

H-10987

NOAA FORM 78-35A

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

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. _____

Registry No. H-10987

LOCALITY

State ALASKA

General Locality TONGASS NARROWS

Sublocality Ketchikan to 1/2 NM SE of Lewis Point

2000

CHIEF OF PARTY

Gerald Douthit

LIBRARY & ARCHIVES

DATE _____

HYDROGRAPHIC TITLE SHEET**H-10987**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.

BState AlaskaGeneral Locality Tongass NarrowsSublocality Ketchikan to 1/2 NM SE of Lewis PointScale 1:5,000Date of Survey Aug. 10 - Nov. 29, 2000Instructions Date April 15, 2000Project No. OPR-O302-KR-00Vessel Zeus, Jolly Pickle and DucerChief of Party Gerald DouthitSurveyed by T. Howland, C. Kemp, B. Hocker, D. Batton, A. Dollard, F. White
D. Moistner, C. Cooper, B. TaylorSoundings taken by echo sounder, hand lead, pole Reson 8101, 8124

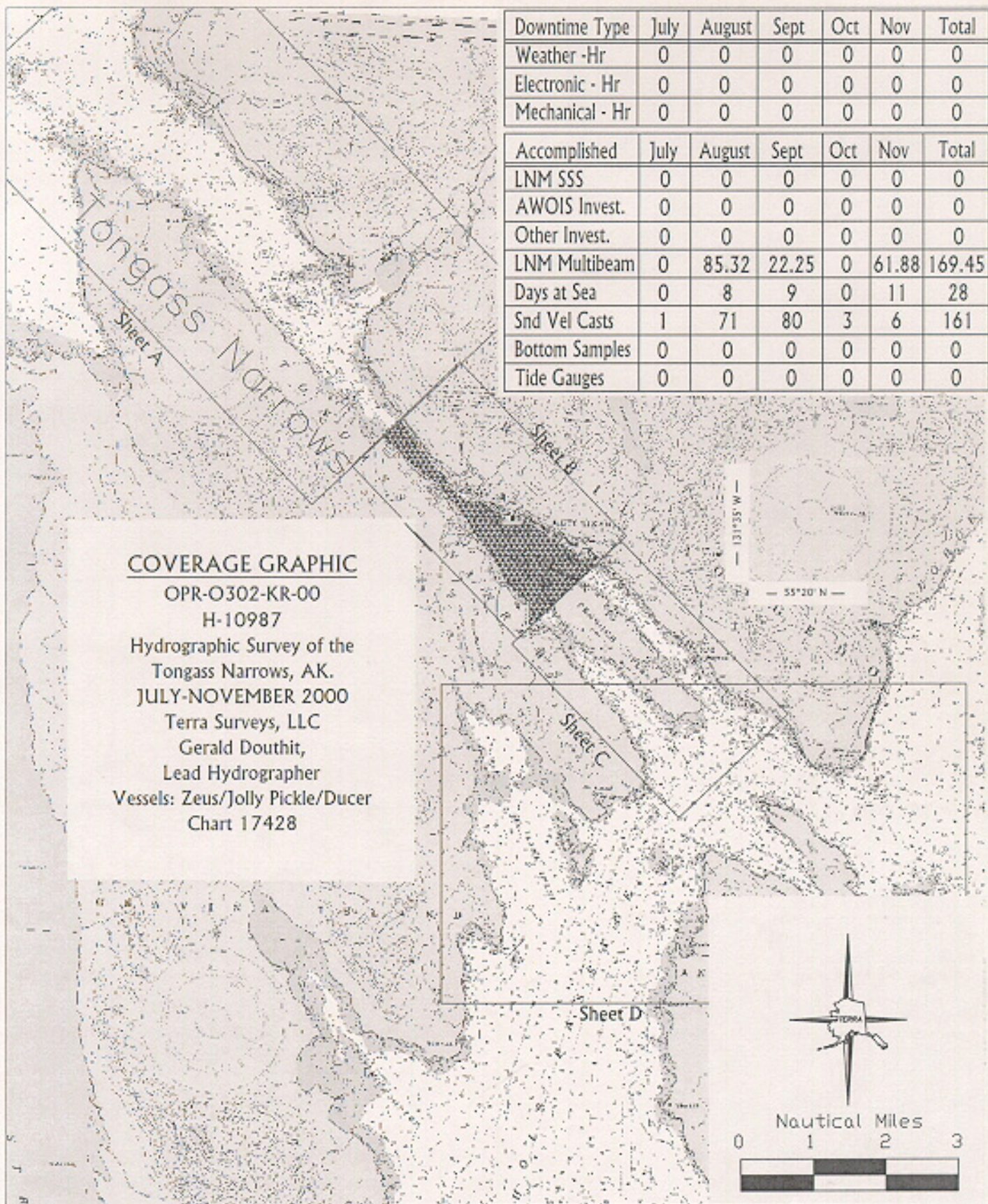
Graphic record scaled by _____

Graphic record checked by _____

Evaluation by R. DaviesAutomated plot by HP Designjet 750CVerification by R. DaviesSoundings in Fathoms and tenths

at

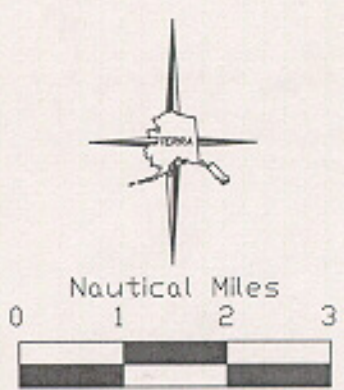
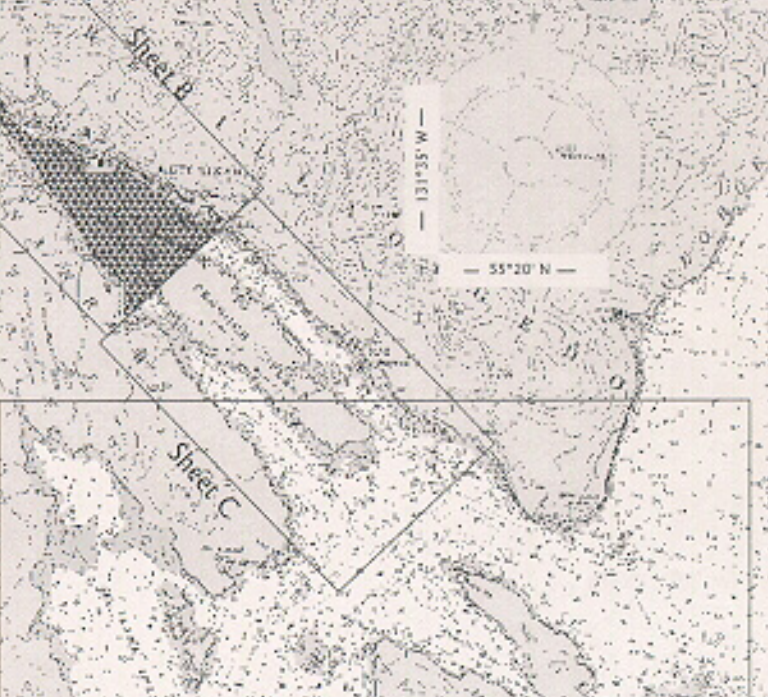
MLLWREMARKS: Time in UTC.**Revisions and annotations appearing as endnotes were****generated during office processing.****All separates are filed with the hydrographic data.****As a result, page numbering may be interrupted or non-sequential**



Downtime Type	July	August	Sept	Oct	Nov	Total
Weather - Hr	0	0	0	0	0	0
Electronic - Hr	0	0	0	0	0	0
Mechanical - Hr	0	0	0	0	0	0

Accomplished	July	August	Sept	Oct	Nov	Total
LNM SSS	0	0	0	0	0	0
AWOIS Invest.	0	0	0	0	0	0
Other Invest.	0	0	0	0	0	0
LNM Multibeam	0	85.32	22.25	0	61.88	169.45
Days at Sea	0	8	9	0	11	28
Snd Vel Casts	1	71	80	3	6	161
Bottom Samples	0	0	0	0	0	0
Tide Gauges	0	0	0	0	0	0

COVERAGE GRAPHIC
 OPR-O302-KR-00
 H-10987
 Hydrographic Survey of the
 Tongass Narrows, AK.
 JULY-NOVEMBER 2000
 Terra Surveys, LLC
 Gerald Douthit,
 Lead Hydrographer
 Vessels: Zeus/Jolly Pickle/Ducer
 Chart 17428



Descriptive Report to Accompany Hydrographic Survey H-10987

Sheet B

Scale 1:5,000

August-September 2000

Terra Surveys, LLC

Chief of Party: Gerald Douthit

A. AREA SURVEYED

This navigable area and shoreline verification survey was conducted in accordance with Hydrographic Project Instructions OPR-0302-KR, Ketchikan to ½ NM SE of Lewis Pt., Tongass Narrows, Alaska dated April 15, 2000.¹

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. Obstructions, wrecks and shoaling have been reported. The project area is approximately 1.5 square nautical miles with the southerly limits located at downtown Ketchikan in southeastern Alaska. The survey area covers the central portion of Tongass Narrows, bound by Revillagigedo Island on the northerly shore and Gravina Island on the southerly shore, and by the northern shore of Pennock Island. Tongass Narrows is transited by over 450 cruise ships annually, the Alaska State Marine Highway ferry system, commercial and sport fishing boats, log barges, recreational boaters (motor, sail and kayaks) and heavy float plane traffic. Ketchikan is a maritime community that depends on the accuracy of NOAA charts.

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.² Concurrently, a limited shoreline and near shoreline feature verification survey was conducted. The shoreline survey verified the general location of the MHW shoreline, the MLLW line and all features seaward of the MLLW.³ Every effort was made to ensure that the survey products could be traced to and reconstructed from the raw data.⁴

Section B Data Acquisition and Processing

B.1 Equipment

Zeus

Approximately ninety-nine percent of the soundings for this survey were acquired from the motor vessel *Zeus*, with the remaining data collected from the jet boat *Jolly Pickle*. The *Zeus* is an aluminum retrofitted Vulcan crab vessel with an overall length of forty-four feet, a beam of thirteen and a half feet and a draft of five feet. Major systems used on the *Zeus* are listed on the following table.

VESSEL <i>ZEUS</i>	
LOA: 44 FT, BEAM 13.5 FT, DRAFT: 5 FT	
Equipment	Manufacturer & Model
Multibeam sonar	Reson SeaBat 8101
Positioning	Trimble 7400
Sound velocity	Applied Microsystems 3317 3279 4425
Vessel attitude	Seatex Seapath 200 SG Brown Meridian Gyro

The Seatex Seapath 200 was used for roll, heave, and pitch data, with increased confidence provided by a SG Brown Meridian Gyro. A system status report was generated for the Seapath 200 on August 14, 2000, Julian Day 227, and is included below. Equipment performance details are provided in the Project-Wide Report, Sections A, Equipment and B, Quality Control.⁵

Jolly Pickle

The *Jolly Pickle* is a twenty-four foot Almar aluminum jet boat with an 8-foot beam and a draft of 1ft. Major systems used on the *Jolly Pickle* are listed on the following table.

VESSEL JOLLY PICKLE	
LOA: 24 FT, BEAM 8 FT, DRAFT: 1 FT	
Equipment	Manufacturer & Model
Multibeam sonar	Reson SeaBat 8124
Positioning	Seatex Seapath 200 Trimble AG120 DGPS
Sound velocity	Applied Microsystems 3317 3279 77-3 4279
Vessel attitude	Seatex Seapath 200

The motor vessel *Ducer*, a nineteen-foot aluminum Grayling Scamp, was employed for all shoreline verification in the survey area. The *Ducer* has a beam of seven feet and a draft of one foot. Major systems used on the *Ducer* are listed in the following table.

VESSEL <i>DUCER</i>	
LOA: 19 FT, BEAM 7 FT, DRAFT: 1 FT	
Equipment	Manufacturer & Model
Singlebeam sonar	Odom 3100
Positioning	Trimble AG120
Sound velocity	N/A
Vessel attitude	N/A

As noted in the Project-Wide Report, singlebeam sonar on the *Ducer* was coordinated with predicted tides for monitoring water depths in nearshore areas in the course of limited shoreline verification. Singlebeam sonar data was not utilized for project depth soundings.

Other Equipment

In addition to the Trimble AG120 and Seapath units used for item investigations on the *Jolly Pickle*, certain detached positions were taken using a Garmin Summit Etrex hand-held GPS unit, with local base correctors applied in real time. Positions taken with the Garmin unit were for the following fixed items: No. 6, Cable crossing sign; No. 7, Cable crossing sign and cable; No. 16, Navigation aid, fixed green light; No. 17, Navigation aid, fixed red light; No. 22, Cable crossing sign. ⁶

B2. Quality Control

The internal consistency and integrity of the survey data was found to be good. ⁷ Survey H-10987 (Sheet B) had 111.35 Nautical Miles of main scheme lines and 4.31 NM of crosslines which is 3.9% of the mainscheme lines. This falls short of the 5% specified in the statement of work. Additional unplanned lines were needed to fill in and detail certain areas such as those around the numerous structures located along the Revillagigedo Island shoreline, this caused the percentage of crosslines to fall below the planned 5%. ⁸

The soundings collected in the survey met or exceeded the accuracy of the specifications.⁹

Analysis of the crosslines was done by comparing each line in totality to a DTM of soundings made from the mainscheme lines. Crossline reports were generated from a dtm of the entire area of sheet B, all showed general trends as well as inconsistencies. (See Separate V Crossline Comparisons)¹⁰

Two different methods of comparison were used. An analysis of individual beams was considered as well as by soundings grouped by angle from nadir. Both categories were also grouped by depth in 10 meter classes. Crossline reports were generated with the Caris program Makehist.exe using a classfile which specified the acceptable NOAA specifications for this project. This is the classfile used for these reports:

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 -50 on a slope was computed. The computed allowable errors met NOAA specifications for this project.

Min. Depth	Max. Depth	Allowable Error
0.0m	-10.00m	0.52m
-10.00m	-20.00m	0.54m
-20.00m	-30.00m	0.60m
-30.00m	-40.00m	0.68m
-40.00m	-50.00m	0.77m
-50.00m	-1000.00m	1.4%

The analysis of the soundings grouped by angle from nadir was undertaken primarily to determine a useable filtering setting for line editing. Using the reports as a guideline, it was decided to filter out all beams which were collected outside of 60 degrees from nadir. Individual beam numbers were not necessarily eliminated. On the Reson 8101, this would effectively eliminate beams 1-9 and 92-101 if the vessel was level. The natural roll of the vessel during collection accounts for the small number of accepted soundings seen in the Smooth sheet histogram outside of 10-91. The beam analysis reports show that 3 out of 10 beams near the nadir were unacceptable.

The results also show a decreasing acceptable swath width with increasing depth. This was confirmed by observation of the soundings in subset mode. The probable cause of this phenomenon is compounding error caused by rays bending over increasing distances while depending on less than perfect SVP data. During subset editing it could be seen that especially on downward slopes, dispersion in soundings would increase with depth. A depth dependant angle from nadir filter would have been ideal in this case unfortunately one is not available at this time. In practice the subset editor would begin by filtering out beams greater than 60 degrees. There were cases where port and starboard swaths were filtered differently when one side was considerably deeper. A line

which was in relatively deep water (over 50m) would be filtered at 50 degrees before editing.

B3. Corrections To Echo Soundings

Hydrographic Survey H-10987 was performed with three other surveys in Project OPR-302-KR. Any changes to the corrections to echo soundings affects all four surveys in the area and is described in the project wide Data Acquisition and Processing Report.

Vertical and Horizontal Control

Soundings for this survey were tide adjusted using data from Tide Station Ketchikan 945-0460. Preliminary water level data was downloaded daily from the NOAA web site (<http://www.co-ops.nos.noaa.gov>) and applied as the data was processed in CARIS. Verified tide data from the Ketchikan gage was then downloaded off the Internet site and applied to the final smooth sheet soundings. Both preliminary and final tide adjustments used tidal zoning provided by NOAA.¹¹

The horizontal control datum for this survey is North American Datum of 1983(NAD 83). The projection used during collection was UTM, Zone 9. Control station *Penthouse* was established and used to send correctors to the survey vessels. A 24-hour observation on USGS Monument *WRONG* was used as a fixed point DGPS performance check on *Penthouse*. The observation survey showed the position on “Penthouse” to meet the required accuracy standards. The control survey to establish *Penthouse* and the 24-hour observation survey is detailed in the Project Wide Vertical and Horizontal Control report. In addition to station *Penthouse*, the United States Coast Guard (USCG) DGPS Beacon at Annette Island was used during hydrographic operations for the Shoreline Verification Survey and for daily confidence cross checks. A summary of the daily DGPS confidence checks can be found in the Project Wide Vertical and Horizontal Control report.¹²

D1. Chart Comparison¹³

The last Notice to Mariners to cover the time surveyed was the December monthly edition, Notice number 49. There were no items that prompted chart comparison.

There was no Danger to Navigation reports submitted for this survey.¹⁴

This survey was compared in Autocad Map to the following charts:

Chart	Scale	Edition	Date
17428 ¹⁵	1:40,000	7 th	February 25, 1995

General agreement between the chart and this survey was good.¹⁶ There are no noticeable shoaling or deepening trends. There were a number of rocks surveyed that are not shown on the chart.¹⁷ This is probably the result of the high sounding density of this survey.¹⁸

Chart Depth	H-10987 Fathoms	Latitude				Longitude				Comment On Agreement With Chart
25	23	55°	21'	04.12"	N	131°	41'	35.41"	W	Near 25 fathoms
15	18.2	55°	21'	50.40"	N	131°	42'	47.48"	W	Near 15 fathoms
N/A	13.6	55°	21'	23.17"	N	131°	42'	15.10"	W	Rock not noted on chart ¹⁹
N/A	6.9	55°	20'	45.35"	N	131°	39'	49.54"	W	Rock not noted on chart ²⁰
N/A	5	55°	20'	46.64"	N	131°	41'	28.52"	W	Rock not noted on chart ²¹
N/A	4.7	55°	21'	55.31"	N	131°	43'	26.61"	W	Rock not noted on chart ²²
N/A	3.4	55°	21'	52.13"	N	131°	43'	22.68"	W	Rock not noted on chart ²³
N/A	3.1	55°	20'	50.78"	N	131°	40'	43.64"	W	Rock not noted on chart ²⁴
N/A	2.1	55°	20'	16.89"	N	131°	38'	25.92"	W	Rock not noted on chart ²⁵

Chart Depth	H-10987 Fathoms	Latitude				Longitude				Comment On Agreement With Chart
25	19.5	55°	21'	03.53"	N	131°	41'	33.16"	W	Near 25 fathoms
19	12.9	55°	20'	14.83"	N	131°	40'	15.98"	W	Near 19 fathoms
20	16.9	55°	20'	27.24"	N	131°	39'	49.61"	W	Near 20 fathoms
3	1.5	55°	20'	16.95"	N	131°	38'	30.95"	W	Near 3 fathoms
22	19.1	55°	19'	57.08"	N	131°	39'	57.17"	W	Near 22 fathoms
22	18.6	55°	19'	38.43"	N	131°	39'	26.71"	W	Near 22 fathoms

AWOIS Items

This contract did not require AWOIS investigations. A list of AWOIS items in the area was provided for “informational purposes only”. A review of the items compared to the chart and a digital terrain model produced from the survey is summarized below.²⁶

Record	Vessel terms	Comments
50305	Unknown	This wreck is clearly visible in the digital terrain model. The location agrees and the entire hull can be viewed ²⁷ .
52514	Obstruction	No evidence of a deadhead in the digital terrain model. ²⁸
52515	Barge	The shoreline crew visually verified a wreck in the vicinity of this position. ²⁹
52516	Obstruction	A dilapidated structure was visually verified during the shoreline survey in the area of this position. ³⁰
52517	Obstruction	Unable to collect multibeam over this shoal area. Nothing noted by shoreline crews. ³¹
52518	Barge	The shoreline crew visually verified a wreck in the vicinity of this position. ³²

D.2 Additional Results

Shoreline Investigation Results³³

Limited shoreline verification was conducted from the *Ducer* along all shores in the survey area to confirm nearshore features. Three categories of results derived from limited shoreline verification of the survey area: verification of nearshore structures, verification of shorelines and natural features, and discovery of new, uncharted features. Each is discussed below.

Nearshore Structures

Table D.2.2 ³⁴ summarizes the nearshore or alongshore structures verified. Each structure was mapped (by area), annotated, and linked to all associated information in the Shoreline Verification MapInfo database under the following Workspace files:

Ketch_BNE1.wor

Ketch_BNE2.wor

Ketch_BNE3.wor

Ketch_BNE4.wor

Ketch_BPI1.wor

Ketch_BSW1.wor

Ketch_BSW2.wor

Shorelines and Natural Features

Shoreline types agreed with chart depictions and were annotated in the Shoreline Verification Aids titled BSL-1 through BSL-9.³⁵

New Features

A number of new or altered features were found to result from ongoing development of area shorelines for private and commercial use. These items were investigated and detached positions were taken. Associated coordinates, heights, depths, observation times, and digital photographs are mapped and detailed within the Shoreline Verification MapInfo database in Workspace file Ketch_ITBI.wor.³⁶ A summary of new features investigated is given in Table D.2.3.³⁷

Disprovals

All charted items within the survey limits were found. No disprovals were discovered.³⁸

Aids to Navigation

Aids to navigation in the survey area, shown in Table D.2.1, served their intended purpose and their characteristics matched those given in the Chart and Light List. New, previously uncharted aids found in the survey were a fixed green light at latitude 55° 20' 17.68" north and longitude 131° 38' 36.06" west, and a fixed red light at latitude 55° 20' 28.81" north and longitude 131° 38' 51.79" west. These two navigation aids, located on the Ketchikan cruise ship pier, were designated Items to Be Investigated. Further information is given in Table D.2.3, New Features.³⁹ Complete information about these items is provided in the MapInfo database under Workspace file Ketch_ITBI.wor.⁴⁰

Table D.2.1

H-10987

Aids to Navigation ⁴¹

NAME	INFORMATION	CHARACTERISTIC	USCG NO.	DESCRIPTION	LATITUDE N	LONGITUDE W
Thomas Basin Entrance Lt 2	Fl red	Fl R 2.5s	22165	Marine Light On Tower	55° 20' 18.1139"	131° 38' 33.7855"
Fxd Grn Lt S. End Deep Draft Dock	Lighted Fl Grn			Marine Light On Tower	55° 20' 17.68"	131° 38' 36.06"
Fxd Red Lt N. End Deep Draft Dock	Lighted Fl Red			Marine Light On Tower	55° 20' 28.81"	131° 38' 51.79"
E. Channel Lighted Buoy 4A	Lighted Fl Red	Fl R 4s	22175	Buoy, Red	55° 20' 22.0421"	131° 39' 0.46985"
Pennock Is. Reef Ltd Buoy PR	Lighted Fl Grn	Fl (2+1) G 6s	22190	Buoy, Grn/Red	55° 20' 17.8418"	131° 40' 5.0015"
Wreck Lighted Buoy WR6	Lighted Fl Red	Q R	22195	Buoy, Red	55° 20' 41.6149"	131° 40' 19.7549"
Bar Harbor S. Entrance Lt 2S	Fl red	Fl R 4s	22200	Marine Light On Tower	55° 20' 51.8148"	131° 40' 42.2119"
Bar Harbor Ent Daybeacon 3S	Lighted Fl Grn		22205	Daybeacon	55° 20' 53.7543"	131° 40' 43.7608"
Bar Harbor Entrance Lt 2	Fl red	Fl R 2.5s	22210	Marine Light On Tower	55° 20' 56.621"	131° 41' 6.500"
Bar Harbor Ent Daybeacon 3			22215	Daybeacon	55° 21' 0.2317"	131° 41' 6.890"
Bar Harbor N. Entrance Lt 2N	Fl red	Fl R 6s	22220	Marine Light On Tower	55° 21' 5.07345"	131° 41' 21.4369"
East Clump Light 7	Fl Grn	Fl G 6s	22225	Marine Light On Tower	55° 20' 41.8237"	131° 41' 19.7814"
Tongass Narrows Buoy 9	Can		22230	Buoy, Green	55° 21' 50.63765"	131° 43' 13.1618"
Marine Hwy	Flashing	Fl R 4s	22235	Marine Light On	55° 21'	131° 42'

Wharf Light N.	Red, Private			Tower	21.6537''	2.2627''
Marine Hwy Wharf Light S.	Flashing Red, Private	Fl R 4s	22235	Marine Light On Tower	55° 21' 15.2076''	131° 41' 48.9166''

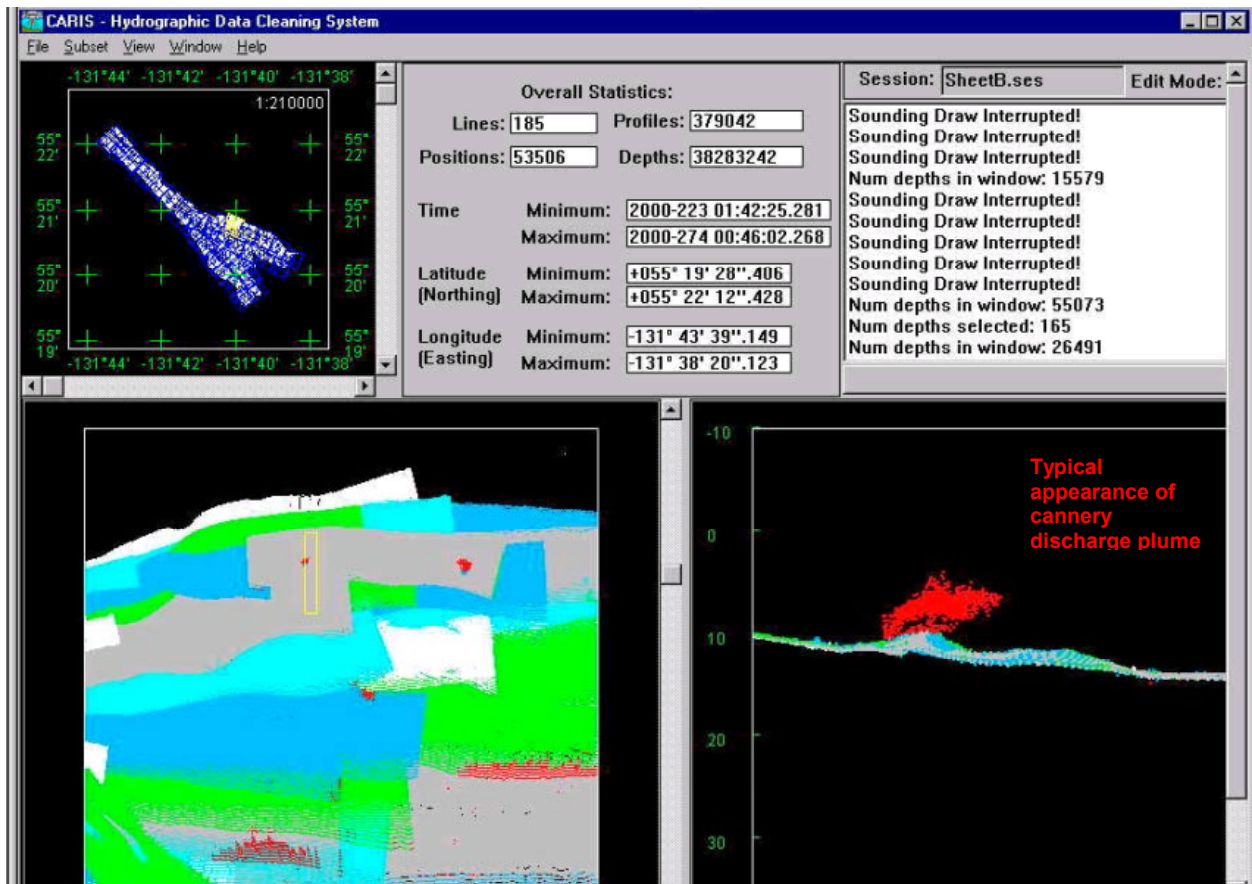
Shaded rows are floating navigation aids

Bridges, Cables and Pipelines

No bridges, overhead cables or overhead pipelines were charted or discovered within the survey limits. A submarine cable crossing area within the survey limits was designated as an Item to Be Investigated.⁴² The surveyed signage and cable positions are given in New Features, Table D.2.3 under BSL-2 items. Complete information about these items is provided in the MapInfo database under Workspace file Ketch_ITBI.wor.⁴³

Discussion

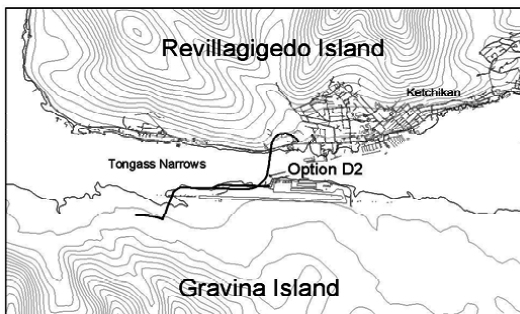
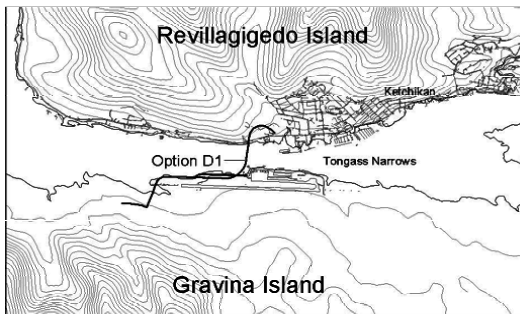
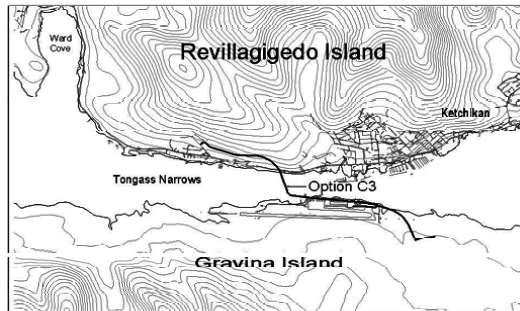
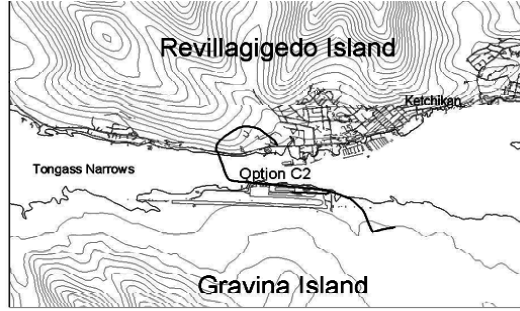
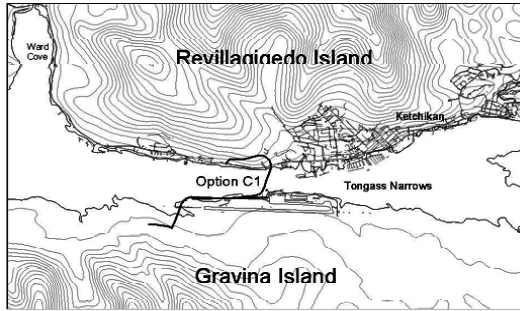
A number of uncharted items were discovered during the Shoreline Verification of the area, including new floating docks and other structures of practical value to mariners. New features are discussed above and in detail in the table later in this section.⁴⁴ No new information of significant scientific value resulted from the survey. Anomalous tidal conditions were not encountered. Environmental conditions bearing directly on the hydrographic data included the presence of bull kelp throughout many areas shoreward of the four-meter curve, as well as some areas seaward of the four-meter curve. Kelp beneath the sonar head may have caused occasional interference in bottom acquisition; however, in general such interference is readily detectable in processing. In some areas, discharge from cannery outflows created plumes of material in the water column. Investigation of plumes with multibeam and side scan led project hydrographers to conclude that the material load in these areas was transitory, rather than an indicator of true seafloor bottom. However, “mounds” at the same locations are assumed to be accumulated cannery discharge that may remain on the seafloor for an indefinite time.⁴⁵



Caris screenshot showing typical plume of material from cannery discharge

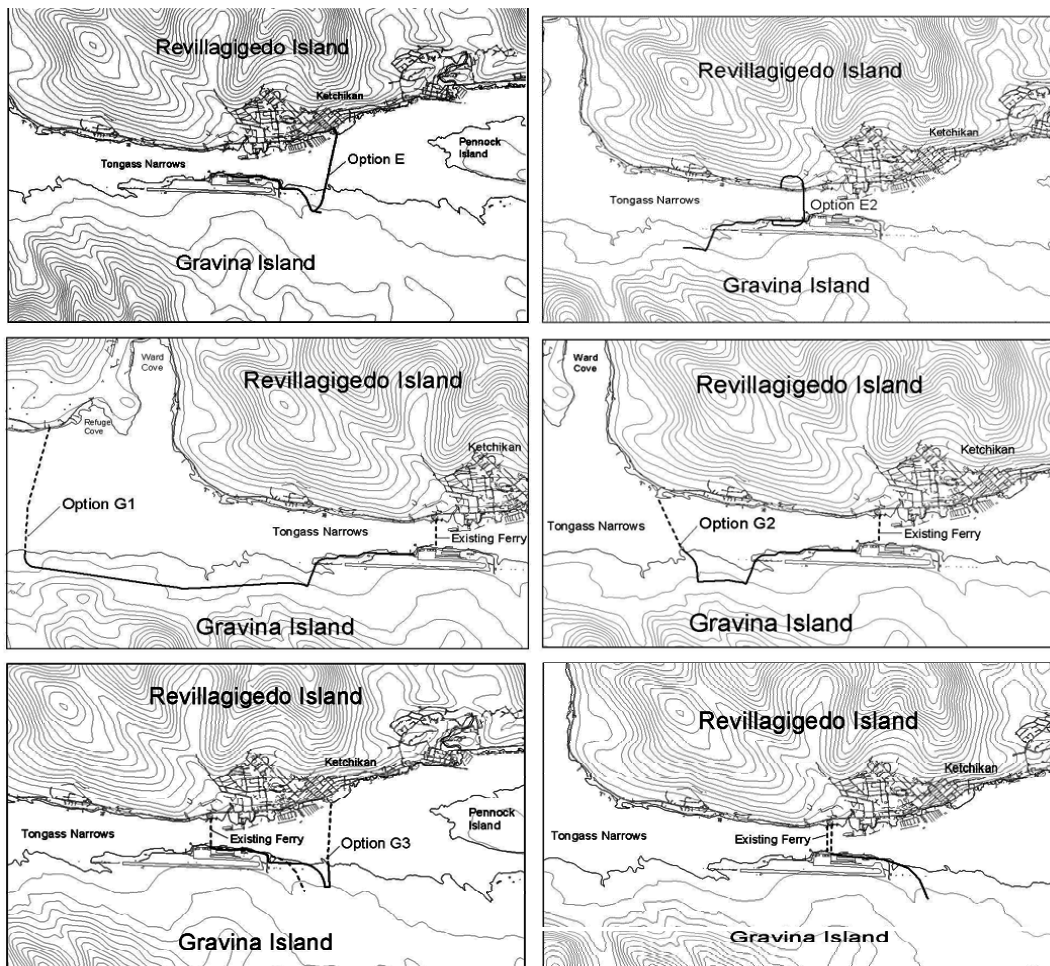
Planned Construction and Need for New Surveys

The survey area comprised the central section of Tongass Narrows, a busy waterway used by AMHS ferries, cruise ships, fishing vessels, float planes, timber interests, and private watercraft. In addition, the shorelines of Revillagigedo, Gravina, and other adjacent islands are frequently impacted by private, commercial, and public development. A significant activity which may indicate the need for new survey of the area in the near future is the proposed Gravina Access Project.⁴⁶ The Gravina Access Project (State of Alaska Department of Transportation and Public Facilities Project #67698, Federal Project #ACHP-0922(5)) includes twelve options for bridges, tunnels, or new ferry terminals which, if constructed, would directly impact the survey area.



Proposed Bridge, Tunnel and Ferry Routes Potentially Affecting Surveyed Area

Option C1: Proposed Bridge; Option C2: Proposed Bridge; Option C3: Proposed Bridge; Option C4: Proposed Bridge; Option D1: Proposed Bridge; Option D2: Proposed Bridge








Proposed Bridge, Tunnel, and Ferry Routes Potentially Affecting Surveyed Area


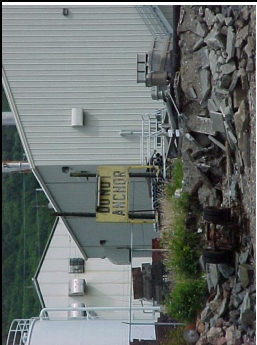

Option E1: Proposed Tunnel; Option E2: Proposed Tunnel; Option G1: Proposed Ferry Route; Option G2: Proposed Ferry Route; Option G3: Proposed Ferry Route; Option G4: Proposed Ferry Route The Gravina Access Project is scheduled for implementation over the next five years.

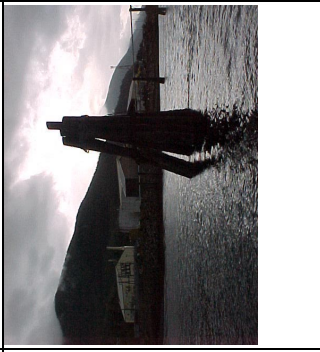

Harbor Discussion




The vessels collecting multibeam data did not enter Thomas Basin Harbor, Bar Point Harbor, or the City Dock Floats. The main shoreline verification boat, the *Ducer*, ran a single beam trace line around the slips. The data was processed and compared to the chart. The trace did not show any obvious concerns and the comparison was good. The single beam soundings were used for reconnaissance only and were not used for generating the smooth sheet. ⁴⁷




No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B1	BSL-1	Floating Dock w/3 steel pilings (north extent) ⁴⁸	55° 22' 03.6" N	131° 43' 00.7" W	B1&2.jpg	
B2	BSL-1	Floating Dock w/3 steel pilings (south extent) ⁴⁹	55° 22' 02.4" N	131° 42' 58.8" W	B1&2.jpg	(see above)
B3	BSL-1	Seaward extent of 5 piles & log boom ⁵⁰ Depth MLLW: - 10,667m Height MLLW: 7.333m	55° 22' 11.340" N 55° 22' 10.829" N 55° 22' 10.949" N	131° 43' 12.325" W 131° 43' 11.962" W 131° 43' 10.934" W	B3.jpg	




No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B4	BSL-1	Seaward extent of log boom extending from shore ⁵¹	55° 22' 01.9" N	131° 43' 01.5" W	B4&5.jpg	
B5	BSL-1	Shoreward extent of log boom extending from shore ⁵²	55° 22' 02.4" N	131° 42' 59.5" W	B4&5.jpg	
B6	BSL-2	Cable crossing sign ⁵³	55° 21' 24.61" N	131° 41' 55.83" W	ITBI_1A_220.jpg	




No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B7	BSL-2	Cable crossing sign and cable ⁵⁴	55° 21' 24.56" N	131° 41' 54.33" W	ITBI_2A_220.jpg	
B7	BSL-2	Cable crossing sign ⁵⁵	55° 21' 24.56" N	131° 41' 54.33" W	ITBI_2B_220.jpg	
B7	BSL-2	Half submerged cable ⁵⁶	55° 21' 24.56" N	131° 41' 54.33" W	ITBI_2C_220.jpg	


No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B8	BSL-2	Dolphin near Carlanna Creek ⁵⁷ Depth MLLW: -9.383m Height MLLW: 5.617m	55° 21' 25.0" N	131° 42' 00.8" W	B8.jpg	
B9	BSL-9	Sunken boat wreck ⁵⁸ Depth MLLW: +0.722m Height MLLW: 5.022m	55° 21' 01.961" N	131° 41' 53.889" W	ITBI_6A_220.jpg	

No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B10	BSL-7	floating dilapidated wood barge and dock ⁵⁹	55° 19' 32.020" N 55° 19' 31.517" N 55° 19' 31.970" N	131° 39' 52.772" W 131° 39' 52.610" W 131° 39' 53.130" W	B10.jpg	
B11	BSL-2	New Dock w/4 metal pilings ⁶⁰	55° 21' 28.890" N 55° 21' 28.809" N 55° 21' 29.248" N	131° 42' 34.990" W 131° 42' 35.089" W 131° 42' 36.241" W	B11.jpg	
B12	BSL-6	3 piles and a dock ⁶¹ Depth MLLW: - 4.866m Height MLLW: 8.134m	55° 20' 08.171" N 55° 20' 07.925" N 55° 20' 08.151" N 55° 20' 07.803" N	131° 39' 31.236" W 131° 39' 30.334" W 131° 39' 30.121" W 131° 39' 29.882" W	B12.jpg	

No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B13	BSL-6	mooring/float ⁶²	55° 20' 08.697" N 55° 20' 08.233" N 55° 20' 08.487" N 55° 20' 08.014" N 55° 20' 06.301" N	131° 39' 41.642" W 131° 39' 41.059" W 131° 39' 40.166" W 131° 39' 39.895" W 131° 39' 38.976" W	B13.jpg	
B14	BSL-6	log boom ⁶³	55° 20' 11.659" N 55° 20' 09.696" N	131° 39' 15.490" W 131° 39' 12.186" W	B14.jpg	
B15	BSL-6	Pile ⁶⁴ Depth MLLW: - 6.743m Height MLLW: 10.757m	55° 20' 08.982" N	131° 39' 04.525" W	B15.jpg	

No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B16	BSL-5	Navigation Aid, fixed green light	55° 20' 17.68" N	131° 38' 36.06" W	navaid_fixedgreenlight_BSL-5_224_b.jpg	
B17	BSL-5	Navigation Aid, fixed red light	55° 20' 28.81" N	131° 38' 51.79" W	navaid_fixedredlight_BSL-5_224_d.jpg	
B18	BSL-5	Dolphin, Deep draft pier ⁶⁵ Depth MLLW: - 18.555m Height MLLW: 7.445m	55;20;16.283N 55;20;16.240N 55;20;16.531N 55;20;15.945N 55;20;16.252N 55;20;16.544N 55;20;16.532N 55;20;16.549N	131;38;34.025W 131;38;33.991W 131;38;34.979W 131;38;34.537W 131;38;33.810W 131;38;34.024W 131;38;34.828W 131;38;34.453W	B18-B.jpg	

No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B19	BSL-5	Floating Dock "Ryus Dock" ⁶⁶	55° 20' 28.9" N 55° 20' 29.0" N 55° 20' 30.0" N	131° 38' 51.6" W 131° 38' 51.6" W 131° 38' 52.8" W	B19.jpg	
B20	BSL-4	Dolphin ⁶⁷ Height MLLW: 7.902m	55° 20' 50.9" N	131° 40' 03.8" W	B20.jpg	
B21	BSL-3	New Dock ⁶⁸	55° 20' 56.3" N 55° 20' 56.4" N 55° 20' 57.1" N	131° 40' 42.1" W 131° 40' 42.2" W 131° 40' 42.3" W	B21.jpg	

No.	Subsheet	Description	Latitude	Longitude	Photo File Directory	Image
B22	BSL-2	Cable Crossing Sign ⁶⁹	55° 21' 18.05" N	131° 42' 18.61" W	ITBI_5A_232.jpg	

Revisions Compiled During Office Processing and Certification

¹ Concur

² Concur

³ Shoreline verification conducted by the hydrographer was analyzed during office processing and shown on the smooth sheet as warranted.

⁴ Concur

⁵ Filed with the hydrographic records.

⁶ Chart cable crossing signs as shown on the smooth sheet.

⁷ Concur

⁸ Concur

⁹ Concur

¹⁰ Filed with the hydrographic data.

¹¹ Concur; additional tide and zone information are filed with the hydrographic data.

¹² Concur

¹³ Survey H10987 was also compare with the following prior surveys;

<u>Survey</u>	<u>Year</u>	<u>Scale</u>
H08801	1964-67	1:10,000
H08802	1964	1:5,000
H08872	1965	1:5,000

The soundings of the three prior surveys compare very well with the present survey. Soundings differ between 1 to 2 fathoms. The greatest difference is the cultural features along shore, especially in the vicinity of Ketchikan. Numerous marinas, piers and other man-made changes have occurred since the prior surveys were done. The hydrographer did not address several charted features falling within the survey limits. These features have been transferred to the chart from prior survey data and compiled in red, if the survey data did not support removal. Features shown in green on the H-Drawing could not be specifically identified with a source. It is recommended that the prior surveys be superseded in the common areas except for the features, soundings and bottom characteristics brought forward from the prior surveys.

¹⁴ Concur

¹⁵ This survey was also compared with chart 17430, 10th Edition, dated Feb. 7th, 1998.

¹⁶ Concur

¹⁷ See recommendations below and smooth sheet for the depiction of the area.

¹⁸ Concur

¹⁹ Chart as 13 fathom *Rk*

²⁰ Chart as 6 fathoms 5 foot *Rk*

²¹ Chart as 5 fathom *Rk*

²² Chart as 4 fathom 4 foot *Rk*

²³ Chart as 3 fathom 2 foot *Rk*

²⁴ Chart as 3 fathom *Rk*

²⁵ Chart as 2 fathom *Rk*

²⁶ AWOIS forms are also attached to this report.

²⁷ Chart 2 fathom *Wk* at latitude 55/20/44.64N, longitude 131/40/20.78W, see smooth sheet for limits of the submerged wreck.

²⁸ Concur, remove charted snag at latitude 55/20/0.57N, longitude 131/40/34.79W.

²⁹ Retain charted wreck at latitude 55/20/45.89N, longitude 131/41/37.21W. This item is outside the limits of hydrography.

³⁰ Retain charted *subm ruins* at latitude 55/20/26.60N, longitude 131/41/9.81W. This item is outside the limits of hydrography.

³¹ Not a complete investigation, retain snag as charted at latitude 55/20/43.67N, longitude 131/41/31.82W.

³² Retain wreck at charted position, latitude 55/20/10.95N, longitude 131/40/51.49. This item is outside the limits of hydrography.

³³ Shoreline verification conducted by the hydrographer was analyzed during office processing and shown on the smooth sheet as warranted.

³⁴ Filed with the hydrographic data.

³⁵ Filed with the hydrographic data.

³⁶ Filed with the hydrographic data.

³⁷ Attached to this report.

³⁸ Do not concur, the hydrographer did not address several charted features falling within the survey limits. These features have been transferred to the chart from their original source. When a feature could not be identified from the prior survey, the feature was retained as charted. No bottom samples were taken during survey operations. Bottom characteristics were transferred from their prior source. Kelp symbols were also carried forward from their prior source.

³⁹ Attached to this report.

⁴⁰ Filed with the hydrographic data.

⁴¹ It is recommended that these aids to navigation be charted with the most recent information from the US CG. District 17.

⁴² This item was not investigated, retain as charted.

⁴³ See smooth sheet for the depiction of these features.

⁴⁴ See smooth sheet for depiction of the survey area.

-
- ⁴⁵ Chart soundings according to the smooth sheet.
- ⁴⁶ Do not concur, this area should be resurveyed at an interval appropriate to local conditions and available resources. See National Survey Priorities 2004.
- ⁴⁷ Retain charted information in these areas.
- ⁴⁸ Chart as floating pier, see smooth sheet for the depiction of the area.
- ⁴⁹ Same as endnote 44
- ⁵⁰ Chart as breakwater, see smooth sheet for depiction of the area.
- ⁵¹ Chart as breakwater, see smooth sheet for depiction of the area.
- ⁵² Same as endnote 50
- ⁵³ Chart as cable crossing sign at the survey position.
- ⁵⁴ Chart as cable crossing sign at the survey position.
- ⁵⁵ Chart as cable crossing sign at the survey position.
- ⁵⁶ Retain charted *Cable and Pipeline Area*.
- ⁵⁷ Chart as High Water dolphin at survey position.
- ⁵⁸ Chart visible wreck at survey position.
- ⁵⁹ Chart as float, see smooth sheet for the depiction of the area.
- ⁶⁰ Chart as floating pier at survey position.
- ⁶¹ Chart as piles and pier, see smooth sheet for depiction of the area.
- ⁶² Chart as log boom and mooring buoy, see smooth sheet for the depiction of the area.
- ⁶³ Chart as log boom, see smooth sheet for the depiction of the area.
- ⁶⁴ Chart as HW pile at the survey position.
- ⁶⁵ Chart as HW dolphin at the survey position.
- ⁶⁶ Chart as floating pier, see smooth sheet for the depiction of the area.
- ⁶⁷ Chart as HW dolphin at the survey position.
- ⁶⁸ Chart as floating pier, see smooth sheet for depiction of feature.
- ⁶⁹ Chart as cable crossing sign at the survey position.

LETTER OF APPROVAL REGISTRY NO. H-10987

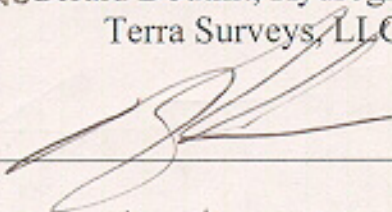
This Report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of survey H-10987 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 to be submitted with this survey include Data Acquisition and Processing Report, Vertical and Horizontal Report, which were submitted on ~~00/00/00~~ 6/5/01. TEN

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

THOMAS S NEWMAU ~~Gerald Douthit~~, Hydrographer
Terra Surveys, LLC

Date


6/5/01

RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

IVLAT	<input type="text" value="55/20/45.90"/>	NATIVLON	<input type="text" value="131/40/14.50"/>	<input type="button" value="Convert"/>	NATVDATUM	<input type="text" value="6"/>
LAT83	<input type="text" value="55/20/44.65"/>	LONG83	<input type="text" value="131/40/20.56"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="44.65"/>		<input type="text" value="131"/> <input type="text" value="40"/> <input type="text" value="20.56"/>		GPSOURCE	<input type="text" value="Direct"/>
LATDEC	<input type="text" value="55.3457361111111"/>	LONDEC	<input type="text" value="131.6723777777778"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History

50305
HISTORY
H8802/64--WRECK LOCATED, 1.7 FM LD: POS. 55-20-45.8N, 131-40-14.5W
(POS CHART SCALED AT 1:10,000)
FE228/80--S-0918-DA-80; WK LOCATED AT POS.55-20-45.9N, 131-40-14.5W, 1.9 FM
LD ON BOW, DIVERS DETERMINE HULK TO BE BARGE-TYPE, UPSIDE DOWN, EVIDENCE OF
CEMENT CARGO. APPROX. 305 FT L, 40 FT W; LOCAL DIVERS SAY WK MAY BE CONVERTED
LIBERTY SHIP; STEEL HULL.
H10987--OPR-0302-KR-00; WRECK VERIFIED AS CORRECTLY CHARTED. NO CHANGES TO THE CHART
RECOMMENDED. (UPDATED 3/03 BY MBH)

Evaluator Comments:
Do not concur, remove charted 1fathom, 5 foot Wk and chart a 2 fathom Wk at latitude 55/20/44.64N, longitude 131/40/20.78W.

ote

itary

YEARSUNK NIMANUM SYSTEMNUM

RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

VLAT	<input type="text" value="55/20/01.89"/>	NATIVLON	<input type="text" value="131/40/28.35"/>	<input type="button" value="Convert"/>	NATIVDATUM	<input type="text" value="06"/>
LAT83	<input type="text" value="55/20/00.64"/>	LONG83	<input type="text" value="131/40/34.42"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="0.64"/>		<input type="text" value="131"/> <input type="text" value="40"/> <input type="text" value="34.42"/>		GPSOURCE	<input type="text" value="Scaled"/>
LATDEC	<input type="text" value="55.3335111111111"/>	LONDEC	<input type="text" value="131.6762277777778"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History
Evaluator Comments:
Hydrographer covered the area with 100% multibeam. No evidence of charted snag.
Remove charted snag at the charted position.

Fieldnote

Proprietary

YEARSUNK NIMANUM SYSTEMNUM

RECRD VESSLTERMS CHART AREA
CARTOCODE SENDINGCODE DEPTH

NATIVLAT	<input type="text" value="55/20/47.14"/>	NATIVLON	<input type="text" value="131/41/31.14"/>	<input type="button" value="Convert"/>	NATIVDATUM	<input type="text" value="06"/>
LAT83	<input type="text" value="55/20/45.89"/>	LONG83	<input type="text" value="131/41/37.21"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="45.89"/>		<input type="text" value="131"/> <input type="text" value="41"/> <input type="text" value="37.21"/>		GPSOURCE	<input type="text" value="Scaled"/>
LATDEC	<input type="text" value="55.3460805555556"/>	LONDEC	<input type="text" value="131.69366944444"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History

Fieldnote

Proprietary

YEARSUNK NIMANUM SYSTEMNUM

RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

VLAT	<input type="text" value="55/20/27.88"/>	NATIVLON	<input type="text" value="131/41/03.29"/>	<input type="button" value="Convert"/>	NATIVDATUM	<input type="text" value="06"/>
LAT83	<input type="text" value="55/20/26.63"/>	LONG83	<input type="text" value="131/41/09.36"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="26.63"/>		<input type="text" value="131"/> <input type="text" value="41"/> <input type="text" value="9.36"/>		GPSOURCE	<input type="text" value="Scaled"/>
LATDEC	<input type="text" value="55.340730555556"/>	LONDEC	<input type="text" value="131.68593333333"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History
Evaluator comments:
Hydrographer visually verified charted subm ruins. Retain charted subm ruins at AWOIS position.

Fieldnote

Proprietary

YEARSUNK NIMANUM SYSTEMNUM

RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

IVLAT	<input type="text" value="55/20/44.96"/>	NATIVLON	<input type="text" value="131/41/25.43"/>	<input type="button" value="Convert"/>	NATIVDATUM	<input type="text" value="06"/>
LAT83	<input type="text" value="55/20/43.71"/>	LONG83	<input type="text" value="131/41/31.50"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="43.71"/>		<input type="text" value="131"/> <input type="text" value="41"/> <input type="text" value="31.5"/>		GPSOURCE	<input type="text" value="Scaled"/>
LATDEC	<input type="text" value="55.345475"/>	LONDEC	<input type="text" value="131.69208333333"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History

Fieldnote

Proprietary

YEARSUNK NIMANUM SYSTEMNUM

RECRD VESSLTERMS CHART AREA
CARTOCODE SNDINGCODE DEPTH

VLAT	<input type="text" value="55/20/12.24"/>	NATIVLON	<input type="text" value="131/40/45.06"/>	<input type="button" value="Convert"/>	NATIVDATUM	<input type="text" value="06"/>
LAT83	<input type="text" value="55/20/10.99"/>	LONG83	<input type="text" value="131/40/51.13"/>	<input type="button" value="Update GP"/>	GPQUALITY	<input type="text" value="High"/>
	<input type="text" value="55"/> <input type="text" value="20"/> <input type="text" value="10.99"/>		<input type="text" value="131"/> <input type="text" value="40"/> <input type="text" value="51.13"/>		GPSOURCE	<input type="text" value="Scaled"/>
LATDEC	<input type="text" value="55.336386111111"/>	LONDEC	<input type="text" value="131.68086944444"/>			

PROJECT ITEMSTATUS SEARCHTYPE
RADIUS INIT ASSIGNED
TECNIQ

Techniqnote

History

Fieldnote

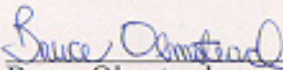
Proprietary

YEARSUNK NIMANUM SYSTEMNUM

APPROVAL SHEET
H10987

Initial Approvals:

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


Bruce Olmstead
Cartographic Team
Pacific Hydrographic Branch

Date: 12/9/04

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.


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

Date: 3 JAN 2005

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10987

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
17430	10/12/04	R. DAVIES	Full Part Before After Marine Center Approval Signed Via <i>Full Application</i> Drawing No. <i>of soundings, curves and features from Smooth sheet.</i>
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.