9570

Diag. Cht. No. 5101-4

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. RA-5-3-75

Office No. H-9570

LOCALITY

State CALIFORNIA

General Locality SANTA CATALINA ISLAND

Locality CATALINA HARBOR AND APPROACHES

19 75

CHIEF OF PARTY

Charles K. Townsend

LIBRARY & ARCHIVES

DATE April 24, 1978

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NOAA FORM 77-28 (11-72) | U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTER NO. H-9570

FIELD NO. RA-5-3-75

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State CALIFORNIA

General locality SANTA CATALINA ISLAND

Locality CATALINA HARBOR and Approaches

Scale 1:5,000 Date of survey 21 Sept 1975 - 16 Oct 1975

Instructions dated 11 August 1975 Project No. OPR-411-RA-75

Vessel NOAA Ship RAINIER Launches RA-4, RA-5, RA-6, and Boston Whaler

Chief of party Charles K. Townsend, CDR, NOAA

Surveyed by LTJG R. Ellis, LTJG A. Armstrong, LTJG C. Cavin, LTJG K. Andreen

Soundings taken by echo sounder, hand lead, pole Ross Model 600 S/N RA-4 1040-6 RA-6 1080 RA-5 1040-3

Graphic record scaled by SHIP'S PERSONNEL

Graphic record checked by SHIP'S PERSONNEL

Positions verified by: ~~Protracted~~ Felipe Rosario Automated plot by PMC Xynetics Plotter

Sounding Verification by Felipe Rosario

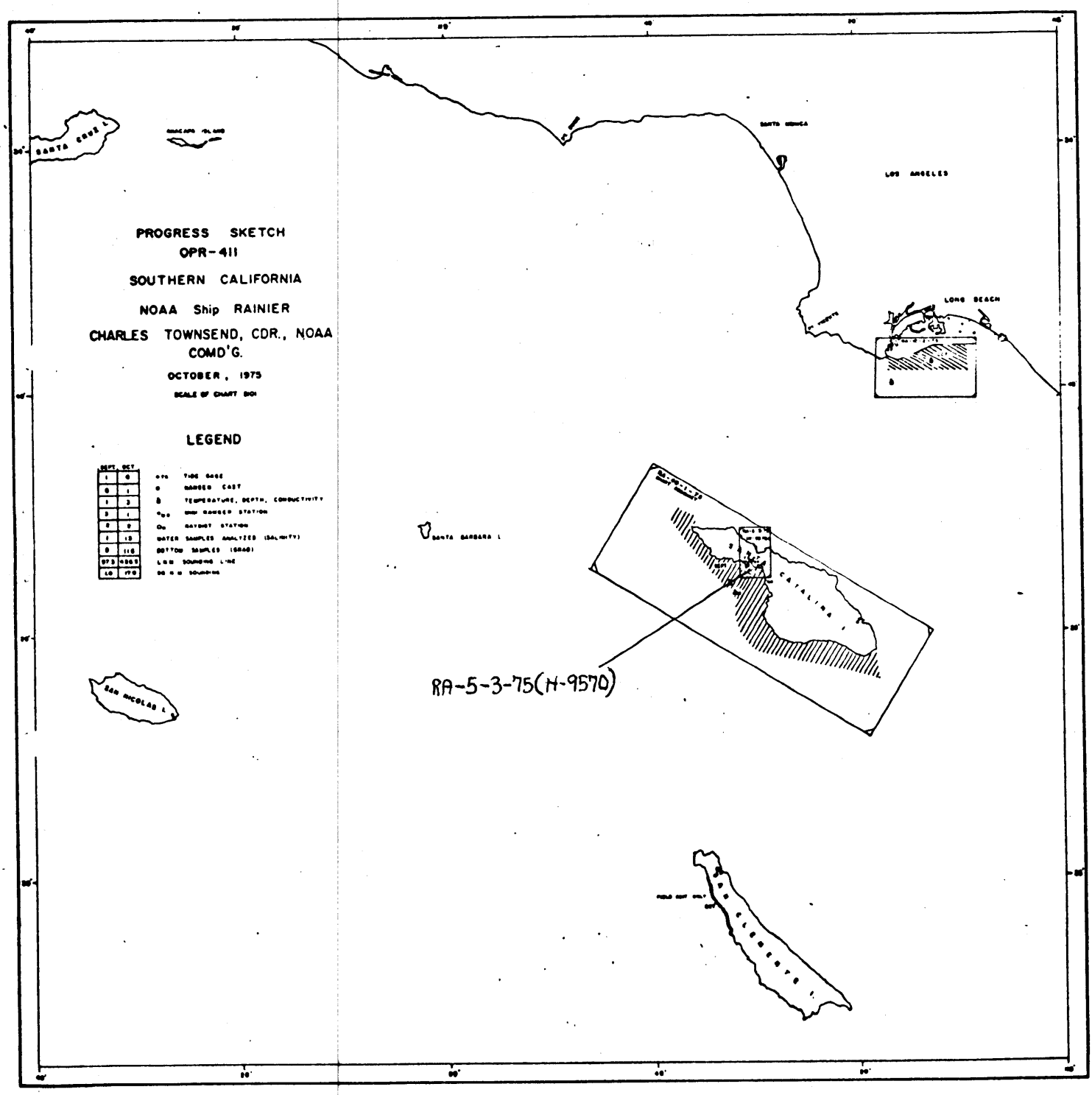
~~Soundings~~ oundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: Survey Time Zone is 000° GMT

The ~~boat~~smooth sheet is 100% complete.

"Miscellaneous data Filed with field records"

Applied to ADD 10/26/75



PROGRESS SKETCH
OPR-411
SOUTHERN CALIFORNIA
NOAA Ship RAINIER
CHARLES TOWNSEND, CDR., NOAA
COMD'G.
OCTOBER, 1975
SCALE OF CHART 1:80,000

LEGEND

SEPT.	OCT.	
1	0	TIDE GAGE
0	1	GAGED CAST
1	3	TEMPERATURE, DEPTH, CONDUCTIVITY
3	1	GAGED STATION
0	9	CURRENT STATION
1	13	WATER SAMPLES ANALYZED (SALINITY)
0	116	BOTTOM SAMPLES (GRAB)
973	4883	LINE SOUNDING LINE
40	990	SINGLE SOUNDING

RA-5-3-75(H-9570)

A. PROJECT

This hydrographic survey was carried out in accordance with Project Instructions, OPR-411-RA-75, Santa Catalina Island, Southern California. The instructions are dated 11 August 1975, and supersede all previous project instructions. No changes to the basic instructions were found to be pertinent to this survey.

B. AREA SURVEYED

The general locality was Santa Catalina Island, off the Southern California coastline. More specifically the 1:5000 scale survey included Catalina Harbor, both the inner and outer regions. The western and southern limits of the survey are 118 31'30"W and 33 24'10"N respectively. The eastern and northern limits are the coastline of the Catalina Harbor region. The survey commenced on 21 September 1975 and continued through 16 October 1975 inclusive.

C. SOUNDING VESSELS

All soundings for this survey were taken by RAINIER launches RA-4 (2124), RA-5 (2125), and RA-6 (2126), with the exception of 25 detached positions that were taken by the 65 H.P. Boston Whaler (2179). All bottom samples for this sheet were taken by launches RA-4 (2124), RA-5 (2125), and the 65 H.P. Boston Whaler (2179), except for 11 samples in deeper water that were taken by the RAINIER (2120) on October 14, 1975 (JD 287). Main scheme soundings were plotted in black ink; crosslines in red ink; junction soundings in blue with a smaller size; bottom samples in blue; prior survey soundings in violet and carmine with a larger size; and pre-survey

review items in light green. Refer to Section O, Statistics, and to "Separates Following the Text", ABSTRACT OF POSTIONS, for tabular information.

D. SOUNDING EQUIPMENT and CORRECTIONS TO ECHO SOUNDINGS

A tabulation of sounding equipment for the survey launches used in compiling RA-5-3-75 (H-9570) is as follows:

Launch	Digitizer	Fathometer
RA-4	Ross Model 6000 S/N 1040-6	Ross Model 5000 Fineline S/N 1040-6
RA-5	Ross Model 6000 S/N 1040-3	Ross Model 5000 Fineline S/N 1070
RA-6	Ross Model 6000 S/N 1080	Ross Model 5000 Fineline S/N 1071

The new method of phase calibration as specified in P.M.C. Oporder, Spring 1975, was incorporated into this survey as it was initially for RA-5-2-75 (H-9497), OPR-411-RA-75 (Spring). The most important difference of this new method was that it ignored the initial mark throughout the calibration procedure and during the actual operation of the fathometer. A copy of the procedure is included in the "Separates Following the Text". These phase checks were made at varying intervals throughout the day.

All three survey launches obtained routine bar checks at one fathom intervals to a depth of seven fathoms. Transducer corrections (TRA) were derived from the bar checks for each individual launch. The corrections were incorporated on a TC/TI (Transducer Correction/Table Indicator)tape for automated processing. A printout

of the TC/TI tape is appended in the "Separates Following the Text".

Velocity Correctors for RA-5-3-75 (H-9570) were computed from two TDC casts taken during the project, Printouts of the velocity corrector tapes are appended in the "Separates Following the Text". Table #1 correctors were computed from a TDC cast taken on 20 September 1975, at latitude 33 23'05"N and longitude 118 31'53"W. Table #2 correctors were derived from a cast taken on 14 October 1975 at latitude 33 23'39"N and longitude 118 32'25"W. A Nansen cast was taken on 14 October 1975 at latitude 33 23'39"N and longitude 118 32'25"W. However, the velocity correctors derived from it corresponded to the correctors from the TDC cast taken on the same day, thus there is nothing appended on the Nansen cast correctors.

The sounding equipment worked reasonably well during the day operations. Major hardware breakdowns of the type that could end a hydro day prematurely were corrected at night. Generally good operation was then shown by the sounding equipment on the following day. For further information concerning sounding equipment and corrections, refer to Corrections to Echo Soundings Report, OPR-411-RA-75 (Fall).

E. BOAT SHEET

The Transverse Mercator Projection and soundings were plotted by RAINIER personnel using the PDP 8/e Hydroplot Computer and Complot plotter Model DP-3 on board in the ship's plotting room. For the entire project, S/N 5445-7 plotter was used for plotting soundings and grids. Due to electronic hardware problems, however

different Hydroplot computer units were used in the plotting room. A tabulation follows:

Dates	Computer S/N
11 Sept. - 10 Oct. 75	1011
10 Oct. - 6 Nov. 75	995
6 Nov. - 12 Nov. 75	1015

The central meridian for the projection was 118 30'00"W, and the control latitude was 3,634,000 meters north of latitude zero. Rough plots were made daily, with visual and electronic position plots made seperate on different rough plot boat sheets for comparison of visual and electronic fixes. A semi-smooth boat sheet was plotted as work progressed. The final smooth plot was begun on 15 October 1975, and was completed on 12 November 1975. A good grade polyester drafting film (Mylar, 0.003 inch thickness) was used for the final plot. No discernable distortion could be detected in the smooth sheet during the period of the final plotting.

F. STATION CONTROL

Station control for RA-5-3-75 (H-9570) included existing triangulation stations, plus photo-picked stations. All measurements taken and computations done followed standard survey methods and procedures. The station name or description, date, quad, and page number that appeared in the heading of the published description of the triangulation station are included in the STATION LIST for Santa Catalina Island, see "Separates Following the Text".

Similiar information is also included in the list for all stations. No unusual geodetic alterations, closures, or ties were necessary to achieve adequate station control.

Photographs' quality and coverage in the inner harbor region were adequate. A sufficient number of photo-picked natural objects were readily identifiable and recoverable for conversion to photo-picked stations. No photogrammetric control problems were encountered in the inner harbor area.

Photograph quality for the outer harbor region was, however, poor. The poor quality was reflected in the photographs with little definition available. Complete coverage was lacking also. This led to a problem of inadequate photo-picked station coverage in the outer harbor region. Refer to Field Edit Report, OPR-411-RA-75 (Fall).

Two electronic stations were located eccentrically, number 513, GUY MINI-RANGER ECC., and number 514, FISHHOOK MINI-RANGER ECC. For description and computations for the two eccentrically located stations, as well as information on all other triangulation stations used for control purposes during this survey, refer to Horizontal Control Report, OPR-411-RA-75 (Fall).

In addition to the SIGNAL LIST, an ASCII Signal list of stations used as control for the visual portion of the survey is appended, refer to "Separates Following the Text". A computer tape punched in even parity ASCII is submitted for the signal list. There is no tape submitted for the Master List.

See Verifier's Report

G. POSITION CONTROL

Position control for RA-5-3-75 (H-9570) involved a combination of visual and electronic control. The smooth sheet layout was divided into an "A" and "B" boat sheet which provided a convenient division for the visual and electronic hydrography. The "5-3B" boat sheet in the inner harbor region and south to latitude 33 24'55"N, was run as a visual survey with electronic control as position checks. The "5-3A" boat sheet in the region south of latitude 33 24'55"N to the southern boat sheet limits was run as an electronic survey with visual control used as position checks. The electronic control for both the inner and outer harbor region was either Mini-Ranger or Raydist. Raydist was used when available Mini-Ranger geometry was unacceptable. The calibration method for both forms of electronic control was range calibration. Sextant calibration was used for a check on the range system. Both systems proved to be completely acceptable. Refer to Electronic Control Report, OPR-411-RA-75 (Fall) for explanations of electronic positioning equipment.

The inner harbor region of the "5-3B" boat sheet north of station HARBOR was fairly tight shallow area, but numerous moored pleasure craft were a hazard to survey operations. Electronic line-of-sight interference was often encountered. Visual control was far more accessable as the numerous signals allowed strong geometry obtainable throughout the area. For this region of the "5-3B" boat sheet the visual positioning controlled the positioning of the

soundings. Mini-Ranger was used primarily as a steering and launch positioning aid to help reduce the possibility of splits. Visual fixes were taken at the same time as the Mini-Ranger fixes, however, for comparison purposes. The comparisons were both good and bad in this area depending upon the situation. When control was strong and Mini-Ranger arc intersection exceeded approximately thirty degrees and no natural objects (sailboats, masts, buildings, etc.) obstructed line-of-sight to the shore transponder, the comparison between the two controls was very favorable, usually less than five meters. Bad comparisons could be attributed to any one of the situations or a combination of the situations mentioned above. Because of the doubt and because most of the problem was believed to be line-of-sight interference problems the visual fixes were allowed to control the soundings of the inner harbor region. There were problems with a few of the visual fixes in the inner harbor area. The simultaneous Mini-Ranger fix (if it fell within the time and course position) was used to resolve signal and angle busts where appropriate.

In the southern more open region of the inner harbor region south of station HARBOR adjacent to Pin Rock to latitude 33 25'23"N electronic control was available but the intersection geometry was weak. Positions 5333-5419, Julian Day 273, were considered run strictly with visual control.

From the center of the mouth of the harbor toward the west and west of Catalina Head visual position control was unattainable due to distances to signals, weak geometry, and lack of adequate signal coverage along the shoreline west of Catalina Head. Use of Mini-Ranger for electronic control was also considered impractical because of poor arc intersection and interference from land masses on the far western limits of the boat sheet. Thus, for positions 4032-4214, JD 279, 4215-4231,JD281, and 4262-4270, JD 288, Raydist was the only feasible positioning control for the area. The use of Raydist alone for the 1:5000 survey was justifiable only under circumstances of tight calibration. It was noticed in the chart adequacy survey that one to two meters repeatability could be obtained on the intersection of the two ranges that had been established for calibration. Refer to Horizontal Control Report, OPR-411-RA-75 (Fall) for other information pertinent to the range calibration system. Further results of calibrations in the Chart Adequacy survey revealed that drift in the Raydist system from morning to afternoon was negligible (less than 0.05 lane) on several occasions. Based on this information it was decided to control hydrography in this region south and west of Catalina Head with the Raydist system. Hourly calibrations were initiated and a significant overlap was made with visually controlled soundings. Results revealed that the hydrography was adequate. Comparison with overlapped visually controlled soundings was better than 3 feet. It was noticed, however, that when the Raydist signal was blocked by Catalina Head the positioning was distorted. As this area was previously controlled by visual positioning the distorted positions were rejected. Continued use of Raydist avoided line-of-sight

interference to reduce chance of distortion.

For the remainder of the "5-3B" boat sheet south of latitude 33 25'33"N and east of Catalina Head both visual and Mini-Ranger geometries were good and there were no natural barriers to provide electronic signal interference. Agreement between visual and electronic was more favorable than in the inner harbor region. Almost every comparison was within five meters. More important, this region of the boat sheet allowed longer lines and therefore more comparisons to develop a trend between the comparisons. A problem of comparisons was noticable on the western end of lines on the southern edge of the "5-3B" boat sheet. Mini-Ranger geometry was weaker toward the western edge of the boat sheet. In addition, these discrepancies were associated with the use of signal 501 (CONE RM1) which was 300 feet in elevation. After angles were reduced for the difference in elevation (refer to the end of this section) of the signals, the visual and Mini-Ranger fixes agreed as well as the rest of the line. To maintain consistancy on the "5-3B" boat sheet, the visual fixes were allowed to control the sounding lines. Mini-Ranger fixes were used for comparison and checks for the entire boat sheet.

The "5-3A" boat sheet, the remaining survey area south to latitude 33 24'10"N, used predominantly electronic control for positioning. The favorable comparison achieved on the "5-3B" boat sheet were considered adequate to enable more emphasis to be placed on the use of electronic control for this part of the survey.

More factors influenced this decision, however. Launch positioning was not as critical as in the inner harbor. The "5-3A" portion of H-9570 was in deep water. The southern edge of the "5-3B" boat sheet indicated that the bottom was steep and very regular with no peaks or deeps in the trace. This type of bottom was expected to continue into the "5-3A" boat sheet. The only areas that required scrutiny were those in the kelp beds which also happened to be close to the surf zone. Because of danger to lives and property involved, these areas were not sounded extensively. The decision was also influenced by lack of complete visual control signal coverage. Inadequate photo coverage and the hazards associated (surf zone) with establishing more signals with horizontal control prohibited extensive signals.

The far southern region south of latitude 33 24'28"N plus crosslines at the junction of "5-3b" and "5-3A" were using Raydist for control with visual checks at varying fix intervals. Agreement between visual and Raydist fixes was very good. Discrepancy in in a few comparisons (especially in the western most area of the boat sheet) was attributed to weak visual control. As such, many visual fixes were "repaired" to match the Raydist fixes. The Raydist positioning was accepted to control the soundings. The remainder of the "5-3A" boat sheet between latitude 33 24'55"N and 33 24'27"N and the shoreline area used Mini-Ranger control as the

primary method of control with visual checks at varying intervals in the center of the boat sheet and at every fix along the near shore region. Good geometry was available in electronic arc intersection except for the extreme western edge of the boat sheet and in the area immediately south of station GUY M/R where the intersection approached thirty degrees (both areas). Mini-Ranger reflection was a problem when the launch approached the shore in some areas of the eastern shoreline. Visual geometry was adequate except for the extreme southern and eastern shoreline area. Fortunately an area of weak control was supplemented by the other system. By combining the information from both visual and Mini-Ranger in the weak zones (eastern surf zone and eastern shoreline in particular) an adequate position was developed. Agreement between fixes was generally good with only individual cases showing discernable differences in position. The electronic control was accepted as the control for the soundings in this area.

A systematic error was discovered in the visual fixes using signals 501 (CONE RM1) and 503 (HARBOR). Their elevations above the waterline created angle errors of up to thirty minutes as the angle was observed from signal to signal and not horizontally. These errors were computed with the aid of a new Wang programmable calculator program, and applied to the observed angles. The application of the correction to the observed angles made the visual fixes compare more favorably with the electronic fixes and also with time and course checking of the visual fixes. Refer to Section S and to "Separates Following the Text" "Inclined Sextant Angle

Corrections", for a more detailed discussion of this systematic error, and the program used to compute the error. See Verifier's Report

H. SHORELINE

Shoreline for RA-5-3-75 (H-9570) final boat sheets was derived from two sources. The primary source for the entire inner harbor region and the area west of Catalina Head to the sheets limits, was a direct transfer from T-sheet manuscript TP-00611, scale 1:5000. The secondary source for the remaining shoreline along the southeast corner of the boatsheets was enlarged from T-sheet manuscript TP-00608, scale 1:20000. Because of the inherent distortion associated with this scaling process, the shoreline features in this area should be used with caution. The general shoreline contours may be acceptably accurate but the precise detailing may not be.

All shoreline and topographic details on the boat sheet were verified by field edit. Rocks and foul areas that could be a potential hazard to navigation were located by photogrammetric methods. Verified shoreline on the boat sheet was in black ink, while revised shoreline was inked in red. The field edit was completed for Catalina Harbor and the seaward side of Santa Catalina Island. The photographs revealed that there was no major revision necessary to the compiled shoreline of the manuscript. ✓

See Verifier's Report

I. CROSSLINES

Crosslines run on RA-5-3-75 (H-9570) totalled 11.7 nautical miles. This was equivalent to 8% of the total number of miles of hydrography run for this survey. Crossline agreement with the main scheme soundings was generally very good throughout the entire boat sheet area. The 5-3B boatsheets (inner harbor) showed the best agreement, with all crossline soundings within 0-2 feet of the main scheme soundings. In the shallowest regions of the northernmost reaches of the harbor, where the bottom was relatively flat, crossline agreement with main scheme was equivalent.

For the remainder of the survey area, the regions on the 5-3B boat sheet outside the harbor's mouth, and the entire 5-3A boat sheet, agreement was still good. However, two problems were encountered here that could account for the majority of crossline and main scheme sounding discrepancy. One is the long slow swell that was present for the entire survey. The height was as great as four feet, and because of its long period, was difficult to detect on the fathograms. Second was the steep bottom gradient encountered, particularly along the near shore regions. In general, the agreement in this outer harbor region was either within 1-4 feet, or appeared to follow the prevailing bottom contour if the crossline fell between two main scheme soundings. Occasional larger discrepancies occurred in the deeper water at the far southern limits of the 5-3A boat sheet (outer harbor). However, these are probably due to the swell and gradient problems discussed previously. Two other larger discrepancies were seen in the inner harbor region.

One, was off the southeast and southwest facing tips of Catalina Head, where differences of from 4 to 20 feet were seen. This again seemed due to the bottom gradient; this region was the steepest of the entire survey area. The second was in the far northwest corner of the 5-3B boat sheet (inner harbor) at approximately 33° 25' 40" N latitude and 118° 31' 10" W longitude, with 10-12 foot differences in crossline and main scheme soundings. Here too, the gradient problem previously mentioned seemed to be the reason for the discrepancy.

Position uncertainty was not considered to be a major factor in crossline discrepancy. The adherence to strict calibration procedures, and the comparison to visual fixes, reduced the possibility of position discrepancy. A shift in a group of crossline soundings would not improve the agreement of crossings as a whole. A shift in one direction would improve some of the crossings, but make others worse.

Sounding equipment used to obtain the crosslines was the same as for main scheme soundings. The combination of various launches did not influence the previously mentioned discrepancies.

J. JUNCTIONS

No specific junctions were required for this boat sheet. However, the boat sheet was divided into two plotting sheets to form a junction. The Chart Adequacy Survey (RA-40-1-75) that was done at the same time was given consideration as a junction survey.

RA-5-3B-75 and RA-5-3A-75 junctioned at approximately the 33° 24' 55" N latitude line. Agreement in depths was excellent as

no discrepancies were noted anywhere in the junction region. The flawless junctioning of the two boat sheets can be explained by the fact that this survey was run as one boat sheet. The splitting previously mentioned was then done to facilitate processing. Overlapping soundings not identified as junction soundings showed excellent agreement also, with maximum discrepancies of 0 - 2 feet. Overlapping soundings also appeared to follow the prevailing contour when spaced between two adjacent soundings from the other boat sheet.

A junction with the central and western portions of the 5-3 boat sheet was made with RA-40-1-75 (Chart Adequacy), scale 1:40,000, year 1975. Agreement in depths was fairly good. In both cases the bottom contour, both east-west and north-south, appeared to be followed well. The junction pattern was two soundings lines that approximate a backwards "L" shape from latitude and longitude: 33°25'33"N, 118 30'20"W south to 33 25'07"N, 118 30'22"W and then west to 33 25'07", 118 31'00"W. Discrepancies range from 0 to approximately 25 feet. The differences can be explained in four reasons: 1) RA-40-1-75 soundings were recorded by rounding to the nearest fathom, then converted to feet for comparison. 2) The transferring of depths from a 40,000 scale boat sheet to a 5,000 scale boat sheet had inherent inaccuracy that must be taken into account. 3) The lack of complete sounding coverage on the Chart Adequacy boat sheet made transfer of soundings from RA-5-3-75 (H-9570) impractical. 4) The allowable position error of the 40,000 scale boat sheet was significant as compared to the 5,000 scale boat sheet. For these reasons the junction with the Chart Adequacy survey should be used as only a rough check. There are no other

junctions applicable to this survey. See Verifier's Report

K. COMPARISON WITH PRIOR SURVEYS

RA-5-3-75 (H-9570) verified pre-survey review items #29 and #30. Pre-survey review item #29, the charted pier ruins due east of the tide gage pier, were found to be non-existent. Three sweeps by a diving party composed of RAINIER personnel produced only silt in this region. A group of large rocks was found which, if viewed from aerial photographs, might look approximately like pier ruins. A geographic position for the furthest offshore rock was obtained using horizontal sextant angles, and computed using program RK 561,H/R

GEODETIC CALIBRATIONS:

Signals	Angles	Lat and Long
L 502	33 19'	33 25'54.560"N
C 415		118 30'23.377"W
R 503	61 38'	
LC 409	140 49'	
RC 507	37 22'	

Refer to "Seperates Following the Text", MASTER SIGNAL LIST, for information on the signals used. The furthest offshore rock was found to have a least depth of 18 inches at 2135 (Z) 16 October 1975. The position of this offshore rock duplicates a position derived from field edit. This information is to serve only as a check on the photo position. It is recommended that the pier ruins east of the tide gage pier be removed from the chart, and that the furthest offshore rock and surrounding foul area be included.

Pre-survey review item #30, the charted wreck on the eastern side of the far inner harbor was found to exist in its presently charted location and to bare at low tide. Further information on P.S.R. item#30, as well as the entire 16 October 1975 diving party operation will be forthcoming in section L.

Comparisons of RA-5-3-75 (H-9570) were made with the following prior surveys:

Registry No.	Scale	Year	Final Boat Sheet Color
H-5556	1:10,000	1934	Violet
H-5557	1:5,000	1934	Carmine

Survey H-5557 was conducted in the far inner harbor region. Comparison with the same region of the 5-3B boat sheet revealed that H-9570 soundings were deeper by up to 1.4 feet.over those similiarly positioned soundings of the H-5557. The largest depth discrepancy between the surveys occurs at 33 25'30"N x 118 29'49"W, due west of triangulation station HARBOR,1933. Survey H-5556 included the remainder of the inner harbor region, plus the entire area covered by the 5-3A boat sheet. The furthest inner harbor comparison, at geographic position 33 25'29"N x 118 30'30"W, revealed that the present sounding is 4 feet deeper than the adjacent comparison sounding taken in 1934. The positioning of the soundings followed the apparent bottom contour. For the remainder of the outer harbor region all contemporary soundings were either equal or shoaler than those of prior survey H-5556. Depth discrepancies of 6 or more feet with H-5556 occurred at the following

geographic positions:

1) 33 24'31"N x 118 31'04"W

2) 33 24'31"N x 118 30'29"W

3) 33 24'31"N x 118 29'58"W

4) 33 25'06"N x 118 30'53"W

5) 33 25'05"N x 118 30'28"W

Finally it is recommended that all contemporary soundings as well as all changes to pre-survey review items, from this survey take precedence over all previous soundings for charting purposes. See Verifier's Report

L. COMPARISON WITH THE CHART

The boat sheet soundings collected for RA-5-3-75 (H-9570) were generally equal or shoaler than those found on N.O.S. Chart 18759, 5128 scale 1:10,000, which was used for comparison. Velocity corrections have not been applied to the boat sheets submitted and they will make a difference of up to 10 feet for the deepest sounding. Also, predicted tides were used for smooth plotting the boat sheet.instead of real time tides, so this will give futher additions or subtractions to the soundings. The inner harbor region shows two regions having sounding depths greater than those previously charted: 1) The region due west of the tip of Ballast Point in the center of the channel, and southwest of the tide gage pier shows discrepancies in the 1 foot range in 20 - 25 feet of water. 2) The eastern offshore edge of the far inner harbor shows variations of 1 - 3 feet in 1 - 6 feet of water. Discussions with local officials revealed that much sedimentation has occurred in Catalina Harbor over the years. This would appear to be the reasoning

behind the two above areas of difference between RA-5-3-75 (H-9570) and the chart. It is recommended that soundings from this survey take precedence over those previously charted.

Shoreline showed the greatest disagreement between the final boat sheet and the blow up to 1:5000 scale of N.O.S. Chart 18759, scale 1:10,000 used for comparison. Final manuscript T-sheet TP-00611 was used to transfer shoreline to the final boat sheet after field edit. Shoreline details that were revised on RA-5-3-75 (H-9570) by field edit, in general consist of the entire boat sheet shoreline. However, two regions show major discrepancies. The first was shoreline west from Catalina Head (latitude 33 25'20"N x longitude 118 30'40"W) to the end of the boat sheet. Comparisons showed major variations for a small cove in the center of Catalina Head, and for the western edge of the head to the boat sheet's western edge. The second region of major discrepancy was on the southeastern shoreline of the boat sheet, centered on approximately latitude 33 25'10"N and longitude 118 29'15"W. Two jutting rounded extensions on the final manuscript made no appearance at all on the 1:5000 scale blow up of N.O.S. Chart 18759. The inner harbor and the remaining southeastern shoreline region all shows minor variations too numerous to list individually.

In general, the M.L.L.W. line, especially for the outer harbor region could not be well defined by the soundings. Factors influencing this were: 1) The shoreline being foul with rocks and heavy kelp

2) A steep bottom gradient, and 3) heavy surf conditions that prevented survey launches from getting in close to shore.

Finally, it is recommended that the shoreline shown on the final manuscript TP-00611 and final boat sheets be considered adequate and supersede the shoreline on the present chart. It has been either taken from the photo coverage provided, verified by field edit, or both. Refer to Field Edit Report, OPR-411-RA-75 (Fall), and to Section H SHORELINE, for additional information.

No shoal investigations were required or carried out during this survey. There were no regions discovered that warranted any larger scale investigations.

Various potential hazards to navigation were investigated by a diving party composed of RAINIER personnel on 16 October 1975. Two,wrecks were investigated. The first, pre-survey review item #30 presently charted on the eastern side of the far inner harbor, was found to bare substantially at low tide. It has become a source of local color and is clearly out of navigation channels leading to and from the inner harbor. It should however, remain charted. The second, submerged wreck in approximately 20 feet of water, was located in the inner harbor region. Geographic positions were taken of the apparent bow and stern regions with horizontal sextant angles, and computed using RK 561, H/R

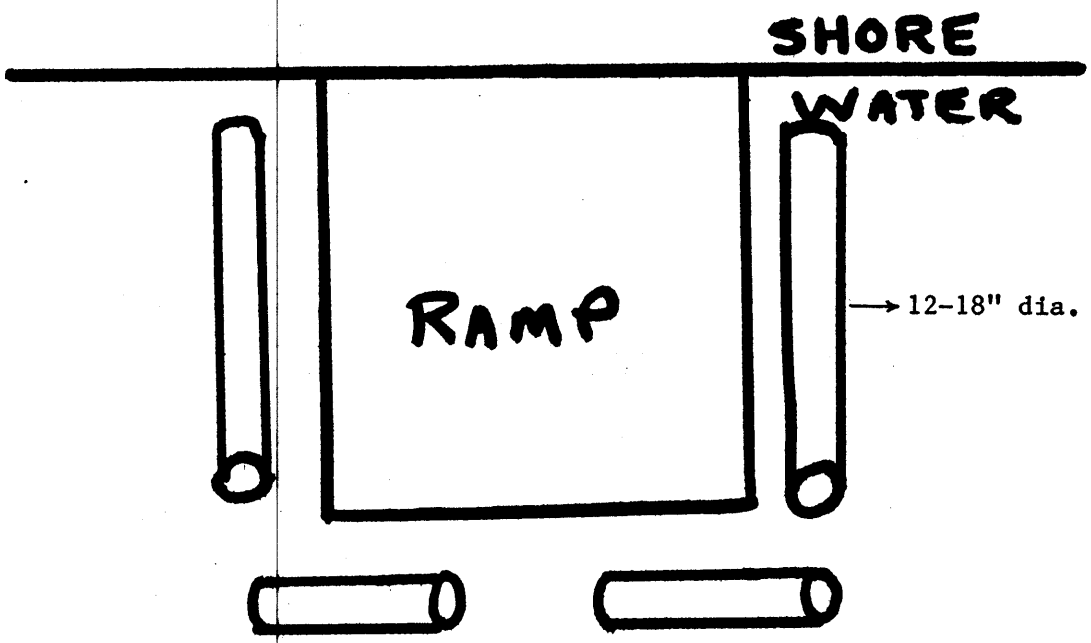
GEODETIC CALIBRATIONS:

	Signals	Angles	Latitude and Longitude
NE Corner of Wreck Pos 9000	L 507	112 00'	33 25'56.478"N
	C 412		118 30'11.280"W
	R 502	53 56'	
	LC 410	92 37'	
	RC 118	18 43'	
SW Corner of wreck Pos. 9001	L 507	115 41'	33 25'56.097"N
	C 412		118 30'12.592"W
	R 502	48 34'	
	LC 410	92 54'	
	RC 118	14 07'	

Refer to "Separates Following the Text", MASTER SIGNAL LIST, for further information on the signals used. A least depth approximately 2/5 of the way from the northeast end was obtained at 1.7 fathoms (10.2 Feet) at 2040Z 16 October 1975. The wreck (209) presents a definite hazard to deeper draft boats and sailboat keels, and it fouls anchors and chains. It should be strongly considered for charting.

A pier ruin, which was shown on the T-sheet manuscript due west of the tide gage pier, was discovered to be an extension of a seaplane landing ramp. The ramp continued underwater for approximately 12-15 feet, and was surrounded by a square shaped pattern of concrete cylinders 12-18 inches in diameter and laying flat. It appears the cylinders were used to prevent sand and silt from

depositing on the ramp. The arrangement appeared as indicated in the following sketch:



This arrangement is out of the navigation channel, and is not a hazard to navigation. However, it is recommended that it be charted for completeness.

Finally, pre-survey review item #29, a pier ruin located due east of the tide gage pier, was not found and should be removed from the chart. Refer to Section K, COMPARISON WITH PRIOR SURVEYS, for a more detailed discussion. See Verifiers Report

M. ADEQUACY OF SURVEY

RA-5-3-75 (H-9570) is a thorough and complete survey of Catalina Harbor. However, the nearshore regions on the eastern limits of the boat sheet lack complete sounding coverage. Extensive kelp beds and dangerous surf conditions prevented survey launches from getting any closer than the limits shown by the plotted soundings. The area is however out of the way of the main navigation channels to and from the harbor. The entire shoreline has been verified by field edit. Thus it is recommended that this area of the boat sheet be considered adequately surveyed.

All fathogram field survey records were scanned and checked for peaks and deeps. Appropriate changes were then entered into the record. ✓

N. AIDS TO NAVIGATION

There are no floating aids nor charted fixed aids to navigation on RA-5-3-75 (H-9570). No new floating or fixed aids were located or verified. A light is recommended for the Catalina Harbor area. A more detailed discussion will be forthcoming in Section Q, RECOMMENDATIONS. There are no other submissions for charting considerations. ✓

O. STATISTICS

The total number of positions collected in this survey is 2271; linear nautical miles, 149.9; square nautical miles, 4.5. A tabulation of positions follows:

Vessel	Nautical Miles Sndg Line	Positions	Remarks
2120	0.0	11	Bottom Samples
2124	16.3	258	Hydrography and Bottom Samples
2125	100.3	1576	Hydrography and Bottom Samples
2126	33.3	393	Hydrography
2179	0.0	33	Detached Positions and Bottom Samples

P. MISCELLANEOUS

Electronic control systems can be used effectively in 1:5000 scale surveys for steering and positioning in the launch. In this survey it assisted in reducing the number of splits that might have been required had the electronic steering not been used. Launch positioning was the primary reason for incorporating the electronics in the survey. Decision was reached to use computerized straight line steering instead if arc steering which could have been used effectively. Visual fixes were taken to control the soundings as specified in the PMC OPORDER and the Hydrographic Manual. The simultaneous visual and electronic fix was added into the operation because of the potential information it could have produced.

Results of the additional information derived from the control comparisons helped to justify use of the electronic control systems on the southern half of the boat sheet. The general trend of favorable comparisons between visual and electronic control should generate more attention toward the use of the Mini-Ranger and Raydist systems for 1:5000 scale surveys. If strict calibration procedures are followed and the hydrographer adheres to stringent quality control procedures, electronic control can be used effectively to obtain the specified accuracy requirements of the Hydrographic Manual for 1:5000 scale surveys.

Q RECOMMENDATIONS

It is highly recommended that more attempts at the combining of visual and electronic control for 1:5000 surveys be undertaken in the future. This can accomplish both positioning information checks as well as further input into the possibility of accepting electronic control solely for 1:5000 scale surveys in areas where visual control would be less practical.

It is further recommended that a close range light for the Catalina Harbor be considered. Possible positions for this light would be either on Catalina Head or at the base of Ballast Point, on the eastern side of the harbor mouth. A range of 5 miles or less would be adequate because the light is needed for the approach to the harbor. The justification for the light in this position is as follows: the region is difficult to approach at night. There are no other aids for Catalina Harbor, and it is the only safe harbor in the area from storms from any direction. The harbor is used extensively by small boat owners who navigate in the area.

No futher recommendations are deemed necessary.

R REFERENCES

1. Corrections to Echo Soundings, OPR-411-RA-75 (Fall).
2. Field Edit Report, OPR-411-RA-75 (Fall).
3. Horizontal Control Report, OPR-411-RA-75 (Fall).
4. Electronic Control Report, OPR-411-RA-75 (Fall).
5. RA-40-1-75, Chart Adequacy (18757), OPR-411-RA-75 (Fall).

S DATA PROCESSING PROCEDURES

RA-5-3-75 was an attempt on the part of the RAINIER personnel to couple visual and electronic survey techniques for a 1:5000 scale boat sheet, whereas previously only visual was considered adequate for this particular scale. Strengths and weaknesses of the combined control have been previously discussed in this text. The combined procedure did make data processing a more complex operation. Since the survey was done with combined visual and electronic control, visual primary and electronic secondary for the inner harbor, electronic primary and visual secondary for the outer harbor, straight electronic control in other areas, the procedures varied with each type or combination of control. The processing will be described for two cases: purely electronic and overlaid control. The overlaid case covers either combination, visual primary, electronic secondary, or electronic primary and visual secondary.

Grids for all boat sheets prepared were plotted with AM 201, GRID AND LATTICE PLOT. Electronic arcs were plotted on the boat sheets with RK 201, GRID, SIGNAL, AND LATTICE PLOT, and signals

were plotted with RK 212, VISUAL STATION TABLE LOAD AND PLOT. All rough, semi-smooth, and smooth boat sheet sounding plotting computations and control was done with RK 211, RANGE/RANGE POSITION AND SOUNDING PLOT for electronic control, and RK 212 and 215, VISUAL STATION TABLE LOAD AND PLOT, and VISUAL POSITION AND SOUNDING PLOT, for visual control.

Pure Electronic Survey Areas

The raw electronic master data tapes were edited with AM 602, ELINORE LINE EDITOR, to remove rejected data, correct missed depths, and to remove unnecessary corrector word data. This yielded an edited electronic master tape. Inserts for peaks and deeps, TRA correctors derived from bar checks, and electronic correctors developed from daily calibrations were incorporated into an electronic corrector tape that corresponded to the master tape. Master and corrector tapes were usually edited and revised after rough and semi-smooth plotting to correct typing errors and any others overlooked. The final tape editions correspond to the smooth boat sheets.

Overlaid Control Survey Areas

The raw electronic master tapes were edited with AM 602, ELINORE LINE EDITOR, to remove rejected data, correct missed depths, and to remove unnecessary corrector word information. This yielded the edited electronic master tape. The format then changed, and the electronic control information was replaced by visual control information. The visual control was hand logged onto the tapes using "Elinore".

This was a cumbersome process, and often took 6-12 hours per night when two launches were running. This yielded a visual master tape. Electronic and visual position plots were made, and the random errors, such as Mini-Ranger busts and visual signal or angle errors were resolved by overlaying the plots. This yielded a corrected visual and master tape. Due to the use of two elevated signals (No. 501 and No. 503 on the ASCII Signal List, see "Separates Following the Text) at close range, a systematic error existed in a good part of the visual work, especially in the central portion of the 5-3B boat sheet (inner harbor). The error was discovered when this region of the visual position plot was overlaid on the Mini-Ranger position plot. No signal or angle busts were visable, yet the discrepancy between similiar fixes was too great. A program, using the Wang Programming Calculator, was developed to correct these inclined sextant angle errors, and was used in the processing of the visual data that used the two elevated signals as control. See "Separates Following the Text", Inclined Sextant Angle Correction, for details and documentation of the program. Corrections to angles were annotated in the sounding volumes. Coupled with this position resolution in editing, rough and semi-smooth plots were done in the process of resolving and correcting depth errors, typing mistakes, and any other flaws overlooked in the previous editing. In the course of this resolution, the electronic control for RA-5 (2125) on JD 273, positions 5333-5419 was rejected due to malfunction in the Mini-Ranger system (poor intersection geometry). The data for that day was processed

as a strictly visual survey. Refer to Electronic Control Report, OPR-411-RA-75 (Fall), for futher information.

Visual and electronic were developed using AM 602 "Elinore", for the overlaid control regions of RA-5-3-75 (H-9570) to incorporate peaks and deeps, TRA corrections, vessel and day numbers, and for the electronic control portion, electronic correctors. These tapes were edited if necessary during the rough and semi-smooth plotting. The final master and corrector tapes again correspond to the smooth boat sheets.

Bottom Samples were obtained using strictly visual control, and data tapes containing the information were processed by hand logging. The field data was transferred to a seperate volume during processing. The latitudes and longitudes were computed and then plotted on the final boat sheet in a similiar fashion to the visual position plots. Also, teletype printouts for all final electronic and visual master tapes and corrector tapes were made for submission.

For both control procedures used during this survey, a tide parameter tape was generated for AM 500, PREDICTED TIDE GENERATOR. Information for the predicted tide reductions came from "Tide Tables, High and Low Water Predictions, 1975, West Coast of North and South America." Information used was for Los Angeles Outer Harbor reference station, with correctors for the Catalina Harbor sub-station. MARTEK TDC data was processed with RK 530, VELOCITY CORRECTION COMPUTATIONS, using the curve fit option, and was then analysed graphically. A velocity corrector tape was then generated using "Elinore".

Launch boat sheets were plotted with the Hydroplot system. Rough sounding and position plots were plotted with correctors and inserts, but sometimes with no tide corrections. Semi-smooth and smooth sheets were plotted with edited master and corrector tapes, plus tide corrections. However, no velocity corrections were applied. Sheets submitted include visual and electronic smooth position plots for 5-3B and 5-3A, plus smooth boat sheets sounding plotted.

For horizontal control processing procedures, refer to Horizontal Control Report, OPR-411-RA-75 (Fall). A listing of all computer programs and their respective version dates used during data acquisitions and processing follows:

Program	Version Date	Title/Description
RK 111	7 Aug 74	R/R Real Time Hydroplot
RK 161	7 May 74	R/R Real Time Hydrolog
AM 201	10 Nov 72	Grid and Lattice Plot
RK 201	18 Apr 75	Grid, Signal, and Lattice Plot
RK 211	16 Aug 74	R/R Position and Sounding Plot
RK 212	1 Apr 74	Visual Station Table Load and Plot
RK 215	15 Aug 74	Visual Position and Sounding Plot
RK 300	22 May 75	Utility Computations
RK 337	8 Aug 74	Unscrambler
PM 360	21 Mar 74	Electronic Corrector Abstract
RK 407	15 Aug 74	Geodetic Direct and Inverse Computations
RK 409	5 Sept 73	Geodetic Utility Package
AM 500	10 Nov 72	Predicted Tide Generator
RK 530	25 June 74	Velocity Correction Computations
RK 561	19 Feb 75	H/R Geodetic Calibration
RK 562	10 Sept 74	H/R Calibration Using Azimuths
AM 602	10 Mar 72	Elinore Line Editor
AM 603	10 Oct 72	Tape Consolidator
Wang Series 700-B	Sept 75	Inclined Sextant Angle Corrections (See "Separates Following the Text")
700/PF/022		Wang Intersection With TTY Output.
Focal Scaling Program	13 Aug 75	

Respectfully submitted;

for John C. Osborn Jr. Ensign, NOAA

TIDE NOTE

H-9570 (RA-5-3-75)
RA-40-1-75

The tide reducers for boatsheet soundings were generated by Hydroplot Program AM 500, PREDICTED TIDE GENERATOR, version 10 NOV. 1972. The daily values used were for Los Angeles, California reference station, as listed in "Tide Tables, High and Low Water Predictions, 1975, West Coast of North and South America". The following corrections were applied:

Time (minutes)	high water	+10
	low water	+15
Height Ratio (high and low water)		0.97

The corrections were derived directly from the Catalina Harbor substation listing in the tide tables.

Tide stations operating in relation to these surveys were:

	Station	Location	Dates of Installation - Removal
1.	Los Angeles Outer Harbor (Control Station)	33° 43.2' N. 118° 16.6' W.	N/A
2.	Catalina Harbor	33° 25.9' N. 118° 30.2', W. .42	9/15 - 10/20/75 (36 days)

ADR Gage (S/N 7210A926M1) was installed at Catalina Harbor on 15 September 1975, using G.M.T. meridian for data compilation. Good records were obtained between installation and 25 September 1975. On 30 September 1975 it was noted that sometime between the 25th and the 30th the battery for the gage failed. A new battery was hooked up, the gage resynchronized to G.M.T., and began functioning smoothly with no apparent drastic change in the gage-staff comparisons. On 14 October 1975 is was further noted that the

tape was not centered properly. The gage time synch. was good, but the data was not being punched on the proper time line on the tape. Between 14 October 1975 and 15 October 1975, several attempts were made to correct this by advancing the tape and resynchronizing the gage. At 2300 (Z) on the 15th the tape was properly centered and the data punched on its correct time line. Annotation on the tape contains the proper G.M.T. for data not punched correctly. Good records continued until 1542 (Z) 20 October 1975 when no data was punched. The gage was removed after 1548 (Z) 20 October 1975. The staff value equivalent to 0.00 ft. on the gage is 0.21 ft.

Final tidal zoning for the smooth sheets will be furnished by Tides Branch (C331), Rockville. It is recommended that tide correctors based on observed tides at Catalina Harbor be used throughout the project.

VELOCITY CORRECTOR TAPE LISTING
RA-5-3-75(H-9570)

TABLE # 1
SCALE - FEET

000030	0	0000	0001	000	000000	000000
000093	0	0002				
000137	0	0004				
000195	0	0006				
000250	0	0008				
000307	0	0010				
000367	0	0012				
000426	0	0014				
000488	0	0016				
000550	0	0018				
000610	0	0020				
000819	0	0025				
000935	0	0030				
001186	0	0035				
001390	0	0040				
001596	0	0045				
001806	0	0050				
002010	0	0055				
002500	0	0060				
002980	0	0070				
003490	0	0080				
004000	0	0090				
004540	0	0100				
005200	0	0110				

VELOCITY CORRECTOR TAPE LISTING
RA-5-3-75(H-9570)

TABLE # 2
SCALE - FEET

000027 0 0000 0002 000 000000 000000
000084 0 0002
000149 0 0004
000205 0 0006
000265 0 0008
000325 0 0010
000380 0 0012
000445 0 0014
000507 0 0016
000575 0 0018
000645 0 0020
000846 0 0025
001030 0 0030
001250 0 0035
001465 0 0040
001685 0 0045
001900 0 0050
002150 0 0055
002670 0 0060
003240 0 0070.
003800 0 0080
004460 0 0090
005130 0 0100

STATION LIST SANTA CATALINA ISLAND

OPR-411-RA-75
RA-40-1-75(CHART ADEQUACY SURVEY)
RA-5-3-75(H-9570)

401 3 33 25 19625 118 30 41169 243 0000 000000
PHOTO TP-00611

402 3 33 25 24377 118 30 41657 243 0000 000000
PHOTO TP-00611

403 3 33 25 27990 118 30 40581 243 0000 000000
PHOTO TP-00611

404 3 33 25 32992 118 30 40771 243 0000 000000
PHOTO TP-00611

405 3 33 25 39584 118 30 40012 243 0000 000000
PHOTO TP-00611

406 3 33 25 42255 118 30 36370 243 0000 000000
PHOTO TP-00611

407 3 33 25 46423 118 30 33146 243 0000 000000
PHOTO TP-00611

408 3 33 25 51406 118 30 31644 243 0000 000000
PHOTO! TP-00611

409 3 33 25 54025 118 30 25238 243 0000 000000
PHOTO TP-00611

410 3 33 25 57849 118 30 19128 243 0000 000000
PHOTO TP-00611

411 3 33 26 03983 118 30 12961 243 0000 000000
PHOTO TP-00611

412 3 33 26 04921 118 30 08667 243 0000 000000
PHOTO TP-00611

413 3 33 26 07777 118 29 59565 243 0000 000000
PHOTO TP-00611

414 3 33 25 50669 118 30 12424 243 0000 000000
PHOTO TP-00611

415 3 33 25 52266 118 30 15226 243 0000 000000
PHOTO TP-00611

416 3 33 25 30976 118 30 21608 243 0000 000000
PHOTO TP-00611
PIN ROCK

STATION LIST SANTA CATALINA ISLAND (CONT.)

119 7 33 26 09118 118 29 47419 139 0000 000000
ISTHMUS 1933 33 118 2
NOT USED FOR POSITION CONTROL OF SOUNDINGS
REF. HORIZONTAL CONTROL REPORT

500 7 33 25 59771 118 33 12897 250 0000 000000
HORN 1934 33 118 3
VISUAL SIGNAL FOR HYDROGRAPHY

501 7 33 25 22512 118 30 43907 250 0091 000000
CONE RM1 1933 1975 33 118 3
VISUAL SIGNAL FOR HYDROGRAPHY
MINI RANGER SITE
REF. HORIZONTAL CONTROL REPORT

502 7 33 25 58649 118 30 04703 250 0003 000000
SANTA CATALINA ISLAND SOUTH BASE 1875 33 118 3
VISUAL SIGNAL FOR HYDROGRAPHY

503 7 33 25 40510 118 30 20398 250 0014 00000
HARBOR 1933 33 118 3
VISUAL SIGNAL FOR HYDROGRAPHY
MINI RANGER SITE

118 7 33 26 20864 118 29 52181 139 0000 000000
SANTA CATALINA ISLAND NORTH BASE 1875 33 118 2
VISUAL SIGNAL FOR HYDROGRAPHY

505 7 33 24 04554 118 29 04773 139 0010 000000
FISH HOOK 1933 33 118 2
VISUAL SIGNAL FOR HYDROGRAPHY
REF. HORIZONTAL CONTROL REPORT

506 7 33 23 30422 118 28 41942 139 0000 000000
WHITE BLUFF 1876 33 118 2
NOT USED FOR POSITION CONTROL OF SOUNDINGS

507 7 33 25 55504 118 30 20112 139 0000 000000
KALU 1975 33 118 3
TRILATERATION STATION
VISUAL SIGNAL FOR HYDROGRAPHY

508 7 33 25 57415 118 30 05401 250 0003 000000
SANTA CATALINA ISLAND SOUTH BASE RM1 1875 33 118 3
REF. HORIZONTAL CONTROL REPORT

509 7 33 25 58851 118 30 05588 250 0003 000000
SANTA CATALINA ISLAND SOUTH BASE RM2 1875 33 118 3
REF. HORIZONTAL CONTROL REPORT

510 7 33 00 35981 118 33 53699 250 0170 329646
TOWER 3 1975 33 118 3
RAYDIST SITE
REF HORIZONTAL CONTROL REPORT

511 7 33 13 16610 119 26 23776 250 0015 329646
STA 4 1968 33 119 2
RAYDIST SITE

512 6 33 25 11574 118 29 19615 139 0002 000000
GUY M/R 1975 33 118 2
VISUAL SIGNAL
STATION ESTABLISHED REF. HORIZONTAL CONTROL REPORT

513 1 33 25 12330 118 29 19160 250 0009 000000
GUY ECC M/R 33 118 2
MINI RANGER SITE
OPEN TRAVERSE POSITION MARKED
REF. HORIZONTAL CONTROL REPORT

514 1 33 24 04560 118 29 04693 250 0010 000000
FISH HOOK ECC M/R 33 118 2
MINI RANGER SITE
UNMARKED OPEN TRAVERSE
REF. HORIZONTAL CONTROL REPORT

SIGNALS 601 THRU 611 ARE ALL UNMARKED INTERSECTION STATIONS THAT WERE USED AS VISUAL SIGNALS FOR HYDROGRAPHY. REF. HORIZONTAL CONTROL REPORT

601 2 33 25 26055 118 30 09342 252 0000 000000
ORANGE WRAPPED ROCK TO RIGHT OF STATION HARBOR

602 1 33 25 24792 118 30 05239 252 0000 000000
GREEN INVERTED TRIANGLE, LOW TO WATER

603 1 33 25 22320 118 29 58094 252 0000 000000
GREEN UPRIGHT TRIANGLE, LOW TO WATER

604 1 33 25 21427 118 29 55379 252 0000 000000
ORANGE UPRIGHT TRIANGLE

605 1 33 25 18908 118 29 55415 252 0000 000000
GREEN CLOTH ON SPIT, COVERED WITH ROCKS

606 1 33 25 18086 118 29 53870 252 0000 000000
ORANGE BANNER ON ROCK

607 1 33 25 17643 118 29 48221 252 0000 000000
GREEN BANNER ON SLOPE

608 1 33 25 18296 118 29 44852 252 0000 000000
ORANGE BANNER ON CLIFF

609 1 33 25 17360 118 29 36599 252 0000 000000
GREEN BANNER ON ROCK

611 1 33 25 09573 118 29 15613 252 0000 000000
ORANGE ROCK TO RIGHT OF STATION GUY

APPROVAL SHEET

H-9570 (RA-5-3-75)

OPR-411-RA-75 (Fall)

SOUTHERN CALIFORNIA

In producing this sheet, standard procedures were observed in accordance with the Hydrographic Manual, PMC OPORDER, and the Instruction Manual for Automated Hydrographic Surveys. Except for the use of electronic control for the 1:5,000 sheets. This deviation was based on many factors which are adequately discussed in the preceeding text. The data was examined daily during the execution of the survey.

The boatsheets and the accompanying records have been examined by me and are considered complete and adequate for charting purposes and are approved.

Leland J Reinke

Charles K. Townsend

CDR., NOAA

1/28/76

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): Catalina Harbor

Period: September 21-October 16, 1975

HYDROGRAPHIC SHEET: H-9570 and Chart Adequacy Survey

OPR: 411

Locality: Off Santa Catalina Island

Plane of reference (mean lower low water): 3.01 ft.

Height of Mean High Water above Plane of Reference: 4.6 ft.

Remarks: Zone direct.

AOR card available

for James C. Hubbard
Chief, Tides Branch

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-9570

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	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 T-sheets TP-00608, TP-00611	
BALLAST POINT	18759	✓							X	1
CATALINA HARBOR	18759								X	2
CATALINA HEAD	18759								X	3
OUTER SANTA BARBARA PASSAGE	18759								X	4
SANTA CATALINA ISLAND	18759								X	5
Lobster Point										6
LOBSTER BAY										7
PIN ROCK	✓									8
										9
										10
										11
										12
										13
										14
										15
										16
										17
						APPROVED				18
						Chas. C. Harrington				19
						CHIEF GEOGRAPHER - C3x8				20
						10 July 1978				21
										22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

U.S. G.P.O. 1972-769-565/516 REG.#6

APPROVAL SHEET

FOR

SURVEY H-9570

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: 12 Feb 1978

Signed: [signature]

Title: Chief, Verification Branch

NOAA FORM 77-27 (5-77) | U. S. DEPARTMENT OF COMMERCE NOAA | HYDROGRAPHIC SURVEY NUMBER

HYDROGRAPHIC SURVEY STATISTICS

H-9570

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	BOAT SHEETS & PRELIMINARY OVERLAYS	4 & 4
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	2 with printouts					
VOLUMES	9					
BOXES			1-smooth pos.& sndg. & tides			

T-SHEET PRINTS (List) TP-00611 2-blow-ups of TP-00608

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	AMOUNTS: VERIFICATION	AMOUNTS: TOTALS
POSITIONS ON SHEET			2166
POSITIONS CHECKED		2166	
POSITIONS REVISED		58	
SOUNDINGS REVISED		118	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME – HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	11		
VERIFICATION OF CONTROL		25	
VERIFICATION OF POSITIONS		133	
VERIFICATION OF SOUNDINGS		64	
COMPILATION OF SMOOTH SHEET		100	
APPLICATION OF TOPOGRAPHY		82	
APPLICATION OF PHOTOBATHYMETRY			
JUNCTIONS			
COMPARISON WITH PRIOR SURVEYS & CHARTS		79	
VERIFIER'S REPORT		79	
OTHER			
TOTALS	11	562	

Pre-Verification by	James S. Green	*Beginning Date*	12-30-75	*Ending Date* 12-30-75
Verification by	F.L. Rosario, SST L. Deodato	*Beginning Date*	1-14-76	*Ending Date* 2-3-78
Verification Check by	J.S. Green, S.H. Otsubo	*Time (Hours)*	35	*Date* 2/13/78
Marine Center Inspection by	HIT	*Time (Hours)*	18 1/2	*Date* 2/27/78
Quality Control Inspection by	RW DeGazarain	*Time (Hours)*	54	*Date* 6/7/78
Requirements Evaluation by	D.J. Hill	*Time (Hours)*	2	*Date* 10/20/78

Reg. No. 9570

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:

H-9570

Information for Future Presurvey Reviews

Future surveys should expect little or no change in this stable area.

Position Index		Bottom Change Index	Use Index	Resurvey Cycle
Lat.	Long.			
332	1183	1	1	50 years
332	1184	1	1	50 years

PACIFIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO: H-9570 FIELD NO: RA-5-3-75

Catalina Harbor, Santa Catalina Island, California

SURVEYED: 21 September - 16 October 1975

SCALE: 1:5,000 PROJECT NO: OPR-411

SOUNDINGS: Ross Fineline Fathometer CONTROL: Visual
Mini-Ranger
Raydist

Chief of Party.....CDR C.K. Townsend J.C. Osborn
Surveyed by.....LTJG R. Ellis, LTJG A. Armstrong,
LTJG C. Cavin, & LTJG K. Andreen
Automated plot by.....PMC Xynetics Plotter
Verified by.....F. L. Rosario
Inked by.....L. Deodato and F.L. Rosario
January 31, 1978

I. INTRODUCTION

Basic hydrography in Catalina Harbor and its approaches, Catalina Island, California, was accomplished on H-9570 by the Ship RAINIER as part of OPR-411-RA-75.

Although a 1:5,000 survey, electronic control was used for a large part of this smooth sheet. The rationale presented in paragraph G of the Descriptive Report appears to justify its use in this case, particularly when extensive comparisons with visual positions were accomplished.

Projection parameters used to prepare the boatsheet have been revised to combine the two boatsheets and center the hydrography on the smooth sheet. Parameters used by PMC are appended.

Boatsheet soundings were reduced from the Los Angeles, California reference station predicted tides. Smooth sheet soundings were reduced from observed tides at Catalina Harbor.

II. CONTROL AND SHORELINE

All hydrography was accomplished utilizing either visual (3-point sextant fixes) or electronic means (i.e. - Mini-Ranger, Raydist).

See Items "F" and "G", "Station Control" and "Position Control", and also "Electronic Control Report, OPR-411-RA-75 (Fall)" for an adequate description of control used for this survey. Daily calibrations were used for all the electronically controlled positions of this survey. For the areas where hydrography was visually controlled, the electronic control values were also used as position checks. Several ~~Many~~ offshore signals falling outside the MHW line were not described. Shoreline was transferred from Class I reviewed manuscript TP-00611. Photography was done in 1972, field edit work performed in 1975 and final review in 1976.

Class I reviewed manuscript TP-00608, enlarged to 1:5,000 from 1:20,000 scale was used to transfer shoreline for the southeastern and northwestern portions. Photography was done in 1972, field edit work performed in 1975 and final review in 1976. See Q.C. Report

III. HYDROGRAPHY

Hydrographic coverage was adequate within the prescribed limits. The inner harbor region and south to Lat. 33°24'55"N was run with visual control. In this area, the hydrography was not resolved until it was reduced (and subsequently verified) that positions using signals #501 and #503 were observed with "tilted" sextants. This "tilt" was discovered during the initial stages for the outer-harbor hydrography by the then visiting cartographic technician to the RAINIER. Angles of elevation were subtended from different locations within the affected survey area. Upon the discovery of the necessity for this slope correction, the previous days' hydrography were replotted to verify the corrector's validity.

The rest of the visual hydrography was conducted with the sextants properly orientated (i.e. - held horizontally).

As per Descriptive Report, foreshore areas were almost wholly inaccessible due to either extensive kelp and/or dangerous surf conditions. Consequently, the shoaler depth curves are lacking and/or incomplete.

Crosslines, amounting to about 8%, were in excellent agreement throughout the survey. With the exception of the aforementioned foreshore areas of kelp proliferation and/or heavy surf action (where hydrography had to be limited), depth curves, the bottom configuration delineation and determination of least depths are adequate.

IV. CONDITION OF SURVEY

Fathograms for inshore ends of sounding lines were rescanned after crosslines were deemed suspect. Final reduced soundings reflect good, acceptable crosslines with differences ranging from 0-3 feet.

Field edit requirements were inevitably and adversely affected by the smaller-scale photos provided for the ship's use.

Photos were provided at 1:20,000 scale while the survey was conducted at a 1:5,000 scale. Great difficulty was encountered in the attempts at locating features photographed in shadows. See Field Edit Report (OPR-411-RA-75, which acknowledges the photos' deficiencies).

Aside from these field-related deficiencies, this survey was found to be satisfactory. The smooth sheet, accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the Provisional Hydrographic Manual.

V. JUNCTIONS

No specific junctions were required for this survey. Consequently, sheet OPR-411-RA-75 (RA-40-01-75), a chart adequacy survey (Chart 18757) was not belabored as a junctional sheet, although it was used for "rough checking" purposes during hydrographic operations.

VI. COMPARISON WITH PRIOR SURVEYS

A. Prior Survey H-5557 (1934) Scale 1:5,000 (feet)

This prior survey was conducted in the inner regions of Catalina Harbor, westerly and northeasterly of Ballast Point. There has been an apparent shoaling near the northeast portion of the harbor, 3-5 feet in some instances. Soundings on either side of the Ballast Point Peninsula reflect the probable shifting of sandy bottom. Depths 2-3 feet shoaler occurred to the north and east of the point. Depths to the west of this point generally tended to be 0-4 feet deeper. This result is consistent with mechanics of sediment transport.

An area of discrepancy is due west of station "HARBOR, 1933", at approximately Lat. 33°25'41", Long. 118°30'24". In this case, a 21-foot prior survey sounding fell amongst 3~~6~~4~~5~~ foot soundings ~~uncovered during~~ Shown on H-9570. The 21 foot sounding was transferred from H-5557.6

Additional soundings, necessary to delineate depth curves or to fill in inshore areas, have been transferred from H-5557 in red.

B. Prior Survey H-5556 (1934) Scale: 1:10,000 (Fathoms)

Many soundings have been transferred from H-5556 in violet to delineate inshore areas.

Common areas of coverage with H-5556 begins southward from Lat. 33°25.9' and extending westward from Ballast Point to encompass the limits of H-9570. Agreement was good with this prior survey, considering the conversion process prior to charting (i.e. - feet to fathoms).

Contour lines have remained relatively unchanged in the offshore areas. Generally, soundings tended to be 0-3 feet deeper on H-9570. An exception, on the prior survey, is a 306-foot sounding (converted from fathoms) at

approximately Lat. 33°24'31", Long. 118°30'35.8". In this case, this isolated sounding fell on the shoaler side of the 300-foot curve.

In view of the (1) oft-reported "extensive kelp beds and dangerous surf conditions" which prevented more foreshore excursions by launches and (2) the ship's conscientious efforts at delineating the limits of these foul areas, this survey can be considered adequate to supersede these two prior surveys in areas of common hydrography, with the addition of the soundings carried forward.

C. Pre-Survey Review Items:

#29. As per Descriptive Report and subsequently reflected by the Class I manuscript (TP-00611, 1:5,000 scale) the pier ruins charted at approximately Lat. 33°25.9', Long. 118°30.4' are non-existent. This was ascertained as a result of three sweeps by a RAINIER diving party. From this perspective, it is recommended that the pier ruins be deleted from future chart editions. The dock, presently charted to the west of the pier ruins, is also recommended to be removed from the chart.

#30. The charted sunken wreck was investigated and found to be correctly charted at approximately Lat. 33°25'55", Long. 118°30'09". The other wreck was located by sextant cuts taken at the "apparent bow and stern sections", identified as position numbers 9000 (NE corner), and 9001 (SW corner), respectively. This wreck is submerged in about 9 feet of water and has been plotted as such on the smooth survey sheet. The point of least depth (approximately 2/5 of the way from the northeast end -- as noted on page 22 of Descriptive Report) was chosen as the wreck's position...i.e. 9 feet.

VII. COMPARISON WITH THE CHART

Comparison with C&GS Chart #5128 (No. 18759), 7th Edition, April 10, 1971, Scale 1:10,000; Chart # 5112 (No. 18757)

This survey compares reasonably well with the charted hydrography, with the following exceptions:

A. The kelp growth was found to be present northward from Catalina Head on the western side of the inner harbor and northward, also, from approximately 33°25.5' to approximately 33°25.8' on the east side of the inner harbor. This pattern of enlarged kelp limits could possibly be attributable to seasonal growth. It is strongly recommended that the kelp limits be added ~~where reflected contemporarily.~~ as shown on the present survey.

B. A limited area, perceptibly in variance, is near the northeast portion of the harbor where the contemporary soundings depict on apparent shoaling of 3-5 feet in some instances.

C. Instead of the (a) pier ruin, and (b) a dock (in the vicinity of Lat. 33°25.9', Long. 118°30.4'), there are now a (a) seaplane ramp and (b) another dock, either re-located and/or newly-built. It is recommended that the presently charted pier ruin and dock be deleted from the charts and that the two "new" features be depicted on future charts.

D. Just due east of the above mentioned items (paragraph c) is a foul area of offshore rocks as depicted by the Class I manuscript and transferred to the smooth survey sheet. It is also recommended this foul area be emphasized in future chart editions.

This survey is adequate to supersede the charted hydrography for the areas of common coverage.

There are no aids to navigation plotting on this smooth sheet. Additionally, however, it is recommended that a light be established to serve as a navigational aid to and from the approaches to Catalina Harbor (See paragraph N, Aids to Navigation - Descriptive Report).

VIII. COMPLIANCE WITH PROJECT INSTRUCTIONS

This survey adequately complies with Project Instructions - OPR-411-RA-75, dated 11 August 1975 (Fall) and amendments thereto.

IX. ADDITIONAL FIELD WORK

No additional field work is recommended for the confines of this survey.

This survey as a whole can be considered as a very good basic survey.

Respectfully submitted,

Felipe L Rosario

Felipe L. Rosario
January 31, 1978

Examined and approved

James S. Green
Chief, Verification Branch

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Pacific Marine Center, 1801 Fairview Ave. E.
Seattle, WA 98102

10 April 1978

TO: Eugene A. Taylor
Director, PMC

FROM: Glen Schaefer
Chief, Processing Division

SUBJECT: PMC Hydrographic Inspection Team Report for Survey H-9570

This survey is a basic hydrographic survey of Catalina Harbor, Santa Catalina Island, California. This survey was conducted by NOAA Ship RAINIER in 1975 in accordance with Project Instructions OPR-411-FA, RA-75, dated 11 August 1975; Change No. 1, dated 19 August 1975; No. 2, dated 22 August 1975; and No. 3, dated 11 September 1975.

The running of a sounding line along the shore from triangulation station HARBOR 1933 to station FISH HOOK 1933 would have greatly increased the definition of the shoaler areas and precluded the necessity to carry forward soundings from the 1934 survey. A north-south orientation of the sounding lines south of Catalina Head, so as not to have them parallel with the depth curves, would have increased the quality of the survey in that area.

The inspection team finds H-9570 to be a very good basic survey adequate to supersede common areas of prior surveys and charted hydrography. Administrative approval is recommended.

Glen R. Schaefer

John C. Albright

James W. Steensland

for A. Eichelberger

ADMINISTRATIVE APPROVAL

H-9570

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

4/11/78
Date

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

C352/RWD

June 7, 1978

TO: A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: R. W. DerKazarian
Quality Evaluator

SUBJECT: Quality Control Report for H-9570 (1975), Catalina Harbor and Approaches, Santa Catalina Island, California

A quality control inspection of H-9570 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, 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. Several depth curves in inshore areas were mechanically drawn on the smooth sheet during verification. Many of these curves were revised by the quality evaluator in order to show a natural delineation of the bottom configuration. In some instances, black dots from photogrammetric manuscripts were erroneously shown in areas delineated by an orange curve that represented the low water line.

2. Several kelp and foul limit lines that were in conflict with one another have been revised; others omitted during verification were added to the smooth sheet during quality control.

3. The high water line delineated on the present survey originates from a four-time enlargement of photogrammetric manuscript TP-00608 (1972-75) and, therefore, should be used for orientation purposes only.

4. A comparison with prior survey H-6186 W.D. (1936) had not been accomplished during verification. The following is in addition to the Verifier's Report, paragraph 7:

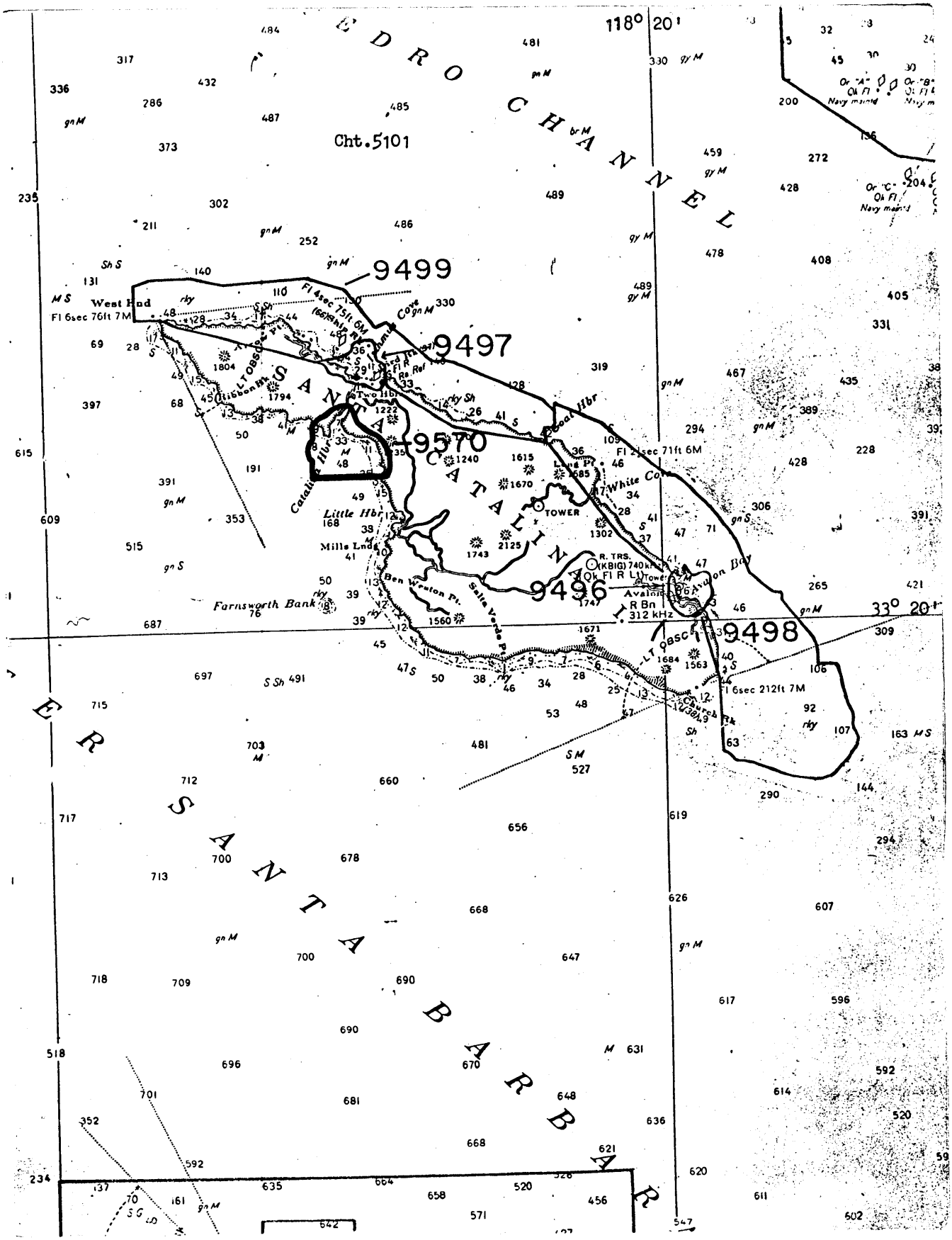
No conflicts exist between effective wire-drag depths and present survey soundings.

5. Corrected soundings for detached positions 1-33 were not listed in the final sounding printout or smooth plotted during verification. These deficiencies were corrected during quality control.

6. Sources for soundings carried forward from prior surveys should be shown in slanted lettering on the smooth sheet.

7. The smooth sheet size is not in accordance with section 1.2.4 of the Hydrographic Manual. The sheet could easily have been trimmed a total of 6 inches top and bottom and plotted on a 36-inch sheet.

cc:
C35
C351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9499
9497
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SANTA CATALINA ISLAND
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ISTHMUS CHANNEL
118° 20'
33° 20'
West End
Fl 6sec 76ft 7M
Fl 4sec 75ft 6M
Fl 2sec 71ft 6M
Fl 6sec 212ft 7M
TOWER
Avalon
Farnsworth Bank
Mills Lnd
Little Hbr
Isthmus Cove
Catalina Hbr
White Cove
Avalon Bay
Ben Weston Pt
Salta Verde Pt
Lt Obsc
R. TRS.
(KBIG) 740kHz
Ok Fl R Lt
R Bn
312 kHz

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

NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. 9570

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
18759	11-13-78	[illegible]	Full ~~Part Before~~ After Verification Review Inspection Signed Via
(5128)		RCS	Drawing No. 13 Revised numerous sndgs &
			depth curves. Added wreck & removed ruins
18757	11-15-78	[illegible]	Full ~~Part Before~~ After Verification Review Inspection Signed Via
(5112)		RCS	Drawing No. 15 Revised several sndgs &
			depth curves. Added wreck & removed ruins
18746	11-16-78	[illegible]	Full ~~Part Before~~ After Verification Review Inspection Signed Via
(5142)		RCS	Drawing No. 33 Revised several sndgs &
			depth curves
18740	11-28-78	R. A. Lillis RCS	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 44
18022	11-28-78	R. A. Lillis	Full Part Before After Verification Review Inspection Signed Via
		RCS	Drawing No. 40
18020	11-28-78	R. A. Lillis	Full ~~Part Before~~ After Verification Review Inspection Signed Via
		RCS	Drawing No. 31 No Corr
			Full Part Before After Verification Review Inspection Signed Via
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			Drawing No.

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

USCOMM-DC 8558-P63