

H11010

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. NA

Registry No. H-11010

### LOCALITY

State Alaska

General Locality Aialik Bay

Sublocality Southern Approaches to Aialik Bay

2000

### CHIEF OF PARTY

Dean Moyles-Racal Pelagos-San Diego, CA

### LIBRARY & ARCHIVES

DATE

September 19, 2002

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTER NO. <b>H-11010</b>
<b>HYDROGRAPHIC TITLE SHEET</b>		
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. <b>NA</b>
State <u>ALASKA</u>		
General Locality <u>Aialik Bay</u>		
Sublocality <u>Southern Approaches to Aialik Bay</u>		
Scale <u>1:20,000</u>		Date of Survey <u>Aug 31-Nov 12, 2000</u>
Instructions Date <u>4/18/00 and 8/1/00</u>		Project No. <u>OPR-P353-KR-00</u>
Vessel <u>F/V Quicksilver and Sea Ducer</u>		
Chief of Party <u>Dean Moyles</u>		
Surveyed by <u>Moyles, Arumugam, Busey, Hall, Reynolds, Orthman, Martinez</u>		
Soundings taken by echo sounder <u>RESON 8101, RESON 8111, RESON 9003</u>		
Graphic record scaled by <u>RACAL PELAGOS PERSONNEL</u>		
Graphic record checked by <u>RACAL PELAGOS PERSONNEL</u>		
Evaluation by <u>B. Mihailov</u>		Automated plot by <u>HP Design Jet 1055</u>
Verification by <u>G. Nelson, B. Mihailov</u>		
Soundings in <u>Fathoms and tenths</u> at <u>MLLW</u>		
REMARKS: <u>The purpose of this work is to provide NOAA with modern and accurate data for the Southern Approaches to Aialik Bay.</u>		
<u>PHB Revision: Report has been evaluated. Comments, revisions, and corrections are entered as footnotes.</u>		
<b>ALL TIMES ARE RECORDED IN UTC.</b>		
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*AWOIS ✓ & SURF ✓ by MBH on 8/22/02*



<b>Separates.....</b>	<b>ii</b>
<b>Acquisition and Processing Logs.....</b>	<b>ii</b>
<b>A - Area Surveyed.....</b>	<b>1</b>
<b>B – Data Acquisition &amp; Processing .....</b>	<b>3</b>
Equipment & Vessels.....	3
QUALITY cONTROL.....	3
Crosslines.....	3
Junctions.....	6
Data Quality .....	6
Quality Control Checks.....	9
corrections to echo soundings.....	9
<b>C – Horizontal &amp; Vertical Control.....</b>	<b>10</b>
HORIZONTAL CONTROL.....	10
Vertical CONTROL.....	10
<b>D – Results and Recommendations .....</b>	<b>11</b>
chart Comparison .....	11
Comparison of Soundings.....	11
Automated Wreck and Observation Information system .....	13
Dangers to Navigation .....	13
additional results .....	14
Shoreline Verification .....	14
Bottom Samples .....	15
Aids to Navigation .....	15
<b>E – Approval Sheet .....</b>	<b>16</b>
<b>Appendix A - Danger to Navigation.....</b>	<b>1</b>
<b>Appendix B - List of Geographic Names .....</b>	<b>2</b>
<b>Appendix C – Progress Sheet.....</b>	<b>3</b>
<b>Appendix D - Tides and Water Levels.....</b>	<b>4</b>
<b>Appendix E – Shoreline Verification Results and Detached Positions .....</b>	<b>7</b>
<b>Appendix F – Grab Sample Positions and Descriptions.....</b>	<b>1</b>

**Separates**

**Acquisition and Processing Logs**

1. Sound Velocity Profile Data (refer to CD)
2. Hydrographic Survey Letter Instructions/Statement of Work
3. Crossline Comparisons (refer to CD)
4. Miscellaneous Logs
5. Charts, Plots, and Graphics

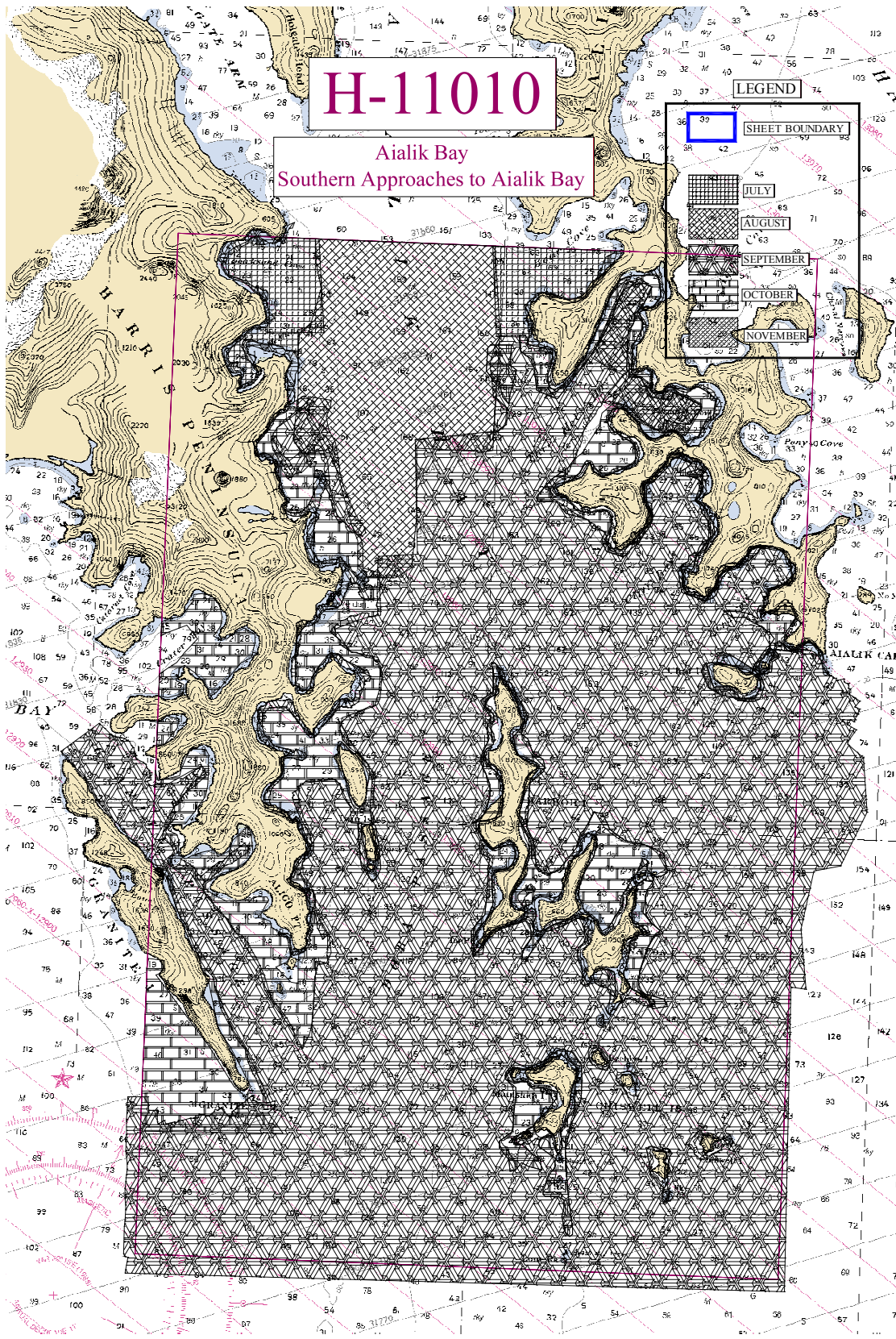
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**A - Area Surveyed**

H-11010 (Sheet C), which is bounded by the coordinate listing below, included the approaches to Aialik Bay. It extended from Three Hole Point in the north to Lone Rock in the south, and from Granite Island in the west to Aialik Cape in the east. A graphic plot inclusive of the survey area for Sheet C follows.

Hydrographic data collection began on August 31, 2000 and ended on November 12, 2000.

<b>Survey Limits</b>		
Work Order # 1		
H-11010		
Sheet C		
Scale 1:20,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	59.79026818	119.80552740
2	59.79021550	119.53473580
3	59.57193414	119.53473581
4	59.57193414	119.80552739
5	59.79026818	119.80552740



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## **B – Data Acquisition & Processing**

Refer to the OPR-P353-KR Data Acquisition and Processing Report for a detailed description of all equipment, survey vessels, processing procedures and quality control features. Items specific to this survey and any deviations from the Data Acquisition and Processing Report are discussed in the following sections.

### EQUIPMENT & VESSELS

The F/V Quicksilver and Sea Ducer acquired all sounding data for H-11010. The Quicksilver, which is 32 feet in length with a draft of 3 feet, was equipped with a Reson 8101 and 8111 for medium to deep-water multibeam data acquisition. From July 4, 2000 to August 20, 2000 the Quicksilver was equipped with the Reson SeaBat 8101 (Processor V 1.15-B0C4 SN 12945 and Transducer SN 193702) with option 033 (pseudo SideScan). From August 23, 2000 to September 26, 2000 the Quicksilver was equipped with the Reson SeaBat 8111 (Processor V 1.18-8AA9 SN 23279 and Transducer Array SN Transmit 0100050/Receive 0700016) with option 033 (pseudo SideScan). From October 6, 2000 to October 24, 2000 the Quicksilver was again equipped with a Reson SeaBat 8101 (Processor V 8101-2.00-57D6 SN 12715 and Transducer SN 111484) with option 033 (pseudo SideScan). The Quicksilver was also equipped with two sound velocity and pressure sensors (4501-SV&P & 4431-SV&P) and a CTD (SBE 19 Plus SN 290) for sound velocity profiles. Vessel attitude was measured using a TSS Heading and Dynamic Motion Sensor (HDMS, IMU SN 049, Processor SN 013) and XTF files logged in Winfrog Multibeam V 3.07 NOAA 28May2000. The multibeam computer was equipped with a NovAtel GPS card. The NovAtel GPS card is a twelve-channel GPS receiver that outputs a position and a One Pulse Per Second (1 PPS).

The Sea Ducer, which is 31 feet in length with a draft of 2 feet was equipped with a Reason 9003 (Processor V 2.17 SN 8594, Transducer SN 332202) for shallow-water multibeam data acquisition and two sound velocity and pressure sensors (4501-SV&P & 4431-SV&P) for sound velocity profiles. Vessel attitude was measured using a TSS Heading and Dynamic Motion Sensor (HDMS, IMU SN 078, Processor SN 016) and XTF files logged in Winfrog Multibeam V 3.07e 22Sept2000. The multibeam computer was equipped with a NovAtel GPS card. The NovAtel GPS card is a twelve-channel GPS receiver that outputs a position and a One Pulse Per Second (1 PPS). The Island C along with an eighteen-foot skiff conducted shoreline verification and acquired Detached Positions (DP's). The skiff was equipped with a DGPS and Telemetry unit and positions relayed to the Island C via Blue-Brick Radios. The F/V Kazor was utilized for obtaining bottom samples. The vessel was equipped with WinFrog V 2.63, DGPS and a grab sampler.

Refer to OPR-P353-KR Data Acquisition & Processing Report for a complete listing of equipment and vessel descriptions.

### QUALITY CONTROL

#### Crosslines

Sheet C was divided into eighteen areas for survey operations. Quality control tielines were planned to measure 5 percent of the main scheme line length. Total crossline length was 61.5 km (33.2 nautical miles) or 3.9 percent of the total main scheme miles. Since the Reson 9003 multibeam system was used for shallow water work only, it was deemed impossible to run tie lines in most areas. This system made up about 25 to 30 percent of the total main line scheme and was the result of not achieving the 5 percent. A total of 154 tie line crossings were examined using the CARIS HIPS Q/C report.

The majority of QC Reports fell well within the required accuracy specifications; reports that had beams below the 95 percent confidence level are associated with the following areas and conditions:

- Due to the high concentration of fresh water mixing and rapid temperature changes, it was virtually impossible to model the water column. To account for this, more sound velocity casts were conducted and survey line spacing decreased. The problem in most cases was not the survey lines but the tielines. The tielines may have used an SVP cast that was one or two kilometers away, causing cupping in the outer beams and thus not achieving the 95 percent confidence level.
- Although the changes in the water column caused the majority of failed beams, another concern was horizontal positioning. The accuracy of a typical DGPS unit is between 1 to 3 m, and with the constant coming and going of satellites in the Fjords; it was not uncommon to get a 1 to 3m-navigation jump. Although this is well within the NOS specifications, Figure 1 below shows graphically how navigation error versus vertical error can rapidly affect the specified accuracy. For example, with a 1.5m navigation error at a water depth of 25m, if the slope of the bottom is greater than 20° then the beams are outside of the 95 percent confidence level.<sup>1</sup>

Note: The QC reports were generated based on the given accuracy specification of:

where,  $a = 0.5$ ,  $b = 0.013$  and  $d = \text{depth}$ .  $\pm \sqrt{a^2 + (b * d)^2}$

However, since a variance of a difference, rather than a variance from a mean is being used, the  $a$  and  $b$  values defined in the makehist.cla file within CARIS will use:

$$a = 0.5 * \sqrt{2} = 0.707$$

$$b = 0.013 * \sqrt{2} = 0.018$$

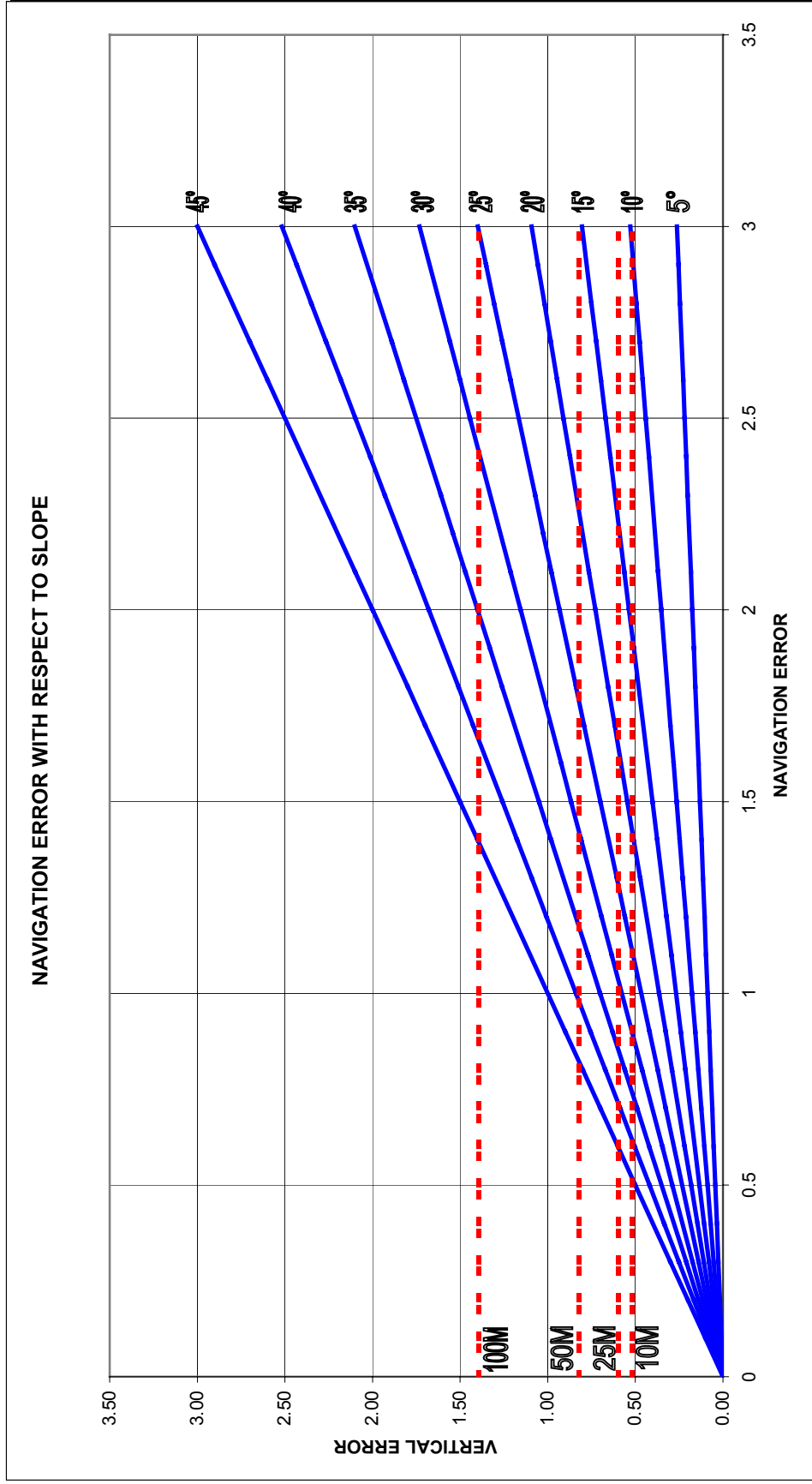
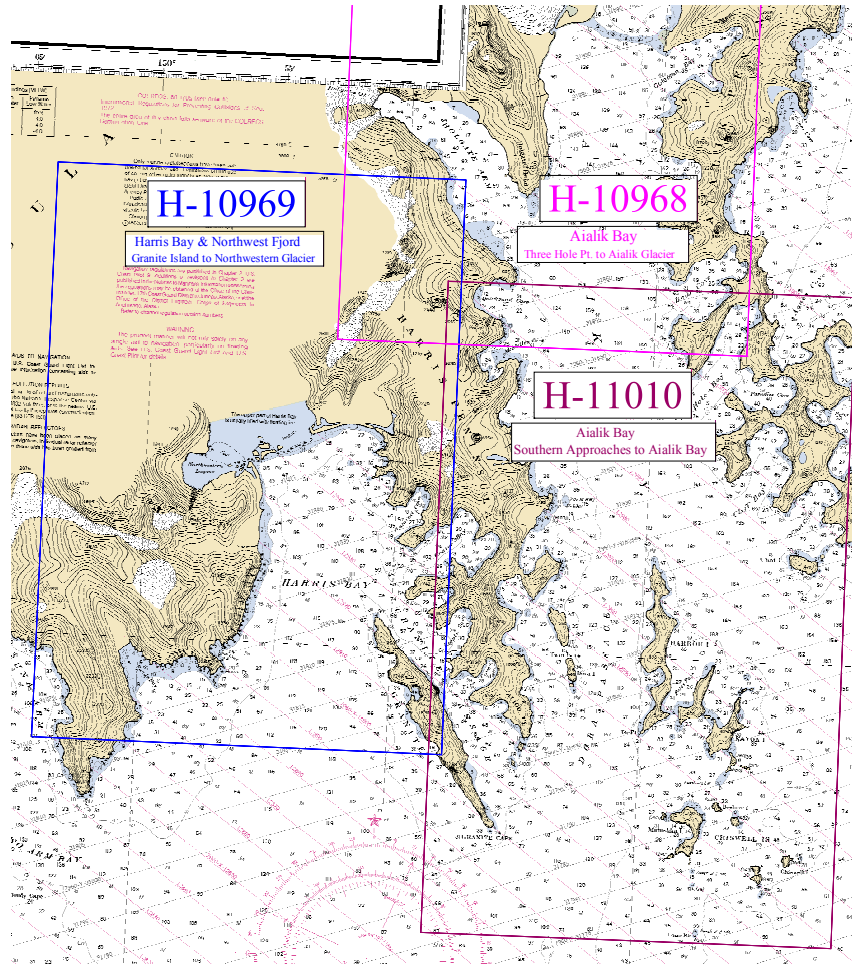


Figure 1: Navigation Error With Respect to Slope.

## Junctions

H-11010 (Sheet C) junctions with:

Registry #	Scale	Date	Junction Side
H-10969	1:20,000	2000	East
H-10968	1:20,000	2000	South



The surveys are in agreement along their common borders. The agreement was noted in the field using the 2-meter DTM's created for coverage verification. The conformity is also apparent in their preliminary smooth sheets.

## Data Quality

During the survey in the Kenai Fjords, under Work Order #8 of OPR-P353-KR, a 42 cm draft error was discovered for the F/V Quicksilver. All soundings for H-11010 were re-processed to account for this error. Since the draft measurement is applied during SVP correction all soundings were re-SVP corrected and merged.



Throughout the survey and routine processing, a general downward and/or upward cupping was noticed in the sounding data for certain areas. Due to the high concentration of fresh water mixing and rapid temperature changes, more frequent sound velocity cast were conducted and survey line spacing decreased.<sup>2</sup>

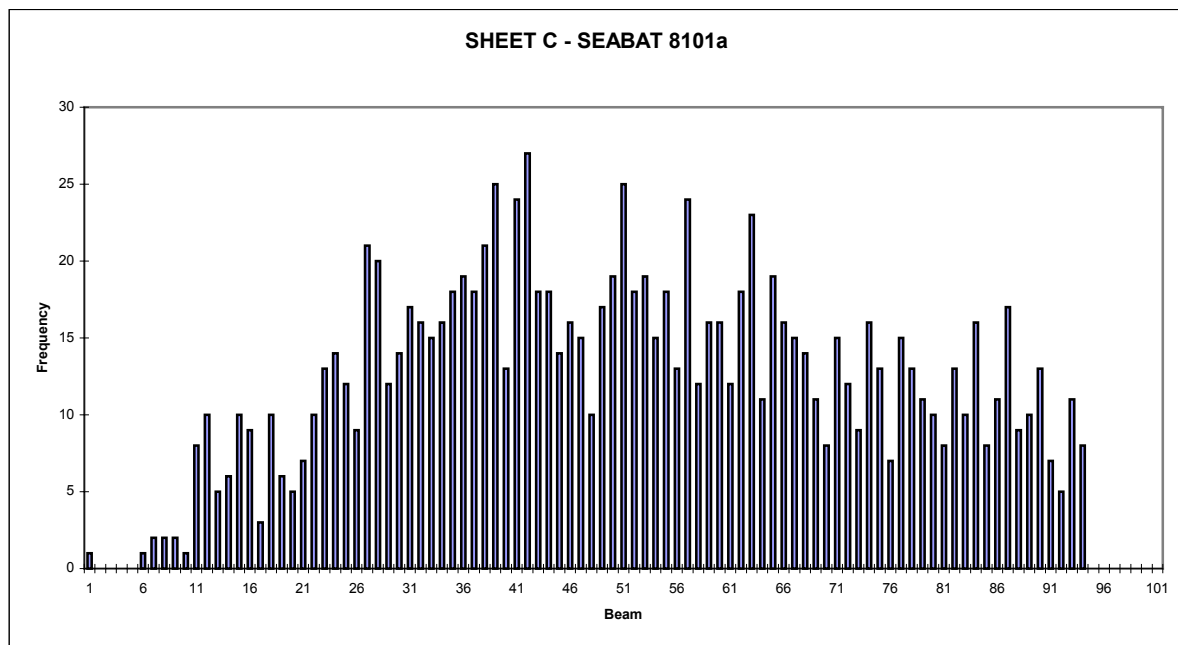
Between October 6, 2000 and October 24, 2000 the Quicksilver was equipped with a Reson 8101 multibeam sonar (serial # 111484). In CARIS Hydrographic Data Cleaning System (HDGS) Subset Edit mode a continual downward cupping was observed in the sounding data. A number of tests were conducted to find the source of the problem, but none were found in the field. To correct this problem survey line spacing was decreased to less than two times the water depth and any miss-matched data was removed in processing<sup>3</sup>. This is very apparent in the histogram for the Sonar (labeled 8101b). When field operations were finished the Reson 8101 was sent to the Reson manufacturer for further testing. The conclusion was the placements of the ceramic elements in the housing, for this particular sonar is about  $0.004^\circ$  larger than the specified nominal values.

Certain areas in Aialik Bay, which include the islands and islets, were deemed unsafe for navigation and the 4m contour was not achieved.

Certain coastal regions where GPS was an issue, full multibeam coverage was not achieved and can be seen in the coverage plots. This was a concern for the majority of areas in the Kenai Fjords, but was rectified for most areas by constant revisiting.

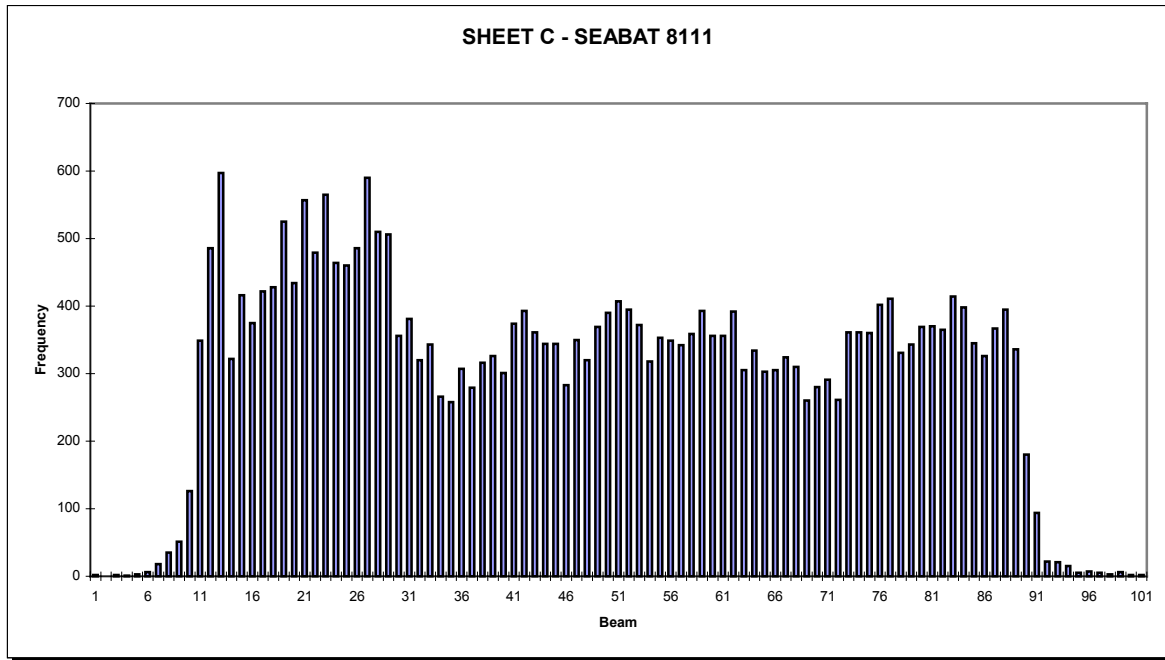
#### Smooth Sheet Histograms

The first histogram is for the Reson 8101 (labeled 8101a) during July 4, 2000 and August 20, 2000 on the F/V Quicksilver. The histogram shows a general sloping trend from nadir to the outer beams. This more noticeable on the starboard side of the nadir beams and is likely the result of a graphical shadow zone created by the shoaler nadir soundings. Once these soundings are drawn, other soundings in the very densely sampled area around nadir cannot be selected. This system was only used on a small portion of H-11010, hence the number of samples.

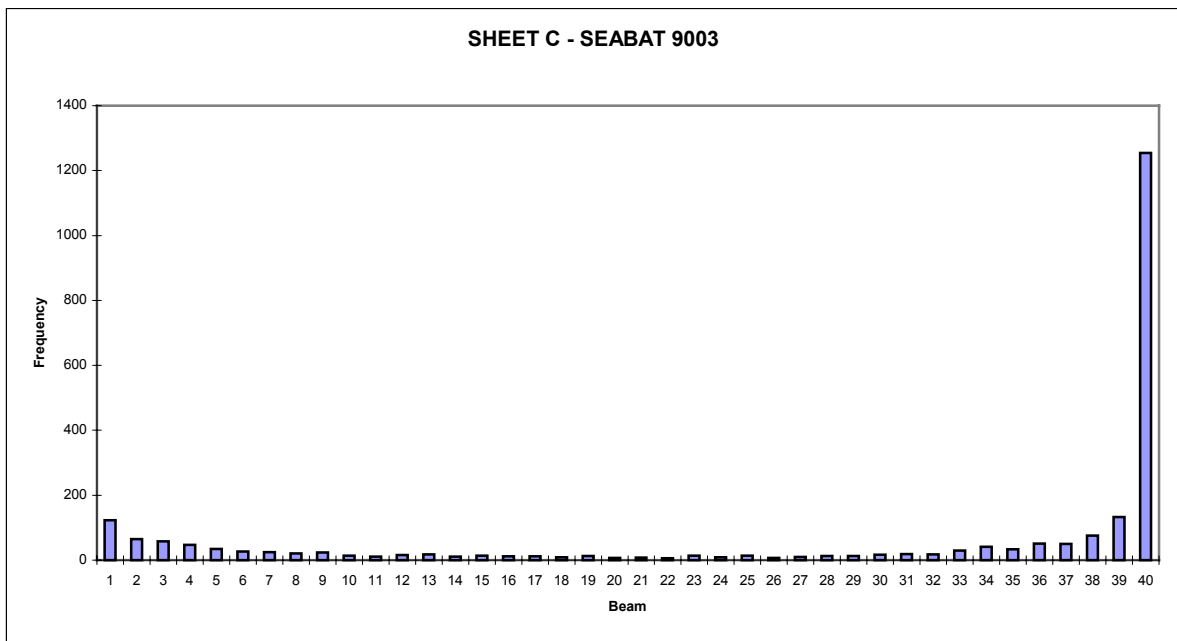


Dated: 17<sup>th</sup> April, 2001

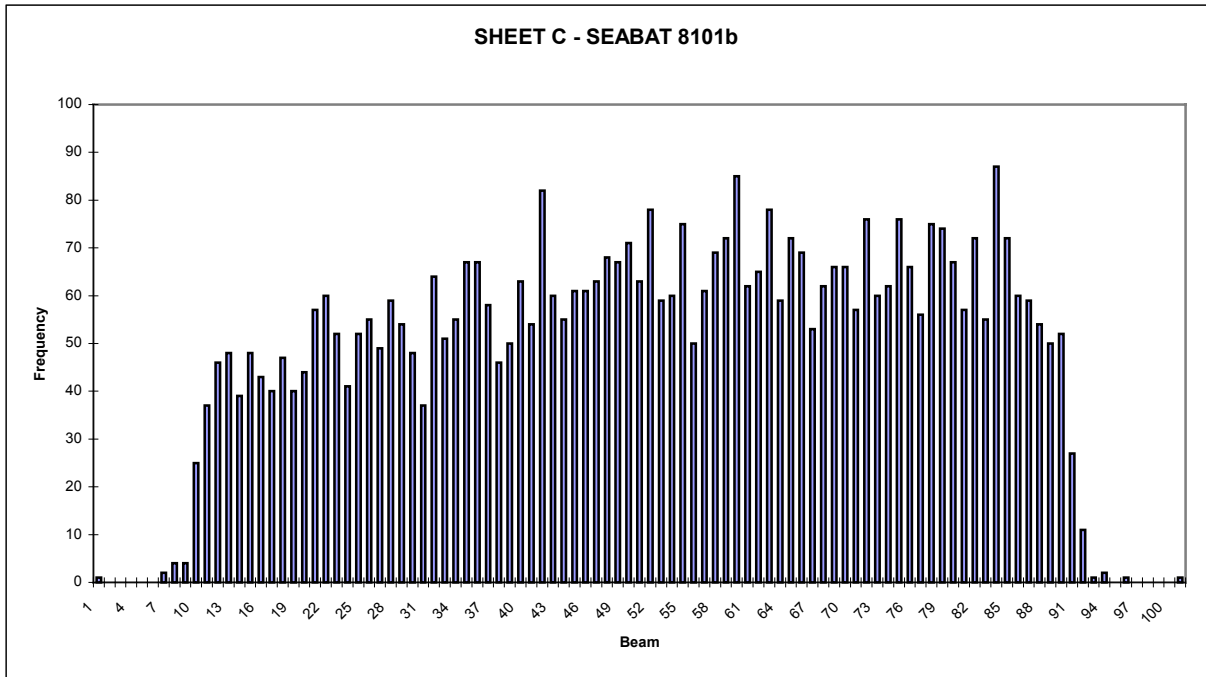
The second histogram is for the Reson 8111 (labeled 8111) during August 23, 2000 and September 26, 2000 on the F/V Quicksilver. This histogram shows two distinct features. The first feature is the increase in sounding frequency on the port side. This is due to the fact that the survey lines were ran with the port side of the vessel to the coast and shoaler soundings. The second feature is the dip around beams 35 and 71 and is a result of the transition between Amplitude and Phase Detection in the Reson System.



The third histogram is for the Reson 9003 (labeled 9003) during September 3, 2000 and November 12, 2000 on the Sea Ducer. The majority of sounding data acquired by the Sea Ducer were from the starboard beams of the Reson 9003. For the safety of the crew, equipment and vessel the survey lines were conducted so the starboard side was to the shoreline. This is very apparent in the histogram shown below.



The fourth histogram is for the Reson 8101 (labeled 8101b) during October 6, 2000 and October 24, 2000 on the F/V Quicksilver. The frequency decreases on the outer beams, this is because of the placements of the ceramic elements in the housing, for this particular sonar was about  $0.004^\circ$  larger than the specified nominal values. The downward cupping that resulted from this varied from line to line and was more noticeable in areas with flat topology. The amount of data that was rejected in HDCS Subset Edit mode was dependent on the degree of downward cupping, therefore getting a general decrease as you more toward the outer beams.



### Quality Control Checks

Refer to the OPR-P353-KR Data Acquisition and Processing Report for the results of the multibeam patch tests conducted during the Kenai Fjords Survey.

Positioning system confidence checks were conducted on a daily basis. WinFrog Multibeam (WFMB) had built in QC windows, where the positioning data was displayed and monitored. The graphics window was configured to show the navigation information in plan view. This includes vessel position, survey lines, and background plots and charts. The Vehicle window can be configured to show any tabular navigation information required. Typically, this window displays position, time, line name, heading, HDOP, speed over ground, distance to start of line, distance to end of line, and distance off line. The Calculation window is used to look at specific data items in tabular or graph format. Operators look here to view 1PPS performance, singlebeam to nadir multibeam comparisons, GPS satellite constellations, and position solutions.

### CORRECTIONS TO ECHO SOUNDINGS

Refer to the OPR-P353-KR Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings.

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## C – Horizontal & Vertical Control

Refer to the OPR-P353-KR Horizontal and Vertical Control Report for a detailed description of the horizontal and vertical control used on this Survey. A summary of the projects horizontal and vertical follows.

### HORIZONTAL CONTROL

The horizontal control datum for this survey was the North American Datum of 1983 (NAD83). All positions were originally collected in WGS84 and transformed to NAD83 during HIPS workfile creation.

Two MBX-3 differential receivers that used the U.S. Coast Guard (USCG) network of differential beacons were the main source of RTCM. Two remote base stations were installed to broadcast differential corrections to the vessels in remote areas of the survey. These stations were installed and maintained by Terra Surveys, LLC. One was located by Aialik Sill in Aialik Bay the other in the northern section of Harris Bay. This RTCM source was only used when needed and was otherwise given a high weight in WinFrog Multibeam (i.e. not used in the GPS solution).

The Stations identified above as Aialik Sill and NW Glacier, were established on July 4, 2000 by Terra Survey, LLC. Verification for Harris and Aialik Bay were conducted on October 5, 2000 and November 1, 2000 respectively. The results of the DGPS verification show a 15.4 m difference for the Aialik Sill station and a 5.4 m difference for the Harris Bay Station. No receiver setting or environmental factors were noticed to cause this deviation. It is apparent from the raw data that the Horizontal Dilution of Precision (HDOP) and the low number of satellites may be deemed the cause of the discrepancy. The HDOP is somewhat high but is mostly still in normal GPS specifications, but with the constant coming and going of satellites the positions will deteriorate. The base station signal may have also been sporadic and may have contributed to the wandering effect that is present in the scatter plot. Verification data for these Remote stations can be found in Appendix B of the OPR-P353-KR Vertical and Horizontal Control Report.<sup>4</sup>

This source of RTCM was only used in remote areas when the Coast Guard corrections were unavailable. The position was constantly monitored in WinFrog Multibeam and quality flagged when not in accuracy specifications. The multibeam data acquired using these base stations tied in good with data acquired using the Coast Guard stations, which concludes that the positions were within accuracy specifications. Anytime this RTCM source was not needed it was given a high weight and not used in the GPS solution.

### VERTICAL CONTROL

All sounding data were reduced to MLLW using unverified tidal data from 6 tide gauges. A sub-contractor, LCMF, operated the gauge and the data was emailed to the processing office at the end of every Julian day<sup>5</sup>.

Gauge	Model	Gauge Type	Location	Latitude	Longitude	Operational
945-5204	H350/355	Digital Bubbler	Upper NW Fjord	59.7900 N	150.0319 W	7/12/00–9/19/00
945-5178	H350/355	Digital Bubbler	NW Passage	59.7486 N	149.8997 W	7/10/00–11/14/00
945-5159	H350/355	Digital Bubbler	Crater Bay	59.7131 N	149.7864 W	7/11/00–11/14/00
945-5151	H350/355	Digital Bubbler	Camp Cove	59.6939 N	149.7478 W	8/29/00–11/11/00
945-5128	H350/355	Digital Bubbler	Bear Cove	59.8014 N	149.6142 W	6/25/00–11/15/00
945-5146	H350/355	Digital Bubbler	Aialik Sill	59.8850 N	149.7183 W	6/29/00–11/11/00

On January 24, 2001 LCMS issued verified tidal data and final zoning for OPR-P353-KR, all sounding data were re-merged when the draft error was fixed. For the Preliminary Smooth Sheet verified tidal data were used. Refer to the Vertical and Horizontal Control Report for additional tidal information and station descriptions<sup>6</sup>.

## D – Results and Recommendations

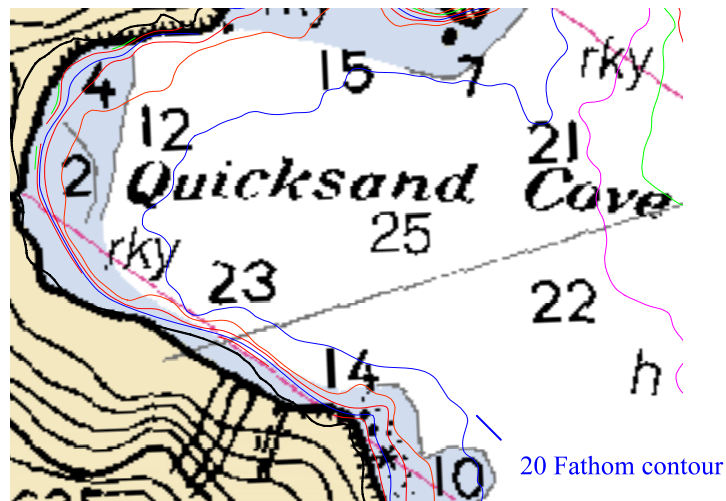
### CHART COMPARISON

H-11010 survey was compared with chart 16682, 14th Edition (June 20, 1998, 1:81,847).<sup>7</sup>

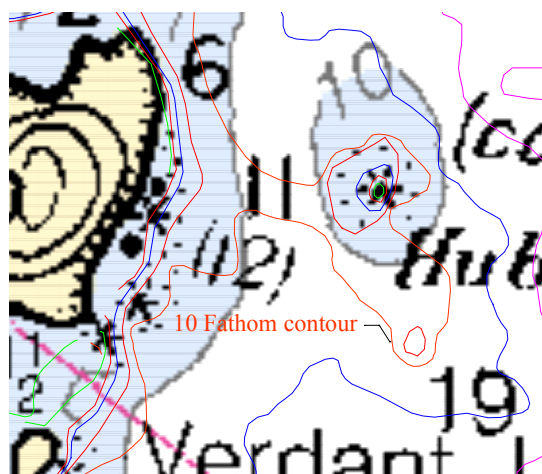
#### Comparison of Soundings

The soundings and contours in general compare well with the existing chart, but a few areas to note follow:

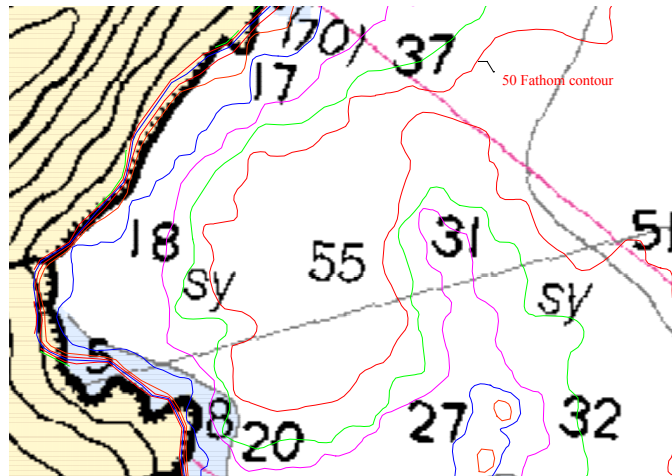
- The approach, which is just south of Chat Island and center of Aialik Bay, is generally 2 to 5 fathoms shoaler.
- Dora Passage as<sup>8</sup> shoaler soundings than chart 16682, this is more noticeable around the north west section of Harbor Island.
- The twenty-fathom contour in Quicksand Cove has migrated eastward approximately two hundred meters.



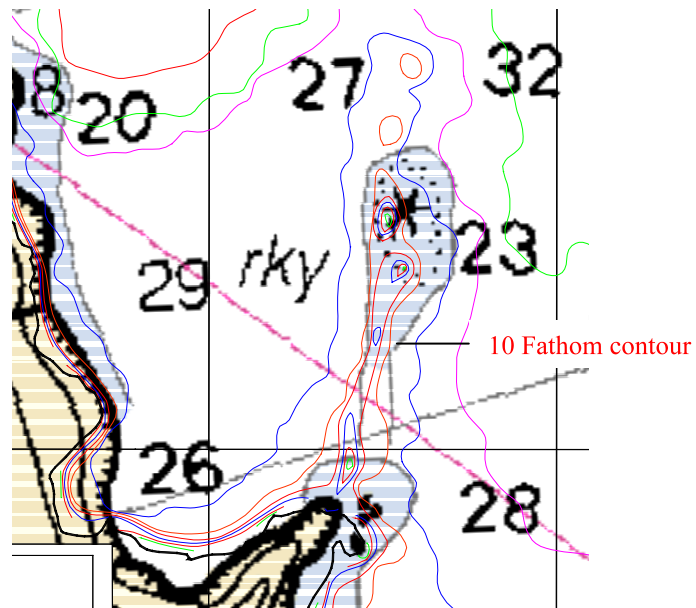
- The ten-fathom contour around Hub Rock has migrated southward approximately two hundred meters.



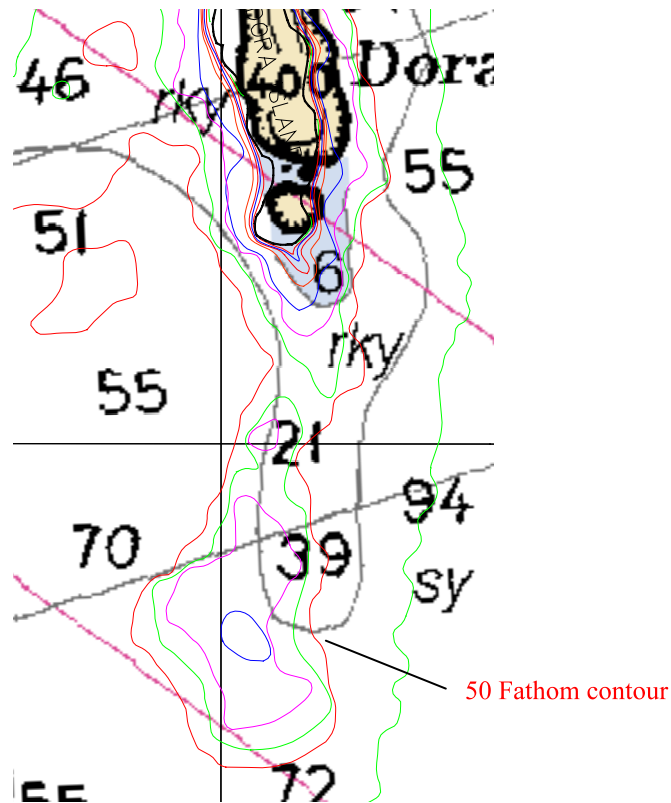
- The fifty-fathom contour to the south of McMullen Cove as <sup>9</sup>migrated to the Southwest.



- The ten-fathom contour changes between McMullen Cove and Hub Rock, the shoal areas extend further to the north.



- The fifty-fathom contour south of Dora Island has migrated approximately 500 meters south.



The shoaler points are highlighted in red on the chart comparison sheet included in Separate 6. No charted features labeled PA, ED, PD, etc. were located<sup>10</sup> in the survey area.

#### Automated Wreck and Observation Information system

No AWOIS items were assigned under this contract.

#### Dangers to Navigation

During production of the preliminary smooth sheet and final reporting fifteen dangers to navigation were noticed. All features are documented in Appendix A, Dangers to Navigation. These dangers were reported to the Pacific Hydrographic branch on 2 April 2001. All features are documented in Appendix A, Dangers to Navigation.<sup>11</sup>

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## ADDITIONAL RESULTS<sup>12</sup>

### Shoreline Verification

Shoreline verification and detached positions (DP's) were carried out with two vessels, the Island C and an 18' skiff. The skiff was equipped with a DGPS unit and positions were relayed to the Island C via Blue-Brick Radio Telemetry Units. The graphic screen in WinFrog V3.0 was configured to view Chart 16682 and the skiff was monitor in real time. Any Shoreline feature and DP's were recorded in Winfrog and on DP forms; each was accompanied with a digital photo when applicable. The limit of safe navigation varied from 5 to 100 meters from the coastline and dependent on the surrounding topography (i.e. over hanging cliffs and glaciers).

There were two sources of shoreline supplied by NOAA for OPR-P353-KR. The Synthetic Aperture Radar (SAR) source included shoreline for Harris and Aialik Bay and the Department of Defense (DOD) source, which was much more detailed, only covered Upper Northwestern Fiord and part of Harris Bay.<sup>13</sup>

Verification was started in Harris Bay and it became very apparent that the SAR shoreline did not depict the coastline accurately. After completing Harris Bay and nearly seventy percent of Aialik Bay it was determined to be inadequate and was disregarded. The DOD shoreline<sup>14</sup> was found to depict the shoreline very accurately, and was used on the Preliminary Smooth Sheet.

Note: In areas where no coastline was provided or was not adequate the approximate shoreline was estimated from the multibeam data set and is shown as a red dashed line on the preliminary smooth sheet.<sup>15</sup>

During shoreline verification a DP was acquired to represent existing features, any revisions to features and new features not shown on the chart. These DP's are included on the Preliminary Smooth Sheet and can be found in Appendix E.<sup>16</sup> Certain areas noted during shoreline verification are listed below:

- A DP was not collected on the charted rock approximately 3 km south of McMullen Cove and 850 meters offshore from a small point of land. However, the multibeam data set confirms the existence of this rock (59° 44' 20.05" N, 149° 44' 28.756" W) and of a second nearby (59° 44' 15.791" N, 149° 44' 26.2" W).<sup>17</sup>
- No DP was collected for Hub Rock, but multibeam data has Hub Rock located at 59° 43' 05" N, 149° 43' 17.5" W.<sup>18</sup>
- The small charted islet at 59° 41' 43.97" N, 149° 44' 50.68" W (back of Camp Cove) is actually part of the shoreline at MLLW, but is separate near high tide.<sup>19</sup>
- Full multibeam coverage around the southern most Island off Aligo Point does not confirm the existence of the two rocks charted at 59° 37' 53.20" N, 149° 45' 1.78" W and 59° 37' 44.34" N, 149° 44' 52.17" W.<sup>20</sup>
- Charted rock on the south side of Ripple Cove (59° 39' 54.42" N, 149° 47' 17.58" W) was not confirmed either by DP investigation or in the multibeam data set.<sup>21</sup>
- On the north side of Chat Cove, of the two-charted rocks only one is confirmed by DP investigation (59° 43' 27.65" N, 149° 33' 49.04" W). This is a rock ledge-extending out from the shoreline. The southwest rock was not located.<sup>22</sup>
- The charted rock west of Aialik Cape at 59° 42' 24.18" N, 149° 32' 13.35" W is actually part of the shoreline.<sup>23</sup>
- Charted rock off the southeast corner of Chat Island was not found during shoreline verification, but is confirmed in the multibeam data set at 59° 41' 53.081" N, 149° 33' 11.516" W.<sup>24</sup>
- An islet on north side of Notoa Island is confirmed with multibeam data, but the rock off west side of islets does not exist in the multibeam data set.<sup>25</sup>
- An islet off eastern point of Notoa Island was not confirmed during shoreline verification or by the multibeam data set.<sup>26</sup>



Dated: 17<sup>th</sup> April, 2001

- No DP was acquired for charted rock marked “Awash at LLW” just north of Beehive Island, but the multibeam data set has the rock located at 59° 37’ 31” N, 149° 36’ 47.5” W. This is a rocky location with two other near-surface rocks nearby to the north.<sup>27</sup>
- No DP’s were acquired for charted islets on east side of Matushka Island, but the area was confirmed during shoreline verification to be a rocky shoreline.<sup>28</sup>
- DP was not acquired on charted rock marked “Rk (25).” south of Matushka Island due to weather, but multibeam data set has its position at 59° 35’ 29” N, 149° 37’ 42.5” W. The multibeam data set shows other rocks in the vicinity.<sup>29</sup>
- DP was not acquired for the charted rock on the north side of Lone Rock due to weather, but multibeam data set has its position at 59° 34’ 32.043” N, 149° 37’ 31.213” W.<sup>30</sup>
- No DP’s were taken on the charted rocks around Chiswell Island and the unnamed Island just west due to weather, but are present in the multibeam data set. The islet on eastern edge of Chiswell Island does exist<sup>31</sup> but the rock does not and is likely part of the same feature<sup>32</sup>. The islet charted off the northeast corner of the unnamed island, remains unconfirmed in both multibeam and the SAR shoreline data.<sup>33</sup> A Rock just off southern point of unnamed island was confirmed by the multibeam data set at 59° 35’ 31.327” N, 149° 35’ 01.895” W.<sup>34</sup> The three charted rocks further south were confirmed by multibeam data set at 59° 35’ 22.804” N, 149° 34’ 59.775” W; 59° 35’ 20.584” N, 149° 34’ 57.461” W and 59° 35’ 18.252” N, 149° 35’ 03.320” W.<sup>35</sup>

The results of the shoreline verification and acquired DP’s are plotted on the Preliminary Smooth Sheet. Refer to Appendix E for a complete listing of DP forms for H-11010 and Separate 6 for a plot of DP’s and Bottom Sample locations.<sup>36</sup>

#### Bottom Samples

On August 15-16, 2000 under Work Order # 8 and November 11, 2000 under Work Order # 1 the F/V Kazor was fitted to obtain bottom samples as specified in the Statement of Work Attachment 6. The purpose of this was to characterize the bottom for possible anchorages.

Bottom sampling was done only in areas suitable for anchorage<sup>37</sup>. Samples were taken with a grab sampler and position was recorded with Winfrog V2.63. Sediment retrieved from the sampler was analyzed and then categorized as specified in Appendix 2 (Table A-4) of the NOS Hydrographic Surveys Specifications and Deliverables. Positions and descriptions of all samples are found in Appendix F<sup>38</sup> and a graphical plot in Separate 6.

#### Aids to Navigation

There were no charted aids to navigation in the survey area. No uncharted aids to navigation were found in the survey area.

**E – Approval Sheet**

**Approval Sheet**

For

**H-11010**

Standard field surveying and processing procedures were followed in producing this survey in accordance with the following documents:<sup>39</sup>

OPR-P353-KR statement of work and hydrographic manual;  
Racal Pelagos Quality Management Plan (QMP-1702-01);  
Racal Pelagos Acquisition Procedures (QMP-1990-01);  
Racal Pelagos Processing Procedures (QMP-1702-03);  
Technical Report for Tidal Zoning Survey, Kenai Fjords

This report has been reviewed and approved. All records are forwarded for final review and processing to the Chief, Pacific Hydrographic Branch.

The data were reviewed daily during acquisition and processing.

Approved and forwarded,



Dean Moyles, Racal Pelagos  
Lead Hydrographer  
RPI Survey Party

### **Appendix A - Danger to Navigation**

During production of the preliminary smooth sheet and final reporting fifteen dangers to navigation were noticed. All features are documented in Appendix A, Dangers to Navigation. These dangers were reported to the Pacific Hydrographic branch on 2 April 2001.<sup>40</sup>

### **Appendix B - List of Geographic Names**

The list of geographical names for Aialik Bay (H-11010) was obtained from a Preliminary Bathymetry Chart from the Department of The Interior United States Geological Survey (Open File Report 80-414). The names on this chart are used by the local tourist industry and charting boats and are has follows:

- Camp Cove

**Appendix C – Progress Sheet**

## 2000 FIELD and FINAL TIDE NOTE

### Hydrographic Sheet: H-11010 (Sheet C)

KENAI FIORDS, AK

NOAA Project No:	OPR-P353-KR-00 KENAI FIORDS, Alaska					
NOAA Contract No:	50-DGNC-8-90028					
<p>The Seward, Alaska tide station (945-5090) served as control for the subordinate stations for this project. Datum determinations were made for subordinate stations, Crater Bay(945-5159), Bear Cove, (945-5128 ), and Camp Cove, (945-5151). These sites generated the final tide reducer files and the basis for final zoning. The NTDE 1960-78 was utilized.</p>						
Location and Time Meridian	Name:	Lat (NAD 83)	Long (NAD 83)	Time Meridian:		
	Crater Bay:	59° 42' 47"	149° 47' 11"	0° (UTC)		
	Bear Cove:	59° 48' 05"	149° 36' 51"	0° (UTC)		
	Camp Cove:	59° 41' 38"	149° 44' 52"	0° (UTC)		
Time Period and Datum Reference	Name:	Established:	Removed:	MLLW	MHW	units
	Crater Bay:	07/11/2000	11/14/2000	0.000	2.989	meters
	Bear Cove:	06/25/2000	11/15/2000	0.000	2.952	meters
	Camp Cove:	08/29/2000	11/11/2000	0.000	2.967	meters
Tide observer	LCMF Incorporated 139 E. 51st Ave. Anchorage, Alaska 99503 (under subcontract to Racal Pelagos, San Diego, CA)					
Gauges	Design Analysis H350/355 bubbler systems.					
Installation	Each gauge was secured inside a waterproof case, and fastened vertically to a wooden brace above the high water line. A tent covered each gauge site installation .  Refer to the tide station packages for additional site specific details of installation.					
Tide staff	None. Spirit leveling was observed between a nearby tidal bench mark and the water. The survey rod was outfitted with a stilling well to dampen wave action.					
Benchmarks	The following benchmarks were installed at these sites:  Crater Bay: 5159 A 2000, 5159 B 2000, 5159 C 2000, 5159 D 2000, and 5159 E 2000 Bear Cove: 5128 A 2000, 5128 B 2000, 5128 C 2000, 5128 D 2000, and 5128 E 2000 Camp Cove: 5151 A 2000, 5151 B 2000, and 5151 C 2000  The following benchmarks were recovered at these sites:  Camp Cove: BM 1 1912, BM 2 1912, BM 4 1965, and BM 5 1965					
Levels	Benchmarks were leveled at the installation and removal of each tidal station. The benchmarks and station datums were connected through frequent leveling to the water. The level runs closed within NOS tolerance. Benchmarks were stable.					
Final Tidal Zoning	The final tidal zoning follows this report (color map and MapInfo zoning file).					



**Appendix D - Tides and Water Levels<sup>41</sup>**

Abstract of Times of Hydrography For Smooth Tides

Project Number: OPR-P353-KR

Registry Number: H-11010

Contractor Name: Racal Pelagos Inc.

Date: April 17, 2001

Sheet Letter: C

Inclusive Dates: August 31, 2000 to November 12, 2000

Field work is Complete and verified tides were applied for the production of the smooth sheet. Refer to LCMF's final verified tides report for additional information.

Abstract of Times of Hydrography for F/V Quicksilver:

YEAR	DAY	START TIME (UTC)	END TIME (UTC)	COMMENTS
2000	243	02:02:06	03:03:29	
2000	243	17:07:02	23:20:26	
2000	244	00:01:53	03:48:59	
2000	244	18:30:20	23:59:59	
2000	245	00:00:00	03:16:01	
2000	245	17:04:12	23:57:30	
2000	246	00:00:42	02:20:32	
2000	246	17:47:10	23:59:59	
2000	247	00:00:00	03:43:15	
2000	247	17:56:49	23:59:59	
2000	248	00:00:00	03:42:36	
2000	248	17:00:54	23:58:14	
2000	249	00:09:58	02:39:55	
2000	249	18:48:10	20:53:51	
2000	250	00:19:21	02:56:24	
2000	250	18:01:05	23:59:59	
2000	251	00:00:00	03:36:55	
2000	251	17:33:45	23:56:25	
2000	252	00:02:48	03:32:47	
2000	252	17:29:00	23:59:59	
2000	253	00:00:00	02:59:00	
2000	253	16:50:55	23:55:15	
2000	254	00:01:49	04:07:45	
2000	254	17:53:00	23:57:40	
2000	255	00:12:46	02:52:50	
2000	255	17:27:23	23:54:35	
2000	256	00:00:00	00:24:53	
2000	256	17:58:45	23:59:59	
2000	257	00:00:00	01:36:23	
2000	257	16:35:46	23:59:59	
2000	258	00:00:00	00:59:16	
2000	258	17:38:13	23:59:59	
2000	259	00:00:00	02:01:45	
2000	259	17:03:45	20:15:30	
YEAR	DAY	START TIME	END TIME	COMMENTS

Project: OPR-P353-KR

Sheet Letter: "C"

Registry No.: H-11010

Dated: 17<sup>th</sup> April, 2001

		(UTC)	(UTC)	
2000	260	19:21:46	21:25:00	
2000	261	23:49:45	23:59:59	
2000	262	00:00:00	01:51:07	
2000	262	17:07:03	23:59:59	
2000	263	00:00:00	01:35:00	
2000	263	16:43:08	23:59:59	
2000	264	00:00:00	01:26:48	
2000	264	17:00:19	23:59:59	
2000	265	00:00:00	03:11:59	
2000	265	16:44:54	23:58:07	
2000	266	00:10:19	02:07:40	
2000	266	16:39:28	17:14:42	
2000	267	16:58:03	17:36:03	
2000	268	22:41:09	23:38:20	
2000	269	00:01:48	02:16:47	
2000	269	18:37:40	22:23:05	
2000	270	21:56:47	21:59:20	
2000	280	01:53:50	03:22:10	
2000	281	17:04:12	23:59:35	
2000	282	00:03:10	00:09:09	
2000	284	17:51:30	23:47:25	
2000	285	00:32:55	03:48:40	
2000	285	18:12:26	23:24:27	
2000	286	00:04:50	03:00:00	
2000	286	18:26:30	23:59:59	
2000	287	00:00:00	03:27:01	
2000	287	16:55:00	23:59:59	
2000	288	00:00:00	00:44:16	
2000	288	17:20:36	23:59:59	
2000	289	00:00:00	03:39:39	
2000	289	16:42:41	22:52:59	
2000	292	17:12:09	23:59:10	
2000	296	23:05:48	23:59:32	
2000	297	00:13:17	03:44:25	
2000	297	16:46:56	23:59:59	
2000	298	00:00:00	03:05:13	

## Abstract of Times of Hydrography for Sea Ducer:

YEAR	DAY	START TIME	END TIME	COMMENTS
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Project: OPR-P353-KR

Sheet Letter: "C"

Registry No.: H-11010



		(UTC)	(UTC)	
2000	247	21:54:27	23:23:13	
2000	248	00:16:03	02:18:00	
2000	248	18:05:35	23:52:43	
2000	249	00:01:27	03:25:48	
2000	249	17:53:38	23:59:59	
2000	250	00:00:00	02:56:58	
2000	250	17:54:56	23:59:59	
2000	251	00:00:00	03:33:18	
2000	251	17:27:39	23:59:59	
2000	252	00:00:00	04:08:04	
2000	252	17:20:20	21:28:03	
2000	253	00:02:38	02:35:50	
2000	253	17:05:03	23:59:47	
2000	254	00:01:14	01:21:37	
2000	256	21:49:22	23:59:59	
2000	257	00:00:00	02:35:55	
2000	258	17:22:40	23:59:59	
2000	259	00:00:00	02:35:33	
2000	259	16:15:52	23:59:59	
2000	260	00:00:00	02:35:50	
2000	260	16:07:27	20:15:40	
2000	262	22:15:48	23:59:59	
2000	263	00:00:00	02:06:07	
2000	263	16:58:00	18:01:25	
2000	265	18:41:12	23:59:59	
2000	266	00:00:00	02:52:31	
2000	274	17:17:55	17:46:25	
2000	294	16:49:14	23:35:29	
2000	295	00:05:46	03:29:20	
2000	299	00:45:05	01:33:48	
2000	308	17:19:46	23:06:34	
2000	309	0:25:10	2:49:42	
2000	309	17:38:48	21:18:09	
2000	310	0:04:04	2:43:09	
2000	310	17:03:31	17:23:30	
2000	313	0:06:53	3:14:04	
2000	313	18:09:48	23:59:59	
2000	314	0:00:00	2:28:46	
2000	315	1:59:51	2:07:56	
2000	315	17:36:58	19:24:54	
2000	316	22:16:24	23:58:40	
2000	317	0:09:49	2:42:22	
2000	317	20:06:28	22:41:56	

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**Appendix E – Shoreline Verification Results and Detached Positions**<sup>42</sup>**ITEM NUMBER:** C001      **JD :** 302      **Time :** 21:57Lat. : N59 36.7563    Long. : W149 35.9499  
East.: 6611139.12m    North. : 353357.58m

Observed height/depth (with respect to the water surface): m

Tide: 3.58 m

True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.**ITEM NUMBER:** C002      **JD :** 302      **Time :** 21:43Lat. : N59 36.7721    Long. : W149 37.3996  
East.: 6611222.04m    North. : 351996.03m

Observed height/depth (with respect to the water surface): -1m

Tide: 3.56 m

True height/depth (reduced to verified MLLW): 2.56 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock, 10m along coast.**ITEM NUMBER:** C003      **JD :** 302      **Time :** 20:48Lat. : N59 35.7501    Long. : W149 37.7222  
East.: 6609338.16m    North. : 351617.71m

Observed height/depth (with respect to the water surface): -1 m

Tide: 3.11m

True height/depth (reduced to verified MLLW): 2.11 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rocky area.

**ITEM NUMBER:** C004      JD : 302      Time : 21:30

Lat. : N59 37.0970    Long. : W149 37.7832  
East.: 6611839.02m    North. : 351659.33m    **N/W end of shoal**

Lat. : N59 37.0790    Long. : W149 37.7210  
East.: 6611803.31m    North. : 351716.46m    **Peak of Awash shoal**

Lat. : N59 37.0513    Long. : W149 37.7146  
East.: 6611751.69m    North. : 351720.44m    **S/E end of shoal**

Observed height/depth (with respect to the water surface):    m

Tide: 3.52 m

True height/depth (reduced to verified MLLW):

Rock:            Reef: X<sup>43</sup>            Ledge :            Other :

**Description:** Awash shoal

**ITEM NUMBER:** C005      JD : 302      Time : 23:20

Lat. : N59 38.8416    Long. : W149 37.1460  
East.: 6615051.71m    North. : 352385.92m    **Rock South of Island**

Lat. : N59 38.8642    Long. : W149 37.1860  
East.: 6615095.11m    North. : 352350.02m    **North End of Island**

Observed height/depth (with respect to the water surface): -0.5 m

Tide: 3.42 m

True height/depth (reduced to verified MLLW): 2.92 m

Rock: X            Reef:            Ledge :            Other :

**Description:** Rock 10m south of Island

**ITEM NUMBER:** C006      JD : 302      Time : 23:30

Lat. : N59 38.8525    Long. : W149 37.2128  
East.: 6615074.4m    North. : 352323.99m

Observed height/depth (with respect to the water surface):    m

Tide: 3.58 m

True height/depth (reduced to verified MLLW):

Rock: X            Reef:            Ledge :            Other :

**Description:** Rock

**ITEM NUMBER:** C007      JD : 302      Time : 23:34

Lat. : N59 38.9220      Long. : W149 37.4775  
East.: 6615213.15m      North. : 352080.54m

Observed height/depth (with respect to the water surface):      m  
Tide: 3.31 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock, 10m diameter.

**ITEM NUMBER:** C008      JD : 302      Time : 23:38

Lat. : N59 38.8766      Long. : W149 37.2556  
East.: 6615120.7m      North. : 352285.57m

Observed height/depth (with respect to the water surface):      m  
Tide: 3.28 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C009      JD : 302      Time : 23:43

Lat. : N59 38.6315      Long. : W149 38.5299  
East.: 6614713.48m      North. : 351070.89m

Observed height/depth (with respect to the water surface):      -2 m  
Tide: 3.25 m  
True height/depth (reduced to verified MLLW): 1.25 m

Rock: X      Reef:      Ledge :      Other :



**Description:** Rock, view to east.

**ITEM NUMBER:** C010      JD : 302      Time : 23:46

Lat. : N59 38.6478      Long. : W149 38.5147  
East.: 6614743.15m      North. : 351086.37m

Observed height/depth (with respect to the water surface): 1 m  
Tide: 3.21 m  
True height/depth (reduced to verified MLLW): 4.21 m

Rock: X      Reef:      Ledge :      Other :



**Description:** Rock exposed 1m, 2m diameter; view to east<sup>44</sup>

**ITEM NUMBER:** C011      JD : 302      Time : 23:50

Lat. : N59 38.6589      Long. : W149 38.4905  
East.: 6614762.84m      North. : 351109.92m

Observed height/depth (with respect to the water surface): 2 m  
Tide: 3.17 m  
True height/depth (reduced to verified MLLW): 5.17 m

Rock:      Reef:      Ledge :      Other : X



**Description:** Islet, 2m along, 15m toward.<sup>45</sup>

**ITEM NUMBER:** C012      JD : 303      Time : 01:45

Lat. : N59 42.8571      Long. : W149 33.1167  
East.: 6622353.56m      North. : 356456.18m

Observed height/depth (with respect to the water surface): -1 m  
Tide: 1.53 m  
True height/depth (reduced to verified MLLW): 0.53 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C013      JD : 303      Time : 01:55

Lat. : N59 43.4608      Long. : W149 33.8174  
East.: 6623498.84m      North. : 355842.8m

Observed height/depth (with respect to the water surface): 6 m  
Tide: 1.31 m  
True height/depth (reduced to verified MLLW): 7.31 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Rock Ledge extending out from exposed rocks.<sup>46</sup>

**ITEM NUMBER:** C014      JD : 303      Time : 00:01

Lat. : N59 38.4543      Long. : W149 40.0021  
East.: 6614440.08m      North. : 349675.13m

Observed height/depth (with respect to the water surface): 3 m  
Tide: 3.07 m  
True height/depth (reduced to verified MLLW): 6.07 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Islet, 30m along, 15m toward<sup>47</sup>.

**ITEM NUMBER:** C015      JD : 303      Time : 02:05

Lat. : N59 43.7403      Long. : W149 36.3991  
East.: 6624111.65m      North. : 353444.44m

Observed height/depth (with respect to the water surface): 1 m  
Tide: 1.18 m  
True height/depth (reduced to verified MLLW): 2.18 m

Rock: X              Reef:              Ledge :              Other :



**Description:** Elongated rock.

Project: OPR-P353-KR

Sheet Letter: "C"

Registry No.: H-11010

**ITEM NUMBER:** C016      JD : 303      Time : 02:10

Lat. : N59 43.7659      Long. : W149 36.4014  
East.: 6624159.23m      North. : 353444.16m

Observed height/depth (with respect to the water surface): 3 m  
Tide: 1.10 m  
True height/depth (reduced to verified MLLW): 4.10 m

Rock: X      Reef:      Ledge :      Other :



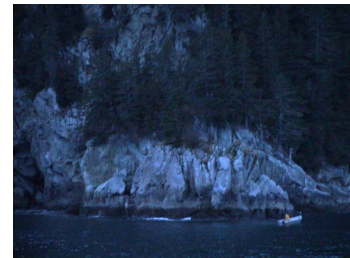
**Description:** Rock<sup>48</sup>.

**ITEM NUMBER:** C017      JD : 303      Time : 02:15

Lat. : N59 43.7102      Long. : W149 36.5413  
East.: 6624061.06m      North. : 353309.04m

Observed height/depth (with respect to the water surface): 18 m  
Tide: 1.01 m  
True height/depth (reduced to verified MLLW): 19.01 m

Rock:      Reef:      Ledge :      Other : X



**Description:** Islet; 60m along, 40m toward.<sup>49</sup>

**ITEM NUMBER:** C018      JD : 303      Time : 02:30

Lat. : N59 44.2474      Long. : W149 38.3103  
East.: 6625123.19m      North. : 351691.59m

Observed height/depth (with respect to the water surface): 4 m  
Tide: 0.78 m  
True height/depth (reduced to verified MLLW): 4.78 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock, 18m along, 11m toward.<sup>50</sup>

Project: OPR-P353-KR

Sheet Letter: "C"

Registry No.: H-11010

**ITEM NUMBER:** C019      JD : 303      Time : 01:27

Lat. : N59 42.0498      Long. : W149 33.2659  
East.: 6620861.29m      North. : 356258.66m

Observed height/depth (with respect to the water surface): 4 m  
Tide: 1.86 m  
True height/depth (reduced to verified MLLW): 5.86 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Islet.<sup>51</sup>

**ITEM NUMBER:** C020      JD : 303      Time : 02:25

Lat. : N59 44.0725      Long. : W149 37.8496  
East.: 6624781.59m      North. : 352110.16m

Observed height/depth (with respect to the water surface): 3.5 m  
Tide: 0.86 m  
True height/depth (reduced to verified MLLW): 4.36 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Islet, 12m along, 7m toward.<sup>52</sup>

**ITEM NUMBER:** C021      JD : 305      Time : 23:13

Lat. : N59 43.2748      Long. : W149 43.9023  
East.: 6623531.13m      North. : 346380.46m

Observed height/depth (with respect to the water surface):      m  
Tide: 3.27 m  
True height/depth (reduced to verified MLLW): 3.27 m

Rock: X              Reef:              Ledge :              Other :



---

Description: Rock.

**ITEM NUMBER:** C022      JD : 305      Time : 23:56

Lat. : N59 42.5968      Long. : W149 44.4224  
 East.: 6622293.55m      North. : 345841.19m

Observed height/depth (with respect to the water surface): 0.3 m  
 Tide: 3.39 m  
 True height/depth (reduced to verified MLLW): 3.69 m

Rock: X      Reef:      Ledge :      Other :



**Description:** Ledge; 0.3m high.<sup>53</sup>

**ITEM NUMBER:** C023      JD : 305      Time : 22:43

Lat. : N59 43.9182      Long. : W149 44.6830  
 East.: 6624754.85m      North. : 345698.43m

Observed height/depth (with respect to the water surface): 13 m  
 Tide: 3.10 m  
 True height/depth (reduced to verified MLLW): 16.10 m

Rock:      Reef:      Ledge :      Other : X

**Description:** Islet, 10m along, 18m toward<sup>54</sup>.

**ITEM NUMBER:** C024      JD : 305      Time : 22:43

Lat. : N59 43.9086      Long. : W149 44.5773  
 East.: 6624732.95m      North. : 345796.69m

Observed height/depth (with respect to the water surface): 23 m  
 Tide: 3.10 m  
 True height/depth (reduced to verified MLLW): 26.10 m

Rock:      Reef:      Ledge :      Other : X

**Description:** Islet, 20m along, 30m toward.<sup>55</sup>

**ITEM NUMBER:** C025      JD : 305      Time : 22:43

Lat. : N59 43.8938    Long. : W149 44.5677  
East.: 6624705.12m    North. : 345804.55m

Observed height/depth (with respect to the water surface): 16 m  
Tide: 3.10 m  
True height/depth (reduced to verified MLLW): 19.10m

Rock:            Reef:            Ledge :            Other : X



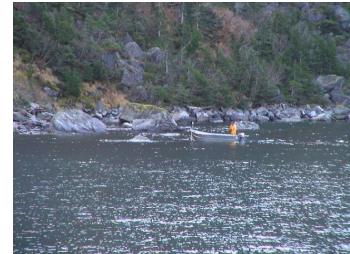
**Description:** Islet. Two tall rocks connected in the middle.<sup>56</sup>

**ITEM NUMBER:** C026      JD : 305      Time : 21:55

Lat. : N59 45.4563    Long. : W149 46.5769  
East.: 6627681.87m    North. : 344044.11m

Observed height/depth (with respect to the water surface): 0.3 m  
Tide: 2.73 m  
True height/depth (reduced to verified MLLW): 3.03 m

Rock: X            Reef :            Ledge :            Other :



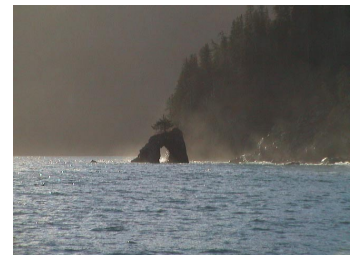
**Description:** 2 rocks.<sup>57</sup>

**ITEM NUMBER:** C027      JD : 305      Time : 22:25

Lat. : N59 45.3172    Long. : W149 45.3726  
East.: 6627376.79m    North. : 345160.46m

Observed height/depth (with respect to the water surface): 15 m  
Tide: 2.97 m  
True height/depth (reduced to verified MLLW): 17.97 m

Rock:            Reef:            Ledge :            Other : X



**Description:** Islet in arch form.<sup>58</sup>

**ITEM NUMBER:** C028      JD : 305      Time : 22:25

Lat. : N59 45.2930    Long. : W149 45.3696  
East.: 6627331.79m    North. : 345161.41m

Observed height/depth (with respect to the water surface): 0.5 m  
Tide: 2.97 m  
True height/depth (reduced to verified MLLW): 3.43 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.<sup>59</sup>

**ITEM NUMBER:** C029      JD : 305      Time : 23:01

Lat. : N59 43.7391    Long. : W149 44.7350  
East.: 6624424.64m    North. : 345635.97m

Observed height/depth (with respect to the water surface):    m  
Tide: 3.22 m  
True height/depth (reduced to verified MLLW): 3.22 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.<sup>60</sup>

**ITEM NUMBER:** C030      JD : 305      Time : 23:40

Lat. : N59 42.9022    Long. : W149 44.1405  
East.: 6622849.16m    North. : 346128.77m

Observed height/depth (with respect to the water surface): -0.6 m  
Tide: 3.37 m  
True height/depth (reduced to verified MLLW): 2.77 m

Rock: X      Reef:      Ledge :      Other :

---

**Description:** Rock.

**ITEM NUMBER:** C031      JD : 305      Time : 23:51

Lat. : N59 42.7316      Long. : W149 43.9854  
East.: 6622526.7m      North. : 346261.07m

Observed height/depth (with respect to the water surface): -0.5 m  
Tide: 3.38 m  
True height/depth (reduced to verified MLLW): 2.88 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C032      JD : 306      Time : 00:38

Lat. : N59 41.8268      Long. : W149 43.2954  
East.: 6620821.68m      North. : 346838.82m

Observed height/depth (with respect to the water surface): 1.5 m  
Tide: 3.32 m  
True height/depth (reduced to verified MLLW): 5.82 m

Rock:      Reef:      Ledge :      Other : X



**Description:** Islet.<sup>61</sup>

**ITEM NUMBER:** C033      JD : 306      Time : 00:43

Lat. : N59 41.7537      Long. : W149 43.3094  
East.: 6620686.62m      North. : 346820.13m

Observed height/depth (with respect to the water surface): -0.6 m  
Tide: 3.32 m  
True height/depth (reduced to verified MLLW): 2.72 m

Rock: X      Reef:      Ledge :      Other :



Description: Rocky area.

**ITEM NUMBER:** C034      JD : 306      Time : 00:50

Lat. : N59 41.5229    Long. : W149 43.5025  
East.: 6620265.92m    North.: 346621.48m    **Start of Ledge**

Lat. : N59 41.5437    Long. : W149 43.5154  
East.: 6620305m    North.: 346610.97m    **End of Ledge**

Observed height/depth (with respect to the water surface): 0.2 m

Tide: 3.27 m

True height/depth (reduced to verified MLLW): 3.47 m

Rock:            Reef:            Ledge : X            Other :

**Description:** Ledge.<sup>62</sup>

**ITEM NUMBER:** C035      JD : 306      Time : 19:56

Lat. : N59 45.1844    Long. : W149 34.7362  
East.: 6626729.73m    North.: 355106.39m

Observed height/depth (with respect to the water surface): -0.5 m

Tide: 1.42 m

True height/depth (reduced to verified MLLW): 0.92 m

Rock:            Reef:            Ledge : X            Other :

**Description:** Ledge.

**ITEM NUMBER:** C036      JD : 306      Time : 00:29

Lat. : N59 42.0619    Long. : W149 43.9916  
East.: 6621284.64m    North.: 346204.05m

Observed height/depth (with respect to the water surface): -0.5 m

Tide: 3.36 m

True height/depth (reduced to verified MLLW): 2.86 m

Rock: X            Reef:            Ledge :            Other :

**Description:** Rock underneath cliff overhang.

**ITEM NUMBER:** C037      JD : 306      Time : 00:22

Lat. : N59 41.6382      Long. : W149 44.4162  
East.: 6620515.1m      North. : 345773.52m

Observed height/depth (with respect to the water surface): -0.7 m

Tide: 3.38 m

True height/depth (reduced to verified MLLW): 2.68 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C038      JD : 306      Time : 00:32

Lat. : N59 42.0635      Long. : W149 43.8981  
East.: 6621284.00m      North. : 346291.82m

Observed height/depth (with respect to the water surface): -0.1 m

Tide: 3.35m

True height/depth (reduced to verified MLLW): 3.25 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C039      JD : 306      Time : 19:24

Lat. : N59 46.1589      Long. : W149 38.7927  
East.: 6628687.19m      North. : 351381.42m

Observed height/depth (with respect to the water surface): -0.1 m

Tide: 1.28 m

True height/depth (reduced to verified MLLW): 1.18 m

Rock: X      Reef:      Ledge :      Other :

Description: Rock.

**ITEM NUMBER:** C040      JD : 306      Time : 19:28

Lat. : N59 45.6582      Long. : W149 38.6101  
East.: 6627751.53m      North. : 351515.21m

Observed height/depth (with respect to the water surface):      m  
Tide: 1.29 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :



**Description:** Rock.

**ITEM NUMBER:** C041      JD : 306      Time : 19:31

Lat. : N59 45.6498      Long. : W149 38.5978  
East.: 6627735.49m      North. : 351526.1m

Observed height/depth (with respect to the water surface): -0.5 m  
Tide: 1.31 m  
True height/depth (reduced to verified MLLW): 0.81 m

Rock:      Reef:      Ledge : X      Other :

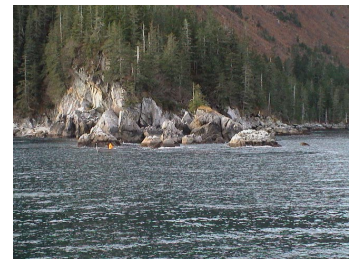
**Description:** Ledge.

**ITEM NUMBER:** C042      JD : 309      Time : 20:57

Lat. : N59 40.8174      Long. : W149 45.0104  
East.: 6619015.59m      North. : 345153.21m

Observed height/depth (with respect to the water surface): 2.5 m  
Tide: 1.63 m  
True height/depth (reduced to verified MLLW): 4.13 m

Rock:      Reef:      Ledge :      Other : X



**Description:** Islet.<sup>63</sup>**ITEM NUMBER:** C043      **JD :** 306      **Time :** 20:59

Lat. : N59 40.8049      Long. : W149 45.0006  
 East.: 6618992.02m      North. : 345161.44m

Observed height/depth (with respect to the water surface): -0.1 m  
 Tide: 1.64 m  
 True height/depth (reduced to verified MLLW): 1.54 m

Rock:              Reef:              Ledge : X              Other :

**Description:** Ledge.**ITEM NUMBER:** C044      **JD :** 309      **Time :** 21:03

Lat. : N59 40.7726      Long. : W149 45.0828  
 East.: 6618935.31m      North. : 345081.85m

Observed height/depth (with respect to the water surface): 2.5 m  
 Tide: 1.67 m  
 True height/depth (reduced to verified MLLW): 4.17 m

Rock:              Reef:              Ledge :              Other : X

**Description:** Islet, 3m diameter.<sup>64</sup>**ITEM NUMBER:** C045      **JD :** 309      **Time :** 20:23

Lat. : N59 40.2094      Long. : W149 43.0411  
 East.: 6617811.6m      North. : 346954.32m

Observed height/depth (with respect to the water surface): 5 m  
 Tide: 1.71 m  
 True height/depth (reduced to verified MLLW): 6.71 m

Rock:              Reef:              Ledge :              Other : X





**Description:** Islet arch extending from Island.<sup>65</sup>

**ITEM NUMBER:** C046      JD : 314      Time : 23:02

Lat. : N59 38.9389      Long. : W149 46.2546  
East.: 6615579.61m      North. : 343840.53m

Observed height/depth (with respect to the water surface): 5.5 m  
Tide: 1.96 m  
True height/depth (reduced to verified MLLW): 7.46 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Islet, 2m Diameter.<sup>66</sup>

**ITEM NUMBER:** C047      JD : 314      Time : 23:04

Lat. : N59 38.9386      Long. : W149 46.4100  
East.: 6615585.15m      North. : 343694.6m

Observed height/depth (with respect to the water surface): 1.5 m  
Tide: 1.94 m  
True height/depth (reduced to verified MLLW): 3.44 m

Rock:              Reef:              Ledge :              Other : X



**Description:** Islet, 2m Diameter.<sup>67</sup>

**ITEM NUMBER:** C048      JD : 314      Time : 23:13

Lat. : N59 39.1806      Long. : W149 46.6452  
East.: 6616043.29m      North. : 343492.56m

Observed height/depth (with respect to the water surface): 2.5 m  
Tide: 1.82 m  
True height/depth (reduced to verified MLLW): 4.32 m

Rock:              Reef:              Ledge : X              Other :



---

**Description:** Ledge, 4m Diameter. <sup>68</sup>

**ITEM NUMBER:** C049      JD : 315      Time : 20:29

Lat. : N59 40.6410      Long. : W149 47.0187  
East.: 6618766.97m      North. : 343255.6m

Observed height/depth (with respect to the water surface): -0.5 m  
Tide: 3.49 m  
True height/depth (reduced to verified MLLW): 2.99 m

Rock: X      Reef:      Ledge :      Other :



**Description:** Submerged rock in an area of fallen rocks.

**ITEM NUMBER:** C050      JD : 315      Time : 00:43

Lat. : N59 39.3187      Long. : W149 46.0483  
East.: 6616276.04m      North. : 344063.62m

Observed height/depth (with respect to the water surface): -0.3 m  
Tide: 0.61 m  
True height/depth (reduced to verified MLLW): 0.31 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C051      JD : 315      Time : 19:10

Lat. : N59 39.7689      Long. : W149 45.9010  
East.: 6617105.39m      North. : 344236.71m

Observed height/depth (with respect to the water surface): 0.3 m  
Tide: 2.93 m  
True height/depth (reduced to verified MLLW): 3.23 m

Rock: X      Reef:      Ledge :      Other :



**Description:** Rock, 1m Diameter.

**ITEM NUMBER:** C052      JD : 315      Time : 20:35

Lat. : N59 40.8216      Long. : W149 47.2918  
East.: 6619112.74m      North. : 343013.48m

Observed height/depth (with respect to the water surface): -0.7 m

Tide: 3.50 m

True height/depth (reduced to verified MLLW): 2.80 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C053      JD : 315      Time : 20:39

Lat. : N59 40.7809      Long. : W149 47.4256  
East.: 6619042.52m      North. : 342884.8m

Observed height/depth (with respect to the water surface): -1 m

Tide: 3.50 m

True height/depth (reduced to verified MLLW): 2.50 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C054      JD : 315      Time : 20:41

Lat. : N59 37.9046      Long. : W149 46.7575  
East.: 6613680.78m      North. : 343287.98m

Observed height/depth (with respect to the water surface): 2 m

Tide: 3.50 m

True height/depth (reduced to verified MLLW): 5.50 m

Rock:      Reef:      Ledge :      Other : X

**Description:** Islet, 10m from shore.<sup>69</sup>

**ITEM NUMBER:** C055      JD : 315      Time : 20:43

Lat. : N59 40.6298      Long. : W149 47.6926  
East.: 6618772.78m      North. : 342622.53m

Observed height/depth (with respect to the water surface): -0.7 m  
Tide: 3.49m  
True height/depth (reduced to verified MLLW): 2.79 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock, 5m Diameter.

**ITEM NUMBER:** C056      JD : 317      Time : 02:02

Lat. : N59 36.8876      Long. : W149 46.0223  
East.: 6611765.41m      North. : 343899.97m

Observed height/depth (with respect to the water surface):    m  
Tide: 0.168 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock, 4m Diameter.

**ITEAM NUMBER:** C057      JD : 315      Time : 20:42

Lat. : N59 40.6863      Long. : W149 47.6703  
East.: 6618876.71m      North. : 342647.86m

Observed height/depth (with respect to the water surface): 1 m  
Tide: 3.50 m  
True height/depth (reduced to verified MLLW): 4.50 m

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock<sup>70</sup>.

**ITEM NUMBER:** C058      JD : 305      Time : 20:45

Lat. : N59 47.3800      Long. : W149 45.9034  
 East.: 344823.34m      North. : 6631223.98m

Observed height/depth (with respect to the water surface): 3 m  
 Tide: 2.11 m  
 True height/depth (reduced to verified MLLW): 5.11m

Rock:            Reef:            Ledge :            Other : X



**Description:** Islet, 8m long.<sup>71</sup>

**ITEM NUMBER:** C059      JD : 305      Time : 20:49

Lat. : N59 47.4008      Long. : W149 45.8856  
 East.: 344841.6m      North. : 6631261.87m

Observed height/depth (with respect to the water surface): 4.5 m  
 Tide: 2.14 m  
 True height/depth (reduced to verified MLLW): 6.64 m

Rock: X            Reef:            Ledge :            Other : X



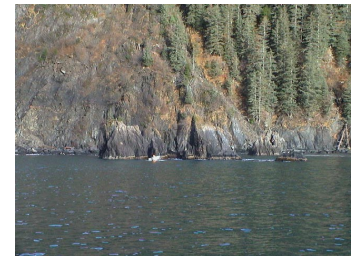
**Description:** Islet, 6m long.<sup>72</sup>

**ITEM NUMBER:** C060      JD : 305      Time : 20:53

Lat. : N59 47.4987      Long. : W149 46.2587  
 East.: 344500.35m      North. : 6631458.05m

Observed height/depth (with respect to the water surface): 1.5 m  
 Tide: 2.19 m  
 True height/depth (reduced to verified MLLW): 3.69 m

Rock: X            Reef:            Ledge :            Other :



**Description:** Rock, 2m diameter.<sup>73</sup>

**ITEM NUMBER:** C061      JD : 305      Time : 20:59

Lat. : N59 47.4383    Long. : W149 46.5570  
East.: 344216.77m    North. : 6631357.68m

Observed height/depth (with respect to the water surface): 1.5 m  
Tide: 2.22 m  
True height/depth (reduced to verified MLLW): 3.72m

Rock: X      Reef:      Ledge :      Other :

Description: Rock, 7m long.

**ITEM NUMBER:** C062      JD : 305      Time : 20:59

Lat. : N59 47.4101    Long. : W149 46.6640  
East.: 344114.54m    North. : 6631309.56m

Observed height/depth (with respect to the water surface): 5 m  
Tide: 2.22 m  
True height/depth (reduced to verified MLLW): 7.22 m

Rock:      Reef:      Ledge :      Other : X



Description: Islet, 8m long.<sup>74</sup>

**ITEM NUMBER:** C063      JD : 305      Time : 21:19

Lat. : N59 46.6961    Long. : W149 46.3303  
East.: 344371.12m    North. : 6629972.03m

Observed height/depth (with respect to the water surface):    m  
Tide: 2.36 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

---

Description: Rock.

**ITEM NUMBER:** C064      JD : 305      Time : 21:19

Lat. : N59 46.2623    Long. : W149 46.3959  
East.: 344276.08m    North.: 6629169.9m

Observed height/depth (with respect to the water surface): 1 m  
Tide: 2.36 m  
True height/depth (reduced to verified MLLW): 3.36 m

Rock: X      Reef:      Ledge :      Other :



Description: Rock, 3m long.

**ITEM NUMBER:** C065      JD : 305      Time : 21:29

Lat. : N59 46.4383    Long. : W149 46.0271  
East.: 344634.73m    North.: 6629481.96m

Observed height/depth (with respect to the water surface): 8 m  
Tide: 2.51m  
True height/depth (reduced to verified MLLW): 10.51m

Rock:      Reef:      Ledge :      Other : X



Description: Islet, 4.5m diameter<sup>75</sup>.

**ITEM NUMBER:** C066      JD : 305      Time : 21:31

Lat. : N59 46.3785    Long. : W149 45.9991  
East.: 344656.29m    North.: 6629369.93m

Observed height/depth (with respect to the water surface): 0.7 m  
Tide: 2.52 m  
True height/depth (reduced to verified MLLW): 3.22 m

Rock: X      Reef:      Ledge :      Other :





**Description:** Rock, 6m long.

**ITEM NUMBER:** C067      JD : 305      Time : 22:14

Lat. : N59 45.9136    Long. : W149 45.5671  
East.: 345024.49m    North.: 6628490.69m

Observed height/depth (with respect to the water surface):    m  
Tide: 2.87 m  
True height/depth (reduced to verified MLLW):

Rock: X      Reef:      Ledge :      Other :

**Description:** Rock.

**ITEM NUMBER:** C068      JD : 306      Time : 19:15

Lat. : N59 46.3958    Long. : W149 39.1789  
East.: 351037.69m    North.: 6629141.11m      **Rock**

Lat. : N59 46.2391    Long. : W149 39.0909  
East.: 351108.38m    North.: 6628847.12m      **Ledge of rock**

Observed height/depth (with respect to the water surface): 1.5 m  
Tide: 1.25 m  
True height/depth (reduced to verified MLLW): 2.75 m

Rock: X      Reef:      Ledge : X      Other :

**Description:** Rock, 3m long.

**ITEM NUMBER:** C069      JD : 306      Time : 19:22

Lat. : N59 46.2115    Long. : W149 39.0654  
East.: 351130.19m    North.: 6628794.97m

Observed height/depth (with respect to the water surface): 1.5 m  
Tide: 1.27 m  
True height/depth (reduced to verified MLLW): 2.77 m

Rock: X      Reef:      Ledge :      Other :





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**Description:** Rock.

**ITEM NUMBER:** C070      JD : 306      Time : 19:27

Lat. : N59 49.5015    Long. : W149 44.6880  
 East.: 351108.38m    North.: 6628847.12m

Observed height/depth (with respect to the water surface): -0.6m  
 Tide: 1.28 m  
 True height/depth (reduced to verified MLLW): 0.68 m

Rock:            Reef:            Ledge : X      Other :

**Description:** Ledge, running southwards.

**ITEM NUMBER:** C071      JD : 306      Time : 18:27

Lat. : N59 47.5695    Long. : W149 39.1937  
 East.: 351111.03m    North.: 6631318.98m

Observed height/depth (with respect to the water surface): 8 m  
 Tide: 1.22 m  
 True height/depth (reduced to verified MLLW): 9.22 m

Rock:            Reef:            Ledge :            Other : X



**Description:** Islet, 25m long.<sup>76</sup>

**ITEM NUMBER:** C072      JD : 306      Time : 18:45

Lat. : N59 47.5051    Long. : W149 37.1813  
 East.: 352987.79m    North.: 6631124.63m

Observed height/depth (with respect to the water surface): - 1.5 m  
 Tide: 1.21 m  
 True height/depth (reduced to verified MLLW): - 0.29 m

Rock: X            Reef:            Ledge :            Other :

**Description:** Rock<sup>77</sup>.

**ITEM NUMBER:** C073      JD : 306      Time : 18:58

Lat. : N59 47.3824    Long. : W149 37.0743  
East.: 353078.84m    North.: 6630893.06m

Observed height/depth (with respect to the water surface):    m  
Tide: 1.22 m  
True height/depth (reduced to verified MLLW): 1.22 m

Rock:            Reef:            Ledge : X            Other :

**Description:** Ledge Awash off Island

**ITEM NUMBER:** C074      JD : 306      Time : 18:59

Lat. : N59 47.3688    Long. : W149 37.0795  
East.: 353072.98m    North.: 6630868.02m            **Rock**

Lat. : N59 47.3649    Long. : W149 37.0867  
East.: 353065.96m    North.: 6630861.05m            **Ledge**

Observed height/depth (with respect to the water surface): 5 m  
Tide: 1.22 m  
True height/depth (reduced to verified MLLW): 5.22 m

Rock:            Reef:            Ledge :            Other : X

**Description:** Islet, 8m long<sup>78</sup> .

**ITEM NUMBER:** C075      JD : 305      Time : 21:01

Lat. : N59 47.3781    Long. : W149 46.7159  
East.: 344063.52m    North.: 6631252.24m

Observed height/depth (with respect to the water surface): 2 m  
Tide: 2.24 m  
True height/depth (reduced to verified MLLW): 4.24 m

Rock: X            Reef:            Ledge :            Other :

**Description:** Rock, 3m long.<sup>79</sup>



**ITEM NUMBER:** C076      JD : 305      Time : 21:06

Project: OPR-P353-KR  
Sheet Letter: "C"  
Registry No.: H-11010

Lat. : N59 47.3784    Long. : W149 46.7415  
East.: 344039.61m    North. : 6631253.8m

Observed height/depth (with respect to the water surface): 1 m  
Tide: 2.28 m  
True height/depth (reduced to verified MLLW): 3.28 m

Rock: X        Reef:        Ledge :        Other :



**Description:** Rock, 2m diameter.

## Appendix F – Grab Sample Positions and Descriptions

JD-TIME (UTC)	LATITUDE	LONGITUDE	NORTHING	EASTING	APPROXIMATE DEPTH (M)	DESCRIPTION
McMullen Cove						
316-2012	N59 45.6220	W149 46.4330	6627984	344192	40.0	gy (gray) CI (clay)
316-2023	N59 45.9590	W149 46.9430	6628629	343741	15.0	Cl (clay) with Sh (shells) fragments & G (gravel)
Camp Cove						
316-2107	N59 41.707	W149 44.566	6620649	345638	53.0	gy (gray) CI (clay) & G (gravel)
316-2115	N59 41.987	W149 44.762	6621176	345476	48.0	gy (gray) S (sandy) CI (clay)
316-2142	N59 41.403	W149 45.013	6620063	346134	26.0	Sh (shells) fragments
316-2146	N59 40.967	W149 45.477	6619272	345665	20.0	No Sample Recovered
Fire Cove						
316-2232	N59 39.3419	W149 46.0786	6616320	344037	26.0	No Sample Recovered
316-2236	N59 39.7805	W149 46.0958	6617134	344055	35.0	No Sample Recovered
Ripple Cove						
316-2252	N59 39.8535	W149 47.5785	6617328	342669	31.0	Sh (shells) fragments
316-2302	N59 40.6995	W149 47.5337	6618896	342777	35.0	rky (Rocky) with St (stones)
Cove Between						
317-2315	N59 40.8822	W149 48.2356	6619262	342133	44.0	rky (Rocky) with Sh (shells) fragments
316-2345	N59 41.1886	W149 47.8989	6619817	342473	31.0	rky (Rocky) with S (Silty Sand)
Cove on West						
317-0014	N59 39.6106	W149 39.4238	6616563	350304	51.0	rky (Rocky) with CI (gray clay)
317-0018	N59 39.5181	W149 39.2702	6616386	350441	37.0	Cl (dense green clay) w/ S (sand) & Sh (shell)
North Side of						
Pete's Pass						
317-0037	N59 39.0386	W149 39.1315	6615491	350536	35.0	Cl (soft green sandy clay) with Sh (shells)
317-0045	N59 39.1768	W149 38.0469	6615707	351565	48.0	No Sample Recovered
Chat Cove						
317-0121	N59 43.3043	W149 32.9821	6623178	356614	60.0	rky (Rocky) – one St (stones)
Cliff Bay						
317-0141	N59 44.357	W149 34.8693	6625201	354922	48.0	Silt with Cl (clay) & Sh (shells)
317-0149	N59 44.4204	W149 36.2468	6625368	353637	31.0	S (coarse sand) and Sh (shells)
Three Hole Bay						
317-0216	N59 44.8194	W149 36.9325	6626133	353023	53.0	rky (Rocky) and G (gravel)
317-0232	N59 45.0970	W149 35.2759	6626587	354595	48.0	Cl (soft green clay) with G (gravel)
317-0240	N59 45.6791	W149 34.9224	6627654	354968	49.0	rky (Rocky)
317-0258	N59 47.0348	W149 36.4977	6630227	353593	49.0	rky (Rocky)
317-0306	N59 47.082	W149 36.248	6630305	353830	48.0	rky (Rocky)

<sup>1</sup> PHB Revision-Review of the data in CARIS subset mode shows no evidence of data outside of NOAA specifications.

<sup>2</sup> PHB Revision-Review of the data in CARIS subset mode shows no evidence of data outside of NOAA specifications.

<sup>3</sup> PHB Revision-Review of the data in CARIS subset mode shows no evidence of data outside of NOAA specifications.

<sup>4</sup> PHB Revision -Filed with the survey records

<sup>5</sup> PHB Revision-Aialik Sil, Upper NW Fjord and NW Passage stations where not used on this survey. Final Tide note is attached.

<sup>6</sup> PHB Revision-Filed with the survey records.

<sup>7</sup> PHB Revision-The Continuous Maintenance Drawing last revised, 4/18/2002 was used for chart comparison during office processing.

<sup>8</sup> PHB Revision-should be “has”.

<sup>9</sup> PHB Revision-should be “has”.

<sup>10</sup> PHB Revision-should be “charted”.

<sup>11</sup> PHB Revision-DTON's were reviewed at PHB. 15 DTON's were reported to USCG, NIMA and N/CS261.

<sup>12</sup> PHB Revision - The smooth sheet was compared to prior surveys H3421 (1912), H4836 (1928-29), H4837 (1928) and H5085 (1930). The comparisons revealed a general agreement between historical and contemporary depths and features with the exception that present survey depths are consistently one to two fathoms shallower. This difference may be attributable to the effects of the significant 1964 Good Friday earthquake and other tectonic events. The present survey is considered adequate to supersede the prior surveys within the common area.

<sup>13</sup> PHB Revision- Shoreline on the smooth sheet originates with digital cartographic feature file (dchf) GC10478 (RSD Project AK98B). The root mean square error is 7 meters. In isolated instances the hydrographer superseded this source by sketching an approximate MHWL onto the smooth sheet. The accuracy of this approximate shoreline is unknown and is depicted on the smooth sheet with a dashed red line. Supersession of this approximate shoreline by RSD data is recommended.

<sup>14</sup> PHB Revision - DCFE GC10478

<sup>15</sup> PHB Revision - See Footnote 8

<sup>16</sup> PHB Revision – Appendix E is attached to this report.

<sup>17</sup> PHB Revision – Retain rock as charted.

<sup>18</sup> PHB Revision – Retain Hub Rk as charted.

<sup>19</sup> PHB Revision – Chart area as shown on SS.

<sup>20</sup> PHB Revision – Delete charted rocks.

<sup>21</sup> PHB Revision – Retain as charted. See Hdwg for 16682H10.969.

<sup>22</sup> PHB Revision – Delete SW rock, retain charted northern Rk, chart islet as shown on SS.

<sup>23</sup> PHB Revision – Chart area as shown on smooth sheet.

<sup>24</sup> PHB Revision – Retain area as charted.

<sup>25</sup> PHB Revision – Delete rock, reposition eastern most islet as shown on SS. Retain remaining area as shown.

<sup>26</sup> PHB Revision – Delete Islet

<sup>27</sup> PHB Revision – Retain subm rock as charted.

<sup>28</sup> PHB Revision – Retain area as charted.

<sup>29</sup> PHB Revision – Retain area as charted. Chart Rk 2<sub>3</sub> to the SW.

<sup>30</sup> PHB Revision – Retain area as charted.

<sup>31</sup> PHB Revision – Retain as charted.

<sup>32</sup> PHB Revision – Delete charted rock.

<sup>33</sup> PHB Revision – Delete Islet.

<sup>34</sup> PHB Revision – Retain as charted.

<sup>35</sup> PHB Revision – Retain as charted.

<sup>36</sup> PHB Revision-Appendix E is attached to this report.

- 
- <sup>37</sup> PHB Revision-Bottom sample XY's were inserted into a digital file for compilation using Microstation95 during office processing.
- <sup>38</sup> PHB Revision-Appendix F is attached to this report.
- <sup>39</sup> PHB Revision - The data, reports and smooth sheet are generally in compliance with specifications: 1) the format for the soundings plotted on the smooth sheet is not in compliance with specifications. The tenths of fathoms value should be depicted as a superscript. Instead, it is depicted as a subscript. The accuracy of the sounding values is not affect, just the plotted appearance.
- <sup>40</sup> PHB Revision-DTON's were reviewed at PHB. 15 DTON's were reported to USCG, NIMA and N/CS261.
- <sup>41</sup> PHB Revision-See 2000 Field and Final Tide Note for H-11010 which is attached to this report.
- <sup>42</sup> PHB Revision-From item C001 to C057 Easting and Northing meter values should be reversed.
- <sup>43</sup> PHB Revision – Reef depicted as rock awash on SS.
- <sup>44</sup> PHB Revision- Reduced Islet height is 7 feet at MHW.
- <sup>45</sup> PHB Revision- Reduced Islet height is 4 feet at MHW.
- <sup>46</sup> PHB Revision- Reduced Islet height is 14 feet at MHW.
- <sup>47</sup> PHB Revision- Reduced Islet height is 10 feet at MHW.
- <sup>48</sup> PHB Revision- Islet shown on SS-Reduced Islet height is 4 feet at MHW.
- <sup>49</sup> PHB Revision- Reduced Islet height is 52 feet at MHW.
- <sup>50</sup> PHB Revision- Reduced Islet height is 6 feet at MHW.
- <sup>51</sup> PHB Revision- Reduced Islet height is 10 feet at MHW.
- <sup>52</sup> PHB Revision- Reduced Islet height is 5 feet at MHW.
- <sup>53</sup> PHB Revision-Reduced Islet height is 3 feet at MHW.
- <sup>54</sup> PHB Revision- Reduced Islet height is 43 feet at MHW.
- <sup>55</sup> PHB Revision- Reduced Islet height is 76 feet at MHW.
- <sup>56</sup> PHB Revision- Reduced Islet height is 53 feet at MHW.
- <sup>57</sup> PHB Revision-one rock shown on smooth sheet with reduced height of 10 feet at MLLW.
- <sup>58</sup> PHB Revision- Reduced Islet height is 49 feet at MHW.
- <sup>59</sup> PHB Revision- Reduced rock height is 11 feet at MLLW.
- <sup>60</sup> PHB Revision- Reduced rock height is 11 feet at MLLW.
- <sup>61</sup> PHB Revision- Reduced Islet height is 10 feet at MHW.
- <sup>62</sup> PHB Revision- Smooth Sheet shows Islet-Reduced rock height is 12 feet at MLLW.
- <sup>63</sup> PHB Revision- Reduced Islet height is 4 feet at MHW.
- <sup>64</sup> PHB Revision- Reduced Islet height is 4 feet at MHW.
- <sup>65</sup> PHB Revision- Reduced Islet height is 11 feet at MHW.
- <sup>66</sup> PHB Revision- Reduced Islet height is 15 feet at MHW.
- <sup>67</sup> PHB Revision- Reduced Islet height is 11 feet at MHW.
- <sup>68</sup> PHB Revision- Reduced Islet height is 5 feet at MHW.
- <sup>69</sup> PHB Revision- Reduced Islet height is 9 feet at MHW.
- <sup>70</sup> PHB Revision- Reduced Islet height is 5 feet at MHW.
- <sup>71</sup> PHB Revision-Reduced Islet height is 7 feet at MHW.
- <sup>72</sup> PHB Revision-Reduced Islet height is 3 feet at MHW.
- <sup>73</sup> PHB Revision-Reduced Islet height is 3 feet at MHW.
- <sup>74</sup> PHB Revision-Reduced Islet height is 14 feet at MHW.
- <sup>75</sup> PHB Revision-Reduced Islet height is 25 feet at MHW.
- <sup>76</sup> PHB Revision-Reduced Islet height is 20 feet at MHW. This islet falls within the limits of H-10968.
- <sup>77</sup> PHB Revision-This rock falls within the limits of H-10968
- <sup>78</sup> PHB Revision-Reduced Islet height is 8 feet at MHW.
- <sup>79</sup> PHB Revision-Reduced Islet height is 4 feet at MHW.

## REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H11010

Survey Title:       State: AK  
                  Locality: Aialik Bay  
                  Sub-locality: Approaches to Aialik Bay

Project Number:    OPR-P353-KR

Survey Dates:     August - November, 2000

Depths are reduced to Mean Lower Low Water using verified tides.  
Positions are based on the NAD83 horizontal datum.

### CHARTS AFFECTED:

CHART	EDITION	DATE	SCALE
16680	10th	July 10, 1999	1:200,000
16682	14th	June 20, 1998	1:81,847

### DANGERS:

FEATURE	DEPTH (Chart Units)	LATITUDE(N)	LONGITUDE(W)
Sounding	6 fathoms 5 feet	59° 39' 59.3"	149° 43' 03.3"
Sounding	9 fathoms 3 feet	59° 40' 06.6"	149° 43' 02.0"
Sounding	3 fathoms 1 foot	59° 39' 17.6"	149° 42' 41.8"
Sounding	9 fathoms 2 feet	59° 35' 57.5"	149° 39' 12.2"
Sounding	5 fathoms 3 feet	59° 35' 36.5"	149° 37' 39.1"
Sounding	2 fathoms 5 feet	59° 35' 24.5"	149° 37' 52.6"
Sounding	4 fathoms 1 foot	59° 34' 49.6"	149° 37' 24.8"
Sounding	6 fathoms 3 feet	59° 37' 50.4"	149° 35' 27.4"
Sounding	8 fathoms 1 foot	59° 38' 00.4"	149° 37' 19.6"
Sounding	5 fathoms 5 feet	59° 38' 18.7"	149° 38' 52.0"
Sounding	2 fathoms 3 feet	59° 38' 23.5"	149° 38' 41.8"
Sounding	3 fathoms 2 feet	59° 38' 33.3"	149° 38' 35.4"
Sounding	2 fathoms 3 feet	59° 38' 54.1"	149° 38' 40.9"
Sounding	7 fathoms 3 feet	59° 38' 43.8"	149° 35' 28.6"
Sounding	4 fathoms	59° 42' 54.1"	149° 43' 11.7"

### COMMENTS:

## REPORT OF DANGERS TO NAVIGATION

The first 14 items on the above list appear to be rocks. The last item listed is a shoal area around Hub Rock. The sounding listed is the southern extent of the shoal.

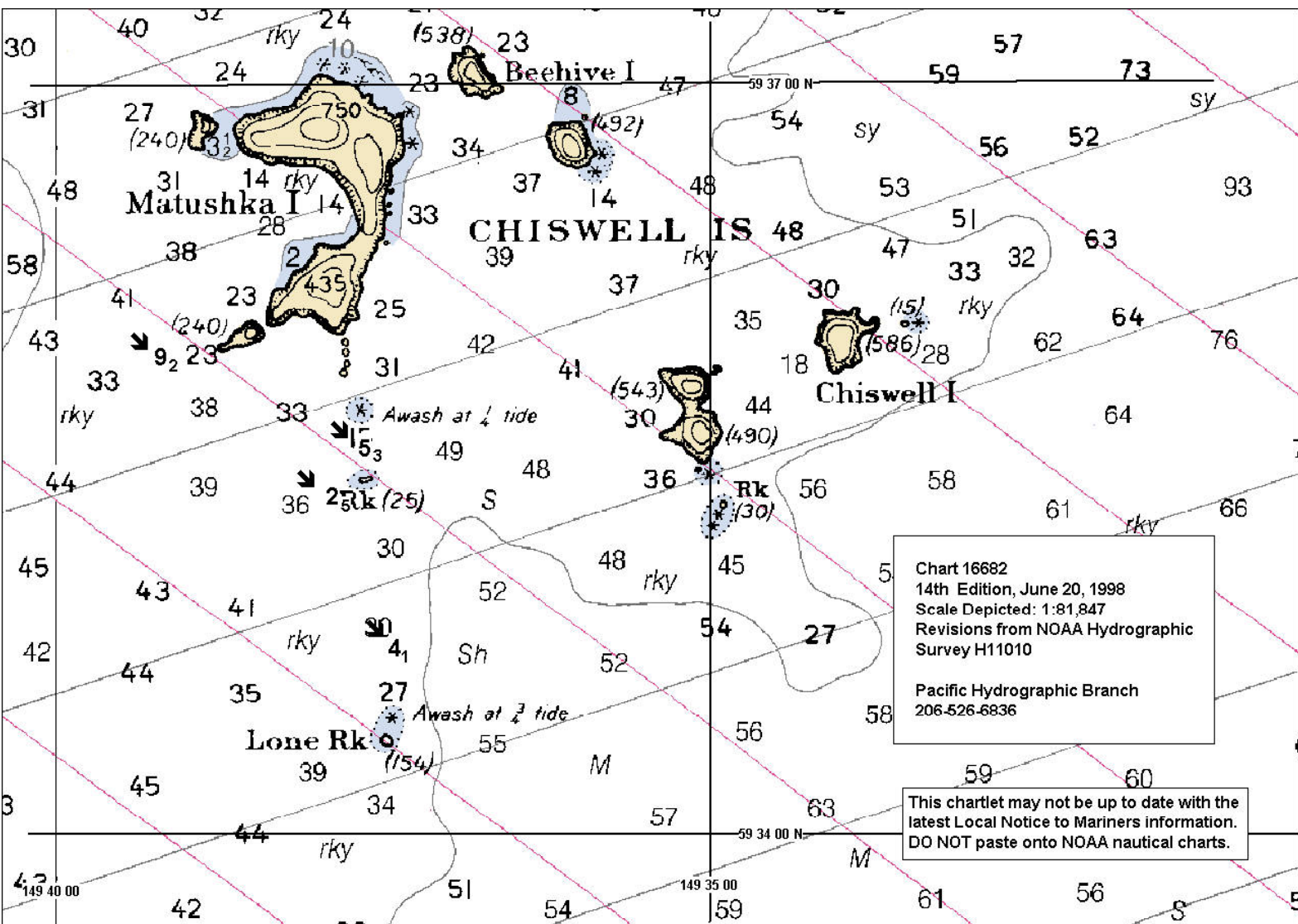
See attached chartlet no. 1

See attached chartlet no. 2

See attached chartlet no. 3

Questions concerning this report should be directed to the Pacific Hydrographic Branch (N/CS34) at (206) 526-6836.





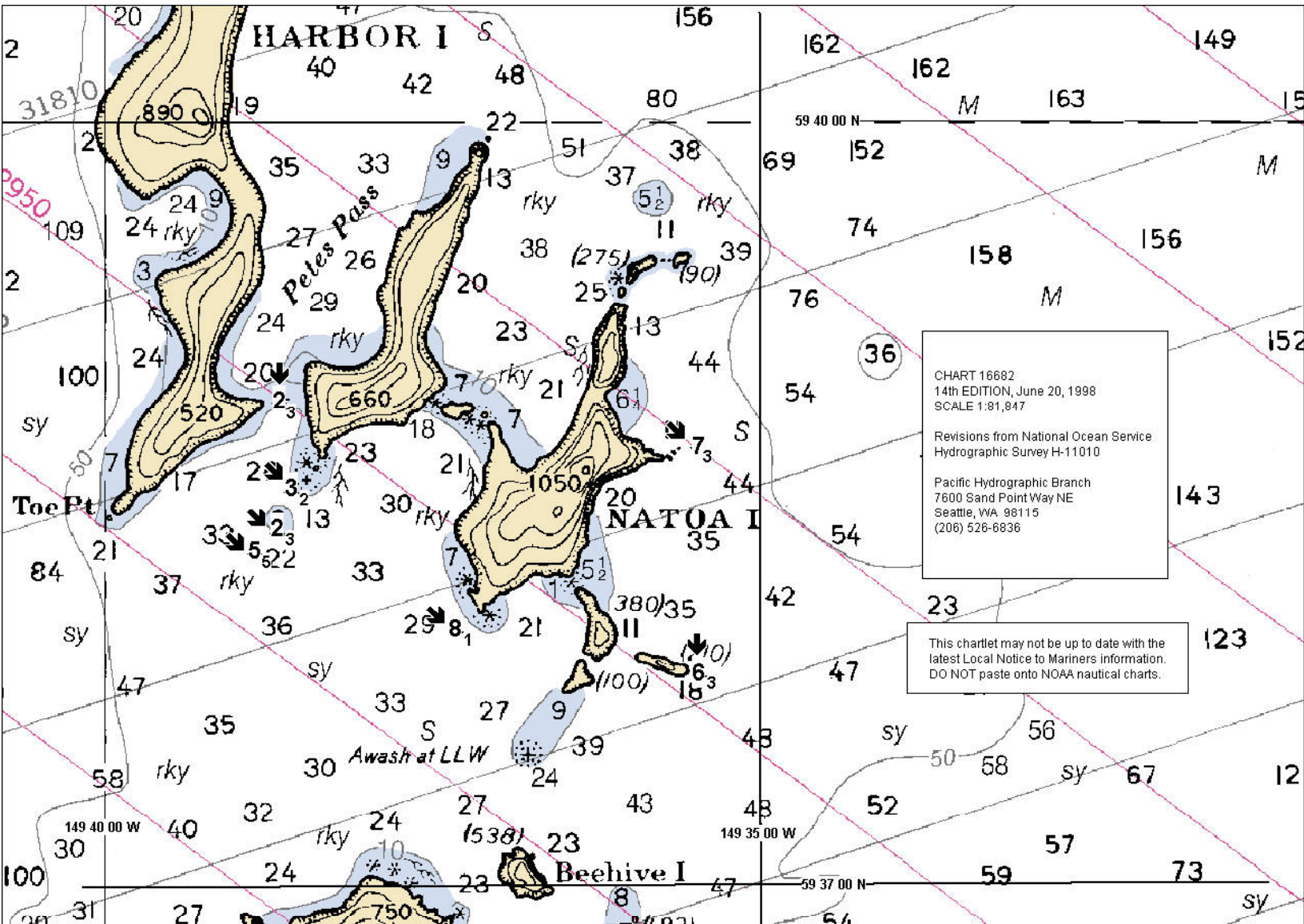


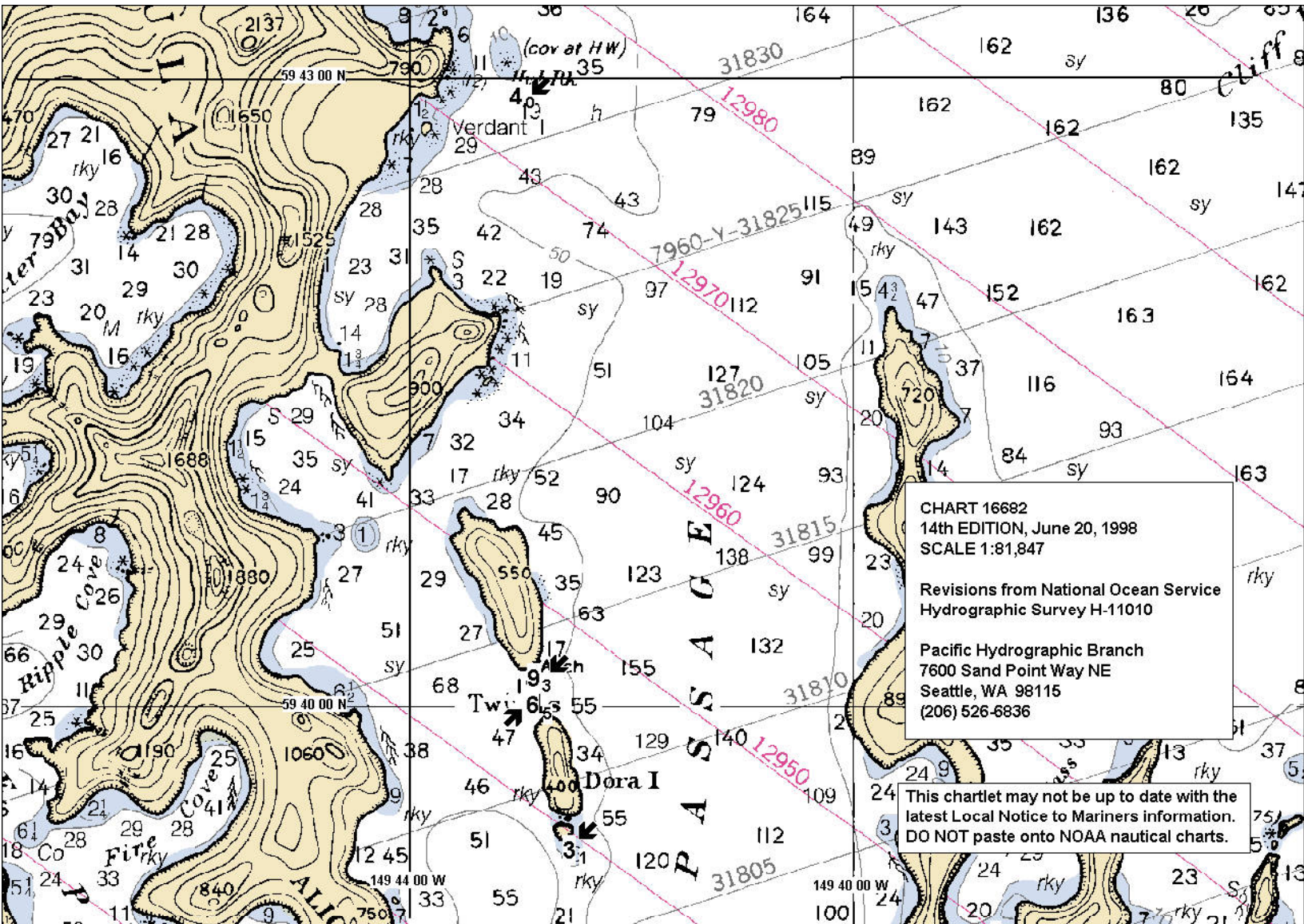
CHART 16682  
 14th EDITION, June 20, 1998  
 SCALE 1:81,847

Revisions from National Ocean Service  
 Hydrographic Survey H-11010

Pacific Hydrographic Branch  
 7600 Sand Point Way NE  
 Seattle, WA 98115  
 (206) 526-6836

This chartlet may not be up to date with the latest Local Notice to Mariners information. DO NOT paste onto NOAA nautical charts.





JUL 09 2001



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
OFFICE OF COAST SURVEY  
Pacific Hydrographic Branch  
Seattle, Washington 98115-6349

MEMORANDUM FOR: Jeffrey Ferguson, NOAA  
Contracting Officer's Technical Representative

FROM: Gary C. Nelson *Gary C. Nelson*  
Assistant Contracting Officer's Technical Representative  
Pacific Hydrographic Branch

SUBJECT: 30-DAY Acceptance Review of H-11010

The Pacific Hydrographic Branch has conducted a 30-day acceptance review of the following contract hydrographic survey:

Registry No: H-11010  
State: Alaska  
General Locality: Aialik Bay  
Locality: Southern Approaches to Aialik Bay  
Contractor: Racal-Pelagos  
Project: OPR-P353-KR  
Contract No: 50-DGNC-0-90017  
Date Received by PHB: June 9, 2001  
30 Day Review by: June 9, 2001

The data submitted for H-11010 was reviewed for compliancy with the Statement of Work.

The 30-day review included but was not limited to the following:

1. An inventory of specified deliverables
2. A review of the SWMB Patch Test data to confirm proper bias values
3. A qualitative review of SWMB cross line comparison data.
4. An examination of the DTM, created by Racal-Pelagos, with the smooth sheet overlaid to ensure shoal areas were portrayed correctly on the smooth sheet.
5. A CARIS workfile of selected shoal soundings was created to compare with the smooth sheet. The comparison was used to verify valid shoal soundings were carried through to the smooth sheet.
6. A preliminary comparison of prior surveys and appropriate nautical charts with the smooth sheet was completed.
7. The data were reviewed for appropriate application of biases, sound velocity, and tides.
8. A preliminary review of the Descriptive Report and smooth sheet. (Note: The results of the final review will be detailed in the ~~Evaluation Report~~ *7/12/02 BM end notes*).



Based upon the review, it is concluded that H-11010 has no major deficiencies that would deem it out of compliance with the Statement of Work. It is recommended that H-11010 be accepted.

cc: John Lowell  
Dennis Hill



**HYDROGRAPHIC SURVEY STATISTICS**

**H-11010**

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET			SMOOTH OVERLAYS: POS., ARC, EXCESS		
DESCRIPTIVE REPORT			FIELD SHEETS AND OTHER OVERLAYS		
DESCRIP-TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES					
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

**SHORELINE DATA**

SHORELINE MAPS (List):

PHOTOBATHYMETRIC MAPS (List):

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List):

**OFFICE PROCESSING ACTIVITIES**

*The following statistics will be submitted with the cartographer's report on the survey*

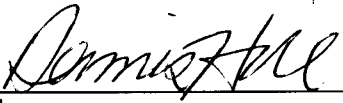
PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET			21
COMPARISON WITH PRIOR SURVEYS AND CHARTS			
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT			53
GEOGRAPHIC NAMES			
OTHER (Chart Compilation)			62
USE OTHER SIDE OF FORM FOR REMARKS			136
	<b>TOTALS</b>		

Pre-processing Examination by	Beginning Date	07/09/2001	Ending Date	
Verification of Field Data by G. NELSON, B. MIHALLOV	Time (Hours)	21	Ending Date	
Verification Check by	Time (Hours)		Ending Date	
Evaluation and Analysis by B. MIHALLOV	Time (Hours)	53	Ending Date	03/04/2002
Inspection by B.A. OLMSTEAD	Time (Hours)	30	Ending Date	06/05/2002

APPROVAL SHEET  
H-11010

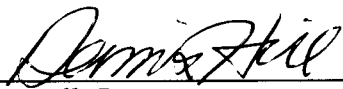
Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

  
\_\_\_\_\_  
Dennis Hill,  
Chief, Cartographic Team  
Pacific Hydrographic Branch

Date: 8-9-02

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

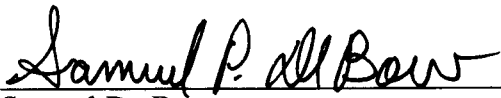
  
\_\_\_\_\_  
John E. Lowell, Jr.  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

Date: 8-9-02

\*\*\*\*\*

Final Approval

Approved:

  
\_\_\_\_\_  
Samuel De Bow  
Captain, NOAA  
Chief, Hydrographic Surveys Division

Date: September 19, 2002

