

Turning the tide on water pollution

Last updated 10:38 29/01/2014

With half of our lakes and rivers unsafe for swimming – and many beaches too – poor water quality is the most important problem facing our environment, writes Nikki Macdonald.

2013 was the year of water worries. After a decade of denial and inaction, suddenly almost everyone agrees New Zealand has a problem. A big one.

In March, the Environment Ministry's freshwater reform paper acknowledged water quality in lowland streams, wetlands and lakes was getting worse and declared a once in a generation opportunity to reverse the trend.

The government's July report into last summer's swimming season found more than half of monitored freshwater sites were graded "poor" or "very poor", compared with 45 per cent the previous year.

In November, the Parliamentary Commissioner for the Environment's report into nutrient pollution predicted that, despite improving farming practices, water quality would continue to deteriorate in many catchments, especially in Canterbury and Southland.

The Environment Ministry followed up with its proposed national bottom lines for indicators of river and lake health, at the same time revealing that six of our waterways already have nitrate levels poisonous to some fish.

That same month, Fonterra head Theo Spierings admitted New Zealand is 8-10 years behind Europe in sustainable dairy farming and that the industry cannot continue growing in the same way it has.

As if to sum up the year's revelations, Lincoln University's end-of-year survey measuring public perceptions, found Kiwis considered water issues to be the most important problem facing the New Zealand environment.

The question now is, how do we turn the tide?

In a river valley about an hour's drive from Richmond, in the upper South Island, a small community has shown the way. Or a way, at least.

When Landcare Research land and water researcher Andrew Fenemor carried out an 11-year study of the Motueka catchment, one of the first problems he identified was pollution in the tawny Sherry River, which feeds the Wangapeka River.

Cows regularly traipsed through the river, and monitoring found E coli bacteria levels of about 650/100ml downstream from three dairy farms. The swimming alert level is 260/100ml.

The community organised a woolshed meeting to discuss Fenemor's research. Barbara Stuart, from sustainability organisation Landcare Trust, was called in to help out. Many in the community had grown up swimming in the Sherry and were alarmed to hear of its decline.

That was 2001. Since then 16 landowners – including the valley's sheep and beef farmers, foresters, chook farmers and lifestylers – have fenced off 5018 metres of the river, built three stock bridges and planted 4000 plants along the river's banks.

Almost overnight the E coli levels – an indicator of potentially disease-causing faecal matter – dropped by 48 per cent.

It's not yet completely safe for swimming – they still get blips after rain – but the water quality has improved so much that freshwater crays have returned and trout now venture to the upper reaches.

Stuart puts the project's success down to several factors: landowner commitment (bridges cost about \$30,000); a planting trial, which helped overcome fears that removing the streamside willows would lead to weeds rampaging; sustainable farming funding, which paid for environmental farm management plans; and the power of getting people working together and earning awards and positive press.

"If you get someone doing the wrong thing, people get upset and peer pressure starts to work."

Sherry River sheep and beef farmer Bill Booth credits Stuart herself, and her ability to get people to buy into the vision.

Having lived in the area for 50 years and brought up his three boys splashing around in the river, Booth wanted to be involved in its cleanup. While the dairy farms were the prime polluters, Booth and other sheep farmers also fenced off their river banks and planted 300m of streamside land.

When funding ran out for Niwa water quality monitoring, he got council money to do it himself. Now, every month he inspects the river and takes samples. In the past five years there's been no thick slime like he remembers during the 90s.

But it's still only marginally swimmable – usually sitting at about 150-200 E coli/100ml.

Keeping stock out was an easy win. Improving further would mean stopping runoff getting into smaller sidestreams, which will be much trickier, Booth says.

"I think everyone realises things aren't as good as they used to be and you've just got to work harder."

Of the country's 425 lakes, rivers and beaches monitored for swimming safety, 31 per cent have unsafe levels of bacteria. Take out the beaches, and half the sites are unsafe.

According to Massey University data, swimming in polluted water was a possible cause of about 2490 cases of campylobacter, cryptosporidium and giardia from 2001 to 2010.

But it's not just cockies that need to work harder. Scientists spoken to by *Your Weekend* emphasise the improvement also needed in urban catchments.

"For the towns, most of it is because of dodgy infrastructure," says Massey University ecologist Mike Joy. "That's a much tougher thing to fix."

Niwa chief scientist for fresh water and estuaries, Clive Howard-Williams helped judge the inaugural Morgan Foundation River Awards, which

named Otago's Shag River as New Zealand's most improved. He points out that, while farmers and the regional council had worked hard to clean up the river, a good chunk of its 13 per cent annual E coli improvement was due to a sewage treatment upgrade.

And in Wellington, a harbour diving platform has been closed since February because of faecal contamination, probably from a broken stormwater drain.

Howard-Williams argues cleaning up our rivers will require a serious effort from community streamcare groups, iwi, district and regional councils and land owners.

While water quality debates often focus on E coli levels, as they're the best indicator of whether water is safe to swim in, the health of rivers depends on a much broader range of factors. Not least, nitrogen and phosphate levels, which were the focus of Parliamentary Commissioner for the Environment Jan Wright's water quality report.

New Zealand's massive dairy boom, which is expected to result in 650,000 more hectares (roughly equivalent to 650,000 rugby fields) of dairy farms in 2020 compared to 1996, has led to huge increases in nitrogen flowing into rivers.

While recycling effluent and stream planting can prevent some nitrogen loss, the majority comes from cow urine, which is much more difficult to manage.

Once it hits rivers and lakes, the nitrogen works with phosphate in sediment deposited from years of deforestation to fuel the growth of slime which makes water unpleasant to swim in and, more significantly, changes the type of insects, fish and birds a river can support.

"The impact of this ongoing and increasing stress will generally be worsening water quality – more blooms of algae and cyanobacteria, more streams trailing metres of brown slime, fewer stream insects and fish, and more wells and waterways exceeding nitrate toxicity limits," Wright's report concludes.

But there's not one answer – deep, fast-flowing rivers are more resilient than shallow lakes, and while some waterways are already stressed, others might cope with further dairy expansion.

While the report did not make recommendations, Wright believes the only way to reduce nitrogen leakage is to limit dairy expansion in areas with stressed rivers, or to use expensive methods of keeping cows off pasture and collecting urine, such as stand-off pads and wintering barns.

"You get this economy versus environment thing," Wright says. "That's a call for all of us as New Zealanders to decide."

But Joy bristles at that argument. As well as making environmental sense, reducing nitrogen pollution also makes economic sense if you count the cost of repairing the resulting damage, he argues. New Zealand is already spending \$500 million cleaning up just eight rivers and lakes.

A good incentive to limit nitrogen use would be to rank farms on their productivity divided by their nutrient loss, Joy suggests.

That's a similar equation to the one used by Waikato agribusiness consultant, vet and fourth-generation dairy farmer Alison Dewes. She works with conscientious farmers like Andrew Hayes (see page 9) to reduce nutrient pollution without sacrificing profit and productivity.

But that, she says, only works for the A+ students with the skill to navigate technical monitoring requirements and the will to spend serious money. The rest will depend on rules.

Fenemor agrees. As well as studying the hard science of the Sherry River, he also investigated what motivates change. He found that while togetherness and community peer pressure are powerful tools, people still need a bottom line to work to.

Which brings us to the Environment Ministry's proposed National Objectives Framework, which sets national bottom lines for specific indicators of river and lake health.

The most contentious indicator appears to be the nitrate toxicity level, which has been set at 6.9 – a nitrate concentration similar to the worst OECD river, London's Thames, and poisonous to one in five species.

Joy labels the limit "bloody scary".

Dewes argues that, given most New Zealand rivers are currently miles below that level, it would be like pushing out the speed limit to 180kmh and expecting everyone to still drive at 100kmh.

The Environment Ministry argues that regional councils are already required to either maintain or improve water quality, so they can't let rivers decline to the toxic level. And they will have to manage nitrogen at much lower levels in order to meet another bottom line – for periphyton, or slime growth.

Perhaps more scary than the proposed nitrate bottom line is the fact that six New Zealand waterways already breach it. The Environment Ministry's modelling predicts it would cost \$22m a year, and require a 45 per cent reduction in nitrogen leaching, to bring four of those sites up to the bottom line.

Massey University associate professor in agriculture and environment Russell Death supports the bottom lines in principle, but is baffled at the exclusion of macroinvertebrate monitoring. The presence of freshwater crayfish, snails, worms and insect larvae are, he says, a critical indicator of river system health. Without that measure, he believes water quality will continue to decline.

"Everybody thinks it should be there, so why isn't it? Why wouldn't you have the single best measure that you could have?"

The Environment Ministry failed to explain why macroinvertebrates had been left out, but said it was still considering including the measure.

Howard-Williams argues a sediment bottom line should also be included, though some classification system would be needed to allow for different river and sediment types.

The proposed bottom line for swimming is "fair", which would require improvement at half the currently monitored sites – a huge ask. But here's the catch: there's no national timeframe for when rivers and lakes have to meet the proposed bottom lines.

The Fresh Water Reform paper is right about one thing – this is a once in a generation opportunity to get things right.

And Barbara Stuart is right about another thing. "We all need to work at this together."

The Hayes family – from left, Rodney, Fred, Andrew and Jenny – at one of the lakes on their Waikato farm that they have restored to health through hard work and careful business decisions. Photo: JEFF BRASS/Fairfax NZ

FLUSHING MONEY

Waikato dairy farmer Andrew Hayes talks to his water sampler so often he can recite her cellphone number.

Cleaning up waterways starts, he reckons, with farmers knowing what's flushing off their pastures. And not just because leaching farm effluent and cow urine is bad for waterways, feeding the weed that clogs them and affecting insect, fish and bird life, but because it's money down the drain.

“You can't see phosphate and nitrate floating down the river, but if you change that into \$50 notes, people would be out there picking it up.”

When Hayes arrived in 1981, farm runoff went straight into the farm's two lakes, which he watched “go backwards badly”. There was no lake fencing, the cows got bogged, and the willows dominating the lakeside provided no food for birds, so ducks pinched the cows' feed.

Silt was piling up so quickly the smaller of the two lakes – Lake Komakorau – was predicted to disappear in five years. “The cruncher” came in 1998, when “a big slime came across and killed every fish and bird in sight”.

Together with the Conservation Department and Waikato Regional Council, the Hayes family fenced the lakes, set up silt traps and buffer zones, planted natives and, critically, reduced the nutrients they add to the land.

With the help of agribusiness consultant Alison Dewes and PhD water researcher Rebecca Eivers, they worked out what was leaching from the farm, and how to limit it.

Hayes hasn't used superphosphate fertiliser in four years and he's cut nitrogen use by 80 per cent. Net profit has rocketed, because he's growing more grass with less nitrogen. And the lakes now support rare birds such as bitterns.

It takes guts to ditch methods you know work, and there's no silver bullet, Hayes says. “Every little thing you do adds up, but it takes years.’

Sue Millar at Silverstream's cleaned up Hulls Creek. Photo: MAARTEN HOLL/Fairfax NZ

URBAN CLEANUP

Down the overgrown track by the miniature steam railway is an unassuming little creek that owes its health to a bunch of committed volunteers. The banks are so densely planted you can't reach the stream in most places. And there are so many flaxes in flower the tuis are drunk on nectar.

Hulls Creek – this small city stream north of Wellington – is typical of New Zealand's urban waterways. When Sue Millar started work here in 2003 it was “appallingly polluted” from a combination of runoff from the golf course, the tip and an old General Motors factory, farming runoff and sewage contamination. Willow roots stretched from bank to bank and the weed was so thick in places you couldn't gauge depth, making crossing hazardous.

There were high bacteria counts throughout the creek, and where it empties into the Hutt River, which is popular for swimming.

Millar, now 76, had worked on bush restoration elsewhere and decided to take up a regional council grant for cleaning up waterways and wetlands. In the 11 years since she and 10-15 volunteers have planted 17,700 plants, including 40 different types of tree and 12 varieties of flax and grass.

Together with the regional council and Massey University experts they've designed and built a fish passage to bridge the lower reach of the stream, formerly blocked by a 2m drop. And the weed disappeared as soon as native trees grew up to shade the water.

A former zoologist and botanist who's done voluntary conservation work for nearly 20 years, Millar has lost count of the hours she's invested. But it's worth it to see the transformation, for which the group was recognised at November's Morgan Foundation River Awards.

- Your Weekend

Drainage & Tanks

© globalsynth...

Australia Wide Modular Tanks and Drainage Cells



Asphalt Thermal oxidizer

* nacahtech.c...

Custom designs to fit your process Meet emissions, Maximize up-time

