Environment Canterbury: Gravel extraction

Context

Braided rivers are some of the most biologically productive and rare ecosystems on Earth. In Canterbury, they formed during the Quaternary Period when glaciers bulldozed through the Southern Alps, their ephemeral waterways carving out wide alpine valleys and carrying large amounts of gravel from glacial moraines to the shallow ocean at the coast. Over 2.5 million years, the sediments and gravels fanned out across braidplains, coalescing into mega alluvial fans that today we call the Canterbury and Amuri Plains. Dynamic ecosystems evolved, adapting to this extraordinary and ever-changing environment. We know this because of the widespread geomorphological evidence[1].

We also know that these braidplains provided numerous irreplaceable life-supporting ecosystem services, otherwise known as critical natural infrastructure. The sediment they delivered to coastal lands counteracted the erosive forces of wind-driven waves and storm surges. Permanent wetlands acted as kidneys, cleaning waterways and drawing carbon dioxide from the atmosphere and storing it in their peaty soils. Ephemeral wetlands played a role too, acting as sponges, absorbing floodwaters and calming their destructive tendencies. In the diverse braidplain ecosystems that formed, and with the assistance of microbial, fungal, and invertebrate communities, water was filtered and nutrients cycled, enabling and supporting unique and endemic aquatic and terrestrial biodiversity. For the early human inhabitants of Aotearoa New Zealand, braided rivers provided plentiful and safe drinking water and mahinga kai; natural infrastructure that enabled them to thrive.

Without natural infrastructure and the ecosystem services and resources that braided rivers provide, there can be no built infrastructure. The reverse is not the case. Thus, natural infrastructure is a first order human necessity over built infrastructure, and—unlike built infrastructure—natural infrastructure is provided free of charge.

Ironically, failing to recognise braidplains as critical natural infrastructure has now put critical built infrastructure[2]—along with farms, businesses, and indeed entire towns—at huge risk. One prominent risk, flooding, was identified in 2019 in NIWA's extraordinarily well-ignored report, which concluded than the level of exposure of built elements at risk within Canterbury's flood hazard area to be $40 billion (based on 2016 valuations)[3]. The rivers' waters are polluted, costing ratepayers to clean it to standards that fall below the World Health Organisation's recommendations[4]. What mahinga kai remains—a mere fraction of historical levels—is tainted. Some endemic bird and fish species integral to maintaining healthy ecosystem services are near extinction. Coastal ecosystems that could have acted as buffers to rising sea levels and storm surges are now starved of the sediments the rivers once delivered along coastal margins. This is in part due to water harvesting for irrigation:

> *"The conventional wisdom is that you harvest flood water in the winter and store it until it's needed* (for agriculture) *in the summer. However, floods are required to carry gravels to the coastal zone and if there's not enough gravel, the waves get hungry and start eroding the land."* – Dr Scott Lanard, NIWA[5]

And in part because the once wide braidplains have been forced into ever-narrowing spaces. During high water flows, the constricted fast-flowing rivers shoot lighter sediments and gravels out into ocean waters too deep for beach-building waves to return to the shore[6].

Importantly, these are not the 'opinions of a few', but rather, grounded in peer-reviewed science[7], on research and investigations that Environment Canterbury (ECan) has commissioned[8], and on facts supported by empirical evidence[1-9].

We applaud the efforts of those at ECan who have presented unequivocal evidence that braidplains and their rare, life-supporting ecosystems continue to be destroyed. And we support their hard mahi as they endeavour to navigate outdated and often conflicting legislation and equally conflicting values in a rapidly changing climate.

When it comes to gravel extraction, rivercare groups, most notably the Ashley Rakahuri Rivercare Group (ARRG) have supplied robust data and evidence[9] that gravel extraction consenting processes in their current form do not consistently adhere to ECan's stated goals in the Canterbury Water Management Strategy (CWMS): to 'protect and restore the natural character of braided rivers'. Further, that by 2025—a mere three years from now—'Five priority braided rivers are under active management to increase habitat area usable by all species of indigenous braided river birds.'[10] Birds are not simply nice to have; they are bioindicators of the health of critical natural infrastructure.

The Ashley Rakahuri River is one of these stated 'active management areas'. Over the last two years, ARRG's concern about riverbed management and gravel extraction has been expressed to ECan on a number of occasions, but significant changes in operational management have yet to see the light of day. Meanwhile, consents for gravel extraction have been issued with little regard for natural character, biodiversity, and mahinga kai values, and without due consideration of climate-related risks, including the risk of maladaptation:

"There is increased evidence of maladaptation across many sectors and regions since the AR5. Maladaptive responses to climate change can create lock-ins of vulnerability, exposure and risks that are difficult and expensive to change and exacerbate existing inequalities." IPCC AR6 WGII[11]

The points above are critically important and need inclusion in the pending review of ECan's Gravel Management Strategy.

Environment Canterbury Catchment Sub-committee

This committee is the major link between ECan and gravel extractors and therefore has significant influence on braided river management.

One of the Catchment Sub-committee's **Purposes** is to:

> **4.** To have regard to the philosophy of ki uta ki tai—from the mountains to the sea—across its streams, lake, wetlands, estuaries, waterways, coastline, biodiversity and water supplies and to the importance and unique characteristics of braided rivers.

Specific Responsibilities include:

> **12.** Ensure that the Sub-committee's activities:
>
> 1. Take into account climate-change related risks; and
> 2. are consistent with Council's plans and initiatives to give effect to Council's declaration of a climate emergency on 16 May 2019.

Councillors on this Sub-committee have been meeting every six weeks. In November 2021 the topic was gravel extraction, and statements from gravel contractors were heard.

We note, in particular, the written submission made by Road Metals, dated October 7, 2021. We address the following points made in Road Metals' submission:

1. That ECan should seriously investigate how much the flow capacities of rivers can be improved;
2. That the costs of consents imposed on gravel extraction businesses should be reduced by reducing the conditions associated with consents; and
3. That ECan and Road Metals ensure that other affected parties (Department of Conservation, LINZ, and NGOs including Birds NZ, Forest & Bird, and river care groups), which Road Metals opine already have too much control and influence at a 'higher level', do not have the current level of influence, and specifically that: ''ECan needs to take back control of being able to manage the rivers in the best interests of all their ratepayers and taxpayers within Canterbury [and that] "Infrastructure must be prioritised to ensure that community needs 'outweigh the opinions of a few'."

1. We agree there should be detailed investigation into how much the flow capacities of rivers can be improved

Hydrologists have recognized for more than ten years that climate change has undermined the concept of stationary in water management[12]. Indeed, they have declared that 'stationarity is dead'[13]. Simply put, regardless of the cumulative years of experience of gravel extractors, the past can no longer inform the future of the hydrology cycle and the impacts on rivers. Stopbanks and gravel removal strategies were devised to mitigate floods under a climate regime that no longer exists. And one that is changing far faster than expected[14].

Globally, as well as here in Aotearoa New Zealand, there is a growing recognition that rivers of all types must be 'given room to move' to avoid catastrophic avulsions in the most vulnerable locations[15]. Allowing braided rivers to reclaim at least some of their original braidplains to help act as

shock-absorbers to mitigate the rapidly increasing risk of mega-floods, will also help reinstate other ecosystem services, that is, their role as critical natural infrastructure. The New Zealand Productivity Commission agrees (emphasis ours):

> "*The Commission recommends that the Government creates a climate-resilience agency... The new entity should also assist regional councils and communities consider the best way to lessen future risk of flooding from rivers. This would include, where appropriate, the potential for using the best-practice model of* ***giving rivers room*** *and developing multiple innovative uses of the wider river corridors."*[16]

Some established gravel extraction companies understand and appreciate the importance of sustaining publicly-owned resources and place environmental considerations at the forefront of their operations. Taggart Earthmoving Ltd., for example, is an active member of the Ashley Rakahuri Rivercare Group with who they work collaboratively to optimise bird breeding habitats during their gravel extraction activities. BRaid has subsequently given them awards for their smart and sustainable riverbird management.

However, this is by no means true of all gravel extraction companies. Internationally, the science is unequivocal that poorly managed gravel extraction contributes to the destruction of the natural character of braided rivers and with it, habitats and ecosystems. Because of this, several countries have banned the activity all together[17].

For this reason, we—

2. Disagree that the conditions associated with the consenting process be reduced. **Indeed, we submit that they be tightened and critically, enforced without undue influence from businesses**

Unlike Land Information New Zealand (LINZ), the Department of Conservation (DOC), and Non-governmental organisations (NGOs), the driving force behind private enterprise is profit generation. By definition, private enterprises are self-serving, seeking to optimise profits by maximizing access to resources whilst minimising production, or in this case extraction costs. The time and costs of consenting processes and having to meet conditions designed to protect braided river ecosystems and the critical role they play as natural infrastructure—simply put—eats into profits.

Gravel extractors that position themselves as victims of an already inadequate system of checks and balances to enable this protection, disingenuously suggest that they have the expertise to prevent floods, thus saving communities the cost of remediation.

As noted, this is not true of all gravel extraction companies. Some do indeed work well with other interested parties to improve braided river ecosystems.

3. It is counter-factual that 'other affected parties' have too much control and influence

The ongoing loss of braided river ecosystems is evidence that our control and influence is neither undue nor truly effective.

The Department of Conservation and NGOs including river care groups such as ourselves, Birds NZ, and Forest & Bird are not businesses with a self-serving financial agenda. We exist not to hinder built infrastructure. Rather, **we exist to support the protection of critical natural infrastructure; public goods that benefit all sectors of society**. Amongst other tasks, this includes developing and maintaining climate resiliency as outlined within the United Nations Environment Programme (UNEP) Convention on Biological Diversity:

> *"Healthy functional ecosystems help reduce climate change vulnerability and disaster risk by reducing physical exposure to hazard, by serving as protective barriers or buffers and so mitigating hazard impacts.*
>
> *"Ecosystem-based adaptation (EbA) should be integrated into broader adaptation and development strategies to maintain and increase resilience and reduce vulnerability of ecosystems and people to adverse effects of climate change.*
>
> *"Ecosystem-based disaster risk reduction includes managing ecosystems to complement, protect and extend the longevity of investments in hard infrastructure*."[18]

We submit that braided river ecosystems are critical natural infrastructure whose health must be prioritized to ensure that community needs in a rapidly changing climate outweigh the financially driven opinions of a few.

Yours faithfully,

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