

2462

YUKON FLATS

Bering Sea
ALASKA

2462

Descriptive Report
to accompany
Hydrographic Sheet.

1899

J. F. R. O.

2462

Descriptive Report.

Descriptive Report and statistics of
Hydrography of Yukon Flats.

To accompany Hydrographic Sheet.

Title and 15 pages

U. S. Coast and Geodetic Survey
Henry S. Pritchett Superintendent
Hydrography
Of The
Yukon Flats
And Of The
Southern Portion of Norton Sound
Bering Sea Alaska
From
Cape Ozer To Cape Darby
Executed in 1899
By the party under charge of
J. F. Pratt Assistant
Scale $\frac{1}{200\,000}$

1

The Hydrography of the Yukon Flats and the Southern Portion of Norton Sound as developed by the U. S. S. Patterson during the summer of 1899, comprises 3416 statute miles of soundings and covers approximately 8235 square miles.

In the vicinity of St. Michael, the prominent mountain peaks of the triangulation of 1898, together with some additional peaks whose positions were determined during the season, were used as hydrographic signals.

From a point midway between Stuart Island and Point Romanof, and thence westerly along the approximate 3 fathoms curve, off the Delta shore line, hydrographic signals, constructed of 4" x 4" scantling with reinforced center piece, were planted and pumped down with a jet to a firm footing. The distance between these signals averaged about two and one half miles, and each signal was occupied and the position of the next further signal determined by carrying the azimuth from

the back signals and reading a mast-head angle for the distance. The distances and azimuths were further checked in the majority of cases by intersections from triangulation stations ashore.

The survey was carried with these signals as described, to a point nearly abreast of the top of the Delta shoal; On August 19, there occurred a gale which wrecked or carried away the majority of the signals, and from that time on the survey was carried forward by anchoring buoys or floats which were distinguished by various arrangements of signal flags or banners nailed to the upright framework of the structure. These buoys were located by astronomical observations as will be described further on.

In general the work during the day was confined to running lines in the shoal water and determining the position of the signals, and at night lines would be run off shore for distances varying from fifteen to thirty miles, the ships returning on parallel courses at an

average distance of five miles from the outwards course.

On rare occasions when working on the inside lines, some prominent mountain peaks could be sighted, but ordinarily no land was visible.

Four lines were run between St. Michael and Cape Nome or Port Safety, one of them entering Golofinin Bay and connecting with the detailed hydrography of that place.

At Cape Dyer, the entrance to Scammon Bay and the inshore work around to the south of the Cape, was done by the steam launch, and will appear on a separate sheet on a larger scale.

In plotting the positions to the south and west of Stuart Island, it will be found that in some of them involving Crater Mt., another peak in a line passing about $\frac{1}{4}$ of a mile to the south of it, has been mistaken for it; this has occurred in thick weather when the different peaks could not be plainly recognized.

Again, in positions involving Romanof, the pointings to it have generally been on

the point of the promontory which appears to be from $\frac{1}{4}$ to $\frac{3}{4}$ of a mile to the westward of the signal, depending on the observer's position. as this signal is on a comparatively low spur of the main hills, it is seldom seen clearly.

From signal "Pope" around to Cape Oyet, the position of the signals have been determined by astronomical observations wherever possible and those signals whose positions could not be so determined were located as accurately as possible by steaming between them and signals whose positions were known. In general the weather was very thick, and observations could only be made at rare intervals.

In all cases where lines have been run out of sight of signals, the probable set between the known positions ~~has~~ been carefully applied.

The tides used in considering the tidal currents have been deduced from the St. Paul, Krupnik, Kwikpak and St. Michael stations, and have been harmonized as nearly as possible with the current observations made at the various anchorages. The ground covered is in the region where the type of

tide changes from semi-diurnal to diurnal, and the tidal data available is very meagre, the set used at times must necessarily be only approximate. With the tidal data for reduced soundings will be found a comprehensive statement pertaining to the tides with the high and low water intervals used from known stations.

In general the sets of the tidal currents were N.E. and S.W. (mag.) corresponding with flood and ebb tide, but in certain localities these directions were much modified, owing probably to the configuration of the bottom and the effect of the river currents. In all places the N.E. set was found to be much stronger than that to the S.W.; the maximum velocity logged was 2.6 knots near the point of the shoal.

During the prosecution of this work stiff breezes to moderate gales were frequently encountered; and as northerly winds shoal these waters very materially and southerly winds deepen them, due allowance should be made for discrepancies when soundings following heavy weather are reduced with the ordinates of the predicted tides.

In the accompanying data will be found the computed astronomical positions used in the plotting.

Only sun observations were obtainable, and these were had in the majority of cases under very unfavorable weather conditions. Foggy and indistinct horizons, together with unknown (but very great) refractions, rendered accurate results impossible. It has been found impossible in the plotting to harmonize all the positions by a consideration of the lines run between them. In all cases the better positions have been adopted in the plotting, and a number of the positions have been practically discarded, their plotted points being reached only approximately by the lines from the better positions. Where observations at the same point give different positions, either a mean has been adopted, or the position used which is farthest seaward.

Current observations were made at all anchorages to the westward of signal "Rope", and harmonized with the predicted tides to deduce the probable sets.

In a number of cases the northeasterly tidal currents have been found to overrun the time of predicted high water by as much as one hour.

In all compass courses the deviation is considered inappreciable, the ship's compass having been compensated.

Notes on special lines.

From position # 61 W day to position # 64 V day the line has not been plotted as its position is uncertain. The position of # 64 V day (= 1 W day) has been located by plotting back from "mid" = 19 W, and assuming the longitude by reference to known lines.

From 33 K' to 32 L' the line has not been plotted as its position is uncertain.

It will be observed that the soundings on the line 1 W to 16 W do not fit their positions, but as there has been no data available to affect the position at 1 W, on which the line is based, it has been allowed to stand. In the plotting, however, the soundings within the above specified limits should be discarded as the surrounding lines are accurately located from nearby hydrographic signals.

From 19 I to 55 I the line was not plotted as the record is conflicting

Notes on Astronomical Positions.

August 20, a. m., at anchorage: mean of two positions adopted.

August 20, M., underway: latitude as observed used in the plotting.

August 24, a. m.; lines of position at Morn; intersection not adopted as the connecting line does not harmonize with position of signal "Night", which position is accepted as being correct. "Morn" is located on one of the lines of position 3.2 miles north of the intersection.

August 24, p. m.; lines of position at signal "Second"; this position is rejected, as the angle of the lines is sharp, and the intersection does not agree with the position of signal "Night" as connected by the Y line.

August 24; latitude observation at signal "Night" adopted in the location of "Night".

August 25, a. m., anchorage at 36Z; lines of position adopted. Of two positions, using the one farthest

seaward

August 25, p. m.; observations for position by two observers. Latitude as observed on August 24 used; and a mean of the two longitudes.

August 25, noon, underway. Plotted position differs by 3 miles from observed position. Plotted position determined by running from 35 Z, which is an accepted position.

August 26, p. m., underway; position discarded.

August 27, a. m., E. Lines of position adopted.

August 28, a. m., underway; latitude not known; only one line of position.

August 28, noon; latitude position not adopted by 1.6 miles.

August 29, a. m., E; position determined by bearings on Cape Dyer.

August 31 and Sept. 1, on beach at Cape Dyer;
mean of observations accepted for position of
Cape Dyer beach.

11

Tidal Data used in the Reduction of Soundings.

The tidal data used in the reduction of the soundings is based on the ~~East~~ Survey tide tables, 1899, observations made at St. Michael, and data furnished by the Office which included the results of observations made by parties in charge of assistants G. R. Putnam and R. L. Fair. As the sounding was done in a rough sea, no attempt is made to approximate closer than the nearest foot in the reduction. Within the limits of the season's work, the type of tide changes from diurnal to semi-diurnal. The construction of the tables used in the reductions is as follows:

In the St. Michael table the figures in black are the staff readings taken from the observed curve of the self-registering tide gauge at St. Michael. The figures in red are from the curves constructed by the predictions in the tide tables, combined with scattering observed readings at St. Michael on those days. The plane of reference read 3.6 on the staff up to August 18, and 4.0 after that date.

The Kripnyuk table is constructed from the St. Paul tides by applying the ratio 0.55 and the time differences to the daily predictions of the 1899 tide

tables. The plane of predictions for the Kripniyuk tides is then raised 1.6 foot to bring it to the plane of predictions of the St. Michael tides.

The Kwikpak bar table is constructed from the Kripniyuk table, by allowing the time differences and .76 foot less range. The allowance for difference of range and for raising the plane of predictions 1.6 feet is made by subtracting 2.0 from the high waters and 1.2 from the low waters of the Kripniyuk table of high and low waters.

Point of Delta tides is the name applied for convenience of reference to the mean of the Kwikpak Bar tides, as deduced above, and the Pastoliac tides, deduced by applying the ratio 1.27 and the time differences to the St. Michael predicted tides.

The time interval between the tides of St. Michael and Pastoliac is $1^h 40^m$, and between Pastoliac and Kwikpak Bar $2^h 00^m$. The 3-fathom line from a point opposite Kwikpak Bar to a point opposite Pastoliac is divided into five equal parts, and it is assumed that the high water interval between each point is 1 hour. From these points supposed isotidal lines are drawn as shown on the hydrographic sheet, and the water area is thus divided

into sections of 1 hour tidal intervals for the reduction of soundings, the center of each section being the isotidal line. A schedule is attached showing the sections in which the soundings occur, and the table by which they were reduced.

In "A" section the tides are assumed to occur $0^h 40^m$ earlier than at St. Michael; "B" section, $1^h 40^m$ earlier than St. Michael, or $2^h 30^m$ later than "Point of Delta"; "C" section, $2^h 40^m$ earlier than St. Michael, or $1^h 30^m$ later than "Point of Delta"; "D" section, $3^h 40^m$ earlier than St. Michael, or $0^h 30^m$ later than "Point of Delta"; "E" section, $4^h 40^m$ earlier than St. Michael, or $0^h 30^m$ earlier than "Point of Delta"; "F" time $1^h 30^m$ earlier than "Point of Delta"; Kwikpak Bar section, from Kwikpak Bar table; all to the southward of Kwikpak Bar section, tides $1^h 00^m$ earlier than Kripvizuk.

*Statistics of Hydrography,
Yukon Flats and Southern Portion of Norton Sound.*

Date 1899.	Letter	Vol	Number of			Vessel.
			Angles & Positions	Soundings	Miles, Statute.	
July 24	Red "A"	1	61	310	60.3	Patterson
" 25	" "B"	1	32	257	85.3	"
" 27	" "C"	1	106	300	151.6	"
" 29	" "D"	1	70	235	92.0	"
Aug. 1	" "E"	1	78	475	95.6	"
" 2	" "F"	2	87	510	104.3	"
" 3	" "G"	2	59	525	98.9	"
" 7	" "H"	2	18	60	21.4	"
" 8	" "I"	2	92	430	145.7	"
" 9	" "K"	3	74	500	87.2	"
" 10	" "L"	3	75	600	91.5	"
" 11	" "M"	3	83	440	102.6	"
" 12	" "N"	4	43	215	58.5	"
" 14	" "O"	4	33	435	40.0	"
" 15	" "P"	4	53	381	72.8	"
" 16	" "Q"	4	78	360	110.6	"
" 17	" "R"	5	31	148	53.2	"
" 18	" "S"	5	54	391	73.6	"
" 19	" "T"	5	82	396	102.5	"
" 20	" "U"	5	75	541	86.7	"
" 21	" "V"	6	64	337	70.5	"
" 22	" "W"	6	58	463	67.5	"
" 23	" "X"	6	101	502	126.8	"
" 24	" "Y"	7	95	640	117.3	"
" 25	" "Z"	7	97	581	121.2	"
" 26	" "A"	8	98	600	119.3	"
" 27	" "B"	8	88	506	75.7	"
" 28	" "C"	8	92	528	68.0	"
" 29	" "D"	9	84	1085	93.3	"
" 30	" "E"	9	47	362	49.7	"
" 31	" "F"	10	10	—	—	"
Forward			2118	13113	2643.6	

Date 1899.	Letter	Vol.	Number of			Vessel
			Angles + Positions	Sounding	Miles, Statute	
Sept. 1	Red "G"	10	²¹¹⁸ 151	¹³¹¹³	^{2643.6}	Patterson
Aug. 31	Blue "F"		21	158	10.0	Launch Vixen,
Sept. 1	" "G"		208	691	47.0	" "
" 2	Red "H"	11	95	805	123.2	Patterson
" 3	" "I"	11	48	408	77.7	"
" 4	" "K"	11	95	710	119.3	"
" 5	" "L"	12	77	414	106.4	"
" 8	" "M"	12	104	487	111.6	"
" 9	" "N"	12	20	98	29.4	"
" 11	" "O"	12	56	347	62.1	"
" 24	" "P"	14	46	212	85.7	"
			3039	17443	3416.0	
<u>Recapitulation</u>						
Launch Vixen.			229	849	57.0	
S. S. Patterson.			2810	16594	3359.0	
Total			3039	17443	3416.0	

