

H11333

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey **HYDROGRAPHIC**

Field No. **S-P903-TC-04**

Registry No. **H-11333**

LOCALITY

State **Alaska**

General Locality **Southwest Prince William Sound**

Sublocality **Patton Bay**

.....
2004
.....

CHIEF OF PARTY

David A. Sinson

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET**H-11333**INSTRUCTIONS The hydrographic sheet should be accompanied by this form,
filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO.

State AlaskaGeneral Locality Southwest Prince William SoundSublocality Patton BayScale 1:20,000Date of Survey 9/14/04-9/18/04Instructions Date March 23, 2004Project No. S-P903-TC-04Vessel R/V DAVIDSON, LAUNCHES D2 and R2Chief of Party P.S. David A. Sinson, NOAASurveyed by SAIC PersonnelSoundings taken by echo sounder, hand lead, pole RESON 8111 MB (DAVIDSON)RESON 8101 MB (D2), RESON 8125 MB (R2)Graphic record scaled by N / AGraphic record checked by N / AEvaluation by D. Sinson, P. Holmberg, M. AmendAutomated plot by N / AVerification by D. Sinson, P. Holmberg, M. AmendSoundings in Fathoms

at

MLLWREMARKS: Time in UTC. Revisions and endnotes weregenerated during office processing. All separatesare filed with the project data.All depths listed in this report are referenced tomean lower low water unless otherwise noted.

Descriptive Report to Accompany Hydrographic Survey H11333

Project S-P903-TC-04
Patton Bay
Southwest Prince William Sound, Alaska
Scale 1:20,000
September 2004
NOAA Time Charter R/V DAVIDSON
Lead Hydrographer: PS David A. Sinson, NOAA
Survey Manager: PS Peter S. Holmberg, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions S-P903-TC-04, dated June 23, 2004, and the Draft Standing Project Instructions dated March 23, 2004. The survey area includes Patton Bay and southern approaches.

Northern Limit	Southern Limit	Western Limit	Eastern Limit
59° 58' 52.93" N	59° 50' 40.83" N	147° 30' 33.54" W	147° 14' 10.93" W

Table 1 Survey Limits

Data acquisition was conducted from September 14 to September 18, 2004 (Julian day numbers 258 to 262).

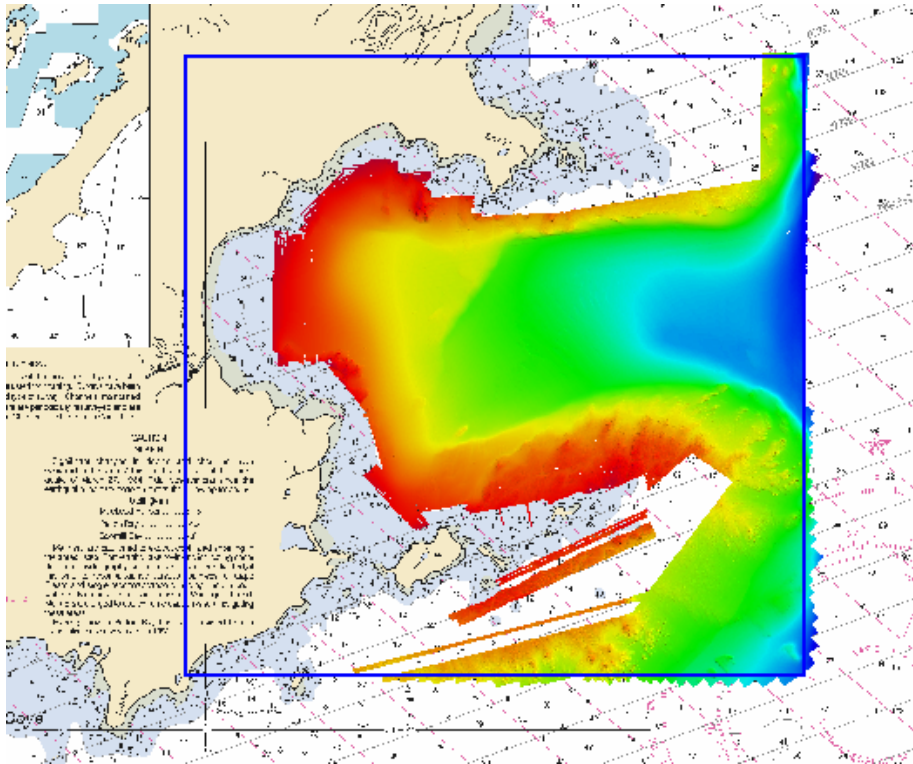


Figure 1. H11333 Survey P903A limits and coverage

B. DATA ACQUISITION AND PROCESSING

Refer to *S-P903-TC-04 Data Acquisition and Processing Report (DAPR)* for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods, submitted under a separate cover.¹ Additional information to supplement sounding and survey data, and any deviations from the DAPR are included in this descriptive report.²

B1. Equipment and Vessels

Data were acquired by the R/V DAVISON, survey launches R2 and D2 and a skiff (DP).³ The ship was used to acquire mid-water multibeam soundings (MWMB) in depths generally greater than 40 meters, sound velocity profiles and bottom samples. Launch D2 acquired shallow-water multibeam sounding in depths generally less than 120 meters and sound velocity profiles. Launch R2 acquired high-resolution shallow water multibeam soundings in depths generally less than 60 meters and sound velocity profiles. The skiff acquired vertical-beam soundings for reconnaissance and shoreline buffers. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

B2. Quality Control

B2.1 System Integration and Calibration

Refer to *S-P903-TC-04 Data Acquisition and Processing Report (DAPR)* for a complete description of SAIC's quality assurance (QA) and quality control (QC) plan.

Refer to the DAPR, for a description of system integration and initial calibration results for equipment and sensors utilized for this survey.

B2.2 Crosslines

Multibeam echosounder crosslines totaled 16.39 linear nautical miles, comprising 2.65% of SWMB hydrography. Crosslines were acquired at the beginning of survey operations for each vessel and all areas within Patton Bay. Due to the short time on site and limited weather window, crosslines were not completed for all mainscheme hydrography. Crossline soundings were evaluated with respect to main scheme soundings in Caris HIPS subset area editor and gridded BASE surface standard deviation models. There was good agreement between crossline and mainscheme soundings and no significant systematic, sound-velocity or water level offsets were observed during final sounding subset and BASE surface analysis. In addition to crossline analysis, digital surface models were created from soundings and evaluated daily. In general, there was good agreement in overlapping coverage of soundings for line-to-line, day-to-day and vessel-to-vessel comparisons; verifying the stability of the systems and accuracy of tide and sound velocity corrections.⁴

B2.3 Junctions

No contemporary surveys junction with H11333 and no junction surveys were specified in the project instructions.

B2.4 Data Quality Factors

Caris BASE surfaces were created at 5-meter resolution for the ship and at 2-meter resolution for the launches. BASE surfaces were used to focus full-density sounding evaluation and editing in areas of high standard deviation and total propagated error (TPE). Sounding subsets were evaluated in areas of high topographic relief to ensure the depth BASE surface accurately represented shoal soundings and features. On shoals and significant features, soundings were reviewed at full density for quality and TPE. Least-depths were designated from high-quality soundings to be represented in the final BASE surface and sounding set. Designated soundings were imported and processed in HSTP Pydro software. Significant features were defined and attributed with S-57 encoding. Refer to the DAPR for a full description of feature processing procedures.

B2.4.1 Sound Velocity Profiles

ISS2000 applies sound velocity correction in real-time during echo sounder acquisition. Sound velocity profiles were collected often to characterize the variable and complex water column conditions in the survey area.⁵ Surface sound velocity was monitored continuously on R2 with the Reson 8125 HRSWMB and on the DAVIDSON with the Reson 8111ER to ensure correct beam formation. Surface sound velocity was used by the 8125 system for correct beam formation on the flat-faced transducer for directional accuracy, and on the 8111ER for correct beam formation for pitch stabilization. Changes in surface sound velocity were also evaluated as an indicator of changes in the water column sound velocity. There is no indication of significant sound velocity errors in the final BASE surface.⁶

B2.4.2 Water level correction

ISS2000 applies predicted water-level correctors with CO-OPS supplied zoning in real-time during echo sounder acquisition. Observed tides from the primary tide gauge were applied to soundings prior to NOAA quality review in Caris HIPS/SIPS. Soundings from crosslines and overlapping lines were examined 3-D sounding subsets and BASE surfaces to identify temporal variation of water level modeling. There was no indication of significant water level correction errors visible in line-to-line comparisons or the final BASE surfaces.⁷

B2.4.3 Residual Sounding Fliers and Noise

CARIS BASE surfaces were evaluated by NOAA hydrographers to focus data editing on areas of high standard deviation of depth. Full-density sounding subsets were reviewed where high standard deviation was indicated. Residual gross flyers and noise were identified in areas of unusually high standard deviation and flagged as rejected. The total range of standard deviation was reduced to a value that corresponded to general bathymetric relief for the survey area. Soundings from multiple lines were evaluated when possible to distinguish noise from

bathymetric features. In general, NOAA quality review required minimal editing and any significant quality deficiencies were corrected before final submission.⁸

B2.4.4 Systematic Errors

CARIS BASE surfaces were evaluated by NOAA hydrographers to identify systematic errors in data correctors including motion, attitude, tide and sound velocity. Sunlight illuminated surface digital terrain models (DTM) were evaluated to find errors in heave, pitch and roll correction. Standard deviation surface models were evaluated to look for disagreement between multiple lines – an indication of temporal variation in water-level or sound velocity correction. There were no significant systematic errors observed during review of this survey.⁹

B2.4.5 Sounding Coverage

Daily coverage was evaluated with DTM models created from preliminary gridded sounding data. SAIC submitted 2-meter, shoal-biased binned data for launches and 5-meter, shoal-biased binned data for the ship. Easting, Northing, Depth data were imported into MapInfo and re-gridded in Vertical Mapper. DTM were subsequently evaluated for coverage and delineation of the 8-meter inshore limit. Final sounding coverage was evaluated in Caris HIPS using BASE surface DTM, TPE and sounding density models.¹⁰

B2.4.6 Swath Angle Filtering

All soundings were filtered (flagged as offline) by SAIC processing software (ISS-2000) to within 58 degrees of nadir for multibeam echosounder bathymetry to increase confidence in sounding accuracy and minimize sound velocity errors. In some cases, outer-beam soundings were re-accepted for holidays and general bathymetry in deeper water to fill in small gaps in the final BASE surface. All data used to create the final BASE surfaces were filtered to meet IHO Order 1 quality tolerances.

B2.4.7 Total Propagated Error (TPE)

Raw soundings were not filtered for TPE. BASE surfaces were created from soundings filtered for TPE values that met IHO Order 1 tolerance. TPE filtering increased the confidence of sounding accuracy based upon system parameter settings in the Caris HIPS Vessel Configuration File (.hvf). Caris configuration files were created from manufacturer system performance specifications and offsets provided by SAIC from the System Acceptance Test (SAT). Caris configuration files for the launches and ship were submitted to HSTP and PHB for review and validation. TPE was viewed in Caris surface models to evaluate sounding accuracy and confidence for significant features and final coverage. Total propagated error for the survey ranged from 0.247 – 1.353 meters. All soundings and designated features depths were qualified by an associated TPE confidence value.

B2.4.8 Multibeam Side-scan Sonar Imagery

Multibeam sonar side-scan (MBSS) imagery was acquired concurrently with multibeam sonar soundings. This imagery was reviewed, together with bathymetry, to identify features, resolve ambiguous soundings and help ensure that the survey did not miss any small, but significant

targets. MBSS imagery was converted to Caris SIPS format and is submitted in a separate folder with sounding data.

B3. Water Level Datum Reduction

HDGS sounding data were reduced to mean lower-low water (MLLW) using verified observed tides from the primary station at Cordova, AK (945-4050), adjusted for zoned range and amplitude correctors provided by CO-Ops as specified in the project instructions and illustrated in Figure 2. All other datum reduction procedures conform to those outlined in the *DAPR*.

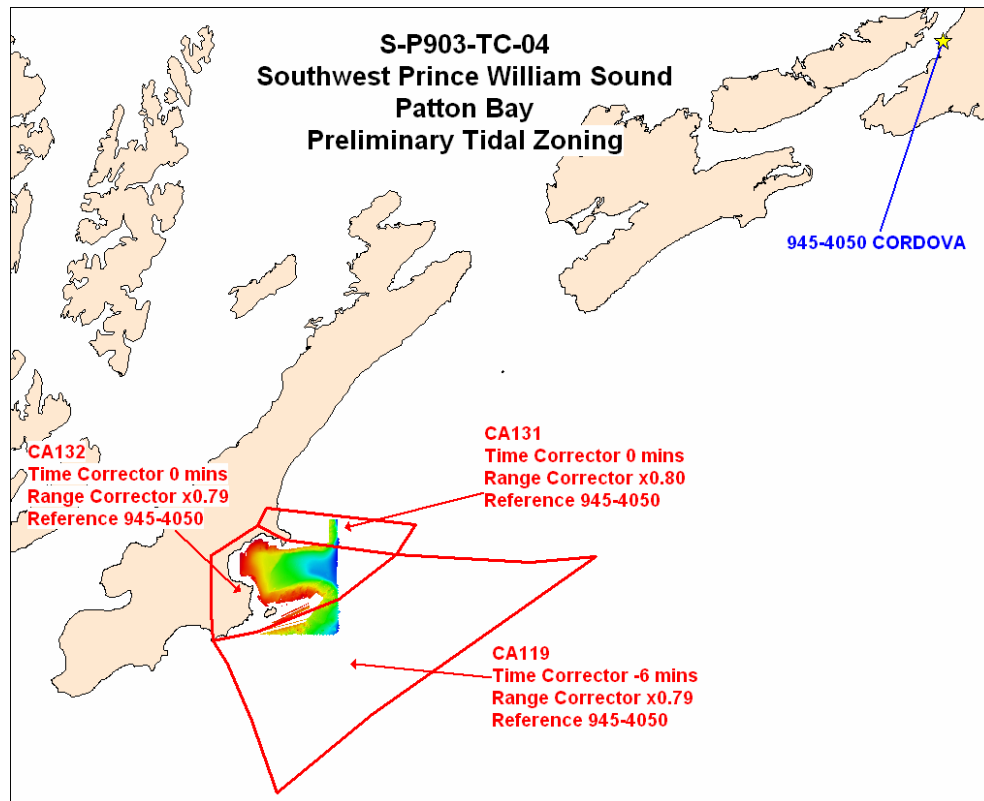


Figure 2. Tide Zoning for H11333

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H11333 can be found in the *S-P903-TC-04 Horizontal and Vertical Control Report*.¹¹ A summary of horizontal and vertical control for this survey follows.

C1.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Potato Point (323 kHz) and Hichenbrook (288 kHz) were utilized during this survey. DGPS Confidence checks were performed daily by comparing positions acquired by primary (POS/MV) and secondary (Trimble MS 750) positioning systems on the ship and launches. Confidence checks were performed on the skiff by comparing Ceeducer DGPS positions with Trimble DGPS positions.

C1.2 Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Cordova, AK (945-4050) will serve as control for datum determination and as the primary source for water level reducers for survey H11333.

The Pacific Hydrographic Branch will apply final approved (verified) tides to the survey data during final processing. A request for delivery of final approved (verified) tides for this survey was forwarded to N/OPS1 on December 01, 2004 in accordance with the FPM and project letter instructions.¹²

D. RESULTS AND RECOMMENDATIONS

D.1 Automated Wreck and Obstruction Information System (AWOIS) Investigations

Two AWOIS items were assigned to this project but were not investigated during this survey.¹³ The AWOIS items were reported (2000) submerged rocks originating from shoreline aerial photography. Skiff and launch operations did not acquire data to develop these areas or features.¹⁴

D.2 Chart Comparison

Survey H11333 was compared with chart 16701 (29th Ed.; September 2004, 1:81,436).¹⁵ Chart comparisons were performed in MapInfo using xyz (E,N,d) sounding data exported from the final BASE surface. Xyz data from the BASE surface were exported at 5-meter resolution from the finalized BASE surface. A MapBasic utility was used to evaluate BASE surface soundings within an appropriate search radius of the charted depth or feature. Chart comparison recommendations and comments were recorded as an attribute of a digital MapInfo radius table and compiled to a final chart comparison workspace and plot.¹⁶

D.2.1 Chart 16701

Many of the depths from chart 16701 disagree with soundings from H11333; differences vary from 1-9 fathoms. With the exception of a few isolated areas, discrepancies are generally located in the middle-eastern and southern regions of the survey (figure 3).

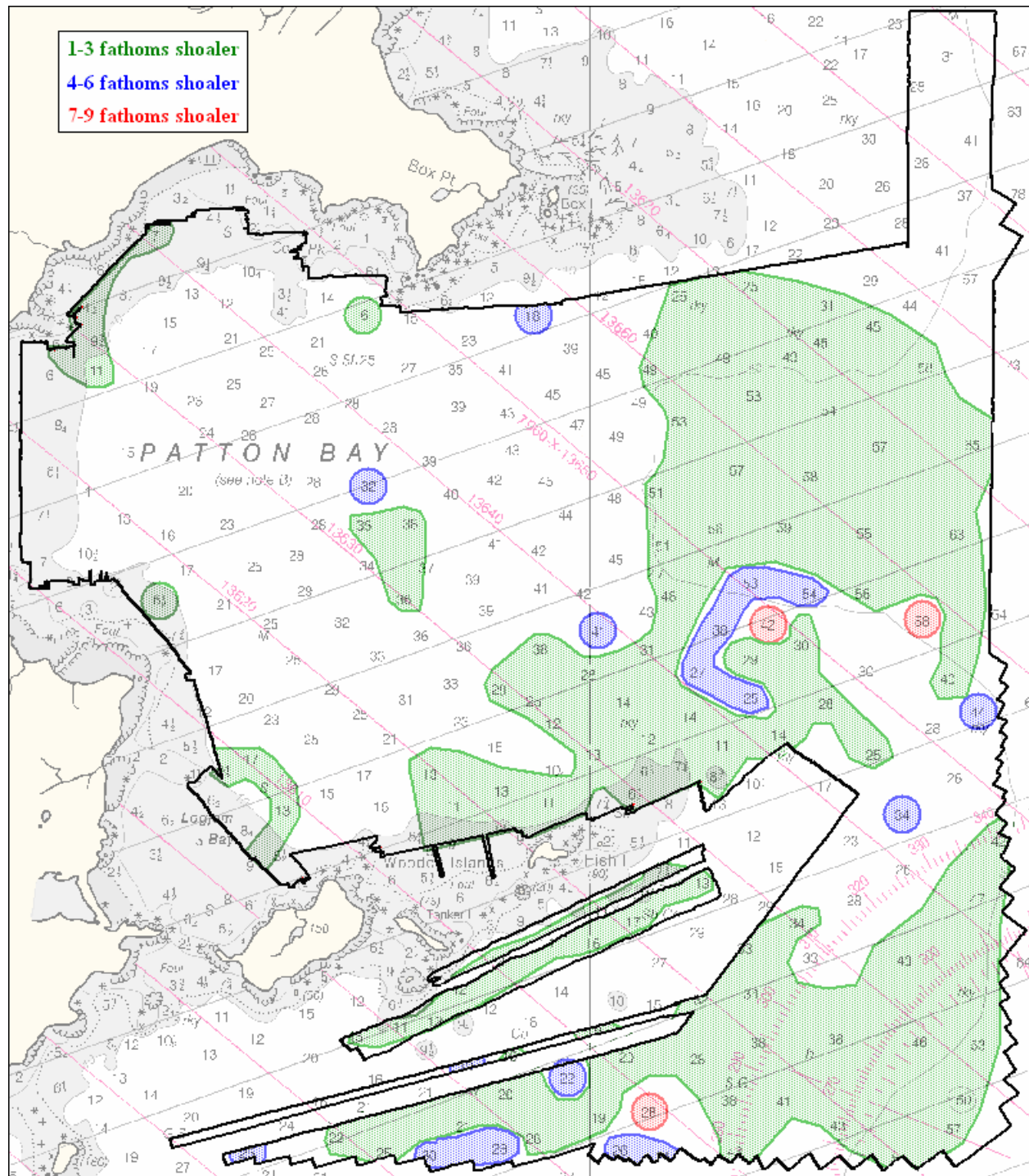


Figure 3. Chart discrepancies for H11333

Differences can be attributed to uplift caused by the 1964 earthquake and high resolution of this 100% coverage multibeam survey. Charted soundings are from a combination of single beam and lead line survey methods. Prior basic surveys pre-date the 1964 earthquake and survey methods did not adequately define the complex sub-surface features and bathymetry of the area.¹⁷

D.2.2 Caution Note B on chart 16701Chart 16701
Caution Note B

Significant changes in depths and shoreline have occurred in the area of this chart as a result of the earthquake of March 27, 1964. Tidal observations since the earthquake indicate bottom uplift at the following locations:

Uplift (feet)	
MacLeod Harbor.....	31.5
Patton Bay.....	14.9
Sawmill Bay.....	7.0

Mariners are cautioned to expect continued shoaling in the areas listed. Post-earthquake revisions indicating shoal depths in hydrography on this chart have been limited, at this time, to reconnaissance surveys southwest of Cape Cleare and single reconnaissance sounding lines in deep water at Montague Strait and east of Montague Island. Mariners are urged to use extreme caution when navigating these areas.

Hydrography in Patton Bay has been revised from a reconnaissance survey made in 1983.

Soundings and observations of this survey are generally consistent with Caution Note B, however the magnitude of uplift exceeds the annotated 14.9 feet.¹⁸ Significant shoal soundings, representing observed uplift, were submitted as dangers to navigation.

D.3 Shoreline

Shoreline verification was not performed during this survey. Very limited skiff acquisition was performed as reconnaissance and for initial development of a new skiff positioning and VBES system.

D.4 Dangers to Navigation and Shoals**D4.1 DTONs**

Eight dangers to navigation (figure 4) were found and reported to the Pacific Hydrographic Branch for verification and final submission to the Seventeenth Coast Guard District on February 4th, 2005.¹⁹ All submitted DTON depths were selected from least-depth soundings on representative shoals.²⁰ These shoals are discussed in section D4.2. Feature 1.6 (highlighted in figure 5) is an especially prominent rock with a least depth of 4.59 meters in surrounding depths of 15 meters. A copy of the preliminary Danger to Navigation Report is included in Appendix I and a copy of the final report will be inserted by PHB following verification and submission to the U.S Coast Guard.

No.	Feature	Depth	Latitude	Longitude	TPE Value
1.1	Sounding	12.49 m	059° 53' 23.945" N	147° 18' 08.084" W	0.250
1.2	Sounding	11.98 m	059° 53' 04.017" N	147° 21' 14.535" W	0.253
1.3	Sounding	13.65 m	059° 53' 16.660" N	147° 20' 37.525" W	0.255
1.4	Sounding	8.43 m	059° 52' 43.696" N	147° 18' 53.631" W	0.254
1.5	Sounding	8.06 m	059° 57' 19.847" N	147° 26' 13.387" W	0.253
1.6	Sounding	4.59 m	059° 54' 57.229" N	147° 26' 27.812" W	0.254
1.7	Sounding	7.15 m	059° 54' 45.079" N	147° 26' 13.662" W	0.253
1.8	Sounding	14.40 m	059° 51' 47.901" N	147° 21' 25.741" W	0.252

Table 2 DTONs

D4.2 Shoals

Navigationally significant shoals were found with 100% SWMB along the western and southern edges of Patton Bay, around the east end of Fish Island and south of the Wooded Islands (figures 5-7). The least depth(s) of each of navigationally significant shoal have been submitted as DTONs (section D4.1).²¹

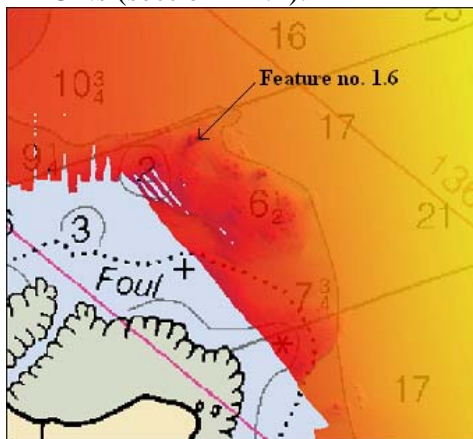


Figure 5. Western Edge of Patton Bay

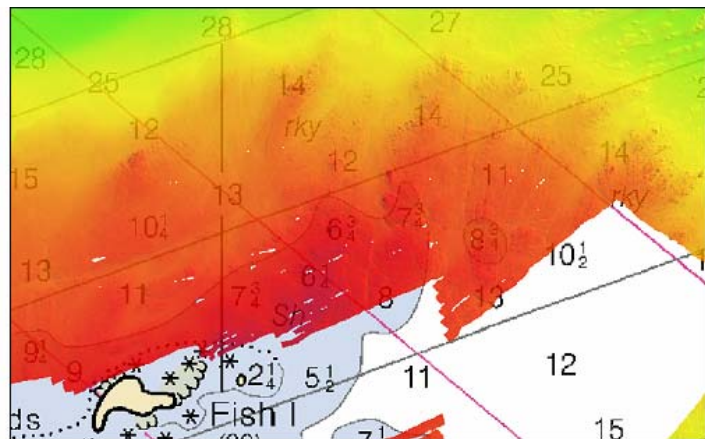


Figure 6. Southern Edge of Patton Bay and NW of Fish Is.

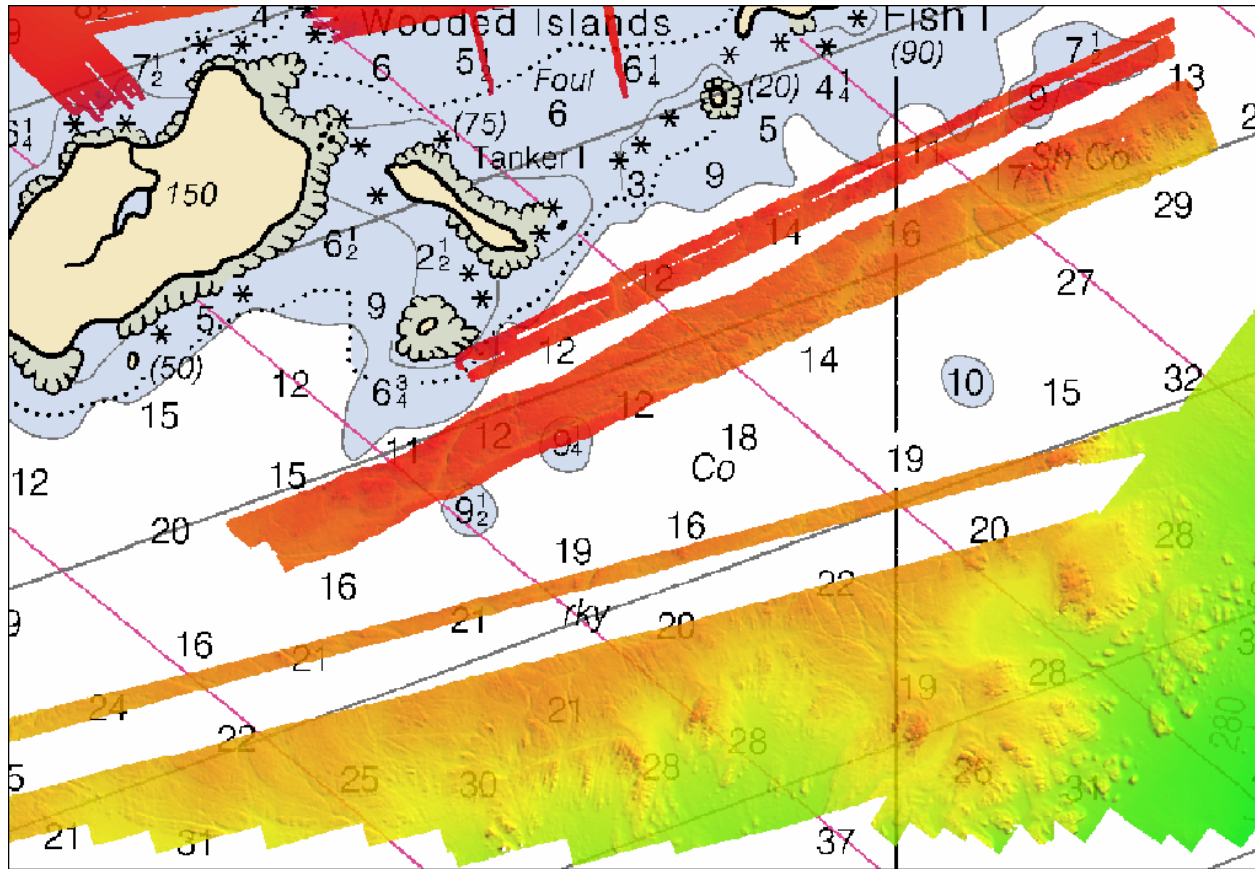


Figure 7. South of Wooded Islands

D.7 Miscellaneous

D.7.1 Bottom Samples

Thirty (30) Bottom samples were collected in accordance with the HSSDM and are attributed as SBDARE S-57 objects in the final Pydro PSS and XML data exchange sets.²²

D.7.2 BASE Surface Deliverables

To meet the BASE surface submission requirements from section 4.2.6.3 of the Field Procedures Manual (FPM), six overlapping field sheets were created to accommodate the higher resolution BASE surfaces (figure 8). Each of the six field sheets contains a 0.5, 1, 2, and 5 meter BASE surface.

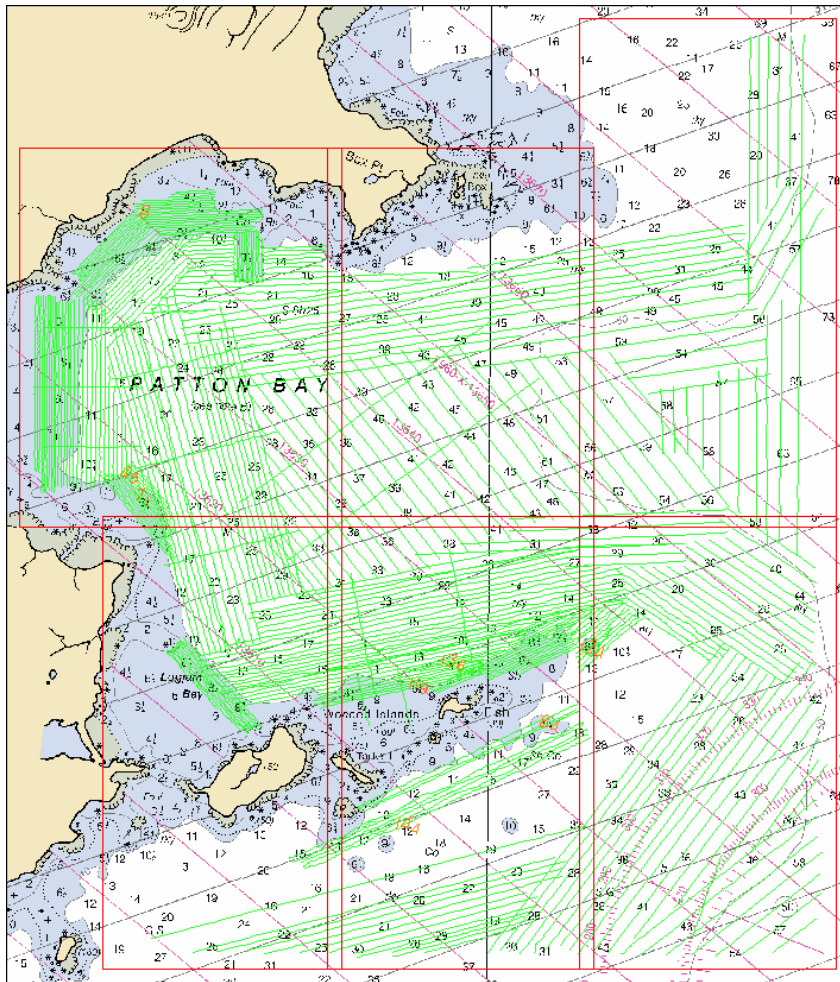


Figure 8. Overlapping Field Sheets

D.7.3 Software Versions

The following list specifies the versions and updates of Pydro and CARIS that were used during the processing of H11333 data.

Preliminary Smooth sheet created with Pydro version o 4.9.3

Data converted with CARIS version 5.4, service pack 1 and hot fix 12.

BASE surfaces created with CARIS version 5.4, service pack 1 and hot fix 21.

D.8 Statistics

Vessel	Survey day	Linear nmi	SVP	Bottom Samples
--------	------------	------------	-----	----------------

D2	258	33.25	8	0
D2	259	42.75	12	0
D2	260	30.41	10	0
D2	261	31.94	11	0
D2	262	28.08	7	0
DA	258	28.35	3	0
DA	259	63.95	4	0
DA	260	88.18	5	0
DA	261	90.98	5	0
DA	262	22.23	2	30
R2	258	24.93	4	0
R2	259	30.14	7	0
R2	260	22.85	8	0
R2	261	49.55	6	0
R2	262	31.86	5	0

Survey totals:

Survey days	Linear nmi	Square nmi	SVP	Bottom Samples
5	619.45	33.77	97	30

D.9 Adequacy of Survey

This survey is considered adequate to supersede charted soundings within the scope of coverage.²³

D.9.1 Summary and Recommendations for Additional Work

The time frame of this survey was limited (5 days) for the project scope and available resources. Unstable weather patterns typical of the late-September Alaska climate and open-sea exposure of the survey area afforded a very brief opportunity for safe survey operations. This area provides good protection for anchorage in Patton and Logjam bays; however, variable Fall storm fronts create heavy swell and rough seas in exposed areas. Ship and launch operations progressed from offshore towards the shoreline, in accordance with NOAA standard procedure. Inshore requirements (8 meters water depth) were met in some areas; however, the survey requirements were not completed to the extent of the project limits. Shoaling trends were identified, but not resolved with this survey. In addition, although brief skiff operations indicated general agreement with photogrammetric source shoreline, verification was not performed. The Lead Hydrographer recommends that additional operations address completion of this survey and shoreline verification when resources, scheduling and stable weather conditions permit. N/CS31 has been notified of the project status and recommendation for additional work.²⁴

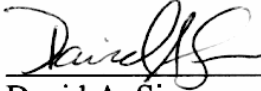
E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition, Hydrographic Survey Guidelines, Field Procedures Manual and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for 2004.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

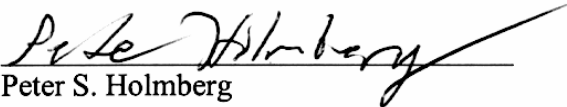
Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for S-P903-TC-04	TBD ²⁵	N/CS34
Horizontal and Vertical Control Report for S-P903-TC-04	TBD ²⁶	N/CS34

Approved and Forwarded: 

 David A. Sinson
 Physical Scientist, NOAA
 Lead Hydrographer

In addition, the following individuals were also responsible for data processing for this survey:

Survey Manager: 

 Peter S. Holmberg
 Physical Scientist, NOAA

¹ Filed with project records.

² Concur.

³ Strike ~~DAVISON~~ Insert DAVIDSON

⁴ Concur.

⁵ SVP profiles were submitted with improper dates. These were corrected during hydrographic QA review.

⁶ Concur.

⁷ Concur.

⁸ Concur.

⁹ Concur.

¹⁰ See endnote 24.

¹¹ Filed with project records.

¹² Approved tides applied to all HDCS data at PHB on 28 June 2005.

¹³ Concur with clarification. AWOIS items were not specified in the Standing Instructions or Project Instructions.

An informal request was made by HSD OPS to investigate these two features, just outside the survey extents.

¹⁴ Concur.

¹⁵ Strike ~~29th~~ Insert 20th. Office chart comparison used raster chart 16701, 20th Edition, Sep. 2004, corrected through NM Sep. 18/04, LNM Aug. 31/04, obtained through MCD. This version incorporated the DtoNs described in section D.4.1.

¹⁶ Filed with project records.

¹⁷ Concur.

¹⁸ Concur.

¹⁹ Strike ~~Figure 4~~ Insert Table 2

Additional DtoN determination occurred during H-cell compilation on 11/10/2005. A shoal sounding of 18.11 m located at 059° 53' 46.090" N, 147° 20' 30.990" W was reported to the Nautical Data Branch. DtoN report filed with project records and appended to this document.

²⁰ Concur with clarification. DtoN Feature 1.1 as listed in Table 2 is not the least depth in the immediate vicinity. A slightly shoaler value was found approximately 73 m eastward, at a depth of 12.146m. The high quality HDCS value (TPE = 0.250) for the 12.146 m shoal is supported by neighboring values shoaler than the reported DtoN depth of 12.493 m. Position of this DtoN update is 59° 53' 22.86"N, 147° 18' 3.91"W. Due to the shoaling of this entire vicinity, the scale of compilation, and the small difference in the value from the original report, no immediate action was taken to update the DtoN during Branch review and compilation.

²¹ See endnote 19.

²² Concur. S-57 objects were correctly attributed.

²³ Concur.

²⁴ A revised survey area outline was created and submitted to HSD Operations Branch on 8/24/2005.

²⁵ Filed with project records.

²⁶ Filed with project records.

H11333 H-Cell Supplemental Report

Project S-P903-TC-04
Patton Bay
South Prince William Sound, Alaska
Survey Scale 1:20,000 Chart Compilation Scale 1:81,436
September 2004
NOAA Time Charter R/V DAVIDSON
Cartographer: PS Mark Amend, PHB

1. Compilation Purpose

The H11333 H-Cell is a submission of a NOAA navigational product update collected under the NOAA "Time Charter" contract for S-P903-TC-04, Patton Bay, South Prince William Sound, Alaska. The H11333 survey covered depths of 2.26 to 142.57 m and contained eight Dangers to Navigation (Dton), with the addition of one Dton determination during compilation (see Section 5).

The H11333 H-Cell will be used to update charts 16701, 16700, 16013, and 531, and also ENC US4AK22M. As noted in the Descriptive Report, the H11333 survey did not fully investigate the coverage area specified in the Project Letter Instructions. Partially surveyed areas in S-P903-TC04 were used to help define a new survey area boundary submitted to HSD Operations Branch.

H-Cell compilation of survey H11333 utilized HSD H-Cell Guidelines 2.0 and OCS H-Cell Specifications Version 1.0. The compilation is based on Chart 16701, 1:81,436 (20th Ed.; Sep, 2004, NM Sep.18/04, LNM Aug. 31/04). Bottom characteristic feature Objects (SBDARE) were imported from the ENC, US4AK22M, which originated from chart 16701, to supplement bottom samples collected during the current survey. See Section 5. Survey Features, for more information.

2. Soundings

2.1 Source Data

The Combined BASE surface, **Combined_5m**, associated with fieldsheet **H11333_office_N**, was used as the basis for H-Cell production following survey product certification. This surface included a designated sounding from a Dton discovered during compilation.

A shoal-biased Product Surface called **H11333_ProdSrf_5m** was created using survey scale settings of 1:20,000, a buffer radius of 200 m, and a node spacing of 5 m to maintain the resolution of the source BASE surface. Defocusing of 30 m was also applied to broaden the shoals for contour displacement.

To fill in small (1-2 empty nodes) holiday gaps in swath coverage present in the BASE and Product Surfaces, interpolation was used to create the final compilation surface,

H11333_ProdSrf_5m_Interp. Interpolation operated on a 3x3 window (15 x 15 m) with a minimum of 6 neighbors.

Several larger holidays (3 nodes and greater) were not filled and were carried through as “no coverage” areas, as described in Section 4. The decision not to fill these areas was made considering the proximity to shoals and trends of the seafloor. Full bottom coverage for this area is expected to be accomplished during the 2006 field season.

2.2 Sounding Selection

A survey scale sounding layer was created using the **H11333_ProdSrf_5m_Interp** Product Surface in BASE Editor. A selection radius of 5 mm was used at 1:20,000 survey scale. Shoal areas and pinnacles were inspected to confirm the biased selection of the suppression routine.

2.3 Sounding Suppression

In CARIS HOM, a sounding suppression routine was applied to the survey scale density sounding layer 100 to emulate the spacing of soundings on chart 16701. Designated Soundings in HIPS were carried through to the soundings layer in HOM. DtoNs, as selected soundings, were checked for position and value accuracy and flagged with a status of “Selected” to maintain their presence during suppression to ensure inclusion with soundings destined to be compiled to the chart.

2.4 Sounding Feature Objects

Chart density SOUNDG feature objects were created from the “Background” and “Selected” sounding spatial objects in HOM. Recent custom changes in CARIS software allowed for the maintenance of millimeter depth value precision through to the creation of the chart unit base cell file. NOAA rounding rules and thresholding to whole integers (at the 11 fathom cutoff) were applied to depth values upon creation of the chart unit 000 product (see note in Section 10.1).

No additional S-57 feature objects were created from bathymetry.

3. Contours

3.1 Contour Creation

Contours were created in CARIS BASE Editor. Contour values present in chart 16701 and/or ENC US4AK22M were specified in a metric depth list of fathom values found in OCS H-Cell Specifications 1.0 (Nov. 2005). Contours were assigned to a CARIS layer number 200, which was then used in HOM for creation of Skin of the Earth (SOTE), Group 1 objects.

METERS	FATHOMS
5.715	3
18.517	10
92.812	50

Contours were filtered using a 0.1 mm vertex tolerance to reduce the number of vertices per line segment.

3.2 Contour / Depth Area Feature Objects

The following series of DRVAL(1,2) values were then used in creation of depth areas to coincide with contours and/or the depth areas of US4AK22M and Chart 16701.

5.715 m
18.517 m
92.812 m
184.252 m

4. Meta Area Objects

Meta areas were created using polygon topology based on the SOTE perimeter and attributed as described in OCS H-Cell Specifications 1.0. Several voids were maintained within the shallower portions of the survey area due to the size of the holidays. Void polygons were created as M_COVR with the attribute, "no coverage".

5. Survey Features

No DP or AWOIS data were collected for survey H11333. There were nine DtoNs within the survey limits of H11333, all of which were flagged with "Selected" status as described in Section 2.3.

DtoN 1.1 as submitted through Pydro (Feb. 2005) was not carried through to the H-cell but was replaced by a neighboring shoaler depth and position 70 m offshore. This is indicated with a blue note in the vicinity of DtoN 1.1. Supporting high-quality HDCS depth measurements justify this change. It is recommended that this value supercede the submitted DtoN 1.1.

The additional DtoN for H11333, discovered during office processing, a shoal sounding of 18.11 m, is located on the southern portion of the bay. This sounding was flagged as "Selected" as described in Section 2.3.

Bottom samples as SBDARE features were imported from Pydro as XML data through the use of CARIS Notebook 2.2. Several charted SBDARE features from NOAA ENC US4AK22M were imported into the cell, retaining appropriate source attribution. A selective distribution of SBDARE features was then created for the Hcell deliverable, eliminating redundant SBDARE attributes (e.g. "mud" sample every km).

All SBDARE features included in H-Cell 11333 that originate with the new hydrographic survey supersede existing charted features. Surveyed and charted features are distinguished by SORDAT and SORIND attributes.

6. Shoreline / Tide Delineations

No shoreline attributes, including Mean Lower Low Water (MLLW) or Mean High Water (MHW) lines were used in the creation of H-Cell 11333.

7. Attribution

All S-57 Feature Objects have been attributed as specified in OCS H-Cell Specifications 1.0.

8. Layout

8.1 Layer Numbers

100	Soundings
200	Group 1 objects (Skin of the Earth)
300	Bottom Samples from survey and imported from US4AK22M
600	Other Group 2 objects
800	Blue Notes layer

8.2 Blue Notes

Notes identifying DtoNs are provided in HOM layer 800 and as point and line shapefiles. Shapefile Blue Note deliverables will be included in the next revision of the OCS H-cell Specifications.

9. Spatial Framework

9.1 Coordinate System

Both the CARIS map and the base cell file deliverables are in a LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

9.2 Horizontal and Vertical Units

HOM Units

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest meter

Chart Unit Base Cell Units

Depth Units (DUNI):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

10. QA/QC

10.1 Data Processing Notes

The default CARIS HOM display settings for soundings are: metric units that are rounded and thresholded per the S-52 standard (30 meter threshold, truncated). CARIS has designed special utilities to accommodate NOAA 's unique rounding, thresholding, and chart unit requirements. Setting an environmental variable to use NOAA rules also allows display of soundings in fathoms and feet in HOM, which is useful for chart comparison purposes. However, development of a new utility for soundings that will permit millimeter precision to be maintained from HIPS throughout HOM processing requires that NOAA rules not be used until following export to the base cell file. It is still possible to view soundings in fathoms for chart comparison purposes using this utility, however, the Fathoms and Feet selection will in fact display soundings in fathoms and fractions. Once the HOM H-Cell has been exported to the base cell file, soundings in millimeters are converted to feet, then rounded and threshold using NOAA rounding rules, and finally converted to fathoms and feet for chart display. This process is currently standard procedure for meeting the OCS H-cell Specifications 1.0.

A bug relating to sounding display has also been discovered in CARIS HOM 3.3, Service Pack 3, used for the creation of this H-Cell: Under certain circumstances, in HOM's Feature view only, some sounding values are incorrectly displayed. Display of those same sounding values in HOM's Spatial view are correct, however. Because the sounding values for the base cell file are generated from the metric units before the conversion to chart units is made, the integrity of the sounding values remains intact.

10.2 ENC Validation Checks

H11333 was subjected to QA and Validation checks in HOM prior to altering the VALDCO and DRVALs, as required to meet OCS H-Cell Specifications 1.0. Full millimeter precision was retained in the export of the metric S-57 base cell data set (000 file). This data set was then converted to a chart unit 000 file. dKart Inspector 5.0 was then used to further check the data set for conformity using the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary. Acceptable errors were only those provided in advance by MCD.

11. Products

11.1 MCD Deliverables

- MCD Chart Units Base Cell File, 1:81,436
- MCD Chart Units Base Cell File - survey scale density soundings only, 1:81,436
- H-Cell Supplemental Report appended to the Descriptive Report
- Descriptive Report with endnotes from cartographic review
- Blue Notes point and line shapefiles

11.2 File Naming Conventions

MCD Chart units base cell file: *US411333_CU.000*

MCD Chart units base cell soundings file: *US411333_SS.000*

Blue Notes shapefiles: *H11333bluenotes_p.shp*
H11333bluenotes_l.shp

11.3 Software

HIPS 6.0:	Management and creation of BASE and Product Surfaces
BASE Editor 1.0:	Creation of the sounding layer and contours
HOM 3.3:	Creation of the H-Cell, S-57 products, QA
GIS 4.4a:	Setting the sounding rounding variable
dKart Inspector 5.0:	Validation of the base cell file
NTXShape	NTX to Shapefile converter used for Blue Notes export

12. Contacts

Inquiries regarding this H-Cell content or construction should be directed to:

Mark Amend, Physical Scientist, Production Team, PHB, Seattle, WA 206-526-6839,
mark.amend@noaa.gov

Appendix A: FEATURE OBJECT GUIDE

CARIS HOM Layer Structure

Layer	Spatial Object Description	S-57 Feature Object
100	Soundings	SOUNDG
200 SOTE	Depth Areas Depth Contours	DEPARE DEPCNT
300	Bottom Samples – Survey and ENC point objects	SBDARE
600	Survey Perimeter, Bounding Box	M_QUAL, M_COVR, M_NSYS
800	Blue Notes, including survey perimeter	

H-11333 AWOIS Items

No AWOIS items were assigned or investigated for this survey.

H11333 DTONS

Note: Top number corresponds to feature number on DTON report, and bottom number corresponds to depth in fathoms.

1.6
2.5

1.7
3.9

1.3
7.4

1.2
6.6

1.1
6.8

1.4
4.6

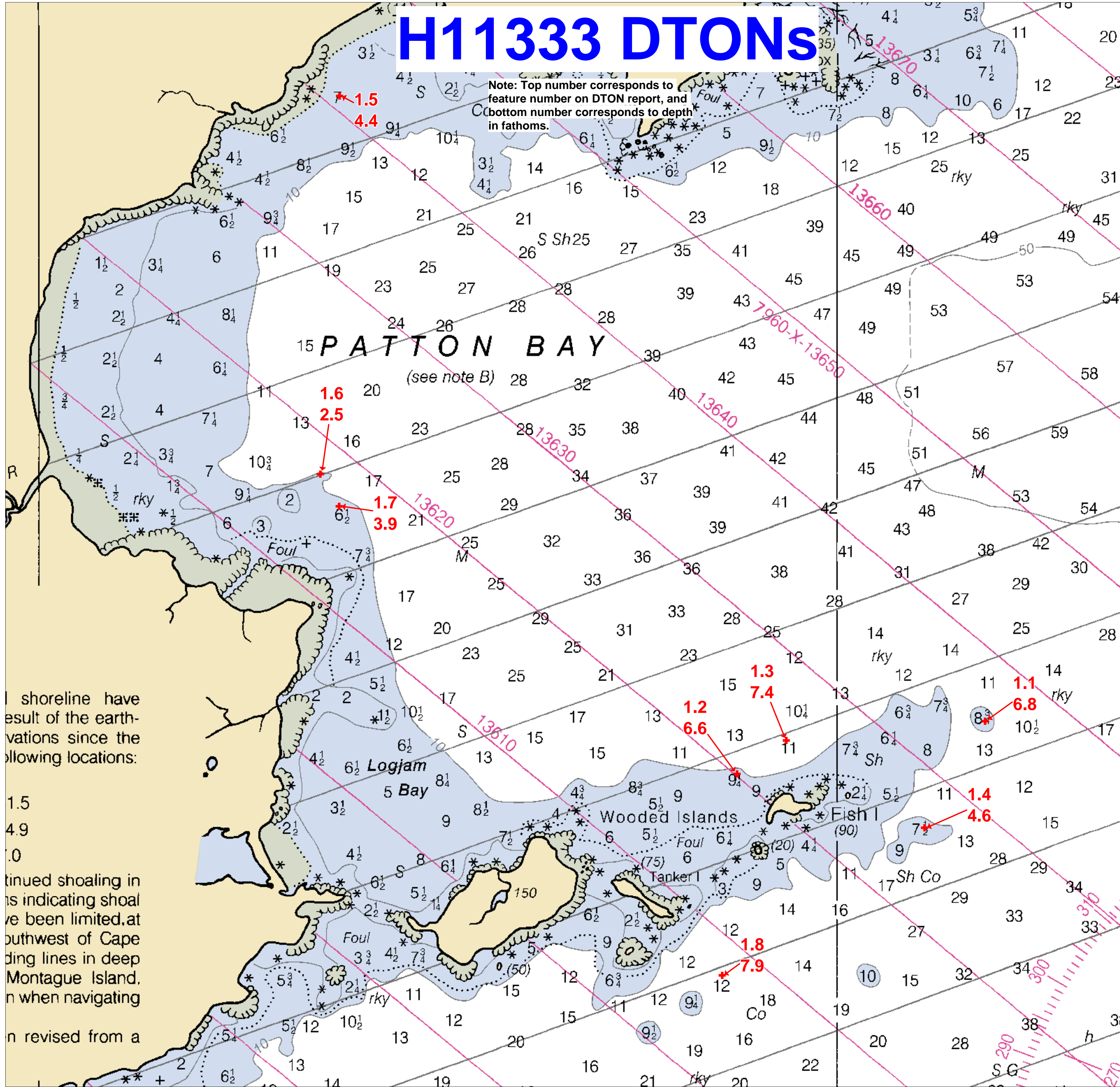
1.8
7.9

shoreline have result of the earth- quavations since the following locations:

1.5
4.9
10

Continued shoaling in is indicating shoal ve been limited, at outhwest of Cape Montague Island, n when navigating

n revised from a



H11333 DTONs

Registry Number: H11333
State: Alaska
Locality: Southwest Prince William Sound
Sub-locality: Patton Bay
Project Number: S-P903-TC
Survey Dates: 09/15/2004 - 09/18/2004

Eight (8) DTONs around the perimeter and south of Patton Bay. DTONs represent areas of shoaling.

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	12.49 m	059° 53' 23.945" N	147° 18' 08.084" W	---
1.2	Sounding	11.98 m	059° 53' 04.017" N	147° 21' 14.535" W	---
1.3	Sounding	13.65 m	059° 53' 16.660" N	147° 20' 37.525" W	---
1.4	Sounding	8.43 m	059° 52' 43.696" N	147° 18' 53.631" W	---
1.5	Sounding	8.06 m	059° 57' 19.847" N	147° 26' 13.387" W	---
1.6	Sounding	4.59 m	059° 54' 57.229" N	147° 26' 27.812" W	---
1.7	Sounding	7.15 m	059° 54' 45.079" N	147° 26' 13.662" W	---
1.8	Sounding	14.40 m	059° 51' 47.901" N	147° 21' 25.741" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 775/16 from p903a / tpe_d2_mb_0 / 2004-260 / d2mba04260_d21

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 53' 23.945" N, 147° 18' 08.084" W
Least Depth: 12.49 m
Timestamp: 2004-260.19:15:35.138 (09/16/2004)
Survey Line: p903a / tpe_d2_mb_0 / 2004-260 / d2mba04260_d21
Profile/Beam: 775/16
Charts Affected: 16700, 16701

Remarks:

DTON represents 2-4 fathom shoaling in comparison to charted depths for this area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_d2_mb_0/2004-260/d2mba04260_d21	775/16	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.2) Profile/Beam - 2968/125 from p903a / tpe_r2_mb_0 / 2004-259 / r2mba04259_d22

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 53' 04.017" N, 147° 21' 14.535" W
Least Depth: 11.98 m
Timestamp: 2004-259.23:08:44.998 (09/15/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-259 / r2mba04259_d22
Profile/Beam: 2968/125
Charts Affected: 16700, 16701

Remarks:

DTON represents 2-3 fathom shoaling in comparison to charted depths north of the Wooded Islands.

Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-259/r2mba04259_d22	2968/125	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.3) Profile/Beam - 1685/190 from p903a / tpe_r2_mb_0 / 2004-260 / r2mba04260_d02

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 53' 16.660" N, 147° 20' 37.525" W
Least Depth: 13.65 m
Timestamp: 2004-260.00:13:00.302 (09/16/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-260 / r2mba04260_d02
Profile/Beam: 1685/190
Charts Affected: 16700, 16701

Remarks:

DTON represents 2-3 fathom shoaling in comparison to charted depths north of Fish Island.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-260/r2mba04260_d02	1685/190	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.4) Profile/Beam - 8728/176 from p903a / tpe_r2_mb_0 / 2004-260 / r2mba04260_d28

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 52' 43.696" N, 147° 18' 53.631" W
Least Depth: 8.43 m
Timestamp: 2004-260.22:46:16.252 (09/16/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-260 / r2mba04260_d28
Profile/Beam: 8728/176
Charts Affected: 16700, 16701

Remarks:

DTON represents general observations of 2-3 fathom shoaling in comparison to charted depths southeast of Fish Island.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-260/r2mba04260_d28	8728/176	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.5) Profile/Beam - 36/187 from p903a / tpe_r2_mb_0 / 2004-261 / r2mba04261_d17

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 57' 19.847" N, 147° 26' 13.387" W
Least Depth: 8.06 m
Timestamp: 2004-261.19:14:01.968 (09/17/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-261 / r2mba04261_d17
Profile/Beam: 36/187
Charts Affected: 16700, 16701

Remarks:

DTON represents general observations of 1-3 fathom shoaling in comparison to charted depths for this area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-261/r2mba04261_d17	36/187	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.6) Profile/Beam - 192/237 from p903a / tpe_r2_mb_0 / 2004-262 / r2mba04262_d12

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 54' 57.229" N, 147° 26' 27.812" W
Least Depth: 4.59 m
Timestamp: 2004-262.16:40:28.937 (09/18/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-262 / r2mba04262_d12
Profile/Beam: 192/237
Charts Affected: 16700, 16701

Remarks:

DTON represents general observations of 1-7 fathom shoaling in comparison to charted depths for this area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-262/r2mba04262_d12	192/237	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.7) Profile/Beam - 1480/163 from p903a / tpe_r2_mb_0 / 2004-262 / r2mba04262_d14

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 54' 45.079" N, 147° 26' 13.662" W
Least Depth: 7.15 m
Timestamp: 2004-262.17:01:09.388 (09/18/2004)
Survey Line: p903a / tpe_r2_mb_0 / 2004-262 / r2mba04262_d14
Profile/Beam: 1480/163
Charts Affected: 16700, 16701

Remarks:

DTON represents general observations of 1-2 fathom shoaling in comparison to charted depths for this area.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_r2_mb_0/2004-262/r2mba04262_d14	1480/163	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

1.8) Profile/Beam - 6807/16 from p903a / tpe_d2_mb_0 / 2004-260 / d2mba04260_d28

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 51' 47.901" N, 147° 21' 25.741" W
Least Depth: 14.40 m
Timestamp: 2004-260.23:09:36.707 (09/16/2004)
Survey Line: p903a / tpe_d2_mb_0 / 2004-260 / d2mba04260_d28
Profile/Beam: 6807/16
Charts Affected: 16700, 16701

Remarks:

DTON represents general observations of 1-4 fathom shoaling in comparison to charted depths south of Tanker Island.

Feature Correlation

Address	Feature	Range	Azimuth	Status
p903a/tpe_d2_mb_0/2004-260/d2mba04260_d28	6807/16	0.00	000.0	Primary

Hydrographer Recommendations

[none]

S-57 Data

Sounding

Additional H11333 DtoN

Registry Number: H11333
State: Alaska
Locality: Southwest Prince William Sound
Sub-locality: Patton Bay
Project Number: S-P903-TC
Survey Date: 09/15/2004

1 DtoN located in the southern portion of Patton Bay

Charts Affected

Number	Version	Date	Scale
16701	20th Ed.	09/01/2004	1:81436
16700	29th Ed.	07/01/2004	1:200000
16013	29th Ed.	11/01/2003	1:969761
531	22nd Ed.	03/01/2004	1:2100000
500	8th Ed.	06/01/2003	1:3500000
530	30th Ed.	03/23/2002	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	18.11 m	059° 53' 46.090" N	147° 20' 30.990" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 1309/90 from h11333 / tpe_d2_mb_0 / 2004-259 / d2mba04259_d14

DANGER TO NAVIGATION

Survey Summary

Survey Position: 059° 53' 46.090" N, 147° 20' 30.990" W
Least Depth: 18.11 m
Timestamp: 2004-259.19:38:50.746 (09/15/2004)
Survey Line: h11333 / tpe_d2_mb_0 / 2004-259 / d2mba04259_d14
Profile/Beam: 1309/90
Charts Affected: 16701_1, 16700_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DtoN noted during Branch Carto Evaluation.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11333/tpe_d2_mb_0/2004-259/d2mba04259_d14	1309/90	0.00	000.0	Primary

Hydrographer Recommendations

Supersede existing charted depth at this location with this value.

Cartographically-Rounded Depth (Affected Charts):

9 ¾fm (16701_1, 16700_1, 16013_1, 530_1)

9fm 5ft (531_1)

18.1m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20040918
 TECSOU - 3:found by multi-beam



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



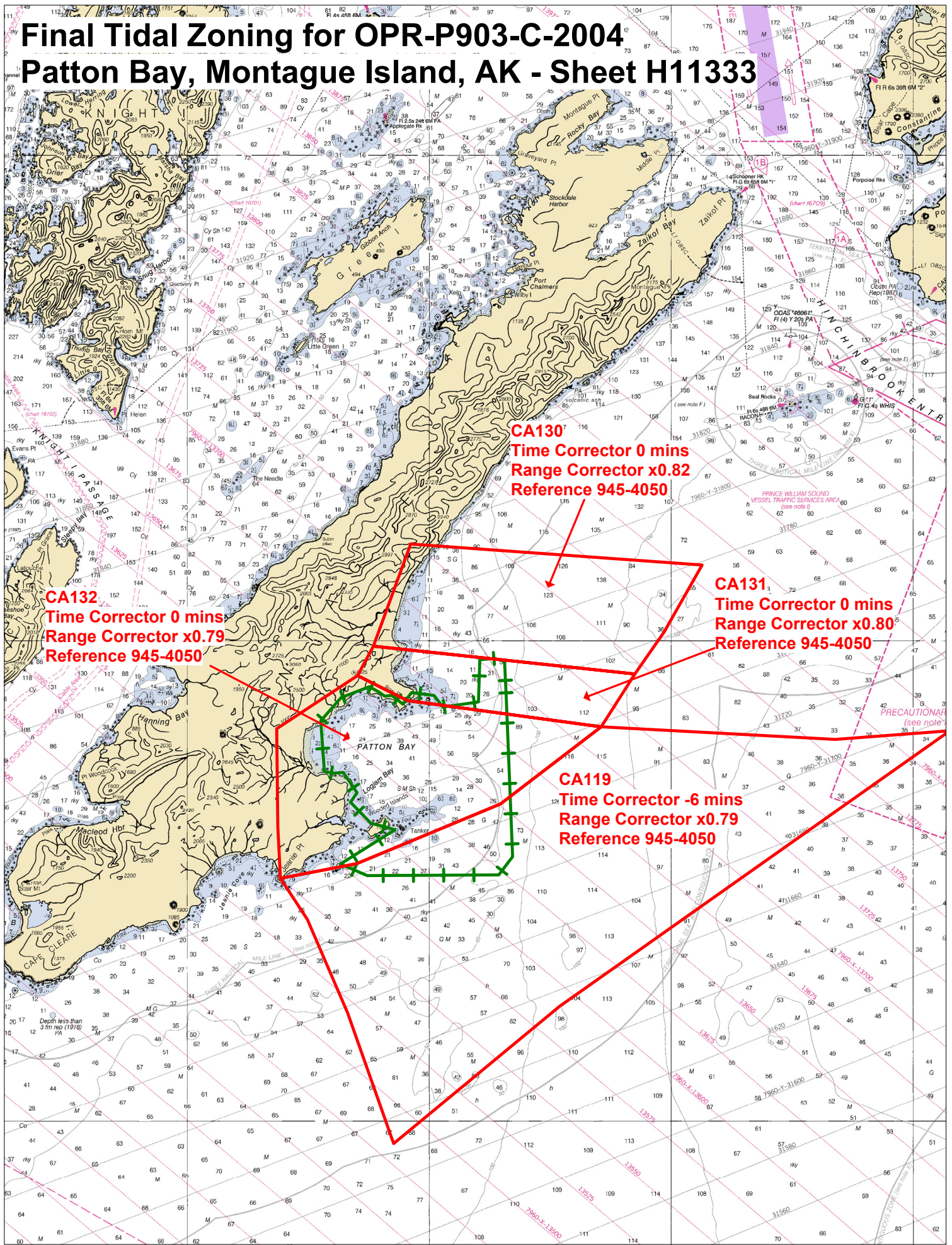
Final tide zone node point locations for OPR-P903-TC-2004, H11333

Format: Tide Station (in recommended order of use)
 Average Time Correction (in minutes)
 Range Correction
 Longitude in decimal degrees (negative value denotes Longitude West)
 Latitude in decimal degrees

	Tide Station Order	AVG Time Correction	Range Correction
Zone CA119	945-4050	-6	0.79
-147.381696 59.650609			
-147.152982 59.74622			
-146.615041 59.937401			
-146.772918 59.931383			
-147.095635 59.9401			
-147.234405 59.886756			
-147.432428 59.845403			
-147.537741 59.835168			
-147.500701 59.806642			
-147.445278 59.741733			
-147.381696 59.650609			
Zone CA130	945-4050	0	0.82
-147.35826 60.06628			
-147.409604 59.995841			
-147.049245 59.976659			
-147.008844 60.005699			
-146.956464 60.051864			
-147.35826 60.06628			
Zone CA131	945-4050	0	0.80
-147.095635 59.9401			
-147.049245 59.976659			
-147.409604 59.995841			
-147.431415 59.975552			
-147.362733 59.958255			
-147.095635 59.9401			
Zone CA132	945-4050	0	0.79
-147.537741 59.835168			
-147.432428 59.845403			
-147.234405 59.886756			
-147.095635 59.9401			

-147.362733 59.958255
-147.431415 59.975552
-147.542961 59.938775
-147.541373 59.87061
-147.537741 59.835168

Final Tidal Zoning for OPR-P903-C-2004 Patton Bay, Montague Island, AK - Sheet H11333

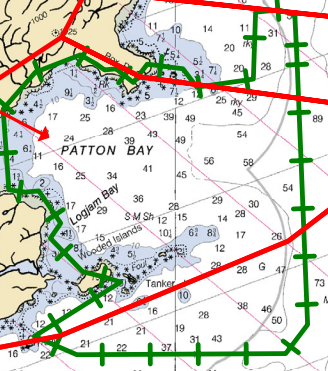


CA130
Time Corrector 0 mins
Range Corrector x0.82
Reference 945-4050

CA132
Time Corrector 0 mins
Range Corrector x0.79
Reference 945-4050

CA131
Time Corrector 0 mins
Range Corrector x0.80
Reference 945-4050

CA119
Time Corrector -6 mins
Range Corrector x0.79
Reference 945-4050



Addendum to H-11333 H-Cell Supplemental Report

It is recommended that MCD remove the multitude of small areas of no coverage that exist in H-Cell H-11333. To better reflect these gaps in seafloor coverage for the ENC, the M_QUAL object covering the survey area should be altered to include several areas delineated to encompass all of the small areas of no coverage. These should be assigned CATZOC Zone of Confidence B to indicate “Full seafloor coverage not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.” For a more complete discussion of these data gaps see the H-11333 Descriptive Report Section B2.4.6 and the H-11333 H-Cell Supplemental Report, Section 2.1 and Section 4.

APPROVAL SHEET
H-11133

Initial Approvals:

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

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