2019/20 Te Awarua-o-Porirua Harbour catchment sediment monitoring

Greater Wellington
Te Pane Matua Taiao

Contents

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For the latest available results go to the GWRC environmental data hub.

Programme overview

Continuous sediment monitoring sites were set up in the lower reaches of the three main tributaries of Te Awarua-o-Porirua Harbour (Porirua Harbour) in 2012/13. The purpose was to quantify the annual and event-based sediment loads to Porirua Harbour, recognising that excessive sediment deposition in the harbour is one of the key issues for estuarine health. These data summarise monitoring results for the period from July 2019 to June 2020.

Monitoring network

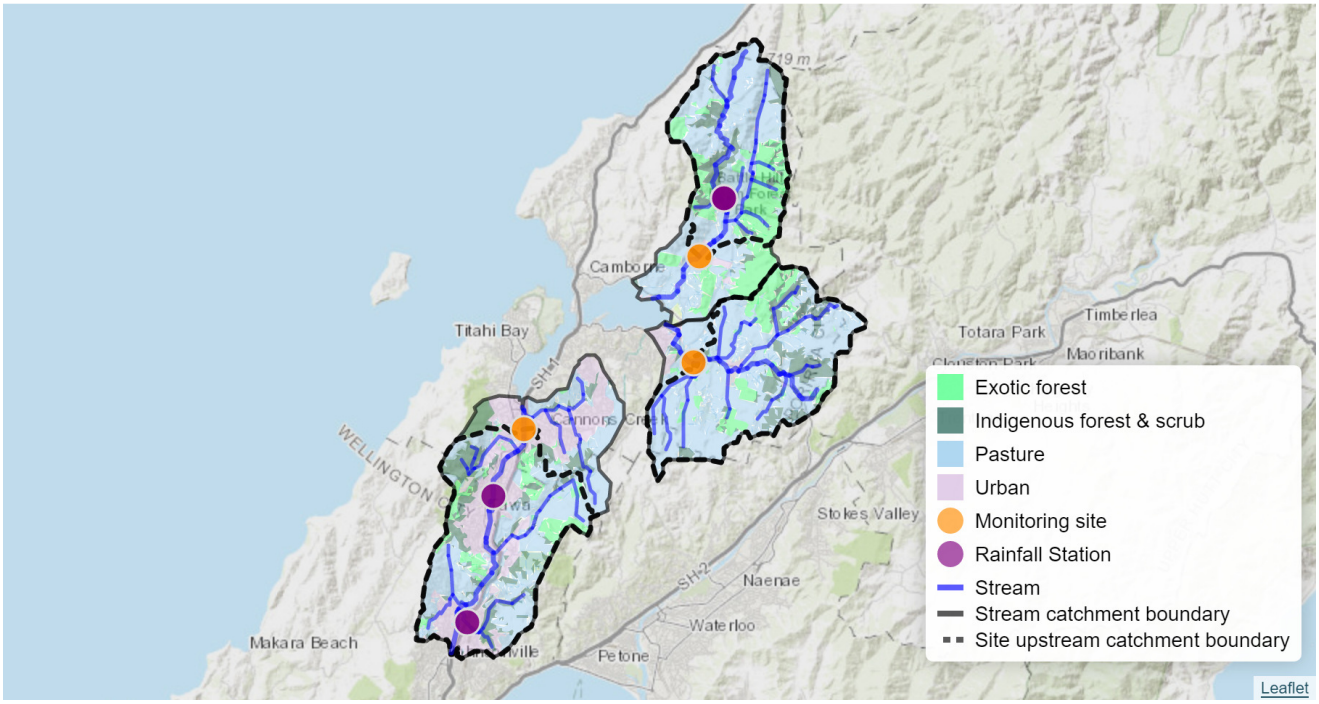

Figure 1: Sediment monitoring sites, rainfall gauges, and landcover classifications for the three main catchments of Te Awarua-o-Porirua harbour. On the map, these catchments are Horokiri Stream in the north, Porirua Stream to the southwest, and Pāuatahanui Stream in the central/eastern region.

The photos below show some of the equipment and surroundings of each monitoring site. For more details on site set up, instrumentation, data collection and processing, plus how sediment loads and yields are calculated, please refer to Morar & Alberto (2018).

Figure 2: Monitoring sites from top to bottom: Porirua Stream at Town Centre, Horokiri Stream at Snodgrass, and Pāuatahanui Stream at Gorge.

Porirua Stream at Town Centre results

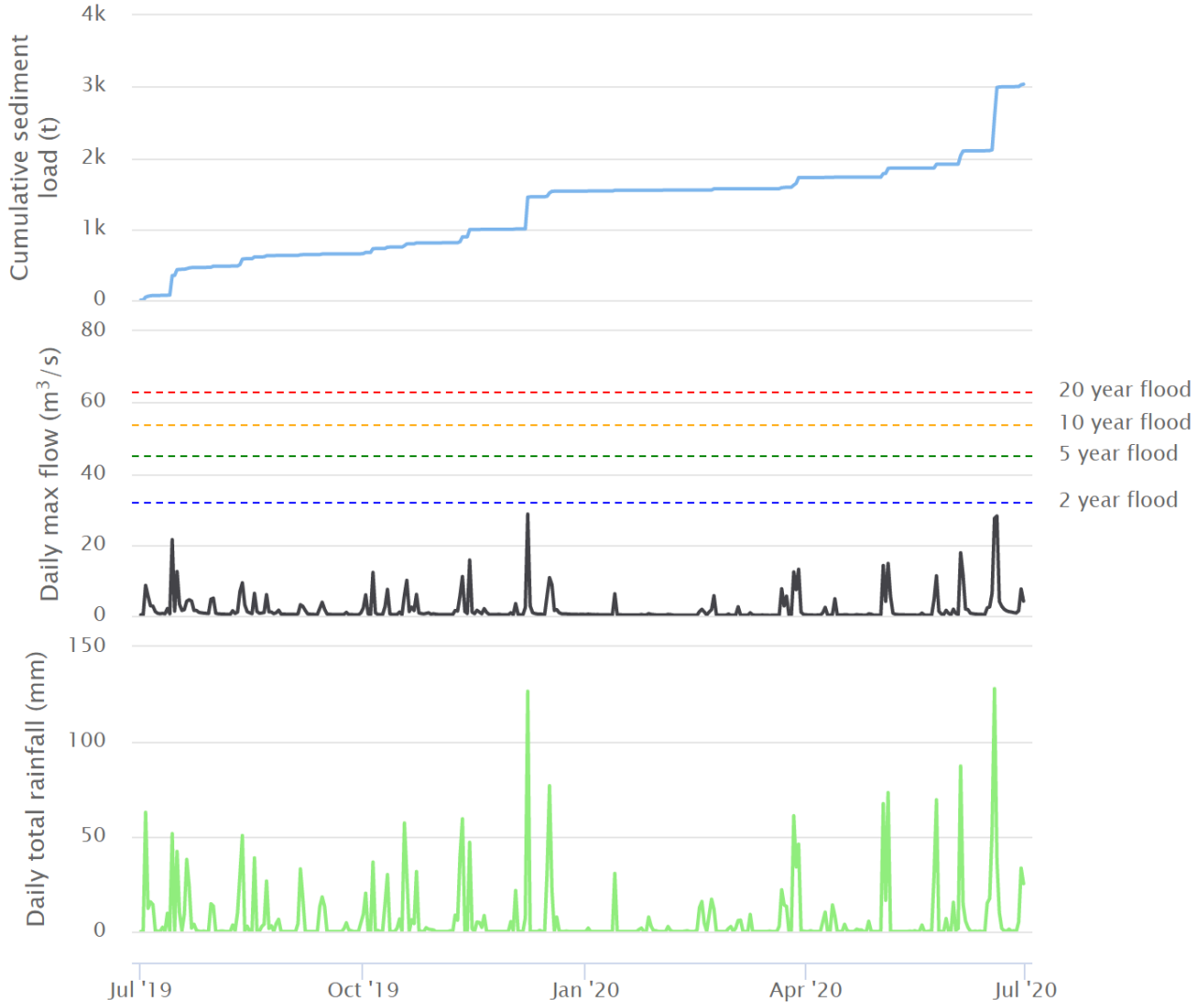

Figure 3: Porirua Stream at Town Centre cumulative sediment load, daily maximum flow and daily total rainfall for the 2019/20 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. The flow event lines represent the flow level at which we would expect *n* years before another event that size.

Table 1: Porirua Stream at Town Centre sediment yields/loads of key events during the 2019/20 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
14-07-2019 - 14-07-2019	0 days, 5 hrs & 55 mins	260	0.07	21.4	1
14-11-2019 - 14-11-2019	0 days, 5 hrs & 30 mins	90	0.02	15.7	1
08-12-2019 - 08-12-2019	1 day, 17 hrs & 50 mins	441	0.11	28.6	1
04-06-2020 - 05-06-2020	1 day, 18 hrs & 50 mins	175	0.04	17.7	1
17-06-2020 - 21-06-2020	4 days, 17 hrs & 25 mins	890	0.23	28.0	1

Table 2: Porirua Stream at Town Centre annual total yields/loads per calendar year since monitoring began.

Year	Time	Sediment load (t)	Sediment yield (t/ha/yr)
2012	124 days 12 hrs	317	0.08
2013	365 days	2,486	0.63
2014	365 days	1,263	0.32
2015	365 days	7,714	1.96
2016	366 days	7,296	1.85
2017	365 days	3,972	1.01
2018	365 days	3,264	0.83
2019	365 days	2,562	0.65
2020	182 days	1,501	0.38
Total	2,862 days 12 hrs	30,375	7.72

Horokiri Stream at Snodgrass results

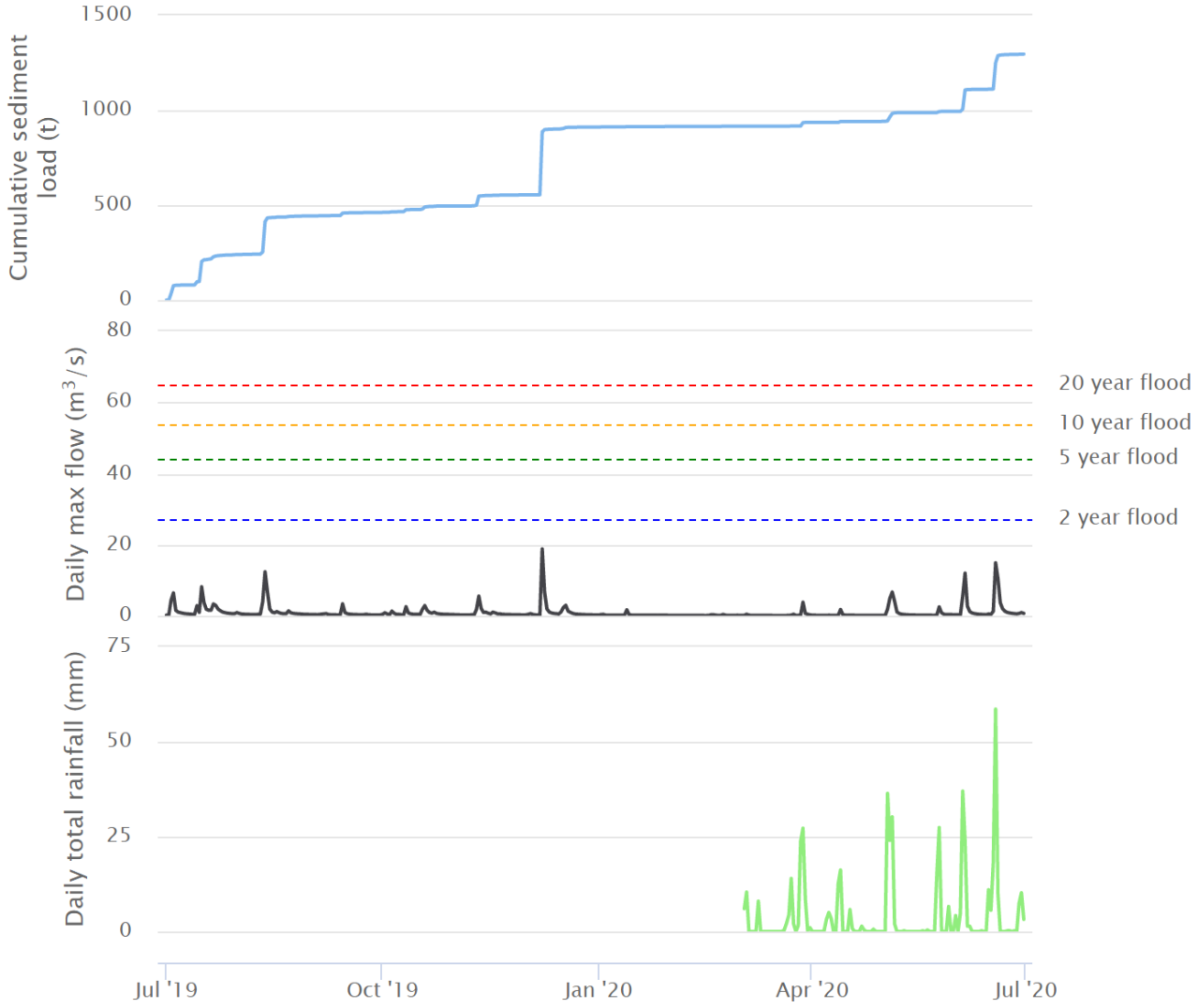

Figure 4: Horokiri Stream at Snodgrass cumulative sediment load, daily maximum flow and daily total rainfall for the 2019/20 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. The flow event lines represent the flow level at which we would expect *n* years before another event that size. Note that catchment rainfall measurements started on March 3 for this monitoring year.

Table 3: Horokiri Stream at Snodgrass sediment yields/loads of key events during the 2019/20 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
16-07-2019 - 19-07-2019	3 days, 23 hrs & 35 mins	116	0.04	8.2	1
11-08-2019 - 14-08-2019	3 days, 22 hrs & 60 mins	191	0.07	12.4	1
08-12-2019 - 10-12-2019	3 days, 13 hrs & 5 mins	344	0.12	18.8	1
04-06-2020 - 06-06-2020	2 days, 15 hrs & 0 mins	113	0.04	12.0	1
17-06-2020 - 20-06-2020	3 days, 7 hrs & 35 mins	180	0.06	14.9	1

Table 4: Horokiri Stream at Snodgrass annual total yields/loads per calendar year since monitoring began.

Year	Time	Sediment load (t)	Sediment yield (t/ha/yr)
2012	47 days 12 hrs	37	0.01
2013	365 days	2,531	0.88
2014	365 days	854	0.30
2015	365 days	4,365	1.52
2016	366 days	5,019	1.75
2017	365 days	1,605	0.56
2018	365 days	1,352	0.47
2019	365 days	1,080	0.38
2020	182 days	384	0.13
Total	2,785 days 12 hrs	17,229	6.00

Pāuatahanui Stream at Gorge results

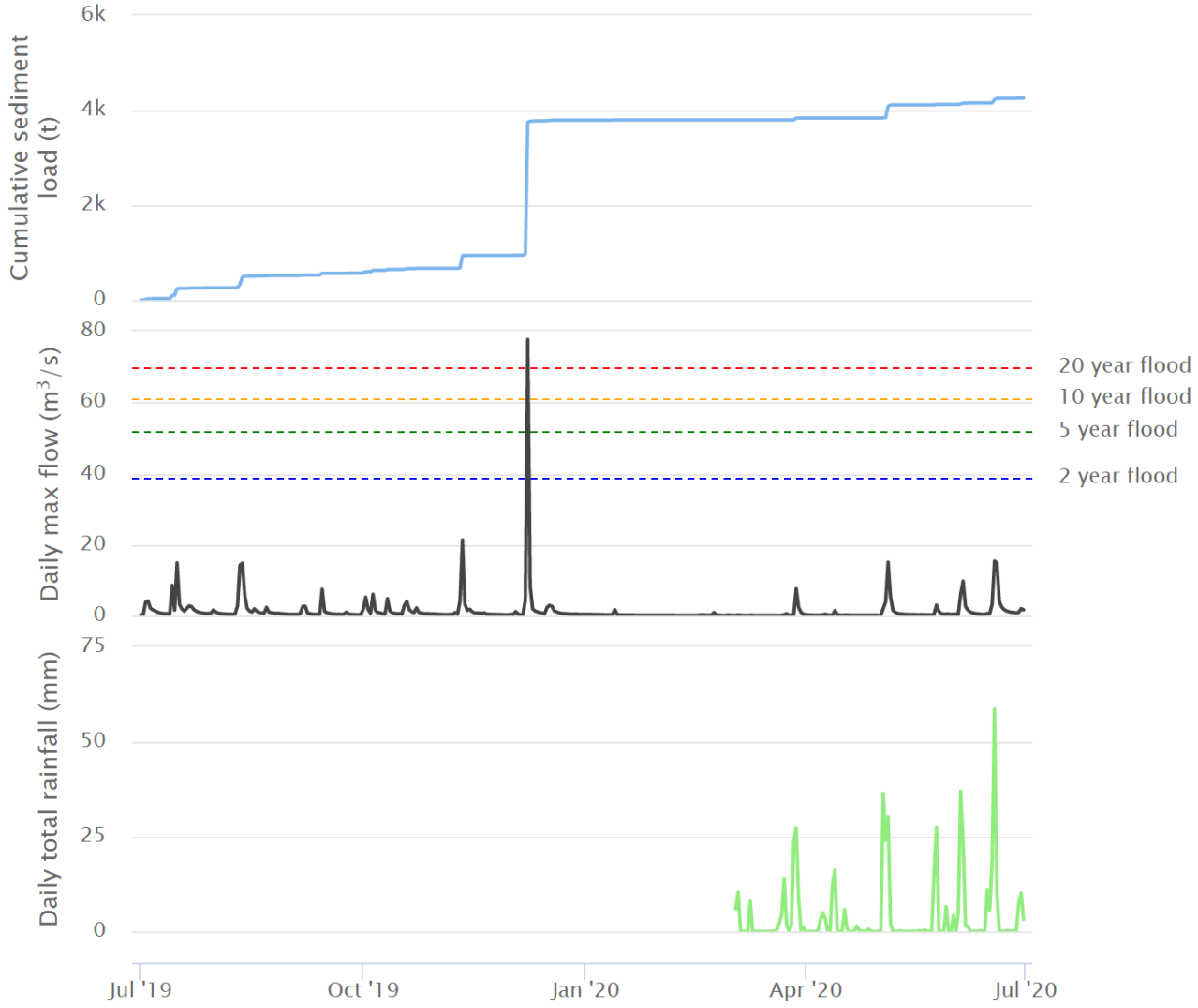

Figure 5: Pāuatahanui Stream at Gorge cumulative sediment load, daily maximum flow and daily total rainfall for the 2019/20 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. The flow event lines represent the flow level at which we would expect *n* years before another event that size. Note that catchment rainfall measurements started on March 3 for this monitoring year.

Table 5: Pāuatahanui Stream at Gorge sediment yields/loads of key events during the 2019/20 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
11-11-2019 - 11-11-2019	1 day, 14 hrs & 55 mins	250	0.07	21.3	1
08-12-2019 - 09-12-2019	1 day, 24 hrs & 40 mins	2780	0.74	77.7	20
17-06-2020 - 19-06-2020	2 days, 6 hrs & 30 mins	94	0.03	15.4	<1

Table 6: Pāuatahanui Stream at Gorge annual total yields/loads per calendar year since monitoring began.

Year	Time	Sediment load (t)	Sediment yield (t/ha/yr)
2013	202 days 12 hrs	2,391	0.64
2014	365 days	855	0.23
2015	365 days	4,117	1.09
2016	366 days	10,104	2.69
2017	365 days	2,024	0.54
2018	365 days	2,327	0.62
2019	365 days	4,011	1.07
2020	182 days	464	0.12
Total	2,575 days 12 hrs	26,293	6.99