

8498

See Hydrographic Master Diag. West Coast.

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. CL-1159 Office No. H-8498

LOCALITY

State Oregon

General locality

Locality Crater Lake

1959

CHIEF OF PARTY

R. E. Williams

LIBRARY & ARCHIVES

DATE Nov. 17, 1959

8498

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

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

REGISTER No.

Field No. UL-1159

State OREGON

General locality CRATER LAKE

Locality

Scale 1:10,000 Date of survey 13 July - 26 August 1959

Instructions dated 19 June 1959

Vessel NPS Launch RANGER

Chief of party R.E. Williams

Surveyed by R.E. Williams

Soundings taken by fathometer, graphic recorder, hand lead, wire Recording fathometer

Fathograms scaled by R.R. Ross

Fathograms checked by M.H. Schilly

Protracted by P.W. Ward

Soundings penciled by P.W. Ward

Soundings in fathoms feet at ~~MSL~~ Lake level 6176.000 feet above MSL
(on staff) and are true depths
water level

REMARKS:

DESCRIPTIVE REPORT

to accompany

HYDROGRAPHIC SURVEY NO. CL-1159

Scale 1:10,000

R. E. Williams, Chief of Party

CRATER LAKE FIELD PARTY

A. PROJECT:

Project 10,000-809 was initiated on 6 July 1959 under project instructions dated 19 June 1959. Instructions were mailed to Lt. R. E. Williams, through the Seattle District Officer. ✓

B. SURVEY LIMITS & DATES:

Hydrographic survey was conducted on Crater Lake, Oregon. Date of beginning field work was 13 July 1959 and date of closing field work was 26 August 1959. ✓

C. VESSEL & EQUIPMENT:

The National Park Service 26 foot launch RANGER was used throughout the survey. The launch was moored at Wizard Island and transportation to and from the island was provided by the NPS 12 foot skiff and outboard motor. ✓

The hydrography was performed at various speeds between 350 rpm and 1200 rpm. The launch had a turning radius of 30 meters. ✓

Soundings were obtained with a EDO 255C fathometer, Serial No. 23, and an EDO UQN fathometer, Serial No. 40. Neither instrument was used exclusively at any depth due to the strength of signal return from various types of bottom. In some cases the EDO 255C was used on the B plus scale when the EDO UQN was not operating properly. A separate fathometer report is attached as Supplement A to this report. ✓

D. TIDE & CURRENT STATIONS:

One tide staff installed by the National Park Service was used throughout the survey. It was located approximately 500 meters west of the old boat landing and BM 6179BY USGS. The staff was read twice a day and the meaned daily reading was used to determine the tide reducer. Since no yearly tabulation had been made to determine the annual lowest datum of the lake, the arbitrary value of 6176.000 feet on the tide staff was used as a datum. Officials of the park service also informed the party that the lake went through a long range cycle of annual water levels. Therefore no datum would be good for more than one or two years. ✓

E. SMOOTH SHEET:

The smooth sheet was constructed by personnel of the Crater Lake Field Party and verified and inked by the Seattle Processing Office. Shoreline was transferred by use of blue line prints of T-sheets T-11190 and T-11191. ✓

An attempt was made to locate all hydrographic signals by standard Photogrammetric methods. However, due to the complete lack of adequate photo coverage on the ratio prints at the scale of the survey, sextant locations of several signals was necessary. In some areas of the lake only one photograph had been blown up to the 1:10,000 scale and used in the compilation of the T-sheets, consequently the normal radial plot method of photo-hydro location could not be used.

Verification of shoreline detail was made at the same time as control and hydrographic stations were plotted.

F. CONTROL STATIONS:

Five control stations in the area were established by CDR H. G. Cole in 1953 and by CDR V. R. Sobieralski in 1957. One station was marked by a topographic disk, PALI 1957, was established in 1957 by intersection from other control stations in the area.

G. SHORELINE & TOPOGRAPHY:

Shoreline was taken from Topographic Sheets T-11190 and T-11191, 1958 based on photography taken by the U. S. Geological Survey in 1953. No changes in shoreline features were noted.

Low water line was not defined by soundings because with no tide involved, the shoreline and low water line coincide.

H. SOUNDINGS:

All depths were measured with the use of EDO fathometers. One for a normal range of 0 to 240 fathoms and one for a range of 0 to 600 fathoms.

An initial error was experienced with the EDO UQN fathometer that indicated large discrepancies in line crossings in the deeper part of the lake. It was discovered that the starting point of keyed initial pulse was not registering on the fathogram. Therefore it was necessary to make a daily tabulation of comparisons between the UQN and 255 fathometers on fixes in areas of regular bottom. This daily variation was applied to all UQN soundings. The details of this instrument error are covered in the enclosed fathometer report.

I. CONTROL OF HYDROGRAPHY:

All hydrography was controlled by visual sextant fixes. The major problem was the avoidance of swingers in the circular body of water. No adjustments on any portion of the work was necessary.

J. ADEQUACY OF SURVEY:

Survey is adequate to supersede all prior surveys for charting purposes. No portion of survey is incomplete. *No prior surveys by this Bureau in this area.*

There are no junctions made with prior surveys.

No non-standard depth curves were used. However, additional 10 fathom depth curves between 120 and 160 fathoms drawn in the vicinity of Latitude $42^{\circ} 56'$, Longitude $122^{\circ} 07'$ may indicate a small broken volcanic cone.

see P
of Review

K. CROSSLINES:

8% crosslines were run covering various areas of project, including development of cone in the vicinity of Latitude $42^{\circ} 57.7'$, Longitude $122^{\circ} 05.8'$. All crosslines are in agreement with the main scheme of hydrography.

L. COMPARISON WITH PRIOR SURVEY:

Comparison was made with survey published by National Park Service in June 1957. It is believed that this survey is a general composite of all prior depth measurements taken in the lake. Coverage by this survey is very sparse and has small basis for comparison with current survey. Depths compared are in general agreement with most differences amounting to less than 2 fathoms. Depth curves do not indicate true bottom configuration except in a very general fashion. Most bottom features developed are indicated roughly on the 1957 survey.

No inshore features, rocks, etc. were indicated on the previous survey.

It is believed that the primary reason for the large differences between prior surveys and current survey was the lack of proper horizontal control and inadequate depth measuring equipment.

M. COMPARISON WITH CHART:

There are no published charts of this area, by this Bureau

N. DANGERS AND SHOALS:

A narrow shoal shelf of from 30 to 60 meters wide exists virtually all around the lake. A somewhat wider, more foul shelf, is located between Latitude $42^{\circ} 56.1'$ and $42^{\circ} 57.4'$ on the west side of the lake. This area is strewn with many large boulders that have fallen into the lake from the crater rim.

One small shoal reef bares during periods of low water at Latitude $42^{\circ} 56.2'$, Longitude $122^{\circ} 09.2'$.

Generally the inshore area around Wizard Island and smaller islands to the Northwest is also foul.

O. COAST PILOT INFORMATION:

Not applicable.

P. AIDS TO NAVIGATION:

Not applicable.

Q. LANDMARKS FOR CHARTS:

Not applicable.

R. GEOGRAPHIC NAMES:

See Addenda B.

S - Y. Not Used.

Z. TABULATION OF APPLICABLE DATA:

- a. Fathometer Report
- b. Geographic Names
- c. Temperature and Salinity Observations
- d. Signal List
- e. Tabulation - EDO UQN Fathometer Error
- f. Tabulation - Tide Staff Readings
- g. Tabulation - Bar Check Corrections & Fathometer Error
Computation

Respectfully submitted:



R. E. WILLIAMS
LCDR, C&GS
CHIEF OF PARTY

FATHOMETER REPORT

to accompany

DESCRIPTIVE REPORT

CL-1159

1. **EQUIPMENT:** The survey was accomplished with a EDO 255C fathometer, Serial No. 23, and a EDO UQN fathometer, Serial No. 40. This combination enabled all depth ranges to be covered. Both fathometers were calibrated for 800 fathoms per second.

The transducer for the EDO UQN fathometer was of conventional design and mounted in a wooden fairwater. The fairwater was suspended over the side as an outboard fish set at a depth of 24 inches. Due to the extreme weight of the fish in relation to the launch, the fish was hinge mounted so as to permit the transducer to remain vertical when running crosswise to a chop or into a head sea. Also this method produced a very good fathogram under all conditions of operation.

The transducer for the EDO 255C fathometer was an experimental ceramic block design, also mounted in a wooden fairwater suspended over the side as an outboard fish at a depth of 30 inches. This transducer was extremely light and was mounted rigidly to the gunwale. The power output of this transducer was approximately 12 decibels of sound at 60° of cone. This made it extremely sensitive to side echos, shadows, and false bottoms. Also in some areas it penetrated the soft upper bottom deposit and reflected from a more impervious lower layer. The upper surface was shown on the fathogram only by a very faint shadow. This is verified by comparing simultaneous fathograms from the UQN and 255 fathometers.

Both outboard fish were mounted on the starboard side of the 26 foot National Park Service launch used throughout the project.

2. **DRAFT CORRECTORS:** Both transducers were set to a measured depth after all equipment and personnel were in the launch. This prevented an erroneous depth measurement caused by a subsequent change in weight or balance in the launch.

All initial settings were held at zero and fathometer error on the 255C EDO was determined by daily bar checks. The UQN fathometer was then tied to the 255C fathometer by daily tabulation of simultaneous depth comparisons.

3. **BAR CHECKS:** Bar checks were taken daily at a depth range of from 10 to 80 feet on the 255C fathometer. Bar consisted of a flat plate 8" x 48" suspended from two equally marked bar lines. Since the UQN fathometer could not be read accurately to less than 6 feet on the 600 fathom scale, no attempt was made to make bar check measurements from it's transducer. A daily tabulation of comparative readings

were taken between the two fathometers and this meant tabular difference was applied to all UQN fathometer soundings.

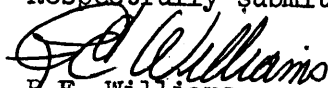
The resultant applied correction was a combination of draft, machine error, and initial error.

4. TESTS: Both fathometers were straight line recorders, hence no paper correction was involved. The 60 cycle frequency meter on the 255C fathometer was calibrated to determine its error and was found to be plus 0.38 cycle. The fathometer was then held at 60.38 cycles throughout the survey.

A deep comparison of depths between the two fathometers was made after a consistent 6 to 8 fathom crossline ^{difference} was found towards the end of the survey. This test showed the UQN fathometer to be reading consistently deep due to an improper initial setting. The initial keying system had been giving spasmodic trouble from the beginning and daily adjustment and maintenance was necessary. Therefore the error was not constant. This problem was written up as Hydrographic Instruction No. 3, Amendment 1. To determine a corrector to apply to all UQN fathometer soundings, a daily tabulation of soundings on fix marks in areas of flat bottom was made. This meant difference was then applied to the UQN soundings. A tabulation of these values is attached to this report. The resultant smooth sheet soundings on crosslines are in complete agreement.

5. TEMPERATURE & SALINITY CORRECTION: The survey was conducted in a body of extremely pure fresh water with equipment calibrated for a salt water velocity of 800 fathoms per second. This necessitated an unusually high Velocity correction of approximately -3%. This makes a difference of about 10 fathoms between boat sheet values and smooth sheet values in the deeper regions of Crater Lake.

Respectfully submitted;



R.E. Williams
LCDR, C&GS
Chief of Party

TABULATION - VELOCITY CORRECTION

CORRECTION (fathoms)	30 July 1959 DEPTH (fathoms)	19 Aug. 1959 DEPTH (fathoms)	MEAN DEPTH (fathoms)
-0.0	6.5	9.0	7.8
-0.1	11.8	15.0	13.4
-0.2	16.8	20.0	18.4
-0.3	21.2	24.0	22.6
-0.4	25.1	27.5	26.3
-0.5	29.1	30.8	30.0
-0.6	33.0	34.0	33.5
-0.7	36.7	37.5	37.1
-0.8	40.5	41.0	40.8
-0.9	44.1	44.2	44.2
-1.0	47.8	47.6	47.7
-1.1	51.4	51.0	51.2
-1.2	55.1	54.6	54.8
-1.3	59.0	58.0	58.5
-1.4	62.5	61.3	61.9
-1.5	66.0	64.5	65.2
-1.6	69.5	67.7	68.6
-1.7	73.1	71.1	72.1
-1.8	76.8	74.5	75.6
-1.9	81.3	77.5	79.4
-2.0	84.0	80.8	82.4
-2.1	87.3	84.0	85.6
-2.2	91.0	87.4	89.2
-2.3	94.8	90.7	92.8
-2.4	98.1	94.0	96.0
-2.5	105.0	100.0	102.5
-3.0	127.0	118.0	122.0
-3.5	147.0	137.0	142.0
-4.0	172.0	159.0	166.0
-5.0	213.0	195.0	204.0
-6.0	253.0	231.0	242.0
-7.0	300.0	272.0	286.0
-8.0	340.0	312.0	326.0
-9.0	385.0	352.0	368.0

SIGNAL LIST
CL-1159

SIGNAL	PHOTO NO.
ABB ✓	1-75
ACE ✓	1-212
ANT ✓ HYDRO	1-75
ARM ✓	1-76
AXE ✓	1-213
BAG ✓	1-75
BAM ✓ HYDRO	1-75
BAT ✓	1-213
BIG ✓	1-76
BUM ✓	1-212
CAR ✓	1-75
COM ✓ HYDRO	1-213
CRY ✓	1-213
CUT ✓	1-212
DAB ✓ HYDRO	1-213
DAY ✓	1-75
DIP ✓	1-212
DUD ✓	1-214
EAR ✓	1-75
EGG ✓ HYDRO	1-212
EGO ✓	1-214
END ✓	1-211
FAR ✓	1-76
FIN ✓	1-75
FIR ✓	1-75
FOG ✓ HYDRO	1-211
FOX ✓ HYDRO	1-212
GAP ✓ HYDRO	1-76
GAS ✓	1-75
GUM ✓	1-212
GUN ✓	1-75
HAG ✓	1-75
HAT ✓	1-75
HOP ✓	1-212
ICE ✓	1-75
IRK ✓	1-211
JAM ✓	1-75
JAP ✓	1-211
JUG ✓	1-75
KEY ✓	1-211
KID ✓	1-75
KIN ✓	1-75
LEG ✓	1-211
LOG ✓	1-75
LOT ✓	1-75
MAR ✓ HYDRO	1-75
MAT ✓	1-211
MIX ✓	1-170
NIP ✓	1-211
NUT ✓	1-75
OAK ✓	1-211
OIL ✓	1-75
PEG ✓	1-75
PIE ✓ HYDRO	1-211
PIG ✓	1-214
QUO ✓	1-213

ALSO ON SHEET

- △ PALL, 1957
- △ BM 7-8 (BPR), 1957
- TOP
- △ SINNOTT, 1957
- △ WATCHMAN LOH. 1953
- △ HILLMAN (USGS), 1931

SIGNAL

RAT ✓
ROC ✓ HYDRO
RUM ✓
SAM ✓
SUB ✓
TAX ✓
TRY ✓
USE ✓
VAN ✓
VEX ✓
WAD ✓
WIT ✓
YAK ✓
YES ✓
ZIG ✓
ZOO ✓

PHOTO NO.

1-213
1-212
1-211
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1-76
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1-212
1-76
1-212
1-76

TABULATION - EDO UQN FATHOMETER

INITIAL ERROR CORRECTION

DATE	DAY LETTER	CORRECTION (fathoms)
5 Aug. 1959	b	-1.8
6 Aug. 1959	c	-2.2
7 Aug. 1959	d	-2.0
10 Aug. 1959	e	-0.9
11 Aug. 1959	f	+0.1
12 Aug. 1959	g	-0.3
13 Aug. 1959	h	+0.6
14 Aug. 1959	j	-0.6
16 Aug. 1959	k	-1.1
17 Aug. 1959	l	-3.6
18 Aug. 1959	m	-5.1
21 Aug. 1959	p	-1.8
22 Aug. 1959	q	-1.3

TABULATION - BAR CHECK CORRECTION

DATE	DAY LETTER	MEAN CORRECTION (fathoms)
3 Aug. 1959	a	+ 0.4
5 Aug. 1959	b	0.4
5 Aug. 1959	b	0.4
6 Aug. 1959	c	0.4
6 Aug. 1959	c	0.4
7 Aug. 1959	d	0.2
7 Aug. 1959	d	0.3
10 Aug. 1959	e	0.3
10 Aug. 1959	e	0.4
11 Aug. 1959	f	0.1
11 Aug. 1959	f	0.4
12 Aug. 1959	g	0.4
12 Aug. 1959	g	0.4
13 Aug. 1959	h	0.1
13 Aug. 1959	h	0.4
13 Aug. 1959	h	0.3
14 Aug. 1959	j	0.3
14 Aug. 1959	j	0.4
16 Aug. 1959	k	0.1
16 Aug. 1959	k	0.3
16 Aug. 1959	k	0.4
17 Aug. 1959	l	0.3
17 Aug. 1959	l	0.3
17 Aug. 1959	l	0.3
18 Aug. 1959	m	0.3
18 Aug. 1959	m	0.2
21 Aug. 1959	p	0.3
21 Aug. 1959	p	0.3
21 Aug. 1959	p	0.3
22 Aug. 1959	q	0.4
22 Aug. 1959	q	<u>0.2</u>
		+ 0.3 (mean) - Total Error*

Edo UQN transducer set at 24 inches depth (+ 0.3 fm.)

Edo 255 transducer set at 30 inches depth (+ 0.4 fm.)

Total Error = Velocity correction (-0.1) + draft (+0.4) = + 0.3 fm.*

* No Edo 255 machine error.

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. 8498...

Records accompanying survey:

Boat sheets 2; sounding vols. 5; wire drag vols.;
 bomb vols.; graphic recorder rolls 6 - Envelopes - *no fath-on "N" 44*
 special reports, etc. 1 - Smooth sheet. 1 - Special report. CL-1959 .
1 - Descriptive report. - *SR & DR in one vol.*

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

Number of positions on sheet	.....	<u>1336</u>
Number of positions checked	.....	<u>134</u>
Number of positions revised	.....	<u>40</u> <u>75</u>
Number of soundings revised (refers to depth only)	.....	258
Number of soundings erroneously spaced	.....	<u>1400</u>
Number of signals erroneously plotted or transferred	.....	.....
Topographic details	Time	<u>8 hrs.</u>
Junctions	Time	.....
Verification of soundings from graphic record	Time	<u>16 hrs.</u>

Verification by William E. Raig Total time 116 hrs. Date 12/17/59

Reviewed by W. Beslund Time 12 Date 1-26-60

GEOGRAPHIC NAMES

Chaski Bay

Cleetwood Cove

Cloudcap Bay

Crater Lake

Danger Bay

Eagle Cove

Eagle Point

Eagle Crags

Governors Bay

Grotto Cove

Llao Bay

Palisades

Palisades Point

Phantom Ship

Pumice Point

Redcloud Cliff

Sentinel Rock

Skell Channel

Skell Head

Steel Bay

Wizard Island

All names listed above are decisions of the Board of Geographic Names. Additional decisions can be furnished by this section for features other than those named on the overlay.

GEOGRAPHIC NAMES SECTION
December 28 1959

George D. Bass

TABULATION - STAFF READINGS

DATE	DAY	LETTER	READINGS	MEAN	CORRECTION *
3 Aug. 1959	46	a	6177.25 6177.23	6177.24	-0.2 fm. -1.24 ft.
5 Aug. 1959	51	b	6177.20 6177.20	6177.20	-0.2 fm. -1.20 ft.
6 Aug. 1959	87	c	6177.18 6177.18	6177.18	-0.2 fm. -1.18 ft.
7 Aug. 1959	109	d	6177.16 6177.16	6177.16	-0.2 fm. -1.16 ft.
10 Aug. 1959	107	e	6177.12 6177.12	6177.12	-0.2 fm. -1.12 ft.
11 Aug. 1959	73	f	6177.08 6177.08	6177.08	-0.2 fm. -1.08 ft.
12 Aug. 1959	98	g	6177.04 6177.02	6177.03	-0.2 fm. -1.03 ft.
13 Aug. 1959	96	h	6177.02 6177.02	6177.02	-0.2 fm. -1.02 ft.
14 Aug. 1959	87	j	6177.00 6177.00	6177.00	-0.2 fm. -1.00 ft.
16 Aug. 1959	120	k	6176.96 6176.96	6176.96	-0.2 fm. -0.96 ft.
17 Aug. 1959	126	l	6176.90 6176.88	6176.89	-0.1 fm. -0.89 ft.
18 Aug. 1959	134	m	6176.86 6176.86	6176.86	-0.1 fm. -0.86 ft.
19 Aug. 1959	60	n	6176.86	6176.86	-0.1 fm.
21 Aug. 1959	120	p	6176.90 6176.86	6176.88	-0.1 fm. -0.88 ft.
22 Aug. 1959	52	q	6176.84 6176.84	6176.84	-0.1 fm. -0.84 ft.
	1366				

Correction Applied: -0.2 fm. - a through k day
 -0.1 fm. - l through q day

* Datum for survey-- 6176.000 ft. on staff.

DIVISION OF CHARTS

REVIEW SECTION -- NAUTICAL CHART BRANCH

REVIEW OF HYDROGRAPHIC SURVEY

REGISTRY NO. H-8498

FIELD NO. CL-1159

Oregon, Crater Lake

SURVEYED: July-Aug. 1959

SCALE 1:10,000

PROJECT NO. 10,000-809

SOUNDINGS: Edo 255c Depth Recorder
Edo UQN Depth Recorder

CONTROL: Sextant fixes
on shore signals

Chief of Party ----- R. E. Williams
Surveyed by ----- R. E. Williams
Protracted by ----- P. W. Ward
Soundings plotted by ----- P. W. Ward
Verified and inked by ----- W. E. Roig
Reviewed by ----- I. M. Zeskind
Inspected by ----- R. H. Carstens

DATE: 1/26/60

1. Shoreline and Control

The shoreline originates with the unreviewed air-photographic surveys T-11190 and T-11191 of 1953-57, supplemented by a small portion of boat sheet shoreline which is shown in red in lat. $42^{\circ}56.42'$, long, $122^{\circ}09.38'$.

The source of the control is given in the Descriptive Report.

2. Sounding Line Crossings

Depths at crossings are in good agreement.

3. Depth Curves and Bottom Configuration

The usual depth curves were adequately delineated. The 130 fm. curve was drawn to better define the bottom configuration in several areas which lie one to two miles east of Wizard Island.

This is a survey of a circular body of water which is about 6 miles in diameter and whose water level is over 6000 feet above MSL. The bottom has relatively smooth slopes except for the protrusion of two cones in lat. $42^{\circ}56.45'$, long. $122^{\circ}07.80'$ and lat. $42^{\circ}57.65'$, long. $122^{\circ}05.8'$, and

the irregularities east of Wizard Island. In general, the bottom drops abruptly from shore to depths of 100 fms. and in the deepest portion depths as great as 322 fms. are found.

4. Junctions with Contemporary Surveys

There are no junctions as the survey covers the entire body of water.

5. Comparison with Prior Surveys

There are no contemporary surveys by this Bureau of Crater Lake.

6. Comparison with Charts

There are no charts of the area by this Bureau.

7. Condition of Survey

a. The sounding records and Descriptive Report are complete and comprehensive.

b. The smooth plotting was accurately done, except as follows:

Soundings were not plotted on lines between positions. The soundings on each position were displaced and the soundings between positions were erroneously plotted on a line between the displaced sounding and the preceding hydrographic position. The soundings were correctly located during verification of the smooth sheet.

Numerous soundings which were corrected in red in the sounding records were not shown in their correct value on the smooth sheet. These soundings were corrected during verification of the smooth sheet.


8. Compliance with Project Instructions

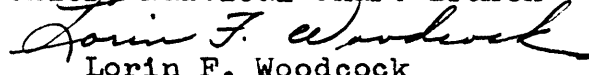
The survey adequately complies with the Project Instructions.

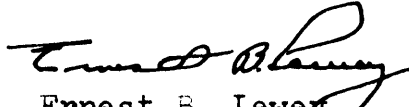
9. Additional Field Work Recommended


This is a basic survey and no additional field work is recommended.

Examined and Approved:


Max G. Ricketts
Chief, Nautical Chart Branch


Lorin F. Woodcock
Chief, Hydrography Branch


Ernest B. Lewey
Chief, Division of Charts


Samuel B. Grenell
Chief, Division of Coastal Surveys

