H11273

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. Sheet "A"

Registry No. H-11273

LOCALITY

State Alaska

General Locality Seward Peninsula

Sublocality Approaches to Port Clarence

2005 and 2007

CHIEF OF PARTY
Lamar Gates

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28
(11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H11273

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.
Sheet "A"

State: Alaska

General Locality: Seward Peninsula

Sublocality: Approaches to Port Clarence

Scale: 1:20,000

Date of Survey: 7/2005-8/2005, 6/2007

Instructions Dated: 28-Apr-05

Project No.: OPR-R365-KR-2005

Vessel: M/V Peregrine, M/V Bristol Endeavor

Chief of Party: Lamar Gates

Surveyed by: Terra Surveys, LLC

Soundings taken by echo sounders: Reson SeaBat 8101 & 8124 Multibeam Echo Sounders

Graphic record scaled by: N/A

Graphic record checked by: N/A

Evaluation by: Beth Taylor, Bruce Olmstead

Automated plot by: HP Designjet 1050C

Verification by: Beth Taylor

Soundings in: Fathoms and tenths at MLLW

REMARKS: Time in UTC. UTM Projection Zone 3

Revisions and annotations appearing as endnotes were generated during office processing. As a result, page numbering may be interrupted or non-sequential.

All separates are filed with the hydrographic data.

Descriptive Report to Accompany Hydrographic Survey H-11273

Sheet A

Scale 1:20,000

June[1] – August 2005
July[2] 2007

Terra Surveys, LLC

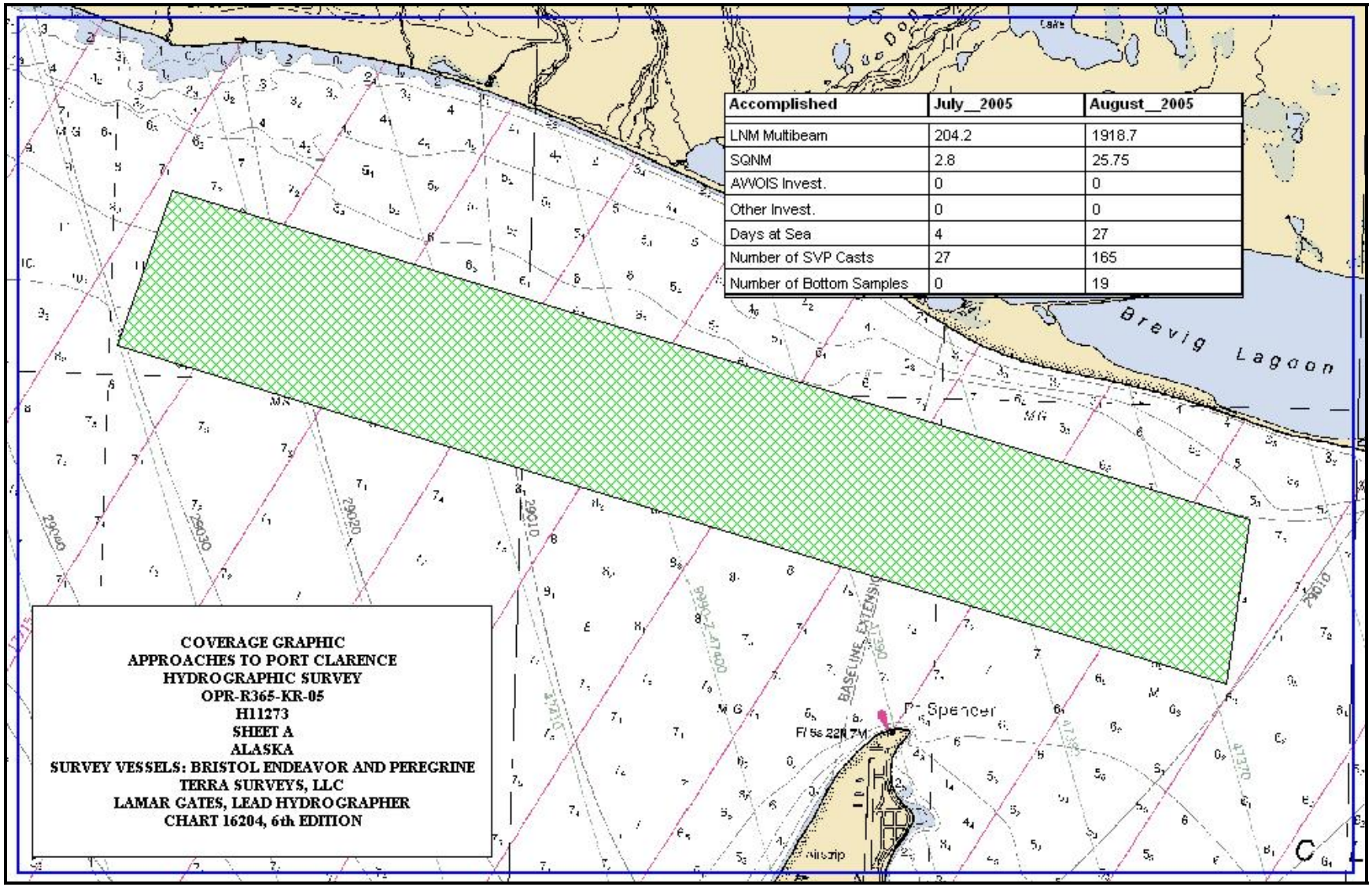
Lead Hydrographer: Lamar Gates

A. AREA SURVEYED

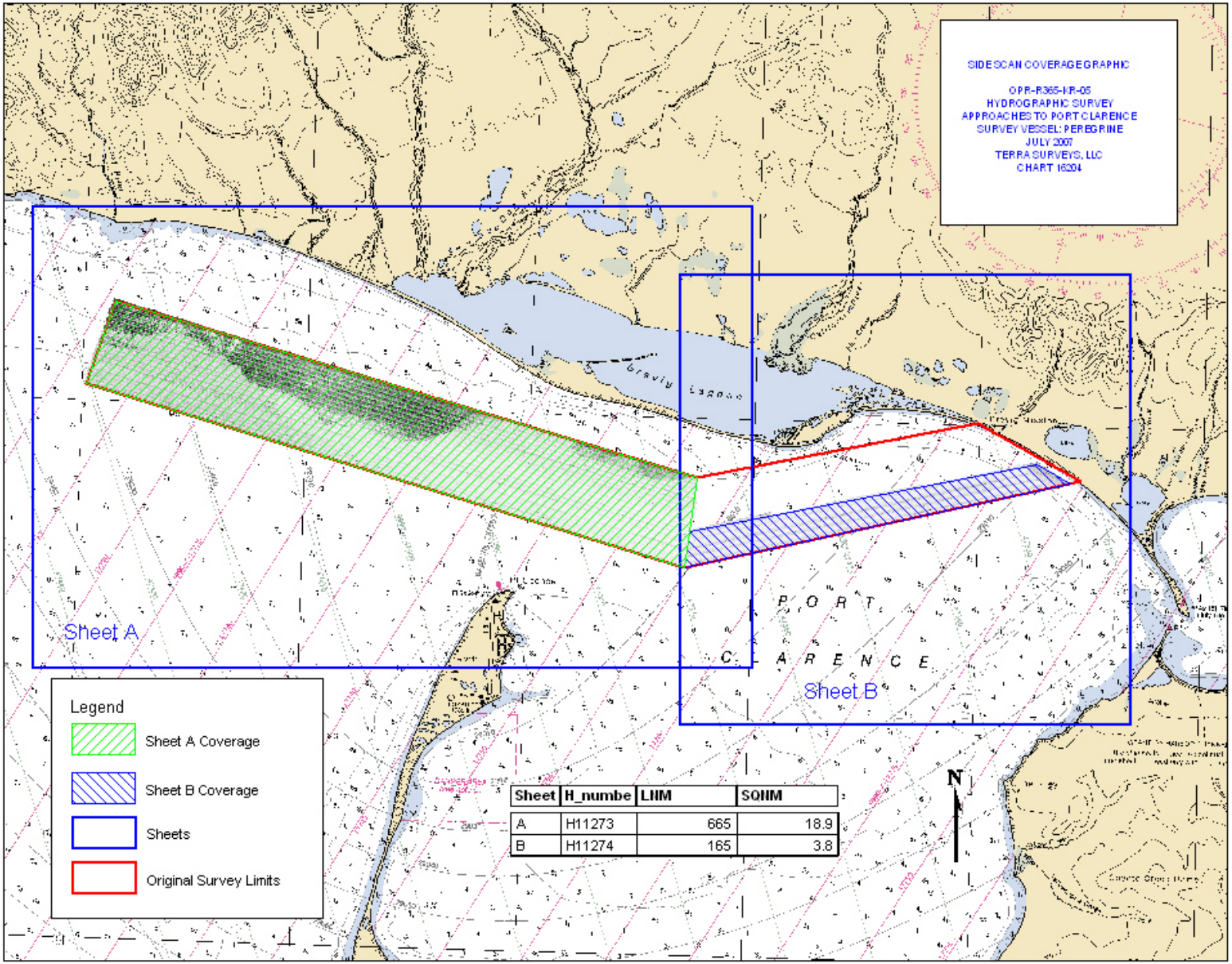
This navigable area survey was conducted in accordance with Hydrographic Project Instructions OPR-R365-KR-2005, Approaches to Port Clarence, Alaska dated July 28[3], 2005.

The purpose of this contract was to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of this area. The project area is approximately 18.9 square nautical miles and lies in Port Clarence, northwestern Alaska, which is the closest water way to the City of Teller. Teller lies on a spit to the east of the project that separates Grantley Harbor from Port Clarence. The City of Teller and the road from Nome to Teller are important for many of the people in this region living a subsistence lifestyle; including the remote village of Brevig Mission. Brevig Mission lies on the northern side of the project. Residents from Brevig Mission cross Port Clarence by skiffs and fishing boats during summer. The area of Port Clarence is currently being studied for marine exports of raw bulk materials requiring improved bathymetry. Point Spencer has a Loran Station which also contributes to the ship traffic in Port Clarence. The vessels using Port Clarence rely heavily on the accuracy of the nautical charts for this area.

Two shallow-water multibeam sonar systems were used to locate and determine the least depth over the obstructions and shoals as well as to determine the least depths over the entire project area. This survey has a maximum depth of 11.1 fathoms[4] and a minimum depth of 5.8 fathoms above datum[5]. A mechanical problem with the Reson 8124 sonar used on the *Peregrine* caused data quality issues which could not be resolved during post-processing. Therefore, a side scan and singlebeam resurvey was completed in June, 2007 to meet object detection criteria in the areas *Peregrine* surveyed during the 2005 season. The singlebeam data aided in quality control only and was not used on the smooth sheet.[6]



Accomplished	July__2005	August__2005
LNM Multibeam	204.2	1918.7
SQNM	2.8	25.75
AWOIS Invest.	0	0
Other Invest.	0	0
Days at Sea	4	27
Number of SVP Casts	27	165
Number of Bottom Samples	0	19


SIDESCAN COVERAGEGRAPHIC
OPR-P365-KR-05
HYDROGRAPHIC SURVEY
APPROACHES TO PORT CLARENCE
SURVEY VESSEL: PEREGRINE
JULY 2007
TERRA SURVEYS, LLC
CHART 16204
Sheet A
Sheet B
P O R T
C L A R E N C E
Legend
Sheet A Coverage
Sheet B Coverage
Sheets
Original Survey Limits
N
Sheet | H_numbe | LNM | SQNM
A | H11273 | 665 | 18.9
B | H11274 | 165 | 3.8

Section B: Data Acquisition and Processing

B.1 Equipment

Soundings for this survey were acquired using the motor vessels *Peregrine* and *Bristol Endeavor.* The *Peregrine* was also used for the 2007 resurvey.

Peregrine, 2005 Season

The *Peregrine* is a 90 ft aluminum hull, landing craft boat with a 24-foot beam and a draft of 3 ft. It was equipped with a starboard-side, pole-mounted Reson SeaBat 8124 Multibeam Echo Sounder System. Major systems used on the *Peregrine* during the 2005 season are listed in the following table.

Peregrine Survey Equipment, 2005 season

Operating System	*Manufacturer*	*Model / Part*	*Serial Number*
Multibeam Sonar	Reson	8124	1301045
Sonar Processor	Reson	SeaBat 81-P	23465
Positioning System	Seatex	Seapath 200 RTK	2173
Motion Sensor	Seatex	MRU-5	1410
SV Probe	Applied Microsystems	SV Plus (500 dBar)	3317
SV Probe	Applied Microsystems	SV Plus (500 dBar)	3359

Peregrine, 2007 Season

To conduct the 2007 resurvey, the *Peregrine* was equipped with a pole-mounted Odom Echotrack single beam echosounder and an Edgetech 4200-FS side scan sonar towfish. Major systems used on the *Peregrine* during the 2007 season are listed in the following table. None of the 2007 data was used on the final smoothsheets.[7]

Peregrine Survey Equipment, 2007 season

Operating System	*Manufacturer*	*Model / Part*	*Serial Number*
Singlebeam Sonar	Odom	Echotrack DF3200 MKII	9837
Positioning System	Odom	F-185	F0606044
Motion Sensor	Odom	F-185	F0606044
Sidescan Sonar	Edgetech	4200-FS	32760
Sidescan Processing	Edgetech	Discover 4200-FS 5.33	NA
SV Probe	Odom Digibar Pro	DB1200	98427

***Bristol Endeavor*, 2005 Season**

The *Bristol Endeavor* is a 71.5-foot steel hull boat with a 21-foot beam and a draft of 3 ft. It was equipped with a starboard-side, pole-mounted Reson SeaBat 8101 Multibeam Echo Sounder System. Major systems used on the *Bristol Endeavor* are listed in the following table.

Bristol Endeavor Survey Equipment, 2005 Season

Operating System	*Manufacturer*	*Model / Part*	*Serial Number*
Multibeam Sonar	Reson	8101	1301045
Sonar Processor	Reson	SeaBat 81-P	32030
Positioning System	Seatex	Seapath 200 RTK	799
Motion Sensor	Seatex	MRU-5	1410
Sound Velocity	Applied Microsystems	SV Plus (500 dBar)	3259
Sound Velocity	Applied Microsystems	SV Plus (500 dBar)	3279

Equipment performance details for the 2005 season are provided in OPR-R365-KR-05 Data Acquisition and Processing Report[8], Sections A. Equipment and B. Quality Control.

B2. Quality Control

The internal consistency and integrity of the survey data was found to be good. All of the soundings that appear on the smooth sheet meet or exceed the accuracy requirements in the specifications. However, two problems concerning data quality occurred during the H-11273 survey. A faulty receiver array in the Reson 8124 sonar reduced the signal to noise ratio which precluded the resolution of notable bottom features in data collected by the *Peregrine*. Additionally, anomalies in sound velocity profiles caused outer beams to reflect artificially shoal soundings. These problems began early in the survey and were believed to be correctable during post processing. However, after analyzing the data it was not possible to provide certainty that no dangers or other features of concern exist.[9] Therefore, Terra Surveys, LLC proposed to conduct a 200% sidescan and singlebeam survey in order to meet object detection requirements in areas surveyed by the *Peregrine* system. The resurvey was completed in July, 2007 and did not reveal any bottom features which pose a danger to navigation. Concurrently, the 2005 shallow water multibeam data were re-edited specifically to reduce slight bathymetric variances resulting from shoaling outer beams. The single beam data was not included in the smooth sheet.[10]

Crosslines

Survey H-11273 had 1,207 nautical miles (NM) of main scheme lines and 75 NM of crosslines. This equates to 6.1% of the mainscheme lines; which is more than the 5% required by the Specifications and Deliverables, Sec. 5.5.3. There were 45 crosslines and 315 mainscheme lines. A total of 25 crossings were analyzed, and comparisons were good. The crossings varied spatially and temporally.

The crosslines were analyzed with a program developed in-house in accordance with Specifications and Deliverables 2003, Section 5.5.3. A comprehensive explanation of the program is in the OPR-R365-KR-05 Data Acquisition and Processing Report. The reports generated from the crossline analysis are in Separate V. Crossline Comparisons, of this report.[11]

An estimated 95% confidence level generated from crossline analysis was used as a guide in determining data acceptability. In practice, the subjective nature of multibeam data cleaning resulted in a slight variance of final smooth sheet soundings from the estimated 95% confidence level. However, the data were acceptable in light of these variations.

Subsequent to re-editing the data acquired by the *Peregrine* system, crosslines were reconfirmed using the surface difference method described in the June, 2006 Specifications and Deliverables, Section 5.5.3. The crosslines were analyzed using CARIS HIPS and SIPS and CARIS BASE Editor. Two swath angle-dependent CARIS BASE surfaces were created for survey H-11273, one using only mainscheme data and one using only crossline data. A surface difference was created in which crossline depths were subtracted from mainscheme depths at the same nodal position. The *z* values of the surface difference were exported to a spreadsheet for analysis. A total of 97.0% of

surface difference nodes met the accuracy standard for the depth range of H-11273. The surface difference is included in the digital deliverables accompanying this report.

H-11273 Mainscheme/Crossline Surface Difference Summary

H-11273 mainscheme depth range	10.6m to 20.5m
H-11273 IHO Order 1 accuracy standard	0.51863m to 0.56630m
Mainscheme depth minus crossline depth range in surface difference	-0.959m to 1.353m
Total number of nodes in surface difference	1,300,462
Total number of depth differences which do not meet accuracy standard	4,249
Percentage of depth differences which meet accuracy standard	97.0%

Smooth Sheet Soundings

The processing of H-11273 took place in two stages. The first stage involved extensive investigation of anomalous data collected by the *Peregrine* system, hand cleaning, and the initial submittal of smooth sheet soundings. A detailed description of this process may be found in the OPR-R365-KR-05 Data Acquisition and Processing Report. Upon review of H-11273, however, NOAA suggested further editing to eliminate variance in depths collected by the *Peregrine* system. Thus, the second stage involved re-editing data to further eliminate spurious soundings caused by the faulty Reson 8124 and sound velocity anomalies.

Multibeam data collected by the *Peregrine* system in 2005 were revisited with the intent of reducing overall variance in depths as well as conducting a comparison to the 2007 sidescan/singlebeam resurvey. First, areas of high standard deviation in the 2005 survey were identified and smoothed by eliminating "noisy" data above and below the sea floor. CARIS subset editor was used during this process. The entire survey was investigated and soundings which deviated from the average/best fit group of soundings observed in each swath were rejected. The result of this process caused a slight deepening of H-11273 smoothsheet soundings and considerably reduced variance in depths observed in the original submission.

Next, the newly-cleaned multibeam data were compared to the originally submitted smoothsheet soundings. CARIS BASE Editor was used for this process. Two swath angle-dependent CARIS BASE surfaces were created; one from the originally-submitted smoothsheet soundings, one from a sounding selection of equal resolution from the newly-cleaned data. Next, a surface difference was created using both surfaces. Areas of difference were noted and these areas were investigated in the 2007 sidescan/single beam data to ensure no features were erroneously rejected during the 2007 cleaning.

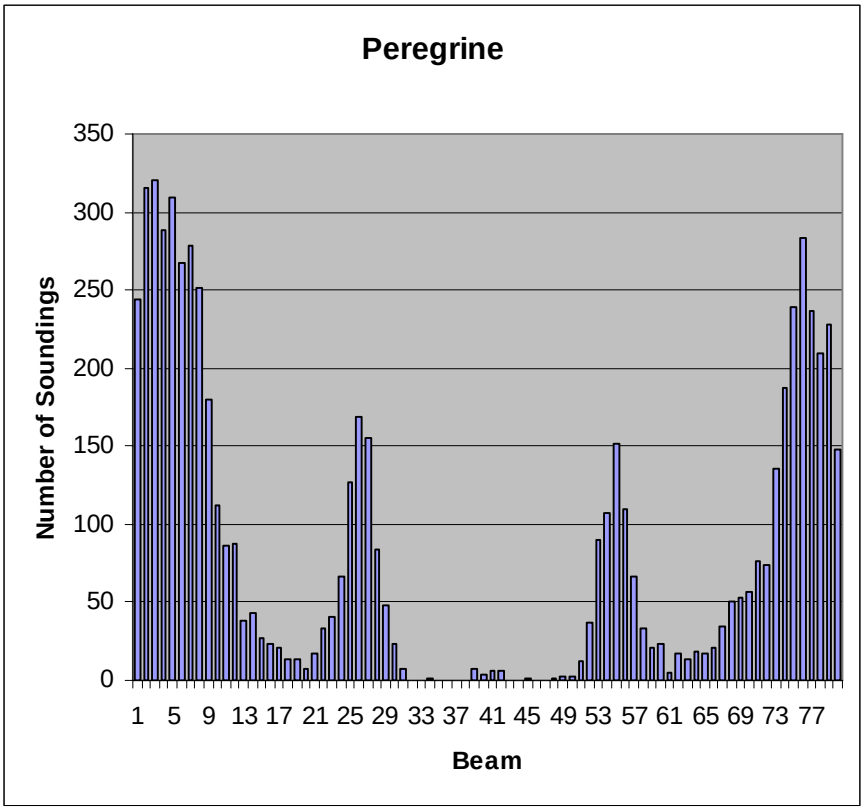
The 2005 multibeam data were also compared to processed depths from the 2007 single beam survey. There was generally good agreement (+/- 0.5 meters) between the surveys.

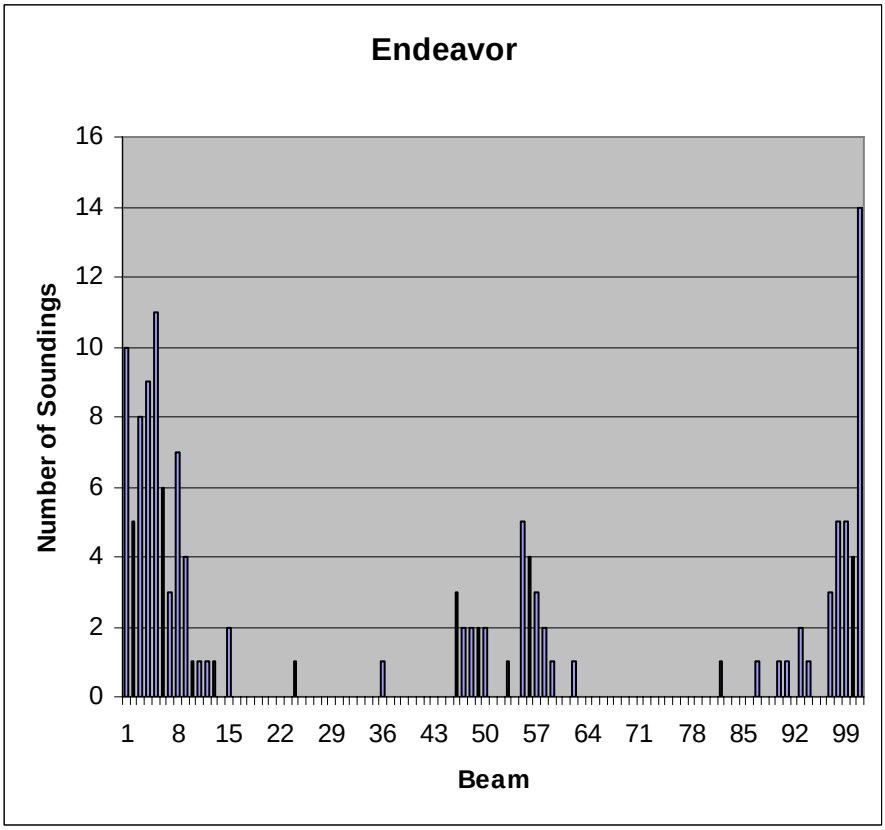
Smooth sheet soundings were extracted from CARIS HIPS and SIPS using CARIS Field Sheet Editor. First, a gridded surface was created using the bin tile layer function in Field Sheet Editor. The grid contains a cell for every 10 square meters of the project. Each grid cell is populated with the shoalest sounding falling within its area of coverage. The attributes of each sounding, including its true position (northing, easting) are included with each grid cell. Soundings were selected from the grid using 4.5 mm spacing at chart scale (1:20,000). The soundings and their attributes were exported from CARIS HIPS and SIPS to ASCII format and written to Microstation. Selected smooth sheet soundings were tagged in Microstation with the following attributes in order for soundings to be traced to the multibeam data set. The tags satisfy Specifications and Deliverables, Section 8.2.2.

Microstation tags
Line Name
Profile
Beam
Vessel
Day/Year
Northing
Easting
Depth (meter)
Sounding Key

Final smooth sheet soundings were compiled into a spreadsheet and plotted. *Figure 1*, on the next page, is a histogram depicting the number of soundings per beam on the smooth sheet. The Reson 8124 multi-beam echo sounder has 80 beams and is numbered from port to starboard, 1-80. The Reson 8101 multi-beam echo sounder has 101 beams and is numbered from port to starboard, 1-101 with beam 51 representing the nadir beam.

Figure 1. ***Sounding vs. Beam Count***





Singlebeam

Singlebeam data was collected to quality control the multibeam data. Singlebeam data were examined and cleaned using CARIS Singlebeam Editor. Single Beam Editor displays a 2-dimensional profile view of survey data where soundings can be queried or flagged as accepted or rejected. Processors simultaneously reviewed the digital data and the analog paper trace, which allow[12] acceptance or rejection of data based on field observations recorded in the acquisition notes or on the analog paper trace.

Side Scan

Side scan data was imported into CARIS HIPS and SIPS using the Conversion Wizard and organized by vessel name and Julian date. After conversion, the side scan data was opened using CARIS HIPS and SIPS Navigation Editor and Attitude Editor. Vessel attitude, gyro and towfish height were examined for consistency. Vessel navigation data was visually scanned for jumps in speed, distance and course made good. Erroneous attitude data and navigation data with speed jumps greater than 2 kts were rejected with interpolation.

Following the attitude and navigation check, the side scan lines were opened in CARIS HIPS and SIPS Side Scan Editor. Altitude tracking was examined and manually corrected if necessary. Application of time varied gain was required during post processing to produce a high quality record over different range scales and bottom types. This resulted in a mosaic that displayed high and low backscatter values in a uniform manner.

The side scan record was carefully examined for contacts using slant range corrected data. There were no contacts identified in H-11273.

Contemporary Survey Junctions

The easterly limits of this survey junctions[13] the westerly limits of H-11274 (2005, Scale 1:20,000) (see *Figure 2.*). There was good agreement between the soundings from each survey.[14]

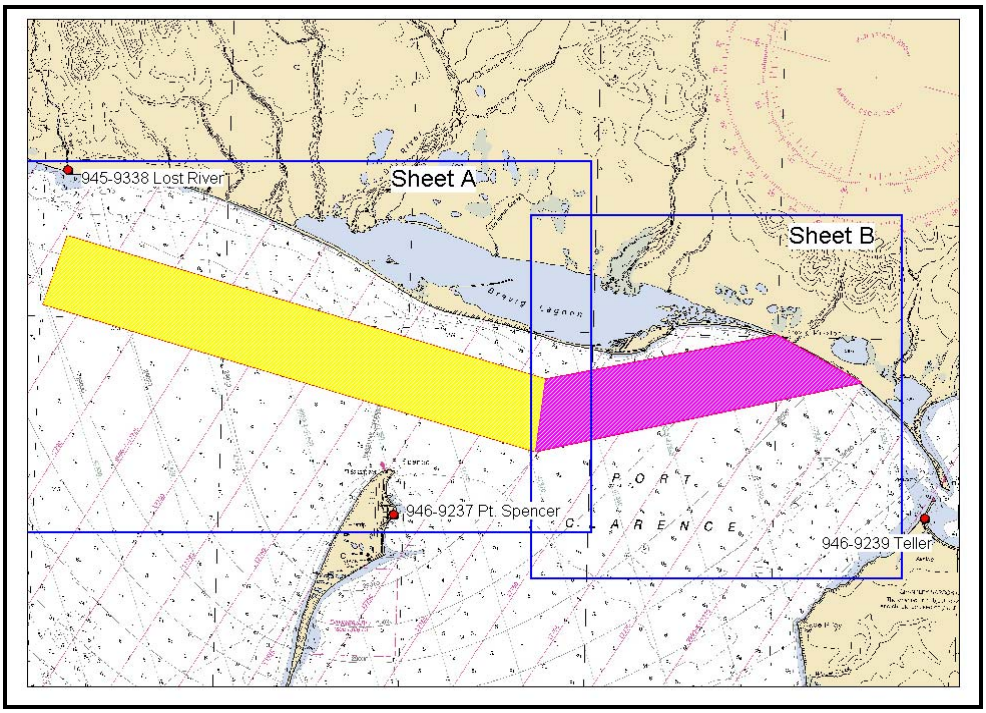


Figure 2. The junction locations of H-11273 and H-11274

Quality Control Checks

Multibeam Sonar, 2005 Season

Nadir Beam versus Lead Line checks were done daily, when practical. The results of the quality control checks are contained in Separate I. *Acquisition and Processing Logs*[15] of this report. There were no unique problems that pertain to this survey. Line acquisition logs are also included in Separate I. and detail the required aspects of quality control for each line.

A detailed discussion of patch tests, data acquisition, and processing is provided in the Data Acquisition and Processing Report (DAPR) for this project.

Sidescan Sonar, 2007 Season

For the 2007 resurvey, daily confidence checks of the side scan sonar operation were conducted by recording a screen shot of the side scan record. The confidence checks were performed when distinctive bottom features (e.g., sand waves) were continuously visible

in the record from the maximum range of one channel to the maximum range of the other channel. A rub test was performed on both channels of the side scan transducer prior to deployment to ensure adequate signal return.

Data for this sheet were collected at 75 and 100m range scale. Refer to "Separate I: ACQUISITION AND PROCESSING LOGS" for range scales for individual lines.

Singlebeam Sonar, 2007 Season

When practical, confidence checks using standardized bar check procedures were performed. The results of these comparisons and the line acquisition logs detailing aspects of quality control for each survey line are contained in "Separate I: ACQUISITION AND PROCESSING LOGS" of this report.

B3. Corrections to Echo Soundings

Hydrographic Survey H-11273 was performed with one other survey in Project OPR-R365-KR-05. Any change to the corrections to echo soundings affects all surveys in the area and is described in the Data Acquisition and Processing Report.

Terra Surveys established three tide gauges for the 2005 survey season. The tertiary tide stations at Teller (946-9239) began collecting data on JD 206, Lost River (946-9338) began on JD 206, and Point Spencer (946-9237) began collecting data on JD206; the hydrographic survey began on JD 209. The survey data collected was reduced using Point Spencer (946-9237) tide station. No tide zones were used for this project. Refer to the Vertical and Horizontal Control Report[16] for the tide report.

C. Vertical and Horizontal Control

This survey was tide corrected using the tertiary tide station Point Spencer (946-9237 Lat 65° 15' 35.81" N and Long 166° 50' 31.16" W). Refer to the Vertical and Horizontal Control Report for methods and operations. Verified final tides were applied to the data after the final extraction from CARIS.[17] There was no zoning applied for this survey.

The horizontal control datum for this survey is North American Datum of 1983 (NAD 83). The projection used during collection was UTM, Zone 3. A temporary control point "TBM2" was established and used as the local differential GPS (DGPS) base station for the entirety of the Approaches to Port Clarence survey and 2007 resurvey projects. The point was a standard aluminum cap, set in the earth with stainless steel drive rod to a depth of 5.3m. The point is located approximately 112m south of Pt. Spencer, 78m north of a 4m day beacon. The central location of this point afforded excellent project-wide differential corrector coverage, with a maximum view of common satellites. A static session was observed for the 2007 resurvey to establish there was no movement.

For the 2007 resurvey, GPS sessions were simultaneously observed between Point Spencer tidal benchmarks and TBM2. RTK height correctors were then applied from TBM2 for the entire resurvey. An Endeco gauge was installed at Point Spencer as a back up and data was collected for 3 hours prior to and 3 hours after the hydrographic data collection. Waterline measurements were observed for one hour prior to and post survey.

The horizontal position for "TBM2" was determined by way of simultaneously observed static GPS survey techniques, tying in three Continuously Operating Reference Station (CORS) monuments. The published values of these monuments can be seen in Table 1 below. NGS data sheet information, acquired from the NGS website, is also included in this report.

Table 1. NGS Published Coordinate Values (NAD83, Geographic)

Point Name	NGS PID	Latitude	Longitude
Prudhoe Bay 2 (CORS)	AJ8056	N 70°15'23.05156"	W 148°20'05.56356"
KEN1 (CORS)	AF9548	N 60°40'30.284"	W 151°21'00.571"
TLKA (CORS)	AH2494	N 62°18'27.556"	W 150°25'12.976"

A static observation of "TBM2"was performed, and processed with simultaneous observations taken from the CORS monuments listed in Table 1. A coordinate was then assigned to "TBM2" and keyed in as the differential base station; this coordinate can be seen in Table 2, and the OPUS processing report can be seen in Appendix B.[18]

Table 2: TBM2 Assigned Coordinate

Monument	Latitude	Longitude
TBM2 2005	65°16’40.62383”	166°50’55.87493”

A summary of the daily DGPS confidence checks can be found in “*Separate I Acquisition and Processing Logs*” included with this report.[19]

D1. Chart Comparison

Local Notice to Mariners Issued and Danger to Navigation Reports

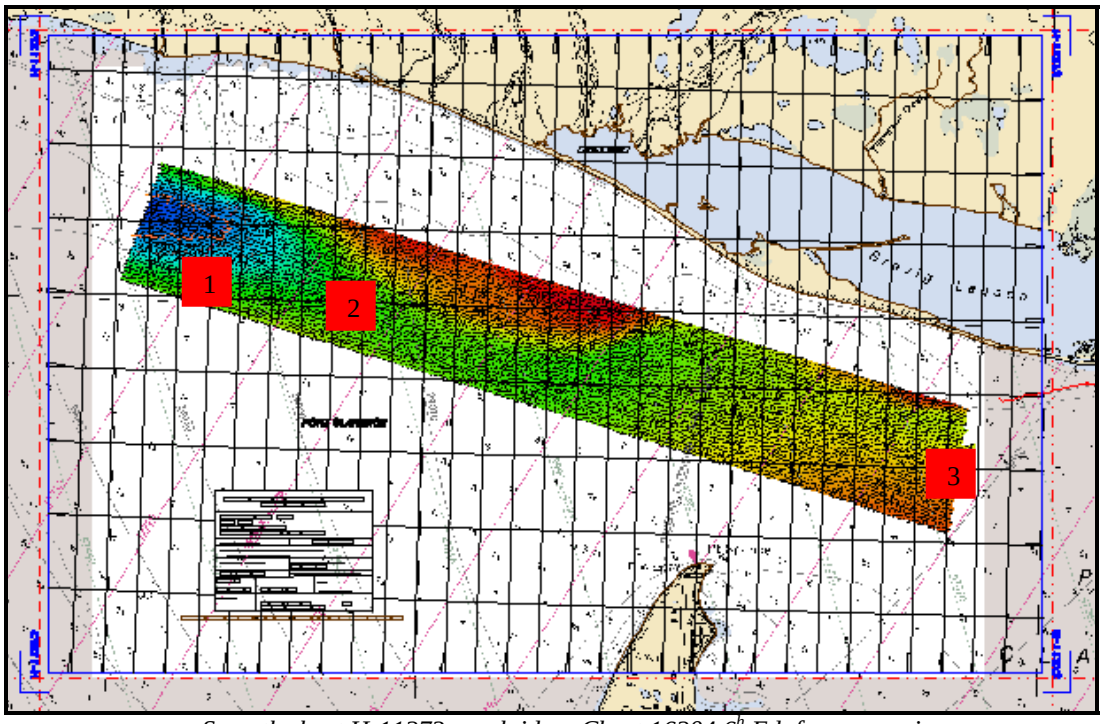
Notice number 38/05, 17th district (September 17, 2005) was the last notice reviewed for this project. There were 3 Local Notice to Mariners that affected this chart. None of the notices were in the survey area.[20]
[21]

This survey was compared in MicroStation to the following charts[22]:

Chart	**Scale**	**Edition**	**Date**
16204	1:100,000	6th	March, 2004
16200	1:400,000	13th	July, 1995

Chart 16204

This survey generally agrees well with the chart.[23] The following pages contain the depth discrepancies found on the smooth sheet.



Smooth sheet H-11273 overlaid on Chart 16204 6h Ed. for comparison

Soundings

The vicinity chart above is referenced to 3 areas in which significant differences were found in the original smooth sheet to chart comparison. During the initial office review of H-11273, a total of six soundings were submitted as Dangers to Navigation (see Appendix 1 of this report for details). After NOAA review, these soundings were not published to the Office of Coast Survey Local Notice to Mariners. The re-editing of H-11273 resulted in deeper soundings than those initially reported (described in "Section B2. Quality Control" of this report). Therefore, the differences between charted depths and reported depths have lessened from those originally submitted. The following chartlets describe the originally reported soundings, re-edited soundings and their comparison to charted soundings.[24] The hydrographer recommends updating the next edition of the chart with soundings from the re-edited 2005 survey.[25]

Area 1

Initial Smooth Sheet

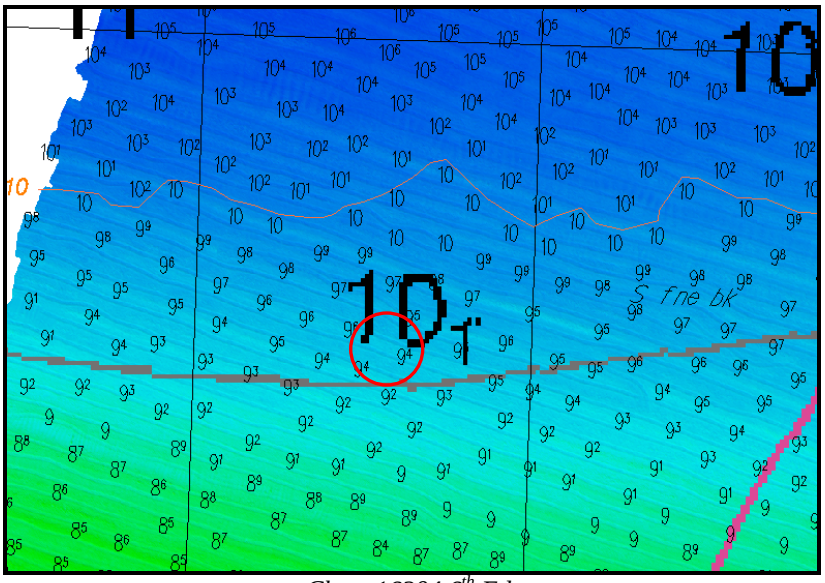


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

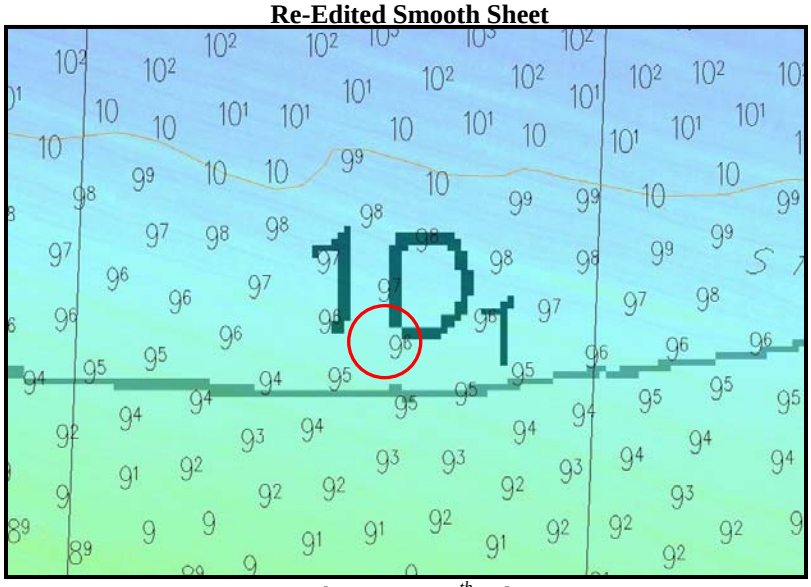


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 36” Longitude W 167° 08’ 23”, 2005 soundings were initially reported as shoaler than charted soundings by up to 4.6 feet. After re-editing, these soundings are shoaler than charted soundings by up to 3.4 feet.[26] The hydrographer recommends updating the next chart edition with soundings from the re-edited 2005 survey.[27]

Initial Smooth Sheet

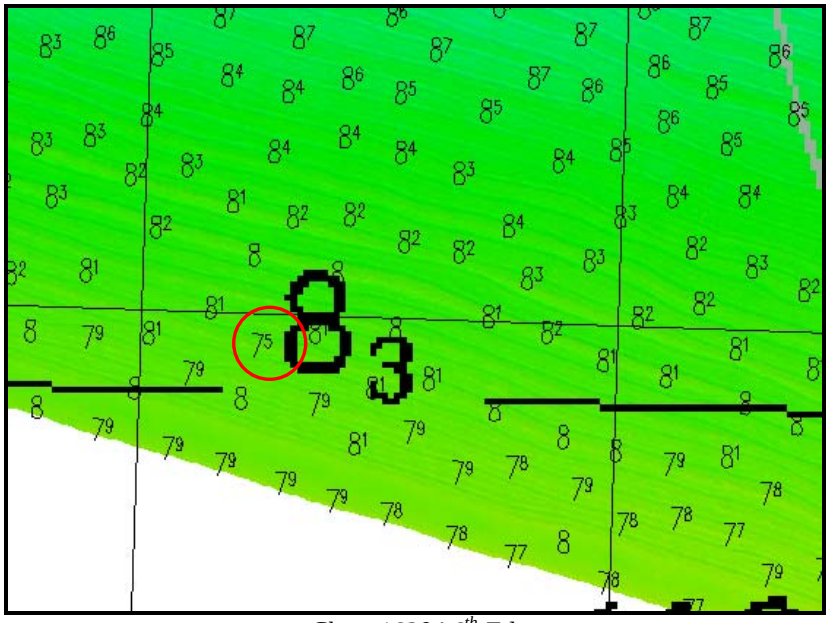


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

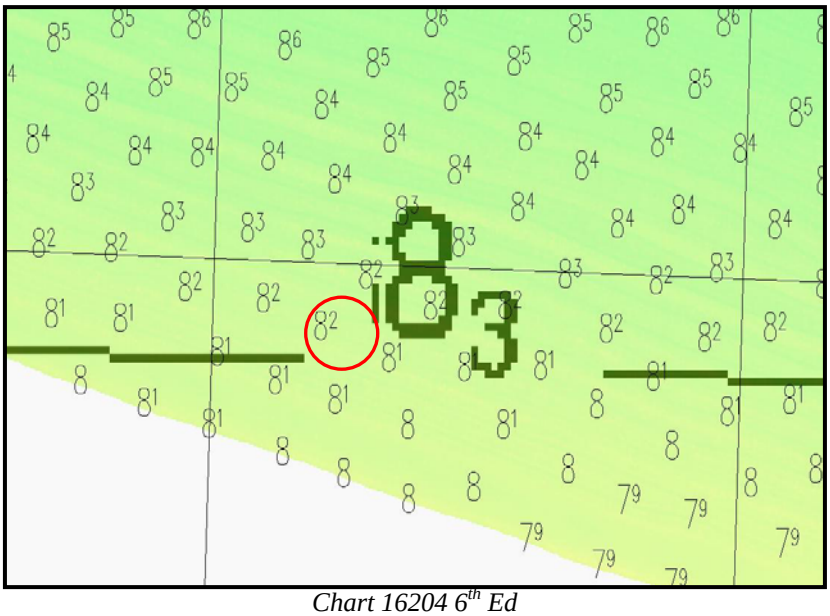


Chart 16204 6th Ed

In the vicinity of Latitude N 65° 19’ 58” Longitude W 167° 06’ 45”, 2005 soundings were initially reported as shoaler than charted soundings by up to 6 feet. After re-editing, these soundings remain shoaler than charted soundings by up to 1.8 feet.[28] The hydrographer recommends updating the next chart edition with soundings from the re-edited 2005 survey.[29]

Area 2

Initial Smooth Sheet

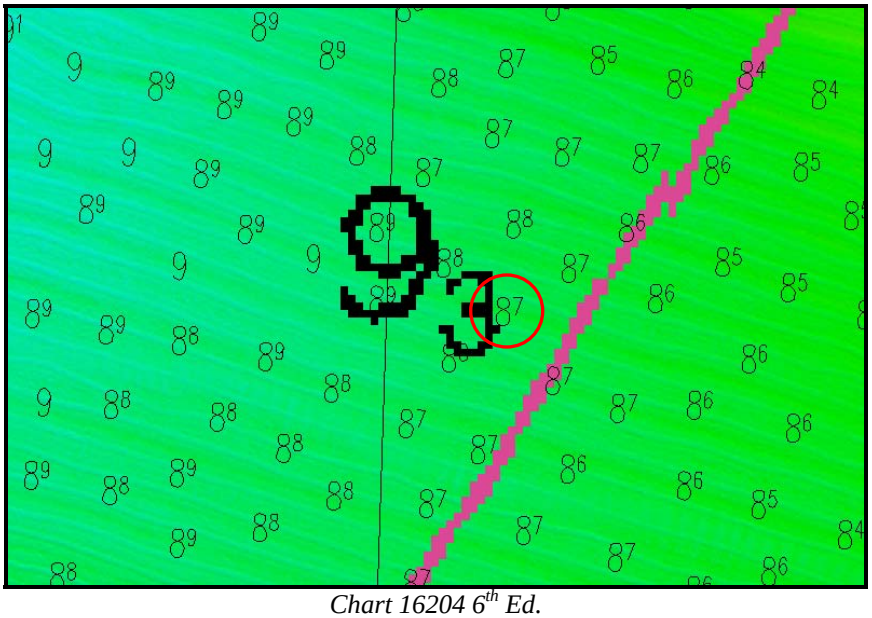


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

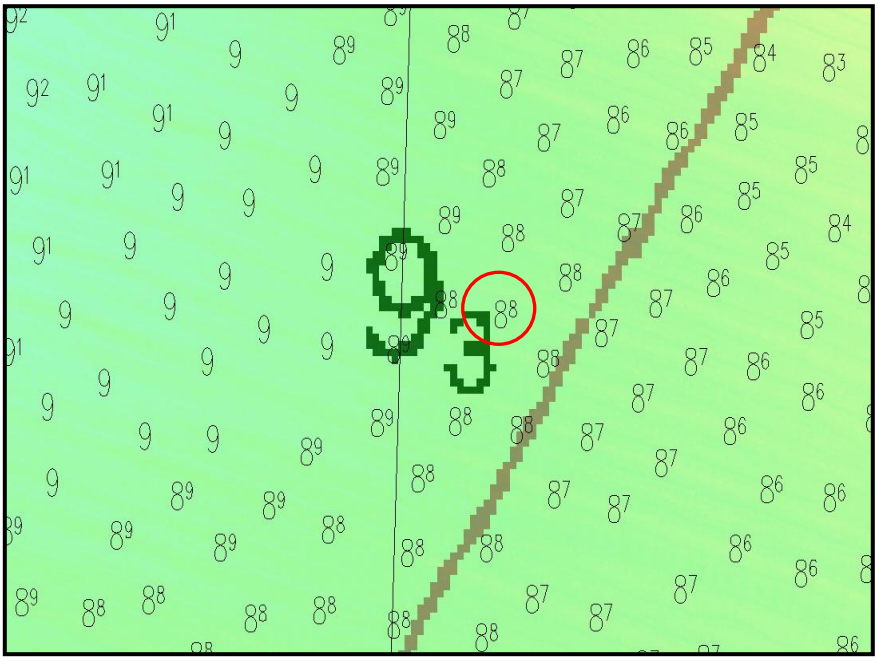


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 29” Longitude W 167° 03’ 48”, 2005 soundings were initially reported as shoaler than charted soundings by up to 4.8 feet. After re-editing, these soundings are shoaler than charted soundings by up to 4.2 feet.[30] The hydrographer recommends updating the next chart edition with soundings from the re-edited 2005 survey.[31]

Initial Smooth Sheet

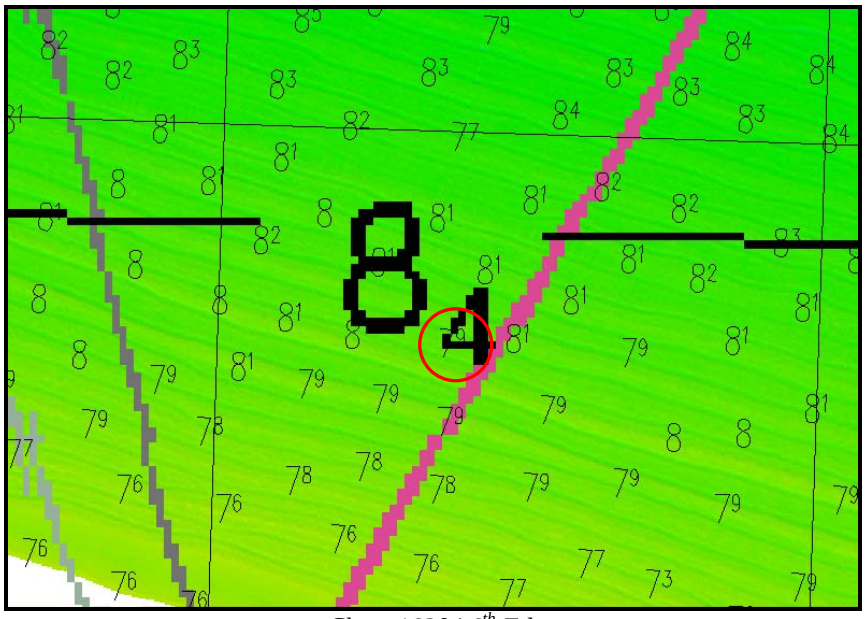


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

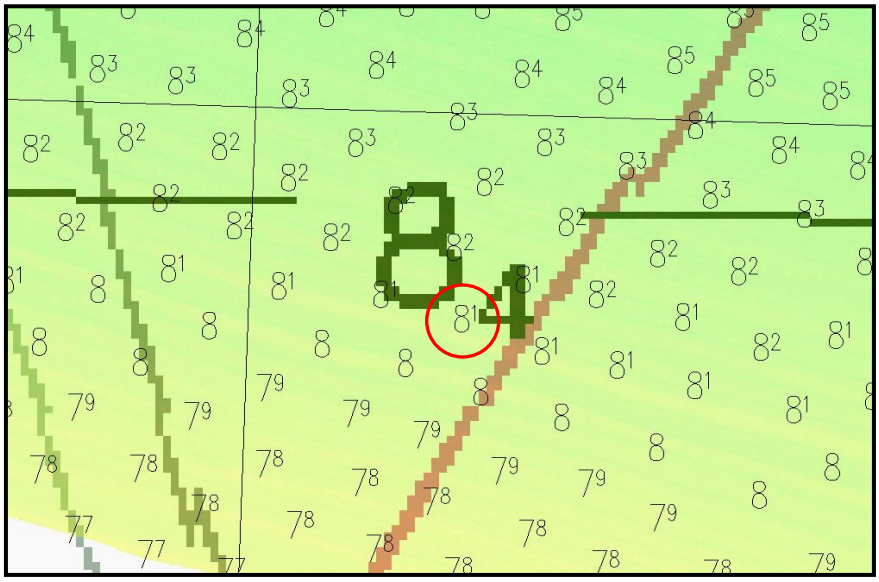


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 19’ 51” Longitude W 167° 04’ 37”, 2005 soundings were initially reported as shoaler than charted soundings by up to 4.6 feet. After re-editing, these soundings are shoaler than charted soundings by up to 3.4 feet.[32] The hydrographer recommends updating the next chart edition with soundings from the re-edited 2005 survey.[33]

Area 3

Initial Smooth Sheet

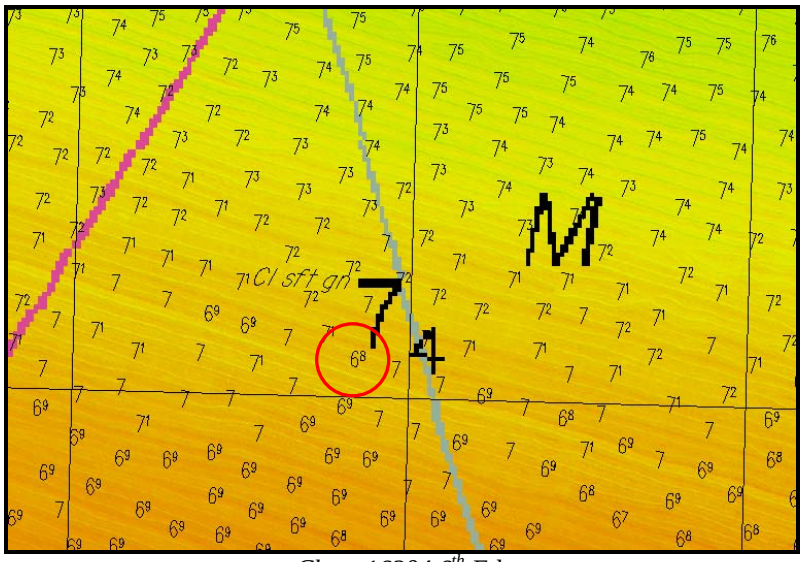


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

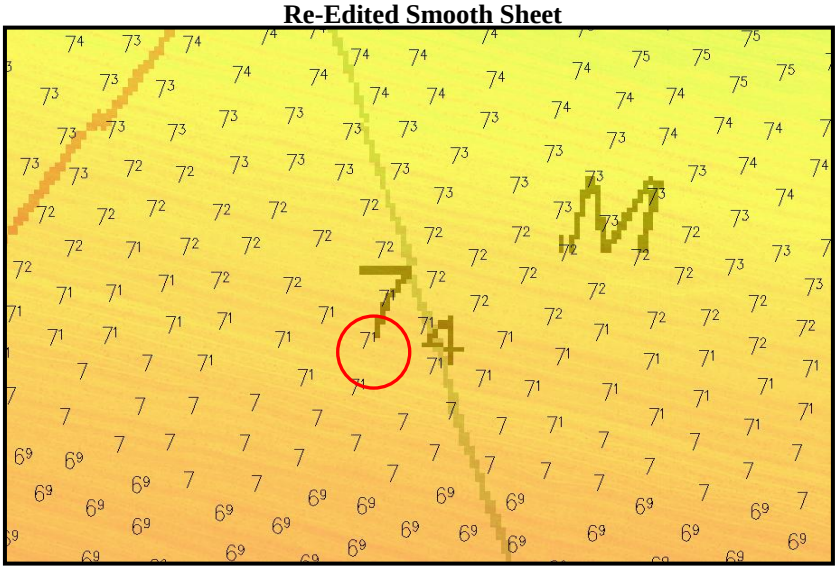


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 18’ 02” Longitude W 166° 44’ 09”, 2005 soundings were initially reported as shoaler than charted soundings by up to 5.2 feet. After re-editing, these soundings are shoaler than charted soundings by up to 3.4 feet.[34] The hydrographer recommends updating the next chart edition with soundings from the re-edited 2005 survey.[35]

Trends and Changeable Areas

The following chartlets describe areas in which 2005 contours are significantly different from charted contours in the same area. The re-editing of H-11273 resulted in deeper soundings than those initially reported (described in "Section B2. Quality Control" of this report). Therefore, the positions of contours originally reported have changed slightly. The following chartlets describe the originally reported contours, currently reported contours and their comparison to charted contours.[36] The hydrographer recommends updating the next chart edition with contours from the re-edited 2005 survey.[37]

Initial Smooth Sheet

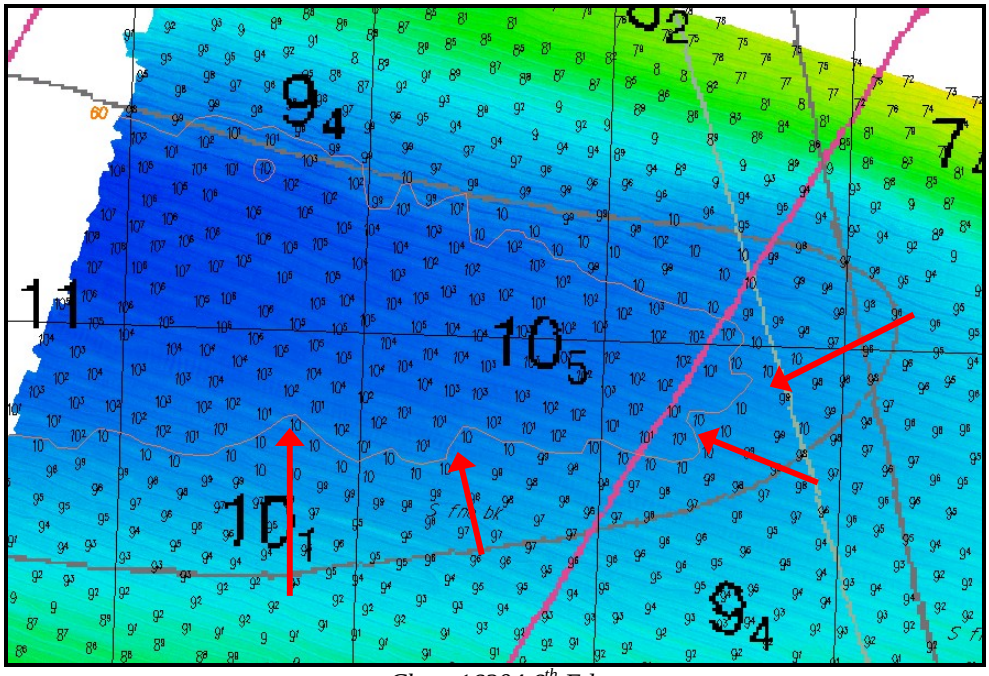


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

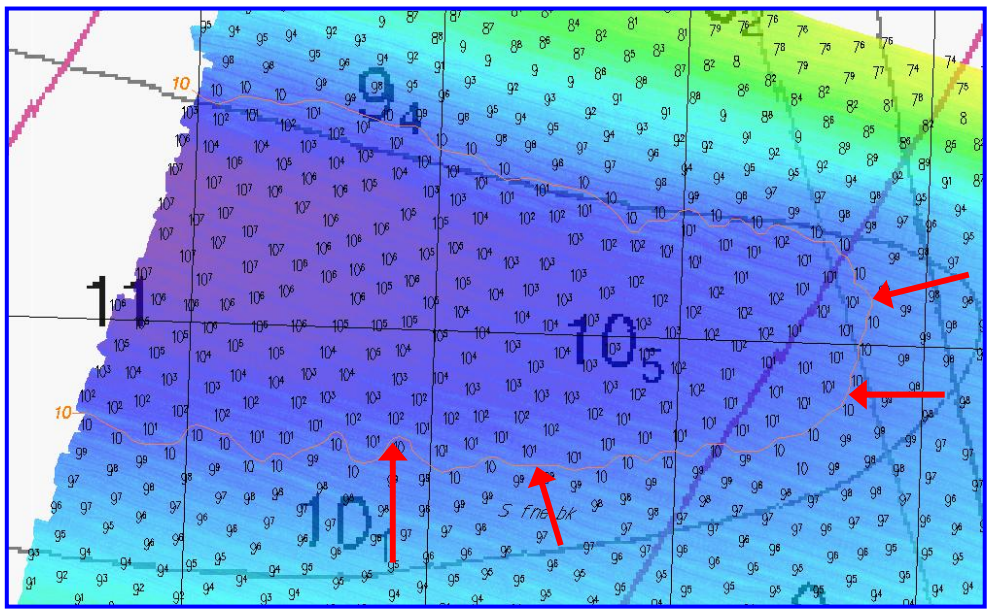


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 57” and Longitude W 167° 06’ 18” initial smooth sheet soundings show the east end of the 10 fathom contour has migrated westward by as much as 350 meters.[38] The south side of the 10 fathom contour has migrated northward by as much as 450 meters.[39] After re-editing, this trend continues. The hydrographer recommends updating the next chart edition by using the contours from the re-edited 2005 survey.[40]

Initial Smooth Sheet

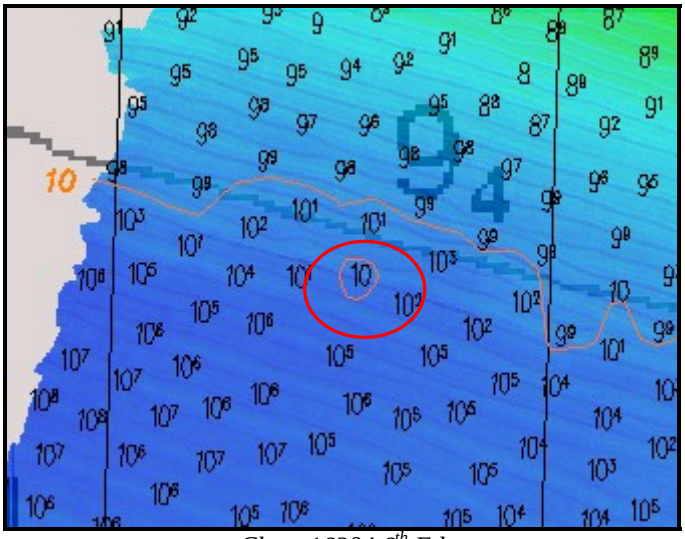


Chart 16204 6th Ed

Re-Edited Smooth Sheet

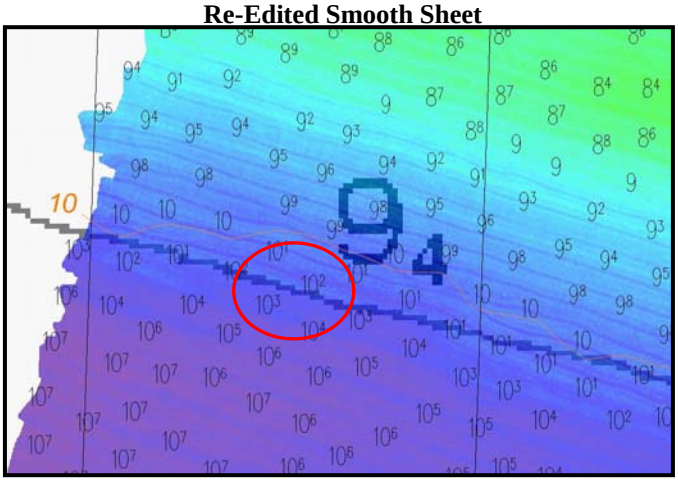


Chart 16204 6th Ed

In the vicinity of Latitude N 65° 21’ 17” and Longitude W 167° 08’ 26”,” initial smooth sheet soundings show a ten fathom contour not previously charted. After re-editing, this contour no longer exists. The hydrographer does not recommend adding a ten fathom contour in this area.[41]

Initial Smooth Sheet

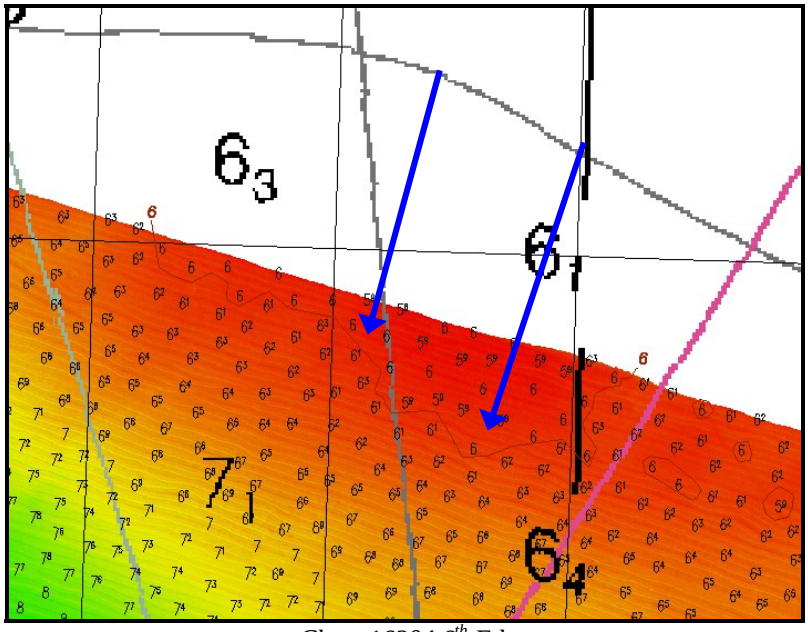


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

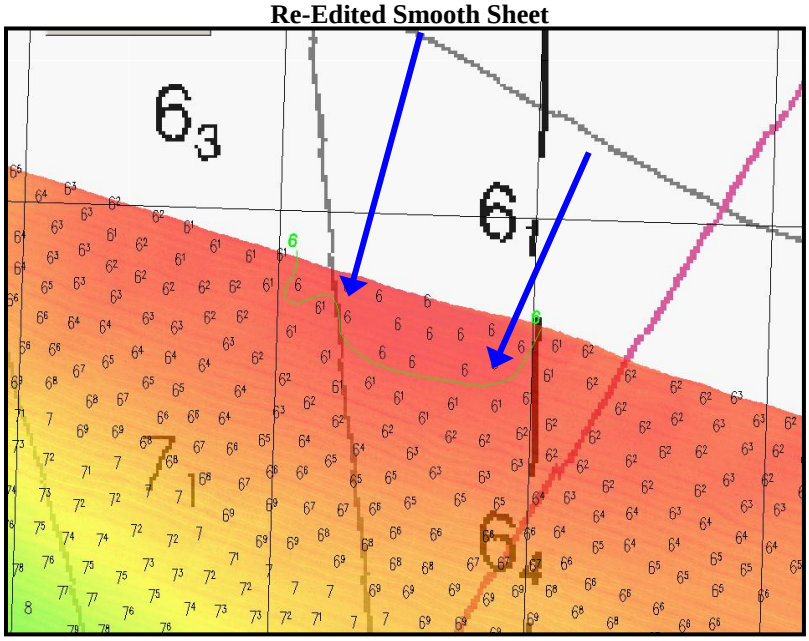


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 46” and Longitude W 167° 00’ 22” initial smooth sheet soundings show the 6 fathom contour has migrated southward by as much as 1000 meters.[42] After re-editing, this trend continues. The hydrographer recommends updating the next chart edition using contours from the re-edited 2005 survey.[43]

Initial Smooth Sheet

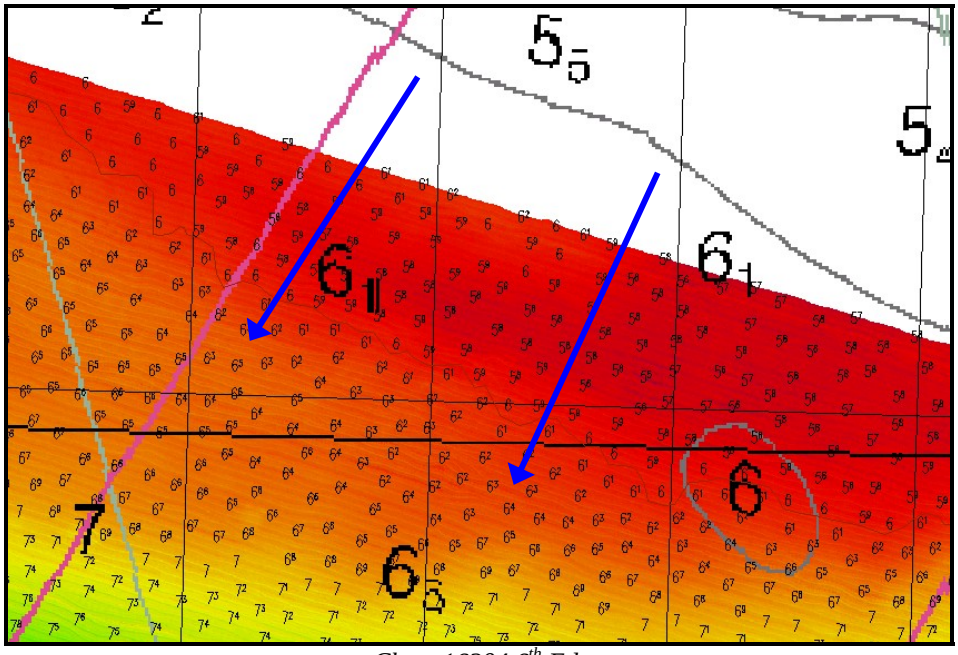


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

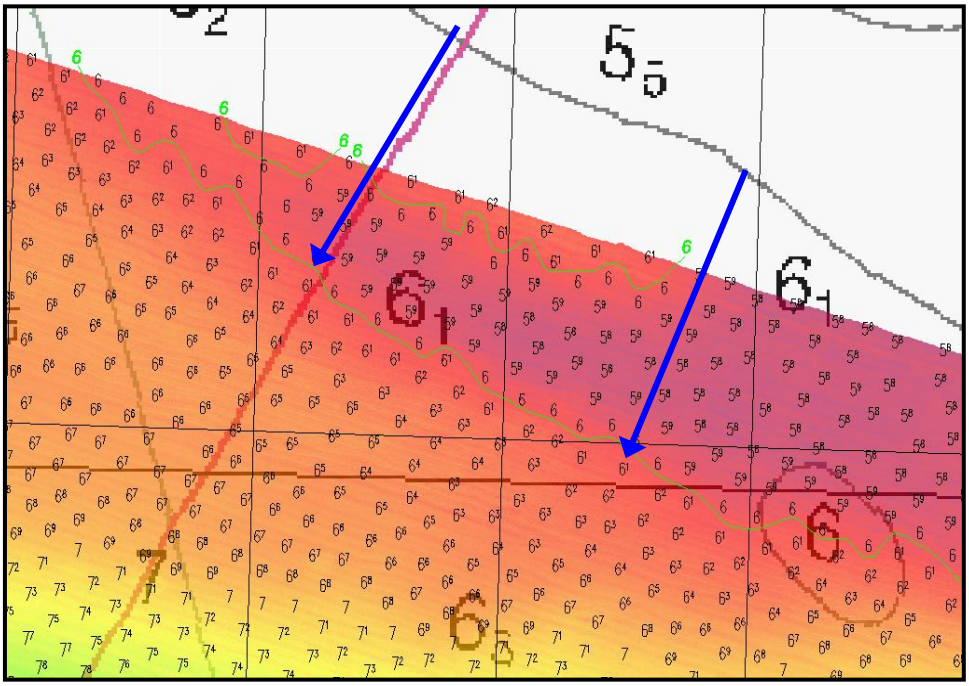


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 07” and Longitude W 166° 55’ 18” initial smooth sheet soundings show the 6 fathom contour has migrated southwestward by as much as 850 meters.[44] After re-editing, this trend continues. The hydrographer recommends updating the next chart edition by using contours from the re-edited 2005 survey.[45]

Initial Smooth Sheet

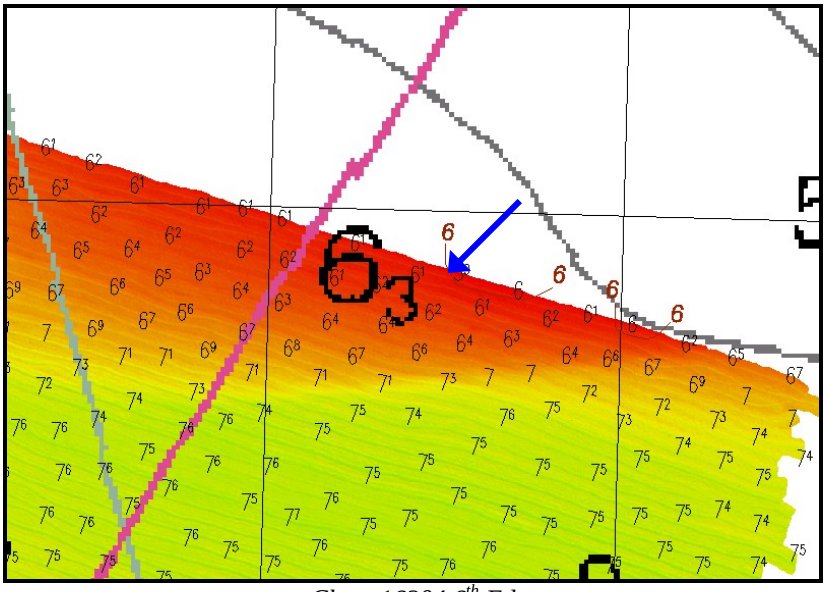


Chart 16204 6th Ed

.

Re-Edited Smooth Sheet

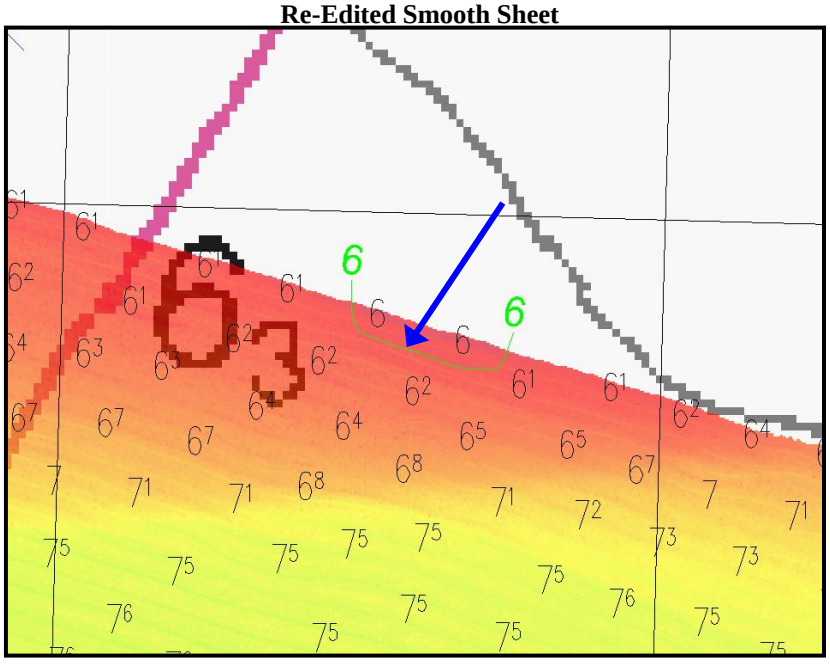


Chart 16204 6th Ed

In the vicinity of Latitude N 65° 18’ 55” and Longitude W 166° 43’ 27” initial smooth sheet soundings show the 6 fathom contour has migrated southward by as much as 250 meters.[46] After re-editing, this trend continues. The hydrographer recommends updating the next chart edition by using contours from the re-edited 2005 survey.[47]

Initial Smooth Sheet

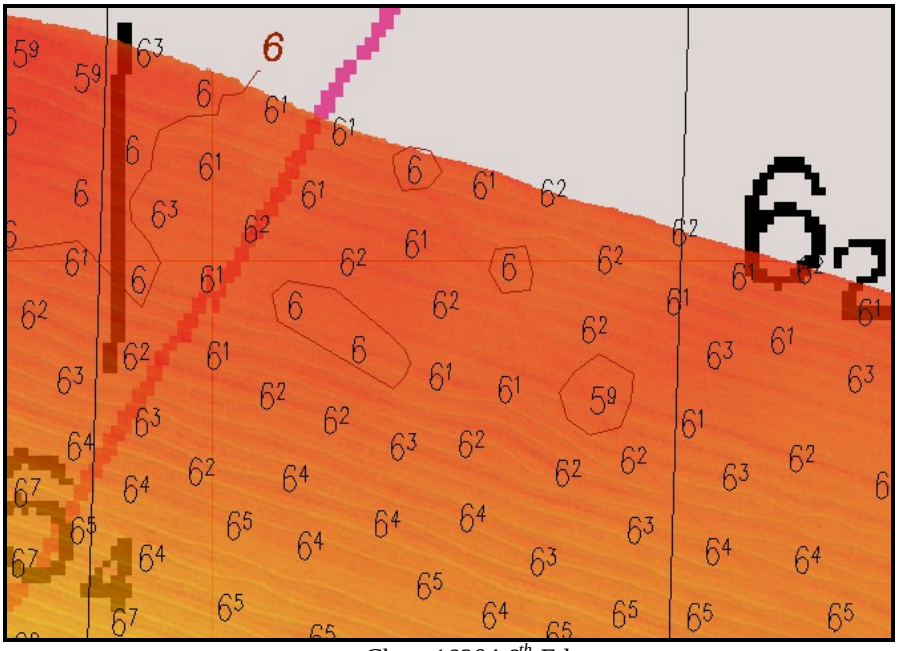


Chart 16204 6th Ed.

Re-Edited Smooth Sheet

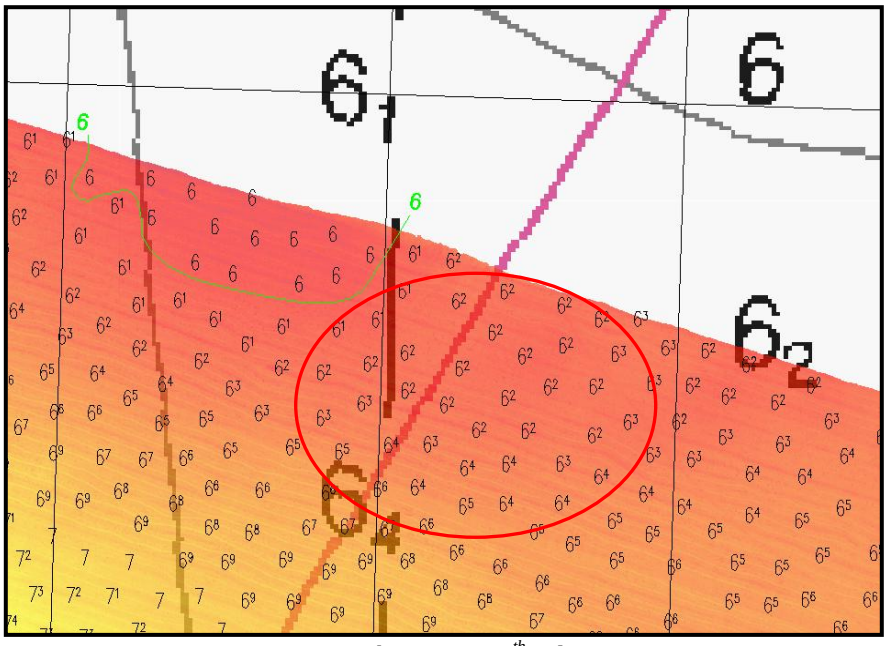
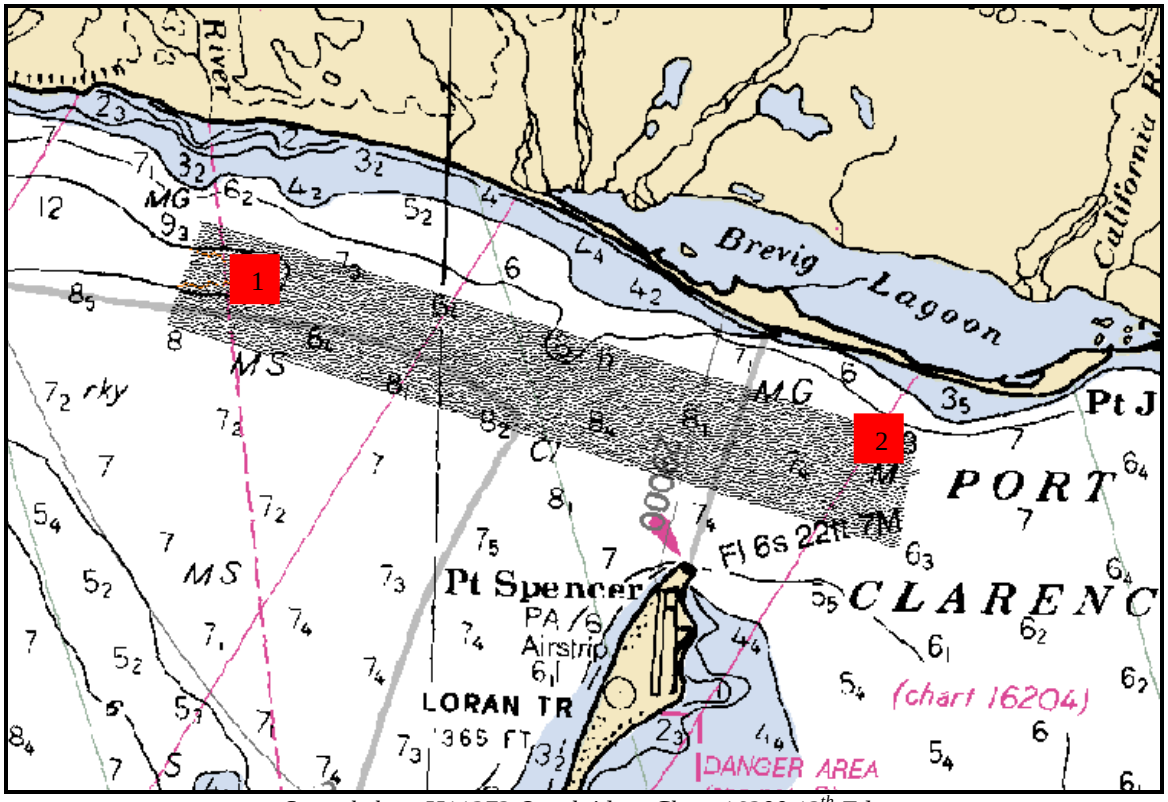


Chart 16204 6th Ed.

In the vicinity of Latitude N 65° 20’ 38” and Longitude W 166° 59’ 24”, initial smooth sheet soundings show six fathom contours not previously charted. After re-editing, these contours no longer exist. The hydrographer does not recommend adding six fathom contours in this area.[48]

Chart 16200 13th Edition



Smoothsheet H11273 Overlaid on Chart 16200 13th Ed.

Due to the small scale of this chart, it compares relatively well with the 2005 survey. The vicinity chart above is referenced to two areas in which significant differences were found in the comparison. The re-editing of H-11273 resulted in deeper soundings than those initially reported (described in "Section B2. Quality Control" of this report). Therefore, the differences between charted depths and reported depths have lessened from those originally submitted.[49] The hydrographer recommends updating the next edition of the chart with soundings from the re-edited 2005 survey.[50]

D2. Additional Results

No additional results are reported for survey H-11273[51].

LETTER OF APPROVAL
REGISTRY NO. H-11273

This Report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of survey H-11273 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report, smooth sheet, digital data, and accompanying records have been closely reviewed and are considered complete and adequate as per the Statement of Work. Other reports submitted with this survey include Data Acquisition and Processing Report, Vertical and Horizontal Report, and the Shoreline Verification Field Notes.

I believe this survey is complete and adequate for its intended purpose.

Lamar Gates, Hydrographer
Terra Surveys, LLC

Date 5-9-06

Revisions Compiled During Office Processing

[1] Strikethrough ~~June~~, replace with July.
[2] Strikethrough ~~July~~, replace with June.
[3] Strikethrough ~~July 28~~, replace with April.
[4] Concur with clarification. The final (revised) smooth sheet shows a maximum depth of 10.7 fathoms.
[5] Strikethrough ~~above datum.~~
[6] Concur with clarification. H11273 was resubmitted after the 2007 resurvey. See B2. Quality Control as part of this report and endnote 10.
[7] Strikethrough ~~smoothsheets~~, replace with smooth sheet.
[8] Filed with the project reports.
[9] Strikethrough ~~exist~~, replace with existed.
[10] Concur. PHB review found the resubmitted data for survey H11273 adequate to supersede all prior surveys and charted miscellaneous source data in the common areas except as noted in this report and the H-drawing.
[11] Filed with the hydrographic records.
[12] Strikethrough ~~allow~~, replace with allowed.
[13] Insert “with”.
[14] Concur. Soundings within the junction area of H11273 and H11274 agreed to within 0.1 fathom or less.
[15] Filed with the hydrographic data.
[16] Filed with the project reports.
[17] For further information, see Field and Final Tide Note attached to this report.
[18] Attached to the Vertical and Horizontal Control Report.
[19] Filed with the hydrographic records.
[20] Concur
[21] The rest of the page is intentionally left blank.
[22] In office processing, H11273 was also compared with Chart 16204, 6th Edition, continuous maintenance raster dated 4/1/08.
[23] Concur with clarification. An error in shoreline digitization on the smooth sheet resulted in smooth sheet misalignment of roughly 130-150 meters off the raster grid for the chart comparison, as can be seen from the chartlets on the following pages. Discussion with the hydrographer confirmed the misalignment in the chart comparison. However, this error did not affect the data. A corrected chart comparison in PHB during office processing showed a general shoaling trend of 1-4 feet throughout the survey area with Chart 16204, 6th Edition, continuous maintenance raster dated 4/1/08. Details are discussed in the following endnotes.
[24] As discussed above, the charlets display an incorrect smooth sheet offset from the raster grid. Chart soundings as shown on the smooth sheet and H-drawing.
[25] Concur.
[26] The charted sounding of 10 fm 1 ft is at approximately Latitude N 65° 20’ 44” Longitude W 167° 08’ 23”. After smooth sheet repositioning, the shoalest survey sounding in the vicinity is 9 fm 4 ft, approximately 3 feet shoaler than charted. Chart according to the smooth sheet.
[27] Concur.
[28] The charted sounding of 8 fm 3 ft is at approximately Latitude N 65° 20’ 04” Longitude W 167° 06’ 38”. After smooth sheet repositioning, the shoalest survey

sounding in the vicinity is 8 fm 2 ft, approximately 1 foot shoaler than charted. Chart according to the smooth sheet.
[29] Concur.
[30] The charted sounding of 9 fm 3 ft is at approximately Latitude N 65° 20' 36" Longitude W 167° 04' 00". After smooth sheet repositioning, the shoalest survey sounding in the vicinity is 8 fm 8 ft, approximately 4 feet shoaler than charted. Chart according to the smooth sheet.
[31] Concur.
[32] The charted sounding of 8 fm 4 ft is at approximately Latitude N 65° 19' 59" Longitude W 167° 04' 45". After smooth sheet repositioning, the shoalest survey sounding in the vicinity is 8 fm 3 ft, approximately 1 foot shoaler than charted. Chart according to the smooth sheet.
[33] Concur.
[34] The charted sounding of 7 fm 4 ft is at approximately Latitude N 65° 18' 11" Longitude W 166° 44' 06". After smooth sheet repositioning, the shoalest survey sounding in the vicinity is 7 fm 2 ft, approximately 2 feet shoaler than charted. Chart according to the smooth sheet.
[35] Concur.
[36] Concur with clarification. Due to the previously discussed smooth sheet offset in the chart comparison, chartlets displayed on the following pages do not accurately reflect final contours in relation to charted contours. The offset does not affect the data. Details of the corrected chart comparison in PHB processing are discussed in the following endnotes. Chart contours as shown on the smooth sheet and H-drawing.
[37] Concur.
[38] Concur.
[39] The corrected chart comparison shows maximum northward movement of the 10 fm curve to be approximately 330 m. Chart as shown on the smooth sheet.
[40] Concur.
[41] Concur. Chart as shown on the smooth sheet.
[42] Concur with clarification. Since the area north of approximately Lat 65/20/56 N, Lon 167/0/55 W to the charted 6 fm curve at Lat 65/21/24 N was not included in survey H11273, it is unknown whether the 6 fm curve has moved or the survey found a new, islolated 6 fm curve. Retain unsurveyed area as charted and chart new 6 fm curve as shown on the Hdrawing.
[43] Concur.
[44] Concur with clarification. Survey data indicated that some areas of the 6 fm curve in this vicinity have moved southwestward from the charted curve, but survey data also support charted areas deeper than 6 fathoms that fall north of the H11273 surveyed curve. Chart as shown on the smooth sheet and H-drawing.
[45] Concur.
[46] Concur. Chart as shown on the smooth sheet and H-drawing.
[47] Concur.
[48] Concur.
[49] Concur with clarification. Vicinity 1 is a charted sounding of 10 fm 5 ft at Lat 65/21/04 N, Lon 167/07/19 W, where H11273 found a depth of 10 fm 2 ft. Vicinity 2 is a charted sounding of 8 fm at Lat 65/18/43, Lon 166/42/49, where H11273 found a depth of 7 fm 3 ft. Chart as shown on the smooth sheet.

[50] Concur. Chart all areas as shown on the smooth sheet and H-drawing.
[51] The evaluator feels that the survey area in the vicinity of Port Clarence may be shoaling due to siltation deposits originating from several rivers that empty into this area. However, due to the limited amount of contemporary survey work conducted in 2005 it is difficult to base any kind of accurate conclusion. Additional work is recommended as resources allow.

2005 FIELD and FINAL TIDE NOTE
Hydrographic Sheet: H11273
Sheet A
Port Clarence
Seward Peninsula, Alaska

NOAA Project No:	OPR-R365-KR-05 Port Clarence, Alaska				
NOAA Contract No:	DG133C04CQ0006				
The NOS Nome, Norton Sound (946-8756) served as a control for the subordinate station on the project. Datum determinations were made for the tertiary subordinate station Pt. Spencer (946-9237). The NTDE 1983-2001 was utilized.					
Location and Time Meridian	Name:	Lat (NAD83)	Long (NAD83)	Time Meridian:	
	Pt. Spencer	65° 15' 30" N	166° 50' 50" W	0° (UTC)	
Time Period and Datum Reference	Name:	Established:	Removed:	MLLW	MHW
	Pt. Spencer	7/22/2006	9/3/2006	1.382	0.401
Tide Observer	Terra Surveys, LLC 1930 South Whiting Circle Palmer, Alaska 99645 (907) 745-7215				
Gauges	Design Analysis Ass. H350XL/355 bubbler systems.				
Install Type	Tide gauges were housed in a plastic structure located above the beach line on a sandy berm. The orifice for gauge A was attached to a 1m x 1m anchor weighing 750lbs. The orifice for guage B was attached to a 0.3m diameter steel disk weighing approximately 250lbs. Both anchors were set in 5.5m of water. The anchors were set approximately 80m offshore using the R/V Peregrine. The tubing from each orifice to the respective gauge is approximately 120m in length.				
Tide Staff	No tide staff was installed. 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.				
Bench Marks	The following bench marks were installed at this site: 9237A 2005, OBM RM 2 1945, OBM July 1944 The following bench marks were recovered at this site: Pt. Spencer: NO 1 1950, NO 2 1950, NO 3 1950,				
Levels	Bench marks were levelled at the installation and removal of the tidal stations. The bench marks and station datums were connected through frequent water level measurements. The level runs closed within NOS tolerance.				
Final Tides	This survey was tide corrected using the Pt. Spencer (846-9237) tide data.				
Reduction of Hydrographic Data	Six minute tide data were reduced to MLLW and applied after the final extraction from CARIS.				

APPROVAL SHEET
H11273

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: 5/14/2008

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.

Gary C. Nelson for Date: 5/22/2008

David O. Neander
CDR, NOAA
Chief, Pacific Hydrographic Branch

Mark Lathrop

Digitally signed by Mark Lathrop
DN: cn=Mark Lathrop, c=US, o=NOAA, ou=HSD, email=mark.t.lathrop@noaa.gov
Reason: AWOIS/Surf Check
Date: 2008.07.09 10:20:36 -04'00'

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. #11273

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
16204	4/1/08	Beth Taylor	Full Part ~~Before After Marine~~ Center Approval Signed Via Application
			~~Drawing No.~~ of soundings, features and
			curves from the 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
			Drawing No.
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.