Department of Commerce and Labor
COAST AND GEODETIC SURVEY

Superintendent.

State: Alaska

DESCRIPTIVE REPORT.

Ltr. C Sheet No. 3115

LOCALITY:

Portland Canal

1900

CHIEF OF PARTY:

R. B. Derickson

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HYDC
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Descriptive Report

to

accompany Plane-Table Sheet

of

Head of Portland Canal,

Alaska and British Columbia.

Scale 1:10000

U.S.S."GEDNEY"

1910.

R.B.Derickson, Asst.,Comdg. Chief of Party.

T.J.Maher,. Asst., Topographer.

3115

DESCRIPTIVE REPORT TO ACCOMPANY PLANE TABLE SHEET

OF HEAD OF PORTLAND CANAL, ALASKA, AND BRITISH COLUMBIA.

This survey was made for the purpose of determining the contours of the high water lines at the Head of Portland Canal.

A synopsis of instructions concerning the same are:- The high water lines, consisting of mean high waters, higher high waters, and highest high waters, to be obtained from tidal observations taken at the head of Portland Canal simultaneously with observations taken at either Fords Cove or Halibut Bay, Portland Canal; elevations of staff readings at the head of the Canal to be referred to B.M's, at either of the above places, established in 1888. Tidal observations were to be made every 10 minutes during 48 consecutive hours, for comparative readings and the necessary computations were to be made on form No.248. Topography and hydrography to be carried on from parallel 54° 52' north to the head of the Canal. Sheet to be made on the scale of 1:10000.

Portland Canal is a deep channel, not more than one mile wide, from the shores of which steep mountains rise to elevations varying from 4000 to 6000 feet. For the topographic survey the plane-table was used. The survey was well controlled by numerous triangulation points. Many old stations were recovered from descriptions furnished, and other were established in the vicinity of those not found. These new stations were located by triangulation, using as base stations those already

recovered. The shore line was coded in, the greatest distance between any two consecutive readings was less than 100 meters. Owing to the steepness and irregularity of the shore, and to secure the degree of accuracy called for in the instructions, it was necessary to occupy many points, whose locations were principally determined by 3 point problem. No stretch of shore line, from △ Shack north to △ Shelf on the east side, and from △ Fig north to △ Round on the west side 100 meters in length has less than one point on it located by rod readings or locations by the three point problem.

Near the southern limit of the survey of the eastern shore, about latitude 54° 52'N. is a small stream which flows thru a canyon steep-to on the southern side. It probably originates on a high snow capped mountain to the eastward. The peak of this mountain which appears to be over 6000 feet high, is beyond the area contained on the sheet. The cone shown between the stream and Lion Point is the lowest of a connected series, terminating in this peak.

From the creek north of Lion Point the shore is steep to, and in many places the three water planes are so close together as to render their contours undistinguishable on a chart of this scale. At Lion Point a flat projects off shore on each side of Lion River which flows thru a valley lying between the aforementioned mountain and a ridge to the northward. It is small, flows with considerable velocity, could scarcely be called a river in the seese in which the term is usually applied, and at the time of the survey was unnavigable for

canoes. Apparently is unnavigable at any time.

It was impracticable to make a plane table survey of the stream on account of the thickness of the underbrush, and a return to the place to make a compass and stadia survey was unfeasible.

From the tree line to the low water line this stream flows in irregular channels over a gravel beach. Beyond the low water line the flat appears to be sand. Lion Point is readily recognised. It is low, and flat, and north of the mouth of the stream is grassy and covered with cottonwood and spruce. A large prominent boulder, on which magnetic station "Debt" is located, is situated on the Point. At mean high water line northward from the Point, the shore bends eastward forming a small bight, the shore of which is low and flat and from the tree line to the low water line, a distance of about 70 meters, the beach is covered with moss & grass. In the vicinity of the low water line are numerous large and small boulders; the largest varying from 2 to 4 feet in height are shown on the sheet. An unoccupied shack is situated near the high water line, about the center of the bight.

The low flat terminates at the base of the ridge, north of Lion Point; the southern end of the ridge forms a conspicuous low shoulder which has been denuded of trees and is now devoid of soil. Northward from this point the shore is steep, irregular, and rugged, cut by several mountain streams of considerable volume, flowing from glaciers capping the ridge which forms the eastern shore. The ridge varies from 4000 to 6000 feet

high and in many places is so steep as to cause climbing very difficult if not impossible.

About two and half miles north from Lion Point the Bear River Flats commence. On the eastern side, these flats consist of sand and gravel; the western part is muddy. On the south-east edge of these flats are some small boulders. These flats are very level; according to the level line, run by an engineer engaged on construction work in this vicinity, the drop was 20 feet in 2000 feet. Deep water may be carried to within a very short distance of these flats, which are steep on their southern end, and vessels should not pass northward of a line joining the Government wharf with the wharf of the Portland Short Line.

The Bear River discharges the greater part of its waters thru the irregular channels on the eastern portion of the flats. The Bear River flows in a southerly direction thru the valley between two mountain ridges, running north and south, one on each side of the Canal, which in this vicinity is about one mile wide. The river is not navigable, at many places too deep for fording, and flows with considerable velocity. At times it overflows its banks, covering a greater area than that shown, but its limits as indicated, show its proper regular channels at ordinary height of water. There are numerous islets and shoals in the stream.

North of the mean high water line on the Bear River Flats, is the town of Stewart, the result of a mining boom along Bear River valley. It is furnished with a pumping station

for water supply, and has an electric lighting plant. It has three hotels, The Northern, The Empress, and the King Edward. Four steamship lines run steamers there, viz: G.T.P., C.P.R., Northern S.S.Co., and Boscowitz S.S.Co., each, generally running one steamer per week. The docking facilities are very poor; the only wharf was one erected by the Canadian Government on the south west extremity of the flats. At low water large vessels could only make fast to the lower end of the wharf, and access to the town was over mud flats. At high water when the flats were covered, goods were taken from the wharf to town by scows. The Cassiar Construction Company were building a wharf to which a railroad was to run over a trestle on the flats. This railroad, known as the Portland Short Line is to extend along the Bear River valley to the mining properties. During the survey, construction work on the road bed, trestle, and wharf was in progress. Rumors were afloat that engineers were to be sent out to report upon the feasibility of connecting with the Canadian Northern R.R. at Edmonton. A Canadian Custom - Office and Post-Office are located in Stewart.

No mining machinery was shipped in, nor was any ore shipped out during the time this survey was made, but I was informed that this was due to the poor facilities fro transportation.

The Bear River valley extends northward from Stewart, is low and level. It appears to be an extensive gravel deposit; is partially covered with a light soil, and in places covered with grass, cottonwood and marsh.

South from the Bear River Flats for a distance of about

¼ miles to the Salmon River Flats, the west shore is similar to the east shore, steep and rocky. These flats are similar to the Bear River Flats. They are muddy and marshy at the northern end and are composed of gravel at the southern end where the Salmon River empties. These flats extend off shore almost to mid channel, leaving a navigable channel about half a mile wide on the eastern side. They cover at high water.

The Salmon River flows with considerable velocity thru a low valley between two mountain ridges. Navigation on it is not practicable. In times of freshets the river overflows its banks, which are composed mainly of gravel, and along which are some small patches of spruce and cottonwood.

The southern extremity of the mountain range, terminating at the northern end of the Salmon River flats, is known as Eagle Point. At the base of this range, on the flats, are located the International Boundary Monument and Stone Ware-House. From the monument the boundary line extends in a northerly direction over the ridge. About 25 meters south from the Monument is a small fresh stream, which is unnavigable. Several elevations of points on the bed of this stream above the plane of mean of lower low waters are given.

On these flats the town of Portland City is situated. The greater part of it is below mean high water. It has been surveyed and staked out. The town is not incorporated and all the legal requirements necessary for obtaining the townsite property had not been complied with. There is one Hotel and a few permanent wooden buildings; the other are simply platforms

mounted on stilts on which tents are pitched.

Portland City as staked out by local surveyors is not plotted upon the sheet, as to much detail might obscure the water-lines. ~~For this reason the topographic symbols are used sparingly~~.

On the eastern edge of the flats almost due east from the monument, a wharf has been ereeted by the Northland S.S.Co. Vessels may tie up to the eastern face of the wharf where they will find sufficient water, but should not attempt to tie up on the north or south side.

A man named Lindenbery has a homestead on the Salmon River Flats. The boundary line between this homestead and the town is a matter of dispute. A gasoline launch makes infrequent trips to Portland City, from Ketchikan. Portland City has no Post Office.

The permanence of Stewart probably depends upon the development work on the mining properties already located. The traffic there during June and July resulted mainly from the influx of prospectors and visitors. No reliable information could be obtained about the value of the mining properties as opinions expressed were by persons more or less interested. No definite information was obtained about mining properties on the American side.

South from Salmon River flats the shore line resumes its bold appearance, and steep mountains rise to the elevation of about 5000 feet. I have shown the top of one mountain, on which, slightly below the highest part is a triangulation station. South from this are other knobs one of which is higher. I

havent shown these, as I could not see their tops, but have shown their approximate direction by dotted contours.

South from the Salmon River Flats, the channel is deep without any visible menace to navigation. The mountains which are in general very steep and capped with snow or ice, are covered with spruce, hemlock, and cottonwood trees, to elevations of 2000 to 3000 feet. During the winter months considerable snow falls at the head of the Canal, and some ice forms in the vicinity of the flats, but not in sufficient quantities to impede navigation.

The International Boundary Manument and the Stone Ware-House near it, were located by triangulation. The location of all points indicated on the sheet as topographic stations, were computed from triangulation cuts and plotted upon the plane table sheet before the topography was commenced. Some hydrographic signals were located by plane table.

Along the edge of the flats wharves may be built without much difficulty, along the offshore face of which vessels could make fast. As the water deepens very rapidly some trouble would be encountered in building wharves along whose sides any but small boats could tie up. The steepness of the beach, and the depth of the water close to, render it impracticable to build wharves anywhere else.

At present there are no facilities for watering ships; small boats may run alongside the mountain streams. Coal may sometimes be obtained in small quantities. Some of the stores in Stewart carry provisions and small quantities of ship chandlery.

TIDAL OBSERVATIONS FOR DETERMINING H.W.CONTOURS.

The bench marks at Fords Cove and Halibut Bay were not recovered. On the evening of May 26th the "Cosmos" arrived, and at 10:00 A.M. on May 27th tidal observations were commenced and carried on until the evening of June 29th. A plane staff 30 feet long, graduated to feet and tenths, and nailed in a truly vertical position to one of the piles of the Canadian Government wharf. Tidal observations were made every 20 minutes, day and night, except for 20 minutes before and after high and low waters, when the interval was reduced to 10 minutes. Readings were taken by two seamen during the day from the wharf and at night from the Str."Cosmos". This arrangement prevented any possible neglect of duty. The depth of the channel rendered the effect of the outflow from the Bear River negligible.

The steamers entering Stewart do not carry chronometers and none were aboard the "Cosmos". Whenever possible, time sights were obtained, and corrections were noted in the tide-books. An attempt was made to refer the tidal planes to the Sitka planes after 48 hours observations, using Sitka predictions given in 1910 Tide-Tables, making the necessary computations on form 248. I did this with several series and they gave different results. For the plane of reference for soundings, I used 28 lower low waters. Sitka predictions for the same period, gave the zero plane. For the mean high waters 56 tides were used. 28 tides were used in computing the tide staff readings of the plane of the mean of the higher high waters.

The elevation of the highest high water used was that on June 8th, when a staff reading of 27.3 was obtained. A comparison of Sitka predictions for the same period gave results differing from those given at the end of the 1910 Tide Tables. I then used predictions ending July 8th at which date the sun and moon had almost the same declination and right ascension as at the beginning of the lunar month. These predictions gave results very nearly coinciding with those given in the tables. I could not continue tide observations until this time, however. On account of the varying results obtained I did not feel justified in using form 248, reducing to Sitka. I therefore used my own observations, uncorrected for the season of the year. It was reported that a higher tide than recorded on the present staff had been observed by some of the people in this locality but no authentic information that could be taken into account.

The graduations in the tide staff were supposed to be in feet, but a very small uniform error existed, indicating that graduations were probably made with a linen tape. Corrections for this error, amounting to about one tenth of a foot, are given in the Leveling Records.

Three bench marks were established and, using an assumed datum plane, duplicate levels were carried to a bench mark near Eagle Point Monument. Reductions were made to the plane of mean lower low waters, the datum plane, which corresponded to a staff reading of 7.33. Mean high water corresponding to a staff reading of 22.81 feet, is 15.56 feet above the datum

plane. The mean higher high water, corresponding to a staff reading of 23.88 feet, 16.63 feet above the datum plane. Extreme high water, corresponding to a staff reading of 27.3 feet, is 20.07 feet above the datum plane. The staff reading differences are corrected for errors in graduation. As determined by level lines run from the tide staff the B.M. near the base of the bronze monument near the Stone House is 4.56 feet above mean high water and 21.20 feet above low water. On the boundary running due east from this monument the higher high water contour intersects the boundary line at a distance of 6 meters. The mean high water contour at a distance of 8146 meters and the lower low water contour at a distance of 819 meters from the center of the monument. The mean high water line of the opposite shore due east from the monument is 1651 m Meters distant from the Eagle Point Monument and, the distance between the mean high water line, on a line due east from the monument is 1569 meters. The distance between the contours of the mean of the higher high waters is 1646 meters.

From Eagle Point bench mark, a point on each plane was located and the rodman,,under the direction of the levelman, followed the contours over the Salmon River Flats. Successive points on each contour were rarely more than twenty meters apart. The plane-table rodman followed the level rodman and, as each successive point was located, it was roded in. Another level rodman held a rod at suitable turning points, upon which the level was frequently checked. The mean high water line

of the plane-table sheet is indicated by a heavy black line; the mean higher high waters by a dark brown line. In accordance with written instructions these lines were to be carried around the head of the Canal, south on both sides to 54° 52'. These were later modified by verbal instructions, confinigg the work to the Salmon River Flats. At the request of Mr. Morse a stake was located on the mean high water line, due east from the boundary monument, where a stone or cement monument was to be located later. As these flats are almost uniformely level, and any error introduced by interpolation for corrected tidal planes would be probably be less than changes due to natural agencies.

Level lines were not run over the Bear River and Lion River Flats. They were located as in ordinary topography. I waited for tides which, according to predictions, should approach the plane of mean high water and then roded along the water line.

(Bk. 1369)

I transmit with the sheet a blue print showing the right of way and contemplated work of the Portland Short Line. Some discrepancies between the indicated and plotted distances may be noted and similar discrepancies between the deflection angles and resulting azimuths of the railway tangents. The railroad is plotted on my sheet from a reduction made from this blue print. The wharf is plotted upon the plane-table sheet from sextant angles, plotted upon a 1:5000 projection and transferred by D.M's. and D.P's. When the topography was carried on the work was insufficiently advanced to be noted on the sheet;

and later the weather conditions were such that I did not care to expose the sheet. The line indicated on the blue print as astronomical north is wrong. I first noted this in roding the streets of Stewart, and later verified the results by erecting a signal over a stake, on a line of stakes, marking a new addition, parallel to the town and railway stakes and running in a presumably north and south direction. This station I cut in by triangulation and later occupied. I then sighted along these stakes which were slightly irregular in alignment. Five minutes either side of the reading in the triangulation record threw the line of sight off the station. The correct azimuth is north 2°12' east.

(Bp. 13699)

The blue print of Portland is essentially correct. If plotted, it should be in broken lines as otherwise an erroneous idea of the size and character of the town will be conveyed. For this purpose I have indicated by a broken line the azimuth of the east side of Monument Street.

The party on the Str."Cosmos" consisted of myself as topographer, Mr.Dunning as levelman, one quartermaster and three seamen as tide observers and rodmen, one engineer, one fireman and one cook.

Respectfully submitted,

T. J. Maher

Assistant, C.& G.Survey,

Topographer.

Approved,

R B Henderson

Asst.,Comdg. Chief of Party.

3222

HYDROGRAPHIC SHEET. #3222

PORTLAND CANAL, ALASKA.

June-July, 1910.

Scale, 1:5,000.
T.J.Maher, in charge
Hydrographic party
on Str. Cosmos.

R.B.Derickson,
Ch.Party.
U.S.S.GEDNEY.

ADDRESS ALL COMMUNICATIONS TO
"SUPERINTENDENT, COAST AND GEODETIC SURVEY,
WASHINGTON, D. C."

3222

Department of Commerce and Labor
COAST AND GEODETIC SURVEY
Washington

May - Aug. 1910.

Statistics from hydrographic sheet No. 1 Portland Canal
Alaska.

Date, 1910.	Letter	Vol.	Soundings	Positions	Miles	Vessels.
June 6	a	1	23	33	0.8	Skiff.
" 7	b	1	34	34	1.5	"
" 8	c	1	283	35	0.9	"
" 9	d	1	99	49	1.6	"
" 13	e	1	127	76	1/6	"
" 14	f	1	55	54	1.2	"
" 15	g	1	60	60	1.6	"
" 16	h	1	132	27	1.1	"
" 16	h	2	466	108	4.0	"
July 1	I	2	168	31	1.8	"
" 14	j	2	200	59	2.8	"
" 19	k	2	678	235	8.5	"
" 21	l	2	586	216	5.9	"
June 15	A	1	4	3		Cosmos
" 17	B	1	77	80	7.0	"
July 1	C	1	190	94	5.0	"
" 12	D	1	77	71	4.0	"
" 13	E	1	54	52	2.3	"
" 14	F	1	59	58	2.9	"
Aug. 1	G	1	80	81	8.4	"
" 2	H	1	33	16	0.5	"
Total			3475	1472	63.4	

Plane of reference is the mean of 28 lower low waters, from May 28, 1910, and corresponds to a tide staff reading of 7.33.
lowest tide observed, reading on staff 3.325
highest tide observed, reading on staff 27.3

Soundings plotted in fathoms.

Protracted by field party.
Plotted & inked by R L Johnston
Verified by

VEC
Mar.14,1911.

HYDROGRAPHIC SHEET 3222.

Portland Canal, Alaska, and British Columbia,

by Asst. R. B. Derickson in 1910.

TIDES.

	Stewart ft.
Mean lower low water, or plane of reference on staff	7.3
Lowest tide observed " "	3.3
Highest " " " "	27.3
Mean range of tide	13.8

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WASHINGTON, D. C."

3115

Department of Commerce and Labor
COAST AND GEODETIC SURVEY
Washington

HEAD OF PORTLAND CANAL, ALASKA. MAY - AUG. 1910.

PLANE TABLE POSITIONS.

Object	Lat.	D.M.	Long.	D.M.
Wash.	55 52	486	130 01	154
		1464		886
Flag	55 54	1109	130 00	96
		742		944
Tree	55 52	1523	130 00	994
		28		45
Hot	55 54	747	130 00	941
		1105		100
Miss	55 54		130 00	
		763		92
Northern Hotel	55 56	201	130 00	35

S.E.Cor.

D.M.s below the ~~dotted~~ line are distances south and east respectively, of the latitude and meridian.

3115

TOPOGRAPHIC SHEET.

3115

PORTLAND CANAL, ALASKA.

June-July, 1910.

Scale, 1:10,000

T. J. Maher,

Topographer.

R. B. Derickson, Asst.

Ch. Party.

Hyd. Sheet. No. 3222

There are a number of positions on this sheet that are questionable. Those which were found to be in error, were corrected, but others, such as the line from pos 23 (red) F to pos 30 F, can not be called wrong, but are doubtful and should be carefully compared with the boatsheet, which has not been sent to the office up to the present time.

Although the limits of the mud flats off the Bear and Salmon Rivers is determined, it is impossible to determine the formation from the soundings given. There does not seem to be any entrance to either river.

The position numbers are placed too close to the positions. The make a blur on the soundings and make the soundings hard to read. This same fault is found on nearly all Hyd. sheets protracted by field parties. The numbers should be below and to the right of the positions and far enough away to entirely clear the sounding when plotted.

R. L. Johnston

June 14, 1911.

Applied to Compilation of new chart 8054.
S.B. Maize, Oct. 1935.