

H11200

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey **HYDROGRAPHIC**

Field No. **OPR-P356-KR-03**

Registry No. **H-11200**

LOCALITY

State **Alaska**

General Locality **Approaches to Prince William Sound**

Sublocality **Hinchinbrook Entrance**

.....
2003
.....

CHIEF OF PARTY

Dean Moyles

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET

H11200

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.

N/A

State Alaska

General Locality Approaches to Prince William Sound

Sublocality Hinchinbrook Entrance

Scale 1:20,000

Date of Survey 06/10/03-08/23/03

Instructions Date 3/5/2005

Project No. OPR-P356-KR-03

Vessel R/V DAVIDSON & R/V QUICKSILVER

Chief of Party Dean Moyles

Surveyed by Moyles, Orthmann, Reynolds, Gill, Mount, Stock, Busey, Briggs, et al

Soundings taken by echo sounder, hand lead, pole Reson 8111 and 8101

Graphic record scaled by FUGRO PELAGOS, Inc. PERSONNEL

Graphic record checked by FUGRO PELAGOS, Inc. PERSONNEL

Evaluation by R.Shipley Automated plot by HP Designjet 1050C

Verification by R.Shipley

Soundings in Fathoms at MLLW

REMARKS: All times are recorded in UTC

UTM Zone 6

Revisions and annotations appearing as endnotes were generated during office processing.

All seperates are filed with the hydrographic data

As a result, page numbering may be interrupted or non-sequential



A - Area Surveyed

H11200 (Sheet A), is bounded by the coordinate listing below, and encompasses Hinchinbrook Entrance.

The R/V Quicksilver initially started hydrographic data collection on June 10, 2003 and ended on June 13, 2003. The R/V Davidson then commenced data collection on August 8, 2003 and completed data collection on August 23, 2003.

Table 1 H11200 Survey Limits¹

Survey Limits Task Order # 12 H11200 Sheet A Scale 1:20,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	60°15'44.971" N	146°45'09.346" W
2	60°11'20.404" N	146°23'26.268" W
3	60°03'44.521" N	146°29'37.306" W
4	60°08'09.089" N	146°51'20.383" W
5	60°15'44.971" N	146°45'09.346" W

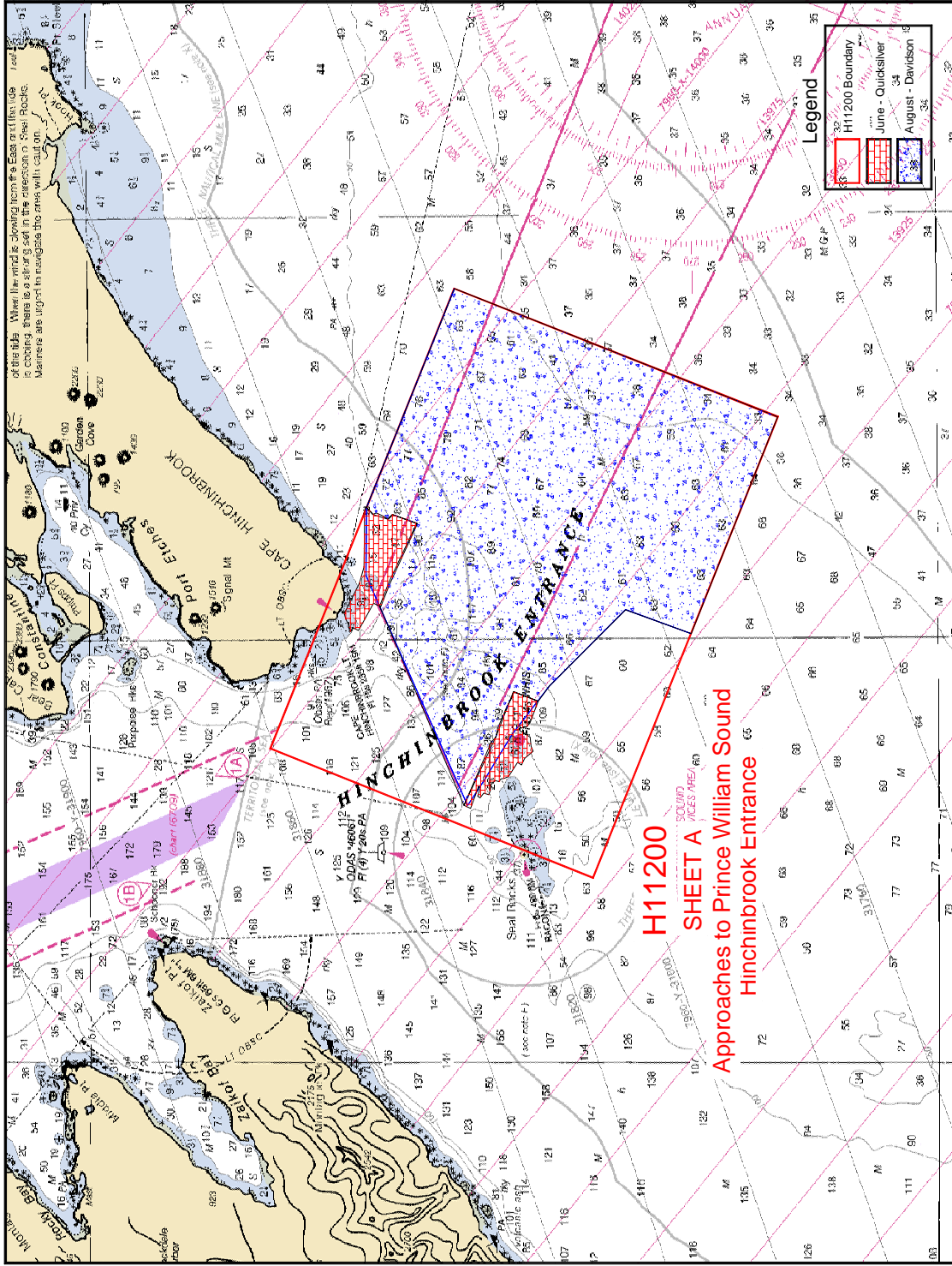


Figure 1 H11200 Survey Limits



B – Data Acquisition & Processing

Refer to the OPR-P356-KR-03 Data Acquisition and Processing Report² for a detailed description of all equipment, survey vessels, processing procedures and quality control features. Items specific to this survey and any deviations from the Data Acquisition and Processing Report are discussed in the following sections.

Equipment & Vessels

The R/V Davidson and R/V Quicksilver acquired all sounding data for H11200. The Davidson is 153-foot survey vessel, with a draft of 17.75 feet, equipped with a hull mounted Reson SeaBat 8111 with option 033 (pseudo SideScan) for deep multibeam data acquisition. The Davidson was also equipped with two AML sound velocity and pressure sensors for sound velocity profiles. Vessel attitude and position was measured using an Applanix Position and Orientation System for Marine Vessel (POS/MV) and XTF files logged in ISIS V 6.24.

The Quicksilver, which is 32 feet in length with a draft of 3 feet, was equipped with a Reson 8101 with option 033 (pseudo SideScan) for multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors for sound velocity profiles. Vessel attitude and position was measured using an Applanix Position and Orientation System for Marine Vessel (POS/MV) and XTF files logged in ISIS V 6.24.

Refer to OPR-P356-KR-03 Data Acquisition & Processing Report for a complete listing of equipment and vessel descriptions.

Quality Control

Crosslines

Quality control tielines were planned to measure 5 percent of the main scheme line length. Total crossline length surveyed was 49.876 km (26.931 nautical miles) or 7.7 percent of the total main scheme miles. Tielines that were conducted were well distributed throughout the sheet to insure adequate crossline quality control. A total of 41 tie line crossings were examined using the CARIS HIPS Q/C report.

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

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

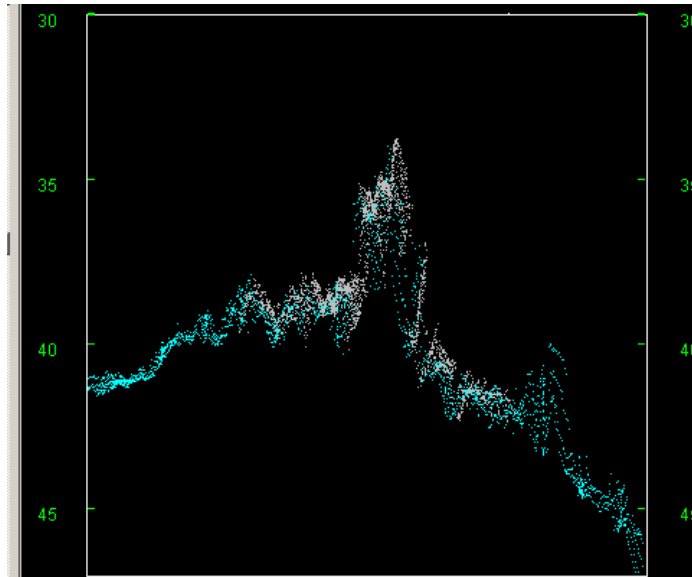


Figure 2: Profile of A03-QC0017

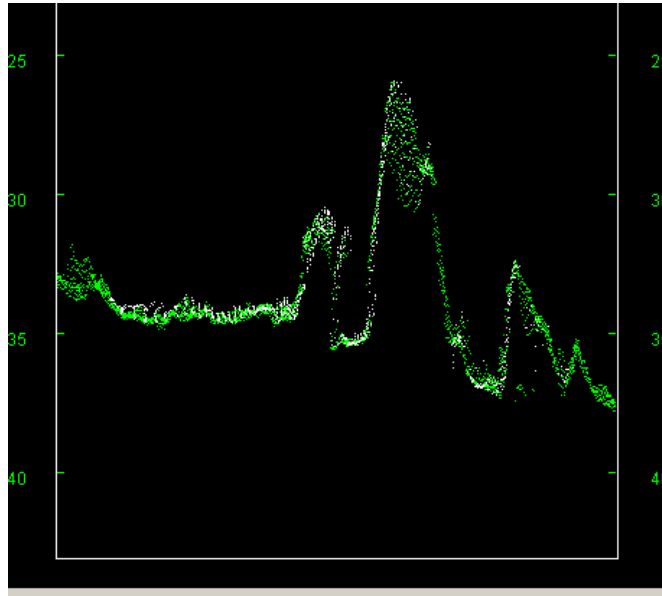


Figure 3: Profile of A03-QC003

- The accuracy of a typical DGPS unit is between 1 to 3 m, and with the constant coming and going of satellites in these areas; it was not uncommon to get a 1 to 3m- navigation jump. Although this is well within the NOS specifications, Figure 1 shows graphically how navigation error versus vertical error can rapidly affect the specified accuracy. For example, with a 1.5m navigation error at a water depth of 25m, if the slope of the bottom is greater than 20° then the beams are outside of the 95 percent confidence level.

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

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

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

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

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

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

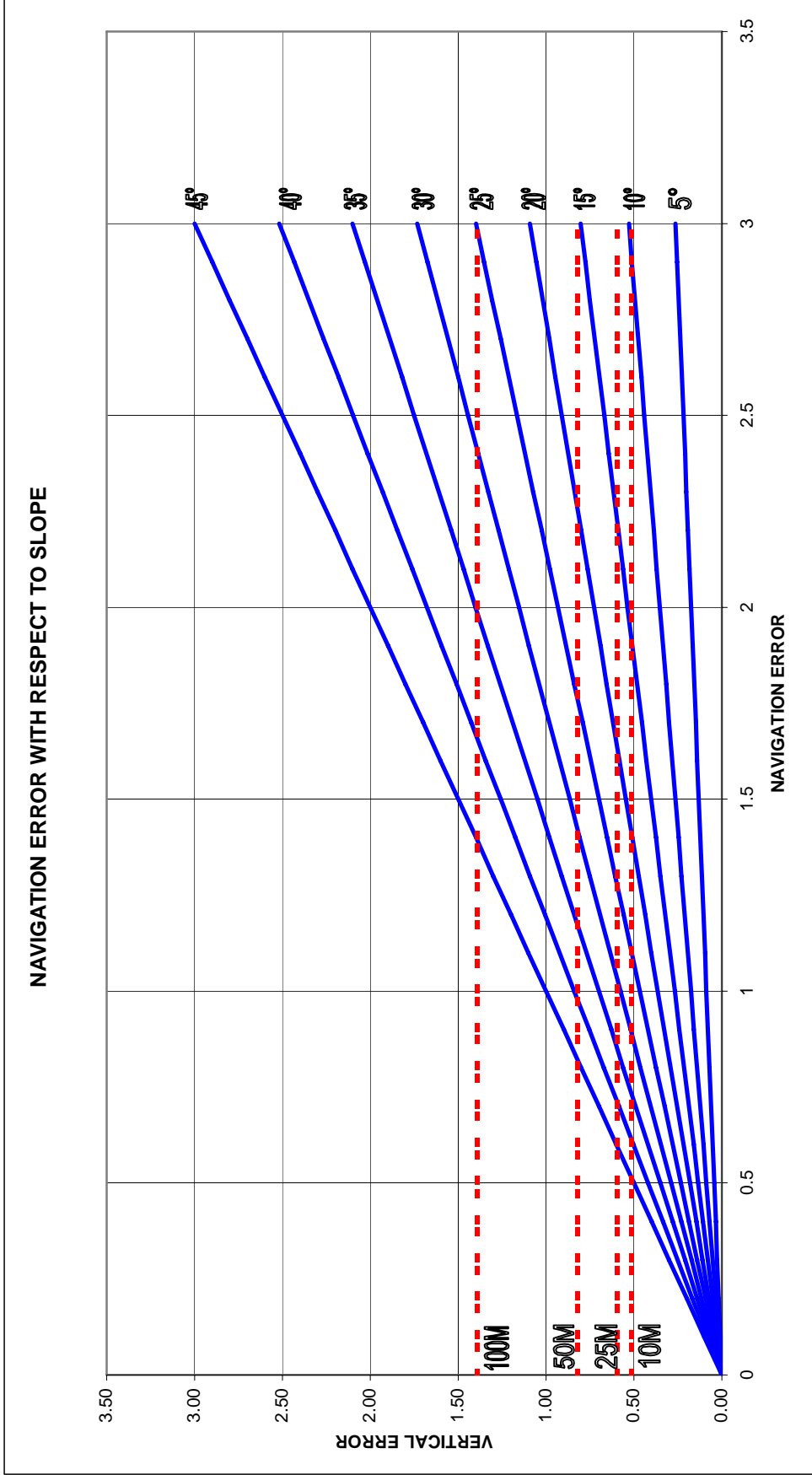


Figure 4: Navigation Error With Respect to Slope

Data Quality

In general the multibeam data quality for H11200 was excellent. One problem to note is as follows:

- During data acquisition and routine processing, a general downward and/or upward cupping was noticed in the across track sounding profiles for certain areas. This is possibly due to the high volume of thermal layering and strong under currents in the water column, an example of this can be seen in the figure below. In an attempt to resolve this cupping, SVP casts were conducted more frequently and line spacing reduced. (Refer to Separate 2 for SVP plots).³

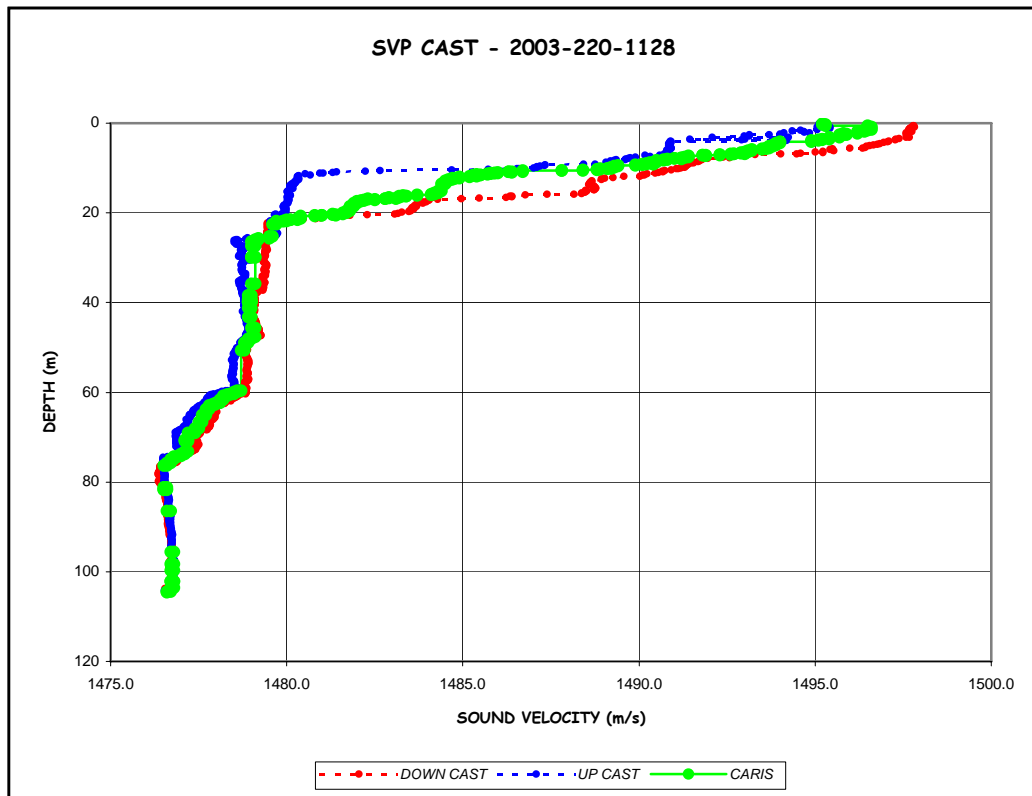


Figure 5 Sample SVP Plot

Survey Junctions

H11200 (Sheet A) junctions with:

Registry #	Scale	Date	Junction Side
H11201	1:20,000	2003	NNE ⁴
H11202	1:20,000	2003	WNW ⁵

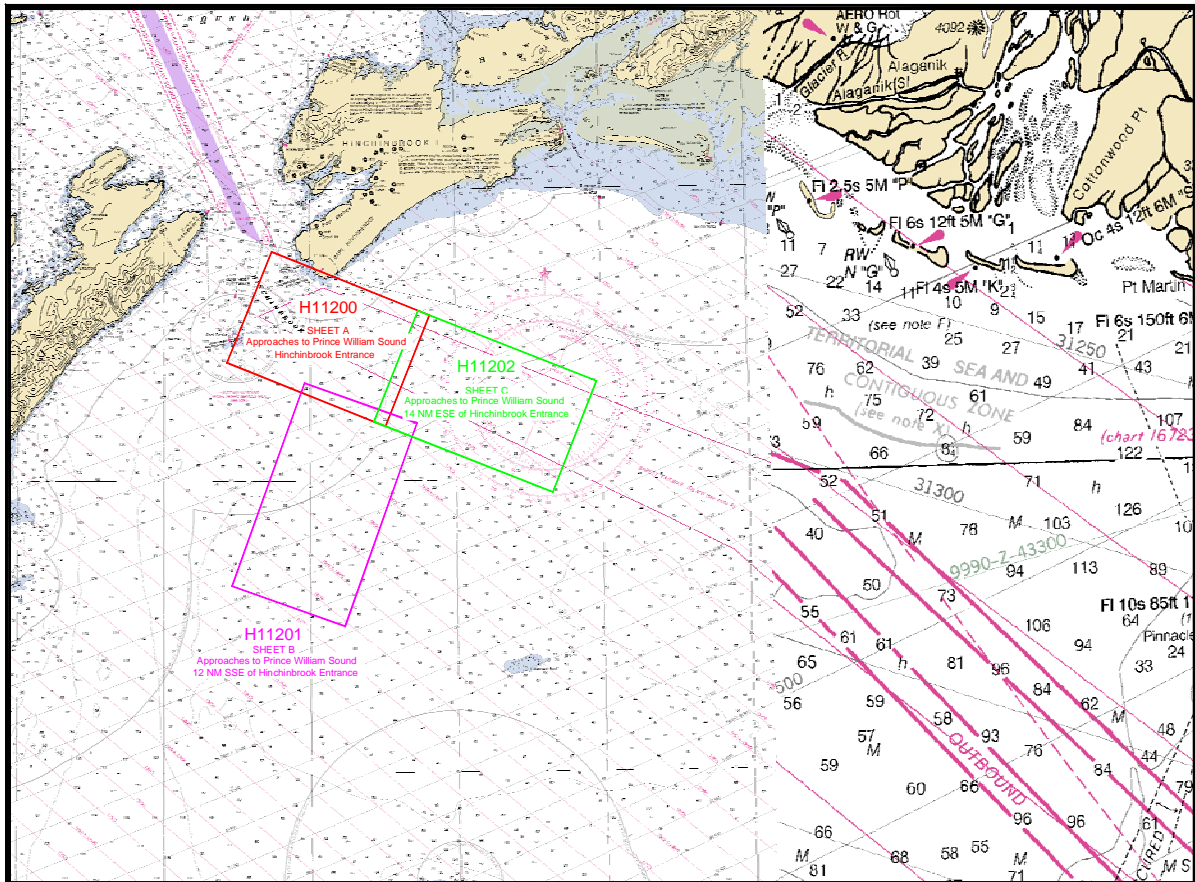


Figure 6 H11200 Survey Junctions

The surveys are in agreement along their common borders. The agreement was noted in the field using the 5-meter DTM's created for coverage verification. The conformity is also apparent in their preliminary smooth sheets.⁶

Smooth Sheet Histograms

Figure 7 Histogram is for the Reson 8101 data collected from June 10, 2003 to June 13, 2003 on the Quicksilver. The histogram is evenly distributed; the decrease of selected soundings on the outer beams is the result of data quality and filtering on the outer beams. In most cases set filters were used to flag the outer beams as rejected, but in other cases additional cleaning or filters were used on a line by line bases resulting in fewer selected soundings. The valley around beam 26 is the transition from phase to amplitude detection method of the sonar.

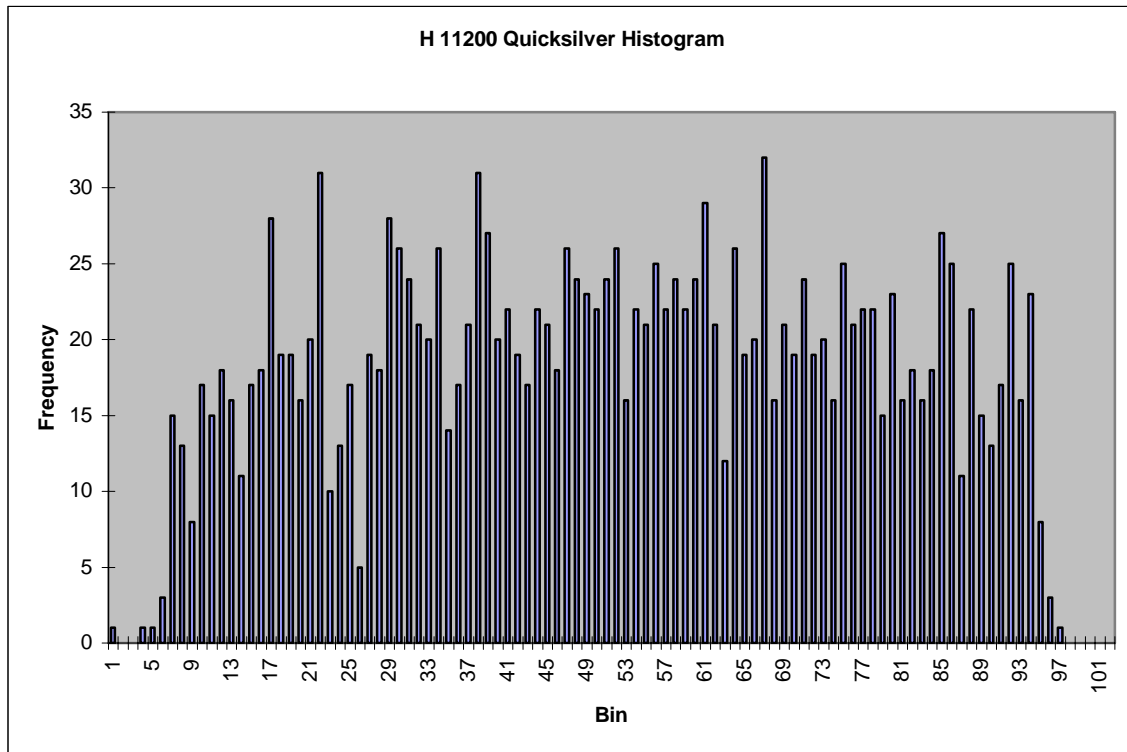


Figure 7 Histogram for 8101 (Quicksilver)

Figure 8 Histogram is for the Reson 8111 data, collected from August 8, 2003 to August 23, 2003 on the Davidson. The histogram reveals several distinct features; one being the spikes on the nadir beams and around beams 28 and 74. These spikes can be contributed to a couple of factors: one being SVP error; hence, if the data is frowning then the nadir beams will be shoaler then the outer beams and if the data is cupping then the opposite is true. Secondly, the increase in the number of selected sounding taken from around the nadir beams and beams 28 and 74 can be also contributed to data density. Since the lines were run, port beams overlapped with port beams and starboard beams overlapped with starboard beams from the adjacent lines. This makes it possible to have higher density data per square meter on the outer edges, leading to a higher chance of sounding selection on the smooth sheet. It is also apparent on these examinations the transition from phase to amplitude detection method of the sonar (around beams 36 and 68). The decrease of selected soundings on the outer beams is the result of deterioration of data quality on the outer beams, especially in deep water. In most cases set filters were used to flag the outer beams as rejected, but in other cases additional cleaning or filters were used on a line by line bases resulting in fewer selected soundings.

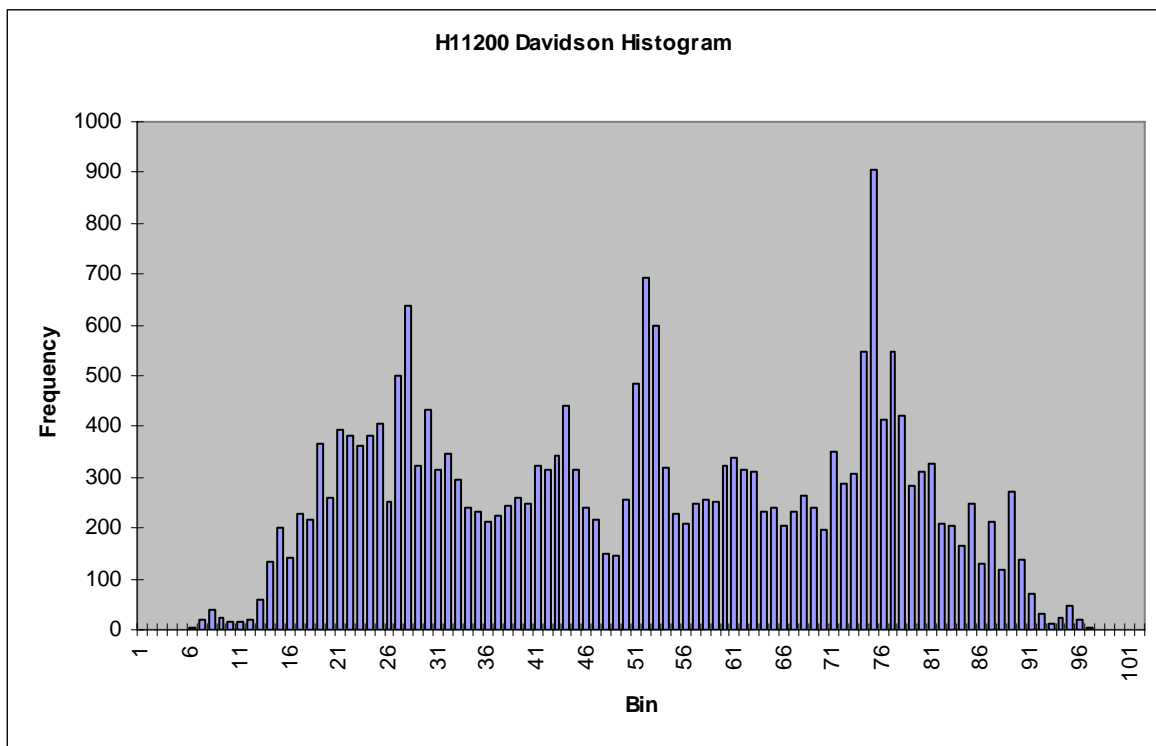


Figure 8 Histogram for 8111 (Davidson)



Quality Control Checks

During the hydrographic survey OPR-P356-KR-03 the R/V's Davidson and Quicksilver conducted a number of confidence checks. This usually consisted of the vessels running two lines in the opposite direction over a reference surface. The Reson systems that were installed on the Davidson and Quicksilver usually compared to within 5 to 10 centimeters.

The patch tests that were conducted for the R/V Quicksilver during OPR-P182-KR-03 (Castle Cape) to derive: timing, pitch, heading, roll errors, was also used for OPR-P356-KR-03 (Approaches to Prince William Sound). These values were then enter into the vessel configuration files for each vessel and utilized in the routine processing for OPR-P356-KR-03 (Approaches to Prince William Sound).

Positioning system confidence checks where conducted on a daily basis. The POS/MV controller software has numerous real time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables (version June 2000) were achieved. These include, but are not limited to the following: GPS Status, Position accuracy, Receiver Status (which included HDOP) and Satellite Status. During periods of high HDOP and/or low number of available satellites survey operations were stopped.

Corrections to Echo Soundings

Refer to the OPR-P356-KR-03 Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings. No deviations from the report occurred.

C – Horizontal & Vertical Control

Refer to the OPR-P356-KR-03 Horizontal and Vertical Control Report⁷ for a detailed description of the horizontal and vertical control used on this Survey. A summary of the projects horizontal and vertical control follows. No deviations from the report occurred.

Horizontal Control

The horizontal control datum for this survey was the North American Datum of 1983 (NAD83). All positions were originally collected in WGS84 and transformed to NAD83 during HIPS workfile creation. Projection of smooth sheet is in NAD83, UTM (Central Meridian 147°00'00").

Two MBX-3 differential receivers that used the U.S. Coast Guard (USCG) network of differential beacons were the main source of RTCM. Refer to the OPR-P356-KR-03 Horizontal and Vertical Control Report for DGPS verification results.

Vertical Control

All soundings were reduced to MLLW initially using unverified tidal data from the Cape Hinchinbrook (for Quicksilver data) and Wooded Island (for Davidson data). The gauge was operated and maintained by the sub-contractor, LCMF.

Table 2 Tide Gauges

Gauge	Model	Gauge Type	Location	Latitude	Longitude	Operational
9454562	H350/355	Digital Bubbler	Wooded Is.	59°52'30"N	147°24'09" W	07/30/03–10/08/03
9454329	H350/355	Digital Bubbler	Hinchinbrook	60°14'18"N	146°38'54" W	06/10/03–06/12/03

On November 17, 2003, LCMF issued verified tidal data and final zoning for OPR-P356-KR-03. The tidal zoning was modified by LCMF, providing only fine adjustments from those issued in the Statement of Work. On November 17, 2003 all sounding data were re-merged using CARIS HIPS tide routine. Verified tidal data was used for the Preliminary Smooth Sheet. Refer to the Vertical and Horizontal Control Report for additional tidal information and station descriptions.

D – Results and RecommendationsChart Comparison

H11200 survey was compared with charts:

- 500 1:3,500,000 7th June 1, 1996
- 530 1:4,860,700 30th Mar 23, 2002
- 531 1:2,100,000 21st Feb 2, 2002
- 16013 1:969,761 28th Apr 14, 2001
- 16700 1:200,000 27th July 1, 2003
- 16709 1:80,000 22nd Jan 19, 2002

Comparison of Soundings

The soundings in general compare well with the existing charts.⁸ Soundings that differ from hydrographic survey H11200 resulted in a Danger to Navigation and are listed in Appendix A Danger to Navigations.⁹

Since Charts 16013 and 16709 have little or no detail pertaining to the contours, the hydrographer compared the contours from H11200 to Chart 16700.

H11200 contours show more detail in the bottom topology in the offshore region, but compare well with the existing charted contours.¹⁰

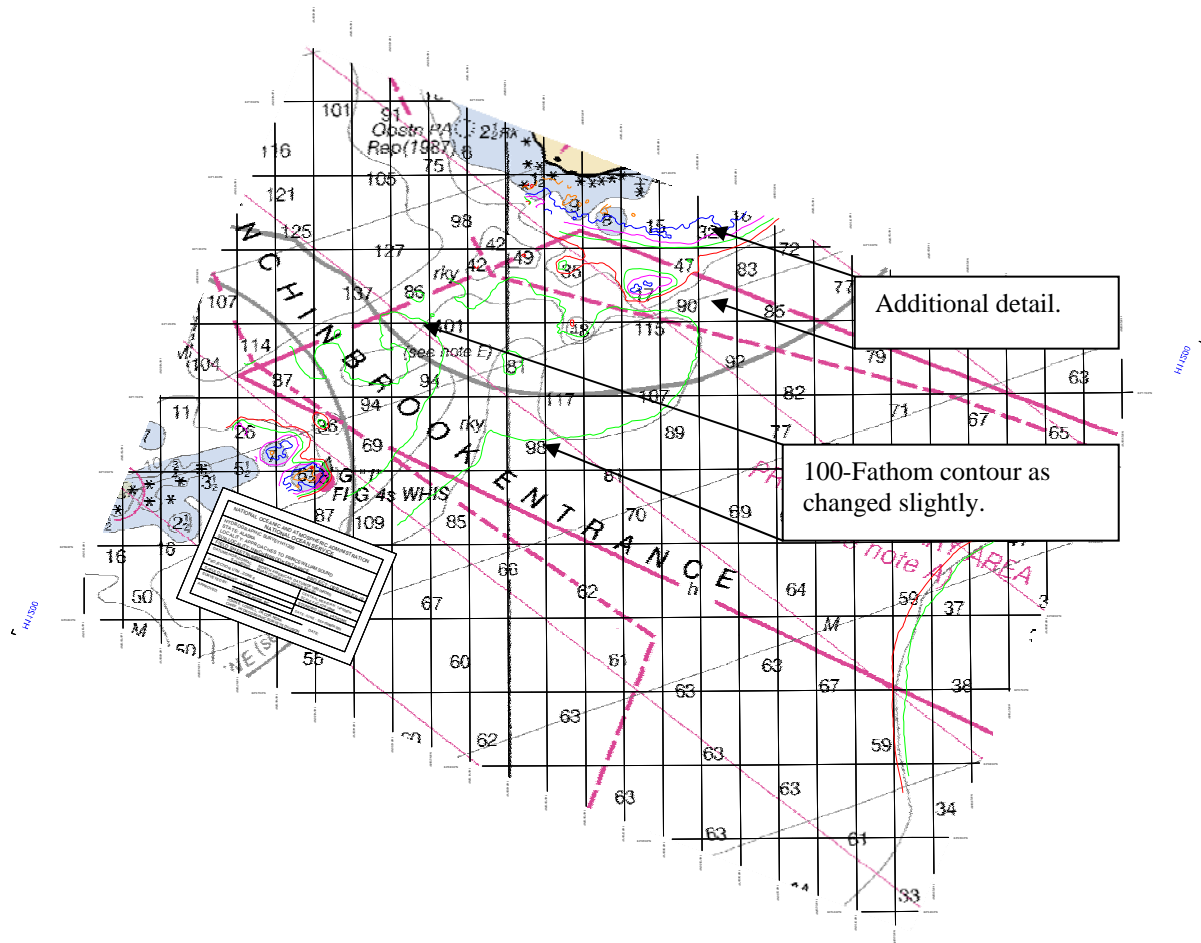


Figure 9 Comparison of Contours



Automated Wreck and Observation Information System

There were no AWOIS items assigned to OPR-P356-KR-03.¹¹

Charted Features

There were no charted features labeled PA, ED, PD, or Rep within the limits of H11200.¹²

Dangers to Navigation

Eight dangers to navigation were located during the hydrographic survey of H11200 and were submitted on August 26, 2003. Refer to Appendix A for Submitted Report.¹³

Additional Results

Shoreline Verification

Shoreline verification was not required under this contract. It should be noted that the charted shoreline from NOAA Chart 16709 was digitized and is depicted on the Smooth Sheet (in brown) for H11200, as per NOAA request.¹⁴

Tidal Range

LCMF established the tidal range for OPR-P356-KR-03 to be 2.841meters (9.32 feet or 1.55 fathoms).

Bottom Samples

Bottom Samples were not required under this contract.¹⁵

Aids to Navigation

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



E – Approval Sheet

Approval Sheet

For

H11200

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

OPR-P356-KR-03 statement of work and hydrographic manual;
Fugro Pelagos, Inc. Acquisition Procedures (2003-NOAAAcquisitionProcedures);
Fugro Pelagos, Inc. Processing Procedures (2003-NOAAProcessingProcedures);
Technical Report for Tides, Prince William Sound.¹⁶

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

The data were reviewed daily during acquisition and processing.

Approved and forwarded,

A handwritten signature in blue ink, appearing to read "Dean Moyles".

Dean Moyles, Fugro Pelagos, Inc.
Lead Hydrographer
Fugro Pelagos, Inc. Survey Party



Appendix A - Danger to Navigation

Eight dangers to navigation were located during the hydrographic survey of H11200.¹⁷

Danger to Navigation Report

Hydrographic Survey Registry Number: H11200

Survey Title: State: Alaska
Locality: Approaches to Prince William Sound
Sub-locality: Hinchinbrook Entrance

Project Number: OPR-P356-KR-03

Survey Dates: August - Septmeber 2003

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

CHARTS AFFECTED:

Chart	Scale	Edition	Date
16013	1:969,761	28 th	04/14/01
16700	1:200,000	27 th	03/09/02
16709	1:80,000	22 nd	01/19/02

DANGERS:

Feature	Depth(ft or fms)	Latitude (N)	Longitude (W)
Rock	5 fms 5 ft	60° 10' 14.9"	146° 46' 07.3"
Rock	4 fms 3 ft	60° 10' 02.8"	146° 45' 05.2"
Rock	5 fms 2 ft	60° 09' 54.8"	146° 45' 25.8"
Sounding	9 fms 2 ft	60° 09' 48.2"	146° 45' 26.8"
Sounding	9 fms 5 ft	60° 13' 36.4"	146° 38' 29.5"
Sounding	8 fms	60° 13' 35.4"	146° 38' 04.9"
Sounding	6 fms 3 ft	60° 13' 34.5"	146° 37' 19.5"
Sounding	8 fms 5 ft	60° 13' 26.7"	146° 36' 41.0"

COMMENTS:

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6835



Appendix B - List of Geographic Names

No new geographic names in the survey were discovered.



Appendix C – Progress Sheet

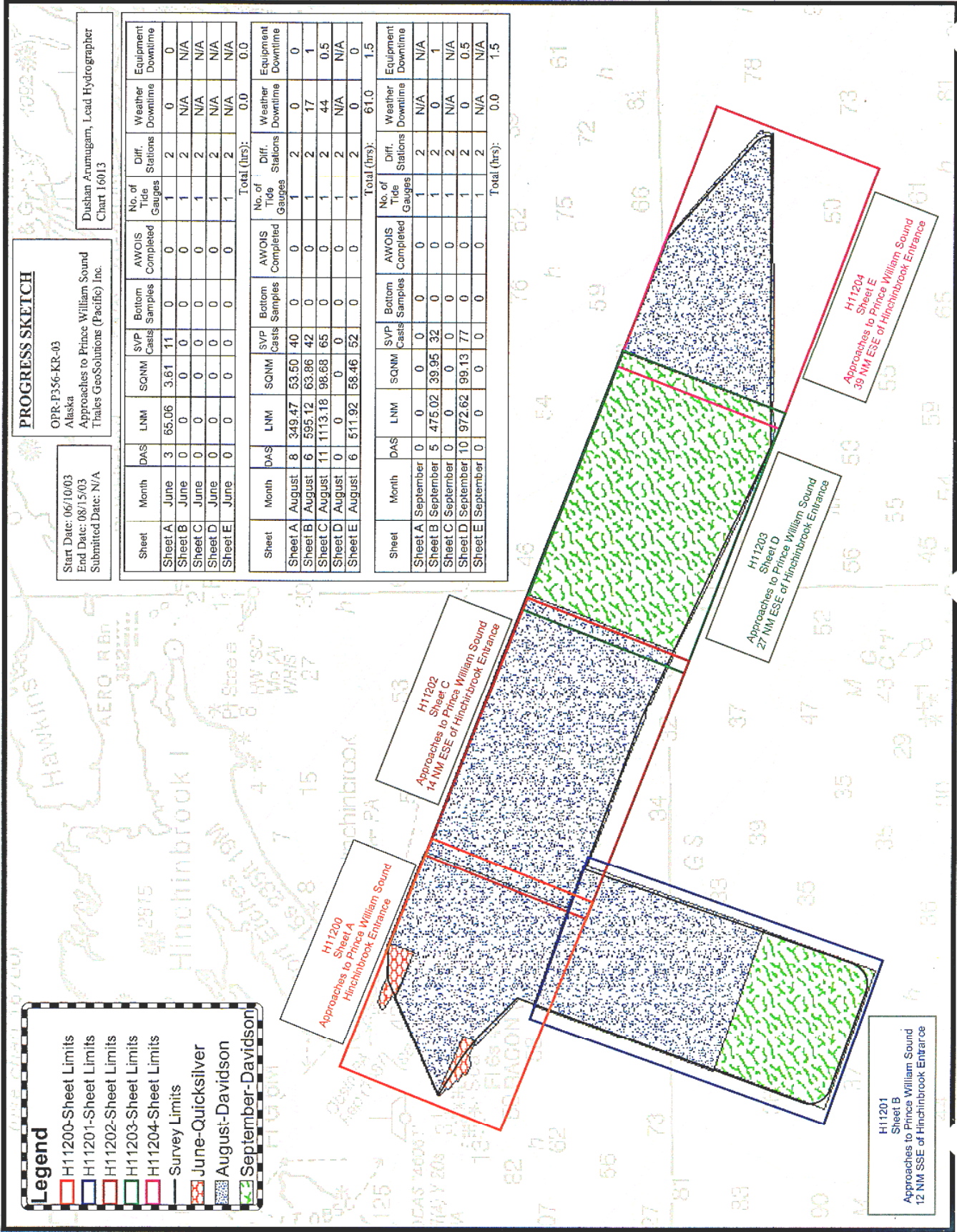
Legend

- H11200-Sheet Limits
- H11201-Sheet Limits
- H11202-Sheet Limits
- H11203-Sheet Limits
- H11204-Sheet Limits
- Survey Limits
- June-Quicksilver
- August-Davidson
- September-Davidson

PROGRESS SKETCH
 OPR-F356-KR-03
 Alaska
 Approaches to Prince William Sound
 Tides GeoSolutions (Pacific) Inc.
 Dushan Aramugam, Lead Hydrographer
 Chart 16013

Start Date: 06/10/03
 End Date: 08/15/03
 Submitted Date: N/A

Sheet	Month	DAS	LNM	SONM	SVP Casts	Bottom Samples	AWOIS Completed	No. of Tide Gauges	Diff. Stations	Weather Downtime	Equipment Downtime
Sheet A	June	3	65.06	3.61	11	0	0	1	2	0	0
Sheet B	June	0	0	0	0	0	0	1	2	N/A	N/A
Sheet C	June	0	0	0	0	0	0	1	2	N/A	N/A
Sheet D	June	0	0	0	0	0	0	1	2	N/A	N/A
Sheet E	June	0	0	0	0	0	0	1	2	N/A	N/A
Total (hrs):											0.0
Sheet	Month	DAS	LNM	SONM	SVP Casts	Bottom Samples	AWOIS Completed	No. of Tide Gauges	Diff. Stations	Weather Downtime	Equipment Downtime
Sheet A	August	8	349.47	53.50	40	0	0	1	2	0	0
Sheet B	August	6	595.12	63.86	42	0	0	1	2	17	1
Sheet C	August	11	1113.18	98.68	65	0	0	1	2	44	0.5
Sheet D	August	0	0	0	0	0	0	1	2	N/A	N/A
Sheet E	August	6	511.92	58.46	52	0	0	1	2	0	0
Total (hrs):											61.0
Sheet	Month	DAS	LNM	SONM	SVP Casts	Bottom Samples	AWOIS Completed	No. of Tide Gauges	Diff. Stations	Weather Downtime	Equipment Downtime
Sheet A	September	0	0	0	0	0	0	1	2	N/A	N/A
Sheet B	September	5	475.02	39.95	32	0	0	1	2	0	1
Sheet C	September	0	0	0	0	0	0	1	2	N/A	N/A
Sheet D	September	10	972.62	99.13	77	0	0	1	2	0	0.5
Sheet E	September	0	0	0	0	0	0	1	2	N/A	N/A
Total (hrs):											0.0



H11200
 Sheet A
 Approaches to Prince William Sound
 14 NM ESE of Hinchinbrook Entrance

H11201
 Sheet B
 Approaches to Prince William Sound
 12 NM SSE of Hinchinbrook Entrance

H11202
 Sheet C
 Approaches to Prince William Sound
 14 NM ESE of Hinchinbrook Entrance

H11203
 Sheet D
 Approaches to Prince William Sound
 27 NM ESE of Hinchinbrook Entrance

H11204
 Sheet E
 Approaches to Prince William Sound
 39 NM ESE of Hinchinbrook Entrance

**Appendix D - Tides and Water Levels**

Abstract of Times of Hydrography For Smooth Tides

Project Number: OPR-P356-KR-03

Registry Number: H11200

Contractor Name: Fugro Pelagos, Inc.

Date: January 16, 2004

Sheet Letter: A

Inclusive Dates: June 10, 2003 to June 13, 2003 & August 8, 2003 to August 23, 2003

Fieldwork is complete and verified tides were applied for the production of the smooth sheet.

Refer to LCMF's final verified tides report for additional information.

Table 3 Abstract of Times of Hydrography for R/V Davidson

YEAR	DAY	START TIME (UTC)	END TIME (UTC)	COMMENTS
2003	220	00:12:29	23:59:59	
2003	221	00:00:00	00:15:16	
2003	221	00:23:04	23:50:02	
2003	222	00:06:14	23:59:59	
2003	223	00:00:00	00:15:23	
2003	223	00:21:54	00:42:59	
2003	232	22:20:43	23:49:20	In-Fills and Tielines
2003	234	18:04:52	23:55:37	In-Fills and Tielines
2003	234	00:30:14	02:05:59	In-Fills and Tielines

Table 4 Abstract of Times of Hydrography for R/V Quicksilver

YEAR	DAY	START TIME (UTC)	END TIME (UTC)	COMMENTS
2003	161	17:19:16	23:59:59	
2003	162	00:00:00	00:05:58	
2003	162	00:11:48	23:59:59	
2003	163	00:00:00	00:09:02	
2003	163	00:14:32	02:20:40	



Appendix E - AWOIS

No AWOIS were assigned under OPR-P356-KR-03.



Revisions Compiled During Office Processing and Certification

¹ Revise sheet limits to the following:

60/13/59N, 146/38/47W

60/11/49N, 146/24/48W

60/04/46N, 146/30/27W

60/11/03N, 146/48/00W

² Filed with the Project Records.

³ Concur.

⁴ PHB Revision--Strikethrough ~~NNE~~ and insert SSW.

⁵ PHB Revision--Strikethrough ~~WNW~~ and insert ESE.

⁶ Concur.

⁷ Filed with the Project Records.

⁸ Concur.

⁹ Attached to this report.

¹⁰ Concur.

¹¹ Concur.

¹² Concur.

¹³ Attached to this report.

¹⁴ Concur with hydrographer's statements

¹⁵ Concur with clarification. Some bottom samples were retained from Charts 16700 and 16709. Chart bottoms samples as shown on the Hdrawing.


¹⁶ Filed with the Project Records.

¹⁷ Attached to this report.


APPROVAL SHEET
H11200

Initial Approvals:

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

 _____ Date: 11/22/2006
for Gary Nelson
Chief, Cartographic Team
Pacific Hydrographic Branch

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

 _____ Date: 24 Nov. 2006
CDR/NOAA
Donald W. Haines
CDR, NOAA
Chief, Pacific Hydrographic Branch

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-11200

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
16709	10/25/06	R. Stapley	Full Part Before After Marine Center Approval Signed Via Full Application Drawing No. of SOUNDINGS, CURVES and features from the SMOOTH SHEET.
16700	10/27/06	R. Stapley	Full Part Before After Marine Center Approval Signed Via Full Application Drawing No. of SOUNDINGS, CURVES and features from the SMOOTH SHEET.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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