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.: PHP-10-1-94

Registery No.: H-10524

LOCALITY

State: California

General Locality: Tomales Bay

Sublocality: Shell Beach to Lagunitas Creek

1994

CHIEF OF PARTY
LT Guy T. Noll, NOAA

LIBRARY & ARCHIVES

DATE: APR 3 1995

H10524

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NOAA FORM 77-28 (11-72)

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

REGISTER NO.

H-10524

HYDROGRAPHIC TITLE SHEET

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.

PHP-10-1-94

State California

General locality Tomales Bay

Locality Shell Beach to Lagunitas Creek

Scale 1:10,000 Date of survey Jan 10-Feb 10, 1994

Instructions dated September 10, 1993 Project No. OPR-L209-PHP

Vessel Jensen Launch 1101 (EDP 0651), SeaArk Launch 1102 (EDP 0652)

Chief of party LT Guy T. Noll, NOAA

Surveyed by LT G.T. Noll, LT R.A. Fletcher, ST R.W. Adams, ST L.K. Simmons, ET E.O. Wernicke

Soundings taken by echo sounder, hand lead, pole Innerspace 448, leadline and sounding pole

Graphic record scaled by PHP Personnel

Graphic record checked by PHP Personnel

Verification by: I. Almacen Automated plot by PHS Xynetics Plotter

Evaluation by: I. Almacen

Soundings in ~~fathoms~~ meters ~~feet~~ at ~~MLW~~ MLLW and decimeters

REMARKS: Time in UTC. Revisions and marginal notes in black were generated during office processing. Some separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

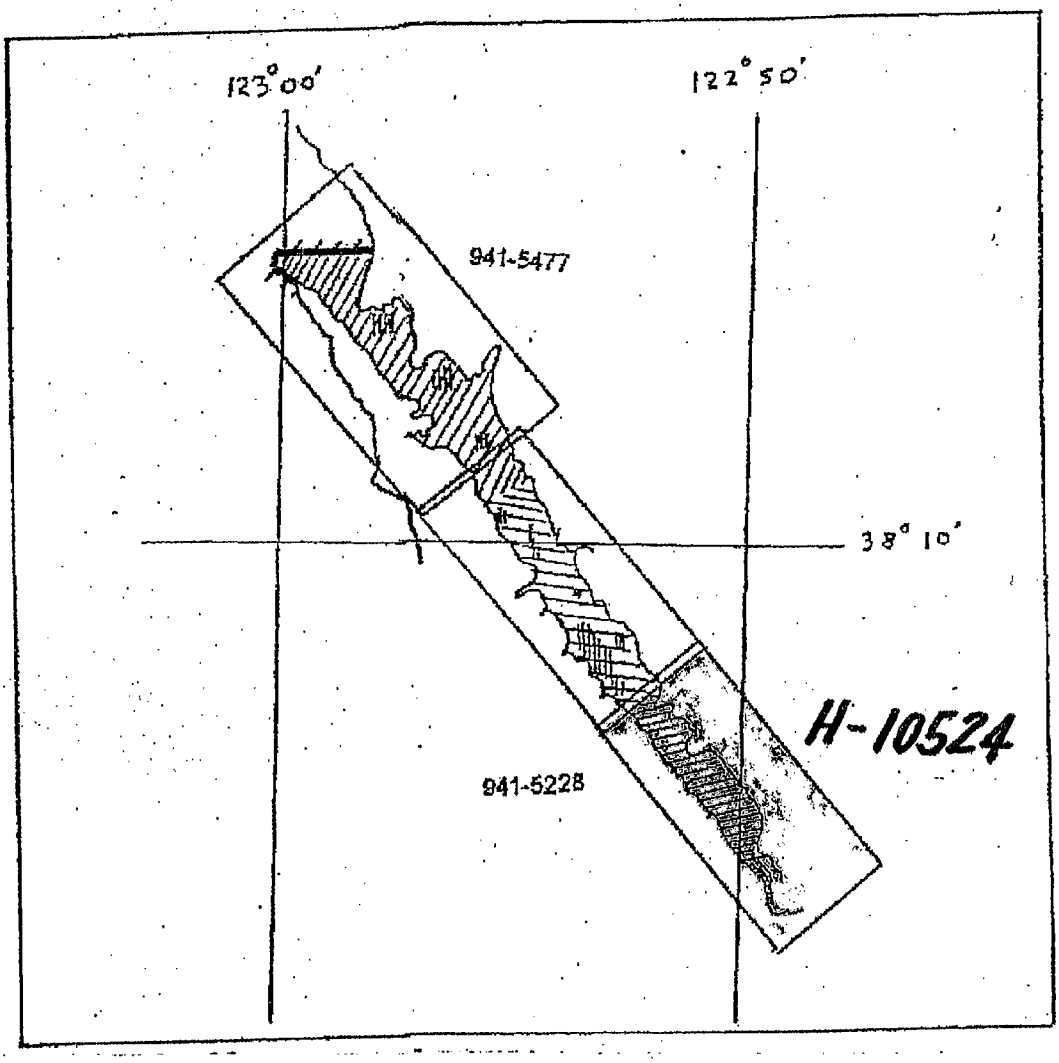
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

Sz 4/3/95 AWOIS and Surf - RWD 4/95

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

U.S. GOVERNMENT PRINTING OFFICE: 1984 - 652-007/41215

PROGRESS SKETCH
OPR-L209-PHP
TOMALES BAY, CALIFORNIA
OCTOBER 1993 - MARCH 1994
HYDROGRAPHIC SURVEY
PACIFIC HYDROGRAPHIC PARTY
LT GUY T. NOLL, CHIEF OF PARTY



Descriptive Report to Accompany Hydrographic Survey H-10524

Field Number PHP-10-1-94
Scale 1:10,000
1994

Pacific Hydrographic Party
Chief of Party: LT Guy T. Noll

A. PROJECT *(See EVAL RPT., Sec. 1)*

This basic survey was conducted in accordance with Hydrographic Project Instructions OPR-L209-PHP, Tomales Bay, California, dated September 10, 1993, as amended by CHANGE No. 1 dated October 26, 1993.

This hydrographic survey, registry number H-10524, was conducted to obtain modern data for the maintenance of existing nautical charts. The project responds to concerns expressed by several environmental associations regarding accretion of sediment at the head of the bay. Shoaling at the entrance to the bay is also causing some concern. Tomales Bay hosts a mariculture industry, a commercial herring fishery, and recreational boating and fishing.

This survey's sheet letter is "C" as specified by the project instructions. This survey is the third for Project OPR-L209-PHP. PHP-10-1-94 is the field number assigned this survey.

B. AREA SURVEYED *(See EVAL RPT., Sec. 1)*

The area surveyed is in the south end of Tomales Bay, California, from Shell Beach to Lagunitas Creek. H-10524 extends from latitude 38°07'40"N south to latitude 38°04'40"N. The shoreline defines the east-west limits. Plotter sheet "C" was skewed to 49° with overall sheet limits measuring 36 cm by 96 cm. Hydrographic limits for H-10524 are within those required by the Hydrographic Manual (Section 1.2.3, pp. 1-6).

Data acquisition was conducted from January 10, 1994, (DN 010) through February 10, 1994 (DN 041).

C. SOUNDING VESSELS

NOAA Launch 1101 (EDP No. 0651), a 29-foot Jensen, and NOAA Launch 1102 (EDP No. 0652), a 21-foot SeaArk, were used for all hydrography, velocity casts, bottom samples and for most shoreline verification. No changes to the standard vessel sounding configuration were necessary.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

The standard HDAPS software suite was used throughout this survey. Program names and versions are listed in Appendix VI.*

The following non-HDAPS computer programs were used:

Program Name	Version	Date
VELOCITY	2.00	1992
NADCON	1.01	1989
INVERS3D	1.00	1991
MONITOR	1.31	1993
GEOID90	1.00	1990
DPLOG.EXE	1.00	1993

Version 4.03 of the PC-DAS SURVEY Program was used for data acquisition.

A laptop-based detached position logging program, DPLOG.EXE, was developed and used for acquisition of detached positions of features inaccessible by launch. Documentation of the new program is included in Appendix VI.*

E. SONAR EQUIPMENT ✓

Not applicable.

F. SOUNDING EQUIPMENT ✓

The following Innerspace Model 448 (IN-448) echosounders, modified with custom EPROMS for HDAPS, were used:

Echosounder Type	Vessel EDP No.	Serial No.	DN Used
IN-448	0651	239	13-14
IN-448	0652	236	10,24-26,31,33,38,41

✓

Soundings were recorded in meters with an assumed speed-of-sound through water of 1500 m/sec. Depths encountered in the survey area range from -1.37 meters to 3.8 meters based on predicted tides.

(GTN (not applicable to this survey)

Occasional breaks in the continuity of the echogram occurred when rapid changes in range scale were required. The hydrographer does not consider these breaks significant unless greater than 6 mm at the survey scale (Section 1.4.6, Hydrographic Manual) or if they occurred over a shoaling trend (potential missed peak), in which cases the section or line was resurveyed.

* Filed with the hydrographic data.

No on-line calibration adjustments were required for the IN-448 on either vessel.

Sounding poles were made by PHP using commercial surveyor's level-rod tape. These self-stick, pre-printed tapes are calibrated in centimeter intervals. They were laminated with clear epoxy to two-inch diameter wooden rods finished with white marine epoxy paint. The sounding poles are 3.3 meters long. No further calibrations are required. The sounding poles were used for verifying depths where echosounder data were unreliable and for determining depths of rocks submerged during data collection.

PHP fabricated the leadlines following Hydrographic Survey Guideline (HSG) 69. Each leadline is 1/4-inch steering tiller rope. Shrink tubing, secured with epoxy glue, marks one-meter intervals from one to thirty. With the line under six pounds of constant tension, markings were calibrated with a steel surveyor's tape. The throwing end is a standard six-pound lead weight shackled to a stainless steel thimble bent to the bitter end. Leadlines were used for depth comparisons with the echosounder.
Leadline calibration forms are included in Separate IV* (Sounding Equipment Calibration and Corrections).

G. CORRECTIONS TO SOUNDINGS

Velocity of Sound

Corrections for the speed of sound through the water column were computed from data obtained with an Applied Microsystems Laboratories (AML) Velocity of Sound Profiler (S/N 03004). The VELOCITY Program was used to determine the speed of sound correctors. The following cast was used to determine the velocity correctors:

Cast	DN	DN Depth*	HDAPS Range	Cast Position Tables	Latitude	Longitude
1	21	7.1	10-41	6	38°07'31"N	122°52'23"W

*Extrapolated depth.

Separate IV contains copies of all velocity cast data and HDAPS Velocity Corrector Tables.*

The AML instrument was calibrated by Northwest Regional Calibration Center on March 17, 1993 (DN 076). A copy of this calibration report is included in Separate IV.*

* Filed with the hydrographic data.

Leadline Comparisons ✓

Leadline comparisons were taken on most days of hydrography to confirm proper digitization of the echosounder depth. These are annotated on the echograms; no systematic drift or error was observed.

Static Draft ✓

Static draft for VN 0652 was determined on May 21, 1993 (DN 141). First, the depth of the transducer face from a reference mark on the hull was measured. Next, with the launch in the water (fuel tanks half full and two crewmen aboard) the depth from this reference mark to the launch's waterline was measured. Combining the two measurements, a static draft of 0.4 meters was calculated. A static draft of 0.5 meters was determined for VN 0651 on January 19, 1993, (DN 019) using a method similar to above.

Dynamic Draft ✓

Settlement and squat measurements for VN 0651 were conducted on March 17, 1993, (DN 076) in San Francisco Bay at the Tiburon Fisheries Laboratory in Tiburon, CA. Settlement and squat measurements for VN 0652 were conducted on May 21, 1993, (DN 141) at the same location. Field records are included in Separate IV.*

Settlement and squat correctors are applied on line to all survey data via the HDAPS offset tables. Offset table 1 corresponds to VN 0651; offset table 2 corresponds to VN 0652. Settlement and squat correctors are reapplied during field processing using the REAPPLY program in HDAPS.

Corrections to Echosoundings ✓

Digitized soundings displayed on line were compared in real time with the analog trace to ensure reasonable agreement. The Innerspace model 448 echosounders used on VN 0651 and VN 0652 do not have the capacity to digitize or record a trace for depths less than 0.7 meters under the transducer, (1.1 meters actual depth in the case of VN 0652 and 1.2 meters in the case of VN 0651). Because project instructions stipulate definition of the zero-meter curve, it was necessary to record depths of less than 0.7 meters. Thus, when the vessel ran aground, as happened frequently, the echogram was annotated on line accordingly and both echogram and data printout were subsequently scanned and annotated to reflect a 0.0-meter sounding under the transducer at these positions. When the vessel was touching the bottom but still moving, the annotation was 0.1 meters. When the vessel was not aground but in depths shallower than 0.7 meters as indicated by truncation of the trace, the echogram was annotated at 0.6 meters if the trace was continuous; if the truncated trace was discontinuous, the echogram was annotated at 0.5 meters 0.4 meters

* Filed with the hydrographic data.

depending on the severity of the truncated trace. Occasional pole soundings support this interpretation of the data. Depths between 0.4 and 0.1 meters could not be estimated with confidence. Representative samples of the trace for both vessels were provided with survey H-10512, sheet A of this project.

Sea grass patches were encountered throughout the bay and often caused digitizing at the depth of the vegetation rather than the actual depth of the bottom. Where this occurred and where the trace and/or annotation were unambiguous, both trace and data printout were corrected.

Tide Correctors

In compliance with Section 5.9 of Project Instructions, the following tidal zone correctors, based on data for reference station Point Reyes, CA, were used for survey H-10524:

Tide Zone	Time Correction	Range Ratio	Table No.	Month
5	1.4	.95	20	Jan
5	1.4	.95	25	Feb

H. CONTROL STATIONS (See EVAL RPT, Sec. 2)

Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD 83). A copy of the HDAPS Control Station Table is included in ~~Appendix III~~ this report (List of Horizontal Control Stations). A separate Horizontal Control Report OPR-L209-PHP, Tomales Bay, was submitted to N/CG245 on November 24, 1993.

I. HYDROGRAPHIC POSITION CONTROL

Position Control

Differential GPS (DGPS) was used for position control throughout this survey. DGPS reference station Marconi DGPS 1993 was installed as described in the Horizontal Control Report in accordance with Field Procedures Manual (FPM), Section 3.4.6. The reference site was confirmed using the program MONITOR per FPM section 3.4.6.3. Copies of the scatter plot and the outlier.sum file are included in Separate III (Horizontal Position Control and Corrections to Position Data).*

* Filed with the hydrographic data.

DGPS Performance Checks

Per FPM, Section 3.4.4.1, DGPS performance checks were obtained on DNs 341(1993), 026, 038, 041 using a piling at Marshall's Boat Works or Daybeacon "5" G, both of which were positioned to Third Order, Class I standards (see Horizontal Control Report). All DGPS performance checks were successful; performance check forms are located in separate III. *

Positioning Equipment

The following GPS equipment was used:

Equipment Location	Type of Receiver/Antenna	Receiver Serial No.	Antenna Serial No.
DGPS Marconi	Trimble 4000SST	2952A00459	2951A00123
VN 0651	Ashtech (v.1E08D)	700417B1139	700378A0272
VN 0652	Ashtech (v.1E08D)	700417B1180	700378B0402
DPLOGGER Backpack	Ashtech (v.1E08D)	700417B1143	700378B0414

The unique serial numbers for all equipment are annotated on the daily master printout.

J. SHORELINE (See EVAL RPT., Sec. 2)

Sources

High-water shoreline detail shown on the field sheet was transferred by hand from a 1:10,000-scale enlargement of DM-10149.

Verification

Field notes from shoreline verification can be found on the echograms and on the DP overlay. A Detached Position Listing created by the HDAPS DP Program is included with the data files.

DM-Sheet Shoreline Agreement

DM-10149 shoreline was verified by its junction with the hydrographic data, by detached positions and by visual inspection. On a few occasions hydrographic data and detached positions were acquired during extreme high tides and data were recorded above the shoreline in marsh areas.

* Filed with the hydrographic data.

Significant discrepancies were as follows:

Disprovals

Several items shown on the shoreline manuscript DM-10149 were disproved. All but one were in intertidal areas (mud flats). Disproved items are plotted in blue on the DP plot. PHP recommends not charting the following items: Concur.

1) Two islets on DM-10149 are high points in the mud flats (intertidal zone):

Disproval DP	Latitude	Longitude
177	38°07'26.700"N (20)	122°51'46.055"W (60)
178	38°07'23.142"N (60)	122°51'47.670"W (80)

2) Two areas depicted as foul on DM-10149 were only high points in the mud flats:

Supporting Data	Latitude	Longitude
1451-1452,1496.6	38°05'32.000"N	122°49'49.000"W
1542-1545	38°05'09.000"N	122°50'11.000"W

3) One area depicted as a marsh islet on DM-10149 is actually a duck blind. The duck blind DP doubles as a disproval DP for the marsh islet: (Plot duck blind)

Disproval DP	Latitude	Longitude
129	38°05'33.206"N (20)	122°50'01.819"W (20)

4) A raft with a small statue on it was plotted on DM-10149 as an obstruction:

Disproval DP	Latitude	Longitude
153	38°06'04.976"N (90)	122°51'18.937"W (40)

(Plot the raft instead of obstn)

Additions

PHP found numerous items not shown on digital map 10149. PHP recommends charting the following items: Concur.

1) Discontinuous fence ruins that run from Millerton Point southeast toward Railroad Point were positioned as follows:

Detached Position	Comment
150	north end of fence ruins
144	mid point of fence ruins
145	turn in fence ruins
146	turn in fence ruins
147	south end, north section, fence ruins
148	north end, south section, fence ruins
132	turn in fence ruins
131	mid point in fence ruins
130	mid point in fence ruins
128	south end of fence ruins

(Refer to DP Listing in data files for positions)

2) PHP positioned two piers charted on NOS chart 18643. The following DPs mark the end of each pier:

DP	Latitude 30	Longitude 400
127	38°05'26.1~~12~~"N	122°50'28.~~397~~"W
1611	38°05'27.~~291~~ 310"N	122°50'32.340"W

3) PHP positioned pier ruins that are not on NOS chart 18643 but are at the same location as a pier from prior survey H-8356:

DP	Latitude 40	Longitude 10
121	38°06'39.0~~22~~"N	122°51'54.2~~06~~"W

4) PHP positioned numerous rocks; most were on NOS chart 18643; a few others were on prior survey H-8356 and a couple were on neither. The following DPs are rocks:

DP	Latitude	Longitude	HT	"Source"
104	38°07'07.~~180~~200"N	122°52'29.860"W	-0.4[6]	Chart 18643
105	38°07'07.~~291~~319"N	122°52'30.~~176~~189"W	-1.8[1]	H-10524
106	38°07'07.~~696~~710"N	122°52'30.~~677~~680"W	-0.5[7]	H-10524
107	38°07'08.~~955~~970"N	122°52'32.~~540~~550"W	-0.0[8]	H-10524
108	38°07'05.~~620~~640"N	122°52'28.~~009~~010"W	-0.5[7]	Chart 18643
109	38°07'04.~~300~~320"N	122°52'27.~~877~~880"W	-0.4[6]	Chart 18643
110	38°07'01.~~377~~390"N	122°52'25.~~386~~390"W	-1.5[7]	Chart 18643
112	38°06'59.~~671~~690"N	122°52'20.~~214~~220"W	-1.1[4]	Chart 18643
113	38°06'59.~~570~~590"N	122°52'19.~~738~~740"W	-0.7[9]	Chart 18643
114	38°06'58.~~262~~280"N	122°52'17.~~435~~440"W	-0.5[7]	Chart 18643
115	38°06'54.~~357~~370"N	122°52'14.230"W	-0.4[6]	Chart 18643
116	38°06'53.~~432~~450"N	122°52'11.~~155~~160"W	-0.0[2]	Chart 18643
117	38°06'52.~~799~~820"N	122°52'10.~~593~~600"W	-1.1[3]	Chart 18643
119	38°06'41.~~870~~890"N	122°51'58.~~216~~220"W	-0.4[7]	Prior H-8356
120	38°06'40.~~718~~730"N	122°51'56.~~595~~600"W	-0.1[2]	Prior H-8356
141	38°05'41.~~804~~820"N	122°49'48.~~465~~470"W	-1.8	Chart 18643
143	38°06'47.~~694~~710"N	122°52'08.~~485~~490"W	-0.7[6]	H-10524
156	38°06'59.~~849~~870"N	122°52'20.~~497~~500"W	~~-1.0~~ 0.9	Prior H-8356
158	38°06'58.~~843~~860"N	122°52'17.~~279~~280"W	0.2	Prior H-8356
159	38°06'59.~~184~~200"N	122°52'18.~~071~~080"W	0.6	H-10524
160	38°06'59.~~333~~350"N	122°52'18.~~498~~500"W	0.3	H-10524

5) The following duck blinds and duck blind ruins were positioned (reference DP Listing for latitudes and longitudes):

DP	Latitude	Longitude	HT	"Source"
129	38°05'33.~~206~~220"N	122°50'01.~~819~~820"W	-4.3	H-10524
133	38°05'59.~~911~~930"N	122°50'37.~~185~~190"W	-2.8[7]	H-10524
134	38°06'20.~~121~~140"N	122°50'37.~~936~~940"W	-3.9[7]	H-10524
136	38°06'15.~~897~~910"N	122°50'28.~~371~~380"W	-3.9[7]	H-10524
137	38°06'05.~~457~~470"N	122°50'28.~~686~~690"W	-1.8[9]	Prior H-8356
140	38°05'58.~~369~~390"N	122°50'17.~~683~~690"W	-2.0	H-10524
174	38°06'13.~~146~~160"N	122°50'25.~~787~~790"W	-0.6[7]	H-10524

6) The following piles, pipe and stakes were positioned (reference DP Listing for latitudes and longitudes):

DP	Latitude	Longitude	HT	"Source"
169	38°07'14.~~216~~230"N	122°51'58.~~558~~560"W	-1.9	H-10524
172	38°05'50.~~887~~900"N	122°50'42.~~326~~330"W	-1.3	Prior H-8356
173	38°05'52.~~795~~810"N	122°50'43.~~974~~980"W	-0.8	H-10524
175	38°06'14.~~921~~940"N	122°50'42.~~401~~410"W	-2.3[0]	H-10524
1184.~~1~~	38°06'47.~~614~~630"N	122°51'21.~~752~~760"W	0.7[6] (obstr)	H-10524 (stake, cov 0[6])
1464.5	38°06'11.~~265~~260"N	122°50'18.~~662~~660"W	~~-3.7~~ -4.3 (pipe)	Prior H-8356

7) The offshore end of a short portion of fence ruins running south from the point at latitude 38°06'57.5"N, longitude 122°51'31.0"W was positioned:

DP	Latitude	Longitude
161	38°06'53.~~838~~"N .840	122°51'31.~~930~~"W .940

8) A snag in the entrance to Lagunitas Creek was located (PN 1453+1) at latitude 38°05'34.~~819~~"N .840 longitude 122°50'03.~~574~~"W. .580 (09) Snag

9) A sunken fiberglass dingy was located (DP 176) at latitude 38°06'20.~~940~~"N .960 longitude 122°50'41.~~174~~"W. .180 PHP recommends charting an obstruction at that position. (04) Obstr concur.

10) Aquaculture debris was located (DP 1570) at latitude 38°07'14.~~031~~"N .050 longitude 122°51'57.~~252~~"W. .260 Obstr (08)

11) During acquisition of buffer lines on DN 010, the perimeter of two active oyster pens were defined. PHP recommends charting the oyster pen boundaries as shown on the DP/field shoreline plot. The centers of the pens are as follows:

PN	Latitude	Longitude
1037-1038(+5)	38°07'26.750"N	122°51'48.000"W (oyster pen)
1028(+4)-1033	38°06'50.000"N	122°51'09.000"W (oyster pen)

12) PHP contacted PG&E supervisor Jim Dunlap (707-648-5783)in December 1993 for the status of the buried cable area: latitude 38°06'42"N to latitude 38°06'32"N, longitude 122°51'06"W to longitude 122°51'57"W. Mr. Dunlap replied that he would provide maps showing cable areas within Tomales Bay. No reply has been received as of this date. PHP made numerous attempts to follow up the initial contact with Mr. Dunlap, to no avail. PHP observed buried cable crossing signs on both shores within the area above. Without any additional information, PHP recommends charting the cable area as shown on the ~~DP/field shoreline plot~~ chart. concur.

K. CROSSLINES

Nautical miles of crosslines (including buffer lines along shore) total 10.0, representing 25% of the mainscheme hydrography on H-10524. Agreement is generally good and well within limits defined in Section 4.6.1 of the Hydrographic Manual. ✓

All crossline soundings run on January 25 (DN 025) are slightly shallower than mainscheme soundings. The consistency of the difference, generally between 0.1 meters and 0.2 meters, indicates it is likely due to abnormal tides, possibly due to meteorological conditions. PHP expects application of smooth tides will improve the agreement between crossline soundings and mainscheme soundings. ✓ The application of actual tides improved the agreement between the mainscheme and crossline soundings.

L. JUNCTIONS (See EVAL RPT., Sec. 5)

The north end of survey H-10524 junctioned with contemporary survey H-10513 (sheet "B") a 1:10,000 scale survey. The common area surveyed was approximately 200 meters wide and from the west shore to the east shore of Tomales Bay. The soundings from the two surveys showed excellent agreement, generally within 0.1 meters.

M. COMPARISON WITH PRIOR SURVEYS (See EVAL RPT., Sec. 6)

PHP conducted a cursory prior survey comparison on Hydrographic Survey H-8356 (1957) a 1:10,000 scale survey. A more rigorous comparison will be performed by Pacific Hydrographic Section, N/CG245.

Comparison of non-Sounding Features

All point features (rocks, duck blinds, piles, stakes, etc.) from the prior survey not depicted on the digital map 10149 were positioned or disproved. All are listed in the DP List, section J "SHORELINE"; positioned items are plotted in red on the DP plot and disproved items are plotted in blue.

Comparison of Soundings

A sounding plot in feet was produced to facilitate sounding comparison with prior survey H-8356. The soundings in the northern portion of the survey area showed excellent agreement except for the area around latitude 38°07'30"N, longitude 122°52'07"W, which has deepened.

From Millerton Point south, there is considerable evidence of sediment deposition. In the area west of Millerton point at latitude 38°06'30"N, longitude 122°51'20"W, the depths found were approximately 0.3 meters (1 ft.) shoaler. The mud flats in the south end of the bay at the mouth of Lagunitas Creek have grown. The 0-foot curve has extended north approximately 150 meters. The most significant change is the area immediately south of Millerton Point. The area centered around latitude 38°06'15"N, longitude 122°50'45"W, has also shoaled approximately 0.3 meters (1 foot) moving the 0-foot curve toward the center of the bay 400 meters.

N. ITEM INVESTIGATION REPORTS

There were two AWOIS items within the limits of H-10524. Item investigation reports are included in ~~Separate VI~~ this report:

N1	AWOIS 5197~~1~~69 - Shoaling Reported
N2	AWOIS 5198~~0~~70 - Shoaling Reported

O. COMPARISON WITH THE CHART (See EVAL RPT., Sec. 7)

PHP conducted a cursory comparison with a stable-based 1:10,000-scale enlargement of Chart No. 18643, 1:30,000, 14th Edition, April 21, 1990. A more rigorous comparison will be performed by Pacific Hydrographic Section, N/CG245.

Comparison of Soundings

A sounding plot in feet was produced to facilitate sounding comparison with NOS chart 18643 which confirmed the same shoaling trends as described in section M "COMPARISON WITH PRIOR SURVEYS".

Some holes and depressions similar to those found on survey H-10513 were found approximately 150 meters from the west shore of Tomales Bay. On DN 025 these depressions and holes were developed to provide additional information for the University of San Francisco and University of Hawaii researchers, Dr. Tim Hollibaugh and Dr. Stephen Smith respectively, who are conducting research in the Bay.

Comparison of non-Sounding Features

All point features (rocks, piles, stakes, etc.) from chart 18643 that were not depicted on digital map 10149 were positioned or disproved. All are listed in the DP List, section J "SHORELINE"; positioned items are plotted in red on the DP plot and disproved items are plotted in blue.

Danger to Navigation

No dangers to navigation were found.

P. ADEQUACY OF SURVEY

This survey is a complete basic hydrographic survey and is adequate to supersede all prior surveys within their common areas.

Q. AIDS TO NAVIGATION (See EVAL RPT., Sec 7d)

No U.S.C.G aids were found in the survey area.

There were two private aids, yellow special purpose buoys, on survey H-10524. PHP acquired detached positions for the buoys on January 13, 1994 (DN 013). The buoys mark the offshore corners of ~~mari~~culture lease M-430-12. The following are the positions acquired:

DP	Latitude	Longitude
102	38°07'16.3~~12~~"N	122°52'01.1~~84~~"W
103	38°07'30.6~~45~~"N	122°52'05.0~~23~~"W

R. STATISTICS

Description	Quantities
Total Positions	657 ~~609~~
Total Detached Positions	85
Total Nautical Miles Hydrography	61
Square Nautical Miles Hydrography	1.75
Velocity Casts	1
Days of Production	11
Bottom Samples	5
Tide Stations	2

S. MISCELLANEOUS

Bottom samples were taken and submitted to the Smithsonian Institute in accordance with Hydrographic Manual, Section 1.6.3. Bottom sample positions and descriptions are plotted on the detached position plot. Copies of Oceanographic Log Sheet-M, Bottom Sediment Data, (NOAA Form 75-44) are included in Separate II.*

PHP found several holes and depressions approximately 150 meters off the west shore of Tomales Bay. These features were developed on DN 025. They appear to be fault related and may be of interest to researchers.

No magnetic anomalies were observed.

No anomalous tidal conditions were observed.

T. RECOMMENDATIONS (See EVAL RPT. Sec. 4)

During hydrographic operations significant shoreline discrepancies were evident; followup with Photogrammetry confirmed that the area was not flown at MLLW, but was instead flown at a +4.0-foot tide on July 25, 1991, 11:07-11:16 PST. Due to the timing of the photography used to compile digital map 10149 an inordinate amount of time was spent positioning items that should have been picked up by photogrammetry, as evidenced by section J "SHORELINE" of this descriptive report. PHP realizes there are many constraints for photogrammetry but would like to stress the importance of a shoreline source document that ~~was~~ should be compiled from photography flown at MLLW. concur.

Due to photogrammety's use of a single symbol for multiple types of items on the digital map, PHP requests the digital file in addition to the digital map. Or change to another symbol for non-single point rocky features. Concur.

* Filed with the hydrographic data.

U. REFERRAL TO REPORTS

Title	Date
1993 Horizontal Control Report OPR-L209-PHP	November 1993 ✓
Coast Pilot	February 1994

No separate Electronic Control Report or Corrections to Echo Soundings Report is scheduled for submittal.

Submitted for approval,

Richard A. Fletcher
Lieutenant, NOAA
Assistant Chief of Party

Approved and forwarded,

Guy T. Noll
Lieutenant, NOAA
Chief of Party

ITEM INVESTIGATION REPORT

ITEM NO.: N1
AWOIS Item 51969

CHART NO.: 18643 (1:30,000)
EDITION: 14th
CHART DATE: April 21, 1990

SURVEY: H-10524

DESCRIPTION AND SOURCE OF ITEM: CL638/81; Shoaling reported ("Almost no water below the Hull")

SOURCE POSITION: latitude 38°06'19.72"N
longitude 122°51'03.97"W (NAD83)

SURVEY REQUIREMENTS: Echosounder; Run additional splits off Millerton Point if shoaling indicated on basic line spacing.

METHOD OF INVESTIGATION: Mainscheme hydrographic sounding.

RESULTS OF INVESTIGATION: The area in question was surveyed on DN 024 with 50-meter line spacing (Fix # 1255-1306). No evidence of significant shoaling other than the general shoaling in the head of Tomales Bay, approximately 0.3 meters. A more detailed discussion of shoaling south of Millerton Point can be found in section M, COMPARISON WITH PRIOR SURVEYS, of the descriptive report.

COMPARISON WITH PRIOR SURVEYS: See section M, "COMPARISON WITH PRIOR SURVEYS", of the descriptive report.

COMPARISON WITH THE CHART AND CHARTING RECOMMENDATIONS: Comparison with the chart revealed excellent agreement between the chart and survey H-10524. The soundings on the chart exactly match the soundings found in the same area by this survey. There is evidence of slight shoaling in surrounding areas as described in section M, COMPARISON WITH PRIOR SURVEYS, of the descriptive report.

Hydrography from survey H-10524 sufficiently depicts the bottom topography in the south end of Tomales Bay including the area in question. There is no evidence of a distinct shoal.

Delete "Shoaling rep 1981" at latitude 38°06'19.72"N, longitude 122°51'03.97"W. *Concur, chart the area based on the present survey.*

ITEM INVESTIGATION REPORT

ITEM NO.: N2
AWOIS Item 51970

CHART NO.: 18643 (1:30,000)
EDITION: 14th
CHART DATE: April 21, 1990

SURVEY: H-10524

DESCRIPTION AND SOURCE OF ITEM: CL638/81; Shoaling reported ("Sand bar out to 125 ft").

SOURCE POSITION:
latitude 38°~~13~~ 06 '~~52~~ 57.00"N
longitude 122°5~~8~~ 1 '~~04.50~~ 34.00"W

SURVEY REQUIREMENTS: Echosounder, 75 meter search radius .

METHOD OF INVESTIGATION: Echosounder and Visual.

RESULTS OF INVESTIGATION: The area was surveyed with echosounder during mainscheme and buffer line hydrography (Fix # 1032-1033,1143-1146,1152-1154). On DN 033, during a dropping tide, PHP visually observed the reported shoal (picture enclosed with hydrographic data). The entire area surrounding the reported shoal consists of mud flats (intertidal zone/between MLLW and MHHW). The reported shoal is a high spot in the mud flats.

COMPARISON WITH PRIOR SURVEYS: Comparison with prior survey H-8356 revealed the area in question was not accessible, not surveyed, and within a fenced area noted as an oyster pen.

COMPARISON WITH THE CHART AND CHARTING RECOMMENDATIONS: Comparison with the chart revealed the same results as comparison with the prior.

Because the area in question is within the intertidal zone and part of the mud flats the hydrographer does not recommend charting a shoal. *Concur.*

Delete "Shl rep 1981" at latitude 38°06'57.00"N, longitude 122°51'34.00"W. *Concur. Chart the area based on the present survey.*

CONTROL STATIONS as of 8 Feb 1994

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
101	T	038:13:53.116	122:58:05.463	0	244	0.0	0.0		10/28/93	941-5477 SAND POINT T.G.
102	T	038:06:48.907	122:52:08.287	0	244	0.0	0.0		09/01/93	941-5288 INVERNESS T.G.
103		038:13:40.854	122:54:49.580	0	250	0.0	0.0		10/05/93	KEYS CADH
104		038:06:12.666	122:56:11.690	0	250	0.0	0.0		10/05/93	PT REYES NCMN
105		038:12:13.489	122:55:22.473	0	250	0.0	0.0		10/05/93	PRESTON 2
106		038:08:48.327	122:52:41.205	0	250	0.0	0.0		10/05/93	MARCONI DGPS REFERENCE STATION
107		038:13:55.730	122:58:04.870	0	250	0.0	0.0		10/05/93	LAWSON'S DGPS REFERENCE STATIO
108		038:12:49.850	122:57:35.559	0	250	0.0	0.0		10/05/93	DM "5"
109		038:09:04.626	122:53:19.927	0	250	0.0	0.0		10/05/93	MARCONI DOCK PILE

CONTROL STATION TABLE
OPR-L209-PHP
Tomales Bay, CA

PHP-10-1-94
Sheet C
H-10524

APPROVAL SHEET

for

SURVEY H-10524

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1993. The data were reviewed daily during acquisition and processing.

Considerable testing was performed by me on the DPLOG.EXE detached position logger data before these data were used to support this hydrographic survey. In the event that the HDAPS files for these data are corrupted, raw data printouts are included to assure data quality control.

The field sheets and supporting data have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CG245, Pacific Hydrographic Section.

Approved and Forwarded,

DATE: March 1, 1994

Guy T. Noll
Lieutenant, NOAA
Chief, Pacific Hydrographic Party

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: April 26, 1994

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-L209-PHP

HYDROGRAPHIC SHEET: H-10524

LOCALITY: California, Tomales Bay

TIME PERIOD: January 10 - February 10, 1994

TIDE STATION USED: 941-5477 Sand Point, Tomales Bay, Ca.
Lat. 38° 13.9'N Lon. 122° 58.1'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 13.05 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.5 ft.

REMARKS: RECOMMENDED ZONING

Apply a +45 minute time correction and a X1.06 range ratio to Sand Point, Ca. (941-5477).

Note: Times are tabulated in Greenwich Mean Time.

William M. Hubbard
CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10524

Name on Survey	A ON CHART NO. 18643	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
BIVAVLE	X									1
CALIFORNIA (TITLE)	X									2
INVERNESS	X									3
LAGUNITAS CREEK	X									4
MILLERTON POINT	X									5
RAILROAD POINT	X									6
SHELL BEACH	X									7
TEACHERS BEACH	X									8
TOMALES BAY	X									9
WILLOW POINT	X									10
										11
										12
										13
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										23
										24
										25

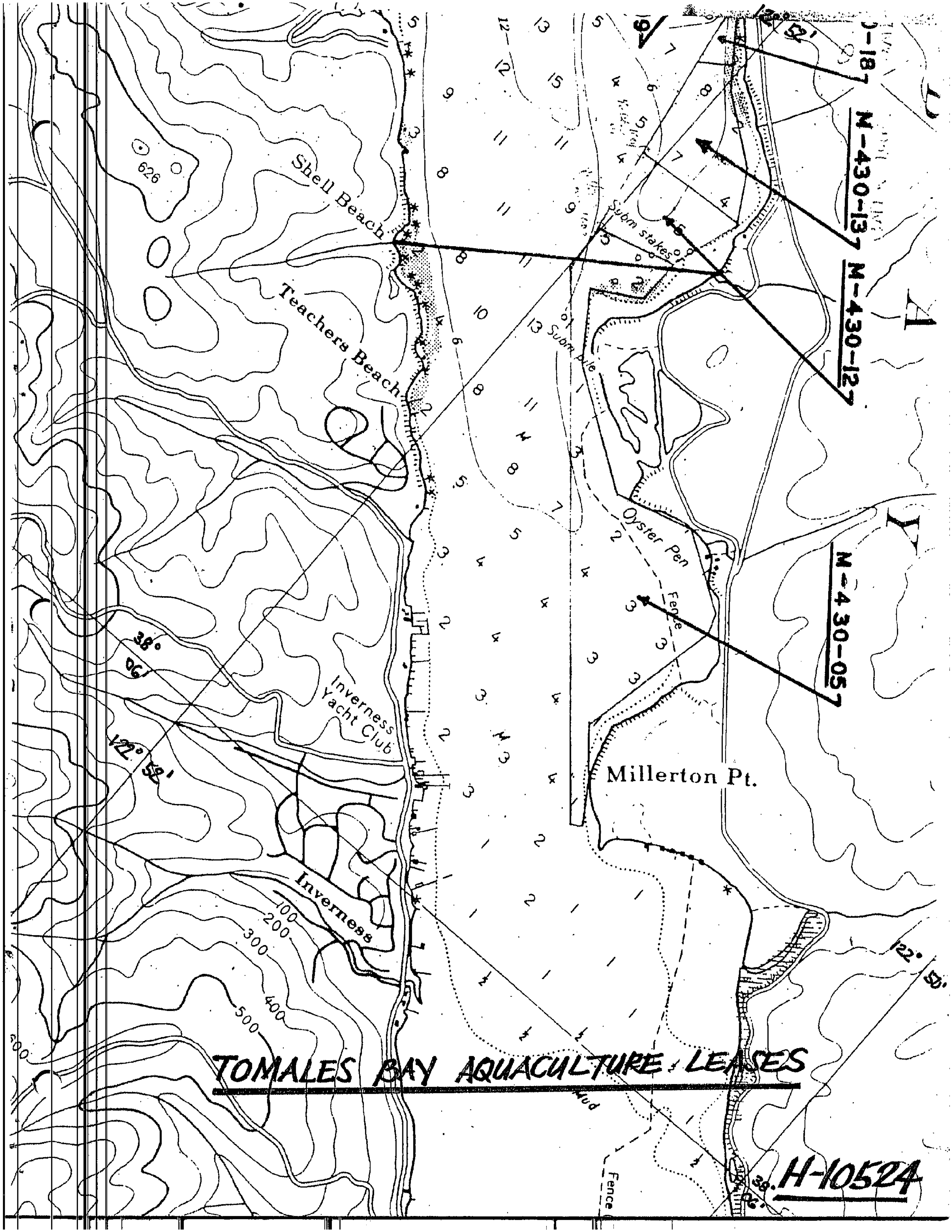
Approved:

Charles E. Harrington

Chief Geographer - N/CG2x5

JUL 14 1994

NOAA FORM 76-155 SUPERSEDES C&GS 197



Shell Beach
Teachers Beach
Subm stakes
Subm pile
Oyster Pen
Fence
Inverness Yacht Club
Millerton Pt.
Inverness
M-430-13
M-430-12
M-430-05
TOMALES BAY AQUACULTURE LEASES
H-10524

NOAA FORM 77-27(H) (9-83)

U.S. DEPARTMENT OF COMMERCE

HYDROGRAPHIC SURVEY STATISTICS

REGISTRY NUMBER: H-10524

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	1					
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

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			657.0
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			

	TIME-HOURS		
	VERIFICATION	*EVALUATION*	*TOTALS*
PRE-PROCESSING EXAMINATION			
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS	16.0		16.0
VERIFICATION OF SOUNDINGS	21.0		21.0
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	12.0		12.0
COMPARISON WITH PRIOR SURVEYS AND CHARTS		10.0	10.0
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS		21.0	21.0
EVALUATION REPORT			
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	41.0	31.0	80.0

Pre-processing Examination by LT D. Haines, LT M. Larsen	*Beginning Date* 3/3/94	*Ending Date* 4/12/94
Verification of Field Data by I. Almacen	*Time (Hours)* 49.0	*Ending Date* 12/13/94
Verification Check by	*Time (Hours)*	*Ending Date*
Evaluation and Analysis by I. Almacen	*Time (Hours)* 31.0	*Ending Date* 2/14/95
Inspection by Russ Davies	*Time (Hours)* 10	*Ending Date* 3-5-95

EVALUATION REPORT
H-10524

1. INTRODUCTION

Survey H-10524 is a basic hydrographic survey accomplished by the Pacific Hydrographic Party under the following Project Instructions.

OPR-L209-PHP, dated September 10, 1993
CHANGE NO. 1, dated October 26, 1993

This survey was conducted in California and covers the southern end of Tomales Bay. The surveyed area extends from the mouth of Lagunitas Creek to the vicinity of Shell Beach at latitude 38/07/30N. This survey was conducted to obtain the latest information for the maintenance of existing nautical charts of the area and also in response to the expressed concerns of environmentalists regarding the movement of sediments around the bay. The bottom consists entirely of mud. Depths range from -1.4 to 3.8 meters.

Tomales Bay hosts a mariculture industry including commercial and sport fishing. The aquaculture leases along the eastern shore of the bay are being managed by the state's Fish and Game office. A chartlet showing these aquaculture lease plots within the survey area is included in this report.

Depth curves depicted on the smooth sheet are the 0, 1, and 2 meters, as noted on the smooth sheet. The bottom characteristics of the survey area are annotated on a separate overlay.

Predicted tides for Point Reyes, California were used for the reduction of soundings during field processing. Approved hourly heights zoned from Sand Point, California, gage 941-5477, 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 1993 Horizontal Control Report for OPR-L209-PHP, contain adequate discussions of horizontal control and hydrographic positioning.

Differential GPS (DGPS) was used to control this survey. With the exception of one position where the maximum allowable horizontal dilution of precision (HDOP) limit of 3.75 has been exceeded during this survey, the quality of the data obtained is considered good. The DGPS performance checks conducted in the field were adequate.

Positions of horizontal control stations used during hydrography are 1993 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: -0.279 seconds (-8.601 meters)
Longitude: 3.975 seconds (96.852 meters)

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

The applicable shoreline manuscript for this survey is DM-10149, compiled at the scale of 1:20,000 and photographically enlarged to 1:10,000. This map originates from photography dated July 1991.

Shoreline and offshore features were verified during this survey. Some features found in the area were not depicted on the shoreline map as a result of the shoreline compilation deficiency mentioned in section T of the hydrographer's report. Also, a few items shown on this map were not found in the field. A detailed listing of these features is included in section J of the hydrographer's report. Newly located features along the coast have been incorporated on the smooth sheet and are shown in red.

3. HYDROGRAPHY

Except as noted 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.

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.

It was confirmed by the Photogrammetry Branch that the survey area was flown at approximately 4-foot of tide, not at MLLW and as a result some of the other shoreline features were not incorporated during the photogrammetric compilation. I concur with the hydrographer's recommendation concerning this deficiency in field procedure mentioned in section T of his report.

5. JUNCTIONS

Survey H-10524 junctions with the following survey.

Survey	Year	Scale	Area
H-10513	1993	1:10,000	North

The junction with survey H-10513 is complete. Comparison is considered good.

6. COMPARISON WITH PRIOR SURVEYS

H-8356 (1957) 1:10,000

Survey H-8356 covers the entire area of the present survey. Shoreline has generally changed along the south end of the bay since the 1957 survey. The present soundings particularly off Millerton Point is generally shoaler by about 0.3 meter (1ft.). The mud flats around the south end of the bay have accreted further north from the entrance to the channel leading to Lagunitas Creek towards the point.

A detailed listing of the located features originating from this prior survey is included in section J of the hydrographer's report.

Survey H-10524 is adequate to supersede the prior survey for the area of common coverage.

7. COMPARISON WITH CHART

Chart 18643, 14th Edition, April 21, 1990; scale 1:30,000

a. Hydrography

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

The following charted features originating from the prior survey were not found and should be deleted from the chart.

Feature	Latitude(N)	Longitude(W) NAD83
Rock awash	38/05/59.0	122/51/16.0
Rock awash	38/06/27.5	122/50/38.0
Rock awash	38/07/01.0	122/52/23.0
Subm Pile	38/07/09.0	122/51/59.0
Subm Stake	38/07/17.5	122/51/57.0
Subm Stake	38/07/22.0	122/51/57.0
Subm Stake	38/07/23.0	122/51/55.0
Subm Stake	38/07/25.0	122/51/52.5
Subm Stake	38/07/27.0	122/51/51.0

Some uncharted small holes and depressions found in the survey area were only developed to provide information for the University of Hawaii and University of San Francisco researchers who are conducting experiments in Tomales Bay.

The area covered by the oyster pen at latitude 38/07/27.0N, longitude 122/51/47.0W, was not developed during this survey due to the possibility of damaging the pen and the shellfish inside. It is recommended that the approximate area of the pen be charted as depicted on the smooth sheet.

Survey H-10524 is adequate to supersede charted hydrography within the common area.

b. AWOIS

AWOIS items 51969 and 51970 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 two (2) privately maintained floating aids located during this survey. These aids are used as the offshore markers for the aquaculture leases along the east side of the bay. These aids are in good condition and serve their intended purpose.

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

There are no danger to navigation found within the area of the survey.

The charted cable area in the vicinity of Millerton Point was not investigated, however, the cable crossing signs were observed on both sides of the bay during this survey. It is recommended that the cable area be retained as charted.

8. COMPLIANCE WITH INSTRUCTIONS

Survey H-10524 adequately complies with the project instructions.

9. ADDITIONAL FIELD WORK

This is a good hydrographic survey and no additional field work is recommended.

Isagani A. Almacen
Cartographer

APPROVAL SHEET
H-10524

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 disproval 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.

Russ W. Davies for Date: 3-5-95
Dennis J. Hill
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 Simmons Date: 3-8-95
Kathy Simmons
Commander, NOAA
Chief, Pacific Hydrographic Section

****

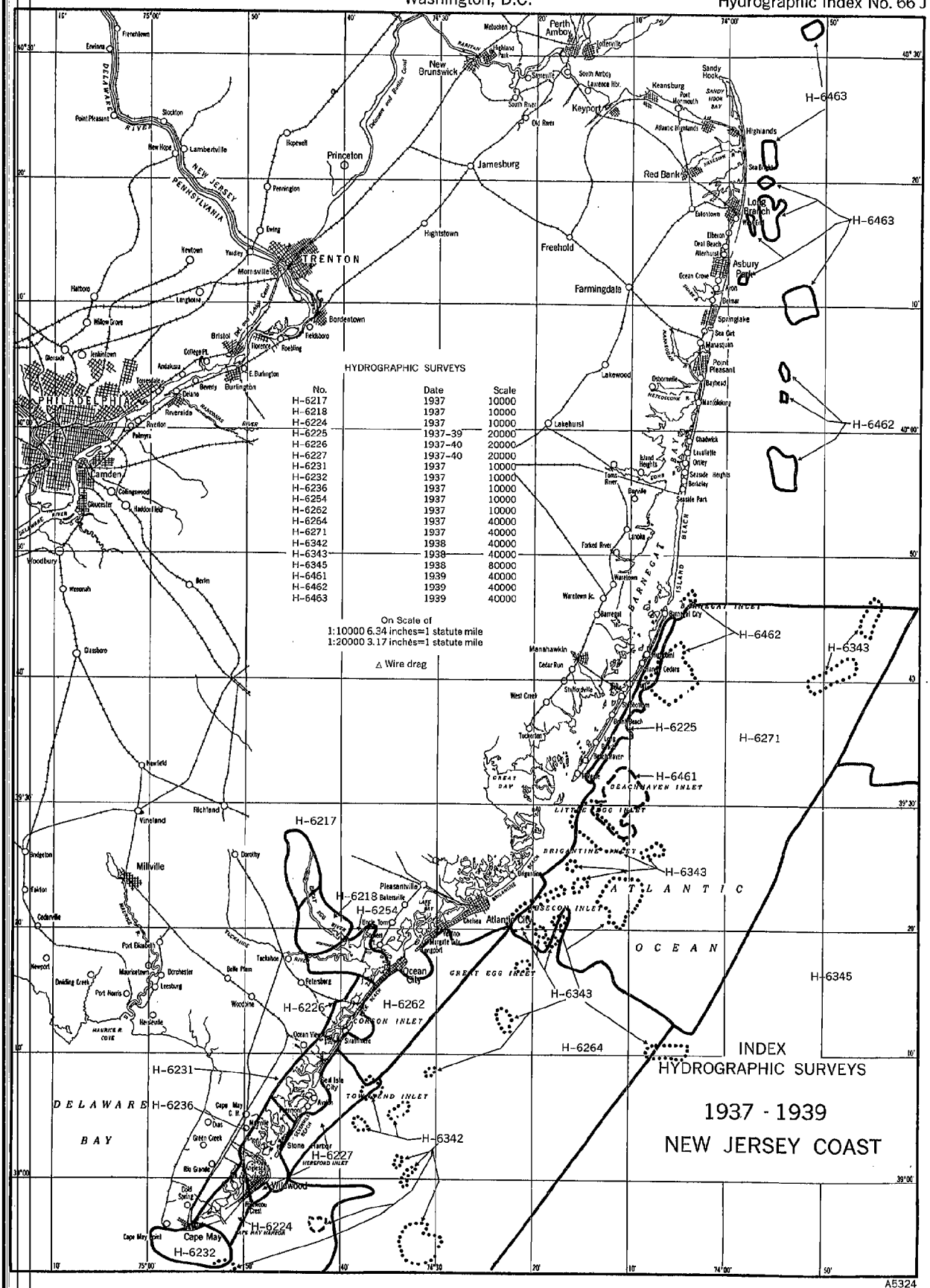
Final Approval

Approved:

Andrew A. Armstrong III for Date: 4/4/95
Thomas W. Richards
Captain, NOAA
Chief, Nautical Charting Division

DEPARTMENT OF COMMERCE
Environmental Science Services Administration
U.S. Coast and Geodetic Survey
Washington, D.C.

Hydrographic Index No. 66 J



A5324

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10524

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
18007	12/19/94	Bruce A. Olmstead	~~Full~~ Part Before ~~After~~ Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
18020	12/19/94	Bruce A. Olmstead	~~Full~~ Part Before ~~After~~ Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
530	12/19/94	Bruce A. Olmstead	~~Full~~ Part Before ~~After~~ Marine Center Approval Signed Via
			Drawing No. Examined, no corrections and soundings applied.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.