

TABLE showing Velocity of Grey River between Cobden Bridge and Ends of Breakwater on the 5th July, 1892.

[Float was put in under centre of Cobden Bridge at 9.25 a.m. Depth of float was 8ft. Strong easterly breeze. High water, 6.30 a.m.; low water, 12.30 p.m.]

Time.	Position of Float.	Distance.	Velocity in Feet per Minute.	Remarks.
9.25	Cobden Bridge to—	Feet.		
9.30	Opposite railway-station	884	177	Centre of bridge second quarter ebb.
9.38	End of quay-wall	1,043	130	Float 100ft. from wharf.
9.41	Centre Street	406	135	" 60ft. "
9.43	Hammond's Hotel, corner Boundary Street	244	122	" 40ft. "
9.48	Upper corner	693	139	" 20ft. "
9.50	Lower corner	350	175	" 20ft. "
9.50½	End of wharf	175	116	" 20ft. "
9.59	Cattle wharf	838	112	" 10ft. "
10.03	Lagoon Point	363	91	Third quarter ebb.
10.18	Signal-station	1,518	101	"
10.31	North tip	1,162	89	"
10.37	South tip	581	97	"
10.55	500yds. straight out, in line with south breakwater	1,500	83	Approximate only

TABLE showing Velocity of Grey River between End of Wharf and Ends of Breakwaters.

[Float was put down 100ft. out in stream from end of wharf. Depth of float, 13ft. High water, 5.30 a.m. low water, 11.30 p.m. 6th July 1892.]

Time.	Position of Float.	Distances.	Velocity in Feet per Minute.	Remarks.
10.32¼	End of wharf to—	Feet.		
10.37½	Cattle wharf	832	158	Second quarter ebb.
10.44	Signal dwelling-house	819	126	"
10.50¾	Peg 20 on wall	792	117	"
10.55¾	Peg 30 on wall	660	134	"
11.1¾	North tip	766	151	Third quarter ebb.
11.6½	South tip	581	131	"

These are the least velocities of the ebb tide a very small fresh greatly increases them, and in a high flood the velocity of the river is about ten miles an hour

Direction of Ground-floats.—On the plan herewith is shown the direction taken by ground-floats drifting out of the river over the bar, the wind being east with a slight westerly swell. These show the prevailing northerly set of the shore-currents of the sea. With a rising tide the floats drift out to sea with a small set to the north, but the blue arrows on the plan show that the surface river-water sets slightly to the southward, while the bottom sea-water sets to the northward. With a falling tide the ground-float sets much more to the north, and finally comes ashore on the beach. With a strong west or south-west wind and heavy southerly swell the shore-current sets very strongly to the north, and south-west wind and southerly swell is the prevailing weather here.

Contours of Depths.—The contour-lines of soundings on the plan herewith show the influence of the current in forming a great bank with shallow water to the north of the river-mouth, while to the south deep water is much nearer the beach. The sand travelling along the south beach crosses the river-mouth, and the strong current out of the river disperses it in an extensive shoal on the north side, while all sand brought out of the river is added to the shoals on the north, and seldom passes south of the river

Shoaling outside Breakwater.—There were very few soundings taken in 1878 outside the lines of the breakwaters, but from the few that there are, compared with the soundings taken by myself, it appears that, as in the case of Westport, there is a general shoaling of the water all round and outside of the ends of the breakwaters. Thus, on the line of south breakwater, produced seaward 11 chains out and 8 chains to the south, the old depths appear to have been 23ft., while the present depth is 15ft. at 18 chains out, and 5 chains south, old depth 26ft., present depth 15ft., at 7 chains out in line of south breakwater the old depth was 15ft., the present depth 15ft. At 11 chains out, and 15 chains north, old depth 15ft., present depth 13ft.; 15 chains out, and 18 chains north, old depth 18ft., present depth 14ft., below low-water spring-tides. There not being enough soundings taken in 1878, it is not now possible to accurately compare two sections out to sea between the pier-heads—one to show the depth then, and the other to show the depth now—but I think there is sufficient evidence that the effect of the construction of the breakwater has been to extend the shoal water all round them and seaward.