

Logan Samuelson

# Giving Light to the Waimapihi

## the challenges of governance and policy for daylighting urban streams in Aotearoa New Zealand

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### Abstract

This article examines the challenges posed by governance and policy to stream daylighting efforts in the urban context of Aotearoa New Zealand. Building on the work of McLean (2020), it examines the prospect of daylighting the Waimapihi stream in Te Whanganui-a-Tara–Wellington. It then provides recommendations for future directions in freshwater management in light of ongoing reforms in the policy sphere, calling for a more inclusive scope of protection within Aotearoa New Zealand’s foremost resource management legislation.

**Keywords** stream daylighting, deculverting, freshwater policy, storm water infrastructure, resource management, Three Waters reform

As our urbanised environments continue to grow, stream daylighting presents one pathway towards rekindling our connection with the non-human environment. Stream daylighting can be defined as ‘the practice of removing streams from buried conditions and exposing them to the Earth’s surface in order to directly or indirectly enhance the ecological, economic, and/or socio-cultural well-being of a region and its inhabitants’ (Khirfan, Mohtat and Peck, 2020, p.1). Stream daylighting presents a host of economic, social, cultural and ecological benefits in alignment with environmental goals aimed at well-being, restoration and conservation, and should not be dismissed. In this article I provide examples of implemented stream daylighting projects in Tāmaki Makaurau–Auckland and Te Whanganui-a-Tara–Wellington, highlighting their resulting benefits. I then look at the example of the piped Waimapihi stream in Te Whanganui-a-Tara to demonstrate governance and policy challenges to future stream daylighting efforts. In doing so, I aim to advance the work of McLean

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(2020) and illuminate the governance and legislative conditions under which further stream daylighting projects could be made feasible in our own backyard.

#### **Stream daylighting: benefits and motivations**

Urbanisation and stream modification have had significant impacts on stream ecological health. Of stream modification methods in urban contexts, culverting or diversion of streams into pipes has been described as the most severe form of modification (Neale and Moffett, 2016). It is often the smallest streams that are the most affected by urbanisation, due to the economic feasibility of their burial (Elmore and Kaushal, 2008). Stakeholders might look to stream daylighting as a means of ameliorating the negative impacts of urbanisation and modification on stream ecological health and of revitalising our waterways for human and non-human benefit alike.

Open waterways have the potential to provide a host of benefits. Lewis, Mansell and Hendy (2014) suggest amenity values, community interaction and well-being, storm water treatment and flood management. Stream daylighting could also prove to be less costly than continuing to maintain and replace existing piped infrastructure (Wild et al., 2010). Furthermore, daylighting can contribute to multiple policy goals in the environmental, social and economic spheres. According to Wild et al., daylighting 'has a high potential to improve aquatic and marginal habitats' (ibid., p.415) through ecological revitalisation; improves fish connectivity and habitats; provides social benefits such as educational opportunities for schools, where classes can visit and carry out learning activities in 'outdoor laboratories'; and increases recreation and amenity values, creating valuable public space such as parks and footpaths for walking, running and cycling and for enjoying nature and the surrounding wildlife. These are just some of the ways stream daylighting can enhance human and non-human well-being.

#### **Examples of urban stream daylighting in Aotearoa New Zealand**

One example of stream daylighting in the urban context of Aotearoa New Zealand is

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the Waitahurangi and Parahiku reaches of the Avondale stream in Tamaki Makaurau, a project completed in 2013. A number of engineering accomplishments are reported to have enhanced the stream's ecology and biodiversity (Liptrot, 2013). For community members the park now serves as a place where people can gather and enjoy the outdoors. Students can engage in educational activities in science and the arts. Others have found fulfilment in the park through the establishment of community orchard projects and enhanced accessibility to resources for customary use (ibid.). Lewis, Mansell and Hendy (2014) similarly report increased amenity and community values, opportunities for community involvement and education, water quality treatment, reduced flow velocities, increased flow capacity, mitigated flood potential, increased abundance and richness of aquatic ecological habitat and enhanced terrestrial habitat. Neale and Moffett (2016) found a significant improvement in stream invertebrate communities, which

will go on to support the wider ecological systems of this stream as food for native fish and birds. The project also supports Māori cultural and spiritual values through the provision of natural resources for customary gathering and use (Lewis et al., 2014).

Another example of stream daylighting is the Waitangi stream in Waitangi Park, Te Whanganui-a-Tara in 2005 (Campbell et al., 2010; Greene and Johnson, 2021). Prior to colonisation, this landscape was highly significant in terms of cultural and ecological value to Māori inhabitants. Following settlement of the area by European colonists, the Waitangi stream was diverted into piped water infrastructure in 1859. The 2005 project was designed to place culture, heritage and history at the forefront to account for the area's significance to tangata whenua and tangata tiriti alike. The project aimed to achieve a cultural, aesthetic and ecologically functional public space, and to treat storm water through its incorporation of a wetland environment and active riparian edge. Monitoring results have since shown that the installed wetland effectively removes contaminants from the piped storm water of the Waitangi stream (Campbell et al., 2010; New Zealand Institute of Landscape Architects, n.d.). Additionally, the park provides urban green space and aesthetic value, and supports biodiversity (Campbell et al., 2010; New Zealand Institute of Landscape Architects, n.d.). In 2010 it was determined that the stream was a suitable habitat for native species (Campbell et al., 2010). Today the park boasts recreational value, connectivity to the greater urban framework in which it is positioned, and cultural installations which connect the park to historical narratives embedded within the site (New Zealand Institute of Landscape Architects, n.d.).

The daylighting projects of the Avondale and Waitangi streams provide the foundation for us to consider additional projects in our own backyard. To do so, I draw on the work of McLean (2020) to envision the prospect of daylighting the Waimapihi stream in Te Whanganui-a-Tara.

### Giving light to the Waimapihi

Before exploring the prospect of daylighting the Waimapihi stream, it is important to understand its complex history and the modification produced through colonial interaction. Te Aro Pa was one of the principal early 19th-century settlements of Te Whanganui-a-Tara, inhabited primarily by Taranaki iwi, Ngāti Ruanui, and Te Ātiawa. In 1841 Baker Polhill arrived and established a successful timber business in what is now lower Aro Street, Aro Valley, sourcing his timber from the area that became known as Polhill's (or Polhill) Gully. In the 1960s Victoria University of Wellington became interested in the Polhill and surrounding area as a site for expansion, but community members challenged this on the basis of its potential for wildlife restoration and recreational use. In 1989 the Polhill Reserve – now known as Waimapihi Reserve – became a Wellington City Council recreational reserve (Brassel, 2014).

The waterways of Aotearoa New Zealand, including those situated within urban contexts, are highly significant to Māori well-being and ways of life (Durie et al., 2017). In te ao Māori, waterbodies are viewed as living beings possessing mauri (life force) and as ancestors; hapū refer to their place within the universe in reference to them. While in te ao Māori the connection between humans and land is one of whakapapa (genealogy), European colonists viewed land in terms of commodity and utility value. Colonists thus segmented and privatised land according to these values, resulting in landscape modifications and severe environmental degradation (McLean, 2020). Originally the Waimapihi stream was an open waterway, flowing over a floodplain towards the sea. However, early colonisers found the stream to be a hindrance to the availability of land for development and urbanisation, a contributing factor to persistent flooding, and a health hazard due to its historic usage as an urban sewage system. As a result, most of the stream was piped by the late 1890s. Today the Waimapihi flows from its headwaters within the Waimapihi Reserve, enters the pipe through which it continues underneath Te Aro, and discharges into Wellington harbour.

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Despite its piping and burial, evidence shows that the Waimapihi is still very much a living waterway. According to a report commissioned by the Greater Wellington Regional Council, electric fishing and spotlighting methods from 2016 to 2019 showed the presence of banded kōkopu, kōaro, kōura, unidentified galaxiidae, and other unidentified fish in the Waimapihi stream's headwaters before it enters the pipe downstream (Harrison, 2019). The Waimapihi stream also boasts the fifth-highest score on the macroinvertebrate community index (MCI) of all urbanised Wellington waterways, at 119, indicating the presence of macroinvertebrates, which provide a source of food for fish and birds. Furthermore, there remains fish presence and passage within the piped section of the Waimapihi stream as species attempt to migrate upstream (McLean, 2020).

McLean explored the potential social and ecological benefits of daylighting the Waimapihi, and the political and legal challenges it entails. She argues that daylighting the Waimapihi could have positive social and environmental impacts, as it could kindle a reconnection between humans and the natural environment by fostering an appreciation of and a heightened sense of responsibility for the stream. This could result in an increased awareness of the stream's health and the employment of alternative methods of community care, stewardship and monitoring, leading to a healthier, richer and thriving ecosystem. Through daylighting we might witness the reintroduction of more native fish species and habitats, as well as flora that would both support and be supported by such an ecosystem. Such a vision is an attractive proposition. Bolstering the well-being of the stream would have co-benefits for human well-being, opportunities for amenity value, aesthetic value, public education, recreation, and resources for customary use. But there are challenges to achieving this vision, based in freshwater management practices, governance frameworks and legislative tools.

### Governance and policy challenges to daylighting the Waimapihi

Most challenges to daylighting the Waimapihi arise from the development of the city of Te Whanganui-a-Tara on top of it. As piped streams become enveloped by the continued urbanisation of their environments above, they become part of a complex network of city infrastructure which becomes increasingly costly to manipulate. Persuading politicians and the public that the inherent value of restoration is higher than the cost thus becomes a key challenge. This economic challenge to daylighting highlights the cost–benefit analysis logic at the core of Western approaches to environmental management: decision making is contingent on outcomes deemed financially appropriate. Undermining this logic, though, is the consideration that maintaining crumbling infrastructure may be more costly in the end (ibid.; Wild et al., 2010). It is thus important for decision makers to consider the ongoing

economic and environmental costs of keeping streams piped versus the one-off cost of daylighting, in light of the ongoing improvements to social and ecological well-being demonstrated elsewhere through daylighting projects. This is an especially important consideration, as pipe infrastructure is already reaching the end of its life.

Another challenge arises from complex governance frameworks which decide which institutions possess which responsibilities along different segments of the stream. Various government organisations, such as the Ministry for the Environment, Greater Wellington Regional Council, Wellington City Council and Wellington Water, have different legislative or governance roles depending on the section in question (McLean, 2020). The results are inter-organisational and interdisciplinary complexities that hinder management objectives and practices. Institutions, or their underpinning disciplines, are often siloed as a result. This problem could be addressed through a greater alignment between governing institutions, legislative tools, strategies, investment plans and programmes of action.

The third challenge arises from the dominant policy tool for resource management in Aotearoa, the Resource Management Act 1991 (RMA). According to part 1 of the RMA, water for the purposes of the act ‘does not include water in any form while in any pipe, tank, or cistern’. Piped and buried waterways are therefore not even defined as water under the RMA, much less as streams containing ecosystems, biodiversity, or characteristics attributed through tikanga (customs and traditional values) or te ao Māori (McLean, 2020). In te ao Māori, as noted above, water is seen to possess mauri, which must be respected, stewarded and protected through kaitiakitanga (environmental stewardship). A key mandate of the RMA is to improve the biodiversity and health of waterways, but in the case of urban waterways this can only be achieved if it is acknowledged that piped streams are actually waterways containing fish and wildlife habitats to begin with. Further, the presence and passage of native fish species in the piped section of the Waimapihi stream

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demonstrates how the RMA is presently failing to protect species. Ultimately, increasing the scope of legislative coverage to include water in piped waterways, along with the fish species that inhabit and pass through them, could result in enhanced social and ecological values by recognising them as something to be preserved and protected. By giving effect to te ao Māori by adopting a view where water within a stream, piped or not, is considered a living entity, people would be more compelled, or even required, to respect its life. This way, the RMA could fulfil its purpose of ‘safeguarding the life-supporting capacity of air, water, soil, and ecosystems’ (s5(2)(b)). Instead, the burial of the Waimapihi has resulted in a loss of governance under

the RMA, and so the stream has been failed by the current legislative framework (ibid.).

#### Discussion

To understand the complex institutional relations that inform the operation of the public service system for environmental management, we might apply a ‘complexity lens’ (Eppel, 2016). Eppel states that:

System governance relies upon different types and sources of knowledge ... Such knowledge is either siloed in the case of more discipline-influenced knowledge or highly distributed, uncodified and often heavily value-laden. Collaborators must learn about the problem and its solutions from each other. They must also learn the way forward through experimentation and learning by doing. (p.8)

This provides one explanation for how institutions may become isolated from one another as they speak different ‘languages’ and are attributed specific responsibilities, acting through respective disciplines, which may lead to tension with those of others. Institutional stakeholders must instead collectively identify and determine the shared values and objectives that inform their respective environmental management practices. Further, the emphasis on ‘learning by doing’ under this approach reinforces how projects like the daylighting of the Avondale or Waitangi streams are not doomed to fail just because they are unfamiliar or lack certainty of outcome.

Governance frameworks and their primary policy tools could also benefit from an alternative view of human–water relations, recognising that piped waterways are more than just water. This approach evokes tenets of te ao Māori and attributes of mauri and kaitiakitanga. As Cousins states, ‘Stormwater needs to be governed as a resource rather than a nuisance, hazard, or liability’ (Cousins, 2017, p.1157). As institutions and resource management have been decentralised, a host of stakeholders have been introduced into the governance of freshwater systems containing waterways like the Waimapihi. These stakeholders range from landowners to businesses, community groups, NGOs

and government agencies, contributing to a multi-level governance structure linking together national, regional, city and third-party governance (ibid.). As a result, 'overcoming and negotiating the challenges presented by water's multiple roles and functions requires particular modes of social, political, and economic control to enable transformations of how society and water interrelate' (ibid., p.1145). Eppel (2016) and Cousins (2017) demonstrate how complex institutional governance over resources can be, especially when disciplines and objectives are misaligned. This becomes especially complex when we consider that the RMA doesn't even recognise piped water as a resource to be managed. Giving effect to te ao Māori and expanding the scope of RMA protection to include piped freshwater ecosystems would be one step towards aligning institutional objectives.

Blue suggests that reimagining the health of waterways might recognise, take into account, and even prioritise the notion of both human and non-human well-being: deconstructing the Western duality of the human and natural worlds 'could offer an opportunity to juxtapose environmental wellbeing alongside ongoing discussions of what it means for people to be healthy' (Blue, 2018, p.470). An incorporation of this understanding ultimately has the potential to better inform management decisions and strategies for freshwater that bolster co-benefits for humans and ecological systems

alike. 'Rather than relying on naturalness, a revitalised river health might be framed as maintaining the character and agency of rivers as living entities ... It might mean renegotiating what matters, recognising less easily articulated meanings and values' (ibid., p.471). The recognition in policy tools and governance frameworks of the more-than-human qualities of freshwater systems, including piped streams, would be one step towards better freshwater management, to which stream daylighting could make a valuable contribution.

### Conclusion

This article illustrates the complex challenges posed by governance and policy frameworks for the effective management of piped freshwater systems and the viability of stream daylighting as a means of surmounting them. In the case of the Waimapihi, governance is hindered by a complicated hierarchy of roles and responsibilities, depending upon which segments of the stream we point towards. Institutions are isolated from one another in both discipline and objective. In the policy sphere, there is a clear lack of scope and legislative oversight under the RMA, which is thus failing the resources it is purportedly dedicated to protecting. In both cases, a shift in the scope of responsibility and collective objectives is needed for more effective management of our waterways. The management of all of our waterways is currently under review through the Three Waters reform

programme. Furthermore, there are calls for the development of systems-wide solutions and improvements for storm water management, including replacing or funding new infrastructure and adapting for climate change (Department of Internal Affairs, 2019; Resource Management Review Panel, 2020). It is unclear whether the goals of this reform are intended to encompass such a shift, but I suggest that they could and need to. Adopting an alternative view of human–water relations in which piped water is seen as a resource whose management could produce co-benefits for humans and non-humans alike could lead to more inclusive protection and management in the policy sphere. This could go on to inform objectives and practices in the governance sphere which might pave the way for stream daylighting projects. Such projects have the potential to generate co-benefits for human health and well-being while simultaneously supporting ecological systems, creating positive feedback between the two, and achieving the common goal of effective and sustainable environmental management more generally, not just of our waterways.

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