Book Review

Mike Joy (ed)

Mountains to the Sea:
Solving New Zealand's Freshwater Crisis

Reviewed by Troy Baisden*

Mike Joy has become a scientist known widely by Kiwis because he regularly sticks his head above the parapet to argue for our freshwater environments and the critters that live in them. The new book he has edited aims to sidestep arguments and focus on finding ways of thinking that lead to solutions. The title *Mountains to the Sea: Solving New Zealand's Freshwater Crisis* should cause any reviewer to ask whether the authors truly deliver solutions. Perhaps unsurprisingly, the answer is both: yes, and no.

In its best moments, the work will remind science readers holding PhDs that they share doctorates in philosophy with the humanities, and scientists can deliver much more to society, culture and the environment by embracing a liberal arts or philosophical approach to identifying and solving problems. In its weaker chapters, this approach becomes a double-edged sword, highlighting inaccuracies and disconnects in ways that weaken the book as a singular product advocating a way forward.

Let's be clear. The most provocative thing about Mike Joy is that he's a self-described advocate for freshwater ecosystems. He is absolutely an advocate, but for the parts of nature that can't speak for themselves on television news or social media. The book succeeds where the motivation of the author(s) comes through clearly, and Joy takes the lead by introducing the book's perspective deftly.

However, the polarised public perception of Joy and his work means that a review should back up and ask: Why is defining motivation the right thing to do in environmental science? There are still many who think scientists should stick to science, or have gone off the rails if they're not so-called 'honest brokers'. Would I suggest readers with this perspective avoid Joy's book?

I'd tend to suggest exactly the opposite. Anyone who can approach the book with an open mind will learn from it. Yet, when it comes to declaring motivation, we have only starting points to an approach that has emerged but not yet been fully documented and embedded in academic institutions. In my own doctoral journey at Berkeley, in the formative years of what is now a top-ranked environmental science programme, I learned that the applied side of environmental science requires gaining enough perspective from the social sciences and

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humanities to declare more than methods and funding. Perspectives, path, and perhaps even epistemology matter for all interdisciplinary endeavours. Among interdisciplinary fields, including health sciences, the benefits of declaring motivation are rather unique for environmental science, because of the focus on human interactions with aspects of nature that do not speak for themselves. Documenting what worked at Berkeley, Andrade *et al*. (2014) noted that success of the 20-year-old interdisciplinary programme contrasts strongly "with the received wisdom of the scientific method as a sacred, objective ritual that leads inevitably to 'Big "T" truth'".

We have come in the last few years to accept scientists in climate change science declaring their advocacy, in the face of political inaction. A generation ago, the noted climate scientist Stephen Schneider was relatively unique in having taken that prophetic approach (Schneider 1988; Russill 2010). Schneider's approach to advocacy can serve as a legitimate end-member of a spectrum that runs from pure science to advocacy (Donner *et al*. 2014). It strikes me that Joy has taken Schneider's path on freshwater. Joy's introduction and many better chapters pass Donner's test of declaring motivations to define a location on the 'science–advocacy continuum'.

In this review, it is useful to focus on Nick Kim's chapter on agricultural contaminants because it breaches Donner's test in two ways. At the outset, it frames a straw person argument of tourists in the New Zealand landscape expecting a true wilderness. Such a perspective hasn't been academically viable after Bill McKibben's book *The End of Nature* (2006) and related work declared 'unaltered wilderness' to be a fallacy in an age of global change, which we now call 'the anthropocene'*.

This flawed statement of motivation leads me to great frustration when I read Kim's overplayed case for agriculture as an apparently reckless source of contaminants applied to the New Zealand landscape, and with implied potential to enter freshwater. The tone espouses 'big "T" truth', yet I find Kim surprisingly selective and often misleading in choosing what 'truth' to present. There is much that can be stated, since the toxic passengers arriving with superphosphate fertiliser carry a lot of baggage, which is messy to unpack. I was perturbed most by Kim's strong focus on radioactivity associated with superphosphate's uranium load, opposing widely accepted understanding that the primary risk is toxicity, and concerns that highlighting radioactivity heightens public confusion (Schipper *et al*. 2011).

Similarly, I can't avoid feeling Kim is deceptive in describing the work associated with the greatest toxic passenger included in superphosphate fertilisers, cadmium. The narrative sidesteps recognition that the fertiliser industry has taken steps to manage the issue historically through voluntary concentration limits, and New Zealand has an action plan agreed by industry and regulators (Cavanagh *et al*. 2013). There is no doubt cadmium remains a serious problem, but we can't evaluate how far New Zealand is from 'solving' our perceived pollution crisis without understanding steps already taken or underway.

There are further concerns about the factual narrative around contamination of our soils, but my overall concern is that finger-pointing seemingly distracts from the path to solving problems, particularly when both facts and motivations remain needlessly in dispute. So, can the book succeed regardless of its weaker chapters? If signalling paths toward possible solutions is enough, some chapters more than meet this test. Two in particular are notable for finding a future where freshwater and farming can co-exist.

In the first, Paul Tapsell and Alison Dewes provide a well-framed case for 'one health' frameworks as a common-sense way forward, delivering healthy land, healthy water, and healthy food. Perhaps more importantly, the concept is even more compelling when shifted from western science and logic into the concepts of te ao Māori (the Māori worldview). My favourite passage in this chapter describes the need to restore mauri (balance in the forces of life) where agricultural growth agendas from governments spanning 2006–2016 overshot environmental limits. This happened in specific places, and so the solution can be framed in a challenging yet targeted way: "Stressed farmers will need leadership and exemplars of lower-footprint farming to transition towards."

In the second, Steve Carden, the CEO of Pāmu (the rebranded Landcorp, which is a transliteration of 'farm') lays out what New Zealand's largest farmer has done to tackle an interrelated shift towards 'farming sustainably and shifting [their] business model.' With both scale and reputation to consider, partly as a state-owned enterprise, Pāmu has actively made itself a leader in many decisions that could look simple in hindsight, from ending the use

*The author uses 'anthropocene with a small 'a' to draw analogy to a 'Period' of geologic time in which humans dominate earth system processes, without focus on when any such Period, denoted by 'Anthropocene' with a big 'A', has begun.

of palm kernel (which is often linked to deforestation in Southeast Asia) to targeting sustainable, market-driven innovation at significant scales, ranging from avocados to sheep-milking.

I recommend other chapters as well worth reading, despite feeling that they didn't create a whole greater than the sum of the parts. Tina Ngata's 'Wai Māori' chapter puts the rest of the book in an essential context, and is a must-read for anyone with limited or piecemeal knowledge of Māori perspectives on water. One notable, but perhaps heavier, read is Catherine Knight's chapter on politics and governance, defining what we perceive in political banter *versus* the nuts and bolts of the Resource Management Act (RMA). For instance, she highlights the hope resulting from the Environmental Defence Society's victory in the 'King Salmon' decision, implying that the resource protection and stewardship/kaitiaki provisions in sections 6 and 7 of the RMA are objectives directly linked to the purpose of the Act, and should not be subject to cost-benefit trade-offs.

Ultimately, when I take a page-by-page or chapter-by-chapter view on whether the book delivers solutions, I feel perhaps there are more marked 'no' than 'yes'. Yet, those marked 'no' do extend Joy's earlier book, *Polluted Inheritance* (Joy 2015), in defining the scope of the problem. On this front, I'd first express disappointment that food health and water storage chapters don't feel better integrated with the solutions I note above. I particularly struggle with closing the book on a chapter "reimagining" landscapes when Tapsell, Dewes and Carden had me convinced there is much we can do to make our current farms more sustainable and more profitable with the right mindset and innovations. Wholesale landscape change may be a solution, but any realist has to worry that it is an abstract one that takes at least a generation or two.

To my mind, the book would be more successful with the stated goal of 'solving' our crisis if Joy had finished with a 'Conclusion' knitting together a path forward, rather than an 'Afterword'. Yet, Joy's Afterword is useful in stating reasons why we seem prone to failure. For instance, consider the dangers in a polarised arena of too much analysis that "cannot see outside its own analytical bubble". That alone is good cause for me to firmly recommend the book if you want to explore the topic from a range of perspectives, and particularly if you might want to get involved in searching for and testing out solutions that could some day be part of a conclusion explaining how we solved this crisis.

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