H-11098

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-0331-KR

Registry No. H-11098

LOCALITY

State ALASKA

General Locality Kasaan Bay

Sublocality Skowl Point to Baker Point

2002

CHIEF OF PARTY
Frederick W. Iversen

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)

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

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-11098

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

FIELD NO.

State **Alaska**

General Locality **Kasaan Bay**

Sublocality **Skowl Point to Baker Point**

Scale **1:10,000** Date of Survey **June 11 - August 15, 2002**

Instructions Dated **1/29/2002** Project No. **OPR-O331-KR-02**

Vessel **Luna Sea and Royal Fish**

Chief of Party **Frederick W. Iversen**

Surveyed by **Terra Surveys, LLC personnel**

Soundings taken by echo sounder, hand lead, pole **Reson 8101 & 8124**

Graphic record scaled by **N/A**

Graphic record checked by **N/A**

Evaluation by **B Taylor** Automated plot by **HP Design Jet 1055cm+**

Verification by **G Nelson**

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

REMARKS: **Time in UTC.**

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

Terra Surveys

1930 Whiting Circle

Palmer, AK 99645

Descriptive Report to Accompany Hydrographic Survey H-11098

Sheet C

Scale 1:10,000

June 11-August 15, 2002

Terra Surveys, LLC

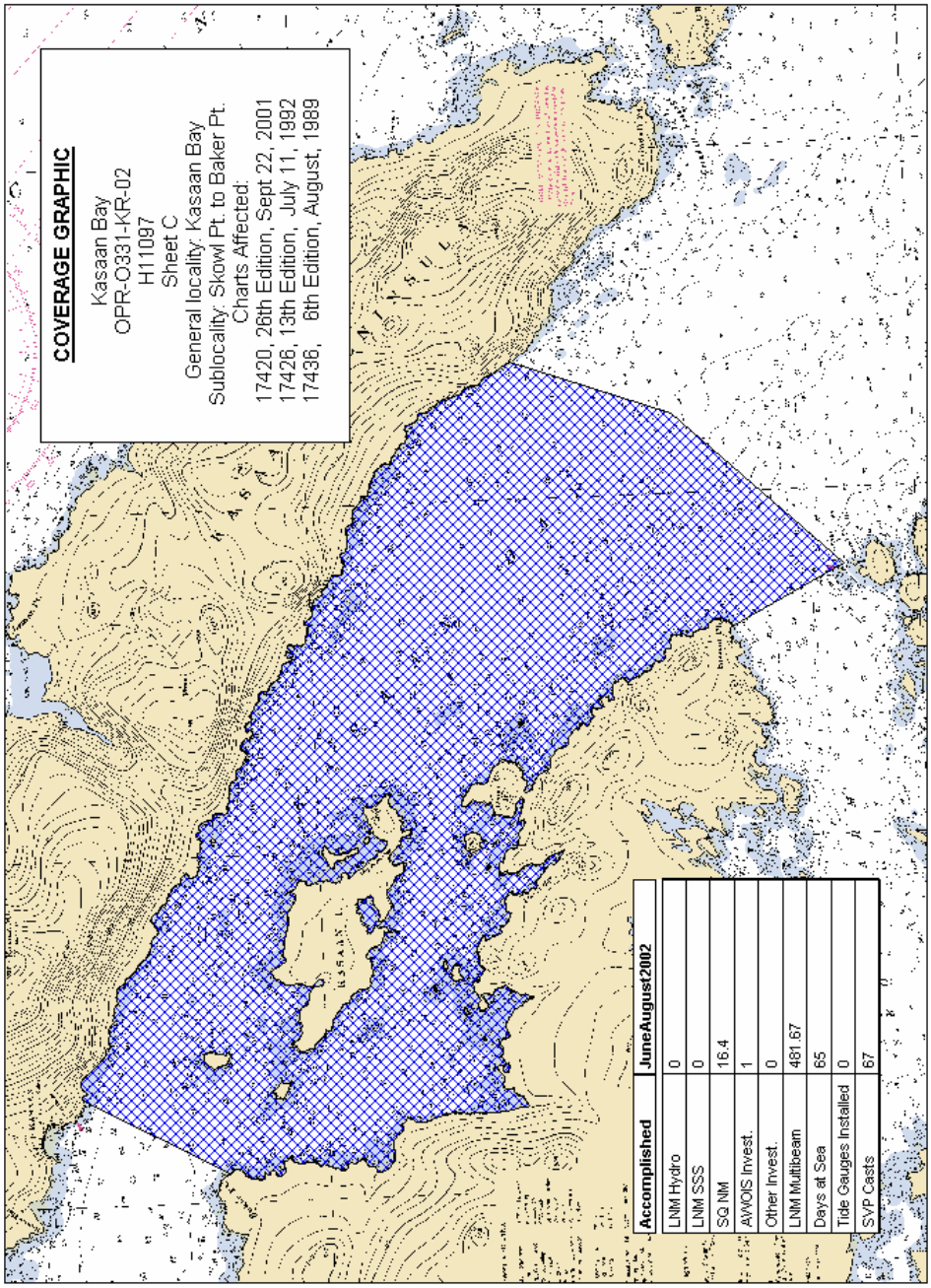
Lead Hydrographer: Frederick W. Iversen

A. AREA SURVEYED

This navigable area survey was conducted in accordance with Hydrographic Project Instructions OPR-O331-KR-02, Kasaan Bay, Alaska dated January 29, 2002.[1]

The purpose of this contract was to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of this area. Kasaan Bay consists of abruptly irregular bathymetry ranging in depths[2] 1 fathom above datum to as deep as 278 fathoms in the eastern entrance to the bay. The bottom type is also variable ranging from hard bedrock to silty mud flats. The Inter-Island Ferry's Prince of Wales, transports passengers twice a day from Ketchikan to Hollis and return. The ferry's transit lies in the northern half of the channel between Patterson Island and Grindall Island at the entrance, and then north of Kasaan Island and into Hollis ferry terminal. Kasaan Bay is also used commercially by fisherman and crabbers.The project area is approximately 16.4 square nautical miles and extends from Skowl Pt. to Baker Pt.[3]

Two shallow water multibeam sonar systems were used to locate and determine the least depth over the obstructions, wrecks and shoals as well as to determine the least depths over the entire project area. This survey has a maximum depth of 159 fathoms and a minimum depth of 1.1 fathom above datum


COVERAGE GRAPHIC
Kasaan Bay
OPR-O331-KR-02
H11097
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition, Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 8th Edition, August, 1989
Accomplished | JuneAugust2002
LNM Hydro | 0
LNM SSS | 0
SQ NM | 16.4
AWOIS Invest. | 1
Other Invest. | 0
LNM Multibeam | 481.67
Days at Sea | 65
Tide Gauges Installed | 0
SVP Casts | 67

Section B Data Acquisition and Processing
B.1 Equipment

Luna Sea

Approximately seventy-nine percent of the soundings for this survey were acquired from the motor vessel *Luna Sea*, with the remaining data collected from the jet boat *Royal Fish*. The *Luna Sea* is a 35-foot aluminum hull boat with a 12.1-foot beam and a 2.25-foot draft. Major systems used on the *Luna Sea* are listed on the following table.

VESSEL *Luna Sea* **LOA: 35 FT, BEAM 12.1 FT, DRAFT: 2.25 FT**	
Equipment	**Manufacturer & Model**
Multibeam sonar	Reson SeaBat 8101
Positioning	Seatex Seapath 200 RTK
Sound velocity	Applied Microsystems 3317 4479
Vessel attitude	Seatex MRU 5

Royal Fish

The *Royal Fish* is a custom built Almar all-welded aluminum boat. Its overall length is 24 feet, with a beam of 8 feet and a draft of 1.5 feet. Major systems used on the *Royal Fish* are listed on the following table.

VESSEL *Royal Fish* **LOA: 24 FT, BEAM 8 FT, DRAFT: 1.5 FT**	
Equipment	**Manufacturer & Model**
Multibeam sonar	Reson SeaBat 8124
Positioning	Seatex Seapath 200
Sound velocity	Applied Microsystems 3279 4425
Vessel attitude	Seatex MRU 5 E

Equipment performance details are provided in the Project-Wide Report, Sections A, Equipment and B, Quality Control.[4]

B2. Quality Control

Line Spacing and Orientation

In general, the survey limits were constrained by the shoreline. This necessitated running shore "buffer" lines. There were slow, winding lines following the 4-meter curve. The Royal Fish typically ran several of these lines to build a buffer zone along the shore. At this point, the Luna Sea could run the regular main-scheme lines into and along this zone with an increased margin of safety. Buffer lines were run at higher tides, for a significantly better swath width and greater success of reaching the 4-meter curve. A line heading was chosen to coincide with the main channel and/or contours and in most instances held through the remainder of the block or sheet. After the first line was run, the next line was set-up so that sufficient overlap would be achieved using the pre-decided beam angle filtering. Typically, only 60° off nadir on the starboard and port channels were displayed to the coverage map in the collection software. Overlap was based on this.

Crosslines

The internal consistency and integrity of the survey data was found to be good. All of the soundings that appear on the smooth sheet meet or exceed the accuracy requirements in the specifications.[5]

Survey H-11098 (Sheet C) had 293.5 nautical miles of main scheme lines and 25.5 NM of crosslines. This[6] equates to 8.7% of the mainscheme lines and exceeds the[7] requirements of 5%.[8]

There were 28 crosslines and 304 mainscheme lines in Sheet C. This resulted in 466 crossings. In addition to the mainscheme lines, a total of 598 shoreline buffer lines (167.0 NM) were collected along with an additional 4 crosslines (0.9 NM) in these areas. This resulted in an additional 28 crossings. A total of 25 crossings were analyzed, 23 from the Luna Sea and 2 from the Royal Fish. These varied spatially, and temporally, which complies with the requirements of the SOW.

Statistical analysis of the crossline comparisons was accomplished using the Caris HIPS Quality control report tool (MakeHist). This tool is used to compare the sounding data from a line against a reference DTM surface. The procedure was to compare the near-nadir beams of the mainscheme lines to the nearest unsmoothed soundings obtained from the crosslines. In addition, the nadir or near-nadir depths of the crosslines were compared to the nearest unsmoothed mainscheme soundings. The reference DTM surface is constructed with soundings from one of the lines. The comparison line would then have its non near-nadir beams removed and the lines compared using the MakeHist tool. In most cases the mainscheme line was selected to be close in time to the crossline in order to minimize any failed intersections due to bottom change as opposed to sounder error. The output from this tool is a text report containing statistical results of the differences between the crossline data and the mainscheme line data. There are two reports for each pair of lines. The statistics are grouped by sonar beam number and can be found in

Separate V[9] of this report. In all cases, the near-nadir beams were found to be acceptable within the 95% compliance standard.

The crossline reports generated with the Caris program use a class file that was developed from the NOAA specifications for this project. The table below shows the parameters for this class file.

Min. Depth	Max. Depth	Allowable Error
0.0m	-10.00m	0.504m
-10.00m	-20.00m	0.537m
-20.00m	-30.00m	0.596m
-30.00m	-40.00m	0.676m
-40.00m	-60.00m	0.821m
-60.00m	-80.00m	1.038m
-80.00m	-100.00m	1.272m
-100.00m	-140.00m	1.638m
-140.00m	-200.00m	2.266m
-200.00m	-1000.00m	1.31%

Each error in the file is for a depth mid-way between each group (ex. -10.00 to -20.00 uses -15 depth to compute an allowable error of .54). From –50m and deeper, a slope was computed. The computed allowable errors met NOAA specifications for this project.

Two histograms were made from the final smoothsheet soundings. The graphs show sounding distribution by beam number. Two multi-beam echo sounders were used on H-11098, Sheet C. One was a Reson 8101 with 101 beams and the other a Reson 8124 with 80 beams. The beams for the 8101 sounder are numbered from port to starboard, 1-101 with beam 51 representing the nadir beam. Likewise the 8124 sounder is numbered from port to starboard, 1-80, with beam 41 representing the nadir beam.

8101 Histogram (***Luna Sea***)

There are two anomalies that are obvious in this chart. There are a large number of soundings used that come from the nadir area of the swath. The other irregularity observed in the data is that there is a slight bias favoring the outer beams of the starboard side.

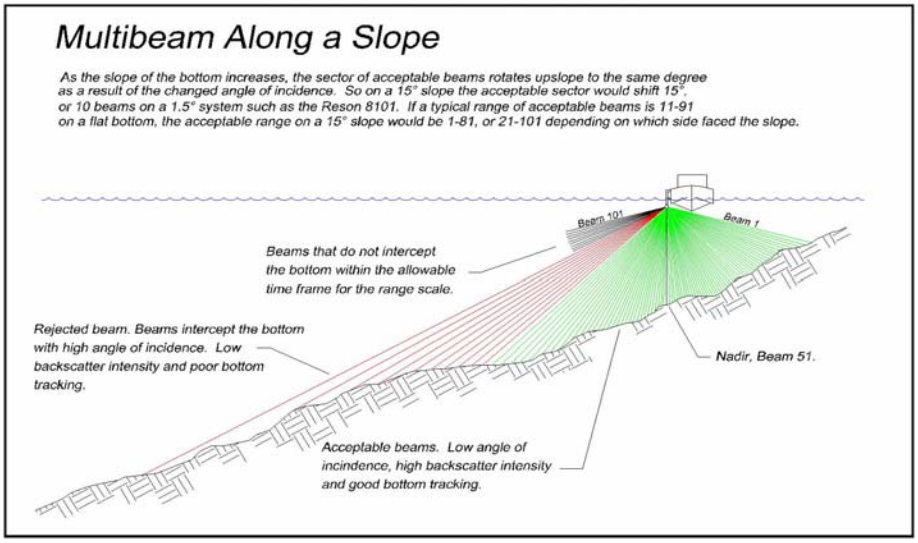
The above-average nadir beam selections[10] is something Terra Surveys, LLC has seen before and are[11] systematic to this sounder. It is called the nadir spiking effect and it can be seen as an artifact in the sun-illuminated DTM image. When two lines from this sounder are compared using the crossline analysis tool, the number of acceptable soundings of these beam numbers (48-53) is usually less then[12] 5% of their neighbors, but still within acceptable tolerance. The shoal biasing of all cells brings these shoaler soundings into the final data set.

The starboard side bias is probably the result of these soundings being less “noisy” than the port beams, which must project under the hull of the ship. It is thought that the ship’s hull or engines create some interference on this side, which would lead to more stray soundings.

A Gaussian distribution in the histogram is apparent. This decrease in the number of soundings towards the outer beams is a result of outer beams being rejected due to refraction and decreased intensity of returns as the depth increased.

The statistics from crossline analysis did not support the use of the outermost beams in several of the depth ranges. This can be seen in the Crossline Summary, Section V. of the Separates[13], where some outer beams used fall short of the 95% confidence level. It is held that the problem was the lack[14] suitable areas within the sheet to run crosslines, smooth and gently sloping seafloor, and not in the quality of mainscheme data. The radically changing bottom and steep slopes meant that much of the depth error budget could be spent by positional errors well within specifications. For example, 2 meters of position error could result in 1 meter of depth error on a 30-degree slope. This position error is not accounted for in the depth error budget laid out in the Technical Specifications and Deliverables Section 5.4.5[15]. The statistical analysis of crosslines in H-11160, Sheet D, an area of less drastic bottom changes, demonstrate the reliability of the sounding equipment and methodology used throughout the survey.[16]

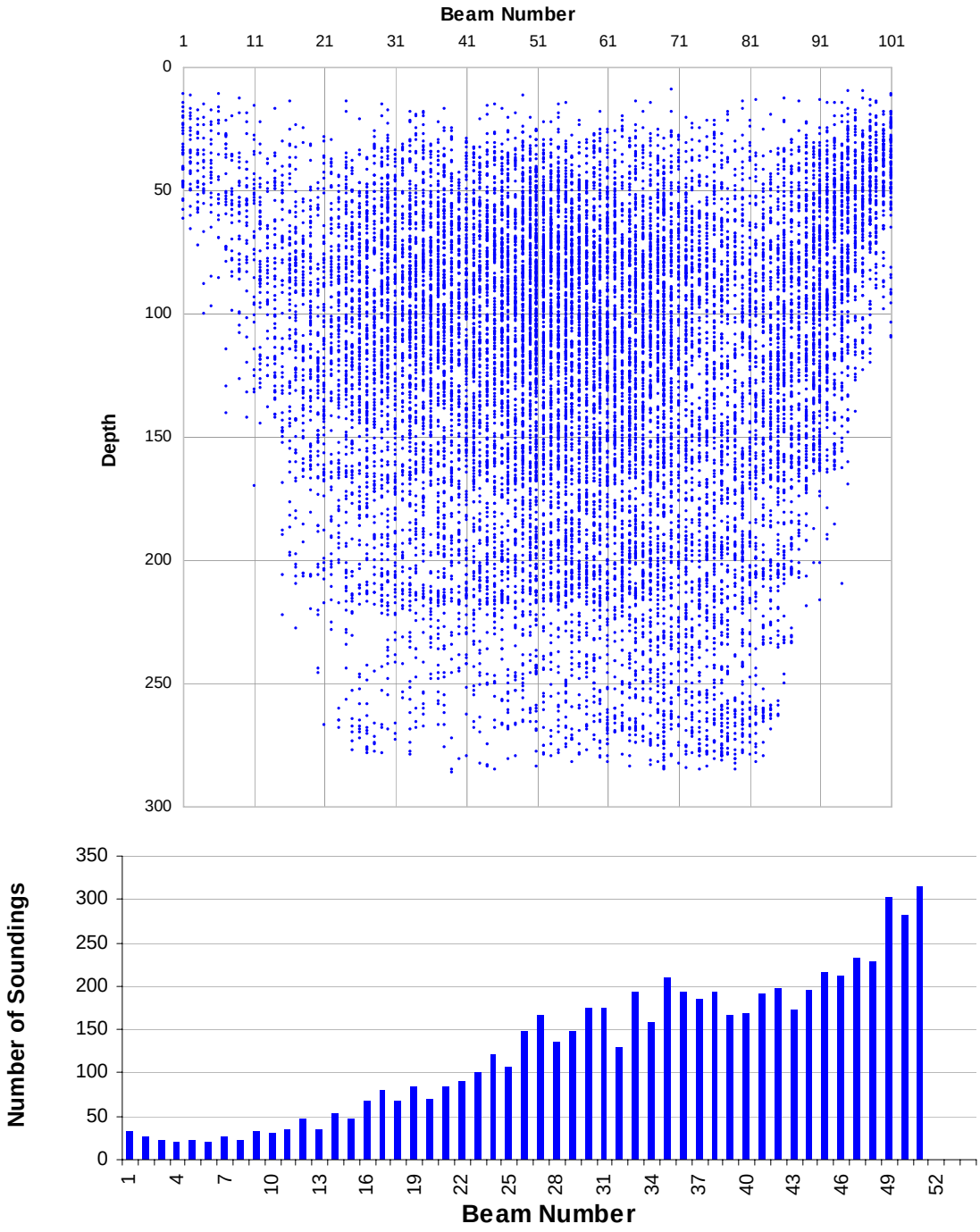
Outer beams were only used in localized areas of excellent data quality. Excellent data quality was found in areas with bottom types that produced strong returns, shoal areas where the effects of roll and sound velocity artifacts were reduced, and along steep terrain where the outermost beams had a better angle of incidence on the up-hill side. This was often the case, due to the steep slopes encountered through most of the survey. This effect is shown in the following figure:



8124 Histogram (***Royal Fish***)

This chart shows large spikes in the outer beams. The *Royal Fish* was used for all of the shallow-water surveying. A review of the smoothsheet shows that most shoreline soundings were from the 8124's outer beams. This is a result of surveying parallel to the shore with the *Royal Fish*, thus causing the outer beams to collect the shoalest soundings.

Sheet C Smooth Sheet Sounding Distribution
Luna Sea

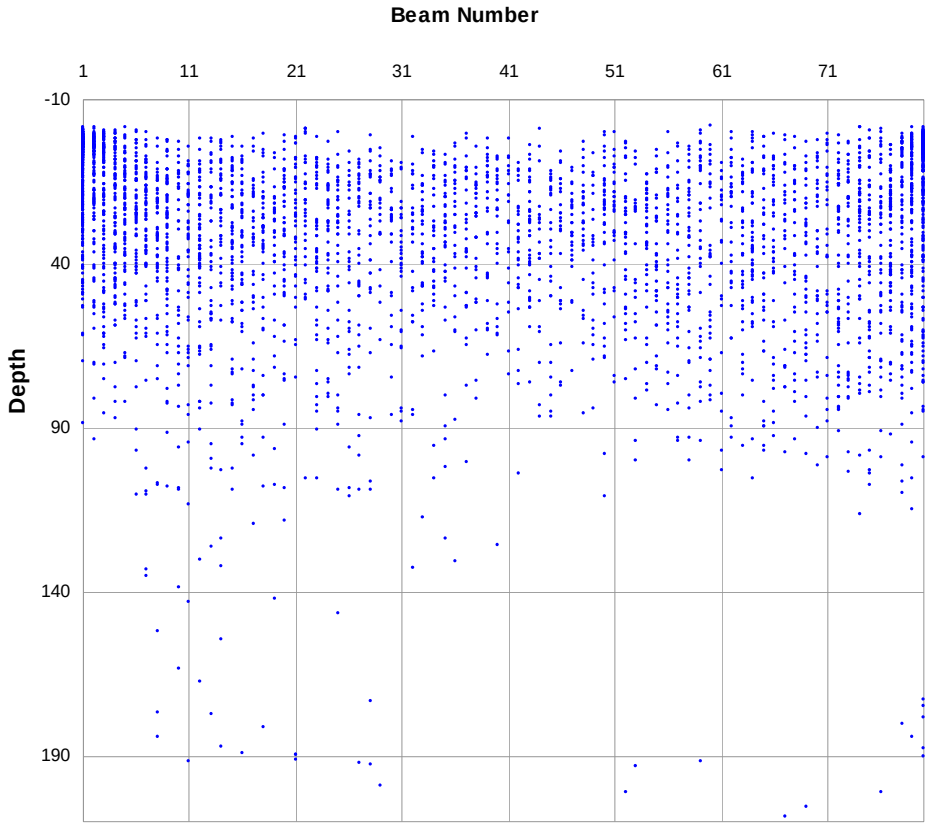


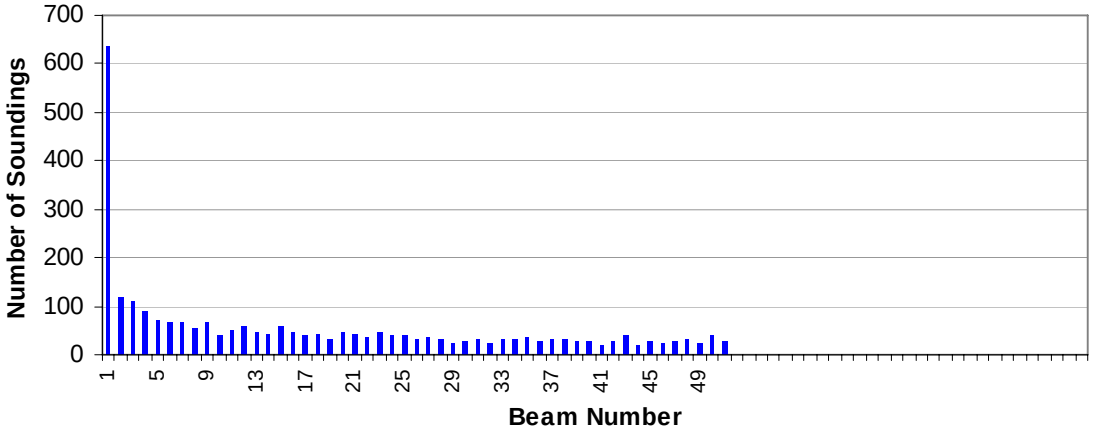
Beam # vs. # of Soundings on Smoothsheet by Vessel

LUNA SEA

Beam	Count	% of Total	Beam	Count	% of Total
1	33	0.51	52	296	4.59
2	26	0.40	53	294	4.56
3	22	0.34	54	307	4.76
4	20	0.31	55	328	5.09
5	23	0.36	56	241	3.74
6	20	0.31	57	251	3.89
7	26	0.40	58	261	4.05
8	23	0.36	59	222	3.44
9	33	0.51	60	252	3.91
10	31	0.48	61	257	3.99
11	35	0.54	62	245	3.80
12	48	0.74	63	237	3.68
13	36	0.56	64	229	3.55
14	54	0.84	65	254	3.94
15	48	0.74	66	240	3.72
16	67	1.04	67	264	4.10
17	80	1.24	68	227	3.52
18	67	1.04	69	271	4.20
19	85	1.32	70	199	3.09
20	69	1.07	71	174	2.70
21	84	1.30	72	198	3.07
22	90	1.40	73	167	2.59
23	101	1.57	74	167	2.59
24	121	1.88	75	172	2.67
25	108	1.68	76	183	2.84
26	149	2.31	77	177	2.75
27	167	2.59	78	131	2.03
28	135	2.09	79	154	2.39
29	148	2.30	80	176	2.73
30	175	2.71	81	153	2.37
31	174	2.70	82	130	2.02
32	129	2.00	83	149	2.31
33	193	2.99	84	144	2.23
34	159	2.47	85	160	2.48
35	209	3.24	86	159	2.47
36	193	2.99	87	145	2.25
37	186	2.89	88	125	1.94
38	194	3.01	89	169	2.62
39	167	2.59	90	164	2.54
40	169	2.62	91	180	2.79
41	191	2.96	92	167	2.59
42	198	3.07	93	153	2.37
43	173	2.68	94	132	2.05
44	196	3.04	95	145	2.25
45	217	3.37	96	97	1.50
46	212	3.29	97	105	1.63
47	233	3.61	98	99	1.54
48	229	3.55	99	71	1.10
49	303	4.70	100	68	1.05
50	282	4.37	101	88	1.37
51	315	4.89	**Total**	**6446**	

Sheet C Smoothsheet Sounding Distribution
Royal Fish





Beam # vs. # of Soundings on Smoothsheet by Vessel

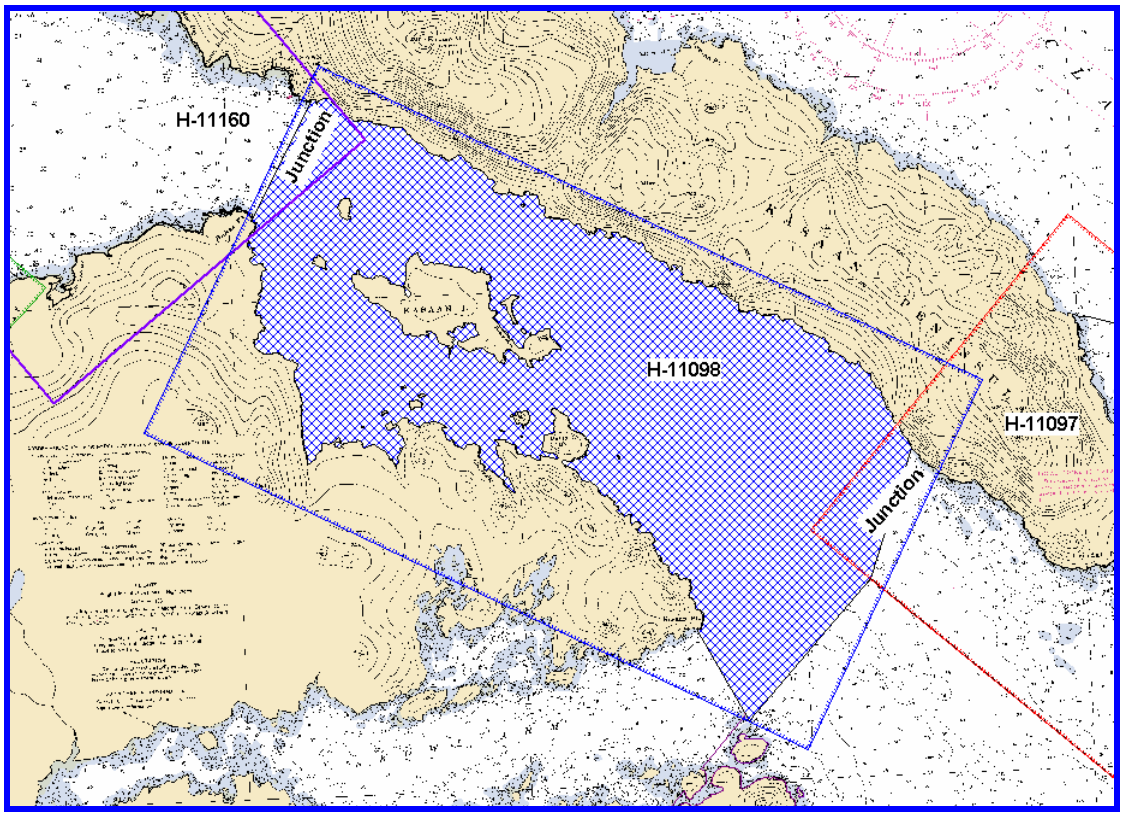
Royal Fish

Beam	Count	% of Total	Beam	Count	% of Total
1	638	23.15	52	35	1.27
2	117	4.25	53	22	0.80
3	110	3.99	54	33	1.20
4	90	3.27	55	34	1.23
5	72	2.61	56	34	1.23
6	67	2.43	57	31	1.12
7	68	2.47	58	40	1.45
8	56	2.03	59	36	1.31
9	68	2.47	60	32	1.16
10	40	1.45	61	22	0.80
11	51	1.85	62	33	1.20
12	58	2.10	63	37	1.34
13	46	1.67	64	46	1.67
14	42	1.52	65	38	1.38
15	58	2.10	66	37	1.34
16	49	1.78	67	29	1.05
17	38	1.38	68	35	1.27
18	44	1.60	69	40	1.45
19	33	1.20	70	34	1.23
20	47	1.71	71	31	1.12
21	44	1.60	72	52	1.89
22	34	1.23	73	43	1.56
23	46	1.67	74	55	2.00
24	41	1.49	75	51	1.85
25	39	1.42	76	50	1.81
26	32	1.16	77	67	2.43
27	36	1.31	78	71	2.58
28	33	1.20	79	121	4.39
29	23	0.83	80	375	13.61
30	27	0.98	Total	**2756**	
31	31	1.12			
32	24	0.87			
33	33	1.20			
34	31	1.12			
35	37	1.34			
36	29	1.05			
37	31	1.12			
38	30	1.09			
39	28	1.02			
40	27	0.98			
41	20	0.73			
42	28	1.02			
43	39	1.42			
44	21	0.76			
45	27	0.98			
46	25	0.91			
47	28	1.02			
48	30	1.09			
49	23	0.83			
50	38	1.38			
51	29	1.05			

Vessel	Sounding Count	% of Total Soundings
Luna Sea	6446	70.0
Royal Fish	2756	30.0
Total	**9202**	

Contemporary Survey Junctions

The northwestern limits of this survey junctions[17] H-11160 (2002, Scale 1:10,000) along it's easterly limits. The southeastern limits of this survey junctions H-11097 (2002, Scale 1:10,000) along it's westerly limits. Both of the smoothsheets for H-11160 and H-11097 were plotted at the same scale as this survey and the soundings for all surveys agreed well.[18] There are no recommendations and no adjustments were made.



The junction location of H-11098, H-11160 and H-11097

Quality Control Checks

All of the quality control methods and procedures are detailed in the project wide Data Acquisition and Processing Report.[19] There were no unique problems that pertain to this survey. A table of Line Statistics is included in Separate V, Crossline Comparisons[20] that details all required aspects of quality control on each line.[21]

B3. Corrections To Echo Soundings

Hydrographic Survey H-11098 was performed with three other surveys in Project OPR-O331-KR-02. Changes to the corrections to echo soundings affect all four surveys in the area and is[22] described in the project wide Data Acquisition and Processing Report.

Tide Issues unique to H-11098

The survey began on DN 162. Tide station Kasaan (945-0581) began collecting data on DN 152, prior to data collection. The data collected was reduced using Kasaan (945-0581).

Luna Sea Pole Movement and Solution

During the processing phase of subset mode, an anomaly in the *Luna Sea*'s data was detected. A series of patch tests pointed toward pole movement as the most likely cause. As a solution, the lead processor went over each day's data and tested the roll throughout that day. The roll offset was then adjusted accordingly in the same way a roll patch line would be done and changed in the vessel configuration file. Throughout the survey, the roll offset varied by as much as 1 degree. This issue was ultimately resolved by affixing bolts on the upper and lower alignment tubes to keep consistency in pole mount position. Refer to Section C of the DAPR[23] for more information. All the data processed with the roll offset adjustments met or exceeded the prescribed accuracy standard of the 95% confidence level.

C. Vertical and Horizontal Control

Soundings for this survey were tide adjusted using data from NOAA tertiary station Kasaan (945-0581). It was installed by Terra Surveys, LLC and John Oswald Consulting (JOC) for this project. Ketchikan preliminary water level data were downloaded from the NOAA web site (http://www.co-ops.nos.noaa.gov) daily. Verified tide data and final zoning from these gauges were processed by JOC. The final zoning methodology is described in further detail in the project wide Vertical and Horizontal Control Report.[24]

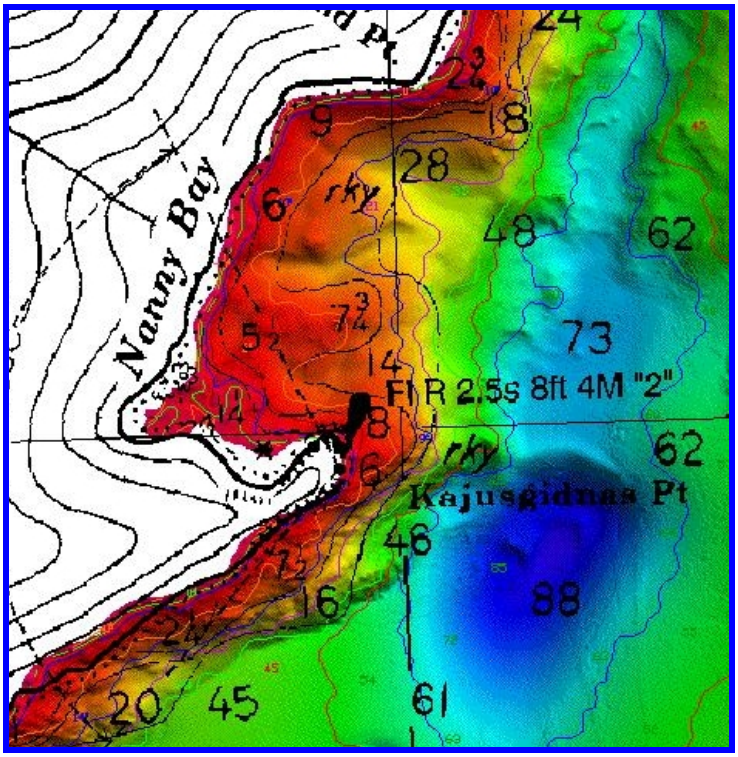
The horizontal control datum for this survey is North American Datum of 1983 (NAD 83). The projection used during collection was UTM, Zone 8. United States Coast Guard Stations (USCG) *Annette Island* was used to send correctors to the survey vessels. A 24-hour observation on NGS station *ANN RESET* was used as a fixed point DGPS performance check on *Annette Island*. The observation survey showed the position on *ANN RESET* met the required accuracy standards. The 24-hour observation survey is detailed in the project wide Vertical and Horizontal Control Report. A summary of the daily DGPS confidence checks can be found in the Separate I[25] of this report.

D1. Chart Comparison[26]

There was no Local Notice to Mariners that affected the survey area. Notice number 36 (Monthly Edition-September 2002) was the last notice reviewed for this project.

This survey was compared in AutoCAD Map and MicroStation to the following charts:

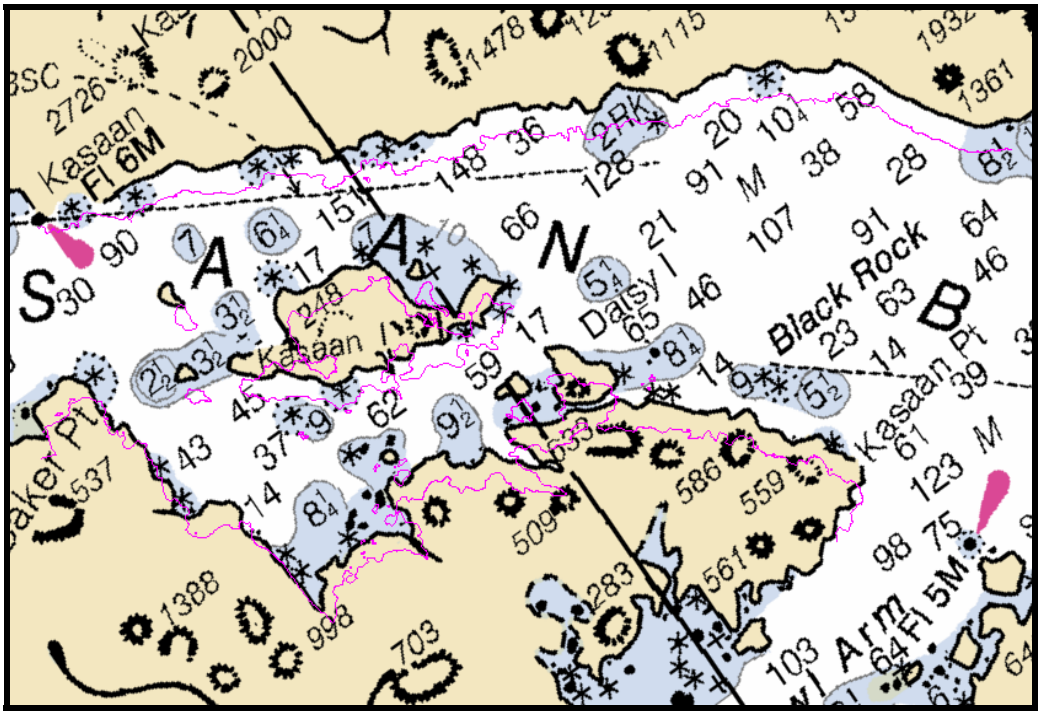
Chart	Scale	Edition	Date
17420	1:229,376	26th	Sept. 22, 2001
17426	1:40,000 & 1:10,000	13th	July 11,1992
17436	1:40,000	6th	Aug.19 1989



A typical chart comparison combining 2002 weeded soundings, a digital terrain model and a monochrome chart.

Chart 17420

The comparison with chart 17420 (26th edition) shows a significant shift of the shoreline to the south and east(ranging from 200-400 meters). Due to the large amount of shoreline shift present, there was no shift performed to compare depths[27] for this chart. However, detailed depth comparisons were made for the largest scale chart, No. 17426.



Portion of Chart 17420 overlaid on H-11098 shoreline showing the significant discrepancy between charted and RSD shorelines

Recommendations

The newest edition of Chart 17420 should be adjusted to the 2002 shoreline findings.[28]

Chart 17436

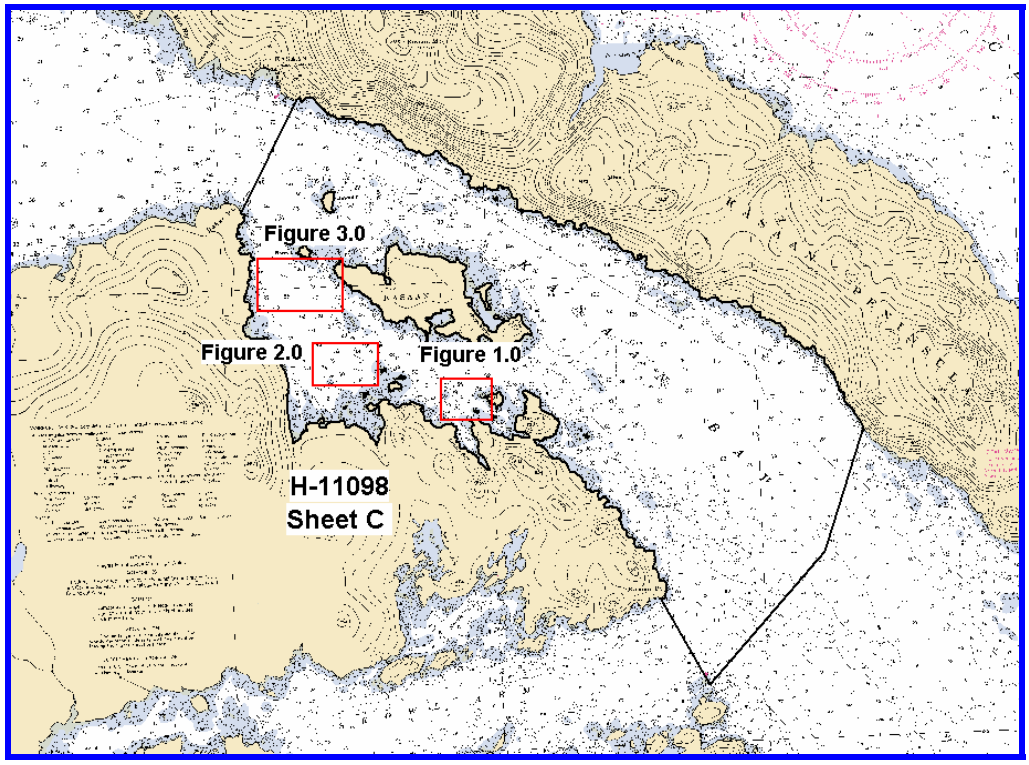
No significant changes were found and no recommendations were made.

Chart 17426

This chart comparison showed many changes within the survey. As a result, two Danger to Navigation reports were generated and can be found in Appendix I of this report.

Rocky (rky) Areas

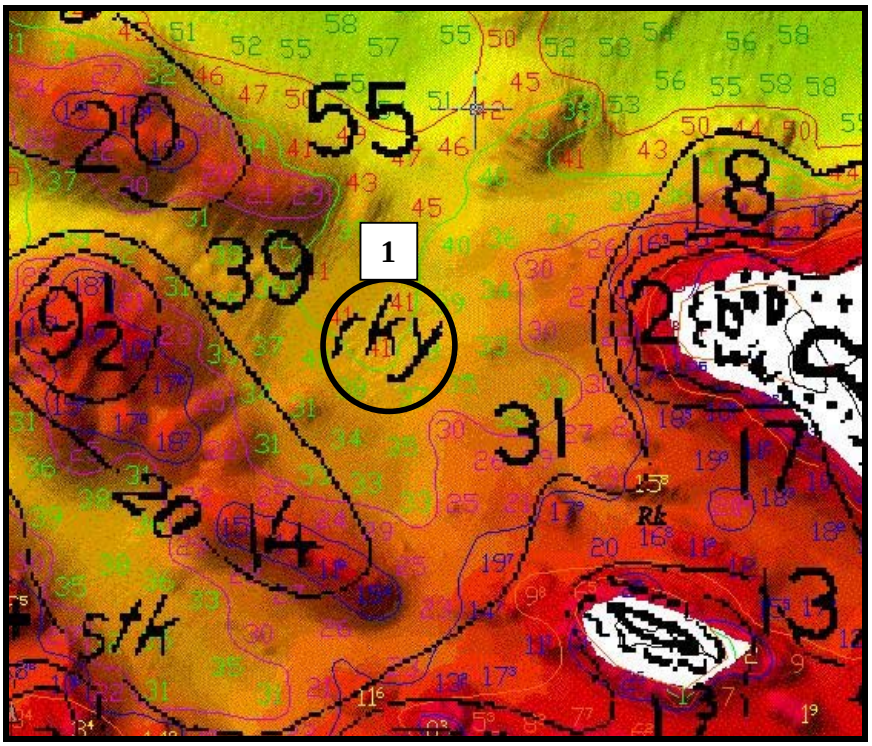
There are 21 areas on the chart labeled as rocky (rky). All but 4 agree[29] and are described on the following pages. Refer to the vicinity map below for locations of these areas.



Portion of chart 17426

Figure 1.0

Vicinity	Comment
(1)55°28’ 47”N and132°20’34”W	Area marked as rocky(rky) is generally featureless.



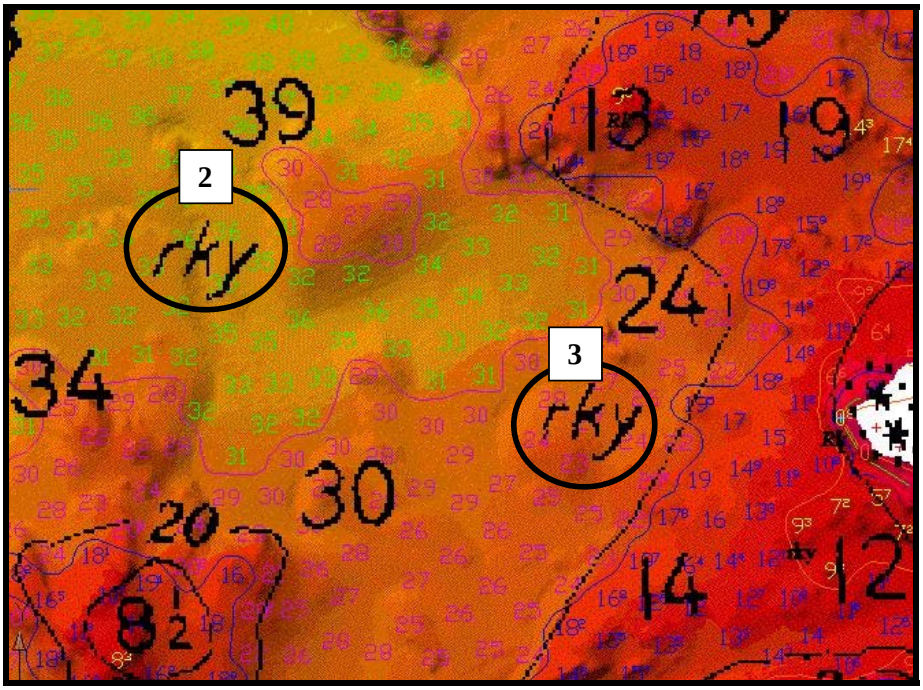
Area circled is marked as rky on Chart 17426(monochrome) with DTM in background

Recommendations

Based on the results of survey H-11098, the Hydrographer recommends removal of the *rky* symbol on the affected charts.[30]

Figure 2.0

Vicinity	Comment
(2)55°29’12”N and 132°22’56”W (3)55°29’06”N and 132°22’31”W	Area marked as rocky(rky) is generally featureless. Area marked as rocky(rky) is generally featureless.



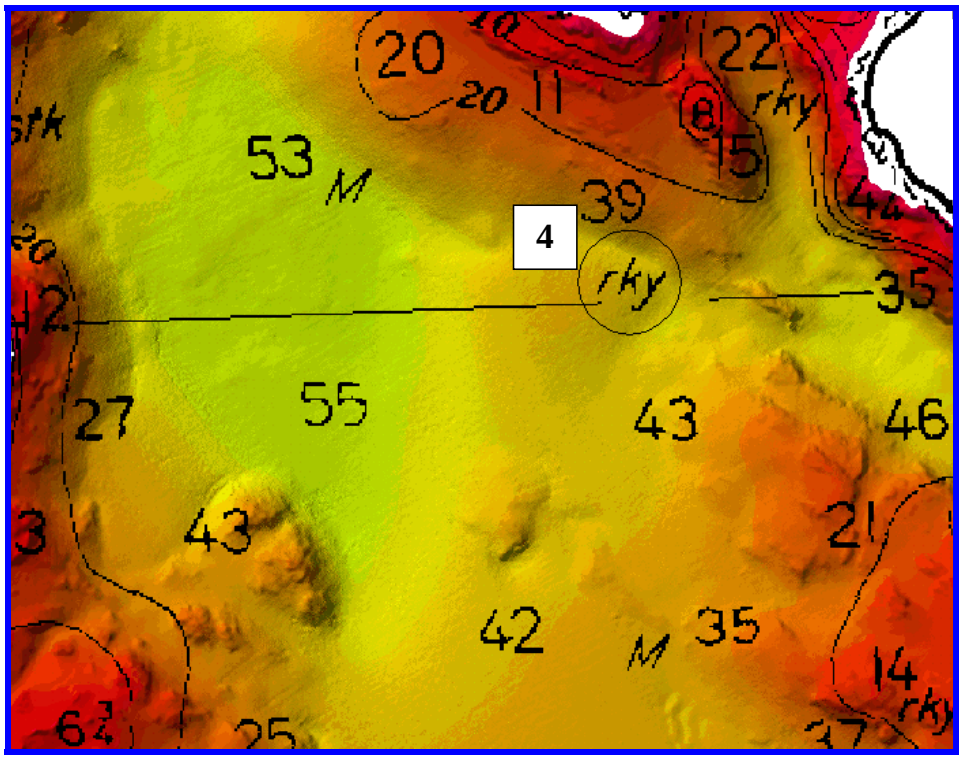
Areas circled are marked as rky on Chart 17426(monochrome) with DTM in background.

Recommendations

Based on the results of survey H-11098, the Hydrographer recommends removal of *rky* symbols located at 55°29’12”N,132°22’56”W and 55°29’06”N,132°22’31”W[31] on the affected charts.[32]

Figure 3.0

Vicinity	Comment
(4)55°30’01”N and 132°23’21”W	Area marked as rocky(rky) is generally featureless.



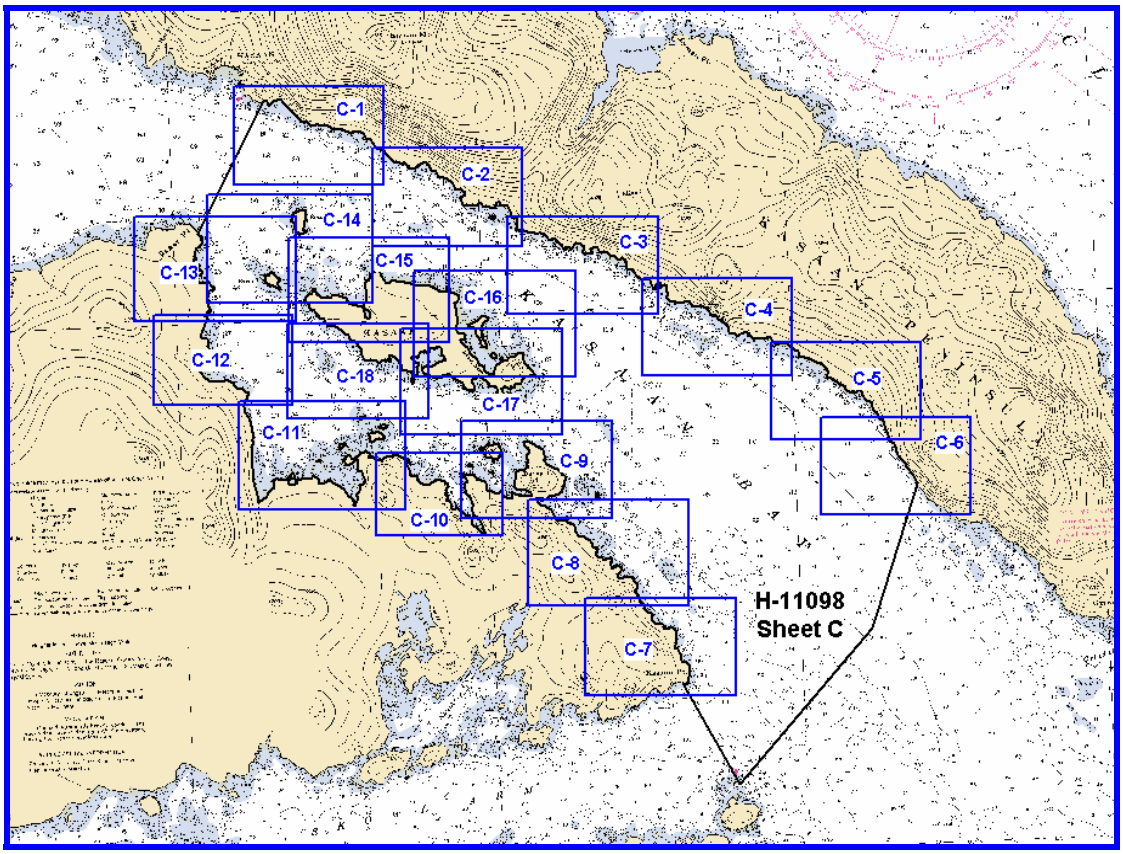
Area circled is marked as rky on Chart 17426(monochrome) with DTM in background

Recommendations

Based on the results of survey H-11098, the Hydrographer recommends removal of the *rky* symbol located at 55°30’01”N and 132°23’21”W on the affected charts.[33]

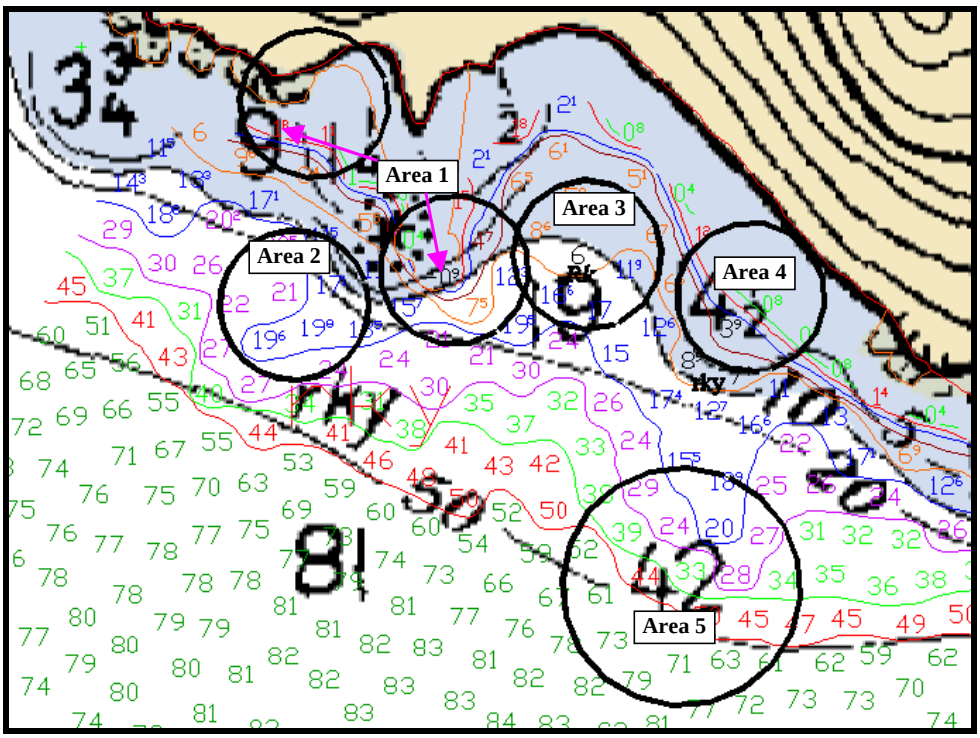
Additional Findings

There were numerous disagreements between Chart 17426 and survey H-11098.[34] The following tables and chartlets highlight areas that were shoaler then the charted depths. Areas 11 fathoms and less were given the most attention. Refer to the vicinity map below for the locations of the compared areas.[35]



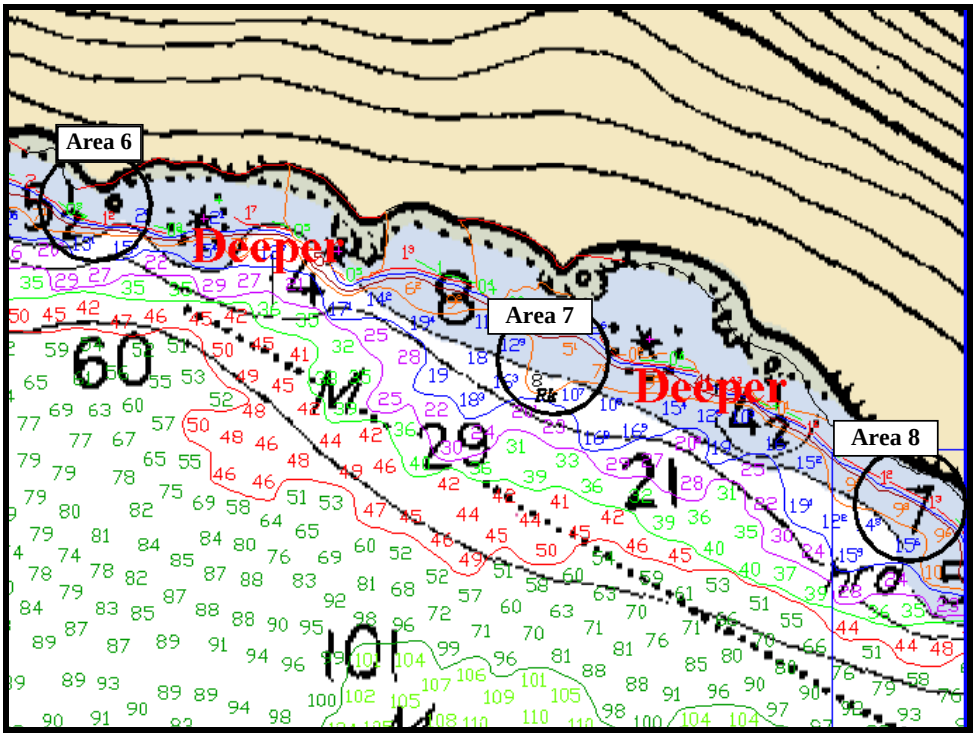
Location index for compared areas of survey H-11098 and chart 17426

Vicinity	Comment	Location Index
Area 1 Copper Queen Reef 55°31’58”N and 132°23’30W 55°31’45”N and 132°22’44”W	A 1.8 fathom sounding at the same location as a charted 9 fathom sounding. A 0.8 fathom sounding at the same location as a 5 ½ charted fathom sounding. A danger to navigation report was submitted.[36]	***C-1***
Area 2 55°31’51”N and 132°23’32”W	The 20 fathom contour line is advancing 125 meters.	***C-1***
Area 3 55°31’54”N and 132°23’12”W	A rock with a depth of 6 fathoms on the deep side of the charted 10 fathom curve.[37]	C-1
Area 4 55°31’51”N and 132°23’03”W	A 3.9 fathom sounding at the same location as a 4 ½ charted fathom sounding.	C-1
Area 5 55°31’44”N and 132°23’04”W	The 20 fathom contour line is advancing 135 meters.	C-1



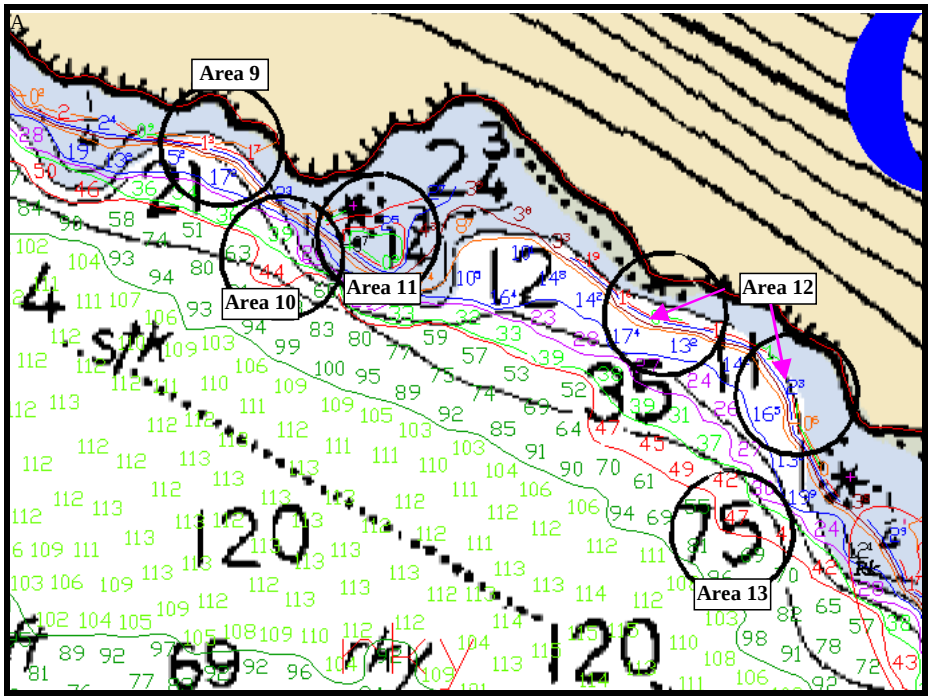
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 6 55°31’45”N and 132°22’44”W	A 0.8 fathom sounding at the same location as a 5 1/2 charted fathom sounding.[38]	C-1
Area 7 55°31’36”N and 132°22’06W	A 8 fathom rock on the deep side of the charted 10 fathom contour line.	C-1
Area 8 55°31’30”N and 132°21’34”W	A 1.3 fathom sounding at the same location as a charted 7 fathom sounding.	C-1/C-2



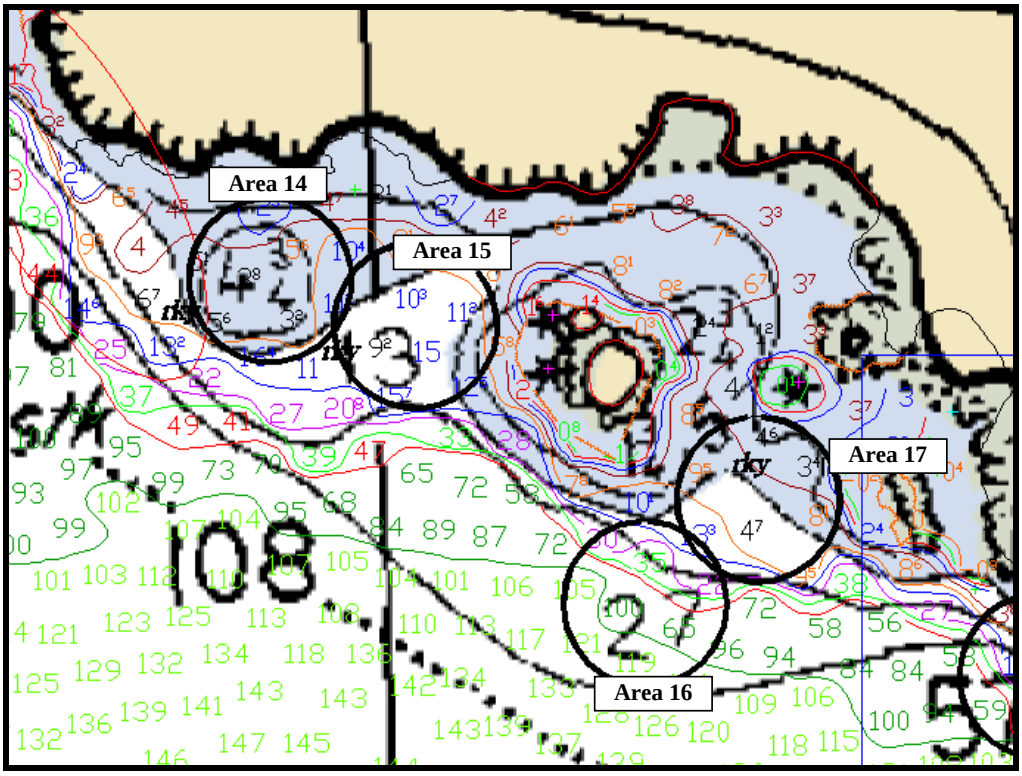
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 9 55°31’22”N and 132°21’12”W	A 1.3 fathom sounding at the same location as a charted 10 fathom contour line.	C-2
Area 10 55°31’17N and 132°21’06W	An example of typical deepening trends throughout the survey. In this case, the 30 fathom contour line is in the same position as the charted 10 fathom contour line.	C-2
Area 11 55°31’18”N and 132°21’01”W	A –0.7 fathom rock that is charted incorrectly. Foul area is charted 40 meters too far inshore.	C-2
Area 12 55°31’14”N and 132°20’38”W 55°31’11”N and 132°20’30”W	The 10 fathom curve is advancing by 30 meters.	C-2
Area 13 55°31’05” and 132°20’33”W	A 47 fathom sounding at the same location as a charted 75 fathom sounding.	C-2



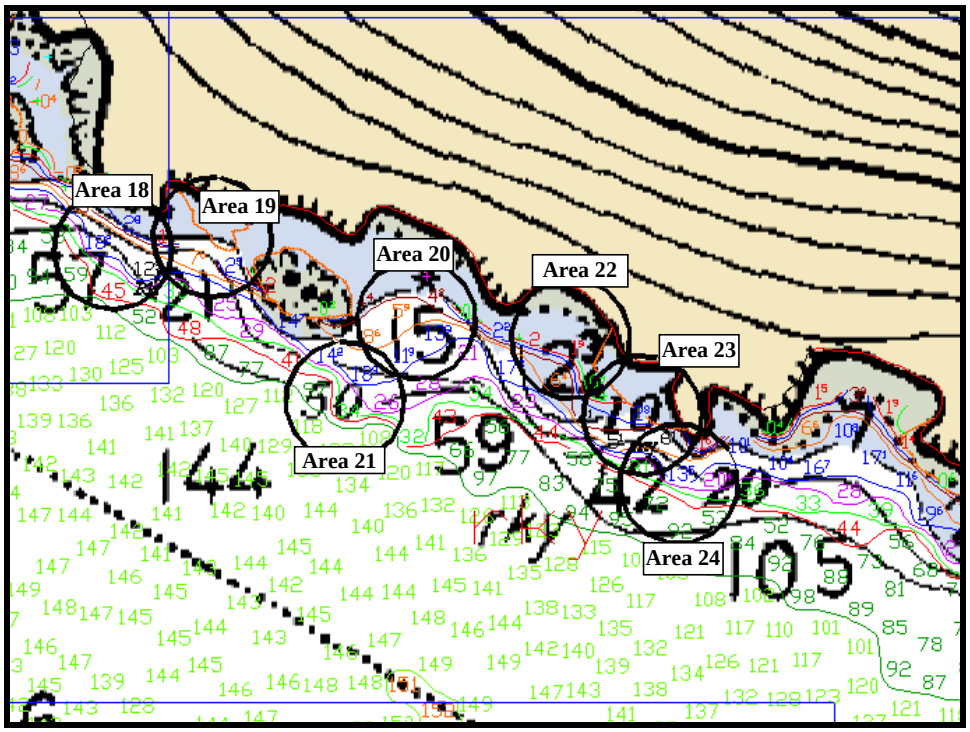
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 14 55°30’56”N and 132°20’07”W	A 3.8 fathom sounding at the same location as a charted 4 ¾ fathom sounding.[39]	C-2
Area 15 55°30’53”N and 132°20’00”W	A 9.2 fathom sounding at the same location as a charted 13 fathom sounding.[40]	C-2
Area 16 55°30’44”N and 132°19’46”W	A 100 fathom sounding at the same location as a charted 27 fathom sounding.	C-2
Area 17 55°30’47”N and 132°19’39”W	A 4.7 fathom sounding on the deep side of a charted 10 fathom contour.	C-2



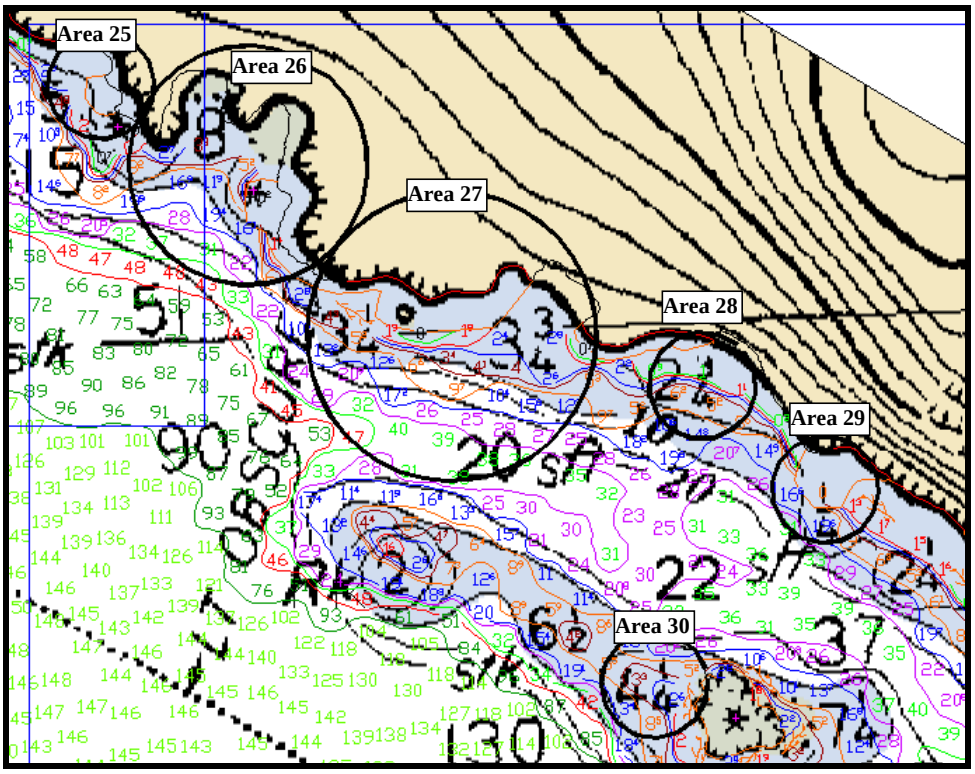
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 18 55°30’41”N and 132°19’20”W	A 12.8 fathom rock sounding on the charted 50 fathom contour.	C-2/C-3
Area 19 55°30’41”N and 132°19’16”W	A 7.5 fathom sounding on the seaward side of a charted 20 fathom contour.	C-3
Area 20 55°30’39”N and 132°19’01”W	A 5.9 fathom sounding on the seaward side of a charted 10 fathom contour.	C-3
Area 21 55°30’35”N and 132°19’05”W	A 34 fathom sounding at the same location as a charted 50 fathom contour.	C-3
Area 22 55°30’37”N and 132°18’47”W	A 1.9 fathom sounding at the same location as a charted 2 ¾ fathom sounding.	C-3
Area 23 55°30’34”N and 132°18’42”W	A 2.8 fathom sounding at the same location as a charted 10 fathom contour.	C-3
Area 24 55°30’30”N and 132°18’42”W	A 72 fathom sounding at the same location as a charted 42 fathom sounding.	C-3



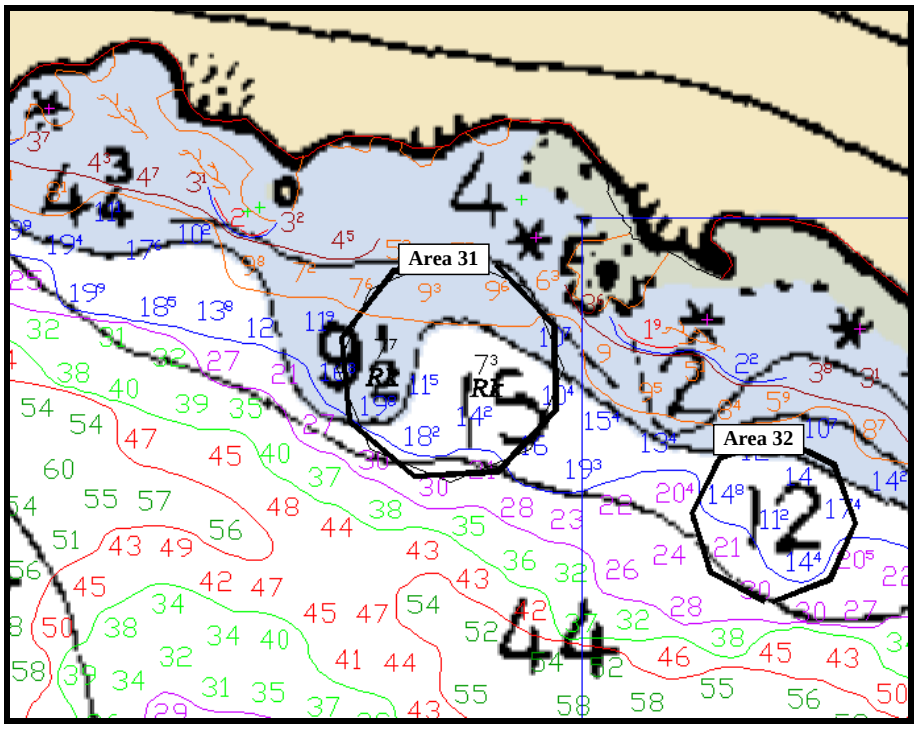
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 25 55°30’11”N and 132°17’15”W	A ledge line not charted.	C-3/C-4
Area 26 55°30’09”N and 132°17’09”W	A 3.8 fathom sounding at the same location as a charted 8 fathom sounding.[41] This area also has a shoreline shift to the west of charted by 40 meters.[42]	C-3/C-4
Area 27 55°29’59”N and 132°16’39”W	A 2.8 fathom sounding at the same location as a charted 3 ¾ fathom sounding. This area also has a ledge line not charted.[43]	C-4
Area 28 55°29’57”N and 132°16’26”W	A 1 fathom sounding at the same location as a charted 2 ¼ fathom sounding.[44]	C-4
Area 29 55°29’51”N and 132°16’17”W	A ledge line not charted.	C-4
Area 30 55°29’42”N and 132°16’33”W	A 3.3 fathom sounding at the same location as a charted 4 ¼ fathom sounding.[45]	C-4



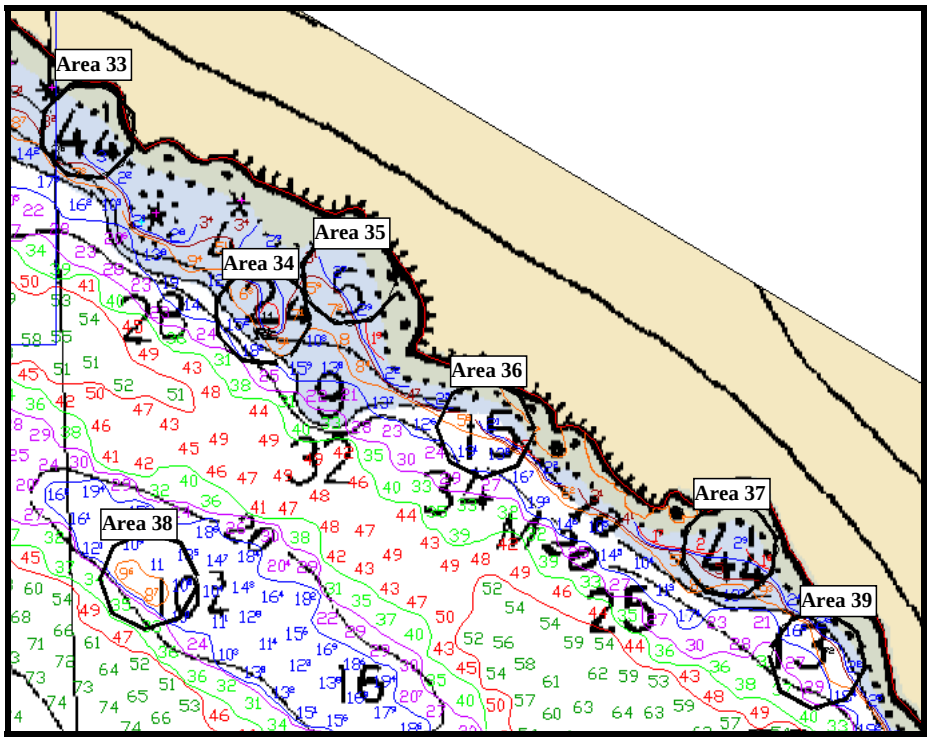
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 31 55°29’33”N and 132°15’25”W	A 7.3 fathom sounding rock at the same location as a charted 15 fathom sounding and on the seaward side of the charted 10 fathom curve.[46]	C-4
Area 32 55°29’28”N and 132°15’09”W	A 11.2 fathom sounding at the same location as a charted 12 fathom sounding.	C-4/C-5



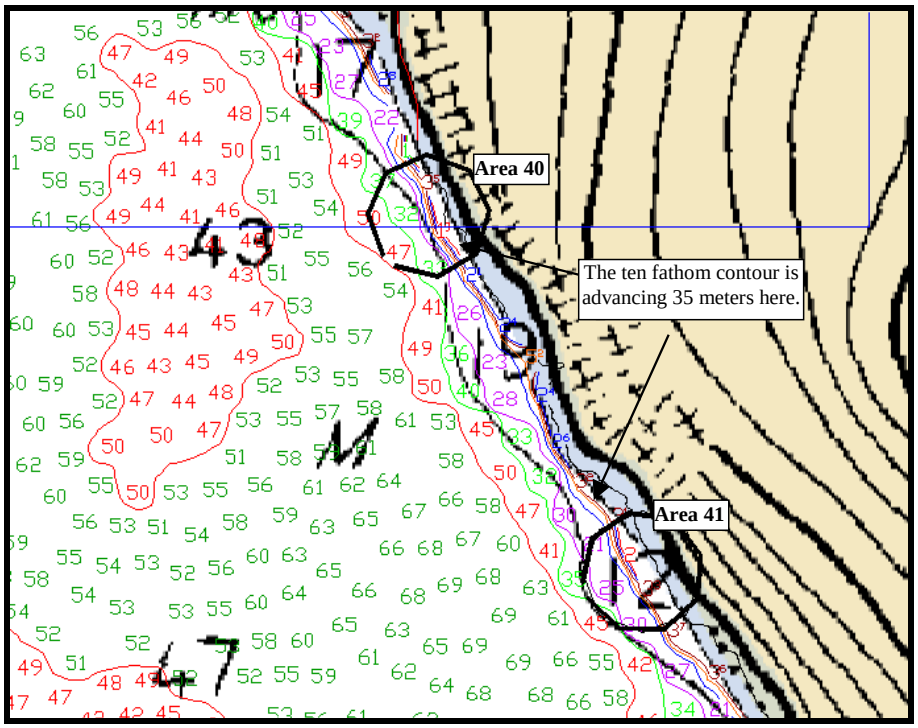
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 33 55°29’29”N and 132°14’55”W	A 3 fathom sounding at the same location as a charted 4 ¼ fathom sounding.	C-5
Area 34 55°29’20”N and 132°14’40”W	A 1.4 fathom sounding at the same location as a charted 2 ¼ fathom sounding.[47]	C-5
Area 35 55°29’22”N and 132°14’33”W	A 2.7 fathom sounding at the same location as a charted 5 fathom sounding.	C-5
Area 36 55°29’14”N and 132°14’19”W	A 2.1 fathom sounding at the same location as a charted 15 fathom sounding.	C-5
Area 37 55°29’07”N and 132°13’56”W	A 2.9 fathom sounding at the same location as a charted 4 ¼ fathom sounding.	C-5
Area 38 55°29’05”N and 132°14’52”W	A 8.7 fathom sounding near the same location as a charted 10 ¾ fathom sounding.[48]	C-5
Area 39 55°29’00”N and 132°13’49”W	A 7.2 fathom sounding at the same location as a charted 13 fathom sounding.	C-5



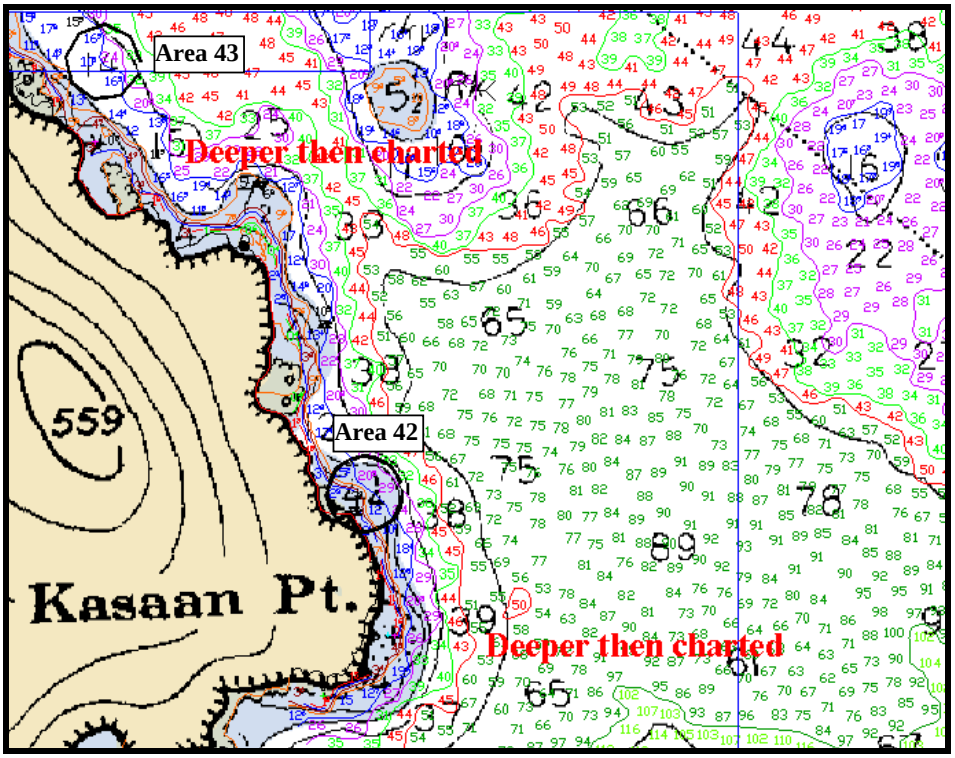
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 40 55°28’42”N and 132°13’30”W	A 1.9 fathom sounding seaward of the charted 10 fathom contour.[49]	C-5/C-6
Area 41 55°28’26”N and 132°13’15”W	A 3.3 fathom sounding at the same location as a charted 12 fathom sounding.	C-6



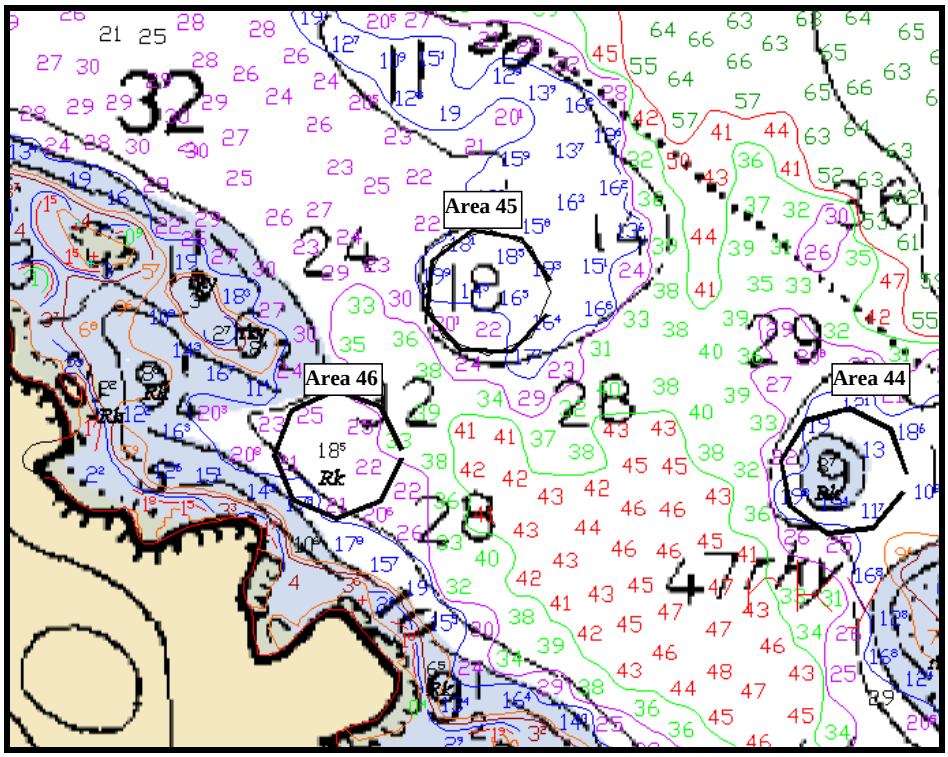
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 42 55°26’46”N and 132°16’53”W	A 3.9 fathom sounding at the same location as a charted 4 ¼ fathom sounding.[50]	C-7
Area 43 55°27’17”N and 132°17’24”W	A 10.3 fathom sounding at the same location as a charted 14 fathom sounding.	C-7/C-8



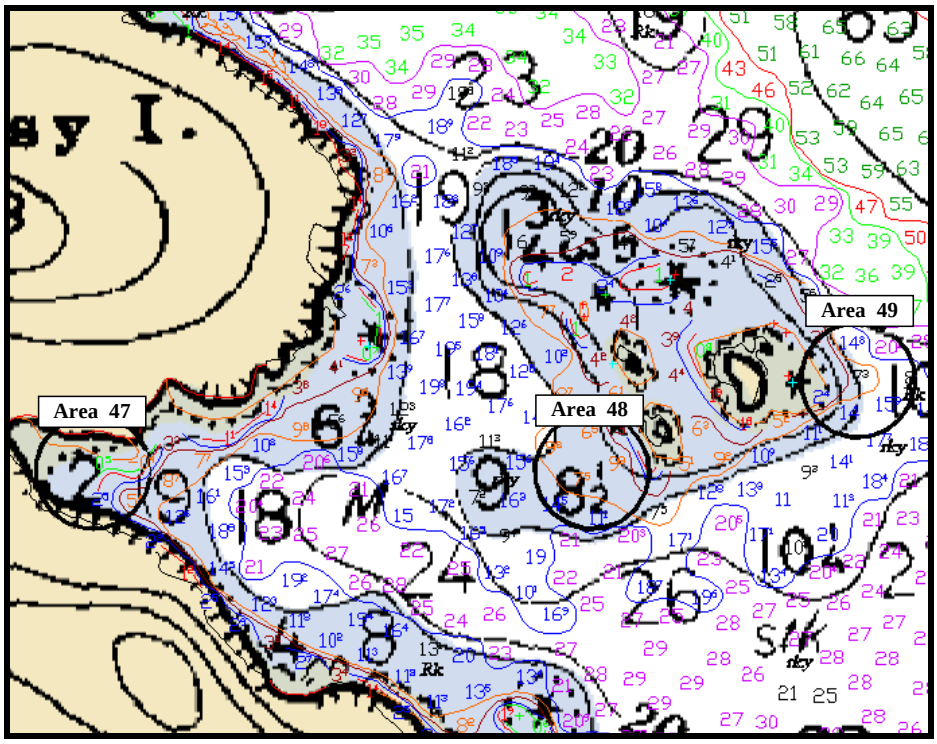
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 44 55°27’45”N and 132°17’21”W	A 8.7 fathom rock sounding at the same location as a charted 9 fathom sounding.	C-8
Area 45 55°27’53”N and 132°17’47”W	A 14.3 fathom sounding at the same location as a charted 18 fathom sounding.	C-8
Area 46 55°27’46”N and 132°17’58”W	A 18.5 fathom rock sounding surrounded by soundings, 21 to 25 fathoms deep. No rock is currently charted at this position.	***C-8***



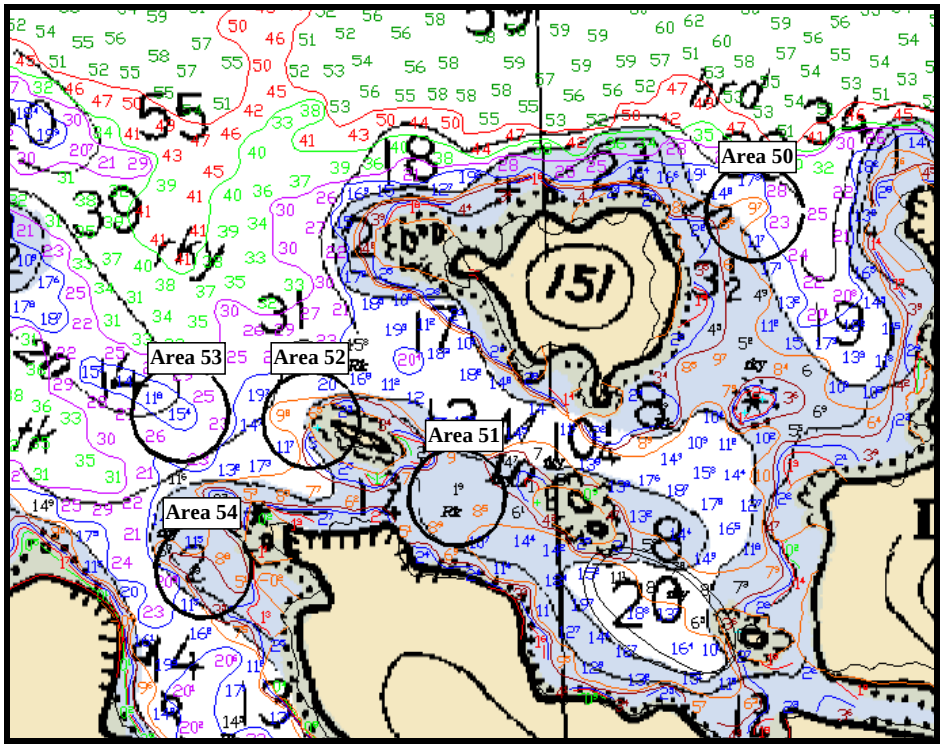
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 47 55°28’16”N and 132°19’07”W	A 0.5 fathom sounding at the same location as a charted 2 fathom sounding.[51]	C-8/C-9
Area 48 55°28’14”N and 132°18’29”W	A 7.5 fathom sounding at the same location as a charted 8 ½ fathom sounding.	C-8/C-9
Area 49 55°28’18”N and 132°18’06”W	A 7.3 fathom rock sounding at the same location as the charted 10 fathom contour.	C-9



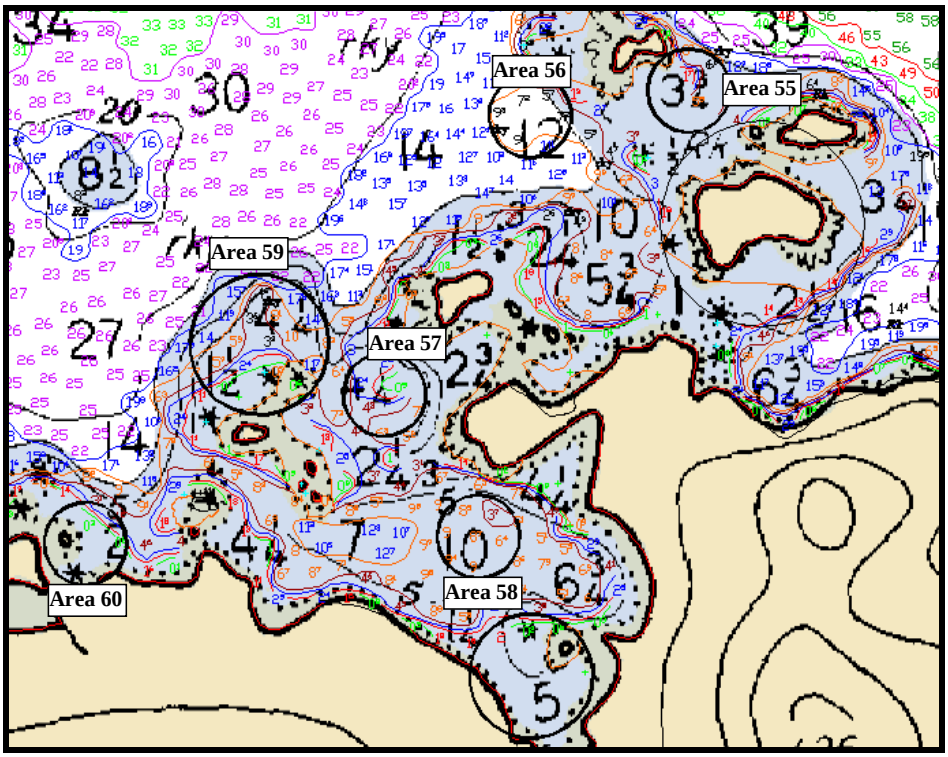
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 50 55°28’48”N and 132°19’40”W	A 9.7 fathom sounding on the seaward side of the charted 10 fathom contour.[52]	C-9
Area 51 55°28’34”N and 132°20’09”W	A 1.9 fathom rock sounding not charted.	C-9/C-10
Area 52 55°28’38”N and 132°20’25”W	A 9.8 fathom sounding on the seaward side of the charted 10 fathom contour.	C-9/C-10
Area 53 55°28’38”N and 132°20’36”W	A 15.5 fathom sounding on the seaward side of the charted 20 fathom contour.	C-10
Area 54 55°28’30”N and 132°20’35”W	A 1.3 fathom sounding at the same location as a charted 2 fathom sounding.	C-10



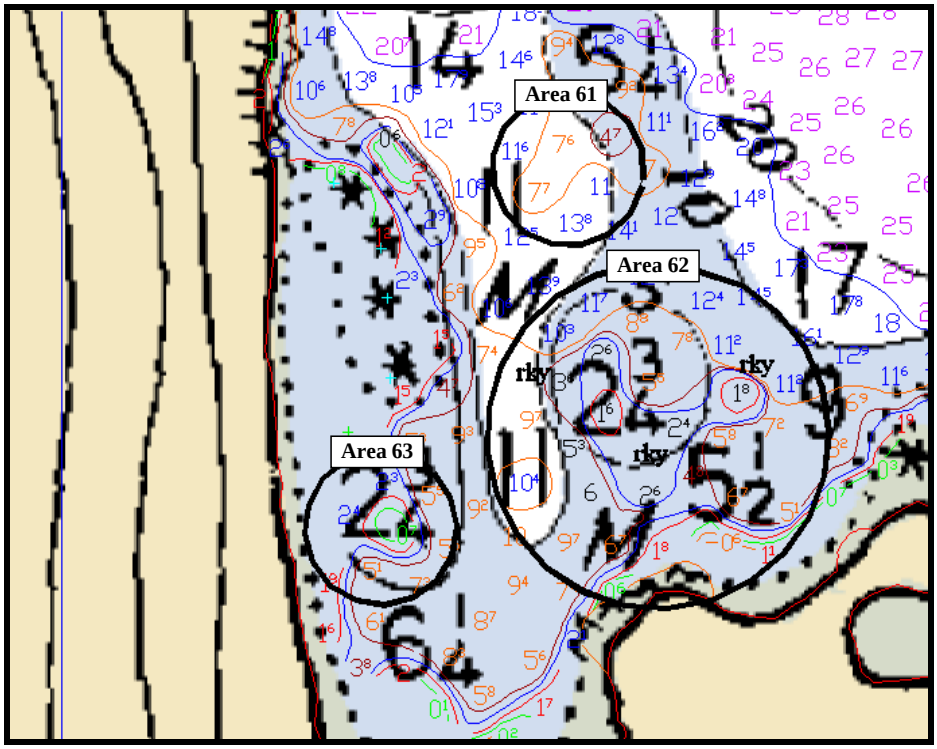
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 55 55°29’04”N and 132°21’56”W	A 1.7 fathom sounding at the same location as a charted 3 ¾ fathom sounding.	C-11
Area 56 55°29’03”N and 132°22’15”W	A 7.2 fathom sounding on the seaward side of the charted 10 fathom contour.[53]	C-11
Area 57 55°28’45”N and 132°22’34”W	A 2.4 fathom sounding at the same location as a charted 4 ¼ fathom sounding.	C-11
Area 58 55°28’35”N and 132°22’21”W	A 8.7 fathom sounding at the same location as a charted 10 fathom sounding.	C-11
Area 59 55°28’50”N and 132°22’43”W	An example of an area with contours that disagree with the chart. The area is deeper then the charted contours depict.	C-11
Area 60 55°28’36”N and 132°23’01”W	A 0.8 fathom sounding at the same location as a charted 2 fathom sounding.	C-11



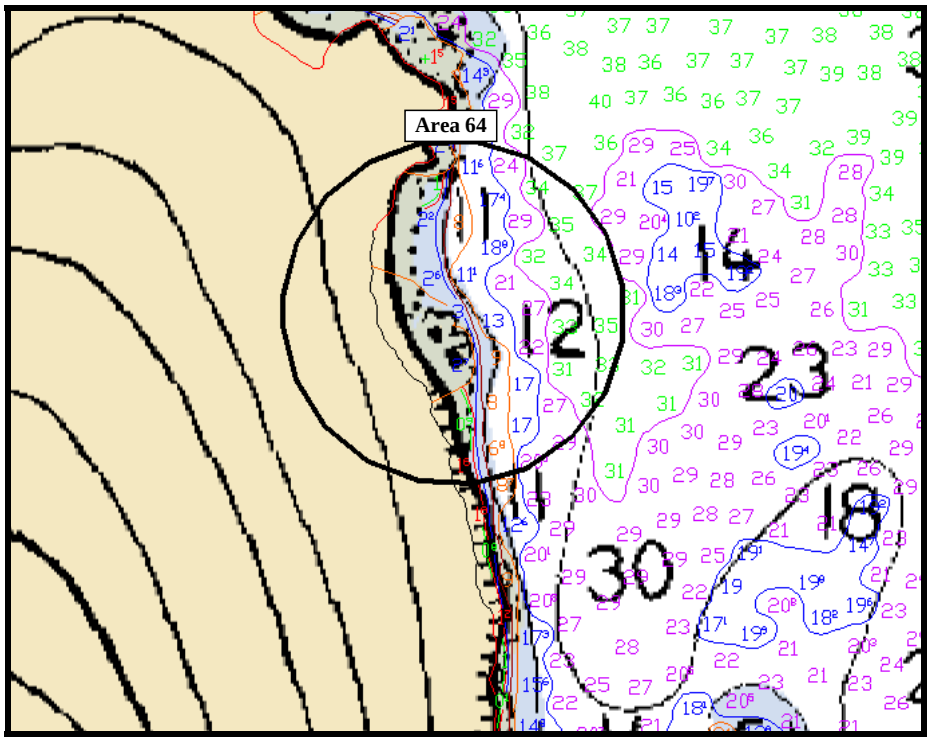
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 61 55°28’48”N and 132°23’34”W	A 7.7 fathom sounding on the seaward side of the charted 10 fathom contour.[54]	C-11
Area 62 55°28’40”N and 132°23’31”W 55°28’41”N and 132°23’23”W 55°28’38”N and 132°23’36”W	A 1.6 fathom sounding at the same location as a charted 2 ¾ fathom sounding.[55] A 1.8 fathom rock sounding not charted. A 10.4 fathom sounding at the same location as a charted 11 fathom sounding.	C-11
Area 63 55°28’36”N and 132°23’44”W	A 0.7 fathom sounding at the same location as a charted 2 ¾ fathom sounding.[56]	C-11



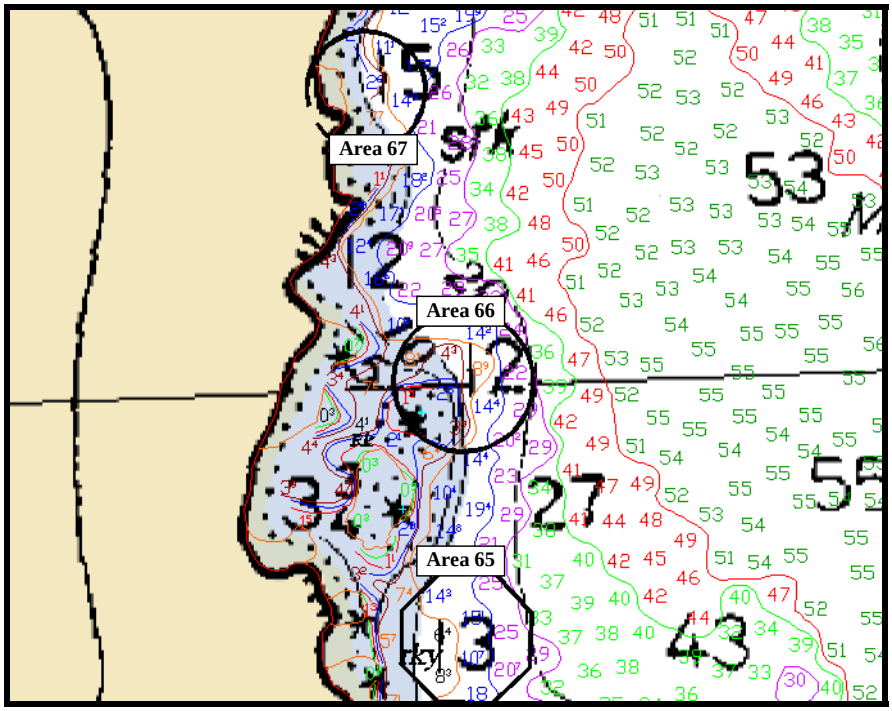
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 64 55°29’10”N and 132°23’48”W	Two areas where the 10 fathom contour line is advancing by 30 meters.	C-11/C-12



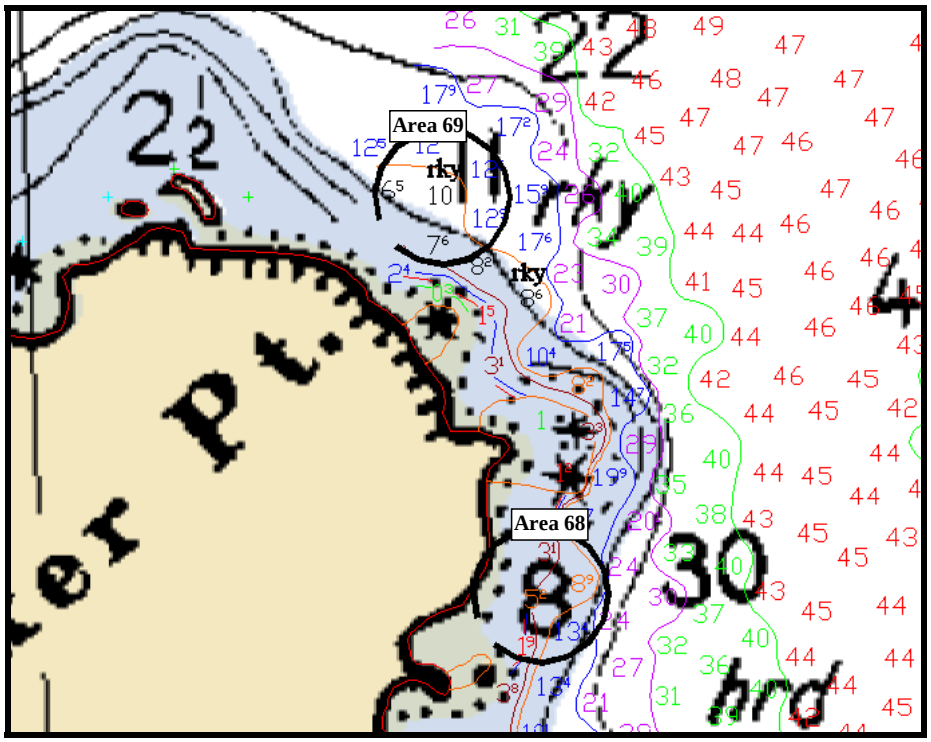
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 65 55°29’49”N and 132°24’20”W	A 6.4 fathom sounding on the seaward side of the charted 10 fathom contour.	C-12
Area 66 55°30’01”N and 132°24’17”W	A 8.9 fathom sounding on the seaward side of the charted 10 fathom contour.	C-12/C-13
Area 67 55°30’13”N and 132°24’24”W	A 2.6 fathom sounding on the seaward side of the charted 10 fathom contour.	C-13/C-14



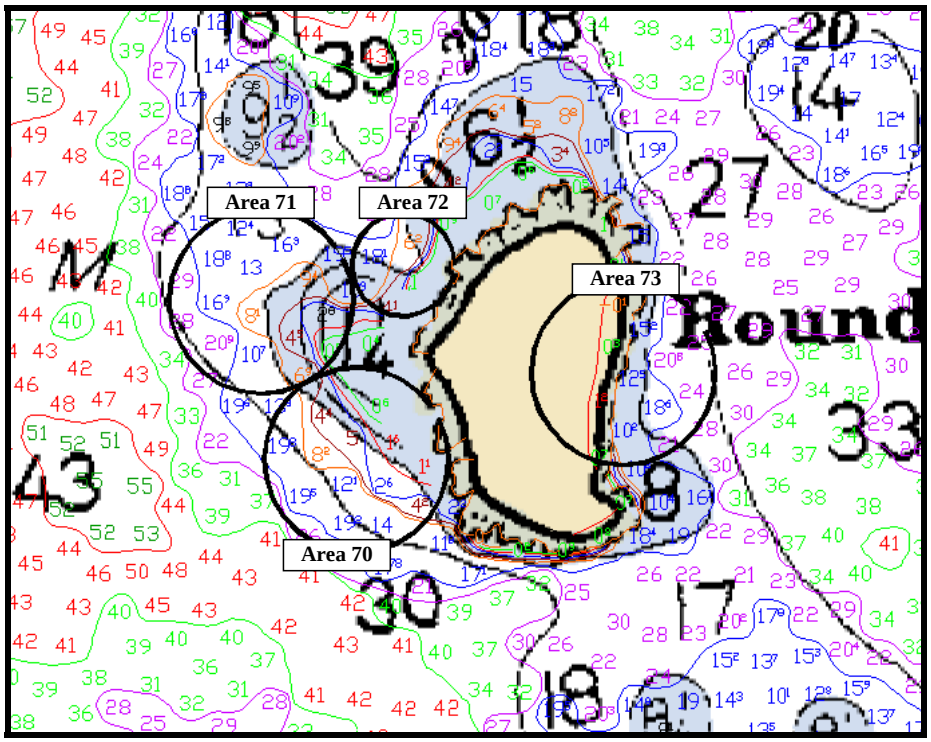
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 68 55°30’43”N and 132°24’30”W	A 5.2 fathom sounding at the same location as a charted 8 fathom sounding.	C-13
Area 69 55°30’43”N and 132°24’36”W	A 10 fathom sounding on the seaward side of the charted 10 fathom contour.[57]	C-13



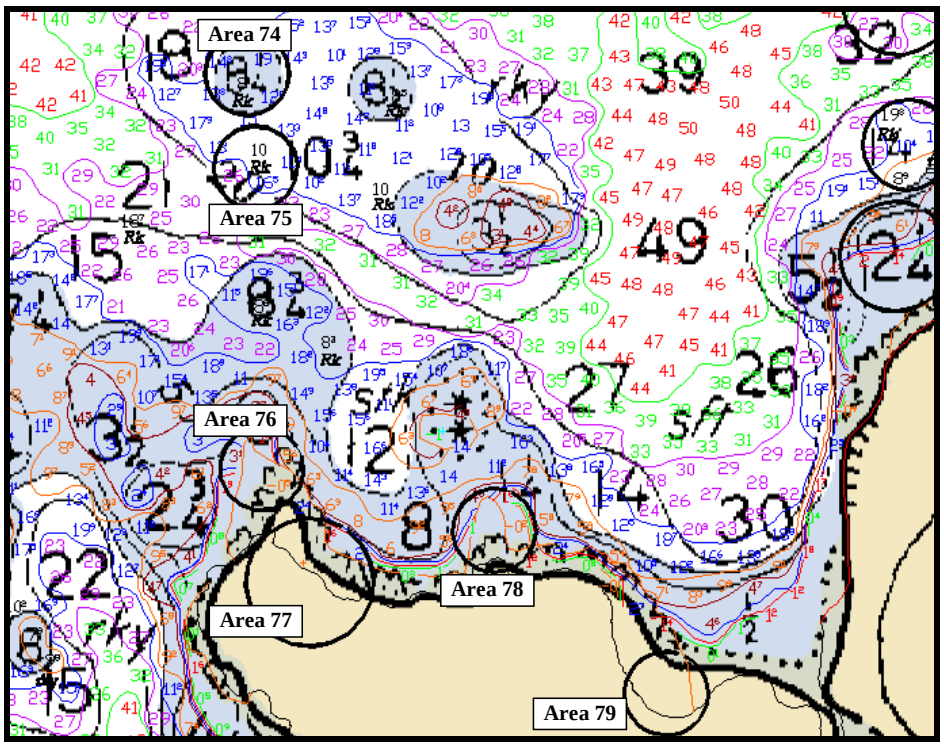
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 70 55°30’52”N and 132°23’13”W	A 8.3 fathom sounding on the seaward side of the charted 10 fathom contour.[58]	C-13
Area 71 55°30’57”N and 132°23’18”W	A 8.1 fathom sounding on the seaward side of the charted 10 fathom contour.	C-14
Area 72 55°31’00”N and 132°23’05”W	A 6.3 fathom sounding on the seaward side of the charted 10 fathom contour.	***C-14***
Area 73 55°30’56”N and 132°22’50”W	Shoreline has receded 30 meters.[59]	***C-14***



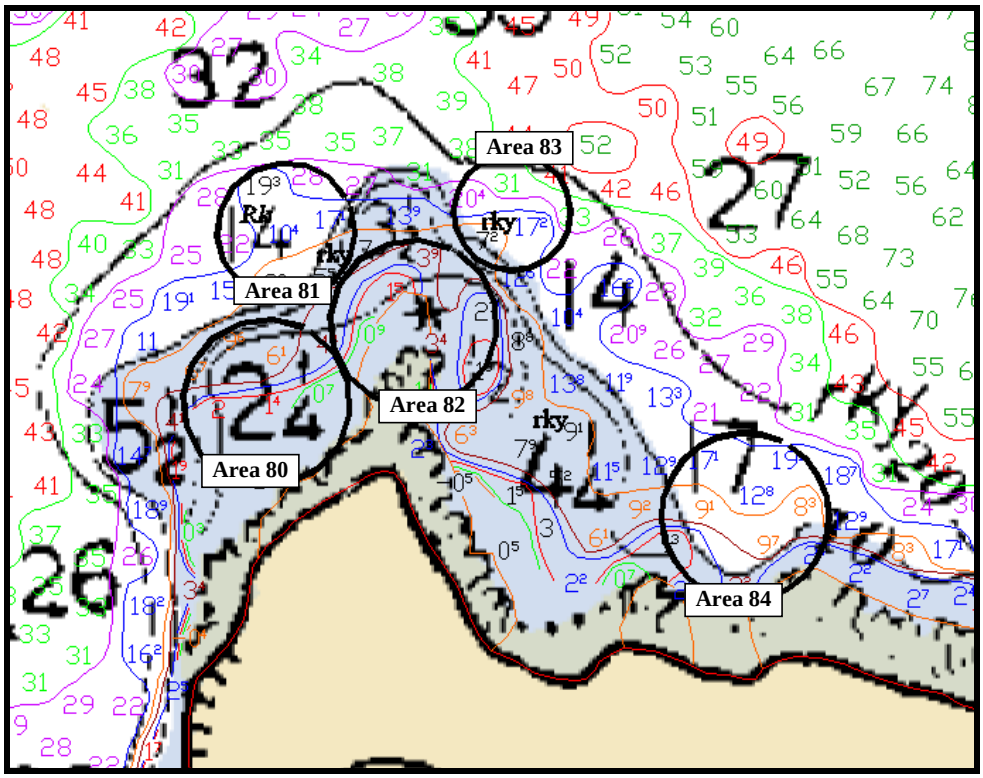
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 74 55°30’39”N and 132°22’48”W	A 8.1 fathom rock sounding at the same location as a charted 8 ¾ fathom sounding.[60]	C-14/C-15
Area 75 55°30’35”N and 132°22’46”W	A 10 fathom rock sounding not charted and near a 26 fathom sounding.	C-14/C-15
Area 76 55°30’21”N and 132°22’47”W	A 1.1 fathom sounding at the same location as a charted 3 fathom sounding. This sounding is also the extents of a ledge line not charted.	C-14/C-15
Area 77 55°30’16”N and 132°22’28”W	Ledge line not charted.[61]	C-14/C-15
Area 78 55°30’14”N and 132°22’44”W	Shoreline that has receded by 40 meters.[62]	C-14/C-15
Area 79 55°30’06”N and 132°22’12”W	Shoreline that has receded by 80 meters.[63]	C-14/C-15



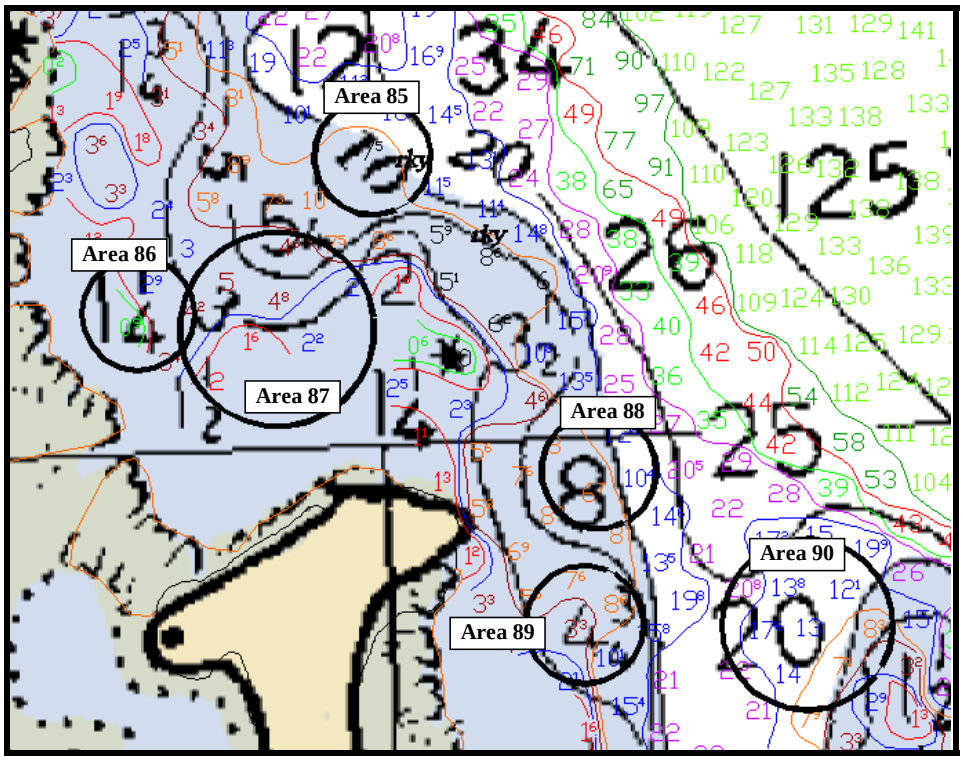
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 80 55°30’29”N and 132°21’48”W	A 1.4 fathom rock sounding at the same location as a charted 2 ¼ fathom sounding.[64]	C-14/C-15
Area 81 55°30’35”N and 132°21’47”W	A 10.4 fathom rock sounding at the same location as a charted 14 fathom sounding.	C-14/C-15
Area 82 55°30’33”N and 132°21’41”W	A 1.5 fathom sounding at the same location as a charted 3 fathom contour. This sounding is also the extent of a ledge line not charted	C-15
Area 83 55°30’34”N and 132°21’35”W	A 7.2 fathom rock sounding, not charted, on the seaward side of the charted 10 fathom contour.	C-15
Area 84 55°30’25”N and 132°21’16”W	A 8.3 fathom sounding on the seaward side of the charted 10 fathom contour.	C-15



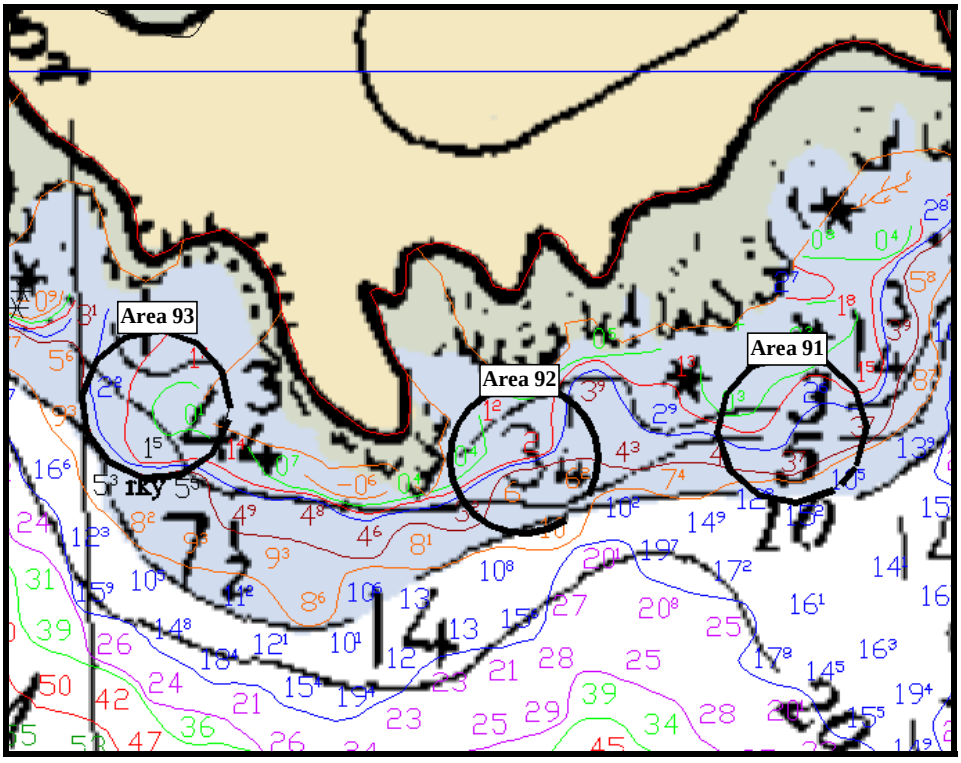
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 85 55°30’10”N and 132°20’00”W	A 7.5 fathom rock sounding, not charted, at the same location as a charted 10 fathom contour.	C-16
Area 86 55°30’04”N and 132°20’15”W	A 0.9 fathom rock sounding at the same location as a charted 1 ¼ fathom sounding.	C-16
Area 87 55°30’04”N and 132°20’08”W	A 1.6 fathom sounding at the same location as a charted 3 fathom contour.	C-16
Area 88 55°29’58”N and 132°19’47”W	A 6.7 fathom sounding at the same location as a charted 8 fathom sounding.	C-16
Area 89 55°29’53”N and 132°19’49”W	A 3.3 fathom sounding at the same location as a charted 4 ¾ fathom sounding.	C-16
Area 90 55°29’51”N and 132°19’34”W	The 10-fathom contour is advancing 35 meters.[65]	C-16/C-17



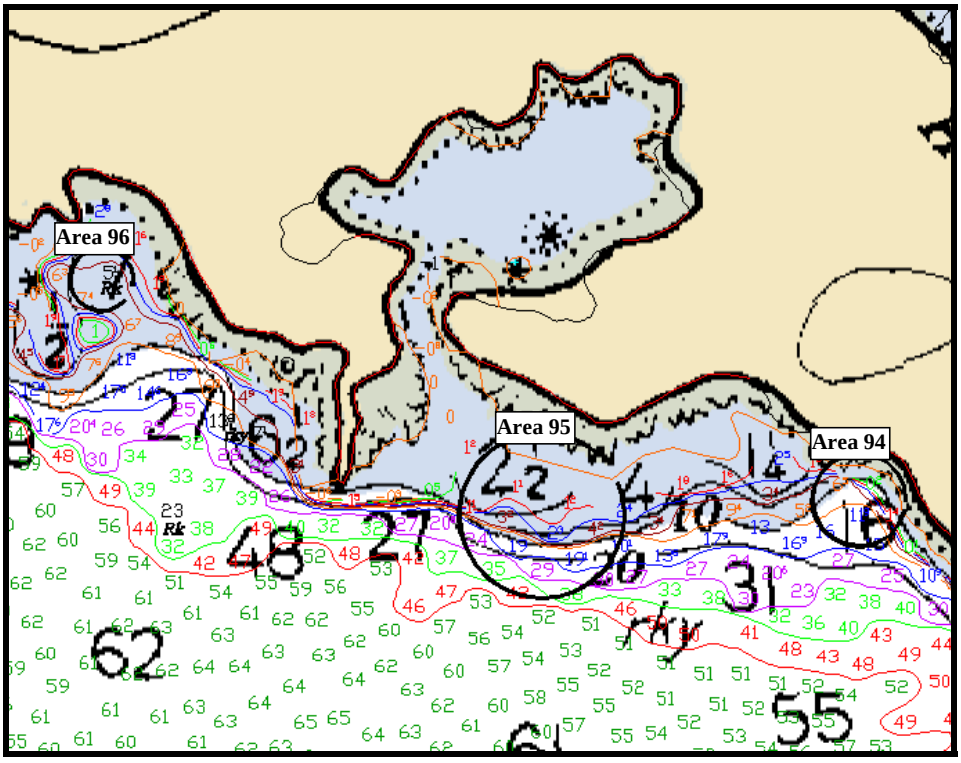
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 91 55°29’13”N and 132°19’22”W	A 3.7 fathom sounding on the seaward side of the charted 5 fathom contour.	C-17
Area 92 55°29’13”N and 132°19’36”W	A 2 fathom sounding at the same location as a charted 3 ¼ fathom sounding.	C-17
Area 93 55°29’14”N and 132°19’56”W	A 1.5 fathom sounding on the seaward side of the charted 5 fathom contour.[66]	C-17



Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 94 55°29’21”N and 132°20’27”W	A 11.9 fathom sounding on the seaward side of the charted 10 fathom contour.[67]	C-17
Area 95 55°29’23”N and 132°20’57”W	A 1.1 fathom sounding at the same location as a charted 2 ½ fathom sounding. This area also has a 3 fathom contour seaward of the charted 10 fathom contour.	C-17/C-18
Area 96 55°29’34”N and 132°21’30”W	A 5.1 fathom rock sounding, not charted, at the same location as a charted 7 fathom sounding.	C-18



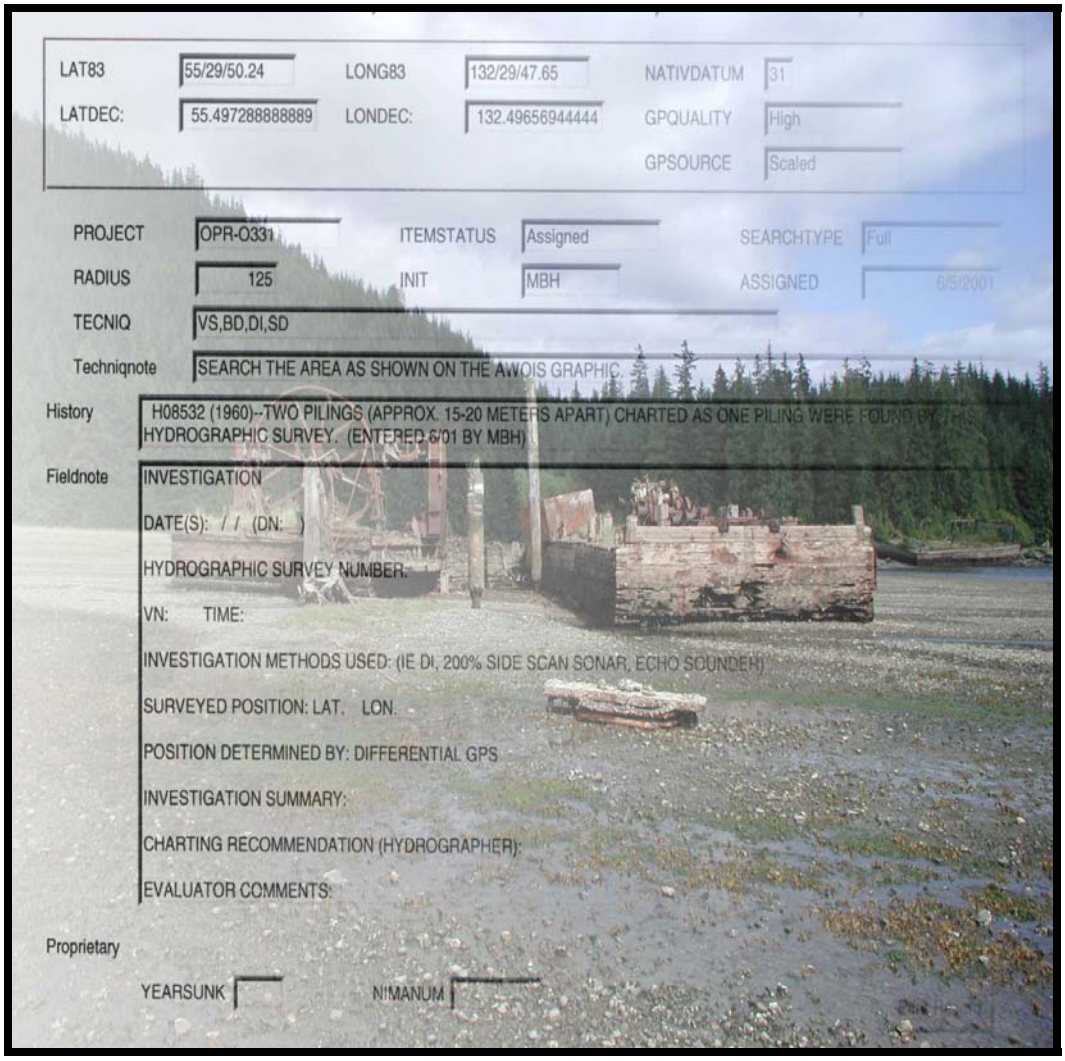
Portion of chart 17426 compared to survey H-11098 soundings and contours

Vicinity	Comment	Location Index
Area 97 55°30’00”N and 132°22’48”W	A 14.8 fathom sounding on the seaward side of the charted 20 fathom contour.	***C-15***

Danger to Navigation Reports

A Dangers to Navigation report was submitted for this survey and can be found in Appendix I of this report.[68]

AWOIS Investigations



AWOIS Items Summary

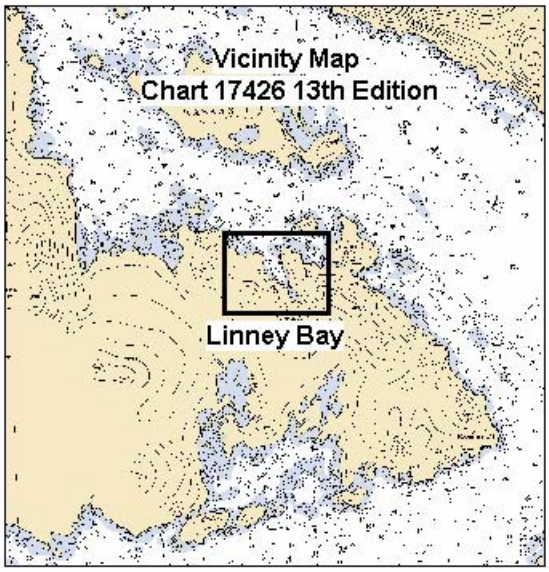
This contract required full investigation of one AWOIS item. The table below is a summary of the item and its results. The next page shows a location map, followed by an individual report.

Record	Description	Comment
52763	Mooring Boom	Full investigation with 200% SWMB, scattered remnants of the booms **found** affixed to rocks on shore (note fixes 1567, 1587, 1610, and 1630 on the DTM below)

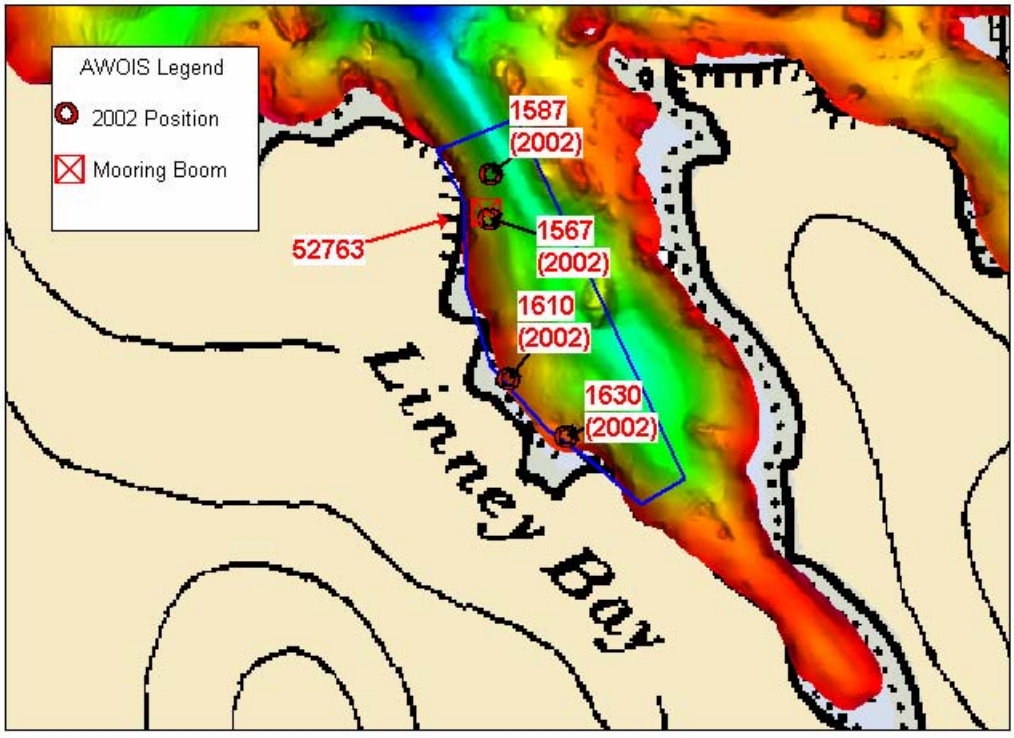
Historical and 2002 AWOIS Positions

H-11098 Sheet C

52763



Location map with digital terrain model showing full 200% SWMB coverage



Item Investigation Report

Item Description (as charted): Mooring Boom

Source: AWOIS record number 52763

Charted Position: Lat 55°28’25.68”N Long 132°20’39.95”W

Charts Affected: 17420 26th edition September 22, 2001
17426 13th edition July 11, 1992

Investigation

Date(s)/Day Number(s): 7/28/02 DN 240 Survey Vessel Name: Royal Fish

Position Numbers/Time: 1567/18:46:18
1587/18:49:25
1610/18:53:03
1630/18:56:16

Investigation Method: Shallow Water Multibeam Sonar/Shoreline Verification

Surveyed Position (NAD83): 1567/Lat 55°28’25.60”N Long 132°20’39.71”W
1587/Lat 55°28’27.56”N Long 132°20’39.44”W
1610/Lat 55°28’18.52”N Long 132°20’38.75”W
1630/Lat 55°28’15.85”N Long 132°20’34.37”W

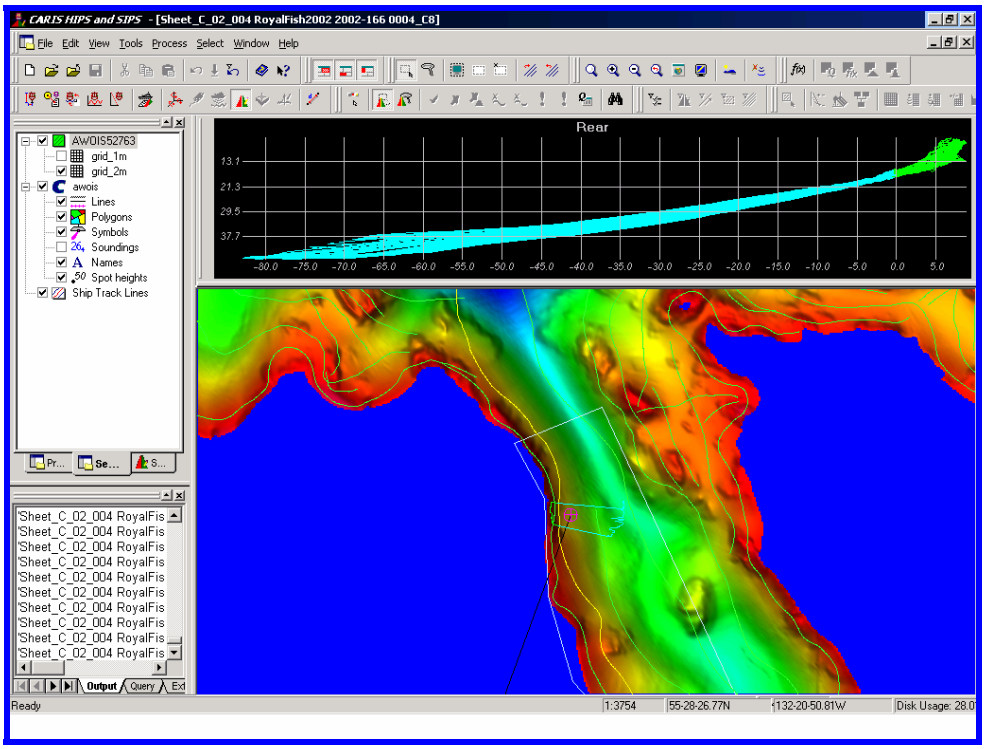
Position Determined By: Differential GPS

Investigation Summary: 500 meters of shoreline were investigated in the charted area of the mooring boom. Scattered remnants of the booms (logs affixed with chains to the rock shore) were found. The area also has 200% SWMB coverage. No submerged ruins were detected.

Charting Recommendation

Reccomendations: Based on the results of survey H-11098, the hydrographer recommends retention of the log symbols.[69] These logs float at high tide.

Recommended Least Depth: N/A



200% SWMB coverage over AWOIS item 52763 as viewed in CARIS HIPS

Photo of AWOIS 52762 log boom remnants affixed to shore

Photo of log boom remnants affixed to shore; taken from 2002 position 1567

Photo of log boom remnant affixed to shore; taken from 2002 position 1587

Photo of log boom remnant affixed to shore; taken from 2002 position 1610

Photo of log boom remnant affixed to shore; taken from 2002 position 1630

D2. Additional Results

Shoreline Investigation

Shoreline and nearshore investigation was required for this contract. A total of 39 PITBIs (Potential Items to Be Investigated) were identified and submitted for review in this survey. These items range from new items not charted, both cultural and natural, to items not charted correctly. Items (most notably rocks) not charted correctly were out of position from 30 to 60 meters. These 39 items were not approved for further investigation. New or not charted correctly items that are not navigationally significant are not shown on the smoothsheet, with the exception of rocks identified from the bathymetry. Traditional shoreline verification was required for any feature seaward of the 4-meter curve. A table of these items and their detached positions is included at the end of this section. [70]

The provided shoreline remote sensing data (RSD) was of known poor quality. Once the fieldwork began it became apparent that it was of very poor quality. More often then[71] not, the shoreline disagreed with the RSD, and agreed with the chart. In any one area, there was a mixture of the shoreline matching the chart, the RSD or neither.[72] The field crews worked with shoreline maps showing both sets of data (RSD and charted) and sketched the ground truth changes onto these maps. Navigation was achieved through HYPACK software showing the position of the boat in its relationship to both sets of data simultaneously. Changes to the RSD shoreline data are shown in red lines on the smoothsheet.[73]

Aids to Navigation:

There are two aids to navigation to report on in survey H-11098.

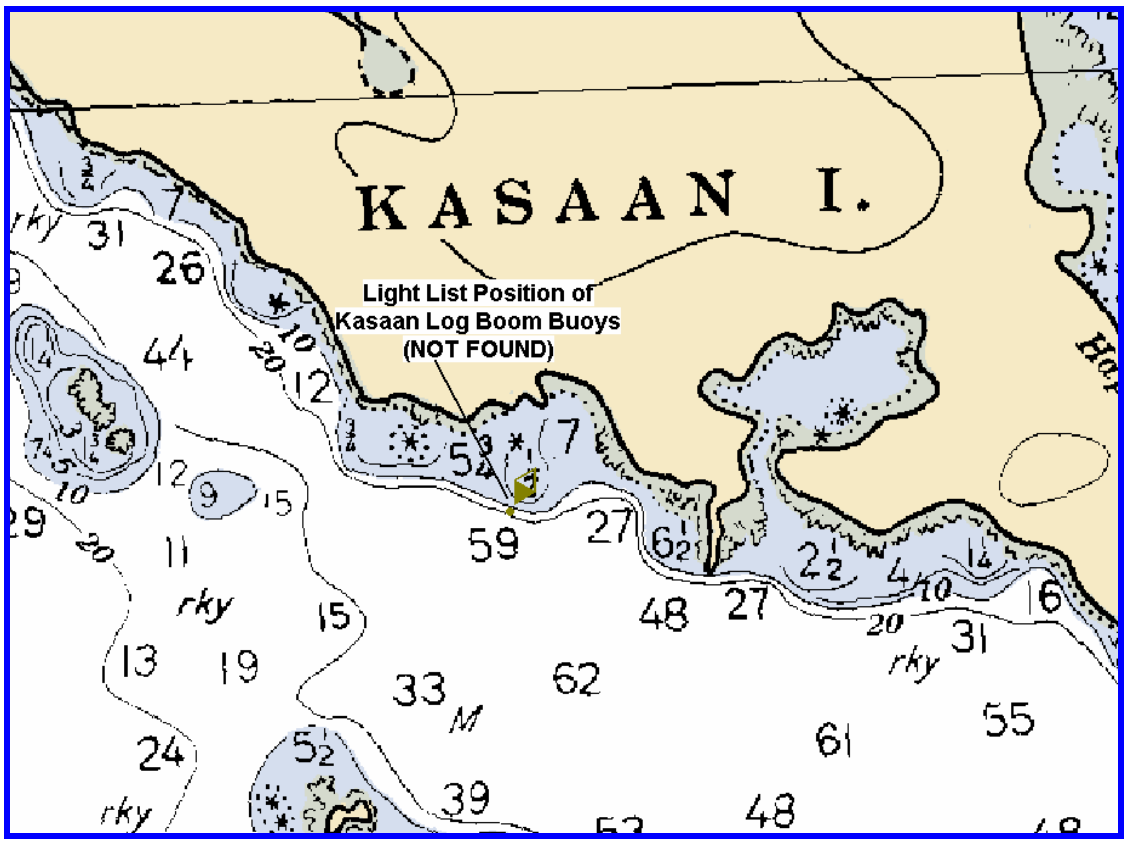
Kasaan Log Boom Buoys (3) (22385)

The Kasaan Log Boom Buoys, as listed in the 2002 Light List vol. VI, were **NOT FOUND** in survey H-11098. The current omission of the Kasaan Log Boom Buoys from Chart 17426 indicates that the buoys no longer exist.[74]

USCG Light list name	Kasaan Log Boom Buoys (3)
Name on chart	Not on chart
USCG Light list number	22385
Characteristic	N/A
Height	*N/A*
Range	N/A
Structure	White and orange buoys worded DANGER LOG BOOM.

Light List position Published 2002, vol. VI:

55°29' 30" N, 132°21' 36" W



Light List Position for Kasaan Log Boom Buoys (22385) on chart 17426

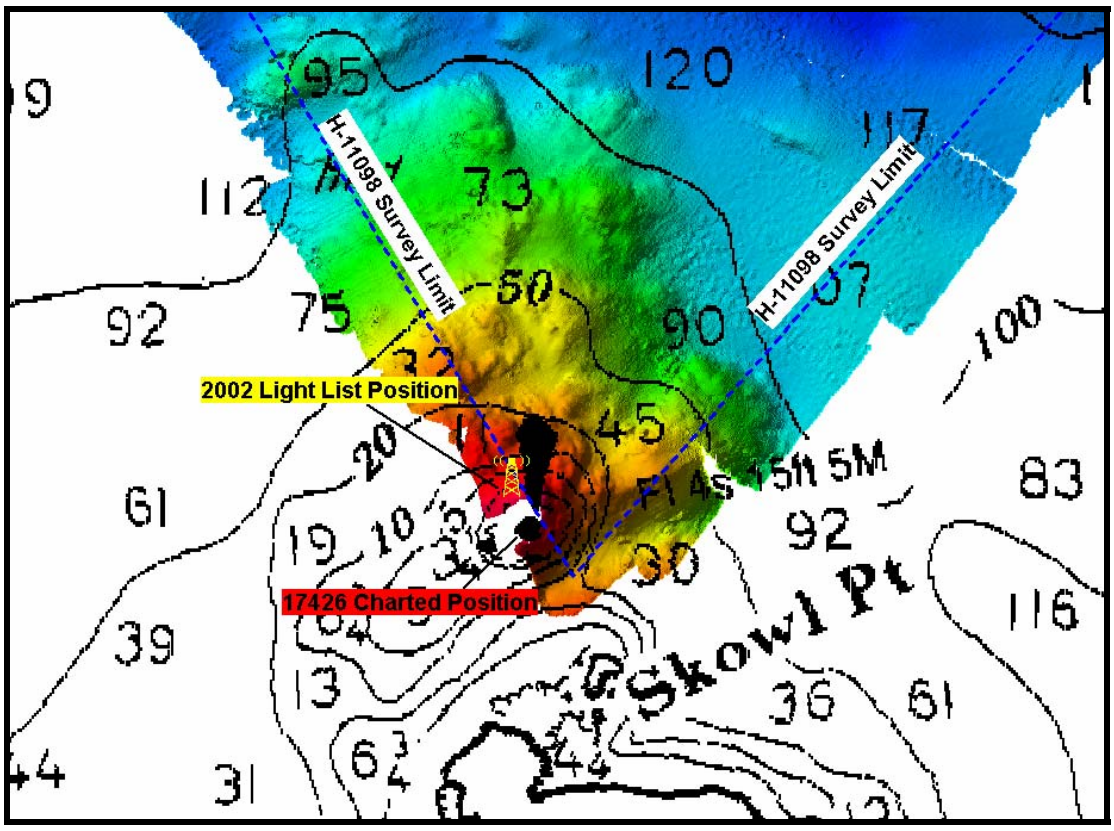
Skowl Point Light (22380)

No position was acquired in survey H-11098 for the Skowl Point Light. The Skowl Point Light position falls approximately 20 meters west of the H-11098 survey limit. H-11098 bathymetry, bounding the charted Skowl Point Light position, indicates the navigation aid is in acceptable range of its charted position, and serves its intended purpose.[75]

USCG Light list name	Skowl Point Light
Name on chart	No Name
USCG Light list number	22380
Characteristic	FI W 4s
Height	*15 feet*
Range	5 nautical miles
Structure	NR on skeleton tower.

Light List position Published 2002, vol. VI:

55°25' 42" N, 132°16' 12" W



H-11098 bathymetry and 17426 monochrome chart depicting the position of the Skowl Pt Light (22380)

The Inter-island Ferry

The Inter-island ferry system began operation between Ketchikan and Hollis with the *MV Prince of Wales* in January 2002. The vessel's length is 198 feet with a beam of 51 feet, a draft of 12 feet and capable of making 15 knots. This will ultimately be a two-ferry system. The first ferry, *MV Prince of Wales*, provides passenger and vehicle transportation from Hollis to Ketchikan. The second one will provide passenger and vehicle ferry transportation from Coffman Cove, on the northern end of Prince of Wales Island, to Wrangell and Petersburg. Construction for the second ferry, the *M/V Stikine*, is to begin in 2002, with service as early as 2003. Refer to the route map on the following page. Maintaining the current charts accurately is necessary for the safety of this ferry service.[76]

MV Prince of Wales

Proposed Inter-Island Ferry Route for 2003

TVI Reports[77]

(Traditional Verification Items)

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
4384	Yes	55° 29' 27.51"	132° 24' 4.85"	664175.81	6152497.77	+1.20	N/A	CSL-12	P7220068	
4306	Yes	55° 29' 22.80"	132° 23' 53.67"	664377.46	6152359.34	+1.38	N/A	CSL-12	P7220067	
4464	Yes	55° 29' 54.48"	132° 24' 23.09"	663824.82	6153319.21	+3.49	N/A	CSL-12	P7220069	
4515	Yes	55° 29' 58.83"	132° 24' 21.25"	663852.05	6153454.64	+1.47	N/A	CSL-12	P7220070	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
4704	Yes	55° 30' 29.63"	132° 24' 29.20"	663676.97	6154401.35	-0.07	N/A	CSL-13	P7220071	
3487	Yes	55° 29' 33.54"	132° 20' 55.94"	667483.13	6152809.20	+1.12	N/A	CSL-17	P8060023	
9465	Yes	55° 27' 57.47"	132° 18' 23.00"	670281.45	6149943.76	+0.30	N/A	CSL-8	P7270139	
9516	Yes	55° 27' 54.47"	132° 18' 14.74"	670430.07	6149856.66	+1.79	N/A	CSL-8	P7270141	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
9539	Yes	55° 27' 56.14"	132° 18' 15.52"	670414.33	6149907.78	+4.79	N/A	CSL-8	P7270142	
9600	Yes	55° 27' 39.03"	132° 17' 12.81"	671535.84	6149421.99	+0.20	N/A	CSL-8	P7270143	
9641	Yes	55° 27' 36.21"	132° 17' 7.92"	671625.10	6149338.06	+3.67	N/A	CSL-8	P7270144	
9691	Yes	55° 27' 35.03"	132° 17' 5.52"	671668.63	6149303.25	+1.14	N/A	CSL-8	P7270144	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
9706[78]	Yes	55° 27' 31.58"	132° 17' 4.59"	671689.08	6149197.44	+1.12	N/A	CSL-8	P7270144	
9944	Yes	55° 28' 16.59"	132° 18' 24.50"	670232.08	6150533.51	-0.59	N/A	CSL-9	P7270146	
45	Yes	55° 28' 19.17"	132° 18' 25.64"	670209.09	6150612.38	+5.68	+1.181	CSL-9	P7270147	
159	Yes	55° 28' 22.89"	132° 18' 20.70"	670291.23	6150730.97	+1.30	N/A	CSL-9	P7270003	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
188[79]	Yes	55° 28' 20.43"	132° 18' 45.25"	669863.25	6150638.21	+3.85	N/A	CSL-9	P7270004	
534[80]	Yes	55° 28' 38.07"	132° 19' 39.77"	668885.47	6151146.39	+0.53	N/A	CSL-9	P7270009	
546[81]	Yes	55° 28' 37.37"	132° 19' 41.46"	668856.53	6151123.70	+2.53	N/A	CSL-9	P7270009	
762	Yes	55° 28' 25.56"	132° 19' 42.90"	668845.29	6150757.63	+5.55	+1.057	CSL-9	P7280287	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
9780	Yes	55° 28' 18.00"	132° 18' 11.23"	670463.43	6150586.21	+2.59	N/A	CSL-9	P7270145	
1037[82]	Yes	55° 28' 37.46"	132° 20' 22.28"	668140.00	6151098.70	+5.97	+1.469	CSL-9	P7280294	
3161a[83]	Yes	55° 28' 46.80"	132° 21' 54.12"	666517.25	6151326.01	+2.82	N/A	CSL-11	P8070030	
3161b[84]	Yes	55° 28' 48.20"	132° 21' 53.81"	666521.00	6151369.54	+1.32	N/A	CSL-11	P8070030	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
4605	Yes	55° 28' 58.77"	132° 22' 0.85"	666385.17	6151691.62	-0.39	N/A	CSL-11	MVC-114F	
4665[85]	Yes	55° 28' 43.24"	132° 22' 51.19"	665519.83	6151178.07	-0.34	N/A	CSL-11	MVC-115F	
4675	Yes	55° 28' 46.17"	132° 22' 44.43"	665634.99	6151273.19	+1.73	N/A	CSL-11	MVC-118F	
4686	Yes	55° 28' 38.53"	132° 22' 40.39"	665714.82	6151039.85	+4.38	N/A	CSL-11	MVC-120F	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
4689[86]	Yes	55° 28' 38.53"	132° 22' 40.39"	665705.14	6151058.59	+5.38	+0.885	CSL-11	MVC-120F	
4694[87]	Yes	55° 28' 41.19"	132° 22' 38.76"	665740.35	6151123.09	+6.47	+1.971	CSL-11	MVC-120F	
4713	Yes	55° 28' 38.75"	132° 22' 53.96"	665476.49	6151037.72	+3.66	N/A	CSL-11	MVC-123F	
4745	Yes	55° 28' 41.57"	132° 23' 43.71"	664599.99	6151091.81	+2.21	N/A	CSL-11	MVC-126F	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
4751[88]	Yes	55° 28' 46.01"	132° 23' 43.99"	664596.40	6151176.40	+3.33	N/A	CSL-11	MVC-126F	
4753	Yes	55° 28' 46.01"	132° 23' 43.99"	664589.95	6151228.90	+1.33	N/A	CSL-11	MVC-127F	
4755	Yes	55° 28' 48.30"	132° 23' 46.73"	664539.20	6151297.97	+0.26	N/A	CSL-11	No Photo	N/A
5796	Yes	55° 30' 18.22"	132° 20' 31.58"	667857.76	6154206.31	+0.83	N/A	CSL-16	P7230081	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
6276	Yes	55° 29' 30.56"	132° 19' 13.92"	669276.60	6152785.84	-0.45	N/A	CSL-16	P7230089	
8984	Yes	55° 26' 36.41"	132° 16' 50.11"	672010.10	6147502.36	+0.13	N/A	CSL-7	P7260132	
1449	Yes	55° 28' 38.40"	132° 21' 14.17"	667228.30	6151093.03	+0.14	N/A	CSL-10	P7280297	
4524	Yes	55° 30' 50.55"	132° 19' 27.37"	668945.44	6155248.56	+7.22	+2.723	CSL-2	MVC_109F	

Summary of Sheet C Traditional Shoreline Verification

TARGET ID	VERIFIED	LATITUDE N	LONGITUDE W	UTM EASTING	UTM NORTHING	HEIGHT (+) OR DEPTH (-) AT MLLW (Meters)	HEIGHT (+) AT MHW (Meters)	SUBSHEET	PICTURE ID	PICTURE
3471	Yes	55° 29' 33.93"	132° 22' 28.70"	665855.28	6152759.60	+1.18	N/A	CSL-18	MVC-091F	
4108	Yes	55° 29' 25.34"	132° 14' 51.86"	673880.47	6152804.08	+4.08	N/A	CSL-5	P7210066	
5415	Yes	55° 30' 20.75"	132° 22' 30.53"	665768.48	6154205.14	+0.70	N/A	CSL-14	P7230078	

PITBI Reports[89]

(Potential Items To Be Investigated)

Sheet C Potential Items To Be Investigated

Shoreline sheet	DN	Target	Easting UTM	Northing UTM	Latitude N	Longitude W	Description
CSL-1	218	2558	666453.9	6156525.42	55.5264	-132.363	Rock not charted
CSL-1	218	2673	666042.34	6156693.04	55.528	-132.369	Rock not charted
CSL-1	218	2787	665643.53	6156823.04	55.5293	-132.376	Islet not charted
CSL-1	218	2817	665589.66	6156777.88	55.5289	-132.376	Rock not charted correctly, position is SW, 35m.
CSL-1	218	2862	665445.57	6156797.83	55.5291	-132.379	Islet not charted
CSL-1	218	3047	664389.63	6157273.4	55.5338	-132.395	Rock not charted
CSL-17	218	3005	669105.74	6152355.77	55.488	-132.323	Rock not charted
CSL-17	218	3566[90]	667544.89	6152852.8	55.493	-132.348	Rock not found

Sheet C Potential Items To Be Investigated

Shoreline sheet	DN	Target	Easting UTM	Northing UTM	Latitude N	Longitude W	Description
CSL-12	203	4306	664377.46	6152359.34	55.4897	-132.398	Rock not charted correctly. Position is SW, 50 m.
CSL-13	203	5016[91]	663340.16	6155238.4	55.5159	-132.413	Islet not charted correctly
CSL-13	203	5048[92]	663261.52	6155268.56	55.5162	-132.414	Islet not charted correctly
CSl-17	218	3005[93]	669105.74	6152355.77	55.488	-132.323	Rock not charted
CSL-4	210	1747	673326.45	6153195.15	55.4941	-132.256	Rock not charted correctly, position is NW, 42 m.
CSL-4	210	1748	673066.87	6153187.83	55.4941	-132.26	Rock not charted
CSL-4	210	1749	673054.59	6153183.46	55.4941	-132.261	Rock not charted
CSL-8	208	9433[94]	670077.11	6150115.09	55.4676	-132.31	Rock not charted correctly, position is W, 40 m.
CSL-8	208	9622	671602.57	6149435	55.4609	-132.286	Rock not charted
CSL-9	208	135[95]	670198.13	6150710.68	55.4729	-132.307	Rock not charted correctly. RSD position SW, 32 m.

Sheet C Potential Items To Be Investigated

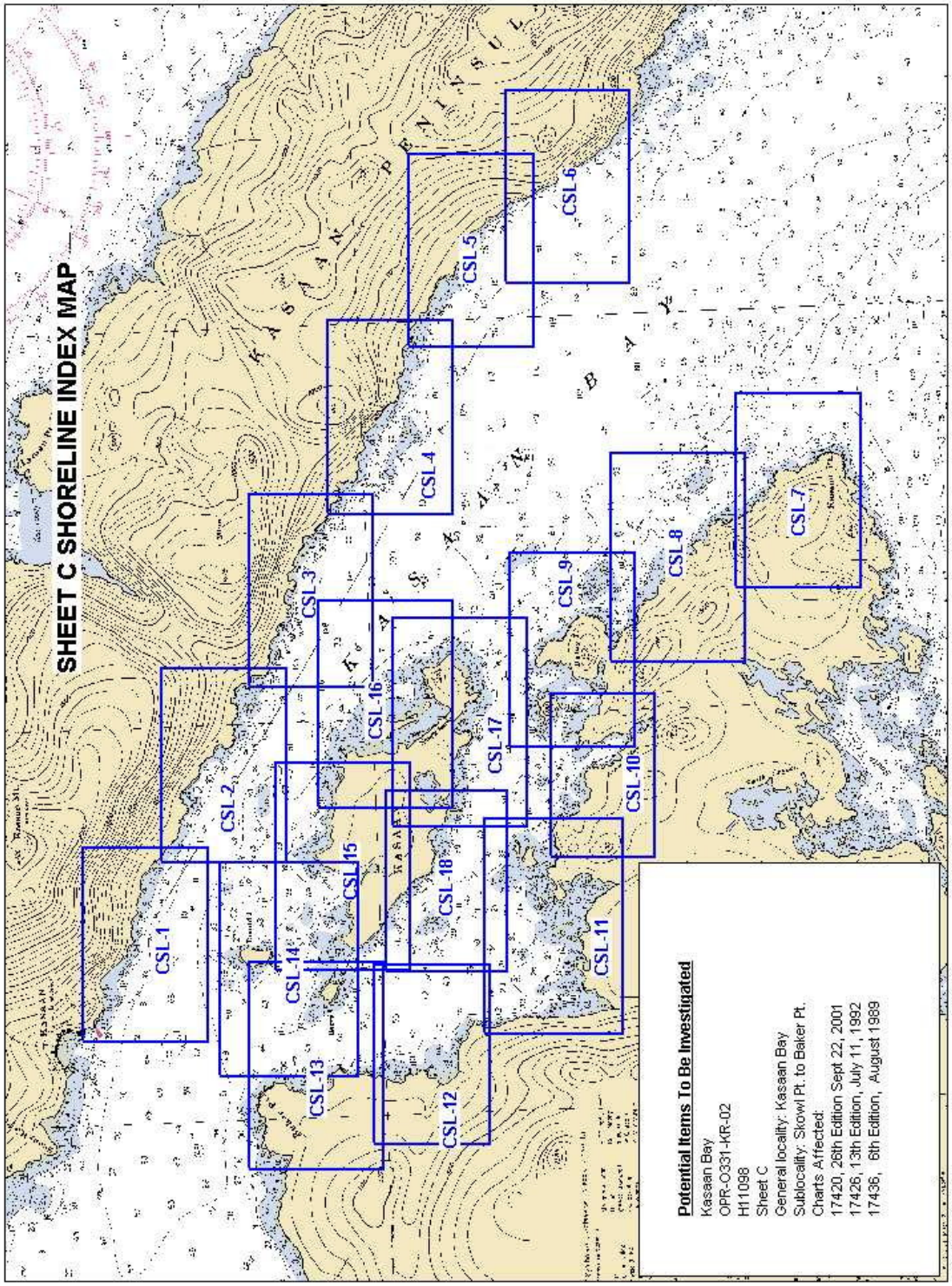
Shoreline sheet	DN	Target	Easting UTM	Northing UTM	Latitude N	Longitude W	Description
CSL-9	208	602	668507.54	6150973.72	55.4758	-132.334	Islet not charted correctly
CSL-9	209	940	668060.5	6150842.28	55.4748	-132.341	Rock not charted
CSL-9	209	1067[96]	668303.72	6151058.71	55.4767	-132.337	Rock not charted
CSL-11	219	3161	666404.08	6151385.81	55.4802	-132.367	Rock not charted
CSL-11	220	3714	666310.96	6151351.87	55.48	-132.368	Rock not charted
CSL-11	220	3751	666232.09	6151274.03	55.4793	-132.37	Rock not charted
CSL-11	220	4127	666070.11	6151345.33	55.48	-132.372	Islet not charted correctly
CSL-11	220	4245	666207.18	6151057.93	55.4774	-132.37	Rock not charted
CSL-11	220	4263[97]	666232.98	6150974.18	55.4766	-132.37	Rock not charted
CSL-11	220	4342	666260.65	6150691.19	55.4741	-132.369	Rock not charted

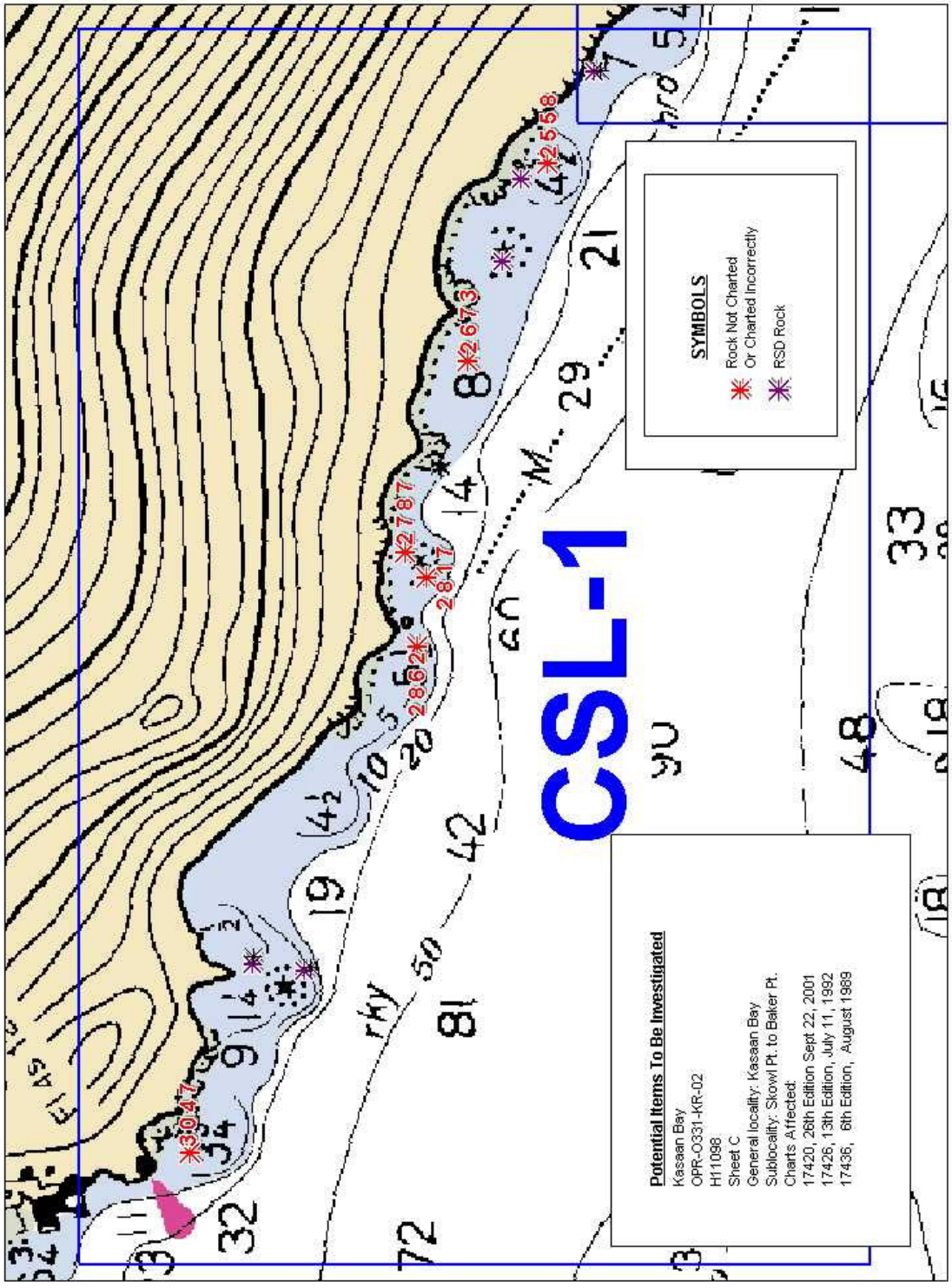
Sheet C Potential Items To Be Investigated

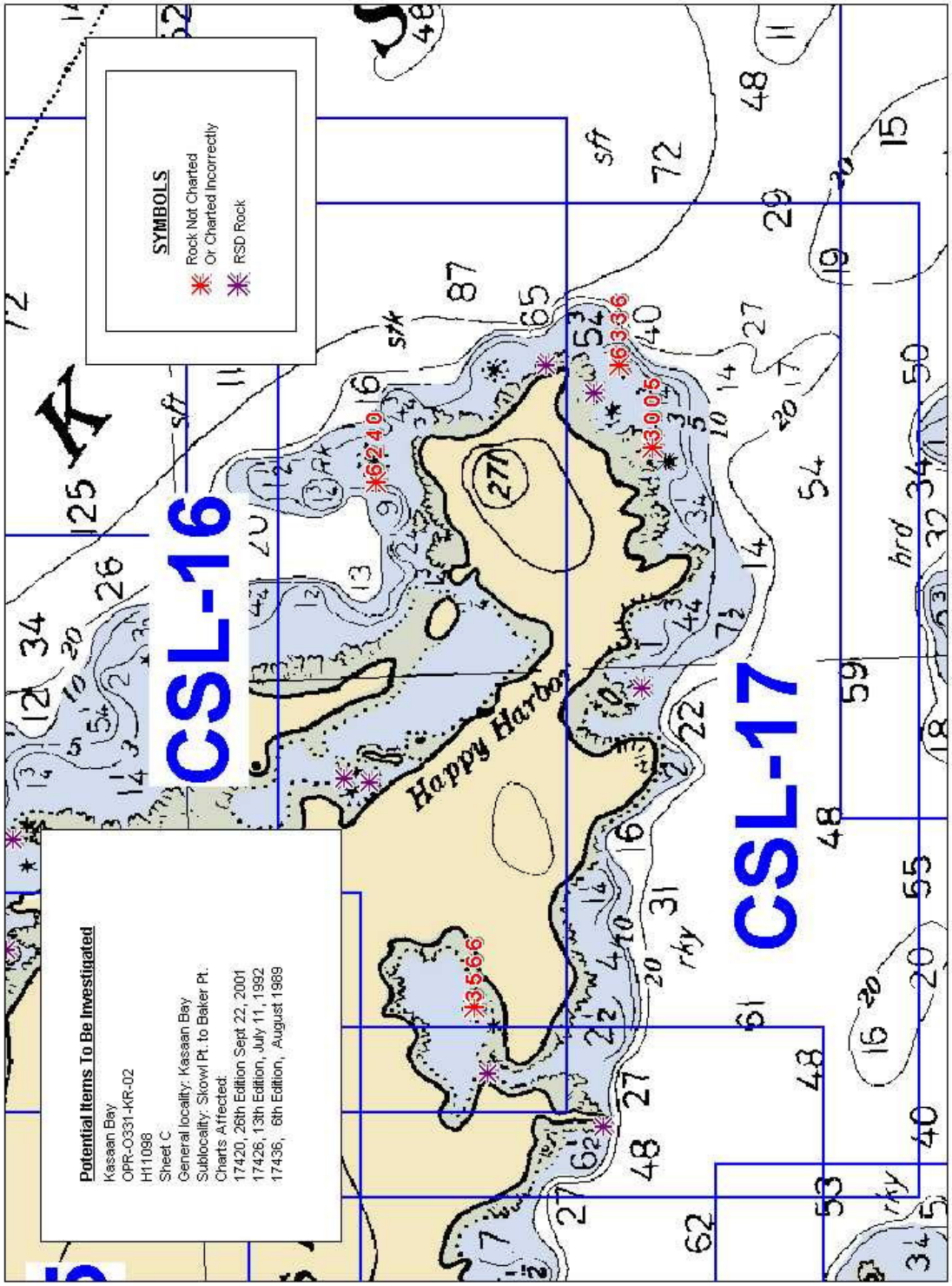
Shoreline sheet	DN	Target	Easting UTM	Northing UTM	Latitude N	Longitude W	Description
CSL-11	220	4672	665584.11	6151226.03	55.4791	-132.38	Rock not charted
CSL-11	221	4741	664554.48	6151034.69	55.4777	-132.396	Rock not charted
CSL-16	204	6240	669006.98	6153126.74	55.495	-132.325	Rock not charted correctly, position is W, 60 m.
CSL-16	204	6336	669333.26	6152450.11	55.4888	-132.32	Rock not found
CSL-7	207	8932	671869.97	6147372.35	55.4423	-132.283	Rock not charted
CSL-2	221	4519	668930.92	6155190.02	55.5135	-132.325	Rock not charted
CSL-2	221	4552	668352.37	6155465.91	55.5162	-132.334	Rock not charted
CSL-2	221	4582	667268.04	6156024.97	55.5216	-132.35	Rock not charted correctly. Position is S, 49 m.
CSL-3	221	4479	669703.01	6154791.17	55.5097	-132.313	Rock not charted
CSL-3	221	4486	669587.33	6154869.39	55.5104	-132.314	Rock not charted

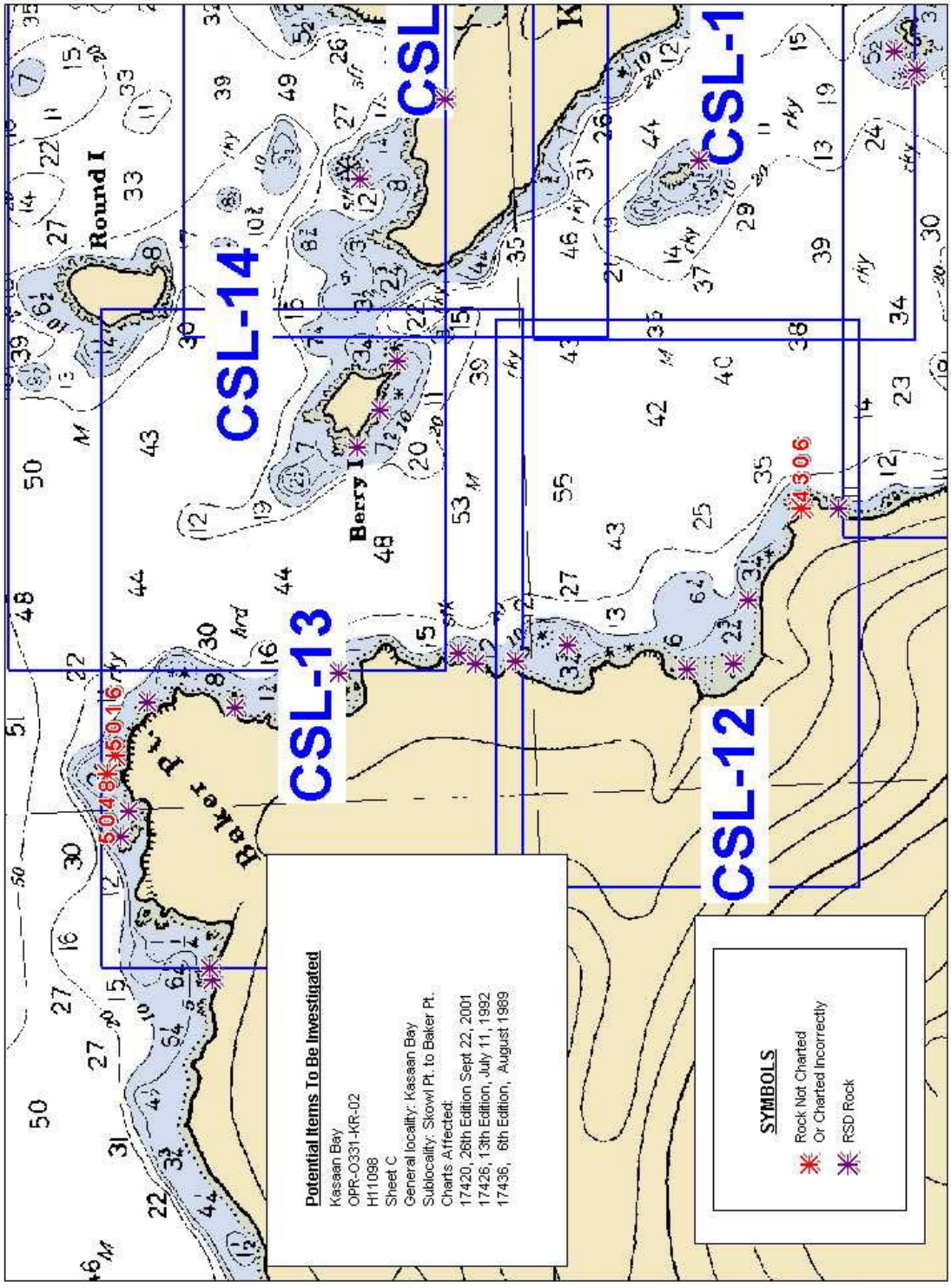
Sheet C Potential Items To Be Investigated

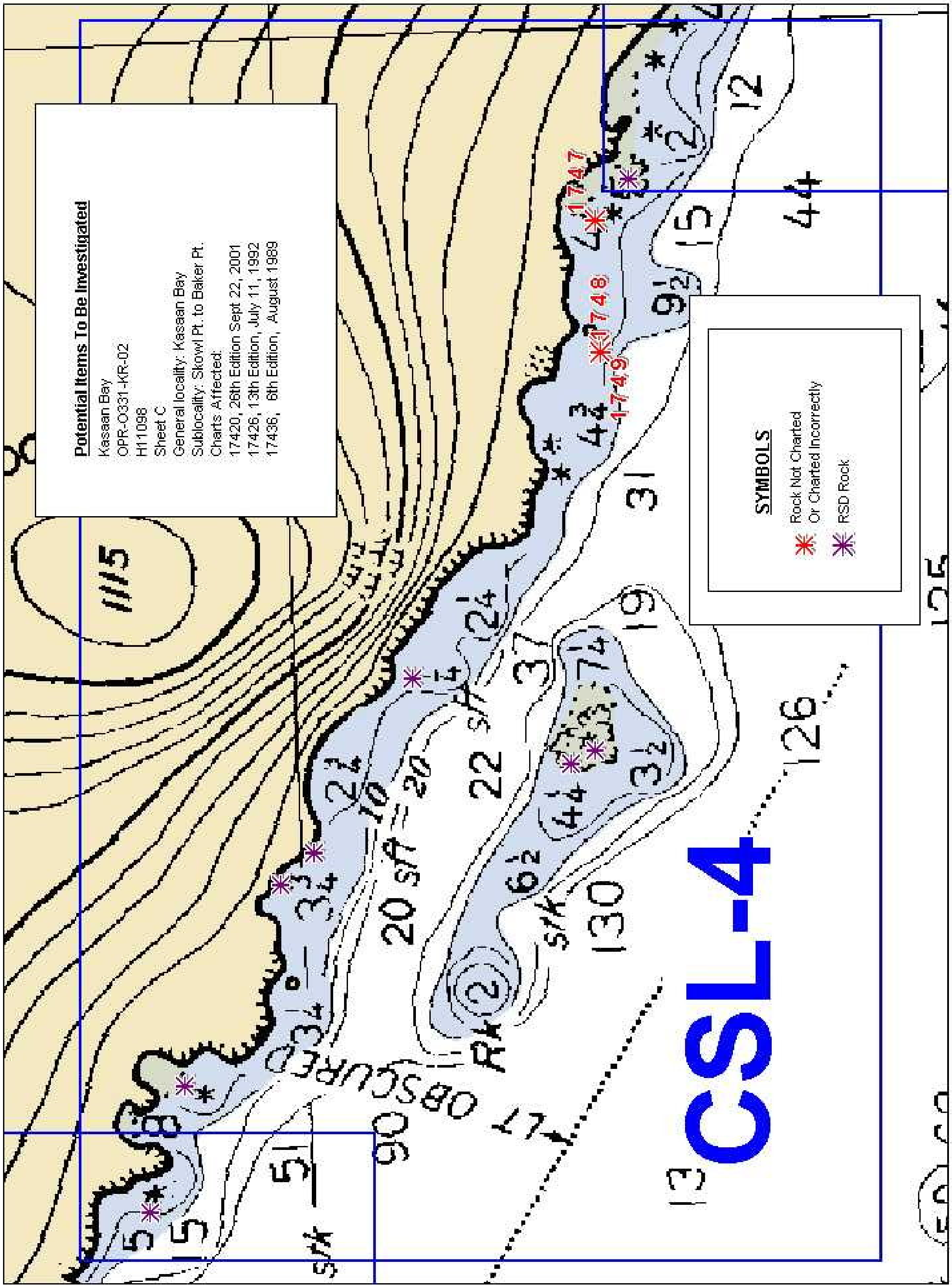
Shoreline sheet	DN	Target	Easting UTM	Northing UTM	Latitude N	Longitude W	Description
CSL-3	221	4502[98]	668968.35	6155073.83	55.5125	-132.324	Rock not charted

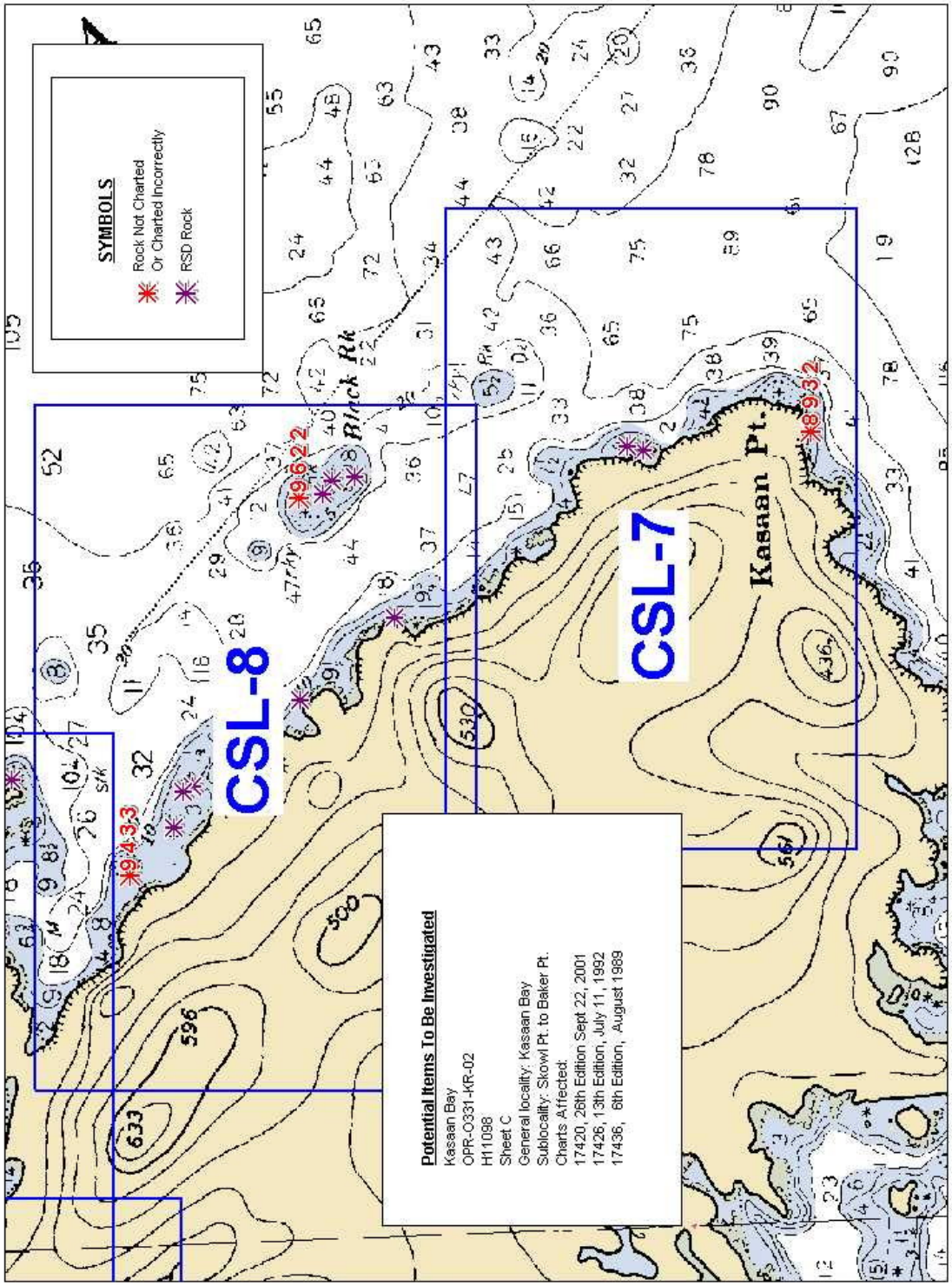

SHEET C SHORELINE INDEX MAP
CSL-1
CSL-2
CSL-3
CSL-4
CSL-5
CSL-6
CSL-7
CSL-8
CSL-9
CSL-10
CSL-11
CSL-12
CSL-13
CSL-14
CSL-15
CSL-16
CSL-17
CSL-18
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989

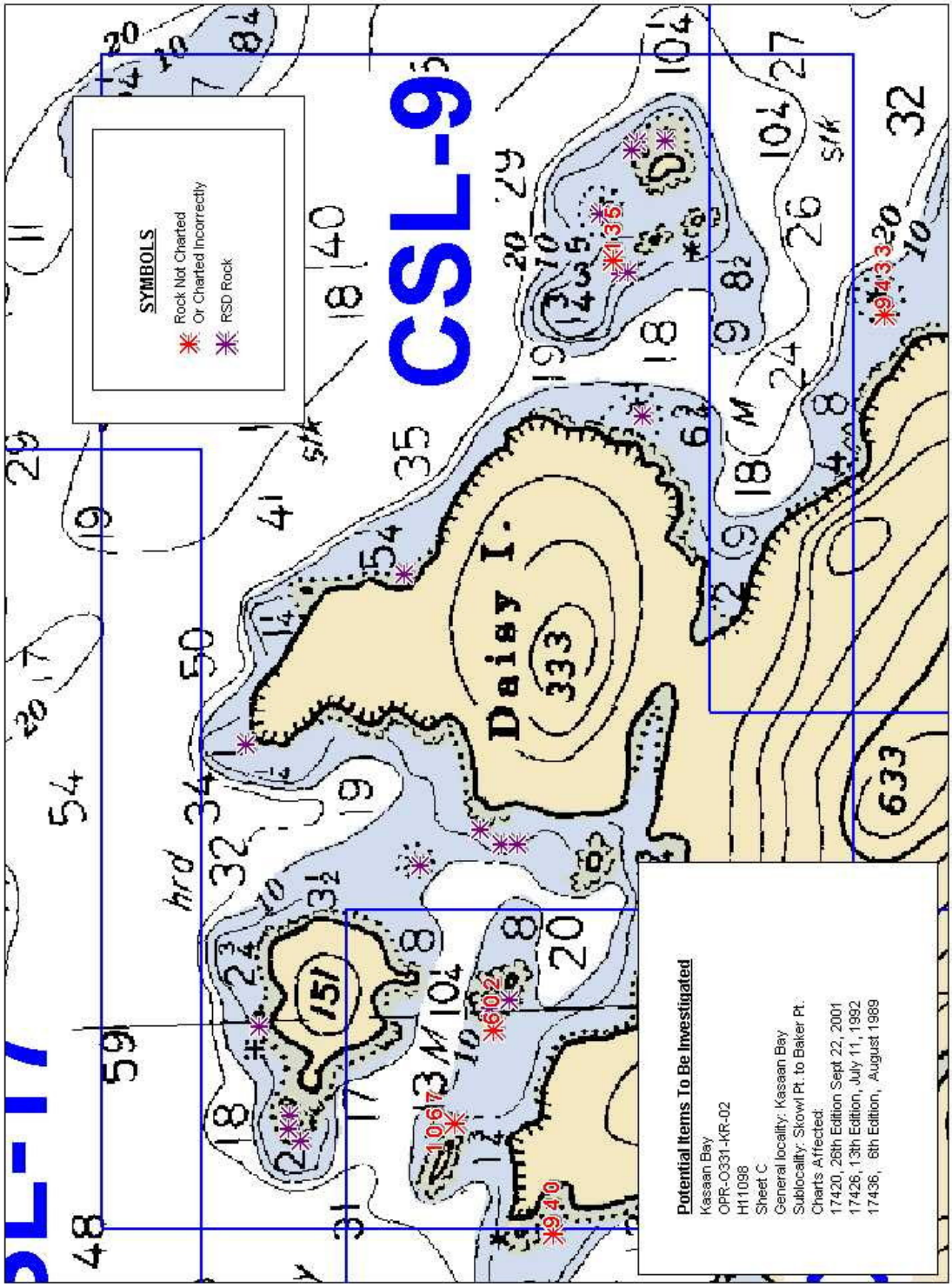

CSL-1
SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989

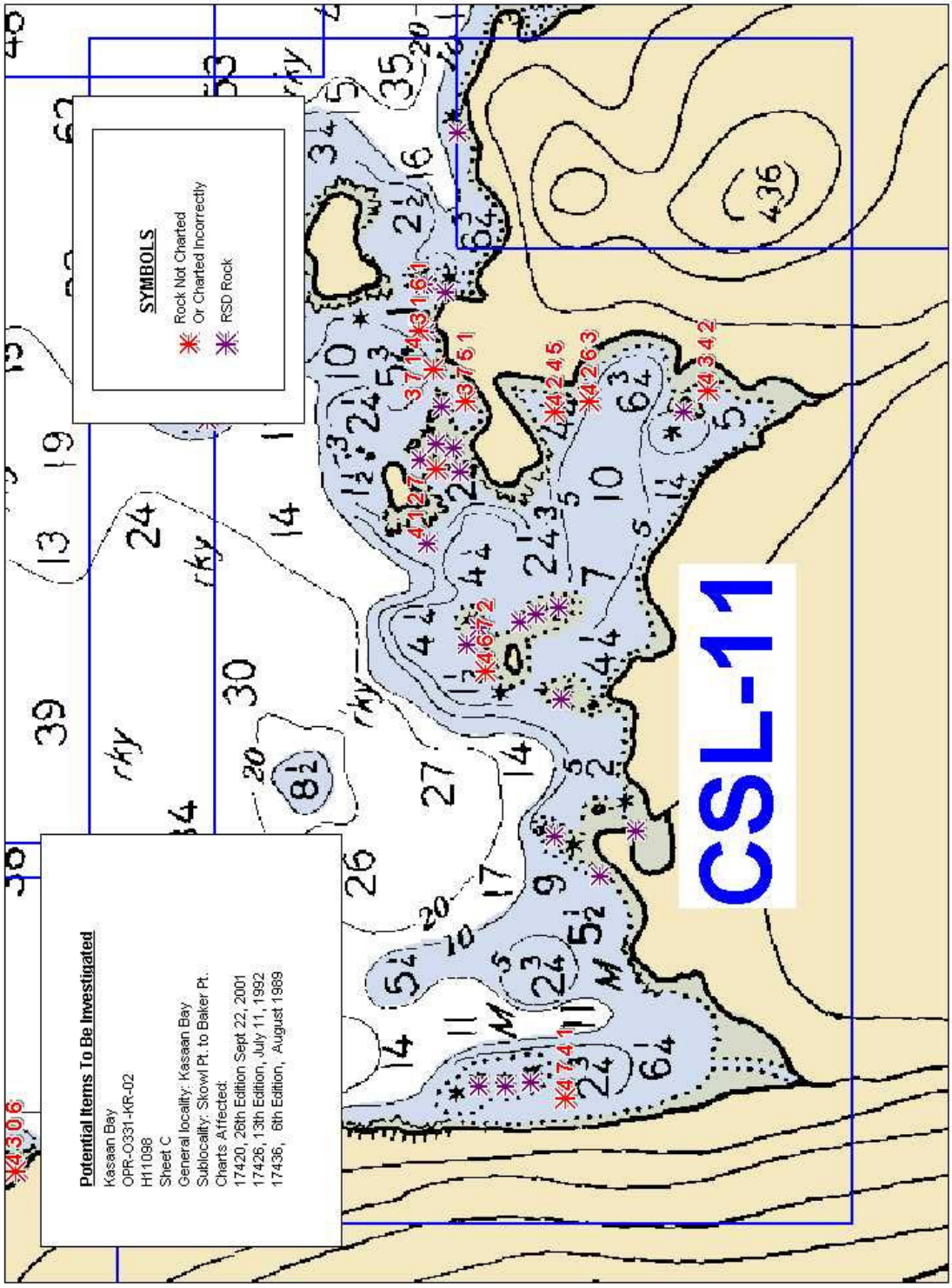

SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
CSL-16
CSL-17
Happy Harbor
6240
6336
3005
3566
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 8th Edition, August 1989

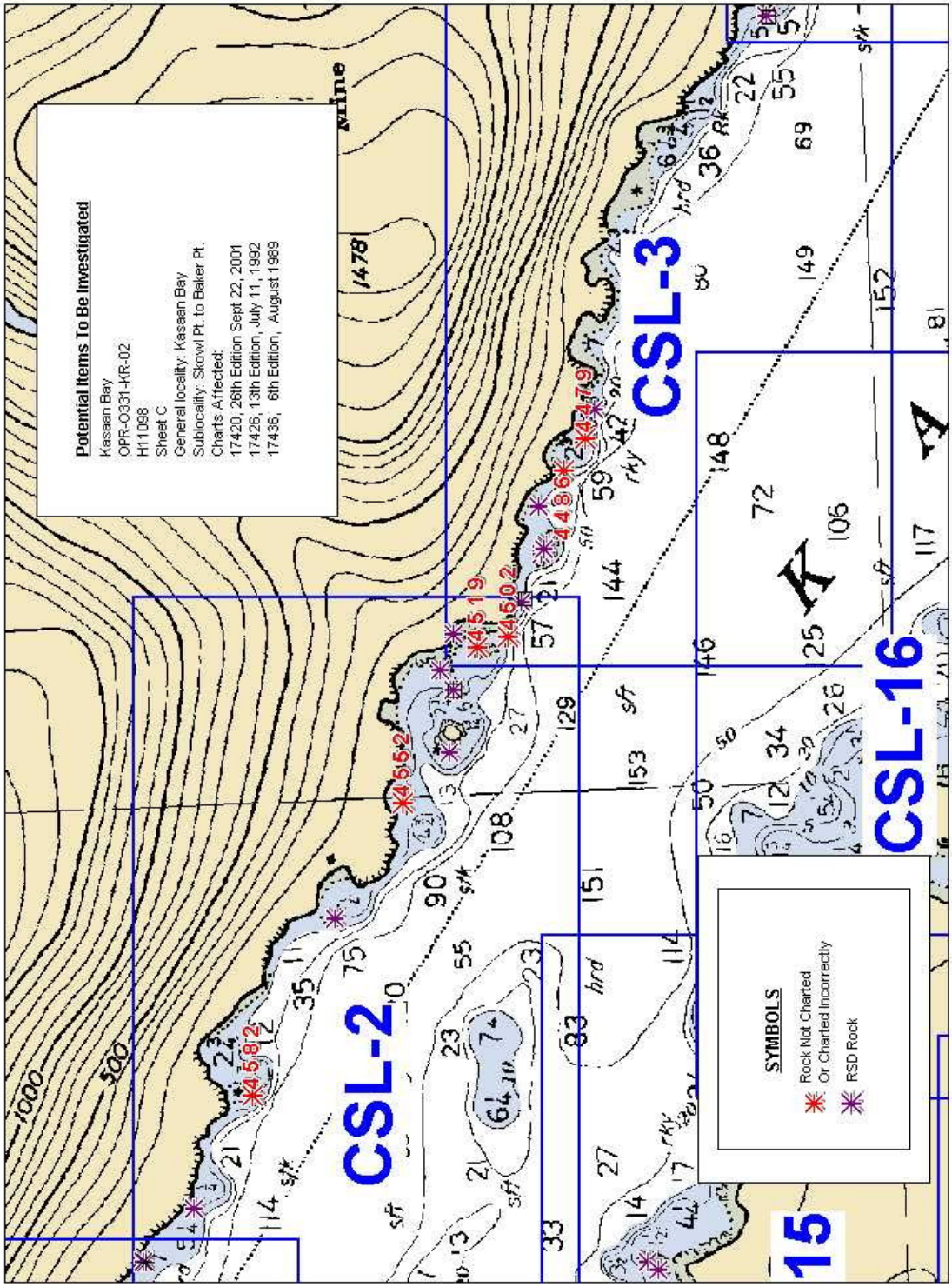

CSL-14
CSL
CSL-1
CSL-13
CSL-12
Round I
Berry I
Baker Pt
5048
5016
4306
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989
SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock


Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989
SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
1747
1748
1749
CSL-4
OBSCURED


SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
CSL-8
CSL-7
Kasaan Pt.
Black Rk
9622
9433
9332
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989


CSL-9
SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
Daisy I.
333
633
151
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989


SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989
CSL-11


Potential Items To Be Investigated
Kasaan Bay
OPR-O331-KR-02
H11098
Sheet C
General locality: Kasaan Bay
Sublocality: Skowl Pt. to Baker Pt.
Charts Affected:
17420, 26th Edition Sept 22, 2001
17426, 13th Edition, July 11, 1992
17436, 6th Edition, August 1989
CSL-2
CSL-3
CSL-16
15
SYMBOLS
Rock Not Charted
Or Charted Incorrectly
RSD Rock
4582
4552
4519
4502
4486
4479

LETTER OF APPROVAL

REGISTRY NO. H-11098

This Report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of survey H-11098 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report, smooth sheet, digital data, and accompanying records have been closely reviewed and are considered complete and adequate as per the Statement of Work. Other reports submitted with this survey include Data Acquisition and Processing Report, Vertical and Horizontal Report, and the Shoreline Verification Field Notes.

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

Frederick W. Iversen, Hydrographer
Terra Surveys, LLC

Date JUNE 12, 2003

RECRD	**52763**	VESSLTERMS	OBSTRUCTION	CHART	17426	AREA	O
		CARTOCODE	284	SNDINGCODE		DEPTH	

NATIVLAT	55/28/25.68	NATIVLON	132/20/39.95	Convert		NATIVDATUM	31
LAT83	55/28/25.68	LONG83	132/20/39.95	Update GP		GPQUALITY	Med
	55 28 25.68		132 20 39.95			GPSOURCE	Scaled
LATDEC	55.4738	LONDEC	132.34443055556				

PROJECT	OPR-O331	ITEMSTATUS	Assigned	SEARCHTYPE	Full
RADIUS		INIT	MBH	ASSIGNED	6/5/2001
TECNIQ	VS,MB,S2,DI,SD				
Techniqnote	SEARCH THE AREA AS SHOWN ON THE AWOIS GRAPHIC.				

History

THE AWOIS POSITION IS THE SCALED OFFSHORE END OF THE FEATURE.
CL854/55--USACE PERMIT TO THE KETCHIKAN PULP COMPANY; FOR THE PLACEMENT OF A MOORING BOOM FOR LOG STORAGE IN LINNEY BAY AS SHOWN ON A SKETCH. THE LOG STORAGE STRUCTURE EXTENDS FROM LAT. 55/28/15.02N, LONG. 132/20/33.11W (NAD83) TO LAT. 55/28/25.68N, LONG. 132/20/39.95W (NAD83). (ENTERED 6/01 BY MBH)

Fieldnote

Date(s)/Day Number(s): 7/28/02 DN 240 Survey Vessel Name: Royal Fish

Position Numbers/Time: 1567/18:46:18
1587/18:49:25
1610/18:53:03
1630/18:56:16

Investigation Method: Shallow Water Multibeam Sonar/Shoreline Verification

Surveyed Position (NAD83):
1567/Lat 55/28/25.60N Long 132/20/39.71W
1587/Lat 55/28/27.56N Long 132/20/39.44W
1610/Lat 55/28/18.52N Long 132/20/38.75W
1630/Lat 55/28/15.85N Long 132/20/34.37W

Position Determined By: Differential GPS

Investigation Summary: 500 meters of shoreline were investigated in the charted area of the mooring boom. Scattered remnants of the booms (logs affixed with chains to the rock shore) were found. The area also has 200% SWMB coverage. No submerged ruins were detected.

Reccomendations: Based on the results of survey H-11098, the hydrographer recommends retention of the log symbols. These logs float at high tide.

Proprietary

Evaluator Comment: Retain floating/anchored log boom notation on Chart 17426.

YEARSUNK		NIMANUM		SYSTEMNUM	13184	Print Record

APPENDIX I

Danger To Navigation Reports

This survey produced two Danger to Navigation Reports.[99] The report and the associated correspondence are included in this appendix.[100] A list of the correspondence is below.

Date	Recipient
June 11, 2002	Commander Coast Guard District CC: Gary Nelson NOAA (COTR)
February 10, 2003	Commander Coast Guard District CC: Gary Nelson NOAA (COTR)

Danger to Navigation Report

Hydrographic Survey Registry Number: H-11098

Survey Title: State: Alaska Locality: Kasaan Bay Sub-locality: Skowl Point to Baker Point

Project Number: OPR-0331-KR-02

Survey Dates: June 11, 2002 - Present

CHARTS AFFECTED:

Chart	Scale	Edition	Date
17426	1:40,000	13th	July 11, 1992
17420	1:229,376	26th	Sept. 22, 2001

DANGERS:

Feature	Depth(fms)	Latitude(N)	Longitude(W)
Rock	0 3/4	55/31/53.0	132/23/20.9
Sounding	1 3/4	55/31/58.5	132//23/31.3

COMMENTS:

A “rock which covers and uncovers” charted at 55/31/54.7(N), 132/23/23.4(W) was not found. A rock was found at 55/31/53.0(N), 132/23/20.9(W) which uncovers 3/4 fm at MLLW. This rock is approximately 70 meters SE of the charted rock mentioned above.

A 1 3/4 fathom depth was discovered at 55/31/58.5N, 132/23/31.3W.

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

Danger to Navigation Report

Hydrographic Survey Registry Number: **H11098**

Survey Title: **State: AK** **Locality: Kasaan Bay** **Sub-locality: Skowl Pt. to Baker Pt.**

Project Number: OPR-O331-KR-02

Survey Dates: 06/11/02 - 08/15/02

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

CHARTS AFFECTED:

Chart	Scale	Edition	Date
17420	1:229,376	26th	9/22/01
17426	1:40,000	13th	7/11/92

DANGERS:

Feature	Depth (fms)	Latitude (N)	Longitude (W)
Sounding	5	55° 27' 08.2"	132° 17' 05.7"
Sounding	8 ½	55° 29' 05.4"	132° 14' 52.5"
Sounding	3 ¼	55° 29' 42.5"	132° 16' 32.7"
Sounding	7 ½	55° 30' 09.1"	132° 17' 20.1"
Sounding	3 ¾	55° 30' 09.6"	132° 17' 08.8"
Sounding	8	55° 28' 18.0"	132° 18' 01.7"
Sounding	7 ¼	55° 28' 13.3"	132° 18' 37.2"
Sounding	5 ½	55° 28' 17.0	132° 18' 48.3
Sounding	1¾	55° 28' 37.8"	132° 19' 49.5"
Sounding	9 ½	55° 28' 48.3"	132° 19' 40.0"
Sounding	7 ¾	55° 29' 50.0"	132° 19' 34.9"
Sounding	3 ¼	55° 29' 20.7"	132° 20' 45.1"
Sounding	1 ¼	55° 28' 49.3"	132° 21' 44.9"
Sounding	9 ¼	55° 29' 00.2"	132° 22' 15.3"
Sounding	9 ½	55° 29' 18.8"	132° 22' 28.6"
Sounding	1 ½	55° 28' 40.1"	132° 23' 31.0"
Sounding	½	55° 28' 36.2"	132° 23' 43.4"
Sounding	7 ½	55° 28' 47.7"	132° 23' 34.5"
Sounding	9 ¼	55° 30' 53.2"	132° 19' 59.9"
Sounding	3 ¼	55° 30' 54.3"	132° 20' 04.8"
Sounding	1 ¼	55° 30' 28.9"	132° 21' 48.2"
Sounding	3 ¾	55° 31' 26.6"	132° 21' 31.1"
Sounding	8	55° 31' 36.5"	132° 22' 06.2"

Danger to Navigation Report

DANGERS:

Feature	Depth (fms)	Latitude (N)	Longitude (W)
Sounding	7 ¼	55° 31' 51.9"	132° 23' 18.8"
Sounding	6	55° 31' 53.6"	132° 23' 12.0"
Sounding	¾	55° 30' 05.6"	132° 22' 52.0"
Sounding	10 ¼	55° 29' 15.3"	132° 23' 33.9"
Sounding	8	55° 29' 15.6"	132° 23' 51.5"
Sounding	9 ½	55° 29' 57.1"	132° 16' 47.5"
Sounding	7 ½	55° 29' 34.1"	132° 15' 30.8"
Sounding	7 ¼	55° 29' 33.5"	132° 15' 25.1"
Sounding	4 ¼	55° 29' 44.7"	132° 16' 38.3"
Sounding	1 ½	55° 29' 49.4"	132° 16' 53.9"

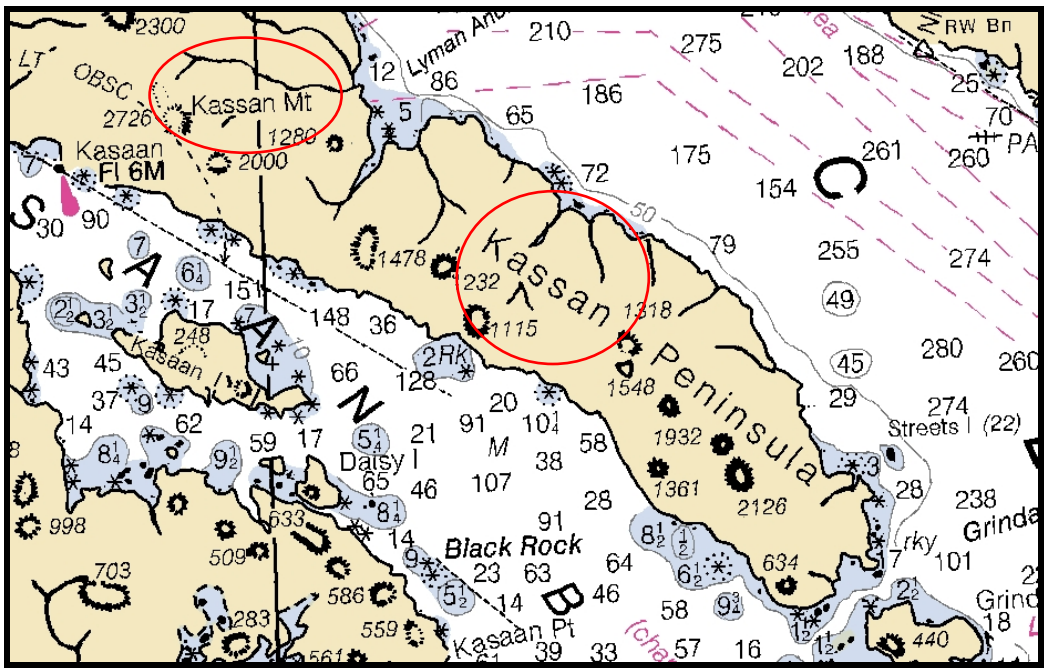
COMMENTS:

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

APPENDIX II

List of Geographic Names

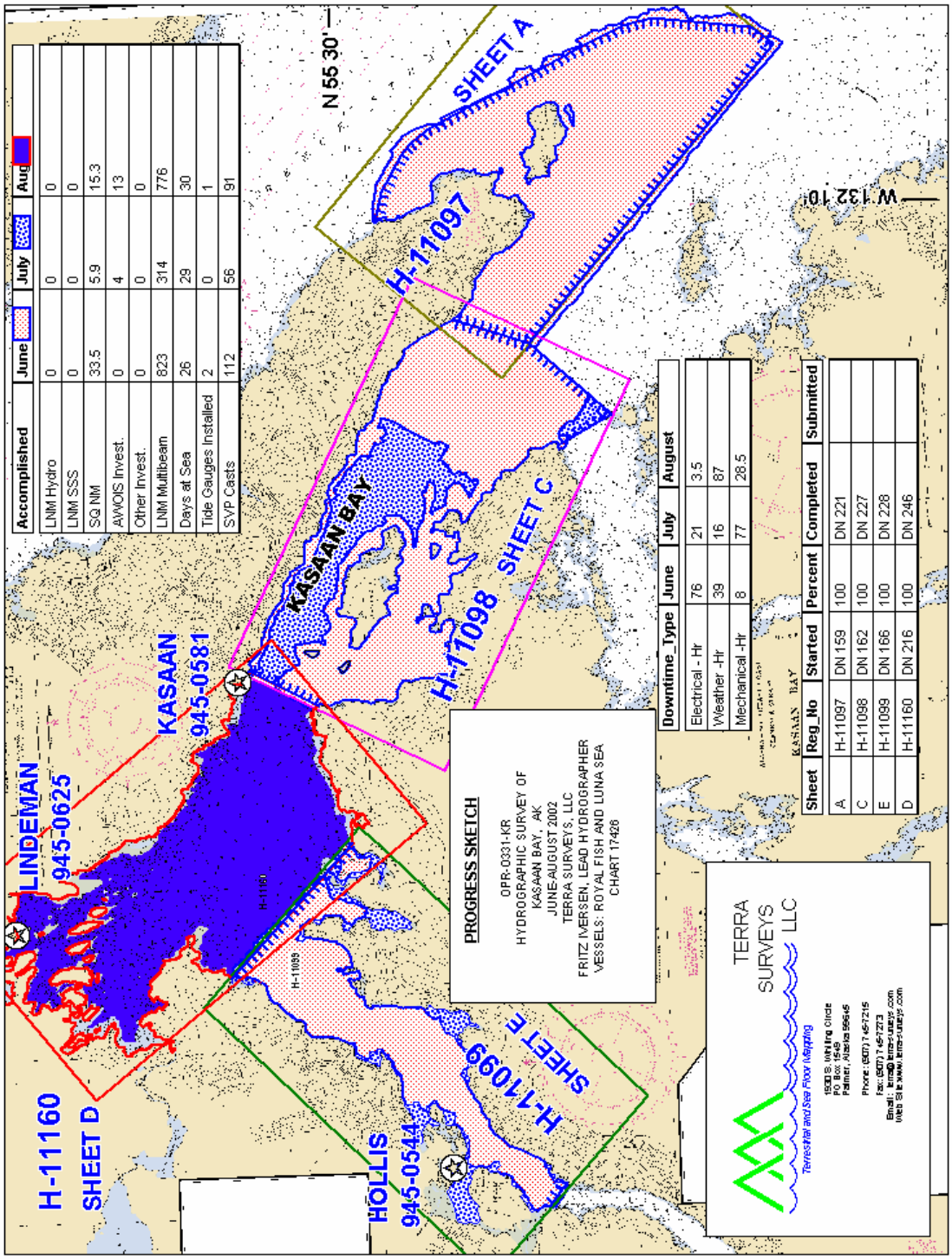
The geographic names Kasaan Peninsula and Kasaan Mountain were found to be misspelled as *Kassan* Peninsula and *Kassan Mountain* on Chart 17420. Local knowledge and all other references found for the area support the proper spelling as Kasaan Peninsula and Kasaan Mountain.[101]



Portion of Chart 17420 showing the misspelling of geographical names

APPENDIX III

Progress Sketch



Accomplished	June	July	Aug
LNM Hydro	0	0	0
LNM SSS	0	0	0
SQ NM	33.5	5.9	15.3
AWOIS Invest.	0	4	13
Other Invest.	0	0	0
LNM Multibeam	823	314	776
Days at Sea	26	29	30
Tide Gauges Installed	2	0	1
SVP Casts	112	56	91

Downtime_Type	June	July	August
Electrical - Hr	76	21	3.5
Weather -Hr	39	16	87
Mechanical -Hr	8	77	28.5

Sheet	Reg_No	Started	Percent	Completed	Submitted
A	H-11097	DN 159	100	DN 221	
C	H-11098	DN 162	100	DN 227	
E	H-11099	DN 166	100	DN 228	
D	H-11160	DN 216	100	DN 246	

APPENDIX IV

Tides and Water Levels

2002 FIELD and FINAL TIDE NOTE

Hydrographic Sheet: H11098

Sheet C
Skowl Point to Baker Point
Kasaan Bay, Alaska

NOAA Project No:	OPR-O331-KR-2002 Kasaan Bay, Alaska					
NOAA Contract No:	50-DGNC-0-90003					
The NOS Ketchikan, AK tide station (945-0460) served as control for the subordinate stations on this project. Datum determinations were made for the tertiary subordinate stations: Kasaan Bay (945-0581), and Hollis Anchorage (945-0544). The NTDE 1960-78 was utilized.						
Location and Time Meridian	Name:	Lat (NAD 83)	Long (NAD 83)	Time Meridian:		
	Kasaan Bay	55° 32' 05"	132° 23' 48"	0° (UTC)		
	Hollis Anchorage	55° 28' 45"	132° 38' 30"	0° (UTC)		
Time Period and Datum Reference	Name:	Established:	Removed:	MLLW	MHW	units
	Kasaan Bay	6/4/2002	9/5/2002	0.000	4.496	meters
	Hollis Anchorage	6/1/2002	9/4/2002	0.000	4.553	meters
Tide observer	Terra Surveys, LLC 1930 South Whiting Circle Palmer, AK 99645 (907) 745-7215					
Gauges	Design Analysis H350XL/355 bubbler systems.					
Installation	Each gauge was secured inside a waterproof case, and fastened vertically inside of an enclosed Rubbermaid Garden Toolshed. Refer to the tide station package for additional site specific details of installation.					
Tide staff	No tide staff was installed. Leveling was performed from a tidal benchmark to the water surface. The water height was read using a metric rod with a stilling well attached to remove interference from waves.					
Benchmarks	The following benchmarks were installed at these sites: Kasaan Bay: 0581 A 2002, 0581 B 2002, 0581 C 2002, 0581 D 2002 Hollis Anchorage: none The following benchmarks were recovered at these sites: Kasaan Bay: BM 2 1911, BM 7 1963 Hollis Anchorage: BM 1 1924, BM 2 1924, BM 3 1924, BM 4 1953, BM 5 1960					
Levels	Benchmarks were leveled at the installation and removal of the tidal station. The benchmarks and station datums were connected through frequent measurements to the water. The level runs closed within NOS tolerance.					
Final Tidal Zoning	This sheet is covered by tide zones SA100, SA101 and SA 102.					
Reduction of Hydrographic data	Terra Surveys, LLC (the prime contractor) was provided with preliminary datums developed by LCMF during June 2002 based upon a short series simultaneous comparison between Ketchikan and the primary subordinate station. Six minute tide data reduced to MLLW and smoothed with a 5th order 5 hour polynomial curve fit was provided to Terra Surveys throughout the field season. In September 2002, LCMF finalized datums and forwarded all data necessary to reduce hydrographic soundings to the prime contractor.					

APPENDIX V

Supplemental Survey Records and Correspondence

Subject:
Terra Surveys Inc. OPR-0331-KR-02 Kasaan Shoreline Verification Processing Procedures
From:
Anne Dollard <Adollard@terrasond.com>
Date:
Thu, 02 Feb 2006 15:44:11 -0900
To:
beth.taylor@noaa.gov
To:
beth.taylor@noaa.gov

Terra Surveys Inc. OPR-0331-KR-02 Kasaan Shoreline Verification Processing Procedures

In response to recent phone conversations and E mails with NOAA rep Beth Taylor, who is reviewing our work; find a summary below to further clarify Terra Surveys processing procedures in regard to shoreline verification.

The RSD data and charted features often varied and disagreed. We found the following scenarios we had to treat in different ways:

- RSD rocks where there was no charted rock
- Charted rocks where there was no RSD rock
- New rocks not represented by Chart or RSD
- Rocks (near a charted rock) not charted correctly

The table of Traditional Shoreline Verification Items (TVI) listed in each Sheet's Descriptive Report, Section D2 Additional Results lists the position of the boat where the target was taken, **not** the actual position of the item corrected for range and bearing. The plotted positions of features on the smoothsheet are **either** the verified RSD position or the target position when the range and bearing are at or near zero from the boat. The reasoning for this was to preserve the RSD data whenever possible without having to compute all new positions. The TVI positions **that are plotted on the smoothsheet** essentially have the same position as the corresponding RSD values when the range and bearing were at or near zero, and are interchangeable. Refer to the delivered velum overlay for an overall comparison of RSD, Charted and Target positions.

Apologies for the confusion.

Anne Dollard
TerraSond Ltd.

Revisions Compiled During Office Processing and Certification

---

[1] Concur.
[2] Insert “from”.
[3] Concur.
[4] Filed with the project reports.
[5] Concur. The data is considered adequate to supersede all prior surveys and miscellaneous charted data in the common areas except as noted in this report and the Hdrawing.
[6] Strikethrough ~~this~~, replace with “Crossline coverage.”
[7] Insert “SOW”.
[8] Concur.
[9] Filed with the project reports.
[10] Strikethrough ~~selections~~, replace with “selection”.
[11] Strikethrough ~~are~~, replace with “is”.
[12] Strikethrough ~~then~~, replace with “than”.
[13] Filed with the project reports.
[14] Insert “of”.
[15] Filed with the project reports.
[16] Concur. Data meets specifications and is acceptable for charting.
[17] Insert “with”.
[18] Concur. In PHB processing, H11098 was also compared with H11236 (OPR-0331-KR, 2003) and H11238 in the junction areas along H11098’s southeastern and eastern limits. The junctions showed very good correlation in most areas.

In the area of Kasaan Point, there was a discrepancy between the smooth sheet MHWL and ledges shown for H11098 and H11238. The H11098 shoreline was shifted seaward of the charted shoreline in the area between approximately Lat55/26/29N, Lo132/17/32W and Lat55/26/35N, Lon132/16/56W, and in this area H11098 showed more ledges, extending farther seaward, than did H11238. It is recommended that only ledgelines from H11098 be charted in this area, not MHWL. It is also recommended that the ledge from H11238 at Lat 55/26/32.4N, Lon 132/17/00W, which agrees with the charted ledge, be compiled as shown on the Hdrawing. Retain charted shoreline pending compilation of H11238.

All data sets have been considered in compiling contours and soundings to H11098.

[19] Filed with the project reports.
[20] Filed with the project reports.
[21] Concur. The survey is considered adequate to supersede all prior surveys and miscellaneous charted data except as specifically noted in this report and the Hdrawing.
[22] Strikethrough ~~is~~, replace with “are”.
[23] Data Acquisition and Processing Report, filed with the project reports.
[24] Filed with the project reports.
[25] Filed with the project reports.

[26] Office comparison was also made to Chart 17426, 14th Edition, Chart 17436, 8th Edition and Chart 17420, 27th Edition, continuous maintenance rasters.
[27] Strikethrough ~~shift performed to compare depths~~, replace with "comparison of contours and soundings performed".
[28] Concur, except as specifically noted in this report and the Hdrawing.
[29] Insert "with the survey findings".
[30] Concur.
[31] Infer "Latitude" and "Longitude" wherever they have been omitted from degrees, minutes and seconds in this report.
[32] Concur.
[33] Concur.
[34] Concur. Also note that there were numerous errors in the depiction of contours on the smooth sheet. Errors have been corrected on the Hdrawing.
[35] Concur. The evaluator concurs with the hydrographer's statements except as noted below. Chart these areas as shown on the smooth sheet. Use smooth sheet positions, not general positions given for the discussions below.
[36] Do not concur. The postion is not within the area as illustrated. A sounding of 5½ fathoms is charted at the position given, but there is no nearby smooth sheet sounding of 0.8 fathoms. The closest smooth sheet sounding to the position is 7.1 fathoms. No Danger to Navigation report was submitted for this position.
[37] Concur with clarification. This sounding was reported as a Danger to Navigation, 6 fathoms at Lat. 55 31 53.6N, Lon. 132 23 12.0W.
[38] Do not concur. This is the same position and charted sounding discussed in endnote 36. There is no nearby smooth sheet sounding of 0.8 fathoms.
[39] Concur with clarification. A shoaler sounding of 3.2 fathoms at Lat. 55 30 54.3N, Lon. 132 20 04.8W was reported as a DtoN. The 4¾ sounding has been removed from the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[40] Concur with clarification. This was reported as a DtoN, 9¼ fathoms at Lat. 55 30 53.2N, Lon. 132 19 59.9W.
[41] Concur with clarification. This was reported as a DtoN, 3¾ fathoms at Lat. 55 30 09.96N, Lon. 132 17 08.8W.
[42] Concur with clarification. The shoreline has been corrected on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[43] Concur with clarification. The 2.8 fathom sounding is east of the charted sounding. A 2.4 fathom sounding is at the position of the charted sounding.
[44] Concur with clarification. The charted sounding is 2¾ fathoms.
[45] Concur with clarification. This was reported as a DtoN, 3¼ fathoms at Lat. 55 29 42.5N, Lon. 132 16 32.7W.
[46] Concur with clarification. This was reported as a DtoN, 7¼ fathoms, Lat 55 29 33.5N, Lon. 132 15 25.1W. The contour has been adjusted on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[47] Concur with clarification. The 1.4 fathom sounding is identified as a *Rk* on the smooth sheet.
[48] Concur with clarification. This was reported as a DtoN, 8½ fathoms, Lat. 55 29 05.4N, Lon. 132 14 52.5W.

[49] Concur with clarification. The contour has been corrected on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[50] Concur with clarification. The 3.9 fm smooth sheet depth is for a rock. Chart 3 fm 5 ft *Rk* at smooth sheet location.
[51] Concur, with exception. The 2 fathom sounding has been removed from the Continuous Maintenance Raster, Chart 17426, 14th Edition. No 0.5 fathom sounding appears on the hydrographer's final smooth sheet at this position.
[52] Concur with clarification. This was reported as a DtoN, 9½ fathoms, Lat. 55 28 48.3N, Lon 132 19 40.0W. The 10-fathom contour has been corrected on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[53] Concur with clarification. The 10-fathom contour has been adjusted seaward on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[54] Concur with clarification. This was reported as a DtoN, 7½ fathoms, Lat. 55 28 47.7N, Lon 132 23 34.5W. The contour has been adjusted on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[55] Concur with clarification. This was reported as a DtoN, 1½ fathoms, Lat. 55 28 40.1N, Lon 132 23 31.0W.
[56] Concur with clarification. This was reported as a DtoN, ½ fathom, Lat 55 28 36.2N, Lon 132 23 43.4W.
[57] Concur, with exception. The position is incorrect. The approximate position of the 10 fathom sounding as displayed in the graphic is Lat. 55 30 57N and Lon. 132 24 34W.
[58] Concur, with exception. The smooth sheet sounding is 8.2 fathoms.
[59] Concur with clarification. On the 13th Edition of Chart 17426, the shoreline recession is evident. However, on the 14th Edition, Continuous Maintenance Raster, the shift is not evident. It appears that the chart shoreline and ledgeline have been adjusted on the raster and now closely match the hydrographer's findings.

Using the 14th Edition, shoreline recession by as much as 75 meters on the east side of the island is evident. This shift was not displayed on the hydrographer's graphic using the 13th chart edition, nor was it discussed by the hydrographer. In addition, ledgeline evident in the 13th edition has disappeared from the 14th edition in this vicinity.

The evaluator recommends charting the island's shoreline using data from the current survey or the most recent shoreline data available.
[60] Concur with clarification. The charted sounding has been revised to 8 fathoms on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[61] Concur with clarification. On the graphic, area 77 has been mislabeled as area 78.
[62] Concur with clarification. On the graphic, area 78 has been mislabeled as area 77. The shoreline has been adjusted on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[63] Concur with clarification. The shoreline has been adjusted on the Continuous Maintenance Raster, Chart 17426, 14th Edition.
[64] Concur with clarification. This was reported as a DtoN, 1¼ fathoms, Lat. 55 30 28.9N, Lon. 132 21 48.2W.
[65] Concur with clarification. The contour has been adjusted on the Continuous Maintenance Raster, Chart 17426, 14th Edition.

[66] Concur with clarification. The 1.5 fathom sounding is identified as a *Rk* on the smooth sheet.
[67] Concur with clarification. The 11.9 fathom sounding is correctly positioned seaward of the charted 10-fathom contour, but the survey data show that the contour lies seaward of its charted position.
[68] Thirty-five dangers to navigation were submitted after PHB review. They are detailed in two Danger to Navigation Reports attached to this report. See endnote 99 for further information.
[69] Concur. See AWOIS Item Investigation Report, attached to this report, for further information.
[70] Chart these items according to the smooth sheet except as noted.
[71] Strikethrough ~~then~~, replace with "than".
[72] Concur. Comparison of Chart 17426, 13th Edition graphics from the survey and Chart 17426, 14th Edition Continuous Maintenance Raster in PHB processing showed that 13th Edition shoreline more often aligned with survey results than did the later edition, possibly as a result of errors in the applied RSD updates. Chart the area using data from the survey except as superseded by more recent RSD data or as noted in this report.
[73] Concur. MHWL changes are shown as dashed red lines on Level 1 of the Hdrawing.
[74] Chart aids to navigation using current information from USCG.
[75] Chart aids to navigation using current information from USCG.
[76] Resurvey as national survey priorities and budget allow.
[77] The evaluator concurs with the hydrographer's findings as listed below, except as endnoted. Note that positions listed in the following table are Detached Positions of the vessel at the time of observation and are not corrected for range and bearing. The evaluator recommends charting all features according to the smooth sheet except as noted. For further information, see the hydrographer's supplemental email, attached to this report.

Three charted rocks were investigated and found in the field or data, but were omitted from the smooth sheet. (For further information, see hand-annotated shoreline verification map CSL-17B, included with Shoreline Verification Logs filed with the project reports.) Their approximate locations are:

Lat 55 29 15N, Lon 132 19 27W
Lat 55 29 17N, Lon 132 19 20W
Lat 55 29 20N, Lon 132 19 12W

Retain these rocks as charted.

Due to scale, individual rocks have been incorporated into ledgeline or reefs on the Hdrawing where warranted.
[78] Concur with clarification. The Shoreline Log verifies the rock as included in Black Rock Reef. Chart in ledge as shown on the Hdrawing.
[79] Concur, with exception. The smooth sheet gives the height of the rock as 12 feet above MLLW. The rounded height should be 13 feet.
[80] Concur with clarification. The smooth sheet shows two rocks in the vicinity. The Shoreline Verification Log states that the two detached positions (targets) are the extents of the (one) charted rock. Retain rock as charted.

[81] Concur with clarification. This position is one of two showing extents of charted rock. See previous endnote. Retain rock as charted.
[82] Concur, with exception. The smooth sheet incorrectly shows the islet's height as 5 feet above MLLW *(5)*. Chart islet 5 feet above MHW *(5)*.
[83] Concur with clarification. There are four Shoreline Verification Logs numbered 3161. Chart according to Descriptive Report and smooth sheet.
[84] See previous endnote.
[85] Concur with clarification. No depth is displayed for the rock awash at this position on the smooth sheet. Based on the depth given in the Summary of Sheet C Traditional ShorelineVerification table (1.1 feet), the rock has been symbolized on the Hdrawing as a rock awash less than 2 feet at MLLW. Chart according to the Hdrawing.
[86] Concur, with exceptions. The latitude and longitude are incorrect. The correct latitude is 55/28/39.15N and the correct longitude is 132/22/40.9W. The smooth sheet incorrectly shows the islet's height as 3 feet above MLLW *(3)*. Chart islet 3 feet above MHW *(3)* at smooth sheet position.
[87] Concur, with exception. The smooth sheet incorrectly shows the islet's height as 7 feet above MLLW *(7)*. Chart islet 7 feet above MHW *(7)*.
[88] Concur, with exception. The latitude and longitude are incorrect. The correct latitude is 55/28/44.3N and the correct longitude is 132/23/43.73W. Chart at smooth sheet position.
[89] Potential Items to Be Investigated have been shown on the smooth sheet and Hdrawing where they fall within survey limits and scope. The evaluator concurs with the hydrographer's findings except as noted. Where warranted, rocks have been incorporated into ledglines or reefs on the Hdrawing due to scale. Chart these items according to the smooth sheet except as discussed in endnotes.

Note that the DR coverage graphics (CSL 1 - CSL 18) have been generalized to symbolize only rocks. Targets may be rocks, ledges, reefs or islets, but all targets are displayed as rocks on the graphics.
[90] Do not concur. The area did not received full multibeam coverage and the rock is not disproved. Retain rock as charted.
[91] Concur with clarification. The item was investigated under OPR-0331-KR survey H11160.
[92] Concur with clarification. The item was investigated under OPR-0331-KR survey H11160.
[93] Strikethrough row. The item is repeated from the previous page.
[94] Concur with clarification. The Shoreline Verification Log identifies the target as a rock. Therefore the *Rk* notation has been added to the 0 fm, 3ft rock depicted on the Hdrawing. Chart according to the Hdrawing.
[95] The Shoreline Verification Log for target 135 was missing from submitted reports. Retain rock as charted.
[96] The position given for the target agrees with the coverage graphic but differs from the smooth sheet. The correct smooth sheet position is Lat 55 28 53.4N, Lon 132 21 59.68W. Chart ledge as depicted on the Hdrawing.

[97] Concur with clarification. The position on the smooth sheet shows a shoal sounding of –0.9 fathoms, or 5 feet above MLLW. Therefore a rock symbol has been added to the Hdrawing at the target position in PHB processing. Chart according to the Hdrawing.
[98] Concur with clarification. The position on the smooth sheet shows a shoal sounding of –0.9 fathoms, or 5 feet above MLLW. Therefore a rock symbol has been added to the Hdrawing at the target position in PHB processing. Chart according to the Hdrawing.
[99] Chart all areas according to the smooth sheet and Hdrawing except as specifically discussed in this report. Differences between the smooth sheet, Hdrawing, and submitted Dangers to Navigation are discussed below:

- DtoN Rock, ¾ fm, Lat 55/31/53.0N, Lon 132/23/20.9W is shown as a ledge on the smooth sheet. Chart area according to the smooth sheet.
- DtoN Sounding, 1 ¾ fm, Lat 55/31/58.5N, Lon 132//23/31.3W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 5 fm, Lat 55° 27' 08.2"N, Lon 132° 17' 05.7"W is shown on the smooth sheet as a *Rk*. Chart 5 fm sounding.
- DtoN Sounding, 8 ½ fm, Lat 55° 29' 05.4"N, Lon 132° 14' 52.5"W is 8.7 fm on the smooth sheet. Chart 8 fm 4 ft sounding.
- DtoN Sounding, 3 ¼ fm, Lat 55° 29' 42.5"N, Lon 132° 16' 32.7"W is 3.3 fm on the smooth sheet. Chart 3 fm 2 ft sounding.
- DtoN Sounding, 7 ½ fm, Lat 55° 30' 09.1"N, Lon 132° 17' 20.1"W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 3 ¾ fm, Lat 55° 30' 09.6"N, Lon 132° 17' 08.8"W is 3.8 fm on the smooth sheet. Chart 3 fm 5 ft sounding.
- DtoN Sounding, 8 fm, Lat 55° 28' 18.0"N, Lon 132° 18' 01.7"W is shown on the smooth sheet as a *Rk*. Chart 8 fm sounding.
- DtoN Sounding, 7 ¼ fm, Lat 55° 28' 13.3"N, Lon 132° 18' 37.2"W is a 7.2 fm *Rk* on the smooth sheet. Chart 7 fm 1 ft sounding.
- DtoN Sounding, 5 ½ fm, Lat 55° 28' 17.0"N, Lon 132° 18' 48.3"W is a 5.6 fm *Rk* on the smooth sheet. Chart as 5 fm 3 ft sounding.
- DtoN Sounding, 1¾ fm, Lat 55° 28' 37.8"N, Lon 132° 19' 49.5"W is a 1.9 fm *Rk* on the smooth sheet. Chart as 1 fm 5 ft *Rk*.
- DtoN Sounding, 9 ½ fm, Lat 55° 28' 48.3"N, Lon 132° 19' 40.0"W is 9.7 fm on the smooth sheet. Chart 9 fm 4 ft sounding.
- DtoN Sounding, 7 ¾ fm, Lat 55° 29' 50.0"N, Lon 132° 19' 34.9"W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 3 ¼ fm, Lat 55° 29' 20.7"N, Lon 132° 20' 45.1"W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 1 ¼ fm, Lat 55° 28' 49.3"N, Lon 132° 21' 44.9"W is 1.3 fm on the smooth sheet. Chart 1 fm 2 ft sounding.
- DtoN Sounding, 9 ¼ fm, Lat 55° 29' 00.2"N, Lon 132° 22' 15.3"W is 9.3 fm on the smooth sheet. Chart 9 fm 2 ft sounding.

- DtoN Sounding, 9 ½ fm, Lat 55° 29' 18.8"N, Lon 132° 22' 28.6"W is a 9.8 fm *Rk* on the smooth sheet. Chart 9 fm 5 ft sounding.
- DtoN Sounding, 1 ½ fm, Lat 55° 28' 40.1"N, Lon 132° 23' 31.0"W is a 1.6 fm *Rk* on the smooth sheet. Chart 1 fm 3 ft *Rk*.
- DtoN Sounding, ½ fm, Lat 55° 28' 36.2"N, Lon 132° 23' 43.4"W is 0.7 fm on the smooth sheet. Chart 0 fm 4 ft sounding.
- DtoN Sounding, 7 ½ fm, Lat 55° 28' 47.7"N, Lon 132° 23' 34.5"W is 7.7 fm on the smooth sheet. Chart 7 fm 4 ft sounding.
- DtoN Sounding, 9 ¼ fm, Lat 55° 30' 53.2"N, Lon 132° 19' 59.9"W is 9.2 fm on the smooth sheet. Chart 9 fm 1 ft sounding.
- DtoN Sounding, 3 ¼ fm, Lat 55° 30' 54.3"N, Lon 132° 20' 04.8"W is a 3.2 fm *Rk* on the smooth sheet. Chart 3 fm 1 ft *Rk*.
- DtoN Sounding, 1 ¼ fm, Lat 55° 30' 28.9"N, Lon 132° 21' 48.2"W is 1.4 fm on the smooth sheet. Chart 1 fm 2 ft sounding.
- DtoN Sounding, 3 ¾ fm, Lat 55° 31' 26.6"N, Lon 132° 21' 31.1"W is 3.9 fm on the smooth sheet. Chart 3 fm 5 ft sounding.
- DtoN Sounding, 8 fm, Lat 55° 31' 36.5"N, Lon 132° 22' 06.2"W is not charted. It is an 8 fm *Rk* on the smooth sheet. Chart 8 fm *Rk*.
- DtoN Sounding, 6 fm, Lat 55° 31' 53.6"N, Lon 132° 23' 12.0"W is shown as a *Rk* on the smooth sheet. Chart 6 fm sounding.
- DtoN Sounding, 7 ¼ fm, Lat 55° 31' 51.9"N, Lon 132° 23' 18.8"W is not charted. Chart vicinity as shown on the smooth sheet and Hdrawing.
- DtoN Sounding, ¾ fm, Lat 55° 30' 05.6"N, Lon 132° 22' 52.0"W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 10 ¼ fm, Lat 55° 29' 15.3"N, Lon 132° 23' 33.9"W is 10.2 fm on the smooth sheet. Chart 10 fm 1 ft sounding.
- DtoN Sounding, 9 ½ fm, Lat 55° 29' 57.1"N, Lon 132° 16' 47.5"W is not depicted on the Hdrawing. A nearby shoaler sounding is shown. Chart area according to the Hdrawing.
- DtoN Sounding, 7 ½ fm, Lat 55° 29' 34.1"N, Lon 132° 15' 30.8"W is a *Rk* on the smooth sheet. It is not depicted on the Hdrawing. It was eliminated because of the shoaler nearby DtoN at Lat 55° 29' 33.5"N, Lon 132° 15' 25.1"W, discussed below. Chart area according to the Hdrawing.
- DtoN Sounding, 7 ¼ fm, Lat 55° 29' 33.5"N, Lon 132° 15' 25.1"W is a 7.3 fm *Rk* on the smooth sheet. Chart 7 fm 2 ft sounding.
- DtoN Sounding, 4 ¼ fm, Lat 55° 29' 44.7"N, Lon 132° 16' 38.3"W is 4.2 fm on the smooth sheet. Chart 4 fm 1 ft sounding.
- DtoN Sounding, 1 ½ fm, Lat 55° 29' 49.4"N, Lon 132° 16' 53.9"W is 1.6 fm on the smooth sheet. Chart 1 fm 3 ft sounding.

[100] Attached Danger to Navigation Reports are those submitted after PHB review.

[101] Concur. Correct charted geographic names as applicable.

APPROVAL SHEET
H11098

Initial Approvals:

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

Bruce A. Olmstead Date: 3/16/2006

Bruce A. Olmstead
Cartographic Team
Pacific Hydrographic Branch

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

CDR/NOAA Date: 17 MARCH 2006

Donald W. Haines
CDR, NOAA
Chief, Pacific Hydrographic Branch

Digitally signed by Jeremy McHugh
Reason: AWOIS / SURF check complete
Date: 2006.03.27 10:30:41 -05'00'

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H11098

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
17426	12/17/05	B. Taylor	(Full) Part Before After Marine Center Approval Signed Via
			Drawing No. application of soundings and
			features from smooth sheet
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED