

5009

Diag. Cht. No. 4115

C. & G. SURVEY

L. & A

MAY 18 1930

Acc. No.

Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

Hawaiian Is.
State. ~~Territory of Hawaii~~

11-5613

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 8 **5009**

LOCALITY:

~~Island of Hawaii~~

Northwest Coast

Puako Bay

U. S. C. & G. S. S. GUIDE

192 '9

CHIEF OF PARTY:

K. T. Adams

5009

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

REG. NO. 5009

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. 8

REGISTER NO. **5009**

State ~~Territory of~~ Hawaiian Is.

General locality NW. Coast ~~Island~~ of Hawaii

Locality Puako Bay

Scale 1:2,500 Date of survey Jan 22 - 27, 19 29

Vessel U.S.C. & G.S.S. GUIDE

Chief of Party K. T. Adams

Surveyed by W. H. Bainbridge

Protracted by J. S. Morton

Soundings penciled by J. S. Morton

Soundings in fathoms -feet

Plane of reference M.L.L.W.

Subdivision of wire dragged areas by _____

Inked by J. D. Torrey

Verified by J. D. T.

Instructions dated Letter of December 21, 19 28

Remarks: _____

Descriptive Report

to accompany

Hydrographic Sheet No. 8.

Puako Bay, Hawaii, T.H.

Scale 1:2,500

DATE OF INSTRUCTIONS: Letter of Dec. 21, 1928.

LIMITS: The hydrographic survey of Puako Bay and approaches extends from approximately $\frac{3}{4}$ mile west of to $\frac{3}{4}$ mile north of the dock.

CONTROL: The customary types of small signals were used, located by topography - Topographic Sheet No. G. Triangulation station PUAKO was used as a signal.

SURVEY METHOD: For the inshore portion of the sheet sounded with hand lead, the usual whaleboat party was employed.

In general the lines were run normal to the shore on ranges, spaced 25 meters apart at the inner ends for about $\frac{1}{2}$ mile each way from the dock. Lines were criss crossed in all directions in the main bight. Outside the limits mentioned ~~mentioned~~ above, the lines were spaced about 35 to 40 meters apart at the inner ends. Shoal areas were more closely developed. Hand lead soundings extend from the shore line out to the 10 fathom curve except in a few spots.

No attempt was made to sound on the foul areas south of signals Tet, and north of signal On.

On the offshore portion of the sheet, soundings were taken from a gig equipped with a hand sounding machine. The lines run by the gig party were normal to the whaleboat system, spaced on an average of 100 meters apart.

This work extended out to 13 fathoms north of the Bay and 42 fathoms west of the Bay.

GENERAL INFORMATION: Puako Bay affords very little protection, and that

to small boats only. It is open to northwesterly and westerly winds; and is full of coral heads, rocks and reefs.

Ships can anchor northwest of the Bay. The GUIDE anchored from 5/8 to 1 $\frac{1}{4}$ mile northwest of station Puako.

The bottom is sand and coral.

Only small boats can go alongside the dock. The mouth of the bight is about 300 meters across in good weather and considerably less in moderate weather. Small boats making the dock have a clear passage holding the dock on a bearing of 137° true until within 150 meters of the dock, from where a lookout should be maintained and the channel sighted out.

Off shore winds cause wind eddys and swirls which renders small boat maneveuring difficult.

In calm weather landings can be made along the cliffs north of the bay, on the sand beach between signals No and Nix, and almost any place in the bay, except in the foul area 0.3 mile west of the dock.

A foul area extends about 125 meters west and northwest of signal No.

The slope of the area west of signals Her and On was much steeper than any where else on the sheet.

The prevailing weather at the time of this survey was the quietest experienced during the work along the coast, which made it possible to develope inshore areas that it would not have been possible to dev-
elope with weather prevailing normal to this section at this time of the year.

LANDMARKS: The most noticable features are: The warehouse and dock at signal In; the large grove of cocanut trees between signals It and In; the small group of tall ironwood trees at signal Pin, which stands well above the surrounding vegetation; the red roofed house, signal Center, shows up from the northwest.

STATISTICS:

Date	Day	Volume	Positions	Soundings	Statute Miles
1929					
Whaleboat (green)					
Jan. 22	a	1	131	Hand Lead 896	5.8
" 23	b	1	118	716	5.6
" 24	c	2	100	716	6.0
" 25	d	2	114	775	7.4
" 26	e	3	143	815	8.1
" 27	f	3	78	363	3.6
Total			<u>684</u>	<u>4281</u>	<u>36.5</u>
Gig (brown)					
Jan. 27	a	4	6 ³ ₄	Hand Machine 6 ³ ₄	3.7
Totals for both boats			7 ⁷ ₈	43 ⁴ ₅	40.2

Respectfully submitted,

W.H. Bainbridge
W.H. Bainbridge, Jr. H & C E

Forwarded, Approved:

K.T. Adams
K.T. Adams,
Chief of Party,
Str. GUIDE.

VERIFICATION REPORT

Hydrographic Sheet No. 8.

This will certify that I have examined the completed smooth sheet and records and approve same.

Your attention is called to a rock near position 92 e. this rock was found on one of the lines on Sheet No. 6 and was put on this smooth sheet from the boat sheet. This position should be checked against smooth sheet No. 6 by the verifier. *Position changed to check H-5006-2.V.I.*

Some hydrography on Sheet No. 6 really supplements this survey. It was intended to plot it all on this sheet, (No. 8) but some of the signals used by the sounding party came beyond the limits of Sheet No. 8.

K. T. Adams

K. T. Adams,
Chief of Party,
Steamer GUIDE.

POST-OFFICE ADDRESS:

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY
Steamer GUIDE, 510 Custom House,
San Francisco, Calif.,
March 10, 1931.

To: Lieutenant (JG) Walter H. Bainbridge,
U.S.C. & G.S.S. LYDONIA, Norfolk, Va.

From: Commanding Officer, U.S.C. & G.S.S. GUIDE.

Subject: Hydrography, Puako Bay, T. of H.

Reference: (Enclosures) Letter of Director dated 2-22-31.
My letter to Director dated 3-10-31.

There is forwarded herewith a photostat recently received from the office, together with copies of letters from the office and in reply to the office regarding the same. These letters are self explanatory and you are requested to examine this photostat and write direct to the Director, giving him your opinion as to whether these rocks exist or not, and whether or not they should be charted.

Furthermore, after doing as above, please forward the photostat with all copies of letters to Lieutenant Glendon E. Boothe for his opinion regarding the same matter and also for his statement as to whether the indicated rocks were actually located by him or transferred from E. R. Hand's 1913 topographic sheet.

Refer to:
12-KTA-h

K. T. Adams,
Commanding,
Steamer GUIDE.

POST-OFFICE ADDRESS:

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY
Steamer GUIDE, 510 Custom House,
San Francisco, Calif.,
March 10, 1931.

To: DIRECTOR, Coast and Geodetic Survey.
From: Commanding Officer, U.S.C. & G.S.S. GUIDE.
Subject: Hydrography, Puako Bay, T. of H.
Reference: Your letter 10-LA, dated February 22, 1931.

I have examined a photostat of the hydrography done in Puako Bay, T. H., with reference to determining the possibilities of the existence of the rocks indicated by you. Unfortunately, at this time there remain on board neither the officers who did the hydrography nor the officer who did the topography of this sheet.

It is my opinion that these rocks do not exist but I do not feel that there is sufficient evidence to cause their rejection from the published chart. The hydrography in this area was a very close development and was done under almost perfect weather conditions. It seems unreasonable to assume that these rocks could exist so spaced that no indication of their existence would be obtained by the hydrographer. On the other hand the very fact that the weather was almost perfectly calm during this survey would exclude the possibility of their being located by breakers during the progress of the survey. Furthermore, the inshore area in this vicinity was of very irregular bottom. Bottom of such a type as to make the existence of such rocks probable.

As to whether the rocks on the new topographic sheet were located by our topographer or transferred to his sheet from E. R. Hand's topography of 1913, I am unable to give any information.

I am forwarding the photostat, together with copies of your letter and my letter, to Lieutenant (JG) Walter H. Brainbridge who was in charge of this hydrography; and to Lieutenant Glendon E. Boothe; who did the topography; requesting that they also examine this situation and advise you of their opinion in the matter.

Refer to:
12-KTA-h

K. T. Adams
K. T. Adams,
Commanding,
Steamer GUIDE.

1931 MAR - 22 AM 8:28
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POST-OFFICE ADDRESS: P.O. Box 969, Norfolk, Va.

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

1931 APR - 8

Director
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Attention
Mr. Standbury

APR 11:59

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

Steamer LYDONIA.

April 6, 1931.

To: The Director,
U.S. Coast and Geodetic Survey,
Washington, D.C.

Thru: Commanding Officer,
U.S.C.&G.S.S. LYDONIA,
Norfolk, Va.

From: W. H. Bainbridge,
Jr.H. & G. Engineer,
U.S.C.&G.S.S. LYDONIA.

Subject: Rocks in Puako Bay, Hawaii, T.H.

References: 1. Letter of Director to Commanding Officer,
Ship GUIDE, 10-LAC, dated Feb. 22, 1931.

2. Letter of Commanding Officer, Ship GUIDE,
to Director, 12-KTA-h, dated March 10, 1931.

I have examined the photostat of Hydrographic Sheet No. 5009,
with reference to determining whether or not the rocks indicated thereon
in yellow pencil exist.

I still have a fairly clear mental picture of this locality,
which checks with the photostat, but I do not remember these rocks. If
they were not noted on the last sheet or in the record books, I did not
see them.

As Captain Adams has stated in his letter to you, the weather
was very calm at the time of the survey, and it may be possible that we
passed by and over the rocks without seeing them, as the surface of the
water was glassy, and no breakers showed ^{them} up.

4-6-31 -2-

However, they may be coral heads, similar to many in Puako Bay proper, submerged at the prevailing stage of the tide; consequently should be shown. But I do not think they exist.

I am forwarding the photostat, together with your letter to Captain Adams, and his letter to me, and copies of his letter and my letter to you, to Lt. G. E. Boothe.

W. H. Bainbridge
W. H. Bainbridge,
Jr. H. & G. Engineer.

Forwarded:
George D. Cowie
George D. Cowie,
Commanding Officer.

Encl.

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND NOT THE SIGNER OF THIS LETTER

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

WASHINGTON

April 11, 1931.

To: The Director.

Through: Chief, Division of Tides and Currents. *sun*

From: Lieutenant Glendon E. Boothe,
U. S. Coast and Geodetic Survey.

Subject: Rocks in Puako Bay, Hawaii, T. H.

References: 1. Letter of the Director to Commanding Officer
U.S.C. & G.S. Ship GUIDE, 10-LA, dated February
22, 1931.

2. Letter of Commanding Officer, U.S.C. & G.S. Ship
GUIDE to the Director, 12-KTA-h, dated March
10, 1931.

3. Letter of Lieutenant (j.g.) W. H. Bainbridge to
the Director, dated April 6, 1931.

I have examined the photostat copy of Hydrographic Sheet No. 5009, with reference as to whether or not the rocks indicated on it in yellow pencil exist. I have also read the copies of the letters written to the Director by Lieutenant Commander K. T. Adams and Lieutenant (j.g.) W. H. Bainbridge.

2. I did the topography of Puako Bay, Hawaii, T. H., on a 1:2500 scale. To the best of my knowledge and belief these rocks do not exist. I base this belief on the following reasons:

(a) In doing this topography I took special care to locate all rocks by actual rod readings that it was possible for my rodmen to reach, without the aid of a boat. (A boat was not available while I was doing this work, and I do not think it was necessary to have one.)

All rocks that were bare that could not be reached by the rodmen were cut in by intersection. All detached rocks that could be seen while doing the work were also cut in.

The breaker lines were also located by intersection whenever practicable.

(b) I had a topographic station on the point near Signal Box. From this position bare rocks as near as

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File in descriptive report

these rocks that are indicated in yellow pencil on the photostat of Hydrographic Sheet No. 5009 would be plainly visible in calm weather. The weather was calm while this work was being done.

No work of any nature was transferred from Lieutenant Commander Hand's 1913 topographic sheet to my topographic sheet.

It is further noted that Lieutenant Commander Adams and Lieutenant Bainbridge give the impression that these are sunken rocks. As I understand the photostat, five of these six rocks are bare at any stage of the tide. Therefore it appears to me, if such is the case, that the hydrographic party ran two separate lines between two of these rocks that are very close together without having seen or noting them, which seems improbable.

It is possible that in an area such as this sheet covers that coral heads are found separately, even though as in this case the sounding lines show a very uniform bottom in this vicinity.

I respectfully wish to state that in view of the above I do not believe that these rocks exist. In view of the fact that this is the critical area in this region insofar as an anchorage is concerned, I believe that these rocks should be charted until further evidence of their existence is found.

Glendon E. Boothe
Glendon E. Boothe,
Lieutenant,
U. S. Coast and Geodetic Survey.

In view of this statement, there is strong evidence that the rocks do not exist, but not conclusive. It will be necessary to show them on H 5009.
Adms

POST-OFFICE ADDRESS:

File with H-5009

*Chief etc
10-213
3*

TELEGRAPH ADDRESS:

EXPRESS OFFICE:

14
1931 APR - 20 AM 11:20

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY
Steamer GUIDE, 202 Burke Building,
Seattle, Wash., April 20, 1931.

To: DIRECTOR, Coast and Geodetic Survey.
From: Commanding Officer, U.S.C. & G.S.S. GUIDE.
Subject: Rocks in Puako Bay, Territory of Hawaii.
Through: INSPECTOR, Seattle Field Station.
Reference: Your letter 10-LA, dated February 27, 1931.

With reference to the discrepancy of the rocks in Puako Bay one feature of the situation which was first overlooked by me, is that your original letter stated that my 1:20,000 topographic sheet showed the rocks, which were evidently transferred from Lieutenant Hand's sheet.

The above assumption must be true because no topography of shoreline was done by this party in this vicinity. The 1:20,000 sheet was used merely to locate signals and if the rocks were shown on it they were transferred.

Due to the enlarged scale of the hydrographic survey, a new topographic survey, scale 1:2,500, had to be made in this vicinity, which contained the only original topography in Puako Bay.

K.T. Adams

K. T. Adams,
Commanding,
Steamer GUIDE.

REFER TO:
12-KTA-h

*Forwarded
Forwards
Inspector COB.*

elm
f.c.

FOR THE FIELD RECORDS SECTION FILE

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
4 volumes of sounding records for

HYDROGRAPHIC SHEET 5009

Locality: Hawaii Island (Puako Bay)

Chief of Party: K. T. Adams, in 1929
Plane of reference is mean lower low water, reading
3.5 ft. on ~~tide staff~~ tabulations at Honolulu
17.3 ft. below B. M. 2

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

W. H. Marmor
Chief, Division of Tides and Currents.

Section of Field Records.
Report on Hydrographic Sheet No. 5009
Hawaiian Islands: Puako Bay.

Surveyed in 1929.

Instructions dated December 21, 1928 (Guide)
Chief of Party, H. J. Adams.

Surveyed by W. H. Bairdbridge.

Protracted and soundings plotted by J. S. Marton.

Verified and inked by J. W. Torrey.

1. The records conform to the requirements of the General instructions.
2. The plan and character of development conform to the requirements of the General Instructions.
3. The plan and extent of development satisfy the specific instructions.
4. Sounding line crossings are adequate.
5. The information is sufficient for drawing the depth curves.
6. The junction with sheet H-5006 is satisfactory.
7. The field plotting is satisfactory.
8. The character and scope of the surveying is excellent, all dangers appear to have been located and additional surveying is not required.

9

J. W. Torrey

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

WASHINGTON

March 27, 1931.

SECTION OF FIELD RECORDS

Report on Topographic Sheet No. 4471

Puako Bay, Hawaiian Islands

Surveyed in 1929

Instructions: Letter dated December 21, 1928 (GUIDE)

Chief of Party, K. T. Adams

Surveyed by G. E. Boothe

Inked by G. E. B.

1. Control - The control for this sheet was based on Δ Puako and azimuths to Kawaihae Lighthouse and Δ Anahoumalu. Since Puako was the only triangulation point on the sheet no checks were obtained on the work. However, the signals that were located on this sheet are the same as were located on the 1:20,000 scale control sheet for this area (see boat sheet, H. 5006) and a comparison between the two sheets shows a very close agreement in the signals. The shoreline on this sheet can therefore be considered the same as if run on an adjusted traverse.
2. Comparison with T. 3422 - A comparison with the 1913 topographic survey (scale 1:20,000) was made and the same discrepancy was noted in the shoreline to the northward of Δ Puako as was noted on the lower portion of T. 4472 (see review for that sheet). As I have already considered the cause of this in great detail in connection with the latter sheet, I shall not go into that again here. Suffice it to say that the discrepancy noted between the 1913 survey T. 3422 and the present survey T. 4471 bears out my belief expressed in the review of T. 4472 that the field party in 1913 failed to carry the adjustment of the shoreline (due to the mixup in Kawaihae Light) through to Δ Puako and only adjusted it for the area around Kawaihae.

From Δ Puako southward the agreement between the two sheets is good. Some differences will be noted around the southern entrance to Puako Bay. This is accounted for by the different interpretations of the high water line and I have been informed by the topographer that the flat lava shoreline makes this very probable. The rocks awash and sunken rocks on T. 3422 that fell

within the limits of the new survey have all been considered and with the exception of the outermost rock awash near \odot Gin (this has been transferred to H. 5009 in red) and the bare rocks to the southwest of \odot Gin on T. 3422 (this will be mentioned below) can be disregarded since they either fall within a reef or close to the limits of a reef defined on the new hydrographic survey (H. 5009).

Reef to southwest of \odot Gin on T. 3422 - This reef was not picked up by the topographer on the new survey nor was it picked up by the new hydrographic survey. The office has referred this matter to the field party and at this writing is still awaiting a reply. No final action is therefore possible now, and the whole matter will be disposed of when H. 5009 is reviewed, and if it is decided to retain it will be transferred to the new survey.

3. Note to Compiler - Inasmuch as the important information from T. 3422 has been transferred to the new hydrographic survey it will be unnecessary to use the old topography within the limits of the new topographic survey, T. 4471.

The change necessitated in the old topography between the limits of T. 4471 and T. 4472 has been considered and explained in a memorandum attached to Descriptive Report, T. 3422.

4. Reviewed by A. L. Shalowitz, March 1931.

Approved:

Chief, Section of Field Records (Charts)

Chief, Section of Field Work (H. and T.)

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

AND REFER TO No. 82-DFM

WASHINGTON

May 21, 1931.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 5009

Puako Bay, Hawaiian Islands

Surveyed in 1929

Instructions dated Dec. 21, 1928 (Letter to Ship GUIDE)

Chief of Party, K. T. Adams

Surveyed by W. H. Bainbridge

Protracted and soundings plotted by J. S. Morton

Verified and inked by J. D. Torrey

1. The records conform to the Hydrographic Manual with the exception that notes in the remarks column regarding rocks, etc. should have been properly referenced by an asterisk in the sounding column.
2. The work is considered in general to be in conformity with the specific instructions. There are a number of spots, however, that should have been further developed, particularly in the entrance to the bay proper where the area is extremely irregular and where coral heads may rise dangerously close to the water surface. Such is the area about 400 meters north of \odot Pin, and the area in the vicinity of the $4 \frac{5}{6}$ fathom spot about 550 meters W by S of \odot No. A few more soundings should also have been taken in the vicinity of the $4 \frac{5}{6}$ fathom spot about 330 meters NW of \odot Box.
3. The junction with H. 5006 is satisfactory. No detailed comparison has been made with the hydrographic survey of 1914 (H. 3650) on account of the displacement of the soundings due to a shift in the old topographic signals as explained in a memorandum accompanying Descriptive Report, T. 3422. A superficial comparison of some of the soundings as referred to the shoreline shows a general good agreement.
4. Reef from T. 3422 - This reef in lat. $19^{\circ} 59' 285$ m., long. $155^{\circ} 50' 205$ m. is shown on T. 3422 (surveyed in 1913) as rocks bare at high water, with a sunken rock off its outer end. It is shown on the hydrographic survey of 1914 (H. 3650) as ~~#~~ sunken rocks, evidently transferred from the 1913 topo.

sheet, since no mention is made of these rocks in the sounding records of H. 3650. The present survey H. 5009 shows no indication whatever of the existence of any such rocks, nor does the latest topographic sheet of the area (T. 4471) indicate the existence of any rocks in this area bare at high water. The letters from the various field officers that were connected with the present surveys are self explanatory and ~~are~~^{are} attached to the descriptive report of H. 5009. While all are strongly of the opinion that the rocks probably do not exist, they, nevertheless, recommend inclusion on the chart.

While the writer is also of the opinion that the rocks do not exist, he is, however, at a loss to understand how a topographer could have so clearly shown them on his topographic sheet unless he actually saw the rocks. He believes that insufficient evidence is at hand to disprove their existence, and the rocks will therefore be retained until such time as a further examination of the area establishes definitely their non-existence. The rocks have been transferred to H. 5009 as sunken rocks and not as bare rocks, since it is more than reasonably certain that either the topographer or the hydrographer on the later surveys would surely have recalled such rocks at such distance offshore.

5. Additional work is required as mentioned in paragraph 2 above, and also in the vicinity of the reef just discussed.
6. Reviewed by A. L. Shalowitz, May, 1931.

Approved:

A. M. Sobieralski
Chief, Section of Field Records (Charts)

Chief, Section of Field Work (H. & T.)

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

AND REFER TO NO. 82-124

WASHINGTON

May 21, 1931.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 5009

Puako Bay, Hawaiian Islands

Surveyed in 1929

Instructions dated Dec. 21, 1928 (Letter to Ship GUIDE)

Chief of Party, K. T. Adams

Surveyed by W. H. Bainbridge

Protracted and soundings plotted by J. S. Morton

Verified and inked by J. D. Torrey

1. The records conform to the Hydrographic Manual with the exception that notes in the remarks column regarding rocks, etc. should have been properly referenced by an asterisk in the sounding column.
2. The work is considered in general to be in conformity with the specific instructions. There are a number of spots, however, that should have been further developed, particularly in the entrance to the bay proper where the area is extremely irregular and where coral heads may rise dangerously close to the water surface. Such is the area about 400 meters north of \odot Pin, and the area in the vicinity of the 4 5/6 fathom spot about 550 meters W by E of \odot No. A few more soundings should also have been taken in the vicinity of the 4 5/6 fathom spot about 330 meters NW of \odot Box.
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5. Additional work is required as mentioned in paragraph 2 above, and also in the vicinity of the reef just discussed.
6. Reviewed by A. L. Shalowitz, May, 1931.

Approved:



Chief, Section of Field Records (Charts)



Chief, Section of Field Work (H. & T.)

Applied to chit. 4167 J.M.A. Feb. 1941
" " comp. 4140 J.M.A. June "