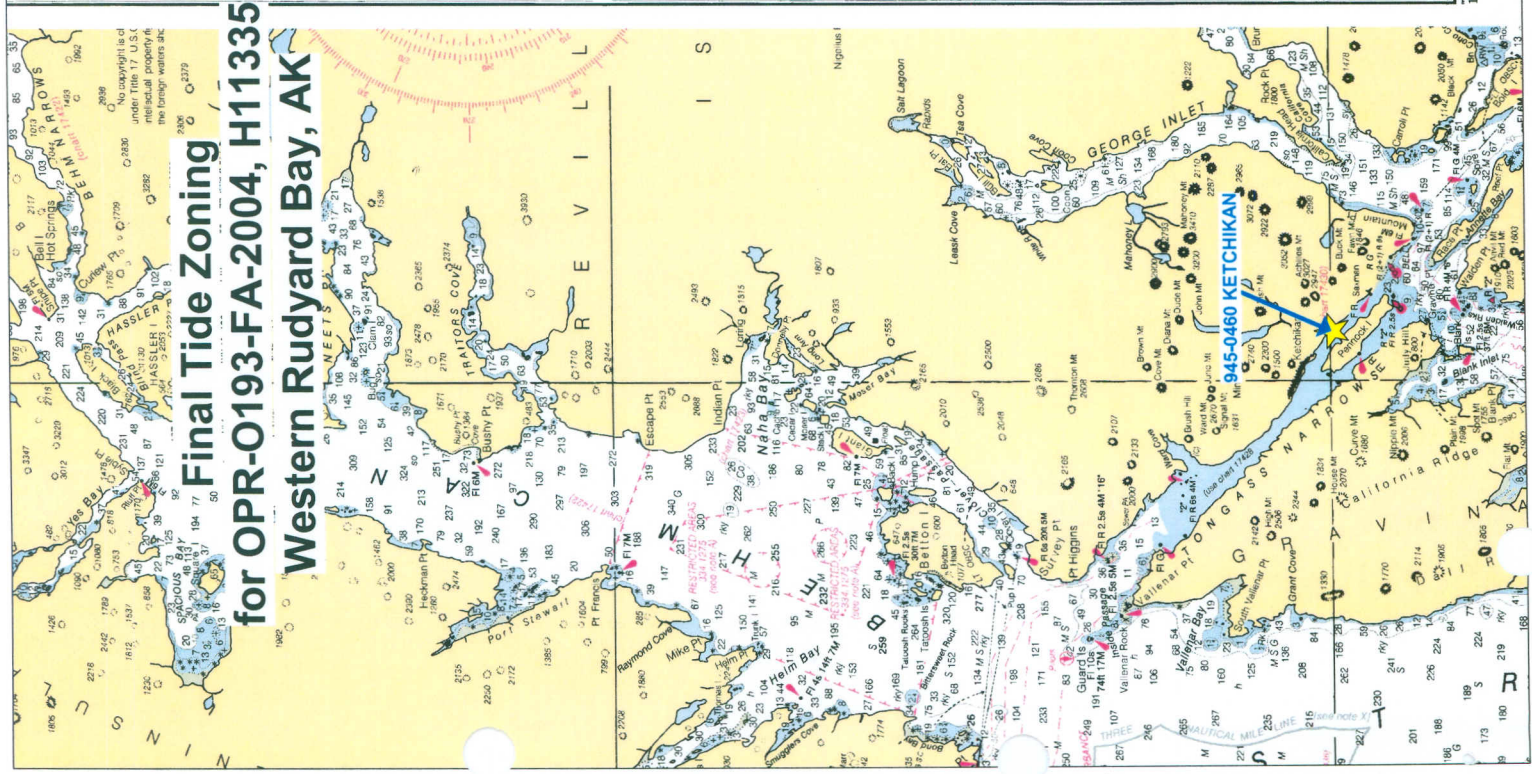
Thomas V. Mero 6/6/05

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

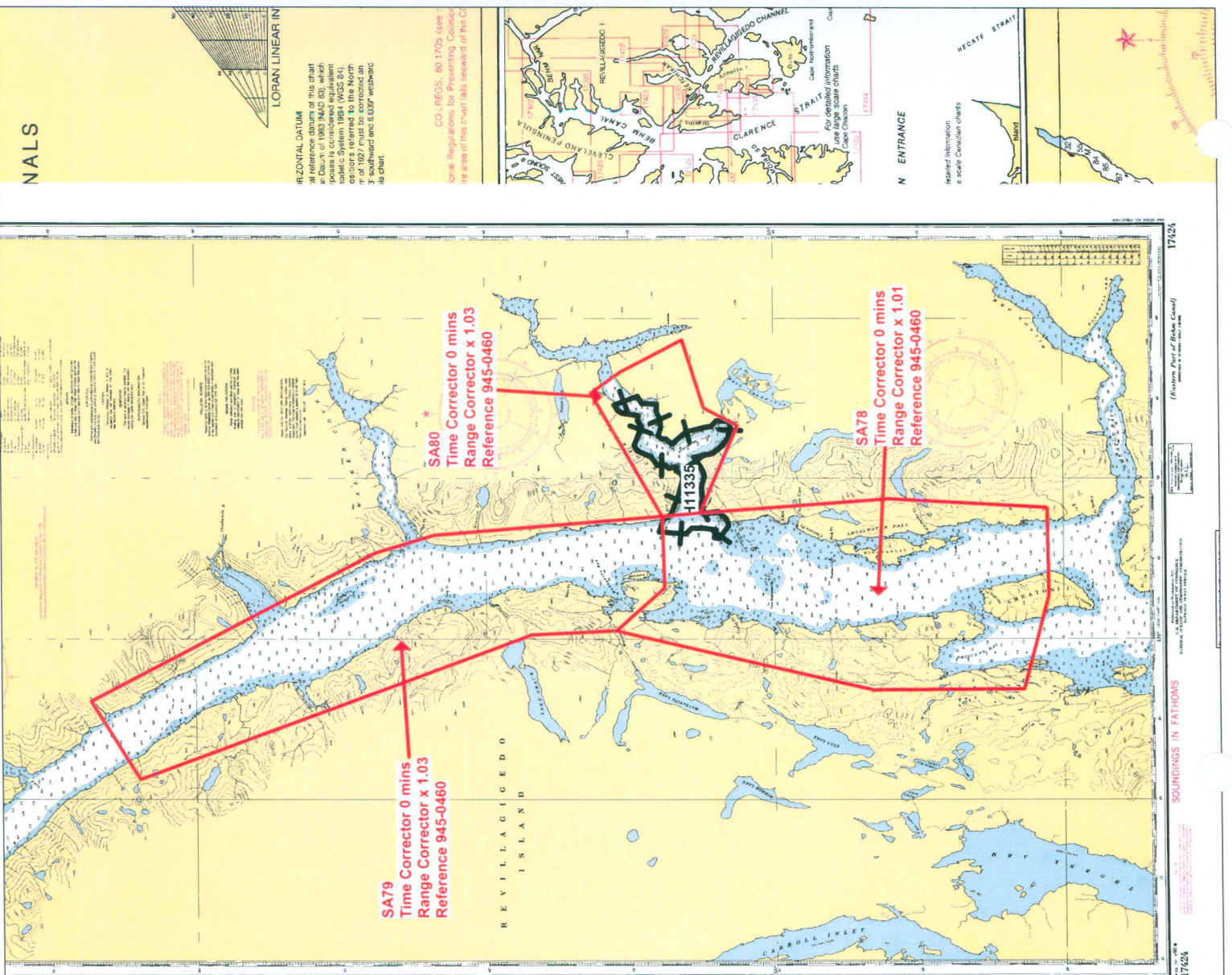
Final tide zone node point locations for OPR-O193-FA-2004, H11335

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
Zone SA78	945-0460	0	1.01
-131.052527 55.356473			
-131.053306 55.442747			
-130.991892 55.591159			
-130.947613 55.563204			
-130.873177 55.564335			
-130.869921 55.542466			
-130.855183 55.433649			
-130.864215 55.342746			
-130.956111 55.341884			
-131.052527 55.356473			
Zone SA79	945-0460	0	1.03
-131.145968 55.865529			
-130.995951 55.640537			
-130.991892 55.591159			
-130.947613 55.563204			
-130.873177 55.564335			
-130.892866 55.696589			
-130.91105 55.729996			
-131.06462 55.893477			
-131.145968 55.865529			
Zone SA80	945-0460	0	1.03
-130.873177 55.564335			
-130.74451 55.605122			
-130.722106 55.587451			
-130.689265 55.552208			
-130.759993 55.539985			
-130.778434 55.520475			
-130.869921 55.542466			
-130.873177 55.564335			



**Final Tide Zoning
for OPR-0193-FA-2004, H11335
Western Ruyard Bay, AK**



H11335 HCell Report
Sarah Wolfskehl, Hydrographic Survey Intern
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to directly update NOAA ENC's with new survey information in International Hydrographic Organization (IHO) format S-57. HCell compilation of survey H11335 utilized Office of Coast Survey HCell Specifications Versions 3.0, in conjunction with the Field and Processing Branch Features Encoding Guide for West Coast US and Alaska Version 1.3. HCell H11335 will be used to update chart 17424, 1:80,000 (8th Ed., May 1, 2007, NM 5/12/07).

1. Compilation Scale

Contours and the density of soundings are compiled as appropriate to emulate those of Chart 17424, 1:80,000. Position and density of features included in the HCell have not been generalized from the scale of the hydrographic survey, 1:10,000.

2. Soundings

2.1 Source Data

A 22 m resolution combined BASE surface, H11335_Combined.hns was used as the basis for HCell production following Branch certification.

A survey-scale full density sounding (SOUNDG) feature object source layer was built from the H11335_Combined.hns surface in CARIS BASE Editor. A shoal-biased selection was made at the 1:10,000 survey scale using a radius table with values shown in Table 1. The sounding feature object source layer was exported as H11335_SS.hob, and imported into CARIS HOM.

Upper Limit (m)	Lower Limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	500	5

Table 1.

2.2 Sounding Feature Objects

In CARIS BASE Editor soundings were manually selected from the survey scale sounding set H11335_SS.hob to create a chart scale sounding set H11335_CS.hob. The H11335_CS.hob sounding selection emulates the density and distribution of soundings on chart 17424, while more closely representing the seafloor morphology. The soundings were selected with regard to the 3, 10 and 100 fathom contours.

3. Depth Areas

3.1 Source Data

The finalized Base Surface, H11335_Combined.hns, was used to generate a depth area, and for survey evaluation and verification purposes only, a set of contours. The contour set included the chart equivalent, 3 and 100 fathom contours, plus a 10 fathom contour. The depth contours were not submitted as deliverables, as according to OCS HCell Specifications ver. 3.0. A second BASE Surface of higher resolution, H11335_0p8_final.hns, was used to digitize the perimeter of the depth area that abuts the shoreline to precisely represent coverage around rocks and along the shoreline.

H11335 junctions with HCell H11334 and H11369. The depth area from each bordering survey's HOM file was used to create the shared edge with H11335. H11334, HCell US411334_CU.000, junctions with the northeast side and H11369, US411369_CS.000, junctions with the southwest side.

3.2 Depth Area Feature Objects

One all-encompassing depth range, 0 meter to 458 meters, was used for all depth area objects below MLLW. Upon conversion to NOAA charting units, this depth range is 0 to 250.4 fathoms.

4. Meta Areas

The following Meta object areas are included in HCell H11335:

M_QUAL
M_COVR

Meta area objects were constructed from filtered perimeter lines delineating the survey limits. The perimeter was first used to create the Skin of the Earth (SOTE) layer, then duplicated to the Meta object layers and attributed per the OCS HCell Specifications, Ver. 3.0.

5. Survey Features

Survey features for H11335 were delivered in Pydro and Notebook format. New chart features consist of 4 new rocks and 2 bottom samples. Two AWOIS items were investigated. One was a disproved obstruction and the second a repositioned mooring buoy. The cartographic actions taken for each survey feature are noted in the Pydro file H11335_Office.pss under the office notes tab. The office notes are printed in red at the bottom of each page of the feature report exported from Pydro. Retained features from chart 17424, such as bottom samples and rocks, that fall within the survey limits were digitized to the HCell.

6. Shoreline / Tide Delineation

No shoreline features, including MLLW or MHW lines were used in the creation of HCell H11335.

7. Attribution

All S-57 Feature Objects have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with OCS HCell Specifications ver. 3.0 and the Field and Processing Branch Features Encoding Guide for West Coast US and Alaska Version 1.3.

8. Layout

8.1 CARIS HOM Layering Scheme

100	Survey Scale Soundings
101	Chart Scale Soundings
200	Depth Area/Skin of the Earth
300	Survey Bottom Samples
301	Chart Bottom Samples
302	Survey Rocks
303	Chart Rocks
304	Mooring Buoy
600	M_COVR
601	M_QUAL
800	Blue Notes (spatial only)
1001	Contours (spatial only)
1002	CFF Shoreline (spatial only)

8.2 Blue Notes

Notes regarding HCell feature compilation are on layer 800 and as shape file sets H11335_bluenotes_p.shp and H11335_bluenotes_l.shp for point and line figures, respectively. Blue note point features are placed directly on the feature they refer to unless a line feature leader was necessary for clarity. A copy of the survey perimeter is included in the line shape file set for orientation purposes.

9. Spatial Framework

9.1 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.

9.2 Horizontal and Vertical Units

During creation of sounding sets and contours, and creation of the HCell, 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.

The 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. In an ENC viewer, heights greater than 6 feet will register in fathoms and feet using the above stated rules. Drying heights are in feet and are rounded using arithmetic methods.

HOM 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
Positional Units (PUNI):	Meters

10. QA/QC

10.1 Data Processing Notes

It is recommended that a 10 fathom contour be generated for this area of the chart to replace the 3 fathom contour. The scale of the chart, the steep and deep nature of the seafloor and the high density data set support a 10 fathom contour.

As per Office of Coast Survey HCell Specifications Versions 3.0, `m_covr 2`, `m_nsys`, and islands of coverage around features outside the survey limits are no longer required and have not been included in this HCell. However, the lack of these objects generates many errors in DKart. The errors have been thoroughly reviewed and it is certain they correlate with the missing objects. The DKart errors are acceptable.

10.2 ENC Validation Checks

H11335 was subjected to QA and Validation checks in HOM prior to exporting to the HCell base cell (000) file. Full millimeter precision was retained in the export of the metric S-57 base cell data set. This data set was then converted to a chart unit 000 file. dKart Inspector 5.0 (Service Pack 1) was then used to further check the data set for conformity to the S-58 version 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary.

11. Products

11.1 MCD Deliverables

H11335 Base Cell File, Chart Units, Soundings compiled to 1:80,000
H11335 Base Cell File, Chart Units, Soundings compiled to 1:10,000
H11335 Descriptive Report including end notes compiled during office processing and certification
H11335 HCell Report
H11335 Data Acquisition and Processing Report
Blue Notes shape files

11.2 File Naming Conventions

HOM file set prefix: *H11335_hc*

MCD Chart units base cell file: *US411335_CS.000*

MCD Chart units base cell file, survey scale soundings: *US411335_SS.000*

11.3 Software

HIPS 6.1:	Management and inspection of combined BASE surfaces
BASE Editor 2.1:	Combination of product surfaces and initial creation of the S-57 bathymetry-derived features, examination of base cell files against the chart; chart density sounding selection
HOM 3.3:	Assembly of the HCell, S-57 products, QA
GIS 4.4a:	Setting the sounding rounding variable
dKart Inspector 5.0:	S-58 Validation of the HCell base cell file

12. Contacts

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

Sarah Wolfskehl
Hydrographic Survey Intern
Pacific Hydrographic Branch
Seattle, WA
206-526-6859
Sarah.Wolfskehl@noaa.gov.

APPROVAL SHEET
H11335

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the H-Cell compiled per the latest OCS H-Cell 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 H-Cell, 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.