10068

Diagram No. 4116-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. FA-80-1-82

Office No. H-10068

LOCALITY

State Hawaii

General Locality East Coast of Oahu

Locality NE of Kaneohe Bay
Kaiwi Channel

19 82-83

CHIEF OF PARTY
CDR W.Forster/CAPT C.Andreasen

LIBRARY & ARCHIVES

DATE February 26, 1985

☆U.S. GOV. PRINTING OFFICE: 1980—766-230

Chart
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NOAA FORM 77-28 (11-72) | U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-10068

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-80-1-82

State Hawaii

General locality East Coast of Oahu

Locality NE of Kaneohe Bay to Kaiwi Channel

Scale 1:80,000 Date of survey 9 Nov - 17 Nov (JD313-321) 1982
9 Oct - 3 Nov (JD 282-307) 1983

Instructions dated 30 July 1982 19 August 1983 Project No. OPR-T126-FA-82
OPR-T126-FA-83

Vessel (2020)

Chief of party CDR W. Forster (1982)
CAPT C. Andreasen (1983)

Surveyed by LT K. Andreen, LT T. Baxter, LT S. Ramsey, LT T. Rulon, LTJG G. Tuell, LTJG J. Bailey, ENS A. Francis, ENS F. Migaiolo, ENS P. Steele, ENS S. Koch, ENS T. Tisch, ENS J. Salmore, ENS W. Mitchell

Soundings taken by echo sounder, ~~hand lead, pole~~ Raytheon LSR and Ross Fineline 5000

Graphic record scaled by FAIRWEATHER Personnel

Graphic record checked by FAIRWEATHER Personnel

Verification ~~by~~ R.D. Mueller Automated plot by PMC Xynetics Plotter

Evaluation by C.R. Davies

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

REMARKS: This survey was conducted during two field seasons - 1982 & 1983. Refer to Section S of this report for a listing of additional reports concerning this survey that have been submitted separately.

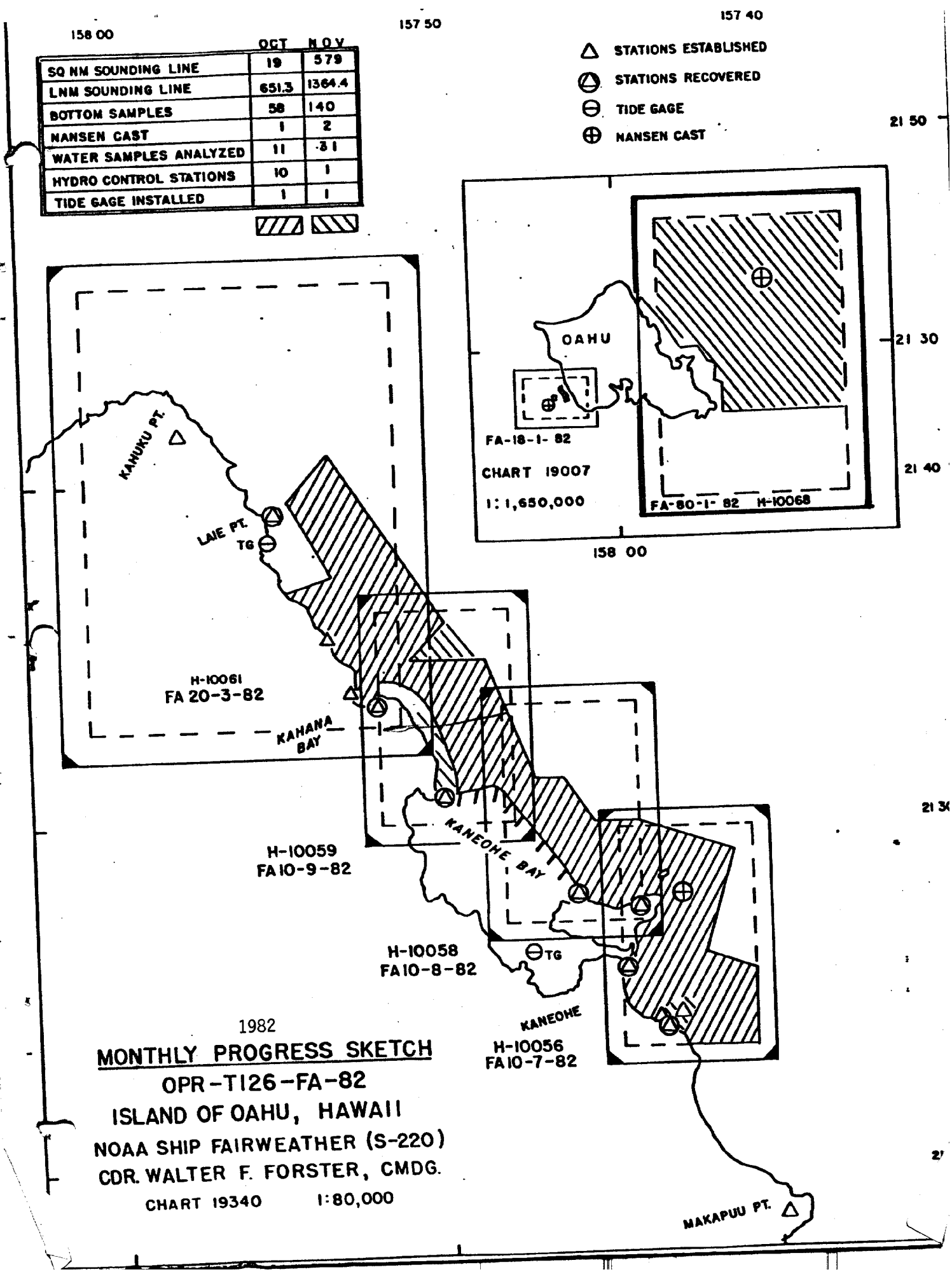
Marginal notes in black made by evaluator.

STANDARDS CK'D 2-27-85
C.Ray

AHOIS/SURF 4/26/89 GM

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978-665-010-1174



1982

MONTHLY PROGRESS SKETCH

OPR-T126-FA-82

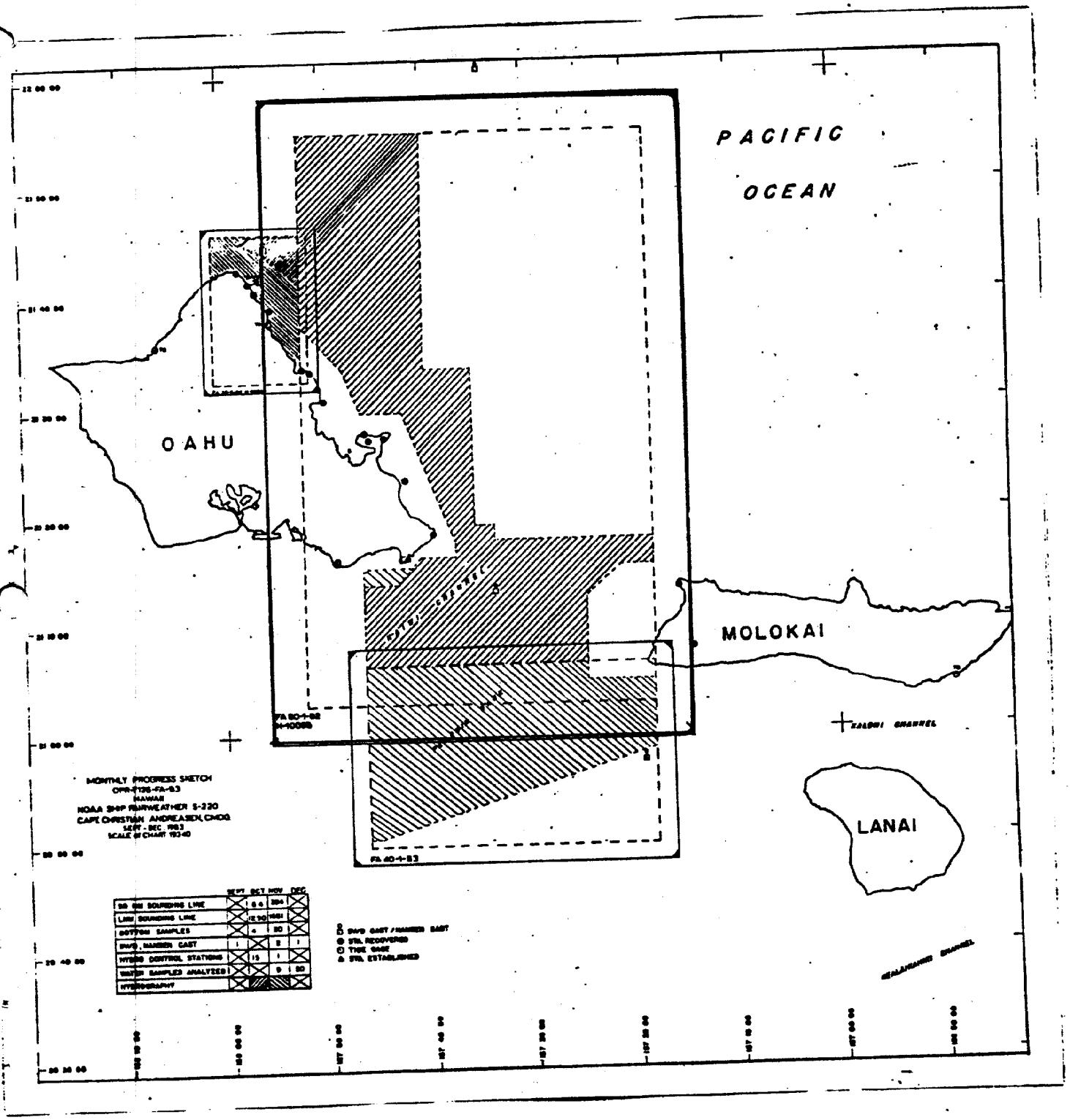
ISLAND OF OAHU, HAWAII

NOAA SHIP FAIRWEATHER (S-220)

CDR. WALTER F. FORSTER, CMDG.

CHART 19340 1:80,000

Progess Sketch 1983



A. Project ✓

This hydrographic survey was begun during the 1982 field season and completed in 1983. The 1982 field work was conducted in accordance with Project Instructions, OPR-T126-FA-82, Hawaiian Islands, dated 30 July 1982 with Change No. 1 dated 7 September 1982, Change No. 2 dated 17 November 1982 and Change No. 3 dated 2~~o~~ February 1983. Operations in 1983 fell under Project Instructions, OPR-T126-FA-83, Hawaiian Islands, dated 19 August 1983 with Change No. 1 dated 20 September 1983. The Hydrographic Manual (4th Edition), PMC OPORDER and the Data Requirements Letter dated 14 April 1983 are also applicable.

B. Area Surveyed ✓

The area covered by this survey lies off the east coast of Oahu Island, Hawaii. The survey begins with the southern limit of latitude 21/06/24 N and continues north to latitude 21/55/18 N. The eastern boundary is longitude 157/16/36 W and the junction with the contemporary survey H-8973 in the area of Molokai Island. The western limit is the junction areas with the contemporary surveys H-8990, H-10056, H-10058, H-10059 and H-10061, H-10124, H-10117.

Hydrographic operations were conducted during the 1982 field season between 9 November (JD 313) and 17 November (JD 321). During 1983, field work occurred between 9 October (JD 282) and 3 November (JD 307).

C. Sounding Vessels ✓

The Ship FAIRWEATHER (2020) was used to obtain all sounding data, bottom samples, SV/D and Nansen casts. No unusual sounding vessel configurations were used.

D. Sounding Equipment and Corrections to Echo Soundings ✓

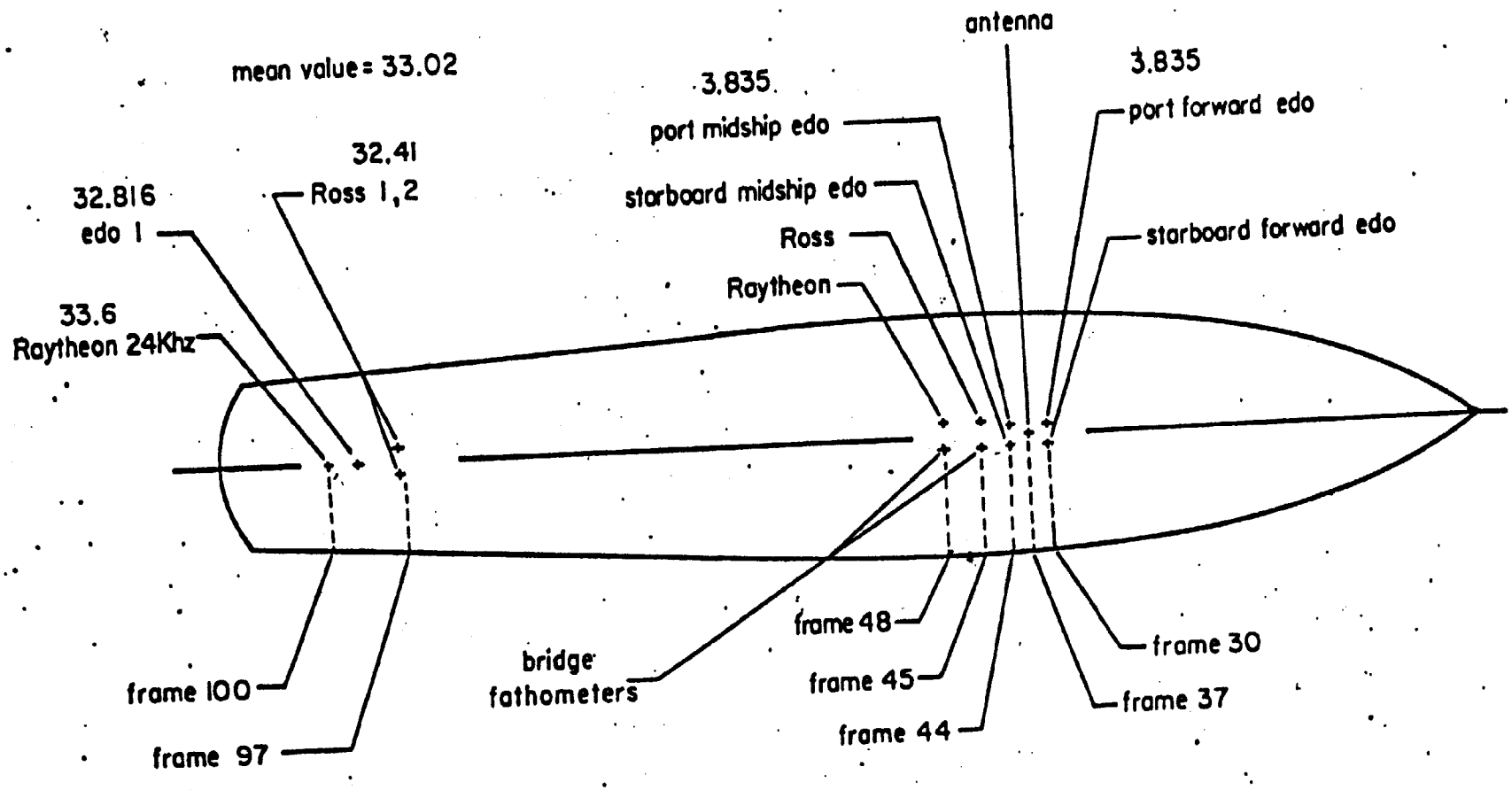
The Ship FAIRWEATHER was equipped with both the Raytheon Line Scan Recorder (LSR) and the Ross Fineline 5000 narrow beam echo sounders. See Table I, Sounding Equipment, for a listing of equipment utilized during this survey.

The Raytheon LSR was the primary echo sounding system used on this survey. The Ross system was used for depths less than 120 fathoms when the LSR could not provide adequate digitization and, usually, whenever depths were less than 100 fathoms. (A few times on the FA-80-1C-82 sheet, the Ross was not used for depths less than 100 fathoms in the junction area between the inshore surveys and this survey, H-10068.) As required by Table 4.4 of the Hydrographic Manual, soundings of less than 100 fathoms must be recorded to the nearest 0.5 fathom. Notations were made on the raw data printouts and on the echograms whenever fathometer systems were switched.

Transducers for each of the FAIRWEATHER's two fathometer systems are located on the centerline of the ship. Primarily, the Ross number 1 and EDO number 1 transducers were used throughout the survey during both field seasons. However, there were a couple occasions during 1982 when both the starboard forward EDO and starboard midship EDO transducers were used and during 1983 the midship EDO transducer was used. Annotations were made on the raw data printout whenever these were switched. Refer to Figure 1, FAIRWEATHER Transducer Location Diagram, for a

FIGURE 1

FAIRWEATHER TRANSDUCER LOCATION DIAGRAM, APRIL 1982



numerical values are distance in meters forward or aft of antenna

sketch of the transducer locations and the appropriate ANDIST corrector value.

TABLE I

Sounding Equipment

FAIRWEATHER (2020)

Date	Instrument	MDL	Analog	Digitizer	Transceiver	Inverter
			1982			
313-321	Raytheon	LSR	C256	203	416	----
313-321	Ross	5000	1040	1047	1048	1103
			1983			
282-307	Raytheon	LSR	C256	203	317	----
282-293	Ross	5000	1054	1054	1048	1053
294-307	Ross	5000	1054	1046	1047	1053

On JD 315 (1982) between 0824 UTC and 0832 UTC, an on-line test of the ship's alternate transducers (starboard forward, starboard midship and skeg-ED01) was conducted to determine if better digitization could be obtained. At the conclusion of this test, the original transducer (skeg-ED01) was returned to service and used throughout the remainder of the 1982 field season. The applicable ANDIST correctors were applied to this data.

Ross fathometer belt tension, initial and phase checks were performed at the beginning of hydrography and whenever paper was changed. Echo sounding equipment was monitored continuously and the recorder initial adjusted to zero when necessary. Initial and phase errors were insignificant and not applicable to soundings collected on this survey.

Settlement and squat correctors were not applied to data collected by FAIRWEATHER during this survey nor was a settlement and squat test conducted. According to Table 4-4 of the Hydrographic Manual, settlement and squat correctors of less than 0.2 fathom need not be applied for depths over 20 fathoms in exposed waters. FAIRWEATHER's TRA of 2.3 fathoms is based on a mean draft of 13.8 feet.

The sounding equipment generally performed well during this survey with only a few difficulties. The Raytheon LSR experienced periodic difficulties tracking the bottom over steeply sloping areas and in very deep water with a relatively soft bottom. Also, many times the digitized depth was lost or incorrect as new personnel were being trained on the equipment learning which sensitivity setting would give the best results. In these cases, the missed depths were scaled from the analog trace and corrected on the raw data printout. When the trace was illegible, data was rejected and re-run if possible, although bottom slope did not permit this in certain cases.

On JD 294 (1983) no hardware interrupt or short marks were being generated by the Ross fathometer. The transceiver (1048) and digitizer (1054) were replaced by transceiver (1047) and digitizer (1046). No data was lost due to this problem.

All data was scanned at least twice to compare analog values to corresponding digitized values and to insert peaks and deeps between soundings. The effects of excessive wave and swell action were corrected at this time in accor-

dance with Section 4.9.8.2 of the Hydrographic Manual. Depths on this survey ranged from 27 to 2460 fathoms.

Velocity correctors for the 1982 field work were determined from one Nansen cast (#004 - 1982). 1983 correctors were calculated from two SV/D and two Nansen casts (#001 through #004 - 1983) in accordance with Section 4.9.5.2 of the Hydrographic Manual. Table II, Nansen and SV/D Casts, lists the dates and locations of all casts pertaining to this survey.

Table II

Nansen and SV/D Casts

Cast	Date	Latitude	Longitude
1982			
004	JD 332	21/50/24 N	157/26/30 W
1983			
001 (SV/D)	JD 271	21/44/00 N	157/49/30 W
002 (SV/D)	JD 307	21/12/00 N	157/33/00 W
003	JD 325	20/57/45 N	157/19/00 W
004	JD 336	22/02/00 N	157/34/24 W

Nansen and SV/D cast instrumentation were calibrated by the Northwest Regional Calibration Center (NRCC) in Seattle, Washington. The reversing thermometers and Beckman Salinometers (59435 and 1603) used in 1982 were calibrated during the month of March, 1982. The thermometers and Beckman Salinometer (59435) used for 1983 field work was calibrated in March and April of 1983. The Plessy Model 9040 Profiling System (5638) used for the SV/D casts was calibrated in April, 1983. For additional calibration information refer to the Corrections to Echo Soundings Reports, OPR-T126-FA-82 and OPR-T126-FA-83.

When using the Plessy Profiling System, an onboard PDP8/e FOCAL computer program was used to convert the output of frequency readings into engineering units for the determination of the sound velocity profile. During use on the third cast (1983), this system suffered a data communication failure resulting in the necessity of performing the last two velocity casts as Nansen casts.

Table III, Velocity Tables, lists the velocity tables pertaining to this survey; the casts from which they were derived; and the data to which they apply.

Table III

Velocity Tables

Table Number	Casts	Applicable Areas
IV (1982)	004	All 1982 Field Work
II (1983)	001, 002, 004	FA-80-1N-82 Sheet FA-80-1C-82 Sheet
III (1983)	003	FA-80-1S-82 Sheet

E. Hydrographic Sheets✓

The three field sheets comprising this survey were plotted aboard the

FAIRWEATHER using PDP8/e computers and Complot plotters. All hydrographic data for this survey will be forwarded to the Pacific Marine Center, Seattle, Washington, for verification and final plotting.

Final field sheets for FA-80-1N-82 and FA-80-1C-82 were plotted within 20 x 36 inch sheet limits whereas FA-80-1S-82 was plotted within a 13 x 36 inch sheet area. All final field sheets were mylar with a skew of zero and a scale of 1:80,000. Due to the averaged depths (100-2000fathoms) on this survey, tide correctors were not applied to the final field sheets.

F. Control Stations✓

Horizontal control for this survey was conducted by FAIRWEATHER personnel. In 1982, eight control stations were recovered and eight new stations established. During the 1983 field season , five more stations were recovered and three additional stations were established. See Table IV, Control Stations, for a list of stations used in support of this survey.

A satisfactory check angle could not be obtained at PAKO 1932 using the published position. A new position for PAKO was determined in 1982 using triangulation techniques from the two existing stations, PAHU 1910, 1969 and MOKOLII ISLAND 2 1976.

All geographic positions are based on the Old Hawaiian Datum. Conventional traverse, triangulation and intersection methods were used throughout the project. No unconventional survey methods were used, no anomalies in control adjustment or in closures were encountered. For further details refer to the Horizontal Control Reports, OPR-T126-FA-82 and OPR-T126-FA-83.

Table IV

Control Stations

Signal Name	Signal Number
MAKAPUU PT. SOUTH RAYDIST 1982 d.m.	100
MAKAPUU PT. SOUTH RAYDIST (M/R) 1982 d.m.	101
MAKAPUU PT. RM3 1969 r.m.	102
MOKULUA ISLAND 2 1982 d.m.	~~110~~ *
HANAUMA 1983 d.m.	150
HANAUMA M/R 1983 d.m.	~~155~~ *
HANAUMA RM2 1983 d.m.	156
KOKO HEAD 3 1927 r.m.	160
HONOLULU ALOHA TOWER 1925 r.m.	~~202~~ *
DIAMOND HEAD 2 RM3 1969 r.m.	205
CAPE 1952 r.m.	~~220~~ *
MOKAPU 1872 r.m.	300
PAKO 1932 (Field Position 1982) r.d.m.	310
PAHU 1910, 1969 r.m.	~~330~~ *
MOKOLII ISLAND 2 1976 r.m.	400
BOZO RM2 1982 d.m.	~~451~~ *
STATE SURVEY 5-1 1969 r.m.	~~500~~ *
STATE SURVEY 5-1 RM1 1969 r.m.	504
LAIE POINT 1969 r.m.	~~550~~ *
LAIE POINT ECC 2 1982 d.n.m.	~~553~~ *
MAKA 1982 d.m.	~~560~~ *
DUNE 1982 d.m.	602 *

(Control Stations, continued)

WIND 1982 d.m.	~~609~~ *
WIND M/R 1982 d.m.	610
WIND RM1 1982 d.m.	~~611~~ *
POHAKULOA 1885 r.m.	650
SAND 1950 r.m.	652
RADIO TOWER OBSTR. LT 1983 d.n.m.	~~658~~ *

* Not used for H-10068

r = recovered; m= monumented; d = described; n= not

The following stations were actually the same control station but given two different signal numbers since both Raydist and Mini-Ranger equipment were set up on the same station and the computer uses the frequency listed on the signal tape to distinguish the difference between them: #100 and #101; #150 and #155; and #609 and #610.

G. Hydrographic Position Control ✓

The primary electronic positioning system for hydrography on this survey was the Teledyne Hastings Raydist system utilized in the range-range mode. The Motorola Mini-Ranger III system was used in the range-range mode for several inshore areas and where poor control geometry or blocking existed with the Raydist system. See Table V, Vessel Electronic Control Equipment, for a listing of equipment utilized.

Table V

Vessel Electronic Control Equipment

Instrument	1982	1983
Hydroplot Controller	06	06 (JD 271-304) 05 (JD 304-307)
Navigation Interface	09	09 (JD 271-281) 20 (JD 281-307)
Mini-Ranger Console/RT	702/1649	701/1538

Raydist calibrations were accomplished using three mini-Ranger III transponders and RK 561 with a check fix computation. Also, theodolite intersections were used for the calibration of the Raydist with computer programs RK 300 and RK 561. Calibrations were performed at the beginning of all hydrography, periodically during operations and after the completion of hydrography.

Careful observation of the strip chart recorder insured prompt detection of lane jumps or problems with the Raydist system. All calibrations and lane jumps were annotated on the lane count strip chart recorder. During the 1982 field season, lane jumps on line were corrected by making algebraic addition of the lane jump value, as shown on the strip chart lane counter. The ship then recalibrated as soon as possible to confirm the temporary corrector value and re-establish the lane and partial lane counts. All lane jumps were noted and explained on the strip chart and on the raw data printout.

In 1983, two problems were experienced with the Raydist system. On JD 282, one of the shore party personnel changed batteries on a Mini-Ranger transponder at station WIND which was located within the Raydist ground plane. Between walking on the ground wires and transmitting on a VHF radio, a jump of 14 lanes

was detected. Hydrography was immediately halted to recalibrate, no data was lost. On JD 294, a lane jump from an unknown cause on station SAND was detected before beginning hydrography. After recalibrating, FAIRWEATHER returned to the survey area with no loss of data.

The only significant equipment malfunction of the Raydist system ocurred in 1982, caused by a corroded antenna coupling on the ship's main mast which suspended ship's survey operations several times. Shore and ship systems were inspected and tested until the corroded coupling was located on JD 316. The remainder of the 1982 survey work was performed using the ship antenna on the port wing of the flying bridge. Occurrences of system shutdown, calibrations and shift of antennas were annotated on the raw data printout and Raydist strip chart recorder.

Final Raydist correctors were determined by taking the mean of the beginning and ending daily calibration. The mean difference between daily correctors and final correctors for the Raydist system for 1982 was 0.10 lanes with a maximum of 0.32 lanes. During 1983, the maximum difference was 0.07 lanes with a maximum difference of 0.23 lanes.

There were no Mini-Ranger R/T unit or console malfunctions affecting data on this survey. Mini-Ranger Base Line Calibrations (BLC's) were conducted in accordance with PMC OPORDER, Appendices M and S. See Table VI, Base Line Calibrations, for the dates and locations of these calibrations. The final correctors for the Mini-Ranger electronic positioning instruments were the mean of the beginning and ending BLC's for each set bracketing a time period.

Table VI

Baseline Calibrations

Location	Date
Honolulu, Hawaii	JD 308-309 (1982)
Seattle, Washington	JD 348 (1982)
Seattle, Washington	JD 251-252 (1983)
Kaneohe Bay, Hawaii	JD 286 (1983)
Kaneohe Bay, Hawaii	JD 329 (1983)

On JD 306 (1983), when attempting to calibrate the Mini-Ranger system using a theodolite intersection there were several problems. Some confusion occurred as to the particular station one of the theodolites was set up on; theodolite observers were inexperienced at both stations; and there was some question as to which initial stations were used. The calibration was within allowable error for the scale of the survey but not up to the usual theodolite intersection standard. Later calibrations with the same Mini-Ranger transponders and baseline calibration data confirmed the proper functioning of the systems.

No unusual weather conditions adversely affected positional accuracy of the survey. No hydrography was conducted with weak control geometry of less than minimum signal strength values as determined by baseline calibration data. No data was lost due to equipment malfunction.

H. Shoreline

There is no shoreline within the limits of this survey. For orientation purposes only, shoreline was drawn on the final field sheets from the 1:80,000 scale chart 19357, Island of Oahu, 16th Edition, dated 5 December 1982.

I. Crosslines ✓

A total of 296.7 nautical miles of crosslines were run on this survey comprising 13.7% of the mainscheme hydrography. Agreement between the crossline and mainscheme soundings meet the requirements of Section 1.1.2 Part B of the Hydrographic Manual.

J. Junctions

Survey H-10068 (FA-80-1-82) junctions with the following ~~seven~~ eight contemporary surveys:

Survey	Scale	Year	Location
H-8973	1:20,000	1968	Southeast
H-8990*	1:12,500	1967	Southwest
H-10056	1:10,000	1982	West
H-10058	1:10,000	1982	West
H-10059	1:10,000	1982	West
H-10061	1:20,000	1982-83	Northwest
H-10117	1:40,000	1983	South
H-10124	1:80,000	1984	South

* A 1:80,000 scale reduction was used for the ease of comparison..

All junction soundings meet the criteria of Section 1.1.2 Part B of the Hydrographic Manual.

Actual overlapping of soundings was not achieved as required by Section 4.3.2 of the Hydrographic Manual in eight locations (four areas) between survey H-10068 and the junctioning surveys. The holidays are in depths greater than 76 fathoms and all except one have a maximum distance between the surveys of 600 meters which is equal to the required line spacing. The one exception is an area the shape of a triangle (location #5 listed below) just north of Mokapu Peninsula where the maximum distance is 900 meters. The eight locations are as follows:

Location	Latitude	Longitude	Junctions Survey	Distance
1	21/14/52 N	157/21/06 W	H-8973	600 meters
2	21/28/14 N	157/41/23 W	H-10056	530 meters
3	21/29/48 N	157/42/47 W	H-10056	530 meters
4	21/29/48 N	157/43/12 W	H-10056	280 meters
5	21/29/38 N	157/45/09 W	H-10058	900 meters
6	21/36/00 N	157/50/20 W	H-10061	300 meters
7	21/36/22 N	157/50/36 W	H-10061	300 meters
8	21/36/33 N	157/51/03 W	H-10061	400 meters

None of the junction problems should have occurred. At Area #1, FAIRWEATHER allowed an oversight/blunder to occur in not extending a current survey line along (on top of) a limit/junction line. The remaining problems occurred where launch survey lines were terminated before proposed limit lines were reached. This combined with scale differences, which make simple comparison difficult, and inadequate transfer of junction survey soundings allowed this problem to occur. In the future, FAIRWEATHER will strive to make complete transfer of junction limit soundings and effect adequate review.

K. Prior Surveys ✓

Comparison of H-10068 was made with 1:80,000 copies of eight prior surveys:

Survey	Scale	Year
H-3252	1:20,000	1910
H-3253	1:20,000	1910-11
H-3287	1:20,000	1910
H-3289	1:20,000	1910-11
H-3433	1:60,000	1926
H-4548	1:40,000	1926
H-5054	1:250,000	1929
H-5299	1:80,000	1932

Comparisons were not conducted during the field work as these prior surveys, except H-3289, were not received until one month after the FAIRWEATHER's return to Seattle. Needed prior surveys were not listed in the project instructions. A similar problem occurred with the Penguin Bank survey and is discussed in Section Q of that report, H-10117.

All soundings which did not meet the criteria of Section 1.1.2 Part B of the Hydrographic Manual were indicated on the 1:80,000 scale copies of the prior surveys by color coded shadings; blue to indicate depths shallower than H-10068 and purple for depths deeper than H-10068.

H-3252

Comparisons between the prior survey H-3252 and the current survey H-10068 were excellent with only two soundings from the prior survey which did not meet the requirements of Section 1.1.2 Part B. These two soundings were found to be deeper than H-10068. concur

H-3253

H-3253 showed excellent agreement with H-10068 as 90% of the prior survey soundings meet the required criteria. Of the 10% that did not follow this trend, all except one were deeper than the contemporary survey. Also, the majority of the discrepancies are located along the 100 fathom depth curve where the bottom is steep. concur

H-3287

H-3287 overlaps the western limits of H-10068 where 95% of the prior survey soundings follow the Hydrographic Manual criteria. The 5% that do not meet this requirement were mainly located in the area of Makapuu Point. All soundings in disagreement except one were found to be deeper than H-10068. It is believed that these lead line soundings were affected by a current in the area, thus indicating that the water was deeper than it actually is. concur

H-3289

Overall agreement between the prior survey H-3289 and H-10068 showed 95% of the soundings within the required limitations. Of all the soundings within their common area, only three did not meet the criteria of Section 1.1.2 Part B; two were deeper than H-10068 and one was shallower. There is no indication as to why these discrepancies exist except that they appear to be misdepths on the prior survey. concur

H-3433

Excellent agreement was obtained between H-3433 and H-10068 with only 5% of

the prior survey depths in disagreement with the current survey. Of these soundings, the majority were located near contour lines where the bottom profile was very steep. concur

H-4548

Comparison between H-4548 and H-10068 showed excellent agreement with only three prior survey depths failing to meet the criteria of Section 1.1.2 Part B. concur

H-5054

Generally good agreement was achieved between the prior survey H-5054 and H-10068 with 80% of the prior survey soundings following the Hydrographic Manual requirements. Of the 20% that failed, the majority of the depths were found to be deeper than the current survey and were usually in groups along the same sounding lines. This area is once again near Makapuu Point where currents are believed to be the cause of the discrepancies. concur

H-5299

Overall agreement between H-5299 and H-10068 was fair to poor with prior survey depths ranging from a 2 to 50 fathom difference. Only 60% of these soundings agreed to within 10 fathoms of the current survey. The majority of the discrepancies outside this limit were located in the area just south of Makapuu Point where all but 1% were deeper than survey H-10068. Once again these differences are believed to be caused by the currents giving false depths to the prior survey. concur

It is recommended that the current survey H-10068 supercede all the prior surveys within their common areas. concur

L. Chart Comparisons

Contemporary survey H-10068 was compared with three charts; 19340, Hawaii to Oahu, 20th Edition, 3 October 1981, scale 1:250,000; 19351, Channels between Oahu, Molokai and Lanai, 7th Edition, 6 February 1982, scale 1:80,000; and 19357, Island of Oahu, 16th Edition, 5 December 1981, scale 1:80,000.

During the comparisons, those soundings which did not meet the requirements of Section 1.1.2 Part B of the Hydrographic Manual are indicated by color coding on the 1:80,000 copies of the charts; blue to indicate depths shallower than H-10068 and purple for depths deeper than H-10068.

Chart 19340

A 1:80,000 scale copy of the common areas between this chart and H-10068 was used to perform the comparison. This area includes the entire survey of H-10068 with most of the soundings on the chart from the prior surveys mentioned in Section K. In general, agreement between these two was fair with 60% of the charted soundings meeting the stated requirements. Of the 40% which did not, the majority of the depths north of latitude 21/20/00 N were shoaler than the current survey whereas the charted soundings south of latitude 21/20/00 N were found to be deeper than H-10068. Also, about 60% of the soundings on chart 19340 in the vicinity of Penguin Bank were three to five fathoms shoaler than H-10068. These disagreements are a result of the errors obtained during the enlargement process along with misdepths on the prior surveys. There seems to be a tendency for many prior survey discrepancy soundings to be north and east of similar H-10068 soundings as though concur

there might have been a control problem with the prior surveys; however, the variance is not totally uniform. It is recommended that the current survey H-10068 supercede all charted soundings. concur

Chart 19351

This chart only overlaps areas on the south sheet of the H-10068 survey (FA-80-1S-82). Comparison in this area was the same as with Chart 19340 with 60% of the charted depths in agreement and 40% failing to meet the criteria. Once again, the area between latitudes 21/12/00 N to 21/19/00 N and longitudes 157/23/00 W to 157/43/00 W has discrepancies four to twelve fathoms deeper than the corresponding area of survey H-10068. These soundings come from prior survey H-3287 and were discussed in Section K. As mentioned under Chart 19340, the charted depths on Penguin Bank were found to be shallower than the current survey. Only a few of these shoal soundings can be identified on prior survey H-3433, which is a 1913 survey with additional work done on it in 1926. Apparently, there exists another prior survey, not identified, which is the source of these discrepancy soundings. Survey H-10068 should supercede depths from this chart within their common areas. Soundings originate with a miscellaneous source.

Chart 19357

Soundings on this chart are the same as that from Chart 19340 displaying a 60/40% agreement/disagreement ratio. The discrepancies in the northern areas were found to be shallower than H-10068 with those south of Makapuu Point mainly deeper. Included in these discrepancies were charted soundings with a "reported" position and one which was a "position approximate" (refer to Table VII). The area in which these were located was developed with 400 meter spacing showing a relatively uniform bottom profile, which was deeper than the "reported depths" and the "PA" sounding of 102 fathoms. It is recommended that H-10068 supercede soundings from Chart 19357 within their common areas. concur

Table VII

Reported Soundings

Latitude North	Longitude West	Charted Depth	H-10068 Depth
21/13/48	157/43/36	95 fms	~~97~~ 96 fms
21/16/36	157/36/00	45 fms	48 fms
21/17/30	157/35/15	45 fms	49 fms
21/17/57	157/33/27	59 fms	86 fms
21/18/00	157/34/42	48 fms	51 fms
21/16/33	157/33/36	102 fms	127-165 fms

See FVAC Report Section VII for additional soundings

The danger zone around Mokumanu Island centered at latitude 21/~~33~~/28 ~~30~~ 20 N, longitude 157/43/20 W, extending two nautical miles offshore, is adequate as charted. This item should remain on the chart to provide protection from the gunnery range at Mokapu Point. An orange flag is hoisted at the end of this gunnery range to warn mariners that firing is in progress. Gunnery practice is published in the U.S. Coast Guard Local Notice to Mariners giving anticipated dates of range use. concur

In accordance with Section 6.5.3 of the Project Instructions, that portion of the 10 nautical mile dumping ground shown on Chart 19357 coincident with H-10068 was investigated for removal. The 50 meter line spacing required in the referenced Project Instructions was amended based upon the regularity of initial

survey lines run at 1600 meter intervals, and local knowledge cited in the following text. Message FA125/CPM1 authorizing this change in line spacing is included in the separates following the text.

The history for the Title 33 dumping grounds was obtained from Mr. David Kern, a marine engineer with the U.S. Army Corps of Engineers. This dump site is officially classified as discontinued and has not been used since the late 1960's. The dump site was used to dispose of dredge spoils from Kaneohe Bay. A limited amount of military hardware was dumped by the Navy at the end of World War II. Detailed records on the dump site are incomplete, but do indicate that most dumping was conducted beyond the 100 fathom curve. No known hazards exist due to dumping, and the local presumption is that most material has been carried to deeper water by bottom transport mechanisms.

No indication of shoaling or dangers to navigation due to dumping were found on H-10068 or during comparison with charts and prior surveys. The nature of bottom samples in the dump site area were not significantly different from samples taken outside the dumping grounds. This dump site should be removed from future editions of the chart. For further and more detailed discussion of the Title 33 dumping grounds refer to Section M, Adequacy of Survey in the Descriptive Reports for surveys H-10058 and H-10059. concur

No dangers to navigation were found nor were there any diver investigations performed within the limits of this survey. concur

M. Adequacy of Survey ✓

Survey H-10068 is complete and adequate to supercede all prior surveys within their common areas. concur

N. Aids to Navigation ✓

No aids to navigation are located within the limits of hydrography for this survey. For further details on navigational aids found adjacent to this survey area, see Section N, Aids to Navigation of the Descriptive Reports for H-10056, H-10058, and H-10059. concur

O. Statistics ✓

Vessel 2020	1982	1983	Total
Positions	1004	1259	2263
Nautical Miles	1159.9	1292.0	2451.9
Square Miles	34.0	104.5	138.5
Bottom Samples	4	10	14
Velocity Casts	1	4	5
Tide Stations	2	2*	3

* Only one new tide station installed in 1983.

There were no current or magnetic stations established within the limits of this survey.

P. Miscellaneous ✓

Project instructions require line spacing to be reduced from the spacing as specified in the Hydrographic Manual for operations conducted on certain of the

larger scale proposed charts. Operations in 1982 were conducted using Hydrographic Manual spacing. In 1983, FAIRWEATHER questioned this and was advised by the Washington office that the project instruction spacing was controlling. As a result, line spacing was reduced by splitting the western (inshore) portion of this 1:80,000 survey. Because the 1982 work just offshore of Kaneohe Bay had been run at 800 meters and the project instructions required a maximum interval of 300 meters for a proposed 1:15,000 scale chart, it was necessary that two lines be run between each pair of 1982 survey lines.

Bottom samples were taken during this survey and forwarded to the Smithsonian Institute as per Section 8.1.2 of the Project Instructions.

Loran C data was obtained in conjunction with the hydrographic positioning data as per Project Instruction, Section 8.4.

Current investigations were conducted in accordance with Section 8.2 of the Project Instructions. Local residents reported an anomalous current at the mouth of Kaĥana Bay. Heavy surf and wind conditions prevented the FAIRWEATHER personnel from confirming this information. The report of this current is firmly upheld by mariners and fisherman frequenting the area. During ship survey operations, a predominent tide rip was observed five nautical miles east southeast of Mokapu Point extending in a roughly east-west direction. A memo to N/OMS detailing current reports is included in the separates following the text. Also, during the 1983 field season while working in the Kaiwi Channel between the islands of Oahu and Molokai, a current of approximately 1.5 to 2.0 knots flowing in a northwest direction was observed.

It should also be noted that throughout the area of this survey, several temporary scientific data bouys were encountered during both the 1982 and 1983 field seasons. It is recommended that information concerning the location of these bouys continue to be obtained through the U.S. Coast Guard as their locations will vary. concur

Traffic throughout the area primarily consists of naval vessels, some tankers/freighters, occasional cruise ships, and numerous pleasure craft. Along the southern portion there is a significant amount of tug and barge traffic, especially at night, which transits to and from Honolulu crossing the Penguin Bank area passing south of Molokai Island. Also, it is common for races such as canoe or kayak races to be held from Molokai to Honolulu on weekends.

Q. Recommendations ✓

The Title 33 dumping grounds discussed in Sections L and M of this report should be removed from future charts of the area. No additional work must be done to insure adequacy of H-10068. concur

R. Automated Data Processing ✓

All range-range hydrography was processed in accordance with the Hydrographic Data Requirements Letter dated 14 April 1983. All peaks, deeps, and sounding corrections were placed on the corrector tape. The following is a list of the Hydroplot programs used for data acquisition and processing during this survey.

Number	Program Name	Version Date
RK 112	Range-Range Real Time Plot	08/04/81
RK 201	Grid, Signal and Lattice Plot	04/18/75
RK 211	Range-Range Non-Real Time Plot	02/02/81
RK 212	Visual Station Table Load	04/01/74

(Program Names, continued)

RK 300	Utility Package	10/21/80
RK 330	Data Reformat and Check	05/04/76
PM 360	Electronic Corrector Abstract	02/02/76
RK 407	Geodetic Inverse/Direct Comp.	09/25/78
AM 500	Predicted Tide Generator	11/10/72
RK 530	Layer Corrections for Velocity	05/10/76
RK 561	Geodetic Calibrations	12/01/82
AM 602	Elinore	12/08/82

S. Referral to Reports ✓

The following is a list of the reports for Hawaiian Islands project that were submitted separately from the descriptive report and the hydrographic records:

Report	Date of Submission
OPR-T126-FA-82	
Horizontal Control Report	January 1983
Electronic Control Report	February 1983
Corrections to Echo Soundings	February 1983
Geographic Names Report	February 1983
Coast Pilot Report	March 1983
OPR-T126-FA-83	
Horizontal Control Report	February 1984
Electronic Control Report	February 1984
Corrections to Echo Soundings	February 1984

HHHHSSC
V
SS DE OA
ISN-OA/27
RIXT
R 271623Z OCT 82
FM NOAACPM SEATTLE WA
TO NOAAS FAIRWEATHER
CM GRNC
BT
UNCLAS
FA125/CPM1
SPLITTING HYDRO LINES TO 50 METERS OVER DUMPSITE IS NOT NECESSARY IF YOU CAN USE INFORMATION GATHERED AT THIS POINT TO JUSTIFY REMOVING THE DUMPSITE NOTATION FROM THE C..RT. IF SO, MAKE THE RECOMMENDATION IN THE D.R. AND DISCUSS HISTORY, DEPTH OF WATER, BOTTOM SAMPLES, ETC..
BT
TOD 271657Z RA AR
HHHH
SSC R

VV

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY

NOAA Ship FAIRWEATHER S220

January 21, 1983

TO : N/OMS - Wesley V. Hull

THRU : N/MOP - Charles K. Townsend
ATTN: N/MOP21 - Ned Austin

FROM : N/S220 - Commanding Officer
NOAA Ship FAIRWEATHER

SUBJECT: Currents, OPR-T126-FA-82, Hawaiian Islands

In accordance with section 8.2.(1-3) of project instruction OPR-T126-FA-82, Hawaiian Islands, the following information regarding tidal currents around the Islands of Hawaii and Oahu is provided:

1. No anomalous currents or tidal conditions were observed on or near the project area on the northeast coast of Hawaii Island. Local residents could provide no further information on this subject.

2. An anomalous current, setting to the northeast in and about the mouth of Kahana Bay was reported by knowledgeable local residents. Heavy surf and wind conditions prevented FAIRWEATHER launches from confirming this information during survey operations. Nevertheless, this current is firmly upheld by mariners and fishermen frequenting the area.

3. During ship survey operations a prominent tide rip was observed 5 nautical miles east southeast of Mokapu Point, extending in a roughly east - west direction. The current was evidenced by a water discoloration line, visibly different sea surfaces, and wind interaction and course offset as the ship crossed the current interface. This effect had been noticed by survey launches farther inshore, in this general area, but to a lesser degree. The configuration of Mokapu Point and Mokumanu Island may influence this phenomenon.

4. Rip currents are common along the shores of Oahu Island in the vicinity of the project areas, and are the subject of public information broadcasts to warn swimmers of this danger. No significant or outstanding examples were noted during survey operations. At least one swimmer fatality was directly related to these currents when a U. S. Marine from Kaneohe USMCAS drowned on a recreational beach.

5. During coastal navigation and channel entrances, no difficulties were encountered by FAIRWEATHER.

6. List of additional current related references may be obtained from:

Commanding Officer
Naval Western Oceanographic Center
Attn: Lt(jg) Scovil
Box 113
Pearl Harbor, HI 96860

7. Section 8.22 of the project instruction requiring comparison observations at stations listed in the "Tidal Current Tables, Pacific Coast of North America and Asia," numbers 4220 to 4250 were not accomplished. The scheduling of these station comparisons was interupted by high winds. Observations would have been possible with current meter instrumentation.

Approval Sheet

During the field operations, the Commanding Officer inspected all field sheets and data on a daily basis. All survey sheets, reports and records are accurate. This survey is complete and adequate to supercede all prior surveys within their common areas.

Submitted by:

Wayne Mitchell

Wayne Mitchell
Ensign, NOAA
NOAA Ship FAIRWEATHER

Approved by:

Christian Andreasen

Christian Andreasen
Captain, NOAA
Commanding Officer
NOAA Ship FAIRWEATHER

SIGNAL LISTING

OPR-T126-FA-83

OAHU, HAWAII

MAKA PUU PT SOUTH RAYDIST 1982; FAIRWEATHER 1982
100 1 21 18 44504 157 39 12838 250 0170 330040

MAKA PUU PT SOUTH RAYDIST 1982 (MINIRANGER); FAIRWEATHER 1982
101 3 21 18 44504 157 39 12838 250 0170 000000

MAKA PUU PT RM3 ~~1872,1927~~,1969 NGS QUAD 211573 1060
102 3 21 18 41093 157 39 20437 250 0199 000000

MOKULUA ISLAND 2 1982 FAIRWEATHER 1982
110 4 21 23 41619 157 42 03934 250 0068 000000

HANAUMA 1983 FAIRWEATHER 1983
150 1 21 15 57756 157 41 54728 250 0081 330040

HANAUMA (MINI-RANGER) 1983 FAIRWEATHER 1983
155 1 21 15 57756 157 41 54728 250 0081 000000

HANAUMA RM2 1983 FAIRWEATHER 1983
156 1 21 15 57564 157 41 55199 250 0081 000000

KOKO HEAD 3 1927 NGS QUAD 211573 1068
160 1 21 15 58185 157 42 24456 250 0195 000000

HONOLULU ALOHA TOWER 1925 NGS QUAD 211573 1197
202 0 21 18 36756 157 52 07425 250 0030 000000

DIAMOND HEAD 2 RM3 1969 NGS QUAD 211573; FAIRWEATHER 1983
205 0 21 15 46354 157 48 52045 250 0232 000000

CAPE 1952 NGS QUAD 211573 1247
220 3 21 25 38832 157 44 31062 250 0001 000000

MOKAPU 1872 NGS QUAD 2117573 1021
300 3 21 27 26776 157 44 04665 250 0202 000000

PAKO 1932 NGS QUAD 211573 1336 (FIELD POSITION: FA 1982)
310 3 21 27 50345 157 46 03948 250 0022 000000

PAHU 1910 NGS QUAD 211573 1016
330 0 21 25 32560 157 47 46679 250 0086 000000

MOKOLII ISLAND 2 1976 NGS QUAD 211574 1041
400 3 21 30 45907 157 49 56052 250 0063 000000

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BOZO RM2 1982                                          FAIRWEATHER 1982
451 3  21 33 12441 157 50 59104  250 0002 000000

STATE SURVEY 5-1 1969    NGS QUAD 211574  1012
500 3  21 33 45145 157 52 00153  250 0049 000000

STATE SURVEY 5-3 1969 RM1 1982          FAIRWEATHER 1982
504 3  21 35 20843 157 53 24839  250 0002 000000

LAIE POINT 1969     NGS QUAD 211574   1011
550 3  21 39 05875 157 55 01852  250 0009 000000

LAIE PT ECC #2 1982                    FAIRWEATHER 1983
553 5  21 39 05640 157 55 01683  250 0009 000000

MAKA 1982                                              FAIRWEATHER 1982
560 3  21 40 41010 157 56 17834  139 0005 000000

DUNE 1982                                              FAIRWEATHER 1982
602 1  21 41 27086 157 56 53236  139 0002 000000

WIND 1982 (MINI-RANGER)                                FAIRWEATHER 1982
609 1  21 42 33062 157 58 02219  250 0006 000000

WIND 1982                                              FAIRWEATHER 1982
610 1  21 42 33062 157 58 02219  250 0006 330040

WIND RM1 1982                                          FAIRWEATHER 1983
611 1  21 42 34648 157 58 01302  250 0000 000000

POHAKULOA 1885      NGS QUAD 211572    1048
650 4  21 07 37753 157 14 10456  250 0248 330040

SAND 1950           NGS QUAD 211572    1066
652 4  21 13 13018 157 15 41425  250 0020 330040

RADIO TOWER OBSTR LIGHT 1983           FAIRWEATHER 1983
658 3  21 27 04867 157 45 34494  250 0000 000000
```

1982
DATA

Field Tide Note

OPR-T126-FA-82

Island of Oahu, Hawaiian Islands

Field tide reduction of sounding was based on predicted tides from Honolulu, Oahu. Correctors were interpolated by the Hydroplot system using program AM 500. All times of both predicted and recorded tides were based on Universal Coordinated Time (UCT). Predicted tides were acceptable for hydrography with no discrepancies attributable to tide errors.

Honolulu Standard Gauge (161-2340)

The permanent tide station at Honolulu, Oahu (161-2340) was the primary controlling gauge for project OPR-T126-FA-82, Island of Oahu. Levels were run by FAIRWEATHER personnel at the beginning and end of the project. Opening levels run on 7 October 1982 (JD 280) to four existing benchmarks were closed to 4.3 mm over the entire run of .49 km. Closing levels, run on 23 November 1982 (JD 327) to the same four benchmarks were closed to 5.0 mm over the entire run of .50 km. No changes in elevation were observed during hydrographic operations. Tide marigrams from station 161-2340 (Honolulu) will be transmitted by the local tide observer in charge of this station.

Mokuoloe Island Subordinate Gauge (161-2480)

The permanent tide station located on Mokuoloe Island (161-2480) was used for controlling the entire survey area along the northeast coast of Oahu. Opening and closing levels were run by FAIRWEATHER personnel to three existing benchmarks at the beginning and end of the project. Opening levels run on 8 October 1982 (JD 281) were closed to 2.1 mm over a run of .49 km. Closing levels, run on 24 November 1982 (JD 328) were closed to 2.0 mm over a run of .50 km. No changes in elevation were observed during hydrographic operations. Tide marigrams will be transmitted by the local tide observer in charge of this station.

Laiemaloo Subordinate Gauge (161-2702)

Tide station Laiemaloo (161-2702) was used to control survey operations run between Kaoio Point and longitude 158°00.0'W along the northeast coast of Oahu. A 1-10 foot scale Metercraft bubbler tide gauge (#7601-7536-34) was installed on 25 October 1982 (JD 298). Two gauge problems developed (see Tide Gauge Problems section) which were field corrected. The gauge then functioned properly until removal on 22 November 1982 (JD 326). Opening and closing levels were run by FAIRWEATHER personnel to five existing benchmarks. Opening levels, run on 26 October 1982 (JD 299) closed to 7 mm over a run of 3.0 km. Closing levels, run on 22 November 1982 (JD 326) closed to 4 mm over the 3.0 km run. An apparent shift in the tide gauge orifice of 4 mm downward was discovered after the running of the closing levels. The orifice movement is a result of the heavy surf conditions in this area. The apparent orifice movement of 4 mm downward is not significant enough that correctors be applied to tide data from this station.

Waimanalo Subordinate Gauge (161-2396)

Tide station Waimanalo (161-2396) was used to control survey operations from the southern limit of hydrography northward to Makapu Point on the northeast coast of Oahu. Investigation of the historical tide station site proved that all the historical benchmarks had been destroyed by recent construction and renovations. A new tide station site, and five new benchmarks were established on the University of Hawaii pier located approximately one mile south of the historical site. Five benchmarks stamped 2376A - 2376E consecutively, were set in the northern cement curb along the length of the pier, running shoreward from the tide gauge location. State survey mark U-11, located at the western limit of the pier, was included in the leveling runs, opening levels, run on 12 October 1982 (JD 285) to all six marks, closed to 1.3 mm over a run of .65 km. Closing levels, run on 24 November 1982 (JD 328) to the same marks, closed to 1.8 mm over a .65 km run. No changes in elevation were seen during hydrographic operations. A 1-10 foot scale Metercraft bubbler gauge (#7601-7536-31) was installed on 11 October 1982 (JD 284) and ran well until removed on 29 November 1982 (JD 333).

Gauge Problems

Laiemaloo Tide Gauge (161-2702)

On 27 October 1982 (JD 300) tide gauge #7601-7536-34 located at tide station Laiemaloo (161-2702) began to malfunction. An interrupted pen trace, caused by corroded pen pivots on the recording mechanism of the gauge, was randomly seen between Julian dates 300 to 312. All periods of lost tidal trace were recoverable by interpolation of the marigram and no hydrography was lost as a result of this malfunction.

Table 1, Periods of Interrupted Tidal Trace, is a listing by Julian dates of periods in which no tidal trace was recorded on the marigram.

On 06 November 1982 (JD 310), gauge #7601-7536-34 located at station Laiemaloo (161-2702) was found to be jammed. No tidal record was gathered between 0100, 4 November 1982 (JD 308) to 0200, 6 November 1982 (JD 310). No hydrography, controlled by this gauge, was run during this period.

Table 1

Times of Lost Tidal Record

Laiemaloo Tide Station (161-2702)

Julian Day	Times (+10)
300	1928-1936
300	1939-2155
301	0945-0950
301	1533-1600
301	1945-2250
301	2315-2340
302	0650-0725
302	0825-0905
302/303	2110-0135
303	0720-1345
303/304	2025-0120
304	0225-0305

Table 1 continued

Julian Day	Times (+10)
304	0631-0708
304	0840-0850
304	0930-1450
304/305	2345-0000
305	1017-1235
307	1058-1735
307	2117-2143
307	2215-2232
312	2020-2035

Miscellaneous

All tidal records were based on a +10 time meridan corresponding to Universal Coordinated Time (UCT).

On 23 November 1982 (JD 327) Hurricane Iwa struck the islands of Oahu, Kauai, and Niihau. A tidal surge of 3-5 feet was predicted for the area on and around these islands. Although the gauge located at station Laiemaloo (161-2702) was removed prior to the hurricane and station Wiamanalo (161-2376) showed no sign of tidal surge, a close inspection of data from both permanent gauge sites should be made on this date to see if either location experienced a tidal surge.

Because the tidal records from the permanent gauge sites will not be transmitted until a later date by the local tide observers, a comparison between adjacent tide gauges could not be made, and should be performed at a later date when all tidal records are available. A recommendation for zoning and time correctors could not be made for the same reasons.

For station Laiemaloo gauge, zero was equivalent to 0.880 feet (0.268 meters) on the adjacent staff. Gauge zero for station Wiamanalo was equivalent to 1.420 feet (-0.433 meters) on the adjacent tide staff. Gauge to staff comparisons for both permenent sites should be taken from historical data because records from both sites were unavailable for determination.

The gauge at station Laiemaloo (161-2702) was only under operation for a period of 28 days. Its removal was necessitated by the approach of Hurricane Iwa.

Times of hydrography abstracts are appended to this field note.

Submitted by:

Arthur E. Francis

Arthur E. Francis
Ensign, NOAA

Approved by:

Walter F. Forster
Commander, NOAA
Commanding Officer

1983
DATA

Field Tide Note
OPR-T126-FA-83
Oahu Island, Hawaii

The primary tide gauge (161-2340) at Honolulu, Hawaii, served as reference station for the predicted tides used on the Oahu Island project as stated in the Project Instructions, OPR-T126-FA-83.

Predicted tide correctors for the field sheets were interpolated aboard the FAIRWEATHER using the program AM-500 dated 10 NOV 72. Zone correctors from Project Instructions were applied to the reference station for hydrography on the inshore sheet FA-20-3-83 (H-10061) only. Due to the surveyed depths (between 100 & 2000 fathoms) of the offshore sheet FA-80-1-82 (H-10068), tide correctors were not applied to this survey. Since Project Instructions did not specify zoning correctors for the Penguin Bank area, correctors for the closest subordinate tide station (Hanauma Bay) were used to obtain the predicted tidal data used on the final field sheet of the offshore survey FA-40-1-83 (H-10117).

All times of both predicted and recorded tides are expressed in Universal Coordinated Time (UTC or Z). All predicted tides were acceptable for hydrography with no discrepancies in data attributable to tide errors.

Four tide gauges were used to support hydrographic operations of the Hawaiian Islands project, OPR-T126-FA-83. These gauges consisted of the primary reference gauge at Honolulu (161-2340); the primary gauge at Mokuoloe Island in Kaneohe Bay (161-2480); and the two field gauges established by FAIRWEATHER personnel; Laiemaloo (161-2702) and Haleiwa (161-2668). Installed at Laiemaloo was a Metercraft analog tide gauge, S/N 7602-705-101. The Haleiwa gauge was also a Metercraft analog recorder, S/N 7601-7536-29.

Levels

Third order levels were performed at all four tide stations before the beginning of hydrographic operations and again before departing the working grounds in accordance with Project Instructions, OPR-T126-FA-83, dated 31 AUG 83.

Levels were performed at the primary reference gauge in Honolulu, Hawaii (161-2340) on 29 SEP 83 (JD 272) and again on 22 NOV 83 (JD 236) between the reference mark of the electric tape gauge and three bench marks. Comparison of opening and closing levels to historic data showed no indication of any vertical movement in the marks or the tape gauge reference mark. The maximum deviation between present and historic levels was 2 mm.

Levels were performed at the primary tide station on Moluoloe Island, Kaneohe Bay, Hawaii, (161-2480) on 28 SEP 83 (JD 271) and again on 21 NOV 83 (JD 325) between the tide staff and three bench marks. Comparison of opening and closing levels showed no indication of any vertical movement in the marks or the staff. Present levels agreed to historic levels to within 1 mm.

1983
DATA

Levels at the Laiemaloo field tide gauge were conducted on 3/4 OCT 83 (JD 276/277) and again on 22 NOV 83 (JD 326) to the five existing bench marks from the staff. Closing levels agreed within 4 mm to opening levels indicating no vertical movement in the marks or the staff. The maximum deviation between present and historic levels was 2 mm.

Levels for the Haleiwa tide gauge were conducted on five separate occasions during survey operations: 13 OCT (JD 286), 21 NOV (JD 325), 25 NOV (JD 329), 28 NOV (JD 332), and 1 DEC (JD 335), 1983. Opening levels were conducted on 13 OCT 83 to establish initial elevations for the five bench marks used.

The first set of closing levels were conducted on 21 NOV 83. Two problems were encountered during these levels. First, the onset of darkness precipitated the loss of the rod level bubble in the water near the staff thus preventing the closure of the level loop to the staff. The second problem was the discovery of a 0.802 meter discrepancy in the elevation of bench mark "2668 D 1983".

On 25 NOV 83, two level loops were run from bench mark "C&GS No. 5 1969" to "2668 D 1983" in an effort to resolve the 0.802 meter discrepancy. These levels confirmed that an error was made during the 13 OCT 83 opening levels.

On 28 NOV 83, one level loop was run from the staff stop to BM "2668 A 1983" in an effort to close out the levels begun on 21 NOV 83. These levels failed to confirm the opening elevation for BM A.

After piecemealing the levels to agree, the complete level run from the staff to all five bench marks were releveled on 1 DEC 83. These final closing levels agreed with the 13 OCT 83 opening levels for bench marks A, B, C, and No. 5 with a maximum variance of 3 mm. They also confirmed the run from C&GS No. 5 to BM D obtained from levels conducted on 21 and 25 NOV 83.

Operational Problems

The bubbler gauge at Laiemaloo only experienced two problems during the course of survey operations. The first problem detected was a minor inconsistency with the speed of the chart drive. This required only that the clock mechanism be reset several times during survey operations. The second problem occurred on 18 OCT 83 at Ø135Z when high surf conditions tore the bubbler tubing apart at the surf zone. The bubbler tubing was replaced and the gauge was restarted at Ø121Z on 26 OCT 83. No hydrographic data was lost due to this problem as ship survey operations were being conducted in water depths that ranged from approximately 100 to 2000 fathoms during the time of the gauge failure.

The Haleiwa bubbler gauge failed to collect tidal data on two occasions as a result of a dry pen. The first gap is from Ø11ØZ on 9 OCT 83 to 22ØØZ on 13 OCT 83. The second gap is on 17 OCT 83 from 113ØZ to 19Ø2Z.

No hydrographic data was lost as a result of the 117 hour gap between 9 OCT and 13 OCT since only deep water ship hydrography was being conducted during this period of time. Interpolation can be used to provide tidal information for the 9.5 hour gap in tidal data on 17 OCT 83.

One additional problem was encountered with the Haleiwa tide record. The printed time on the chart paper was centered between time lines in such a way as to cause confusion for different observers as to the actual gauge time of observations. This problem was corrected during the final scan of the marigram.

No other problems were encountered with this or the other tide gauges.

For processing information the 0.24 foot mark of the staff at Haleiwa (161-2668) was found to be equal to the zero foot mark on the gauge. At Laiemaloo (161-2702), the 6.9 foot mark on the staff was equal to the zero foot mark on the gauge.

DATE: August 4, 1983

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): 161-2396 Waimanalo, Hawaii
161-2702 Laiemaloo, Hawaii

Period: November 9 - 28, 1982

HYDROGRAPHIC SHEET: H - 10068

OPR: T 126

Locality: East Coast Island of Oahu Hawaii

Plane of reference (mean lower low water): 161-2396 = 2.22 ft.
161-2702 = 9.95 ft.

Height of Mean High Water above Plane of Reference is 161-2396 = 1.4 ft.
161-2702 = 1.7 ft.

REMARKS: Recommended Zoning

1. North of Latitude 21° 30.0' Zone Direct on 161-2702 Laiemaloo, HI
2. South of 21° 30.0' Zone Direct on 161-2396 Waimanalo, HI

fa Donald Carrier
Chief, Tidal Datums Section, Tides & Water Levels Branch

DATE: 8/14/84

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Pacific

OPR: T126

Hydrographic Sheet: H-10068

Locality: Offshore NE Coast Oahu, HI

Time Period: November 9-28, 1982 and October 9, 1983 - November 2, 1983

Tide Station Used: 161-2340 Honolulu, HI 1
161-2376 Waimanalo, HI 2
161-2702 Laiemaloo, HI 3

Plane of Reference (Mean Lower Low Water):
(1982 & 1983 work) 161-2340 = 3.69 ft.
(1982 work) 161-2376 = 2.22 ft.
(1982 work) 161-2702 = 9.95 ft.
(1983 work) 161-2702 = 9.88 ft.

Height of Mean High Water Above Plane of Reference:
(1982 & 1983 work) 161-2340 = 1.5 ft.
(1982 work) 161-2376 = 1.4 ft.
(1982 work) 161-2702 = 1.7 ft.
(1983 work) 161-2702 = 1.8 ft.

Remarks:

Recommended Zoning:

1) 1982 Work:
   a) North of Latitude 21° 30.0' Zone Direct on 161-2702.
   b) South of Latitude 21° 30.0' Zone Direct on 161-2376.

2) 1983 Work
   a) North of Latitude 21° 30.0' Zone Direct 18.0' * on 161-2702.
   b) South of Latitude 21° 30.0' to 21° ~~30.0'~~ Zone on 161-2340 and apply -1 hr 10 minute time correction.
   c) South of Latitude 21° 18.0' Zone Direct on 161-2340.

* FROM TEL. CONV. W/JOE MULLEN ON 8/29/84.

Samuel C. Hubbard
Chief, Tidal Datums Section

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10068

GEOGRAPHIC NAMES

East Coast of Oahu Offshore

Name on Survey
Kaiwi Channel to NE of Kaneohe Bay

	A ON CHART NO. 19357 16th Ed.	B ON PREVIOUS SURVEY NO. 5054, 5299, 3252	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
Pacific Ocean	X	X	X	X	X					1
Island of Oahu	X		X					X		2
Laie Point	X	X	X							3
Kalaipaloa Point	X	X	X		X					4
Makalii Point	X	X	X		X					5
Kahana Bay	X	X			X					6
Kaoio Point	X	X	X							7
Mokolii Island	X	X	X		X					8
Kaneohe Bay	X	X	X		X			X		9
Mokapu Peninsula	X	X	X		X					10
Mokumanu Island	X		X		X					11
Mokapu Point	X	X	X		X					12
Kapoho Point	X	X	X		X					13
Kailua Bay	X	X	X		X					14
Lanikai	X		X	X	X					15
Wailea Point	X		X		X					16
Waimanalo Bay	X		X	X	X			X		17
Makapuu Point	X		X		X			X		18
Koko Head	X	X	X		X					19
Hanauma Bay	X		X		X					20
Maunalua Bay	X						X			21
Diamond Head Crater	X		X		X					22
Waikiki Beach					X					23
Honolulu	X		X		X		X			24
Keehi Lagoon	X		X				X			25

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10068

East Coast of Oahu Offshore

Name on Survey

Name on Survey	A ON CHART NO. 19357, 7th Ed.	B ON PREVIOUS SURVEY NO. 5054, 19351 7th Ed. 5299, 3433	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
Kaiwi Channel to NE of Kaneohe Bay										
Sand Island	X		X				X			1
Penguin Bank	X	X								2
Island of Molokai	X	X	X				X			3
Ilio Point	X	X	X				X			4
Laau Point	X	X	X				X			5
Kaiwi Channel	X		X							6
										7
										8
										9
										10
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										22
										23
										24
										25

HYDROGRAPHIC SURVEY STATISTICS

H-10068

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ARC, EXCESS	5
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	3

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDIAN FILES						
ENVELOPES						
VOLUMES	2					
CAHIERS	4					
BOXES	1					

SHORELINE DATA

SHORELINE MAPS(List):

PHOTOBATHYMETRIC MAPS(List):

NOTES TO THE HYDROGRAPHER(List):

SPECIAL REPORTS(List):

NAUTICAL CHARTS(List):

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			2263
POSITIONS REVISED	17		
SOUNDINGS REVISED	88		
CONTROL STATIONS REVISED	0		
	TIME - HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION	2		2
VERIFICATION OF CONTROL	6		6
VERIFICATION OF POSITIONS	44		44
VERIFICATION OF SOUNDINGS	50		50
VERIFICATION OF JUNCTIONS	6		6
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	28.5		28.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		14	14
EVALUATION OF SIDESCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		31	31
OTHER		7.0	7.0
Digitization		6.5	6.5
TOTALS	136.5	58.5	195.0

Pre-processing Examination by J.L. Stringham	*Beginning Date*	*Ending Date* 7/23/84
Verification of Field Data by R. Mueller	~~Processing~~ Beg. date 8/8/84	*Ending Date* 11/14/84
Verification Check by J.L. Stringham, B. Olmstead, J. Green	*Time(Hours)* 39	*Ending Date* 1/16/85
Evaluation and Analysis by C.R. Davies	~~Processed~~ Begin 1/7/85	*Ending Date* 1/11/85
Inspection by Dennis Hill	*Time(Hours)* 2	*Ending Date* 1/31/85

PACIFIC MARINE CENTER
EVALUATION REPORT

REGISTRY NO: H-10068 FIELD NO: FA-80-1-82

Hawaii, East Coast of Oahu, NE of Kaneohe Bay to Kaiwi Channel

SURVEYED: November 9 - November 17, 1982
October 9 - November 3, 1983

PROJECT NO: OPR-T126-FA-82
OPR-T126-FA-83

SOUNDINGS: Ross Fineline 5000
Raytheon Line Scan Recorder

CONTROL: Teledyne Hastings Raydist
Motorola Mini-Ranger III
Range/Range

Chief of Party.....Cdr. W. Forster
Capt. C. Andreasen

Surveyed by.....Lt. T. Baxter
Lt. K. Andreen
Lt. S. Ramsey
Lt. T. Rulon
Lt. T. Otsubo
Lt.(JG) G. Tuell
Lt. (JG) J. Bailey
Ens. A. Francis
Ens. F. Migaiolo
Ens. P. Steele
Ens. J. Koch
Ens. T. Tisch
Ens. J. Salmore
Ens. W. Mitchell

Automated Plot by.....PMC Xynetics Plotter

Verified by..... R. D. Mueller

Evaluated by.....C. R. Davies

1. INTRODUCTION

H-10068 is a basic hydrographic survey conducted in accordance with the following:

Project Instructions OPR-T126-FA-82, dated July 30, 1982
Change No. 1, dated September 7, 1982
Change No. 2, dated November 17, 1982
Change No. 3, dated January 20, 1983
Project Instructions OPR-T126-FA-83, dated August 19, 1983
Change No. 1, dated September 20, 1983

H-10068 is an offshore survey of the east coast on Oahu between latitude 21°56'00"N and 21°06'00"W. It extends inshore to the 100 fathom curve and approximately 25 nautical miles offshore to longitude 157°17'00"W.

Predicted tides based on the Honolulu, Hawaii gage were not utilized during shipboard processing because of the survey depths (between 100 and 2400 fathoms). Tide correctors used for the reduction of the final soundings are computed from approved hourly heights from one permanent tide gage, Honolulu (161-2340) and two temporary field tide gages, Waimanalo (161-2376) and Laiemaloo (161-2702).

During office processing the projection parameters were changed to center the hydrography on the smooth sheet and to change the projection to polyconic.

II. CONTROL AND SHORELINE

Hydrographic control and positioning are adequately discussed in the hydrographer's Descriptive Report paragraphs F and G, and Horizontal and Electronic Control Reports for OPR-T126-FA-82 and OPR-T126-FA-83.

The smooth sheet was plotted using published and field positions based on the Old Hawaiian Datum.

No shoreline is shown on H-10068 as it is an offshore survey.

III. HYDROGRAPHY

Crossline soundings are in good agreement. Small discrepancies can be attributed to irregular or steep sloping bottom. In areas where this steep sloping bottom occurred a number of holidays existed, caused by missed soundings on the fathograms. There was no evidence of unusual bottom characteristics in the area of the holidays and the depth curves could be drawn continuously. Hydrography within the limits of H-10068 was adequate to determine the bottom configuration and least depths. Standard depth curves were adequately drawn.

IV. CONDITION OF SURVEY

The hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual with the exception of items discussed in the Preprocessing Report, dated June 7, 1984, and:

The junction of H-10068 with H-8973, H-10056, H-10058, H-10061 was not completed, see section J of the hydrographers Descriptive Report.

V. JUNCTIONS

H-10068 junctions eight contemporary surveys:

Survey	Year	Scale	Note	Color	Junction
H-8973	1968	1:20,000	Adjoins	red	Southeast
H-8990	1967	1:12,500	Adjoins	violet	Southwest
H-10056	1982	1:10,000	Adjoins	red	West
H-10058	1982	1:10,000	Adjoins	orange	West

H-10059	1982	1:10,000	Adjoins	violet	West
H-10061	1982-83	1:20,000	Joins	red	Northwest
H-10117	1983	1:40,000	Joins	violet	South
H-10124	1984	1:80,000	Joins	red	Southwest

Soundings and depth curves in the junctional areas are in agreement. One sounding was transferred to H-10068 from H-8973 to depict shoaler information. There were several areas, see hydrographer's Descriptive Report section J, where the junction was not completed because there was not an overlap of at least one sounding line. This resulted in small holidays that were deemed not significant. No additional field work is required as depth curves could be drawn continuously.

There are no contemporary surveys to the east and north, but the depths are in harmony with the charted depths.

VI. COMPARISON WITH PRIOR SURVEYS

H-3252 (1910) 1:20,000
H-3253 (1910-11) 1:20,000
H-3287 (1910) 1:20,000
H-3289 (1910-11) 1:20,000

The present survey soundings are generally 2 to 20 fathoms shoaler than those of the prior surveys. These differences are attributed to the relative accuracy of data acquisition and survey scale. H-10068 is adequate to supercede the prior information within the limits of hydrography.

H-3433 (1913-26) 1:60,000
H-4548 (1926) 1:40,000

The present survey soundings generally compare well with small differences of ±2 to 5 fathoms. These differences are attributed to the relative accuracy of the data acquisition. H-10068 is adequate to supercede the prior information within the limits of hydrography.

H-5054 (1929) 1:250,000
H-5299 (1932) 1:80,000

The present survey soundings generally compare well, differences are small ±2 to 5 fathoms. These differences are attributed to the relative accuracy of the data acquisition and the survey scale. H-10068 is adequate to supercede the prior information within the limits of hydrography.

VII. COMPARISON WITH CHART

Chart 19340 20th Ed. Oct. 3, 1981
Chart 19351 7th Ed. Feb. 6, 1982
Chart 19357 16th Ed. Dec. 5, 1981

Chart 19351, although was not listed in the Project Instructions for comparison, provides the largest scale coverage in the southeastern portion of the survey area. Therefore, a comparison with this chart has been accomplished.

a.) Hydrography - Charted information originates with the prior surveys discussed previously and from unknown sources.

The depths east of Makapuu Point charted as reported soundings were determined to originate with the NOAA Ship PIONEER as chart letter 1359/63 (per telephone inquiry to N/CG221). These depths are not consistent with present survey depths and are believed to be inaccurately positioned by as much as 800 meters. The present survey provides no indication of such anomolous depths and it is recommended that the chart reported depths be superseded by present survey depths.

The 95-fathom sounding Reported 1964, charted at latitude 21°13'48"N, longitude 157°43'36"W is confirmed by a 96-fathom sounding on H-10068. It is recommended that the 96-fathom depth supersede the 95-fathom depth.

H-10068 is adequate to supersede charted hydrography within the common area.

A non-dangerous sunken wreck charted at latitude 21°30'41"N, longitude 157°46'36"W was not specifically investigated and it is recommended that the wreck be retained as charted. This wreck is located in the junctional area between H-10068 and H-10058 and the records for H-10058 indicate that a specific investigation was conducted during that survey. The investigation consisted of 50 meter line spacing echo sounding over an area of approximately 400 by 800 meters and failed to verify or disprove the wreck.

Geographic names shown on the smooth sheet originate from the above charts.

b.) Controlling Depths - There are no controlling depths within the limits of present survey.

c.) Aids to Navigation - There are no aids to navigation within the limits of the present survey

VIII. COMPLIANCE WITH INSTRUCTIONS

H-10068 adequately complies with the project instructions and changes listed in section 1 of this report except as noted in section 4, Condition of Survey.

IX. ADDITIONAL FIELD WORK

H-10068 is a good basic hydrographic survey. The wreck discussed in Section VII has not been disproven and may be a candidate for additional field work pending a re-evaluation of source data.

Respectfully submitted

Charles R. Davies

C. R. Davies
Cartographer
January 14, 1985

This survey has been verified and evaluated. I have examined this survey and it meets Charting and Geodetic Services survey standards and requirements for use in nautical charting except as noted in the Evaluation Report. This survey is recommended for approval.

Dennis Hill
Chief, Hydrographic Section

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-10068

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

Chief, Nautical Chart Branch (Date) 1 February 1985

CLEARANCE: SIGNATURE AND DATE:

N/MOP2:LWMordock 2/7/85

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendations are forwarded with my concurrence.

2-14-85

Director, Pacific Marine Center (Date)

4116 No. 2

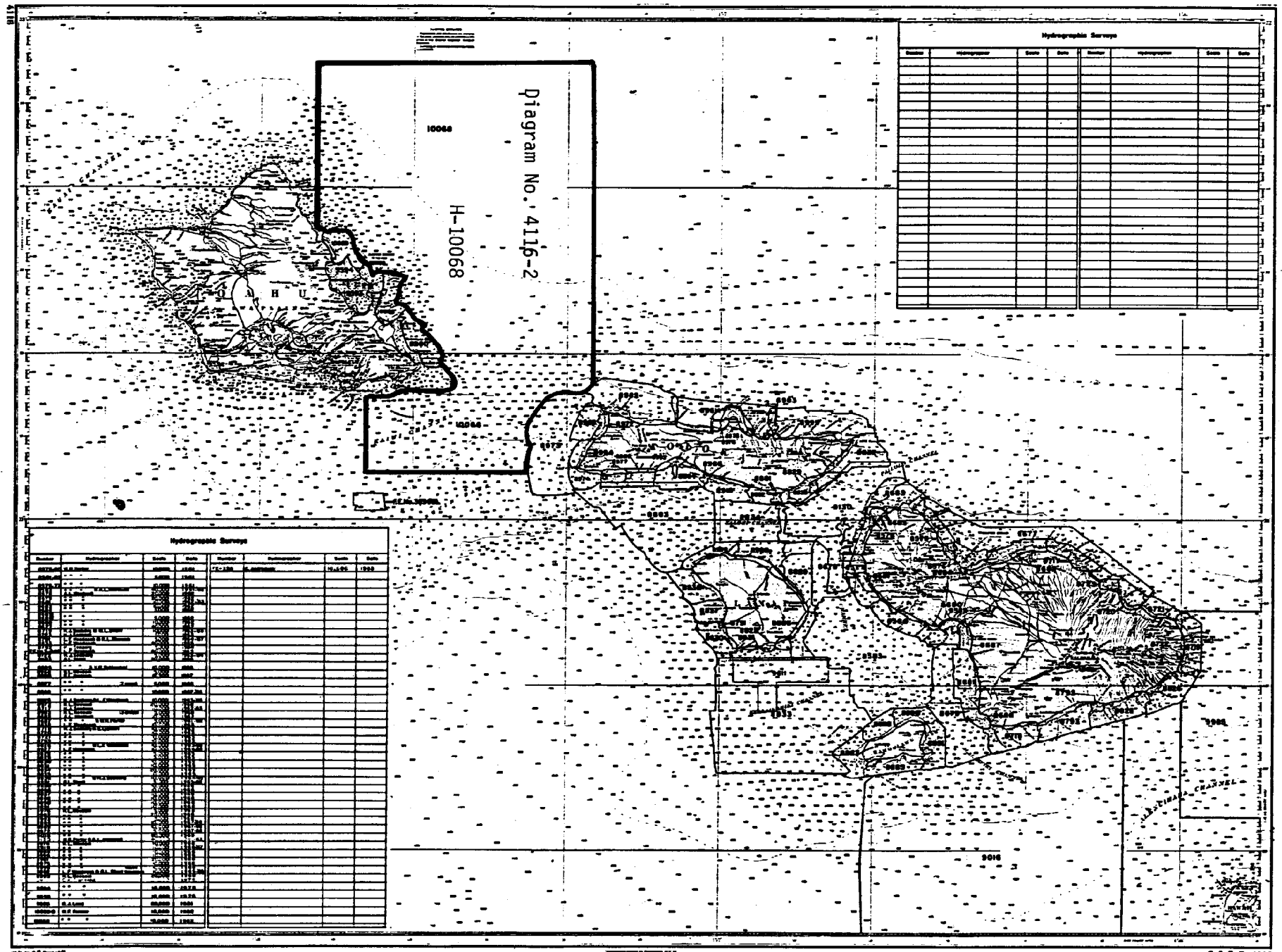
Diagram No. 4116-2
H-10068
10068
O A H U
Hydrographic Surveys
Hydrographic Surveys

FORM C&GS-8352
(3-25-63)

NAUTICAL CHART DIVISION

1/2

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10068

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
19010	6-14-85	J. O'Connor	~~Full Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 15 - Exam for critical corr only.
			Hold for application to larger scales. No Corr.
19340	9/13/85	W.J. Bramucki	Full Part Before After Verification Review Inspection Signed Via
			Drawing No. #23 Exam'd for critical corr only defer full
			application until appl to larger scale charts.
19010	3/14/89	RA Shipley	Full ~~Part Before~~ After ~~Verification Review Inspection~~ Signed Via
			Drawing No. full APPLICATION Applied
19358	3/15/89	S.H. Clark	Full ~~Part~~ ~~Before~~ After ~~Verification Review Inspection~~ Signed Via
			Drawing No. full application
19359	3/17/89	RA Shipley	Full ~~Part Before~~ After ~~Verification Review Inspection~~ Signed Via
			Drawing No. full APPLICATION
19357	3/23/89	RA Shipley	Full ~~Part Before~~ After ~~Verification Review Inspection~~ Signed Via
			Drawing No. full APPLICATION applied thru
			19358 & 19359
			Full ~~Part Before~~ After Verification Review Inspection Signed Via
19340	4/24/89	RA SHIPLEY	Drawing No. FULL APPLICATION OF SDGS THRU 19357
			Full ~~Part Before~~ After Verification Review Inspection Signed Via
19007	5/12/89	RA SHIPLEY	Drawing No. FULL APPLICATION OF SDGS THRU 19340
			Full ~~Part Before~~ After Verification Review Inspection Signed Via
546	7/12/89	RA SHIPLEY	Drawing No. FULL APPLICATION OF SDGS THRU 19007
19004	6/20/90	[illegible]	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. full application of sndgs. from SS thru 19340.
19013	6/22/90	Thad B. Cummings	Full application of sndgs from SS thru 19004.
19010	7/18/90	Thad B. Cummings	Full application of sndgs from SS thru 19004.
19351	8/28/90	Thad B. Cummings	Full application of sndgs. from SS
50	8/28/90	Thad B. Cummings	No Correction needed.

FORM C&GS-8352 SUPERSEDES ALL EDITIONS OF FORM C&GS-975.

USCOMM-DC 8558-P83

NOAA FORM 75-96
(10-83)

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

2/2

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10068

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
530	9/25/90	Elias B. Domingo	Full ~~Part Before~~ After Marine Center Approval Signed Via Full application
			Drawing No. of soundings from SS thru 19010, 19010 —
			Added three Sndgs (1106, 1208, 317 fms)
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.