2021/22 Te Awarua-o-Porirua Harbour catchment sediment monitoring

Greater Wellington
Te Pane Matua Taiao

Contents

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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 2021 to June 2022.

Monitoring network

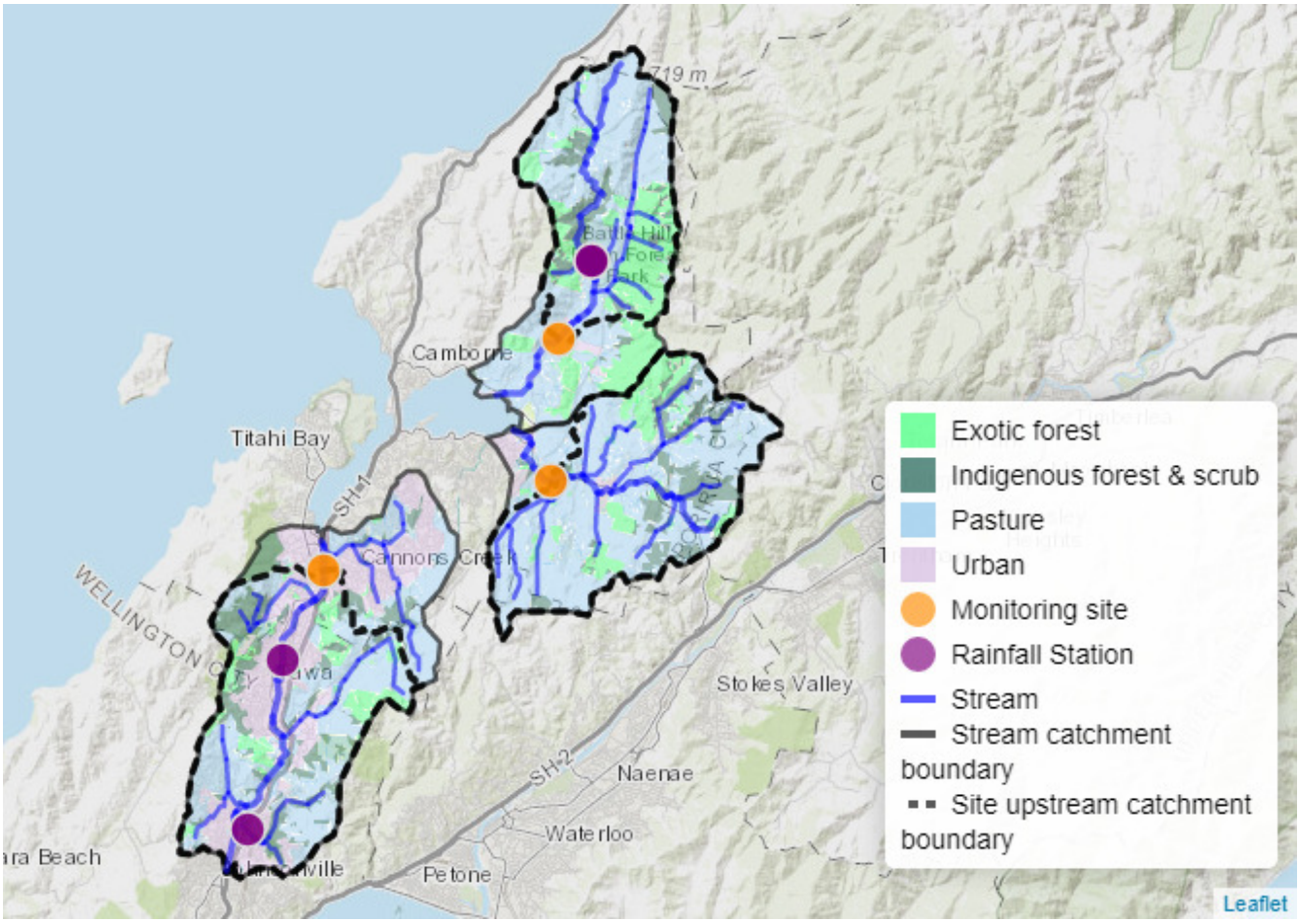

Figure 1: Sediment monitoring sites, rainfall gauges, and landcover classifications for the three main catchments of Te Awarua-o-Porirua harbour. On the map, these catchments are Horokiri Stream in the north, Porirua Stream to the southwest, and Pāuatahanui Stream in the central/eastern region.

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

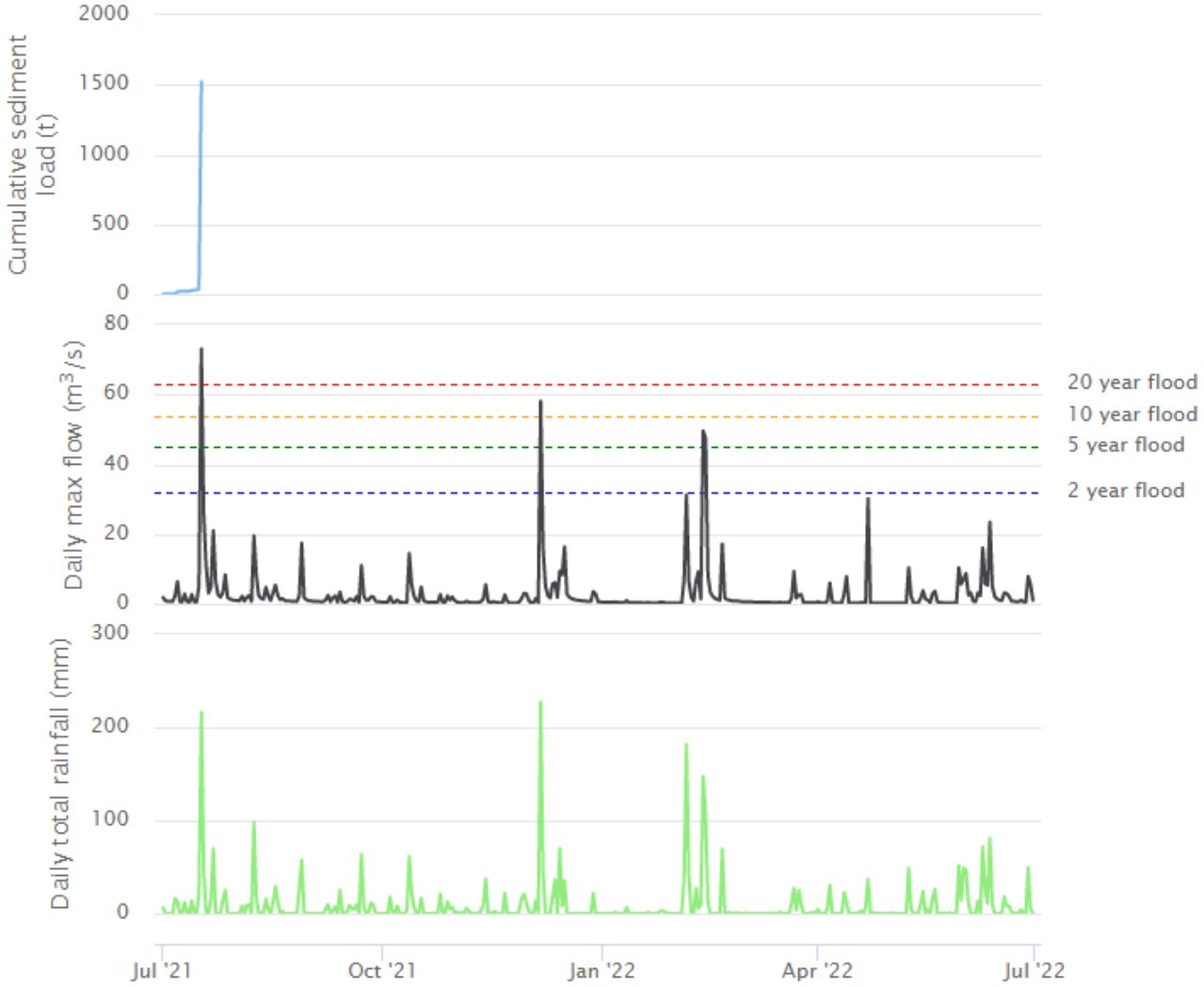

Figure 3: Porirua Stream at Town Centre cumulative sediment load, daily maximum flow and daily total rainfall for the 2021/22 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more 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 2021/22 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
17-07-2021 - 17-07-2021	1 day, 15 hrs & 35 mins	1483	0.38	73.0	20

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	366 days	4,149	1.05
2021	198 days 12 hrs	2,214	0.56
Total	3,244 days	35,237	8.95

Horokiri Stream at Snodgrass results

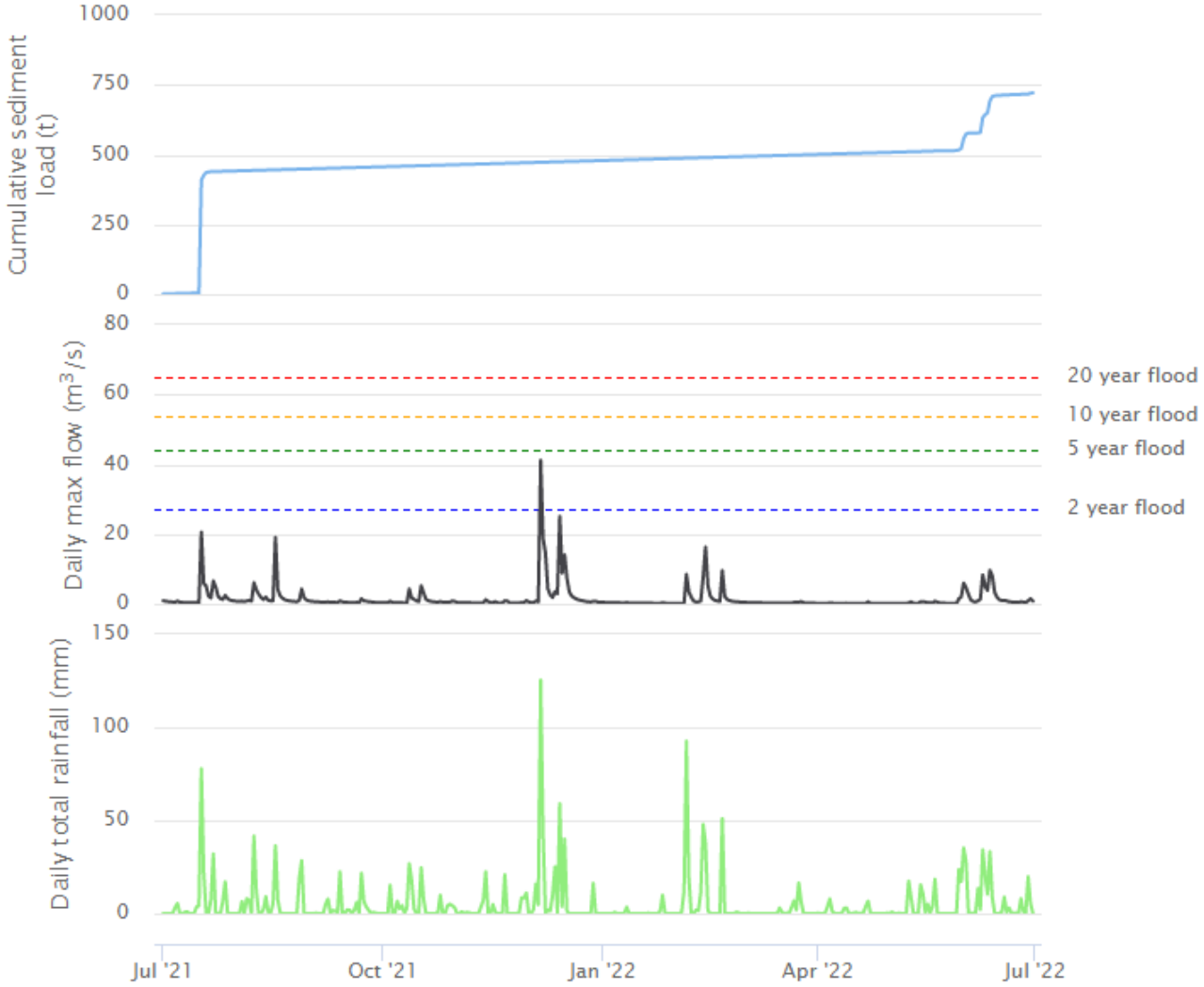

Figure 4: Horokiri Stream at Snodgrass cumulative sediment load, daily maximum flow and daily total rainfall for the 2021/22 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. The flow event lines represent the flow level at which we would expect *n* years before another event that size.

Table 3: Horokiri Stream at Snodgrass sediment yields/loads of key events during the 2021/22 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
17-07-2021 - 20-07-2021	3 days, 11 hrs & 10 mins	434	0.15	20.5	1
09-06-2022 - 16-06-2022	8 days, 13 hrs & 20 mins	133	0.05	9.6	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	38	0.01
2013	365 days	2,541	0.88
2014	365 days	857	0.30
2015	365 days	4,382	1.53
2016	366 days	5,039	1.75
2017	365 days	1,611	0.56
2018	365 days	1,357	0.47
2019	365 days	1,081	0.38
2020	366 days	1,393	0.48
2021	202 days 12 hrs	666	0.23
2022	44 days 12 hrs	281	0.10
Total	3,515 days 12 hrs	19,245	6.70

Pāuatahanui Stream at Gorge results

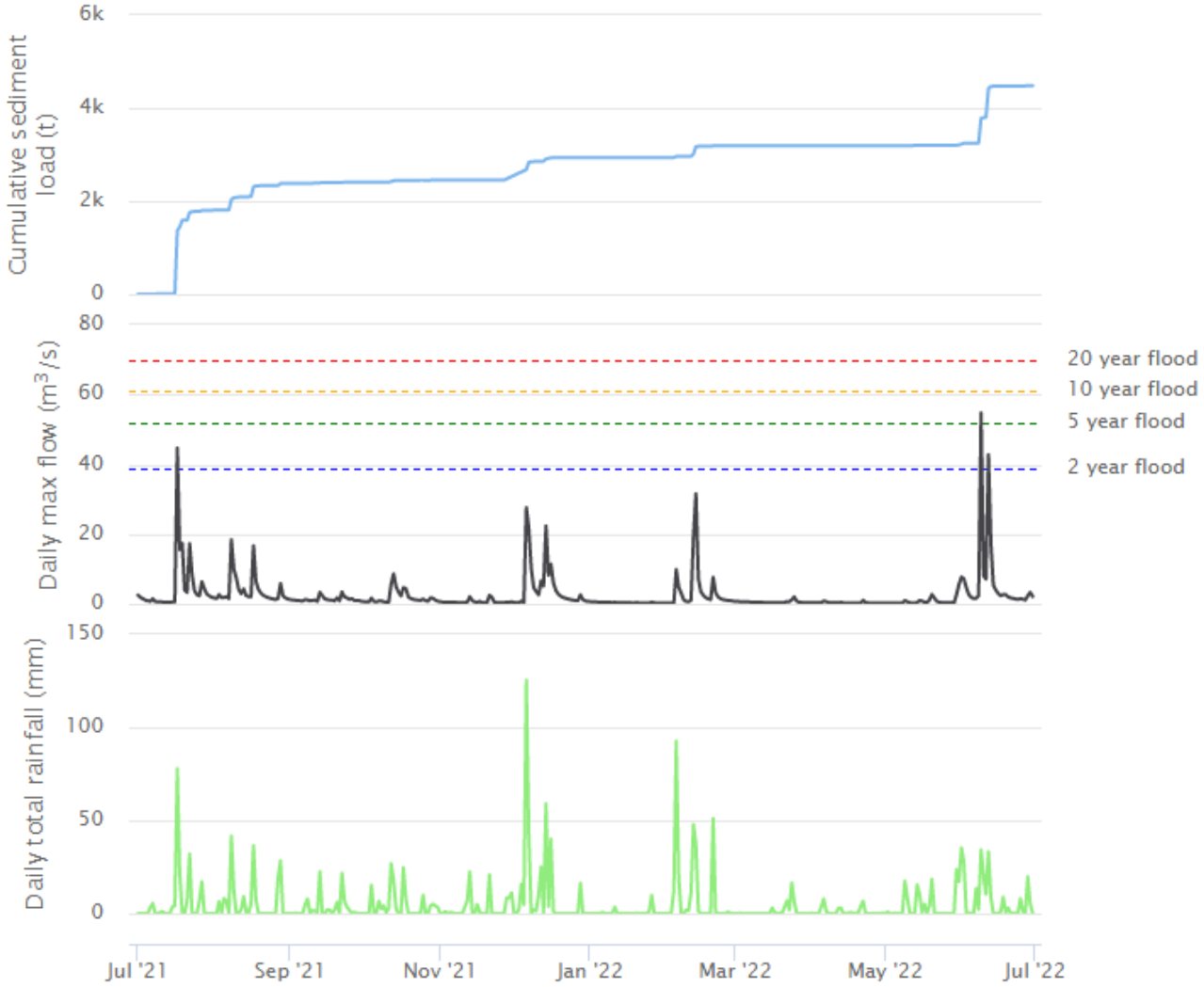

Figure 5: Pāuatahanui Stream at Gorge cumulative sediment load, daily maximum flow and daily total rainfall for the 2021/22 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. The flow event lines represent the flow level at which we would expect *n* years before another event that size.

Table 5: Pāuatahanui Stream at Gorge sediment yields/loads of key events during the 2021/22 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
17-07-2021 - 20-07-2021	3 days, 2 hrs & 5 mins	1583	0.42	44.6	2
22-07-2021 - 25-07-2021	3 days, 13 hrs & 35 mins	178	0.05	17.3	1
08-08-2021 - 11-08-2021	4 days, 13 hrs & 5 mins	276	0.07	18.4	1
17-08-2021 - 19-08-2021	3 days, 16 hrs & 10 mins	231	0.06	16.6	1
06-12-2021 - 18-12-2021	13 days, 13 hrs & 20 mins	480	0.13	27.6	1
12-02-2022 - 17-02-2022	5 days, 23 hrs & 5 mins	215	0.06	31.5	1
09-06-2022 - 14-06-2022	6 days, 18 hrs & 0 mins	1220	0.32	54.7	5

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	366 days	2,255	0.60
2021	365 days	3,278	0.87
2022	181 days	1,542	0.41
Total	3,305 days 12 hrs	32,904	8.74