

8398

Diag. Cht. No. 6380-2.

FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. PA-1157 Office No. H-8398

LOCALITY

State Washington

General locality Haro Strait

Locality Stuart Island - North Side

1957

CHIEF OF PARTY

W. C. Russell

LIBRARY & ARCHIVES

DATE December 1960

USCOMM-DC 87022-P66

8398

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

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

REGISTER No. H-8398 ✓

Field No. PA-1157

State Washington

General locality Haro Strait
~~San Juan Islands~~ *Questionable geographic name. See name approved by BGN-GAK*

Locality Stuart Island - North Side
~~Vicinity of Stuart Island~~

Scale 1:10,000 Date of survey April 18 - June 2, 1957

Instructions dated 1 Oct. 1956 (and proper instructions referred to therein)

Vessel USCGC PATTON & LAUNCH 87

Chief of party William C. Russell

Surveyed by W. C. Russell, W. E. Randall & T. E. Simkin

Soundings taken by ~~Patton~~, graphic recorder, hand lead, wire

Fathograms scaled by PATTON Personnel

Fathograms checked by PATTON Personnel

Protracted by H. C. PARSONS

Soundings penciled by H. C. PARSONS

Seattle Field Office

Soundings in fathoms ~~feet~~ at ~~MLLW~~ and are true depths

REMARKS:
.....
.....
.....
.....
.....



14-8398

DESCRIPTIVE REPORT

TO ACCOMPANY

HYDROGRAPHIC SURVEYS NOS:

H-8398(PA-1157)

H-8399(PA-1257)

H-8400(PA-1357)

NORTHWEST WASHINGTON, HARO STRAIT
(North of Lat. 40° and West of Ft. Doughty, Orcas Id.)

SHIP PATTON - W. C. RUSSELL, CMDG.

SCALE 1:10000 - DATE: 1957

SURVEYED BY:

W. C. RUSSELL, W. E. RANDALL & T. E. SIMKIN

###

A. PROJECT:

This survey was executed under Supplemental Instructions-
Project 12410, Coast of Washington, North of Anacortes, dated 1 October 1956,
and the prior instructions referred to therein.

B. SURVEY LIMITS AND DATES:

The three boat sheets cover United States waters north
of Latitude 48° 40' and extend eastward from the vicinity of Turn Point,
(Stuart Island) along the United States - Canadian boundary to Latitude 48°
46.5', thence eastward to Longitude 122° 59.5'; thence southward to Latit-
tude 48° 44'; thence eastward to Longitude 122° 57'; thence southward to
Point Doughty; and thence southward along Orcas Island to Latitude 48° 40'.
Haro Strait and President Channel are included.

Field work was begun on 18 April and concluded on 17
October 1957.

-2-

C. VESSEL AND EQUIPMENT:

The survey was accomplished using the Ship PATTON and Launch 87. Turning radii were about 150 meters for the ship and about 25 meters for the launch. Sounding speeds were about seven knots; the ship's speed was generally limited by the allowable maximum spacing between positions on the boat sheet.

Soundings were obtained with 808 type depth recorders calibrated for velocities of 800 fathoms per second. The ship's recorder was No. 74; the launch's No. 51. Bottom samples and vertical casts were obtained with handlead or wire sounding machine.

D. TIDE AND CURRENT STATIONS:

Tide reducers were obtained from a portable automatic gage maintained at Echo Bay, Sucia I. No current stations were observed within the area of this survey.

E. SMOOTH SHEET:

Smooth sheet construction and plotting will be covered in an addendum report.

F. CONTROL STATIONS:

Signals on all three sheets were located photogrammetrically in the majority of cases. Such location was obtained by selecting pass points for signals; by holding to pass points and pricking nearby objects; or by intersection from different photographs. Other signals were located by traverse, theodolite (PATT 1957), sextant, or planetable^{PATT-A-57} (northeast section of Orcas I., on H-8400 (PA-1357)). Triangulation stations were utilized where available.

In some cases a signal was located by reference to a photogrammetrically-located point which was not used as a signal. Such points were located by standard methods and are shown on the blackline impressions, labeled "Pt. A", "Pt. B", etc. Reference data used to locate signals from these points is shown in the sounding volumes and/or blackline impressions.

Final positions of photo signals are on blackline impressions of final manuscripts T-5588 S, T-5589 N, and T-5589 S.

F. CONTROL STATIONS (CONTIN.):

Alphabetical lists of control stations, compiled on a hydrographic sheet basis, are appended to this report and attached to the fly-leaves of the pertinent sounding volumes. ✓

G. SHORELINE AND TOPOGRAPHY:

Most of the shoreline was taken from final prints of photogrammetrically-compiled manuscripts Nos. T-5588 and ¹⁹⁴⁴⁻⁵³ 5589. ^{5589.5} ₁₉₄₄₋₅₄ The northern portion of Orcas Island, as shown on Sheet H-8400 (PA-1357) was not covered by recent surveys. Shoreline in this area was from Topographic Sheet ~~T-2192 (date 1894)~~ ~~and T-2229 (1895)~~ ~~T-2195 of 1894~~. It was checked by reference to adjacent sounding lines and, at the northern end, by frequent measurements on graphic control Sheet PA-A-57. ✓

Sheet H-8398 (PA-1157): Discrepancies noted in red on boat sheet in vicinity of Lat. $48^{\circ}40'.7$ at ~~west~~ ^{east} entrance to Prevost Harbor. Adequate notes in the sounding records will permit smooth plotting of the revised shoreline. ✓

Sheet H-8399 (PA-1257): Discrepancy noted in red on boat sheet at Lat. $48^{\circ}41.25'$ near Signal HAG.
Not applicable to H-8398

Sheet H-8400 (PA-1357): Discrepancies noted in red on boat sheet at north entrance of Mail Bay, in vicinity of Signal GUY; at Signal MIS; reef 150 meters west of Signal END; and reef 150 meters south of Signal SUB. Additional discrepancies are shown on graphic control sheet PA-A-57. (See also under "L").
Not applicable to H-8398

It was impracticable in most places to delineate the low waterline due to foul or steeply-sloping bottom conditions. ✓

H. SOUNDINGS:

Soundings were taken with 808-type depth recorders operated on the fathom scale. Exceptions to this were in areas where heavy grass obscured the bottom. Such areas were not recognized until late in the season when handlead soundings were taken to obtain bottom samples. Thereafter, soundings in grass were taken on the foot scale with frequent, simultaneous handlead soundings. The final, reduced soundings are shown in fathoms. ✓

Vertical casts were taken with wire sounding machines on the ship and the launch to obtain corrections for echo soundings. Because of severe currents and jagged or steep bottom, agreement generally was poor. Consequently, wire soundings were not considered for echo corrections except in the case of shoal-water launch soundings. ✓

Corrections to echo soundings were obtained entirely from temperature and salinity observations for the ship. Launch corrections were the result of combining bar checks, vertical cast comparisons, and temperature and salinity observations. Variations in initial are recorded as a separate correction. Phase differences are included in the echo corrections. Abstracts of Phase and Echo Corrections follow text. ✓

An exception to the above method of including phase differences as part of the echo correction is found in the sounding volumes of Launch 87 for Sheet H-8398 (PA-1157). Because the phase differences were so large, it was decided early in the season to include this correction with the tide reducers when reducing soundings in order to obtain more reasonable soundings on the boat sheet. Thus the two major corrections were combined to provide one easily handled number for reduction of soundings. This method of combining the corrections was considered too unique to warrant its continued use on the other sheets. } only on boat sheet

Ship: The initial of the recorder was set at 1.5 fathoms, the draft of the transmitter and receiver units. Frequent checks of ship's ✓

H. SOUNDINGS (Cont'd.):

draft revealed no ^{substantial?} consequential variations due to fuel load or sounding speed.

Launch: The initial of the launch was determined by bar check to be 0.3 fathom. (Actually 0.35 is probably better, since 0.3 or 0.4 would satisfy the bar checks, but 0.3 was selected for recording in the sounding records.)

I. CONTROL OF HYDROGRAPHY:

Hydrography was controlled by three-point sextant fixes using signals ashore. In some places, as along beachlines, positions consisted of estimated distances from signals. No substandard methods were used.

J. ADEQUACY OF SURVEY:

This survey is complete and adequate to supersede prior surveys. Junctions of these contemporary sheets are satisfactory and no holidays exist. Depth curves at the junctions were compared by tracings and found to be in good agreement. Junctions are adequate with Sheets H-8115 and H-8116 along Lat. 48° 40', ~~Not compared on smooth sheet~~ the southern limit of hydrography. No other recent surveys exist adjacent to these present surveys except those of Canadian origin. None of these were available to this party. Soundings from Canadian surveys shown on the published chart, No. 6380, agree with the present survey.

K. CROSSLINES:

Approximately 10 percent. of all sounding lines are crosslines. The soundings are in adequate agreement.

L. COMPARISON WITH PRIOR SURVEYS:

Sheet H-8398 (PA-1157): This survey covered parts of prior surveys H-405 (1853; 1:200,000); H-2113 (1891; 1:20,000); and H-2215 (1894; 1:10,000). No large discrepancies were noted. In general, the

L. COMPARISON WITH PRIOR SURVEYS (Contin.):

soundings agree within one fathom. In a few instances, as at Position 100m NW of Latitude 48° 42', Longitude 123° 11', and at 200m, ^{from H-2113 (1891)} NW of Latitude 48° 42', Longitude 123° 09', it appears an error of 10 fathoms was made in H-2215. *The data shown on this sounding in sounding volumes of H-2215 (1894) is unadjustable.*

Sheet H-8399 (PA-1257): This survey covered part of prior survey H-2113. The soundings on the two surveys generally agree. The following exceptions are to be noted:

Lat.	Long.	New Depth	Old Depth	Remarks
48° 41.09'	123° 02.70'	0.5 Fm.	9 1/2 Ft.	Mouatt Reef
48° 40.18'	123° 02.20'	2 ⁹	40 Fm.	On Prelim. Review smooth sheet agrees.
48° 40.45'	123° 01.02'	2 ⁷	22 "	"
48° 43.47'	122° 59.90'	8 ⁹	1 1/2 Ft.	No. 8 on Prelim. Review
48° 45.2 ⁸ '	123° 00.73'	6 ⁰	14 Fm.	No. 7 on Prelim. Review Later Canadian Surveys agree

Not applicable to H-8398

A deep channel extends northward from Pt. Disney east of Mouatt Reef as indicated on H-2113

On Prelim. Review

Sheet H-8400 (PA-1357): This survey covers part of prior survey H-2113. The soundings generally agree. The following exceptions are to be noted:

The 36 and 40 fathom soundings of No. 9, Prelim. Review, are in 100 fathoms.

The shoal area immediately west of Signal END, No. 10, Preliminary Review, is developed more completely on the new survey. Currents run violently through this area making handlead soundings impracticable except for a few minutes each day. Kelp is so profuse that the bottom is obscured in most places except when the current streams the kelp in a towed-under condition. Soundings eventually were obtained by echo sounder with personnel stationed on each side of the launch visibly verifying all shoal soundings announced by the echo sounder operator. The bow wave of the launch

Not applicable to H-8398

L. COMPARISON WITH PRIOR SURVEYS (Contin.):

moved aside the kelp sufficiently to enable viewers to see the bottom where it was less than three fathoms below the launch. Several bare rock symbols were shown on the old topographic survey T-2192. There are no bare rocks in this area.

The 43-fathom sounding of No. 11, Preliminary Review, is in 82 fathoms.

The reef 150 meters south of Signal SUB, mentioned under "G", also was shown on the old topographic sheet T-2192 as a bare rock. It appears there may have been a different meaning for the bare rock symbol when T-2192 was done. The present hydrographic survey and graphic control sheet should be accepted where discrepancies exist.

Not applicable to H-8398

M. COMPARISON WITH CHART:

The three surveys were compared with Chart No. 6380, 8th Edition, Revised 11/26/56, scale 1:80,000. The difference in scale prevented any accurate comparison, but generally agreement was good. Notable exceptions were listed under "L" above. Another difference, an omission on the chart, is the shoal sounding of 0.5 fathoms about 120 meters NE of Signal RAS on Sheet H-8398 (PA-1157). This was found in an area unsurveyed on prior Survey H-2215.

N. DANGERS AND SHOALS:

Most dangers consist of shoals extending off points of land and are adequately delineated by the depth curves. Additional dangers are: (from boat sheet and subject to adjustment).

<u>Location</u>	<u>Depth(MLLW)</u>	<u>Position</u>	<u>Remarks</u>
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Lat. 48° 41' + 632 m.

Long. 123° 14' + 236 m.

(1) SHEET H-8398 (PA-1157)

0 Ft.	not 117f but located by several unnumbered positions taken after pos 117f.	Awash portion of rock ridge extending offshore from Turn Pt. The ridge drops rapidly offshore of a 1/4 Ft. sounding which is 50 meters NW of this 0 Ft. sounding.
0 2 fm	pos 45-46a	

H. DANGERS AND SIGNALS (Contin.)

Location	Depth (NLLM)	Position	Remarks
Lat. 48° 41' + 397 m. Long. 123° 12' + 51 m.	3 Ft.	162 e	Reported on Form 786 (U.S.C.G. notified) ✓

SHEET H-8399 (PA-1257)

Lat. 48° 41' + 162 m. Long. 123° 02' + 852 m.	3.1 Ft.	42 g	Mouatt Reef; reported on Form 786 (U.S.C.G. notified)
Lat. 48° 43' + ¹⁵⁷⁰ 2475 m. Long. 123° 01' + 268 m.	uncovers 1 Ft.	8/8/57	This area was already shown to be foul on Chart No. 6380.
Lat. 48° 43' + ¹⁵³⁸ 2470 m. Long. 123° 01' + 242 m.	uncovers ½ Ft.	"	-do-
Lat. 48° 43' + ¹⁴⁹⁰ 2424 m. Long. 123° 01' + 244 m.	covers ½ Ft.	"	-do-

Not applicable to H-8399

SHEET H-8400 (PA-1357)

No new dangers have been found on this sheet. The area west of Signal END, shown foul on the chart, was investigated. Smooth sheet plotting may reveal some changes in this area.

Not applicable to H-8398

O. COAST PILOT INFORMATION

Additions and Corrections to Coast Pilot 7, Pacific Coast, California, Oregon and Washington - Seventh (1951) Edition & Supplement of 12 January 1957.

Page 416, Line 46: Add - In the northwestern part of the harbor, a landing float is maintained by the state for the use of small craft. Fresh water is available at a hand pump located in the state-maintained parkway connecting this harbor with PREVOST HARBOR to the north. (Note to Editor: The floats and park between are all maintained by the Washington State Parks and Recreation Commission, as referred to in the Supplement for Page 417, Line 4.)

Page 417, Line 2: Read - (after "shelter and anchorage") "A wharf with 11 feet depth at the face is maintained at the west shore for summer residents and USCG personnel stationed at Turn Point Light. A mail boat operates between Prevost Harbor and Friday Harbor. The Washington State Parks and Recreation Commission maintains a landing float for the use of small craft in the harbor. Depth at the float is 9 feet."

Q. COAST PILOT INFORMATION (Contin.):

Page 417 Line 25 - 28: read - (after "depth of") three feet and is marked by kelp, lies 600 yards offshore and 0.5 mile northward of Pt. Disney. A wharf with ten feet depth is on the shore northeast of Mouatt Reef. A mail boat operates between Waldron I., and Friday Harbor. The post office is near the wharf.

Page 417 Line 35 - 36: after "Bare Island.", delete remainder of paragraph. (Note to Editor: Thorough search failed to reveal rock or kelp).

Page 417 Line 39: read - 261° to 347°. (Note to Editor: This is from NM-21/1972/57).

Page 429 Line 43 -44: Delete sentence beginning "A mooring buoy.."

Page 435 Line 35 - 37: read: (after "Burroughs Bay") contains ruins of a sawmill, wharf and lumberyard.

Currents encountered in the area varied considerably. In many places there seemed to be no period of slack water; the currents resulted in whirlpools and rips that seemed to continue throughout the day. As determined from launch "ground speeds" the current maximums were about three knots in the more confined channels; such as, President Channel, Boundary Pass, the area between Skipjack Island and Waldron Island, and the area west and north of Turn Pt. A specific example of current occurred on 14 August when the launch broke down and drifted from Position 1 to Position 2 today. The average speed was 1.7 knots (no wind) and the direction toward Haro Strait rather than toward San Juan Channel as would be expected. This occurred from one hour after low water to two hours after low water.

P. AIDS TO NAVIGATION:

No floating aids are in the area. The fixed aids are correct as published in the Light List and shown on the chart.

Q. LANDMARKS FOR CHARTS:

None are recommended.

R. GEOGRAPHIC NAMES:

1/6/57

See special report on geographic names.

S. SILTED AREAS:

Most of the deep, flat-bottomed areas are covered with silt.

For specific depths and area limits, see fathograms.

T. BY-PRODUCT INFORMATION:

No significant by-product information was noted.

U. MARKED TOPOGRAPHIC STATION:

Not on this survey

PATT 1957 -- data and computations

PATT 1957 is a standard topo mark set as close to the position of DOUGHTY 4, 1940 as was possible from the description. DOUGHTY 4 has been removed and there were no reference marks. It is felt that the location of PATT 1957 is within four feet of the position of DOUGHTY 4.

Location of PATT 1957 was by theodolite (Wild T-2). All stations in the vicinity that would furnish strong 3-point fixes were observed with four D & R. The signals were all plumb within one inch except for SLANT 1894 which was eccentric. (The target was six inches northwest of the station mark). Heat waves were fairly bad during the observations.

The position computed for PATT 1957 varies with the 3-point fix selected. For this reason, three different 3-point problems were computed; the accepted (field) position of PATT-1957 is a mean of the three solutions. This position was used on graphic control Sheet PA-A-57 as well as on hydrographic sheet H-8400 (PA-1357).

Analysis of computations.

Latitude	Longitude	3-point fix	O. P. Triangle
42 42 + 1340.7 m.	122 56 + 1130.7 m.	FRE - ANN - HAM	PATT - ANN - HAM
+ 1343.9	+ 1109.9	FRE - SAT - FUP	PATT - ANN - FUP
+ 1336.9*	+ 1108.7}	ALL - HAM - SAT	{ PATT - ALL - HAM
+ 1336.9*	+ 1108.7 }		{ PATT - ALL - SAT

U. MARKED TOPOGRAPHIC STATION (Contin.):

Latitude	Longitude	3-point fix	G. P. Triangle
43.396*	54.288*		
48 42 + 1340.5 m.	122 56 + 1109.8 m.	Accepted (field mean) position of PATT 1957	
48 42 + 1340.4 m.	122 56 + 1109.0 m.	Position of lost station DOUGHTY 4, 1940	

*These two sets of values are combined as one in the final meaning because they are from the same 3-point fix.

FRE is FREEMAN 1894 HAM is HAMMOND 3, 1940 PUF is PUFFIN I. LT. 1940
 AIL is SMALL 1894 SAT is SATURNA I. LT. 1909

The record book and computation data for this station should accompany the smooth sheet until the smooth sheet is completed.

V. TRAVERSE:

Signals from SANDY 1940, RM 2, along the west coast of Waldron Island to DRY 1942 were located by traverse, using a 300-ft. steel tape and measuring angles (D & R) with a Wild T-2 theodolite. The initial was on Skipjack Light, 1950, at each setup because the backsights were too short to provide good azimuths. The positions on the smooth sheet were obtained graphically; no adjustment was necessary. The record book "Observations of Horizontal Directions" should accompany this sheet until it is completed.

Z. TABULATION OF APPLICABLE DATA:

- Geographic Names Report.
- Observations of Horizontal Directions and computations for Station PATT 1957.
- Observations of Horizontal Directions for traverse from SANDY RM 2 1940 to DRY 1942.
- Temperature and Salinity Report.

Respectfully submitted,

William E. Randall
 William E. Randall
 LCDR CGS
 Cmdg., Ship PATTCH

TIDE NOTE ✓

SHEETS H-8398 (PA-1157); H-8399 (PA-1257); and H-8400 (PA-1357)

A portable automatic tide gage at Echo Bay, Sucia Island, Washington, furnished tide reducers for the entire season. Its position was:

Lat. 48° 45.3'
Long. 122° 53.7'

Midway through the season, on 10 July, the gage was moved a few yards to the west into deeper water to obtain minus tides.

MLLW on the staff (5 April to 10 July) . 2.40 ft.
(10 July to 17 Oct.) . 3.87 ft.

ABSTRACT OF PHASE COMPARISONS

Date & Day Letter	A - B	B - C	C - D	D - E	Remarks
<u>(PA-1157)</u>					
19 Apr/B	+ 0.68 (9)	<u>- 0.73 (6) R</u>			Sloping
20 Apr/C	+ 0.91 (10)				
24 Apr/extra			- 2.57 (34)		
25 Apr/D	+ 0.76 (10)				
4 May/G		- 0.57 (10)		+ 3.18 (9)	<i>Applicable</i>
5 May/H		- 0.44 (10)			
6 May/J	+ 0.61 (14)				
1 Jun/M ^{Pos.} 65,87	<u>+ 0.50 (4) R</u>				Too few
<u>(PA-1257)</u>					
31 Jul/B pos. 3		<u>- 1.2 (1) R</u>			Too few
1 Aug/C		- 0.52 (10)			<i>Not Applicable</i>
20 Sep/J	+ 1.08 (12)	- 0.45 (10)			
23 Sep/extra	+ 0.98 (30)				
<u>(PA-1357)</u>					
24 Sep/D		<u>- 0.55 (22)</u>			<i>Not Applicable</i>
Arith. Means..	+ 0.84	- 0.51	- 2.57	+ 3.18	
		<u>+ 0.84</u>	<u>+ 0.33</u>	<u>- 2.24</u>	
	+ 0.84	+ 0.33	- 2.24	+ 0.94	

FINAL CORR'NS

A-scale 0.0 B-scale + 0.8 C-scale + 0.3 D-scale - 2.2 E-scale + 0.9

Launch 87 1957
Recorder No. 51

ABSTRACT OF PHASE COMPARISONS

DATE	A - B	B - C	C - D
	(20)		
7 MAY	- 0.27		
	(20)	(7)	
8 "	- 0.33	+ 1.67	
		(25)	(20)
20 "		+ 1.69	+ 2.43
10 AUGUST		{ + (15) } _R	
		+ 2.10	
Arith. Means	- 0.30	+ 1.69	+ 2.43
		- 0.30	+ 1.39
	- 0.30	+ 1.39	+ 3.82
Final corr'n to scale	A = 0	B = - 0.3	C = + 1.4 D = + 3.8

Not applicable

PHASE COMPARISONS USED H-8398 (PA-1157)*

Means	A - B = -0.22;	B - C = +1.65;	C - D = +2.45
Final Corr'n to Scale	A = 0	B = -0.2	C = +1.4 D = +3.9

Applicable

*Fathometer No. 51 (Launch) soundings for Sheet H-8398 (PA-1157) were reduced using erroneous A - B phase comparison of -0.22 fms. This was discovered after check scanning phase comparisons, but the error of 0.1 fathom (in depths no less than 35 fathoms) was not considered large enough to change the reducers - which had already been entered and checked. As noted in Descriptive Report, phase comparisons were combined with tide reducers for Sheet H-8398 (PA-1157). In Sheets H-8399 (PA-1257) and H-8400 (PA-1357), phase was combined with velocity correction in the conventional manner.

only on boat sheet

ABSTRACT OF ECHO CORRECTIONS

(Temperature & Salinity and Phase Differences)

Period: 18 April - 7 May 1957 applies to Sheet H-8398 (PA-1157)

DEPTH (fm)	CORRECTION (fm)				
	A-scale	B-scale	C-scale	D-scale	E-scale
0 to 8	0.0				
21	+ 0.1				
42	0.2				
64	0.4	+ 1.2			
87		1.4	+ 0.9		
100.5		1.6	1.1		*
157			1.3	- 1.2	+ 1.9
over				0.7	2.4

← Includes phase corr.
Dew

Applicable

On 2-day (Ship) the corrections for E-scale are -0/1 to 157 fms and + 0.4 for deeper depths. As explained in Vol. 1 of Sheet H-8398 (PA-1157), this is because the range of E-scale was changed after sounding on A-day.

Period: 8 May - 2 June 1957 applies to Sheet H-8398 (PA-1157)

0 to 7	0.0				
15	+ 0.1				
24	0.2				
33	0.3	+ 1.1			
52	0.4	1.2			
70		1.4			
88		1.6	+ 1.1		
127		1.8	1.3	- 1.2	
174			1.8	0.7	+ 2.4
over					2.9

← Includes phase corr.
Dew

Period: covers all work on Sheets H-8399 (PA-1257 and H-8400 (PA-1357)

0 to 5	0.0				
12.5	+ 0.1				
20	0.2				
27.5	0.3				
42.5	0.4	+ 1.2			
57.5	0.6	1.4			
73		1.6	+ 1.1		
90		1.8	1.3		
106			1.5	- 1.0	
152			1.8	0.7	+ 2.4
over				0.2	2.9

Not Applicable

Launch 87 1957
Recorder No. 51

ABSTRACT OF ECHO CORRECTIONS

Sheet No. Final Echo Correction (Velocity Only)

H-8398 (PA-1157)	0.0 to 17.5 Fm.	0.0
	27.0	+ 0.1
	46.5	+ 0.2
	65.5	+ 0.4
	85.0	+ 0.6
	100.5	+ 0.8
	145	+ 1.0
	193	+ 1.5
	241	+ 2.0

Applicable

Comp. W.E.R.

H-8399 (PA-1257) & H-8400 (PA-1357) Velocity Correction (See curve - T&S, + Barclays)

0.0 to 9.5	0.0
19.0	+ 0.1
33.5	+ 0.2
48.0	+ 0.4
63.0	+ 0.6
75.0	+ 0.8
114.0	+ 1.0
150+	+ 1.5

Not Applicable

Final Echo Correction (Velocity & Phase)

Depth (Fms)

A Scale

0 - 9.5	0.0
- 19.0	+ 0.1
33.5	+ 0.2
48.0	+ 0.4
63.0	+ 0.6
75.0	
114.0	
150 +	

B Scale

+ 0.1
+ 0.3
+ 0.5
+ 0.7

C Scale

+ 2.2
+ 2.4
+ 2.9

D scale

+ 4.8
+ 5.3

Comp. E. E. S.

H-8398 ✓

ALPHABETICAL LIST OF SIGNALS * PA-1157

<u>NAME</u>	<u>SOURCE</u>	<u>DESCRIPTION</u>
ACE	1077 PD	ww wood structure - small
ACT	1077 PD	ww
ANN	1018 PD	wh. wrap on tree
ANT	ANT 1894	large wh. billboard
ARN	1049, 1018, 1077, 1078, 1048 I	S. gable - low barn
BAG	1020 PD	banner in tree
BAH	1077 PD	ww
BAR	BARN 1950 - T5588S	S. gable - large barn
BED	1018 PD	ww pole - short
BIT	1077 pt"E" Vol.1, p.5	ww
BUT	1079 PD	ww rock
CAB	1077 PD	ww boulder
CAM	1019 PD	ww rock
CAT	1077 PD	wh cloth on snag
CON	1079 PD	ww rock
CUT	Hydrographic - Vol. 14, p. 3	ww rock
DAN	DANDY 1894	wh pyramid structure
DAW	1020 PD	ww rock
DAY	1077 PD	ww boulder
DIM	1077 (PP)	ww rock point
DOG	1079 pt"D" Vol 1, p.4	ww pyramid and pole - small
DUD	1018 PD	white wrap on tree
EAR	1020 pt"F" Vol 1, p.6	ww rock
EAT	1077 PD	ww rock point
EGG	1078 PD	ww
EVA	1049 (PP)	white wrap on tree
FAR	1077, 1049 I pt "A" Vol 1, p.3	wrap on W'ly of two trees
FAT	1020 Vol 1, p.6	2x4 on ledge
FIT	1049 PD	ww rock point
FIX	1078 PD	ww rock point
GAB	1018, 1077, 1078 I	N. gable - white house
GAD	1077 PD	ww rock outcrop
GAS	1020 PD	ww
GEM	1079 PD	W. gable - yellow house
GUL	GULL 1894	black ball on pole (ww)
GUS	1049 PD	rag on end tree
HAG	1077 PD	white wrap on lone pine
HAR	1049, 1018, 1077, 1078, 1048 I	E. gable - white shanty on pier
HER	1020 PD	white pyramid
HIS	1049 PD	ww pole & misc.
ICE	Vol 1, p.4 (D&D from SPLICE 1894)	ww on high point of island
IDA	1077 PD	white wrap on lone pine
IRK	1049, 1079 PD	ww rock point
JAP	1077 PD	ww on low, flat rock
JAX	Vol 1, p.4 (D&D from JOHN 1894)	white wrap on tree
JOE	JOE 1942	ww structure and banner
KED	1076 pt"B" Vol 1, p.3	ww rock
LAD	Hydrographic - Vol 11, p.3	ww high rock point
MAG	1076 PD	ww rock and boards
NAT	1048 PD	ww rock

ALPHABETICAL LIST OF SIGNALS * PA-1157 ✓

<u>NAME</u>	<u>SOURCE</u>	<u>DESCRIPTION</u>
OAK	1048 PD	ww rock
PAD	1018 PD	ww rock point
PIT	PITCH 1894	white pyramid structure - large
PUD	PUDDING 1894	-do-
QUO	1018 PD	ww rock
RAP	Hydrographic - Vol 1, p.5	white wrap on tree
RAS	GRASSY 1894	white pyramid structure - large
RED	1049, 1018, 1077, 1078, 1048 I	E. gable - redroofed house
RIP	RIPPLE 1942	white pyramid structure - large
SAD	1018 PD	white wrapped bush
SAN	SANDY 1940 - RM#2	large white structure
SAT	SATURNA ISLAND LIGHT 1909	lighthouse
SIG	Hydrographic - Vol 1, p.5	sign on pier
STU	STUART WEST 2 1942	white pyramid structure - large
TAN	1018 PD	ww rock
TOM	Hydrographic - Vol 1, p.5	ww
TRE	1049, 1018, 1077, 1048 I	wrap on lone tree at base of bluff
UMP	STUMP 1894	white pyramid structure - large
URN	TURN POINT LIGHT 1942	lighthouse
USE	1018 pt"C" Vol 1, p.3	ww rock
VAL	Hydrographic - Vol 14, p.4	ww rock point
WAD	1019 PD	ww high rock
WAS	1018 PD	ww rock
YAK	1018 PD	ww pyramid
ZAG	1079 PD	tall dead tree

Numbers under "source" refer to photographs
 PD - "pricked direct"
 I - "by intersection"
 D&D- "distance and direction"

SMOOTH SHEET

The smooth sheet was hand constructed by personnel of the Seattle Hydrographic Processing Unit using standard methods of construction and checking.

CONTROL STATIONS

✓ Photo signal MAG on Stuart Island, was assumed to have been plotted in error. None of the positions, using the photo location agreed for time and course or crossings. A majority of the positions in which signal MAG were used, as a center object, were plotted by sum angle, time and course. Resection of these fixes gave a position 20 meters to the S. E. This new position resolved all discrepancies in crossings, time and course.

In order to give better control to the hydrography in the N. E. corner of the sheet two sets of curves, using the loci of angles between SATURNA ISLAND LIGHT, 1909 - SANDY RM 2, 1940 and SANDY RM 2, 1940 - ANT, 1894, were drawn. Computations were furnished by the Ship.

✓ The locations of signals HAR and SIG on Stuart Island are Questionable, but no discrepancies developed at the crossings. Signal HAR was located by azimuth and distance from the S. E. corner of the Prevost Harbor Dock, which was located by photogrammetry. A new dock had been built since the photos had been taken, but the hydrographer claimed that the new pier was on the site of the old one. The notes give the length of the pier, from the MHWL, as being 233 ft, while the photo pier length measures approximately 155 ft. This could give a difference in signal location of 78 ft. No discrepancies were found in lines using this signal, as all points were relative.

Hydro signal SIG was located by a sextant fix with an angle using HAR as a check. This fix did not plot on the photo location of the Reid Harbor State Park Pier, as stated in the record book. The fix was replotted on the pier using the sum angle. This new location resolved all discrepancies in plotting in the cove across the harbor on Satellite Island.

SOUNDINGS

✓ In the area of Turn Point the bottom profile was so steep that, in some cases, there is forty fathoms difference between the side echo and the bottom. By reading the side echo in all cases good crossings were obtained.

ADEQUACY OF SURVEY

This survey is complete and adequate for charting, with the possible exception of one small area at the entrance to Johns Pass, Lat. 48° 40'4", Long. 123° 09'6", where there are a couple of 5 fathom soundings that weren't investigated by the hydro party. *Appears to be adequately covered with depths of 5[±] 5[±] and 6[±] fms. obtained.*

The junction with H-8399 has been compared and found in agreement. The depth curves can be drawn adequately.

COMPARISON WITH CHART

This survey was compared with Chart 6380, 9th Ed., Aug. 9, 1960. All charted soundings in the area of the smooth sheet were checked and most were found in agreement.

See section of the above mentioned chart, attached to this report, for comparison.

Respectfully submitted

William M. Martin
WILLIAM M. MARTIN
SUPERVISORY CARTOGRAPHER

Approved and forwarded

M. E. Wennermark
M. E. WENNERMARK
CAPTAIN, C&GS
SEATTLE DISTRICT OFFICER

STATISTICS

SHEET H-8398 (PA-1157) ✓

Ship PATTON:

<u>VOL.</u>	<u>DAY</u>	<u>DATE</u>	<u>NO. of POS.</u>	<u>NAUT. MILES</u>	<u>H.L. & WIRE SNDGS</u>
1	A	4/18	159	37.7	0
2 & 3	B	4/19	214	45.3	2
3 & 4	C	4/20	232	44.2	1
4	D	4/25	105	17.8	2
5	E	5/2	182	28.4	2
5,6,7	F	5/3	305	39.4	1
7 & 8	G	5/4	208	34.0	4
8	H	5/5	199	28.5	4
8	J	5/6	78	9.0	2
8 & 9	K	5/7	228	41.4	2
9, 10	L	5/31	231	33.4	0
10	M	6/1	183	26.1	5
11	N	6/2	103	13.8	8
Totals:			2427	399.0	33

Launch 87:

1	a	May 8	166	20.3	0
1, 2	b	9	230	23.7	0
2	c	16	185	18.4	3
2, 3	d	17	192	23.5	1
3	e	18	164	9.4	8
3, 4	f	19	170	10.2	11
4	g	20	200	24.7	2
5	h	21	204	21.8	3
5, 6	j	22	160	12.8	18
6	k	23	105	6.9	2
Totals:			1776	171.7	48

SHEET TOTALS: 4203 570.7 81

AREA: 18.2 sq. naut. mi.

GEOGRAPHIC NAMES

Survey No. H-8398 ✓

Name on Survey	6380										K
	A	B	C	D	E	F	G	H	I	J	
	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	BGN		
Boundary Pass	x										1
Charles Point	x										2
Haro Strait	x								x		3
Johns Island	x										4
Johns Pass	x										5
Prevost Harbor	x										6
Reid Harbor State Park	x										7
Sandy Point	x										8
Satellite Island	x								x		9
Stuart Island	x										10
Turn Point	x										11
Waldron Island	x										12
San Juan Islands	2-1471 a.j.w.										13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25
											26
											27

George M. Bee
GEOGRAPHIC NAMES SECTION
16 JANUARY 1961

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. 8398.....

Records accompanying survey: Smooth sheets ¹.....;
 boat sheets ¹...; sounding vols. ¹⁷...; wire drag vols.;
 Descriptive Reports ¹...; graphic recorder envelopes ⁵...;
 special reports, etc.

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

Number of positions on sheet	1263
Number of positions checked	47
Number of positions revised	1
Number of soundings revised (refers to depth only)	
Number of soundings erroneously spaced	
Number of signals erroneously plotted or transferred	
Topographic details	Time	16
Junctions	Time	20
Verification of soundings from graphic record	Time	22 hours 4
Special adjustments	Time	

Verification by *Monte Schugald* Total time *24 hours* Date *17 June 1964*
 Reviewed by *George A. Kogemczak* Time *177 - 24 = 201* Date *20 Feb-70*
 Inspected by: *Dea E. Westbrook* TIME *3.2 hrs.* Date *12 Nov. 1970*

OFFICE OF HYDROGRAPHY AND OCEANOGRAPHY

MARINE CHART DIVISION

HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-8398

FIELD NO. PA-1157

Washington -- Haro Strait -- Stuart Island - North Side

SURVEYED: April 18, 1957, through June 2, 1957

SCALE: 1:10,000

PROJECT NO.: 12410

SOUNDINGS: 808 Fathometer,
Handlead

CONTROL: Sextant fixes
on shore signals

Chief of Party.....	W. C. Russell
Surveyed by.....	W. C. Russell
.....	W. E. Randall
.....	T. E. Simkin
Protracted by.....	H. C. Parsons
Soundings Plotted by.....	H. C. Parsons (PMC)
Verified and Inked by.....	A. K. Schugeld (AMC)
Reviewed by.....	G. A. Kozemczak
.....	Date: Feb. 20, 1970
Inspected by.....	D. E. Westbrook

1. Description of the Area

This survey covers an area around the north side of Stuart Island and extends to the vicinity of the Canadian boundary at the northerly survey limits. Depths as deep as 207 fathoms were found off the northwest point of Stuart Island. Satellite Island, situated within Prevost Harbor on the north central shore of Stuart Island, has several islets, rocks, and shoals off its southeastern extremity.

The bottom is irregular with steep slopes. Ledges, rocks awash, and reefs fringe much of the shoreline. The bottom characteristics vary over the survey area, and consist of rocks, broken shells, green mud, fine sand, and gravel.

2. Control and Shoreline

The source of control is given in the Descriptive Report.

The shoreline originates with T-5588 (1949-53), T-5589 (N) 1949-54, and T-5589 (S) 1949-54.

A substantial portion of the shoreline was inaccurately transferred from the T-sheets by the smooth plotter. Most of the important differences were revised by the reviewer, as the T-sheets were apparently not examined during verification.

3. Hydrography

A. Depths at crossings are in good agreement.

B. Very little mean lower low-water line was delineated by soundings because of steep and generally foul character of the inshore areas. The usual depth curves were adequately delineated.

A few dashed and brown curves have been added to emphasize important bottom features.

C. Development of the bottom configuration and the investigation of least depths are considered adequate.

4. Condition of the Survey

The field plotting, field verification, sounding records, and the Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual with the following exceptions:

A. Approximately fifty percent of the ledge symbolization from T-5588 of 1949-53 was not shown on the smooth sheet and was added by the reviewer. Inaccuracies in shoreline transfer are described in Part 2 of this review.

B. Several high water rocks from T-5588 were shown with erroneous elevations and were revised by the reviewer.

C. The circles of equal angle drawn in the northeast corner of the survey sheet contain two curve positioning errors. The 86° and 94° (red ink) curves were inked out of position. Short sections of curve have been drawn at the ends of these curves to show their correct location.

5. Junctions

An adequate junction was effected with H-8399 (1957) on the east, and H-8116 (1954) on the south. On the north and west, the limits of this survey are the project limits in the vicinity of the Canadian boundary. Present survey depths are in harmony with charted depths along that limit.

An adequate junction was also effected with H-8115 (1954) on the southeast. Because of numerous minor differences in the delineation of the 12-fathom shoal in that area on the two surveys, a portion of the older work was superseded in favor of the present survey.

6. Comparison with Prior Surveys

A. H-405 (1:200,000) 1853

This reconnaissance survey shows nothing of interest for modern charts, and is entirely superseded by the present survey in the common area.

B. H-2113 (1:20,000) 1891 H-2215 (1:10,000) 1894

H-2113 covers the eastern half of the present survey. The remaining portion is covered by a part of H-2215. A comparison between the present and prior surveys reveals this area to be generally stable in both shoreline and bottom configuration. The only notable difference appears in the southeastern portion of the present survey where present depths are generally 1 and 2 fathoms deeper than prior depths. These differences can be attributed to the less accurate wire soundings on the older surveys.

The following soundings on H-2113 and H-2215 are discredited by the present soundings and are considered to be 10 fathoms in error:

<u>SOUNDING</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>PRESENT DEPTH</u>
52 3/4 fm.	48°42.60'	123°06.88'	63 fm.
51 1/2 fm.	48°42.20'	123°07.35'	61 fm.
87 fm.	48°42.21'	123°08.07'	77 fm.
60 fm.	48°42.03'	123°09.15'	70 fm.
79 1/2 fm.	48°42.05'	123°11.08'	90 fm.

The present survey is considered adequate to supersede the above mentioned prior surveys within the common area.

ms

7. Comparison with Chart 6380 (16th Ed., February 17, 1969)
Chart 184-SC (9th Ed., March 15, 1969).

A. Hydrography

The charted hydrography originates with the previously discussed surveys which require no further consideration, supplemented by the partial application of depths from the boat sheet and verified smooth sheet of the present survey. Only minor differences were noted between charted depths and present survey depths.

Attention is directed to:

1. The small islet charted in lat. $48^{\circ}40.82'$, long. $123^{\circ}10.27'$, although originally shown as an islet on T-2193 (1894), was first charted from T-5588 (1949-53). This islet was found by the hydrographer to be a rock awash which uncovers 7-ft. at MLLW.
2. The $\frac{1}{2}$ -fm. Rk charted on Chart 6380 in lat. $48^{\circ}41.21'$, long. $123^{\circ}12.05'$ is from the present survey before review. The least depth on this rock was corrected to 0.3-fm. and the charts should be revised accordingly.

The present survey is adequate to supersede the charted hydrography within the common area.

B. Aids to Navigation

Turn Point Light, the only aid to navigation within the area of this survey, is in substantial agreement with its charted position and adequately marks the feature intended.

8. Compliance with Instructions

The survey adequately complies with the Project Instructions.

9. Additional Field Work

This is an excellent basic survey and no additional field work is recommended.

Examined and Approved:

John O. Boyer
Chief
Marine Chart Division

[Signature]
Associate Director
Office of Hydrography
and Oceanography

RHC

TIDE NOTE FOR HYDROGRAPHIC SHEET ✓

~~Division of Coastal Surveys~~

19 January 1961

Division of Charts: R.H. Carstens

Plane of reference approved in
17 volumes of sounding records for

HYDROGRAPHIC SHEET 8398

Locality San Juan Island, Washington

Chief of Party: W.C. Russell (1957)

Plane of reference is mean lower low water reading.

2.4 ft. on tide staff at Echo Bay, Washington.

10.3 ft. below B. M. 1 (1956)

Height of mean high water above plane of reference is: 7.9 ft.

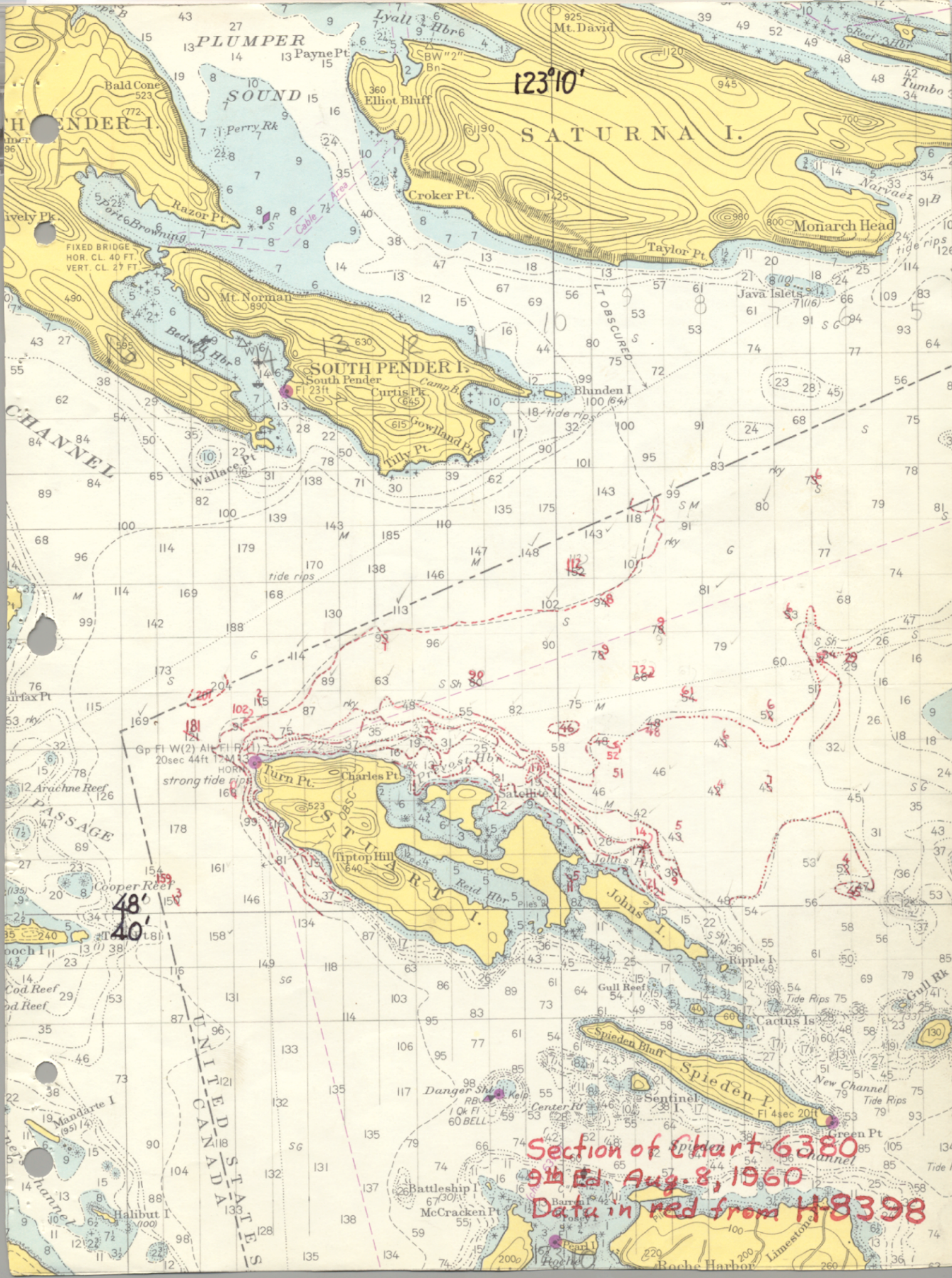
Condition of records satisfactory except as noted below:

NOTE: Tide reducers for the positions listed below have been revised
in red and verified:

<u>VOL.</u>	<u>POSITIONS</u>
5	1E - 67E ✓ 85E - 182E ✓ 1F - 25F ✓
6	26F - 207F ✓
7	3G - 158G ✓ 179G - 202G ✓ 240F - 305F ✓
8	34H - 199H ✓

J. M. Symons
Acting Chief, Tides and Currents Branch

Chief, ~~Division of Tides and Currents~~



123°10'

PLUMPER SOUND

SATURNA I.

SOUTH PENDER I.

CHANNEL

OBSCURED

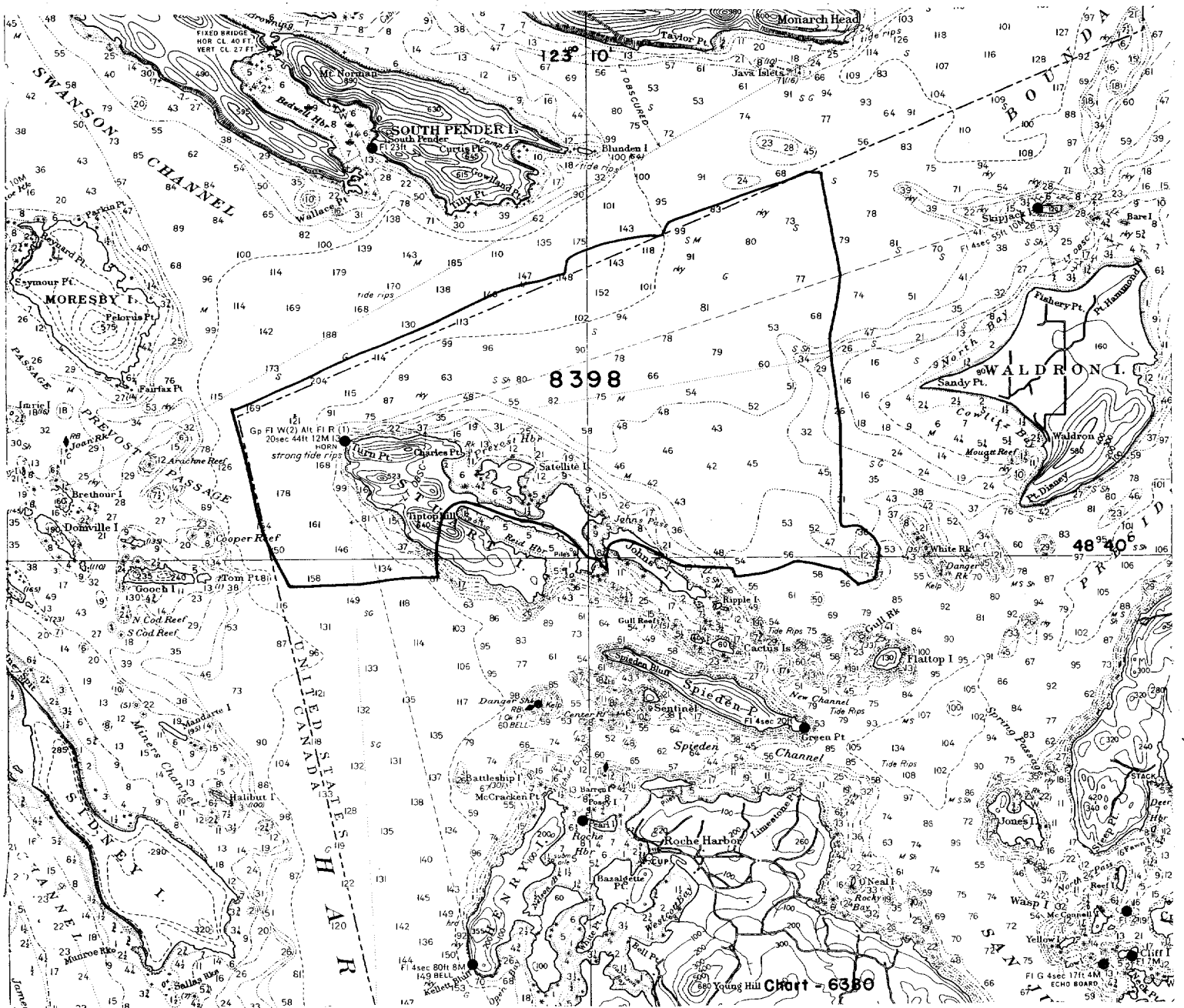
FIXED BRIDGE
HOR. CL. 40 FT.
VERT. CL. 27 FT.

strong tide rips

48'
40'

UNITED STATES
CANADA

Section of Chart 6380
9th Ed Aug. 8, 1960
Data in red from H-8398



NAUTICAL CHARTS BRANCH ✓

SURVEY NO. H-8398

Record of Application to Charts

DATE	CHART	CARTOGRAPHER	REMARKS
2/25/61	6300	Helmer	Before After Verification and Review Exam. - Pcdgs
			added to dwg.
3-22-61	6380	M. Rogers	Partially applied Before After Verification and Review
9-9-70	6300 ^{#33}	J.T. Gallahan	Before After Verification and Review before inspection
			part appl thru reduction Chrt 6380
10-14-70	6380	Jeffrey Stuart	Before After Verification and Review before insp
			Part applied.
4/79	18432	Cortis	Before After Verification and Review
		7-13-79 - RCS	Fully Applied
7/80	18421	Cortis	Before After Verification and Review
		7-24-80 RCS	Fully Applied
7/80	18423 ^C	Cortis	Before After Verification and Review
		7-24-80 RCS	Fully Applied
7/80	18400	Cortis	Before After Verification and Review
		7-24-80 RCS	Fully Applied
			Before After Verification and Review
			Before After Verification and Review

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.