



Testing our thinking - Developing an enduring National Infrastructure Plan – Submission by the Royal Forest & Bird Protection Society of New Zealand Inc.

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To: Te Waihangā New Zealand Infrastructure Commission

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Introduction

1. Forest & Bird consider it critical that the NIP prioritises nature-based solutions in our future infrastructure decisions. That is – the NIP should look at how it can restore and emulate the nature to reduce pressure on built infrastructure and the natural environment.
2. Throughout our history, Forest & Bird have educated the public on the issues of forest clearance, wetland destruction, and river encroachment on our communities and infrastructure. These sorts of actions have drastically increased the pressure on our infrastructure – by making our slopes unstable (contributing to landslides and erosion), reducing the water holding capacity of our valleys (increasing flooding in our communities), and channelling floodwaters through narrow river channels and floodways (increasing erosion and exacerbating flood risk when stopbanks are overwhelmed). It is time we do things differently.
3. Historically, pākehā communities have relied on ‘engineered’ infrastructure solutions to manage risks from natural hazards, such as flooding. While it has been known for a long time amongst river managers and engineers that these infrastructure systems only provide a certain level of protection from disaster and are effectively temporary in nature, this generally has not been recognised by the public and communities protected by them.
4. However, as the climate changes, these solutions are increasingly prone to fail. New Zealanders received a wakeup call in this regard with the immense devastation caused by Cyclone Gabrielle and the Tāmaki Makaurau Auckland floods in early 2023. It is increasingly clear to people and decision makers that we cannot protect ourselves from every natural hazard with engineered infrastructure alone, and that in many cases moving out of harm’s way is the most effective option. It is also becoming clear to decision makers and communities that the damage we have done to the natural environment – wetlands, forest, and rivers in particular – is exacerbating the impacts of natural hazards and decreasing the resilience of our infrastructure.
5. Ecosystems can play a vital role in helping us be more resilient to the impacts of future extreme weather and lengthen the lifespan and capacity of our infrastructure. Rather than look back to using ‘engineered’ solutions of the past to manage things like flood risk (which have many unintended consequences and have been ecologically destructive, as well as expensive), we need to look at how we can work with and enhance nature to help us adapt to these impacts. By protecting nature, we can protect ourselves and our communities.
6. Unfortunately, significant investment is being made and planned for in this “hard” infrastructure. We urgently need to shift our thinking and include nature-based solutions (NbS) as part of the Commission’s and Governments approach instead.

7. We need to recognise that nature is important both for its own sake and as an asset that provides society with services that we cannot afford to lose. There are many benefits, known as ‘ecosystem services’ provided by a well-functioning natural environment and the indigenous biodiversity within. Ecosystem services are a great way to relate the presence and health of biodiversity to our built and rural environments and the people which inhabit them.
8. Following the devastating events experienced in early 2023, we need to realise the urgency to work with, not against, nature. Aotearoa New Zealand’s approach to infrastructure development must ensure that we look after our natural world, so it can look after us, in turn giving effect to kaitiakitanga and increasing the nation's resilience.
9. Using nature to help adapt in this way, as part of our infrastructure, is referred to as using ‘nature-based solutions’ (NbS).
10. Nature-based solutions are defined in Aotearoa New Zealand’s National Adaptation Plan¹ as “Solutions that are inspired and supported by nature and are cost effective, and at the same time provide environmental, social, and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features (e.g., vegetation and water features) and processes into cities, landscapes, and seascapes, through locally adapted, resource-efficient, and systemic interventions”. See an example in Figure 1.

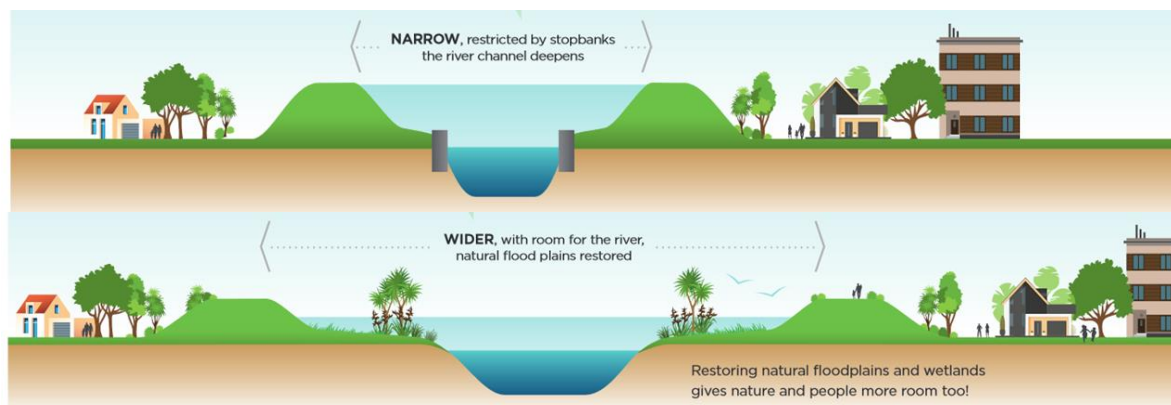


Figure 1: An example of a NbS to flood management. Wider river corridors provide space for rivers to flood safely, where floodwaters don’t get as deep and stopbanks don’t have as much pressure put on them (and therefore the likelihood of failure is decreased). Wider corridors also provide space for natural habitat to develop, and for riparian planting, wetlands, and recreational areas, as well as improving rivers’ connection to and recharge of groundwater (increasing drought resilience)².

¹ <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/adapting-to-climate-change/national-adaptation-plan/>

² https://www.forestandbird.org.nz/sites/default/files/2022-11/F%26B_Room-For-Rivers_Report_online_0.pdf

11. The use of NbS has been adopted overseas using various names and implemented with tremendous success. Actions have focused generally on restoring the ability of the natural environment to hold soil on hillsides, lower temperatures in cities, buffer coastal townships from storms and storm surge, and to help the landscape absorb and slowly release water, for example – creating win-win situations where landscapes’ natural resilience to floods and droughts is restored through making room for rivers³ to flood safely (restoring river health at the same time); restoring wetlands as the natural ‘sponges’ and ‘kidneys’ of the landscape⁴; permanently reforesting hillsides to reduce flood flows, hold soil, and reduce erosion⁵; and making space for – and restoring – coastal ecosystems to buffer coastal areas.
12. Focusing on such nature-based ‘infrastructure’ solutions is consistent with experts’ views on how best to adapt to the impacts of climate change, such as those of a team of New Zealand river management experts who in 2021 wrote:

“International studies show that allowing a river to self-adjust is cheaper and more effective than active interventions that force a river into a particular place.”⁶

13. In the context of infrastructure, NbS may include the following:

- Wetland restoration
- Reforesting hillsides with native trees
- Pest control to remove introduced browsers from forests and restore forest integrity (increasing their capacity to absorb water)
- Making room for rivers to flood safely (increasing the width of river corridors)
- ‘Daylighting’ streams and making room for them to flood safely (i.e., removing them from pipes underground, where they may have been relegated as part of a stormwater system)
- Permeable paths
- Urban forests
- Green roofs
- Green corridors
- Rain gardens
- Swales
- Floodable parks
- Coastal dune restoration

³ https://www.forestandbird.org.nz/sites/default/files/2022-11/F%26B_Room-For-Rivers_Report_online_0.pdf

⁴ https://www.forestandbird.org.nz/sites/default/files/2022-02/Every%20Wetland%20Counts%20brochure_1.pdf

⁵ <https://www.canopy.govt.nz/plan-forest/why-plant-trees/soil-conservation/>

⁶ <https://theconversation.com/why-we-should-release-new-zealands-strangled-rivers-to-lessen-the-impact-of-future-floods-153077>

14. While it is important to integrate more healthy green spaces/NbS throughout our land to increase the resilience of our infrastructure, it is also crucial that we protect and enhance those ecosystems *already* present (e.g., existing forests, wetlands, and river corridors) to ensure their ability to help mitigate climate impacts is not weakened further.
15. Considerable costs could be avoided through protection and retention of existing ecosystems as part of our infrastructure strategy because it is much cheaper to simply protect what already exists rather than trying to ‘recreate’ it as a nature-based solution later. For example, a study by design firm Arup found nature-based infrastructure to be fifty percent more affordable than human-made alternatives, and twenty-eight percent more effective⁷. Where those nature-based solutions are in situ (and therefore do not come at a cost – they simply require recognition and protection), they would be even more cost-effective. As stated by the discussion document, ‘we can’t build our way out of all our challenges’.
16. It is estimated that NbS can provide 37% of the mitigation required until 2030 to achieve the targets of the Paris Agreement⁸. The opportunity NbS provide Aotearoa New Zealand must not be overlooked.

Submission Points

(Presented by survey questions, as in **bold text** below. Where we did not have feedback, the question is excluded)

Q1. What are the most critical infrastructure challenges that the National Infrastructure Plan needs to address over the next 30 years?

17. Climate adaptation, resilience and mitigation are critical infrastructure challenges.
18. Two thirds of New Zealanders live within 5 km of the coast⁹. With this geographic population spread comes a large and wide pressure on placement of infrastructure – even without the pressure of climate change. A recent report has estimated 10,000 coastal properties across Auckland, Wellington, Christchurch, and Dunedin could become uninsurable by 2050¹⁰. This alone illustrates our ongoing failure as a nation to work around nature, as we continue to put our infrastructure and

⁷ <https://www.arup.com/globalassets/downloads/insights/biodiversity-by-2030-transforming-cities-relationship-with-nature.pdf>

⁸ <https://www.worldbank.org/en/news/feature/2022/05/19/what-you-need-to-know-about-nature-based-solutions-to-climate-change#:~:text=Nature%2Dbased%20solutions%20are%20actions,well%2Dbeing%20and%20biodiversity%20benefits>

⁹ <https://niwa.co.nz/climate-change-information-climate-solvers/climate-change-and-possible-impacts-new-zealand#:~:text=In%20New%20Zealand%2C%20the%20sea,a%20challenge%20for%20stormwater%20net works.>

¹⁰ <https://helenclark.foundation/publications-and-medias/premiums-under-pressure/>

communities in the wrong places - places we know are at a high risk of inundation and damaged as the climate continues to change. We need to ensure our infrastructure is in the right place, now and into the coming decades. This means working with nature (by learning to live with it and designing infrastructure with natural processes in mind), not trying to out-engineer it.

19. Increased rainfall will pose a challenge for our current stormwater networks. Many of our drainage networks will need to be upgraded and expanded to manage projected higher storm water flows to avoid flooding¹¹. Working with nature to increase landscape's ability to absorb rainwater will decrease the burden and requirements on our grey infrastructure, in-turn, this will lead to cost-saving for both new infrastructure projects and maintenance/upgrades of existing infrastructure. To achieve this, need to focus on making our built environments spongier¹², accepting rather than burying natural processes. We need to restore wetlands, reforest hillsides, and make room for rivers to reduce the need to rebuild our infrastructure over and over.
20. All pieces of the infrastructure puzzle have a significant role to play in reducing the countries emissions and contribution to climate change/mitigation. "What is not commonly recognized is that of the top 15 sectors where our society produces greenhouse gases, infrastructure systems play a direct role in nearly all of them¹³". Key Actions from Chapter 7 of our Emissions Reductions Plan have already outlined areas of focus for improving the resilience and lowering the emissions of infrastructure¹⁴. It is crucial that the NIP integrates and prioritises this work.

Q2. How can te ao Māori perspectives and principles be used to strengthen the National Infrastructure Plan's approach to long-term infrastructure planning?

21. Māori have a deep relationship with their whenua that goes far beyond property rights/land ownership due to their connection through whakapapa. This creates many complexities in integrating 'western' frameworks with those of Māori, with wide-ranging implications¹⁵. Any framework or process must acknowledge and work on improving that.
22. Māori also have a much deeper and longer understanding of the landscape in Aotearoa than pākehā – for example, where wetlands were located and where rivers used to flow. This means many māori

¹¹ <https://niwa.co.nz/climate-change-information-climate-solvers/climate-change-and-possible-impacts-new-zealand#:~:text=In%20New%20Zealand%2C%20the%20sea,a%20challenge%20for%20stormwater%20net%20works.>

¹² <https://helenclark.foundation/publications-and-medias/sponge-cities/>

¹³ <https://www.unops.org/news-and-stories/insights/how-infrastructure-defines-our-climate>

¹⁴ <https://environment.govt.nz/publications/aotearoa-new-zealands-first-emissions-reduction-plan/planning-and-infrastructure/>

¹⁵ <https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/environmental-plans-strategies/aucklands-climate-plan/preparing/Pages/impact-of-climate-change-for-maori.aspx>

communities can offer valuable knowledge about risk and where we should and shouldn't put our infrastructure.

23. Incorporating the perspective of te ao Māori and embracing Māori principles is crucial for effectively addressing and adjusting to climate change effects and all other significant challenges in Aotearoa New Zealand, such as those brought by our past and current investment and planning for infrastructure. The commitment to the principals of te Tiriti o Waitangi is a key component of an enduring national direction. To apply a te ao Māori perspective is to craft initiatives collaboratively with Māori, to prioritise te ao Māori and mātauranga Māori within the planning efforts, and to enable Māori leadership in plans that are by and for Māori. The Commission must make the consideration of the former a primary focus of the development of this plan.
24. Many past actions have disadvantages māori communities and increased their risk to the impacts of climate change. The Hawke's Bay Independent Flood Review¹⁶, for example, found that many māori communities lived on floodplains in places of high risk as a consequence of having lost more 'valuable' land to the Crown. These perspectives and historical injustices need to be considered in infrastructure planning.

Q4. How can the National Infrastructure Pipeline be used to better support infrastructure planning and delivery across New Zealand?

25. Ensure:

- NbS are promoted,
- Projects that utilise NbS, as either the primary infrastructure mode, or as part of a hybrid approach¹⁷, are prioritised. This will ensure we get the most out of infrastructure through the numerous co-benefits offered by NbS,
- alignment to NAP¹⁸, National Climate Strategy¹⁹, and numerous other pieces of legislation and national direction which prioritises NbS (e.g. NZCPS, NPS-FM, NPS-IB),
- cost-benefit analysis is carried out for all projects,
- the cost-benefit of NbS is understood, including bigger picture thinking of co-benefits and long-term value for money (e.g., maintenance costs).

Q5. Are we focusing on the right problems, and are there others we should consider?

¹⁶ <https://www.hbrc.govt.nz/assets/Document-Library/Cyclone-Gabrielle/Report-of-the-Hawkes-Bay-Independent-Flood-Review-Digital-Version.pdf>

¹⁷ A hybrid infrastructure approach combines grey infrastructure with NbS to create more resilient and sustainable systems.

¹⁸ <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/adapting-to-climate-change/national-adaptation-plan/>

¹⁹ https://environment.govt.nz/assets/J001281-MfE-Climate-strategy-brochure-FF_webV2.pdf

26. The relationship between infrastructure and biodiversity should be considered much more in infrastructure planning.
27. Infrastructure projects have a significant bearing on the health and presence of biodiversity. The UK Environment Act 2021 recognises this by promoting NbS through several key provisions aimed at enhancing biodiversity, improving water quality, and addressing climate change. The Act mandates that new developments must achieve a minimum 10% biodiversity net gain (BNG)²⁰. This means that developers must ensure that their projects not only avoid harm to existing ecosystems but also contribute positively to biodiversity, encouraging the use of NbS like habitat restoration and creation. The BNG requirement came into effect in February 2024 for most local planning developments and in 2025 will apply for nationally significant infrastructure projects²¹. Through the NIP, Aotearoa New Zealand has the opportunity to set similar standards. Given the current biodiversity and climate crisis, this opportunity should not be missed.
28. Without considerations and requirement like this, there is a great irony that our infrastructure projects often continue to contribute to a decline in biodiversity (and often an increase in emissions), which then undermines the natural functioning of the earth. This then impacts our infrastructure when ecosystems collapse (such as a forest collapsing that was previously holding soil on a hillside) or the extreme weather impacts of climate change hit.

Q6. What changes would enable better infrastructure investment decisions by central and local government?

29. Looking at the bigger picture would enable better investment.
30. The NIP should, through various directives and financing incentives, encourage regional and local government to prioritise NbS in Regional Policy Statements, Regional and District Plans, Long Term Plans, and Long-term Infrastructure Plans.
31. The system is currently failing to adequately value social and ecosystem services. Benefits that aren't typically monetised need to be better considered. For example, the benefits (or lack of) of a project for biodiversity, public health, recreation, etc. Appropriately considering the non-monetary benefits of infrastructure projects is crucial for making well-rounded decisions that account for social, environmental, and economic impacts throughout the life of a project.
32. An example of this failing is the current “like for like” provision of flood protection repairs after a large flood. Often, if a stopbank fails during a flood, for example, a regional council will only be able to get central government funding to replace the stopbank as it was. However, for a (usually

²⁰ <https://www.minterellison.co.nz/insights/the-uk-environment-act-a-new-era-for-biodiversity>

²¹ <https://www.burges-salmon.com/news-and-insight/legal-updates/environment/what-to-expect-from-environmental-law-in-2023>

relatively small) additional investment, the council could re-align the stopbank further back from the river – giving more room to the river (a NbS) – and reducing the potential for future failure. However, the government setup does not provide for this ‘improvement’, and so we continue to rebuild status quo infrastructure after floods, even though we know that in the bigger picture, a change is needed.

33. The Infrastructure Commission should be emphasising the long-term value for money²² of NbS over engineered (grey) infrastructure. The Commission should establish a comprehensive framework that places NbS as the preferred outcome, enabling prudent and cost-effective investment strategies. This framework should streamline and enable the use of NbS, while requiring thorough justification for a departure away from NbS to the use of grey infrastructure. Such an approach will facilitate the optimal allocation of resources while promoting sustainability and resilience in the face of climate change and contributing to meeting requirements and objectives of other legislation and strategies such as the RMA, NPS-FM, NZCPS, and Te Mana o te Taiao Biodiversity Strategy.

Q7. How should we think about balancing competing investment needs when there is not enough money to build everything?

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Q10. What approaches could be used to get better value from our infrastructure dollar? What's stopping us from doing this?

34. Utilising existing NbS (i.e., protecting established forests and wetlands, river corridors, etc) and restoring more of them can significantly reduce both the burden-on-existing and need-for-more grey infrastructure. If we can protect the natural infrastructure that we have which is regulating natural processes (such as wetlands helping absorb flood flows), then we will not need to invest as much in grey infrastructure. In these cases, it is not so much about “balancing” things like investment in nature and investment in infrastructure, but recognising that investing in one (nature) can save costs in the other (infrastructure). We can probably build less infrastructure for climate change mitigation, for example, if we can increase our environmental restoration.
35. NbS, such as wide river and stream corridors, planting on steep hillsides, rain gardens, and wetlands, often require lower initial investments and have reduced maintenance costs compared to grey infrastructure that attempts to manage the same effects these NbS can manage. They provide multiple benefits, such as flood control, water purification, and urban cooling, which can decrease the need for separate grey infrastructure solutions. Additionally, NbS can extend the lifespan of existing infrastructure by reducing stress and preventing damage from extreme weather events, leading to long-term savings.

²² https://www.camecon.com/wp-content/uploads/2021/03/The-economic-costs-benefits-of-nature-based-solutions_final-report_FINAL_V3.pdf

36. Other related tools, such as water meters, public transport, cycle lanes, household power generation, stormwater harvesting, and time of use charging, can also help us reduce pressure on infrastructure. Water meters are well proven tools to reduce water use – meaning we don’t need to build things like water storage tanks or dams, or find ‘new’ sources of water as often. Time of use charging can reduce pressure on roads and power infrastructure and generation. Distributed networks of small-scale power generation (household solar) can reduce need for new power generation. Water storage tanks at a household level can reduce the need for stormwater capacity (and provide emergency or drinking water capacity). Grey water tanks can reduce the need for wastewater treatment infrastructure. Public transport and cycle lanes reduces the pressure of cars on roads (by reducing traffic). Etc. These are all tools that should be looked at to reduce the need to large grey infrastructure projects, in tandem with environmental restoration.

Q12. How can we improve the way we understand and manage risks to infrastructure? What's stopping us from doing this?

- Better incorporate Mātauranga Māori into planning and decision-making processes.
- Understand the co-benefits of NbS.
- Introduction of an NPS-NHD to ensure infrastructure isn’t going in harm's way.

Q13. How can we lower carbon emissions from providing and using infrastructure? What's stopping us from doing this?

37. Use what we already have. For example, currently, roading and car parking takes up approximately 43% of the public space in Central Auckland²³, the country's largest city. This space could be repurposed and retrofitted with different, lower carbon, transport modes, such as active transport (e.g., bike lanes) and public transport (e.g., bus lanes).

38. Prioritise NbS.

Q14. Are any changes needed to our infrastructure institutions and systems and if so, what would make the biggest difference?

39. We need to shift away from the ‘normal way’ of doing infrastructure in Aotearoa New Zealand. Te Waihangā should resource the establishment of a comprehensive monitoring framework that records the benefits derived from nature-based solutions projects. Such an initiative would yield invaluable insights, facilitating informed decision-making within the unique context of New Zealand (and building on international databases of nature-based solutions –such as in the UK²⁴). By

²³ <https://theconversation.com/rethinking-roads-as-public-spaces-what-nz-cities-can-learn-from-barcelonas-superblock-urban-design-226601#:~:text=New%20Zealand%20is%20one%20of,space%20could%20be%20used%20differently?>

²⁴ <https://www.gov.uk/government/news/natural-flood-management-part-of-the-nations-flood-resilience>

providing data and analysis, this framework would serve as a critical resource for local and regional government, empowering them to make well-informed and accountable decisions that align with public interests. Furthermore, the implementation of this monitoring framework would offer a systematic approach to evaluating the effectiveness of nature-based solutions, enabling a thorough understanding of their impact on local ecosystems and communities. This, in turn, would foster a culture of transparency and accountability, instilling confidence in local governments as they prioritise sustainable and nature-centric approaches to infrastructure development and environmental management.

Q16. What regulatory settings need to change to enable better infrastructure outcomes?

- NPS-NHD introduced to protect NbS and prevent infrastructure from being in high-risk locations
- NPS-FM strengthened to better protect in-situ NbS
- NPS-Biodiversity strengthened to better protect in-situ NbS
- Ensure public engagement and expert consultation.

SUBMISSION ENDS