



Mike Joy on the freshwater crisis

Edited transcript of The Policy Fix podcast interview with Mike Joy, 11 March 2019, recorded at Rutherford House, Victoria University of Wellington. The interviewer is Keri Mills.

KM: *Nau mai whakarongo mai and welcome to The Policy Fix, a podcast by The Policy Observatory, AUT. Ko Keri Mills tēnei and today I'll be speaking with Dr Mike Joy, Senior researcher at the Institute for Governance and Policy Studies at Victoria University of Wellington, on his work on Aotearoa New Zealand's freshwater crisis.*

Mike is the author of Polluted Inheritance: New Zealand's Freshwater Crisis, and editor of the recent collection [Mountains to Sea: Solving New Zealand's Freshwater Crisis](#).

Tēnā koe Mike.

MJ: Hello.

KM: *So, to begin with could you tell us what the crisis is?*

MJ: The crisis in freshwater is in our surface water, and our rivers, and our lakes, and our groundwater. There are four big things. There are nutrients: phosphorus (phosphate), and nitrogen, and the effects they have on freshwater. And then there's sediment, and then there's human health, or pathogens. So those are the four broad things, and if we look at those then across the country we have the cleanest rivers in the world, in the mountains; and in the lowlands we have some of the worst rivers and lakes in the world. A classic example is a comparison that I've pulled together with some friends about nitrate flux through rivers. The Waikato River is among the top three worst in the world. The Manawatū river is only slightly below that. And both of them are worse than the Yangtze and the Mississippi Rivers, two of the most nutrient polluted rivers in the world. So on a global standard, at the lower ends our rivers are really really bad, and at the higher ends we've got the most pristine lakes and mountain streams in the world.

KM: *Maybe if I just take you through each of those four things that you mentioned. Could you tell us what the nutrient problem is?*

MJ: Okay so there are two key nutrients. There's a bunch of them that plants need to grow, but the two key ones are nitrogen and phosphorus. And we put that on the land, artificially, huge amounts of it. In the case of nitrate, through nitrogen fertiliser made

from fossil fuel: a third from Kapuni, from our natural gas, two thirds from the Middle East. We turn it into nitrogen fertiliser, and we put it on the land to grow grass. The phosphate comes from West Sahara at the moment, but it's come from all over the world, and there are a whole lot of ethical issues around where we source our phosphate from.

The message as far as rivers goes is that, we put those two things on the land to grow grass; when they end up in waterways they grow algae. I mean it's just another plant, and of course it grows, and it gets to excess levels, and then it has problems. Algae is naturally at the base of all food systems in freshwaters, at a healthy level. But what happens is we get it to an unhealthy level. It's called periphyton, it's the algae that grows on the bed of the waterways and the rivers. And if you imagine it like a mown lawn – that's how it naturally is - and the invertebrates are grazing like sheep would graze on grass. But what happens when you get excess nutrients, you get like a big huge forest. And you imagine sheep trying to graze a forest - it doesn't work. That's the best analogy I can imagine for the waterways.

The really crucial part is that in water excess algae causes big fluctuations in oxygen. So you start getting daily fluctuations of oxygen, once it gets past a certain point – in the early morning going down to unliveably low levels of oxygen, and in the afternoon going up to unliveably high levels of oxygen. And in the middle sometimes it's ok, but the levels start oscillating and swing even more. And then if you get a flood come down it washes it away, and you start again - you have a clean slate and the river's clean again, so it's a process like that.

Sediment is a much older and longer lasting problem. We started with colonisation and massive forest clearance that resulted in a huge amount of sediment which is the dirt, the soil, the sand, everything off hillsides and riverbanks. Once you take the trees away it all ends up in the waterways. It has physical effects on the river itself but it also carries phosphate with it. So, thinking of those two nutrients again: nitrogen and phosphorous. Nitrogen is really mobile in water and will just be part of the water and move through the system really quickly. Phosphate's bound to sediment mostly and so it ends up in the river, in the sediment. And in the case of a river of course the algae is sitting on the sediment on the bed of the river, so it can mine all the phosphate it needs out of the sediment. It doesn't need any in the water column because it's there in the sediment. And so the sediment has physical impacts, not just ecological ones, but huge impacts on the usability of rivers and the clarity of rivers and -

KM: *It'd change their shape as well I'd imagine.*

MJ: Yeah, it changes their shape completely. You don't have to go far back in New Zealand history to see photos and to hear stories of ships that went right up rivers. I think of the Waihou in Thames, and the Cam in Kaiapoi, and Blenheim, and the Whanganui and places like that where ships went right up into the townships, and now you wouldn't be able to - you'd run aground in a kayak. Whereas they had massive big boats going up there. So we can see those physical changes.

And they don't stop there - you get then huge impact on the nursery for ocean fisheries. Pretty much the only snapper spawning area is now the Kaipara harbour. They once would have been all the harbours of New Zealand, but the eel grass is smothered by the sediment, and so there are just huge impacts from that. Plus really expensive ones for towns and cities, with flooding and pumping that has to happen. We could spend a whole podcast just on what sediment does.

Then the last one is the human health side of things: pathogens and cryptosporidium, all kinds of life in the water that can be harmful to humans, but don't worry the native ecosystems at all. The fish and invertebrates and the life in the river couldn't care less about these pathogens, these are part of the faecal oral pathway for mammals and birds that make us sick. So it's purely a human problem.

KM: *So what would you say are the fundamental causes of this crisis you've just described?*

MJ: It's a lack of regulation; it's a lack of *realisation*, for a start. There's just the classic come into a new place, knock everything down, turn it into farming thinking that you're doing this great thing, feeding the world or feeding the population. And then at some point there's a realisation that actually you've gone too far and you're causing a lot of harm. But by then there's a lot of money tied up in it, and there's the big lobbying power of industry.

In New Zealand it's an interesting situation I think - many commentators have said we had this fantastic natural advantage: we fixed nitrogen naturally through clover. So our paddocks were full of clover and we didn't have to add artificial nitrogen at all. We were adding phosphate, and a lot of it came from Nauru, but we didn't add artificial nitrogen, and it wasn't until the gas exploration era off the Taranaki coast where there was a deal done with New Zealand by BP - a 'take or pay scheme'. So, you have to take this much gas. And it was way more than we could possibly use so the New Zealand government ran round and came up with ways to use that gas because they were going to pay for it anyway, so 'let's build a plant to make gas into nitrogen fertiliser' - which is the Kapuni Plant. So then, it was round the 1980s, we had this excess of nitrogen fertiliser so we just very quickly industrialised farming in New Zealand, switching from a natural source, to a fossil fuel source. That has driven a massive intensification, and pollution of our waterways.

KM: *So is that an easy fix, could we go back to clover?*

MJ: Oh we could very easily and I'm working, I'm on an environmental reference group with Landcorp -Pāmu - New Zealand's biggest farmer, the government farmer. And we've shown very clearly that we could go back to it, very easily. The problem is that, you make something artificial like that and it's big, big business. The fertiliser companies are massive in New Zealand and then combined with the milk industry they have an incredible influence on government and policy. And their influence is kind of the reverse of policy, it's *no* policy, it's not doing anything. Not doing anything and allowing this expansion to happen is exactly what the industry wanted. And that is the

problem: not doing anything about this expansion when you know it's going to cause problems later on.

KM: *And what do you think is the cause of that inaction?*

MJ: All I see is we have this marvellous Resource Management Act that clearly says that this shouldn't happen. The ideals of it were really clear. But it's just so easily pulled apart and the Regional Councils were left kind of in a policy vacuum, because there was no National Policy Statement on freshwater - which should have happened very early on and didn't. And so they were pretty much all doing their own thing and doing their own thing made them very vulnerable to being picked off one by one by the industry. So in every council hearing, and I've been involved in plenty of them, there is an army of the best lawyers in New Zealand, on behalf of industry, there fighting the councils every step of the way when they try to limit this kind of thing. Which culminated in Nick Smith and the National Government sacking Environment Canterbury, a council that tried to do something to limit growth, and got knocked over in the process. They sacked the elected council members and replaced them with their own commissioners. That was the ultimate industry pressure that stopped any protection.

KM: *And is it farming? You've been mainly talking about -*

MJ: Yeah so, without a doubt the biggest impacts are the nutrients and sediment and they're mostly happening in rural areas. About 40% of the length of our waterways are in pastoral catchments, and 0.8 of 1% are in urban. So definitely there's big issues with urban: the latest figures are that, of 350 odd waste water treatment discharges 152 of them go to freshwater, and of those only seven currently meet the requirements for the National Objective Framework level B for human health. Which is actually a really weak standard, and 145 of them don't meet that. So there's definitely issues there, with the urban, human side - but on a geographical, length-of-river analysis then it's farming by a long long shot. And it's *intensive* farming.

KM: *Including the E. coli?*

MJ: Yes, both sides. Very similar. I've actually got some NIWA maps that I use in my talks, and the map for places that fail E. coli, fail sediment, fail nutrients is effectively a map of intensive farming in New Zealand. It's just a complete overlay.

KM: *The current government has a [new work programme](#): what do we know about it, and do you think it's heading in the right direction?*

MJ: Well I'm on two or three working groups as part of those changes. I'm not allowed to talk in detail about what's happening but I can say there is a huge change of attitude. We have an environment minister, David Parker, who really understands the issues, knows what needs to be done, and there's a huge amount of work happening in the right direction. I guess myself and the others that are on these working groups are equally cynical and equally realise that the tough decisions that need to be made to

save freshwater (and this would go for almost all of our environmental issues including climate change) the changes that are necessary are so big now because we've left it so long, that if you were to do it, you'd get voted out. And that's the dilemma. I think if all New Zealanders realised how bad we were, the trouble we were in, whether it's for freshwater or for climate, then they would totally accept the necessary changes. But because they don't, most people will just - I mean if this government was to bring in the kind of changes that we need to protect freshwater, the farming industry would go nuts. Any threat to them being able to do exactly what they want is always a problem for a government. I think the science has finally made it into the policy understanding, whether it will end up in actual policy is another story. It's a huge risk for this government.

KM: While we are in our ideal podcast world, what would you do if these political obstacles weren't in the way - what is actually required?

MJ: So it's quite simple for freshwater, it will mean a big deintensification. The kind of farms that are sustainable are nothing like the farms that we have at the moment. The most unsustainable type of farming is what we have - which is a monoculture that runs on fossil fuel and mined phosphate that is irreplaceable. Non-renewable resources being used to make food, in a monoculture, is just about as wrong as you can get, as unsustainable as you can get. So this utopia that we should have, looks much more like permaculture - it's really diverse farms and what we call closed loop farms, where nutrients are cycled within the farming system, exactly like they are in nature. And you don't have all these external inputs going in there and then you don't have all the problems leaking out of these systems either.

KM: *So how do you create a closed loop farm?*

MJ: So if it comes to dairy - and I don't think dairy's a good idea in the first place, but if you do - then the cows don't go out on the grass, they're on a pad or in a shed. The pathway for most of that nitrogen is through urine, and so you just collect it and then you use it to grow other plants, vegetables, food, and you never let it leave the farm. And so you don't need to pour stuff in because you haven't let it go in the first place.

The system's like it is at the moment because there's no cost in losing it. I mean they're not paying anywhere near enough for the stuff in the first place. And then we just let it go because there's no cost in letting it go. I've been involved in research, and I can point you to other research showing clearly that, for example, dairy farming in New Zealand, if it had to pay the cost to clean up its environmental impact, then it's a nil sum game. We just wouldn't bother, because there would be no money in it. There's not a huge amount of money in it anyway for the farmers, but we just wouldn't bother because the costs of cleaning it up would nullify the whole process. It's because we subsidise the industry by allowing them to pollute that they make money. It's just privatising public wealth. And I guess the worst bit of it is that we are not paying, no one is paying; it's being left for future generations to clean up.

KM: *You mentioned before that this intensification wasn't actually profitable. So would we necessarily lose money by changing to this permaculture model that you describe?*

MJ: No we wouldn't but the problem is that a big chunk of the farming money made in this country is not made by farming, it's made by capital gains. So all those conversions that happened - for example in Canterbury where it was cheap country - you had massive land value increase in that process. There's bucketloads of data now showing that farms with lower inputs make more profit: the farms that are the most environmentally friendly make the most profit - but their land value is tied to the production. So, a great example from some of the Landcorp farms, where we could halve the nitrogen loss, but the land value drops by 20%. And when you're talking millions of and millions of dollars of land value, then that drop is a significant amount. We've got land value set round the right to pollute. You take the right to pollute away and the land value drops and so the farming for capital gains, because we don't have a capital gains tax, is a big part of it.

KM: *So would you advocate those policies: a capital gains tax and cost for polluting?*

MJ: Yes but if we're going to have a capital gains tax then we don't have any exemptions, the family home or the family farm or whatever. It needs to be a tax on everything like the rest of the taxes are, and not exemptions for special cases.

KM: *Do you see a way to transition justly into a model that works better for the environment and perhaps better for farmers as well?*

MJ: Oh yeah, so this model that I'm talking about, this more permaculture model, means getting people back onto the land but in conditions that are nice. They really struggle to get farm workers on dairy farms and that's why a huge proportion of the farm workers come from overseas, and from countries that are more desperate than us. Because it's tough; it's a really hard life. They work incredibly hard because there's very little profit in it. And they're landscapes that you don't want to be in. I've spent some time recently on some of these big Canterbury dairy farms, and there's not a tree in sight. And this is not good for the animals either, but it's certainly not good for the farm workers. You're either out there in incredible heat in summer time, in these bouldery soils that reflect the heat back up at you from the ground as well. Really strong winds because they've knocked down all the shelterbelts to put the pivot irrigators in. So you just have these almost deserts out there that they farm on, which are not nice places to be. And you're just on some machinery out there in the middle of nowhere, or milking cows all day long. Whereas the diverse systems that have vegetables and fruit and nuts and bees and trees and everything are beautiful places to be, and places where you would love to work. So it's not just a better economics than the alternative model, it's a much nicer place to be as well.

KM: *And lastly just to briefly bring back in the complicated politics with all its obstacles to change. Do you see in that, real world, any easy things that can be achieved?*

MJ: There's definitely some changes that could happen in the short-term. For a start a moratorium right now – it should've happened ages ago - on any more expansion of intensification. Stopping the rot now and starting to try and haul it back is really really important. More water conservation orders on rivers and a ban on any more irrigation schemes, because they inevitably end up with worse problems for freshwater. You could just draw some lines in the sand right now; that's something that could be done.

KM: *Well good luck with it all!*

MJ: Okay cheers.

KM: *Tēnā koe Mike.*

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Nō reira, e te whānau kua whakarongo mai nei – tēnā koutou, tēnā koutou, tēnā koutou katoa.

