

# 9132

Diag. Cht. No. 4115.

FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
COAST AND GEODETIC SURVEY

## DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. PF-10-3-70 Office No. H-9132

### LOCALITY

State HAWAII

General locality West Coast, Hawaii Island West Coast  
Mano Point to Pualea Point

Locality Kahawai Bay to Kaholawa Bay

1970-71

### CHIEF OF PARTY

Capt. E.A. Taylor, Capt. R.H. Houlder

### LIBRARY & ARCHIVES

DATE NOV 5 1974

*Chls.*

4115

4140

4179

4102 see purged scales  
cht.

*Area 6*  
**9132**  
**9133**  
**9134**

HYDROGRAPHIC TITLE SHEET

H-9132

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.

PF-10-3-70

State HAWAII

General locality ~~HAWAII ISLAND,~~ HAWAII, WEST COAST

Locality ~~WEST COAST, ISLAND OF HAWAII~~ MANO PT. to PUALOA PT.

Scale 1:10,000

Date of survey March 10-19, 1970

Instructions dated Dec. 22, 1969

Project No. OPR-419

Vessel USC&GSS PATHFINDER, ML#1, ML#2

Chief of party Captain E.A. Taylor

Surveyed by Ship Personnel

Soundings taken by echo sounder, ~~xxxxxxx~~ Raytheon DE-723 Precision Depth Recorder

Graphic record scaled by Ship Personnel

Graphic record checked by Ship Personnel

Protracted by \_\_\_\_\_ Automated plot by Pacific Marine Center

Soundings penciled by \_\_\_\_\_

Soundings in fathoms ~~xxx~~ at ~~xxx~~ MLLW \_\_\_\_\_

REMARKS: NOTE: This survey is not complete.\* (See Recommendations).

completed in 1971

Insufficient bottom samples

Applied to stds 1/2/75  
CAF

eltd  
4140  
4115  
4179  
4102

KAHOOLAWE

MAUI ISLAND

PF-40-1-70

PF-10-1-70

PF-10-2-70

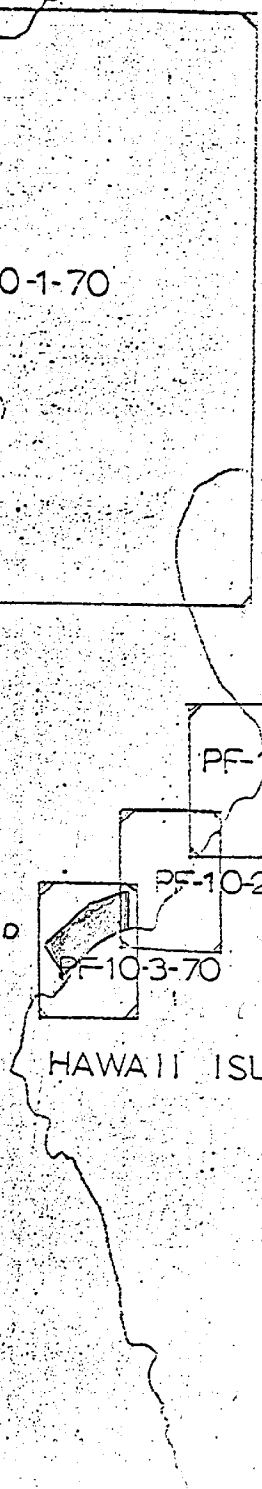
AREA SURVEYED

PF-10-3-70

HAWAII ISLAND

OPR-419

INDEX OF SHEETS



H-943 OPR - 419  
PF-10-3-70; 1:10,000  
USC & GSS PATHFINDER

E.A. TAYLOR CMDG

A. PROJECT

The hydrography was done in accordance with project instructions OPR-419, West Coast of Hawaii Island, Hawaii, dated Dec. 22, 1969. It is a continuation of the work done by the USC&GS McARTHUR during 1968-1969.

B. AREA SURVEYED

The area surveyed covers 3.2 Nautical miles of shore line on the west coast of Hawaii Island. The survey extends from Lat.  $19^{\circ} 51' 40''$ , Long.  $155^{\circ} 57' 20''$  to Lat.  $19^{\circ} 52' 15''$ , Long.  $156^{\circ} 01' 00''$  to Lat.  $19^{\circ} 50' 40''$ , Long.  $156^{\circ} 01' 10''$ , and to Lat.  $19^{\circ} 59' 50''$ , Long.  $156^{\circ} 00' 00''$ . Hydrography began on this sheet March 10 and ended March 19, 1970.

This survey junctions with prior survey 5005 (1:20,000; 1928) and AR-40-1-69. A junction is made with contemporary survey PF-10-2-70.

C. SOUNDING VESSEL

Soundings for the survey were obtained with the Ship PATHFINDER and two of its Launches. The identifying colors of each of these vessels were: PATHFINDER -- Green, ML #1 -- Blue, ML #2 -- Red.

D. SOUNDING EQUIPMENT

The following Raytheon Fathometers were used during the survey.

<u>Vessel</u>	<u>Model</u>	<u>Serial No.</u>
Ship	DE 723	940
ML #1	DE 723	557
ML #2	DE 723	935

E. SMOOTH SHEET

Smooth sheet projections and plotting will be accomplished by electronic data processing at Pacific Marine Center.

## F. CONTROL

All hydrography was completed using visual control. Signals were located using the photogrammetric radial line method, and by sextant cuts from photo points. Signals 076, 077, and 078 were located by sextant cuts from three photo-subpoints referred to as subpoints A, B, and C in this survey. (see below for additional data) One signal was built over triangulation station NAWAI 1928. Because this station was not included in the Triangulation Diagram #4115 Oct. 1961, G.P. data for the station was considered questionable and this signal was located by photogrammetric means.

*Sig # 78 located photogrammetrically in 1971  
A Station NAWAI 1928 position good and adjusted*  
Advance Manuscripts T-12537 (July 1969), T-12538 (Aug. 1969), and T-12539 (Oct. 1969) were used for transfer of signals to the boatsheets.

A five inch dog-ear was attached to the northeast corner of this boat-sheet on which signals 056 and 058 were plotted and used for hydrography.

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### Location of Signal 076, 077, and 078.

Subpoints A, B, and C, were occupied and sextant cuts were observed for the three signals as follows:

#### Occupying Subpoint A

<u>Signal</u>	<u>Angle and direction</u>	<u>Initial signal</u>
#076	39° 48' left from	Subpoint C
#077	52° 55' left from	Subpoint C
#078	20° 35' left from	Signal 079

#### Occupying Subpoint B

#076	104° 04' left from	Subpoint C
#077	126° 22' left from	Subpoint C
#078	19° 56' left from	Signal 079

#### Occupying Subpoint C

#076	16° 40' right from	Subpoint B
#077	20° 09' right from	Subpoint B
#078	60° 10' right from	Signal 079

## G. SHORELINE

The shore line was traced onto the boatsheets from the following advance Manuscripts: T-12537, T-12538, and T-12539.

## H. CROSSLINES

Approximately 9.4 percent crosslines were run. Good agreement was obtained at all crossings.

I. JUNCTIONS

All junctions were in good agreement.

J. COMPARISON WITH PRIOR SURVEY

The pre-survey review item shown on sheet 3 of 5 of the pre-survey review, OPR-419, D.E.W., 9/26/68 by a unnumbered dashed circle (Lat. 19° 50' 13" Long. 155° 59' 56") requires more development to either verify or disprove its existence. With the exception of this item the survey has good agreement with the prior survey 5005 (1:20,000; 1928).

K. COMPARISON WITH THE CHART

The chart, (C&GS 4140, 3rd Ed., Jan 24, 1966), for this area was produced from the prior survey mentioned in section J.

L. ADEQUACY OF SURVEY

With the exception of an investigation of a pre-survey review item (see section J) the northern 80% of this sheet is complete and adequate to supersede prior surveys for charting. No field work was accomplished on the southern 20% of this sheet due to time limitations for the project.

All offshore hydrography was performed by the PATHFINDER on the final day of the project. The replotting of the sounding lines after the completion of the project resulted in small displacements of several lines causing the line spacing to exceed the desired 200 meters in a few instances. However, the bottom contours in these areas were changing gradually, and the survey is believed adequate for charting.

M. AIDS TO NAVIGATION

There is one privately maintained light on this boat sheet which may be suitable as an aid to navigation. (See Recommendations)

N. STATISTICS

<u>Vessel</u>	<u>Number of Positions</u>	<u>Nautical Miles of Sounding Line</u>
PATHFINDER	514	88.7
ML #1	343	53.3
ML #2	457	61.3
Totals	1314	203.3

Area surveyed, 9.1 sq. miles

Number of oceanographic stations, 2

Bottom samples, 0

O. MISCELLANEOUS

Breaker zones are shown on this boatsheet. (See Advance Manuscript T-12537, Lat. 19° 50' 00" Long. 155° 59' 50"). On a day with moderate swells the surf breaks near the outer edge of a submerged coral reef. On a calm day there is an inner breaker zone.

T-12537 In the general area of Kakapa Bay at Lat. 19° 49' Long. 156° 00.3' there exist a major discrepancy in the names of two prominent points of land. This T-sheet shows the point which forms the north shore of Kakapa Bay as Kikaua Pt. and the point forming the south shore as Papiha Pt. The chart 4140 gives the name of Papiha Pt. to the northern point and does not name the point to the south.

A Geographic Names investigation was not made on any of these discrepancies due to the lack of time at the end of the project when these discrepancies were found.

P. RECOMMENDATIONS

1. Signal No. 78 is a privately maintained light which points seaward. The character of this light should be further investigated for its value as an aid to navigation.

2. Investigation of a pre-survey review item (see section J) needs to be completed. *No records of completion*

3. No Bottom samples were taken on this sheet. —

These items were not completed due to time limitation for the project.

Q. REFERENCES TO REPORT

1. USC&GSS PATHFINDER, 1970 Field Season Report
2. Fathometer Report, 1970 Field Season, USC&GSS PATHFINDER
3. Field Edit Report, 1970 Field Season, USC&GSS PATHFINDER

Respectfully submitted,

*Richard S. Young*

Richard S. Young  
LT(jg) USESSA

Approved by:

*J. D. Stachelhaus*

J. D. Stachelhaus  
Field Operations Officer  
USC&GSS PATHFINDER

TIDE NOTE

The standard tide gage at Hilo, Hawaii served as the reference gage to control field operations. A portable Bristol bubbler tide gage was installed and maintained at Kawaihae, Hawaii during the survey. Predicted tides from Hilo, Hawaii were used to reduce soundings on the boat sheet. Datum information for the Kawaihae gage will be supplied by Pacific Marine Center from information received from the Rockville office.



VELOCITY CORRECTIONS

Correction to Depth (fms)	Depth (fms)	Correction to Depth (fms)	Depth (fms)
0.0	1.0	1.1	25.3
+ 0.1	3.3	1.2	27.5
0.2	5.5	1.3	29.7
0.3	7.8	1.4	33.2
0.4	10.0	1.6	37.1
0.5	12.0	1.8	41.3
0.6	14.3	2.0	45.8
0.7	16.5	2.2	50.0
0.8	18.8	2.4	54.3
0.9	21.0	2.6	59.0
1.0	23.1	2.8	62.6

LIST OF SIGNALS

The units for the tabulated values of latitude and longitude are degrees, minutes, and meters.

<u>SIGNAL NO.</u>	<u>LAT.</u>	<u>LONG.</u>	<u>ORIGIN OF POSITION</u>
056	19 51 0407	155 56 0446	T-12538
058	19 51 0521	155 56 1354	
059	19 51 0594	155 56 1670	
060	19 51 0666	155 57 0442	
061	19 51 0674	155 57 1222	T-12537
067	19 51 0491	155 58 0108	
068	19 51 1469 <del>0371</del>	155 58 0367	
069	19 51 0110	155 58 0874	
070	19 50 1687	155 58 1364	
071	19 50 1453	155 58 1636	
072	19 50 1040	155 59 0052	
073	19 50 0794	155 59 0166	
074	19 50 0704	155 59 0320	
075	19 50 0533	155 59 0633	
076	19 50 0202	155 59 0539	
077	19 50 0206	155 59 0453	
078	19 50 0072	155 59 0741	
079	19 50 0012	155 59 0973	
080	19 49 1706	155 59 1267	
081	19 49 1430	155 59 1569	
082	19 49 1080	155 59 1678	
083	19 49 0768	156 00 0030	
084	19 49 0524	156 00 0410	
085	19 49 0303	156 00 0428	
086	19 49 0160	156 00 0369	
087	19 48 1785	156 00 0804	
088	19 48 <del>0381</del> 1461	156 00 0975	
090	19 48 0958	156 00 1544	T-12539
00A	19 50 0530	155 59 0646	T-12537
00B	19 50 0258	155 59 0602	
00C	19 50 0106	155 59 0815	

APPROVAL SHEET

The field work on this survey has been inspected and approved. The boat-sheets and field records have been inspected and approved.

*E. A. Taylor*

E. A. Taylor  
CAPT, USESSA  
Commanding Officer  
USC&GSS PATHFINDER

FINAL

RF 10-3-70  
OPR 419 AREA W. COAST HAWAII IS.  
VESSEL m/l # 1 PATFINDER  
PAY 069 to 076  
POSITION \_\_\_\_\_ TO \_\_\_\_\_  
TYPE OF TAPE Tc / Ti

102700 00 0003 0002 069 0 000000 000000-  
103500 00 0002-  
103900 00 0003-  
104300 00 0002-  
105730 00 0003-  
085015 00 0003 0002 070 0 000000 000000-  
085145 00 0002-  
090415 00 0003-  
090915 00 0002-  
091145 00 0003-  
091615 00 0002-  
092715 00 0003-  
093345 00 0002-  
093800 00 0003-  
111530 00 0004-  
121945 00 0003-  
121230 00 0004 0002 071 0 000000 000000-  
122230 00 0003-  
124515 00 0004-  
124945 00 0003-  
101145 00 0002 0002 076 0 000000 000000-  
104800 00 0003-  
112800 00 0002-  
114030 00 0003-

Final

PF 10-3-70  
OPR 419 AREA W. COAST HAWAII IS.  
VESSEL PATHFINDER  
DAY 077 to 078  
POSITION \_\_\_\_\_ TO \_\_\_\_\_  
TYPE OF TAPE Tc/Ti

094500 00 0024 0002 077 0 000000 000000 ✓  
095200 00 0023 ✓  
101500 00 0024 ✓  
140600 00 0023 ✓  
143300 00 0024 ✓  
093500 00 0024 0002 078 0 000000 000000 ✓  
145900 00 0025 ✓  
164300 00 0024 ✓

Final

PF 10-3-70  
 OPR 419 AREA W. COAST HAWAII IS.  
 VESSEL M/L # 2 PATHFINDER  
 DAY 069 to 077  
 POSITION \_\_\_\_\_ TO \_\_\_\_\_  
 TYPE OF TAPE Tc/Ti

090900 00 0003 0002 069 0 000000 000000 ✓  
 140000 00 0002 ✓  
 140545 00 0003 ✓  
 085930 00 0003 0002 070 0 000000 000000 ✓  
 083515 00 0003 0002 071 0 000000 000000 ✓  
 095230 00 0002 ✓  
 104730 00 0003 ✓  
 102945 00 0003 0002 076 0 000000 000000 ✓  
 154745 00 0002 ✓  
~~093345 00 0002 0002 077 0 000000 000000~~  
 093345 00 0002 0002 077 0 000000 000000 ✓  
 094115 00 0003 ✓

**HYDROGRAPHIC TITLE SHEET**

H-9132

**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 HAWAII

General locality West Coast of Hawaii Island

Locality Kahuwai Bay to Kahioawa Bay

Scale 1:10,000 Date of survey 30 October to 13 Nov. 1971

Instructions dated 17 September 1971 Project No. OPR-419-FA-71

Vessel NOAA Ship FAIRWEATHER Launches FA-3, FA-4, and FA-6

Chief of party CAPT. R. H. Houlder

Surveyed by LT. L. K. Nelson and ENS. F. B. Arbusto

(FA-4) Ross 400A Fineline  
Soundings taken by echo sounder, ~~hand lead~~ pole (FA-3, FA-6) Raytheon DE-723, S.N. 533,542

Graphic record scaled by FAIRWEATHER personnel

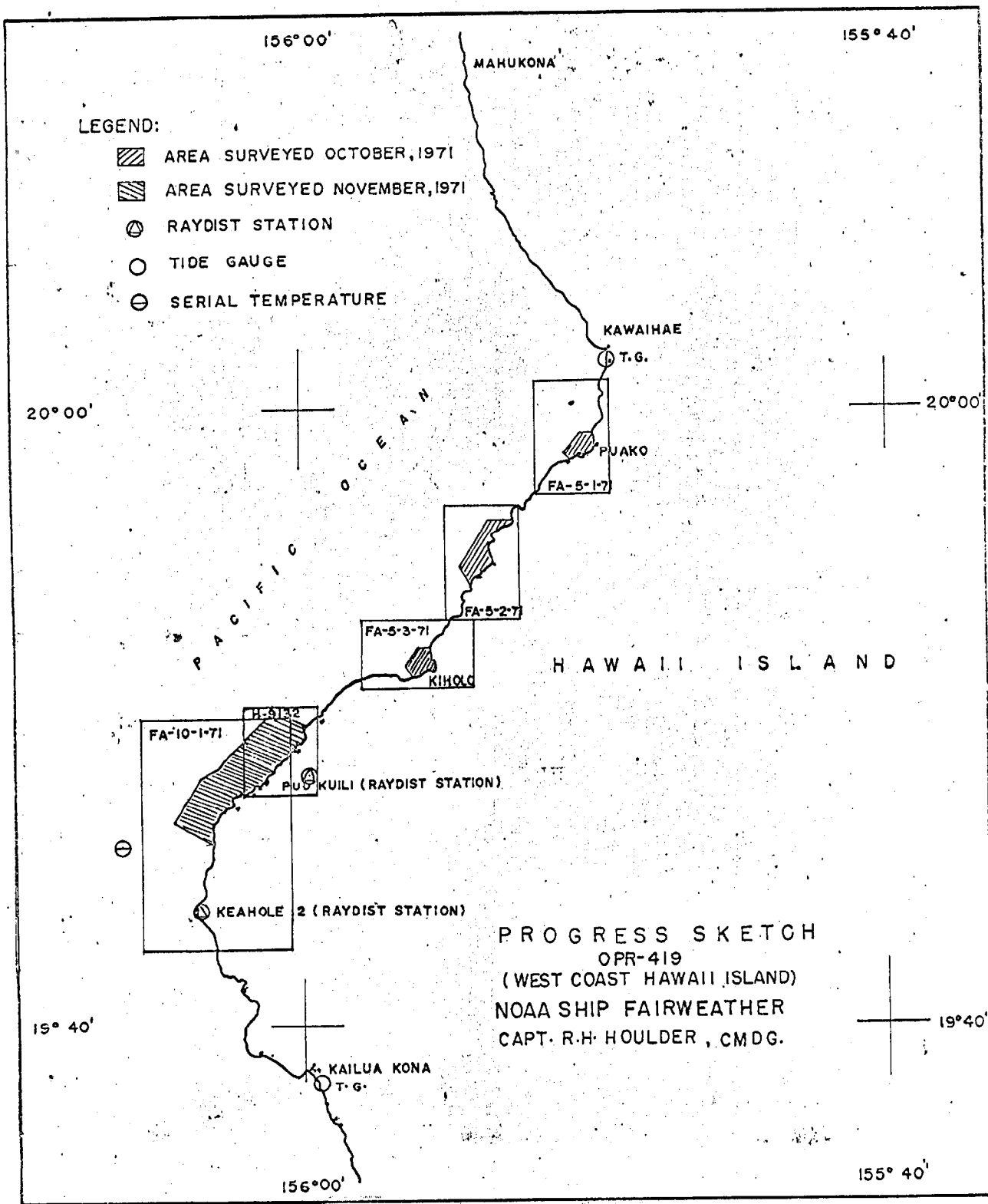
Graphic record checked by FAIRWEATHER personnel

Protracted by \_\_\_\_\_ Automated plot by \_\_\_\_\_






Soundings penciled by \_\_\_\_\_

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



LEGEND:

-  AREA SURVEYED OCTOBER, 1971
-  AREA SURVEYED NOVEMBER, 1971
-  RAYDIST STATION
-  TIDE GAUGE
-  SERIAL TEMPERATURE

PROGRESS SKETCH  
 OPR-419  
 (WEST COAST HAWAII ISLAND)  
 NOAA SHIP FAIRWEATHER  
 CAPT. R.H. HOULDER, CMDG.



Descriptive Report  
to Accompany  
Hydrographic Sheet H-9132  
West Coast of Hawaii Island, Hawaii  
Scale 1:10,000  
NOAA Ship Fairweather (MSS20)  
Capt. R. H. Houlder, Commanding

A. PROJECT

The survey was accomplished under OPR-419 project instructions dated 17 September 1971 and in accordance with the PMC Oorder.

B. AREA SURVEYED

The survey was made off the west coast of Hawaii Island north of Kahoiawa Bay and south of Kahawai Bay. Hydrographic lines were run approximately perpendicular to the rough coastline pattern and was accomplished south of a line between latitude 19° 49' 50" N., longitude 155° 59' 55" W. and latitude 19° 50' 27" N., longitude 156° 01' 00" W., to a line between latitude 19° 49' 05" N., longitude 156° 01' 40" W. and latitude 19° 48' 25" N., longitude 156° 01' 02" W. Hydrography was done between 30 October 1971 and 13 November 1971. The survey was a continuance of a survey started by the NOAA Ship Pathfinder in 1970. It junctions with contemporary survey H-9237 on the south and prior surveys H-9132 on the north and H-9015 on the west.

C. SOUNDING VESSEL

Three Fairweather launches were used to accomplish the hydrography. The following are the color codes applicable to each vessel

FA-3	Blue
FA-4	Green
FA-6	Brown

D. SOUNDING EQUIPMENT

FA-3 and FA-6 used a Raytheon DE-723-1 fathometer with serial numbers 533 and 561 respectively. FA-4 used a Ross 400A Finline fathometer.

Velocity corrections were determined from serial temperature and salinity observations. Bar checks were taken daily. An abstract of the cumulative corrections to the soundings of the survey is included in this report.

*See addendum to this  
Ships report:  
Fathometer and Velocity  
Correction Report!*

E. SMOOTH SHEET

The position and sounding data were recorded, logged for automated processing and plotted by ships' personnel using the PDP-8E computer. The signal list was prepared by ships' personnel. The final smooth sheet is to be plotted electronically and verified by personnel at Pacific Marine Center.

F. CONTROL

Signals were located photogrammetrically using advance manuscripts T-12537 and T-12539, both 1:10,000, completed in August 1969 and October 1969 respectively.

G. SHORELINE

Shoreline was transferred to the boatsheet from advance manuscripts T-12537 and T-12539. No discrepancies were noted in the field.

H. CROSSLINES

Crosslines consisting of approximately 10% of the regular system of sounding lines were in good agreement.

I. JUNCTIONS

Junction was made with H-9132 on the north, H-9015 on the west and contemporary survey H-9237 on the south.

Soundings did not disagree by more than one fathom between the present survey and prior surveys H-9132 and H-9237 and by not more than two fathoms on prior survey H-9015. In the latter survey the few discrepancies found were due to the irregularity of the bottom.

J. COMPARISON WITH PRIOR SURVEYS

The survey was not compared with any prior survey.

K. COMPARISON WITH THE CHART

All soundings found on C&GS chart number 4140, 1:80,000, fourth edition, printed 25 October 1969, corrected 24 July 1971 agreed to within one fathom except for one charted sounding of 25 fathoms located at 19° 49' 20" N., 156° 00' 52" W. The present survey found the depth to be 22.8 fathoms at the same location. The bottom in the locality appears to be regular although slopes to seaward. No uncharted hazards or dangers were found.

L. ADEQUACY OF THE SURVEY

The survey is complete and adequate for charting.

M. AIDS TO NAVIGATION

No aids to navigation were located in the survey area. ✓

N. STATISTICS

	FA-3	FA-4	FA-6	
Positions	200	208	53	=461 ✓
Sounding Lines (N.M.)	18.8	27.9	2.4	
Total Area Surveyed (Sq. M.)			2.04	

O. MISCELLANEOUS

None

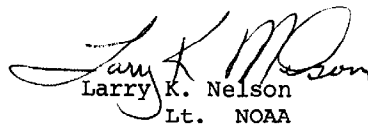
P. RECOMMENDATIONS

None

Q. REFERENCE TO REPORTS

1. Field Edit Report, OPR-419, NOAA Ship Fairweather, 1971.
2. Fathometer Report, OPR-419, NOAA Ship Fairweather, 1971.
3. Coast Pilot Report, OPR-419, NOAA Ship Fairweather, 1971.
4. Triangulation and Traverse Report, OPR-419, NOAA Ship Fair-  
weather, 1971. ✓
5. PDP 8E Software and processing Report, OPR-419, NOAA Ship  
Fairweather, 1971.
6. PDP 8E Hardware Report, OPR-419, NOAA Ship Fairweather, 1971.

Respectfully Submitted

  
Larry K. Nelson  
Lt. NOAA

TIDE NOTE

Two portable Bristol bubbler tide gages were installed and operated in connection with launch hydrography during the survey. A 0-10 foot bubbler gage was installed at Kawaihae Harbor, Hawaii Island, Hawaii (latitude  $20^{\circ}02.30'$  N., longitude  $155^{\circ}49.85'$  W.) on 27 September 1971 and was removed on 18 November 1971. A similar bubbler gage was installed at Kailua, Hawaii Island, Hawaii (latitude  $19^{\circ}38.52'$  N., longitude  $155^{\circ}59.97'$  W.) on 29 September 1971 and was removed on 18 November 1971. Hourly heights were scanned and checked by ship's personnel for both gages and the data was forwarded with the marigrams to C33, Rockville, Maryland, for analysis.

GEOGRAPHIC NAMES

Survey No.

Name on Survey	Source										
	A	B	C	D	E	F	G	H	K		
AWAKEE BAY											1
HAWAII ISLAND											2
KAHOLAUA BAY											3
KAHOIWA POINT											4
KAHUWAI BAY											5
KAKAPA BAY											6
KAUPULEHU											7
KIKAUA POINT											8
KUA BAY											9
KUKIO											10
KUKIO BAY											11
KUMUKEHU POINT											12
MAHEWALU POINT											13
MANO POINT											14
PACIFIC OCEAN											15
PAPIHA POINT											16
PUIALOA POINT											17
KIHOLO BAY											18
NAWAIKULUA POINT											19
											20
											21
											22
											23
											24
											25
											26

Approved  
 Chas. E. Harrington  
 Staff Geographer  
 6 Feb 1975

VELOCITY CORRECTIONS  
West Coast, Hawaii Island  
OPR-419 1971  
NOAA Ship FAIRWEATHER (MSS-20)  
CAPT. R. H. Houlder, Commanding

Corrections to be applied to the following sheets:

FA-10-1B-71 (H-9237)  
also H-9132

The following table will be used between the dates of 16 October 1971 and 18 November 1971.

<u>APPLICABLE DEPTHS</u> (Fathoms)		<u>CORRECTIONS</u> (Fathoms)
0.0	<del>*</del>	0.0
1.6		+ .05
2.7		+ .10
3.8		+ .16
4.9		+ .21
6.0		+ .27
9.6		+ .45
12.3		+ .58
15.0		+ .72
17.8		+ .86
20.5		+ .99
23.2		+ 1.13
26.0		+ 1.27
28.7		+ 1.41
47.8		+ 2.37
61.5		+ 3.03
95.7		+ 4.57
123.0		+ 5.58
191.4		+ 7.05
246.1		+ 7.95
300.9		+ 8.72
355.4		+ 9.45
410.1		+10.10

*\* Incorrect see  
copy of Fathometer & Velocity  
Correction Report  
attached as an addendum  
to this ships report*

ECHO CORRECTIONS

West Coast, Hawaii Island

OPR-419 1971

NOAA Ship FAIRWEATHER (MSS-20)

CAPT. R. H. Houlder, Commanding

SHEET	DATE	CORRECTIONS	POSITIONS
<u>LAUNCH FA-3</u>			
FA-5-1-71	10-16-71	+1.4 feet	3001-3063
	10-17-71	+1.2 "	3073-3197
	10-18-71	+1.3 "	3211-3383
	10-19-71	+2.0 "	3454-3570
	10-20-71	+1.4 "	3576-3672
	10-21-71	+1.8 "	3673-3702
	10-27-71	--- *	3703-3708
	10-28-71	+1.4 "	3709-3800
	10-31-71	--- *	3800-3804
FA-5-3-71	10-29-71	+1.5 feet	2001-2064
	10-30-71	+1.8 "	2065-2180
	11-01-71	+1.3 "	2181-2283
H-9132	11-03-71	+0.5 fathoms	2001-2047
	11-04-71	+0.2 "	2048-2133
	11-10-71	+0.4 "	2150-2200
FA-10-1B-71	11-11-71	+0.4 fathoms	2005-2040
	11-15-71	+0.2 "	2041-2108
	11-15-71	--- *	2109-2116
	11-15-17	+0.2 "	2117-2127
	11-16-71	+0.3 "	2128-2245

--- \* Bottom samples taken.

ECHO CORRECTIONS

West Coast, Hawaii Island

OPR-419 1971

NOAA Ship FAIRWEATHER (MSS-20)  
CAPT. R. H. Houlder, Commanding

SHEET	DATE	CORRECTIONS	POSITIONS
<u>LAUNCH FA-4</u>			
FA-5-2-71	10-17-71	+2.8 feet	5001-5119
	10-18-71	+2.8 "	5120-5231
	10-19-71	+2.1 "	5232-5371
	10-20-71	+2.0 "	5372-5483
	10-21-71	+2.3 "	5484-5612
	10-27-71	+2.5 "	5618-5731
	10-29-71	+2.8 "	5732-5787
	10-31-71	--- **	5788-5794
H-9132	10-30-71	--- *	6001-6009
	11-01-71	+0.2 fathoms	6010-6040
	11-02-71	+0.3 "	6041-6208
FA-10-1B-71	11-04-71	+0.3 "	4028-4058
	11-10-71	+0.3 "	4059-4128
	11-11-71	+0.3 "	4129-4218
	11-13-71	+0.3 "	4219-4228
	11-14-71	+0.3 "	4236-4342
	11-15-71	+0.4 "	4343-4522
	11-16-71	+0.4 "	4523-4670
	11-17-71	+0.4 "	4671-4754

--- \* Bottom samples taken.

--- \*\* Detached positions.



ECHO CORRECTIONS

West Coast, Hawaii Island

OPR-419 1971

NOAA Ship FAIRWEATHER (MSS-20)  
CAPT. R. H. Houlder, Commanding

SHEET	DATE	CORRECTIONS	POSITIONS
<u>LAUNCH FA-6 (Hydro Skiff)</u>			
FA-5-1-71	10-27-71	0.0 feet	4000-4002
	10-27-71	+0.7 "	4003-4013
	10-27-71	0.0 "	4014-4018
	10-27-71	+0.7 "	4019-4021
	10-27-71	0.0 "	4022-4026
	10-27-71	+0.7 "	4027-4029
	10-27-71	0.0 "	4031, 4033
	10-27-71	+0.7 "	4035-4049
	10-27-71	0.0 "	4050-4054
	10-27-71	+0.7 "	4055-4058
	10-27-71	0.0 "	4060-4065
	10-27-71	+0.7 "	4066-4069
	10-27-71	0.0 "	4070, 4072
	10-27-71	+0.7 "	4073-4076
	10-27-71	0.0 "	4077
	10-27-71	+0.7 "	4078-4080
	10-27-71	0.0 "	4081-4089
FA-5-2-71	10-28-71	+0.8 feet	4000-4111
	10-30-71	+0.6 "	4120-4122
	10-30-71	+0.6 "	4130-4136
	10-30-71	+0.6 "	4140-4180
FA-5-3-71	11-01-71	0.0 feet	2301-2313
	11-01-71	+0.7 "	2314-2317
	11-01-71	0.0 "	2318-2320
	11-01-71	+0.7 "	2321-2327
	11-01-71	0.0 "	2328-2329
	11-01-71	+0.7 "	2330-2341
H-9132	11-13-71	+0.2 fathoms	2201-2225
	11-13-71	+0.7 "	2226-2245
	11-13-71	+0.2 "	2246-2252
	11-13-71	+0.7 "	2253

INITIAL CORRECTIONS

West Coast, Hawaii Island

OPR-419 1971

NOAA Ship FAIRWEATHER (MSS-20)

CAPT. R. H. Houlder, Commanding

SHEET	VESSEL	CORRECTIONS	POSITIONS
FA-5-1-71	FA-3	0.0	3001-3804
	FA-6 (Hydro Skiff)	0.0	4000-4089
FA-5-2-71	FA-4	0.0	5001-5794
	FA-6 ( " " )	0.0	4000-4180
FA-5-3-71	FA-3	0.0	2001-2283
	FA-6 ( " " )	0.0	2301-2341
H-9132	FA-4	0.0	6001-6208
	FA-3	0.0	2001-2200
	FA-6 ( " " )	0.0	2201-2253
FA-10-1B-71	FA-3	0.0	2005-2245
	FA-4	0.0	4028-4754

TRA CORRECTOR TAPE  
H-9132, FA-#3

2023 0 1971

094000 0 0005 0001 307 000000 000000

074200 0 0002 0001 308 000000 000000

TRA CORRECTOR TAPE  
H-9132, FA-4

2024 0 1971

101500	0	0000	0001	303	000000	000000
100530	0	0002	0001	305	000000	000000
075900	0	0003	0001	306	000000	000000
094000	0	0003	0001	307	000000	000000
074200	0	0002	0001	308	000000	000000
084100	0	0004	0001	314	000000	000000

TRA CORRECTOR TAPE  
H-9132, FA-6

2026 0 1971  
080900 0 0002 0201 317 000000 000000  
085800 0 0000  
133500 0 0002  
141800 0 0000

LIST OF SIGNALS  
Sheet H-9132

OPR-419 1971  
West Coast, Hawaii Island  
NOAA Ship FAIRWEATHER (MSS-20)  
CAPT. R. H. Houlder, Commanding

<u>Signal Number</u>	<u>LATITUDE (° ' m)</u>	<u>LONGITUDE (° ' m)</u>
075	19° 50' 1733m	155° 59' 2175m
078	19 50 0234	155 59 2546
080	19 49 5532	155 59 4309
081	19 49 4651	155 59 5391
082	19 49 3512	155 59 5766
083	19 49 2439	156 00 0062
084	19 49 1889	156 00 1436
086	19 49 1763	156 00 0917
087	19 48 5805	156 00 2762
088	19 48 4751	156 00 3350
090	19 48 3116	156 00 5305
091	19 49 4202	156 00 0021
092	19 49 3090	155 59 5821
093	19 49 0026	156 00 2161
094	19 48 5464	156 00 3446
095	19 48 3877	156 00 4267
096	19 48 2566	156 00 5937
097	19 48 1942	156 01 0282
098	19 48 1242	156 01 1251

70-71 Combined Signal List  
with Verifier's Report  
-End-

FATHOMETER AND VELOCITY CORRECTION REPORT

OPR-419 1971

NOAA Ship FAIRWEATHER (MSS-20)

CAPT. R. H. Houlder, Commanding

## FATHOMETER AND VELOCITY CORRECTION REPORT

Due to the shortness of the Hawaiian field season and the relative stability of the water column, only one Nansen cast for velocity was taken.

The location was latitude 19°48' N., longitude 156°06' W. and at a depth of 400 fathoms.

Values for the sound velocity corrections were obtained by using the AM 530 program, developed by the WHITING, on the FAIRWEATHER's PDP-8/E computer and then checking these values with long hand calculations. At first, there was quite a large discrepancy between the computer printout and the Hydrographic Manual tables for sound velocity correction (1536 m/sec vs. 1533 m/sec). This resulted in an extensive study of all our to-date methods of calculating the velocity of sound through sea water. The tables in the Hydrographic Manual were computed using an empirical formula developed by Kawahara, based on observations of salinity and temperature taken up to that time. In May 1961, the U. S. Navy found that tables based on this earlier equation by Kawahara gave sound velocity 3 to 4 meters per second too slow. (Special Publication 58, supplement to H. O. Publication 64). The Wang computer tapes for velocity correction were based on the Hydrographic Manual and values obtained from such are also 3 to 4 meters too slow. Checking further, it was found that the PDP-8/E computer program, written for use on board the WHITING, was compiled using Wilson's equation (developed by Wayne D. Wilson, Naval Ordnance Laboratory). When the correction derived from this PDP-8/E program was compared by hand calculation with the velocity corrections derived from H.O. Special Publication 58, the two were in complete agreement.

It is therefore recommended that further use of the Hydrographic Manual for calculating velocity corrections be discontinued and existing Wang tapes using this format be reprogrammed using tables in H.O. Special Publication 58.

Two velocity correction printouts from the PDP-8/E are included with this report. The 1:5,000 scale boatsheets utilize the abstract in feet and the 1:10,000 scale sheets in fathoms. Also in compliance with the PDP-8/E program, a graph has been drawn up (applicable depth minus depth velocity correction vs. depth velocity correction). From this graph are taken the true sound velocity corrections, acceptable over the entire range of depths, from the area surveyed. A copy of this graph and abstracts of the true velocity corrections are included with this report.

Launches FA-3 and FA-6 (hydro skiff) used Raytheon DE-723 fathometers, serial numbers 533 (529 after 16 November 1971) and 561 respectively. Launch FA-4 used the Ross 400A fathometer. Bar checks




for total fathometer corrections were made by Launches FA-3 and FA-4 while Launch FA-6 (hydro skiff) made pole checks.

The total correction obtained to soundings from the bar check consists of the draft correction, the instrument error correction and the sound velocity correction. Therefore, in order to obtain the true transducer correction (draft correction plus instrument error correction), the mean sound velocity correction to a depth of 6 fathoms (the maximum depth at which bar checks were made) was subtracted from the total correction. An abstract of this true TRA correction, for each launch, is included with this report. (Since the hydro skiff worked only in shallow depths and the velocity correction in the surface layer was close to 0, it was ignored and the total correction obtained by pole check was considered to be the true TRA correction).

Phase comparisons were made on all fathometers used during the 1971 field season. The initial checks were made between 25 April 1971 and 18 May 1971. The final checks were made between 18 February 1972 and 24 February 1972. An abstract of these checks is included with this report.

The initial correction is the amount by which the initial varies from the assumed preset initial. The initial was set to 0 fathoms (or feet) on all FAIRWEATHER launches and remained so throughout the season. An abstract of these corrections is also included with this report.

Respectfully submitted,



Frank B. Arbusto, Jr.  
LT(jg), NOAA

8/20/74  
KH

TRUE SOUND VELOCITY CORRECTIONS

(Obtained by graphic methods from Table 3)

Corrections to be applied to the following sheets: FA-10-1B-71 (H-9237)  
and H-9132

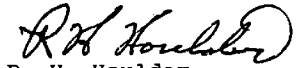
The following table will be used between the dates of 16 October 1971  
and 18 November 1971.

<u>Sounding Depths (fathoms)</u>	<u>Corrections (fathoms)</u>
1.5	0
3.4	+ .1
5.4	+ .2
7.3	+ .3
9.2	+ .4
11.1	+ .5
13.0	+ .6
14.9	+ .7
16.8	+ .8
18.7	+ .9
20.6	+ 1.0
22.5	+ 1.1
24.4	+ 1.2
26.3	+ 1.3
27.9	+ 1.4
29.8	+ 1.5
31.8	+ 1.6
34.9	+ 1.7
38.4	+ 1.9
42.5	+ 2.1
46.2	+ 2.3
50.5	+ 2.5
54.5	+ 2.7
58.5	+ 2.9
62.5	+ 3.1
66.8	+ 3.3
70.9	+ 3.5
75.1	+ 3.7
79.6	+ 3.9
83.5	+ 4.1
88.2	+ 4.3
93.0	+ 4.5
97.5	+ 4.7
102.5	+ 4.9
111.9	+ 5.1
127.0	+ 5.6
146.3	+ 6.1
172.2	+ 6.6
216.0	+ 7.1
284.0	+ 8.1
358.0	+ 9.1
444.0	+10.1

TRANSMITTAL SHEET

This fathometer and velocity correction report has been examined and found complete.

APPROVED AND FORWARDED:



R. H. Houlger  
CAPT, NOAA  
Comdg., Ship FAIRWEATHER

TRANSMITTAL SHEET

The field work was examined daily under the supervision of this command. The boatsheet was inspected daily for completeness and no additional work is considered necessary.



R. H. Houlder  
CAPT., NOAA  
Comdg., Ship FAIRWEATHER

HYDROGRAPHIC SURVEY STATISTICS  
HYDROGRAPHIC SURVEY NO. H-9132

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS		3	
DESCRIPTIVE REPORT		1	OVERLAYS		2	
DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES			1 <i>var</i>			
CAHIERS	1	<i>where?</i>	1			
VOLUMES	9					
BOXES						

T-SHEET PRINTS (List)

T-12537 T-12538 T-12539 not transmitted

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				1775
POSITIONS CHECKED		1775		
POSITIONS REVISED		37		
DEPTH SOUNDINGS REVISED		432		
DEPTH SOUNDINGS ERRONEOUSLY SPACED		0		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		0		
	TIME (MANHOURS)			
Verification of Control		3		
Verification of Positions		42		
Verification of Soundings		147		
Smooth Sheet Compilation		55		
ALL OTHER WORK		11		
TOTALS		258		
PRE-VERIFICATION BY	BEGINNING DATE		ENDING DATE	
VERIFICATION BY <i>Karol M. Hoops</i> <i>A. E. Eichelberger</i> Karol M. Hoops A.E. Eichelberger	12/28/73		10/18/74	
REVIEW BY	BEGINNING DATE		ENDING DATE	

VERIFIER'S REPORT  
 HYDROGRAPHIC SURVEY, H- 9132

**INSTRUCTIONS** - This form serves to identify items of a check list in verification together with items which are separately reported to the Reviewer. The form is not to be forwarded to the Reviewer. A report, which is prepared for the Reviewer, should identify items by number and letter and will be filed in the Descriptive Report until the survey is reviewed.

**CL - Check List Items:** should be checked as having been completed during the verification processes.

**R - Report Item:** This column refers to those items reported to the reviewer and is used to indicate the items discussed.

Part I - DESCRIPTIVE REPORT	CL	R	Part III - JUNCTIONS (Continued)	CL	R
<p><b>Note:</b> The verifier should first read the Descriptive Report for general information and problems.</p> <p>1. The Descriptive Report was consulted, paragraphs checked if found satisfactory, and notations were made in soft black pencil regarding action taken.                      Remarks Required: -- None</p>	X		<p>10. Junctions with contemporary surveys were satisfactory except as follows:                      Remarks Required: -- Consider conditions after adjustments have been made; note adjustments made. Make special notes of Butt junctions and areas which are SUPERSEDED.</p>		X
<p>2. Soundings originating with the survey and mentioned in the Descriptive Report have been verified and checked in soft black pencil, including latitude and longitude, together with position identification.                      Remarks Required: -- None</p>	X		<p><b>Part IV - VOLUMES</b></p> <p>11. All items affecting the plotting of the survey which are entered in the remarks columns of the sounding records were noted and check marked. In all cases appropriate action was taken and exceptions noted in the volumes.                      Remarks Required: -- None</p>	N/A	
<p>3. All reference to survey sheets mentioned in the Descriptive Report should include registry number and year.                      Remarks Required: -- None</p>	X				
<p><b>Part II - SHORELINE AND SIGNALS</b></p> <p>4. Source of shoreline signals                      Remarks Required: -- List all surveys</p> <p>a. Give earliest and latest dates of photographs</p> <p>b. Field inspection date</p> <p>c. Field Edit date</p> <p>d. Reviewed-Unreviewed</p>		X	<p>12. Condition of sounding records was satisfactory except as follows:                      Remarks Required: -- Mention deficiencies in completeness of notes or actions for the following:</p> <p>(a) rocks</p> <p>(b) line turns</p> <p>(c) position values of beginning and ending of lines</p> <p>(d) bar check or velocity correctors</p> <p>(e) time recording</p> <p>(f) notes or markings on fathograms</p> <p>(g) was reduction of soundings accurately done?</p> <p>(h) was scanning accurate?</p> <p>(i) were peaks at uneven intervals missed?</p> <p>(j) were stamps completed?</p> <p>(k) references to adjacent features</p>		X
<p>5. The transfer of contemporary topographic information was carefully examined and reconciled with the hydrography.                      Remarks Required: -- Discuss remaining differences.</p>	X				
<p>6. The plotting of all triangulation stations, topographic stations and hydrographic signals has been checked and noted in processing stamp No. 42 on the smooth sheet.                      Remarks Required: -- None</p>	X				
<p>7. Objects on which signals are located and which fall outside of the high-water line have been described on the sheet.                      Remarks Required: -- List those signals still unidentified.</p>	X		<p><b>Part V - PROTRACTING</b></p> <p>13. All positions verified instrumentally were check marked in color in the sounding records, and verifier initialed the processing stamp.                      Remarks Required: -- None</p>	N/A	
<p><b>Part III - JUNCTIONS</b></p> <p><b>Note:</b> Make a cursory comparison preliminary to making soundings in area of overlap.</p> <p>8. All junctions of contemporary or overlapping sheets were transferred in colored ink and overlapping curves were made identical.                      Remarks Required: -- None</p>	X		<p>14. The protracting and plotting of all unsatisfactory crossings were verified.                      Remarks Required: -- None</p>	N/A	
<p>9. The notation in slanted lettering "JOINS H---- (19)" was added in colored ink for all verified contemporary adjoining or overlapping sheets. Those not verified are shown in pencil.                      Remarks Required: -- None</p>	X		<p>15. All detached positions locating critical soundings, rocks, buoys, breakers, obstructions, kelp, etc., were verified and the position numbers are legible.                      Remarks Required: -- None</p>	X	

Part V - PROTRACTING (Continued)	CL	R	Part VIII - AIDS TO NAVIGATION	CL	R
16. The protracting was satisfactory except as follows: Remarks Required: -- Refers to protracting in general except for specific faults repeated often, or faults in control information, which required considerable replotting or adjustments.	N/A		26. All fixed aids located together with those on the contemporary topographic sheets, have been shown on the survey. Remarks Required: -- Conflicts of any nature listed.	X	
17. The protractor has been checked within the last three months. Remarks Required: -- Date of check, type of protractor and number.	N/A		27. All floating aids listed in the Descriptive Report should be verified and checked in soft black pencil, including latitude and longitude and position identification. Remarks Required: -- None	X	
<b>Part VI - SOUNDINGS</b> 18. All soundings are clear and legible, and critical soundings are a little larger than adjacent soundings. Remarks Required: -- None	N/A		<b>Part IX - BOAT SHEET</b> 28. The boat sheet was constantly compared with the smooth sheet with reference to notes, position of sounding lines and supplemental information. Remarks Required: -- None	X	
19. Sounding line crossings were satisfactory except as follows: Remarks Required: -- Discuss adjustments.	X		29. Heights of rocks awash were correctly reduced and compared with topographic information. Remarks Required: -- Note excessive conflicts with topographic information.		X
20. The spacing of soundings as recorded in the records was closely followed; Remarks Required: -- None	X		<b>Part X - GENERAL</b> 30. All information on the sheet is shown in accordance with figures 82 and 83 in the Hydrographic Manual (Pub. 20-2). Remarks Required: -- None	X	
21. The scanning, reduction, spacing, plotting of questionable soundings have been verified. Remarks Required: -- None	X		31. Unnecessary pencil notes have been removed from the sheet. Remarks Required: -- None	X	
22. The smooth plotting of soundings was satisfactory except as follows: Remarks Required: -- Refer to legibility, errors in spacing, and errors in numbers - but not to errors in scanning.	N/A		32. Degree, minute values and symbols have been checked; also electronic distance arcs have been properly identified and checked on the smooth sheet. Remarks Required: -- None	X	
<b>Part VII - CURVES</b> 23. The depth curves have been inspected before inking. Remarks Required: -- By whom was the penciled curves inspected.		X	33. The bottom characteristics are adequately shown. Remarks Required: -- None		X
24. The low-water line and delineation of shoal areas have been properly shown in accordance with the following: a. From T-Sheet in dotted black lines b. From soundings in orange c. Approximate position of sketched curve is dashed orange d. Approximate position of shoal area not sounded in black dashed Remarks Required: -- None	X		<b>Part XI - NOTES TO THE REVIEWER</b> 34. Unresolved discrepancies and questionable soundings.		X
25. Depth curves were satisfactory except as follows: (This statement should not refer to the manner in which the curves were drawn). Remarks Required: -- Indicate areas where curves could not be drawn completely because of lack of soundings. For some inshore areas a general statement is sufficient.	X		35. Notation of discrepancies with photogrammetric survey inserted in report of unreviewed photogrammetric survey or on copy.	X	
			36. Supplemental information.		X
Verified by <i>Karol M. Hoops</i> <i>A. E. Eichelberger</i> Karol M. Hoops & A. E. Eichelberger, Cartographic Technicians				Date 10/18/74	

VERIFIER'S REPORT

PF-10-3-70

H-9132

This sheet was constructed and plotted at Pacific Marine Center, Seattle, Washington. Information relating to this survey will be noted under the heading by the number and letter as on Verifier's Report, C&GS Form 946A.

PART II SHORELINE & SIGNALS

4. The following Advance Manuscripts were used for the transfer of the Shoreline and Topographic features.

T-12537 (1:10,000)

- |                        |              |
|------------------------|--------------|
| a. Date of Photography | August 1963  |
| b. Field Inspection    | June 1964    |
| c. Field Edit Applied  | October 1972 |

T-12538 (1:10,000)

- |                        |              |
|------------------------|--------------|
| a. Date of Photography | August 1954  |
| b. Field Inspection    | June 1964    |
| c. Field Edit Applied  | October 1972 |

T-12539 (1:10,000)

- |                        |                |
|------------------------|----------------|
| a. Date of Photography | August 1963    |
| b. Field Inspection    | June 1964      |
| c. Field Edit Date     | September 1972 |

PART III JUNCTIONS

10. This survey junctions with contemporary surveys:

H-9131, 1970 (1:10,000) on the East;  
 H-9015, 1964 (1:40,000) on the West; and  
 H-9237, 1971-72 (1:10,000) to the South

Depth curves in the junction area with H-9131 were left in pencil, as H-9131 has been previously submitted: The junction with H-9015 was made and is comparable but no curves were involved. The junction was made in house with H-9237 and depth curves were transferred and inked.

PART VII CURVES

23. The penciled depth curves were inspected by A.E. Eichelberger, Cartographic Technician.



PART IX BOATSHEET

29. The following rocks were located as detached positions and are in addition to those incorporated on the manuscripts.

<u>Pos</u>	<u>Lat</u>	<u>Long</u>	<u>Depth or Elevation</u>
2228	19°49'35"	156°00'03"	Awash MLLW
2229	49'25"	00'05"	Awash MLLW
2231	49'21"	00'11"	Awash MLLW
2232	49'24"	00'17"	rk -.8 fathom
2233	49'23"	00'19"	end of rky point
2236	49'10"	00'25"	rk -.8 fathom
2239	49'00"	00'34"	Awash MLLW
2240	48'57"	00'36"	Awash MLLW
2241	48'52"	00'36"	rk -.7 fathom
2242	48'31"	01'09"	rk -.7 fathom

No symbol - position doubtful

2226	19°49'43"	156°00'03"	Awash MLLW
------	-----------	------------	------------

PART X GENERAL

33. No bottom samples were taken during 1970 hydro.

PART XI NOTES TO THE REVIEWER

34. Submerged ledge limits were omitted as they interfered with the depth curves. Notes in void areas were considered pertinent to the survey, therefore, were inked.

Signal numbers were duplicated between years. In most cases, the signal G.P.'s were slightly different, therefore, the distinction was made by adding a zero in front of the number of the 1971 signal. (Example 083)

Where methods of location of signals are different, the highest order symbol was applied.

36. Positions and Soundings were verified and smooth sheet compiled by Karol Hoops, Cartographic Technician under the supervision of A.E. Eichelberger, Cartographic Technician.

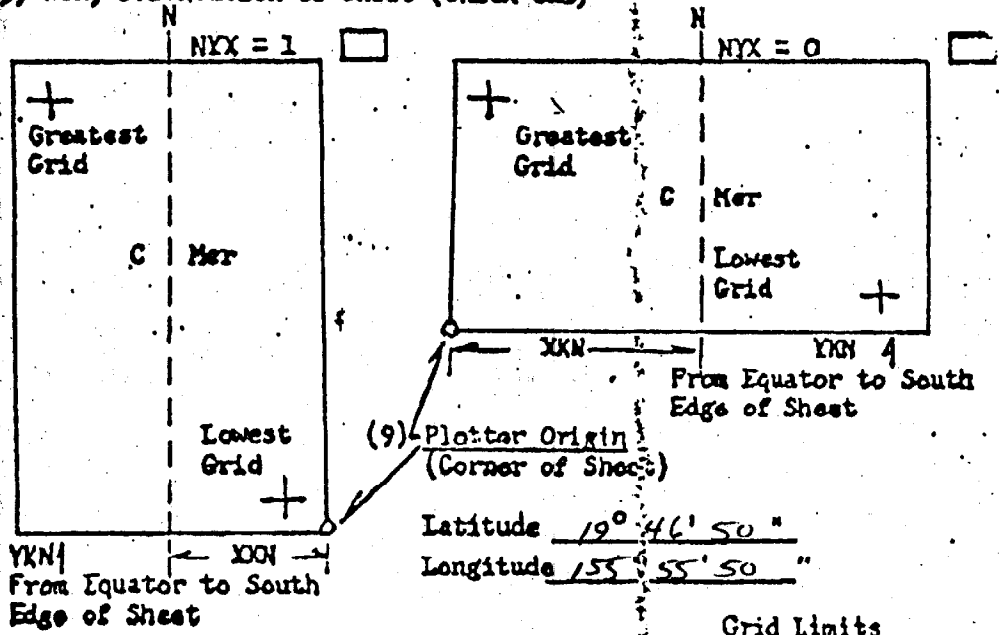
Respectfully submitted,

*A. E. Eichelberger*

A.E. Eichelberger  
Cartographic Technician  
10/18/74

PARAMETERS FOR DIGITAL COMPUTING  
POLYCONIC PROJECTION  
38850

- (1) Project No. OPR-419 (4) Requested by \_\_\_\_\_  
 (2) H No. 9132 (5) Ship or Office \_\_\_\_\_  
 (3) Field No. PF-10-3-70 (6) Data Required \_\_\_\_\_  
 (7) Visual  Pt.(0) or Fathoms (1)  (8) Electronic  (fill out form #3)  
 (10) XKN (SP 5) Distance from CIER to East Edge (NYX = 1) or West Edge (NYX = 0). (Origin) 5530.90 Meters  
 (11) YKN (SP 241) Distance from Equator to South Edge of Sheet. (Origin) 2187942.8 Meters  
 (12) Central Meridian 155° 59' 00"  
 (13) Survey Scale 1:10000  
 (14) Size of Sheet (Check one) 36x60  42x60   
 (15) NYX, Orientation of sheet (Check one)



Grid Limits	
(16) Greatest Latitude	<u>19° 55' 00"</u> (Projection Line Interval Page 4 Hydro Manual.)
(17) Lowest Latitude	<u>19° 47' 00"</u>
(18) Difference	<u>8' 00"</u>
(21) Greatest Longitude	<u>156° 02' 00"</u>
(22) Lowest Longitude	<u>155° 56' 00"</u>
(23) Difference	<u>6' 00"</u>
(19)	<u>30"</u>
(20)	<u>16 XSI</u>
(24)	<u>130"</u>
(25)	<u>12 XSI</u>

Plate No. 30050-PF 10-3-70  
 Date 4/9/70

PARAMETER CARD II

REC II AND III EXPANDED CARDS -  
 Ream packed to include 0 to east of Batsheet  
42" sheet  
30050

Best major axis of the earth	6,378,206.4	RDA	1 2 3 4 5 6 7 8 9 10
Constant - Distance from central meridian to origin of plotter SP 5	3' at 10047' meters	YRN	11 12 13 14 15 16 17 18 19 20
Constant - Distance from equator to origin of plotter SP 2/1	meters	YRN	21 22 23 24 25 26 27 28 29 30
Central Meridian of Projection	155 59 00 00 W	YRN	31 32 33 34 35 36 37 38 39 40
Plotter Scale/Survey Scale	1:100000	SCA	41 42 43 44 45 46 47 48 49 50
North/south axis of sheet - to correspond to (Y axis - 0)	0 - feet	RYX	51
East/West axis - 1) of plotter	1 - fathom	FOR	52
Identification No.		JN	53 54 55 56 57
		YR	58 59 60

PARAMETER CARD III

1st Lat. Intersection	19 47 00 00 W	YSR	1 2 3 4 5 6 7 8 9 10
2nd Lat. Intersection	15 5 00 00 W	XSR	11 12 13 14 15 16 17 18 19 20
Difference between Grid	30	DYR	21 22 23 24 25 26 27 28 29 30
Internal (Long)		XSN	31 32
Internal (Lat)		YSN	33 34 35

Computed \_\_\_\_\_  
 Punched \_\_\_\_\_  
 Checked \_\_\_\_\_  
 Date 4/9/70

S I G N A L P L O T T E R C A R D S

H-NO.					LATITUDE	LONGITUDE	X	Y	X
09132	005600	000000	1	00000	19511324	155561533	00777	08498	56
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09132	006100	000000	1	00000	19512192	155574200	03424	08778	61
09132	006700	000000	1	00000	19511597	155580371	04087	08586	67
09132	006800	000000	1	00000	19511223	155581261	04359	08465	68
09132	006900	000000	1	00000	19510358	155583004	04892	08186	69
09132	007000	000000	1	00000	19505486	155584688	05406	07904	70
09132	007100	000000	1	00000	19504725	155585623	05692	07659	71
09132	007200	000000	1	00000	19503382	155590179	05861	07225	72
09132	007300	000000	1	00000	19502582	155590570	05981	06967	73
09132	007400	000000	1	00000	19502290	155591100	06143	06872	74
09132	007500	000000	1	00000	19501733	155592175	06471	06693	75
09132	007600	000000	1	00000	19500657	155591852	06373	06345	76
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09132	007800	000000	1	00000	19500234	155592546	06585	06209	78
09132	007900	000000	1	00000	19500039	155593344	06828	06146	79
09132	008000	000000	1	00000	19495548	155594354	07137	05987	80
09132	008100	000000	1	00000	19494651	155595392	07454	05698	81
09132	008200	000000	1	00000	19493512	155595766	07568	05330	82
09132	008300	000000	1	00000	19492498	156000103	07671	05003	83
09132	008400	000000	1	00000	19491704	156001409	08070	04746	84
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09132	008600	000000	1	00000	19490520	156001268	08027	04364	86
09132	008700	000000	1	00000	19485805	156002763	08484	04133	87
09132	008800	000000	1	00000	19484751	156003350	08664	03793	88
09132	009000	000000	1	00000	19483116	156005305	09261	03265	90
09132	075				71 195 1733	155592175	06471	06693	075
09132	078				71 19500234	155592546	06585	06209	078
09132	080				71 19495532	155594309	07123	05983	080
09132	081				71 19494651	155595391	07454	05698	081
09132	082				71 19493512	155595766	07568	05330	082
09132	083				71 19492439	156000062	07659	04984	083
09132	084				71 19491889	156001436	08079	04807	084
09132	086				71 19491763	156000917	07920	04766	086
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09132	088				71 19484751	156003350	08663	03795	088
09132	090				71 19483116	156005305	09261	03268	090
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09132	093				71 19490026	156002161	08300	04205	093
09132	094				71 19485464	156003446	08693	04025	094
09132	095				71 19483877	156004267	08944	03513	095
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09132	097				71 19481942	156010282	09560	02889	097

09132 098

71 19481242 156011251 09876 02662

098

09132 099

71 19480598 156012134 10126 02455

099

000048



U.S. DEPARTMENT OF COMMERCE  
Environmental Science Services Administration  
COAST AND GEODETIC SURVEY

Date: May 23, 1970

Reply to  
Attn of: CFS231-2

Subject: Tide Information, Island of Hawaii

To: Chief, Tides Section  
C3312

During February and March 1970, the PATHFINDER performed hydrography on the west coast of Hawaii on Project OPR 419. A bubbler tide gage was established at Kawaihae Harbor, Hawaii where good records were obtained except for the period February 10 to 26.

If feasible, we would appreciate your office projecting hourly heights at Kawaihae Harbor for the above period from the tide gage at Hilo in combination with the available records that were obtained from the Kawaihae tide gage. The records from the Kawaihae tide gage have been forwarded to PMC.

*E. A. Taylor*

E. A. Taylor  
CAPT, USESSA  
Comdg., PATHFINDER



Environmental Sciences Services Administration  
COAST AND GEODETIC SURVEY  
Rockville, Md. 20852

Date: June 10, 1970

Reply to  
Attn of: C3312-15-CGS

Subject: Tides at Kawaihae

To: Commanding Officer  
USC&GSS PATHFINDER

RECEIVED

JUN 15 1970

SHIP PATHEINDER

Record received was sufficient to verify listing of Kawaihae in the tide table. MLLW on 1970 staff is 2.4 ft.

A copy of Honolulu tabulations for February and March, with reference to MLLW noted in red, is enclosed for use in computing needed water levels at Kawaihae.

*Martha A. Winn*

Martha A. Winn  
Chief, Tides Section  
Oceanography Division

Enclosures



U.S. DEPARTMENT OF COMMERCE  
Environmental Science Services Administration  
COAST AND GEODETIC SURVEY

Date: 17 June 1970

Reply to  
Attn of: CFS3 4060/03.11

Subject: Tide Correctors/PF-10-3-70/OPR-419

To: Commanding Officer  
USC&GSS PATHFINDER

The Tide Tape V for PF-10-3-70 includes hourly heights between 0300, JD71 and 2300, JD77. This does not cover the entire period during which hydro was run: 0900, JD69 to 1800, JD78.

Please advise if these hourly heights are from the bubbler gage at Kawaihae, and whether values are available for the periods of hydro not covered on either end of the Tide Tape. If values are not available from Kawaihae, has PATHFINDER requested Hilo tides for these periods?

I would also appreciate being routinely sent info copies on any transmittals of marigrams from the ship to Rockville. This is our only confirmation that the Tides Division has been requested to furnish PMC with datums and/or range and time relationships for gages operated in the survey area.

*K. William Jeffers*

K. William Jeffers  
Chief, Processing Division  
Pacific Marine Center





**U.S. DEPARTMENT OF COMMERCE**  
**Environmental Science Services Administration**  
COAST AND GEODETTIC SURVEY  
Rockville, Md. 20852

Date: June 18, 1970

Reply to  
Attn of: C331W-165-MCFOE

Subject: Tidal Data, OPR-419, West Coast of Hawaii

To: Chief, Processing Division

Attn: CFS231-2

Mean lower low water corresponds to 2.4 feet on 1970 tide staff at Kawaihae, H.I. This gage is to be used in controlling soundings in the vicinity of Kawaihae Bay.

Zoning for the two other proposed gage locations (not yet established) cannot be furnished until tide observations are obtained and processed. However, Table 2 of the Tide Tables, West Coast North and South America can be used in making the preliminary sheet layout.

*L.C. Wharton*  
L. C. Wharton  
Tides & Currents Branch  
Oceanography Division

Refer: H-9132 (PF-10-3-70)



**U.S. DEPARTMENT OF COMMERCE**  
**Environmental Science Services Administration**  
**COAST AND GEODETIC SURVEY**

Date: 9 JULY 1970

Reply to  
Att'n of: CFS 231-2

Subject: TIDE CORRECTORS OPR-419

To: CHIEF, PROCESSING DIVISION  
PACIFIC MARINE CENTER

In reply to your memorandum of 17 June 1970, a new tide tape was made and forwarded for PF-10-3-70, (H-9132) covering the period from JD69 to JD78. This tide tape was formulated from data taken from the tide gage which was installed at Kawaihae for this survey.

Marigrams from the Kawaihae gage were not available from 12 Feb. to 26 Feb. due to malfunction of this gage. Hourly heights were requested for the standard gage at Hilo from Rockville for this period. We received hourly heights from the standard gage at Honolulu in reply to this request. The received Honolulu data covered the entire months of Feb. and Mar. By projecting hourly heights from Honolulu to Kawaihae for the times during which the Kawaihae gage was functioning it was found that the projected tides matched the actual tides at Kawaihae. We have, therefore, used the Honolulu data supplied by Rockville for the periods during which the Kawaihae gage was malfunctioning. This was necessary for the following surveys on the OPR-419 project:

PF-40-1-70 (H-9129)  
PF-10-1-70 (H-9018)  
PF-10-2-70 (H-9131)

*E.A. Taylor*

E.A. Taylor  
COMMANDING OFFICER  
USC&GSS PATHFINDER

ENCLOSURES:

Memo from CFS 231-2 to Chief Tides Section  
Memo C3312-15-CGS to Commanding Officer, PATHFINDER  
of 10 June  
Memo CFS231-2 to Chief Tides Section, May 23

TIDE NOTE FOR HYDROGRAPHIC SHEET

December 16, 1970

~~NO. 1000 OF THE U.S. COAST AND GEODETIC SURVEY~~

Pacific Marine Center

Plane of reference approved ~~IN~~  
~~WITHIN THE U.S. COAST AND GEODETIC SURVEY~~ for

HYDROGRAPHIC SHEETS 9018, 9129, 9131, and 9132

Locality: Kawaihae, Hawaii

Year  
~~Chief of Party~~ 1970

Plane of reference is mean lower low water

Tide Station Used (Form C&GS-681):

Kawaihae

Height of Mean High Water above Plane of Reference is as follows:

1.5 ft.

Remarks

  
Chief, Tides and Currents Branch

5/22/74

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): Kawaihae Harbor, Hawaii Islands

Period: 28 September - 18 November 1971

HYDROGRAPHIC SHEET: H9132

OPR: 419

Locality: West Coast of Hawaii

Plane of reference (mean lower low water): 2.1 feet

Height of Mean High Water above Plane of Reference is 1.6 ft.

Remarks: Zone direct.

  
for Chief, Tides Branch

PATHFINDER  
OPR-419  
H-9018, H-9129, H-9131, H-9132  
TIME MERIDIAN 150 DEG. WEST  
HONOLULU AND KAWAIHAE, HAWAII  
1970  
CORRECTIONS IN FATHOMS  
*MLLW = 2.4 ft*  
*Time shift = 0 min*  
*Range ratio = 1.0*

092500 00 1002 0000 041 0 030000 000000  
110000 00 1001  
160000 00 1000  
171700 00 1001  
200000 00 1002  
205900 00 1003  
232800 00 1002  
055900 00 1001 0000 042 0 000000 000000  
100000 00 1002  
120000 00 1001  
162200 00 1000  
180000 00 1001  
193600 00 1002  
230000 00 1003  
020000 00 1002 0000 043 0 000000 000000  
075300 00 1001  
080000 00 1002  
122900 00 1001  
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182000 00 1001  
202800 00 1002  
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041900 00 1002  
150000 00 1001  
160000 00 1000  
190000 00 1001  
210000 00 1002  
022900 00 1003 0000 045 0 000000 000000  
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160000 00 1001  
170000 00 1000  
200000 00 1001  
220000 00 1002  
030000 00 1003 0000 046 0 000000 000000  
050000 00 1002

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110000	00	1001				
120000	00	1000				
140000	00	1001				
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214600	00	1001				
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040000	00	1003	0000	047	0	000000 000000
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080000	00	1001				
085900	00	1000				
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100000	00	1000				
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210000	00	1000				
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233900	00	1002				
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061900	00	1002				
075900	00	1001				
085900	00	1000				
090000	00	1001				
100000	00	1000				
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212200	00	1000				
230000	00	1001				
001700	00	1002	0000	049	0	000000 000000
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103100	00	1000				
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040000	00	1004				
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145900	00	1001				
150000	00	1002				
183900	00	1001				
224200	00	1000				
001200	00	1001	0000	051	0	000000 000000
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035900	00	1003				

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073700 00 1002  
100000 00 1001  
120000 00 1000  
140000 00 1001  
170000 00 1002  
200000 00 1001✓

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080000 00 1002  
093700 00 1001  
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002100 00 1000 0000 054 0 000000 000000  
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140000 00 1000  
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222600 00 1001  
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080000 00 1002  
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161400 00 1001  
210000 00 1002



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Tides and Currents Branch

12/15/70

PATHFINDER  
PF-10-3-70  
H-9132  
TIME MERIDIAN - 150 WEST  
TIDE STATION - KAWAIHAE HARBOR, HAWAII  
YEAR - 1971  
CORRECTIONS IN FATHOMS  
MLLW CORRECTION - 2.1 FEET  
TIME SHIFT - ZERO  
RANGE RATIO - 01.00

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110000 00 1002

152800 00 1003

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174600 00 1001

205000 00 1000

221100 00 1001

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055900 00 1003

070900 00 1002

112600 00 1001

125900 00 1002

155900 00 1003

173600 00 1002

190900 00 1001

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235300 00 1001

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013300 00 1003

024600 00 1004

051200 00 1005

063100 00 1004

073200 00 1003

084200 00 1002

130000 00 1001

155800 00 1002

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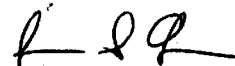
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201000	00	1001				
232000	00	1000				
003100	00	1001	0000	308	0	000000 000000
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030700	00	1003				
034100	00	1004				
070000	00	1005				
080500	00	1004				
090900	00	1003				
103200	00	1002				
150000	00	1001				
185900	00	1002				
210000	00	1001				
220000	00	1000				
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100000	00	1003				
105900	00	1004				
133600	00	1003				
153600	00	1002				
193900	00	1001				
232700	00	1002				
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141200	00	1003				
161200	00	1002				
183600	00	1001				
190000	00	1000				
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224600	00	1002				
230000	00	1003				

100000

APPROVAL SHEET

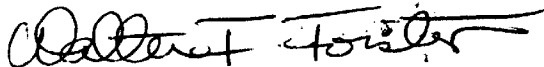
The smooth sheet has been inspected, is complete, and meets the requirements of the General Instructions for automated surveys and the Hydrographic Manual. (Note: All exceptions are listed in the Verifier's Report)

Examined and approved,



James S. Green  
Supervisory Cartographic Technician

Approved and forwarded,



Walter F. Forster, Cdr., NOAA  
Chief, Processing Division  
Pacific Marine Center



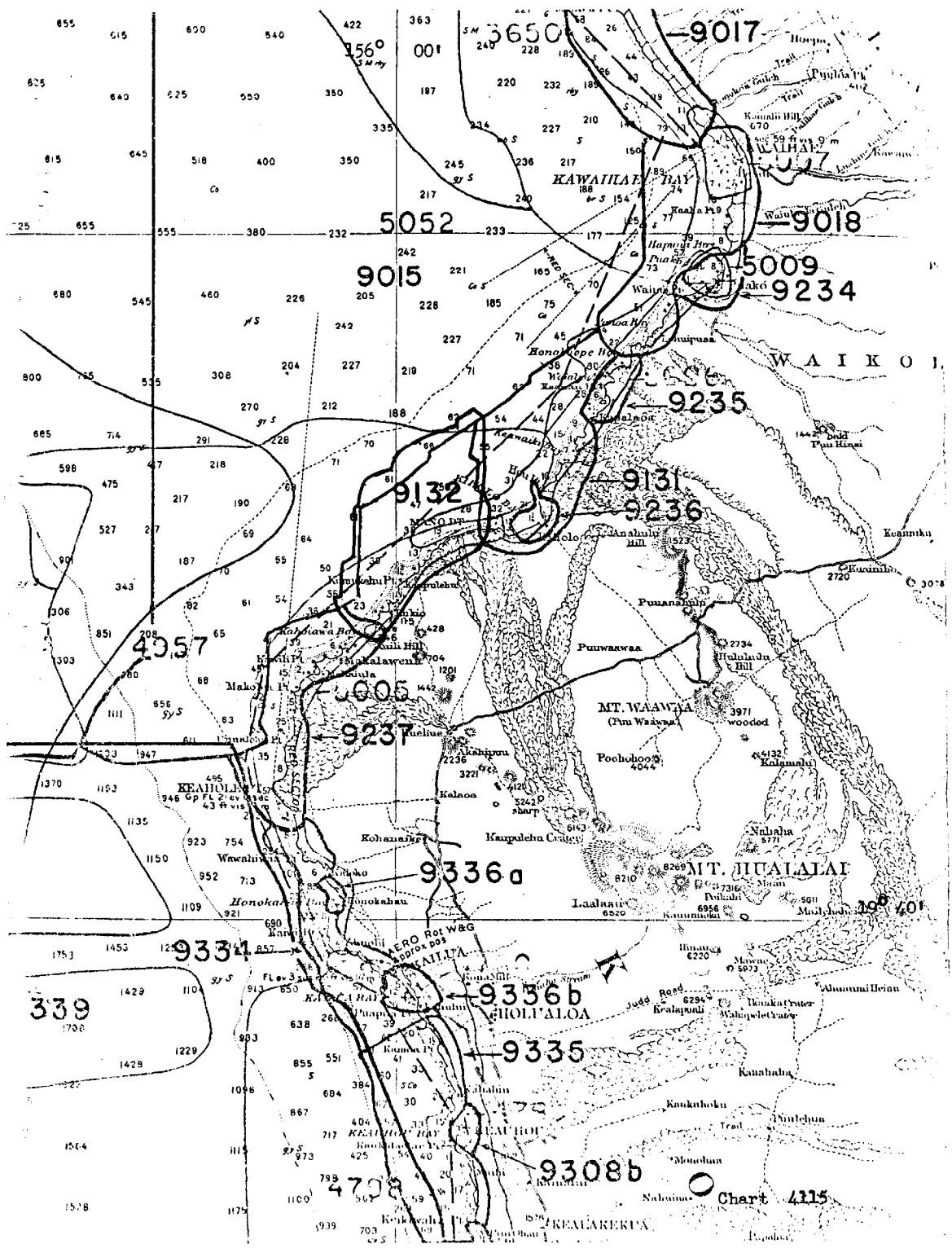


Chart 4115

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9132

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
4179	9-12-75	W. HANSMAN	<del>Full Part Before</del> After Verification Review Inspection Signed Via Drawing No. Exam. for critical corrs. No corr.
4140	3/20/77	J. Bailey	Full <del>Part Before</del> After Verification Review Inspection Signed Via Drawing No. #949M Fully app'd Hydro from Class I survey after verification
4115	5/27/77	M.J. Friese	Full Part Before After Verification Review Inspection Signed Via Drawing No. 13 Examined - partially app'd critical corrections only (rocks & fowl)
4102	12/7/77	Kurmon, D.	Full Part Before After Verification Review Inspection Signed Via Drawing No. 31 Exam'd summary - no information retained at the time
4102 (19004)	3/28/80	Stempel	Full Part Before After Verification Review Inspection Signed Via Drawing No. 32 Applied thru 19320 (4115) (This was <del>app'd</del> fully applied to 4115 in 1978 - see history for Drg #14, item *41) Consider fully app'd Full Part Before After Verification Review Inspection Signed Via Drawing No.
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Exam. for N. M.  
None Required 1/17/74 S. Martof