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Form 504
Rev. April 1935

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

~~Topographic~~
Hydrographic } *Sheet No.* 1240

State Washington

LOCALITY

Grays Harbor

Markham to Hoquiam
~~South side of Grays Harbor~~

~~19~~ 1940-41

CHIEF OF PARTY

Charles Pierce

U. S. GOVERNMENT PRINTING OFFICE 102231

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Form 537
Ed. Dec., 1930

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REG. NO.

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.

Field No. 1240

REGISTER NO. H6665

State Washington

General locality Grays Harbor

Locality Markham to Hoquiam ~~South side of Grays Harbor~~

Scale 1: 10000 Date of survey Nov. Dec. Jan., 19 40,41

Vessel DISCOVERER

Chief of Party Charles Pierce

Surveyed by Earle A. Deily and C. F. Chenworth

Protracted by Paul I. Hauk Oakland Processing Office

Soundings penciled by S. B. Grenell ditto

Soundings in ~~fathoms~~ feet at Mean lower low water

Plane of reference Mean lower low water

Subdivision of wire dragged areas by

Inked by C.E. Dennis

Verified by C.E. Dennis

Instructions dated April 13, and June 26, ~~and Sept 30~~, 19 39

Remarks: Records reduced and sheet plotted in the Oakland Processing Office.

U. S. GOVERNMENT PRINTING OFFICE, 1932

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PRELIMINARY DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SHEET, FIELD No. 1240 H-6665 (1940-41)

South side of Grays Harbor, Washington
Project HT 235

AUTHORITY

This survey was authorized by instructions dated 4-13-39, and supplemental instructions dated 6-26-39, issued to W. M. Scaife, and supplemental instructions dated 9-30-39 transferring the project to the ship DISCOVERER.

SURVEY METHODS

The approximate limits of the work of this party along the Southern edge of the main channel was furnished by the office on a chart. This information was transferred to the boat sheet as a dashed line in red ink. By ending the work on this line there were a number of places where the zero foot curve would not be defined so it was arbitrarily decided in such cases to extend the developement to define that curve.

The length of the field season was limited and the sheet was worked on until the last day of the season. There was not time to carry the work to a junction with the main channel on the Northeast portion of the sheet, but an attempt was made to complete the developement as for as the Northernmost sounding line. It is thought that the work is complete within the area which was worked on.

Noted in Review Paragraph 9

satisfactory

The spacing of the sounding lines is such as was specified in the supplemental instructions, i.e. such spacing as to sedure a satisfactory survey and not to exceed 50 meters inside the 2 fathom curve except on flats covered by one foot or less at mean lower low water where a spacing of 200 meters is permissable, and

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100 meter spacing outside the 2 fathom curve. Sufficient additional lines were run in order to more adequately define the depth curves and the channels.

Standard Coast Survey methods were used throughout. The signals were located by triangulation and plane table survey with the exception of a few off lying piles which were used as hydrographic signals and located by sextant fix upon previously located signals.These locations are shown in the sounding records. Surveys listed in Review. 1616

In general the control was adequate except that the fixes became some what weak at the Eastern limits of the sheet.

There were numerous days during which it was difficult or impossible to see the signals on the South shore from a mile or two off, and since it was necessary to rely upon these signals until the work had progressed well towards the Northern limit of the work, a considerable amount of time was lost because of poor visibility due to rain, fog, smoke, or mist on cloudy days, and a low lying sun behind signals which were mostly in shadow and a slight haze on clear days.

It may readily be seen from an inspection of the sheet that the movements of the party were greatly restricted by the stage of the tide. The fact that such a large area of the sheet embraces flats which are bare at the lower stages of the tide made a considerable amount of lost time necessary while waiting for high water or a rising tide.

All soundings were taken with the hand lead. The lead line was checked regularly morning and evening and the error was negligable except for two days. On v day, Dec. 30, and w day, Dec. 31, the line was checked and found to be marked perfectly

before the beginning of work and on each day it was found to be in error at the close of the day. The error of the line is indicated in the proper manner in the sounding record. On each of these two days a new Sampson bronze center line from different lots was used. These lines had been prepared by soaking in water for a period of three or four days. On the one used on w day the bronze center was found to have broken through in a number of places and it is thought that it might be possible that the fabric of the line was wrapped too tightly about the center to slip and in consequence the center broke through when shrinkage occured. It is also thought that it might be possible that the method of preparing the line was ineffective because the water proofing used on the line prevented the water from soaking through during the time of preparation. It is thought that steaming might have the desired effect before marking the new line. This was not tried due to the fact that the season was nearly over when this trouble was encountered. The season was finished out by using old lines which gave no more trouble.

Corrections applied.

Strong tidal currents were encountered on this project which made the steering of ranges very desirable and this was done whenever possible, but because of the prevailance of conditions of poor visibility, it was necessary to steer compass courses most of the time with the attendant difficulties.

On cross lines in particular where the course is normal to the direction of the current, the spacing of the soundings are liable to be slightly in error between positions due to the efforts of the helmsman to hold up to a strong current. An effort was made to run the cross lines at slack water but since this period lasts for such a short time, many of them were run

crossings agree satisfactorily

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normal to a strong current.

DISCREPANCIES

At position Lat. 46°-57'.0, Long. 123°-57'.8, the first sounding obtained after position 41w was recorded as a minus 5 4 ft. between 7 ft. and 8 2 ft. soundings in a small cross channel. Since this appeared to be a doubtful sounding it was investigated on z day. Approximately 25 minutes were spent in drifting over the area and feeling for the shoalest spot. Positions 35z to 37z inc. give the results of this investigation. The shoalest obtained was on position 36z where a 1 ft. was obtained. Several soundings of 2 ft. were had, and it seems logical that the minus 5 ft. was the result of an error of one fathom either through an error in reading the lead line or through a misunderstanding in recording the sounding, and it is recommended that the minus 5 4 ft. be rejected in favor of those obtained on z day.

Recommendation accepted. See last paragraph page 6 of this report.

Crossings fail to check in a number of cases by a foot or two, but it has been noticed that on all occasions where they were completed on the same day, they agreed very closely. It is thought that the smooth plotting will care for these apparently questionable crossings, particularly since it has been noticed during the course of the field season, that the predicted tides which were used to reduce the soundings on the boat sheet, appeared to be some what in error. true

See report of processing office attached hereto.

If, after the smooth plotting, some of the crossings remain unsatisfactory, it is recommended that the soundings on the East and West system of lines be accepted as correct because of the likelihood of the cross lines being slightly out in position due to cross currents as mentioned earlier in this report. It is not thought that the current would be likely to affect the accu-

Crossings satisfactory. See review.

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racy of the soundings on the East and West lines in the depths which were encountered.

DANGERS

The shoal areas on either side of the narrow channels are the only things which might be termed as dangers within the limits of this survey.

CHANNELS

The main ship channel lies to the Northward of this survey. Since it is maintained by the Engineer Department, this party was not required to develope it.

The buoyed South channel as developed upon this sheet has a controlling depth of ~~12~~ 13 ft. which occurs near the Eastern limit of the sheet. The channel depths increase gradually towards the West to 19 ft. (Controlling depth in λ 124°-02) This channel is used quite often by small tugs with log rafts, and it serves a landing which is shown near the Eastern end of the sheet as a large dock with hydrographic signal "hop" on the end. Trucks haul timber from surrounding logging camps and dump them into the log booms on either side of this dock from whence they are towed away by tugs. φ 46°56.1 λ 123° 54.7'

In the vicinity of position Lat. 46°-55'.3, Long. 124°-00'.5, a small buoyed channel (Johns River Cutoff Channel) leaves the South channel in a Southwesterly direction and furnishes a connection with the channel extending from Pt. Chehalis to South Bay. Only the Eastern portion of this channel falls within the limits of this sheet. The controlling depth as determined from this sheet is but 2 ft. It is thought however that with a little closer developement, a slightly deeper controlling depth might have been obtained. This channel does not appear to be of much importance, as no traffic at all was

Development adequate. Controlling depth at NE end of this channel is 2 ft. MLLW

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observed in it while the party was working in the field. It is likely that some small tugs with log rafts use it as a short cut between South Bay and Aberdeen- Hoquiam at high water.

In the vicinity of position Lat. 46°-55'.3, Long. 124°-00'.5 a narrow channel leaves the South channel in a Southeasterly direction and makes its way past the village of Markham and into the Johns River. Three feet can be carried to a point in the mouth of the river* and one foot can be carried for about half a mile beyond. A shingle mill is located about a quarter of a mile upstream from the mouth of the river and it is supplied with logs by tugs which use the entrance channel and the river above the mill at high water. The outer portion of the entrance channel is marked by bush stakes on both sides.

*To φ 46°54'.0 λ 123°59'.7

In the vicinity of position Lat. 46°-57'.8, Long. 123°-57'.8 a fairly wide and well defined channel (North Channel cutoff) leaves the main ship channel (North Channel) and extends in an Easterly direction. The controlling depth is ~~about 12~~ 8 feet. The channel* is blocked at the Eastern limit of the sheet by a row of pilings as shown on the sheet. A tug with a barge has been observed dumping in this vicinity.

* This is middle Channel, a fork of North channel cutoff. See paragraph below.)

At the extreme Northeast corner of the work a well defined channel (North Channel Cutoff) extends in a West-Southwesterly direction to a junction with the channel (middle channel) just described, and thence westward to a junction with North Channel. The Northeastern end of this channel has not been completed as yet but it is thought that there is no outlet to the main ship channel.

Latest Chart shows 8 ft. can be carried through this channel to main ship channel. (Using old information) M.A.B. 10/20/41

There are several cross channels draining the large area of flats as shown on the sheet. None of these extend all the way from the main channel to the South channel and all dwindle away to nothing. They are not marked in any way and are of little

value. Their courses can sometimes be defined by large logs and stumps which are stuck in the banks of the bordering flats and which usually show above the surface of the water. These have evidently drifted into the small channels and have gone aground on their banks.

None shown on survey.

At theWestern limit of the work on this sheet the main channel and the South channel are close to each other and 3 feet may be carried on a crossing from one to the other.

Critical soys are on H-6646 (1940).

ANCHORAGES

Since the only deep water within the limits of this work occurs in the channels, there are no good anchorages; shallow draft vessels however could find an anchorage just South of the main channel and West of red spar buoy No. 38.

This is the entrance To North Channel Cutoff

COMPARISON WITH PREVIOUS SURVEYS

Because of the difficulty encountered during the previous season in attempting to compare the work of this party with that of the engineer department, no attempt was made this year to secure copies of the work of the Engineer Department. In the past season it was found that the work of the Engineer Department was on a different datum than that of this bureau. It was also evident that the bottom was of a shifting nature, and a considerable amount of dredging was being done to maintain the main channel; hence it was realized that a satisfactory comparison could not be made.

Noted in Review. Instructions require satisfactory junction with latest USE surveys.

Comparison with chart 6195 shows that the present survey gives a more detailed delineation. Generally speaking the channels and the shoals are the same in position and shape, except

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that some cross channels across the shoal area are shown on this survey which are not shown on the chart, and the one which is shown on the chart has evidently changed as it is not the same on this survey.

The 5 foot* spot which is shown on the chaft just South of buoy S "38" on the Southern edge of the main channel appears to have shifted about 200 meters to the Eastward.

ϕ 46°57.7
λ 128°57.3

Noted in review
* H-6665 (1940-41) shows 8 to 10 ft here.

GEOGRAPHIC NAMES

The geographic names have been taken care of in the topographic survey reports.

STATISTICS

Statute miles of sounding lines -----	356.1
Number of positions ----------	2773
Number of soundings, (hand lead) ----	~~13923~~ 4,278
Area, square statute miles ----------	13

TIDAL NOTE

The reduction of soundings to datum plane is controlled by tidal data secured during the progress of the field work from tide gages operated at Markham and at Moon Island. The gage at Moon Island should be used for the reduction of all soundings which were made while it was in operation, with the exception of t, day upon which the gage at Markham should be used. All other days should be controlled by the gage at Markham.

Gages were also in operation at Westport and at Aberdeen for the duration of the field season.

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It is believed that this report is as nearly complete as possible before the accomplishment of the smooth plotting and that a much fuller discussion of the crossings may be made after the sheet has been smooth plotted.

Report of Processing office attached.

Respectfully submitted

C. F. Chenworth
Aid, C. & G. Survey

Approved and forwarded

Charles Pierce, H. & G. Engr.
Commanding ship DISCOVERER

Through

L. D. Graham, H. & G. Engr.
Commanding ship DISCOVERER

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PROCESSING OFFICE REPORT

REDUCTION OF RECORDS:

The sounding volumes were reduced from tidal data furnished by the DISCOVERER in accordance with the instructions in the Descriptive Report. All soundings were reduced to ½ foot.

PROTRACTING:

Positions were plotted with the three-arm steel protractor and no unusual difficulty was found in plotting. The fixes were in general strong and easily plotted. Any departure from recorded plotting data has been noted in colored pencil in the sounding volume.

PENCILLED SOUNDINGS, CROSSINGS AND DEPTH CURVES:

Soundings have been pencilled in even feet except along the low water line where -½ and ½ foot soundings have been pencilled to facilitate drawing the low water line. A large area of the sheet covers shoals bare at low water so there are an unusual number of minus soundings.

The depth curves have been drawn in for every fathom and these curves have been smoothed out as much as possible to indicate the true coutour of the shoals.

In general the crossings are excellent, seldom exceeding one foot disagreement even along the steep channel edges. In many cases an apparent disagreement of one foot is actually only ½ foot as the fraction has been omitted in plotting. Most crossing discrepancies are apparently due to tide reduction differences as they generally appear in the restricted shoal areas where the tidal flow would probably lag the recorded tide at the gages. Review

JUNCTION:

H-6646 1940 This sheet makes a junction on the west with sheet 1140 which was smooth plotted in this office in the spring of 1941. Notes covering the junction with the channel on the north border of this sheet are contained in the foregoing Descriptive Report furnished by the field party.

A junction comparison with a tracing of smooth sheet 1140, H-6646 (1940) indicates excellent agreement except in the following area:

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Lat: 46°-55.71'
Long: 124°-01.66' A zero (0) sounding on sheet H-6646 (1940) 1140 falls on an eighteen (18) foot sounding on sheet H-6665 (1940-41) 1840. This is along the steep edge of the channel and may be due to dredging operations, a natural shift in the channel in the elapsed time between surveys or to an error in position* on sheet 1140. Also, the overlap between sheets is insufficient in this area and the west end of the shoal just north of the geographic position indicated above is not too well defined. This appears to be due in part to an apparent discrepancy in crossings on sheet 1140.

To be considered in review of H-6646 (1940)

(green)
* Pos 34 b of H-6646 was incorrectly protracted

CONCLUSION:

This survey seems to be complete in every detail and no further field work is recommended.

S. B. Grenell, H. & G. Engr.,
Officer in Charge,
Oakland Processing Office.

Form 712
DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
Rev. June 1937

TIDE NOTE FOR HYDROGRAPHIC SHEET

~~Division of Hydrography and Topography~~

SEP 13 1941

Division of Charts: Attention: Mr. H. R. Edmonston

Plane of reference approved in
10 volumes of sounding records for

HYDROGRAPHIC SHEET 6665

Locality Grays Harbor, Washington

Chief of Party: L. D. Graham in 1940-1941
Plane of reference is mean lower low water reading
2.2 ft. on tide staff at Markham
15.0 ft. below B. M. 1
2.6 ft. on tide staff at Moon Island
20.8 ft. below B. M. triangulation Station MOON

Height of mean high water above plane of reference is 8.5 feet at Markham; 9.0 feet at Moon Island.

Condition of records satisfactory except as noted below:

Chief, Division of Tides and Currents.

U. S. GOVERNMENT PRINTING OFFICE 154327

GEOGRAPHIC NAMES

Survey No. H6665

See page 8 of this report.

Name on Survey	On Chart No. A,	On previous survey No. B,	On U. S. quadrangle Maps C,	From local information D	On local Maps E	P. O. Guide or Map F	Rand McNally Atlas G	U. S. Light List H	K	
Grays Harbor										1
South Channel										2
Markham										3
Johns R.										4
Stearns Bluff										5
Hoquiam										6
										7
Moon I.										8
										9
										10
										11
										12
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										18
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										22
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										27

Names underlined in red approved by L. Heck on 12/3/41

M 234

	Remarks	Decisions
1		
2		
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6	For title	
7		
8	Location of tide staff.	
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Surveys Section (Chart Division)

HYDROGRAPHIC SURVEY NO. H6665

Records accompanying survey:

Boat sheets One.; sounding vols. (10).; wire drag vols. ....;

bomb vols. .....; graphic recorder rolls .....;

special reports, etc. .....

.....

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

Number of positions on sheet		2773
Number of positions checked		735
Number of positions revised		02
Number of soundings recorded		14278
Number of soundings revised (refers to depth only)		97
Number of soundings erroneously spaced		508
Number of signals erroneously plotted or transferred		0
Topographic details	Time	11 hrs 6
Junctions	Time	0
Verification of soundings from graphic record	Time	0

Verification by C.E. Dennis Total time 60 Date 9/24/41.

Review by H.F. Steaman Time .57 hrs Date 11/21/41

FORM M-238

MEMORANDUM

IMMEDIATE ATTENTION

SURVEY
DESCRIPTIVE REPORT
~~PHOTOSTAT OF~~ } No. H H6665

received Sept. 4, 1941
registered Sept. 5, 1941
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
20			
22			
24			
25	✓	HC	Pages 5, 6 and 7
26			
30			
40			
62			
63			
82			
83			
88			
90			

RETURN TO

82	T. B. Reed

VERIFIER'S REPORT OF HYDROGRAPHIC SURVEY NO. H H6665

Verified and Inked by C.E. Dennis Date 9/24/41

1. The descriptive report was consulted and appropriate action taken.

2. Soundings originating with the survey and mentioned in the descriptive report have been verified, including latitude and longitude.

3. All references to survey sheets mentioned in the descriptive report include the registry number and year.

4. Geographic names of hydrographic features are in slanting lettering and of topographic features in vertical lettering. Not on sheet

5. All items effecting the plotting of the survey which are entered in the remarks columns of the sounding records were noted and check marked. In all cases appropriate action was taken.

6. All positions verified instrumentally were check marked in the sounding records.

7. All critical soundings are clear and legible.

8. The metal protractor has been checked within the last three months.

9. The protracting and plotting of all bad crossings were verified.

10. All detached positions locating critical soundings, rocks or buoys were verified.

11. The boat sheet was compared with the smooth sheet.

12. The spacing of soundings as recorded in the records was closely followed.

13. The bottom characteristics were shown on outstanding shoals.

14. The reduction and plotting of doubtful soundings were checked.

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15. The transfer of contemporary topographic information was carefully examined.

16. All junctions were transferred. None

17. The notation "JOINS H " was added for all contemporary adjoining or overlapping sheets now registered.

18. The depth curves have been drawn to include the significant depths.

19. All triangulation stations and transfer of topographic and hydrographic signals were checked by the field party.

20. Heights of rocks were checked against range of tide. None

21. Rocks transferred from topographic survey have a dotted curve where None shown thereon.

22. Unnecessary pencil notes have been removed.

23. Objects on which signals are located and which fall outside of the low water line have been described on the sheet.

24. The low water line and delineation of shoal areas have been properly shown (see letter of October 20, 1934).

25. Degree and minutes values and symbols have been checked.

26. Source of shoreline and signals (When not given in report).
T-6807 (1940)
T-6808 (1940)
T-6809 (1940)
T-6810 (1940-41)

27. Depth curves were satisfactory except as follows:

28. Sounding line crossings were satisfactory except as follows: ✓

29. Junctions with contemporary surveys were satisfactory except as follows: None

30. Condition of sounding records was satisfactory except as follows: ✓
No list of signals

31. The protracting was satisfactory except as follows: ✓

32. The field plotting of soundings was satisfactory except as follows:
508 soundings where erroneously spaced
97 soundings where mis-plotted

33. Notes to reviewer: The ~~Hydrographic station~~ Topographic signal at the south end of the Johns River was called TREE on this survey and is called FIR on the topographic sheet.
The Grays Harbor Upper Range Rear Light ~~Topographic~~ Triangulation station was called KAN on this survey.

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DIVISION OF CHARTS

SURVEYS SECTION

REVIEW OF HYDROGRAPHIC SURVEY REGISTER NO. H-6665
FIELD NO. 1240

Washington - Grays Harbor, Markham to Hoquiam
Surveyed in November 1940, January 1941, Scale 1:10,000
Instructions dated 4-13-39 and 6-26-39 (W. M. Scaife)
9-30-39 (DISCOVERER)

Soundings: Hand lead Control: 3 Point fixes on shore signals

Chief of Party - Charles Pierce, L. D. Graham
Surveyed by - Earle A. Deily, C. F. Chenworth
Protracted by - Paul I. Hauk
Soundings plotted by - S. B. Grenell
Verified and inked by - C. E. Dennis
Reviewed by - H. F. Stegman, November 14, 1941
Inspected by - H. R. Edmonston

1. Shoreline and Signals

Shoreline and topographic signals originate with planetable surveys T-6807, T-6808, and T-6809 all of 1940 and T-6810 (1940-41). Hydrographic signals PILE and ELP were located by sextant fixes recorded in Vol. 6 of the sounding records.

2. Sounding Line Crossings

The agreement of sounding line crossings is satisfactory. At the steep slope along the edge of the channel in Lat. 46°55.9', Long. 124°01.5' there were differences of as much as 8 feet. The shoaler soundings have been plotted.

3. Depth Curves

The usual depth curves, including practically the entire low water line, can be satisfactorily drawn.

4. Junctions with Contemporary Surveys

(a) The junction on the west with H-6646 (1940) will be considered in the review of that survey.

(b) Adjacent surveys to the eastward have not yet been received in the office.

(c) The northern limit of the present survey joins U. S. Engineers surveys of North Channel. These surveys are considered in paragraph 6, below.

5. Comparison with Prior Surveys

(a) H-1589 a&b (1883), H-2085 (1891); Scale 1:20,000

These surveys cover almost the entire area of the present survey. Along the south channel a general deepening of 4 to 8 feet has taken place. The shallow channels across the tidal flats in the general vicinity of Lat. 46°56.5', Long. 123°58' show no similarity to those of the present survey. The present survey depths vary from 20 feet deeper in Lat. 46°55.7', Long. 124°01.8' to 20 feet shoaler in Lat. 46°57.1', Long. 123°59.0', due to shifting of the channels. The present survey supersedes these surveys.

(b) H-3228 (1911), H-3229 (1911); Scale 1:10,000

These two surveys cover the south channel within the area of the present survey. In general, the depths are from 3 feet shoaler to 3 feet deeper on the present survey. The maximum differences noted were in the vicinity of Lat. 46°55.5', Long. 124°00.5' where the present survey is 6 feet deeper in depths of 21 to 22 feet. H-6665 supersedes these surveys.

6. Comparison with Chart 6195 (Latest print dated 6-11-41)

(a) Hydrography

Hydrography originates with the surveys mentioned in paragraph 5(b) above and the following U. S. Engineers blueprints:

Bp. 515 (1900)	Bp. 29689 (1936)
Bp. 12496 (1908	Bp. 34001 (1940)
Bp. 19517 (1924)	Bp. 34612 (1940)
Bp. 20996 (1926)	Bp. 35218 (1941)

Bp. 35218 is subsequent to the present survey. With this exception the above information is superseded by H-6665 (1940-41). Northward of

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Lat. 46°57.5' the present survey depths are in general as much as 6 feet shoaler than the charted depths. A 5-ft. spot from Bp. 19517 (1924) in Lat. 46°57.7', Long. 123°57.3' falls in depths of 8 to 10 feet on the present survey. Because of the changeable nature of this area the sounding has not been carried forward.

The charted 1-ft. sounding in Lat. 46°56.0', Long. 123°55.4' is believed to be erroneous. H-3228 (1911) and the present survey both show depths of 15 feet in this position. The charted 13-ft. depth in Lat. 46°55.8', Long. 124°01.5' is likewise believed to be an incorrectly compiled 19-ft. sounding from H-3229 (1911). These soundings first appeared on the April 1912 edition of chart 6195.

(b) Aids to Navigation

Aids to navigation located on the present survey are in agreement with the positions and notations on the chart and in the Pacific Coast Light List of 1941, except as follows:

1. Buoy C-25 near Lat. 46°56', Long. 124°02' is not charted. It was removed subsequent to the date of the present survey.

2. Bell buoy 30-A in Lat. 46°55.8', Long. 124°01.8' is shown as lighted on the chart and light list.

3. Lighted buoy 27 in Lat. 46°56.3', Long. 124°01.0' is shown as a lighted bell buoy on the chart and light list.

4. Spar buoys in South Channel and Johns River Cut-off Channel (Lat. 46°55', Long. 124°01') differ as much as 350 meters from their charted positions. These positions should be corrected to agree with those of the present survey.

5. The two white spar buoys in Lat. 46°54.5', Long. 124°02.0' and Lat. 46°55.2', Long. 124°00.8' are not shown on the chart or in the Pacific Coast 1941 Light List.

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(c) Controlling Depths

The present survey extends to the limits of the U. S. Engineers surveys of North Channel. The controlling depths in that channel are charted from information furnished by the U. S. Engineer Dep't. Natural channels within the area of the present survey are noted in the descriptive report, pages 5, 6, and 7.

7. General Comment

(a) The records are legible and conform to the requirements of the Hydrographic Manual except that they do not contain a list of signals.

(b) The field drafting was satisfactory except that more than 3% of the soundings were erroneously spaced, and the shoreline was shown by dashes rather than a solid line.

(c) The descriptive report satisfactorily covers all matters of importance except as noted in paragraph 8, below.

(d) The two beacons in the vicinity of Lat. 46°55.75', Long. 124°01.2' were noted in the Sounding Records, Vol. 6, page 35, as piling with diamond day marks. They probably mark a range used in dredging operations by the U. S. Engineers. They are not listed in the Pacific Coast 1941 Light List.

(e) For charting purposes it would have been desirable to extend hydrography beyond the project limits in the vicinity of Lat. 46°57.0', Long. 123°59.4' so as to include the three-fathom curve.

8. Compliance with Project Instructions

Satisfactory, except that no comparison was made with the latest U. S. Engineers' channel surveys (D.R., page 7). Paragraph 8 of the instructions states that a satisfactory junction with the latest U.S.E. surveys should be made.

9. Additional Field Work Recommended

This survey is satisfactory and no additional field work is required. However, when work on the project

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is resumed the following work should be accomplished:

(a) For charting purposes it is desirable that fixes be obtained on the navigation ranges in North Channel.

(b) The area north and east of Lat. 46°58.0', Long. 123°56.0' should be included in the adjoining survey on the east. This hydrography should extend northward to the limits of the latest U. S. Engineer surveys of North Channel and should include the 18-ft. curve.

10. Superseded Surveys

H-1589a	(1883)	in part
H-1589b	(1883)	" "
H-2085	(1891)	" "
H-3228	(1911)	" "
H-3229	(1911)	" "

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Applied to Chart 6195 10/21/41 W.A.B. Before review