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Diag. Cht. No. 4000

Form 504

U. S. COAST AND GEODETIC SURVEY

DEPARTMENT OF COMMERCE

DESCRIPTIVE REPORT

Type of Survey TOPOGRAPHIC

Field No. Midway Office No. T- 6827 a & b

LOCALITY

State TERRITORY OF HAWAII

General locality

Locality MIDWAY ISLANDS

194 1

CHIEF OF PARTY

F. B. T. Siems

LIBRARY & ARCHIVES

DATE July 10, 1942

B-1870-1 (11)

DECLASSIFICATION BY NOAA
PURSUANT TO DOC SYSTEMATIC REVIEW
GUIDELINES AS DESCRIBED IN SECTION
3.3 (a), EXECUTIVE ORDER 12356

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

TOPOGRAPHIC TITLE SHEET

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

Field No. MIDWAY-1941

REGISTER NO.

T6827 *alb* ~~CONFIDENTIAL~~

State Territory of Hawaii

General locality ~~Territory of Hawaii~~

Locality Midway Islands

Scale 1:10,000 Date of survey November, 1941, 1941

Vessel EXPLORER

Chief of Party F. B. T. Siems

Surveyed by E. B. Brown, Jr. G. A. Smith

Inked by E. B. Brown Jr. - G. A. Smith

Heights in feet above M.H.W. to ground to tops of trees

Contour, Approximate contour, Form line interval.....feet

Instructions dated September 24, 1941, 1941

Remarks:.....

REG. NO.

T6827

~~CONFIDENTIAL~~

1500 Westlake Ave. North, Seattle, Wash.

MES:PF

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T6827

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July 2, 1942

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

Through: Officer in Charge
Seattle Processing Office

From: E. E. Smith
Assoc. Cartographic Engineer

Subject: Topography, Adugak Island, Aleutian Islands, Alaska.

There is being shipped to you today a topographic plate showing random lines at Midway Island, T. H., and at Adugak Island and Nikolski Bay, Unalak Island, Alaska.

I recall that Adugak Island as shown on T-6711 was lacking in contours and elevations, and suggest that this penciled field sheet be compared with the smooth sheet for possible additional information.

*Sheets compared
but no additional
information added
to T-6711*

A copy of this letter accompanies the sheet.

E. E. Smith
Assoc. Cartographic Engr.

Forwarded, approved:

F. B. T. Siems
Officer in Charge
Seattle Processing Office

DESCRIPTIVE REPORT

T6827
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To accompany

TOPOGRAPHIC SHEET MIDWAY-1941

Project CS-270

U. S. C. & G. S. "EXPLORER"

F. B. T. Siems, Commanding.

AUTHORITY:

This sheet was executed in accordance with instructions dated September 24, 1941, Project No. CS-270. ✓

EXTENT:

The sheet includes the entire atoll of the Midway Islands with the exception of that part of the reef inaccessible to a plane table, which was the submerged portion south of the islands. ✓ On the sheet the reef is broken up into several short pieces in order to conserve space. Both sides of the sheet are used.

CONTROL:

Horizontal control was based on triangulation executed by the ship Explorer during the 1941 season, and upon triangulation previously accomplished by the U.S. Engineers and the U.S. Navy. Since the astronomical observations for the determination of latitude, longitude and azimuth were in progress during the performance of the topography, no spherical projection was made. In lieu thereof the rectangular coordinates used by the antecedent surveying agencies were adopted. The grid is laid out in feet rather than meters to facilitate the plotting of the existing coordinates. ✓

SCALE:

The scale used is 1:10,000. ✓

METHODS:

For a description of the methods used in running the random traverses on the northern part of the reef, reference is made to the attached Supplementary Report. Standard methods of plane table topography were used. On the islands most setups were checked by three point fixes, and on the reef traverses were run between signals established by triangulation. All traverses closed without appreciable error. The heights of the various elevated objects were determined by vertical angles taken by plane table alidade and distances carefully scaled from the sheet.

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(Methods, cont.):

The heights of the water tanks were checked by comparison with the construction blueprints; the two values were found to agree very closely.

GENERAL DESCRIPTION:

The Midway Islands consist of a coral atoll, roughly circular and about six miles in diameter, and containing two small sand islands on the south side of the lagoon inside the reef. The islands are not more than forty-five feet above the water at their highest point. The sand takes the shape of rounded sand dunes of varying heights, terminating on the shore in a soft sand beach, of widths up to more than 100 meters in places, and sloping gently down to the water line. The dunes are thickly covered with a broad leafed shrub (*scaevola koenigii*) that adds eight to ten feet to the apparent height of the terrain. On the north part of the larger island is a patch of coniferous trees, Honolulu Ironwood (*casuarina equisetifolia*), rising to a height of 75 feet above the water. There are a few scattered clumps of these trees apart from the main group.

All vegetation and soil has been artificially introduced to the islands from the outside, principally by the Commercial Pacific Cable Company. This company has established a small community on the island complete with living quarters, fruit trees of various sorts, domestic fowl and animals, and windmills for pumping water. With the exception of the boathouse and dock shown on the north side of the island, all these buildings, etc., are concealed by the trees mentioned above and offer no landmarks for the navigator. The islands form a sanctuary and breeding ground for hundreds of thousands of birds, the Black Footed Albatross (*diomedea nigripes*), popularly known as the "Goonie", the Laysan Albatross (*d. immutabilis*), and a form of Petrel (*oceanodroma*) being the most numerous.

The coral reef forming the atoll does not form a closed circuit, having a natural opening on the west side and an artificial channel on the south side. The reef rises abruptly from the deep water, and there are no offlying rocks or shoals. It is highest on the north side, projecting three feet or more above high water, gradually diminishing in height toward the south on the east and west sides. On the south side it is, for the most part, completely submerged to a depth up to three feet at low water. Breakers are constantly in evidence on the seaward side of all portions of the reef. The width of the actual reef was difficult to determine with any finality. The part that is above high water consists of a chain of tiny coral islets of various sizes, continuously drenched by breakers. These high portions are on the seaward side, while toward the lagoon the reef assumes a very gradual slope and breaks down into many small projections and detached coral heads. The water over this part may be as shallow as three to six inches at low water. The transition from reef to

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(General Description, cont.):

lagoon continues gradually until the realm of topography ceases and that of hydrography begins. To delineate the actual line of demarcation between the two areas would have required an unreasonable multiplicity of shots, so such a procedure was not attempted. The inner edge of the reef is shown instead by a dotted line made up of a series of judiciously located shots and offering a fair approximation of the change from the reef to deeper water.

In recent months considerable construction has been carried on by the U.S. Navy. There are many buildings on the larger island, for the most part concentrated in the eastern portion. Construction was still in progress at the time of the survey, and as a consequence there was no permanence as to the number and location of structures. A few were located and are shown on the sheet. The largest and most prominent is the airplane hangar ('A' on the sheet). Also located were the administration building ('B'), the contractor's office building ('C'), and the power house ('D'). The locations of these few buildings agree very closely with those as given on a print furnished by the local authorities (14th Naval District drawing No. MID-NI-106), and it is felt that the remaining structures, both existing and contemplated, can be located most expeditiously by transfer from a suitable plan executed by those engaged in the construction. On the whole there are no particularly prominent buildings that could be useful as landmarks. On the smaller island there is to be a complete airport. The runways are completed, but most of the buildings are yet to be built. The runways are shown in pencil on the sheet and were transferred from an existing plan. *Runways were copied from sheet.*

There are several prominent structures on the larger island that are visible from seaward. The five tall water tanks are cylindrical in shape, with hemispherical bottoms and conical tops, and are elevated on four legged steel towers. The elevations as given are to the finials on the conical tops. The three tanks on the eastern part of the island are painted in a checkerboard pattern with alternate red and white squares. The other two, namely RED 1941 and LEAD 1941, are solid red in color. The largest of the tanks, TALL 1941, is also the tallest, and it is easily the most prominent object visible when approaching the atoll in daylight. The tower called CAMP (U.S.E.) is comparatively short, constructed of wood, and painted gray. It is not a particularly good landmark.

In the southwest part of the island is a triangular group of radio towers. These towers are easily distinguishable if the distance is not too great, but owing to their tenuous construction they are not useful as landmarks beyond fifteen miles from the island. Near the U.S. Lighthouse is a radio direction finder tower. This is useless as a landmark since it offers no substantial silhouette against the sky. Pan American Airways has erected and maintains a revolving airplane beacon that offers a better signal to mariners than the U.S. Lighthouse, but since it is lighted only when planes are expected it cannot be regarded as reliable. The U. S. Lighthouse is not one of the more

(General Description, cont.):

prominent features of the island. It is a skeleton steel mast located on the fringe of the trees on the north part of the island and projecting well above them. It may be fairly easily picked out after once being identified, but since there are many towers that are more prominent in the daytime and since there many other lights, both white and colored, at night, from which the lighthouse must be selected, the initial identification may not be immediate. The lookout towers shown on the sheet, together with another at FRIGATE (U.S.N.), are merely platforms mounted on square skeleton towers of moderate height. They are not visible at any great distance.

The smaller island has no objects of any particular height or prominence owing to the presence of the airport. The tank shown here on the sheet is a low metal storage tank and is not the same one located in that vicinity by triangulation. On the southeast corner of this island was a navigational light, EASTERN ISLAND LIGHT (U.S.E.). This was blown down in a gale that occurred during the stay of the Explorer, and it was not rebuilt up to the close of the field season. Due to the sandy nature of the islands the shorelines are not stable and are known to change markedly during severe storms.

Since the completion of this topography the outbreak of hostilities has created the possibility of the destruction of some of the artificial structures on the islands, particularly the water tanks, hangars and docks. It is not known at the present writing what changes, if any, in the recorded topography have taken place.

GEOGRAPHIC NAMES:

The two islands of the atoll have well established names that appear on all current charts and in all articles written about them. The larger and western island is known as Sand Island and the other as Eastern Island.

There are also in the lagoon two small spots of sand that were given names by the present construction contractor. One is just off the western point of Eastern Island and is well named as Spit Island. The other, a little more to the west and north, was called Cooney Island, but such usage was purely arbitrary on the part of the local engineers. As a matter of fact, it is doubtful if these patches of sand are permanent enough to be dignified by a formal appellation. There is record of a third small island, Swan Island, which exists now as a shoal just north of Spit Island. It would be better to use the generic term "sand islet" in connection with these little islands.

HYDROGRAPHIC SIGNALS:

On the south side of Eastern Island two signals, Boob and Skiff, were established for hydrographic purposes. Their locations were not permanently marked and should be considered as non-recoverable.

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COMPARISON WITH OTHER CHARTS:

H.O. Chart 1952, edition of 1922, print of October 1940, was the only available example of previous work at Midway. This chart is not on a comparable scale (1:29254), so a detailed comparison is hardly possible. There are, however, two points of difference that can be mentioned. The shorelines of the two islands have changed to some extent, particularly the attenuated spit on Eastern Island. The sand islet in the north part of the lagoon does not now exist. The general outline of the reef seems to be in good agreement.

MAGNETICS:

Declinatoire observations were performed six times during the progress of the topography. The results of the observations are tabulated below.

Tabulation of Declinatoire Observations

<u>Location</u>	<u>Date</u>	<u>Time</u>	<u>Scaled Decl.</u>	<u>Inst. No.</u>	<u>Corr. (Oct. 1941)</u>	<u>Reduced Decl.</u>
REEF POINT	11/17/41	10:00 AM	E 8°53'	H 252	+19'	E 9°12'
Islet	11/24/41	10:00 AM	E 9°58'	"	"	E 9°57'
CANARY	11/29/41	03:00 PM	E 8°03'	"	"	E 8°22'
SURF	11/12/41	11:00 AM	E 9°06'	H 253	+09'	E 9°15'
OUTER	11/14/41	10:00 AM	E 9°06'	"	"	E 9°15'
SEAL	11/17/41	02:30 PM	E 8°53'	"	"	E 9°02'

Comparison with Magnetometer Observations

(Comparisons made only where the locations of the two observations are sufficiently close together).

<u>Decl. Sta.</u>	<u>Mag. Sta.</u>	<u>Reduced Decl.</u>	<u>Mag. Obs.</u>	<u>Diff. (Mag.-Decl.)</u>
Islet	TE-10	E 9°57'	E 9°59'	+02'
OUTER	OUTER	E 9°15'	E 8°59'	-16'
SEAL	SEAL	E 9°02'	E 8°45'	-17'

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STATISTICS:

Miles of shoreline	9
Square miles of topography	1.6
Miles of reef	12

The north, east and southeast portions of the reef were executed by Lieut.(j.g.) E. B. Brown Jr. The shorelines of the islands and the west and southwest portions of the reef were executed by Deck Officer G. A. Smith.

Respectfully submitted,

G. Albion Smith
G. Albion Smith,
Deck Officer, U.S.C.&G.S.

Approved and Forwarded,

F. B. T. Siems
F. B. T. Siems, Commanding,
U.S.C.&G.S. Ship Explorer.

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SUPPLEMENTARY REPORT

To

DESCRIPTIVE REPORT

To accompany Topographic Sheet

MIDWAY 1941

The north reef was located by random traverses in accordance with Special Report on Random Traverses submitted with the 1941 Season's Report of Project HT 218, Aleutian Islands. At the time of the survey the triangulation stations which averaged about 1 mile apart had been established but not located. However, in some cases the relative positions of 2 stations was known and plotted prior to running the traverse between them. The traverse closures were in all cases so small that the traverse end and the triangulation station on which the closure was made fell within the same prick point.

Each section of random traverse originated near a triangulation station and generally included one or more other stations. When the plane table was set up at the origin of the traverse, cuts were drawn to all triangulation stations that would fall on the sheet. When the triangulation computations were available the stations were plotted on the sheet by laying off the distances between the origin station and the other stations to which cuts had been taken a grid was then erected on each section of random traverse using the origin station and most distant station to control the grid. Intermediate stations were used as checks.

In order to conserve aluminum mounted sheets an old sheet was used for the majority of the random traverse work. This second sheet had been used for standardization of declinatoire and for some random traverses in the Aleutian Islands. It was considered advisable to transfer the topography to one sheet for convenience of filing in the Washington Office as well as preventing confusion that would be caused by submitting a sheet on which much unrelated data appears.

^{T-6827}
A grid was constructed on Sheet Midway 1941 and transfer of the traverses made using tracing paper. The transfer was verified before the tracing paper had had enough time to become distorted. Both sheets are to be forwarded to the office.

Approved
E. B. Brown, Jr.
Comdg EXPLORER

E. B. Brown, Jr.
E. B. Brown, Jr.,
Jr. H. & G. Engr.,
U.S.C. & G.S.S. EXPLORER.

Remarks.

Decisions

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GEOGRAPHIC NAMES

Survey No.

16827 ~~CONFIDENTIAL~~

Name on Survey

	On Chart No.	On previous survey No.	On U. S. quadrangle Maps	From local information	On local Maps	P. O. Guide or Map	Rand McNally Atlas	U. S. Light List	
A,	B,	C,	D	E	F	G	H	K	
<u>Eastern Island</u>									1
<u>Gooney Island</u>									2
<u>Midway Islands</u>									3
<u>Sand Island</u>									4
<u>Spit Island</u>									5
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Names underlined in this approved
by L. Heck on 1/30/43

MEMORANDUM

IMMEDIATE ATTENTION

SURVEY
DESCRIPTIVE REPORT
~~PHOTOGRAPH OF~~

~~NO. 24~~

No. T

T6827

~~CONFIDENTIAL~~

received July 10, 1942
registered October 16, 1942
verified
reviewed
approved

This is forwarded in order that your attention may be directed to the matters as indicated below. Please initial in column 3 as an acknowledgement that your attention has been thus directed. The complete original records are available if desired. If you cannot give this your immediate attention, please initial, note, and forward to the next section marked, calling for the records at your convenience.

ROUTE		Initial	Attention called to
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RETURN TO

82	R. W. Knox
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R.W.K.

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DIVISION OF CHARTS

SURVEYS BRANCH

REVIEW OF TOPOGRAPHIC SURVEY REGISTRY NO. 6827a&b
Field No. Midway 1941

Territory of Hawaii, Midway Islands
Surveyed in November 1941; Scale 1:10,000
Instructions dated September 24, 1941

Plane Table Survey

Aluminum Mounted

Chief of Party - F. B. T. Siems
Surveyed by - E. B. Brown; G. A. Smith
Inked by - E. B. Brown; G. A. Smith
Reviewed by - R. H. Carstens
Inspected by - H. R. Edmonston, February 27, 1943

1. Adjoining Surveys

The present survey covers the complete high water area of the Midway Islands atoll.

2. Comparison with Prior Surveys

There are no prior surveys of the area by this Bureau.

3. Comparison with H.O. Chart 1952 (latest print date 12-41)

The U. S. Coast and Geodetic Survey publishes no large scale chart of this area.

The charted position of the atoll is about 3/4 mile south of the present survey position. The agreement is fairly good with respect to general shape of the reef and the islands.

4. Condition of Survey

The Descriptive Report is very well written and complete. The inking of the survey was satisfactorily accomplished.

5. Compliance with Instructions for the Project

Satisfactory.

6. Superseded Surveys

None.

Examined and approved:

Robert W. Knud

Chief, Surveys Branch

J. S. Brown

Chief, Division of Charts

S. R. Rayner

Chief, Section of Hydrography

G. W. Rude

Chief, Division of
Coastal Surveys

Applied to new compilation of Chart 4188... Aug. 25, 1943 G.H.S.

" " Chs. 4060 12/29/44

Applied to new compilation of Chart 4176 April 1944 *R.*