2022/23 Te Awarua-o-Porirua Harbour catchment sediment monitoring

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 2022 to June 2023.

Monitoring network

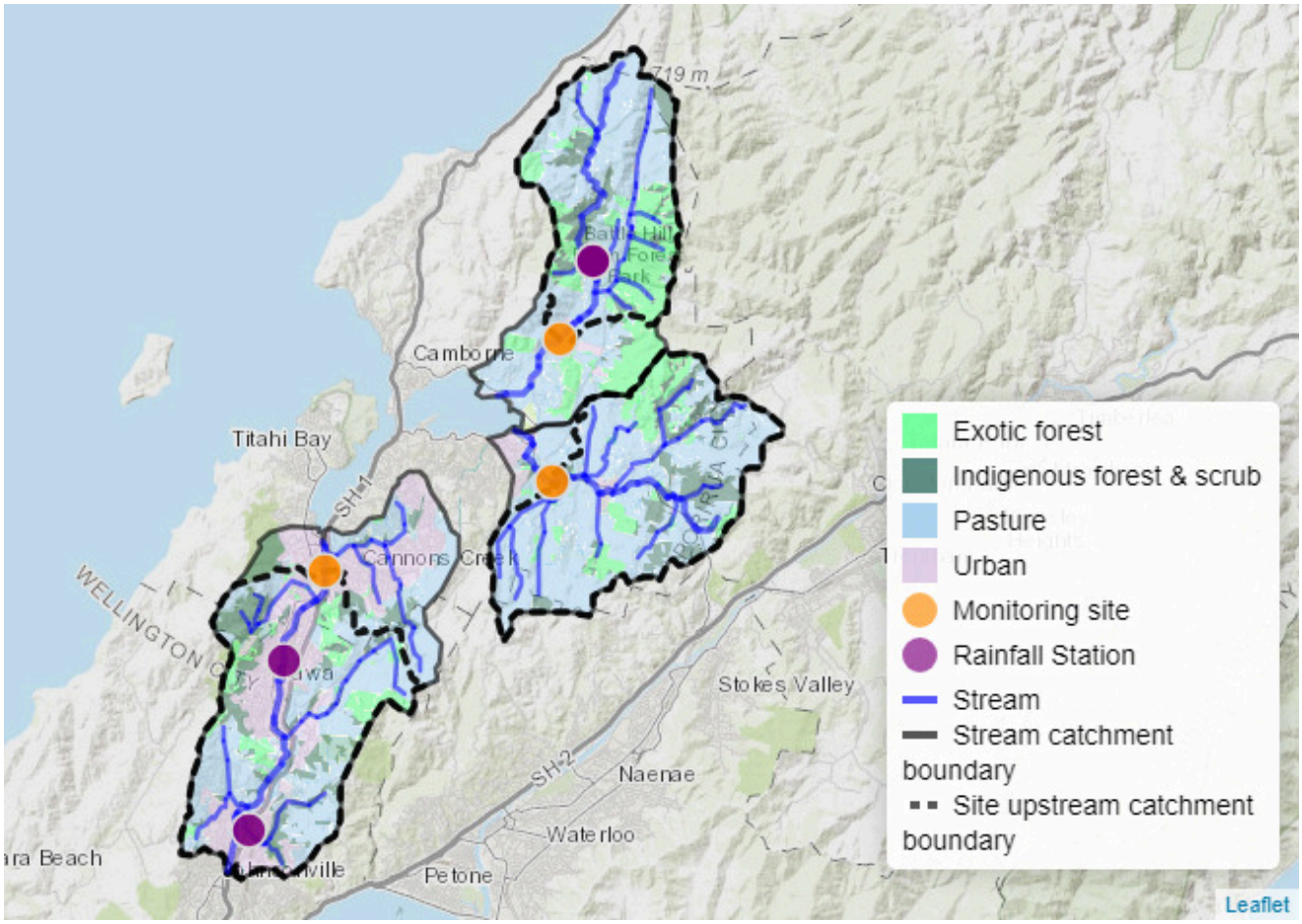

Figure 1: Sediment monitoring sites, rainfall gauges, and landcover classifications for the three main catchments of Te Awarua-o-Porirua harbour. On the map, these catchments are Horokiri Stream in the north, Porirua Stream to the southwest, and Pāuatahanui Stream in the central/eastern region.

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

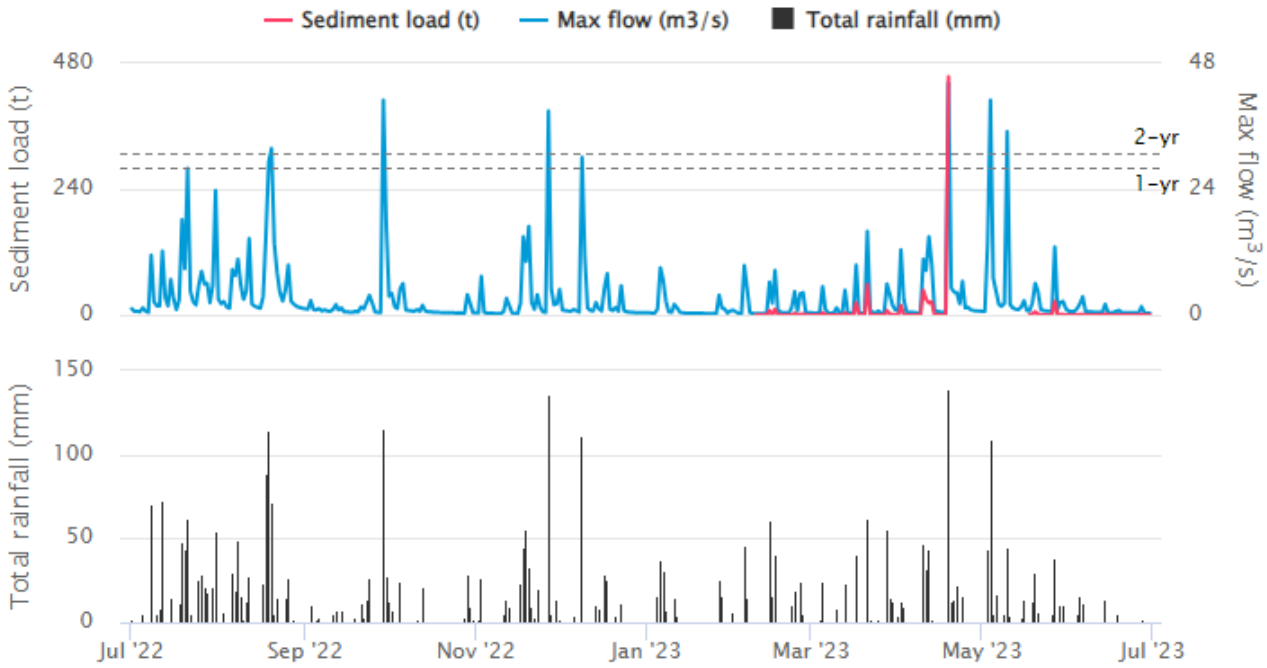

Figure 3: Porirua Stream at Town Centre point-specific sediment load, daily maximum flow and daily total rainfall for the 2022/23 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. **Note:** when there are gaps in the sediment load predictions, the resulting annual sediment load totals may be underreported. The dashed flow event lines represent the flow level at which we would expect *n* years before another event that size (e.g. 1-yr suggests a flow event that size occurs on average once every year).

Table 1: Porirua Stream at Town Centre sediment yields/loads of key events during the 2022/23 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
21-03-2023 - 21-03-2023	9h	53	0.01	15.9	<1
02-04-2023 - 02-04-2023	6h	17	0.00	12.4	<1
10-04-2023 - 13-04-2023	3d 12h	122	0.03	14.9	<1
19-04-2023 - 21-04-2023	2d 7h	454	0.12	44.2	2
27-05-2023 - 27-05-2023	1d 13h	24	0.01	13.0	<1

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

Year	Time	Sediment load (t)[1]	Sediment yield (t/ha/yr)
2012	122 days 22 hrs	309	0.08
2013	362 days 8 hrs	2,396	0.61
2014	361 days 15 hrs	1,204	0.31
2015	357 days 21 hrs	7,273	1.85
2016	360 days 11 hrs	6,957	1.77
2017	352 days 1 hr	3,806	0.97
2018	356 days 18 hrs	3,132	0.80
2019	360 days 17 hrs	2,463	0.63
2020	365 days 22 hrs	3,985	1.01
2021	195 days 12 hrs	2,117	0.54
2023	112 days 16 hrs	775	0.20
Total	3,311 days 19 hrs	34,417	8.74

1: Annual sediment loads published in reports prior to 2022/23 will vary from what is published for the current report due to updates in the load calculation. Annual loads published in the current report are the most up-to-date.

Horokiri Stream at Snodgrass results

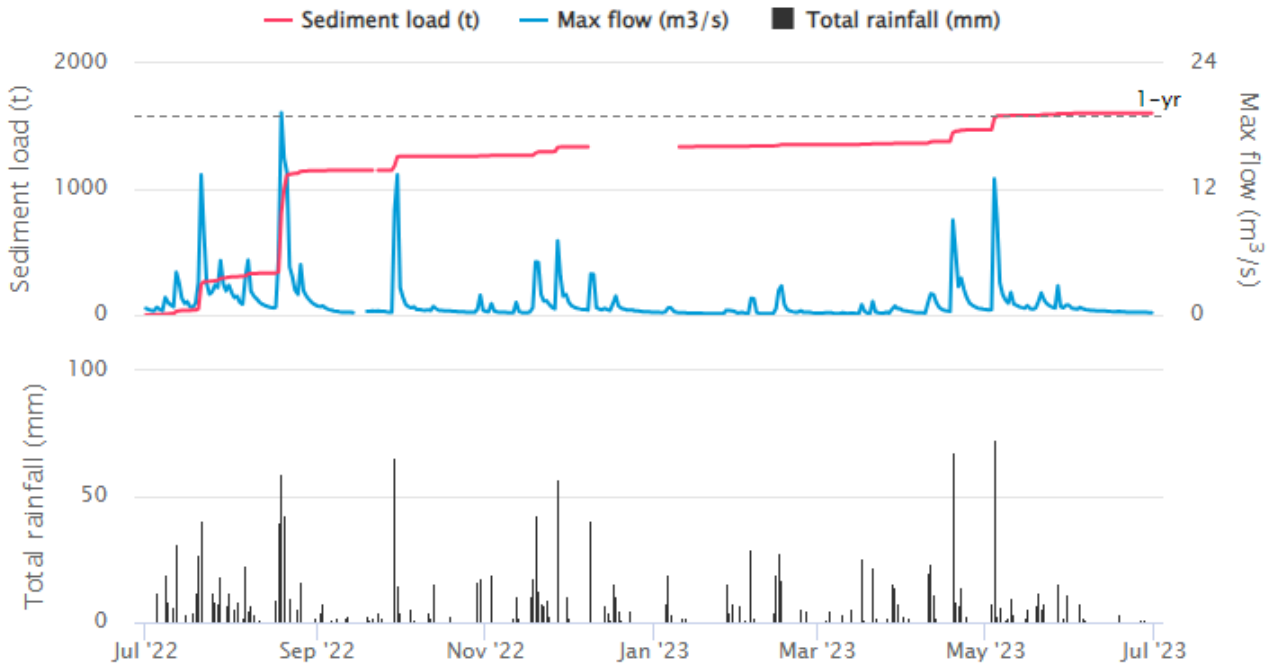

Figure 4: Horokiri Stream at Snodgrass cumulative sediment load, daily maximum flow and daily total rainfall for the 2022/23 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. **Note:** when there are gaps in the sediment load predictions, the resulting cumulative and annual sediment load totals may be underreported. The dashed flow event lines represent the flow level at which we would expect *n* years before another event that size (e.g. 1-yr suggests a flow event that size occurs on average once every year).

Table 3: Horokiri Stream at Snodgrass sediment yields/loads of key events during the 2022/23 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
19-07-2022 - 24-07-2022	5d 18h	229	0.08	13.4	<1
18-08-2022 - 22-08-2022	4d 7h	782	0.27	19.3	1
29-09-2022 - 01-10-2022	3d 19h	108	0.04	13.4	<1
19-04-2023 - 21-04-2023	3d 12h	80	0.03	9.1	<1
03-05-2023 - 08-05-2023	4d 6h	110	0.04	13.0	<1

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

Year	Time	Sediment load (t)[1]	Sediment yield (t/ha/yr)
2012	43 days 5 hrs	40	0.01
2013	355 days 6 hrs	2,695	0.94
2014	360 days 3 hrs	880	0.31
2015	361 days 7 hrs	4,754	1.65
2016	351 days 19 hrs	5,400	1.88
2017	339 days 6 hrs	1,748	0.61
2018	364 days 14 hrs	1,471	0.51
2019	362 days 2 hrs	1,175	0.41
2020	358 days 4 hrs	1,506	0.52
2021	184 days 18 hrs	722	0.25
2022	196 days 7 hrs	1,563	0.54
2023	171 days 23 hrs	268	0.09
Total	3,456 days 18 hrs	22,222	7.73

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Pāuatahanui Stream at Gorge results

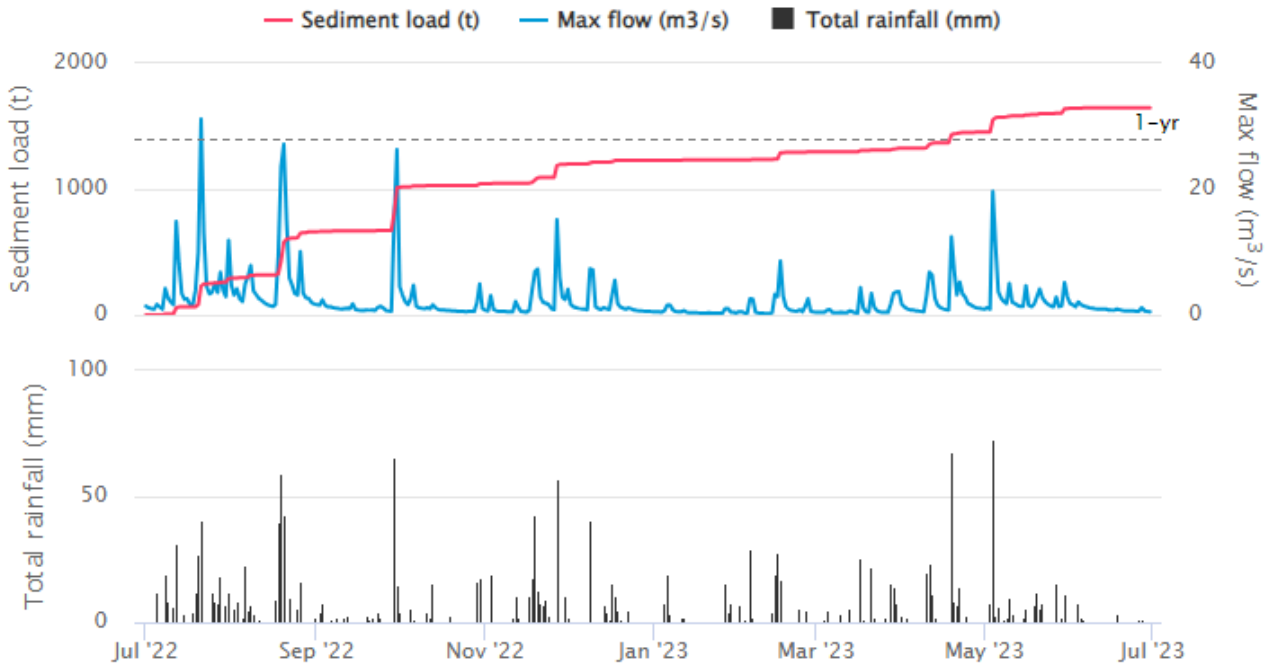

Figure 5: Pāuatahanui Stream at Gorge cumulative sediment load, daily maximum flow and daily total rainfall for the 2022/23 monitoring season. Sediment load is predicted using a turbidity vs discrete suspended sediment concentration model that is updated annually, see Morar & Alberto (2018) for more information. **Note:** when there are gaps in the sediment load predictions, the resulting cumulative and annual sediment load totals may be underreported. The dashed flow event lines represent the flow level at which we would expect *n* years before another event that size (e.g. 1-yr suggests a flow event that size occurs on average once every year).

Table 5: Pāuatahanui Stream at Gorge sediment yields/loads of key events during the 2022/23 monitoring year.

Event	Duration	Sediment load (t)	Sediment yield (t/ha)	Max flow (m^3/s)	Flow return period (years)
12-07-2022 - 13-07-2022	2d 21h	54	0.01	14.9	<1
19-07-2022 - 25-07-2022	6d 18h	184	0.05	31.1	1
17-08-2022 - 22-08-2022	5d 20h	287	0.08	27.1	<1
29-09-2022 - 01-10-2022	2d 2h	344	0.09	26.3	<1
27-11-2022 - 29-11-2022	3d 12h	101	0.03	15.2	<1
19-04-2023 - 21-04-2023	2d 7h	72	0.02	12.4	<1
04-05-2023 - 06-05-2023	2d 5h	117	0.03	19.6	<1

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

Year	Time	Sediment load (t)[1]	Sediment yield (t/ha/yr)
2013	188 days 20 hrs	2,141	0.57
2014	360 days 10 hrs	744	0.20
2015	358 days 14 hrs	3,816	1.01
2016	363 days 21 hrs	9,563	2.54
2017	360 days 1 hr	1,779	0.47
2018	359 days 13 hrs	2,069	0.55
2019	363 days 8 hrs	3,742	0.99
2020	364 days 23 hrs	1,967	0.52
2021	348 days 9 hrs	2,907	0.77
2022	349 days 7 hrs	2,608	0.69
2023	180 days 23 hrs	419	0.11
Total	3,602 days 5 hrs	31,756	8.44

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