H-11165

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. OPR-0327-KR

Registry No. H-11165

LOCALITY

State ALASKA

General Locality NORTHERN CLARENCE STRAIT

Sublocality Lincoln Rock to Point Stanhope

2002

CHIEF OF PARTY
DEAN MOYLES

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DATE

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-11165

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.

State **Alaska**

General Locality **Northern Clarence Strait**

Sublocality **Lincoln Rock to Point Stanhope**

Scale **1:10,000** Date of Survey **7/17/02-9/17/02**

Instructions Dated **6/24/2002** Project No. **OPR-O327-KR-02**

Vessel **RV Quicksilver, RV Minotaur and skiff**

Chief of Party **Dean Moyles**

Surveyed by **Moyles, Arumugam, Reynolds, Orthman, Sipos, Greene**
Harrison, Nadeau, et al

Soundings taken by echo sounder, hand lead, pole **Reson 8101 and leadline**

Graphic record scaled by **Thales Geosolutions Personnel**

Graphic record checked by **Thales Geosolutions Personnel**

Evaluation by **B Taylor** Automated plot by **HP Design Jet 500**

Verification by **G Nelson**

Soundings in **Fathoms and tenths** at **MLLW**

REMARKS: **Time in UTC.**

Revisions and annotations appearing as endnotes were generated during office processing. All separates are filed with the project data. As a result, page numbering- may be interrupted or non-sequential.

Thales Geosolutions	**LCMF**	**Terra Surveys**
3738 Ruffin Road	**139 E. 51st Ave**	**1930 Whiting Circle**
San Diego, CA 92123	**Anchorage, AK 99503**	**Palmer, AK 99645**

A - Area Surveyed

H11165 (Sheet E), which[1] is bounded by the coordinate listing below[2], and encompasses Lincoln Rock to Point Stanhope.

Hydrographic data collection began on July 17, 2002 and ended on September 17, 2002.

Table 1 H11165 Survey Limits

Survey Limits Task # 10 H11165 Sheet E Scale 1:10,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	55º59’50.086	132º4141.158[3]
2	56º04’41.466	132º4141.158[4]
3	56º04’41.466	132º34’20.651
4	55º59’50.086	132º34’20.651

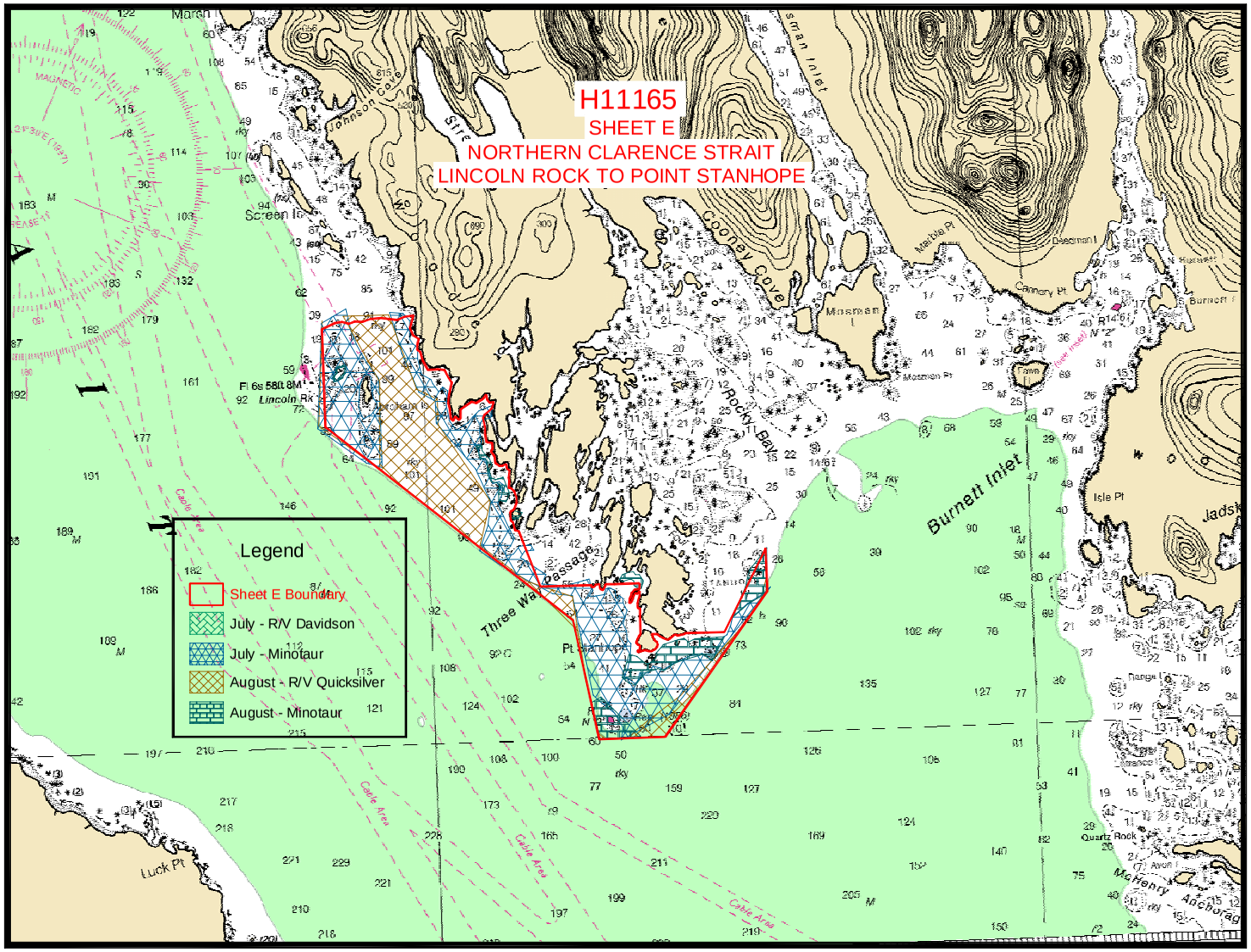


Figure 1 H11165 Survey Limits

B – Data Acquisition & Processing

Refer to the OPR-O327-KR Data Acquisition and Processing Report[5] 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 R/V's Quicksilver and Minotaur acquired all sounding data for H11165. The Quicksilver, which is 32 feet in length with a draft of 3 feet, was equipped with a Reson 8101 with option 033 (pseudo SideScan) for medium multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors (for sound velocity profiles. Vessel attitude was measured using a TSS Heading and Dynamic Motion Sensor (HDMS) and XTF files logged in ISIS V 5.84.

The Minotaur was utilized for near shore multibeam data acquisition. The vessel is 29 feet in length, with a draft of 2 feet. The Minotaur was also equipped with a Reason[6] 8101 with option 033 (pseudo SideScan) and two AML sound velocity and pressure sensors for sound velocity profiles. Vessel attitude was measured using a TSS Heading and Dynamic Motion Sensor (POS/MV) and XTF files logged in ISIS V 5.84.

WinFrog v3.2.7 was configured to output a Pseudorange Console (PR-Console) position to ISIS v5.84 for all vessels. The PR-Console position was generated by WinFrog v3.2.7 as the weighted arithmetic average of the pseudo-range positions calculated from the RTCM sources.

Refer to OPR-O327-KR Data Acquisition & Processing Report for a complete listing of equipment and vessel descriptions.

Quality Control

Crosslines

Sheet E was divided into 3 areas for survey operations. Quality control tielines were planned to measure 5 percent of the main scheme line length. Total crossline length surveyed was 9.55 km (5.16 nautical miles) or 4.3 percent of the total main scheme miles. The majority of line kilometers surveyed in Sheet E were near the shoreline. It was deemed impossible to run tie lines in most of these areas. The tielines that were conducted were well distributed throughout the sheet to insure adequate crossline quality control. A total of 27 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:

- The majority of beams that fell outside of the 95 percent confidence level were located in areas having extreme steep slopes and/or rocks. The figures below show a few examples of this.

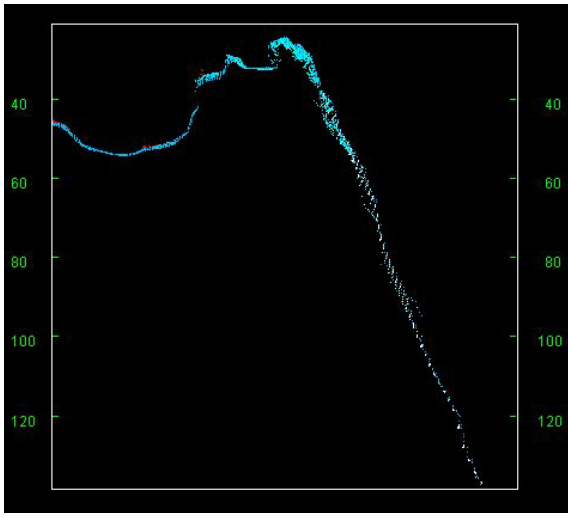


Figure 2: Profile of E01-QC003

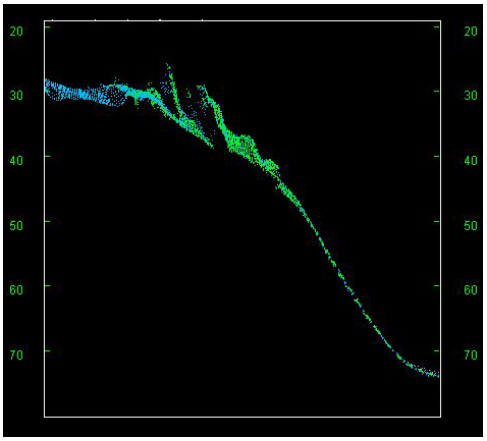


Figure 3: Profile of E01-QC020

- The accuracy of a typical DGPS unit is between 1 to 3 m, and with the constant coming and going of satellites in these areas; it was not uncommon to get a 1 to 3m-navigation jump. Although this is well within the NOS specifications, Figure 1 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 then 20º then the beams are outside of the 95 percent confidence level.[7]

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

$$\pm\sqrt{[a^2 + (b*d)^2}$$

where, a = 0.5, b = 0.013 and d = depth.

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:

$$a = 0.5*\sqrt{2} = 0.707$$
$$b = 0.013*\sqrt{2} = 0.018$$

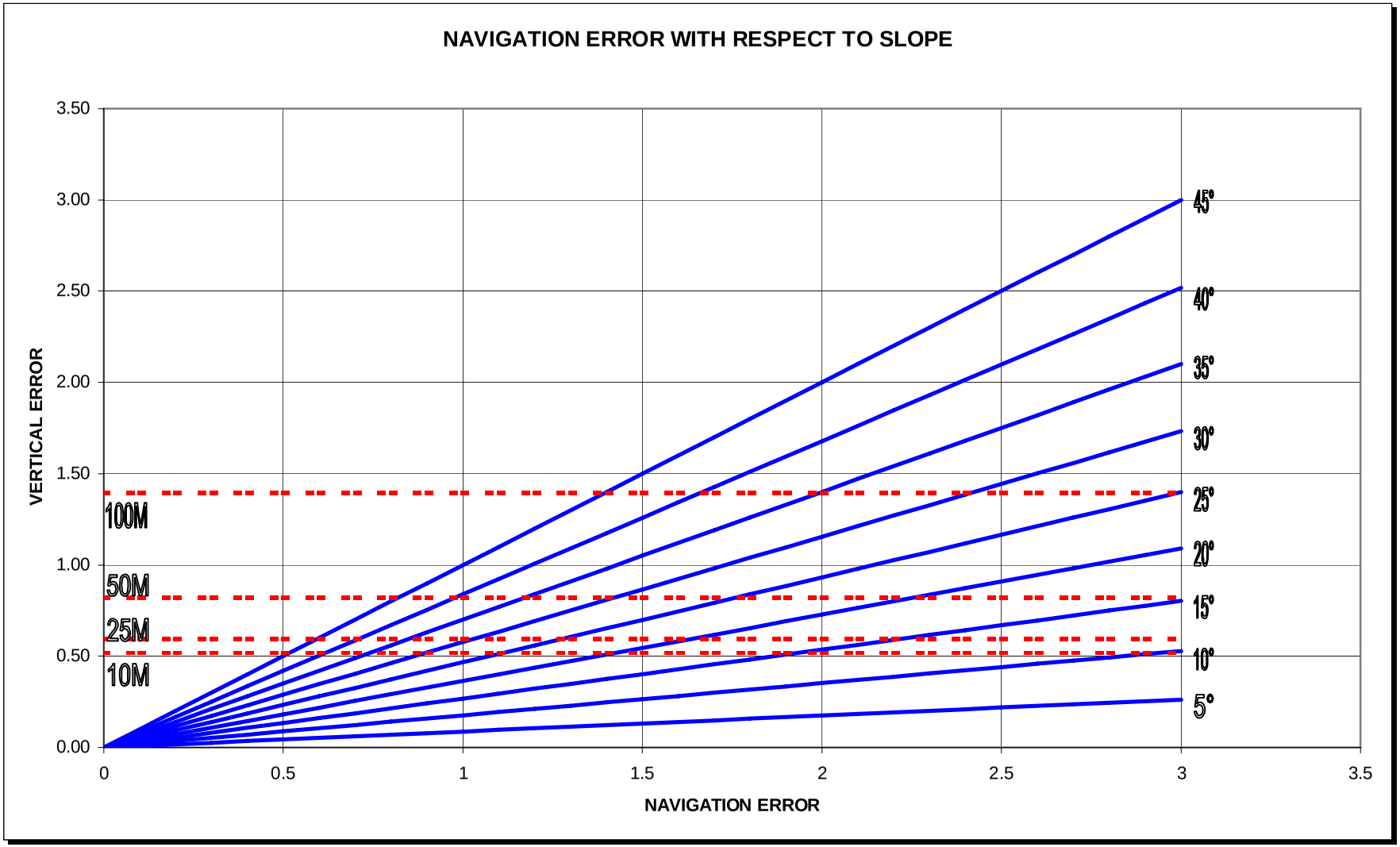


Figure 4: Navigation Error With Respect to Slope

Data Quality

In general the multibeam data quality for H11165 was excellent.[8] One problem to note is as follows:

WinFrog v3.2.7 was configured to output the Pseudorange Console (PR-Console) position to ISIS v5.84 for the bathymetry data in the XTF files. The PR-Console position was generated by WinFrog v3.2.7 as the weighted arithmetic average of the pseudo-range positions calculated from the RTCM sources. Extensive testing revealed that the time between the calculation and the actual output of the PR-Console position was not constant, and since the computer clock in the Triton ISIS computer is set with the time in the PR-Console string from WinFrog v3.2.7, the time stamps in the XTF files are incorrect.

In most cases the latency varied between 0 and 1 sec, but in some instances (less than 5%) the navigation latency could have been up to 2 seconds. On average the survey speeds ranged from 3 to 5 knots, which would result in a horizontal positioning errors of 1.5 – 2.5 meters.

To rectify the variable latency, the navigation data (time and position) from the WinFrog RAW files were extracted and inserted into the XTF files. Since the time logged in the raw files was the GPS time of the position at the time of the calculation, any navigation time latencies (constant or variable) were removed. The XTF files were then re-converted to a new CARIS project. Then the newly generated navigation files were moved into the existing project to overwrite old navigation data. The navigation was then re-examined and the lines remerged in HDCS.

Refer to the Non-Conformance Reports[9] numbered 2002-001 and 2002-002 in Appendix F[10] for a complete description of the problem and resolution.

Survey Junctions

The southwest side of H11165 (Sheet E) junctions with:[11]

Registry #	Scale	Date	Junction Side
H-11164	1:20,000	2002	Northeast

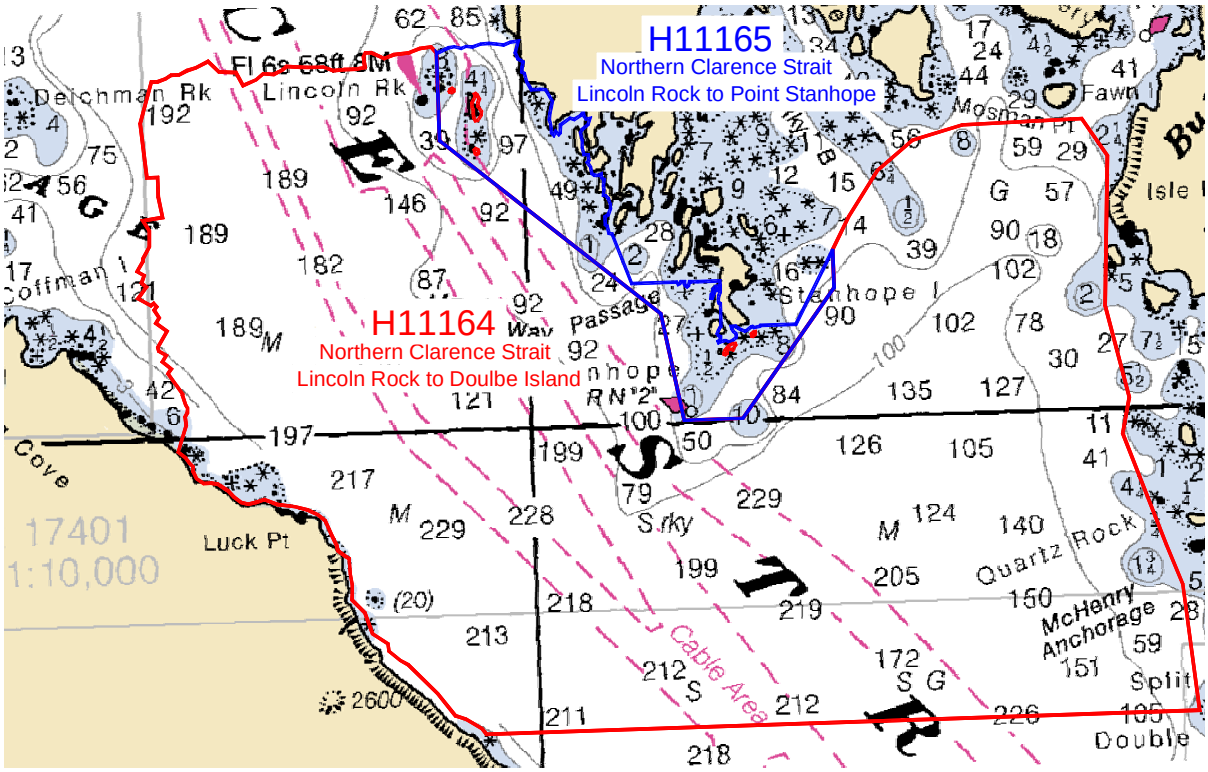


Figure 5: Survey Junction

The surveys are in agreement along their common borders. The agreement was noted in the field using the DTM's created for coverage verification. The conformity is also apparent in their preliminary smooth sheets.[12]

Smooth Sheet Histograms

Figure 6 Histogram is for the Reson 8101 data collected from July 17, 2002 to September 17, 2002 on the Minotaur. The histogram shows an increase on selected soundings from the outer beams. This is the result of surveying near the shoreline and the simple fact that the outer beams are the shallowest. Also the majority of lines were run[13], port beams overlapped with port beams and starboard beams overlapped with starboard beams from the adjacent lines. This makes it possible to have higher density data per square meter on the outer edges, leading to a higher chance of sounding selection on the smooth sheet.

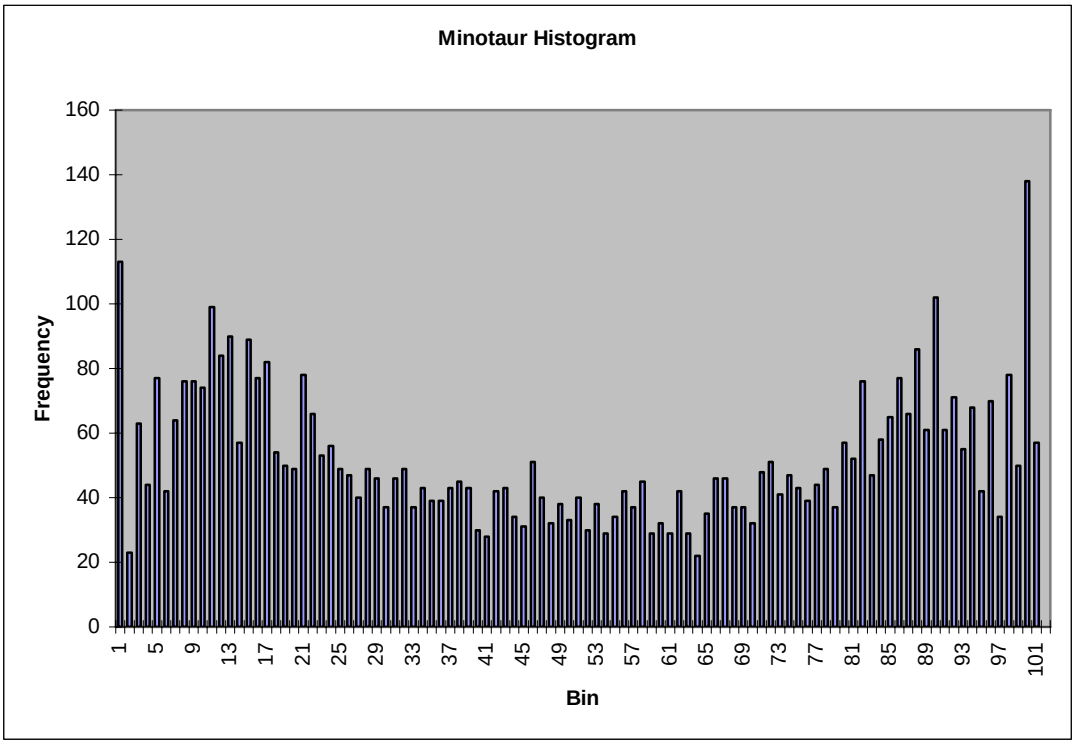


Figure 6 Histogram for 8101 (Minotaur)

Figure 7 Histogram is for the Reson 8101 data collected from July 17, 2002 to August 11, 2002 on the Quicksilver. The histogram is evenly distributed, but there is an increase on selected soundings from the outer beams.[14] This is the result of surveying near the shoreline and the simple fact that the outer beams are the shallowest. It is more noticeable on the port side because the captain was seated on the port side[15] of the vessel and due to safety reasons they wanted to run the lines with the port side to the shore. Also apparent, is the transition from phase to amplitude detection of the sonar (beams 36 and 68) and any errors due to sound velocity.

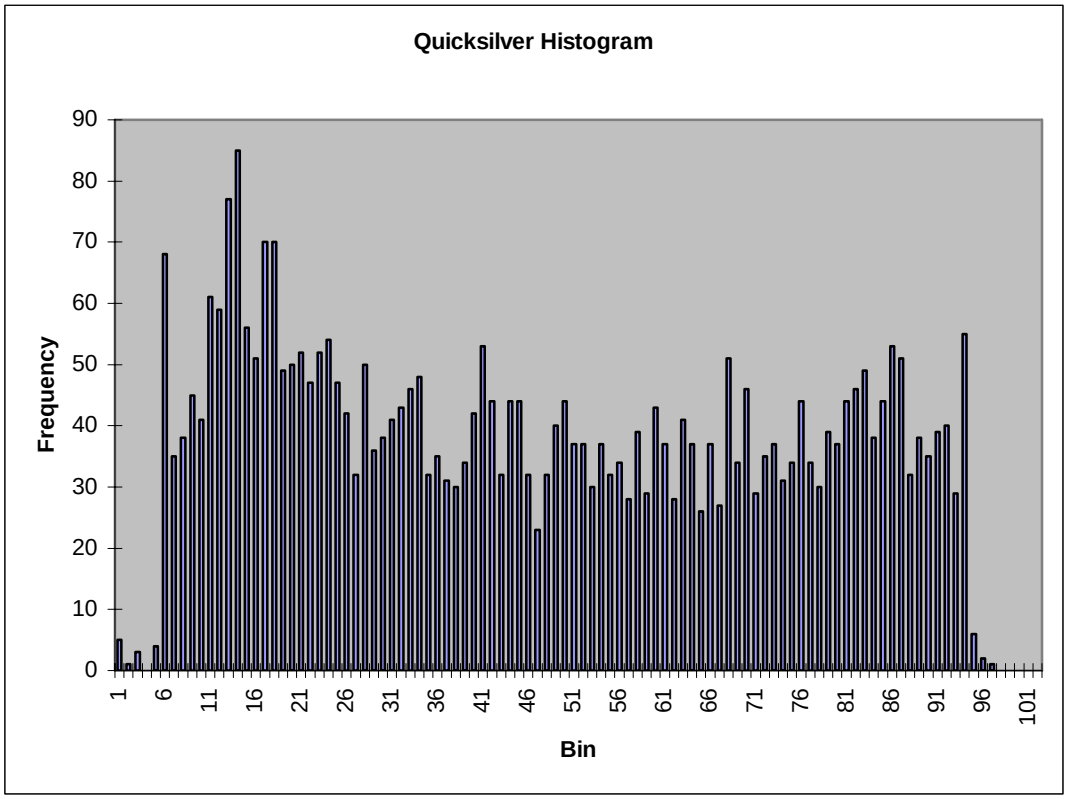


Figure 7 Histogram for 8101 (QuickSilver)

Quality Control Checks

During the hydrographic survey OPR-O327-KR the R/V's Davidson, Quicksilver, Minotaur and Mistral conducted a number of confidence checks. This usually consisted of the vessels running two lines in the opposite direction[16] over a reference surface (usually the patch test site). The Reson 8101 systems that were installed on the Quicksilver, Minotaur and Mistral and the Reson 8111 on the Davidson usually compared to within 5 to 10 centimeters. This was also apparent from the results of the confidence checks that were preformed during OPR-O309-KR (Approaches to Icy Bay).

The patch tests that were conducted during OPR-O309-KR (Approaches to Icy Bay) to derive: timing, pitch, heading, roll errors, was[17] also used for OPR-O327-KR (Clarence Strait). It should be noted that due to the navigation latency and the re-processing of the XTF files for the patch test lines, new values were derived for timing, pitch, heading and roll. These values were then enter[18] into the vessel configuration files for each vessel and utilized in the routine processing for OPR-O327-KR (Clarence Strait).

Positioning system confidence checks where[19] conducted on a daily basis. WinFrog has 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 GPS satellite constellations and position solutions.

Corrections to Echo Soundings

Refer to the OPR-O327-KR Data Acquisition and Processing Report[20] for a detailed description of all corrections to echo soundings. No deviations from the report occurred.

C – Horizontal & Vertical Control

Refer to the OPR-O327-KR Horizontal and Vertical Control Report[21] for a detailed description of the horizontal and vertical control used on this Survey. A summary of the projects[22] horizontal and vertical control follows. No deviations from the report occurred.

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. Projection of smooth sheet is in NAD83, UTM (Central Meridian 135º00'00").

Two MBX-3 differential receivers that used the U.S. Coast Guard (USCG) network of differential beacons were the main source of RTCM. Biorka Island, Level Island and Annette Island were the USCG stations utilized during the OPR-O327-KR survey.

Vertical Control

All sounding data were reduced to MLLW initially using unverified tidal data from one tide station located on Beck Island. A sub-contractor, LCMF, operated the gauges and the data was emailed to the Coffman Cove office at the end of every Julian day.

Table 2 Tide Gauges

Gauge	Model	Gauge Type	Location	Latitude	Longitude[23]	Operational
9450906	H350/355	Digital Bubbler	Beck Island	56º02'47"N	132º51'45" W	07/15/02–09/18/02
9450973	H350/355	Digital Bubbler	Blashke Is.	56º07'38"N	158º06'47"W	08/25/02–09/17/02

On September 24, 2002, LCMF issued verified tidal data and final zoning for OPR-O327-KR and all sounding data was re-merged. 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.[24]

D – Results and Recommendations

Chart Comparison

H11165 survey was compared with charts:[25]

- 17360, 32nd Edition (September 22, 2001, 1:217,828)
- 17382, 14th Edition (September, 2002, 1:80,000)
- 17420, 26th Edition (September 22, 2001, 1:229,376)

Comparison of Soundings

The soundings and contours in general compare well with the existing chart,[26] areas of difference to note are:

- Hydrographic survey H11165 revealed a depth of –0.7 fathoms in the vicinity of a 8 fathom sounding on chart 17360 located at 56º00'45.329" N, 132º35'22.738" W (650262.807 E, 6210102.294 N). It should be noted that a rock symbol is present on Chart 17382 in this position. This area was surveyed with 100% multibeam coverage.[27]
- Hydrographic survey H11165 revealed a depth of 14.9 fathoms in the vicinity of a 4.25 fathom sounding on chart 17382 located at 56º03'36.785" N, 132º41'00.292" W (644240.865 E, 6215201.426 N). This area was surveyed with 100% multibeam coverage.[28]

- Hydrographic survey H11165 revealed a depth of 0.7 fathoms in the vicinity of a 6 fathom sounding on chart 17382 located at 56º03'08.913" N, 132º39'01.200" W (646329.523 E, 6214409.609 N). This area was surveyed with 100% multibeam coverage.[29] It is apparent that the shoreline on Chart 17382 is project incorrectly, thus creating this noted difference.
- Hydrographic survey H11165 revealed a depth of 7.3 fathoms in the vicinity of a 14 fathom sounding on chart 17382 located at 56º03'01.401" N, 132º39'13.430" W (646125.905 E, 6214170.249 N). This area was surveyed with 100% multibeam coverage.[30] Note: A shoaler sounding in the vicinity was issued as a Danger to Navigation.[31]
- Hydrographic survey H11165 revealed a depth of 96 fathoms in the vicinity of a 101 fathom sounding on chart 17382 located at 56º02'31.747" N, 132º40'13.936" W (645110.292 E, 6213218.311 N). This area was surveyed with 100% multibeam coverage.[32]
- Hydrographic survey H11165 revealed a depth of 94 fathoms in the vicinity of a 101 fathom sounding on chart 17382 located at 56º02'11.952" N, 132º39'39.904" W (645719.769 E, 6212626.428 N). This area was surveyed with 100% multibeam coverage.[33]
- Hydrographic survey H11165 revealed a depth of 76 fathoms in the vicinity of a 49 fathom sounding on chart 17382 located at 56º02'23.083" N, 132º39'13.388" W (646166.868 E, 6212986.014 N). This area was surveyed with 100% multibeam coverage.[34]
- Hydrographic survey H11165 revealed a depth of 19.8 fathoms in the vicinity of a 24 fathom sounding on chart 17382 located at 56º01'28.129" N, 132º38'30.011" W (646975.348 E, 6211313.139 N). This area was surveyed with 100% multibeam coverage.[35]
- Hydrographic survey H11165 revealed a depth of 94 fathoms in the vicinity of a 10 fathom sounding on chart 17382 located at 56º00'04.208" N, 132º35'59.526" W (649670.073 E, 6208809.257 N). This area was surveyed with 100% multibeam coverage.[36]
- Hydrographic survey H11165 revealed a depth of 19.9 fathoms in the vicinity of a 29 fathom sounding on chart 17382 located at 56º00'26.098" N, 132º635'51.914"[37] W (649778.353 E, 6209490.373 N). This area was surveyed with 100% multibeam coverage.[38]
- Hydrographic survey H11165 revealed a depth of 31 fathoms in the vicinity of a 6 fathom sounding on chart 17382 located at 56º00'46.387" N, 132º35'08.095" W (650515.180 E, 6210143.867 N). This area was surveyed with 100% multibeam coverage.[39]

Soundings that differ from hydrographic survey H11165 are highlighted in red on the chart comparison sheet included in Separate 6.[40] Other soundings that differed resulted in a Danger to Navigation[41] are listed in Appendix A Danger to Navigations.[42]

Automated Wreck and Observation Information System

There were three AWOIS items assigned to OPR-O327-KR, but only two were within the limits of H11165.

- AWOIS Item 52536-this item is described has being an[43] isolated 4 and 1-fathom soundings.

Survey lines were conducted to provide 200% coverage over the required search radius. The multibeam and backscatter data were reviewed in Delphmap and CARIS. Shoal soundings were found in the area, but are slightly shifted from the charted position. Therefore, it is recommended that the soundings on the chart be updated with sounding data from OPR-O327-KR. Refer to Appendix E for AWOIS Form.[44]

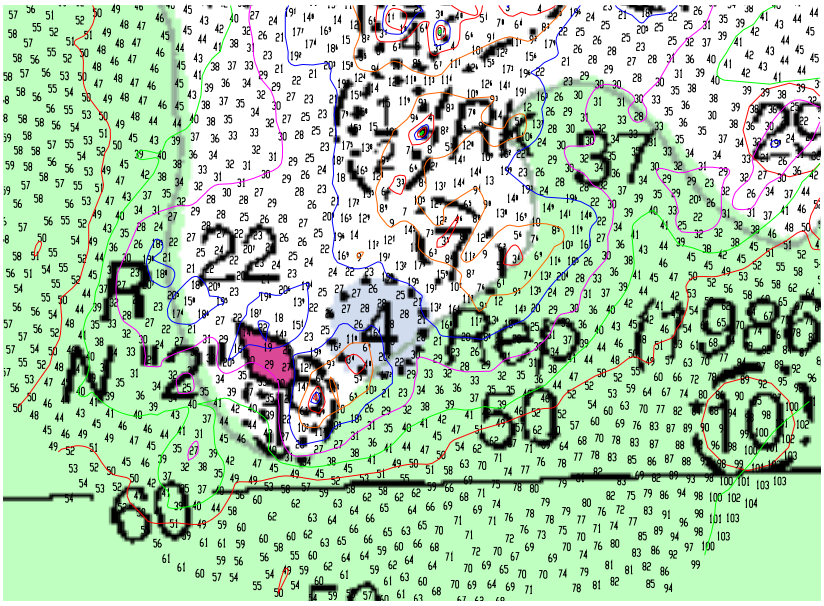


Figure 8 AWOIS 52536

- AWOIS Item 52537-this item is described has[45] being an isolated 10-fathom sounding.[46]

Survey lines were conducted to provide 200% coverage over the required search radius. The multibeam and backscatter data was reviewed in Delphmap and CARIS and no shoal soundings were found in the area. Therefore, it is recommended that this sounding be removed from the affected charts. Refer to Appendix E for AWOIS Form.[47]

Charted Features

There were no charted features labeled PA, ED, PD, or Rep within the limits of H11165.[48]

Dangers to Navigation

Nineteen dangers to navigation were located during the hydrographic survey of H11165.[49] These dangers to navigation were submitted on September 24, 2002. Refer to Appendix A for Submitted Report [50]

Additional Results

Shoreline Verification

Limited shoreline verification was conducted in accordance with SOW 3.4.2 for remote sensing features inshore of the 4-meter curve, including the MHW line. Traditional shoreline verification was conducted in accordance with SOW 3.4.3 for remote sensing features seaward of the 4-meter curve.[51] The 4-meter curve was determined from H11165 multibeam data, where present, and at the hydrographer's discretion in areas where no multibeam data was available.

A 19ft skiff, referred to as the DP Skiff, was used to perform shoreline verification. The skiff was owned and piloted by Mr. Clayton Smalley, a local resident of Coffman Cove, AK, who has over 35 years of extensive local knowledge of the survey area. The DP skiff could generally safely navigate in any area where it could maintain 0.5 meters of under-keel clearance, except in locations of heavy swells near shore. The DP skiff was outfitted with a Garmin GPSMAP 176C differential GPS receiver and a WINFROG data acquisition system. NOAA supplied Thales with photogrammetric shoreline data in raster format for TP-00582, TP-00583 for use as source shoreline. The T-sheet raster images were registered and digitized in AutoCAD by Thales personnel and the resultant vector data were used in WINFROG for field verification. In addition, the multibeam 4-meter curve and CH 17382 was[52] displayed as a layer in WINFROG for reference. The DP skiff was not outfitted with an echosounder, however a leadline was used to take soundings on submerged features.

Traditional verification of remote sensing offshore features was generally performed within a few hours of predicted low water. Traditional verification of remote sensing offshore features was performed by running along the 4-meter curve and taking Detached Positions (DPs) on any feature observed near, on, or off-shore of the 4-meter curve. Although the SOW only required that new features observed were to be noted and recommended for additional investigation, all new features actually observed near, on, or off-shore of the 4-meter curve were immediately investigated with a DP. Observed features included exposed rocks, reefs, ledges, and islets, as well as submerged features indicated by visual sightings in clear water, kelp patches, surface action, and the pilot's local knowledge. DPs and their corresponding hydrographer's remarks were digitally recorded in WINFROG. Digital photographs were taken for features when feasible. However, photographs were not taken on features that were submerged beneath the water's surface at the time of the DP. Digital photographs were favored over sketches in order to increase efficiency during the limited low tide windows. However, some hand-drawn sketches were also taken and are included in the Hydrographer's Field Notes.[53] A DP form for each DP was digitally produced from the WINFROG file. The

DP form also includes the digital photograph, if taken, and shows the DP overlaid onto the largest scale chart, the vector shoreline data, and associated multibeam coverage. The DP forms and raw field notes can be found on the Project CD under the Reports Directory.[54]

It should be noted that large rocks, generally greater than 20m in size, often received at least 2 DPs, with a DP taken at each physical extent. The physical extents of DP'd rocks were also often outlined as corresponding gaps in associated multibeam coverage. In such instances, the corresponding smooth sheet rock symbol was placed in the center of the extents as defined by DPs and/or the gap in multibeam coverage. When this was done it was noted on the corresponding correlator sheet.[55]

Limited verification of the MHW line (remote sensing shoreline) was generally performed during periods of mid to high tide. However, limited verification of the MHW line was also performed concurrently with low tide investigation of offshore features in select areas at the hydrographer's discretion. The general location of the MHW line was determined by running as close to the shoreline as possible, generally 2-20 meters offshore, and periodically recording an EVENT in WINFROG approximately every 10-45 seconds. Taking an EVENT digitally recorded the vessel's time and position and the hydrographer's remarks. Typical hydrographer's remarks were "GL HWL OK" for sections where the General Location of the MHW Line appeared to match the photogrammetric shoreline data to within 20 meters. In areas where there appeared to be a potential discrepancy, remarks typically described the location of the apparent MHW line in reference to the skiff at the time of the EVENT. For example, "HWL 5m to E" meant that the apparent MHW line was 5m to the east of the skiff at the time of the EVENT. EVENTS were plotted during office review and overlaid onto H11165 multibeam coverage plots, T-sheets, and affected charts for final MHW verification. DP Forms were not produced for EVENTS and EVENTS are not depicted on the DP plot, however, EVENTS are provided in a supplemental AutoCAD file.[56]

Limited verification of remote sensing features inshore of the 4-meter curve was performed concurrently with both limited verification of the MHW line (performed at mid-high tide) and traditional verification of offshore features (performed at low tide). EVENTS were taken to record hydrographer's remarks for most inshore features. Typical remarks included "DM rk ok" and "DM rk not seen". It should be noted that in such instances, the skiff's location, and therefore the EVENT position, was often at a significant distance (> 20 meters) away from the actual location of the inshore feature. The EVENTS for features inshore of the 4-meter curve were plotted during office review and compared to the multibeam coverage, T-sheets, and the chart. If a feature inshore of the 4-meter curve appeared to be inadequately located on the remote sensing source, it is listed as a recommendation for additional item investigation. Although it was not required by the SOW, some specific inshore features were investigated by traditional verification (i.e. coming alongside the feature and recording a DP and photograph) when it was determined by the hydrographer that doing so had minimal operational impact on collecting required DPs.

Features that are itemized and discussed are as follows:

All sections of T-sheet MHW line that were within the survey area and were determined to be in the correct general location (within 20 meters) by means of limited shoreline verification are shown on the smooth sheet in black.[57] T-sheet MHW line compared very well to field verification observations and the smooth sheet shows only a few changes which are itemized below:

1. New islet (6 ft ht MHW), at 56 03 32.15 N, 132 41 22.29 W (X = 643865.27 Y =6215045.37) was positioned by DP# JD241_35.[58]
2. New islet (3 ft ht MHW), at 56 03 57.97 N, 132 40 09.47 W (X = 645097.60 Y = 6215885.84) was positioned by DP#242_20 and DP#242_21. This feature is depicted as two rocks on T-00582, however this survey found the item to be a single feature with a height that warrants that it be depicted as an islet.[59]
3. New islet (3 ft ht MHW), at 56-03-221.02[60] N, 132 39 45.19 W (X = 645556.00 Y = 6214757.91) was positioned by DP#242_15. This feature is depicted as a rock on T-00582. However, this survey found the feature to be the high point of a new ledge extending from an existing T-sheet islet. The observed height of the high point warrants that it be depicted as a separate islet.[61]
4. T-sheet islet (no height), at 56 1 55.42 N, 132 38 7.33 W (X = 647339 Y = 6212170) was positioned by DP# JD241_11 to be a rock (17 ft height MLLW) at 56 01 56.74 N, 132 38 06.40 W (X = 647353.69, Y = 6212211.45). The T-sheet islet is considered disproved and a rock is depicted on the smooth sheet instead.[62]
5. T-sheet shoreline, at 56 3 12.423 N, 132 39 36.201 W (X = 645720.489 Y = 6214497.527) was deemed inadequate, the approximate shoreline was estimated from the multibeam data set and is shown as a red dashed line on the preliminary smooth sheet.[63]

The following are T-sheet rocks that were located by DP or multibeam to be > 20m from there source position. They are shown on the smooth sheet in black at their surveyed position with surveyed heights/depths unless noted. In these cases, the T-sheet rock is considered disproved and the surveyed rocks that are shown on the smooth sheet are considered new.

1. T-sheet rock (no height), at 56 0 40.08 N, 132 36 24.10 W (X = 649206 Y = 6209903) was positioned by DP# JD232_42 as new rock (14 ft height at MLLW) 56 00 39.09 N, 132 36 23.59 W (X = 649215.93 Y = 6209872.85).[64]

Charted rocks within the survey limits were generally identified to correspond with a smooth sheet rock, or cluster of smooth sheet rocks. It should be noted that charted rock symbols are often centered at positions up to 200m away from their corresponding smooth sheet rocks. Charted rock symbols within the survey limits were generally disproved at their centered positions with multibeam coverage, and/or, by DPs taken on actual highpoints observed in the area during shoreline verification. The hydrographer therefore recommends that existing charted rock symbols within the survey limits be deleted, and rocks or ledges be charted in these areas based on the position of rocks or ledges shown on the smooth sheet. Exceptions where the hydrographer recommends that charted rocks be retained are itemized below.

Charted rock disapprovals are not itemized except for instances of important navigational significance or where further comment is warranted.

1. Charted rock at 56 4 14.61 N, 132 40 26.78 W is outside of the survey limits and was therefore not proved or disproved by multibeam coverage. However, two new rocks were found approximately 100 m to the east of the charted rock during shoreline verification and are depicted on the smooth sheet. (Refer to JD242_23[65] and JD242_23.) For clarification, the hydrographer recommends that the rock be retained as charted, in addition to charting the two new rocks based on the smooth sheet.[66]
2. Charted rock at 56 3 23.63 N, 132 39 44.63 W is inshore of the 4-m curve and was not proved or disproved by multibeam coverage or traditional shoreline verification. Limited shoreline verification confirmed the general location of a cluster of four T-sheet islets at the location of the charted rock. The islets are shown on the smooth sheet. The hydrographer recommends that the charted rock be deleted and that islets be charted based on the smooth sheet.[67]
3. Charted rock at 56 1 31.18 N, 132 34 42.08 W is outside the survey limits and was not proved or disproved by multibeam coverage. A 10-minute visual search was performed and no indication of a rock, shoal, or kelp was seen. DP #JD242_003 was taken at the charted rock location and a 29.0 meter leadline depth was obtained. The hydrographer recommends that the charted rock be deleted.[68]
4. In areas where the multibeam data indicated an isolated submerged rock of navigational significance, an “Rk” text label was placed adjacent to selected sounding (multibeam least depth) on the smooth sheet.[69]
5. In areas where the multibeam data indicated a submerged rocky bottom with numerous high points, an “rky” text label was placed in the area on the smooth sheet.

Recommendations for Additional Item Investigations

T-sheet rocks inshore of the 4-meter curve received limited verification and are retained on the smooth sheet.

1. A multibeam gap inshore of the 4 –meter curve indicates a likely shoal. The shallowest multibeam sounding found in the data was a 1.937 m MLLW (Line 2DFILL-005, profile 2766, beam 101) at 55-59-34.71N, 132-45-52.50W and is represented on the smooth sheet as a 1 fathom sounding. However, the actual least depth was likely not obtained due to only partial multibeam coverage over the feature. The multibeam gap was investigated by DP# JD 254_02. No exposed feature was seen. The DP skiff conducted a 10-minute leadline search, however limited water clarity prevented the DP Skiff from finding the shoal. The hydrographer recommends that the shoal be investigated with 100% multibeam during a period of extreme high tide.[70]

Tidal Range

LCMF established the tidal range for OPR-O327-KR Clarence Strait to be 4.632 meters (15.19feet or 2.53 fathoms). This value was used in determining height above MHL.[71]

Shoreline Correlator Sheet

ArcMap 8.2 with the Shoreline Correlator add-on, written by the Thales GeoSolutions (Pacific) Inc. GIS department, aided in the processing of the Shoreline Verification results. The correlator utilized the Winfrog Log files to create an individual DP form for all acquired DP's. The correlator was mapped to the Log, Tide, Photos, NOAA Chart (largest scale available), T-Sheet, Smooth Sheet Soundings and Multibeam Coverage files to calculate and display the desired information for each DP. Figure 1 shows an example of a DP form produced from the Correlator. The DP forms and raw field notes can be found on the Project CD under the Reports Directory.[72]

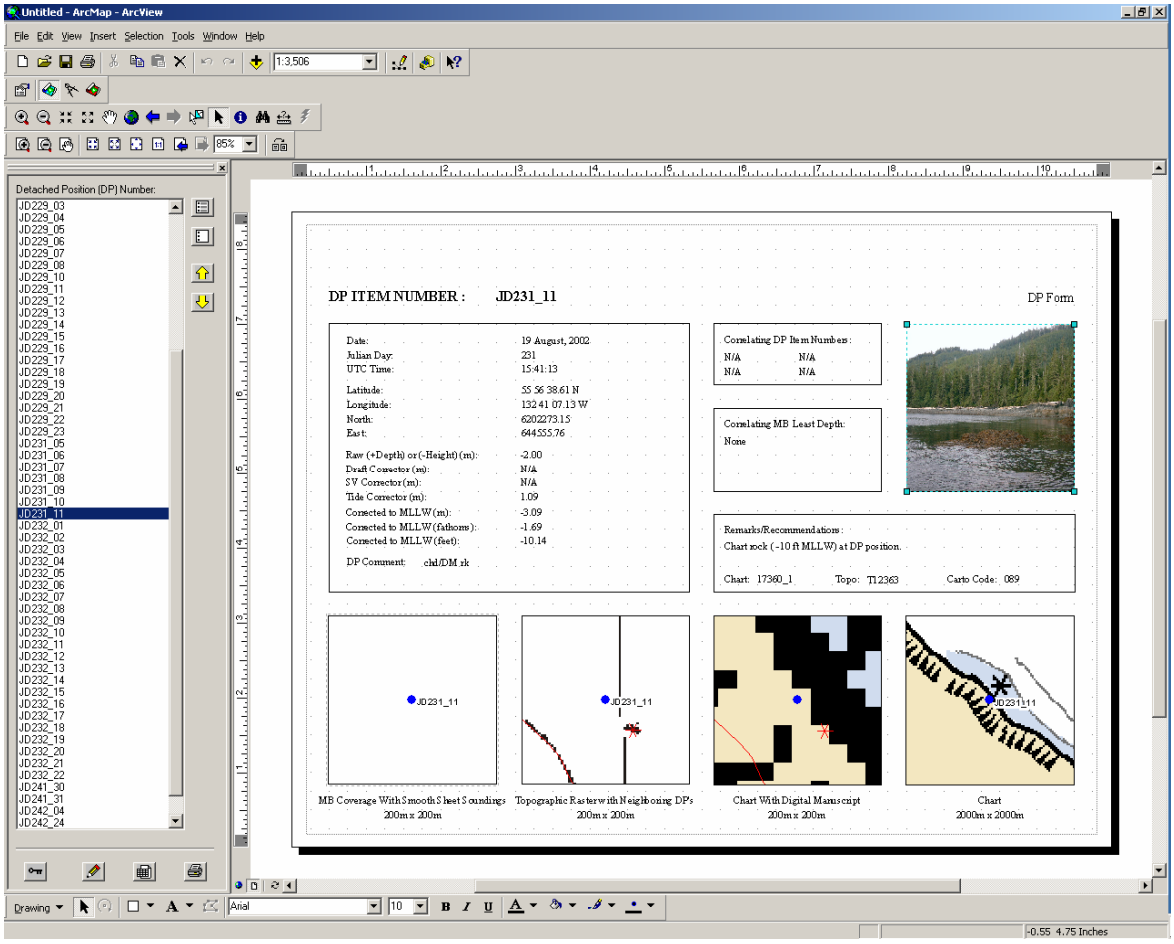


Figure 9 DP Correlator Sheet

Bottom Samples

Bottom Samples were not required under this contract.[73]

Aids to Navigation

There was one charted aid to navigation within the limits of H11165. Point Stanhope Buoy 2 (Aid Number-22465) is in good working order and is serving its intended purpose.[74]

Table 3 Position of Aid to Navigation

Name	Type	Surveyed Position	Charted Position (17382)	Listed Position	Position Difference (m) Survey-Charted	Position Difference (m) Charted-Listed
R N "2"	Floating Aid	56º00'07.428"N	56º00'07.376N	56º00'06"N		
		132º37'01.080"W	132º36'59.520W	132º37'00"W	27.08	43.36

Miscellaneous

The geographic name Lincoln Island on the Smooth Sheet for H11165, is not present on any of the existing charts, but was obtained from T-Sheet TP-00582.[75]

E – Approval Sheet

Approval Sheet

For

H11165

Standard field surveying and processing procedures were followed in producing this survey in accordance with the following documents:

OPR-O327-KR statement of work and hydrographic manual;
Thales GeoSolutions (Pacific) Inc. Acquisition Procedures (AP-2438-01 & AP-ISIS-01);
Thales GeoSolutions (Pacific) Inc. Processing Procedures (PP-2438-01);
Technical Report for Tides, Clarence Strait.

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, Thales GeoSolutions (Pacific) Inc.
Lead Hydrographer
TGP Survey Party

Appendix A - Danger to Navigation

Nineteen dangers to navigation were located during the hydrographic survey of H11165.[76]

Hydrographic Survey Registry Number: **H11165**

Survey Title: State: ALASKA Locality: Northern Clarence Strait Sub-locality: Lincoln Rock to Point Stanhope

Project Number: OPR-0327-KR-02

Survey Dates: August 2002

Depths are reduced to Mean Lower Low Water using predicted tides.

Positions are based on the NAD83 horizontal datum.

CHARTS AFFECTED:

Chart	Scale	Edition	Date
17360	1:217,828	32nd	09/22/01
17382	1:80,000	14th	04/26/97
17420	1:229,376	26th	09/22/01

DANGER:

Feature	Depth(ft or fms)	Latitude	Longitude
Rock	Awash 6 ft	56/00/46.512N	132/35/23.412W

COMMENTS

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch (N/CS34),

at 526-6836.

Danger to Navigation Report

Hydrographic Survey Registry Number: **H11165**

Survey Title: **State: ALASKA**
Locality: **Northern Clarence Strait**
Sub-locality: **Lincoln Rock to Point Stanhope**

Project Number: **OPR-0327-KR-02**

Survey Dates: **August 2002**

Depths are reduced to Mean Lower Low Water using predicted tides.

Positions are based on the NAD83 horizontal datum.

CHARTS AFFECTED:

Chart	Scale	Edition	Date
17360	1:217,828	33rd	05/01/03
17382	1:80,000	15th	03/01/03
17420	1:229,376	26th	09/22/01

DANGER:

Feature	Depth(ft or fms)	Latitude	Longitude
Sounding	6 fms	56/01/16.3N	132/34/41.5W
Sounding	6 fms 1 ft	56/00/59.4N	132/35/05.9W
Rock	covers 1 ft	56/00/45.5N	132/36/04.0W
Sounding	4 fms 1 ft	56/00/37.9N	132/36/09.5W
Sounding	3 fms 2 ft	56/00/17.4N	132/36/30.3W
Sounding	8 fms 2 ft	56/00/42.4N	132/36/52.0W
Sounding	6 fms 1 ft	56/01/11.2N	132/37/04.8W
Sounding	7 fms 2 ft	56/01/13.9N	132/37/24.9W
Sounding	8 fms 3 ft	56/01/28.0N	132/37/52.9W
Sounding	4 fms 2 ft	56/03/24.8N	132/41/35.8W

COMMENTS: The DTONs noted above were found during office processing of H11165

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

Appendix B - List of Geographic Names

No new geographic names in the survey were discovered.[77]

Appendix C – Progress Sheet

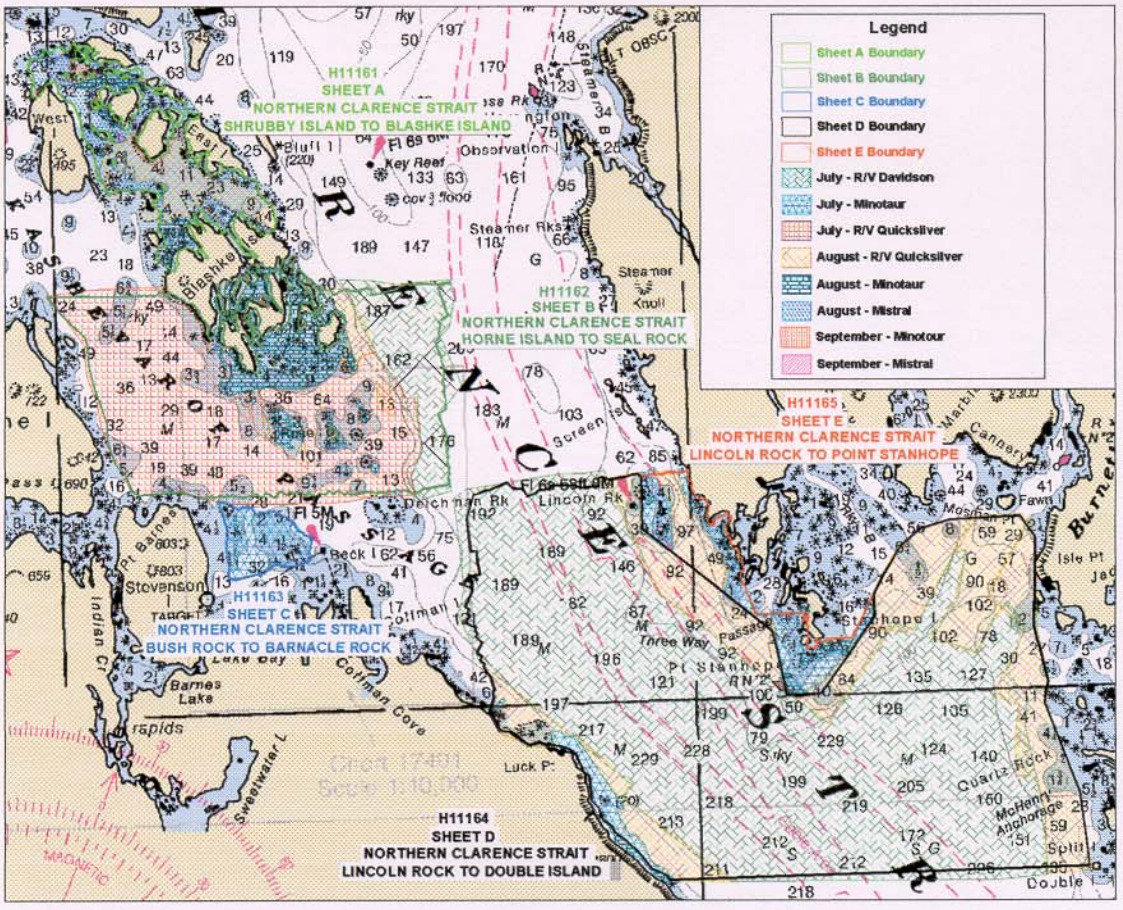
PROGRESS SKETCH

OPR-O327-KR-02
Northern Clarence Strait
Shrubby Island to Point Stanhope
Thales GeoSolutions (Pacific) Inc.

Dean Moyles, Lead Hydrographer
Chart 16360

Start Date: 7/17/02
End Date: 9/17/02
Submitted Date: N/A

Sheet	Month	DAS	LNM	SQNM	SVP Casts	Bottom Samples	AWOIS Completed	No. of Tide Gauges	Diff. Stations	Weather Downtime	Equipment Downtime
Sheet A	July	0	0	0	0	N/a	0	0	0	0	0
Sheet B	July	15	267.12	14.61	37	N/a	0	1	0	0	0
Sheet C	July	15	66.09	1.20	22	N/a	0	1	0	0	0
Sheet D	July	15	279.59	24.96	40	N/a	0	1	0	0	0
Sheet E	July	15	97.25	3.62	17	N/a	0	1	0	0.05	0.13
Sheet A	August	31	213.39	3.88	72	N/a	2	1	0	0	0
Sheet B	August	31	225.64	5.6	77	N/a	2	2	0	0	0
Sheet C	August	31	5.4	0.03	3	N/a	2	1	0	0	0
Sheet D	August	31	97.68	1.56	23	N/a	2	1	0	0	0
Sheet E	August	31	22.35	0.12	17	N/a	2	1	0	7.2	0.13
Sheet A	September	17	74.9	0.4	25	N/a	1	1	0	3.9	0.7
Sheet B	September	17	46.9	0.2	23	N/a	1	2	0	0	0
Sheet C	September	17	1	0	3	N/a	1	1	0	0	0
Sheet D	September	6	1	0	1	N/a	1	1	0	0	0
Sheet E	September	9	1	0	1	N/a	1	1	0	0	0



Appendix D - Tides and Water Levels

2002 FIELD and FINAL TIDE NOTE

Hydrographic Sheet: H11165

Sheet E
Lincoln Rock to Point Stanhope
Northern Clarence Strait, Alaska

NOAA Project No:	OPR-O327-KR-2002 Clarence Strait, AK					
NOAA Contract No:	50-DGNC-8-90028					
The NOS Ketchikan, AK tide station (945-0460) served as control for the subordinate station on this project. Datum determinations were made for the tertiary subordinate station: Beck Island (945-0906). The NTDE 1960-78 was utilized.						
Location and Time Meridian	Name:	Lat (NAD 83)	Long (NAD 83)	Time Meridian:		
	Beck Island	56° 02' 47"	132° 51' 45"	0° (UTC)		
Time Period and Datum Reference	Name:	Established:	Removed:	MLLW	MHW	units
	Beck Island	7/15/2002	9/18/2002	0.000	4.632	meters
Tide observer	LCMF, Inc. 139 E. 51st Avenue Anchorage, AK 99503 (907) 273-1825					
Gauges	Three Design Analysis H350/355 bubbler systems.					
Installation	Each gauge was secured inside a waterproof Pelican case, and fastened vertically inside of an Weatherport Tent. Refer to the tide station package for additional site specific details of installation.					
Tide staff	No tide staff was installed. Leveling was performed from a tidal benchmark to the water surface. The water height was read using a metric rod with a stilling well attached to remove interference from waves.					
Benchmarks	The following benchmarks were installed at this site: Beck Island: none The following NOS benchmarks were recovered at this site: Beck Island: 0906 A 1978, 0906 B 1978, 0906 C 1978, 0906 D 1978, 0906 E 1978					
Levels	Benchmarks were leveled at the installation, reinstallation and removal of the tidal station. The benchmarks and station datums were connected through frequent measurements to the water. The level runs closed within NOS tolerance and the benchmarks were stable.					
Final Tidal Zoning	Tide zones SA129, SA130 and SA133 were used to apply tide data from Beck Island to reduce hydrographic soundings to MLLW.					
Reduction of Hydrographic data	Thales Geosolutions, Pacific (the prime contractor) was provided with preliminary datums developed by LCMF during July 2002 based upon a short series simultaneous comparison between Ketchikan and the subordinate station. Six minute tide data reduced to MLLW and smoothed with a 5th order 5 hour polynomial curve fit was provided to Thales throughout the field season. In October 2002, LCMF finalized datums and forwarded all data necessary to reduce hydrographic soundings to the prime contractor.					

Appendix E - AWOIS

RECRD	**52536**	VESSLTERMS	OBSTRUCTION	CHART	17382	AREA	O
		CARTOCODE	0067	SNDINGCODE		DEPTH	

NATIVLAT	56 00 12.2	NATIVLON	132 36 51.5	Convert		NATIVDATUM	31
LAT83	56 00 10.90	LONG83	132 36 57.60	Update GP		GPQUALITY	Low
	56 0 10.9		132 36 57.6			GPSOURCE	Direct
LATDEC	56.003027777778	LONDEC	132.616				

PROJECT	OPR-O327-KR	ITEMSTATUS	Assigned	SEARCHTYPE	Full
RADIUS	400	INIT	MCR	ASSIGNED	2/14/2000
TECNIQ	MB,ES,DI				
Techniqnote	VERIFY OR DISPROVE 4 FM SOUNDING AND DEVELOP SHOAL TO VERIFY OR DISPROVE I FM DEPTH IN POS. 56-00-05.3 N 132-37-02 W				

History

HISTORY
CL226/86--17TH CGD; USCGC PLANTREE REPORTS THAT DURING A BUOY OPERATION FOR POINT STANHOPE BUOY 2, IT WAS DISCOVERED THAT THE SHOAL THE BUOY MARKS IS MISCHARTED. BUOY WAS RELOCATED TO 56 00 12.2N, 132 36 51.5W (NAD 27). CG SIDE SCAN INFORMATION INDICATED THAT SHOAL IS LOCATED 176 FT FROM NEW BUOY LOCATION. A ZODIAC WAS USED TO TAKE A LEAD LINE SOUNDING OF 4 FMS 30 FT EAST OF THE BUOY.
**** IT APPEARS THAT REPORTED NAD 27 POSITION WAS RE-APPLIED TO THE CHART IN 1997 WITHOUT CONVERTING TO NAD 83 . ENTERED 2/00 MCR
H3793WD/16; SHEET 3 -- 6 FT SOUNDING OBTAINED APPROX. 100M TO THE SOUTH. CHARTED IN 56-00-05.3N 132-37-02W NAD 83, 2/00 MCR

Fieldnote

INVESTIGATION

DATE(s): 07/30/02 - 07/31/02 (DN:211-212)

HYDROGRAPHIC SURVEY NUMBER: H11165
VN: Quicksilver Time: 22:26:00

INVESTIGATION METHODS USED: 200% Multibeam and Backscatter coverage

SURVEYED POSITION: Lat. 56 00 10.9 N Lon. 132 36 57.6 W, searched 400m radius circle

POSTION DETERMINED BY: DIFFERENTIAL GPS

INVESTIGATION SUMMARY: Survey lines were conducted to provide 200% coverage over the required search radius. The multibeam and backscatter data was reviewed in delphmap and CARIS and the shoal soundings were found in the area, but are slightly shifted from the charted position.

CHARTING RECOMMENDATION (HYDROGRAPHER): It is recommended that this soundings on the chart be updated with sounding data from OPR-0327-KR.

Proprietary

EVALUATOR COMMENTS: Update charted soundings with data from H11165.

YEARSUNK		NIMANUM		SYSTEMNUM	11699	Print Record

Appendix F - Non-Conformance Reports[78]

NON-CONFORMANCE REPORT

Project Number:	P2544	Date: 11/5/2002
Project:	Hydrographic Survey, Alaska 2002	
Client:	NOAA (OPR-O327-KR-02)	
Vessel:	R/V Davidson, F/V Quicksilver, M/V Minotaur, F/V Mistral	
Reported:	D. Arumugam, D. Moyles	
Compiled:	D. Arumugam	

Description of Non-Conformance:

Positioning errors in some bottom features were noted during processing. The Navigation latency in the Patch tests were not consistent. Variable navigation latency in the navigation software (WinFrog) has been identified as the source of the positioning errors.

Discussion:

In most cases the Navigation latency was between 0 and 1 sec, causing a maximum horizontal positional error of 4m (maximum speed of survey was 8knots). On average the survey speeds were in the range of 3 to 5 knots, which result in horizontal position errors of 1.5 – 2.5 meters. There are also some instances (less than 5%) that the Navigation latency could be up to 2 seconds. Since the area of survey in Clarence strait had features of steep slopes any little error in horizontal position created a vertical error that failed IHO specifications.

The computer clock in the ISIS (acquisition software) computer is set with the time in the NMEA Position string, which comes from WinFrog v3.2.16 (navigation software) computer. The time between the calculation and the output of the NMEA Position string is not constant, hence the variable Navigation time latency. In addition to the above WinFrog outputs the same time and position if no new calculation was complete in time for the output cycle. Since ISIS uses this time to set its clock, the time in ISIS gets set back by a second. If two calculations occur before an output, you would see the time go ahead by one second. This causes some of the time stamps in the XTF files to be incorrect. The XTF file stores 5 different time stamps for each ping, which are listed below:

1. PING TIME (hh:mm:ss.00) The Bathy time.

2. FIX TIME (hh:mm:ss.00) The most recent navigation update time.

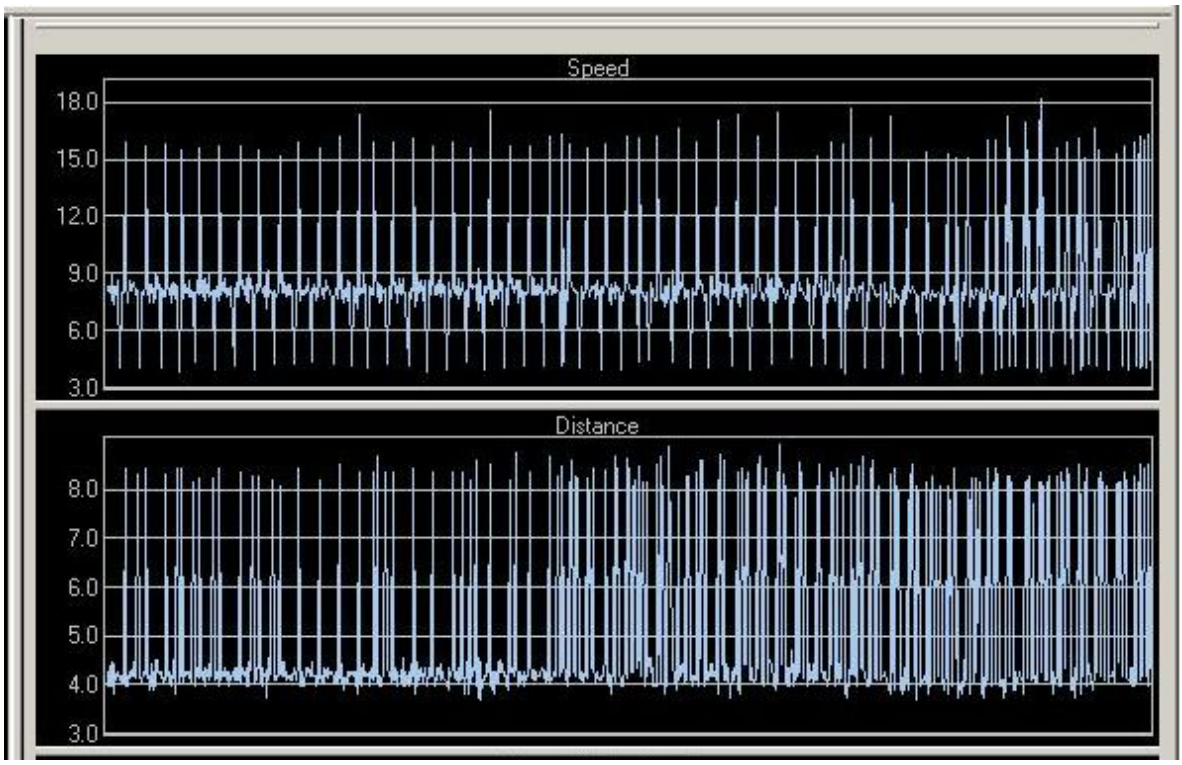
3. ATTITUDE TIME (milliseconds) The time used to coordinate Bathy data with Attitude data. The time the Bathy ping was received.

4. NAV FIX TIME (milliseconds) The time when navigation received.

5. BYTE COMPUTER CLOCK TIME (hh:mm:ss.00) The ISIS computer clock time when ping was received.

Of the five clocks only the three hh:mm:ss.00 clocks gets reset by ISIS. The 2 millisecond clocks (timers) continues to increment.

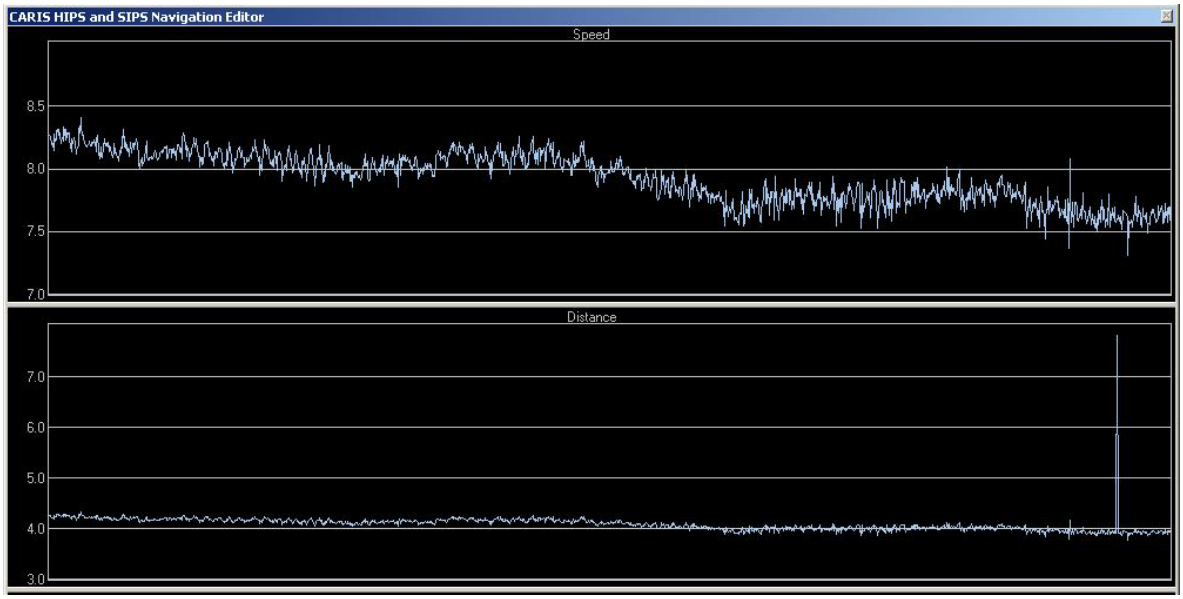
When converted to Caris the millisecond times are used to generate all the times in Caris. Since the millisecond timers have no reference the first ping used to set the reference time (Attitude time = Ping time). As a result if the first ping time is off by a second the whole line will have that error. Once converted to Caris the Navigation editor shows the following:



Since Caris users the millisecond clocks to generate its clocks we see speed jumps in the Navigation data.

Resolution

The XTF files were fixed (detailed below) then reconverted to a new Caris project. Then the newly generated Navigation files moved into the existing project to overwrite old Navigation data. This Navigation was then examined the data remerged in Caris.



In fixing the XTF files the problem was broken into 2 parts.

1. Fix the variable latency.
2. Calculate the time error in the first ping.

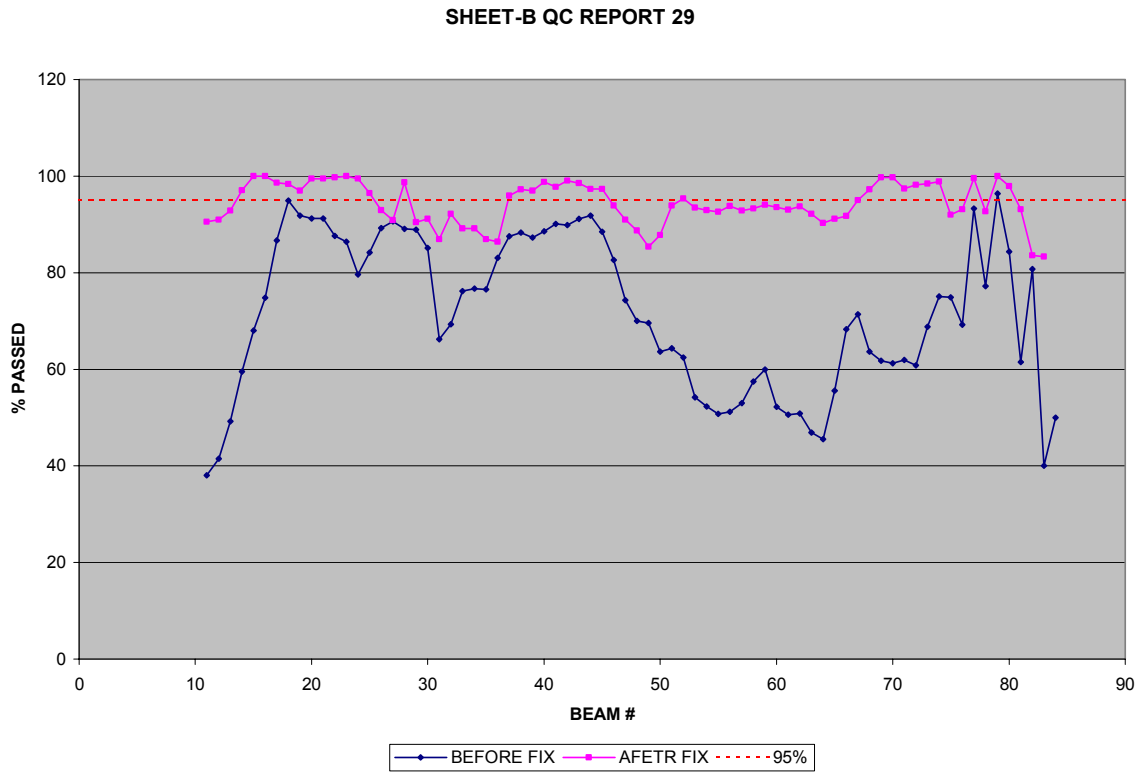
To fix the variable latency the Navigation data (time and position) from the WinFrog RAW files were extracted and inserted into the XTF files. Since the time logged in the raw files was the GPS time of the position at the time of the calculation, any Navigation time latencies (constant or variable) were removed.

To calculate the time error in the first ping, the time differences between each Attitude time and Ping time were calculated. The minimum from this data was the time error in the first ping. The ping time as logged in the XTF file (comes from the NMEA string) can never go ahead in time, since that was true it was possible to use this formula. This difference was then applied to the first ping time.

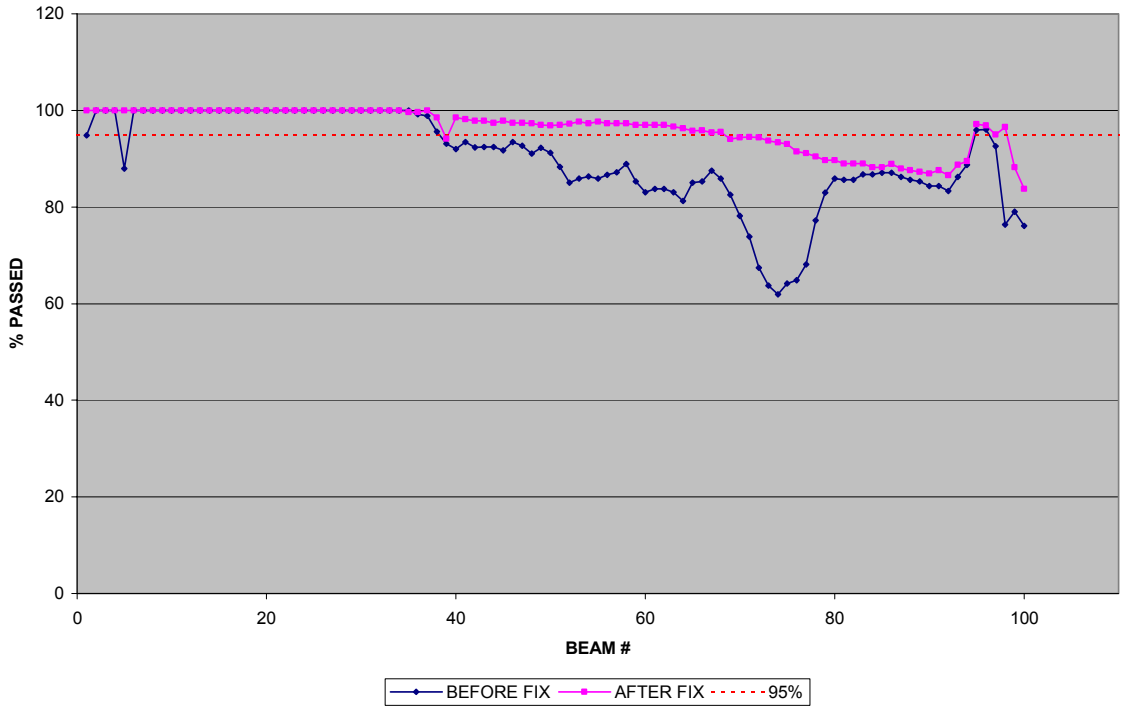
To keep things consistent all ping times were also corrected using the first ping time and the attitude time. The corrected XTF files are named with a *_C* at the end of the original filename.

Results

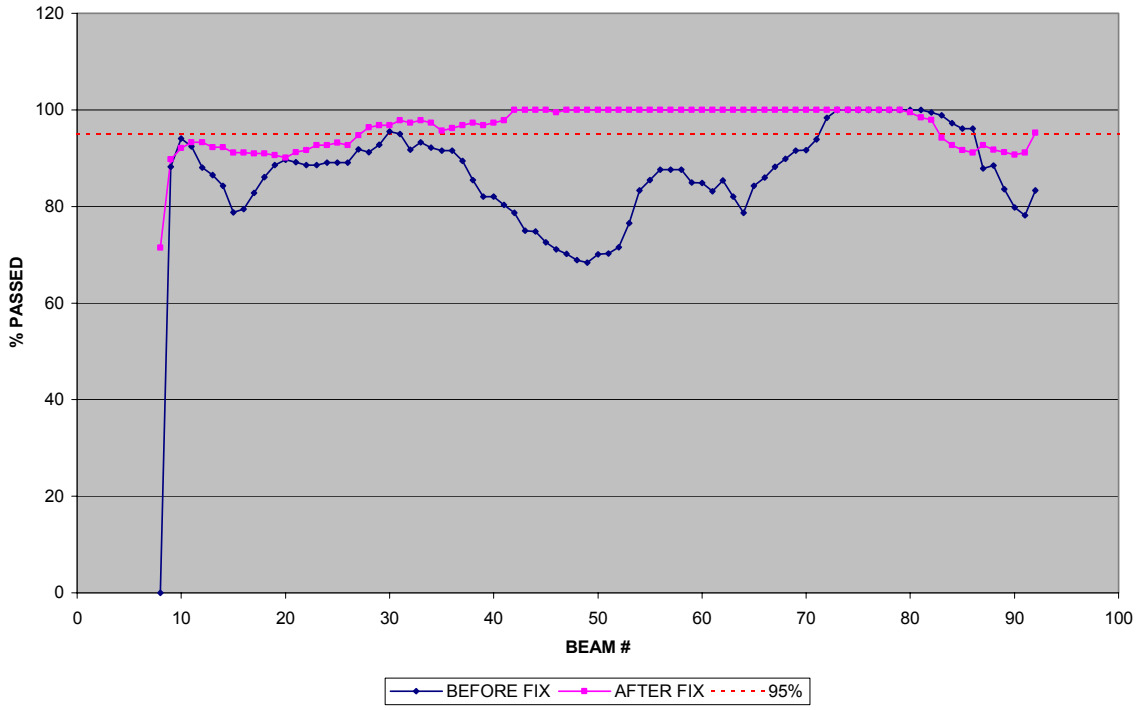
Below are some examples of QC Reports before and after the fix.



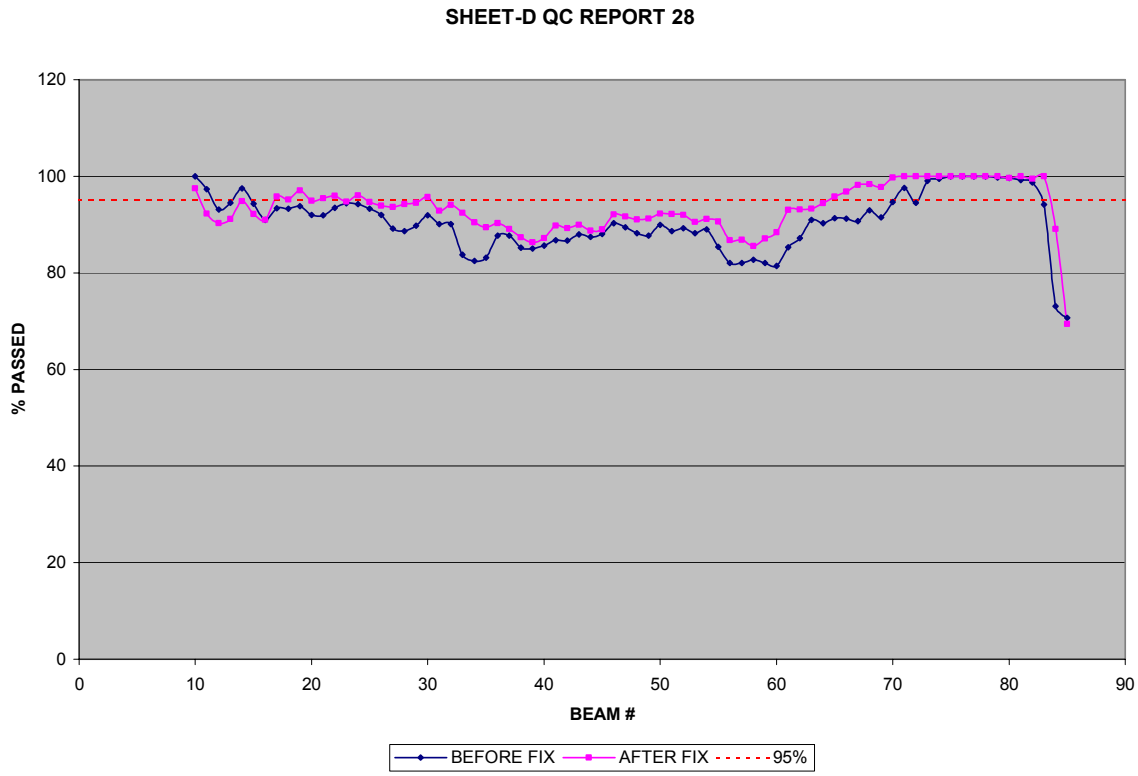
SHEET-B QC REPORT 25



SHEET-C QC REPORT 44



As per the graph it is clear that the QC results improved greatly for the above QC reports. This was true for about 80 – 90% of the QC reports. There were a few instances in which the results after the fix did not improve by much. The following is an example.



Around 40 QC results were compared by graphing the before and after. In no instances was it visible that this resolution degraded the QC results.

Revisions Compiled During Office Processing and Certification

[1] Strikethrough ~~, which~~.
[2] Concur.with clarification. The coordinates listed define the sheet limits. Refer to Surdex for the survey area.
[3] Strikethrough ~~132º4141.158~~, replace with 132º41'41.158".
[4] Strikethrough ~~132º4141.158~~, replace with 132º41'41.158".
[5] Filed with the project reports.
[6] Strikethrough ~~Reason~~, replace with Reson.
[7] Crossline data met or exceeded requirements for quality control.
[8] Concur. The data is adequate to supersede all prior surveys and charted miscellaneous source data in the common areas except as specifically noted in this report.
[9] The title Non-Conformance Reports is in error. The problem described was satisfactorily resolved and the data is in conformance with IHO standards.
[10] Attached to this report.
[11] Concur.
[12] Concur. In PHB processing, H11165 was also compared at its northern junction with H10959. The comparison was generally excellent, within one fathom. However, in the junction areas along the eastern shore where the bathymetry is steep, H11165 generally found shoaler soundings than H10959, with differences up to 5 fathoms. Charted depth curves within the common areas have been drawn with consideration for all data sets within the common areas. Supersede depths from H10959 in the common areas except as specifically noted in this report and the Hdrawing.
[13] Strikethrough ~~the majority of lines were run~~, replace with "in the majority of lines run".
[14] Concur with clarification. The histogram shows a sharp drop in the selection of soundings from the outermost beams, approximately 1-5 and 95-101. Data from the outermost beams is often filtered out or rejected in processing due to poor quality. In the range of acceptable beams, the histogram shows the pattern as described.
[15] Concur with clarification. The histogram shows an increase in sounding selection between approximately beams 6 through 27 on the port side.
[16] Strikethrough ~~the opposite direction~~, replace with "in opposite directions".
[17] Strikethrough ~~was~~, replace with "were".
[18] Strikethrough ~~enter~~, replace with "entered".
[19] Strikethrough ~~where~~, replace with "were".
[20] Filed with the project reports.
[21] Filed with the project reports.
[22] Strikethrough ~~projects~~, replace with "project's".
[23] Longitude for Blashke Island gauge 9450973 is in error. Strikethrough ~~158º06'47"W~~ and replace with "132°53'39"W".
[24] Also see Final Tide Note attached to this report.
[25] H11165 was also compared in PHB processing with Charts 17360, 33rd Edition, 17382, 16th Edition, and 17420, 27th Edition.

[26] Do not concur. While there was consistency with the charts in some areas, the survey also found considerable deviation from charted contours and soundings in many areas, including uncharted shoals.

Note that errors occurred in the depiction of contours on the smooth sheet. Contour errors have been corrected on the Hdrawings.

Chart areas discussed below based on the current survey.

[27] Concur with clarification. The rock symbol is present on Chart 17360, 33rd Edition, and the 8 fathom sounding has been removed.

[28] Concur.

[29] Concur with clarification. The 6 fathom sounding is not present on Chart 17382, 16th Edition.

[30] Concur with clarification. The 14 fathom sounding is not present on Chart 17382, 16th Edition.

[31] See Dangers to Navigation reports, attached to this report, for further information.

[32] Concur.

[33] Concur.

[34] Concur.

[35] Concur.

[36] Concur with clarification. This was AWOIS item 52537, investigated by survey H11164. The area was surveyed with 200% multibeam coverage. For further information, see H11164 Descriptive Report.

[37] Strikethrough ~~132º635'51.914"~~, replace with 132º35'51.914".

[38] Concur.

[39] Do not concur. No 6 fathom sounding occurs at this position on Chart 17382. An elevation of 6 feet above MLLW, referring to a nearby rock, is depicted at the location.

[40] Filed with the project reports. Note that in Separate 6 (hard copy), the chart comparison overlay for 17382 is incorrectly labeled in Section 7 as 17383.

[41] Insert "and".

[42] Strikethrough ~~Danger to Navigations~~, replace with "Dangers to Navigation". Attached to this report.

[43] Strikethrough ~~has~~, replace with "as". Strikethrough ~~an~~ .

[44] Attached to this report. See AWOIS form for evaluator recommendation.

[45] Strikethrough ~~has~~, replace with "as".

[46] This item, which occurs at the junction of H11164 and H11165, is described on the hydrographer's AWOIS form as being investigated by survey H11164. See H11164 Descriptive Report and AWOIS form for information and evaluator's recommendation.

[47] See previous endnote. Refer to AWOIS form and H11164 Descriptive Report for information about this item.

[48] Do not concur. A 4 fathom sounding labeled "Rep (1986)" falls within the limits of H11165. Chart area according to the current survey.

[49] Eleven Dangers to Navigation were submitted after PHB review. Chart according to the smooth sheet, with the following changes and corrections:

- DtoN Rock, awash 6 ft, Lat 56/00/46.512N, Lon 132/35/23.412W . The smooth sheet shows two rocks near this position, with elevations above MLLW of 3 feet and 4 feet. Due to scale, the evaluator recommends charting rock awash symbol between the two smooth sheet rocks as shown on the Hdrawing. Remove (6) notation from Chart 17382.

- DtoN Sounding, 6 fms 1 ft, Lat 56/01/11.2N, Lon 132/37/4.8W . A nearby shoaler sounding of 4 fm 4 ft was chosen for the Hdrawing. Chart according to the Hdrawing.
- DtoN Sounding, 8 fms 3 ft, Lat 56/01/28.0N, Lon 132/37/52.9W . The sounding appears on the smooth sheet as 8 fm 4 ft. Chart according to the smooth sheet.

[50] See Dangers to Navigation reports, attached to this report, for DtoNs submitted after PHB review.
[51] Concur.
[52] Strikethrough ~~was~~, replace with were.
[53] Filed with the project reports.
[54] Filed with the project reports.
[55] Chart rocks as depicted on the smooth sheet, except as discussed in this report.
[56] Filed with the project reports.
[57] RSD MHW line is shown on the Hdrawings in blue on level 5.
[58] Concur.
[59] Concur with clarification. The position given is for DP#JD242_21, the northern extent of the islet. Chart islet between DP's as depicted on the smooth sheet.
[60] Strikethrough ~~56-03-221.02~~, replace with 56 03 21.02.
[61] Concur.
[62] Concur. Chart rock at smooth sheet position.
[63] Concur with clarification. The MHW line revision also appears as a dashed red line on the final smooth sheet.
[64] Concur with clarification. Due to scale, the rock has been incorporated into ledgeline on the Hdrawing.
[65] Strikethrough ~~JD242_23~~, replace with JD242_22.
[66] On Chart 17382, 16th Edition, the rock has been incorporated into shore ledge. Since the two rocks discussed by the hydrographer support the charted ledge, the evaluator recommends that the ledge be retained as charted.
[67] Concur with clarification. The rock is not charted on 17382, 16th Edition. Chart the area as depicted on the smooth sheet.
[68] Do not concur. The DP Correlator Sheet states that the leadline depth is inaccurate and should not be plotted. The evaluator recommends retaining the charted rock until a multibeam investigation of the area proves or disproves its existence and location.
[69] *Rk* and *rky* labels have been shown on the Hdrawing as warranted.
[70] DP JD254_2 for H11165 is not at the position given and is not associated with a mulibeam gap. The location given is within H11164, and the paragraph is repeated from the H11164 Descriptive Report, page 21, item #5.
[71] Strikethrough ~~MHL~~, replace with MHW.
[72] Filed with the project reports.
[73] Concur. There were no charted bottom samples within the survey limits. Bottom characteristics are retained in green from Chart 17382.
[74] Concur. Chart aid to navigation with the most recent information from USCG, District 17.
[75] Concur with clarification. It is recommended that this geoname be added to the chart if warranted.
[76] Eleven Dangers to Navigation were submitted after PHB review. See attached reports and endnote 49 for further information.

[77] Strikethrough ~~in the survey were discovered~~, replace with "were discovered in the survey area".
[78] The title Non-Conformance Reports is in error. As discussed in the report attached, the problem described was satisfactorily resolved and the data is in conformance with IHO standards.

APPROVAL SHEET
H11165

Initial Approvals:

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

Bruce A. Olmstead Date: 1/4/2006
Bruce A. Olmstead
Cartographic Team
Pacific Hydrographic Branch

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 Descriptive Report.

, CDR/NOAA Date: 9 Jan. 2006
Donald W. Haines
CDR, NOAA
Chief, Pacific Hydrographic Branch

Corey Allen
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Complete
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NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H11165

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
17382	10/20/05	B. Taylor	Full Part Before After Marine Center Approval Signed Via
			Drawing No. Application of soundings and
			features from smooth sheet.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.