

F00577

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC
Field No.
Registry No. F00577

LOCALITY

State Alaska
General Locality Northern Glacier Bay
Sublocality Berg Bay and Fingers Bay

2009

CHIEF OF PARTY

..... Captain David O. Neander, NOAA

LIBRARY & ARCHIVES

DATE

<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>	<p>REGISTRY No</p> <p style="text-align: center;">F00577</p>
<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.</p>	<p>FIELD No:</p>
<p>State <u>Alaska</u></p> <hr/> <p>General Locality <u>Northern Glacier Bay</u></p> <hr/> <p>Sub-Locality <u>Berg Bay and Fingers Bay</u></p> <hr/> <p>Scale <u>1:40,000</u> Date of Survey <u>November 9, 2009</u></p> <hr/> <p>Instructions dated <u>9/2/2009</u> Project No. <u>OPR-O351-FA-09</u></p> <hr/> <p>Vessel(s) <u>Launch 2802</u></p> <hr/> <p>Chief of party <u>Captain David O. Neander, NOAA</u></p> <hr/> <p>Surveyed by <u>FAIRWEATHER Personnel</u></p> <hr/> <p>Soundings by <u>Reson SeaBat 7125</u></p> <hr/> <p>SAR by <u>Kay MacDonald</u> Compilation by <u>Katie Reser</u></p> <hr/> <p>Soundings compiled in <u>Fathoms</u></p> <hr/>	
<p>REMARKS: <u>All times are UTC. UTM Zone 8N.</u></p> <hr/> <p><u>The purpose of this survey is to provide contemporary surveys to update</u></p> <hr/> <p><u>National Ocean Service (NOS) nautical charts.</u></p> <hr/> <p><u>Revisions and end notes in red were generated during office processing.</u></p> <hr/> <p><u>Page numbering may be interrupted or non sequential.</u></p> <hr/> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the</u></p> <hr/> <p><u>National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.</u></p> <hr/>	

Descriptive Report to Accompany Hydrographic Survey F00577

Project OPR-0351-FA-09

Glacier Bay, Alaska

Scale 1:40,000

November 2009

NOAA Ship *Fairweather*

Chief of Party: CAPT David O. Neander, NOAA

A. AREA SURVEYED

The survey area was located in Northern Glacier Bay within the sub-locality of Berg Bay and Fingers Bay. This field examination was conducted at the request of the National Park Service to identify shoal areas at the entrances to Berg Bay and Fingers Bay. The field examination corresponds to sheet F in the sheet layout provided with the project instructions, as shown in Figure 1 below.

Data were acquired on November 9th, 2009 (DN 313).

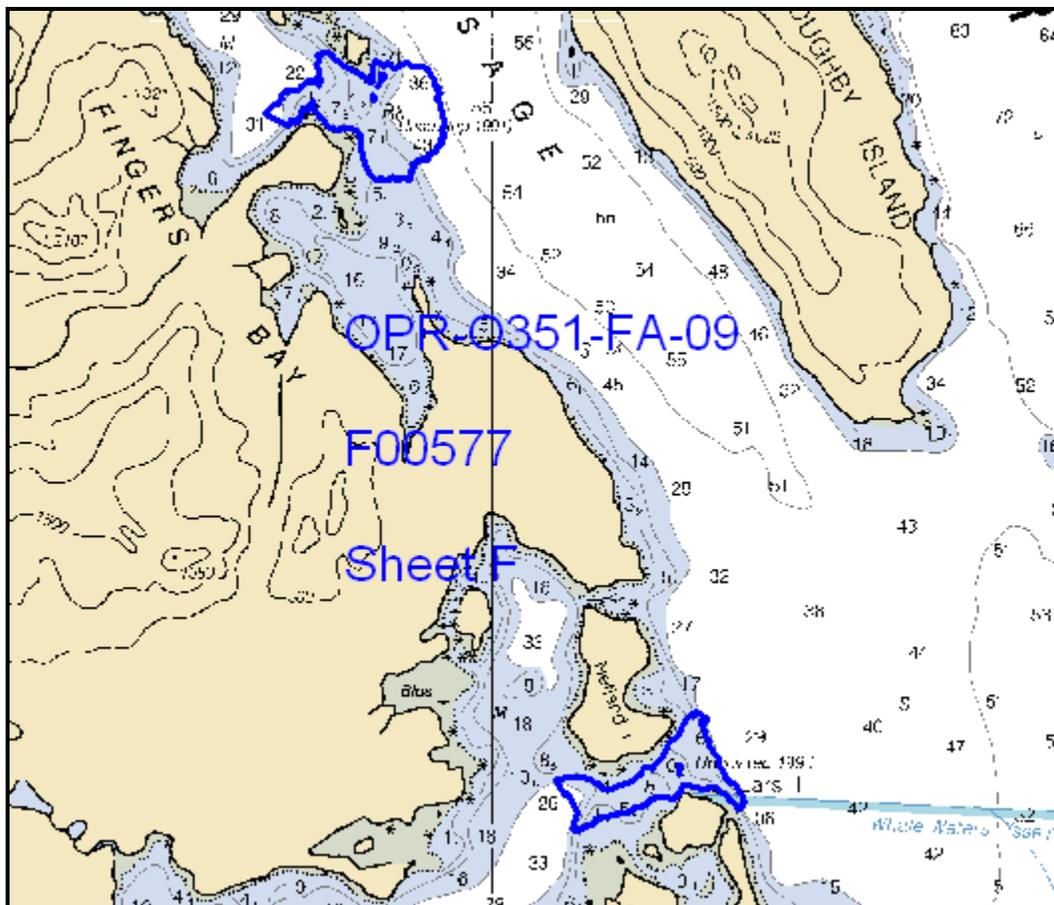


Figure 1: F00577 Survey Outline

One-hundred percent multi-beam echo-sounder (MBES) coverage was obtained in the survey area to at least the 8-meter curve. Data were acquired as close to shore as safely possible. Additional coverage was obtained in order to determine least depths over features or shoals.¹

Main-scheme mileage for MBES acquisition were calculated and are displayed in Table 1 below.

MAIN SCHEME - Mileage	
0	Single Beam MS
20.50	Multibeam MS mileage
0.00	FAIRWEATHER S-220
0.00	Launch 1010
0.00	Launch 1018
0.00	Launch 2801
20.50	Launch 2802
0	SideScan MS
20.50	Total MS
CROSSLINE - Mileage	
0	Single Beam XL
0.00	Multibeam XL
0.00	FAIRWEATHER S-220
0.00	Launch 1010
0.00	Launch 1018
0.00	Launch 2801
0.00	Launch 2802
0.00	Total XL
OTHER	
0	Developments/AWOIS - Mileage
0	Shoreline/Nearshore Investigation - Mileage
0	Total # of Investigated Items
0	Total Bottom Samples
0.55	Total SNM
November 9th 2009	Specific Dates of Acquisition
313	Specific Dn#s of Acquisition

Table 1: F00577 Survey Statistics

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition/processing systems and survey vessels, along with quality control procedures and data processing methods, are included and described in the *NOAA Ship Fairweather 2009 Data Acquisition and Processing Report* (DAPR) and the Addendum to the *Fairweather 2009 DAPR*, which is submitted under separate cover. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections. This field examination was completed as specified by Hydrographic Survey Project Instructions OPR-O351-FA-09, dated September 2nd, 2009.

B1. Equipment and Vessels

Equipment and vessels used for data acquisition and survey operations during this field examination are listed below in Table 2.

	Launch 2802
Hull Registration Number	2802
Builder	Jensen
Length Overall	8.8m (29')
Beam	3.7m (12')
Draft, Maximum	0.3m
Cruising Speed	24 knots
Max Survey Speed	8 knots
Primary Echo-sounder	RESON 7125
Sound Velocity Equipment	SBE 19plus, SVP 71
Attitude & Positioning Equipment	POS/MV V4
Type of operations	MBES

Table 2: Vessel Inventory

No vessel configurations used during data acquisition deviated from the DAPR.

B2. Quality Control

Data acquired using MBES systems on all platforms conform to expected standards.

B.2.1 Crosslines

Multibeam crosslines for this field examination were not run due to limited time available.² This field examination was conducted on the last day of acquisition for the project, prior to the ship sailing to conduct work on the next assignment.

B.2.2 Junctions

Junctions are not applicable for this field examination, per the project instructions.³ The areas examined on sheet F, Fingers Bay and Berg Bay, were located several miles south of sheets C and D of the same project.

B.2.3 Quality Control Checks

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

DENSITY ANALYSIS

A Python script was written aboard *Fairweather* by ST Weston Renoud to compute the percentage of nodes populated with at least five soundings from the finalized BASE surfaces to determine if data density requirements are met. All surfaces meet the density requirement.⁴ Table 3 shows the statistical results of this analysis. In addition, the raw output from the Python script is found in Appendix 5.

Finalized Surface Resolution	Depth Range	Percentage of nodes with five or more soundings
1m	0 - 23	99.78%
2m	18 - 40	99.61%
4m	35 - 80	99.51%
8m	75 - 160	98.82%

Table 3: Five Soundings Per Node Density Analysis results.

B.2.4 Data Quality Factors

COVERAGE ASSESSMENT

The holidays shown below in Figure 2 (Fingers Bay) and Figure 3 (Berg Bay) occurred primarily due to time constraints for this field project, transit times between the two areas surveyed, and time spent dealing with acquisition equipment issues.

For holidays larger than 3 nodes across, the corresponding multi-beam backscatter side scan was examined and no navigationally significant items were found; additionally, the least depths were represented.⁵

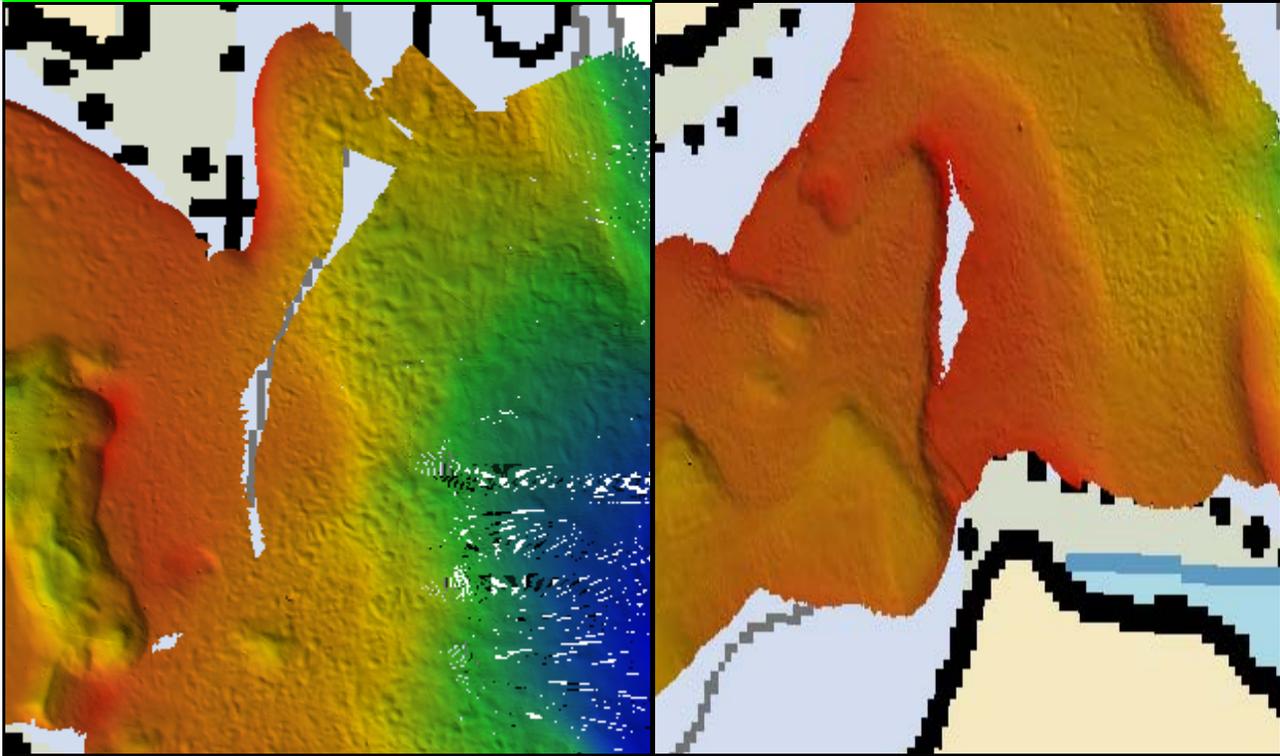


Figure 2: Fingers Bay holiday

Figure 3: Berg Bay holiday

TRUEHEAVE:

Due to limited memory on the acquisition machine, TrueHeave was not logged for some lines. MBES data were investigated in CARIS subset mode and data quality from that day was not affected by the lack of TrueHeave.⁶ Listed below is the series of survey lines for which TrueHeave was not logged: 2009F_3132026 through 2009F_3132227

DESIGNATED SOUNDINGS

Designation of soundings followed procedures as outlined in section 5.1.1.3 of the NOS Hydrographic Surveys Specifications and Deliverables (HSSDM) dated April 2009.

A total of nineteen soundings were designated and are depicted in Figures 4 and 5 below. Seven are within the area surveyed in Berg Bay and twelve are within Fingers Bay. These soundings were designated to preserve shoal depths and to note discrepancies within depth contours.⁷

BOTTOM SAMPLES

Bottom samples were not collected for F00577 due to the limited field time available for survey work.⁸

B.2.5 Accuracy Standards

To assess vertical accuracy standards an “IHO_1” child layer was created for the 1 meter through 8 meter finalized surfaces using logic equation:

$$\text{IHO-1: } ((0.5^2 + ((\text{Depth} * 0.013)^2))^0.5) - \text{Uncertainty}.$$

A color map was used to assess the IHO uncertainty difference layer, green for positive values (Pass) and red for negative values (Fail). Figure 4 shows the IHO_1 child layers for the 1 meter through 8 meter finalized surfaces.

All data meet the data accuracy specifications as stated in the HSSDM.⁹

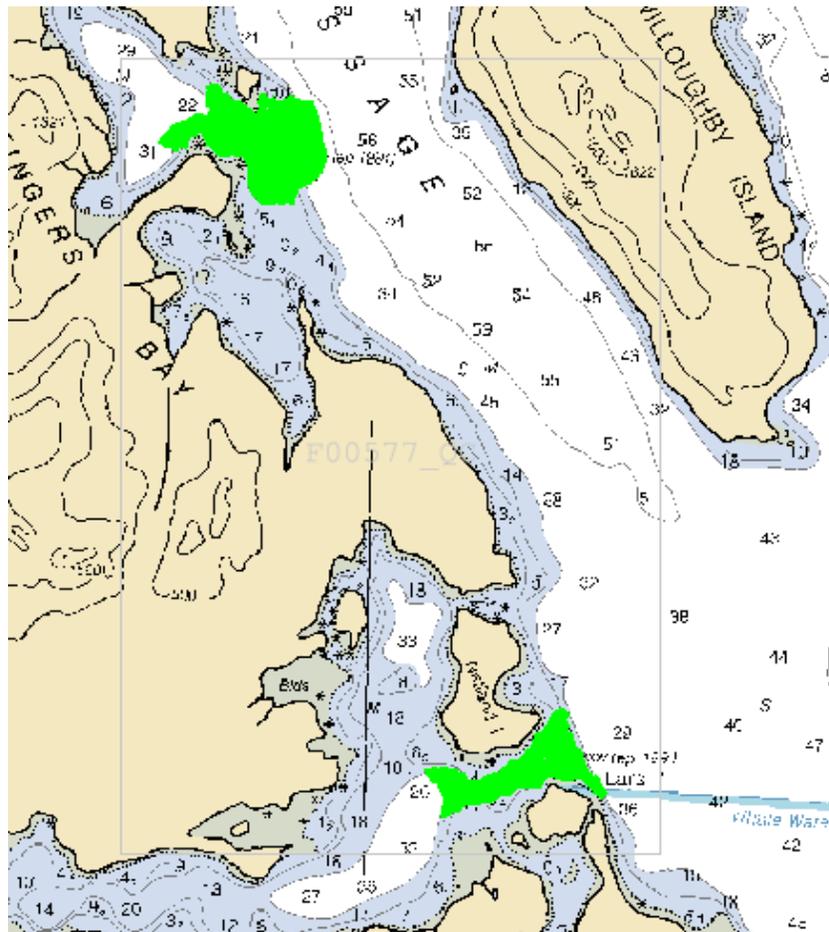


Figure 4: IHO Order 1 Pass (green) or Fail (red)

B3. Corrections to Echo Soundings

Data reduction procedures for F00577 conform to those detailed in the DAPR, with exceptions discussed below.

B4. Data Processing

Initial data acquisition and processing notes are included in the acquisition and processing logs. Additional processing actions, such as final tides and sound velocity applied, are most accurately tracked in the survey wide query in the “Reviewer Qry” tab of the F00577 Data Log spreadsheet. All of the logs are included in the digital Separates I folder.

Data processing procedures for survey F00577 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v7.0, and Hotfix 5. All data were then subsequently processed using CARIS HIPS & SIPS v7.0, Service Pack 1, Hotfix 1, 3 and 4. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE (Combined Uncertainty and Bathymetry Estimator) Surfaces and Parameters utilized, along with any deviations from the processing procedures outlined in the DAPR are discussed below.

TPE/TPU VALUES:

The survey specific parameters used to compute TPE/TPU in CARIS for F00577 are listed in Table 4.

Tide values:	Measured	0.01 m	Zoning	0.2 m
Sound Speed Values:	Measured	1.0 m/s	Surface	0.5 m/s

Table 4: Survey Specific CARIS TPE/TPU Parameters

CUBE SURFACES:

The CARIS HIPS BASE (Bathymetry Associated with Statistical Error) surfaces created and the associated resolutions and depth ranges are listed below in Table 5.¹⁰

The NOAA CUBE parameters mandated in Hydrographic Surveys Technical Directive 2009-2 were used for the creation of all CUBE BASE surfaces in Survey F00577 and are listed in Table 5 below.

Field sheet Name	Surface Name	Depth Ranges (m)	Resolution (m)	CUBE Parameters
F00577_QC	F00577_1m	All	1	NOAA_1m
	F00577_2m	All	2	NOAA_2m
	F00577_4m	All	4	NOAA_4m
	F00577_8m	All	8	NOAA_8m
	F00577_1m_Final_0to23	0-23	1	
	F00577_2m_Final_18to40	18-40	2	
	F00577_4m_Final_35to80	35-80	4	
	F00577_8m_Final_75to160	75-160	8	
	F00577_Combined_8m		8	

Table 5: Depth Ranges, Resolutions, and CUBE Parameters

C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey F00577 can be found in the *OPR-0351-FA-09 Horizontal and Vertical Control Report*, 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 correctors from the U.S. Coast Guard beacon at Gustavus, Alaska (288 kHz) were used during real-time acquisition.

All data has been reviewed and meets the horizontal accuracy requirements of the NOS Hydrographic Surveys Specifications and Deliverables Dated April, 2009.

C.2. Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW) as specified in the Project Instructions. The Project Instructions list Elfin Cove, Alaska (945-2634) as the operating National Water Level Observation Network (NWLON) primary tide station. This station was used during preliminary processing. After receipt of the Tide Note, the operating NWLON primary tide station at Juneau, Alaska (945-2210) served as control for datum determination and as the primary source for water level correctors for field examination F00577.

Fairweather personnel installed Sutron 8210 “bubbler” tide gauges at the tertiary stations listed below in Table 6. The gauges were installed in order to provide information to the 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. Refer to the *OPR-0351-FA-09 Horizontal and Vertical Control Report* for further information about the tide stations.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal	Gauge #	S/N
Composite Island	945-2682	Tertiary 30 Day	September 25, 2009	November 6, 2009	12	023513
Muir Inlet	945-2584	Tertiary 30 Day	September 26, 2009	November 7, 2009	10	010799
Wachusett Inlet	945-2632	Tertiary 30 Day	October 12, 2009	November 9, 2009	17	85173
Tarr Inlet	945-2749	Tertiary 30 Day	October 8, 2009	November 8, 2009	14	24444

Table 6: Tide Gauge Information

A request for delivery of final approved (smooth) tides for survey F00577 was forwarded to N/OPS1 on November 12th, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. A copy of the request is included in Appendix IV.¹¹

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels (smooth tides) from the Juneau, Alaska station (945-2210) by applying tide file 9452210.tid and time and height correctors through the zone corrector file F00577CORF.zdf. **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.**

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

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

Field examination F00577 was compared with the following charts listed in Table 7. As per the most recent Notice to Mariners there were no new changes within the survey area.¹²

NOAA Chart Number	Chart Scale	Edition Number	Edition Date	Updated with Notice to Mariners through
17318	1:80,000	7 th Ed.	March 1, 2009	May 23 2009 (21/07)

Table 7: NOAA Charts compared with field examination F00577

D.1.1. Chart 17318

Depths from field examination F00577 generally agreed within one or two fathoms of depths on chart 17318 although larger discrepancies are noted.¹³ Some of the shoaler depths represented on the chart near the shoreline appear to have been pulled off shore for cartographic representation, but remain accurate within the scale of the chart.¹⁴ Due to the size and scale of this survey, few charted depths are directly comparable to surveyed soundings.

In Fingers Bay, a surveyed sounding of 1 fathom, 1 foot was acquired which is shoaler than the charted depth of 1 fathom, 3 feet, as shown in Figure 5.¹⁵ The entrance to Berg Bay, see Figure 6 below, has a surveyed sounding of 0 fathoms which is shoaler than the charted depth of 0 fathoms, 2 feet, though a definitive least depth was not obtained in this area because of the gap in coverage due to the shoal nature of the bottom and lack of low water shoreline windows for feature verification.¹⁶

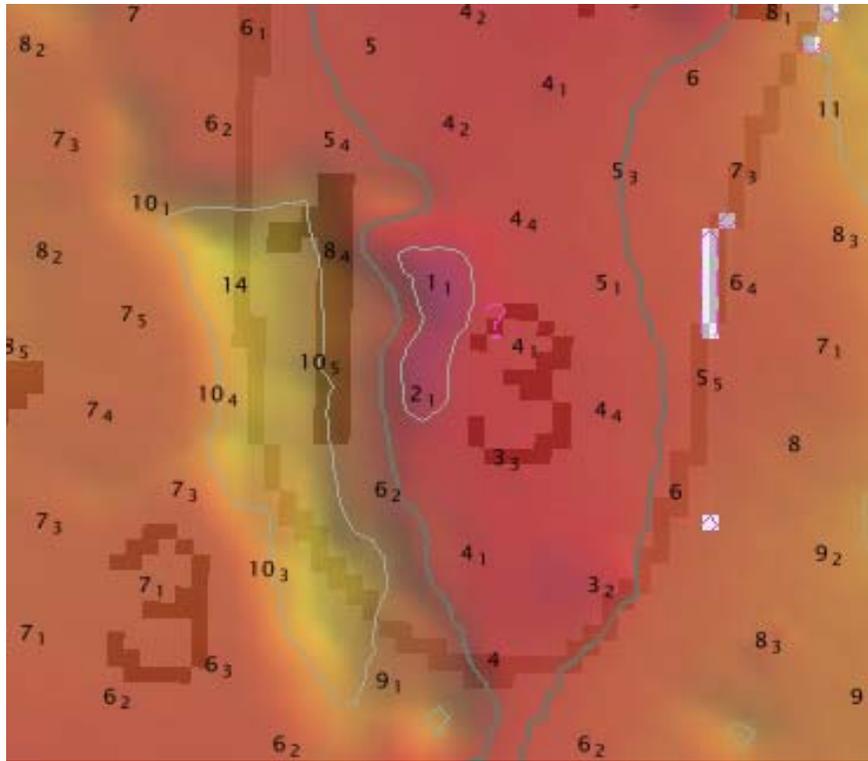


Figure 5: Fingers Bay. Surveyed sounding of 1 fathom, 1 foot near charted depth of 1 fathom 3 feet.

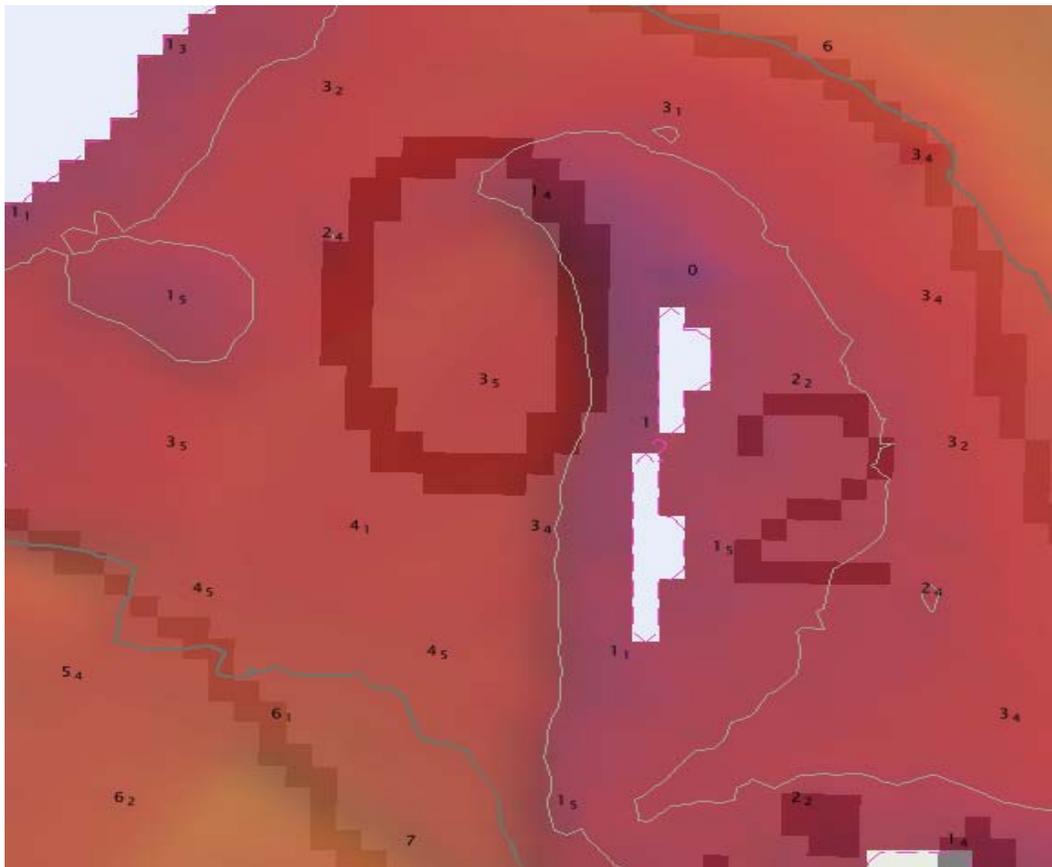


Figure 6: Berg Bay. Surveyed sounding of 0 fathoms near charted depth of 0 fathom 2 feet.

D.1.2. Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. **The surveyed soundings are adequate to supersede prior surveys in their common areas.**¹⁷

D.2 Additional Results

D.2.1 Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of field examination F00577.¹⁸

D.2.2 Dangers to Navigation

There were no dangers to navigation found within the limits of field examination F00577.¹⁹

D.2.3 Shoreline Source and Verification

There was no shoreline verification conducted on field examination F00577, due to lack of suitable low water windows and time constraints.²⁰ This field examination was conducted just prior to the last day of acquisition for project OPR-0351-FA-09.

D.2.4 Aids to Navigation

There were no aids to navigation within the limits of field examination F00577.²¹

D.2.5 Bottom Sample

Bottom samples were not required for F00577.²²

E. Supplemental Reports

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Hydrographic Systems Readiness Review 2009	May 15, 2009	N/CS33
Data Acquisition and Processing Report 2009	December 17, 2009	N/CS33
Horizontal and Vertical Control Report for OPR-0351-FA-09	May 28, 2010	N/CS33
Tides and Water Levels Package for OPR-0351-FA-09	November 20, 2009	N/OPS1
Coast Pilot Report for OPR-0351-FA-09	TBD	N/CS26



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

May 23, 2010

MEMORANDUM FOR: LCDR Richard T. Brennan, NOAA
Chief, Atlantic Hydrographic Branch

FROM: CAPT David O. Neander, NOAA
Commanding Officer

David O. Neander
2010.05.25 20:37:07
-07'00'

TITLE: Approval of Hydrographic Survey F00577,
OPR-0351-FA-09

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey F00577 in accordance with the Hydrographic Manual, Fourth Edition; Field Procedures Manual, April 2009; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for April 2009. Additional guidance was provided by applicable Hydrographic Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS33, Atlantic 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:

Eric Heiner
2010.05.25 23:26:38 Z

3M Eric Heiner
Survey Manager

Briana Welton
I attest to the accuracy and
integrity of this document
2010.05.25 22:43:04 Z

LT Briana Welton
Field Operations Officer

Digitally signed by Lynnette
Morgan
Date: 2010.05.25 18:50:54 -08'00'

CST Lynnette V. Morgan
Chief Survey Technician

Attachment



Revisions and Corrections Compiled During Office Processing and Certification

¹ Concur.

² Concur. The data is adequate for charting despite not having crosslines because the overlap between swaths was sufficient enough to determine there were no systematic errors.

³ Concur.

⁴ Concur.

⁵ Concur. The holidays were not navigationally significant based on the scale of the chart and all least depths were obtained. The holidays were not preserved in the HCell coverage.

⁶ Concur. The data is adequate for charting despite the lack of TrueHeave on some survey lines.

⁷ The shoal depths were adequately represented in the 8-meter combined BASE surface used for compilation.

⁸ Concur. There is one bottom type that falls within the survey area. It has been blue noted to be repositioned to accommodate a new sounding.

⁹ Concur. The data is adequate to supersede charted data in the common area.

¹⁰ An 8-meter combined BASE surface was created during the Survey Acceptance Review and was used as the basis of compilation.

¹¹ See attached Tide Note dated March 26, 2010.

¹² F00577 was compiled to the following chart:

Chart	Scale	Edition	Edition Date	NTM Date
17318	1:80,000	7 th	03/01/2009	07/02/2011

¹³ Concur.

¹⁴ Concur with clarification. Generalization of depths offshore is no longer an accepted cartographic practice. Chart depths as depicted in the HCell.

¹⁵ The 1fm 1ft depth is depicted as a submerged rock in the HCell.

¹⁶ Concur with clarification. Based on the backscatter imagery, there are no significant features located in the data gap. After final tide correction, the 0fm depth is now 0fm 1ft. It is depicted in the HCell as a rock awash, depth known.

¹⁷ Concur. Chart depths as depicted in the HCell.

¹⁸ Concur.

¹⁹ Concur.

²⁰ Concur.

²¹ Concur.

²² Concur. There is one bottom type that falls within the survey area. It has been blue noted to be repositioned to accommodate a new sounding.



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : March 26, 2010

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O351-FA-2009
HYDROGRAPHIC SHEET: F00577

LOCALITY: Berg Bay & Fingers Bay, Northern Glacier Bay, AK
TIME PERIOD: November 9, 2009

TIDE STATION USED: 945-2210 Juneau, AK
Lat. 58° 17.9'N Long. 134° 24.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.676 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SEA304, SEA305 and SEA309

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: 2010.04.06 07:15:02 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION



F00577 HCell Report
Katie Reser, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey F00577 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 F00577 was compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17318	1:80,000	7 th	03/01/2009	07/02/2011

The following ENC's were also used during compilation:

Chart	Scale
US4AK3DM	1:80,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from an 8-meter multibeam combined surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	3
10	20	4
20	50	4.5
50	500	5

In CARIS BASE Editor soundings were manually selected from the high density sounding layer (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	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 F00577_SS.000
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.5166	10.125	10
20	36.576	37.9476	20.750	20
30	54.864	56.2356	30.750	30

5. Meta Areas

The following Meta object areas are included in HCell F00577:

M_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography.

6. Features

Shoreline verification was not required for this survey and, therefore, no features were delivered to PHB. Charted features that exist within the survey limits were either imported from the ENC or blue noted to be retained.

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

\$CSYMB	Blue notes
M_QUAL	Data quality meta object
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks

The M_QUAL is adequate for NDB product searches.

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

F00577 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

F00577_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:80,000
F00577_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
F00577_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
F00577_Outline.gml	Survey outline
F00577_Outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.2	Creation of soundings and bathy-derived features, meta area objects, 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	Validation of the base cell file.
Northport Systems, Inc., Fugawi Marine ENC Ver.3.1.0.435	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

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APPROVAL SHEET
F00577

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

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

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