

9737

Diag. Cht. No. 5302-2

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-5-1-78
Office No..... H-9737

LOCALITY
State California
General Locality Estero Bay
Locality Morro Bay

1978

CHIEF OF PARTY
B.I. Williams

LIBRARY & ARCHIVES

DATE May 2, 1979

☆ U.S. GOV. PRINTING OFFICE: 1976-669-441

9737
5302

AREA 5

CHART 18703

N/c 18020, 18022, 18700, INT 501

HYDROGRAPHIC TITLE SHEET

H-9737

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-5-1-78

State CALIFORNIA

General locality ESTERO BAY

Locality MORRO BAY

Scale 1:5000

Date of survey 30 January-18 February 1978

Instructions dated 11 November 1977

Project No. OPR-L100-FA-78

~~FAIRWEATHER~~

Vessel Launch FA-5 (2025) Whaler 2 (2027), Whaler 1 (2028), Avon Redstart (2029)

Chief of party CDR B.I. Williams

Surveyed by B. Williams, A. Yanaway, R. Crowell, S. Knight, M. Finke, L. Roberts, J.P. Quinlan

Soundings taken by echo sounder, hand lead, pole ROSS Finline and Raytheon Echo Sounders

Graphic record scaled by A. Yanaway, R. Crowell, S. Knight, M. Finke, L. Roberts,

Graphic record checked by A. Yanaway, R. Crowell, S. Knight, M. Finke, L. Roberts

Positions Verified by :

~~Reviewed by~~ Isagani A. Almacen

Automated plot by PMC Xynetics Plotter

Soundings

Verification by Isagani A. Almacen

Soundings in ~~XXXXXX~~ feet at ~~XXXX~~ MLLW

REMARKS: This survey is complete and adequate for charting.

*Added to stack,
8-16-79 WST*

OPR-L100 (411) - FA-78

PROGRESS SKETCH

MORRO BAY, CALIFORNIA
NOAA SHIP FAIRWEATHER S-220
CDR BRUCE I. WILLIAMS, CMDG
SCALE OF NOS CHART 18703

-1978-

STATIONS ESTABLISHED

- JAN
- 3. TOON, 1978 M/R
 - 4. SPIT, 1978 M/R
 - 6. HILL 3, 1978 M/R
- FEB
- 9. WIL, 1919
 - 10. ROD 2, 1933
 - 11. UP-RM, 1919
 - 12. ZARD, 1933
 - 13. WATER TANK ON SLOPE OF BLACK HILL, 1933

STATIONS RECOVERED

- JAN
- 1. MORRO BAY PG&E CO WEST STACK, 1956
 - 2. MORRO BAY WEST BREAKWATER LIGHT, 1976
- FEB
- 5. BLACK HILL, 1881 M/R
 - 7. WHITE, 1883 M/R
 - 8. TUB 2, 1963 M/R

LNM SOUNDING LINE	6.0	79.3
SQ NM SOUNDING LINE	0.12	1.07
STD CAST (MARTEK)	1	0
BOTTOM SAMPLES	0	13

JAN FEB

△ STATIONS RECOVERED

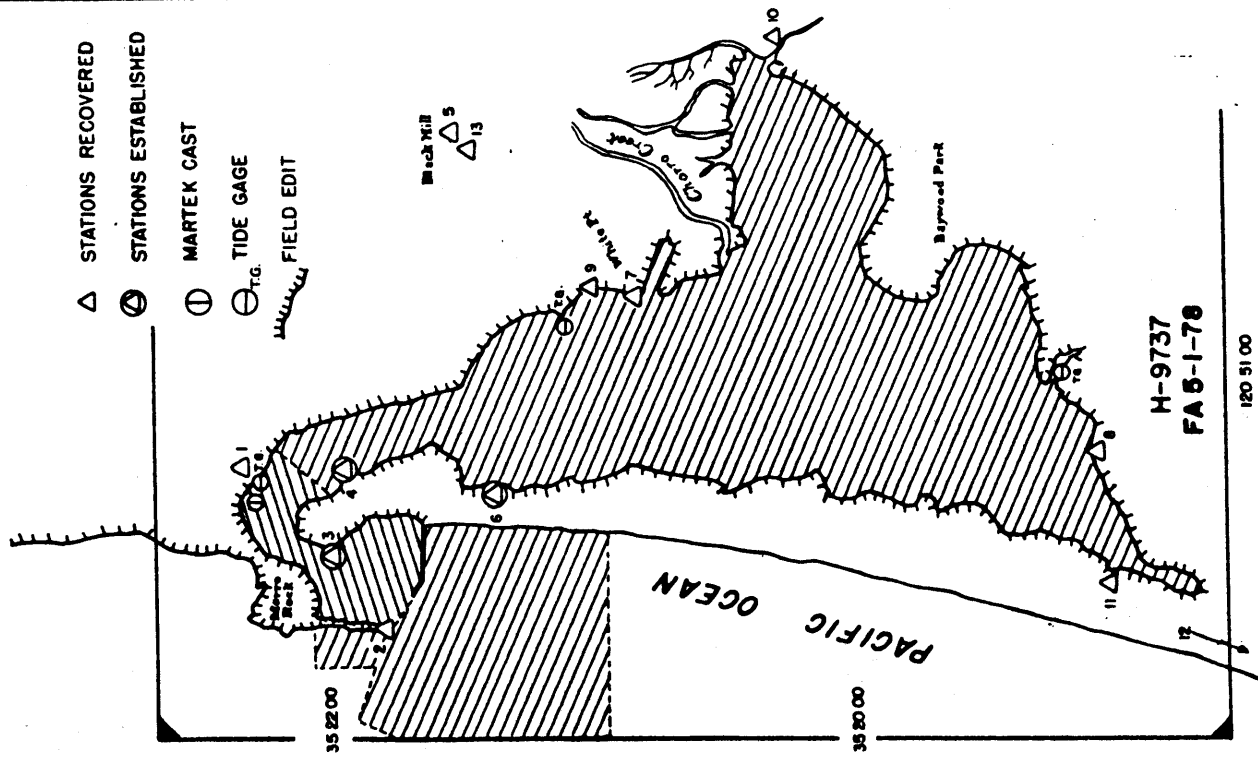
⊙ STATIONS ESTABLISHED

① MARTEK CAST

⊖ TIDE GAGE

FIELD EDIT

Black Hill
△ 5
△ 13



H-9737
FA 5-1-78

120 51 00

DESCRIPTIVE REPORT
NOAA SHIP FAIRWEATHER S220
OPR-L100-(411)-FA-78
SURVEY H-9737 (FA-S-I-78)

A. PROJECT

This survey was accomplished in accordance with Project Instructions OPR-L100-FA-78, Southern California Coast, dated 11 November 1977, with Change No. 1, dated 22 November 1977, with Change No. 4, dated 23 January 1978, with PSR Extension OPR-L100 (411) FA-78, Chart 18703, dated 11 November 1977, and with the PMC OpOrder.

B. AREA SURVEYED

FA-5-1-78 covered Morro Bay, an area from Morro Rock, lat. 35°22'20"N on the north, to lat. 35°19'00"N on the south, and from long. 120°50'15"W on the east, to the mouth of the breakwater at long. 120°52'15"W on the west. FA-5-IW-78 was included to provide an adequate junction with previous surveys. It covers a rectangular area from the mouth of the breakwater west to long. 120°52'45"W, and from lat. 35°22'00"N on the north, to lat. 35°21'00"N on the south.

C. SOUNDING VESSELS

Hydrography was accomplished by four vessels and by personnel on foot from piers and from shore. Most of the hydrography was done by two boats, FA-5 and Whaler 2. Both of these boats were used for range/azimuth data, with FA-5 (EDP 2025, Hull 1001) used solely for this purpose, Whaler 2 (EDP 2027) used mainly for this purpose, but it was also used for bottom samples and a few Detached Positions. The Avon Redstart (EDP 2029) was used only on JD 030 for a tagline survey of White Point Marina. Whaler 1 (EDP 2028) was used in conjunction with "on-foot" personnel.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

Launch FA-5 used a Ross Fineline model 200-A fathometer, S/N 1036. This fathometer was the only means by which this launch gathered soundings. Whaler 2 was equipped with a Raytheon model DE-719-B fathometer S/N 6168, which was used for depths over approximately 3.5 feet. When shoaler waters were encountered, a sounding pole (constructed from a level rod) was put over the side adjacent to the transducer from the Raytheon fathometer. These shoal waters were encountered frequently by Whaler 2 because the boat was often pulled by the OIC in order to get a good zero-foot curve delineation along the edges of the mud flats. The Avon Redstart personnel used the same sounding pole that was later used by the Whaler 2 personnel. Whaler 1 and "on foot" personnel used a leadline which was dropped from its varied locations, - piers, shore, and the boat. A check on the accuracy of the Raytheon fathometer was performed

in the following manner: the sounding pole was placed adjacent to the fathometer transducer so that both would measure the same depth at the same time; both readings were then compared. By adjusting the fathometer, the transducer draft could be eliminated from the echo trace, and the trace would read the true depth. This method was learned on the second day of operation so several experiments were performed on-line until the draft was neutralized. See Abstract of Corrections to Echo Soundings appended.

Contrary to Hydro. Manual Requirements

SOUNDING INSTRUMENT

<u>VESSEL</u>	<u>INSTRUMENT</u>	<u>MODEL</u>	<u>S/N</u>	✓
FA-5	Ross Fineline	200-A	1036	
Whaler 2	Raytheon Sounding Pole	DE-719-B	6168	
Avon Redstart	Sounding Pole			
Whaler 1 and "on-foot" personnel	Leadline			

The depths on FA-5-1-78 ranged from -2 feet to 40 feet and the depths on FA-5-1W-78 ranged from 1 foot to 79 feet (using predicted tides).

E. HYDROGRAPHIC SHEETS

All data were plotted by the shipboard PDP-8e Hydroplot system. The ship's PDP-8e computer (S/N 09524) utilized a complot plotter, Houston Instruments model DP-3 S/N 6166-22. The projection was a modified transverse mercator at a scale of 1:5000. The area was covered by two boatsheets, origins at Lat. 35°18'44"N and Long. 120°49'43"N, and Lat. 35°20'55"N and Long. 120°51'15"W, with skews of 100° and 90° respectively. A blowup of the most congested part of the survey was made at 1:2500 with its origin at Lat. 35°20'46"N and Long. 120°50'23"W with a skew of 116°. Copies of the parameter tapes are appended.

F. CONTROL STATIONS

Several control stations were recovered in the area. They were used to establish SPIT 1978, TOON 1978 and HILL 3 1978. Horizontal control was accomplished with respect to the 1927 North American Datum. No photogrammetrically located signals were used for hydrography. For more information and clarification, see HORIZONTAL CONTROL REPORT, MORRO BAY, OPR-L100-(411)-FA-78.

G. HYDROGRAPHIC POSITION CONTROL

Most hydrography was controlled by range/azimuth positioning. Motorola Miniranger III was used for range data and Wild T-1 and Wild T-2 Theodolites were used to provide azimuths. The Miniranger transponders were mounted on photo tripods and placed beneath the theodolites which were mounted on survey tripods and placed directly over stations.

A tagline was used for horizontal positioning control during the survey at White Point Marina. Sextants were used to position the tagline at right angles to the shoreline. Whaler 1 used sextants and a Ranging Inc. Rangematic MK05 1200 rangefinder for positioning. The rangefinder was check calibrated by observing several known distances and then comparing the observed distance with the actual distance. On one position, 6093, the angle observed was inaccurate due to the current, which ran at approximately four knots. The current took the boat away from the position before a sextant cut could be taken and when an attempt was made to reestablish the previous position, the Whaler was positioned farther away from the pier than it was when the sounding was taken. The minirangers were check calibrated several times a day using fixed aids to navigation as one end of the check calibration range, and the known station as the other end of the range. These results were compared with the calibration performed before and after the project by the Electronics Department and the Electronics and Instrumentation Officer of the FAIRWEATHER. All calibration checks are included with the raw data printouts. See Abstracts of Corrections to Electronic Position Control, appended.

H. SHORELINE

All shoreline was taken from Class I manuscripts, scale 1:5000, TP 707, 708, and 709. Field Edit was performed on all three manuscripts and the corrections were applied to the smooth field sheets of both FA-5-1-78 and FA-5-1W-78. There is a discrepancy between the manuscript and the zero-foot curve at approximately Lat. 35°20'51"N, Long. 120°50'55". This is not due to Field Edit error but instead is due to Spring tides combined with unusual storm tides. The smooth field sheets were plotted using predicted tides, so when real tides are applied to the smooth sheet, this disagreement will be resolved. For further details and clarification, see FIELD EDIT REPORT, MORRO BAY OPR-L100-FA-78.

I. CROSSLINES

Of the 78.8 total nautical miles of hydrography run, 9.7 nautical miles or 12.3% were crosslines. Soundings during these crosslines agreed excellently with soundings during the main scheme, where the maximum disagreement was one foot. Even these very minor disagreements may disappear with the application of the real tides which are yet to be applied.

J. JUNCTIONS

No contemporary surveys were furnished with which a proper junction could be made. A junction with H-5750, Point Buchon to Morro Rock, 1934, was made. On this survey, the jetty from Morro rock to shore was still under construction and both the North Jetty and the South Jetty at the mouth of the Bay had not been constructed. Because of this information, comparisons inside the jetties would not prove useful. Agreement outside of the jetty area was good where comparisons agreed to within 1/2 fathom over the entire area of junctioning.

K. COMPARISON WITH PRIOR SURVEYS

For FA-5-1-78, there were three PSR items:

PSR 26, Shoaling, addresses two areas of shoaling. The first, between Lighted Buoy "4" and Buoy "6", was reported to have a least depth of 5 feet MLLW. The surveyed depth agreed with this depth very well. The second area of shoaling questioned, had a least depth of 6 feet MLLW and extended 75 feet into the channel between Lighted Buoy "8" and Buoy "10". Lighted Buoy "8" had been removed by the time this survey was begun and Lighted Daybeacon "8" had been installed. A shoal area, with a least depth of 5' to 8 feet does exist halfway between these two aids. Using the charted position of Lighted Buoy "8", the shoal area developed during FA-5-1-78 agreed with and confirmed the shoal questioned in PSR 26. *do not concur, See O.C. Report* ✓

PSR 27, Pier Ruins: This item was investigated, and the presence of visible pier ruins was confirmed. There were four pilings and a jagged plank visible. Three of these pilings stand upright and the fourth, (the northwestern piling), is canted at an angle of approximately 60° to the vertical. A range/azimuth Detached Position was taken next to the southwestern piling. The position calculated from the Detached Position was Lat. 35°21.23'N and Long. 120°50.68'W. This piling extends approximately 11 feet above the bottom which has a depth of 5 feet MLLW. *Elevation shown in raw data P10, reduces to (1) fms.* ✓

PSR 28, Visible Wreck, Position Approximate: This wreck was located off Baywood Park, with the position approximately 35°19.71'N and Long. 120°50.65'W. The wreckage remains and protrudes from the sand 1 foot and is exposed at low tide. The position shown on the chart is reasonably accurate. This is not a navigable area so that insufficient cause exists to warrant retention of the wreck symbol. *(See Verifiers Report)* ✓

FA-5-1-78 was compared with the prior survey H-5751, Morro Bay, January, 1935. The channels at the south end of the bay are deeper than before by 3 to 5 feet and are well defined. The westernmost of the southern channels is similar in depth and pattern to that of 1935. The channel east of the main channel at approximately Lat. 35°20'05"N has shortened and is shoaler than on the prior survey. White Point Marina was constructed after the 1935 survey. The channel due west of White Point along Lat. 35°20'45"N has shifted slightly and has some shoaling along its entire length. North of Lat. 35°21'15"N, the total topography has changed so drastically that comparison between the two surveys is worthless. This is due to the jetty that was under construction at the time of the 1935 survey between Morro Rock and shore. This jetty altered the flow of water from a North-South flow to a West-to-East-to-South fan flow. The shoreline on both sides of the channel changed drastically due to the flow change thus making step-by-step comparisons next to impossible. ✓

L. COMPARISON WITH THE CHART

FA-5-1-78 was compared with Chart 18703, 13th edition, February 1977, Morro Bay Inset, Scale 1:10,000. On this chart, there was one wreck visible, position approximate, discussed in the section on PSR items. *also a submerged dangerous wreck at Morro Bay Entrance buoy #1 - overlooked by hydrographer - maybe because it is partially obliterated by the light disc on the buoy.* ✓

The platform charted at the mouth of Chorro Creek should be deleted ✓
from the chart since it has been removed and there are no traces left
of its existence.

Red Nun Buoys "18" and "20" have been replaced with Daybeacons "18" ✓
and "20". ✓ Black Can "15" ✓ has been replaced by Daybeacon "15". ✓ As
stated earlier, Lighted Red Nun "8" ✓ has been replaced by Lighted
~~Daybeacon~~ "8". ✓ See forms 76-40 appended. For most of this survey,
Lighted Red Nun "2" was not in place and was being repaired. A Detached Po-
sition was taken on its new position where it was located in 15⁷ feet of
water compared to the listed 18 feet. It is recommended that the buoy
be charted as surveyed rather than as charted previously. Three shoals
appear on the chart and all were well developed. The first, at about
Lat. 35°21'50"N, Long. 120°51'10"W, was found to have a least depth of
2¹ feet at MLLW compared with the charted 1/2 fathom. The second shoal,
at about Lat. 35°21'30"N, Long. 120°51'06"W, had a least depth of 2⁴ ✓
feet at MLLW compared with the charted least depth of 1/2 fathom. The
third shoal, at about Lat. 35°21'18"N, Long. 120°50'50"W, had a charted
least depth of one fathom compared to the surveyed least depth of 5 feet
at MLLW. - *5 ft L.D. is 35 meters S.E. of charted 1/2 fm shoal.*

Two other areas were developed for least depth. The first, at about ✓
Lat. 35°22'18"N, Long. 120°51'33"W, was found to have a least depth of
1² feet MLLW. The second, at about 35°22'08"N, Long. 120°51'28"W, was ✓
found to have a least depth of 1² foot at MLLW. The latter is inside
the area discussed in PSR 26 (Shoaling) and it is recommended that this
least depth be charted because several boats were observed aground on
this shoal during the period of this survey. All the shoals listed
were developed at 10 meter spacing.

M. ADEQUACY OF SURVEY

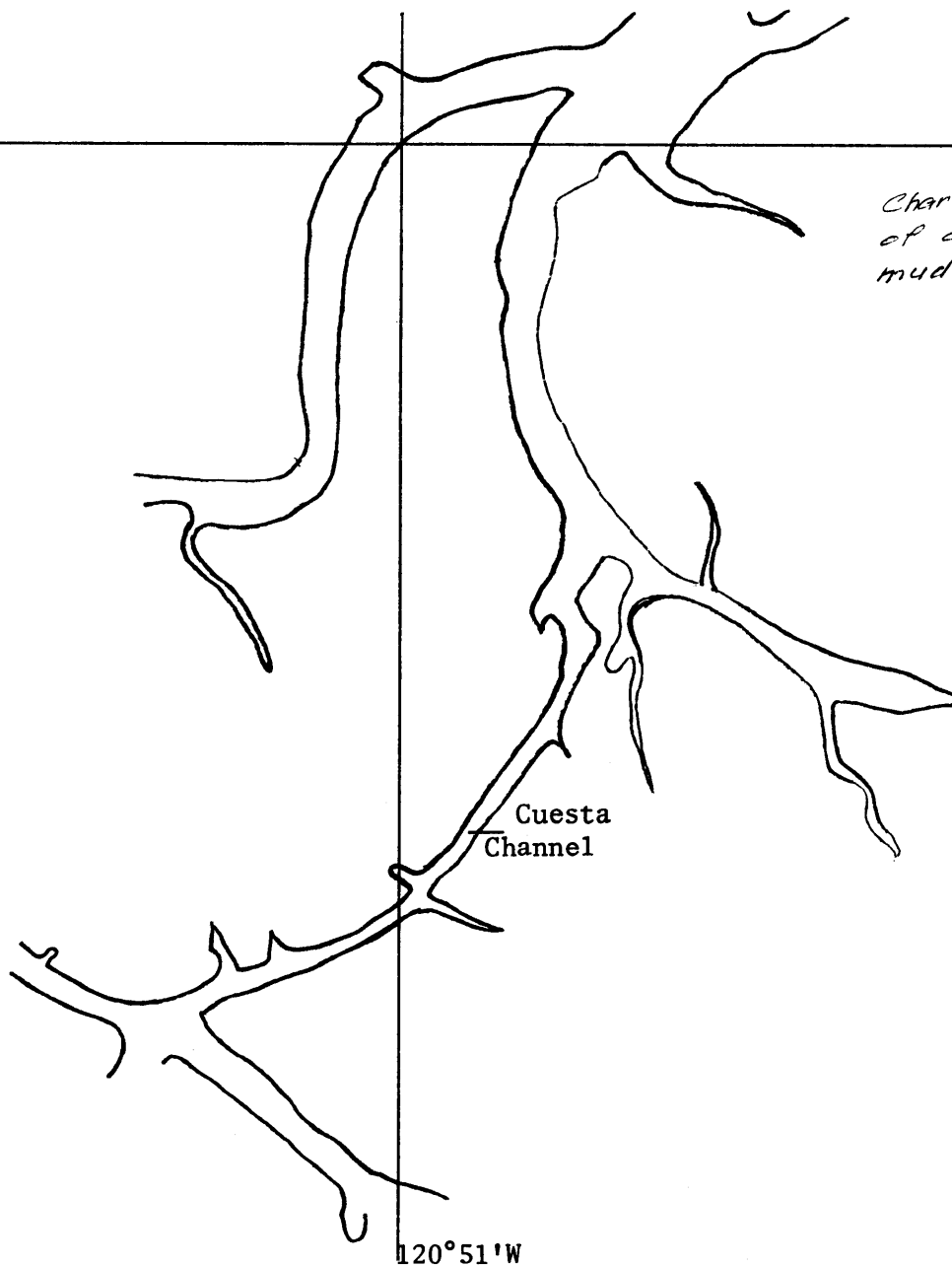
All fathograms from the launch and Whaler survey were scanned both on-line ✓
and after times of hydrography for peaks and deeps. Extreme care was made
to delineate the zero-foot curve. The OIC of Whaler 2 walked the shore-
line covering the majority of mudflats and pulled the boat behind him.
In the area of piers and steep grades, soundings were taken by hydrogra-
phers on foot. This survey is both adequate and complete to supersede
all prior surveys for charting.

N. AIDS TO NAVIGATION

All buoys, both navigational and mooring, were located by detached ✓
positions. Numerous mooring buoys were located throughout Morro Bay
and are plotted on the field smooth sheet. *Wh & Orange "No Wake" buoy #5
was not located with a D.P. & not shown on boat sh.*
The buoy was plotted from two references in the sdg vol. 7ps
The following is a comparison with Light List Volume III Pacific Coast
and Pacific Islands, 1978. As mentioned before, Lighted Buoy "2" was
not in place for most of this survey and was placed as listed in Section L.
Lighted Buoy "3" is located in slightly shoaler water at 17 feet MLLW,
than the reported 21 feet. Lighted Buoy "4", in the PSR shoaling region,
is located in 14 feet MLLW as compared to the listed 18 feet. Lighted
~~Daybeacon~~ "8" is listed to be in 25 feet of water while it is actually
in 20 feet at MLLW.

35°20'N

*Charted delineation
of channels thru
mud flats*



120°51'W

The main channel at Lat. 35°21'54"N Long. 120°52'00"W was found slightly shoaler than the charted depths with the minimum depth in the area of ~~14~~ ¹¹ feet, compared to the charted 3 1/2 fathoms. The ^{main} channel leading to White Point Marina was found to have a least depth of 12³ to 12⁷ feet compared to the charted depth of 2 1/2 fathoms. A deep point off Fairbank Point exists at a comparable depth to the charted depth. The channel listed as abandoned in the southern portion of Morro Bay, Cuesta Channel, was actually found to be the main channel to use to reach the south end of the bay. ✓

Note B on the chart, stated that the westernmost channel was marked by privately maintained floating aids. Vandals destroyed most, if not all, of these floating aids and the aids have not been replaced. It is recommended that this note be removed from the chart since these aids will probably not be replaced in the near future, according to the Harbor Master. ✓

Privately maintained aids referred to in Note B were not located on the present survey and are considered to no longer exist. ✓
concur
FPS
FPS.

All other Aids to Navigation are as listed in the Light List. Privately maintained buoys mark the channel into White Point Marina, important because of the shoal west of the mouth of the marina. For those Aids to Navigation not listed in the Light List and for more information on positions of Fixed Aids to Navigation, see Horizontal Control Report, Morro Bay, OPR-L100-(411)-FA-78.

O. STATISTICS

The following is a list of the launch and boat statistics for FA-5-1-78 ✓

<u>VESSEL</u>	<u>N.M. Main Scheme</u>	<u>N.M. Crosslines</u>	<u>Bottom Samples</u>
2027	32.7	4.8	13
2025	35.5	4.9	
Avon Redstart	0.6		
"On Foot" and Whaler 1	1.3		

There were three tide gauges, an extra tide staff, and one Martek cast made. See Oceanographic Log Sheet-M, Bottom Sediment Data, Field Tide Note, and Velocity Table One, all appended.

P. MISCELLANEOUS

Greenwich Mean Time (+8 hours) was used for all survey records, both "logger" and hand-logged. Velocity correctors were not applied to the final field smooth sheet. Nor were real tides used for the final plot of the field smooth sheet. Bar checks or "pole checks" as discussed in Section D were made daily. ✓

Q. RECOMMENDATIONS

This survey is complete and adequate for charting of Morro Bay and should supercede all prior surveys. As noted in Section K, the wreck off Baywood Park need not be retained on the chart. Restating Section L, it is recommended that the platform at the mouth of Chorro Creek be deleted from the chart since it no longer exists. Also, note B on the chart should be removed since it is no longer accurate. (See Verifier's Report) ✓
retain wreckage 95 shown on present survey 715

Shortly after completion of this survey, it was learned that the U.S. Army Corps of Engineers plans to start dredging the entrance, Navy Channel, and part of the main channel of Morro Bay. The extent of the dredging operation was unknown at the time of this report.

R. AUTOMATED DATA PROCESSING

Range/azimuth data from Launch FA-5 were collected using Aircraft Standards logger system. Program RK 330, Reformat and Data Check, dated 5 May 1976, was used to reformat the logger data. Hand logged data from Whaler 2, Whaler 1, "on-foot" personnel, and the Avon Redstart were converted to Master Hydrographic range/azimuth and range/range tapes using Program AM 602, Elinore, Line Oriented Editor, dated 21 May 1975. Some fixes were converted from G.P.'s to range/range data using RK 300, Utility Computations, dated 5 February 1976. These data were plotted as follows. The range/azimuth data were plotted ✓

using RK 212, Visual Station Table Load and Plot, dated 1 April 1974, and program RK 216, Visual Stations and Sounding Plot, dated 5 February 1976. The range/range data were plotted using RK 211, Range/Range Non-Real Time Plot, dated 30 January 1976. All the data were plotted on sheets made on the ship's hydroplot system using program RK 201, Grid, Signal, and Lattice Plot, dated 18 April 1975.

S. REFERENCES TO REPORTS

FIELD EDIT REPORT, MORRO BAY, OPR-L100-(411)-FA-78
HORIZONTAL CONTROL REPORT, MORRO BAY, OPR-L100-(411)-FA-78
ELECTRONIC CONTROL REPORT, MORRO BAY, OPR-L100-(411)-FA-78

Submitted by:




Ens. Mark S. Finke, NOAA

APPROVAL SHEET

FIELD NUMBER FA-5-1-78
REGISTER NUMBER H-9737

This fieldsheet and all accompanying records are hereby approved.
This survey was conducted under my supervision and the survey is complete
and adequate for charting purposes.


CDR Bruce I. Williams
Commanding Officer
NOAA Ship FAIRWEATHER S-220

STATIONS USED FOR FA-5-1-78

BLACK HILL 1881-The station was located about 1 mile southeast of Morro Bay on a hill in Morro Bay State Park. It was blocked from sight from portions of the work area due to trees and geographic configuration.

*Falls off
sheet*

HILL 3 1978-The station was established on the large spit in the general area of HILL 2, on the highest sand dune in the area. The only difficulties resulting from the use of this station came from the number of boat masts in the bay (the masts could possibly interfered with the Miniranger signal.)

SPIT 1978-This station, established in the work area for the purpose of range/azimuth control, was located on the spit on the northeastern-most high dune. Some hydrography was run from this station behind and amid boat masts.

TOON 1978-This station was located on a small jetty inside the mouth of the entrance to Morro Bay. It was used for hydrography in the area of the entrance to the bay.

TUB 2 1963-The station was located at the south end of Morro Bay and was used to control hydrography in the south end of the survey area from White Point south. There were no restrictions on visibility from the station except east of the station where geography blocked Miniranger reception and theodolite observation.

WHITE 1883-The station was located on the highest point on White Point. It was used to control some hydrography north of the station. South of White Point, the bay was blocked from view by numerous trees.

For more complete descriptions of stations, refer to Horizontal Control Report, Morro Bay, OPR-L100-(411)-FA-78.

OPR - 411 (L100) SIGNAL TAPE - MORRO BAY

29 JAN. 1978

MORRO BAY, WEST BREAKWATER, LIGHT 1976

001 5 35 21 46555 120 52 07654 139 0005 000000

TOON (ESTB. 1978)

010 7 35 21 59909 120 51 45959 250 0003 000000

MORRO BAY PG&E CO. W. STACK 1956

020 2 35 22 19491 120 51 22986 139 0000 000000

SPIT (ESTB. 1978)

030 5 35 21 55188 120 51 22840 250 0006 000000

HILL 3 (ESTB. 1978)

040 5 35 21 20997 120 51 31448 250 0020 000000

BLACK HILL 1881

050 0 35 21 30897 120 49 50380 250 0201 000000

WHITE 1883

060 2 35 20 49327 120 50 33985 250 0024 000000

TUB 2 1963

070 6 35 19 04818 120 51 20421 250 0003 000000

falls off chart

Replaces C&GS Form 567.

- TO BE CHARTED
- TO BE REVISED
- TO BE DELETED

REPORTING UNIT
(If on a Ship or Office)
NOAA Ship
Fairweather

STATE
Calif.

LOCALITY
Morro Bay

DATE
14 Feb.
1978

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO. **CFR L100-78** SURVEY NUMBER **N.A. 1927** DATUM

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION			METHOD AND DATE OF LOCATION (See instructions on reverse side)		CHARTS AFFECTED
		LATITUDE D.M. Meters	LONGITUDE D.P. Meters	DATE	OFFICE	FIELD	
Day-marker	#6 <input checked="" type="checkbox"/> Green on boat sheet 7PS	05.176	45.209	35 22	120 51	F-3-6-L	18703
	#8 <input checked="" type="checkbox"/> Red Triangle Placard with Flashing Red Light	14.256	51.36.888	35 22	120 51	F-3-6-L	18703
	#10 <input checked="" type="checkbox"/> Green on boat sheet 7PS	359.88	1176.81	35 22	51 22.206	F-3-6-L	18703
	#12 <input checked="" type="checkbox"/> Green on boat sheet 7PS referenced in sdq vol. but no color mentioned. 7PS	146.59	684.35	35 21	51 11.432	F-3-6-L	18703
	#14 <input checked="" type="checkbox"/> referenced in sdq vol. but no color mentioned. 7PS	124.83	352.31	35 21	51 07.307	F-3-6-L	18703
	#15 <input checked="" type="checkbox"/> Green Square Placard	40.274	225.19	35 21	51 01.091	F-3-6-L	18703
	#16 <input checked="" type="checkbox"/> Red	220.60	35.62	35 21	51 03.974	F-3-6-L	18703
	#17 <input checked="" type="checkbox"/> Green Square Placard	29.769	121.24	35 21	50 51.569	F-3-6-L	18703
	#18 <input checked="" type="checkbox"/> Red Triangle Placard	448.59	1589.25	35 21	50 53.907	F-3-6-L	18703
	#20 <input checked="" type="checkbox"/> Red Triangle Placard	16.542	1626.91	35 21	50 44.348	F-3-6-L	18703

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
- GEODETIC PARTY
- PHOTO FIELD PARTY
- COMPILATION ACTIVITY
- FINAL REVIEWER
- QUALITY CONTROL & REVIEW GRP.
- COAST PILOT BRANCH

(See reverse for responsible personnel)

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	
POSITIONS DETERMINED AND/OR VERIFIED	B. I. Williams
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	
<p style="text-align: center;">INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' (Consult Photogrammetric Instructions No. 64.)</p>	
<p>OFFICE</p> <p>I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75</p> <p>FIELD</p> <p>I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection</p> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	<p>FIELD (Cont'd)</p> <p>B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982</p> <p>II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75</p> <p>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>
<p>ORIGINATOR</p> <p><input type="checkbox"/> PHOTO FIELD PARTY <input type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)</p> <p>FIELD ACTIVITY REPRESENTATIVE</p> <p>OFFICE ACTIVITY REPRESENTATIVE</p> <p><input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE</p>	

Velocity Table
Morro Bay, Calif.
Sound Velocity Corrector Abstract

The following sound velocity correctors are to be applied to all soundings in feet from a fathometer on survey FA-5-1-78 (H-9737).

Depth in Feet	Corrector (Feet)
0.0 - 5.1	+ 0.0
5.2 - 12.1	0.2
12.2 - 19.3	0.4
19.4 - 26.2	0.6
26.3 - 33.4	0.8
33.5 - 40.3	1.0
40.4 - 46.9	1.2
47.0 - 53.8	1.4
53.9 - 60.3	1.6
60.4 - 66.9	1.8
67.0 - 73.4	2.0
73.5 - 80.1	2.2
80.2 - 85.3	2.4

FIELD TIDE NOTE
OPR-L100-FA-78
H-9737
MORRO BAY, CALIFORNIA

Field tide reductions were based on Los Angeles, outer harbor, tides and were interpolated by PDP 8/e computer utilizing program AM500. Times of both predicted and recorded tides are on GMT.

Gage location and operation periods were as follows:

<u>SITE</u>	<u>LOCATION</u>	<u>PERIOD</u>
MORRO BAY 941-2298	35°22'15.4"N 120°51'25.6"W	21 January-20 February 1978 (30 days)
FAIRBANKS POINT 941-2292	35°21'05.8"N 120°50'44.3"W	26 January-17 February 1978 (22 days)
CUESTA by the SEA	35°19'12.6"N 120°50'56.2"W	25 January-16 February 1978 (22 days)

MORRO BAY

Gage s/n 7403A3402M12, a Fischer-Porter ADR, was installed on the city T pier on 21 January and operated without breaks in record or problems until removal on 20 February 1978. The gage reads 8.54 feet greater than the tide staff.

FAIRBANKS POINT

Gage s/n 6903A5568M13, a fischer-Porter ADR, was installed on 26 January and operated without breaks in record until 17 February 1978 when it was removed. The time was initially set 12 hours slow, at the beginning of the record, but was corrected on 31 January. There were no other abnormalities during the remaining period of operation. The gage reads 57.68 feet greater than the tide staff.

CUESTA by the SEA

Gage s/n 68A9334, a 0-20 foot Bristol-Bubbler, was installed on 25 January 1978. The gage operated well, with only minor differences, until removal on 16 February 1978. A staff-gage comparison was done, at 12 min. intervals, on 30 January for a period of 6 hours 12 mins. On 11 February the staff was destroyed by a boat and was not replaced subsequent to gage removal. The gage reads 0.97 feet greater than the tide staff.

VICINITY of MORRO ROCK

In accordance with change No.4 to project instructions, a tide staff was installed at Lat 35°22'05.2"N Long. 120°45'45.2"W and was read at 15 min. intervals for a period of 12 hours 30 mins. on 31 January 1978.

LEVELS

The tide staff at Morro Bay, 941-2298, was leveled to six permanent bench marks. The staffs at Fairbanks Point and Cuesta by the Sea were leveled to three recoverable points. No datum shifts were apparent at Morro Bay or at Fairbanks Point. The tide staff at Cuesta by the Sea was destroyed five days prior to gage removal.

ZONING

No tidal zoning was attempted in the field. It is recommended that zoning be accomplished by PMC utilizing the multi-gage option, ~~for~~ tide reducers, during office plotting.

July 13, 1978

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): 941-2248 Cuesta-by-the-Sea, CA.
941-2292 Fairbanks, CA.
941-2298 Morro Bay, CA.

Period: January 30 - February 18, 1978

HYDROGRAPHIC SHEET: H-9737

OPR: L 100
(411)

Locality: Morro Bay, California

Plane of reference (mean lower low water): 2.5 ft. - Cuesta-by-the Sea
2.83 ft. - Fairbanks
2.52 ft. - Morro Bay

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

Remarks: Recommended zoning:

1. Outside of the breakwater at the entrance to Morro Bay apply -10 minute time correction to Morro Bay.
2. Inside the breakwater and south to 35°21'35" zone direct on Morro Bay.
3. 35°21'35" to 35°20'00" zone direct on Fairbanks.
4. South of 35°20'00" zone direct on Cuesta-by-the-Sea.

Don M. Spellman
Chief, Tides Branch



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C3313/SKG
1063/B.011

F. N. 9737

SEP 18 1978

TO: Bruce Williams
Commanding Officer
NOAA Ship FAIRWEATHER
Pacific Marine Center

FROM: Donald M. Spillman *got*
Acting Chief
Tides and Water Levels Branch
Oceanographic Division

SUBJECT: Evaluation of Field Records Received for OPR-L100-FA-78,
Southern California Coast

The purpose of this evaluation report is to provide a feedback mechanism between the field parties and the Rockville office. It is not intended to be a gripe sheet aimed at field units. Instead, it is hoped that this will assist the field parties in obtaining quality data and will result in making the field units aware of the reasons for specific requirements. Evaluation reports will be compiled as soon as each survey is completed; i.e., field work completed and tide data received and processed. Any comments and questions on the content of these evaluation reports will be appreciated.

All field records received by the Oceanographic Division for OPR-L100-FA-78 have been reviewed. The data received was of good quality and the tide requirements set forth in the Project Instructions have been met satisfactorily.

A few minor problems were found in the station packages received, such as the absence of descriptions for the TBM's at station 941-2292, Fairbanks Pt., Morro Bay, and the general lack of sufficient detail in filling out the tide station reports.

Planning of the tide station locations for this survey was difficult because of the lack of historical tide data inside Morro Bay. Based on information available before the hydrographic survey, the range of tide decreased from 3.5 feet at Morro Beach, outside, to 2.9 feet at the town of Morro Bay, inside the inlet. There was no additional data available for the southern portion of the bay as well. This apparent 0.6 foot decrease in range led to the placement of a short term station near Morro Rock, in an attempt to pinpoint the change in tidal characteristics.



Analysis of the data from the stations operating during the survey shows significant changes in the tidal characteristics from the historical data. The range of tide varies from 3.5 feet at the entrance, to 3.6 feet at Morro Bay (Town), to 3.7 feet at both Fairbanks Pt. and at Cuesta-by-the-Sea. The time of high water is approximately 0.5 hours later and the time of low water is 0.7 hours later at Cuesta-by-the-Sea than at the entrance to Morro Bay in Estero Bay.

The final zoning forward to the Pacific Marine Center divided sheet H-9739 as follows:

<u>ZONE</u>	<u>TIDE STATION AND CORRECTORS USED</u>
Estero Bay, Outside of Entrance	941-2298, Morro Bay with a -10 minute time corrector.
From Entrance inside to Latitude 35°20'N	Direct on 941-2298, Morro Bay.
From Latitude 35°21'35"N, south to 35°20".00N	Direct on 941-2292, Fairbanks Pt.
South of Latitude 35°20'.00"	Direct on 941-2248, Cuesta-by-the-Sea.

The final zoning provided for the other two hydrographic sheets of this survey are as follows:

<u>ZONE</u>	<u>TIDE STATION AND CORRECTOR USED</u>
Sheet H-9740, Inside Jetties	Direct on 941-1165, Ventura Marina.
Sheet H-9740, Outside Jetties	941-1270, Rincon Island with a -10 minute time corrector.
Sheet H-9714, Entire Sheet	941-1270, Rincon Island with a -10 minute time corrector.

cc:
 CPM3
 CPM131

GEOGRAPHIC NAMES

H-9737

Name on Survey	Source of Name									
	A	B	C	D	E	F	G	H	I	J
	ON CHART NO. 18703	ON PREVIOUS SURVEY NO. H-5751 (1935)	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST	KT-SHEET	
Baywood Park ✓	X		X					X		1
Ghorro Creek ✓	X		X							2
Guesta-by-the-Sea ✓	X		X					X		3
Estero Bay ✓	X		X					X		4
Morro Bay ✓	X	X	X					X		5
Morro Bay (City) ✓	X	X	X					X		6
Morro Bay State Park CEH			X					X		7
Morro Rock ✓	X	X	X	X				X		8
Kairbank Point ✓	X		X					X		9
White Point ✓	X		X					X		10
White Point Marina				X						11
MIDWAY MARINA ✓										12
										13
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										25

Approved:

Chas. P. Harrington
Chief Geographer - C3x5

29 June 1970

APPROVAL SHEET

FOR

SURVEY H- 9737

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position print-out has been made. A new final sounding print-out has been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the verifier's report.

Date: 2 April 1979

Signed: A. E. Eichelberger

Title: for Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9737

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS & PRELIMINARY OVERLAYS	486
DESCRIPTIVE REPORT	1	SMOOTH OVERLAYS: POS. ARC, EXCESS	3

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS	1 - with printouts		1			
VOLUMES	8					
BOXES			1 - Smooth & Tides			

T-SHEET PRINTS (List) TP-00707, TP-00708 & TP-00709, 1 - Tide plot, 1 - contour plot

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	PRE-VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			1985
POSITIONS CHECKED		1985	
POSITIONS REVISED		30	
SOUNDINGS REVISED		668	
SOUNDINGS ERRONEOUSLY SPACED		3	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		--	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	3		
VERIFICATION OF CONTROL		4	
VERIFICATION OF POSITIONS		82	
VERIFICATION OF SOUNDINGS		247	
COMPILATION OF SMOOTH SHEET		34	
APPLICATION OF TOPOGRAPHY		28	
APPLICATION OF PHOTOBATHYMETRY		--	
JUNCTIONS		4	
COMPARISON WITH PRIOR SURVEYS & CHARTS		12	
VERIFIER'S REPORT		16	
OTHER		8	
TOTALS	3	435	438
Pre-Verification by James S. Green	Beginning Date 5/17/78	Ending Date 5/17/78	
Verification by Isagani A. Almacen	Beginning Date 7/14/78	Ending Date 3/02/79	
Verification Check by Stanley Otsubo and James S. Green	Time (Hours) 43	Date 3/14/79	
Marine Center Inspection by H.I.T.	Time (Hours) 19	Date 4/10/79	
Quality Control Inspection by F.P. SAULSBURY	Time (Hours) 120	Date 5/31/79	
Requirements Evaluation by J. Myer	Time (Hours) 4	Date 8/1/79	

J. Myer 6/26/79 13 hrs.

Reg. No. H-9737

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. _____

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:

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO: H-9737

FIELD NO: FA-5-1-78

California, Estero Bay, Morro Bay

SURVEYED: 30 January - 18 February 1978

SCALE: 1:5000

PROJECT NO: OPR-L100 (411)

SOUNDINGS: ROSS Fineline Fathometer
and Raytheon DE-719B Fathometer
Leadline & Sounding Pole.

CONTROL: Range/Azimuth

Chief of Party.....CDR Bruce I. Williams
Surveyed by.....B. Williams, A. Yanaway,
R. Crowell, S. Knight, M. Finke
L. Roberts & J.P. Quinlan
Automated plot by.....Xynetics Plotter (PMC)
Verified by.....Isagani A. Almacen
6 March 1979

I. INTRODUCTION

This is a basic hydrographic survey of Morro Bay including the area offshore of the breakwater west to longitude 120° 52' 45" and from latitude 35° 22' 00" on the north to latitude 35° 21' 00" on the south.

Hydrography was accomplished by NOAA Ship FAIRWEATHER from 30 January to 18 February 1978.

Range/Azimuth positioning method was primarily adopted on this particular survey, using Motorola Mini-Ranger III positioning equipment with a Theodolite (T-2) instrument for determining azimuth. Tagline survey method was also utilized in pier areas along the bay.

II. CONTROL AND SHORELINE

Horizontal control used on this survey consisted of existing triangulation stations and two (2) newly established third-order control stations along the bay.

No photogrammetrically located stations were used on this survey.

Shoreline detail information was obtained from unreviewed Class I shoreline manuscripts TP-00707, TP-00708 and TP-00709.

The dates of photography and field edits of the above manuscripts are as follows:

TP-00707: March 1976 ✓ -- February 1978 ✓
TP-00708: June 1976 ✓ -- February 1978 ✓
TP-00709: March 1976 ✓ -- February 1978 ✓

III. HYDROGRAPHY

Crossline soundings were in satisfactory agreement on this survey.

The development of the bottom configuration as well as the determination of least depths including low water line is considered adequate, except for the following:

A. The 6 and 12 foot depth curves in the vicinity of latitude 35° 22' 10", longitude 120° 51' 48" along the west side of the navy channel mentioned in the ship's descriptive report, were ~~not developed~~ on this survey.

B. Additional sounding lines should have been run along the middle of the channel in the area between buoys "3" and "4" to completely delineate the approach to Morro Bay.

Planned C.B.E. dredging in the channel should have been accomplished by now 5/24/79

The inking of depth curves on the smooth sheet is ⁱⁿ complete, where inadequate hydrographic development precluded the delineation of portions of

IV. CONDITION OF SURVEY

the 6, 12 & 18 ft. depth curves.

The automated plotting of smooth sheet including accompanying overlays, hydrographic records and reports are adequate and conform to NOS hydrographic standards. The field procedures conform to the requirements stated in the hydrographic manual except for the adjustments to echo sounder initial settings done in the field to compensate for the draft and variations during hydrography.

In using this new Raytheon DE-719B fathometer, the field party misinterpreted the "tide and draft adjustment" mentioned in the operator's manual. What had really happened was both tide and draft controls were adjusted to compensate for draft alone and not actually the combination of tide and draft variations as tabulated on transducer correction abstract included in the ship's descriptive report.

Procedure of setting initial at 0 should be followed.

It should be noted that on this survey, this is the first time the new fathometer was used in the field. This portable fathometer mentioned in the 1976 hydrographic manual was assumed to have been previously evaluated in the field and found to meet the NOS requirement for hydrographic surveying.

V. JUNCTIONS

There were no junctions with contemporary surveys.



Comparison

~~Junction~~ off the entrance to Morro Bay was made with H-5750, Pt. Buchon to Morro Rock, which is the only survey covering the area since 1934. Agreement is still considered satisfactory. It agreed to within 1 to 3 feet in depths ranging from 20 to 82 feet.

VI. COMPARISON WITH PRIOR SURVEYS

Comparison was made with H-5751 (1:5,000), a 1935 survey of Morro Bay area. It should be noted that during the time of prior survey, Morro Bay area was not yet developed. A jetty was still under construction and the entrance breakwaters were not yet in existence. The shoreline along the channel up to Cuesta-by-the-Sea as well as the direction of flow of water inside the bay has changed extensively, causing significant changes in the bottom configuration throughout the area.

The following pre-survey review items were covered on this survey:

- A. PSR Item 26: The shoaling reported by the harbor master in chart letter 1050 of 1977 was investigated in the field. The shoal area between buoy "A₂" and "B₄" was found to have a minimum depth of ~~16~~ 9 feet extending about ~~75~~ ¹²⁰ feet into the channel. Another shoaling was found along the southern side of the channel midway between lighted day beacon "8" and buoy "10". Least depths of 1/2 foot at MLLW were located within the shoal area. It is recommended that these shoal areas be indicated on the chart as determined in this survey. *See also O.C. Report 1/2 ft shoal is at edge of channel*
- B. PSR Item 27: The pier ruins charted at latitude 35° 21.23' longitude 120° 50.70' reported in chart letter 849 of 1969 ~~was~~ ^{where} investigated in the field. Visible remains of the pier consisting of pilings were found. It is recommended that these ruins be retained on the chart as determined in this survey. *ruins, piling (I)*
- C. PSR Item 28: The visible wreck (PA) charted at latitude 35° 19.71' longitude 120° 50.65' originating from a 1965 U.S. Geological Survey map was found in the field. According to the ship's descriptive report, the charted position of the wreck was checked and found reasonably accurate. The wreckage remains, protrudes about 1 foot, and is exposed at low tide. Contrary to ship's recommendation, it is ~~still recommended that the wreck symbol be retained in the chart of the area.~~ *wreckage be charted as shown on the present survey*

The current survey is considered adequate to super^Scede the prior survey of 1935 for areas of common coverage.

VII. COMPARISON WITH CHART

- A. This survey was compared with chart 18703 (C&GS 5387) 1:40,000 (inset - 1:10,000), 13th edition, February 1977. Aside from those previously mentioned on the preceding section, the following other changes have been noted:
1. The middle of the channel from the entrance of the Bay to

latitude 35° 22' 05" and in the vicinity of latitude 35° 22' 10", longitude 120° 51' 45" is 3 to 5 feet shoaler than the charted depths.

2. The entrance channel to ^{Midway} ~~White Point~~ Marina was found to be shoaler by 3 to 5 feet with visible shoaling off the point. The present controlling depth inside the marina is about 5 feet compared to the charted 8 feet. *Chart depths as shown on present survey*

3. The three (3) charted shoal areas along ^{side} the main channel were developed in the field. The shoals in the vicinity of latitude 35° 21' 50", longitude 120° 51' 12" and latitude 35° 21' 30", longitude 120° 51' 06" were found to have a least depth of 1 and 4 feet respectively as compared to charted 1/2 fathom (3 feet). The shoal area at latitude 35° 21' 18", longitude 120° 50' 50" with charted least depth of 1 fathom (6 feet) was found to be 1 foot shoaler on this recent survey.

4. The platform across ^{from} the mouth of Chorro Creek Charted at latitude 35° 20' 25.5", longitude 120° 51' 49.0" was found to have been removed. It is recommended that it be deleted from the chart.

concur
JPS

5. No information as to the condition of the submerged wreck charted at latitude 35° 21' 30" N, longitude 120° 52' 15" W. was mentioned in the ship's report. It is recommended that the wreck symbol be retained as charted.

See also
R.C. Report

B. Aids to Navigation

On this survey, some buoys and daymarkers were found to have been either removed, replaced or relocated along the main channel (refer to Section L of DR and Form 76-40). Updated positions of all these existing navigational aids including privately maintained buoys were determined in the field and found to apparently serve the purpose intended.

Navigational aids maintained by the Coast Guard and the city of Morro Bay including privately maintained buoys marking the channel leading to ~~White Point~~ ^{Midway} Marina were plotted on the smooth sheet. Other privately maintained mooring buoys located along the channel indicated on the smooth sheet were not plotted due to congestion on the sheet. *Copies of the boat sheet showing the location of these mooring buoys have been inserted in the D.R.*

Survey records do not mention that Midway Marina Chan. buoys are privately maintained.

Based on the information obtained from the field, vandals destroyed almost all of the charted privately maintained floating aids along the channel from White Point down to the southern end and according to the harbor master, these markers most probably will not be replaced. I concur with the ship's recommendation that the note pertaining to these aids be removed from the chart of the area.

concur
JPS

The present charted information of Morro Bay primarily originated from the Army Corps of Engineers surveys. The Corps plans to commence dredging the entrance, Navy channel and part of the main channel soon. ✓

This survey is adequate to super^sede charted hydrography within the common area.


VIII. COMPLIANCE WITH PROJECT INSTRUCTION

The survey complies with the project instructions.

IX. ADDITIONAL FIELDWORK


This is a good basic hydrographic survey and no additional field work is necessary. However, because of the continuing developments of Morro Bay area, significant changes could be expected in the future and for purposes of updating the chart of the area, contact must be maintained with the Coast Guard, Corps of Engineers, and the city of Morro Bay.

Respectfully submitted,



Isagam A. Almacen
Cartographic Technician
March 6, 1979

Examined and Approved:



James S. Green
Chief, Verification Branch



**U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

DATE : April 13, 1979
TO : OA/CPM - Eugene A. Taylor
FROM : OA/CPM 3 - *Glen R. Schaefer*
SUBJECT: PMC Hydrographic Inspection Team
Report for Survey H-9737

This survey is a basic hydrographic survey of Morro Bay, Estero Bay, California. This survey was conducted by NOAA Ship FAIR-WEATHER in 1978 in accordance with Project Instruction OPR-L100-FA-78 dated November 11, 1977, and Change Nos. 1 and 4 dated November 22, 1977, and January 23, 1978, respectively.

Additional developments in certain areas of this survey, which would have improved the overall quality of the survey, are identified in the verifier's report.

The inspection team finds H-9737 to be a good basic survey adequate to supersede common areas of prior surveys and charted hydrography. Administrative approval is recommended.

Glen R. Schaefer
Glen R. Schaefer

David B. MacFarland, Jr.
David B. MacFarland, Jr.

James W. Steensland
James W. Steensland

Arnold E. Eichelberger
Arnold E. Eichelberger



ADMINISTRATIVE APPROVAL
H-9737

The smooth sheet and reports of this survey have been examined and the survey is adequate for charting and to supersede common areas of prior surveys.

E A Taylor

Eugene A. Taylor, RADM
Director
Pacific Marine Center

13 April 1979

Date



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

OA/C352:FPS

May 31, 1979

TO: R. H. Carstens
Acting Chief, Hydrographic Surveys Division

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury *F. P. Saulsbury*
Quality Evaluator

SUBJECT: Quality Control Report for H-9737 (1978), California, Estero Bay, Morro Bay

A quality control inspection of H-9737 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, sounding line crossings, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

1. Three charted landmarks, two stacks and a standpipe, in the vicinity of latitude $35^{\circ}22.33'$, longitude $120^{\circ}51.21'$, were not mentioned in the survey records nor in the Verifier's Report. These features were transferred to the smooth sheet from TP-00707 (1976-78) during quality control inspection.
2. Presurvey Review Item 28--The visible wreck, PA, charted in latitude $35^{\circ}19.71'$, longitude $120^{\circ}50.65'$ from a 1965 U.S. Geological Survey map was verified by the hydrographer. The hydrographer stated that the charted PA position for the wreck is "reasonably accurate." No additional positional data was furnished. The wreckage should have been accurately located with a detached position. Chart the wreckage as shown on the present survey.

A few other items, transferred to the present survey from contemporary topographic surveys with positions approximate, should have been accurately located on the present survey by the hydrographer if the topographic position was inadequate.



3. The descriptions and/or positions of several aids were amended or corrected from the survey records during quality control inspection. In some instances incorrect or incomplete information in these records contributed to an erroneous representation of some aids on the smooth sheet. The color, character, and/or positions for the following aids were corrected by the quality evaluator.

- a. Morro Bay Channel Buoys--numbers 2, 3, 4, 5, 7, 12, 14, 16
- b. Morro Bay Channel Light "8"
- c. Speed buoy "5" (white and orange)
- d. Two mooring buoys in latitude 35°22.02', longitude 121°51.3'
- e. Daybeacons--numbers 6, 10, 12, 14, 15, 16, 17, 18, 20
- f. White buoy at latitude 35°21.98', longitude 120°51.29'
- g. Black and white buoy in latitude 35°20.96', longitude 120°50.8'

Additional corrections or additions to the smooth sheet from the survey records during quality control include:

- a. Identification of Tide Station at Daybeacon "6"
- b. Delineation of pipe at latitude 35°21.33', longitude 120°50.98'
- c. Delineation of stake at latitude 35°21.28', longitude 120°50.92'
- d. Addition of descriptions and elevations of some offshore features
- e. Displacement of soundings that obliterated piers
- f. Position approximate (PA) label annotated on the smooth sheet at some features where incomplete information was provided by the surveyor

These items are detailed on the one-half scale copy of the survey to be furnished the verifier.

4. Generally, geographic positions and elevations were not shown at detached positions in the sounding volumes.

5. Cartographic codes in the printout, identifying survey items located by detached positions, are generally incorrect. Most of these are recorded as code 251 as missed soundings.

6. The "reported awash" feature and the two rocks awash charted from an undetermined source in the vicinity of latitude $35^{\circ}21.90'$, longitude $120^{\circ}52.14'$ were not disposed of by the hydrographer, are not shown on the contemporary topographic manuscript, TP-00707 (1976-78), and are referred to the compiler for disposition.

7. The rock awash charted from an undetermined source in latitude $35^{\circ}22.05'$, longitude $120^{\circ}51.91'$ was transferred to the present survey as an islet from TP-00707 (1976-78).

8. Due to cultural and natural change, the shoreline and alongshore features should be charted as shown on the present survey and the contemporary photogrammetric manuscripts.

9. The piling PA located on TP-00707 (1976-78) in the vicinity of latitude $35^{\circ}21.86'$, longitude $120^{\circ}51.14'$ were located by detached positions (561-562) on the present survey and should be charted as shown on the smooth sheet.

10. Presurvey Review Item 26--The shoal reported in Chart Letter 1050 of 1977 as falling between buoys "4" and "6" was found on the present survey between buoys "2" and "4," 350 meters south^{west} of its reported position. This shoal is the result of natural southwesterly growth of the shoal charted in this area so that it now intrudes approximately 120 feet into the Morro Bay Entrance Channel in the vicinity of latitude $35^{\circ}21.83'$, longitude $120^{\circ}51.98'$. Chart depths in this area as shown on the present survey.

11. The daybeacons shown on the present survey are not shown on the chart comparison print since they were installed subsequent to the edition date of the chart. According to information obtained from the Coast Guard, these aids are intended to mark an impending Corps of Engineers dredged channel.

Daybeacons "12" and "14" are shown as piles on TP-00707 (1976-78). Their locations on the present survey were taken from TP-00707. References to these aids were found in the survey records, but no color information was provided by the hydrographer.

The lighted bell buoy No. 1 charted in latitude $35^{\circ}21.51'$, longitude $120^{\circ}52.31'$ is shown on the present survey as unlighted and may be in error.

The lighted red buoy No. 8 charted in latitude $35^{\circ}22.21'$, longitude $120^{\circ}51.65'$ has been replaced with a fixed light, 40 meters northeast of the charted lighted buoy, as shown on the present survey.

Buoys marking the entrance channel to Midway Marina, not now charted, are shown on the present survey.

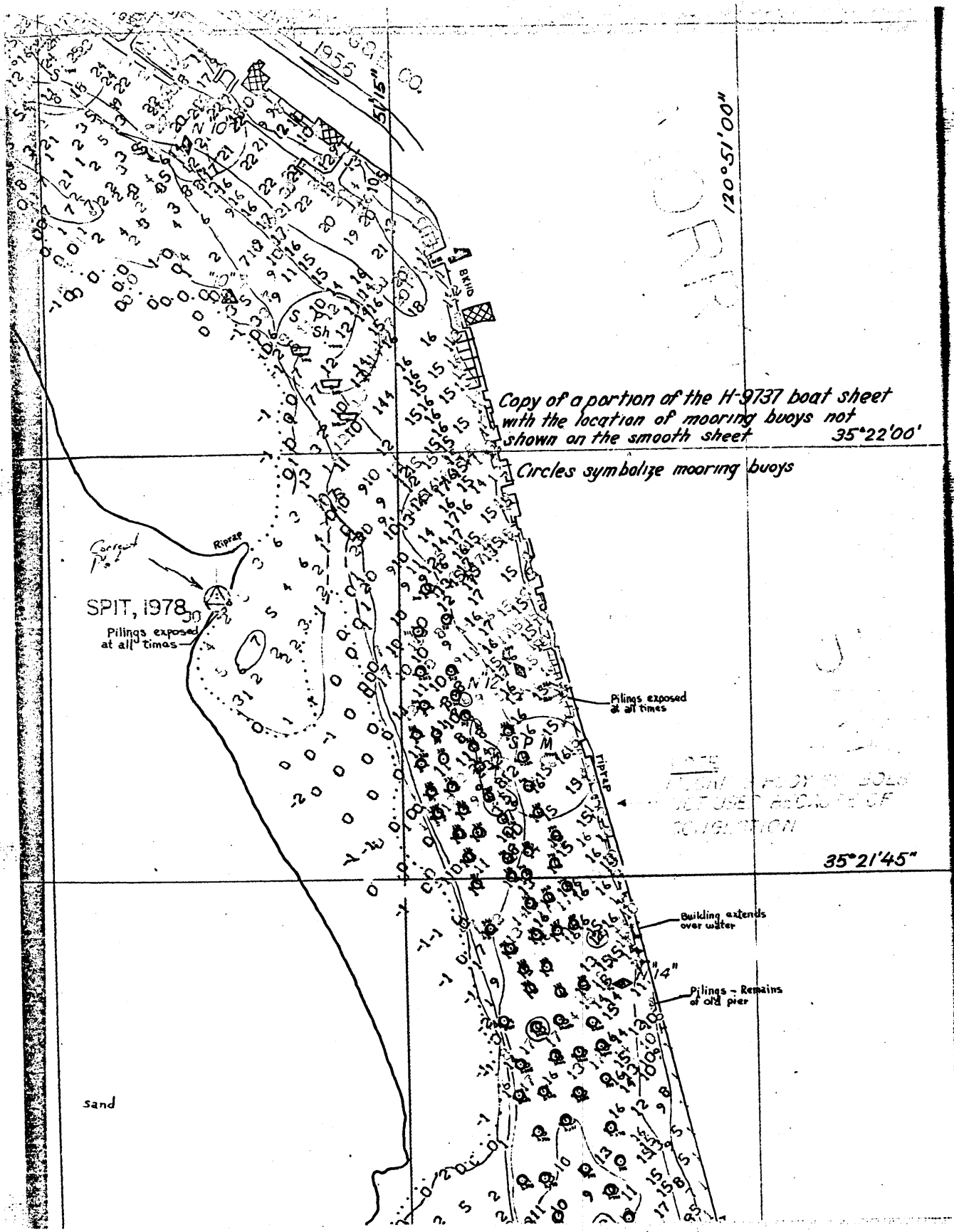
The privately maintained white buoy plotted in latitude $35^{\circ}21.98'$, longitude $120^{\circ}51.29'$, not presently charted, apparently marks the shoal shown on the present survey.

Because of congestion, numerous mooring buoys were not plotted on the smooth sheet during verification. Notes on the smooth sheet attest to this and identify the general location of the mooring buoys. A section of the boat sheet, containing the plotted boat sheet positions of the mooring buoys, has been inserted in the Descriptive Report during quality control inspection.

With the exception of some of the daybeacons, the positions of the aids adequately mark their intended features.

12. The use of station Black Hill 1881 as a visual signal in range-azimuth control should have been avoided as Black Hill fell off the sheet.

cc:
OA/C35
OA/C351



Copy of a portion of the H-9737 boat sheet
with the location of mooring buoys not
shown on the smooth sheet 35°22'00"

Circles symbolize mooring buoys

SPIT, 1978
Pilings exposed
at all times

Pilings exposed
at all times

NOTE
FROM FIELD TO BOLS
STRUCTURE BECAUSE OF
COMPLETION

35°21'45"

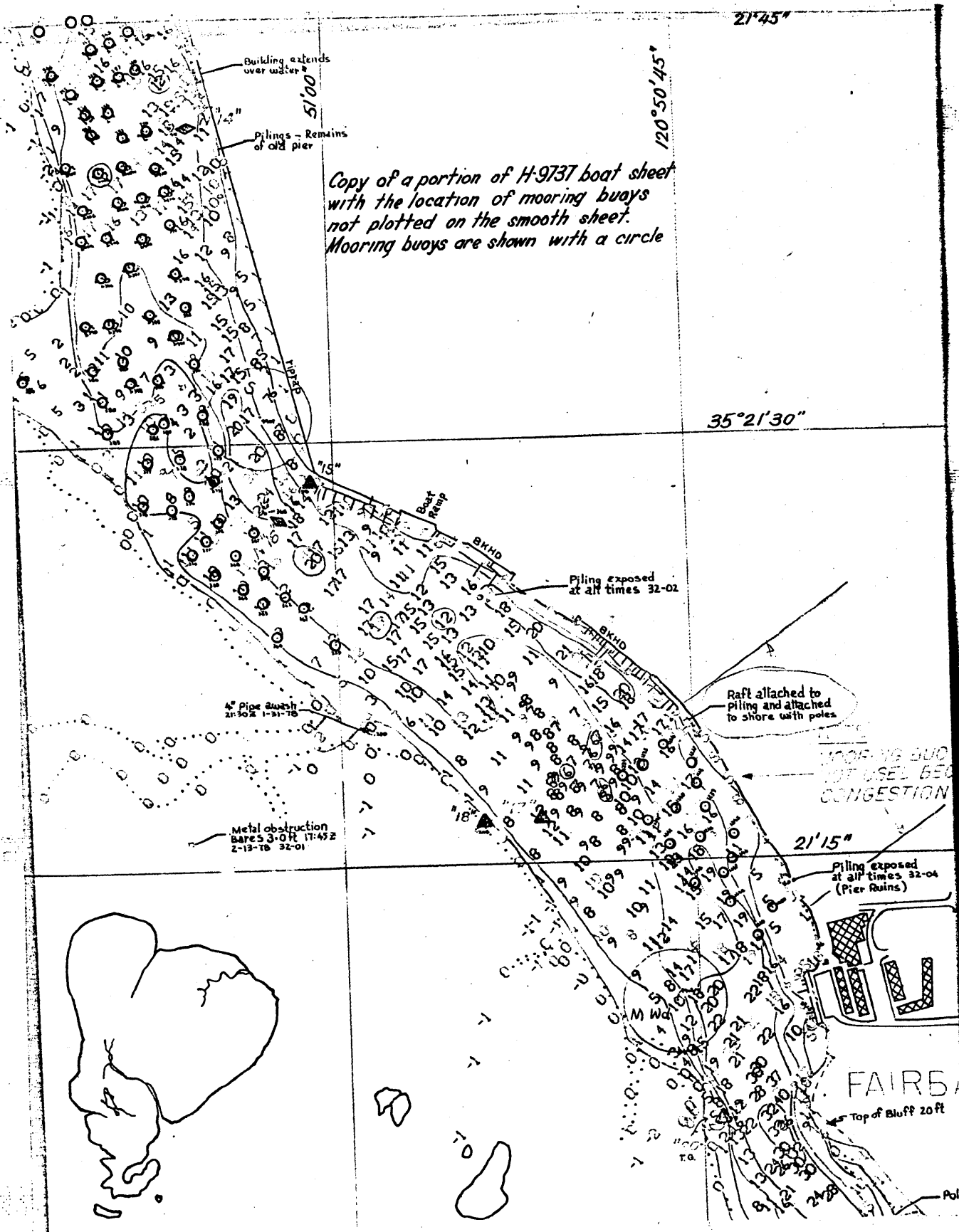
Building extends
over water

Pilings - Remains
of old pier

sand

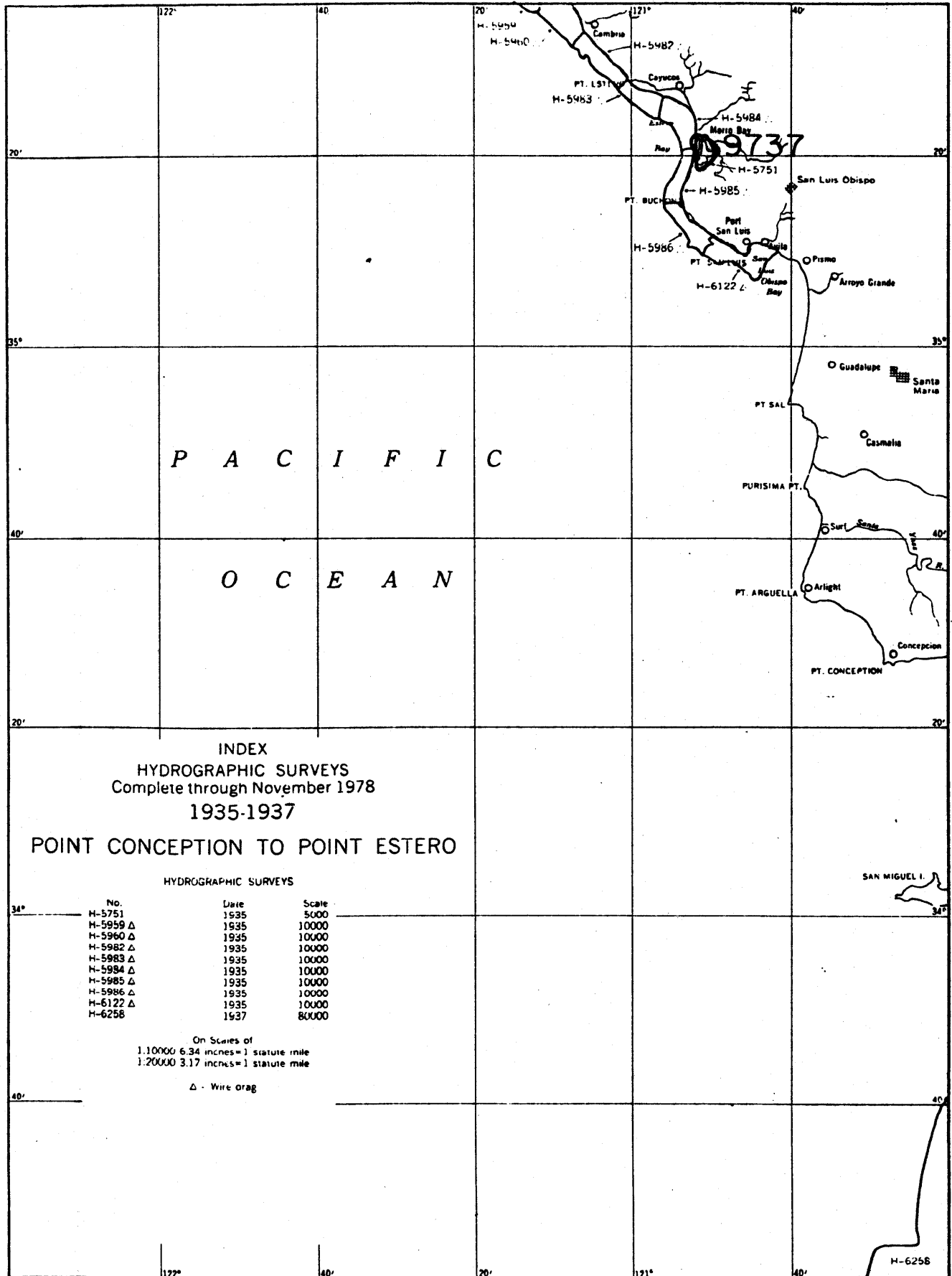
CORR
120°51'00"

Copy of a portion of H-9737 boat sheet
with the location of mooring buoys
not plotted on the smooth sheet.
Mooring buoys are shown with a circle



DEPARTMENT OF COMMERCE
 National Oceanic and Atmospheric Administration
 National Ocean Survey
 Rockville, Maryland

Hydrographic Index No. 941



INDEX
 HYDROGRAPHIC SURVEYS
 Complete through November 1978
 1935-1937

POINT CONCEPTION TO POINT ESTERO

HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-5751	1935	5000
H-5959 Δ	1935	10000
H-5960 Δ	1935	10000
H-5982 Δ	1935	10000
H-5983 Δ	1935	10000
H-5984 Δ	1935	10000
H-5985 Δ	1935	10000
H-5986 Δ	1935	10000
H-6122 Δ	1935	10000
H-6258	1937	80000

On Scales of
 1:10000 6.34 inches=1 statute mile
 1:20000 3.17 inches=1 statute mile

Δ - Wire drag

SAN MIGUEL I.

H-6258

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO.

9737

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
18703	8/24/79	Hamilton <i>W</i>	Full Part Before After Verification Review Inspection Signed Via Drawing No. 27
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
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