

H10531

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey .. Hydrographic.....

Field No. .. RA-10-1-94.....

Registry No. ... H-10531.....

LOCALITY

State California.....

General Locality ... Estero Bay.....

Sublocality .. Northern Portion of Estero Bay..

1994

CHIEF OF PARTY

..... R. G. Arnold, CAPT., NOAA.....

LIBRARY & ARCHIVES

DATE MAR 6 1995.....

HYDROGRAPHIC TITLE SHEET

H-10531

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.

RA-10-1-94

State California

General locality Estero Bay

Locality Northern Portion of Estero Bay

Scale 1:10,000 Date of survey March 25 - April 18, 1994

Instructions dated 2/23/94 Project No. OPR-L111-RA

Vessel RAINIER (2120), (2123), (2124), (2125), (2126)

Chief of party CAPT Russell C. Arnold, NOAA

Surveyed by CAPT R. Arnold, LT D. Neander, LT D. Haines, LTJG D. Lemke, ENS G. Glover, ENS J. Graham, ENS S. Shaulis, ENS K. Pavaille, ENS S. Maenner, ENS S. Smith

Soundings taken by echo sounder, ~~hand lead, potex~~ DSF-6000N, Pneumatic depth gage

Graphic record scaled by RAINIER PERSONNEL

Graphic record checked by RAINIER PERSONNEL

Verification by: R. Davies Automated plot by PHS Xynetics Plotter

~~Extracted by:~~ R. Davies

Evaluation by: R. Davies

~~Modification by:~~ Meters

Soundings in ~~fathoms xxx feet~~ at ~~MLLW~~ MLLW and Decimeters

REMARKS: Time in UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

AWOIS and Surf ✓ 4/95 RUD

PROGRESS SKETCH

121 00' 00"

OPR-L111-RA

120 50' 00"

HYDROGRAPHIC SURVEY
ESTERO BAY, CALIFORNIA

MAR 25 - APR 18, 1994

NOAA SHIP RAINIER
R. C. ARNOLD, CAPT., NOAA
COMMANDING

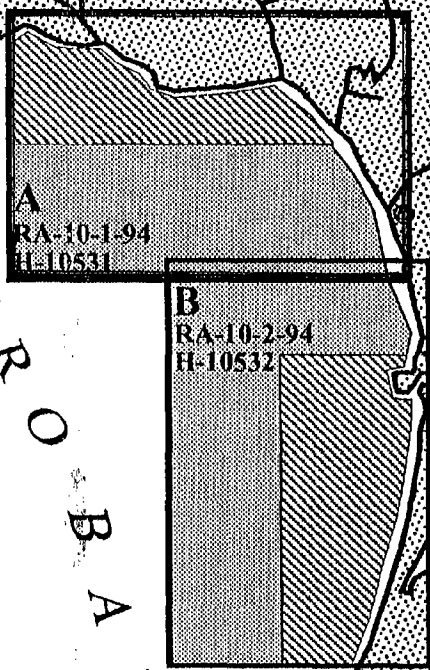
SCALE OF CHART 18700 = 1:216,116

035 20' 00"

PACIFIC

OCEAN

ESTERO BAY



035 20' 00"

MAR APR

20	19
539	957
203	44
0	162
2	2
1	1
1	1
6	4
0	14

SQ. NM SOUNDINGS
LNM SOUNDINGS
LNM SIDE SCAN SOUNDINGS
BOTTOM SAMPLES (GRAB)
ELECTRONIC CONTROL STATIONS
TEMP., DEPTH, SOUND VEL. CAST
TIDE GAGES
GEO. CONT. STATIONS EST./REC.
AWOIS ITEMS INVESTIGATED
AREA SURVEYED

121 00' 00"

120 50' 00"

Descriptive Report to Accompany Hydrographic Survey H-10531

Field Number RA-10-1-94

Scale 1:10,000

March-April 1994

NOAA Ship RAINIER
Chief of Party: Captain Russell C. Arnold

A. PROJECT ✓

This basic hydrographic survey, under the navigable area concept, was completed in Estero Bay, California, as specified by Project Instructions OPR-L111-RA dated February 23, 1994 and Change Number 1, dated *May 24, 1994*.

Survey H-10531 corresponds to "Sheet A" as defined in the Project Instructions.

This project responds to a U.S. Coast Guard request to survey the approaches, offshore oil tanker moorings, and loading facilities at Estero Bay. Estero Bay, which is an environmentally sensitive area, is host to heavy tanker traffic passing close inshore. This project provides data in support of existing charts and a planned large scale inset of the area.

B. AREA SURVEYED ✓ *See Eval Rpt, section I*

The survey area is located in the northern portion of Estero Bay. The survey is bounded by longitude 121°00.0' W to the west, the latitude 35°23.7' N to the south, and the 5 m depth curve to the north and east. Data acquisition was conducted from March 25, 1994, Day Number (DN) 84, through April 18, DN 108.

C. SURVEY VESSELS ✓

Data were acquired by the NOAA SHIP RAINIER and four survey launches as noted below:

<u>Vessel</u>	<u>EDP #</u>	<u>Operation</u>
RAINIER	2120	Sound Velocity Cast Bottom Samples
RA-3	2123	Side Scan Sonar Hydrography
RA-4	2124	Hydrography Detached Positions
RA-5	2125	Side Scan Sonar Hydrography Bottom Samples Detached Positions
RA-6	2126	Hydrography Dives

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Data acquisition and processing were accomplished with the following HDAPS programs:

<u>Program Name</u>	<u>Version</u>	<u>Date Installed</u>
BACKUP	2.00	3/7/94
BASELINE	1.14	3/7/94
BIGABST	2.07	3/7/94
BIGAUTOST	3.01	3/7/94
BLKEDIT	2.02	3/7/94
CARTO	2.11	3/7/94
CLASSIFY	1.05	3/7/94
CONVERT	3.54	3/7/94
CONTACT	2.32	3/7/94
CONVERT	3.62	3/7/94
DAS_SURV	6.62	3/7/94
DIAGNOSE	3.03	3/7/94
DISC-UTIL	1.00	3/7/94
DP	2.14	3/7/94
EXCESS	4.21	3/7/94
FILESYS	3.21	3/7/94
GRAFEDIT	1.06	3/7/94
HIPSTICK	1.01	3/7/94
HPRAZ	1.26	3/7/94
INVERSE	2.01	3/7/94
LISTDATA	1.02	3/7/94
LOADNEW	2.10	3/7/94
LSTAWOIS	3.06	3/7/94
MAINMENU	1.20	3/7/94
MAN_DATA	2.01	3/7/94
NEWPOST	6.01	3/7/94
PLOTALL	2.25	3/7/94
POINT	2.10	3/7/94
PREDICT	2.01	3/7/94
PRESURV	7.07	3/7/94
PRINTOUT	4.03	3/7/94
QUICK	2.04	3/7/94
RAMSAVER	1.02	3/7/94
REAPPLY	2.10	3/7/94
RECOMP	1.02	3/7/94
SCANNER	1.00	3/7/94
SELPRINT	2.04	3/7/94
SYMBOLS		3/7/94
VERSIONS	1.00	3/7/94
ZOOMEDIT	2.22	3/7/94

Velocity corrections were determined using the program VELOCITY ver. 2.10, installed 3/15/94.

E. SONAR EQUIPMENT ✓

Side scan sonar (SSS) operations were conducted using an EG&G Model 260 image-corrected SSS recorder and a Model 272-T single frequency towfish. RA-5 was equipped with a thermal recorder, and RA-3 was equipped with a multi-stylus recorder. SSS data was acquired with RA-3 on DN 84-93, 103, and with RA-5 on DN 90. Serial numbers of the equipment used are located on the raw master printouts.

The SSS towfish was configured with a 20° beam depression, the normal setting, which yields the best beam correction. The 100 kHz frequency was used throughout this survey. The 100 m range scale (RS) was used primarily for this survey. The 75 m and the 50 m RS were used in the shallower waters (usually less than 10 m water depth). The towfish was deployed exclusively from the stern of the launch.

Standard line spacing used was 150 m for 100 m RS, 100 m for 75 m RS and 70 m for 50 m RS (Side Scan Sonar Manual Sec 2.1.3.2). Actual line spacing was varied along the north edge of the western SSS coverage area and along the western edge of the southern SSS coverage area to achieve required overlap at the limit of coverage. Overlap of SSS coverage was checked online using the real-time plot and the edited swath plot was employed to identify holidays.

Two hundred percent SSS coverage was achieved as required in the project instructions by conducting two separate 100% coverages wherein the vessel track lines during the second coverage split the distance between the tracklines of the first coverage (SSS Manual Sec. 1.2.2).

Daily confidence checks were performed by towing the fish over bottom texture features. Confidence checks were also possible during SSS operations due to numerous rocks, obstructions and bottom features.

The SSS traces were scanned for data quality and contacts. Contacts were selected if an object had a connecting shadow and the shadow indicated a significant height above the bottom. Any contact appearing significant was entered into contact tables. In areas of numerous contacts, the number of contacts recorded was limited to one per selected sounding per channel. Contacts in less than 20 m of water which had a height less than 1 m and contacts in water greater than 20 m with heights less than 10% of the total depth were labeled insignificant. The significant contacts were grouped into developments and investigated by intensive echo sounder investigation. In addition, dives were conducted to investigate the most significant features as determined by echo sounder development. Tables for contact/development correlation are located in "Separates to be Included with Survey Data, Section V." *

Problems ✓

When satellites were at or near their elevation mask of 8° or during other times of high HDOP, minor discontinuities in position were noted. While conducting SSS, these discontinuities led to apparent holidays in the coverage. The problem was exacerbated by the new HDAPS algorithm for computing SSS swath coverage, based on "course made good." The swath width is centered on and perpendicular to each CMG segment. During times of DGPS discontinuities, the swath coverage can become twisted, occasionally creating small holidays. When it was clear that the positioning was the sole reason for the holiday, the affected area was smoothed, but not exceeding the 4 cm smoothing limit. In other cases where the reason for the holiday was unclear or could be linked to intentional or unintentional departures from the reference line, the section was re-run.

The side scan sonar equipment ran without problems on Sheet A.

* Filed with the hydrographic data.

F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N is a dual frequency (100kHz, 24 kHz), paper trace echo sounder. Serial numbers are included on the headers of the daily raw master printouts.* No problems which affect survey data were encountered. All soundings were acquired using the High + Low, High frequency digitized setting.

A pneumatic depth gauge (S/N 8503358) was used for dive investigations on DN 106-108. It was calibrated by the Pacific Operations Section (N/OES214) on March 17, 1994. Filed with the project folder.

Problems ✓

For the most part echo sounder developments were used successfully to resolve contacts; however, there were several anomalous soundings of considerable apparent height which after further echo sounder development and dives were found to be erroneous. The exact reason was never determined, although the presence of kelp, fish, or even whales (all of which were numerous) could explain the phenomenon.

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Correctors for the velocity of sound through water were determined from the casts listed below:

<u>Velocity</u> <u>Table #</u>	<u>Cast</u> <u>#</u>	<u>DN</u>	<u>Cast</u> <u>Position</u>	<u>Deepest</u> <u>Depth (m)</u>	<u>Applicable</u> <u>DN</u>	
1	1	089	35° 24' 14" N 120° 00' 32" W	116.3	84-97	Plots off sheet limits.
2	2	104	35° 23' 48" N 120° 59' 38" W	115.4	103-108	

The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 811), calibrated 12/17/93. Velocity correctors were computed using the PC program VELOCITY in accordance with Hydrographic Survey Guideline (HSG) No. 69. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV.* Sounding Equipment Calibrations and Corrections".

Static Draft ✓

A transducer depth was determined using FPM Fig 2.2 for launches 2123, 2124, 2125 and 2126 in the spring of 1994 and was entered into the offset tables* for each launch.

Settlement and Squat ✓

Correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2., using FPM fig. 2.3, and are included with project data for OPR-L111-RA. The data used was collected in Shilshole Bay, Washington in March of 1994.

* Filed with the hydrographic data.

Offset Tables ✓

Offset tables contain offsets and laybacks for the GPS antenna and the SSS towpoint, as well as the static draft and settlement and squat data. Offset tables 3-6 correspond to the number of the launch. The offset tables were compiled with new measurements in the spring of 1994 and are contained in the "Separates to be Included with Survey Data." *

Heave ✓

The launches are not equipped with heave, pitch and roll sensors; consequently, irregular profiles caused by sea action were taken along a line representing the mean depth, not from tops of peaks (HSG No. 31). Periods of significant sea action were annotated on the fathograms and raw master printouts.

Bar Check and Lead Lines ✓

Bar check and lead lines were calibrated by RAINIER personnel at PMC during the winter 1993-1994 inport. Calibration forms are included with the project data for OPR-L111-RA. Bar checks were performed on a weekly basis and served as a functional check of the DSF-6000N.

Tide Correctors ✓

The tidal reference and control station used for this survey was Port San Luis, California (941-2110). Tidal information was used from this station with 0 00 time correction and 0.00 height correction as provided in the project instructions.

HDAPS listings of the data used in generating tide corrector tables are included in Appendix V* of this report.

The tide gage at Port San Luis is maintained by Pacific Operations Section (N/OES214). The gage was checked daily on weekdays for data output by POS via computer modem. Opening levels were performed by RAINIER personnel on March 21 and March 23. Closing levels were performed on April 15.

The station description, field tide records, and Field Tide Note (Appendix V)* were forwarded to N/OES212 in accordance with HSG No. 50 and FPM 4.3. A request for approved tides was forwarded to N/OES2. *Tide Note dated July 6, 1994 is attached.*

H. CONTROL STATIONS ✓ *See Eval Rpt, section 2*

A listing of the geodetic stations used to control this survey is included in Appendix III of this report.

Two DGPS base stations were established using static GPS methods. California High Precision Stations, HPGN 05 07 and TIDAL 14 were used as control stations. Station TOWER was established atop the Morro Bay Coast Guard building and station CHEVRON was established on Chevron Oil Company property approximately two miles north of Morro Bay. Horizontal datum for this project is NAD 83. All existing stations were recovered in accordance with methods stated in Section 5.2.4 of the Field Procedures Manual. Further information can be found in the "Spring 1994 Horizontal Control Report for OPR-L111-RA" and Appendix III.*

* Filed with the hydrographic data

I. HYDROGRAPHIC POSITION CONTROL ✓

Method of Position Control ✓

All soundings and features were positioned using differential GPS. Serial numbers for Ashtech GPS equipment are annotated on the data printouts.

The estimated system error (ESE) for the DGPS "fly away system" has recently been reduced from 4 m to 2.5 m (Change No. 1 to Project Instructions). For a 1:10,000 scale hydrographic survey, the HDOP limit becomes 6.0 (FPM Section 3.4.2).

Calibrations & Systems Check Methods ✓

System checks were performed by launch to launch comparisons of position. Three observations of position were made by each launch using correctors from two independent DGPS base stations. System checks were performed once a week and the results were transferred to forms which are included in the project data for OPR-L111. An abstract of the system checks is included in the "Separates to be Included with Survey Data, III. Horizontal Position Control and Corrections to Position Data".

Problems ✓

Using the new ESE of 2.5 m, the maximum allowable inverse distance between two DGPS system check positions becomes HDOP (observed) x 2.5 m (FPM Section 3.4.4.1). During periods of low HDOP, the maximum allowable error is reduced to levels unachievable using three observations. On several such occasions, the launches would take as many as ten positions each to meet performance check specifications.

Ashtech GPS ✓

VHF differential shore stations were established at stations CHEVRON and TOWER. The difference between the computed location and the station's published position was recorded by the MONITOR program on a PC. Data from a 24-hour period were recorded and examined for signs of multi-path signal reflection, which was not evident at either station.

Problems ✓

Except as noted below, the differential GPS stations on TOWER and CHEVRON ran without problems for sheet A.

During the first 10 days of the project, one satellite (SV7), critical to our constellation, was unhealthy. This resulted in a period of high HDOP which lasted for one to two hours in the early afternoon. Examination of this data during office processing revealed no significant problems.

Offset ✓

The launch GPS antenna offsets are stored in the HDAPS Offset Tables as listed in Section G. Copies of the Offset Tables are included in the "Separates to be Included with Survey Data." *

* Filed with the hydrographic data.

J. SHORELINE ✓ *See Eval Rpt, section 2*

There was no photogrammetric source data for OPR-L111. Shoreline for field sheets was drawn from an enlargement of NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD83). Shoreline is shown in brown, and used for orientation purposes only. *Concur*

Verification of the shoreline inshore of the 5 m depth curve was not required for this project. *Concur*

K. CROSSLINES ✓

Crosslines are in good agreement with mainscheme hydrography. Crosslines totaled 38.3 nautical miles, representing 11.2% of the total mainscheme hydrography.

L. JUNCTIONS *See Eval Report, section 5*

The survey joins H-10532 to the south. There were no discrepancies in soundings or depth curves found along the junction. Agreement between overlapping soundings appears acceptable. Detailed comparisons will be made by N/CG245.

M. COMPARISON WITH PRIOR SURVEYS *See Eval Report, section 6*

Preliminary comparisons with prior surveys were conducted by RAINIER during survey operations. Final prior survey comparison will be accomplished by N/CG245.

N. ITEM INVESTIGATIONS ✓

Six AWOIS items were assigned to survey H-10531.

AWOIS ITEM 52021

1. Area of Investigation

State:	California
Locality:	Estero Bay
Reported Latitude:	35° 24' 16.0" N
Reported Longitude:	120° 52' 35.0" W
Datum:	NAD 83
Depth:	4 1/4 FM (7.7 m)
Feature:	Scattered Rocks

2. Description of Source Item

Scattered rocks found in the vicinity in COE survey BP 5697⁶/₅₈. Position scaled from chart.

3. Survey Requirements

Verify or disprove, determine least depth and position. Techniques to be used are echo sounder, 200% side scan sonar, bottom drag, or diver investigation.

4. Method of Investigation

A dive investigation was conducted, including a 25 m circle search and 100 m visual search. Search time was 35 minutes and water visibility was 3 m.

5. Results of Investigation

Date: DN 107
Time (UT): 16 42 42
Average Measured Depth: 8.0 m
Pneumo Depth Corrector: +.2
Predicted tide corrector: -.1
Corrected Least Depth: 8.1 m (4 1/4 FM)
~~8.7~~ ~~Rk~~
Position Number 8719
Latitude 35° 24' 15.904" N
Longitude 120° 52' 36.400" W
Datum: NAD 83

Scattered rocks were located and least depth measured by pneumatic depth gage.

6. Comparison with Prior Surveys

The item did not originate with a prior survey.

7. Comparison with the Chart and Charting Recommendations

The item was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83). This item was not submitted as a Danger to Navigation.

Recommendation-

Delete charted depth of 4 1/4 FM.

Chart a rock ~~at 4 1/4 FM~~ ^{Submerged} at revised position 35° 24' 15.904" N, 120° 52' 36.400" W. *Concur*
1/2

AWOIS ITEM 52022

1. Area of Investigation

State: California
Locality: Estero Bay
Reported Latitude: 35° 24' 08.0" N
Reported Longitude: 120° 52' 34.0" W
Datum: NAD 83
Depth: 4 1/2 FM (8.2 m)
Feature: Submerged Rock

2. Description of Source Item

Submerged rock found in the vicinity in COE survey BP 5697⁶/₁₅₈. Position scaled from chart.

3. Survey Requirements

Verify or disprove, determine least depth and position. Techniques to be used are echo sounder, 200% side scan sonar, bottom drag, or diver investigation.

4. Method of Investigation

A dive investigation was conducted, including a 25 m circle search and 100 m visual search. Search time was 20 minutes and water visibility was 2 - 3 m.

5. Results of Investigation

Date: DN 107
 Time (UT): 17 27 58
 Average Measured Depth: 7.7 m
 Pnemo Depth Corrector: +.2
 Predicted tide corrector: -.1
 Corrected Least Depth: 7.8 m (4 1/4 FM)
 8.4 RK (4 1/2 FM)

Position Number 8721
 Latitude 35° 24' 07.886" N
 Longitude 120° 52' 34.268" W
 Datum: NAD 83

A submerged rock was located and least depth measured by pneumatic depth gage.

6. Comparison with Prior Surveys

The item did not originate with a prior survey.

7. Comparison with the Chart and Charting Recommendations

The item was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83). This item was not submitted as a Danger to Navigation.

Recommendation-

Delete charted depth of 4 1/2 FM at search location.

Chart a rock ~~at~~^{submerged} 4 ^{1/2} FM at location 35° 24' 07.886" N, 120° 52' 34.268" W.

AWOIS ITEM 52023

1. Area of Investigation

State: California
 Locality: Estero Bay
 Reported Latitude: 35° 24' 01.0"N
 Reported Longitude: 120° 52' 33.0"W
 Datum: NAD 83
 Depth: 5 1/4 FM (9.6 m)
 Feature: Scattered Rocks

2. Description of Source Item

Scattered rocks found in the vicinity in COE survey BP 5697⁶/58. Position scaled from chart.

3. Survey Requirements

Verify or disprove, determine least depth and position. Techniques to be used are echo sounder, 200% side scan sonar, bottom drag, or diver investigation.

4. Method of Investigation

A dive investigation was conducted, including a 25 m circle search and 100 m visual search. Search time was 25 minutes and water visibility was 2 - 3 m. 200% SSS was also run in the area.

5. Results of Investigation

Date: DN 107
 Time (UT): 17 53 42
 Position Number 8722
 Latitude 35° 24' 01.470" N
 Longitude 120° 52' 33.162" W
 Datum: NAD 83

A dive was conducted at the reported location; no rocks were found. 200% SSS revealed no indication of rocks.

6. Comparison with Prior Surveys

The item did not originate with a prior survey.

7. Comparison with the Chart and Charting Recommendations

The item was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83). This item was not submitted as a Danger to Navigation.

Recommendation-

Delete charted depth of 5 1/4 FM at reported location. *Chart according to this survey. Least depth in area, 10 meters at lat. 35/24/01N, long. 120/52/31 W.*

AWOIS ITEM 52031**1. Area of Investigation**

State: California
 Locality: Estero Bay
 Reported Latitude: 35° 23' 56.90" N
 Reported Longitude: 120° 52' 33.64" W
 Datum: NAD 83 (14.5m)
 Depth: 7 1/4 FM in vicinity (13-1m)
 Feature: Fuel pipeline; 8 inch diameter

2. Description of Source Item

Navy offshore oil handling terminal found in COE survey CL385/61.

3. Survey Requirements

To ensure that scouring has not occurred, zig zag 100 m wide across the axis inshore, to the limit of safe navigation. Echo sounder development, 200% SSS, or dive investigation is required.

4. Method of Investigation

A dive investigation was conducted, including a 25 m circle search and compass zig zag search inshore. Search time was 35 minutes and water visibility was 2 - 3 m.

5. Results of Investigation

The dive search on DN 107 indicated no sign of the pipeline. The pipeline appears to be covered with sand.

6. Comparison with Prior Surveys

The item did not originate with a prior survey.

7. Comparison with the Chart and Charting Recommendations

The item was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83).
This item was not submitted as a Danger to Navigation.

Recommendation-

Retain pipeline in charted location. *CONCUR*

AWOIS ITEM 52032**1. Area of Investigation**

State: California
Locality: Estero Bay
Reported Latitude: 35°23' 57.0"N
Reported Longitude: 120°52' 40.0"W
Datum: NAD 83
Depth: 7 $\frac{1}{4}$ FM depth in vicinity (14.2m)
Feature: Fuel Pipeline, 16" diameter

2. Description of Source Item

USN aircraft fuel pipeline terminal, 16 inch pipeline, approx 2900 ft long, offshore end. Position sealed from chart.

3. Survey Requirements

To ensure that scouring has not occurred, zig zag 100 m wide across the axis inshore, to the limit of safe navigation. Echo sounder development, 200% SSS, or dive investigation is required.

4. Method of Investigation

A dive investigation was conducted on DN 107. The pipe was found and followed inshore. Search time was 28 minutes and water visibility was 2 m.

5. Results of Investigation

The pipeline was found completely or partially covered with sand, with no scouring evident. No positions were taken.

6. Comparison with Prior Surveys

The item did not originate with a prior survey.

7. Comparison with the Chart and Charting Recommendations

The item was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83).
This item was not submitted as a Danger to Navigation.

Recommendation-

Retain item as charted. *CONCUR*

AWOIS ITEM 52033**1. Area of Investigation**

State: California
Locality: Estero Bay
Reported Latitude: 35° 24' 53.9"N
Reported Longitude: 120° 52' 38.64"W
Datum: NAD 83

Depth: N/A
 Feature: Scrap Steel Pipe

2. Description of Source Item

Scrap steel pipe 10 3/4" (Anode for Cathodic protection of No 2 18" submarine loading lines). Presently owned by Chevron, approx 750 ft long.

3. Survey Requirements:

N/A

4. Method of investigation:

Due to location of the scrap pipe in the surf zone, it was unsafe to investigate this item during the time of the survey.

5. Results of Investigation

N/A

Recommendation-

Retain as charted. *Concur*

O. COMPARISON WITH THE CHART

See EAC Report, sections 7 and 6.

This survey was compared to NOS chart 18703, 22nd Edition, November 6, 1993, 1:40,000 (NAD 83).

The kelp charted along the north shore is accurately charted, although the extent and density will vary throughout the year. *Retain Kelp as charted.*

There were three charted shoals which, due to time constraints, were not adequately investigated to support disapproval. All three originate with wire drag surveys and are considered reliable least depths.

In the vicinity of latitude 35° 25' 44" N longitude 120° 53' 36" W, a 3/4 FM (1.7 m) ⁵ ~~shoal~~ ^{rock} is charted. 50-meter line spacing was run in this area revealing a 2.2 FM (4.2 m) depth. Further development was not conducted over this feature. Recommend retain 3/4 FM (1.3 m) sounding as charted. *Concur, see section 6 of EAC Report.*

In the vicinity of latitude 35° 26' 08" N longitude 120° 54' 00" W a 2 1/4 - 2 3/4 FM (4.1 - 5.0 m) shoal is charted. 50-meter line spacing was run over this area revealing a 3 FM (5.9 m) depth. Further development was not conducted over this area. Recommend retain soundings as charted. *Do not concur, retain 5.2 m (2 3/4 FM Rk) as chart, see section 6 of EAC Report. Remove 2 1/4 FM Rk (4.2 m) and chart 4.5 m Rk (2 1/2 FM) at lat. 35° 26' 05.68" N long. 120° 54' 00.86" W*

In the vicinity of latitude 35° 27' 20" N longitude 120° 59' 35" W a 4 1/4 FM (7.7 m) shoal is charted. 50-meter line spacing revealed a 5 3/4 FM (10.6 m) depth. Further development was not conducted over this area. Recommend retain 4 1/4 FM (7.7 m) sounding as charted. *Concur, see section 6 of EAC Report.*

The north shore of Estero Bay, out to the 20 m curve, is very rocky with numerous shoals. Shoaler depths than charted were found in many areas (see Dangers to Navigation).

Final comparisons will be made by N/CG245.

Dangers to Navigation

Twenty-one dangers to navigation were identified during survey operations and were reported to the Eleventh Coast Guard District by letter dated April 21, 1994. Copies of the correspondence are included in Appendix I of this report. *Six new dangers were identified during office processing.*

P. ADEQUACY OF SURVEY

With the exceptions of items noted in Sections N and O, and prior to final approval, survey H-10531 is complete and adequate to supersede charted depths and features in their common areas. *See Form Report, sections 6 and 7.*

Q. AIDS TO NAVIGATION

Five-floating Aids to Navigation were located within the survey boundaries. Four were found in their charted positions, and one was changed to a mooring buoy. Detailed information is available in *this report*.
~~Appendix VI.~~

Detached positions were obtained on sixteen buoys associated with the two Chevron terminals. Detailed information is summarized in ~~Appendix VI.~~ *this report.*

Five landmarks in the vicinity of Morro Bay were positioned to third-order accuracy by intersection methods. One landmark was positioned to less than third-order. Unadjusted field positions were forwarded to the U.S. Coast Guard by letter dated May 4, 1994. A copy of the letter is included in *this letter applies to survey H-10532*.
~~Appendix VI~~ of this report. Further information can be found in the "Spring 1994 Horizontal Control Report". *One landmark is located within the survey area. It should be retained as charted.*

R. STATISTICS

Vessel:	<u>2120</u>	<u>2123</u>	<u>2124</u>	<u>2125</u>	<u>2126</u>	<u>Total</u>
# of Pos	55	2279	3430	1420	997	8181
NM Hydro	0	148.7	500.5	157.2	102.5	908.9
SSS NM	0	149.3	0	2.8	0	152.1

NM ² Hydrography	17.54
Velocity Casts	2
Detached Positions	34
Tide Stations	1
Bottom Samples	79
Dives	21

S. MISCELLANEOUS

Bottom samples were obtained in accordance with Sections 1.6.3 and 4.7.1 of the Hydrographic Manual. Bottom samples were stored and shipped in accordance with Section 4.7.1 of the Hydrographic Manual and Hydrographic Survey Guideline No. 36. Bottom samples were sent to the Smithsonian Institution in accordance with the Project Instructions.

The Coast Pilot comparisons were made in accordance with the Project Instructions. See Section U for report information.

T. RECOMMENDATIONS

As noted in Section I, during times of low HDOP, it was difficult to demonstrate a successful critical systems check. The problem was partly the result of lower maximum allowable Estimated Position Error due to the low HDOP and reduced Estimated System Error (ESE), and partly the result of sea action and antenna separation. To compensate for the latter two problems, we recommend a minimum EPE_{max} of 5 m be established for the purposes of launch to launch system checks.

U. REFERRAL TO REPORTS ✓

The following supplemental reports contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Spring 1994 Horizontal Control Report for OPR-L111-RA	May 1994	N/CG245
Spring 1994 Coast Pilot Report for OPR-L111-RA	May 1994	N/CG245
Project related data for OPR-L111-RA	May 1994	N/CG245

Respectfully Submitted,

Shepard M. Smith
Shepard M. Smith
Ensign, NOAA

Approved and Forwarded,

Russell C. Arnold
Russell C. Arnold
Captain, NOAA
Commanding Officer

Sec Q Insert
Oil Terminal Mooring Buoy Summary ✓

All terminal buoys are maintained by Chevron USA.
 Light List buoys are listed separately.
 Mooring Buoys are white cylindrical buoys with a blue stripe.
 Horizontal axis, 5 ft in diameter and 10 ft long.

Name	Pos. #	Latitude	Longitude	Characteristics
Torro Creek Terminal				
#1	5450	35 24 17.35	120 52 53.82	Mooring buoy
#2	5451	35 24 16.34	120 52 48.55	Mooring buoy
#3	5452	35 24 20.97	120 52 45.47	Mooring buoy
#4	5453	35 24 25.43	120 52 46.65	Mooring buoy
#5	5454	35 24 26.81	120 52 50.96	Mooring buoy
Cone Buoy	5456	35 24 24.59	120 52 53.68	White cone 2 ft high
White Spar	5457	35 24 23.08	120 52 51.22	White Spar 5 ft high
Estero Beach Terminal				
#1	5458	35 24 38.45	120 53 09.49	Mooring buoy
#2	5460	35 24 38.49	120 53 02.28	Mooring buoy
#3	5461	35 24 41.20	120 52 59.59	Mooring buoy
#4	5462	35 24 45.21	120 53 00.18	Mooring buoy
#5	5463	35 24 48.56	120 53 05.10	Mooring buoy
#6	5464	35 24 50.65	120 53 09.28	Mooring buoy
#7	5459	35 24 38.14	120 53 14.11	Mooring buoy
Red ball buoy	5465	35 24 44.61	120 53 07.24	Red ball 18" diameter*
Cone Buoy	5466	35 24 45.96	120 53 09.78	White cone 2 ft high

*Temporary buoy in the approximate location of a white spar buoy.

Section Q: Descriptive Report Insert

Name of Aid: Lighted Whistle Buoy "EB"

Light List #: 3940

Pos. # 5468 Method of Positioning: 3rd Order **Hydro**

Positioning Info

Latitude N Longitude W

Charted Pos. 35 24 08 120 56 00

Survey Pos. 35 24 03.3 120 55 56.2 ✓

Easting Northing

Charted Pos. 13486 26133.5

Survey Pos. 13583.1 25989.4

Difference Between Survey/Charted Position 173.8 m 146.0 deg T

Characteristics

Do Characteristics Match Light List? (y/n) N/A

If NO, what are the characteristics? _____

New/Uncharted Aids (if info is known or easily obtained)

Date Established: _____

Maintained By: _____ Private (y/n)

Frequency of Maintenance: _____

Purpose: _____

Section Q: Descriptive Report Insert

Name of Aid: Toro Creek Submarine Terminal Bell Buoy

Light List #: 3945

Pos. # 5455 Method of Positioning: 3rd Order Hydro

Positioning Info

Latitude N Longitude W

Charted Pos. 35 24 25 120 53 04

Survey Pos. 35 24 26.5 120 53 10.9 ✓

Easting Northing

Charted Pos. 17926.8 26657.8

Survey Pos. 17751.6 26702.7

Difference Between Survey/Charted Position 180.9 m 284.4 deg T

Characteristics

Do Characteristics Match Light List? (y/n) NO

If NO, what are the characteristics? White Cylindrical Mooring Buoy, horizontal axis
5 ft diameter X 10 ft long, "6", unlighted

New/Uncharted Aids (if info is known or easily obtained)

Date Established: Unknown

Maintained By: Chevron USA Private (y/n) y

Frequency of Maintenance: _____

Purpose: _____

Section Q: Descriptive Report Insert

Name of Aid: Estero Submarine Gong Buoy

Light List #: 3950

Pos. # 5467 Method of Positioning: 3rd Order Hydro

Positioning Info

Latitude N Longitude W

Charted Pos. 35 24 51 120 53 23

Survey Pos. 35 24 52.1 120 53 27.6 ✓

Easting Northing

Charted Pos. 17447.2 27458.9

Survey Pos. 17330.5 27491.8

Difference Between Survey/Charted Position 121.2 m 285.7 deg T

Characteristics

Do Characteristics Match Light List? (y/n) y

If NO, what are the characteristics? _____

New/Uncharted Aids (if info is known or easily obtained)

Date Established: _____

Maintained By: _____ Private (y/n) y

Frequency of Maintenance: _____

Purpose: _____

Section Q: Descriptive Report Insert

Name of Aid: Constantine Rock Buoy
Light List #: 3960
Pos. # 5434 Method of Positioning: 3rd Order **Hydro**

Positioning Info

	Latitude N	Longitude W
Charted Pos.	35 26 10	120 56 40
Survey Pos.	35 26 13.9	120 56 38.6 ✓
	Easting	Northing
Charted Pos.	12477.8	29893.6
Survey Pos.	12512.9	30014

Difference Between Survey/Charted Position 125.4 m 16.3 deg T

Characteristics

Do Characteristics Match Light List? (y/n) yes
If NO, what are the characteristics? _____

New/Uncharted Aids

(if info is known or easily obtained)

Date Established: Unknown
Maintained By: Chevron USA Private (y/n) n
Frequency of Maintenance: _____
Purpose: _____

Section Q: Descriptive Report Insert

Name of Aid: Mouse Rock Bell Buoy 3MR
Light List #: 3955
Pos. # 5440 Method of Positioning: 3rd Order **Hydro**

Positioning Info

	Latitude N	Longitude W
Charted Pos.	35 26 18	120 54 30
Survey Pos.	35 26 20.3	120 54 31.1 ✓
	Easting	Northing
Charted Pos.	15756.6	30139.8
Survey Pos.	15728.2	30210.6

Difference Between Survey/Charted Position 76.3 m 338.1 deg T

Characteristics

Do Characteristics Match Light List? (y/n) y
If NO, what are the characteristics? _____

New/Uncharted Aids

(if info is known or easily obtained)

Date Established: _____
Maintained By: _____ Private (y/n) n
Frequency of Maintenance: _____
Purpose: _____

CONTROL STATIONS as of 2 May 1994

No	Type	Latitude	Longitude	H	Cart	Freq	Vel Code	MM/DD/YY	Station Name
100	F	035°22'16.583	120°51'29.092	23	250	0.0	0.0	03/24/94	TOWER(DGPS STATION)
101	F	035°24'42.744	120°52'16.536	25	250	0.0	0.0	03/25/94	CHEVRON(DGPS STATION)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102-3767

NOAA Ship RAINIER

April 21, 1994

Commander
Eleventh Coast Guard District
Federal Building
501 W. Ocean Boulevard
Long Beach, CA 90822

**ADVANCE
INFORMATION**

Dear Sir:

NOAA Ship RAINIER has located twenty-one dangers to navigation in Estero Bay, California (Project OPR-L111-RA) within the limits of hydrographic survey H-10531. The attached information is provided for publication in the Local Notice to Mariners for the Eleventh Coast Guard District. A copy of the chartlet is also included.

This is advance information subject to office review. Questions concerning this letter should be directed to the Chief, Pacific Hydrographic Section at (206) 526-6835.

Sincerely,

Russell C. Arnold
Captain, NOAA
Commanding Officer

Attachments

cc: DMAHTC
N/CG221
PMC



Hydrographic Survey Registry Number: H-10531

Survey Title: State: California
Locality: Estero Bay
Sublocality: Northern Portion of Estero Bay

Project Number: OPR-L111-RA

Survey Date: March - April 1994

**ADVANCE
INFORMATION**

Features are reduced to mean lower low water using predicted tides.

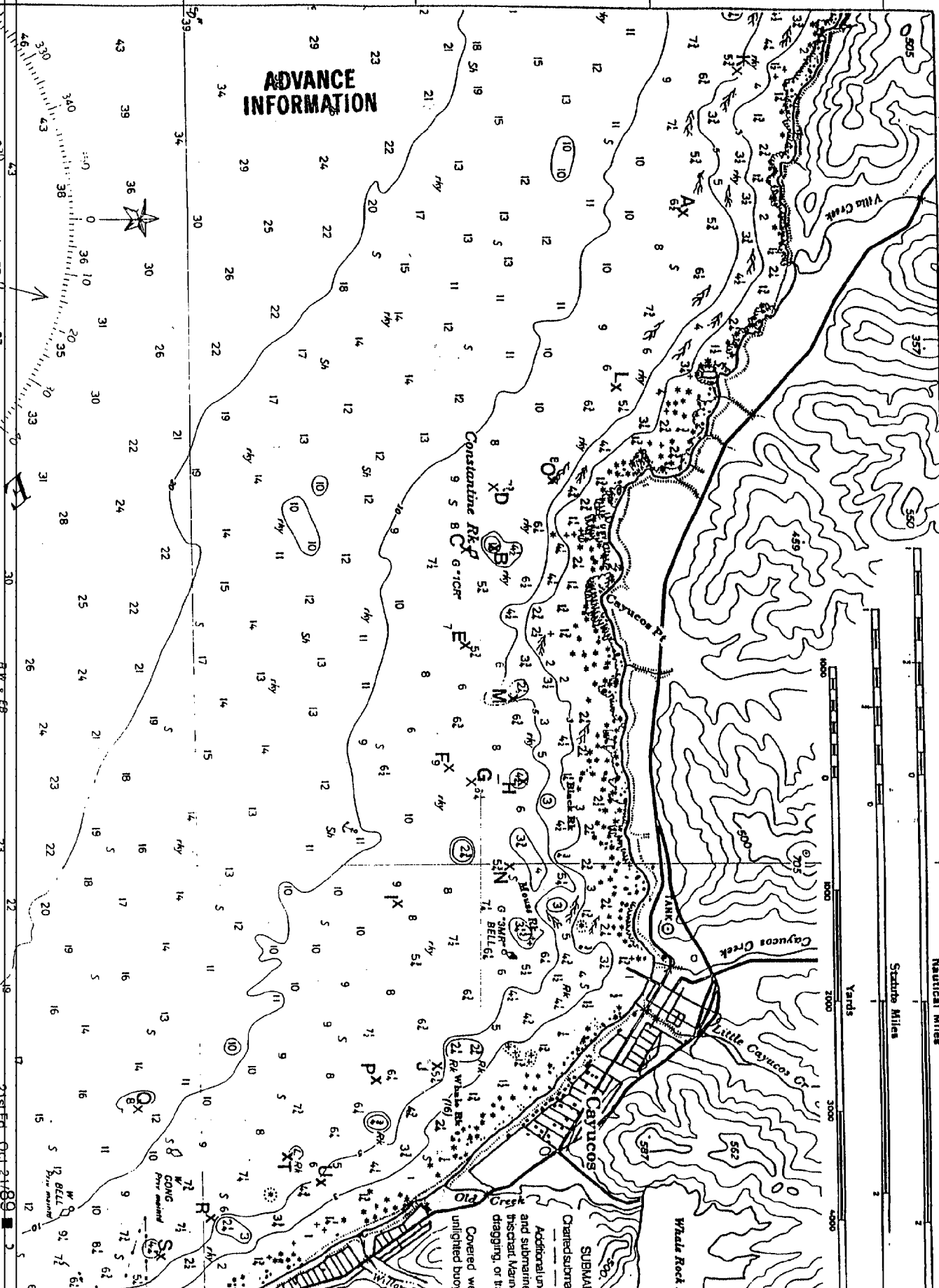
Affected Nautical Charts:

<u>Chart</u>	<u>Edition/Date</u>	<u>Scale</u>	<u>Datum</u>
18703	22nd, 11/6/93	1:40,000	NAD83
18700	16th, 12/14/91	1:216,116	NAD83

	<u>Danger to Navigation</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
A.	Shoal, 5 fathom	35/27/07.8	120/58/34.2
B.	Shoal, 1 fathom	35/26/15.8	120/56/43.0
C.	Shoal, 5 1/4 fathom	35/26/07.9	120/56/45.1
D.	Shoal, 5 1/2 fathom	35/26/18.6	120/56/59.0
E.	Shoal, 5 fathom	35/26/03.5	120/56/10.3
F.	Shoal, 5 3/4 fathom	35/26/01.3	120/55/35.4
G.	Shoal, 4 3/4 fathom	35/26/11.2	120/55/24.0
H.	Shoal, 4 fathom	35/26/19.9	120/55/27.6
I.	Shoal, 7 1/4 fathom	35/25/47.7	120/54/50.0
J.	Shoal, 4 1/2 fathom	35/25/55.7	120/53/54.1
K.	Shoal, 4 1/2 fathom	35/27/20.5	120/59/19.8
L.	Shoal, 5 fathom	35/26/49.6	120/57/38.7
M.	Shoal, 3 1/4 fathom	35/26/17.0	120/55/55.8
N.	Shoal, 4 1/2 fathom	35/26/16.9	120/54/57.9
O.	Shoal, 5 3/4 fathom	35/26/32.8	120/57/10.9
P.	Shoal, 5 fathom	35/25/41.3	120/53/54.4
Q.	Shoal, 7 1/4 fathom	35/24/42.5	120/53/44.4
R.	Shoal, 5 fathom	35/24/57.5	120/53/08.2
S.	Shoal, 3 3/4 fathom	35/24/46.5	120/52/55.3
T.	Shoal, 3 1/2 fathom	35/25/23.5	120/53/21.0
U.	Shoal, 3 fathom	35/25/29.5	120/53/20.7

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Section at (206) 526-6835.

ADVANCE INFORMATION



Nautical Miles
 1 2 3
 0 1 2 3
 Statute Miles
 0 1 2 3
 Yards
 0 1000 2000 3000 4000

MAGNETIC
 47
 46
 45
 44
 43
 42
 41
 40
 39
 38
 37
 36
 35
 34
 33
 32
 31
 30
 29
 28
 27
 26
 25
 24
 23
 22
 21
 20
 19
 18
 17
 16
 15
 14
 13
 12
 11
 10
 9
 8
 7
 6
 5
 4
 3
 2
 1
 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

18793

21st Ed., Oct 27, 1989

Covered we
 unlighted buoy

Charted submer
 SUBMAR
 and submarine
 the chart name
 diagging or tra

Additional
 and submarine
 the chart name
 diagging or tra

Charted submer
 SUBMAR
 and submarine
 the chart name
 diagging or tra

Charted submer
 SUBMAR
 and submarine
 the chart name
 diagging or tra



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
Seattle, Washington 98115-0070

January 20, 1995

Commander (OAN)
Eleventh Coast Guard District
Federal Office Building
501 W. Ocean Blvd.
Long Beach, CA 90822-5399

Dear Sir:

During office review of hydrographic survey H-10531, California, Estero Bay, six shoal soundings were found and are considered potential dangers to navigation affecting the following chart.

<u>Chart</u>	<u>Edition/date</u>	<u>Datum</u>
18703	22nd, 11/6/93	NAD 83

It is recommended that the enclosed Report of Dangers to Navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6853.

Sincerely,

Kathy A. Timmons

Kathy A. Timmons
Commander, NOAA
Chief, Pacific Hydrographic Section

Enclosure

cc: DMA/TC
N/CG221



REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H-10531
Survey Title: State: CALIFORNIA
Locality: ESTERO BAY
Sublocality: NORTHERN PORTION OF ESTERO BAY

Project Number: OPR-L111-RA, NOAA Ship Rainier

The following were discovered during hydrographic surveying operations:

Affected nautical chart:

Chart Number	Edition		Horizontal Depth	Datum	Geographic Position	
	No.	Date			Latitude(N)	Longitude(W)
18703	22nd	11/6/93	9 1/2 fm	NAD 83	35/26/35.68	120/58/41.78
18703	22nd	11/6/93	9 1/2 fm	NAD 83	35/25/39.35	120/57/40.48
18703	22nd	11/6/93	9 3/4 fm	NAD 83	35/25/40.66	120/57/09.03
18703	22nd	11/6/93	9 1/2 fm	NAD 83	35/25/30.24	120/56/47.59
18703	22nd	11/6/93	8 1/4 fm	NAD 83	35/25/38.76	120/55/55.07
18703	22nd	11/6/93	10 fm	NAD 83	35/24/48.93	120/53/58.57

Depths reduced to Mean Lower Low Water using approved tides.

Questions concerning this report should be directed to the Pacific Hydrographic Section at (206) 526-6853.

APPROVAL SHEET

for

H-10531
RA-10-1-94

Standard procedures were followed in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual in producing this survey. The data were examined daily during data acquisition and processing.

The field sheet and accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved.



Russell C. Arnold
Captain, NOAA
Commanding Officer



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

ORIGINAL

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: July 6, 1994

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-L111-RA

HYDROGRAPHIC SHEET: H-10531

LOCALITY: California, Northern Portion of Estero Bay, Estero Bay

TIME PERIOD: March 25 - April 18, 1994

TIDE STATION USED: 941-2110 Port San Luis, Ca.
Lat. $38^{\circ} 10.1' N$ Lon. $120^{\circ} 45.2' W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 4.13 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.7 ft.

REMARKS: RECOMMENDED ZONING

Times and heights are direct on Port San Luis, Ca. (941-2110).

Note: 1. Times are tabulated in Greenwich Mean Time.

2. Data for Port San Luis, Ca. (941-2110) is stored in file #741-2110.



CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10531

Name on Survey	ON CHART NO. 18703 ON PREVIOUS SURVEY NO. CON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP GRAND McNALLY ATLAS U.S. LIGHT LIST									
	A	B	C	D	E	F	G	H	K	
BLACK ROCK	X									1
CALIFORNIA (title)	X									2
CAYUCOSE	X									3
CAYUCOSE POINT	X									4
CHINA HARBOR	X									5
CONSTANTINE ROCK	X									6
ESTERO BAY	X									7
MORRO BEACH (locale)	X									8
MOUSE ROCK	X									9
WHALE ROCK	X									10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20
										21
										22
										23
										24
										25

Approved

Charles E. Harrington
Chief Geographer - N/CG 275

MAY 23 1994

HYDROGRAPHIC SURVEY STATISTICS

H-10531

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

RECORD DESCRIPTION		AMOUNT		RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1		SMOOTH OVERLAYS: POS., ARC, EXCESS		1	
DESCRIPTIVE REPORT		1		FIELD SHEETS AND OTHER OVERLAYS			
DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS		
ACCORDION FILES	4						
ENVELOPES							
VOLUMES							
CAHERS							
BOXES				2			
SHORELINE DATA							
SHORELINE MAPS (List):							
PHOTOBATHYMETRIC MAPS (List):							
NOTES TO THE HYDROGRAPHER (List):							
SPECIAL REPORTS (List):							
NAUTICAL CHARTS (List):							

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS		
	VERIFICATION	EVALUATION	TOTALS
POSITIONS ON SHEET			8181
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS		
	VERIFICATION	EVALUATION	TOTALS
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	29		29
VERIFICATION OF SOUNDINGS	49		49
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPLIATION OF SMOOTH SHEET	23		23
COMPARISON WITH PRIOR SURVEYS AND CHARTS		23	23
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		27	27
GEOGRAPHIC NAMES			
OTHER			
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	101	50
			151

Pre-processing Examination by M. Larsen	Beginning Date 3/25/94	Ending Date 4/18/94
Verification of Field Data by R. Davies	Time (Hours) 101	Ending Date 10/26/94
Verification Check by	Time (Hours)	Ending Date
Evaluation and Analysis by R. Davies	Time (Hours) 50	Ending Date 10/26/94
Inspection by B. Olmstead	Time (Hours) 46	Ending Date 1/19/95

**EVALUATION REPORT
H-10531**

1. INTRODUCTION

Survey H-10531 is a basic hydrographic survey under the navigable area concept, accomplished by the NOAA Ship *Rainier* under the following Project Instructions.

OPR-L111-RA, dated February 23, 1994
CHANGE NO. 1, dated May 24, 1994

This survey was conducted in California and covers the northern portion of Estero Bay between Morro Beach and China Harbor. The surveyed area extends from latitude 35/23/42N to latitude 35/27/42N, and from longitude 120/52/14W to longitude 121/00/00W. The bottom consists of sand, shells and mud. Depths range from 1.5 meters near shore to 101 meters offshore.

Side scan sonar was used on this survey to search the area between regular sounding lines for indications of possible dangers and bottom irregularities. The sonar search was conducted for the approaches to the offshore oil tanker moorings and loading facilities at Estero Bay with 200% swath coverage of the bottom within the area specified in the project instructions. Significant side scan sonar contacts identified in the field were adequately investigated by echo sounder developments. This project will provide data in support of existing charts and a planned large scale inset of the area.

Depth curves depicted on the smooth sheet were selected from those authorized through HSG 69. However, instead of drafting all authorized curves only those curves considered necessary for the reasonable portrayal of the bottom were drafted. The selected curves are the 5, 10, and 20 meter. A note was added to the smooth sheet to identify these values. A few supplemental depth curves have been added to the smooth sheet in brown where warranted. Bottom characteristics are annotated on a separate overlay.

Predicted tides for Port San Luis, California were used for the reduction of soundings during field processing. Approved hourly heights zoned from Port San Luis, California, gage 941-2110, were used during office processing.

The field sheet parameters have been revised to center the hydrography on the smooth sheet and to change the projection to polyconic. NAD 83 is used as the horizontal datum for plotting and position computation. The offset values and sound velocity correctors are adequate. An accompanying computer printout contains the parameters and the correctors.

A digital file has been generated for this survey that includes categories of information required to comply with Hydrographic Survey Guidelines No. 52, Standard Digital Data Exchange Format, April 15, 1986. Certain descriptive information, however, may not be in

the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

2. CONTROL AND SHORELINE

Sections H and I of the hydrographer's report and the Spring 1994 Horizontal Control Report for OPR-L111-RA, contain adequate discussions of horizontal control and hydrographic positioning.

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 6.0 was computed for survey operations. The quality of 231 positions exceeded the limit in terms of HDOP. The majority of these positions occur during the evening hours for the first ten days of the project, see section I of the hydrographer's report. A review of the data, however, indicates that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

Positions of horizontal control stations used during hydrography are 1994 field values based on NAD 83.

The smooth sheet and accompanying overlays are annotated with NAD 27 adjustment ticks based on values determined with NGS program NADCON. Geographic positions based on NAD 27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude: -0.095 seconds (-2.915 meters)
Longitude: 3.663 seconds (92.425 meters)

The year of establishment of control stations shown on the smooth sheet originates with the horizontal control records for this survey.

The shoreline for survey H-10531 was drawn in brown ink and originates with chart 18703, 22nd edition, and should be used for orientation purposes only.

3. HYDROGRAPHY

Except as noted below and elsewhere in this report, hydrography is adequate to;

- a. delineate the bottom configuration, determine least depths, and draw the standard depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation;
- c. show the survey was properly controlled and soundings are correctly plotted.

Several areas on the present survey were not adequate to supersede prior information. See section 6 of this report for the identification of these depths and features.

4. CONDITION OF SURVEY

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, March 1993 edition, except for the following.

Several submerged rocks and shoal depths could not be superseded by this survey and were carried forward from their sources, i.e., prior surveys, or retained on the chart.

A complete list of all prior surveys which the hydrographer used for comparison should be listed in section M of the hydrographers report.

Three charted features were discussed in section O, comparison with the chart. These features originate with the prior surveys and should have been discussed in section M, comparison with prior surveys.

One charted landmark, tank, was not investigated. All landmarks are required to be examined, located and described within the project area, section 4.2.2 of the project instructions.

5. JUNCTIONS

Survey H-10531 junctions with the following survey.

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Area</u>
H-10532	1994	1:10,000	South

The junction with survey H-10532 is complete.

There are no contemporary surveys to the west. A comparison with charted depths reveals good agreement with the present survey.

6. COMPARISON WITH PRIOR SURVEYS

H-5566(1933)	1:40,000
H-5692(1934)	1:10,000
H-5708(1934)	1:10,000

Surveys H-5566, H-5692 and H-5708 cover the entire area of the present survey. Shoreline

has generally remained stable throughout the survey area over the past sixty years. Depths vary approximately one meter with no significant discernible pattern of deepening or shoaling. These differences are largely attributed to the relative accuracy of the data acquisition techniques between these surveys and dynamic natural processes.

Except for soundings and features inside the 5-meter depth curve and the following features and soundings, survey H-10531 is adequate to supersede the above prior surveys within the common area.

<u>Sounding or Feature</u>	<u>Latitude(N)</u>	<u>Longitude(W) NAD83</u>
29.2 (16 fm)	35/24/22.5	120/54/13
25.6 (14 fm)	35/24/31.5	120/54/07
20.1 (11 fm)	35/25/03	120/54/26
2.7 Rk (1 1/2 fm)	35/26/32.5	120/54/24
1.2 Rk (4/6 fm)	35/26/40	120/54/33
5.5 (3 fm)	35/26/41	120/54/51.5
5.2 (2 5/6 fm)	35/26/40.5	120/54/58.5
1.5 Rk (5/6 fm)	35/26/36	120/55/03
5.4 (3 fm)	35/26/39	120/55/18
4.2 (2 1/6 fm)	35/26/24	120/55/57.5
8.2 (4 1/2 fm)	35/26/22	120/56/21
4.8 (2 4/6 fm)	35/26/27	120/56/22
Rock awash	35/26/39	120/54/39.5
Two submerged rocks	35/26/27	120/54/35
Submerged rock.	35/27/39	120/59/35.5
Submarine loading lines (submerged pipeline)	35/24/45	120/53/08

Kelp symbols have been transferred throughout the common area between the above prior surveys and the present survey.

H-5692WD(1935) 1:10,000

H-5708WD(1935) 1:10,000

H-5983WD(1935) 1:10,000

H-5984WD(1935) 1:10,000

Wire drag surveys H-5692, H-5708, H-5983 and H-5984 cover the entire area common to the present survey. There are no wire drag (hang) depths that originate with prior surveys H-5692 and H-5708. There are several depths which originate with other two surveys. The following hang depths were not adequately investigated during the present survey and have been brought forward to the smooth sheet. All other depths are superseded by the present survey.

<u>Sounding or Feature</u>	<u>Latitude(N)</u>	<u>Longitude(W) NAD83</u>
4.8 Rk (2 4/6 fm)	35/26/09	120/55/04
7.6 (4 1/6 fm)	35/27/21	120/59/34.5
4.5 rky (2 1/2 fm)	35/24/56	120/52/51
7.3 Rk (4 fm)	35/25/24	120/53/27
1.5 Rk (5/6 fm)	35/25/45	120/53/37
kelp	35/26/05	120/53/59
5.2 Rk (2 5/6 fm)	35/26/10	120/54/01
10.3 Rk (5 4/6 fm)	35/25/55	120/54/28.5

TP-00706(1976) 1:20,000

Section 6.10 of the project instructions lists this shoreline map as prior survey. In addition the hydrographer was not required to perform shoreline verification. A comparison with the chart and the above shoreline map reveals no significant differences. It appears that this shoreline map is the source for the charted shoreline.

All the above prior hydrographic surveys cover the area of the present survey. However, the present survey's specification of terminating hydrography at the 5-meter depth curve resulted in a significant exclusion zone between the present hydrography and the high water line. It is assumed that in this zone all soundings and features originating with prior surveys are not superseded. Rather than transfer all individual sounding from priors to the present survey to make it complete, selected soundings were transferred. Those selected for transfer are some of those used in the present compilation of chart 18703. This procedure allows the origin of charted soundings to be preserved. The transferred soundings are color coded on the sounding plot.

There are no AWOIS Items which originate with the above mentioned prior surveys.

7. COMPARISON WITH CHART

Chart 18703 22nd Edition, November 6, 1993; scale 1:40,000

a. Hydrography

Charted hydrography originates with the prior surveys mentioned in section 6 and miscellaneous sources and requires no further discussion.

Except for the depths and features mentioned in section 6 of this report and the following, survey H-10531 is adequate to supersede charted hydrography within the common area.

<u>Feature</u>	<u>Latitude(N)</u>	<u>Longitude(W)</u>
pipeline	35/23/56.9	120/52/33.6 (AWOIS 52031)
pipeline	35/23/57.0	120/52/40.0 (AWOIS 52032)
pipeline	35/24/53.9	120/52/38.64 (AWOIS 52033)

b. AWOIS

All AWOIS items originate with miscellaneous sources. Refer to the hydrographer's report for discussion and disposition of these features.

c. Controlling Depths

There are no channels with controlling depths found within the survey area.

d. Aids to Navigation

There are no fixed aids within the survey area. There are eight floating aids within the survey area. In addition to the floating aids, there are thirteen terminal buoys maintained by Chevron USA. These aids were located and serve their intended purpose.

One charted landmark, tank, at approximately latitude 35/27/01N and longitude 121/54/39W, was not investigated and should be retained.

e. Geographic Names

Names appearing on the smooth sheet and in the survey title have been approved by the Chief Geographer.

f. Dangers to Navigation

The hydrographer reported twenty-one dangers to navigation to the Eleventh Coast Guard District. An additional six dangers to navigation were generated during office processing. See attached letters.

8. COMPLIANCE WITH INSTRUCTIONS

Survey H-10531 adequately complies with the project instructions, except where noted in this report.

9. ADDITIONAL FIELD WORK

This is an adequate hydrographic survey. Additional field work is recommended to investigate the soundings and features noted in sections 6 and 7 of this report.



**C.R. Davies
Cartographer**

APPROVAL SHEET
H-10531

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproof of charted data. The digital data have been completed and all revisions and processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts have been made and are included with the survey records. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce Alan Olmsted
for Dennis J. Hill Date: 1/19/95
Chief, Hydrographic Processing Unit
Pacific Hydrographic Section

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy Timmons
Commander Kathy Timmons, NOAA Date: 1/30/95
Chief, Pacific Hydrographic Section

Final Approval

Approved:

J. Austin Yeager
for J. Austin Yeager Date: 2/8/95
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

