

6009

U. S. COAST & GEODETIC SURVEY  
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6009

Form 504  
Ed. June, 1928

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
R. S. Patton, Director

State: California

**DESCRIPTIVE REPORT**

~~Tide Gauging~~ } Sheet No. I (T-5009)  
Hydrographic } **6009**

LOCALITY

Sacramento River

~~Morse Slough to Deadhorse Island~~

North Fork Mokelumne River and  
Georgiana Slough.

1934

CHIEF OF PARTY

Lieut. L. P. Raynor

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

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REG. NO. 6009

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.

Field No. I (T-5002)

REGISTER NO. 6009

State CALIFORNIA

General locality Sacramento - River

Locality North Fork Mokelumne R. and Georgiana Slough  
~~Morse Slough to Deadhorse Island~~

Scale 1:10,000 Date of survey March 21 to 26, 1934

Vessel HELEN F (Leased Launch)

Chief of Party L. P. RAYNOR

Surveyed by L. P. RAYNOR & N. G. KORNEEFF

Protracted by THOMAS M. MEANS - GEORGIANNA SLOUGH BY G. C. WHITE

Soundings penciled by THOMAS M. MEANS GEORGIANNA SLOUGH BY G. C. WHITE

Replotted by A. H. YEOMANS (office)

Soundings in ~~X~~ feet

Plane of reference MLLW

Subdivision of wire dragged areas by

Inked by A. H. YEOMANS

Verified by A. H. Y.

Instructions dated SEPTEMBER 2, 1933 et. al., 19

Remarks: HYDROGRAPHIC SIGNALS PLOTTED BY: THOMAS M. MEANS

GEORGIANNA SLOUGH BY G. C. WHITE

HYDROGRAPHIC TITLE SHEET

Field No. I (T-5002)

STATE: CALIFORNIA

GENERAL LOCALITY: SACRAMENTO-SAN JOAQUIN DELTA

LOCALITY: PORTIONS OF GEORGIANNA SLOUGH, NORTH FORK OF MOKELUMNE  
RIVER AND SNODGRASS SLOUGH 38° 11' to 38° 14'

SCALE: 1:10,000

DATE OF SURVEY: MARCH 21 to 26, 1934

VESSEL: HELEN F (Leased Launch)

CHIEF OF PARTY: L. P. RAYNOR

SURVEYED BY: L. P. RAYNOR & N. G. KORNEEFF

PROTRACTED BY: THOMAS M. MEANS - GEORGIANNA SLOUGH BY G. C. WHITE

SOUNDINGS PENCILED BY: THOMAS M. MEANS      GEORGIANNA SLOUGH BY  
G. C. WHITE

SOUNDINGS IN FEET.

PLANE OF REFERENCE: MLLW.

INSTRUCTIONS DATED: SEPTEMBER 2, 1933 et.al.

HYDROGRAPHIC SIGNALS PLOTTED BY: THOMAS M. MEANS  
GEORGIANNA SLOUGH BY G. C. WHITE

DESCRIPTIVE REPORT

of

HYDROGRAPHIC SHEET I (T-5002)

AUTHORITY, LIMITS, PARTY, DATES:

The AUTHORITY for this work is contained in the following letters:

1. 22 LE 1990 March 17, 1933
2. 22 AHH 1990 August 12, 1933
3. SUPPLEMENTAL INSTRUCTIONS  
PROJECT 98 HT Sept. 2, 1933
4. 26 RS 1990 Nov. 9, 1933
5. 22 AHH 1990 Nov. 16, 1933
6. 22 MEN 1990 Dec. 2, 1933

This sheet covers Georgianna Slough from the Sacramento River to latitude  $38^{\circ} 11'$ ; the North Fork of the Mokelumne River from the same latitude to Millers Ferry Bridge, and a portion of Snodgrass Slough below latitude  $38^{\circ} 14'$ , approximately. The work was done by a party under either the Chief of Party or in charge of N. C. Korneeff, Observer, between March 21 and 26, 1934. Hydrographic signals were placed and located by party under supervision of R. E. McGowan, Observer. *(see insert on sheet 60 part below  $38^{\circ} 11'$ )*

GENERAL NOTES:

The natural waterways included in the hydrographic survey are held within narrow limits by levees from 15 to 20 feet high, built to protect the rich agricultural land from damage by flood water. These levees were built of material dredged from the bed of the adjacent waterways, but the increased depth is in many places gradually being filled by sediment brought down the river. The firmer doundation found here has made it unnecessary to rebuild the levees to any great extent after they have once been brought to height and grade. The outer slope of the levees is covered in most cases with a fairly heavy growth of bushes and trees. These overhang from 2 to 5 meters on both banks of the Georgianna Slough and are a menace to navigation by boats of any considerable length. *(not shown on insert sheet)*

SURVEY METHODS:

Hydrographic signals were located by the following methods:

1. By spotting directly in the field on a photo-lithographic print of the photo compilation of this area, such topographic detail as tule points, gables of sheds, intersection of ditch lines

with highwater line, <sup>brush line</sup> etc., or, as a variation from this, by measurements from such detail with tape or stadia and angles with sextant. Positions so located are surrounded by red circle.

2. By sextant three-point fixes using detail of the photo compilation for objects. Shown in blue on the boat and smooth sheets.

3. By using the print as a planetable sheet and locating points by traverse measurement from some well identified detail. Shown in red.

Signals were placed at edge of brush line on either side of Georgianna slough. This appears to be shown as the high water line on the print as indicated by the fact that several measurements across the stream by stadia and range finder were greater than the scaling from the photo-lithographic print. *also see records Vol. 1 p. 1 + 2*

Boat positions were determined by the usual method of three-point fix or distances were measured with range finder and bearings obtained by pelorus #24874, used with magnetic compass of the same number. The smooth sheet is an aluminum plate coated with tanned gum arabic on which the photo compilation has been printed by photo-lithographic processes.

#### SMOOTH PLOTTING, GEORGIANNA SLOUGH:

##### SIGNALS:

Signals were located by ditches, gables, sextant angles, etc., by R. E. McGowan and party. As shown on the boat sheet and smooth sheet, the signals are on the high water line. However, the high water line shown by photo compilation appears to be the overhanging brush line. McGowan took this into consideration and placed the signals on the brush line in this slough. *except one located in records on H.W. line*

##### POSITIONS OF SOUNDING LINES:

The center line was plotted on the smooth sheet from bearing and distances to the signals as obtained in the hydrographic survey. The line between positions was drawn as a smooth curve conforming to the general shape of the shoreline.

##### SHORELINE REVISION:

The shoreline was then revised on a tracing using the simultaneous range finder distances from the sounding launch. The distances were measured on the tracing from the center line previously plotted on the smooth sheet. After drawing the revised shoreline, the two sounding lines on either side of the center line were plotted in the same manner as the center line. It was found that when simultaneous distances with the range finders were taken to the brush line the total width of the stream checked with that shown by photo compilation. The actual width of the stream appears to be about 10 to 15 meters wider than that shown by the maps. The sounding lines adjacent to the shoreline are shown on the tracing overlay. Range finders #8 and #7277 were used for simultaneous readings in the above work.

*smooth sheet revised to agree with tracing and revised top sheet*

NAVIGATION, CHANNELS, SHOALS:

Georgianna Slough is frequently used as a cutoff by vessels coming down the Sacramento River from above Walnut Grove when bound for locations on the San Joaquin River. It avoids the necessity of running clear down to Three Mile Slough and thence to the San Joaquin River. The north fork of the Mokelumne River is used by commercial vessels as far up as the Miller Ferry Bridge while small fishing and pleasure craft roam at will through any of the waterways shown. Georgianna Slough is narrow and comparatively deep, the controlling depth being very little less than 18 feet, while depths up to 40 feet were obtained. The north fork of the Mokelumne River is uniformly of considerable depth throughout except for the comparatively large shoal area in the general vicinity of NW 26 to NM 25. Here the controlling depth is about 9 feet.

*14 ft 100 meters south of junction with Sacramento R. Lat. 38° 14' 37"*

This shoal is very hard, resembling rock and is what is known locally as "Hardpan." When struck strongly with the sounding pole it gives out a ring similar to what one would expect from hard rock bottom. The armed lead would only bring up specimens of the one-half inch or so layer of silt on top of the "Hardpan". The presence of the shoal at this place is probably due to the fact that the dredgers building the levee were unable to cut into this area of hardpan and of necessity had to avoid and leave it in place. A large piece of drift wood bares about 2 feet at MLLW. It lies 63 meters bearing  $52^{\circ}$  (true) from MN 25. The channel between Miller Ferry Bridge and New Hope Bridge is shoal and narrow and should be avoided by craft drawing more than 3 feet of water. There are no wharves in this area, landings being made alongside the bank if necessary to handle cargo.

CURRENT DATA, TIDE REDUCERS:

As noted in the descriptive report on 5001, this slough is effected by the flood waters in the Sacramento River and has a distinct hydraulic gradient, with the high end during most of the year at the Sacramento River end. During the whole time that the hydrographic party was in the vicinity of Georgianna Slough, the current ran from the Sacramento River towards the Mokelumne River with no reversal of current as expected on flood tide.

According to Mr. Stafford, State Water Supervisor of the Sacramento-San Joaquin Delta, the flow of water is always from the Sacramento River into the Mokelumne and thence to the San Joaquin except in the very lowest stages of the Sacramento River. This usually occurs in August or September, when on a rising tide there is a short period when the current reverses and flows north through Georgianna Slough.

The tide reducers for the work in Georgianna Slough were obtained from simultaneous readings on the tide staff at Walnut Grove on the Sacramento River and the staff on Georgianna Slough, Mokelumne River end. The plane of reference is MLLW, which is 2.5 on the staff at the lower end of Georgianna Slough and 2.7 on the staff at Walnut Grove.

The tide observations were reduced to the height above the reference plane, and a straight line hydraulic gradient was assumed to exist between the 2 staffs at any particular time. The two staffs were  $10\frac{1}{2}$  miles apart and the heights of the water were plotted for each staff at one-half hour intervals, and at each end of a line assumed to be  $10\frac{1}{2}$  miles long. Connecting the simultaneous readings with a straight line gave a means of scaling the probable heights above the reference plane at any particular point. On the boat sheet in red ink are shown the miles starting with the zero mile at the staff near the Mokelumme River. The reduction to be made in the vicinity of each mile was taken from the hydraulic gradient curve constructed as noted above.

The tide reducers for the work in the north fork of the Mokelumme River and Snodgrass Slough were obtained from the portable automatic tide gage maintained at the New Hope Bridge on the South Fork. Corrections to be made for the time of tide are shown on the sheet with appropriate notes. The reading of this staff corresponding to MLLW is 2.0 feet.

Table of staff readings corresponding to various tide reducers follow:

Staff reads:

1.2 to 1.7	add	$\frac{1}{8}$ ft.
1.7 to 2.2	zero	
2.2 to 2.7	subtract	$\frac{1}{8}$ ft.
2.7 to 3.2	"	1 ft.
3.2 to 3.7	"	$1\frac{1}{8}$ ft.
3.7 to 4.2	"	2 ft.
4.2 to 4.7	"	$2\frac{1}{8}$ ft.
4.7 to 5.2	"	3 ft.
5.2 to 5.7	"	$3\frac{1}{8}$ ft.
5.7 to 6.2	"	4 ft.
6.2 to 6.7	"	$4\frac{1}{8}$ ft.
6.7 to 7.2	"	5 ft.
7.2 to 7.7	"	$5\frac{1}{8}$ ft.
7.7 to 8.2	"	6 ft.
8.2 to 8.7	"	$6\frac{1}{8}$ ft.

CLEARANCES, BRIDGES, POWER LINES:

The horizontal clearance of the double<sup>leaf</sup> bascule bridge at Walnut Grove on the Sacramento River was measured and found to be  $194\frac{1}{2}$  feet, the vertical clearance was found to be 19 ft. at MHW.

The horizontal clearances of the swing bridge on Georgianna Slough near the Sacramento River were found to be 46 feet for the east span and 79 feet for the west span. The vertical clearance for both spans was found to be 16 feet above MHW.

5002

The horizontal clearances of Millers Ferry Swing Bridge over the North Fork, Mokelumne River were found to be  $85\frac{1}{2}$  feet for the east span, 74 feet for the west span, with a vertical clearance of 11 feet for each span.

The vertical clearance of overhead power line between wooden poles over Georgianna Slough is 148 feet at MHW. This was determined on March 5, 1934, using range finder No. 8.  $125$  at HW used

**LANDMARKS:**

Attached is a list of landmarks in addition to what has previously been sent you by photo field inspection party and by photo compilation party of M. H. Reese.

LPR:T

*L. P. Raynor*  
L. P. Raynor  
Chief of Party



STATISTICS

5002

Mar.	1	A	1	4.00	250	28
"	2	B	1	14.80	848	88
"	16	C	1	2.60	200	20
"	19	D	1 & 2	14.00	1035	142
"	20	E	2	5.70	487	68
"	26	F	2	1.00	103	24
Apr.	4	G	2	<u>.50</u>	<u>33</u>	<u>8</u>
		TOTALS		42.60	2956	378

HYDROGRAPHIC SIGNALS- 92



Field Records Section (Charts)

HYDROGRAPHIC SHEET No. **6009**

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

Number of positions on sheet	<b>.378..</b>
Number of positions checked	<b>.153.</b>
Number of positions revised	<b>.153..</b>
Number of soundings recorded	<b>.2956.</b>
Number of soundings revised	<b>1567..</b>
Number of signals erroneously plotted or transferred	<b>..0..</b>

Date:.... **APRIL 4, 1935** .....

Cartographer:.. **A.H. YEOMANS** .....

*Plotting 153 pos. 1567*  
Verification of protracting ) **AHY**  
Verification & inking of rocks and shoals) by A.H.Y.

Verification of inking by A.H.Y.

Review by *[Signature]*

**14 hrs**  
Time: } **32 hrs**  
Time: }  
Time: **5 hr**

LCC

October 1, 1934

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in  
2 volumes of sounding records for

HYDROGRAPHIC SHEET 6009

Locality Morse Slough to Deadhorse Island, San Joaquin Delta, Calif

Chief of Party: L. P. Raynor in 1934

Plane of reference is mean lower low water, reading

2.5 ft. on tide staff at Georgiana Slough

10.6 ft. below B.M. 1

2.7 ft. on tide staff at Walnut Grove

20.1 ft. below B. M. 1

2.0 ft. on tide staff at New Hope Bridge

11.2 ft. below B. M. 1

The reducers for sounding in Georgiana Slough were applied in accordance with the hydraulic gradient between Walnut Grove and Golden State Cannery near the Makelumne River.

Height of mean higher high water above plane of reference is approximately 3.8 ft.

Condition of records satisfactory except as noted below:

*Hammner*

Acting Chief, Division of Tides and Currents.

Report on H 6009  
Chief of Party L.P. Raynor

Protracted by T. Means  
G.C. White, A.H.Y.

Surveyed in 3/34

Surveyed by L.P.R., H.G. Koneeff

Soundings plotted by F.H.M., G.C.W.  
A.H.Y.

Verified and inked by A.H. Yeomans

1. The records conform to the requirements of the General Instructions.
2. The usual depth curves were completely drawn except along the shoreline, and ~~around single soundings of greater depth.~~
3. The field plotting was completed to the extent prescribed in the Hydrographic Manual.
4. The office draftsman had to completely revise the shoreline of Georgianna Slough and replot the hydrography.
5. The junctions with adjacent sheets H 6007, 6006, and 6010 (all 1934) were found to be satisfactory ~~except that H 6010 had 25 foot soundings that fell between 28 and 36 foot soundings on 6009.~~ O.K. ~~ED~~
6. In the original photo compilation of Georgianna Slough the hush line was taken as the high water line. This was revised in the office from range finder distances taken by the hydrographic party. The smooth sheet was revised accordingly by the verifier, which widened the stream about 20 meters. Hydrographic signal NE 22 located and checked in the field shows it on the boat sheet and smooth sheet at the intersection of a ditch line and the high water line of The North Fork Mokelumne River  $38^{\circ}12.2'$ ,  $121^{\circ}31'$ . Information in the records vol. 1, page 2 put it 65 meters east of that location on a fence line (see photo 373, 30-1). Since the field plotting agrees with the time interval spacing of continuous lines (17D, 93D, 125D), the signal was left as plotted in the field. Between NE 25 and NW 24, North Fork Mokelumne River, 21-22D a remark in the records says

(2)  
"hit bottom between soundings" a sunken rock symbol  
was used for this position. → Plotted as a 0' sounding  
based on 3ft draft of vessel.

Submitted by,

A. H. Yeomans



Section of Field Records

REVIEW OF HYDROGRAPHIC SURVEY NO. 6009 (1934).

North Fork of Mokelumne River and Georgiana Slough,  
Sacramento River, California

Surveyed in March, 1934

Instructions dated: March 17, 1933 (L.P. Raynor)  
Sept. 2, 1933 (L.P. Raynor)

Hand Lead and Pole Soundings - 3 Point fix Control on Shore Signals.  
Range finder distances.  
Compass bearing using Pelorus.

Chief of Party - L. P. Raynor.

Surveyed by - L. P. Raynor and N. G. Korneef.

Protracted by - Thomas M. Means, A. H. Yeomans (office)

Soundings plotted by - Thomas M. Means and A. H. Yeomans (office)

Verified and inked by - A. H. Yeomans.

1. Condition of Records.

The records are neat and legible and conform to the requirements of the Hydrographic Manual except as follows:

a. No list of signals used was noted in the records.

b. On the cover label and title page of the records, the position numbers and day letters were in black ink. These were changed to the proper color in the office. (Par. 138).

2. Compliance with Instructions for the Project.

The plan, character and extent of the survey satisfy the instructions for the project.

3. Sounding Line Crossings.

The waterways are, in many places too narrow to allow a system of cross lines, but the crossings that do occur as well as the agreement of soundings on adjacent parallel lines are satisfactory.

4. Depth Curves.

The usual depth curves may be satisfactorily drawn.

5. Junctions with Contemporary Surveys.

a. The junction with H-6007 (1934) on the east and with H-6010 (1934) on the south are satisfactory.

b. The junction with the U. S. Engineer's Survey of 1927-1931 (B.P. 26283) is satisfactory. However in Georgiana Slough from the Sacramento River to the draw-bridge, where the two surveys overlap, the present survey (H-6009) indicates deepening near the western



side of the slough. For the overlapping area the present survey should supersede the U. S. Engineer's Survey.

6. Comparison with Prior Surveys.

There are no prior surveys by this Bureau within the limits of the present survey.

7. Comparison with Chart.

There is no published chart covering the area of the present survey.

8. Field Plotting.

The field protracting and plotting were accurate and conform to the requirements of the Hydrographic Manual.

9. Additional Field Work Recommended.

This survey is complete and no additional work is required.

10. Superseding Old Surveys.

There are no previous surveys to be superseded.

11. Reviewed by Leo S. Straw, April 1935.

Inspected by - A. L. Shalowitz.

Examined and approved:

C. K. Green, *C. K. Green*  
Chief, Section of Field Records.

*L. O. Pollock*  
Chief, Division of Charts.

*F. L. Bondur*  
Chief, Section of Field Work.

*G. H. Rude*  
Chief, Division of H. & T.

*Applied to drawing of Chart 5528 Apr. 22, 1935 - J.T.W.*

*Applied to drawing of Chart 5527 Apr. 22, 1935 - J.T.W.*