	NGAA FORM 76-35A U.S. DEPARTMENT OF COMMERCE NATIONAL OCTIANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE
00	DESCRIPTIVE REPORT
00	Type of Survey HYDROGRAPHIC
0	Field No. OPR-L325-KR-00 Registry No. H-10998
7	LOCALITY
	General Locality SAN PEDRO BAY
	Sublocality Approaches to Los Angeles and Long Beach 2001
	CHIEF OF PARTY Jonathon L. Dasler, P.E., P.L.s.
	LIBRARY & ARCHIVES
	DATE

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2. 5

Descriptive Report to Accompany Hydrographic Survey H10998

Scale 1:10,000 Year 2000 Senior Hydrographer, Jonathan L. Dasler, P.E., P.L.S. Field Unit: David Evans and Associates, Inc.

A. AREA SURVEYED

David Evans and Associates, Inc. (DEA) conducted a navigable area survey of a portion of San Pedro Bay, California, in accordance with Hydrographic Project Instructions OPR-L325-KR-00, dated September 1, 2000.

The survey area was located offshore of Long Beach, California, from the outer breakwaters to approximately 3.5 NM offshore (Figure 1). This area is designated as the approaches to the Ports of Los Angeles and Long Beach and Commercial Anchorage G. The survey encompasses an area of 11.23 square nautical miles. The survey was assigned registry number H10998 and designated as Sheet "A".



Figure 1. Approaches to Los Angeles and Long Beach survey limits.

Project instructions required 200 percent side scan sonar coverage of the area (shaded red¹ in Figure 1) with multibeam data acquired during side scan operations. Full multibeam coverage was not originally required for this survey. The outer 1,100 meters of the approach to Long Beach required alteration of the project instructions due to gill nets restricting side scan operations. This area was surveyed with 100 percent multibeam coverage (shaded green in Figure 1) and is discussed in detail in correspondence in Appendix V and in section A8.c in the Data Acquisition and Processing Report for Project OPR-L325-KR-00.² AWOIS search areas are shown in blue in Figure 1. Attachment 9 in the project instructions for H10998 required 200 percent side scan sonar coverage of the AWOIS search radius outside of the breakwater. Data acquisition was conducted from October 15, 2000 (Day Number 289) to December 5, 2000 (Day Number 341).³

B. DATA ACQUISITION AND PROCESSING

For this project, DEA implemented a state-of-the-art data acquisition and preliminary processing system aboard the *Research Vessel (R/V) Zephyr*, in accordance with National Oceanic and Atmospheric Association (NOAA) standards and modern remote sensing techniques.

B1. Equipment

Instrumentation used to conduct the survey and redundant systems to provide confidence checks consisted of the equipment listed in Table 1.

Instrument	Eurotion	Serial Number
Instrument	Function	Number
EdgeTech DF1000	Digital side scan sonar imagery with tow fish	25933
Side Scan Sonar	heading and depth sensors.	
HSP Cable Payout Meter	Continuous digital output of deployed side scan	0020
	tow cable length for layback calculations	
Alden Thermal Printer	Real-time printing of side scan sonargram	20687-999K
Model 9315CTP		
Reson SeaBat 8101	Multibeam sonar with side-scan option	17024
TSS POS/MV 320	Integrated Differential Global Positioning	
(Version 3)	System (DGPS) and inertial reference system	235
	for position, heading, heave, roll and pitch data	
Trimble 4000 SE	Secondary positioning system for Quality	3342A04196
	Assurance/Quality Control (QA/QC)	
Trimble Probeacon	Obtain differential corrections from Point Loma	
	United States Coast Guard (USCG) differential	0220094316
	beacons.	
Trimble ProXRS	Portable DGPS system for detached positions	
Model 33302-51	and establish GPS confidence checks	0224010291
TSS DMS05	Secondary heave, roll, pitch sensor	2220
Odom Echotrac DF 3200	200 kHz single beam echosounder for single	9414
MKII	beam comparison	
SeaBird SBE-19 SeaCat	Primary Conductivity, Temperature, and Depth	
CTD Profiler	(CTD) profiler for sound velocity profiles	1919847-2691
SeaBird SBE-19 SeaCat	Secondary CTD profiler for sound velocity	1921127-2793
CTD Profiler	profiles	

 Table 1. Survey instrumentation.

The R/V Zephyr, registry number 929931, was used for data acquisition for this survey. The R/V Zephyr has an aluminum hull, a 44-foot length overall, a 13-foot beam, weighs 34 gross tons and has a draft of five feet. The R/V Zephyr is a commercial fishing vessel converted to conduct oceanographic research and hydrographic surveys. She is outfitted with a data acquisition lab, an over-the-side mount for the multibeam transducer and an A-frame for sampling and instrument deployment.

Detailed descriptions and figures of the *R/V Zephyr* and equipment is included in the Data Acquisition and Processing Report for Project OPR-L325-KR-00. There were no deviations in equipment configurations or survey vessel from those listed in the project-wide report.

B2. Quality Control

Quality control is discussed in detail in section B of the Data Acquisition and Processing Report for Project OPR-L325-KR-00. Data were reviewed at multiple levels of data processing including swath editing, subset editing, and analysis of anomalies revealed in sunillumination. Any edits to the data were done at the swath or subset editing level to maintain data integrity such that all edits may be tracked throughout the data processing pipeline. No data were deleted but rather flagged as rejected and could be displayed and queried at any time during processing. Side scan data were reviewed for contacts by two hydrographers in real-time, during contact verification, and during mosaic generation. Side scan contacts were compared to multibeam during Caris editing sessions and compared to anomalies in the multibeam data sun-illuminated imagery. Data acquisition statistics for the survey are listed in Table 2.

Description	Quantities
Days of Acquisition	20
Total Soundings (mainscheme)	384,538,512
Total Selected Soundings	16,846
Total Mainscheme (nm)	474.9
Total Crosslines (nm)	31.7
Total Mainscheme (no. of lines)	484
Total Crosslines (no. of lines)	17
Total Detached Positions	0
Total Square Nautical Miles	11.23
Velocity Casts	104
Tide Stations Installed	0

Table 2.Survey statistics.

B2.a Crossline Comparisons

A total of 31.7 nautical miles of crosslines, or 6.7 percent of mainscheme lines, were run for analysis of survey accuracy. Crosslines were run perpendicular to the shoreline from deep water to shallow water across the entire survey providing a good representation for accuracy analysis. Due to the relative consistency of the site, only 15.6 percent of the crosslines were analyzed. Statistical analysis of the data set was conducted using the Universal Systems Limited (USL) makehist routine, version dated December 10, 1998. A one-meter sort of all crosslines was compared to a two-meter gridded Digital Terrain Model (DTM) based upon a one-meter shoal bias export of mainscheme data. A quality control report was created listing statistics by beam number. The full report is included in Appendix V of this report.⁴

Using the IHO standard equation of

$$sqrt((a^2 + (b * d)^2))$$
 with $a = 0.500$ and $b = 0.013$

the analysis showed agreement of greater than 99 percent on beams 3 and 11 through 100 throughout the entire data set. Beams 8 through 10 showed agreement of greater than 96

percent and beam 7 showed agreement of 95.1 percent. The mean difference of the data set exhibited a maximum value of 19.9 centimeters.

The majority of the differences were less than 1.37 centimeters. Beams 3, 4, and 7 through 100 exhibited greater than 95 percent agreement at the five-decimeter level (Figure 2).



Figure 2. Crossline comparison histogram of percentage of beams within 5 decimeters.

The crossline set analyzed all beams of the sonar swath. The frequency that each beam was selected on the Preliminary Smooth Sheet is shown in Figure 3. The sounding data used was filtered with a dynamic 54-degree cutoff to port and starboard. The higher frequency of selection of outer beams at the 54-degree level is expected, as outer beams will reflect more shoal depths than inner beams. Figure 3 also shows beams selected out to beam 4 (70.5 degrees to port) and beam 93 (63 degrees to starboard). This is due to vessel roll and the dynamic beam angle selection. Beams 4 and 8 were selected once to open up the swath coverage at features to obtain a least depth that was missed by nadir beams.



Figure 3. Selected sounding histogram of survey area for H10998 Smooth Sheet.

The good agreement of the crosslines, surveyed prior to mainscheme acquisition, showed no systematic errors in multibeam acquisition and data processing routines. Minor differences could be attributed to extended heave and refraction errors.⁵

B2.b Junctions

This survey had no junctions for comparison.⁶

B2.c Comparison with Prior Surveys

Comparison with prior surveys was not required under this contract. See section D1 for comparison to the nautical charts.⁷

B2.d Unusual Conditions

Several local conditions impacted side scan sonar operations during the survey. Side scan sonar operations were impacted by a large concentration of lobster pots near the middle breakwater. Line jogs around lobster pots were required to avoid entanglement of the side scan sonar in the lines to the pots from surface floats. Fill lines in some areas were required to provide 200 percent coverage.

The quality of the side scan sonar imagery was impacted by large schools of fish. The impact was primarily on bottom tracking for slant range corrections and was corrected during playback for mosaic generation.

Gill nets prevented side scan sonar operations in the outer portion of the approach to Long Beach. The gill net problem is discussed in detail in correspondence in Appendix V^8 and in section A8.c of the Data Acquisition and Processing Report for Project OPR-L325-KR-00.

B3. Corrections to Echo Soundings

Detailed descriptions and figures of the corrections to echo soundings are included in the Data Acquisition and Processing Report for Project OPR-L325-KR-00. There were no deviations from those listed in the project-wide report.

C. VERTICAL AND HORIZONTAL CONTROL

C1. Vertical Control

National Ocean Service (NOS) existing tide station at Los Angeles, Outer Harbor, California (941-0660) was used for the survey in accordance with Attachment #7, dated September 1, 2000, of the Project Instructions.⁹ Zone PAC9 with a time corrector of 0 minutes and a range ratio of 0.97 was the only zone applied to the tide data. Zone PAC10 is on the border of the survey area and was not used for the few soundings that fell in the zone.

The NOS tide station experienced no down time during periods of hydrographic survey. All data were successfully retrieved and are included on the tape with the HDCS processed data.¹⁰

Detailed descriptions of the vertical control used can be found in the Vertical and Horizontal Control Report for Project OPR-L325-KR-00.¹¹ There were no deviations from those listed in the project-wide report.

Evaluation of the tides applied was accomplished through crossline comparisons, comparing adjacent lines during Caris subset editing, and analysis of the sun-illuminated images generated from one-meter shoal-biased multibeam data. Crossline comparisons are discussed in section B2.a of this report and represent all errors associated with the survey. It is difficult to associate a precise vertical error due to tides. Errors observed are a composite from various sources such as measurement error, tides, heave, refraction, transducer draft, settlement and squat. In accordance with the Specifications and Deliverables (June 2000), the minimum error expected as result of tides is 0.2 meters with a maximum allowable error of 0.45 meters. NOAA verified tides were reviewed for spikes and blunders and compared to predicted tides. Verified tides matched predicted tides extremely well, with a standard deviation of 0.038 meters and a maximum deviation of 0.10 meters. No obvious errors as a

result of tide zoning or misapplied tides were apparent after analysis of sun-illuminated images.¹²

C2. Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83). A Universal Transverse Mercator (UTM), Zone 11, projection was used with metric units when exporting to MicroStation to produce the Preliminary Smooth Sheet for the project.¹³

Differential corrections were obtained from the USCG differential GPS beacons at Point Loma, California. The survey area was located 79 nautical miles from Point Loma and 134 nautical miles from Vandenburg AFB. For this reason, Point Loma was used as the primary source for differential corrections as it provided a more reliable signal to receive corrections.¹⁴

Detailed descriptions of the horizontal control used can be found in the Vertical and Horizontal Control Report for Project OPR-L325-KR-00.¹⁵ There were no deviations from those listed in the project-wide report.

D. RESULTS AND RECOMMENDATIONS

D1. Chart Comparison

Four published charts, listed in Table 3, cover the survey area. From selected soundings on the Preliminary Smooth Sheet, comparisons were made to the depths on each of the charts.

Chart	Scale	Edition	Date
18751	1:12,000	41	16 Dec 00
18749	1:20,000	36	17 Oct 98
18746	1:80,000	32	07 Nov 98
18740	1:234,270	38	28 Nov 98

 Table 3. Charts covering the survey area.¹⁶

D1.a Notice to Mariners Issued during the Survey

DEA evaluated all Notice to Mariners from the start of survey operations through the end of survey operations (LNM 52/00). The review resulted in the following:

LNM 40/00: Los Angeles/Long Beach Harbor – DREDGING OPERATIONS

Natco Limited is conducting dredging in the Los Angeles/Long Beach Harbor through 01 November 2000. The dredge *Sugar Island* is on scene and monitoring channels 13 and 16 VHF-FM. Mariners are requested to transit the area with caution.

The dredge remained in the area through December 2000 and was dredging during the entire survey.¹⁷

LNM 42/00: Corrections to Light List.

#3108	- Lighted Buoy 5	33 41 53 118 14 41	Fl G 2.5s	Range=4	Green
#3109	- Lighted Buoy 6	33 41 57 118 14 28	Fl R 4s	Range=4	Red

LNM 45/00: Drag Barge Operations.

Taking place in the vicinity of the Long Beach Harbor Approach Channel through 30 November 2000. The tug *American Spirit* will be pushing a barge with a 30-ton drag blade lowered to the bottom. Mariners are advised to contact VTS Long Beach to arrange passage. Contact: Mark Epping of American Marine at (310) 547-0919.

This operation was not observed during the survey.

LNM 47/00: Proposed Changes in Aids to Navigation.

The Coast Guard proposes to change the characteristic of Los Angeles Approach Channel Lighted Whistle Buoy 3 (LLNR 3107) from Fl G 4s to Q Fl G. Send comments by December 21 2000.

LNM 42/00 through LNM 52/00: Discrepancies in Aids to Navigation.

#3107 Los Angeles App Channel LWB 3 Racon

The status of this aid went from inoperative to watching properly several times during this period. The last report in LNM 52/00 is that the Racon was inoperative.

D1.b Depth Comparison

Chart 18751

Chart 18751, 41st Ed., Dec. 16/00, is a 1:12,000 scale chart and only covers the survey area near the breakwater. The charted 60-foot curve matches the survey 60-foot curve reasonably

well. Charted depths are significantly different and do not match the charted 60-foot curve in some areas. The Los Angeles dredge channel¹⁸ near the breakwater was surveyed 12 to 15 feet more shoal than is charted. The outer portion of the channel, near buoys "5" and "6", was surveyed three feet more shoal than charted.¹⁹

West of the dredge channel, surveyed depths 200 meters south of the Los Angeles Light are 10 feet more shoal than the depths on chart 18751. Charted depths are 60 to 63 feet and observed depths from the survey are 50 to 53 feet in this area. Proceeding to the west, surveyed depths are three to six feet more shoal than those surveyed.²⁰

East of the Los Angeles dredge channel, surveyed depths are seven feet more shoal than charted depths at the start and taper to three feet more shoal at Longitude 118°12'30"W. East of this line the remainder of the chart depicts depths three feet more shoal with the Long Beach Channel the exception. The Long Beach dredge channel was surveyed three to nine feet deeper than the charted depths.²¹

Two dangers that were submitted in a Report of Danger to Navigation²² during survey H10998 have been added to the 41st edition of chart 18751. One is a wreck with a least depth of 59 feet located 1,200 meters northeast of buoy Y"B". The other is an obstruction with a least depth of 66 feet located 1,200 meters east²³ of buoy Y "B."

<u>Chart 18749</u>

Chart comparisons were completed with chart 18749, 36^{th} Ed. as required by the hydrographic survey letter instructions, attachment #5 (included in Section IV of the Separates to this report). During the survey, a new edition of chart 18749 (37^{th} Ed. 11/8/00) was issued. The new edition differed substantially from the previous edition. Consequently, the comparisons made with the 36^{th} edition are obsolete. No comparisons were made with the new edition as it was unavailable at the time of the comparison. Comparisons with the 36^{th} edition can be found in Appendix V²⁴, Supplemental Survey Data and Correspondence.²⁵

Chart 18746

Chart comparisons with chart 18746, 32^{nd} Ed. were completed as required by the hydrographic survey letter instructions, attachment #5 (included in Section IV of the Separates to this report). During the survey, a new edition of chart 18746 (33^{rd} Ed. 11/25/00) was issued. The new edition differed from the previous edition. Consequently, the comparisons made with the 32^{nd} edition are obsolete. No comparisons were made with the 32^{nd} edition can be found in Appendix V²⁶, Supplemental Survey Data and Correspondence.

Chart 18740

Chart 18740, 38th Ed., Nov. 28/98 is a 1:234,000 scale chart and contains only 10 soundings depicting the area surveyed. The majority of these are in good agreement with the survey

data. The 8.5-fathom wreck west of the Los Angeles Channel and south of the San Pedro breakwater is charted one fathom more shoal than surveyed, see D1.d AWOIS Items. The 11-fathom sounding 2,200 meters south of buoy RW "LA" is charted one fathom more shoal than surveyed. The 17-fathom sounding south of the 11-fathom sounding is charted three fathoms deeper than surveyed. The 12-fathom sounding in the center of Anchorage G is charted one fathom deeper than surveyed.

The surveyed 10-fathom contour 400 meters west of the Los Angeles Channel is inland 500 meters from the charted curve. East of the Los Angeles Channel the surveyed 10-fathom curve is up to 1,500 meters inland. The surveyed curve agrees with the charted curve in the middle of the commercial anchorage. The charted contour fails to break for the dredged Long Beach Channel. The Long Beach Channel is not depicted on the chart.

D1.c Feature Comparison

A foul area noted on H10998 northeast of buoy 2, on the approach to Los Angeles, is charted as a fish haven. The boundary of the foul area matches the charted fish haven located on charts 18740, 18746 and 18749. Charts indicate a minimum depth of 63 feet over the fish haven. The least depth from survey H10998 over the area is 62 feet.²⁷

The San Pedro, Middle and Long Beach breakwaters match the edges of multibeam data and appear to be accurately positioned on all charts of the area.²⁸

The Long Beach dredge channel is located correctly on chart 18751 but the depths from survey H10998 are three to nine feet deeper than those charted (see section D1.b).²⁹ Dredging operations were underway in Long Beach Channel while the survey was being conducted (see section D2.g).

The alignment of the Los Angeles dredge channel is accurately shown on all charts of the area. Charted depths down the Los Angeles dredge channel differ significantly from those surveyed. Chart 18751 indicates depths down the channel four to 12 feet more shoal than those surveyed. No depths in the channel are indicated on chart 18740. A detailed discussion of depth comparisons is in section D2.g.³⁰

Two uncharted wrecks located during the survey were not considered a danger to navigation. Because of their depth, they are listed here and not in section D1.e Danger to Navigation Reports. The first is a 39-foot-long wreck with a least depth of 68.0 feet. The wreck falls on a 78-foot sounding on chart 18749 and between four 13 fathom soundings on chart 18746. It is recommended that the wreck be charted with a depth of 68 feet at Latitude 33° 41'29.481"N and Longitude 118°12'31.311"W.³¹

The other uncharted wreck was surveyed with a least depth of 70.9 feet. It is located 0.35 nautical miles northeast of the fish haven near Los Angeles Channel. The charted depth in the area is 77 feet (chart 18749) and 12 fathoms (chart 18746). The corresponding side scan

contact is 307/235021P. It is recommended that the wreck be charted with a depth of 71 feet at Latitude 33° 41' 11.616"N and Longitude 118°13' 10.485"W.³²

D1.d AWOIS Items

Seven AWOIS items were assigned to survey H10998 for investigation. Attachment 9 in the project instructions for H10998 required 200 percent side scan sonar coverage of the AWOIS search radius outside of the breakwater. No side scan sonar operations were conducted in the AWOIS search areas inshore of the breakwaters. In addition, multibeam data were collected on significant contacts within the AWOIS search radius by running two orthogonal lines over the contact. One of the assigned AWOIS items and a portion of another AWOIS search radius fell outside of the survey area requiring additional coverage beyond the survey limits. All other AWOIS items required no additional work beyond the 200 percent side scan sonar coverage of the survey area and multibeam investigation of contacts.

AWOIS 52590 is the sunken schooner *Loop* with a search radius of 250 meters. The wreck was reported in 1950 as being blasted by the U.S. Army Corps of Engineers and a sweep was conducted to 52 feet. Although not required, side scan sonar coverage was run beyond the search radius and continued into the H10998 survey area. This resulted in a larger search area for the reported wreck. Side scan sonar operations resulted in location of the wreck (contact number 311/194147P) 170 meters from the reported position in the AWOIS database. The wreck is 30 meters in length and has two high points. Multibeam data collected over the wreck resulted in a least depth of 58.5 feet and 59.8 feet on the second high point. It is recommended that the wreck be charted with a depth of 58 feet at Latitude 33°41' 49.895" N and Longitude 118°15' 58.619" W.³³

AWOIS 52591 was reported in 1990 as the *S/V Discovery* and is charted as "Position Approximate" on chart 18749. The assigned search radius is 750 meters. Side scan sonar coverage of the search area resulted in a possible wreckage contact (contact number 305/171221S). A least depth of 48.0 feet was located with the multibeam sonar 20 meters south of the reported position in the AWOIS database. It is recommended that the wreck be charted with a depth of 48 feet at Latitude 33°42' 22.350" N and Longitude 118°15' 04.032" W.³⁴

AWOIS 52592 was reported in 1968 as the 86-foot *F/V Southern Explorer* and is charted as "Wreck" on chart 18749. The assigned search radius is 250 meters. Side scan sonar and multibeam coverage of the search area resulted in no contact located. It is recommended that the wreck be removed from the chart.³⁵

AWOIS 52593 was reported in 1974 as a 21-foot sailboat and is charted as "Position Doubtful" on chart 18749. The assigned search radius is 750 meters. Side scan sonar coverage of the search area resulted in a contact on a 30-foot vessel (contact number 300/193054S). A least depth of 48.7 feet was located with the multibeam sonar 260 meters southeast of the reported position in the AWOIS database. It is recommended that the wreck

be charted with a depth of 48 feet at Latitude 33°42'34.984"N and Longitude 118°14'21.032"W.³⁶

AWOIS 52594 was reported in 1982 as a 40-foot fishing vessel and is charted as "Position Approximate" on chart 18749. The assigned search radius is 750 meters. Approximately one-third of the search area falls inside of the Middle Breakwater and was not covered during this survey. However, the wreck was reported outside of the breakwater. Side scan sonar coverage of the search area outside of the breakwater resulted in two contacts (contact numbers 300/210233P and 300/222646S). Both of these contacts are on what appears to be a rock pile which is clearly not the reported 40-foot fishing vessel. It is recommended that the wreck be removed from the chart.³⁷

AWOIS 52595 is a rock reported by the U.S. Navy in 1983 and is charted as "rock reported (1983)" on chart 18749. The assigned search radius is 750 meters. Side scan sonar coverage of the search area resulted in contacts on a rock outcrop nearly 40 meters in length and rising 14 feet off the seafloor with two high points (contact numbers 297/195539P and 307/204551P). A least depth of 61.2 feet was located with the multibeam sonar 160 meters north of the reported position in the AWOIS database. The least depth of the second high point was determined to be 61.6 feet. It is recommended that the rock be charted with a depth of 61 feet at Latitude 33°40'39.301"N and Longitude 118°13'39.744"W.³⁸

AWOIS 52596 is another rock reported by the U.S. Navy in 1983 and is charted as "rock reported (1983)" on chart 18749. The assigned search radius is 750 meters. Side scan sonar coverage of the search area resulted in a significant contact rising 13 feet off the seafloor (contact numbers 296/234752P and 307/191709S). The contact appears to be a continuation of an outcrop complex extending from AWOIS item 52595. A least depth of 55.2 feet was located with the multibeam sonar 150 meters north of the reported position in the AWOIS database. It is recommended that the rock be charted with a depth of 55 feet at Latitude 33°40'31.950"N and Longitude 118°13'20.340"W.³⁹

Although not assigned as an AWOIS item, AWOIS 50190 was within the survey area and was investigated with 200 percent side scan sonar coverage and multibeam sonar least depths were determined. The wreck *Olympic* was imaged with the side scan sonar (contact numbers 295/191643S and 306/173731P) and determined to be 90 meters in length and 20 meters wide with two shoal depths. A least depth of 61.9 feet was located with the multibeam sonar with a second high point determined to be 65.1 feet. It is recommended that the wreck be charted with a depth of 62 feet at Latitude 33°39'24.617"N and Longitude 118°13'49.331"W.⁴⁰

D1.e Danger to Navigation Reports

Twenty items were located during the survey that prompted four Reports of Danger to Navigation to be submitted to the Pacific Hydrographic Branch (PHB), Seattle, Washington. A summary of the reports follows; copies of the letters sent to PHB are included in Appendix I.⁴¹

The first report were submitted to PHB during survey operations. The remainder were found while analyzing the side scan sonar contacts and hillshaded model. They were submitted to PHB after confirmation.

The first Report of Danger to Navigation included three items.

The first item is a sunken barge with a least depth of 59.0 feet. It is located 0.9 nautical miles south of the Long Beach Breakwater light. The barge is 45 feet in length, 13 feet wide and rises off of the seafloor eight feet. The charted depth in the area is 67 feet (chart 18749). Corresponding side scan contacts are 292/175742S and 316/213151S. It is recommended that the wreck be charted with a depth of 59 feet at Latitude 33° 42' 26.479"N and Longitude 118° 11' 30.162"W.⁴²

The second item is a debris pile with a least depth of 65.9 feet. It encompasses an area of approximately 30 x 36 meters. Five separate objects were found, with the largest rising 12.1 feet off of the seafloor. The area is 1.7 nautical miles southeast of the Long Beach Breakwater light. The charted depth in the area is 77 feet (chart 18749). Corresponding side scan contacts are 313/174705S and 293/171806S. It is recommended that the obstruction be charted with a depth of 66^{43} feet and Latitude 33° 41' 34.572"N and Longitude 118° 10' 09.756"W.⁴⁴

The third item is an obstruction rising 11.8 feet off of the seafloor and has a least depth of 65.8 feet. The object is approximately five meters in length and five meters wide. The object lies between the G-5 and G-6 anchorage areas, and is approximately one nautical mile south of the Middle Breakwater. The charted depth in the area is 78 feet (chart 18749). Corresponding side scan contacts are 309/201929P and 298/211508S. It is recommended that the obstruction be charted with a depth of 66 feet at Latitude 33° 41' 59.007"N and Longitude 118° 12' 51.513"W.⁴⁵

<u>The second Report of Danger to Navigation included nine items near the entrance to</u> <u>Los Angeles harbor.</u>

The first item is a wreck that was found with a least depth of 59.1 feet. The wreck is approximately 26 feet in length. The wreck falls between the 60-foot contour and a sounding of 65 feet (on chart 18749) and 9.5 fathoms and 12 fathoms (on chart 18746). Corresponding side scan contacts are 318/201129S and 318/183504P. It is recommended that the wreck be charted with a depth of 59 feet at Latitude 33°42'00.316"N and Longitude 118°15'48.315"W.⁴⁶

The second item is a wreck with a least depth of 48.6 feet. This wreck appears to be AWOIS item 52593 and is located 260 meters southeast of the charted position, see section D1.e⁴⁷ AWOIS Items. The wreck is an intact vessel measuring approximately 30 feet long by 13 feet wide. The charted depth in the area is 50 feet (chart 18749) and 8.5 fathoms (chart 18746). Corresponding side scan contacts are 300/193054S and 319/235027P. It is

recommended that the wreck be charted with a depth of 48 feet at Latitude 33° 42' 34.984"N and Longitude 118° 14' 21.032"W.⁴⁸

The third item is a rock that has a least depth of 53 feet and is located approximately 0.35 nautical miles east of the Los Angeles Channel and 0.4 nautical miles south of the Middle Breakwater. The charted depth in the area is 58 feet (chart 18749) and between 8.5 fathoms and 10 fathoms (chart 18746). Corresponding side scan contacts are 299/191855P and 305/200202S. It is recommended that the rock be charted with a depth of 53 feet at Latitude 33° 42' 23.481"N and Longitude 118° 14' 12.271"W.⁴⁹

The fourth item is a rock with a least depth of 57.5 feet It is located within the G-1 anchorage area. The charted depth in the area is 64 feet (chart 18749) and 10.5 fathoms (chart 18746). The corresponding side scan contact is 299/182501P. It is recommended that this rock be charted with a least depth of 57 feet at Latitude 33° 42' 22.404"N and Longitude 118° 13' 43.180"W.⁵⁰

The fifth item is an obstruction that was found with a least depth of 55 feet and is located approximately 0.2 nautical miles south of the San Pedro Breakwater. The charted depth in the area is 59 feet (chart 18749) and 9.5 fathoms (chart 18746). It is recommended that the obstruction be charted with a depth of 55 feet at Latitude 33° 42' 04.897"N and Longitude 118° 15' 48.330"W.⁵¹

The sixth item is an obstruction that has a least depth of 55 feet and is located approximately 90 meters east of the Los Angeles Channel and 180 meters north of red buoy number 2.⁵² The charted depth in the area is 61 feet (chart 18749) and lies on top of the 10-fathom contour (chart 19746). It is recommended that the obstruction be charted with a depth of 55 feet at Latitude 33° 42' 03.323"N and Longitude 118° 14' 26.416"W.⁵³

The seventh item is an obstruction with a least depth of 50 feet. It is located approximately 0.5 nautical miles east of the Los Angeles Channel and 0.15 nautical miles south of the Middle Breakwater. The charted depth in the area is 55 feet (chart 18749) and nine fathoms (chart 18746). It is recommended that the obstruction be charted with a least depth of 50 feet at Latitude 33° 42' 40.481"N and Longitude 118° 14' 07.333"W.⁵⁴

The eighth item is an obstruction with a least depth of 58 feet. It is located approximately between red buoy number 2⁵⁵ in the Los Angeles Channel and anchorage area G-5. The charted depth in the area is 60 feet (chart 18749) and 10 fathoms (chart 18746). It is recommended that this obstruction be charted with a least depth of 58 feet at Latitude 33° 42' 03.876"N and Longitude 118° 13' 55.031"W.⁵⁶

The ninth item is an obstruction with a least depth of 53 feet. It is located 0.1 miles north of the G-1 anchorage area and 0.25 nautical miles south of the Middle Breakwater. The charted depth in the area is between 55 and 58 feet (chart 18749) and 9 fathoms (chart 18746). It is recommended that this obstruction be charted with a least depth of 53 feet at Latitude 33° 42' 44.692"N and Longitude 118° 13' 36.755"W.⁵⁷

The third Report of Danger to Navigation included seven items near the entrance to Long Beach harbor.

The first item is an obstruction with a least depth of 51 feet. It is located on the north edge of the G-2 anchorage area. The charted depth in the area is 55 feet (chart 18749) and nine fathoms (chart 18746). It is recommended that this obstruction be charted with a least depth of 51 feet at Latitude 33° 42' 51.133"N and Longitude 118° 13' 03.498"W.⁵⁸

The second item is a rock pile with a least depth of 48.1 feet. It covers an area four meters wide by eight meters long. The rock pile is located between the Middle Breakwater and the G-3 anchorage area. The charted depth in the area is 53 feet (chart 18749) and 8.5 fathoms (chart 18746). The corresponding side scan contact for this rock is 300/204344S. It is recommended that the rock be charted with a least depth of 48 feet at Latitude 33° 43' 09.494"N and Longitude 118° 12' 38.914"W.⁵⁹

The third item is a debris pile with a least depth of 50.1 feet. It is located near the northeast edge of anchorage area G-4. The charted depth in the area is 57 feet (chart 18749) and 9 fathoms (chart 18746). Corresponding side scan contacts are 302/200114S and 300/162425S. It is recommended that the obstruction be charted with a least depth of 50 feet at Latitude 33° 43' 00.894"N and Longitude 118° 12' 07.550"W.⁶⁰

The fourth item is a rock pile with a least depth of 62.3 feet. It covers an area 20 meters wide by 30 meters long. It is located near the center of anchorage area G-7. The charted depth in the area is 67 feet (chart 18749) and 11 fathoms (chart 18746). Corresponding side scan contacts are 309/225135P and 298/233741P. It is recommended that the rock be charted with a least depth of 62 feet at Latitude 33° 42' 24.323"N and Longitude 118° 12' 02.745"W.⁶¹

The fifth item is an obstruction with a least depth of 57.5 feet. It is located approximately 0.8 nautical miles south of the Long Beach Light and 0.1 nautical miles west of the Long Beach Channel. The charted depth in the area is 64 feet (chart 18749) and between 9 and 11 fathoms (18746). The corresponding side scan contact is 292/163410S. It is recommended that the obstruction be charted with a least depth of 57 feet at Latitude 33° 42' 36.814"N and Longitude 118° 11' 14.473"W.⁶²

The sixth item is a rock with a least depth of 60.5 feet. It is located 1.5 nautical miles south of the Long Beach Light and 0.1 nautical miles west of the Long Beach Channel. The charted depth in the area is 73 feet (chart 18749) and 12 fathoms (chart 18746). Corresponding side scan contacts are 292/214528P and 292/220007P. It is recommended that the rock be charted with a least depth of 60 feet at Latitude 33° 41' 52.608"N and Longitude 118° 11' 19.042"W.⁶³

The seventh item is a rock with a least depth of 59.4 feet. It is located approximately 0.75 nautical miles south of the Long Beach Breakwater and 0.2 nautical miles east of the Long Beach Channel. The charted depth in the area is 64 feet (chart 18749) and 10.5 fathoms

(chart 18746). The corresponding side scan contact is 292/164149P. It is recommended that the rock be charted with a least depth of 59 feet at Latitude $33^{\circ} 42' 37.479$ "N and Longitude 118° 10' 34.592"W.⁶⁴

The fourth Report of Danger to Navigation included one item southeast of the charted <u>fish haven.</u>

The item is a debris pile with a least depth of 59 feet. It is located approximately 0.8 nautical miles southeast of the fish haven near Los Angeles Channel. The charted depth in the area is 67 feet (chart 18749) and 10.5 fathoms (chart 18746). Corresponding side scan contacts are 306/222604P and 296/201004P. It is recommended that this obstruction be charted with a least depth of 59 feet at Latitude 33° 40' 19.970"N and Longitude 118° 12' 49.128"W.⁶⁵

D2. Additional Results

D2.a Shoreline Investigations

Not applicable. Shoreline verification was not required. The shoreline depicted on the Smooth Sheet was digitized in MapInfo from chart 18749 and is for reference purposes only.⁶⁶

D2.b Prior Survey Comparison

Comparison with prior surveys was not required under this contract. See section D1 for comparison to the nautical charts for the area.⁶⁷

D2.c Aids to Navigation

Eight navigational aids are within the survey limits. The positions of the navigational buoys were obtained by locating the anchor blocks with the multibeam data. Both the anchor blocks and chains were observed while surveying lines adjacent to the navigational aids. GPS-derived buoy positions were used to verify anchor block positions. Positions of all the aids were compared to both the charted positions and to the position listed in the Light List (Volume VI, 2000); differences are noted below in Table 4. Each aid properly served its function and was operating correctly. The exception is the center of channel buoy "LB" on the approach to Long Beach. The buoy is positioned due south of the center of the breakwater opening into Long Beach. The actual channel is skewed to the southeast and does not run due south. For the buoy to be in the center of the projection of the channel, it should be moved 350 meters east. Buoys have recently been renumbered and positioned for the approach to Los Angeles. The aids to navigation found agree well with the new edition of chart 18749, 37th edition. Consequently, the Light List is out of date and does not agree with the latest chart edition or the survey.⁶⁸

D2.d Overhead Clearance

There are no overhead bridges, cables or other structures, which would impact overhead clearance in the survey area.⁶⁹

D2.e Cables, Pipelines and Offshore Structures

There were no observed submarine cables, pipelines, drilling structures, production platforms, or well heads within the survey limits.⁷⁰

D2.f Environmental Conditions Impacting the Quality of the Survey

Although the survey meets the required accuracy, environmental conditions impacted the quality of the survey. The extended period of the seas impacted the quality of heave compensation. Changes in the sound velocity profile, both spatial and temporal, impacted refraction compensation during the survey. It is unclear if this was a result of ocean upwelling or impact from the confluence of the two entrance channels into Los Angeles and Long Beach harbors. To compensate for these changes, frequent casts were observed within the immediate area being surveyed. Both of these environmental conditions are discussed in detail in the Data Acquisition and Processing Report for the project.⁷¹

Name	Type	Survey Position	Chart 18751 Position	Chart 18749 Position	Chart 18746 Position	Chart 18740 Position
RW ''LB''	Buoy	33° 41° 24.34" N 118° 11° 01.29" W	Not Within Chart Boundary	33° 41' 24" N 118° 11' 01" W 13m*	33° 41' 23" N 118° 11' 01" W 42m*	33° 41' 23" N 118° 11' 03" W 60m*
G "1"	Buoy	33° 39' 26.04" N 118° 13' 31.33" W	Not Within Chart Boundary	Charted on 37 ^{thd} Ed. (not available)	Charted on 33 rd Ed. (not available)	Not Charted
R ''2''	Buoy	33° 40° 24.15" N 118° 13' 44.33" W	Not Within Chart Boundary	Charted on 37 th Ed. (not available)	Charted on 33 rd Ed. (not available)	Not Charted
G3"	Buoy	33° 41° 15.93" N 118° 14° 24.33" W	Not Within Chart Boundary	Charted on 37 th Ed. (not available)	Charted on 33 rd Ed. (not available)	Not Charted
G ''S''	Buoy	33° 41° 50.88" N 118° 14° 39.75" W	33° 41° 53″ N 118° 14° 41″ W 73m*	33° 41° 53" N 118° 14' 41" W 73m*	33° 41' 52" N 118° 14' 42" W 67m*	Not Charted
R ''6'' **	Buoy	33° 41° 54.99" N 118° 14° 26.95" W	33° 41' 57'' N 118° 14' 28'' W 68m*	33° 41' 57" N 118° 14' 28" W 68m*	33° 41' 57" N 118° 14' 29" W 81m*	Not Charted
RW "LA"	Buoy	Not Found (removed)	Not Charted	Not Charted on 37 th Ed.	Not Charted on 33 rd Ed.	33° 41' 23" N 118° 14' 25" W
¥**	Buoy	33° 42' 00.43" N 118° 12' 03.67" W	33° 42° 00" N 118° 12° 03" W 22m*	33° 42' 00" N 118° 12' 03" W 22m*	33° 42' 00" N 118° 12' 02" W 45m*	33° 41' 59" N 118° 12' 06" W 74m*

Table 4. Positions of aids to navigation.

*** Not included in Light List Volume VI 2000.

* Difference between chart and survey position
 ** Listed in LNM 42/00 Corrections to Light List

SURVEY: H10998 FIELD UNIT: DAVID EVANS AND ASSOCIATES, INC.

D2.g Construction Projects

During survey operations, a dredging project was underway in the approach channel to Long Beach. The hopper dredge *Sugar Island* was operating 24 hours per day and impeded survey operation. Correspondence in Appendix V^{72} documents communications with the Los Angeles District Corps of Engineers and NATCO, the dredging contractor. The channel was eventually surveyed when the dredge shut down for fueling. The dredge continued working after completion of survey H10998 and was reportedly continuing to work in the channel until mid-January of 2001. An updated, post-dredge, survey of the channel should be obtained from the Los Angeles District Corps of Engineers.⁷³

D2.h Bottom Characteristics

As per the project instructions for OPR-L325-KR-00, Attachment #6, bottom samples were obtained in designated Anchorage G in accordance with section 7.1 of the Specifications and Deliverables (June 2000). Commercial Anchorage G lies between the approaches to Long Beach and Los Angeles near the Middle Breakwater. A total of eight samples was taken on a 1200-meter grid within the anchorage area. Position, depth, date, time, identifier (GS-1 through GS-8), description and photograph were recorded for each sample. Samples were bagged, marked with a unique identifier, and will be archived for one year at DEA's Portland office. Each sample was described in accordance with National Ocean Service (NOS) Cartographic Codes. The location and abbreviated description are depicted on the Preliminary Smooth Sheet and included in Table 5. Photos of each sample can be found in Appendix V⁷⁴ of this report. Water depth at sample locations varied from 19.0m to 24.1m. Sediment sample particle size ranged from silt to medium-grained sand (0.02mm to 0.50mm). Samples appear to have high organic content and are predominantly brown to gray in color.

Sample ID	Classification	Term	Color	Water Depth	Latitude	Longitude
GS1	Sand	Fine	Brown	20.9m	33° 42' 18.24"N	118° 13' 48.88"W
GS2	Sand	Fine	Brown	19.8m	33° 42' 31.63"N	118° 13' 05.47"W
GS3	Sand	Fine	Brown	19.0m	33° 42' 46.37"N	118° 12' 22.64"W
GS4	Sand	Fine	Brown	18.5m	33° 43' 00.38"N	118° 11' 39.85"W
GS5	Silt	Mud	Gray	21.0m	33° 42' 29.61"N	118° 11' 36.30"W
GS6	Silt	Mud	Gray	22.1m	33° 42' 19.51"N	118° 12' 09.88"W
GS7	Sand	Fine	Brown	23.1m	33° 42' 08.42"N	118° 12' 41.91"W
GS8	Sand	Medium	Brown	24.1m	33° 41' 58.87"N	118° 13' 13.85"W

 Table 5. Sediment sample data.

D2.i Recommendations

The center of channel buoy "LB" on the approach to Long Beach is not located near the projection of the channel. The buoy is positioned due south of the center of the breakwater opening into Long Beach. Vessels steering a strait course from the buoy to the center of the breakwater entrance would pass close to the west edge of the channel. The actual channel is skewed to the southeast as it heads out of the entrance and does not run due south. For the buoy to be in the center of the projection of the channel, it should be moved 350 meters east.⁷⁵

The Long Beach dredge channel is not shown on charts 18740, 18746 and 18749⁷⁶. The 60foot or 10-fathom curve runs across the channel 800 to 1,000 meters offshore of the entrance. It is recommended that the 60-foot or 10-fathom curve be revised on these charts to reflect the 70-foot deep channel going into Long Beach.

The 41^{st} edition of chart 18751, dated 16 DEC/00, is grossly inaccurate offshore of the breakwaters and should be revised.⁷⁷

E. APPROVAL SHEET

Descriptive Report to Accompany Hydrographic Survey H10998

Standard field surveying and processing procedures were followed in producing this survey in accordance with the NOS Hydrographic Surveys, Specifications and Deliverables (June 2000). The survey is complete and adequate for charting purposes and no additional work is required. I personally supervised this survey during data acquisition and processing.

The following references are helpful in verifying and evaluating this survey.

- 1. Hydrographic Project Instructions OPR-L325-KR-00, NOAA, September 1, 2000.78
- 2. NOS Hydrographic Surveys Specifications and Deliverables, June 2000.
- 3. NOAA Chart, 18751, edition 41, scale 1:12,000, December 16, 2000.
- 4. NOAA Chart, 18749, edition 36, scale 1:20,000, October 17, 1998.
- 5. NOAA Chart, 18746, edition 32, scale 1:80,000, November 7, 1998.
- 6. NOAA Chart, 18740, edition 38, scale 1:234,270, November 28, 1998.

Other reports submitted with this Descriptive Report on March 23, 2001 include:

- 1) Data Acquisition and Processing Report for H10998, March 23, 2001.
- 2) Vertical and Horizontal Report for H10998, March 23, 2001.

The following items are approved for stated accuracy and completeness in hydrographic survey H10998.

- 1. Preliminary Smooth Sheet.
- 2. Multibeam Sun-Illuminated Images (2).
- 3. Multibeam Sonar Swath Coverage Plot.
- 4. Side Scan Sonar Mosaic (100% Coverage).
- 5. Side Scan Sonar Mosaic (200% Coverage).
- 6. Side Scan Sonar Contact Plot.
- 7. Tapes of digital data.
- 8. Associated records supporting the survey.

The plots, data and supporting records have been reviewed by me and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and forwarded,

Jonathan L. Dasler, P.E., P.L.S. Senior Associate Director of Hydrographic Services David Evans and Associates, Inc.

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APPENDIX I Danger to Navigation Reports

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10998

Survey Title:	State:	CALIFORNIA
	Locality:	San Pedro Bay
	Sublocality:	Approaches to Los Angeles and Long Beach

Project Number: OPR-L325-KR-00

Survey Date: October 15, 2000 – December 7, 2000

Features are reduced to Mean Lower Low Water using preliminary tides and are positioned on NAD 83.

Charts affected:	18751	40 th Edition/17 Oct 98, scale 1:12,000, NAD 83
	18749	36 th Edition/17 Oct 98, scale 1:20,000, NAD 83
	18746	32 nd Edition/07 Nov 98, scale 1:80,000, NAD 83
	18740	38 th Edition/28 Nov 98, scale 1:234,270, NAD 83

DANGERS TO NAVIGATION

FEATURE	<u>DEPTH</u>	LATITUDE(N)	LONGITUDE (W)
1. Wreck	59.0 feet	33/42/26.479	118/11/30/162
2. Obstruction	65.9 feet	33/41/34.572	118/10/09.756
3. Obstruction	65.8 feet	33/41/59.007	118/12/51.513

Item Number 1 is a sunken barge located 0.9 nautical miles south of the Long Beach Breakwater light. The barge is 45 feet in length, 13 feet wide and rises off of the seafloor 10.5 feet. A depth of 59.0 feet was found using beam number 77. The charted depth in the area is 67 feet.

Item Number 2 is a debris pile, encompassing an area of approximately $100 \ge 120$ feet. Five separate objects were found, with the largest rising 12.1 feet off of the seafloor. The area is 1.7 nautical miles southeast of the Long Beach Breakwater light. A depth of 65.9 feet was found using beam number 64. The charted depth in the area is 77 feet.

Item Number 3 is an obstruction rising 11.8 feet off of the seafloor. The object is approximately 15 feet in length and 15 feet wide. The object lies between the G-5 and G-6 anchorage areas, and is approximately 1 nautical mile south of the Middle Breakwater. A depth of 65.8 feet was found using beam number 17. The charted depth in the area is 78 feet.

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 562-6836.

Hydrographic Survey Registry Number: H10998

Survey Title:	State:	CALIFORNIA
	Locality:	San Pedro Bay
	Sublocality:	Approaches to Los Angeles and Long Beach

Project Number: OPR-L325-KR-00

Survey Date: October 15, 2000 – December 7, 2000

Features are reduced to Mean Lower Low Water using verified tides and are positioned on NAD 83.

Charts affected:	18751	41 st Edition/12 Dec 00, scale 1:12,000, NAD 83
	18749	36 th Edition/17 Oct 98, scale 1:20,000, NAD 83
	18746	32 nd Edition/07 Nov 98, scale 1:80,000, NAD 83
	18740	38 th Edition/28 Nov 98, scale 1:234,270, NAD 83

DANGERS TO NAVIGATION

Several rocks and obstructions were found near the approach to Long Beach harbor near the Long Beach and Middle breakwaters.

FEATURE	<u>DEPTH</u>	LATITUDE (N)	LONGITUDE (W)
1. Obstruction	51 feet	33° 42' 51.133"	118° 13' 03.498"
2. Rock	48 feet	33° 43' 09.494"	118° 12' 38.914"
3. Obstruction	50 feet	33° 43' 00.894"	118° 12' 07.550"
4. Rock	62 feet	33° 42' 24.323"	118° 12' 02.745"
5. Obstruction	57 feet	33° 42' 36.814"	118° 11' 14.473"
6. Rock	60 feet	33° 41' 52.608"	118° 11' 19.042"
7. Rock	59 feet	33° 42' 37.479"	118° 10' 34.592"

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10998

Survey Title:	State:	CALIFORNIA
	Locality:	San Pedro Bay
	Sublocality:	Approaches to Los Angeles and Long Beach

Project Number: OPR-L325-KR-00

Survey Date: October 15, 2000 – December 7, 2000

Features are reduced to Mean Lower Low Water using verified tides and are positioned on NAD 83.

Charts affected:	18751	41 st Edition/12 Dec 00, scale 1:12,000, NAD 83
	18749	36 th Edition/17 Oct 98, scale 1:20,000, NAD 83
	18746	32 nd Edition/07 Nov 98, scale 1:80,000, NAD 83
	18740	38 th Edition/28 Nov 98, scale 1:234,270, NAD 83

DANGERS TO NAVIGATION

Several wrecks, rocks and obstructions were found near the approach to Los Angeles harbor near the San Pedro and Middle breakwaters.

FEATURE	<u>DEPTH</u>	LATITUDE (N)	LONGITUDE (W)
1. Wreck	59 feet	33° 42' 00.316"	118° 15' 48.315"
2. Wreck	48 feet	33° 42' 34.984'	118° 14' 21.032"
3. Rock	53 feet	33° 42' 23.481"	118° 14' 12.271"
4. Rock	57 feet	33° 42' 22.404"	118° 13' 43.180"
5. Obstruction	55 feet	33° 42' 04.897"	118° 15' 48.330"
6. Obstruction	55 feet	33° 42' 03.323"	118° 14' 26.416"
7. Obstruction	50 feet	33° 42' 40.481"	118° 14' 07.333"
8. Obstruction	58 feet	33° 42' 03.876"	118° 13' 55.031"
9. Obstruction	53 feet	33° 42' 44.692"	118° 13' 36.755"

Feature 1 is a wreck approximately 26 feet in length.

Feature 2 is an intact wreck measuring approximately 30 feet long by 13 feet wide.

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10998

Survey Title:	State:	CALIFORNIA
	Locality:	San Pedro Bay
	Sublocality:	Approaches to Los Angeles and Long Beach

Project Number: OPR-L325-KR-00

October 15, 2000 - December 7, 2000 Survey Date:

Features are reduced to Mean Lower Low Water using verified tides and are positioned on NAD 83.

Charts affected:	18749 18746 18740	36 th Edition/17 Oct 32 nd Edition/07 No 38 th Edition/28 Nov	98, scale 1:20,000, NAD 83 v 98, scale 1:80,000, NAD 83 v 98, scale 1:234,270, NAD 83
DANGERS TO NA	AVIGATION		
<u>FEATURE</u>	<u>DEPTH</u>	LATITUDE (N)	LONGITUDE (W)
Obstruction	59 feet	33° 40' 19.970"	118° 12' 49.128"

The feature is a debris pile located approximately 0.8 nautical miles southeast of the fish haven near Los Angeles channel. The charted depth in the area is 67 feet (chart 18749) and 10.5 fathoms (chart 18746).

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 562-6836.

Revisions Compiled During Office Processing and Certification

¹ PHB Revision- Replace red with blue.

² PHB Revision- Filed with the hydrographic records.

³ PHB Revision- Concur.

⁴ PHB Revision- Filed with the hydrographic records.

⁵ PHB Revision- Concur.

⁶ PHB Revision- Concur.

⁷ PHB Revision- Concur. A prior survey comparison was not completed by PHB. The survey area was fully ensonified using 100% multibeam. The survey is adequate to supercede all prior surveys within the common area.

⁸ PHB Revision- Filed with the hydrographic records.

⁹ PHB Revision- Filed with the hydrographic records.

¹⁰ PHB Revision- Concur, filed with the hydrographic records.

¹¹ PHB Revision- Filed with the hydrographic records.

¹² PHB Revision- Concur.

¹³ PHB Revision- Concur.

¹⁴ PHB Revision- Concur.

¹⁵ PHB Revision- Filed with the hydrographic records.

¹⁶ PHB Revision- During office processing comparisons were made to continuous

maintenance rasters 18751 43rd edition, Aug. 04, 2004 and 18749, 39th edition Aug. 04,

2004. The evaluator recommends that the present survey supercede the charted information within the common area except as noted in this report.

¹⁷ PHB Revision- The evaluator recommends that the MCD apply the latest depth

information within the maintained channels.

¹⁸ PHB Revision- Labeled "Main Channel" on Edition 43

¹⁹ PHB Revision- Concur.

²⁰ PHB Revision- Concur with clarification. Replace "…more shoal than those surveyed" with "…more shoal than those charted".

²¹ PHB Revision- Do not concur. PHB comparison with 18751, 43rd edition, Aug. 04, 2004, showed the survey to be 1-6 feet shoaler than the Long Beach Channel.

²² PHB Revision- See Section D1.e, this report.

²³ PHB Revision- Replace east with west.

²⁴ PHB Revision- Filed with the hydrographic records.

²⁵ PHB Revision- A comparison of the 39th edition was made at PHB.

²⁶ PHB Revision- Filed with the hydrographic records.

²⁷ PHB Revision- Concur.

²⁸ PHB Revision- Concur.

²⁹ PHB Revision- see endnote 21.

³⁰ PHB Revision- Concur.

³¹ PHB Revision- Concur.

³² PHB Revision- Concur.

³³ PHB Revision- Concur with clarification. Remove charted 52 wreck at Lat. 33/41/54.6 N, Long. 118/16/02.3 W and chart 58 *Wk* at survey position Lat. 33/41/49.895 N, Long. 118/15/58.619 W.

³⁴ PHB Revision- Concur with clarification. Remove charted *Wk PA* and chart 48 *Wk* at Lat. 33/42/22.350 N, Long. 118/15/04.032 W.

³⁵ PHB Revision- Concur with clarification. Remove charted 26 *Wk* at Lat. 33/42/36N, Long. 118/14/41W. Further inspection of the DTM revealed wreckage with a least depth of 43.0 feet. Chart 43 *Wk* at survey position Lat. 33/42/36.5N, Long. 118/14/40.5W.

³⁶ PHB Revision- Concur with clarification. Remove charted wreck *PD* and chart 48 *Wk* at survey position Lat. 33/42/34.984 N, Long. 118/14/21.032 W.

³⁷ PHB Revision- Concur.

³⁸ PHB Revision- Concur with clarification. Remove charted rock and *Rk rep* (1983) note and chart 61 *Rk* at Lat. 33/40/39.301 N, Long. 118/13/39.744 W.

³⁹ PHB Revision- Concur with clarification. Remove charted rock and *Rk rep* (1983) note and chart 55 *Rk* at survey position Lat. 33/40/31.950 N, Long. 118/13/20.340 W.

⁴⁰ PHB Revision- Concur with clarification. Remove charted 61 *Wreck* and chart 62 Wk with danger curve at survey position.

⁴¹ PHB Revision- Appendix I attached to this report.

⁴² PHB Revision- Concur. Retain 59 *Wk* as currently charted.

⁴³ PHB Revision- Replace 66 with 65.

⁴⁴ PHB Revision- Concur.

⁴⁵ PHB Revision- Concur with clarification. The hydrographer labeled the 66 *Obstn* as a *Wk* on the smoothsheet. The evaluator recommends retaining the 66 *Obstn* as currently charted.

⁴⁶ PHB Revision- Concur. Retain 59 *Wk* as currently charted.

⁴⁷ PHB Revision- Replace D1.e with D1.d.

⁴⁸ PHB Revision- Concur. See endnote 36.

⁴⁹ PHB Revision- Concur. Retain 53 *Rk* as currently charted.

⁵⁰ PHB Revision- Concur. Retain 57 *Rk* as currently charted.

⁵¹ PHB Revision- Concur. Retain 55 *Obstn* as currently charted.

⁵² PHB Revision- Replace red buoy number 2 with red buoy number 6.

⁵³ PHB Revision- Concur. Retain 55 *Obstn* as currently charted.

⁵⁴ PHB Revision- Concur. Retain 50 *Obstn* as currently charted.

⁵⁵ PHB Revision- Replace red buoy number 2 with red buoy number 6.

⁵⁶ PHB Revision- Concur. Retain 58 *Obstn* as currently charted.

⁵⁷ PHB Revision- Concur. Retain 53 *Obstn* as currently charted.

⁵⁸ PHB Revision- Concur. Retain 51 *Obstn* as currently charted.

⁵⁹ PHB Revision- Concur. Retain 48 *Rk* as currently charted.

⁶⁰ PHB Revision- Concur. Retain 50 *Obstn* as currently charted.

⁶¹ PHB Revision- Concur. Retain 57 *Obstn* as currently charted.

⁶² PHB Revision- Concur. Retain 62 *Rk* as currently charted.

⁶³ PHB Revision- Concur. Retain 60 *Rk* as currently charted.

⁶⁴ PHB Revision- Concur. Retain 59 *Rk* as currently charted.

⁶⁵ PHB Revision- Concur. Retain 59 *Obstn* as currently charted.

⁶⁶ PHB Revision- Concur.

⁶⁷ PHB Revision- See endnote 7.

⁶⁸ PHB Revision- Concur with clarification. It is recommended that the aids to navigation be charted using the most recent information from the USCG.

⁶⁹ PHB Revision- Concur.

⁷⁰ PHB Revision- Concur.

⁷¹ PHB Revision- Filed with the hydrographic records.

⁷² PHB Revision- Copy attached to DR.

⁷³ PHB Revision- Concur.

⁷⁴ PHB Revision- Copy attached to DR.

⁷⁵ PHB Revision- Concur with clarification. The evaluator recommends reviewing latest resources regarding the hydrographer's comments.

⁷⁶ PHB Revision- Do not concur. Long Beach Channel is portrayed on chart 18749, 39th edition.

⁷⁷ PHB Revision- Do not concur. The survey was compared to the 43rd edition of chart 18751, dated Aug. 2004.

⁷⁸ PHB Revision- Filed with the hydrographic records.

APPROVAL SHEET H10998

Initial Approvals:

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

Kouse Odmitico

Bruce Olmstead Cartographic Team Pacific Hydrographic Branch

Date:

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 Descriptive Report.

COR/WORA Date: 28 FEB 2005

Donald W. Haines LCDR, NOAA Chief, Pacific Hydrographic Branch

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10998

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
18751	12/20/04	R. Shipley	Full Part Before After Marine Center Approval Signed Via FULL APPLICATION
			Drawing No. OF SOUNDINGS, CURVES AND FRATURES FROM
			SMOOTH SHEET.
18749	12/23/04	R. Chipley	Full Part Beinte After Marine Center Approval Signed Via FULL APPLICATION
		manar 1	Drawing No. of SOUNDINGS, LURUES AND FEATURES from
			SMOOTH SHEET.
		No. 1 States	Full Part Before After Marine Center Approval Signed Via
			Drawing No.
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			Full Part Before After Marine Center Approval Signed Via
	1993		Drawing No.
	19.623		
			Full Part Before After Marine Center Approval Signed Via
	141237124		Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
L			

SUPERSEDES CAGS FORM 8352 WHICH MAY BE USED.