

Water New Zealand  
PO Box 1316  
Wellington 6011

3<sup>rd</sup> June 2022

Ministry for the Environment  
PO Box 10362  
Wellington 6143

Email: [adaptation@mfe.govt.nz](mailto:adaptation@mfe.govt.nz)

Dear Sir/Madam,

## **SUBMISSION FOR WATER NEW ZEALAND ON THE NATIONAL ADAPTATION PLAN FOR RESPONDING TO CLIMATE CHANGE RISKS**

### **INTRODUCTION AND OVERVIEW**

Water New Zealand (“Water NZ”) appreciates the opportunity to provide a submission for the inquiry on the draft National adaptation plan for responding to climate change risks. Water NZ is a national not-for-profit organisation which promotes the sustainable management and development of New Zealand’s three waters (drinking water, wastewater and stormwater).

Water NZ is the country's largest water industry body, providing leadership and support in the water sector through advocacy, collaboration and professional development. Its 2,600 members are drawn from all areas of the water management industry including regional councils and territorial authorities, consultants, suppliers, government agencies, academia and scientists. Many of our members will be making their own submissions and this submission is intended to compliment those of our members.

### **BACKGROUND**

Climate change impacts are being realised now and having widespread environmental, social, economic and cultural impacts. For the water industry this exacerbates the impacts of climatic and natural hazards such as drought, flooding, land slips and coastal erosion.

Freshwater resources are compromised by multiple compounding pressures. Droughts are increasing in frequency and intensity putting pressure on ecological flow levels in waterbodies, already compromised by competing interests; drinking water abstraction, irrigation, horticulture and industrial takes. The mana of the water being affected.

Many of our water and wastewater and stormwater networks and treatment plants are in coastal areas or alongside rivers and increasingly vulnerable to the increased intensity and frequency of extreme weather events. And sea level rise Gravity-based stormwater and wastewater systems will fail if inundated by rising sea levels or floodwaters.

Climate change will put significant pressure on the three water systems and management. Economic impacts include damage to assets, implications for development and infrastructure and disruption to service provision.

As well as working to mitigate emissions and the problems affecting us, as an industry we need to work together to ensure our assets and service provided adapt to our ever-changing environment.

However, we cannot do it alone, nor do we have adequate funding to resource the required actions. The effects of natural hazard events and climate change that we have experienced to date has highlighted that society as a whole needs to take responsibility for responding to and adapting to climate change. This is best led by central government directives and the draft National Adaptation Plan is a step in the right direction to achieve a societal shift.

## **GENERAL COMMENTS**

The National Adaptation Plan (NAP) demonstrates the broad breadth of adaptation considerations, opportunities and work already underway. It is heartening to see the many opportunities to adapt, however given the volume of the work, we believe further work to identify priorities or align work programmes. This could be achieved by strengthening links between the national climate adaptation risk assessment. Aligning actions to priority risks would help ensure critical gaps are not missed in our response.

An important example of where this approach could help is in addressing risks to potable water supplies. These are identified in The National Climate Change Risk Assessment New Zealand's most urgent climate risk. The only directly related action within the NAP is the reform of three water entities. While reform is an important component of ensuring that water suppliers have the capacity to respond to future climate risks, further action will be needed across multiple spheres. For example, research and innovation, urban planning, land use decisions, building consenting processes, societal attitudes (e.g., towards valuing water and acceptance of recycled water) will all influence our ability to meet future water supply needs.

One of the core principals of the National Adaptation Plan is to take actions with co-benefits. Happily reducing the risk to potable water supplies is one area where multiple co-benefits can be achieved, for example by lowering energy and chemical use, saving customers and utilities money. The *IPCC WGII Sixth Assessment Report*<sup>1</sup> also identifies improving urban water security as an area of high feasibility and with high synergies with mitigation, shown in the extracted figure below.

Improving urban water security is also an area with much lower hanging fruit in New Zealand. On average twenty percent of water entering our urban water networks is lost through leaks. Average residential water uses in New Zealand, of 281 litres person day<sup>2</sup>, is nearly three times more than average water use in the Pacific (97.89 litres person day)<sup>3</sup>, and more than the average residential property use of Australian cities other than Darwin<sup>4</sup>. Taking action to drive down water usage and reduce losses is a no-regrets option for improving urban water security, while concurrently reducing emissions.

---

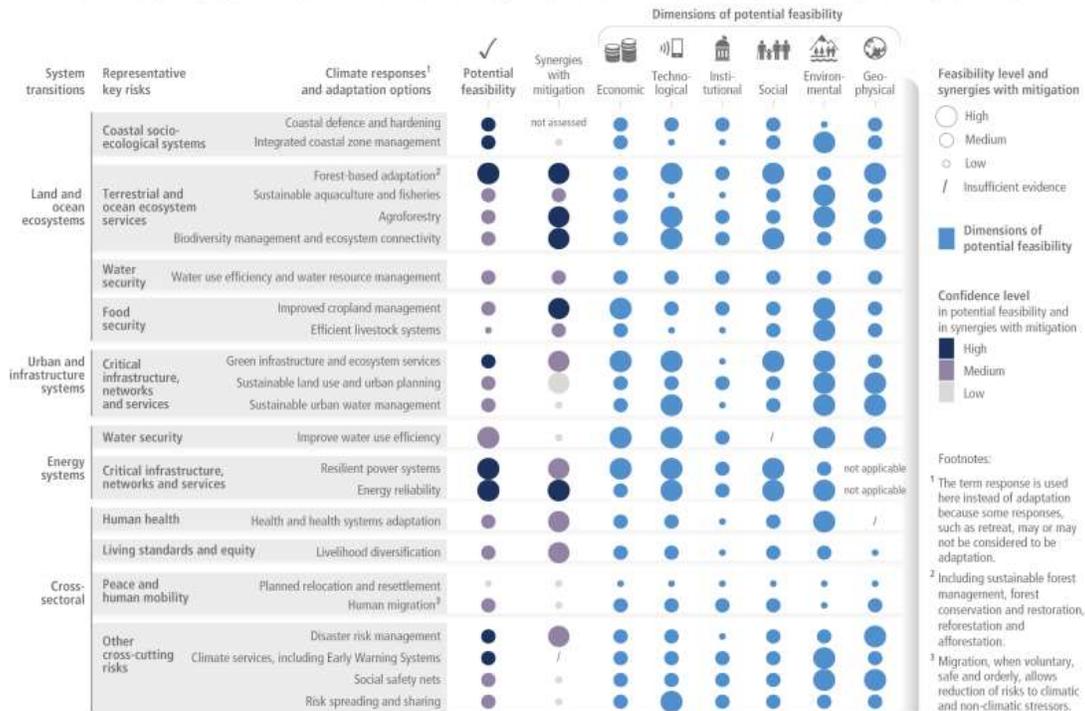
<sup>1</sup> <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

<sup>2</sup> <https://www.waternz.org.nz/NationalPerformanceReview>

<sup>3</sup> PWWA Annual Report 2021

<sup>4</sup> National performance report 2020–21: urban water utilities <http://www.bom.gov.au/water/npr/>

**Diverse feasible climate responses and adaptation options exist to respond to Representative Key Risks of climate change, with varying synergies with mitigation**  
 Multidimensional feasibility and synergies with mitigation of climate responses and adaptation options relevant in the near-term, at global scale and up to 1.5°C of global warming



The IPCC figure above also identifies; Green infrastructure and ecosystem services, sustainable land use and urban planning as other feasibility climate adaptation actions that offer synergies with mitigation. Taking a systems approach to capturing and using water where it falls, transforming our stormwater networks to incorporate water sensitive urban design and taking nature-based approaches into flood management, are another practical no regrets example of where to focus adaptation efforts.

Nature based solutions offer multi benefits, for example restoring coastal wetlands will absorb impacts of increased storminess, detain flood flow, provide biodiversity and act as carbon sink, whilst also providing cultural and recreation values. Application of a whole of water cycle- system approach would give form to Te mana o te wai. This would be consistent with other, broader objectives that the Government has for the environment.

Historically, we have taken a strong engineering focus to flood management- diverting rivers, and draining, and building on, land that were part of a river’s floodplain. Water managers worldwide are looking to use natural green infrastructure as a flexible and efficient way to manage flood flows and risk (softer engineering). Diverting watercourses, building on floodplains and piping streams is expensive, disruptive and removes cultural and ecological connections. More significantly it upsets Te mana o te wai. Industry practice is moving away from costly, bigger stop banks, pipes, and pumps (hard engineering) towards ways of capturing holding and reusing water where it falls.

There is an industry appreciation of the need to more fully integrate the planning and management of catchments land use and water management to mitigate flooding risk. Prompting local authorities and land developers to a more holistic approach to land, floodplain and water management, to adapting practice and avoiding flood hazard in the first place, ensure new development in flood hazard areas is appropriate is a more adaptive and resilient approach.

Conversely without adequate consideration, adaptation to increased flooding or water scarcity runs the high risk of adding additionally to emissions. For example, upsizing infrastructure to cope with larger flood events, desalination seawater to provide for water supplies.

Direction is needed for water utility operators how to balance asset costs from disasters such as drought, flooding, the long-term expense of transitioning from fossil fuel to renewable energy, with customers willingness and ability to finance this work.

The increasing cost to communities from replacing or fixing assets following physical events will become unpalatable. Asset managers need direction on having conversations with the wider community on whether to fight or flight, rebuild or retreat hazard prone assets, on a timeline that gives everyone certainty.

It is because of both the opportunities, and the risks, facing our urban water systems in relation to climate change that we believe they need to be given more weight in adaptation planning. In our submission we identify some of the opportunities to act. We welcome further engagement with central government to help realise a path to their implementation.

## **COMMENTS ON SPECIFIC QUESTIONS**

### **System wide actions**

*6. Do you agree with the objectives in this chapter?*

Yes. We support reform of the resource management system and institutional arrangements for water services, which are not adequately structured to effectively address climate resilience in their current form.

A critical element of ensuring these reforms effectively deliver climate resilience is that they create incentives for water to be used efficiently. We need a resource management system which establishes an allocation regime that incentivises efficient water use. We need water service entities with governance structures that facilitate long term planning and can attract and retain technically competent staff, incentivised to understand and respond to future climate challenges.

We need provisions in the proposed Natural and Built Environments Act (NBA) and Spatial Planning Act (SPA) that will help to facilitate proactive planning through identification of hazard areas, to inform both the location of future developments and infrastructure provision and areas needing adaptation. It would be beneficial for local governments, planning committees and proposed new water service entities to work together on these plans.

Government also needs to work with local authorities and land developers and prescribe a more holistic approach to land, floodplain and water management now - to ensure no time or opportunity are lost before the Climate Adaptation Act is enacted.

Legislative change is needed to provide local government with a mandate to make decisions that align with adaptation principles. A new legislative framework should limit the potential for perverse outcomes to ensue. It should also provide for flexibility and agility in decision-making, to reflect new knowledge and enable an adaptive management response to the rapidly changing circumstances we are facing.

At present, it can be very difficult to make appropriate decisions due to the relative rigidity of statutory plans developed under the RMA. For example, it is not easy to prevent development from taking place in locations that are likely to be at greater risk from climate

change than was previously known, as the zoning enabling development is locked into resource management plans.

While there is not current sufficient detail in these reform packages to know how this will be achieved, we look forward to working with the government to ensure that both reforms drive improvements in water systems resilience and give effect to Te mana o te Wai.

*7. What else should guide the whole-of-government approach to help New Zealand adapt and build resilience to a changing climate?*

### **Unlock funding for water sector co-ordination through an industry levy**

The NCCRA identifies risk to potable water as the most urgent risk from climate change. The reform of institutional arrangements for water services is the only action in the adaptation plan that directly addresses this challenge. Reform of institutions alone will not be sufficient to mitigate these risks. Collaboration will be required across the entities, and with related actors. A levy on the new entities (such as the BRANZ levy in the building sector) to enable the development of water related innovation, standards, good practice guidance would be an effective mechanisms to facilitate action across all groups involved in urban water related climate adaptation.

### **The government also needs to play a greater role in managing flood risk.**

Floods are New Zealand's most frequent and most significant natural hazard and cost the country around \$160 million per year. There is a need to ensure that consistent and robust information on flood risk is being made available by councils and insurance companies to ensure business and homeowners, communities, developers, and lenders adapt to flood risks in an appropriate fashion.

Floods can be mitigated through proactive, well-proven protection schemes, and provided return on investment from active 'risk reduction' measures. Currently, flood damage is in most cases avoided because of the efficacy of existing flood protection schemes. The efficacy of flood protection would be extended by an integrated flood management approach is, considering rivers, coasts and stormwater. As well as incentivising alternative stormwater management practices, such as water sensitive urban design.

There has been historic underinvestment in existing stormwater services in many districts of New Zealand. In our annual review of drinking water, wastewater and stormwater services 18 of 37 (48%) councils did not collect enough revenue to cover the costs of their stormwater networks. Over the past four years, expenditure was lower than depreciation in 15 of these districts<sup>5</sup>. If the trend persists, levels of service in these districts would be expected to decline.

Adding the cost of upgrading and maintaining flood protection schemes to meet future 'acceptable levels of risk' posed by climate change, including the protection of Crown-owned assets, it is beyond the reasonable capacity of ratepayers to meet costs on their own. Te Uru Kahika (the Regional and Unitary Councils of Aotearoa New Zealand) have recently highlighted the urgent need for investment in flood protection schemes and requested co-investment in those schemes from central government of approximately \$150m per annum to protect communities and investments in hazard prone areas.

This suggests learnings from the case study to explore co-investment for flood protection in Westport are likely to be needed for other regions in New Zealand. Establishment of water service entities also offers an opportunity to establish stormwater charges that adequately

---

<sup>5</sup> Water New Zealand, 2020-2021 National Performance Review

reflect the costs of service provision, noting that desired levels of flood protection and/or costs may be out of reach for some communities.

Government co-investment in resilience approaches now, such as flood protection schemes, would reduce risks to communities and Crown assets to a more tolerable level, while being considerably more prudent and less costly than managing the risks through reactionary post-event measures. Further consideration needs to be given to exploring opportunities for co-investment in flood protection.

We expand upon further opportunities to support a more climate resilient potable water and stormwater networks in our response to questions in the infrastructure section of the consultation.

*8. Do you agree that the new tools, guidance and methodologies set out in this chapter will be useful for you, your community and/or iwi and hapū, business or organisation to assess climate risks and plan for adaptation?*

Yes. We support the action to provide access to the latest climate projections data, however want to underscore the critical role of appropriate science communication when publishing this information. Interpreting currently available projection information often requires an understanding of the different global climate models and representative concentration pathways, putting understanding beyond the reach of many who may need it for decision making. Guidance to interpret the projections need to be tailored for a technical audience's such as engineers and planners, as well as the broader public.

We are also supportive of the develop of an adaptation information portal. We tautoko the work of the Deep South Science Challenge who have already made significant in-roads in the development of such a portal. Their website already provides information and access to climate projections and best practice case studies, that would provide a useful starting point for further development following the completion of the governments Science Challenge's.

## **Natural environment**

*14. Do you agree with the actions set out in this chapter?*

We agree with the action to *Reform the Environmental Reporting and Monitoring System to allow better measurement of environmental change*. We would like to see these changes support regional council to collate water metering information, so a picture can be built of where water is used in New Zealand (not just where it has been consented to be used, which is all we currently know). We tautoko the work of regional councils in the development and delivery of the LAWA website. This provides an excellent resource that could be enhanced with further investment in environmental monitoring, including providing aforementioned breakdowns of water use.

We partially agree with the action to *Prioritise nature-based solutions and implement Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020 (ANZBS)*. Both “prioritisation of nature-based solutions” as well as “implement Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020” are sensible objectives. We do not agree they should be linked together as a single action. There are several nature-based solutions in the water sector (for example using natural wetlands to treat wastewater, swales to filter stormwater etc) that do not fall within the remit of the biodiversity strategy.

The *Water Availability and Security programme* described in this chapter does not appear to address issues related to urban water supply. However, elsewhere it is referred to as a response to potable water supply risks. Clarification is needed to determine if the scope of

this programme will include urban water supply issues. Water New Zealand's view is that urban water supplies should be considered, as they often compete for water with agriculture, and primary industry. *Water availability climate change guidelines*<sup>6</sup> are an Australian example of how incorporation of climate change projections could be approached across both primary industry and municipal water supplies.

The primary importance of protecting the natural environment and allowing it to continue to function and to adapt naturally to the changing climate is recognised and supported. Integrated catchment planning and local community restoration strategies and priorities support this.

Most aquatic ecosystems are not well known enough to understand the impacts of climate change. There needs to be a dedicated research programme targeted at understanding the threats to vulnerable species and ecosystems and planning for their protection now.

Weed issues will become prevalent. Algal blooms occurrences will likely increase as the waters warm. This has issues for drinking water supply and recreation. A funded management and adaptation programme is needed, to better respond to emerging pests and contaminants and react quickly. National support and investment is required from central government for the freshwater biosecurity programme; partnership is a good start, but it lacks national support for real action.

*17. What do you identify as the most important actions that will come from outside of central government (e.g., local government, the private sector or other asset owners, iwi, hāpu and/or other Māori groupings such as: business, forestry, fisheries, tourism, urban Māori, the private sector) to build the natural environment's resilience to the impacts of climate change?*

Within built areas requires the urban water environment needs to be designed to facilitate the natural environment, and ensure it is resilient to the impacts of climate change. To this end, many actors influence the form of our urban environment. These include;

- Developers, who have a critical role in determining how water is used in, and flows through, new developments. Including rain and grey water reuse
- Water end-users who influence how much water is abstracted from the environment.
- Owners and operators of public and private sewage systems (compliance and or overflows to the environment).
- Local government – as ,water and drainage provider and funder, land use and development regulator, emergency management coordinator and planner will continue to play a leading role in risk management and adaptation.
- As well as the future new water entities, whose exact role is yet to be fully determined.

## **Homes, buildings and places**

*20. What else should guide central government's actions to increase the resilience of our homes, buildings and places?*

Government could provide support to ensure homeowners are provided with clear information about the level of flood risk faced by their properties. Information on flood risk can be difficult to access, and often differs for the same location depending on the source of the information; be it provided by a territorial authority, regional council, or insurance company.

---

<sup>6</sup> <https://www.water.vic.gov.au/climate-change/adaptation/guidelines>

In 2018 the Office of the Auditor General reviewed stormwater management at three councils to understand how well current practices are protecting our homes from flooding<sup>7</sup>. The auditor general reported;

“To date, the three councils have had an incomplete understanding of the flood risk in their districts. Much of their assessment of flood risk has been based on information collected after a flood. This reactive approach risks councils focusing on reducing the effects of the most recent flood, rather than considering all possible flooding events and their effects. It also means that they cannot forecast accurately, and risk being poorly prepared for unanticipated events.

The three councils have gaps in their understanding of the current state of their stormwater systems. These gaps limit their ability to make well-informed and deliberate decisions about how to manage those systems. This means that the councils are unlikely to have had informed conversations with their communities about the potential risk of flooding and the cost of reducing that risk.”

The auditor general made five recommendations for local councils to implement. It is Water New Zealand’s view that these recommendations remain as relevant now as in 2018;

1. understand the current and likely future flood risks in their district or city sufficiently to take a proactive approach to reduce the risk and effects of flooding;
2. provide elected members with the necessary information and options, including about local flood risks and their stormwater systems, to make well-informed and deliberate decisions about investment in their stormwater systems;
3. improve the information they make available to their communities so that people can understand:
  - o the potential risk of flooding;
  - o what the council is doing to manage that risk, including how it is managing the stormwater system and at what cost; and
  - o what the remaining risk is to the community;
4. improve their understanding of their stormwater systems, which will entail ensuring the adequacy of their stormwater asset data, including condition data and information on the performance and capacity of the stormwater systems; and
5. identify and use opportunities to work together with relevant organisations to more effectively manage their stormwater systems.

Some responsibility for implementing these actions will be transferred to new water entities if reform of the water sector proceeds with stormwater included in its remit. Clearly stating who has responsibility for actioning these recommendations when new water entities are established would help ensure flood risks are better understood in the future. Regardless of where responsibility falls central government can support the implementation of these actions through creating regulatory drivers, supporting guidance, and in some instances direct funding. We explore some of the avenues to better support the management of flood risk in our response to the infrastructure question.

*23. Do you think that there is a role for government in supporting actions to make existing homes and/or buildings more resilient to future climate hazards?*

The Building for Climate Change Programme mentioned in this chapter, rightly includes water efficiency targets for homes. Ensuring homes are water efficient will improve their resilience in the face of increasing length and frequency of droughts due to climate change.

---

<sup>7</sup> <https://oag.parliament.nz/2018/stormwater/part-1>

Other water efficiency initiatives that could be introduced by government to support this include; development and enforcement of minimum product water efficiency standards, water efficiency labelling, development of commercial water efficiency benchmarks, providing information and incentives for water recycling and reuse, and volumetric water charging and metering.

Changing the Building Code/regulations to improve guidance and financial incentives for these and other innovative building solutions that are more capable of dealing with changing climate (e.g. green roofs and living walls, pervious paving, rain tanks, re-use of water, flood-proofing buildings etc) would be one way to incentivise their uptake. This would also support increasing personal/whanau emergency resilience as well as have conservation and water reuse benefits.

*25. What are some of the current barriers you have observed or experienced to increasing buildings' resilience to climate change impacts?*

Current building consenting requirements act as a barrier to the installation of rainwater tanks. Rainwater tanks can support the climate resilience of buildings and places by relieving pressure on water supplies and stormwater networks. There is little information or standards to support homeowners to install greywater recycling systems.

## **Infrastructure questions**

*27. What else should guide central government's actions to prepare infrastructure for a changing climate?*

The infrastructure work programme needs to more closely linked with climate mitigation initiatives to manage trade-offs and ensure mal adaptation does not occur. For example, increasing the size of stormwater pipelines to respond to future rainfall increases the amount of embodied carbon involved in their construction, in turn adding to climate change. Improving our understanding of the embodied carbon in our assets, for example by developing a national database linked to tool's such as the Moata Carbon Portal<sup>8</sup> would help us better manage such trade-offs.

*29. The national adaptation plan has identified several actions to support adaptation in all infrastructure types and all regions of Aotearoa. a. Do you see potential for further aligning actions across local government, central government and private sector asset owners?*

Yes. Aligning agreed approaches for forecasting flood risk. In our response to question 20 we talk about some of the existing shortfalls in existing information on flood risk. In our response to question 29.e. we outline some of the other supporting guidance that is needed to facilitate this.

*e. Do you think we have prioritized the right tools and guidance to help infrastructure asset owners understand and manage climate risk?*

Partially. Other guidance material that is needed to assist water services improve the climate resilience is outlined below.

**Water Sensitive Urban Design practices for stormwater.** The Auckland Council Document Water Sensitive Design for Stormwater, known as GD04, provides guidance for the application of water sensitive design (WSD) to land use planning and land development, with a specific focus on stormwater and freshwater management. Extending this document so it was applicable at a national level would support other regions to adopt water-sensitive

---

<sup>8</sup> <https://www.mottmac.com/digital/moata-carbon-portal>

urban design practices that mimic nature-based solutions, minimise flood risk, and support green urban spaces.

**Guidelines for modelling rainfall runoff.** National guidelines for determining rainfall runoff would support improved decision-making and cost efficiencies on matters such as natural hazard risk assessment (especially for floods) and right-sizing infrastructure investment such as flood protection schemes, stormwater systems, wastewater systems and transport infrastructure.

Such guidelines are commonplace around the world. In New Zealand, there are a limited number of locally specific guidelines have been developed based on rainfall and flow data, for example, *TP108 Guidelines for Stormwater Modelling Runoff in the Auckland Region*. These guidelines are frequently used outside the regions where they were developed, often inappropriately. Gathering robust data and developing locally specific guidelines is costly. This is a key reason why only some places have done so. The increasing intensity of rainfall events with climate change, is exasperating already existing flood risks.

Many areas of New Zealand that are exposed to flood risk lack knowledge, skills, or the money to access flood forecasting techniques or to invest in the capital works to fully mitigate risks. Development of national rainfall and runoff guidelines could be of considerable benefit to these communities by providing better information to prioritise limited resources and manage residual risks via emergency planning.

*31. Are there any other tools or data that would help infrastructure asset owners make better decisions?*

From a Three Waters perspective, more capital investment is needed in tools such as flow meters, smart meters, level sensors and other control and instruments that use IoT for (near) real-time situational awareness. Operational investment is also needed in platforms, software and dashboards to analyse and visualise the data to make better informed and faster decisions. Central government can encourage the Three Waters entities to develop national standards and practices, so entities can share learnings with each other.

New Zealand needs more focus on the resilience of critical infrastructure, built environments, productive land, etc to ensure it is protected from ever-increasing flood risks from rivers, coastal inundation and stormwater. Consideration needs to be given as to how and when to reduce levels of service over time and develop a mechanism to divest assets once a climate change threshold is met.

Further consideration needs to be given to the linkages between various types of infrastructure services. For example, power companies could potentially abandon an asset/services that may directly affect other assets (e.g. pumpstations or treatment plants,) that rely of the power supply. This situation may leave stranded assets that still require servicing, placing disproportionate onus on an infrastructure service provider.

National leadership and coordination is required to ensure that the various infrastructure service providers undertake a cohesive and integrated climate change response and avoid silo thinking. Central government is best placed to carry out that role.

## **Economy and financial system**

*9. What else should central government do to realise a productive, sustainable and inclusive economy that adapts and builds resilience to a changing climate?*

Support the adoption of water metering and volumetric charging for water. Volumetric charging has been shown to reduce water use, and hence improve resilience to drought. As noted by the productivity commission;

“Rapidly emerging technologies such as digital or ‘smart metering’ means that consumers have a far greater sense of the value and importance of the water they receive. Metering results in greater equity than is currently the case, where a blanket uniform annual charge offers no incentive to change consumer behaviour. It helps identify leakage, offers a pricing tool to manage supply in times of Page 7 drought, and allows the consumer to far more effectively manage their demand requirements” (p. 187).<sup>9</sup>

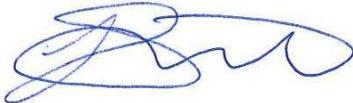
In many areas, managed retreat will require significant shifts in planning and alteration of existing water networks and construction of new networks. For key infrastructure such as (waste)water treatment plants and their conveyance systems, it is also important to plan for investment management and integration of managing climate risks. The final NAP needs to incorporate transition risks and investment arising from adaptive measures.

*45. Should the Government have a role in supporting flood insurance as climate change risks cause private insurance retreat?*

No. It is important that the government does not distort incentives for people to move out of flood prone areas. The Australian Productivity Commission addresses the need to minimise distortions to insurance markets in their report, *Barriers to Effective Adaptation* (p. 23)<sup>10</sup>;

“Minimising distortions to insurance markets Insurance helps people to manage many of the climatic (and other) risks they face. By pricing risks, insurance also gives households, businesses and governments an incentive to reduce these risks. However, government intervention in insurance markets may mean that insurance premiums do not appropriately reflect the underlying level of risk.”

Water NZ thanks the Ministry for the opportunity to provide comments on the National Adaptation Plan. We consent to the release of our submission.



---

Lesley Smith  
Insights and sustainability advisor, Water New Zealand

---

<sup>9</sup> Productivity Commission. (November 2018). Local government funding and financing - Issues paper

<sup>10</sup> Australian Productivity Commission, *Barriers to Effective Adaptation*

<https://www.pc.gov.au/inquiries/completed/climate-change-adaptation/report/climate-change-adaptation.pdf>