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

DESCRIPTIVE REPORT

Type of Survey **Hydrographic Survey**

Field No. **H11837**

Registry No. **OPR-P385-TE-08**

LOCALITY

State **Alaska**

General Locality **Northern Cook Inlet**

2008

CHIEF OF PARTY
Kathleen Mildon

LIBRARY & ARCHIVES

DATE **November 2009**

NOAA FORM 77-28 (11-72)

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

REGISTRY No

HYDROGRAPHIC TITLE SHEET

OPR-P385-TE-08

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. **H11837**

Alaska **State**

General Locality Northern Cook Inlet

Sub-Locality Knik Arm to Point MacKenzie

N/A **Scale**

Date of Survey August 1– August 13, 2008

Instructions dated March 3, 2008

Project No. OPR-P385-TE-08

Vessel *R/V Mt. Augustine*

Katie **Chief of party** Mildon

TerraSond **Surveyed by** Ltd.

Multib **Soundings by echo sounder, lead line, pole** eam Echosounder

N/A **Graphic record scaled by**

N/A **Graphic record checked by**

Automated Plot N/A

Verification by ***Atlantic Hydrographic Branch***

Soundings in fathoms feet at MLW MLLW Meters at MLLW

REMARKS: Contract No.: DG133C-05-CQ-1079

Contractor: TerraSond Ltd. All times recorded in UTC

1617 South Industrial Way, Suite 3

Palmer, AK 99645 ***Office comments in red, bold, italic***

DESCRIPTIVE REPORT
OPR-P385-TE-08

Anchorage, AK, as seen from H11837

Registry Number: **H11837**

Vessel: ***R/V Mt. Augustine***

Survey: **A**

State: **Alaska**

General Locality: **Northern Cook Inlet**

Sublocality: **Knik Arm to Point MacKenzie**

Survey Dates: **August 1 – August 13, 2008**

Lead Hydrographer: **Kathleen Mildon**

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APPENDICES

SEPARATES

A. AREA SURVEYED

A navigable area survey was conducted in Northern Cook Inlet, Alaska in accordance with the NOAA, National Ocean Service, Statement of Work, Shallow Water Multibeam Sonar and Side Scan Sonar Services, OPR-P385-TE-08, dated March 3, 2008. ***Concur with clarification. Revised SOW (see Attachment #6 dated 12 July 2008) was sent to AHB by DACB on 12 February 2010.***

The purpose of this project was to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area. The project area was adjacent to Anchorage at the southern terminus of the Knik Arm of the Cook Inlet estuary, approximately 5.8 square nautical miles in area and 5 nautical miles in length.

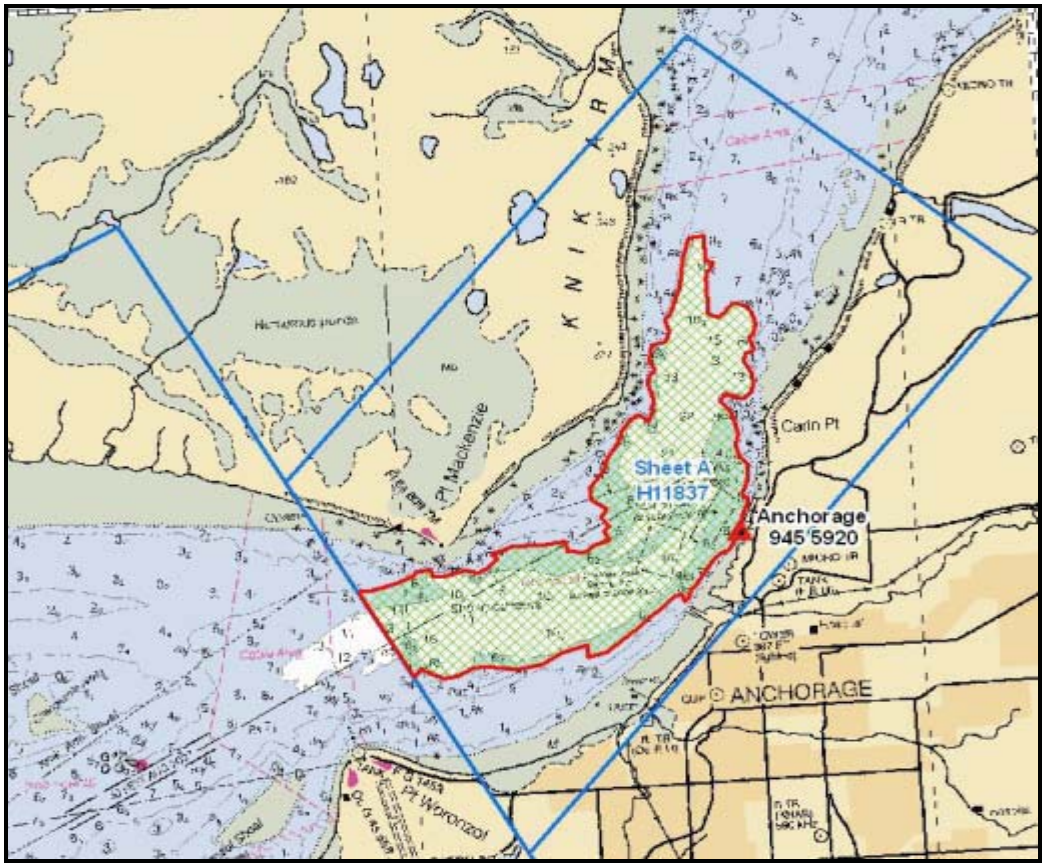


Figure 1 – Overview of H11837 with Chart 16663, 8th Edition, March 2006. Soundings in fathoms.

The Upper Cook Inlet includes several offshore oil and gas production fields, as well as numerous oil and gas pipelines running throughout Cook Inlet. The inlet splits into two branches at Point Campbell, Knik Arm and Turnagain Arm, both well known for their abundance of silt and strong tides, making marine navigation difficult. Cook Inlet supports a strong commercial fishing infrastructure and an active annual tourist draw, as well as national and international shipping traffic. Shipping traffic can include crude oil, refined oil products, and liquefied natural gas. The frequency and density of high-risk marine traffic limited by winter ice conditions, shallow depth waterways, dynamic

seafloor profiles, and powerful tides and currents demand the most accurate and up-to-date navigational charts to operate in a safe and efficient manner.

The Port of Anchorage and the ships that use it rely heavily on the accuracy of the nautical charts for this area.

Coverage, consisting of set line spacing of 90 meters with shallow-water multibeam echosounder, was achieved within the limits of hydrography for this survey. The multibeam imagery was used to locate and determine the least depth over obstructions and shoals as well as to determine the least depths over the entire project area. This survey has a maximum depth of 57.5 meters and a minimum depth of 0.1 meters below the Mean Lower Low Water (MLLW) tidal datum. There were a total of 8 bottom samples collected at a 2,000 meter interval. Refer to Appendix V* Supplemental Survey Records & Correspondence for the bottom sample table. ***Appended to this report***

For H11837 survey limits, refer to Figure 1 on the preceding page.

DATA ACQUISTION AND PROCESSING

A.1. Equipment

Bathymetry for this survey was acquired using the hydrographic survey vessel *Mt. Augustine.*

R/V Mt. Augustine

The *R/V Mt. Augustine* is an aluminum hull vessel, 10.2 meters length overall with a 3.3 meter beam and a 0.9 meter draft. Major systems used on *Mt. Augustine* are listed in Table 1.

VESSEL Mt. Augustine LOA: 10.2m, BEAM 3.3m, DRAFT: 0.9m	
Equipment	**Manufacturer & Model**
Multibeam sonar	Reson SeaBat 8101
Side Scan Sonar	EdgeTech 4200FS
Positioning	Applanix POS M/V
Sound speed	Applied Microsystems SV Plus & SV Plus (V2)
Vessel attitude	Applanix POS M/V

Table 1 - Major systems used aboard the *R/V Mt. Augustine*.

Equipment performance details are provided in the Data Acquisition and Processing Report (DAPR) *, Sections *A. Equipment* and *B. Quality Control*. ***Submitted with H-Cell Deliverable***

A.2. Quality Control

A.2.1. Side Scan Sonar

Side scan sonar data collection was not required in this Sheet. ***Concur with clarification. The submitted SOW dated 12 July 2008 required 100 and 200% side scan coverage for Project OPR-P385-TE-08. AHB received the revised revision of the SOW from DACB on the 12 February 2010. Side scan is available for this survey.***

A.2.2. Shallow Water Multibeam

No conditions with the potential for adversely affecting data integrity were encountered with the multibeam suite used during this survey.

Multibeam confidence checks were conducted on the *R/V Mt. Augustine* to verify proper operation of the multibeam suite on a weekly basis, weather permitting. The confidence checks were performed by comparing nadir beam depths with lead line depths or alternatively by comparing soundings collected on the *R/V Mt. Mitchell* with those collected by the *R/V Mt. Augustine* at the same location.

Uncertainty surfaces were built in CARIS Hips and Sips; the uncertainty child layer was analyzed to verify the quality of the data in the surface. Very little data did not meet the IHO Order 1 specifications. These were generally single outer beams and were not grouped in areas. Upon review they were kept as acceptable data.

Sound speed profiles were taken as deep as possible and were geographically distributed within the survey area to meet the criteria specified in NOS Hydrographic Surveys Specifications and Deliverables. Sound speed profiles extended to 95% of the anticipated water depth and are representative of local and diurnal variability. No data quality issues related to speed of sound measurements were encountered during the survey. ***Concur with clarification. Submitted SVP file was not edited to reflect the survey boundaries; however, no casts were without the project limits and did not result in any SVP artifacts.***

A detailed discussion of multibeam system calibrations, patch tests, sound speed, data acquisition, and processing is provided in the DAPR*. ***Submitted with H-Cell Deliverable***

A.2.3. Crosslines

116 mainscheme lines totaling 132.9 lineal nautical miles and 6 crosslines totaling 7.4 lineal nautical miles of crosslines were run during the 2008 survey of H11837. The ratio of the lineal nautical miles of crosslines to the lineal nautical miles of mainscheme lines, at 5.6 %, meets the 5 % required by "NOAA, NOS Hydrographic Surveys Specifications and Deliverables", April 2007, Section 5.1.4.

The crossline analysis was conducted using CARIS HIPS' QC Report routine. Each crossline was selected and run through the process, which calculated the difference between each accepted crossline sounding and a BASE surface created from the mainscheme data.

The differences in depth were grouped by beam number and statistics computed which included the percentage of soundings compared whose differences from the BASE surface fall within IHO survey Order 1.

The majority of beams meet IHO Order 1 at the 95 % confidence level or better. Refer to Separate IV* for QC Reports. ***Submitted with original field records***

A.2.4. Contemporary Survey Junctions

This survey junctions with one other survey. The westerly limits of this survey junction with the easterly limits of H11838 (OPR-P385-TE-08). In CARIS Hips and Sips the base surfaces for each survey sheet were opened. The tool tip feature was then incorporated to analyze the difference between sounding values for each sheet at multiple locations along the survey junction. The soundings are in good general agreement between the surveys. No adjustments or recommendations were made based on the junction analysis.

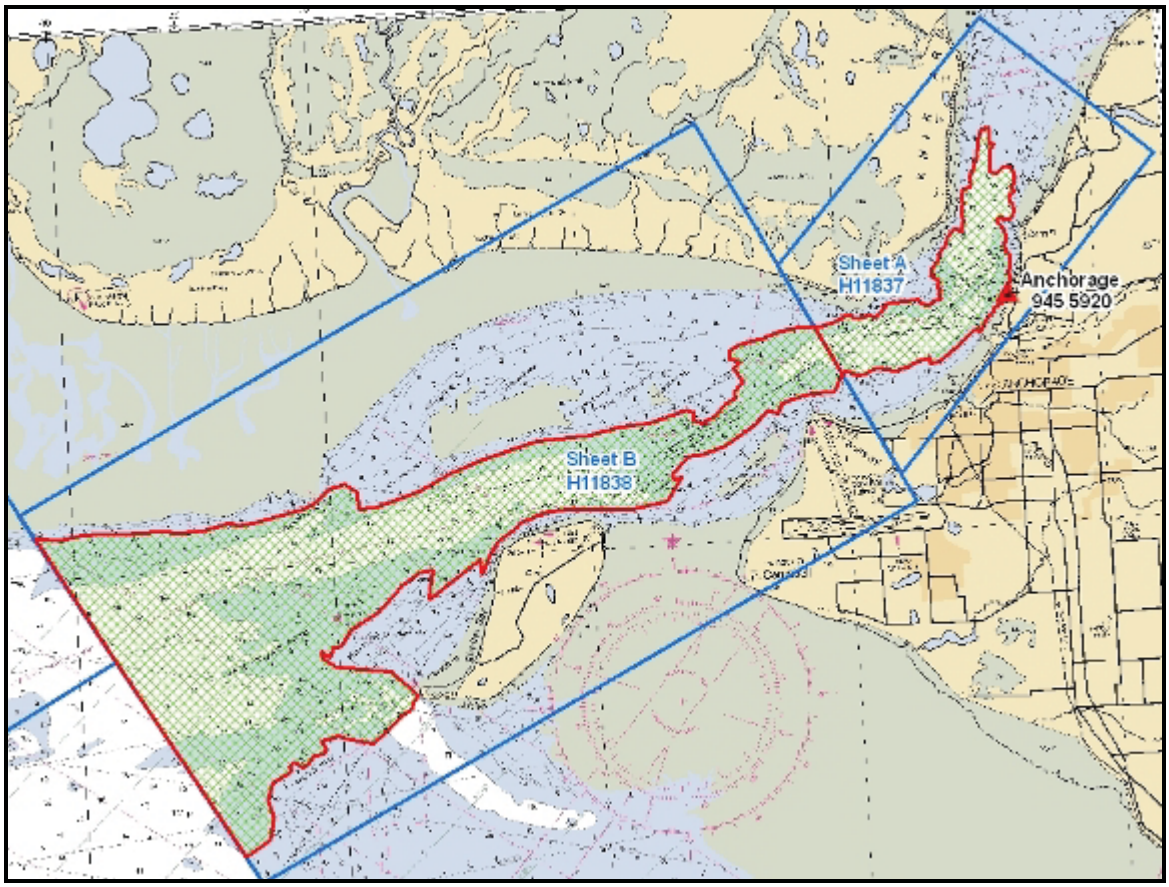


Figure 2 – Overview of survey area showing the junction locations of H11837 with H11838 (OPR-P385-TE-08).

A.3. Corrections to Echo Soundings

Survey H11837 was performed in conjunction with five other surveys in Project OPR-P385-TE-08. Any change to the corrections to echo soundings affects all surveys in the area and is described in detail in the DAPR*. ***Submitted with the H-Cell deliverable***

Sounding data were reduced preliminarily using zoning provided by NOAA/CO-OPS under the project instructions and final tides from the historic USC&GS tide stations at Point Possession, AK (945-5866) and North Foreland, AK (945-5869).

Final sounding data were reduced using Post Processed Kinematic Smoothed Best Estimate Trajectory (PPK SBET). SBET's were applied to the sounding data through CARIS. The navigation and elevation were applied to the sounding data. An offset model between Mean Lower Low Water and the Ellipsoid was used and GPStide was applied. Refer to the Horizontal and Vertical Control Report (HVCR) * for PPK methods and operations. Refer to the Data Acquisition and Processing Report (DAPR) * for data collection and processing methods. ***Submitted with the H-Cell deliverable***

A.4. Data Processing

The final depth information for this survey was submitted as a collection of CARIS BASE surfaces which best represented the seafloor at the time of the 2008 survey. All possible measures were taken to ensure the data was correctly processed and the appropriate designated soundings, representing the least depth of significant contacts, were selected and retained in the finalized surfaces.

In accordance with the statement of work, shallow water multibeam (SWMB) line spacing was set to meet the project specifications. This was not optimal for SWMB coverage and resulted in SWMB coverage gaps as the outer beams of adjacent lines did not meet.

Several grids of varying resolution were created for H11837 due to the wide depth range and varying bathymetry found in the survey area. Grid spacing of 1, 2, and 4 meters were used for the BASE surfaces and Digital Terrain Models (DTM).

Depth Range	BASE Surface Resolution
0-23m	1m
20-52m	2m
46-115m	4m

Table 2 - BASE surface resolution vs. survey depth.

5 digital products (1 for each variable BASE surface and 2 images of the entire survey area) were submitted for the 2008 survey. 2008 survey depths were submitted as a CARIS BASE Uncertainty surface which was weighted by the greater of either the standard deviation of sounding values, or *a priori* uncertainty values derived from HIPS TPE calculation. Additionally, two sun-illuminated, geographically referenced Digital Terrain Model images depicting the coverage of the survey area were submitted; one representing the depth child layer and one representing the uncertainty child layer. All grids are projected to UTM Zone 5 North, NAD 1983. Naming conventions for each grid are as follows:

CARIS BASE Uncertainty Surface: H11xxx_1m_0to23m_Final

- H11xxx represents the sheet (H11837-H11842)
- 1m represents the resolution
- 0to23m represents the depth range

Sun-Illuminated Elevation DTM: H11837_Coverage.tif
Uncertainty DTM: H11837_Uncertainty.tif

A data set containing a single S-57 (.000) base cell file and supporting files were submitted in conjunction with the other 2008 survey deliverables. The base cell contains information on objects not represented in the depth grid, including, but not limited to, shoreline and the nature of the seabed (bottom samples). Each feature object includes the mandatory S-57 attributes, contract specific attributes, and any additional attributes assigned.

The DAPR* Sections A: Equipment – Data Collection; and B: Quality Control contain a detailed discussion of the steps followed when acquiring and processing the 2008 survey data. ***Submitted with H-Cell deliverable***

B. VERTICAL AND HORIZONTAL CONTROL

Final sounding data were reduced using Post Processed Kinematic Smoothed Best Estimate trajectory (PPK SBET). SBET's were applied to the sounding data through CARIS. The navigation and elevation were applied to the sounding data. An offset model between Mean Lower Low Water and the Ellipsoid was used and GPStide was applied. Refer to the Horizontal and Vertical Control Report* (HVCR) for PPK methods and operations. ***Submitted with H-Cell deliverable***

The horizontal control datum used for this survey is the North American Datum of 1983 (NAD 83). The projection used was UTM, Zone 5 North.

C. RESULTS AND RECOMMENDATIONS

C.1. Chart Comparison

The chart comparison for H11837 was performed by comparing all RNC and ENC charts that intercept the project area to the surveyed data.

Discrepancies are discussed in context of the largest scale chart available and assumed to apply to the smaller scale charts unless specifically mentioned.

Chart	Type	Scale	Edition	Issue Date	NM / LNM Through
16665	RNC	1:50,000 (Inset 1:20,000)	9th	2006-03-01	2006-03-04 2006-02-21
16663	RNC	1:100,000	8th	2006-03-01	2006-03-18 2006-03-07
16660	RNC	1:194,154	30th	2006-06-01	2006-06-17

					2006-06-06
16013	RNC	1:969,761	30th	2006-07-01	2006-07-15 2006-07-04
531	RNC	1:2,100,000	24th	2007-07-01	2007-07-21 2007-07-03
500	RNC	1:3,500,000	8th	2003-06-01	2003-05-31 2003-05-13
50	RNC	1:10,000,000	6th	2003-06-01	2003-05-31 2003-05-13
US3AK1DM (16660)	ENC	N / A	8th	2009-06-04	2009-05-26
US5AK16M (16665)	ENC	N / A	10th	2009-06-03	2009-06-03

Table 3 – Charts used during chart comparisons

Notices to Mariners (NM) issued from March 2008 through September 2008 (from issuance of SOW to completion of survey) that affected the survey were examined as well, ending with NM 36/08 and LNM 37/08. No discrepancies were found.

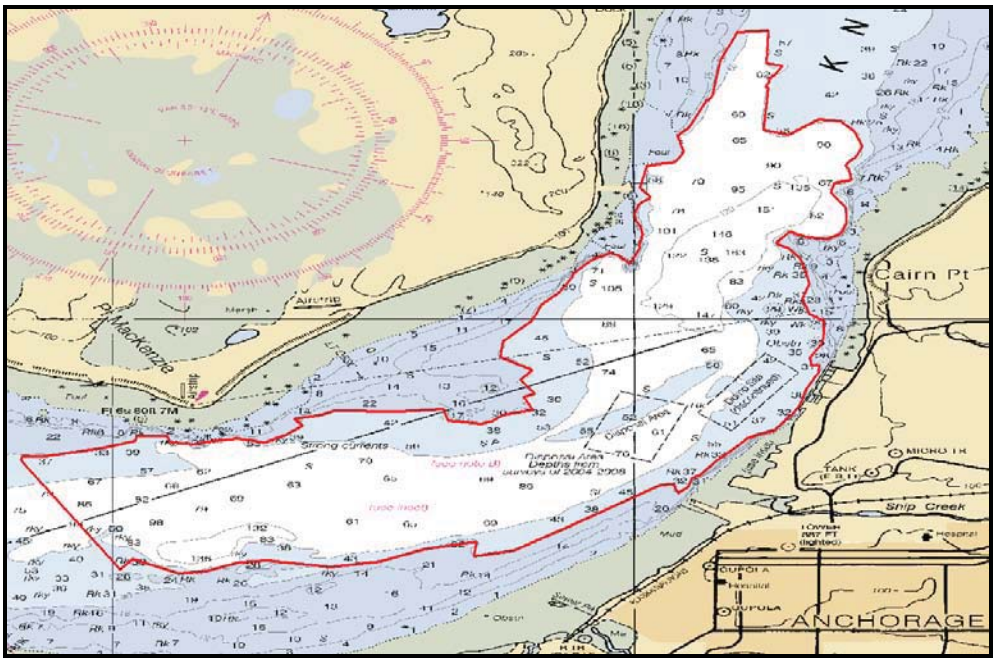


Figure 3 – Survey limits of H11837 shown on chart 16665

The chart comparison was accomplished by generating sounding and contours and overlaying them along with the finalized BASE surfaces on the latest edition NOAA charts. The general agreement between charted soundings and H 11837

soundings was then examined and a more detailed comparison was undertaken for any shoals or other dangerous features.

General agreement between this survey and the charts is poor. Significant differences are itemized in the sections below. ***Concur***

C.1.1. New Features

One new DTON feature was identified during H 11837. ***Concur with clarification. Appendix I documents that two DtoNs were submitted to MCD by AHB. Both DtoNs have been applied to current charts.***

Feature	Latitude	Longitude	Charted Depth (ft)	Sounding Depth (ft)	Difference (ft)
Rock	61-13-16.42***4035***N	149-59-57.44***4379***W	50	35.***436***	15
Wreck	***61-14-57.6089N***	***149-53-14.1986W***	***-***	***16.919***	***-***

Table 4 – New DTON features identified in H11837

The feature was identified as a DTON during chart comparisons and submitted to AHB on 10/20/2009 (OPR_P385_TE_08_H11837_DtonReport_9). ***Concur***

It is recommended "Rk" be added to existing charts at this position and the charted depth of 50 ft be changed to 35 ft. ***Concur***

One DTON was issued for a shoaler sounding acquired on a previously charted rock (see item 4 in section D.1.2.) ***Concur***

C.1.2. Charted Features

Survey results regarding potentially hazardous features within the survey extents are itemized below.

1. Charted Rk (chart 16665 inset), depth 28 feet, was confirmed by this survey (survey position 61-15-09.67***6599***N, 149-53-16.88***8515***W) but with deeper least depth of 30 ***.102*** feet. Feature received complete multibeam coverage. Recommend updating charted Rk to survey position and depth. ***Do not concur. Rock is within the newly digitized rocky seabed area. Remove charted rock, chart as a sounding.***
2. Charted Rk (chart 16665 inset), depth 31 feet, was confirmed by this survey (survey position 61-15-11.18***16***N, 149-53-23.92***528***W) but with deeper least depth of 33 ***.635*** feet. Feature received complete multibeam coverage. Recommend updating charted Rk to survey position and depth. ***Do not concur. Rock is within the newly digitized rocky seabed area. Remove charted rock, chart as a sounding.***
3. Charted Wk (chart 16665 inset), depth 29 feet, was confirmed by this survey (survey position 61-15-04.21N, 149-53-39.06W) but with deeper least depth of 31

feet. Feature received complete multibeam coverage. Recommend updating charted Wk to survey position and updating the AWOIS database (record ID 50721). ***Do not concur. The multibeam development is not adequate to supersede the charted wreck. Retain wreck as charted.***

4. Charted Wk (chart 16665 inset), depth 29 feet, was confirmed by this survey (survey position 61-14-57.61~~0~~***089***N, 149-53-14.60~~0~~***198***W) but with a shoaler depth of ~~17~~***16.919*** feet. Feature received complete multibeam coverage. Recommend updating charted Wk to survey position and depth. Wreck not found in AWOIS database; recommend addition to database.

   This item was identified as a DtoN during chart comparison and submitted to AHB on 10/ 20/2009 (OPR_P385_TE_08_H11837_DtonReport_10). ***Concur. MCD applied the wreck to the chart (16665) as a 17ft wreck.***

5. Charted Obstn (chart 16665 inset), depth 30 feet at 61-14-48.10N, 149-53-13.73W was not observed by this survey. However, the obstruction is on the edge of the multibeam coverage and may not have been covered. Recommend retain as charted. Recommend updating AWOIS database (record ID 52648). ***Concur***

6. Charted Rk (chart 16665 inset), depth 39 feet, was confirmed by this survey (survey position 61-14-01.92N, 149-58-15.45) but with a deeper depth of 41 feet. Additionally, a shoaler rock was located 20 meters southwest at 61-14-01.60***5990***N, 149-58-16.23***10***W with a least depth of ~~39~~ 38.986 feet. This may be the charted rock with a mismatched depth. Recommend moving Rk position to surveyed position 61-14-01.60***5990***N, 149-58-16.23***10***W. ***Concur with clarification. Delete charted rock. Add new rock at survey depth and location.***

7. Charted Rk (chart 16665 inset), depth 27 feet, was confirmed by this survey (survey position 61-14-00.27***594***N, 149-59-26.75***15***W) but with a deeper depth of 29***.416*** feet. Feature received complete multibeam coverage. Recommend updating charted Rk to survey position and depth. ***Concur***

8. Charted Rk (chart 16665 inset), depth 30 feet at 61-13-00.51N, 149-59-45.23W was not observed by this survey. However, the area received incomplete multibeam coverage and may not have been captured. Recommend retain as charted. ***Concur***

9. Charted Rk (chart 16665 inset), depth 37 feet at 61-13-45.03N, 149-54-27.65W was not observed by this survey. However, the area received incomplete multibeam coverage and may not have been captured. Recommend retain as charted. ***Concur. H-Cell includes rock from ENC.***

10. Charted Rk (chart 16665 inset), depth 32 feet at 61-13-53.15N, 149-54-09.50W was not observed by this survey. However, the Rk is on the edge of the multibeam coverage and may not have been covered. Recommend retain as charted. ***Concur***

11. Charted Rk (chart 16660 and ENC US3AK1DM), depth 6 fathoms 2 feet, at 61-13-25.46N, 149-55-23.27W was not observed by this survey. The position received complete multibeam coverage with no indication of a rock. However, the Rk could be nearby due to gaps between adjacent swathes. Recommend retain as

charted. Note: this feature does not appear on the larger scale charts 16663 and 16665, recommend inclusion on those charts. ***Concur with clarification. No evidence of rock found in source grid. Recommend to delete rock on chart 16660. No cartographic action necessary on chart 16665.***

12. "Strong current" conditions indicated by the chart notes, were confirmed by the survey vessel during survey operations. Recommend retaining as charted. ***Concur***

C.1.3. Soundings

Survey depth agreement with the charts varies widely across the project area. ***Concur***

There were no discernable trends in the shoaling or deepening areas except the east side of the survey area which showed a general deepening on the order of 2 to 5 meters versus charted data and the west side which showed a general shoaling in areas on the order of 2-3 meters. ***Concur***

Significant differences (generally those greater then +/- 10 % of charted depth) are itemized in the table below. It is recommended that soundings from H11837 supersede previously charted soundings. ***Concur with clarification. H-Cell is compiled to the ENC and not the raster for this survey. See Appendix V(appended to this report) for more information.***

Chart	Charted Depth	Survey Depth in Vicinity	Charted Position
16665 (Inset)	25 feet	29 feet	61-15-36.51N, 149-53-35.82W
16665 (Inset)	35 feet	45 feet	~~61-15-22.09N, 149-53-46.15W~~ ***Incorrect Coordinate***
16665 (Inset)	43 feet	48 feet	61-15-22.09N, 149-53-46.15W
16665 (Inset)	58 feet	~~67~~***66*** feet	61-15-19.25N, 149-53-39.72W
16665 (Inset)	42 feet	~~53~~***47*** feet	61-15-10.38N, 149-53-49.26W
16665 (Inset)	42 feet	~~53~~***52*** feet	61-15-06.90N, 149-53-55.34W
16665 (Inset)	33 feet	40 feet	61-15-01.04N, 149-53-46.82W
16665 (Inset)	32 feet	41 feet	61-14-27.33N, 149-53-29.85W
16665 (Inset)	34 feet	~~41~~***40*** feet	61-14-18.76N, 149-53-38.54W
16665 (Inset)	37 feet	46 feet	61-14-10.32N, 149-53-48.49W
16665 (Inset)	66 feet	74 feet	61-13-52.85N, 149-54-40.11W
16665 (Inset)	32 feet	~~39~~***37*** feet	61-13-39.20N, 149-54-36.02W
16665 (Inset)	45 feet	52 feet	61-13-35.02N, 149-55-03.34W
16665 (Inset)	41 feet	51 feet	61-13-42.11N, 149-54-43.74W

Chart	Charted Depth	Survey Depth in Vicinity	Charted Position
16665 (Inset)	26 feet	35 feet ***Concur with clarification. Retain charted 26ft sounding***	61-13-27.29N, 149-55-07.87W
16665 (Inset)	73 feet	~~82~~***83*** feet	61-13-31.99N, 149-55-35.79W
16665 (Inset)	101 feet	~~86~~***84*** feet	61-15-43.36N, 149-54-42.79W
16665 (Inset)	66 feet	~~75~~***77*** feet	61-14-48.37N, 149-55-25.62W
16665 (Inset)	52 feet	~~65~~***66*** feet	61-14-39.03N, 149-55-29.42W
16665 (Inset)	45 feet	52 feet	61-14-50.68N, 149-55-53.45W
16665 (Inset)	46 feet	60 feet	61-14-42.52N, 149-55-42.33W
16665 (Inset)	32 feet	48 feet	61-14-33.20N, 149-55-47.43W
16665 (Inset)	44 feet	50 feet	61-14-27.47N, 149-55-36.93W
16665 (Inset)	60 feet	~~71~~***65*** feet	61-15-06.15N, 149-54-04.37W
16665 (Inset)	44 feet	50 feet	61-14-27.48N, 149-55-36.79W
16665 (Inset)	30 feet	~~44~~***43*** feet	61-14-20.69N, 149-55-46.01W
16665 (Inset)	32 feet	~~40~~***36*** feet	61-14-14.26N, 149-55-54.61W
16665 (Inset)	68 feet	~~58~~***57*** feet	61-13-38.23N, 149-59-27.18W
16665 (Inset)	57 feet	49 feet	61-13-45.60N, 149-59-40.16W
16665 (Inset)	136 feet	~~113~~***112*** feet	61-13-07.65N, 149-59-22.80W
16665 (Inset)	82 feet	~~70~~***68*** feet	61-13-34.17N, 150-00-02.52W
16665 (Inset)	67 feet	54 feet	61-13-40.29N, 150-00-11.29W
16665 (Inset)	69 feet	~~59~~***57*** feet	61-13-39.12N, 149-59-50.79W
16665 (Inset)	39 feet	50 feet	61-15-15.93N, 149-55-38.04W
16665 (Inset)	33 feet	45 feet	61-14-39.07N, 149-56-01.94W
16665 (Inset)	35 feet	~~42~~***41*** feet	61-14-43.67N, 149-53-27.08W
16665 (Inset)	55 feet	~~65~~***63*** feet	61-13-58.90N, 149-54-14.16W
16665 (Inset)	45 feet	~~52~~***51*** feet	61-13-15.86N, 149-56-02.78W
16665	90 feet	~~73~~***72*** feet	61-16-25.69N, 149-53-10.62W

Chart	Charted Depth	Survey Depth in Vicinity	Charted Position
16665	67 feet	75 feet	61-16-06.99N, 149-53-09.34W
16665	82 feet	~~106~~*102* feet	61-15-50.73N, 149-53-14.58W

Table 5 – Sounding discrepancies

C.1.4. Trends and Changeable Areas

Contours were created in IVS Fledermaus and examined concurrently with the charted contours from chart 16665 (largest scale chart) in CARIS HIPS.

Agreement is variable across the survey area, with a few areas comparing well but most showing a shift. In the southern section of the survey area most contours have been displaced, but with no obvious trend, other then a general deepening to the east (vicinity of Anchorage) and a shoaling to the west (vicinity of Pt MacKenzie).

Some examples of the shifts are illustrated below.

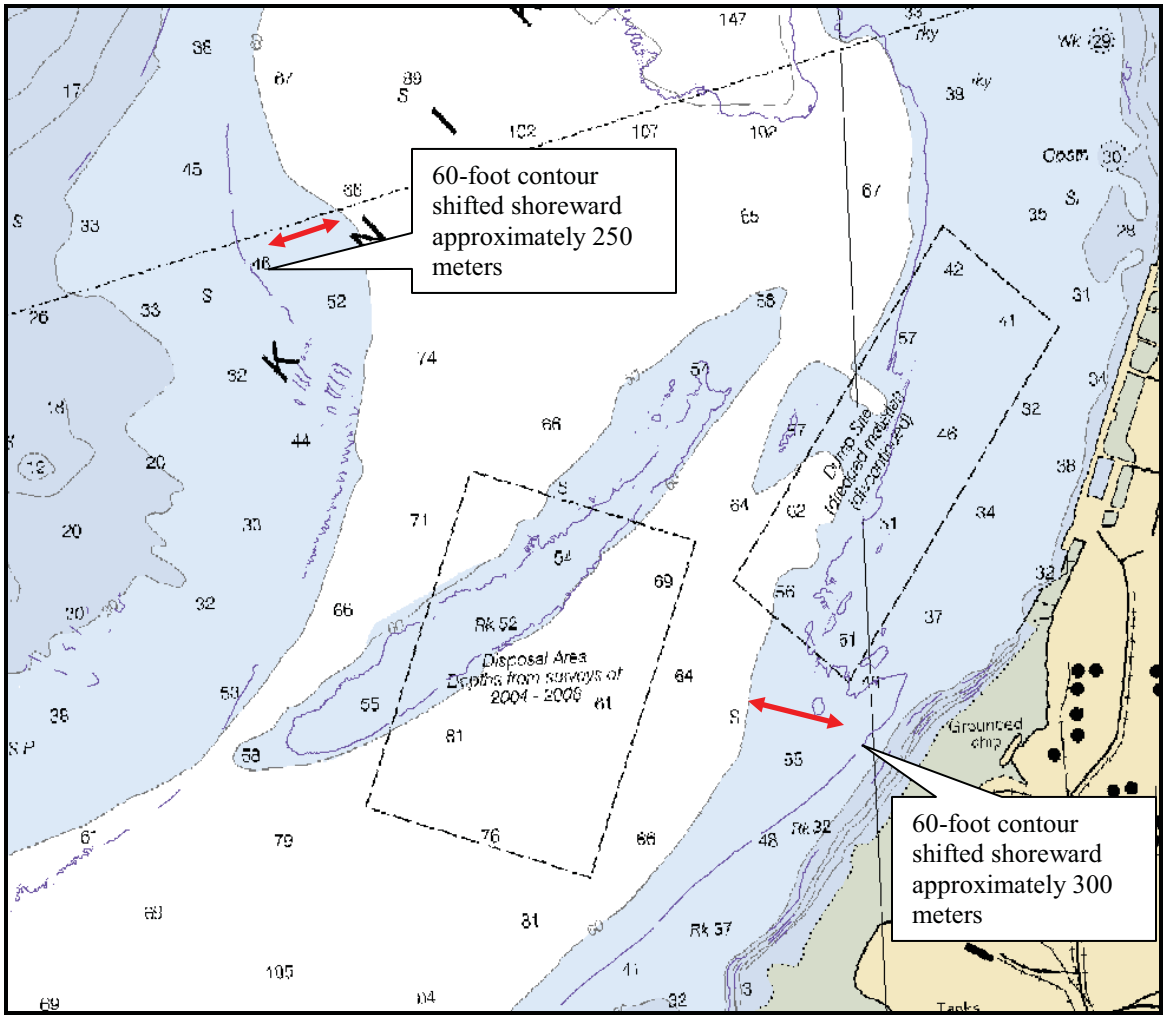


Figure 4 – Contours from H11837 (purple) overlaid on chart 16665

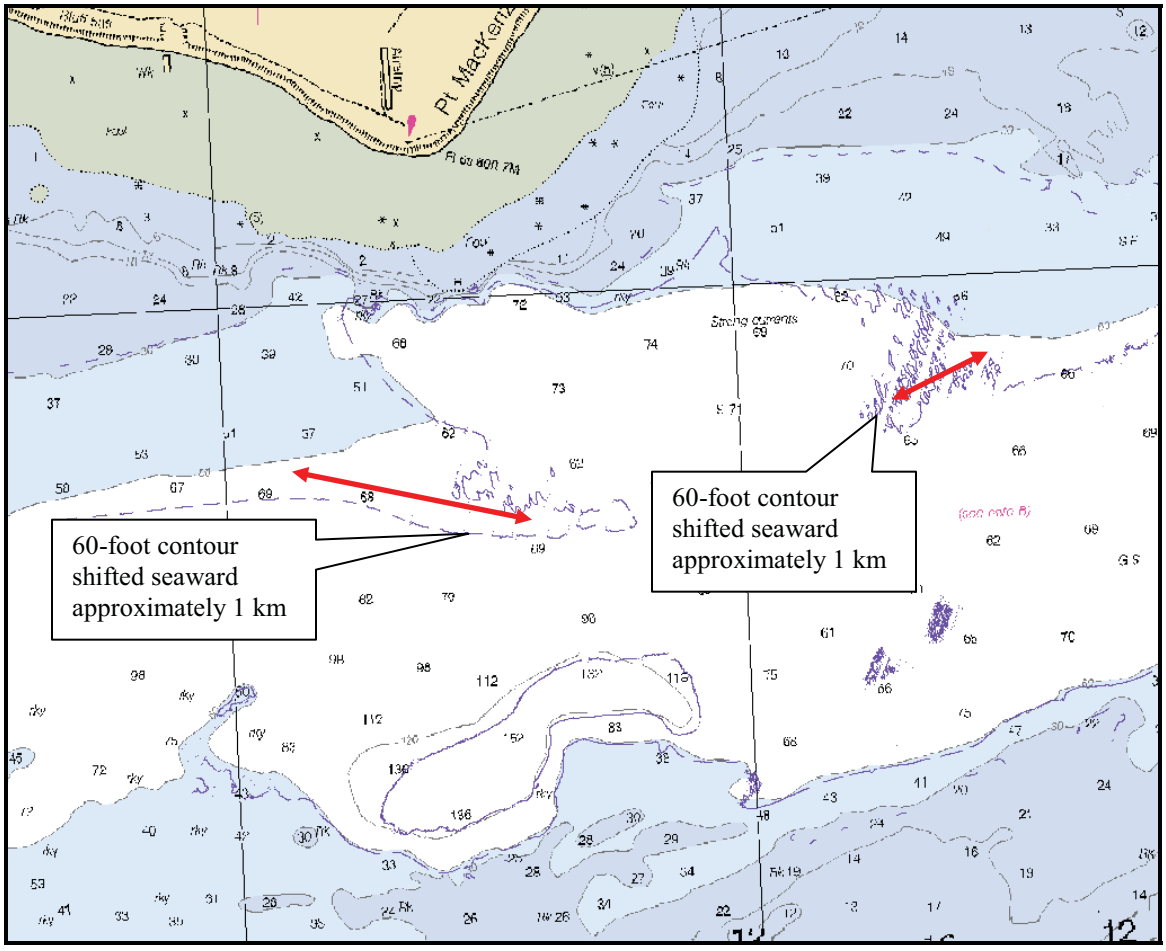


Figure 5 – Contours from H11837 (purple) overlaid on chart 16665

The widely variable changes from the charts found by this survey confirm that chart NOTE B (chart 16665), that the "Area is subject [to] Drastic and continuing change…" is entirely appropriate. The note should be retained. ***Concur***

The hydrographer recommends that the charted contours be updated to reflect the 2008 survey data. ***Concur***

C.1.5. AWOIS Items Summary

Investigation of Automated Wreck and Obstruction Information System (AWOIS) items was not required under this task order.

C.1.6. Features Labeled PA, ED, PD, or Rep.

There were no charted features labeled "PA, ED, PD, or Rep." within the survey extents of H11837. ***Concur***

C.2. Additional Results

C.2.1. Aids to Navigation

There are no charted Aids to Navigation within the survey extents. ***Concur***

C.2.2. Drilling Structures

An investigation of drilling structures was not required under this task order. ***Concur***

No charted drilling structures exist within the survey extents. ***Concur***

C.2.3. Comparison with Prior Surveys

A comparison with prior surveys was not required under this task order. See Section D.1 for a comparison to the nautical charts. ***Concur***

C.2.4. Bottom Samples

8 bottom samples were collected in support of the 2008 survey (Appendix V *). The samples were distributed geographically to obtain a full representation of the bottom characteristics as specified in "NOAA Hydrographic Surveys Specifications and Deliverables", Section 7.1. ***Concur *Appended to this report***

C.2.5. Bridges and Overhead Cables

There are no bridges or overhead cables in the survey area. ***Concur***

C.2.6. Submarine Cables and Pipelines

There are no charted submarine cables or pipelines within the survey area.

Concur

LETTER OF APPROVAL

REGISTRY NO. H11837

This report and the accompanying digital data are respectfully submitted.

Field operations contributing to the accomplishment of survey H11837 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report, 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 the Data Acquisition and Processing Report and the Horizontal and Vertical Control Report.

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

Kathleen Mildon

Digitally signed by Kathleen Mildon
DN: cn=Kathleen Mildon, o=TerraSond Ltd, ou=Charting, email=kmildon@terrasond.com, c=US
Date: 2009.11.23 17:17:59 -09'00'

Kathleen Mildon, Hydrographer
TerraSond Ltd.

Date__November 23, 2009 _____

TERRASOND

APPENDIX I

Danger To Navigation Reports

Danger to Navigation Report

Registry No.: H11837

State: Alaska

General Locality: Northern Cook Inlet

Sub Locality: Knik Arm to Point MacKenzie

Project Number: OPR-P385-TE-08

Survey Dates: 08/01/2008 – 08/13/2008

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

The DTONs in this report result from comparison of 2008 survey data to the largest scale Electronic Navigational Chart(s) (ENC's) covering the survey area (Table 1). During office review of H11837, 2 features were identified by the 2008 survey and are recommended for addition (Table 2).

ENC	Edition Number	Issue Date	Chart	Scale
US4AK15M	5 1/	16/08	16663	1:100,000
US5AK16M	7 2/	21/08	16665	1:50,000

Table 1 – The largest scale Electronic Navigation Charts that cover the extents of survey area H11837.

Feature Number	Feature Name	Feature Type	Latitude	Longitude	Sounding Value (m)
1.1	35ft ROCK	Obstruction	61° 13' 16.4" N	149° 59' 57.4" W	10.66
1.2	17ft Wreck	Wreck	61° 14' 57.6" N	149° 53' 14.6" W	5.18

Table 2 – Uncharted features in H11837 identified by the 2008 survey.

Attachments:

NOAA Response for DTONs 1.1 – 1.2

H11837_DtoN_#1_2.pdf

Digital Data:

NOAA Response for DTONs 1.1 – 1.2

H11837_DtoN_#1_2.xml

H11837_DtoN_#1_2

Registry Number: H11837

State: Alaska

Locality: Northern Cook Inlet

Sub-locality: Knik Arm to Point MacKenzie

Project Number: OPR-P385-TE-08

Survey Dates: 08/03/2008 - 08/09/2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16665	9th	03/01/2006	1:20,000 (16665_2)	[L]NTM: ?
16665	9th	03/01/2006	1:50,000 (16665_1)	USCG LNM: 10/16/2007 (09/29/2009) CHS NTM: None (09/25/2009) NGA NTM: 02/16/2002 (10/03/2009)
16663	8th	03/01/2006	1:100,000 (16663_1)	[L]NTM: ?
16660	30th	06/01/2006	1:194,154 (16660_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	35ft ROCK	Obstruction	10.66***80***	61° 13' 16.4" N	149° 59' 57.4" W	---
1.2	17ft Wreck	Wreck	5.18***6*** m	61° 14' 57.6" N	149° 53' 14.6" W	---

1 - Danger To Navigation

1.1) 35ft ROCK

DANGER TO NAVIGATION

Survey Summary

Survey Position: 61° 13' 16.4" N, 149° 59' 57.4" W

Least Depth: 10.66*80* m (= 34.97*35.436* ft = 5.829*906* fm = 5 fm 4.97*5.44* ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2008-222.17:19:18.000 (08/09/2008)

GP Dataset: H11837_DtoN_1_2.txt

GP No.: 1

Charts Affected: 16665_2, 16665_1, 16663_1, 16660_1, 16013_1, 531_1, 500_1, 50_1

Remarks:

The following item was found during hydrographic survey operations. Object discovered: Rock Covered 35 feet corrected to Mean Lower Low water using GPSTide-derived correctors Shoaler sounding of 35ft least depth in charted 50ft

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11837_DtoN_1_2.txt	1	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 35ft rock at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

35ft (16665_2, 16665_1)

5 ¾fm (16660_1, 16013_1)

5fm 5ft (16663_1, 531_1)

10.7*8*m (500_1, 50_1)

S-57 Data

Geo object 1: Obstruction (OBSTRN)

Attributes: OBJNAM - 35ft Rock

QUASOU - 6:least depth known

SORDAT - 20080809***13***

SORIND - US,US,survy***graph***,H11837

TECSOU - 3:found by multi-beam

VALSOU - 10.66***80*** m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart 35ft rock at survey location.

Feature Images

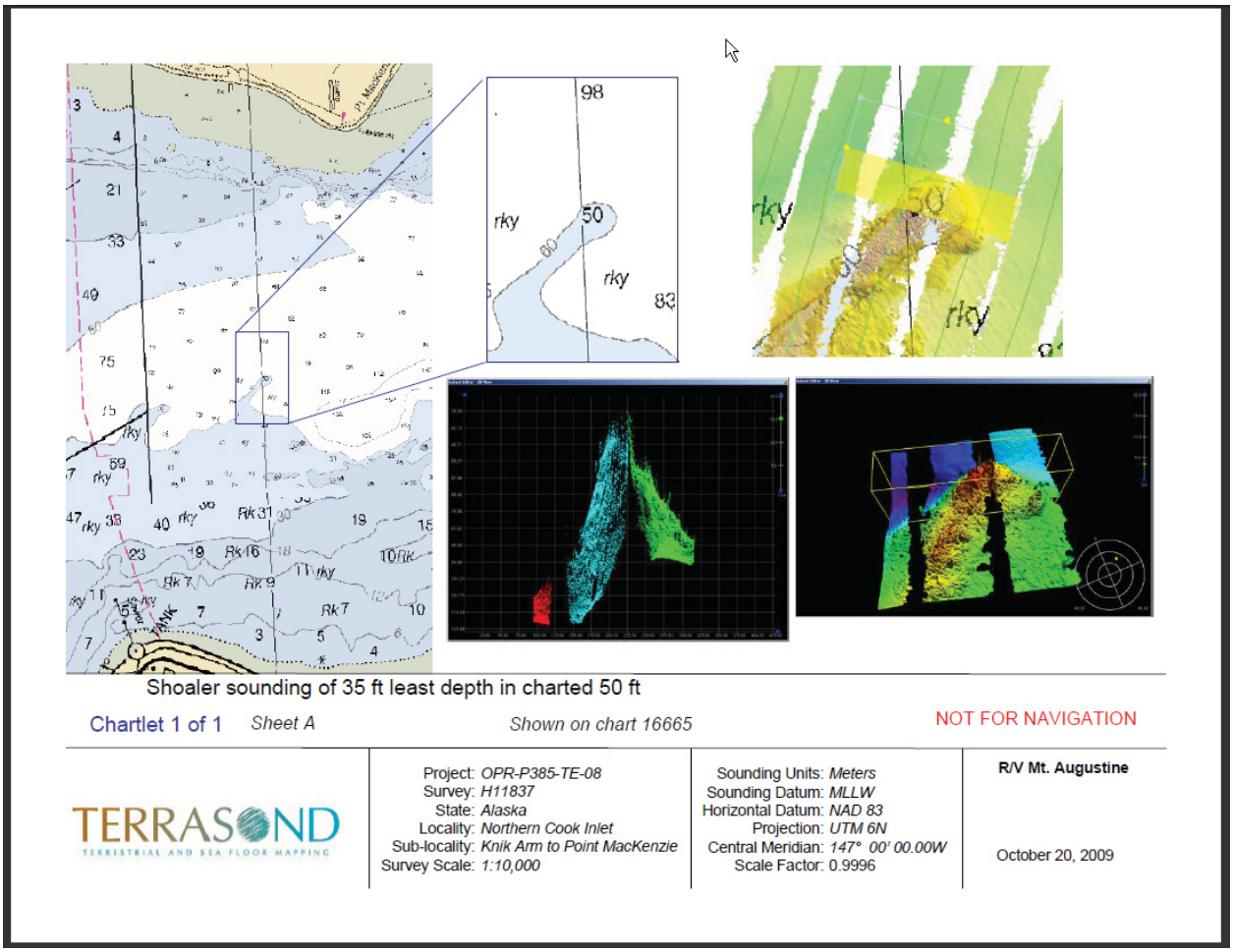


Figure 1.1.1

1.2) 17ft Wreck

DANGER TO NAVIGATION

Survey Summary

Survey Position:	61° 14' 57.6" N, 149° 53' 14.6" W
Least Depth:	5.18*6* m (= 16.9*1*9 ft = 2.832*20* fm = 2 fm 4.9*1*9 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2008-216.18:24:13.000 (08/03/2008)
GP Dataset:	H11837_DtoN_1_2.txt
GP No.:	2
Charts Affected:	16665_2, 16665_1, 16663_1, 16660_1, 16013_1, 531_1, 500_1, 50_1

Remarks:

The following item was found during hydrographic survey operations. Object discovered: Wreck Covered 17 feet corrected to Mean Lower Low water using GPSTide-derived correctors Currently charted least depth on feature is 29 feet.

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11837_DtoN_1_2.txt	2	0.00	000.0	Primary

Hydrographer Recommendations

Recommend charting 17ft Wreck at surveyed location.

Cartographically-Rounded Depth (Affected Charts):

17ft (16665_2, 16665_1)

2 ¾fm (16660_1, 16013_1)

2fm 5ft (16663_1, 531_1)

5.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	OBJNAM - 17ft Wreck

QUASOU - 6:least depth known

SORDAT - 20080803*13*

SORIND - US,US,survy*graph*,H11837

TECSOU - 3:found by multi-beam

VALSOU - 5.18*6* m

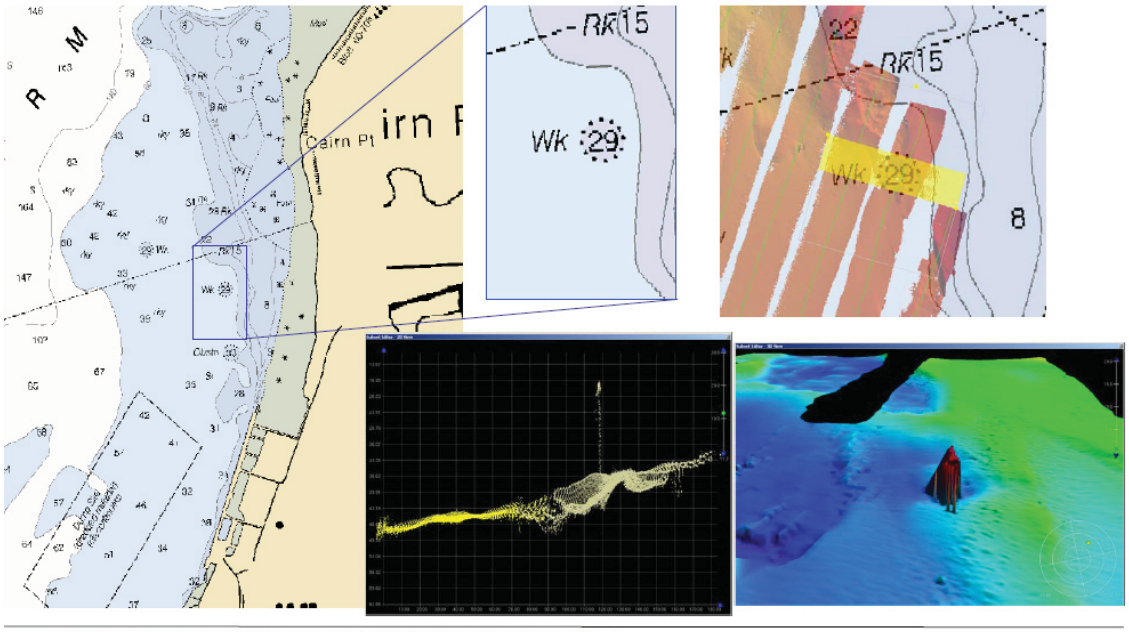
VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Office Notes

Concur. Chart 17ft wreck at survey location.

Feature Images



Shoaler sounding on Wk of 17 ft least depth in charted 29 ft

Chartlet 1 of 1 *Sheet A* *Shown on chart 16665* NOT FOR NAVIGATION

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TERRESTRIAL AND SEA FLOOR MAPPING

Project: *OPR-P385-TE-08*	Sounding Units: *Meters*	**R/V Mt. Augustine**
Survey: *H11837*	Sounding Datum: *MLLW*	
State: *Alaska*	Horizontal Datum: *NAD 83*	
Locality: *Northern Cook Inlet*	Projection: *UTM 6N*	
Sub-locality: *Knik Arm to Point MacKenzie*	Central Meridian: *147° 00' 00.00W*	October 20, 2009
Survey Scale: *1:10,000*	Scale Factor: 0.9996	

Figure 1.2.1

TERRASOND

APPENDIX II

Survey Feature Report

AWOIS

There were no Automated Wrecks and Obstructions (AWOIS) assigned in survey area H11837.

Platforms

There were no Platforms in survey area H11837.

Uncharted Wrecks

There were no Uncharted Wrecks in survey area H11837.

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APPENDIX III

Progress Sketch and Final Survey Limits

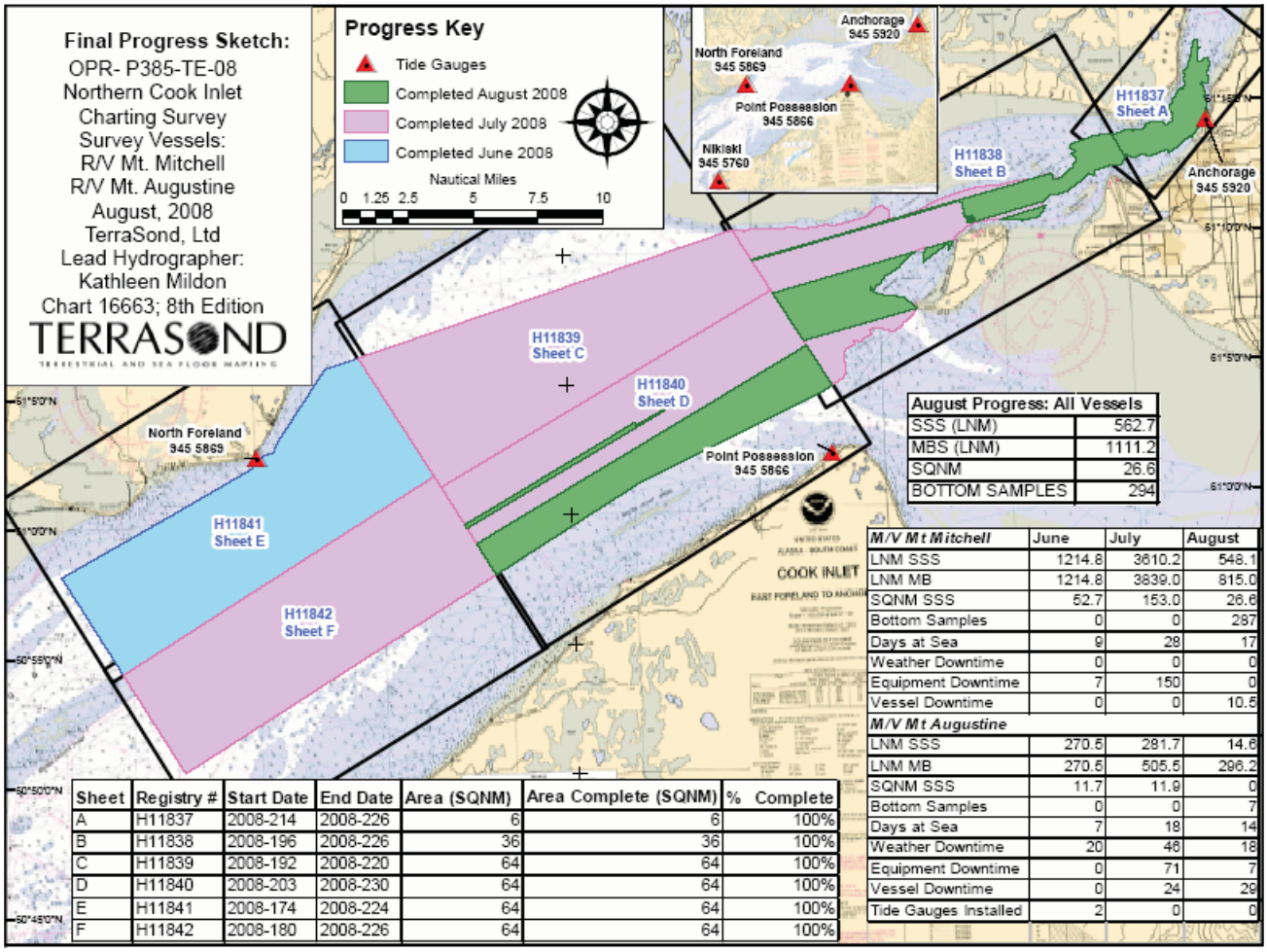

Figure 1: Final Progress Sketch for OPR-P385-TE-08

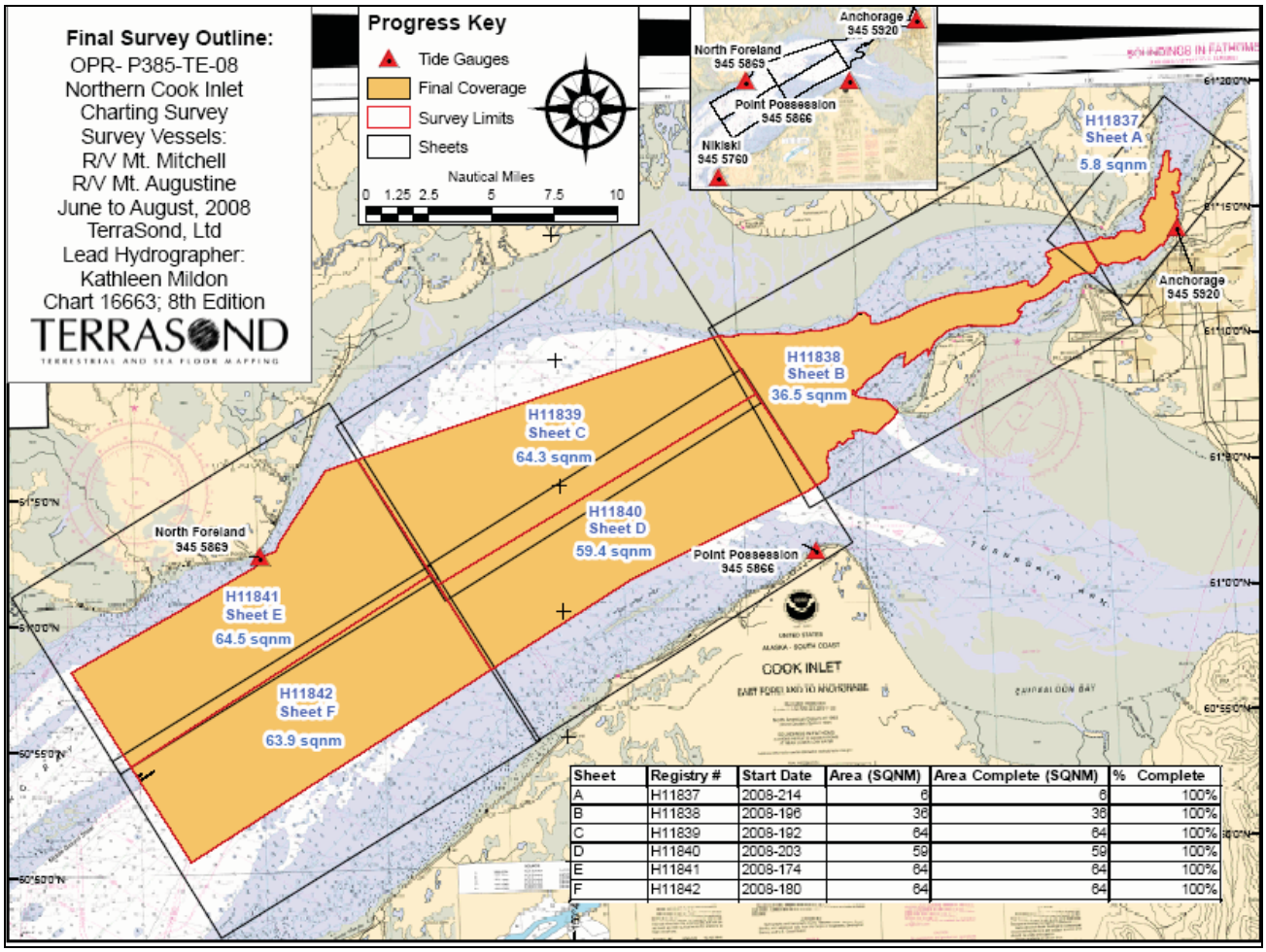

Figure 2: Final Survey Outline for OPR-P385-TE-08

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APPENDIX IV

Tides and Water Levels
Field Tide Notes

Abstract of Times Hydrography

Project: OPR-P385-TE-08

Registry No.: H11837

Table 1 – Sheet A Times of Hydrography: Inclusive Dates: August 1st, 2008 – August 13th, 2008. This Survey ran 24 hours a day.

START		END	
Day (Julian)	Time (UTC)	Day (Julian)	Time (UTC)
214	23:14	226	22:49

Attachments:

Site Reports and Closeout Reports for:
945-5866 Point Possession
945-5869 North Foreland

Site Report

945-5869 North Foreland, Alaska

Site Visit	Purpose of Visit	Installation	Team Leader	Mike Zieserl, JOA	Date of Visit	6/12 - 13/2008
Tertiary Station	Installation	June 12, 2008	Removal		Number of Days	
Project	OCS	OPR-P385-TE-08			JOA	122
Position (NAD83)	Latitude (N)	61° 02' 34"	Longitude (W)	151° 09' 49"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	n/a	GOES Angles	Elev 20°/ Az 162°	Magnetic Declination	19° E, +0°16' W/year

Contractor	Prime	Tide Consultant
	Terrasond 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Anne Dollard	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	Uplands (and dock)	Tidelands
	Tyonek Native Corporation 1689 C Street, Suite #219 Anchorage, AK 99501-5131 Phone (907) 272-0707 ATTN: Chuck Akers cakers@tyonek.com	State of Alaska

Local Info	Contact Chuck Akers prior to traveling to Tyonek. He will coordinate permission with Tyonek Village Council. He may be able to coordinate someone to meet you at the airstrip and drive you to the dock. Debbie Standifer and her son Josh Bartels assisted with the station installation. Debbie has a Ford Expedition she rents. Her cell phone is 830-6929 and home phone is 583-2265. Josh's cell phone is 830-4854 and his email is dreamkeeper07@yahoo.com. Prior to the installation of the tide gauges, access was blocked by a large tank set by heavy equipment across the pier. Chuck Akers had the tank moved.
Location	This tertiary station is located on the Tyonek Pier, approximately 1.5 miles SW of the village of Tyonek, on the west side of Cook Inlet. The station is approximately 40 miles SW of the Ted Stevens Anchorage International Airport and 26 mile NE of Nikiski. The station was reached by fixed wing aircraft from Merrill Field in Anchorage.
Tide House	The tide gauges are housed in an existing wooden shed at the end of the Tyonek Pier. The shed is used to house the batteries and charge controller for a wind generator on the dock. The tide gauges are mounted on the north wall of the shed. The shed appears weatherproff and the door is not locked.

Primary DCP						
Gauge 1	**Installed**	6/12/2008	**Removed**			
94558691	**Radar Sensor**	DAA H3611i	Serial No.	1582	Level Point to Sensor "0"	4mm below bottom of plate
	Data Logger	DAA H522+	Serial No.	2414	Firmware	2.12
	GOES Radio	combined in H522+			GPS timing	Yes
	GOES Address	90700540	Channel	170	Format	Binary (9 byte)
	Interval	1 hour	Offset	0:00:20	Transmit Window	10 seconds
	Power	1 battery with 20W solar panel and Sunsaver 6 solar regulator				
	Radar Mount	The radar was hung with a unistrut bracket from the metal bull rail on the east side of the dock.				
	Comments	The H522+ may perform a reset when a flash card is inserted into PCMCIA slot. The side button was broken and has been disconnected from the circuit board.				

Secondary DCP						
Gauge 2	**Installed**	6/12/2008	**Removed**			
94558692	**Radar Sensor**	DAA H3611i	Serial No.	1618	Level Point to Sensor "0"	Even with bottom of plate
	Data Logger	DAA H522+	Serial No.	2413	Firmware	2.11
	GOES Radio	combined in H522+			GPS timing	Yes
	GOES Address	90701636	Channel	170	Format	Binary (9 byte)
	Interval	1 hour	Offset	0:00:30	Transmit Window	10 seconds
	Power	1 battery with 20W solar panel and Sunsaver 6 solar regulator				
	Radar Mount	The radar was hung with a unistrut bracket from the metal bull rail on the east side of the dock. This radar is closer to the tide shed than the primary radar.				
	Comments	On 6/24, this radar was rotated on its mount to try to decrease the noise in its measurements. The offset from the measure down point on the dock to the bottom of the mounting plate of the radar did not change.				

Tide Staff	None. Performed "measure downs", lowering weighted steel tape to the surface of the water and recording distance up to stamped TBM on the dock. Also performed "staff shots", leveling from a tidal bench mark to the water surface. The water height was measured with the aid of a stilling well on the survey rod. The traditional "staff shots" seem to be accurate and consistent than the measure downs. Josh Bartels is the local contact and he performs weekly measure downs.

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9455869 H	5	0	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K

Leveling	Date	Order	Type	Bench Marks Connected
	6/12/2008	Third	Optical	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Also ran levels through 5 marks which are just stamped into the metal dock surface: L, M, N, G and F		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9455866 H	6/12/2008	29 hrs	61° 02' 46.29651"	151° 10' 3.08016"	13.903
	NAVD88 GPS Tie	Not required per OCS hydro specifications until OPUS Projects is operational.				
	Comments	Most suitable mark for GPS, but there is a metal conveyor that partially obstructs view of sky.				

Station History
6/13/08 Mike Zieserl - completed installation staff shots
6/24/08 Mike Zieserl - rotated Radar 2 on mounting bracket to try to reduce measurement noise. Performed measure downs and staff shots.
7/1/08 Mike Zieserl - Upgraded firmware for both gauges to 2.12. Removed side button from Gauge 1 H522+. Remapped radar 2 (had not been measuring water height for several days). Performed measure downs.
7/10/08 Cody Mayfield - performed traditional staff shots and set up GPS receiver on bench mark 9455869 H for Terrasond GPS network observation.
8/7/08 Cody Mayfield - performed traditional staff shots

Site Report

945-5869 North Foreland, Alaska

Site Visit	Purpose of Visit	Closeout	Team Leader	Mike Zieserl, JOA	Date of Visit	9/4/2008, 10/8/2008
Tertiary Station	Installation	June 12, 2008	Removal	September 4, 2008	Number of Days	84
Project	OCS	OPR-P385-TE-08			JOA	122
Position (NAD83)	Latitude (N)	61° 02' 34"	Longitude (W)	151° 09' 49"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	n/a	GOES Angles	Elev 20°/ Az 162°	Magnetic Declination	19° E, +0°16' W/year

Contractor	Prime	Tide Consultant
	Terrasond 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Anne Dollard	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: Mike Zieserl

Owner	Uplands (and dock)	Tidelands
	Tyonek Native Corporation 1689 C Street, Suite #219 Anchorage, AK 99501-5131 Phone (907) 272-0707 ATTN: Chuck Akers cakers@tyonek.com	State of Alaska

Local Info	Contact Chuck Akers prior to traveling to Tyonek. He will coordinate permission with Tyonek Village Council. He may be able to arrange someone to meet you at the airstrip and drive you to the dock. Debbie Standifer and her son Josh Bartels assisted with the station installation. Prior to the installation of the tide gauges, access was blocked by a large tank set by heavy equipment across the pier. Chuck Akers had the tank moved. Debbie's daughter Gena assisted with station removal.
Location	This tertiary station is located on the Tyonek Pier, approximately 1.5 miles SW of the village of Tyonek, on the west side of Cook Inlet. The station is approximately 40 miles SW of the Ted Stevens Anchorage International Airport and 26 mile NE of Nikiski. The station was reached by fixed wing aircraft from Merrill Field in Anchorage.
Tide House	The tide gauges are housed in an existing wooden shed at the end of the Tyonek Pier. The shed is used to house the batteries and charge controller for a wind generator on the dock. The tide gauges are mounted on the north wall of the shed. The shed appears weatherproff and the door is not locked.

Primary DCP Gauge 1 94558691						
	Installed	6/12/2008	**Removed**	9/4/2008		
	Radar Sensor	DAA H3611i	Serial No.	1582	Level Point to Sensor "0"	4mm below bottom of plate
	Data Logger	DAA H522+	Serial No.	2414	Firmware	2.12
	GOES Radio	combined in H522+			GPS timing	Yes
	GOES Address	90700540	Channel	170	Format	Binary (9 byte)
	Interval	1 hour	Offset	0:00:20	Transmit Window	10 seconds
	Power	1 battery with 20W solar panel and Sunsaver 6 solar regulator				
	Radar Mount	The radar was hung with a unistrut bracket from the metal bull rail on the east side of the dock.				
	Comments	The H522+ may perform a reset when a flash card is inserted into PCMCIA slot. The side button was broken and has been disconnected from the circuit board.				

Secondary DCP Gauge 2 94558692						
	Installed	6/12/2008	**Removed**	8/26/2008		
	Radar Sensor	DAA H3611i	Serial No.	1618	Level Point to Sensor "0"	Even with bottom of plate
	Data Logger	DAA H522+	Serial No.	2413	Firmware	2.11
	GOES Radio	combined in H522+			GPS timing	Yes
	GOES Address	90701636	Channel	170	Format	Binary (9 byte)
	Interval	1 hour	Offset	0:00:30	Transmit Window	10 seconds
	Power	1 battery with 20W solar panel and Sunsaver 6 solar regulator				
	Radar Mount	The radar was hung with a unistrut bracket from the metal bull rail on the east side of the dock. This radar is closer to the tide shed than the primary radar.				
	Comments	On 6/24, this radar was rotated on its mount to try to decrease the noise in its measurements. The offset from the measure down point on the dock to the bottom of the mounting plate of the radar did not change. This radar was "remapped" on 7/1/08, after which it worked reliably.				

Tide Staff	None. Performed "measure downs", lowering weighted steel tape to the surface of the water and recording distance up to stamped TBM on the dock. Also performed "staff shots", leveling from a tidal bench mark to the water surface. The water height was measured with the aid of a stilling well on the survey rod. The traditional "staff shots" seem to be more accurate and consistent than the measure downs. Josh Bartels was the local contact and he performed semi-weekly measure downs. Staff shots were performed by JOA personnel.

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9455869 H	5	0	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K

Site Report

945-5869 North Foreland, Alaska

Leveling	Date	Order	Type	Bench Marks Connected		
	6/12/2008	Third	Optical	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K		
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).				
	Comments	Also ran levels through 5 marks which are just stamped into the metal dock surface: L, M, N, G and F				
	Date	Order	Type	Bench Marks Connected		
	9/4/2008	Third	Optical	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K		
	Comments	Ran levels through 5 marks which are just stamped into the metal dock surface: L, M, N, G and F. Ran levels on dock twice because elevations changed from installation (3 wire in the morning, then single wire later in the day). Dock elevations seem to change as the tide changes.				
	Date	Order	Type	Bench Marks Connected		
	10/8/2008	Third	Optical	9455869 D, 9455869 E, 9455869 H, 9455869 J, 9455869 K		
	Comments	Reran closeout levels because of movement in marks on dock, including sensor "0". Ran levels on dock twice because elevations changed from installation (3 wire in the morning, then 3 wire later in the day). Dock elevations seem to change as the tide changes.				
GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9455866 H	6/12/2008	29 hrs	61° 02' 46.29651"	151° 10' 3.08016"	13.903
	NAVD88 GPS Tie	Not required per OCS hydro specifications until OPUS Projects is operational.				
	OPUSDB	http://beta.ngs.noaa.gov/CORS-Proxy/oraOpusDbWeb/getDatasheet.jsp?PID=BBBF25&style=modern				
	Comments	Most suitable mark for GPS, but there is a metal conveyor that partially obstructs view of sky.				
Station History	6/13/08 Mike Zieserl - completed installation staff shots					
	6/24/08 Mike Zieserl - rotated Radar 2 on mounting bracket to try to reduce measurement noise. Performed measure downs and staff shots.					
	7/1/08 Mike Zieserl - Upgraded firmware for both gauges to 2.12. Removed side button from Gauge 1 H522+. Remapped radar 2 (had not been measuring water height for several days). Performed measure downs.					
	7/10/08 Cody Mayfield - performed traditional staff shots and set up GPS receiver on bench mark 9455869 H for Terrasond GPS network observation.					
	8/26/08 Mike Zieserl - performed traditional staff shots, removed Radar #2 to send to another project. Measured distance between Radar #2 LP and leveling point on the dock before removal. Calibration test not performed before the radar was shipped to another project.					
	9/04/08 Mike Zieserl - closeout levels and staff shots, removed tide station.					
	10/08/08 Mike Zieserl - reran closeout levels because of movement of marks on dock. Movement was again confirmed.					

Site Report

945-5866 Point Possession, Alaska

Site Visit	Purpose of Visit	Installation	Team Leader	Lamar Gates, Terrasond	Date of Visit	6/8 - 11/2008
Tertiary Station	Installation	June 9, 2008	Removal		Number of Days	
Project	OCS	OPR-P385-TE-08			JOA	122
Position (NAD83)	Latitude (N)	61° 02' 02"	Longitude (W)	150° 24' 20"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981869	GOES Angles	Elev 20°/ Az 162°	Magnetic Declination	19° E, +0°16' W/year

Contractor	Prime	Tide Consultant
	Terrasond 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Anne Dollard	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: John Oswald

Owner	Betty J. Gilchrist, PO Box 4256, Soldotna, AK 99669 (uplands) State of Alaska (tidelands)
Location	This tertiary tide station is located on the NW shore of Point Possession, on the east side of Cook Inlet on the Kenai Peninsula. It is at the base of a 60 ft high bluff. There is an open field at the top of the bluff and an abandoned day marker on a skeleton steel tower. The station is approximately 16 mi SW of Ted Stevens Anchorage International Airport, and 22 miles SW of the Port of Anchorage. The station was accessed by helicopter and fixed-wing from Anchorage.
Tide House	The tide gauges are housed inside of a Weather Port tent erected above the gravel beach among the alder trees.

Primary DCP						
Gauge 1	**Installed**	6/10/2008	**Removed**			
94558661	**Pressure Sensor**	DAA H350XL	Serial No.	1354	Vent Value, tubing attached (m)	0.037
	Data Logger	combined in H350XL	Firmware	2.12H	Slope Constant in Gauge	0.68980
	Pump	DAA H355	Serial No.	1899		
	GOES Radio	DAA H222	Serial No.	1705	GPS timing	Yes
	GOES Address	9070B6CE	Channel	170, 300 baud	Format	NGWLMS
	Interval	1 hour	Offset	00:02:10	Transmit Window	10 seconds
	Power	Powered by 2 blue top Optima batteries with 75W solar panel (on top of bluff) for recharging				
	Orifice	Orifice is attached to anchor constructed from pieces of railroad track with 70ft buoy line and Norwegian buoy. The orifice line is 460 m (1500 ft) long, paired with 3/8" galvanized aircraft cable and secured to beach with rebar.				
	Comments					

Secondary DCP						
Gauge 2	**Installed**	6/10/2008	**Removed**			
94558662	**Pressure Sensor**	DAA H350XL	Serial No.	1051	Vent Value, tubing attached (m)	0.044
	Data Logger	combined in H350XL	Firmware	2.12H	Slope Constant in Gauge	0.68980
	Pump	DAA H355	Serial No.	2882		
	GOES Radio	DAA H222	Serial No.	1699	GPS timing	Yes
	GOES Address	907060A6	Channel	170, 300 baud	Format	NGWLMS
	Interval	1 hour	Offset	0:01:20	Transmit Window	10 seconds
	Power	Powered by 2 blue top Optima batteries with 75W solar panel (on top of bluff) for recharging				
	Orifice	Orifice is attached to anchor constructed from pieces of railroad track with 70ft buoy line and Norwegian buoy. The orifice line is 460 m (1500 ft) long, paired with 3/8" galvanized aircraft cable and secured to beach with rebar.				
	Comments					

Tide Staff	None. Performed "staff shots", leveling from tidal bench mark to rod with stilling well in the water.

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9455866 D	10	0	945 5866 B, C, D, E, F, 1, 2, 3, 4 and 5
	Comments	945 5866 A was searched for but not found.		

Leveling	Date	Order	Type	Bench Marks Connected
	6/8 - 11/08	Third	Optical	945 5866 B, C, D, E, F, 2, 3, and 4
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Bench marks 945 5866 1 and 5 were not leveled to because only the stems of the monuments were recovered.		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	NAVD88 GPS Tie	Not required per OCS hydro specifications until OPUS Projects is operational.				
	Comments	No GPS performed during install. Terrasond will complete before station removal.				

Station History	6/11/2008 Cody Mayfield - fixed leak in gauge 2. Finished tide station installation.

Site Report

945-5866 Point Possession, Alaska

Site Visit	Purpose of Visit	Closeout	Team Leader	W Bowen, Terrasond	Date of Visit	9/3 - 4/2008
Tertiary Station	Installation	June 9, 2008	Removal	September 4, 2008	Number of Days	87
Project	OCS	OPR-P385-TE-08			JOA	122
Position (NAD83)	Latitude (N)	61° 02' 02"	Longitude (W)	150° 24' 20"	Time Meridian	0° (UTC)
Local Values	Gravity (milligals)	981869	GOES Angles	Elev 20°/ Az 162°	Magnetic Declination	19° E, +0°16' W/year

Contractor	Prime	Tide Consultant
	Terrasond, Ltd 1617 South Industrial Way, Suite 3 Palmer, AK 99645 (907) 745-7215 ATTN: Anne Dollard	John Oswald & Associates, LLC 2000 E. Dowling Rd, Suite 10 Anchorage, AK 99507 (907) 561-0136 phone ATTN: Mike Zieserl

Owner	Betty J. Gilchrist, PO Box 4256, Soldotna, AK 99669 (uplands) State of Alaska (tidelands)
Location	This tertiary tide station is located on the NW shore of Point Possession, on the east side of Cook Inlet on the Kenai Peninsula. It is at the base of a 60 ft high bluff. There is an open field at the top of the bluff and an abandoned day marker on a skeleton steel tower. The station is approximately 16 mi SW of Ted Stevens Anchorage International Airport, and 22 miles SW of the Port of Anchorage. The station was accessed by helicopter and fixed-wing from Anchorage.
Tide House	The tide gauges are housed inside of a Weather Port tent erected above the gravel beach among the alder trees.

Primary DCP						
Gauge 1	**Installed**	6/10/2008	**Removed**	9/4/2008		
94558661	**Pressure Sensor**	DAA H350XL	Serial No.	1354	Vent Value, tubing attached (m)	0.037
	Data Logger	combined in H350XL	Firmware	2.12H	Slope Constant in Gauge	0.68980
	Pump	DAA H355	Serial No.	1899		
	GOES Radio	DAA H222	Serial No.	1705	GPS timing	Yes
	GOES Address	9070B6CE	Channel	170, 300 baud	Format	NGWLMS
	Interval	1 hour	Offset	00:02:10	Transmit Window	10 seconds
	Power	Powered by 2 blue top Optima batteries with 75W solar panel (on top of bluff) for recharging				
	Orifice	Orifice is attached to anchor constructed from pieces of railroad track with 70ft buoy line and Norwegian buoy. The orifice line is 460 m (1500 ft) long, paired with 3/8" galvanized aircraft cable and secured to beach with rebar.				
	Comments					

Secondary DCP						
Gauge 2	**Installed**	6/10/2008	**Removed**	9/4/2008		
94558662	**Pressure Sensor**	DAA H350XL	Serial No.	1051	Vent Value, tubing attached (m)	0.044
	Data Logger	combined in H350XL	Firmware	2.12H	Slope Constant in Gauge	0.68980
	Pump	DAA H355	Serial No.	2882		
	GOES Radio	DAA H222	Serial No.	1699	GPS timing	Yes
	GOES Address	907060A6	Channel	170, 300 baud	Format	NGWLMS
	Interval	1 hour	Offset	0:01:20	Transmit Window	10 seconds
	Power	Powered by 2 blue top Optima batteries with 75W solar panel (on top of bluff) for recharging				
	Orifice	Orifice is attached to anchor constructed from pieces of railroad track with 70ft buoy line and Norwegian buoy. The orifice line is 460 m (1500 ft) long, paired with 3/8" galvanized aircraft cable and secured to beach with rebar.				
	Comments					

Tide Staff	None. Performed "staff shots", leveling from tidal bench mark to rod with stilling well in the water.

Tidal Bench Marks	Primary	Recovered	Established	Designations
	9455866 D	10	0	945 5866 B, C, D, E, F, 1, 2, 3, 4 and 5
	Comments	945 5866 A was searched for but not found.		

Leveling	Date	Order	Type	Bench Marks Connected
	6/8 - 11/08	Third	Optical	945 5866 B, C, D, E, F, 2, 3, and 4
	NAVD88 Level Tie	No NAVD88 marks within 1.6km (1 mi).		
	Comments	Bench marks 945 5866 1 and 5 were not leveled to because only the stems of the monuments were recovered and confirmation of their identity is uncertain.		

GPS & OPUS	Bench Mark	Date	Session Length	Latitude (N)	Longitude (W)	Ellipsoid Height (m)
	9455866 D	7/12/2008	8hrs	61° 2' 2.19192"	150° 24' 21.55615"	9.424
	NAVD88 GPS Tie	Not required per OCS hydro specifications until OPUS Projects is operational.				
	OPUSDB	http://beta.ngs.noaa.gov/CORS-Proxy/oraOpusDbWeb/getDatasheet.jsp?PID=BBBF49&style=modern				
	Comments	Original GPS observation was 32hrs in length, but the quality of the solution during a couple segments of the observation were poor, and the data was trimmed back to 8hrs.				

Station History
6/11/2008 Terrasond & JOA - fixed leak in gauge 2. Finished tide station installation.
7/16/08 Terrrasond - Gauge 2 does not seem to be working properly. Purged tide gauges.
7/24/08 Terrrasond & JOA - Purged tide gauges, investigated Gauge 2 problems. Did not resolve.
7/31/08 Terrrasond - Both orifice anchors found upside down underwater. Flipped anchors right side up.
9/4/08 Terrrasond - Closeout staff observations, leveling. Demobilize tide station.

TERRASOND

APPENDIX V

Supplemental Survey Records and Correspondence

Bottom Samples

8 bottom sam ples were collected in suppor t of the 2008 survey. The sam ples were distributed geographically to obtain a full representation of the bottom characteristics as specified in NOAA Hydrographic Surveys Specifications and Deliverables, Section 7.1.

Point #	Date	Time UTC	Depth (m)	Latitude	Longitude	Color	Surface Description	Nature of Surface
A01	8/14/2008	17:14	31.2	61° 16' 21.905" N	149° 53' 29.938" W			sand
A02	8/14/2008	17:02	26.1	61° 15' 45.96" N	149° 54' 47.11" W			sand
A03	8/14/2008	16:56	19.2	61° 14' 50.222" N	149° 53' 38.999" W			sand
A04	8/14/2008	16:42	26.5	61° 14' 23.865" N	149° 55' 25.167" W			sand
A05	8/14/2008	16:34	32.0	61° 13' 34.657" N	149° 55' 53.055" W			sand
A06	8/9/2008	6:06	21.7	61° 13' 45.774" N	149° 57' 48.459" W	grey	fine	sand, silt
A07	8/9/2008	6:25	33.1	61° 13' 12.977" N	149° 59' 24.673" W	grey	medium, fine	sand, silt
A07	8/7/2008	17:18	31.5	61° 13' 12.16" N	149° 59' 23.11" W	grey	medium	sand

Table 1 – Bottom samples obtained in conjunction with survey H11837.

-------- Original Message --------
Subject: Re: H11837_Raster-ENC-disparity
Date: Wed, 09 Jun 2010 11:01:33 -0400
From: Andrew Kampia <Andrew.Kampia@noaa.gov>
To: Edward Owens <Edward.Owens@noaa.gov>
References: <4C0E9A78.7080807@noaa.gov>

Ed,

I intended to find a thorough explanation of why there is a discrepancy between the ENC and Raster. However, I am not exactly sure why. I know it's due to a combination of critical corrections over time, some from Corps of Engineers surveys, many from DtoN soundings that were submitted in October and November of 2009, and possibly it has something to do with chartlets that were created due to the number of sounding and curve revisions in the DtoNs. The chartlets were created for the 16665 1:50,000 scale in a different area than the inset and were sent out in the Local Notice to Mariners. ENC may have used our WIP files to apply the chartlets. I included them in the emails strictly as an "FYI.":

http://ocsdata.ncd.noaa.gov/nm/SupportImage.asp?ItemID=184918
http://ocsdata.ncd.noaa.gov/nm/SupportImage.asp?ItemID=184920

Anyway, the area in the example you sent to me shows the ENC soundings in Blue. I compared these soundings to the Raster continual maintenance files and they match ***very*** well. That's good because the H-Cell will be applied to our continual maintenance files. So for your application, you can use the information in the ENC as the most current product. The ENC sounding spacing in your example is appropriate for the 1:20,000 scale inset.

I hope that helps. Please let me know if you have any other questions or need clarification.

Thanks.

Edward Owens wrote:

Hello Andy,

I've attached a one pager outlining the Raster/ENC issue we talked about earlier today for survey H11837. If you need any additional information or clarification please let me know. Thanks for looking into this so quickly.

Best regards, Edward
--
Andy Kampia
Chief, Products Branch A
(Pacific Coast, Alaska & Great Lakes)
Marine Chart Division - Office of Coast Survey
N/CS21, SSMC3, Room: 6657
1315 EAST-WEST HWY
Silver Spring, MD 20910-3282
301-713-2745 x152

AHB Inquiry – Survey H11837 June 8, 2010
Raster Chart / ENC Disparity

ENC

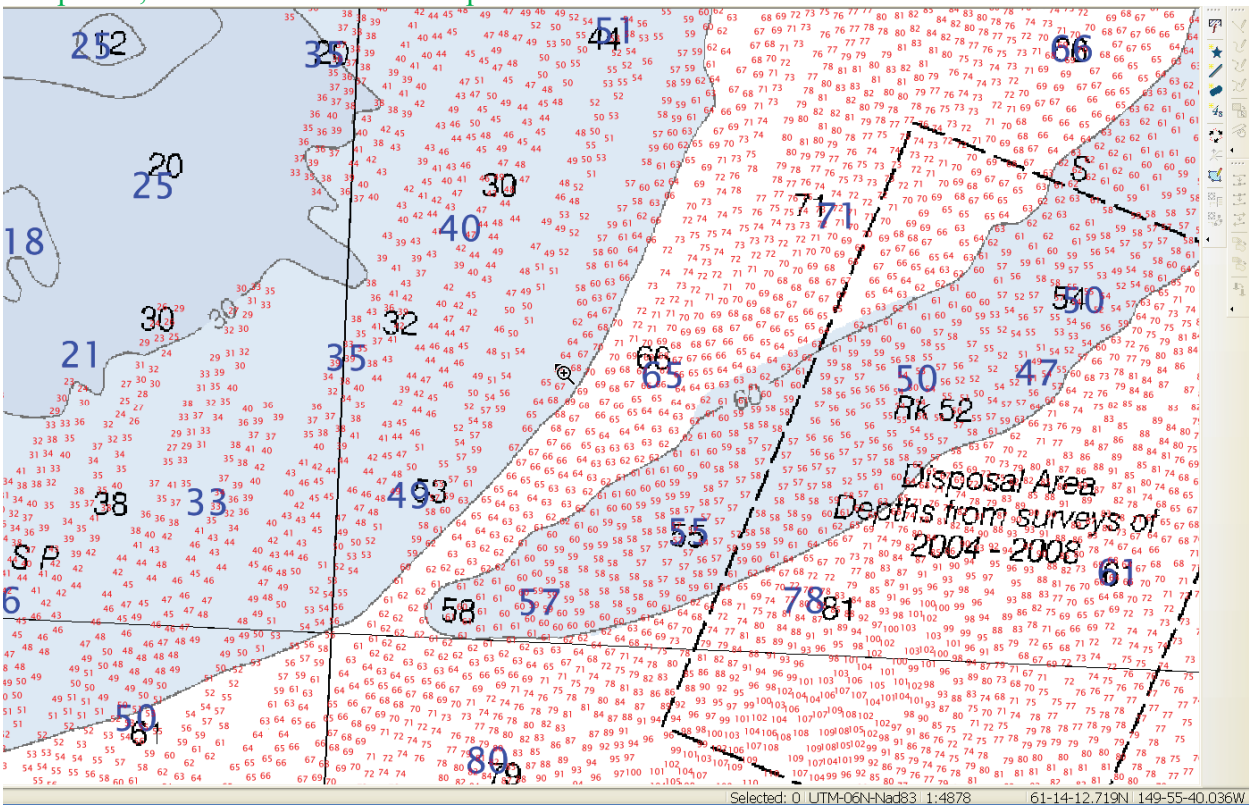
ENC Name	XML	Edition	Update Application Date	Update	Issue Date	Zip File Date Time*	CGD	LNM Clear Date	NGA Clear Date	Chart
US5AK16M	View	15	5/17/2010	0	5/17/2010	05/18/2010 15:45:47	17	5/25/2010	6/12/2010	16665

Raster

16665	View	Cook Inlet-Approaches to Anchorage;Anchorage	50,000	9	Mar /06 (NM:3/4/2006) (LNM:2/21/2006)	9	Mar /06 (NM:6/12/2010) (LNM:5/25/2010)

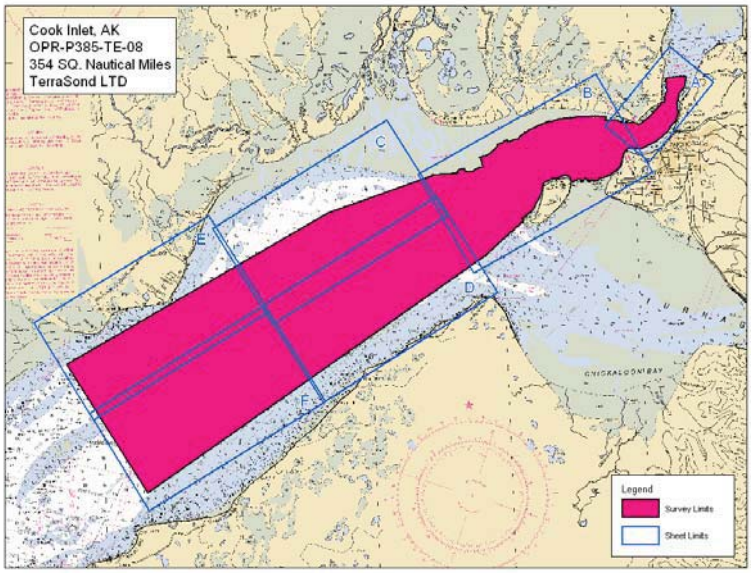
Raster Chart 16665_2 1:20,000
ENC US5AK16M Soundings---------Blue
H11837 Survey Scale Soundings----------Red

Survey Sounding agreement much more closely matches ENC soundings. Which are we to compile to, Raster or ENC? Which product was based on more recent data.



TERRASOND
TERRESTRIAL AND SEA FLOOR MAPPING

Cook Inlet, Alaska OPR-P385-TE-08
Revised Work Plan for Side Scan Survey



Sheets A-F Sheet Layout

GENERAL SURVEY DETAILS

292 Square Natical Miles of side scan survey with shallow water multibeam developments in Upper and Mid Cook Inlet, Alaska covering six sheets.

Proposed Modification to Attachment 5 Task Order Requirements of Statement of Work (SOW) dated March 3, 2008

Proposed Modification to SOW 3.1 Side Scan Sonar Data
Add the language:

"A relaxation of TS Section 6.2.3 Tow Fish Height will be allowed. The contractor will survey at 100 meter range settings, all effective and useable sidescan data will be acceptable regardless of towfish height."

Proposed Modification to SOW 3.1 Side Scan Sonar Data
Add the language:

"TS 6.2.1 Accuracy for object detection shall be increased to a target size to 2 x 2 x 2 meters in 40 meters of water or less, then 10% of water depth when in water greater then 40 meters, per Order 1 surveys for sheets A-F.

Proposed Modification to Attachment 6 Task Order Tides Requirements of Statement of Work (SOW) dated March 3, 2008

Proposed Modification to 1.5.1 Zoning
Add the language:

"In addition to traditional zoning, the contractor will develop zoning through the use of GPS PPK height data. An ellipsoid height model will be developed by the contractor by surveying nine historic COOPS tidal bench marks with GPS to assist and QC/QA the final reduction and zoning of hydrographic data.

Station	Name
945-5866	T-39 Point Possession
945-5869	North Foreland
945-5920	Anchorage
945-5777	Boulder Point
945-5912	Fire Island
945-5824	Moose Point
945-5760	Nikiski
945-5934	Port MacKenzie
945-5768	West Foreland"

SURVEY CONDITIONS/OVERVIEW

The project area covers 292 square nautical miles in Cook Inlet, Alaska. The area extends 4.6 nautical miles north of the Port of Anchorage, and 45 nautical miles South Westerly to Boulder Point. It is a high traffic area utilized by large vessels that are transiting back and forth to the Port of Anchorage. Anchorage is the main port for goods entering South Central Alaska.

According to the Coastal Pilot, the summer winds are from the southeast from May to September when they will switch to the north during the winter. Diurnal tides of 29 feet (at Anchorage) make navigation and hydrography a difficult challenge. The tidal currents can exceed 8 knots during a large tide further up the Inlet. Large boulders exist, that are not marked by kelp that can be moved by the winter ice. "Dangerous wave conditions exist over the shoals when the current opposes winds over 12 knots (Coast Pilot 25ed., Ch 4, para. 999)."

The optimal time for this project will be to start on June first and finish by early September. Significant weather patterns will develop in September and get worse in the fall.

The M/V *Mt. Mitchell* will be chartered for this project. The specifics of the vessel are listed below but in general it was designed for hydrography (a former NOAA Survey vessel) .The Mt. Mitchell crew has previously worked in the area of this project. The Mt. Mitchell is capable of surviving and working in the conditions in the project area and housing the crew onboard. This will be a 24 hour operation.

The operation is self contained (live aboard) as the area is extremely large, making a day boat operation impractical. The main vessel will remain surveying while a launch transits to Anchorage, Nikiski or Kenai every 7 days for supplies and crew changes. The main vessel will need to refuel approximately every 28 days.

SURVEY VESSELS

Two Survey Vessels will be utilized:

1. The M/V *Mt. Mitchell* is a 232' X 44' steel hulled Ocean Survey vessel. It is home ported in Seattle, Washington. It has a fifteen foot draft. The vessel has sufficient house and deck space to support sounding operations. It has ample staterooms for the entire crew. It also has housing for a NOAA COTR. The *Mt. Mitchell* is available for the entire project. It will carry two survey crews for a 24 hour/ 3 shift operation, and fuel and water for most of the project.
2. In addition it will carry the *St. Augustine*, a 30 ft launch for multibeam surveying alongside and in areas inaccessible to the *Mt. Mitchell*. We will have the option to add a third crew if necessary.

TSL's own vessel, the *SeaDucer* can be used as a back-up survey vessel if necessary.

Project Vessels

M/V Mt. Mitchell

M/V ST. Augustine

M/V SeaDucer

PROJECT PHASE CATEGORIES

Preparation

- Tasks that will take place in Palmer prior to field operations include preliminary planning, notifying stakeholders, preparing S57 data and RSD shoreline information, preparing progress sketch templates, setting up processing including TPL for CUBE processing and compilation of charts and other information required for the survey.

Mobilization

- Mobilization will take place in Seattle, Washington, at TSL's facilities in Palmer Alaska and in Seward, Alaska.
- Equipment preparation will include testing and setting up tide gauges; installation of survey systems on the vessel and survey launch, calibration of SVP and survey equipment, construction of a multibeam mounts for use on the survey launch, testing and installation of data collection, processing and storage equipment.
- The Seatell VSAT system, Kongsberg EM710 Multibeam Echo Sounder, hull mounted Edgetech 4200 sidescan and MVP-200 sound velocity winch have already been installed. Installation of the remainder of the survey systems is scheduled for Seward, AK on June 1. Vessel reference frame and sensor survey of the *Mt. Mitchell* was completed in Seattle. Vessel reference frame and sensor survey of the launch will be conducted in Palmer.
- Following the installation of all systems the Mt. Mitchell will begin sea trials, multibeam calibration and settlement tests for both the *Mt. Mitchell* and the launch.
- Transit from Seward to the worksite will follow the sea trials and calibrations and will require 1.5-2 days.

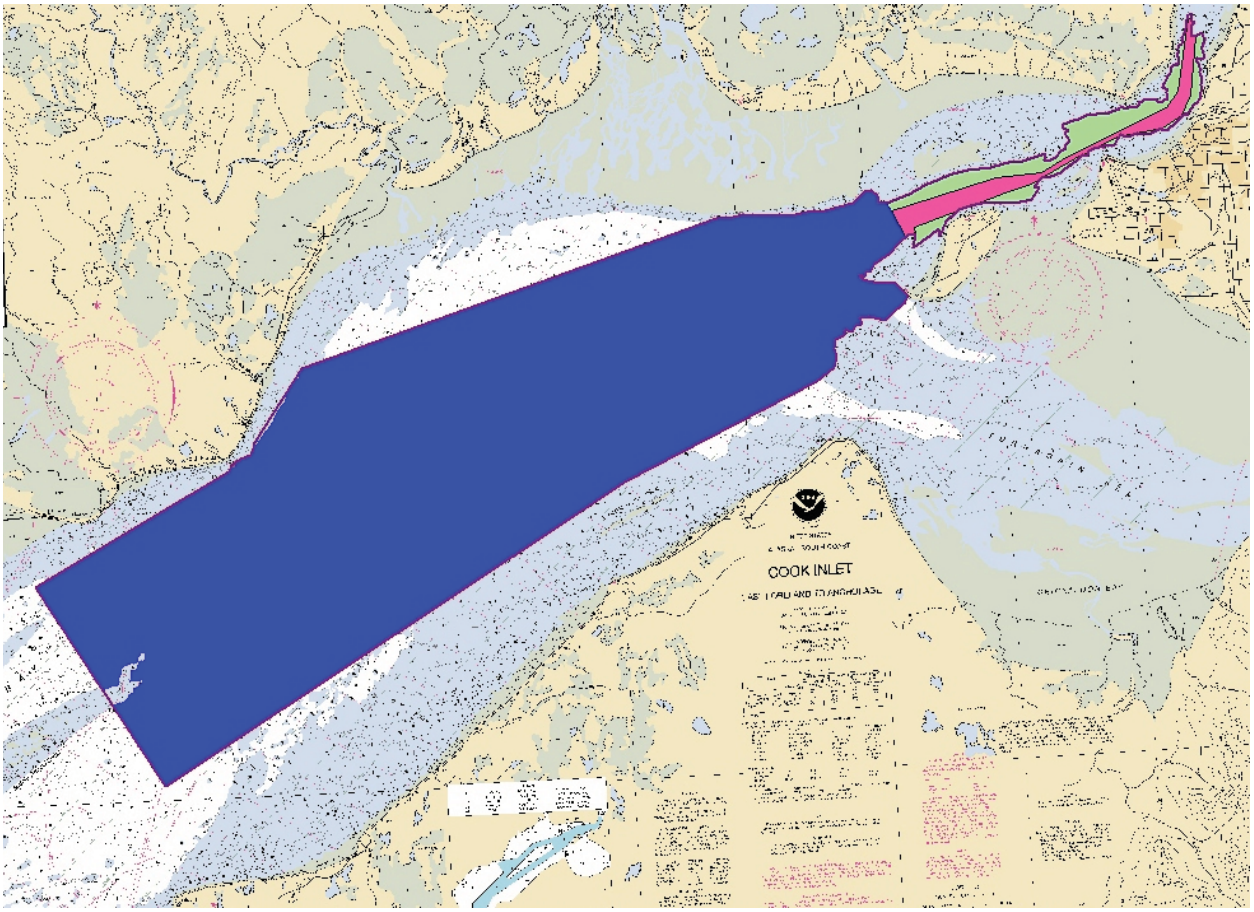
Communications and Differential GPS

- USCG DGPS corrections from Kenai.
- We have purchased and installed a Sea-Tel WaveCall 4006 VSAT satellite communication system for use in Cook Inlet. The system uses a 1 meter Ku-band maritime antennae for voice and data communications. This system will be configured with service to provide 1024 kbps download and 256 kbps upload. TSL has used VSAT systems on three NOAA surveys previously (2002, 2003 and 2005, and 2007). It has enabled us to manage the field operations with a smaller crew and provide better support from Palmer.
- VHF communications are available onboard each of the boats at all times for marine communications and safety.
- Two satellite phones will be available onboard the Mt. Mitchell. One will be a TSL Irridium phone and the other will be the Mt. Mitchell's Global Star Satellite phone. Both will support voice and text messages but will not support data transfer. Communications between the Mt. Mitchell, our survey launch and other vessel traffic will be via marine VHF radios.
- Cellular phones will work in some areas of the project.

SURVEY OPERATIONS OVERVIEW

Currents in Cook Inlet can exceed 7 knots. Production was computed taking into account the average of speed made good against and with the currents. The Tides and Currents program was use to analyze the currents in the area. Speed made good is calculated using the hourly currents and their effect on the boats working speed of 8 knots through the water. The distance made good totals the speed made good with and against the current, arriving at an average distance made good for each day. The constraints were a speed over ground cap set at 9 knots and a speed through the water of 8 knots. The maximum speed the Edgetech 4200 sidescan system can operate and remain within specification is 9.8 knots over the ground and we have found that irregardless of the speed over the ground, noise levels are problematic when pushing the system through the water faster than 8 knots. The result is that we can go 9 knots with the current pushing and usually do less than 8 knots working against the current.

Days of sounding operations were computed by dividing the survey into Northern and Southern portions. The majority of the Northern portion will be surveyed by the launch due to the shoals.



Survey Area. Blue is area completed with 3 shifts daily. Red/Green area is completed with 2 shifts per day (no night shift). Green is launch area. Red is Mt Mitchell area.

Northern Portion of Project	
Mainline Launch Miles	206.00
Cross Lines (5%)	10.84
Reruns and Holidays	10.84

Total Launch Miles for Northern Portion of Project	227.68
Production for Launch	48.31
Weather Factor for Launch	15%
Average Production for Launch (including Weather)	31.75
Other Tasks for Launch	
Samples (days)	1.00
Edge Survey	0
Launch Days Survey of Northern End	**8.17**
Mainline Mt Mitchell Miles	144.00
Cross Lines (5%)	7.20
Reruns and Holidays	7.20
Total Mt Mitchell Miles for Northern Portion of Project	158.40
Production for Mt Mitchell	124.22
Weather Factor for Mt Mitchell	10%
Percent of time lost to moving bottom gauges biweekly (6 hours each occurrence)	4%
Average Production for Mitchell (including Weather)	107.36
Mitchell Days Survey of North End	1.48

The Southern portion will be surveyed by both the Mitchell and the launch concurrently as much as weather allows the launch to go out. The launch and the Mt. Mitchell have a combined production rate used to compute the number of days of survey. The launch has a larger weather factor, and will not be able to survey while it is doing ancillary tasks (trips to shore and bottom samples). The estimated production lost from the launch on these days has been accounted for to arrive at a total number of days to complete the Southern portion (broken into middle and southern portion see the tables below).

Middle Portion of Project (MB only but 3 shifts)	
Mainline Miles	556.00
Cross Lines (5%)	29.26
Reruns and Holidays (5%)	29.26
Total Miles for Southern Portion of Project	614.53
Production for Mt Mitchell/day	124.22
Weather Equipment Factor for Mt Mitchell	10%
Percent of time lost to moving bottom gauges biweekly (6 hours each occurance)	4%
Average Production for Mt Mitchell (inc Weather, gauge moves)	107.36
Production for Launch	48.31
Weather Equipment Factor for Launch	20%
Percent of time lost to Trips to Shore (1 day per week)	14%
Average Production for Launch (inc Weather)	31.75

Other Tasks for Launch	
Samples (days)	2
Edge Survey (days)	1
Days Total for Survey of Southern End	**5.03**

Southern Portion of Project	
Mainline Miles	5,103
Cross Lines (5%)	268.58
Reruns and Holidays (5%)	268.58
Total Miles for Southern Portion of Project	5,640.16
Production for Mt Mitchell/day	124.22
Weather Equipment Factor for Mt Mitchell	10%
Percent of time lost to moving bottom gauges biweekly (6 hours each occurance)	4%
Average Production for Mt Mitchell (inc Weather, gauge moves)	107.36
Production for Launch	48.31
Weather Equipment Factor for Launch	15%
Percent of time lost to Trips to Shore (1 day per week)	14%
Average Production for Launch (inc Weather)	34.16
Other Tasks for Launch	
Samples (days)	11
Edge Survey (days)	1
Days Total for Survey of Southern End	**42.75**

Data Collection

Both vessels will survey simultaneously when the weather is acceptable for the launch. We expect high currents, and new shoaling trends to complicate the survey. The launch will be responsible for bathymetry including main and cross lines to be required for the shoal areas reaching the 4 meter curve in sheets C-F the *Mt. Mitchell* can not survey.

Sheets A and B will be surveyed with SWMB only on the same 90 meter line spacing as the southern part of the inlet.

TSL will have a crew of 10 hydrographers living aboard the Mt. Mitchell:

Lead Hydrographer (1)
Senior Hydrographers (3)
Junior Hydrographers (3)
Lead Processor (1)
Junior Processor (1)

Junior Processor (1)

TSL will have a crew of 7 hydrographers following the completion of the southern 275 square miles since the need for a night shift is over.

- The *Mt. Mitchell* will have a hull mounted Kongsberg EM710 70-100kHz multibeam sounder with an Applanix POSMV motion system, and an Edgetech 4200 High Speed Mode hull mounted side scan system. Data will be collected with QINSy software. Line logs will be kept digitally and DGPS QA will be logged and monitored for conditions out of specifications. Survey operations will be stopped until the conditions are within specifications.
- The *St. Augustine* will have a pole mounted Reson 8101 multibeam with an Applanix POSMV motion system and an Edgetech 4200 High Speed Mode hull mounted side scan system. Data will be collected with QINSy software. Line logs will be kept digitally and DGPS QA will be logged and monitored for data out of specifications. Survey operations will be stopped until the conditions are within specifications. The system on the launch will also provide redundancy of equipment for the *Mt. Mitchell*'s collection system.
- Collected data will be reviewed and checked both for quality control and coverage aboard the *Mt. Mitchell.* Data will be transferred to Palmer as often as possible and weekly at minimum via courier on recordable DVD-ROM disks, hard drive or LTO tape by launch and then by road to Palmer. Additional data processing staff will be positioned in Palmer.
- The *Mt. Mitchell* will survey at 2-9 knots. The *Mt. Mitchell* should average 107 line miles per day. The launch will work only days. It will produce 34 line miles per day. These production estimates allow for weather and ancillary tasks.
- Sound Velocity profiles with be collected with a MVP-200 Moving Vessel Profiler, eliminating the need to stop for casts. The launch will use the sound velocity data from the moving profiler when surveying in the vicinity of the *Mt. Mitchell.* The launch will also be equipped with an Applied Microsystems SVplus and will stop for casts as required when surveying in a different location from the *Mt. Mitchell*.

TIDE PROGRAM

Overview

TSL will be processing the tides with post processing kinematic (PPK) acquired through a motion sensor and 2 movable Seabird acoustic gauges. An ellipsoid height survey of nine historical tide gauge sites throughout the Inlet will be conducted prior to hydrography. This will establish MLLW-Ellipsoid height separation. This separation value will be applied to dangers and chart comparisons during collection. As a back up and QC/QA to the GPS tides, two traditional tide stations will be installed, one at Point Possession and one at North Forelands. John Oswald and Associates will be assisting in the planning, installation, monitoring and reporting of tide stations and data. TerraSond will install, and perform the periodic water level and water density readings at Pt. Possession. TerraSond, Ltd. will demobilize Point Possession. JOA will install, and perform the periodic water level and water density readings at North

Foreland. Additionally, the tides program will utilize two primary and two subordinate sites for QC/QA of GPS tides:

Anchorage (945-5920)
Nikiski (945-5760)
Point Possession (945-5866)
North Foreland (945-5869)

The data from the primary gauges at Anchorage and Nikiski will be downloaded off the hydro hotlist. Two bubbler gauges will be installed at Point Possession and a Radar gauge will be installed at North Forelands. Data will be transmitted via GOES transmission to JOA for analysis.

- TSL will deploy 2 submersible Seabird 26Plus gauges equipped with Paros pressure sensors. Each gauge will be independently set and will have an anchor (railroad wheel or similar), a surface buoy and also ground line for retrieval should the buoy become detached and floating.
- The Seabird 26Plus gauges will be moved and redeployed at least four times during hydrography around the sounding data for zoning. These gauges have been used as tertiary gauges previously (by JOA) in support of NOAA hydrography where gauge installation is difficult or impractical. TerraSond has successfully used this brand of gauge for zoning support on surveys for NOAA and other clients.
- TSL will operate two digital barometers on shore and one on the vessel to correct and get absolute water level for the Seabird 26Plus gauges.
- Preliminary datum to be determined from at least 7 days of data (simultaneous computations from NOAA NWLON at Anchorage and Nikiski) combined with tertiary gauges corrected for separation. TSL will use this datum for preliminary reduction of soundings during field operations.
- TSL will obtain staff shots at Point Possession using leveling techniques once weekly accessing the beach using a fixed wing aircraft at both sites. JOA will obtain staff shots at North Forelands using leveling techniques once weekly. Both sites will be accessed using a fixed wing aircraft.

- TSL will maintain Point Possession during all hydrographic operations in the field. JOA will maintain North Forelands during all hydrographic operations in the field.
- TSL will perform required geodetic ellipsoid height tie with dual frequency GPS at tPoint Possession. JOA will perform required geodetic ellipsoid height tie with dual frequency GPS at North Forelands.
- TSL crew will demobilize all equipment, perform closeout leveling and clean site at Point Possession. JOA crew will demobilize all equipment, perform closeout leveling and clean site at North Forelands.
- JOA will prepare all computations and tabulations of data from their Anchorage office.
- JOA will prepare and deliver all required Tide reports, including Installation and Final reports and perform GPS blue booking.

Bottom Sampling

- There are 252 bottom samples in water depths ranging from 2 to 33 fathoms. They will be collected on good weather days, using the *Mt Augustine* and will require 14 days.

Data Processing and Reporting

- Initial data processing will be performed concurrent with the data collection onboard the *Mt. Mitchell*. Data will be further processed in Palmer during collection and final data processing including application of verified tides and final data checks will follow data collection.
- Descriptive reports will be performed from Palmer following data collection.

SIGNIFICANT DATES FOR THE SURVEY

June 1	Crew to Seward for mobilization of the vessel *Mt. Mitchell*
June 2 – 3	Installation of systems onboard the Mt. Mitchell and Launch
June 4 – 5	Sea Trials, Calibration and Settlement determination for *Mt. Mitchell* and Launch
June 6 - 7	Transit to Survey Area
June 8 – Aug 8	Survey work in Cook Inlet
Aug 9 - 10	Transit to Seward
Aug 11- 12	Remove equipment from Mt. Mitchell
Aug 13 - 19	Mt Mitchell transits to Seattle
Aug 13	Return equipment to Palmer
Aug 13 – Dec 9	Data reduction and report generation

KEY PERSONNEL

Anne Dollard, PLS – Project Manager, Lead Hydrographer
Raj Bhangu – Lead Hydrographer, Lead Processor
Kathleen Mildon – Field Project Manager, Lead Hydrographer
Kelly Fournier – Lead Processor/Senior Hydrographer
Joe Talbot – Senior Hydrographer
Steven MacDonald – Senior Hydrographer
Garrett Yaeger – Senior Hydrographer
Marta Kryntzky – Hydrographer
Chris Russoniello – Hydrographer

Sufficient support personnel are also available.

Attached is a brochure for the Sea Tel VSAT system, Kongsberg EM710, MVP-200, Applanix POS/MV, EdgeTech 4200 and information on the vessel *Mt. Mitchell.*

From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Friday, September 26, 2008 11:36 AM
To: James DePasquale
Cc: Anne Dollard; Kathleen Mildon; Raj Bhangu; Thomas Newman
Subject: Re: Cook Inlet processing

Thanks, Jim, this is exactly what I was looking for.

Mark

James DePasquale wrote:
Mark,

We are still plugging away at picking SSS contacts in H11840 and H11842. The statistics are shaping up to be roughly 10,000 individual contacts for each of these sheets which we can likely expect to correlate to 5,000 individual features. We have not yet begun picking SSS contacts in H11839 and H11841. Multibeam processing is coming along nicely; we have finished processing our PPK data and will be applying it to the multibeam data shortly.

We have developed a workflow which compares multibeam data processed with conventional tide gauges to the PPK-processed data to ensure the quality of the PPK solution. To accomplish this, we will compare and contrast three individual copies of the multibeam survey; the first using purely conventional tides and attitude, the second using PPK navigation and the third using PPK tides, navigation and attitude.

Per our discussion on 08.26.08, we will report 200 S-57 objects (i.e. rocks) per sheet in addition to bottom samples, navigational aids and oil platforms. The features will be spatially distributed in such a way as to concentrate the majority of them in shoaler areas of higher navigational significance and disperse them in deeper areas. We will use three factors to determine the distribution; horizontal position of each feature, prevailing depth from the 2008 survey and least depth of each feature.

The basic steps to accomplish this are:

1. Correlate SSS contacts from overlapping lines into a master feature list. The position and dimensions of the SSS contact most proud of the seafloor will be assigned to

each singulated feature record while the sonar file names from each correlating contact are retained in that feature's attributes.

2. We will intersect each feature with a 20-meter resolution BASE surface, adding mean depth values from the surface to each feature's attributes. Next, we will subtract each feature's target height from the mean depth values, resulting in a general least depth or clearance at MLLW for each feature.

3. Of the 200 features per sheet, we will disperse 75% to areas shoaler than 11 fathoms and 25% to areas deeper than 11 fathoms using least depth values computed in step 2 to determine significance. The procedure is as follows:

A. Divide each sheet into two areas; shoaler than 11 fm and deeper than 11 fm.
B. Sort features falling within the shoaler area by least depth and extract the 150 lowest values.
C. Sort features falling within the deeper area by least depth and extract the 50 lowest values.

4. At this point, we will consider the spatial distribution of features in each depth area by plotting the 200 features extracted in the previous step. If the features appear to be evenly distributed throughout each area, these will become S-57 objects. We will begin correlating them with multibeam data per Section 6.3.2 of the April, 2007 *NOS Hydrographic Surveys Specifications and Deliverables.*

However, if the features are spatially biased within each depth area, we will take the following steps:

A. Split the 11 fm and shoaler area into 150 grid cells of equal area.
B. Split the 11 fm and deeper area into 50 grid cells of equal area.
C. Overlay the features with the grid cells and extract the feature presenting the lowest least depth value within each grid cell.

Thus, 75% of the 200 features per sheet will be within areas shoaler than 11 fm, 25% of the 200 features will be within areas deeper than 11 fm and an even representation of each depth area is maintained.

Please feel free to contact me at any time if you have any questions or suggestions.

Regards,

Jim DePasquale

-----Original Message-----
From: Mark.T.Lathrop [mailto:Mark.T.Lathrop@noaa.gov]
Sent: Thursday, September 25, 2008 10:49 AM
To: James DePasquale
Cc: Anne Dollard
Subject: Cook Inlet processing

Hi Jim,

Can you give me some feedback about your Cook Inlet processing? Which methodology that we discussed is working best, any issues with contact sorting, etc. What about the sheets we didn't look at during my visit? Anything new you've discovered?

Thanks,

Mark

From: Crescent Moegling [mailto:Crescent.Moegling@noaa.gov]
Sent: Friday, August 08, 2008 8:06 AM
To: pete holmberg
Cc: Mark T Lathrop
Subject: Re: Modifications to Terrasond's 08 Cook Inlet Project

Pete,

Thanks so much for valuable feedback. I will be putting together a new SOW to reflect our conversation this morning as well as providing some feedback to Terrasond on the issues they brought up during your visit.

Crescent

pete holmberg wrote:
Mark and/or Crescent,

This was my first time doing a site visit. It was not made clear to me if I was/am a COTR or not. More specifically I did not know if I had the authority to give guidance that would alter the SOW. I did have the 1 week COTR training back in January 05 for sailing aboard the Time Charter.

The following are reasonable requests and clarifications to the SOW and deliverables for this project. Cook Inlet is such a unique and dynamic area that I think it is necessary to alter the requirements. After lengthy discussions Jim Depasquale (jdepasquale@terrasond.com), Kelly Fournier (kfournier@terrasond.com), and I agreed that the following changes in deliverables are needed. Terrasond is requesting documentation to approve these changes. I openly told them that I would act as a technically experienced liaison to grant them this. Although, I also told them I didn't know if the documentation would come to them in the form of an offial change to the SOW or just an email. Either way they need something in writing to support their modified deliverables.

The SOW states that 100 meter line spacing shall be used. To get better coverage, Terra has decided to run 90 meter line spacing (no problem, more conservative). However they are still unable to attain a complete 100% and 200% SSS coverages. Together the coverages maybe make about a 170% SSS coverage. Terra is covered by the SOW only asking for 100m spacing. But Terra is asking if they need submit separate mosaics as the Specs and Deliverables requires. Each mosaic standing alone has sliver gaps, but together the form a solid coverage.

The SOW also states that all objects greater than 1m shall be developed for least depth. Cook inlet is so full of rocks that Terra would have to nearly come back and get bathy over every sliver gap in the SWMB coverage that is covered by SSS (see attached graphic of SWMB covg). Doing that would defeat the goal of expatiating the rapid resurveying of

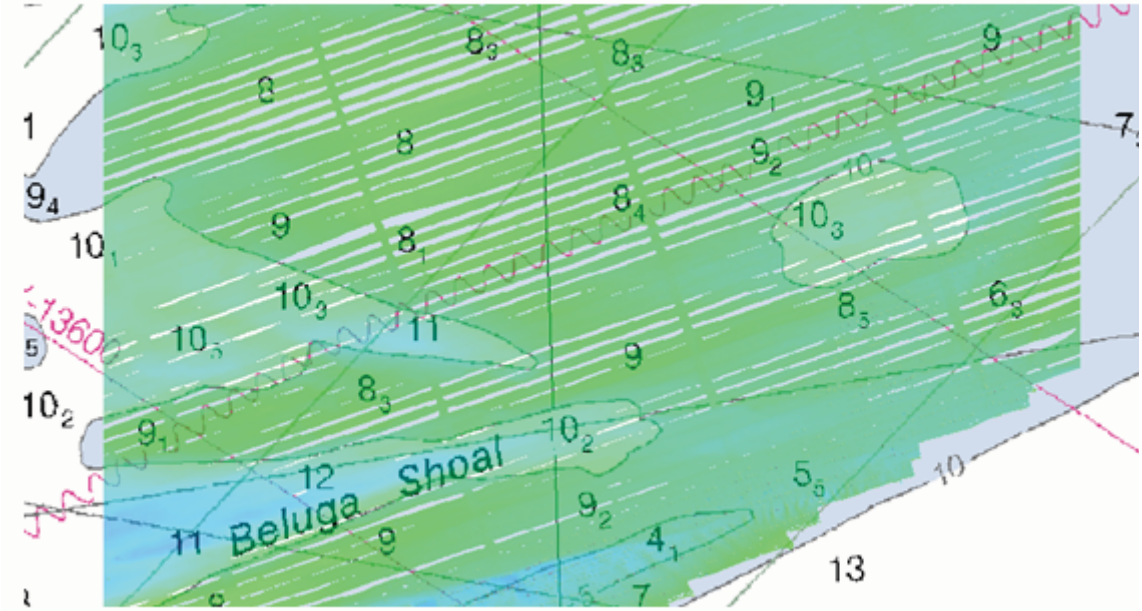
the area and make utilizing SSS pointless. After speaking with Mark Lathrop about this we decided the loose guidance of; develop any rocks that have shadows that measure the height of the rock greater than the heights of the surrounding rocks in the adjacent SWMB coverage.

Another problem is that the unusually strong tide rips cook inlet are moving rocks well over 1m in size around the inlet. Looking at the SSS I saw for myself that this is obvious. It is more appropriate to relax the development and delineation of rock contacts to those 2m and greater as opposed to 1m. They don't want to survey moving rocks.

Now on to the rocky seabed area delineation. All the contractors are asking for guidance on this right now and Cathleen and I are struggling to come up with something as concrete as possible. Terra made a new point that I had not heard before. If they are to pick out the shoalest rocks to delineate an area, then they have to measure the least depth on all rocks. They claim it would be simpler to submit them all and let us delineate the area of rockyness. It is a cartographic decision to decide weather or not rocks should be grouped into areas or left to stand alone. Regardless I gave them the loose guidance to identify rocks at or double the density of soundings on the largest scale chart.

Terra would also like to know why sheet limits are still being assigned? They would prefer to only get the survey boundaries.

Peter Holmberg
Cartographer/Hydrographer/(COTR?)
206-526-6843



--
Crescent Moegling
NOAA Hydrographic Surveys Division
Branch Chief - Data Acquisition Control
301.713.2700 x111

Comments Trail for Request 01000370. Print

Issue Description:

When converting contractor XTF for side scan imagery the starboard channel waterfall appears in the port channel of the converted XTF file in CARIS format. I have uploaded an example XTF file (5351-29A-c.xtf), jpeg image of the converted file, XTF dump in text format, and HIPS/SIPS ver7 config report to the following FTP server directory:
ftp://ftp.caris.com/incoming/support/USA/NOAA/CASIE_CARROTT/

We have tried converting the Terrasond XTF file using a variety of conversion selection parameters and the results are all the same, starboard channel in port waterfall with nothing in the starboard waterfall. It appears the conversion *.dll is referencing the starboard channel and placing it in the port waterfall. When referencing the dump XTF it list the port sonar channel 1 but doesn't contain or list a starboard channel.

The contract XTF was originally recorded using QPS QINSy data acquisition software and either exported or saved as XTF format. We have viewed the contract provided XTF file using a freeware XTF viewer, and both channels appear to be properly displayed. At this time we think this is a conversion issue, and request CARIS's assistance.

Thank you for your support and efforts,

Casie Carrott

Comments Item/Date

1. **Burns Foster**
2010-02-09 09:51

Casie,

After looking through this XTF, it seems the 1st channel was actually encoded as sub-bottom data instead of side scan, which is why you are seeing only the starboard channel in SIPS (we ignore subbottom channels). It's possible we can create a utility to alter the channel type in the XTF, but I'm uncertain at this point how long it will take. The alternative would be to make this change on your end, or ask Terrasond to do so.

Let me know what you'd like to do from those two options.

Thanks,

Burns

2. **Castle Eugene Parker**
2010-02-11 09:15

Good Day Burns,
AHB will go back to Terrasond and inquire as to the possibility of revising the XTF as mentioned below. This is a Terrasond issue as was not delivered in a condition where it would be Caris compatible. AHB needed confirmation from Caris as to what and how the converter reads the XTF.
Thanks for your time and effort with this XTF issue.
Gene Parker

3. **Burns Foster**
2010-02-11 09:36

Cassie,

Not a problem. If Terrasond is unable to fix it we can do it from our end, but it will take time to write a utility to do so.

Thanks,

Burns

Subject: [Fwd: [Fwd: Re: H11837_Raster-ENC-disparity]]
From: Edward Owens <Edward.Owens@noaa.gov>
Date: Wed, 30 Jun 2010 15:27:31 -0400
To: Kyle.Bates@noaa.gov

-------- Original Message --------
Subject: [Fwd: Re: H11837_Raster-ENC-disparity]
Date: Wed, 09 Jun 2010 12:29:15 -0400
From: Edward Owens <edward.owens@noaa.gov>
Organization: NOS, OCS, HSD, Atlantic Hydrographic Branch
To: Katrina Wyllie <Katrina.Wyllie@noaa.gov>, kyle.bates@noaa.gov
CC: Rick Brennan <Richard.T.Brennan@noaa.gov>

Kyle and Katrina,

Here's the response from MCD. Let's move forward using the ENC for the H-Cell application (First time I've heard of us doing this wholesale*!.) All correspondence including the screen captures will need to be in the report and discussed adequately. Tally-ho!

Edward

-------- Original Message --------
Subject: Re: H11837_Raster-ENC-disparity
Date: Wed, 09 Jun 2010 11:01:33 -0400
From: Andrew Kampia <Andrew.Kampia@noaa.gov>
To: Edward Owens <Edward.Owens@noaa.gov>
References: <4C0E9A78.7080807@noaa.gov>

Ed,

I intended to find a thorough explanation of why there is a discrepancy between the ENC and Raster. However, I am not exactly sure why. I know it's due to a combination of critical corrections over time, some from Corps of Engineers surveys, many from DtoN soundings that were submitted in October and November of 2009, and possibly it has something to do with chartlets that were created due to the number of sounding and curve revisions in the DtoNs. The chartlets were created for the 16665 1:50,000 scale in a different area than the inset and were sent out in the Local Notice to Mariners. ENC may have used our WIP files to apply the chartlets. I included them in the emails strictly as an "FYI.":

http://ocsdata.ncd.noaa.gov/nm/SupportImage.asp?ItemID=184918
http://ocsdata.ncd.noaa.gov/nm/SupportImage.asp?ItemID=184920

Anyway, the area in the example you sent to me shows the ENC soundings in Blue. I compared these soundings to the Raster continual maintenance files and they match ***very*** well. That's good because the H-Cell will be applied to our continual maintenance files. So for your application, you can use the information in the ENC as the most current product. The ENC sounding spacing in your example is appropriate for the 1:20,000 scale inset.

I hope that helps. Please let me know if you have any other questions or need clarification.

Thanks.

Edward Owens wrote:
> Hello Andy,
>
> I've attached a one pager outlining the Raster/ENC issue we talked about earlier today for survey H11837. If you need any additional information or clarification please let

> me know. Thanks for looking into this so quickly.
>
> Best regards, Edward

--
Andy Kampia
Chief, Products Branch A
(Pacific Coast, Alaska & Great Lakes)
Marine Chart Division - Office of Coast Survey
N/CS21, SSMC3, Room: 6657
1315 EAST-WEST HWY
Silver Spring, MD 20910-3282
301-713-2745 x152

Edward A. Owens <Edward.Owens@NOAA.GOV>
Lead Physical Scientist
Atlantic Hydrographic Branch
NOAA

AHB Inquiry – Survey H11837 June 8, 2010
Raster Chart / ENC Disparity

ENC

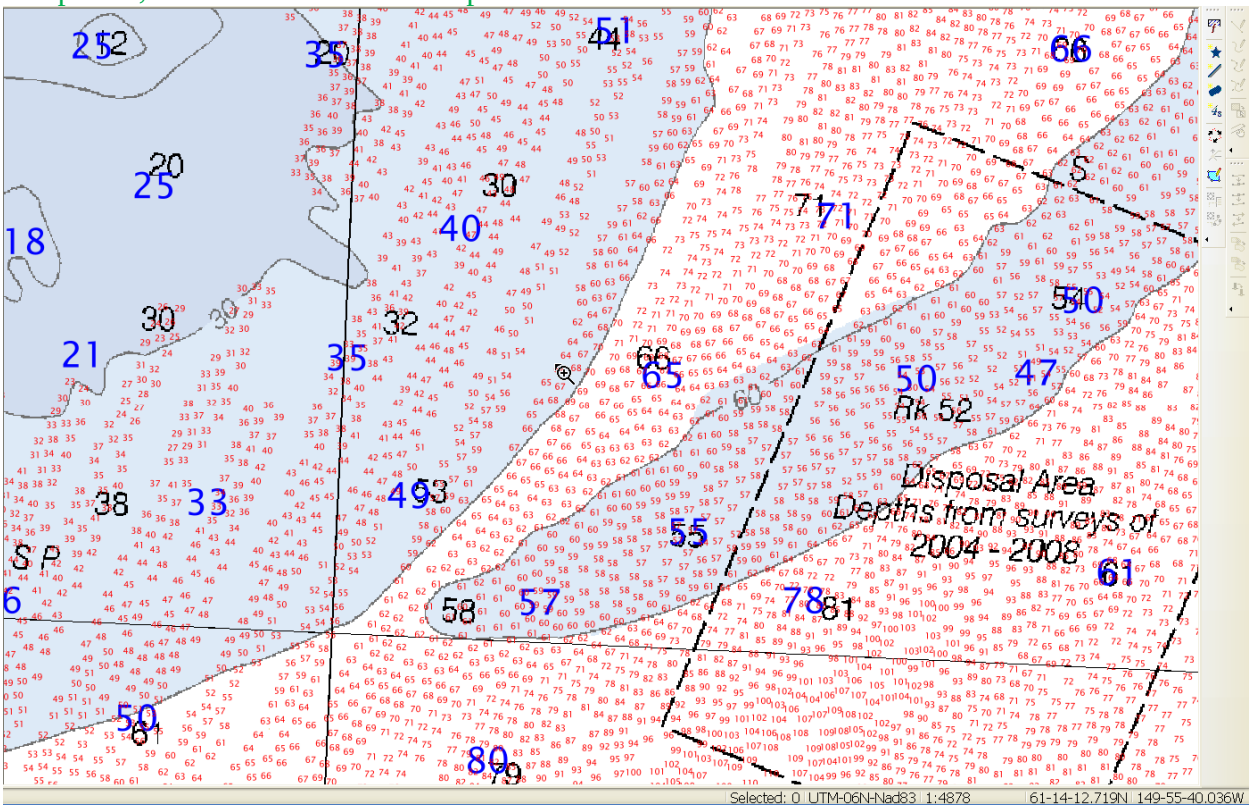
ENC Name	XML	Edition	Update Application Date	Update	Issue Date	Zip File Date Time*	CGD	LNM Clear Date	NGA Clear Date	Chart
US5AK16M	View	15	5/17/2010	0	5/17/2010	05/18/2010 15:45:47	17	5/25/2010	6/12/2010	16665

Raster

16665	View	Cook Inlet-Approaches to Anchorage;Anchorage	50,000	9	Mar /06 (NM:3/4/2006) (LNM:2/21/2006)	9	Mar /06 (NM:6/12/2010) (LNM:5/25/2010)

Raster Chart 16665_2 1:20,000
ENC US5AK16M Soundings---------Blue
H11837 Survey Scale Soundings----------Red

Survey Sounding agreement much more closely matches ENC soundings. Which are we to compile to, Raster or ENC? Which product was based on more recent data.



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AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H11837
PROJECT No.	OPR-P385_TE_08
FIELD UNIT	Terrasond
LARGEST SCALE CHART	***16665_2, edition 9, March 2006, 1:20,000***
ADDITIONAL CHARTS	***16665_1, edition 9, March 2006, 1:50,000***
SOUNDING UNITS	**Feet**
COMPILER	Kyle S. Bates

Source Grids	**File Name** H:\Compilation\ H11837_P385_TERRA\AHB_H11837\
	SAR Final Products\GRIDS\ H11837_1m_0to23m_Final_0.hns
	SAR Final Products\GRIDS\ H11837_2m_20to52m_Final_0.hns
	SAR Final Products\GRIDS\ H11837_4m_46to115m_Final_0.hns
Surfaces	**File Name** H:\Compilation\H11837_P385_TERRA\AHB_H11837\COMPILE\Working
Combined	**H11837_4m_Combined.csar**
Interpolated TIN	\Interpolated TIN\ **H11837_4m_InterpTIN.csar**
Shifted Interpolated TIN	\Interpolated TIN \Shifted Surface**H11837_4m_InterpTIN_Shifted.csar**
Final HOBs	**File Name** H:\Compilation\H11837_P385_TERRA\AHB_H11837\COMPILE\Final_Hobs
Survey Scale Soundings	**H11837_SS_Soundings.hob**
Chart Scale Soundings	**H11837_CS_Soundings.hob**
Contour Layer	**H11837_Contours.hob**
Feature Layer	**H11837_Features.hob**
Meta-Objects Layer	**H11837_MetaObjects.hob**
Blue Notes	**H11837_BlueNotes.hob**

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	Coverage Available
SORDAT	20080813
SORIND	US,US,graph,H11837
M_QUAL	
CATZOC	zone of confidence U (data not assessed)
INFORM	R/V Mt. Augustine
POSACC	10
SORDAT	20080813
SORIND	US,US,graph,H11837
SUREND	20080813
SURSTA	20080801
DEPARE	
DRVALV 1	0.499ft
DRVALV2	187.005ft
SORDAT	20080813
SORIND	US,US,graph,H11837

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M_CSCL	
CSCALE	50000
SORDAT	20080813
SORIND	US,US,graph,H11837

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: 3
   b. Resolution of Combined (m): 4m

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (1mm at 20000): ; Radius Value = 1
   d. Queried Depth of All Soundings
      i. Minimum: 0.499ft
      ii. Maximum: 187.005ft

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 4
   b. Natural Neighbor
   c. Shifted value: *-.75ft*

IV. CONTOURS:
   a. Use a Depth List: H11837_NOAA_depth_curves_list.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. FEATURES:
   a. Total Number of Features: 7

VI. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 213
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius:
      i. Sounding Space Range Table: H11837_SSR.txt
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings:272

ATLANTIC HYDROGRAPHIC BRANCH
H-CELL REPORT to ACCOMPANY
SURVEY H11837 (2008)

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS Base Manager version 2.3 SP1 HF 1-16
CARIS S-57 Composer version 2.1 HF 1-4
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3 HF 8

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's original 1, 2, and 4m grids, combined at 4 meter resolution. The survey scale soundings were created from the combined surface at 1mm radius at 1:20,000. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

A TIN (Triangulated Irregular Network) surface was created from the survey scale soundings from which an interpolated surface was generated for the purpose of automatically generating depth contours. These contours were minimally edited and forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached directly before this H-Cell Report. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (UWTROC, SBDARE, SNDWAV, WRECKS), US5AK16M_ENC Features (UWTROC, SBDARE, WRECKS), US3AK1DM_ENC Features (SBDARE), Meta objects (M_COVR, M_QUAL, M_CSCL), and cartographic Blue Notes ($CSYMB).

All of the components with the exception of the sounding selection and depth contours were inserted into one feature layer (including the Blue notes, as dictated by Hydrographic Technical Directive 2008-8 and HSD's H-Cell Specifications 2009). The

SAHOB H-Cell layers were exported to S-57 format for the H-Cell deliverable. H11837 H-Cell chart scale soundings were selected based upon the scale of the applicable chart. The H-Cell's SS deliverable includes survey scale soundings selected and depth contours.

The SAHOB's were exported from CARIS Bathy DataBASE to a metric S-57 file (H11837_SS_metric.000 and H11837_CS_metric.000). These files were then opened in CARIS HOM and were converted from metric to chart units (feet) and exported for final delivery to MCD as H11837_SS.000 and H11837_CS.000. The final deliverables are two S-57 files; one that contains the chart scale soundings, all the features, meta objects, and blue notes (H11837_CS.000), and one that contains the survey scale sounding selections and depth contours (H11837_SS.000). Quality assurance checks were made utilizing CARIS S-57 Composer 2.0 validation checks and dKart Inspector 5.0 tests.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H11837 CARIS H-Cell final deliverables include the following products:

H11837_CS.000	1:20,000 Scale	H11837 H-Cell with Chart Scale Selected Soundings
H11837_SS.000	1:20,000 Scale	H11837 Selected Soundings (Survey Scale)

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the field unit with no additional correction required by Atlantic Hydrographic Branch. The field unit applied verified water levels in conjunction with the preliminary tidal zoning which was accepted and approved by N/OPSI CO-OPS as the final zoning for H11837. Sounding datum is Mean Lower Low Water (MLLW). Vertical datum is Mean High Water (MHW)

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 6N.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

16665_2 (9th Edition, Mar. /06)
Corrected through NM 05/29/2010
Corrected through LNM 05/18/2010
Scale 1:20,000

16665_1 (9th Edition, Mar. /06)
Corrected through NM 05/29/2010
Corrected through LNM 05/18/2010
Scale 1:50,000

ENC Comparison **US5AK16M**
Cook Inlet – Approaches to Anchorage; Anchorage
Edition 15
Application Date 2010-05-17

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "D" and Appendix I and II of the Descriptive Report. The following exceptions are noted:

a. Four rocky seabed areas and one sand wave area were digitized and included in the H-Cell to represent the geology of the survey seafloor.
b. The wreck at 61-15-04.2959N, 149-53-38.7413W was surveyed by the field unit to a least depth of 31feet. With further investigation of the submitted data, it is recommended to retain the 29 foot wreck as charted. The field did not perform an adequate development of the wreck and the least depth of 31 feet was questionable. For the safety of the mariner, the shoaler charted depth is recommended to be retained.
c. The rock at 61-13-44.9969N, 149-54-27.3866W was not developed by the field unit. The H-Cell includes the rock from the ENC.

D.3. MISCELLANEOUS

There is a discrepancy between the ENC and raster chart. This was discussed with MCD and the conversation is included in Appendix V of the Descriptive Report. For an unknown reason, the ENC is more recent than the raster chart and direction was given to AHB to compile to the ENC instead of the raster.

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1. of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey:

D.4. ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11837

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

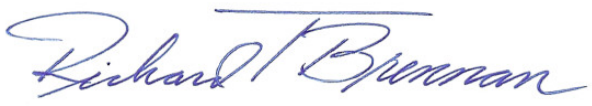
Kyle Bates
2010.06.18
16:44:35 -04'00'

Kyle Bates
Hydrographic STEP Intern
Atlantic Hydrographic Branch

Digitally signed by Katrina Wyllie
DN: cn=Katrina Wyllie, o=NOAA, ou=AHB, email=katrina.wyllie@noaa.gov, c=US
Date: 2010.06.18 16:43:43 -04'00'

Katrina Wyllie
Hydrographic Intern
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.



Richard T. Brennan
I am approving this document
2010.06.30 17:53:24 -04'00'

Approved: _____

Richard T. Brennan
Commander, NOAA
Chief, Atlantic Hydrographic Branch

Digitally signed by Mark Lathrop
DN: cn=Mark Lathrop, o=NOAA, ou=HSD, email=mark.t.lathrop@noaa.gov, c=US
Reason: AWOIS/Surf Check
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