

9237

Diag. Cht. No. 4115.

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC.....
Field No. FA-10-1B-71 & FA-10-1B-72.....
Office No..... H-9237.....

LOCALITY

State HAWAII.....
General Locality ... WEST COAST.....
Locality PUALOA PT. TO FUHILI PT.....

19 71-72

CHIEF OF PARTY

..... R. H. Houlder. & G. E. Haraden.....

LIBRARY & ARCHIVES

DATE 1/27/75.....

9237

HYDROGRAPHIC TITLE SHEET

H-9237

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.

FA-10-1B-71

State HAWAII

General locality West Coast of Hawaii Island

Locality Puialoa Point to ^{Puhili Point} ~~Makelele Point~~

Scale 1:10,000 Date of survey 1st thru 18th November 1971
See also 1972 Title Sheet for South Half of survey

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

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

Chief of party CAPT. R. H. Houlder

Surveyed by LT. L. K. Nelson, LT(jg). W. A. Hoyle

Soundings taken by echo sounder, ~~hand lead~~ pole (FA-4) Ross 400A Fineline
(FA-3) Raytheon DE-723, serial number 573

Graphic record scaled by FAIRWEATHER personnel

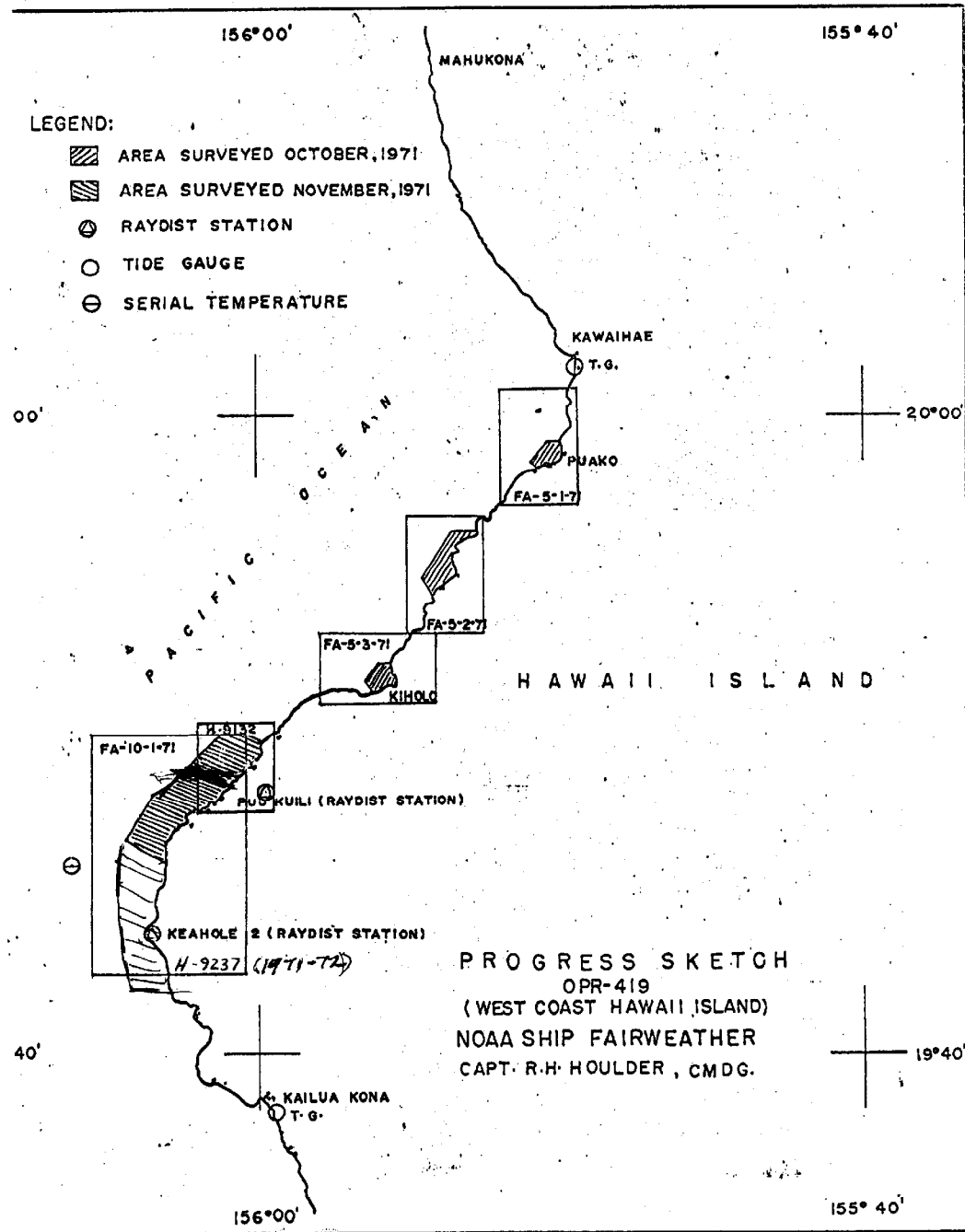
Graphic record checked by FAIRWEATHER personnel

Protracted by _____ Automated plot by PMC - Gerber Digital Plotter

Soundings penciled by _____

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

REMARKS: _____



EXTRACTED FROM CGCS 4115

Descriptive Report
to Accompany
Hydrographic Sheet H-9237 (FA-10-1B-71)
West Coast of Hawaii Island, Hawaii
Scale 1:10,000
NOAA Ship FAIRWEATHER (MSS20)
CAPT. R. H. Houlder, Commanding

A. PROJECT

The hydrographic survey was accomplished under OPR-419 project instructions dated 17 September 1971. ✓

B. AREA SURVEYED

Hydrographic sheet H-9237 was divided into two boatsheets in order to accommodate the use of the PDP-8/E Hydroplot system. The two boatsheets were field numbered FA-10-1B-71 (northern half of H-9237) and FA-10-1A-71 (southern half of H-9237). ✓

Limits of hydrographic sheet H-9237 are as follows:

West	155°05.5' W.
North	19°49.5' N.
South	19°44.0' N.
East	Hawaii Island (Puialoa Point to Keahole Point Lighthouse)

The limits of boatsheet FA-10-1B-71 are as follows:

North	19°49.5' N.
South	19°47.0' N.
East	Hawaii Island (Puialoa Point to Makolea Pt.)

The control was established from 25 October 1971 to 31 October 71. Hydrography extended from 1 November 1971 to 18 November 1971.

This survey ^{overlaps or} junctions with the following prior and contemporary surveys:

Register Number H-9132, 1:10,000, 1970-71.
Register Number H-9015, 1:40,000, 1969 (AR-40-1-69).
Register Number 4957, 1:80,000, 1929.
Register Number 5005, 1:20,000, 1928-29.

C. SOUNDING VESSELS

(Sounding lines were run by):

FA-3	Blue	Positions 2001 - 2245
FA-4	Green	Positions 4028 - 4754

 ✓

D. SOUNDING EQUIPMENT

Launch FA-3 used a Raytheon DE-723 fathometer (Serial No. 523).
Launch FA-4 used a Ross Fineline Digital Model 400A Fathometer. ✓

The sounding velocity corrections were determined from serial temperature and salinity observations. The echo corrections were determined from bar check results. The fathograms were checked to determine initial corrections to the soundings. An abstract of the cumulative corrections to the soundings for the survey is included with this report.

E. SMOOTH SHEET

The final smooth sheet is to be plotted electronically and verified by personnel at Pacific Marine Center. ✓

The final boatsheet was plotted by the PDP-8/E Hydroplot system. It consists of three overlays:

1. Visual position overlay.
2. Sounding overlay.
3. Detached position overlay.

F. CONTROL

The hydrographic control consisted of both visual and electronic (Raydist). Launch FA-3 ran visual hydrography exclusively. FA-4 used both visual and electronic control. ✓

All inshore electronic hydrography complied with the project instructions in making frequent visual fix comparison with the electronic fixes to determine any attenuation of signals. In most cases, inshore hydrographic lines ended with visual fixes.

All hydrographic signals, with the exception of signals 120, 121, and 122, were located by photogrammetric methods. The latter three signals were located by third order traverse originating from a second order station established by a private engineering company, R. M. Towwill Corporation, Honolulu, Hawaii.

A Wild T-2 theodolite was used in measuring the angles, and distances were measured with a MRA-3 Mark II Tellurometer.

Computations were performed on the FAIRWEATHER PDP-8/E computer. Geodetic positions were based on the Hawaii State Plane Coordinate System, zone 1.

G. SHORELINES

Shoreline was transferred directly to the boatsheet from Advance Manuscripts, ~~T-12537~~ to T-12539, scale 1:10,000. ✓

Field edit of the shoreline on T-125~~37~~^{39 and 40} to T-12539 for the area of hydrography was completed on H-9237.

H. CROSSLINES

Crosslines, consisting of 15% of the regular system of sounding lines, were in good agreement. ✓

I. JUNCTIONS AND COMPARISON WITH PRIOR SURVEYS

Junctions were made with contemporary survey AR-40-1-69^{H 9015} from 19°47.0' N., 156°05.0' W. to 19°49.5' N., 156°01.5' W. and with contemporary survey H-9132 from 19°49.2' N., 156°01.8' W. to 19°48.7' N., 156°00.8' W. The junction with AR-40-1-69^{H:9015} indicates a discrepancy of 3 to 4 fathoms, the present survey having the shoaler soundings. The junction with H-9132 indicates satisfactory agreement. *junction with H9015 is adequate* ✓

Due to the fact that good agreement was found between H-9132 and the present survey and USC&GS Chart No. 4140 (see section I), it is believed that AR-40-1-69^(H:9015) is in error. It was noted that the geodetic position of station KEAHOLE 2 as determined by FAIRWEATHER personnel differed from the published coordinates by one second of longitude.

If this station was used in the positioning of their electronic control, this would account for part of the error.

J. COMPARISON WITH THE CHART

Comparison of the survey with USC&GS Chart No. 4140 (1:80,000), 3rd edition, 24 January 1966, indicates that the bottom characteristics have generally remained the same. Soundings agreed to within one fathom throughout. ✓

A pre-survey review indicated a shoal area off Kawilli Point approximately 19°47.5' N., 156°02.7' W. This survey verifies the existence of the shoal area. CONCUR

K. ADEQUACY OF THE SURVEY

The survey of H-9237 is considered ~~not~~ complete. The northern & southern halves of H-9237 (FA-10-1B-71) ^{are} complete and sufficient for charting purposes. *with the addition of sdgs. carried forward from H-5005 (1928 29) the survey is adequate.* ✓

L. AIDS TO NAVIGATION

There ~~are~~^{is one} ~~at~~ aids to navigation in the area of the survey.
Keahole Pt. Light. ✓

M. STATISTICS

	<u>FA-3</u>	<u>FA-4</u>	<u>Ship</u>
Positions	245	718	0
Sounding line (n.m.)	24.1	69.3	0
Area surveyed (sq. n.m.)	0.5	3.5	0
Temperature/salinity casts	0	0	1
Bottom samples	13	0	0

N. MISCELLANEOUS

Various rocks and objects were located by sextant fix and plotted on the boatsheet. Bottom samples were taken in accordance with the Hydrographic Manual by Launch FA-3. ✓

O. RECOMMENDATIONS

Complete the survey by developing the southern half of H-9237.
Completed. ✓

P. REFERENCE TO REPORTS

1. Season's Report, NOAA Ship FAIRWEATHER, 1971.
2. Field Edit Report, OPR-419, NOAA Ship FAIRWEATHER, 1971.
3. Fathometer Report, OPR-419, NOAA Ship FAIRWEATHER, 1971.
4. Coast Pilot Report, OPR-419, NOAA Ship FAIRWEATHER, 1971.
5. Traverse and Triangulation Report, OPR-419, NOAA Ship FAIRWEATHER, 1971. ✓
6. PDP-8/E Software and Processing Report, OPR-419, NOAA Ship FAIRWEATHER, 1971.
7. PDP-8/E Hardware Report, OPR-419, NOAA Ship FAIRWEATHER, 1971.

Respectfully submitted,

Kenneth H. Underwood

Kenneth H. Underwood
ENS., NOAA

TRANSMITTAL SHEET

The field work was examined daily under the supervision of this command. The boatsheet was inspected daily for completeness and additional work is considered necessary south of latitude 19°47'20" N.



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

✓

LIST OF SIGNALS
Sheet H-9237

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

<u>Signal</u> <u>Number</u>	<u>LATITUDE</u> (° ' m)	<u>LONGITUDE</u> (° ' m)
090	19° 48' 3116m	156° 00' 5305m ✓
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 ✓
099	19 48 0598	156 01 2134 ✓
100	19 47 5756	156 01 2728 ✓
101	19 47 5665	156 01 3099 ✓
102	19 47 5581	156 01 3916 ✓
103	19 47 4494	156 01 5009 ✓
104	19 47 3867	156 01 5778 ✓
105	19 47 3782	156 02 0460 ✓
106	19 47 3825	156 02 1099 ✓
107	19 47 2982	156 02 2106 ✓
108	19 47 2361	156 02 2827 ✓
109	19 47 1737	156 02 2415 ✓
110	19 47 1242	156 02 2264 ✓
111	19 47 0335	156 02 2748 ✓
112	19 47 0676	156 02 3463 ✓
113	19 46 5968	156 02 4558 ✓
114	19 46 4930	156 02 5864 ✓
115	19 46 4013	156 02 5946 ✓
120	19 45 2804	156 03 0763 ✓
121	19 45 5895	156 03 0808 ✓
122	19 46 3224	156 03 0756 ✓
123	19 43 5128	156 03 4983 ✓

-End-

VELOCITY TABLE H-9237

1976 WORK

000
000015 0 0000 0001/000000 000000
000034 0 0001
000054 0 0002
000073 0 0003
000092 0 0004
000111 0 0005
000130 0 0006
000149 0 0007
000168 0 0008
000187 0 0009
000206 0 0010
000225 0 0011
000244 0 0012
000263 0 0013
000279 0 0014
000298 0 0015
000318 0 0016
000349 0 0017
000384 0 0019
000425 0 0021
000462 0 0023
~~000505~~
000505 0 0025
000545 0 0027
000585 0 0029
000625 0 0031
000668 0 0033
000709 0 0035
000751 0 0037
000796 0 0039
000835 0 0041
000882 0 0043
000930 0 0045
000975 0 0047
001025 0 0049
001119 0 0051
001270 0 0056
001463 0 0061
001722 0 0066
002160 0 0071
~~002200~~
002840 0 0081
003580 0 0091
004440 0 0101

L271,278

271 VELOCITY CORRECTION TAPE

272 RA-10-6-72

273 RA-10-7-72

274 RA-10-8-72

275 RA-10-9-72

276 FA-10-1-71

277 LAUNCH 2126

278 TABLE 0007

*

L279,310

279 000015 0 0000 0007 000 000000 000000

280 000035 0 0001

281 000054 0 0002

282 000077 0 0003

283 000097 0 0004

284 000117 0 0005

285 000145 0 0006

286 000185 0 0008

287 000225 0 0010

288 000265 0 0012

89 000305 0 0014

290 000350 0 0016

291 000390 0 0018

292 000425 0 0020

293 000465 0 0022

294 000505 0 0024

295 000550 0 0026

296 000595 0 0028

297 000640 0 0030

298 000685 0 0032

299 000730 0 0034

300 000775 0 0036

301 000820 0 0038

302 000870 0 0040

303 000925 0 0042

304 000985 0 0044

305 001035 0 0046

306 001210 0 0050

307 001380 0 0055

308 001590 0 0060

309 001830 0 0065

310 002250 0 0070

*

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	^{DAY} 315 11-11-71	+0.4 fathoms	2005-2040
	319 11-15-71	+0.2 "	2041-2108
	319 11-15-71	--- *	2109-2116
	319 11-15-17	+0.2 "	2117-2127
	320 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.

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 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>			
-(All entries in this column minus Mean S.V.C.)-			
FA-5-1-71	10-16-71	+ .5 feet	3001-3063
	10-17-71	+ .3 "	3073-3197
10	10-18-71	+ .4 "	3211-3383
	10-19-71	+1.1 "	3454-3570
	10-20-71	+ .5 "	3576-3672
	10-21-71	+ .9 "	3673-3702
	10-27-71	--- *	3703-3708
	10-28-71	+ .5 "	3709-3800
	10-31-71	--- *	3800-3804
FA-5-3-71	10-29-71	+ .6 feet	2001-2064
	10-30-71	+ .9 "	2065-2180
	11-01-71	+ .5 "	2181-2283
H-9132	11-03-71	+ .4 fathoms	2001-2047
	11-04-71	+ .1 "	2048-2133
	11-10-71	+ .3 "	2150-2200
FA-10-1B-71	^{Day} 315 11-11-71	+ .3 "	2005-2040
	319 11-15-71	+ .1 "	2041-2108
	319 11-15-71	--- *	2109-2116
	319 11-15-71	+ .1 "	2117-2127
	320 11-16-71	+ .2 "	2128-2245

--- * Bottom samples taken.

TRA 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>			
(All entries in this column are minus Mean S.V.C.)			
FA-5-2-71	10-17-71	+1.9 feet	5001-5119
	10-18-71	+1.9 "	5120-5231
	10-19-71	+1.2 "	5232-5371
	10-20-71	+1.1 "	5372-5483
	10-21-71	+1.4 "	5484-5612
	10-27-71	+1.6 "	5618-5731
	10-29-71	+1.9 "	5732-5787
	10-31-71	--- **	5788-5794
H-9132	10-30-71	--- *	6001-6009
	11-01-71	+ .1 fathoms	6010-6040
	11-02-71	+ .2 "	6041-6208
FA-10-1B-71	11-04-71	+ .2 "	4028-4058
	11-10-71	+ .2 "	4059-4128
	11-11-71	+ .2 "	4129-4218
	11-13-71	+ .2 "	4219-4228
	11-14-71	+ .2 "	4236-4342
	11-15-71	+ .3 "	4343-4522
	11-16-71	+ .3 "	4523-4670
	11-17-71	+ .3 "	4671-4754

--- * Bottom samples taken.
--- ** Detached positions.

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

FAIRWEATHER
FA-10-1-71
H-9237
TIME MERIDIAN - 150
TIDE STATION - KAILUA KONA, HAWAII
YEAR - 1971
MLLW CORRECTION - 2.6 FEET
TIME SHIFT - ZERO
RANGE RATIO - 01.00

021900 00 1003 0000 308 0 010000 000000
031300 00 1004
064000 00 1005
074800 00 1004
084800 00 1003
100000 00 1002
144700 00 1001
182000 00 1002
205900 00 1001
231500 00 1000
234800 00 1001
030000 00 1002 0000 314 0 000000 000000
040000 00 1001
045900 00 1001
070000 00 1002
095800 00 1003
095900 00 1004
125900 00 1003
143400 00 1002
203900 00 1001
045400 00 1002 0000 315 0 000000 000000
045900 00 1001
50000 00 1002
050500 00 1001
084000 00 1002
133700 00 1003
152500 00 1002
205900 00 1001
232800 00 1002
010000 00 1003 0000 317 0 000000 000000
020000 00 1004
044300 00 1003
113600 00 1002
141400 00 1003
162600 00 1002
183600 00 1001
190000 00 1000
214900 00 1001

232200 00 1002
013400 00 1003 0000 318 0 000000 000000
025900 00 1004
051000 00 1003
070000 00 1002
075900 00 1001
080000 00 1002
090000 00 1001
130000 00 1002
140000 00 1003
63600 00 1002
183200 00 1001
204400 00 1000
222600 00 1001
234800 00 1002
014600 00 1003 0000 319 0 000000 000000
041400 00 1004
054500 00 1003
071500 00 1002
104000 00 1001
163600 00 1002
185900 00 1001
210000 00 1000
225100 00 1001
235900 00 1002
012000 00 1003 0000 320 0 000000 000000
050000 00 1004
062400 00 1003
081000 00 1002
120000 00 1001
171100 00 1002
195900 00 1001
205900 00 1000
225900 00 1001
002500 00 1002 0000 321 0 000000 000000
012400 00 1003
060000 00 1004
070800 00 1003
090000 00 1002
134000 00 1001
171200 00 1002

0

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. ✓

4/16/74

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 Form 362

Tide Station Used (NOAA Form 77-12): Kailua Kona

Period: Sept. 29 - Nov. 18, 1971

HYDROGRAPHIC SHEET: H9237

OPR: 419

Locality: West Coast of Hawaii Island

Plane of reference (mean lower low water): 2.6 ft.

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

Remarks: Zone direct on Kailua Kona gage.


Chief, Tides Branch

DESCRIPTIVE REPORT
TO ACCOMPANY HYDROGRAPHIC SURVEY

FA-10-1b'-71

H-9237

Scale 1:10,000

1972

NOAA Ship RAINIER

CAPT G.E. HARADEN
Commanding

HYDROGRAPHIC TITLE SHEET

H-9237

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.

FA-10-1b'-72¹/₂

State HAWAII

General locality West Coast, Hawaii Island

Locality Makolea Pt. to Puhili Pt.

*see also 1971
title sheet*

Scale 1:10,000

Date of survey SEPTEMBER 22-25, 1972

Instructions dated 15 JUNE 1972

Project No. OPR-419-RA-72

Vessel NOAA Ship RAINIER

Chief of party CAPT. G. E. HARADEN

Surveyed by LTJG J. MCCABE

Soundings taken by echo sounder, hand lead, pole ROSS Model 5000 (SN:1040)

Graphic record scaled by SHIP'S PERSONNEL

Graphic record checked by SHIP'S PERSONNEL

Protracted by _____ Automated plot by COM PLOT DP-35

PML - Gerber Digital Plotter

Soundings penciled by _____

Soundings in fathoms FEK at NKN MLLW _____

REMARKS: The Modified Transverse Mercator Projection, soundings and position
numbers on the boat sheet were plotted by the RAINIER'S PDP 8/e
Computer and COM PLOT Plotter.

on boat sheet

A. PROJECT

The survey was conducted in accordance with PROJECT INSTRUCTIONS OPR-419-RA-72, dated 15 June 1972 and Change Number 1, dated 11 September 1972. ✓

B. AREA SURVEYED

This 6 square mile coastal survey is centered approximately 1 mile north of KEAHOLE POINT off the western shore of Hawaii Island, Hawaii. The survey is bounded on the east by the shoreline, on the south by latitude $19^{\circ} 42.5'N$ and on the west by longitude $156^{\circ} 05'W$, and on the north by latitude $19^{\circ} 47.5'N$. The survey began on 22 September 1972 (J.D. 266) and was completed 25 September 1972 (J.D. 269). Listed below are three prior surveys of this area: ✓

Reg. No.	Scale	Year
H-5005	1:20,000	1929
H-4957	1:80,000	1929
H-9015	1:40,000	1969

Junctions were also made with the following contemporary surveys:

PF 10-3-70-H-9132	1:110,000	1970
FA-10-1-71 H/2-H-9237	1:10,000	1971
RA-10-7-72 (H-9334)	1:10,000	1972
RA-80-1-72 (H-9339)	1:80,000	1972

C. SOUNDING VESSEL

All soundings and bottom samples were obtained by the Uniflite launch RA-6. The soundings along mainscheme lines are shown in black ink. The crosslines and shoreline are shown in red ink. All bottom samples are denoted on the boat sheet by green circles. The soundings on the boat sheet were plotted by the Complot Plotter in combination with a Digital Equipment Corporation PDF 8/e computer. ✓

D. SOUNDING EQUIPMENT

Launch RA-6 used a Ross Model 5000 Recorder Number 1040 in depths from 0 to 200 fathoms. Bar checks down to 7 fathoms were taken daily and the results abstracted. Internal phase comparisons were routinely made throughout the survey and no phase correction is necessary. ✓

The Ross fathometer uses a stylus traveling in a straight line, thus no fine arc corrections were necessary. No

abstract of initial corrections was compiled in that any observed difference in the initial value appears only on the analog record and does not affect the digitized soundings. In check scanning the fathograms the initial correction was considered before reading the analog record. The fathogram was scanned continuously in the field by comparing it to the digitized values. Judicious use of the blanking function was made to eliminate spurious returns. ✓

All corrections were logged onto the TC/TI tape. A 0.4 fathom draft correction was applied to the soundings obtained by the Uniflite launch.

Velocity corrections were computed from the bar checks and a Nansen Cast taken on 13 October 1972 at latitude 19° 17.8'N longitude 155° 58.2'W. The resulting velocity correction table was entered on tape and utilized via the TC/TI tape.

The above equipment performed well with the exception of not being consistently capable of sounding over steep gradients at depths greater than 100 fathoms. For further information on sounding equipment and corrections refer to Sounding Corrections Report, OPR-419-RA-72.

E. SMOOTH SHEET

The boatsheet's Modified Transverse Mercator Projection and soundings were plotted by RAINIER personnel using the onboard PDP 8/e Complot system. The boatsheet was prepared using a central meridian of 156° 00'W and a control latitude of 2,050,000 meters North of latitude zero. Position numbers and Mini-Ranger arcs were also plotted by the computer and plotter. The final smooth sheet will be plotted by PMC's Electronic Data Processing Division. ✓

All soundings were plotted with draft and predicted tide corrections applied. The fathograms were scanned for peaks and deeps and compared against the printouts and all necessary corrections have been made.

Actual tides, hourly heights and time and height differences will be furnished to the Pacific Marine Center's Processing Division by the Rockville office.

F. CONTROL

Sheet FA-10-lb'-71 was surveyed using an electronic range/range positioning system called "Mini-Ranger". This system is built by Motorola Inc. See the Mini-Ranger Report OPR-419 NOAA Ship RAINIER, 1972 for detailed information about the Mini-Ranger System. ✓

Transponders were placed on four-legged stands at triangulation stations KUILI, 1882 latitude 19° 48' 11.674"N longitude 156° 00' 44.802 "W; and LAE NIAU 2, 1972 latitude 19° 40' 39.057"N longitude 155° 58' 13.730"W. KUILI was 104.1 meters above sea-level and LAE NIAU 2 was 452.63 meters above sea-level. The KUILI-LAE NIAU 2 baseline was used for all work on this sheet. Arc intersections were between 70 and 120 degrees. RA-6, which accomplished all the hydrography between Sept. 22 and Sept. 25, did not encounter any Mini-Ranger problems. The land was relatively low and flat close to the shoreline and both transponders were elevated.

G. SHORELINE

Shoreline details were traced directly from the shoreline manuscripts. Field edit of these manuscripts was completed by ship's personnel. For detailed information reference the Field Edit manuscripts. There was 5.1 nm of shoreline which was run along the 5 fathom curve, for the safety of the boat and crew, which delineated the coral reef very well. ✓

H. CROSSLINES

Crosslines on sheet FA-10-lb'-71 totaled 8.8 nautical miles or 21.4% of the mainscheme miles run. There is excellent agreement between mainscheme and crosslines in all cases. ✓

I. JUNCTIONS

Survey FA-10-lb'-71 junctions with FA-10-l-71, plotted by hand in green, RA-10-7-72 plotted in green, and RA-80-l-72 plotted in blue. All contemporay surveys show excellent agreement with this survey, as shown by the excellent junctioning of depth curves between the surveys. All soundings agree within 1 fathom. ✓

J. COMPARISON WITH PRIOR SURVEYS

There is only one Presurvey review item within this survey - a 34 fathom sounding at latitude $19^{\circ} 44.4'N$ and longitude $156^{\circ} 04.2'W$. ^{see} Investigation of this item revealed a ~~34~~³⁵ fathom shoal at ^{approx} the same latitude and longitude. There are three prior surveys in the area which are listed under Area Surveyed. All prior surveys show excellent agreement. All soundings agree within 1 fathom. ✓
350 meter line spacing
34 and other steps retained

K. COMPARISON WITH THE CHARTS

This survey was compared with charted soundings on chart 4140 (in special violet) 4th. ed. October 25, 1969, 1:80,000. The soundings comparison is excellent. All soundings agree within 1 fathom. ✓

L. ADEQUACY OF SURVEY

This survey is complete and adequate to supersede all prior surveys for charting. ✓

M. AIDS TO NAVIGATION

The only aid to navigation was Keahole Point Light which was found as described in the light list. (At latitude $19^{\circ} 43.9'N$ and longitude $156^{\circ} 03.8'W$). ✓

N. STATISTICS

This sheet contains 437 positions, 49.0 nautical miles of sounding lines, approximately 6 square nautical miles of survey area and 8 bottom samples. ✓

O. DATA PROCESSING

All data was recorded in master tape format using the on-line Hydrolog system controlled by program AM 170. Corrector tapes were prepared using the standard Hydroplot/Hydrolog format for all peaks, deeps, sounding and control changes. ✓

Separate master tapes and corrector tapes were prepared for each day. Standard formats, as specified in the INSTRUCTION MANUAL, Automated Hydrographic Surveys, were used for the TC/VI and velocity correction Tapes.

Note that TRA correctors and velocity table numbers shown on the Hydroplot/Hydrolog tapes are to be ignored for processing at PMC. The correct data is listed on the TC/TI tape.

P. RECOMMENDATIONS

None.

Q. REFERENCES TO REPORTS

1. Sounding Correction Report, OPR-419 NOAA Ship RAINIER, 1972.
2. Mini-Ranger Report, OPR-419 NOAA Ship RAINIER, 1972.

Respectfully Submitted

Jan W McCabe

Jan W. McCabe
LTjg, NOAA

APPROVAL SHEET

H-9237

FA-10-1b'-71

Kona Coast, Hawaii, 1972

In producing this sheet, hydrographic procedures were observed and the data was examined daily during the execution of the survey.

The data on the boat-sheet and the accompanying records have been examined by me and are considered complete and adequate, and are hereby approved.

G. E. Haraden

G. E. HARADEN
CAPT, NOAA

✓

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

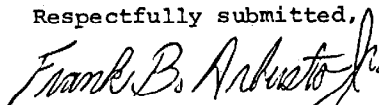
for total fathometer corrections were made by Launches FA-3 and FA-4 while Launch FA-6 (hydro skiff) made pole checks.

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

1972



ABSTRACT OF POSITION NUMBERS

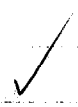
VESSEL	JULIAN DAY	POSITION NUMBER	REMARKS
RA6	266	6000-6043	Kuili - Lae Niau 2
RA6	267	6044-6179	" "
RA6	268	6180-6368	" "
RA6	269	6369-6444	Kuili - Lae Niau 2 6369-6376 = B.S. 6407-6411 = Rej.

FAIRWEATHER
FA-10-1-71
H-9237
TIME MERIDIAN - 150
TIDE STATION - KAILUA KONA, HAWAII
YEAR - 1972
MLLW CORRECTION - 2.6 FEET
TIME SHIFT - ZERO
RANGE RATIO - 01.00

050900 00 1003 0000 266 0 010000 000000
064200 00 1002
081300 00 1001
095900 00 1000
115100 00 1001
130000 00 1002
150000 00 1003
150500 00 1004
172400 00 1003
183300 00 1002
194200 00 1001
232900 00 1000
003000 00 1001 0000 267 0 000000 000000
012700 00 1002
035800 00 1003
035900 00 1004
061100 00 1003
073300 00 1002
091500 00 1001
112000 00 1000
123700 00 1001
135900 00 1002
173900 00 1003
190000 00 1002
200700 00 1001
235900 00 1000
010000 00 1001 0000 268 0 000000 000000
020000 00 1002
031800 00 1003
052200 00 1004
072300 00 1003
084200 00 1002
104000 00 1001
110000 00 1000
111900 00 1000
131700 00 1001
150000 00 1002
172800 00 1003

190500 00 1002
200800 00 1001
001300 00 1000 0000 269 0 000000 000000
011200 00 1001
021300 00 1002
033100 00 1003
063700 00 1004
82500 00 1003
100000 00 1002
142200 00 1001
192600 00 1002
211000 00 1001

0



TIDE NOTE

H-9237

(FA-10-1b'-71)

It is recommended that the tide station established at Kailu Kona, Hawaii Island, Hawaii in latitude $19^{\circ} 38.52'N$ longitude $155^{\circ} 59.97'W$ be used to control the soundings on this survey. The gage operated on time meridian $150^{\circ} W$. Hourly heights will be furnished to the PMC Processing Division by the ship. Reduction to MLLW and copies of the marigrams will be furnished by Tides Division, Rockville.

Predicted tides for boatsheet control were obtained from the Tide Tables, 1972, West Coast of North and South America using the Napoopoo (On Honolulu) subordinate station. The tides were machine generated, and applied directly to the data when plotted by the computer.

May 7, 1974

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 Form 362

Tide Station Used (NOAA Form 77-12): Kailua Kona

Period: August 16 - November 13, 1972

HYDROGRAPHIC SHEET: H-9237

OPR: 419

Locality: West coast of Hawaii Island

Plane of reference (mean lower low water): 2.6

Height of Mean High Water above Plane of Reference is 1.6

Remarks:

Zone direct

James R. McLeod
for Chief, Tides Branch

GEOGRAPHIC NAMES

Survey No.

H-9237

Name on Survey


Name on Survey	Source											No.
	A	B	C	D	E	F	G	H	K			
	On Chart No.	On previous Survey No.	On U. S. Quadrangle Maps	From local information	On local Maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List				
AWAKEE BAY ✓												1
HAWAII ✕												2
HOONA BAY ✓												3
KAHOIAWA BAY ✓												4
KAHOIAWA PT. ✓												5
KALIHI PT. ✓												6
KAWIKOHALE PT. ✓												7
KAWILI PT. ✓												8
KEAHOLE PT. ✓												9
KUA BAY ✓												10
MAHAUULA ✓												11
MAKAKO BAY ✓												12
MAKALAWENA ✓												13
MAKOLEA PT. ✓												14
PUIALOA PT. ✓												15
PUU ALII BAY ✓												16
PUUKALA PT. ✓												17
UNUALOHA PT. ✓												18
WAWALOLI BEACH ✓												19
MAHAUULA BAY												20
PACIFIC OCEAN												21
												22
												23
												24
												25
												26

Approved
 Chris E. Harrington
 Staff Geographer
 16 April 1975

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

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9237

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & PNO.	1	BOAT SHEETS	2
DESCRIPTIVE REPORT	2	OVERLAYS	8 2

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES	1		1			
CAHIERS	1					
VOLUMES	6 2					
BOXES						

T-SHEET PRINTS (List)
~~1-10500, 2-10510~~

SPECIAL REPORTS (List)

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

PROCESSING ACTIVITY	AMOUNTS <i>total for both sheets</i>			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				
POSITIONS CHECKED		1105	110	
POSITIONS REVISED		74	0	
DEPTH SOUNDINGS REVISED		126	10	
DEPTH SOUNDINGS ERRONEOUSLY SPACED		0	0	
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		0	0	
	TIME (MANHOURS)			
Verification of Control		8	1	
Verification of Positions		31	5	
Verification of Soundings		152	15	
Smooth Sheet Compilation		158	9	
ALL OTHER WORK		16	54	
TOTALS		365	84 + 33	
PRE-VERIFICATION BY	BEGINNING DATE	ENDING DATE		
VERIFICATION BY <i>Robert Montemayor</i> Robert Montemayor, Cartographic Tech.	BEGINNING DATE 3/14/74	ENDING DATE Jan 3, 1975		
REVIEW BY <i>George M Frank</i>	BEGINNING DATE 7-25-75	ENDING DATE 9-16-75		

Curs. Inspec. - A. SAULSBURY

Carstens 4 hrs 8/27/76

Reg. No. H-9237

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

H-9237

Items for Future Presurvey Reviews

None

<u>Position</u>	<u>Index</u>	<u>Bottom Change</u>	<u>Use</u>	<u>Resurvey</u>
<u>Lat.</u>	<u>Long.</u>	<u>Index</u>	<u>Index</u>	<u>Cycle</u>
194	1561	1	1	50 years

Reg. No. H9237

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

Reg. No. H9237

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQ'D. _____ INITIALS _____

REMARKS:

H-9237

Items for Future Presurvey Reviews

None

<u>Position Index</u>		<u>Bottom Change</u>	<u>Use</u>	<u>Resurvey</u>
<u>Lat.</u>	<u>Long.</u>	<u>Index</u>	<u>Index</u>	<u>Cycle</u>
194	1561	1	1	50 years

OFFICE OF MARINE SURVEYS AND MAPS
MARINE SURVEYS DIVISION
MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9237

FIELD NO. FA-10-1B-71

Hawaii, West Coast, Puialoa Point to Puhili Point

SURVEYED: November 1-18, 1971; September 22-25, 1972

SCALE: 1:10,000

PROJECT NO.: OPR-419

SOUNDINGS: Ross 400A Finline and
Raytheon DE-723 Echo Sounders

CONTROL: Mini Ranger, Raydist,
and Sextant Fixes on
Shore Signals

Chief of Party G. E. Haraden
..... R. H. Houlder
Surveyed by J. McCabe
..... L. K. Nelson
..... W. A. Hoyle
Automated Plot by Gerber Digital Plotter (PMC)
Verified by R. Montemayor
Reviewed by G. M. Frank and F. Saulsbury
Date: September 16, 1975
Cursory inspection made--survey
processing considered complete F. Saulsbury
June 9, 1976

1. Control and Shoreline

The source of control is given in the Descriptive Report, paragraph F.

The shoreline originates with Class I photogrammetric manuscripts T-12539 and T-12540 with 1963 photography and field edits of 1971 and 1972 respectively.

The mean high water line on the present survey is shown for guidance only and the true position is shown on the topographic surveys previously mentioned.

2. Hydrography

Sounding line crossings are in good agreement.

Depth curves are adequately delineated north of latitude 19°47'. South of this, the development of bottom configuration in depths less than 20 fathoms was inadequate and has been supplemented by numerous soundings carried forward from the prior survey, H-5005 (1928-29).

3. Condition of the Survey

The field plotting, sounding records, automated printouts, and the Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual supplemented by the Instruction Manual - Automated Hydrographic Surveys, except for:

- A. An insufficient number of bottom samples were taken.
- B. Elevations of bare rocks and rocks awash are not slanted.

4. Junctions

An adequate junction was effected with H-9015 (1969) on the west, H-9334 (1972) on the south, H-9132 (1970) on the north, and H-9339 (1972) on the west.

5. Comparison with Prior Surveys

- A. H-4655a (1927) 1:247,000
H-4957 (1928-29) 1:80,000

These surveys fall in the area of the present survey but are not discussed in the present review.

- B. H-5005 (1928-29) 1:20,000

This survey covers the entire area of the present survey. A comparison between the prior and present depths indicates differences of 1 to 2 fathoms in depths less than 20 fathoms. These differences are attributed to less accurate methods of surveying on the prior survey.

With the addition of numerous inshore soundings, several rocks awash, and bottom characteristics brought forward from H-5005 (1928-29), the present survey is adequate to supersede the prior survey within the common area.

6. Comparison with Chart 4140 (latest print date December 29, 1973)

A. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration.

The sunken rocks charted from T-3425 (1913) at latitude 19°48.05', longitude 156°01.60'; latitude 19°46.60', longitude 156°03.30'; latitude 19°46.25', longitude 156°03.20'; latitude 19°45.90', longitude 156°03.30'; and latitude 19°45.70', longitude 156°03.20' originally designated the

approximate location of breakers on the 1913 survey. The present survey adequately delineates the dangers in these areas.

The present survey is adequate to supersede the charted hydrography within the common area.

B. Aids to Navigation

Keahole Point Light charted in latitude 19°43.85', longitude 156°03.82' agrees with its survey location and adequately serves the purpose intended.

7. Compliance with Instructions

This survey adequately complies with the Project Instructions except for the excessive line spacing in depths less than 20 fathoms around rocky points which should be 100 meters.

8. Additional Field Work

This survey is considered to be a very good basic survey. A more thorough development of the area along the shore, especially in the southern half of the survey, would have been desirable.

Examined and Approved:

A. J. Patrick
Chief
Marine Surveys Division

R. H. Smith
Associate Director
Office of Marine Surveys
and Maps

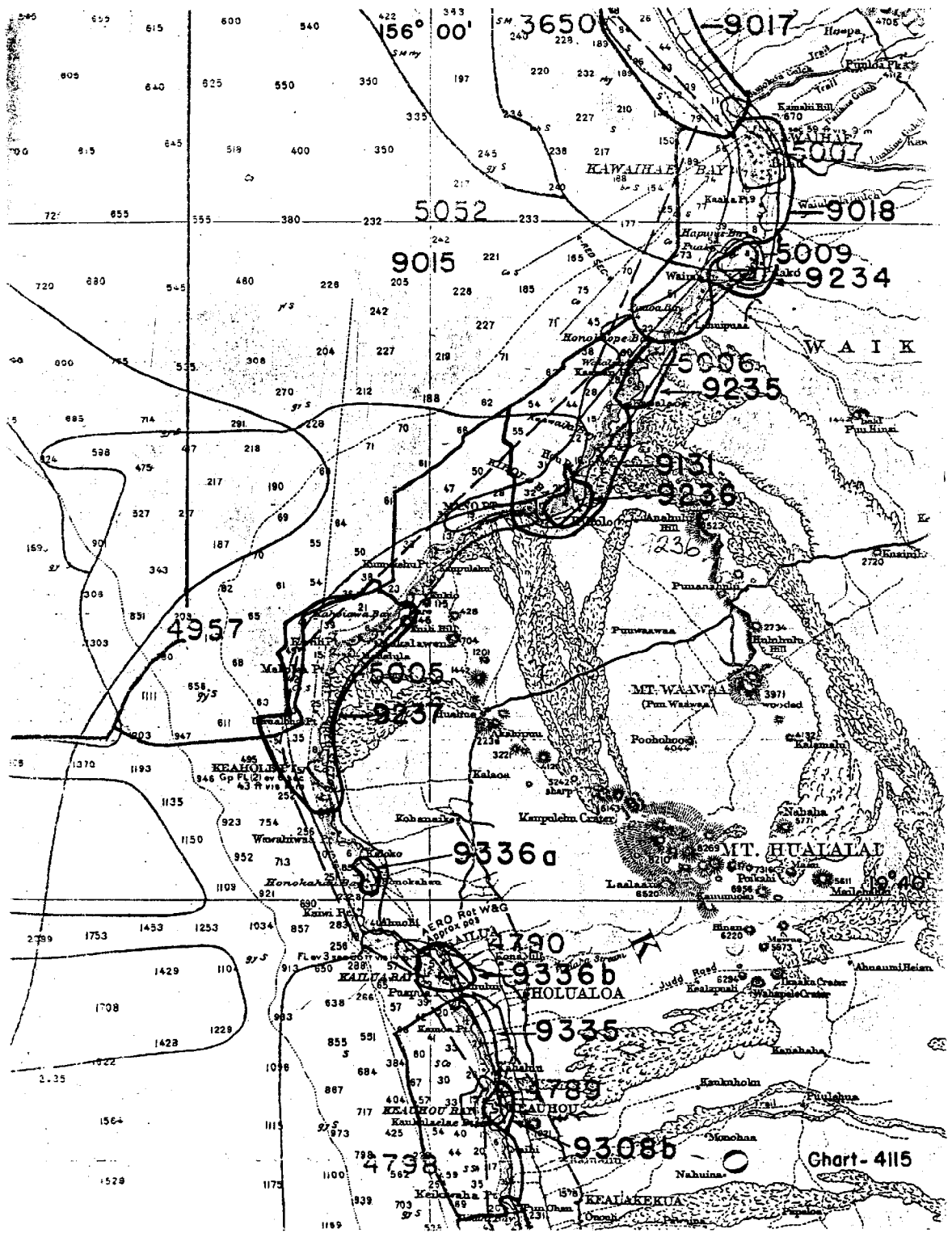


Chart - 4115

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9237

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
4140	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
4102	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
4115	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
4179	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
4001	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
9000	2/25/75	C.S. Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For NM only
4179	9/16/75	HAUSMAN	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam For Critical Corr only No corr.
4140	10/21/75	Nator	Full Part Before After Verification Review Inspection Signed Via Drawing No. Revised smog, curves, rocks
4102	10/21/75	Nator	Full Part Before After Verification Review Inspection Signed Via Drawing No. No critical corr
4140	10/19/76	M. D. Kain	Full Part Before After Verification Review Inspection Signed Via Drawing No. EXAMINED for critical corr. only
19007 4001			INSPECTED 18010
4001	11/4/76	J. Graham	Examined thru chart 4179 Dwg. #11 No corrections
530 9000	11/29/76	V.G. Borawski	After Review + cursory Insp: Exam'd, No Corr, This Survey Can Be Considered Fully Appl'd At This Scale.
19326 4115	2/16/77	C.S. Forbes	Examined thru chart 4140 - no corrections

