

Freshwater sustainability: stream water quality



Indicator 1.2 Stream macroinvertebrate community index (MCI)

STEADY

Purpose of indicator

The macroinvertebrate community index (MCI) allows for changes in waterway health to be measured over time. Macroinvertebrates are animals that do not have a backbone and are visible to the naked eye. They form an important link in stream food-chains providing a major source of food for fish. The number and types of Macroinvertebrate communities present is an indicator of the health of a waterway.

The MCI score is achieved by assigning each type of macroinvertebrate a value between one and 10, where one means it is capable of living in environments that are less desirable (e.g. low oxygen and clarity, high nutrients). Macro invertebrates with a value of 10 only live in pristine environments. This means that the higher the MCI the more pristine the water body is likely to be.

Table 1.2 Macroinvertebrate community index results

Stream	Land Use	2001-2002	2002-2003	2003-2004	2004-2005	Trend (linear)
Ngongotaha Stream (Paradise Valley Road)	Pasture	85.7	111.6	96.7	86.2	→
Ngongotaha Stream (Hamurana Rd)	Urban	72.9	NS	NS	60	↓
Okaro Tributary	Pasture/ informal riparian retired	86.3	90.8	95.6	87.5	↑
Okataina Tributary	Reference site*	106.7	NS	95.4	NS	→
Pongakawa Tributary (Rotoehu)	Pasture	82	84.2	NS	84.6	→
Puarenga Stream	Forestry	86.1	101.3	9 ⁴	68	↓
Waiiti (Hinehopu)	Reference site*	61.4	101.4	113.3	15.3	→
Okareka Tributary	Pasture / rip retire Gum to native	NS	87.2	NS	NS	Baseline

Source: Environment Bay of Plenty, 2006

NS = not sampled

* reference sites are usually areas of native bush or areas that have maintained a high level of naturalness

Current information and trend

The monitoring results in Table 1.2 are from six monitoring sites and two reference sites. The six monitoring sites are streams exposed to potentially damaging land use practices. The reference sites are relatively pristine areas and are used as a 'control', which means that trends and levels of MCI in other monitoring sites can be attributed to land use and activity surrounding the stream.

Two of the monitoring sites show steady MCI scores: a section of Ngongotaha stream where the dominant land use is pasture, and the Pongakawa Stream, where the land use is also pasture.

Two monitoring sites show a decline in their MCI scores over the reporting period. One is a section of the Ngongotaha Stream where the land use is predominantly urban, and the other is a section of the Puarenga Stream where the predominant land use is forestry. MCI scores of the Puarenga Stream have fluctuated noticeably since monitoring began at this site. The Puarenga Stream is sensitive to forestry activities and receives water from a catchment where tertiary treatment of final effluent also occurs.

Rehabilitation of streams through riparian area retirement and planting should result in an increasing MCI as the health of the waterway improves, providing a better habitat for macroinvertebrates.





Purpose of indicator

Livestock in streams and lakes contribute nutrients and faecal coliforms to the water, which negatively affects water quality. Monitoring the percentage of water bodies protected from stock access gives an indication of the potential threat of nutrients and faecal coliforms entering water bodies, and how much riparian areas remain unprotected.

Current information and trend

Works to fence off and/or re-vegetate stream and lake margins are carried out in partnership with land owners, and are supported by funding grants from Environment Bay of Plenty and Rotorua District Council. According to a 2007 report by Environment Bay of Plenty, the percentage of lake margins protected from existing and potential livestock access has increased from 93% to 99% since 2003. Similarly, the percentage of protected stream margins has risen from 88% to 93%. Table 1.3 is a summary of the extent of protection works for exclusion of stock on each of the lake's margins facilitated by EBOP.



Ongoing works will be supported by stock exclusion rules in the Regional Water and Land Plan. Environment Bay of Plenty staff proactively advise on stock exclusion mechanisms on a property-by-property basis, and are also engaged in the development of a 'toolbox' of nutrient management actions for incorporation into specific environmental programmes.

What the community said

A large proportion (80%) of the Rotorua community visit the lakes at least once a year. Most people (78%) were satisfied with the management of the natural character of the lakes.

Table 1.3 Protection status of Rotorua lake and stream margins from stock access

Lake	Lake margin		Stream margin	
	Total (km)	Percent protected	Total (km)	Percent protected
Okareka	10.6	100%	4.0	97.5%
Okaro	2.2	100%	4.9	100%
Okataina	29.1	100%	50.8	98.4%
Rerewhakaaitu	21.9	100%	7.3	97.3%
Rotoehu	39.3	100%	25.1	100%
Rotoiti	57.1	99%	54.4	98.9%
Rotokakahi	15.6	100%	1.4	100%
Rotoma	24.7	100%	17.7	100%
Rotomahana	29.1	100%	77.0	88.3%
Rotorua	44.7	92%	385.3	90.7%
Tarawera	47.4	100%	126.8	95.9%
Tikitapu	5.1	100%	2.1	100%
TOTAL	326.8	99%	756.8	93%

Source: Environment Bay of Plenty, 2007

Freshwater sustainability: bathing water quality



Indicator 1.4 E.coli counts in Rotorua streams and lakes

GETTING BETTER

Purpose of indicator

Bathing water quality is important for the continued use and enjoyment of the district's lakes, rivers and streams. Streams flow into the lakes, which means that stream health and water quality has a direct impact on lake health and water quality.

Environment Bay of Plenty regularly tests popular bathing spots for faecal coliforms including Escherichia Coli (E.coli). Activities in the catchment can contribute to elevated levels of faecal coliforms in the water. Common causes include agricultural run off and urban wastewater, and stock in water ways. Monitoring faecal coliform levels gives an indication of how safe water is to swim in, and also provides an early warning of 'problems' in land use activities and water management.

Current information and trend

For most lakes and streams the average faecal coliform count is decreasing, which means that in general the lakes are safer to swim in. Table 1.4 shows monitoring results from nine lakes in the district and Table 1.5 shows monitoring results from eight streams. There may be various reasons for why the faecal count trend is showing an improvement at most sites. Environmental programs around the Rotorua lakes have contributed to keeping stock out of waterways through fencing and

Table 1.4 Lake annual E.coli count averages 2001-2006

Lake	2000	2001	2003	2004	2005	2006	Trend
Okareka	54	62	5	32.5	25	6	↓
Okaro	331	21	3.5	43	12	8	↓
Okataina	1	NS*	16	1	12	3	↓
Rerewhakaaitu	37	12	0.5	10	18	14	↓
Rotoiti	68	8	33	81	14	12	↓
Rotoma	5	NS*	43	29	20	3	↓
Rotorua	73	49	319	128	36	25	↓
Tikitapu	NS*	NS*	1	12	27	9	↓
Tarawera	13	NS*	17	24	4	11	↓

Source: Environment Bay of Plenty, 2006
NS*= No Sample

Table 1.5 Stream E.coli count averages 2001-2006

Stream/ River	2003	2004	2005	2006	Trend
Soda Springs (Rotoehu)	108.5	59	82	64	↓
Waiteti Stream	180.0	174	57	76	↓
Awahou Channel	36.0	82	27	71	↑
Utuhina Stream	423	NS*	77.5	177	↑
Kaituna River	2.0	19	7	56.5	↑
Puarenga Stream	195	371	264	224	↓
Ngongotaha Stream	390	249	212	362	↑
Ohaui Channel	25	31	20	45	↑

Source: Environment Bay of Plenty, 2006
NS*= No Sample

providing alternative watering points for stock. Re-vegetation of lake and stream edges, and implementation of pest plant and animal controls, are other contributing factors.

What the community said

Almost half of Rotorua residents (47%) said they were satisfied with lake water quality management.





ACTIONS YOU CAN TAKE



In 15 minutes

- ✓ The water you use ends up in the lake eventually! Be conscious of what you put down the drain in your home and in the streets.
- ✓ Find out if there is a community environmental group in your area and get involved.
- ✓ When boating or swimming in the lakes make sure you take your rubbish home, including biodegradable waste, as it all contributes nutrients to the lakes.
- ✓ Don't feed the ducks, geese or swans at swimming areas. This encourages them to stay in the swimming areas and their waste is a source of faecal coliforms.
- ✓ Be mindful of the amount of water you use; it ends up at the wastewater treatment plant, then eventually in our lakes.
- ✓ Pick up after your dog, horse or other pets.
- ✓ Report any illegal dumping of soil, waste or rubbish in waterways to Environment Bay of Plenty (0800 73 83 93).



In 1 hour plus

- ✓ Get involved in your catchment's action plan by contacting your regional council.
- ✓ Re-vegetate lake edges. If you want to plant on your property get advice about which plants would be best.
- ✓ If you own a large property think about whether your land management practices are helping or harming lake water quality in your catchment.
- ✓ Stop stock access to water bodies and provide stock with an alternative water supply.

WEBSITES FOR MORE INFORMATION AND IDEAS

[Information on lakes water quality, bathing water quality and action plans](#)

Environment Bay of Plenty
www.envbop.govt.nz

Environment Waikato
www.ew.govt.nz

[Reports and recommendations for managing Rotorua's lakes](#)

Parliamentary Commissioner for the Environment
www.pce.govt.nz

[Reports and information about water resources](#)

4 Million Careful Owners
www.4million.org.nz

[State of New Zealand's lakes and recreational water quality](#)

Ministry for the Environment
www.mfe.govt.nz