



Forest & Bird

TE REO O TE TAIAO | *Giving Nature a Voice*



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To: Ministry for the Environment
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Sent via email to naturalhazardRMA@mfe.govt.nz

From: **Royal Forest and Bird protection Society of New Zealand Inc. (Forest & Bird)**
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Submission on the Proposed National Policy Statement for National Hazard Decision-making.

Introduction:

1. The Royal Forest & Bird Protection Society (Forest & Bird) is New Zealand's largest and longest-serving independent conservation organisation. Our mission is to be a voice for nature – on land, in the sea, and in our fresh waters.
2. Forest & Bird's constitutional purpose is to "take all reasonable steps within the power of the Society for the preservation and protection of the indigenous flora and fauna and the natural features of New Zealand."
3. We are a registered charity, with our funding coming primarily from members and supporters; we receive government grants only for specific projects. Our nearly 50 volunteer branches throughout Aotearoa New Zealand work on the ground to restore nature through activities such as running pest control programs, native plant nurseries, field trips, and public talks.

Summary of Answers / General Comments:

4. Key points from our submission are:
 - a) Overall, Forest & Bird supports the policy intent of the NPS-NHD but submit it needs to be amended significantly to have its intended effect.

- b) The NPS-NHD should apply to all development, including development under the NPS-UD. Leaving some development out could enable the creation of future risk and frustrate future managed retreat efforts, and/or efforts to implement nature-based hazard mitigation measures.
- c) An NES is required alongside the NPS-NHD to give councils the immediate ability to consider natural hazard risk in decision-making on controlled and RD development activities, without waiting for plan changes.
- d) Policy 5 needs to be tightened to remove loopholes that could continue to allow development to go ahead in high-risk locations, and that could create significant residual risks (such as enabling intensified development behind a new stopbank, which could fail and have significant consequence during a large/extreme flood, for example).
- e) Direction is needed on the management of residual risk.
- f) We support the incorporation of a precautionary approach to risk classification, but note it would be useful to define this.
- g) We support the incorporation of the part of Policy 6(a) which prioritises nature-based solutions for hazard mitigation, however this should be strengthened to make nature-based solutions the absolute priority in providing natural hazard mitigation. This is consistent with the National Adaptation Plan and the NPS-FM concept of Te Mana o te Wai.
- h) An additional policy (or policies) should be introduced to recognise the value of existing ecosystems (particularly native forests, wetlands, river corridors, sand dunes, tussockland, etc.) in providing natural hazard mitigation to a wide area in their existing form (i.e., as 'in situ' nature-based solutions), and to require water sensitive design. Recognition of existing ecosystems' value in hazard mitigation could be modeled off provisions already operative in the coastal environment through the NZCPS (policies 25-27) and would ensure consistency in management between coastal and 'inland' areas. This could be achieved by adding sub-provisions (d) - (f) to Policy 5, for example:

Policy 5: Planning decisions must ensure that:

....

(d) in all areas,

(i) the protection, restoration or enhancement of natural defences that protect land uses, or sites of significant biodiversity, cultural or historic heritage or geological value, from natural hazards is provided for, and
(ii) it is recognised that such natural defences include, but are not limited to, native forests, river corridors, floodplains, wetlands, intertidal areas, coastal vegetation, dunes and tussockland, and

(iii) any more than minor adverse effects of development on the ability of those natural defences to continue to mitigate risk, including risk to areas downstream, is avoided, remedied or mitigated, and

(e) use of water-sensitive design, such as through rainwater harvesting devices, green roofs, site landscaping, rain gardens, wetland treatment systems, and low impact stormwater attenuation systems is required, and

(f) redevelopment, or change in land use, where that would reduce the risk of adverse effects from hazards, including managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances, and designing for relocatability or recoverability from hazard events is encouraged, and

(g) a precautionary approach is taken where information is uncertain, unknown or little understood.

- i) The above amended version of Policy 5 should be required (under the NPS-NHD's implementation provisions) to be directly inserted into all relevant plans under section 55 of the RMA as a matter of priority.
- j) The NPS-NHD (or an associated NES) should require all new development to use water sensitive design principles, regardless of what risk area they fall in. We have provided an example of this in the proposed policy amendment above. This is the norm overseas (some places have much stronger direction, with 'green roofs' required in some places¹ for example). A standalone policy could also be introduced to achieve this.
- k) There is no direction relating to any standard approach to the classification of risk, and the use of the term "high" is inconsistent with the RMA term "significant". Incorporation of risk tolerance into risk assessment also makes assessment too subjective. Direction on how risk should be assessed and over what timeframe is needed so consistent national thresholds or trigger levels for risk tolerance can be defined. Specific reference to risk increasing with climate change should also be made. We note there are international standards on risk assessment that could be used as a model.
- l) The NPS-NHD should specifically refer to climate change and climate change increasing risk.
- m) The NPS-NHD should include a policy directing councils to provide information on risk to communities in a way they can readily access and understand (this would be similar to NPS-FM Policy 14 direction that "Information (including monitoring data) about the state of water bodies and freshwater ecosystems, and the challenges to their health and well-being, is regularly reported on and published.")

¹ <https://www.landscapearchitecture.nz/landscape-architecture-aotearoa/greenroof>

- n) An additional objective should be added to the NPS-NHD recognising climate change and the value of nature to hazard mitigation.

Answers to Consultation Questions:

(Q1) Is more action needed to reduce development from occurring in areas facing natural hazard risk?

- 5. Yes. More action is needed to reduce development from occurring in areas facing natural hazard risk.
- 6. Action on this will also provide the co-benefit of helping to discourage development that would encroach into (and adversely impact) important ecosystems or their remnants, particularly where those are prone to natural hazards such as river corridors and floodplains, wetlands, and coastal ecosystems like estuaries and dunes.
- 7. This will also enable the ongoing provision of ecosystem services provided by healthy, well-functioning natural environments to mitigate natural hazard risk (i.e., in-situ nature-based solutions will be able to continue to function, and potential new space for nature-based solutions will be made available through avoidance of development in those spaces).

(Q2) Are there any other parts of the problem definition that you think should be addressed through the NPS-NHD? Why?

Lack of national direction

- 8. The problem definition notes there is currently no national direction to guide decision making. While the introduction of the NPS-NHD would help with addressing this gap, it provides for (1) a delay by needing to be given effect to through plan changes (except for resource consent decisions and designations) and (2) a loophole by not overriding the NPS-UD. In effect, this will mean national direction continues to be limited. The proposed NPS-NHD should apply to areas in the NPS-UD, and an NES should be introduced alongside the NPS to provide decision-makers with immediate scope in decision-making (e.g., to make proposed Policy 4 operative immediately).
- 9. There is also existing direction on managing natural hazard risk in the coastal environment through the NZCPS. The direction is relatively strong (e.g., in Policies 25-27) and should be carried through to the NPS-NHD. However, just carrying this across will still not address the policy gap, as many councils are still yet to give effect to the NZCPS and could take some time to give effect to an NPS-NHD. Again, this is why an NES is urgently needed.

Climate change

10. The problem mentions that severe weather is increasing with climate change. But the proposed NPS-NHD does not include any direction on managing changing risk profiles under climate change. This is a significant gap. Provisions should acknowledge climate change and provide direction on the frequency of reassessment of risk required, for example.

(Q3) Are there other issues that have not been identified that need to be addressed through the NPS-NHD or the comprehensive National Direction for Natural Hazards?

Alignment with other national direction

11. Consideration should be given to the alignment (or misalignment) of the NPS-NHD with other national direction that includes policies on nature-based solutions and hazard mitigation. This includes the NZCPS (Policies 25-27 in particular), the NPS-FM (Policy 4), the NPS-IB (Policy 4 and Section 3.6), the National Adaptation Plan, the Emissions Reduction Plan, and Te Mana o Te Taiao the Aotearoa NZ Biodiversity Strategy (TMOTT). The NPS-NHD provides an opportunity for consistent and strong direction to mitigate natural hazards while restoring biodiversity and protecting existing mitigation functions of intact ecosystems. This should not be missed.

Ability of existing ecosystems to mitigate natural hazards

12. The problem definition should note the general lack of recognition in regional and local government planning documents of the value of existing ecosystems in providing hazard mitigation (e.g., in situ forests, wetlands, dunes, tussock lands, river corridors and floodplains, etc.), as well as a lack of strong policy to protect these systems. More action is needed to stop development occurring in ways or in places that adversely affect the ability of these natural ecosystems to mitigate risk (including the value they provide in slowing climate change by sequestering carbon – thereby reducing *future* increases in risk as well as helping mitigate the impact of hazards themselves).
13. This recognition is directed through the NZCPS (mainly through Policies 25-27) but is currently missing for ‘inland’ areas (except in part for section 3.6 of the NPS-IB, which is yet to be implemented).
14. We have suggested an amendment to Policy 5 (outlined in our summary above) to recognise the value of existing ecosystems in hazard mitigation, using the wording in the NZCPS as its basis. In our view, it doesn’t make sense to have differing direction on hazard management practices in the coastal environment from those elsewhere (particularly when the value of ‘natural defences’ / nature-based solutions often compounds as you reach the coast, with upstream ‘defences’ – such as wetlands and forests – all contributing to protection from impacts further downstream; and given land use activities are not significantly different).

15. The introduction of an NPS-NHD provides an opportunity

- to extend the existing recognition of ecosystems as ‘natural defences’ from the NZCPS to inland areas,
- to extend the direction of the provision for future managed retreat from the NZCPS
- to reduce any conflicts and confusion between ‘inland’ areas and coastal environment and ensure hazard mitigation policy is easier for people to understand
- to reuse familiar / already established terms in policy, such as ‘natural defences’ (though we note the National Adaptation Plan and TMOTT refer to ‘nature-based solutions’)

16. Recognition of ecosystems as natural defences / in-situ nature-based solutions is critical. For example, development needs to be avoided in wetlands as those wetlands buffer flood flows for areas downstream.² (While it can be argued the NPS-FM and NES-F stop development in wetlands, we note they provide several ways around these restrictions, including through offsetting and compensation). Similarly, development that would remove an area of native forest or vegetation should be avoided, as native vegetation mitigates the impacts of heavy rain for those downstream.³

17. The same principle applies to riverbeds and active floodplains, riparian margins, sand dunes, shrubland, tussockland, and mangrove forests. Development that reduces the extent of a riverbed or active floodplain would reduce the flood capacity of that river.⁴ Even areas of historic wetland (and peat wetland in particular) may be providing natural hazard mitigation through the enhanced soil moisture capacity they have as a remnant of their physical geology, even if above the ground they may no longer ‘appear’ to a layperson to be a wetland. Development of these areas presents not only a risk to the development and community itself (e.g., development in a historic wetland would increasingly be prone to flooding) but also to those communities and ecosystems downstream, who are reliant on the buffering effect of that natural ‘asset’ to minimise the impact of natural hazards such as flooding.

18. It is also critical to recognise that these areas are active in slowing the pace of climate change and lowering the risk of extreme weather events, as many of these ecosystems actively sequester carbon and therefore slow the pace of climate change. If they are destroyed, climate change accelerates.

² This was recognised decades ago by the Parliamentary Commissioner for the Environment after Cyclone Bola (and probably earlier by many others), who wrote “The draining of wetlands has intensified flooding problems in many areas, as wetlands can “buffer” floodflows.” <https://pce.parliament.nz/media/lr2n4g4x/inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf>

³ This was also recognised by the PCE in the 1988 report following Cyclone Bola, who wrote “...extensive deforestation... has led to... greatly accelerated, widespread, severe erosion...” and ““...afforestation of the land probably represents the only realistic, economically viable, erosion control option.”

⁴ See for example Brierley et al.’s (2022) ‘Reanimating the strangled rivers of Aotearoa New Zealand’, which notes that through our current approach to river ‘management’ “we may inadvertently be manufacturing future disasters”. <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1624>

19. The NPS-NHD needs to recognise, provide for, and protect the ability of ‘in situ’ nature-based solutions to continue to mitigate natural hazard risk (rather than just prioritising ‘new’ nature-based solutions as per proposed Policy 6(a)).
20. Considerable adaptation costs could be avoided through protection and retention of existing ecosystems 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 28 percent more effective.”⁵ 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. They also avoid a time lag to adaptation and provide a key tool in early adaptation, noting “Research by the Global Commission on Adaptation found that early adaptation is in countries’ strong economic self-interest, with an overall rate of return on investment in improved resilience showing cost-benefit ratios of as much as 10:1 within ten years for some interventions.”
21. The importance of ‘upstream’ natural ecosystems in natural hazard mitigation (in this case, flood mitigation) was recognised in the Parliamentary Commissioner for the Environment’s 1988 report following Cyclone Bola,⁶ which included statements such as (bolding added):
- “The draining of wetlands has intensified flooding problems in many areas, as **wetlands can “buffer” floodflows.**”
 - “**...extensive deforestation... has led to... greatly accelerated, widespread, severe erosion...**”
 - “Under pastoral farming regimes, erosion rates are in general, much greater than soil formation rates on this country... **pastoral farming can not be considered a sustainable land use on much of this hill country...**”
 - “**...afforestation of the land probably represents the only realistic, economically viable, erosion control option.**”
 - “This inquiry has concluded that it is time to change policies and practices to the goal of sustainable land use for all the New Zealand land area. **Policies and practices for today should recognise that sustainability of land use applies to both the hill country and flood plains.** The **policies should recognise that measures to keep floodwaters away from people are required as well as measures to deal with the consequences** of flooding.”
 - “The true social impacts of soil conservation include... mitigation of downstream impacts... e.g. on water quality, flooding [and] retention of the soil resource for future generations... [these] have real value to society...”

⁵ <https://helenclark.foundation/publications-and-medias/sponge-cities/>

⁶ <https://pce.parliament.nz/media/lr2n4g4x/inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf>

22. In addition to the recognition of in-situ ecosystems and their role in mitigating flood risk, the NPS-NHD needs a stronger emphasis on the use of 'new' nature-based solutions to mitigate flood risk (beyond that proposed in Policy 6). This is discussed more below.

Management of Residual Risk

23. Despite the proposed NPS-NHD directing decision-makers to develop in lower risk locations, it still provides loopholes to allow development in high-risk locations (discussed below in response to question 4), potentially creating significant residual risks (also discussed below).

(Q4) Do you support the proposed NPS-NHD's requirement that decision-makers take a risk-based approach when making decisions on new development in natural hazard areas? Why or why not?

24. Yes, we support this in principle. Climate change will exacerbate exposure to and risk from natural hazards. This risk will affect both the built and natural environment. Reducing risk to people and property, such as by avoiding development or intensification in high-risk environments is essential. Methods such as avoidance of high-risk areas often provide the potential to increase the protection and therefore resilience of the natural environment and ecosystems to the impacts of climate change.

25. However, we are concerned that the way risk is dealt with through decisions made under the proposed NPS-NHD could result in significant residual risks for communities and frustrate the ability of communities to develop more sustainable nature-based risk-reduction strategies in the future.

26. Our key concerns with how the NPS-NHD approaches risk are:

- the proposed NPS-NHD is vague when it comes to risk assessment – there is no direction on how risk is to be assessed or over what timeframe, and there is inappropriate inclusion of 'tolerance' in risk assessment
- even where high natural hazard risk areas are identified, there are relatively easy pathways to develop in those areas
- the NPS-NHD does not manage residual risks, which will remain (or be exacerbated) even where hazard protection is provided
- the proposed pathway for development in the context of the risk-based approach (under Policy 5) could promote the use of site-scale 'engineered' management of risk, and frustrate the use of landscape-scale nature-based approaches (preferred under Policy 6)

27. The consultation document notes (p. 17) that councils will undertake risk assessments as part of a "plan change, consent application or designation process" and that "as a result of this assessment, appropriate safeguards will then be put in place or, where appropriate, plan changes and consent applications will be declined."

28. While it is promising to see sentiment that development in high-risk areas will be declined, the proposed NPS-NHD policies provide a relatively straightforward way for an applicant to provide what might be considered “appropriate safeguards”, such as through proposed Policy 5 which says development should be avoided “unless the risk is reduced to a tolerable level”, which could be achieved through the construction of a stopbank, for example.
29. Similarly, in moderate-risk areas, “mitigation measures” are required, which again could be achieved using stopbanks. This could result in development going ahead, resulting in a community then being developed behind that stopbank who feel they are at low risk of flooding. This was recognised by the Parliamentary Commissioner for the Environment following Cyclone Bola, who noted (in 1988) “Public perception of river control schemes has been that the schemes offer an absolute standard of flood protection and unwise intensive development behind stopbanks has often been encouraged.”⁷
30. In these cases, while the risk of small/common floods might have been reduced to a “tolerable level”, the risk/consequence of a large flood may have been increased. This was illustrated in Hawke’s Bay in the Pakowhai area, where the convergence of two stopbanks designed to protect the area effectively caused the area to flood to much greater depths than it otherwise would have once water had overwhelmed the stopbanks, resulting in people being evacuated from their rooftops by helicopter and boat. This has also been identified as a risk for Westport.⁸
31. This is a significant “residual risk”, which the NPS-NHD should acknowledge and provide direction on. While this may be addressed through proposed Policy 6 (“...natural hazard mitigation measures [should] not exacerbate natural hazard risks in other areas...”) it is unclear if and how this applies to these sorts of residual risks.
32. In our view, it is much more sustainable and safer for communities, as well as more enabling of nature-based solutions (and therefore better for the ecology of rivers, floodplains, and wetlands, for example), to keep communities out of harm’s way where possible. This was noted by Brierley et al. (2022)⁹ in their recent paper on river management in Aotearoa, which included the statements “working against nature does not work”, “[we] may inadvertently be manufacturing future disasters”, and “moving out of harm's way saves lives”.
33. With regard to the frustration of the future use of nature-based solutions in the context of a risk-based approach: providing easy pathways through the NPS-NHD to reduce risk to “tolerable levels” and use “mitigation measures” through, for example, the use of stopbanks, could lock-in an engineered ‘solution’ for a prolonged period. In the case of stopbanks and edge protection plantings (such as willows), these could significantly narrow the active floodplain or channel width of a river corridor, with the future ability to shift those stopbanks – and adopt a nature-based approach of

⁷ <https://pce.parliament.nz/media/lr2n4g4x/inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf>

⁸ <https://www.newsroom.co.nz/holes-found-in-westport-flood-plan>

⁹ <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1624>

‘making room for’ the river¹⁰ – then being extremely difficult (given that development behind those stopbanks often occurs, and land parcels go into private ownership, with landholders then expecting ongoing flood protection and buyouts becoming difficult).

34. While the proposed NPS-NHD Policy 6(a) states a preference for nature-based solutions, it has the caveat that this only applies “where possible”. It is unclear what the test for “where possible” is. Policy 6 also applies a test of “over the life of any new proposed development”. We are concerned that that an engineered solution could be considered the “most effective” mitigation over the ‘life’ of a development, but it would be much more cost-effective and co-beneficial to use a nature-based approach over a longer period. This should be recognised by the NPS-NHD.
35. The NPS-NHD should make nature-based solutions the absolute priority in providing natural hazard mitigation.

(Q5) Should all natural hazards be in scope of the proposed NPS-NHD? Why or why not?

36. Yes. It makes sense for all hazards to be considered together, particularly given the co-benefits of using nature-based solutions to mitigate natural hazard risk often occur across interconnected hazards – e.g., native forests help protect downstream communities from flooding but are also less fire-prone than exotic forests, thereby reducing fire risk. Co-benefits need to be considered together.
37. However, it may be appropriate for the priority given to certain hazards to be approached differently under the NPS-NHD. For example, earthquake risk is often given a significant priority in our communities given its high consequence, even though frequency of large events is relatively low. But we lack this same elevation and understanding of flood risk – with no standardised approach to managing risk or communicating how to respond to floods for the public. With flooding as our number one hazard, and with climate change increasing flood occurrence, more investment is needed on this front (including investment in conservation and nature-based solutions to mitigate risk).
38. Many hazards perhaps seen by communities as having been ‘low priority’ (flooding, drought, fire) will become higher risk as climate change exacerbates hazard severity and frequency. Including all hazards in the NPS-NHD now will enable New Zealand to be better prepared to deal with new and emerging hazards (e.g., severe drought, sea level rise, freshwater salinization, etc.).

(Q6) If not all natural hazards are in scope, which ones should be included? Why?

39. As above, all hazards should be considered together. Even those that might not at first seem relevant to be considered together, such as earthquakes and flooding, could play out together. This

¹⁰ https://www.forestandbird.org.nz/sites/default/files/2022-11/F%26B_Room-For-Rivers_Report_online_0.pdf

is illustrated by the township of Franz Josef, for example, where an earthquake, landslide, and flood could feasibly occur at the same time. The example of subduction during the Canterbury Earthquake Sequence creating heightened flood risk can also be considered.

(Q7) Should all new physical development be in scope of the proposed NPS-NHD? Why or why not?

40. "New development" in the proposed NPS-NHD (as per p. 18 of the discussion document¹¹) includes "all new buildings or structures, extensions to existing buildings, replacement of existing buildings and the construction, extension or replacement of infrastructure. This includes residential and multi-unit dwellings, papakāinga, marae, educational facilities, health facilities, visitor accommodation, community facilities, commercial and infrastructure developments."
41. However, the proposed NPS-NHD then excludes development under the NPS-UD (section 1.5).
42. This appears to mean councils do not have to consider natural hazard risks as directed by the NPS-NHD for developments under the NPS-UD. While the discussion document notes "most local authorities have applied natural hazard risk as a qualifying matter to their proposed plan changes", we take this to mean not all councils have. It would make sense for the NPS-NHD to direct a consistent approach to NPS-UD development that minimises future risk for communities. I.e., it should apply to all development.
43. Excluding development that involves intensification in existing developed areas does not make sense. Increasing housing density and/or undergoing brownfield development will likely result in a higher population density and additional infrastructure in these areas. If these areas are in high or moderate risk locations, the increased presence of both people and infrastructure will increase exposure to hazards, in-turn increasing hazard risk. Excluding such developments from the NPS-NHD would be contradictory to its objective.
44. Also, development in these NPS-UD areas where they might otherwise be better suited to transition to nature-based solutions or could be candidate locations for managed retreat in future (such as, for example, low-lying areas that are tagged for intensification or development) would exacerbate the ability of communities to implement nature-based solutions in these areas and frustrate future retreat.
45. The NPS-UHD should therefore apply to all new development and should not exclude development under the NPS-UD.

¹¹ <https://environment.govt.nz/assets/publications/RMA/Proposed-National-Policy-Statement-for-Natural-Hazard-Decision-making-Discussion-document.pdf>

(Q8) What impact do you think the proposed NPS-NHD would have on housing and urban development? Why?

46. The NPS-NHD *should* provide decision-makers with the ability to better direct appropriate land use while protecting communities from hazards and restoring the natural environment. Keeping development out of high risk zones should facilitate greater attention to the need for water sensitive design, managed retreat, widening/restoring river corridors, and floodplain/wetland restoration, and on the co-benefits that come with these initiatives.
47. However, as noted elsewhere, in our view the proposed NPS-NHD will not achieve this outcome. Significant work is needed to strengthen the direction in the NPS and provide decision-makers with the abilities they need to address natural hazard risk in a changing climate.
48. If developed effectively, the NPS-NHD will help drive a movement toward positioning communities out of harm's way and opening high-risk areas such as river corridors/floodplains, coastal areas, and wetlands (including historic wetlands) for potential nature-based solutions such as wetland restoration and making room for rivers. This will have a positive long-term effect on community and environmental wellbeing and help achieve sustainable management of the environment as per the RMA direction.

(Q9) Do you agree with the proposed objective of the NPS-NHD? Why or why not?

49. Yes. However, we consider an additional objective similar to that of NZCPS Objective 5 would be appropriate. This would create consistent management of hazards between the coastal environment and inland areas and ensure the value of nature and nature-based solutions in mitigating the impacts of climate change are recognised.
50. We suggest an amendment to include an additional objective:

Objective 2: To ensure that natural hazard risks are managed by:

- taking account of climate change
- locating development away from areas prone to significant risks
- considering responses, including managed retreat, for existing development in this situation; and
- protecting, restoring, and recreating natural defences to natural hazards.

(Q10) What are the pros and cons of requiring decision-makers to categorise natural hazard risk as high, moderate or low?

Pros:

51. Decision makers will be directed to favor development in low-risk locations

Cons:

52. The proposed NPS-NHD is vague when it comes to risk assessment, and inappropriately includes community tolerance in risk assessment.
53. While we support the categorisation of risk, further direction is needed. We recommend looking internationally for examples of this (such as in the UK for flood risk; the Australian Geotech Society's (AGS) landslide risk management (LRM)/risk to life¹²; and ISO 31000 Risk Management) and incorporating thresholds for hazard events (such as a 1% Annual Exceedance Probability flood; or “next 100 years” as per the NZCPS) that risk must be assessed against for various risk levels.
54. While the AGS guideline given as an example above is currently only relevant to LRM, it has established a framework for conducting LRM within a defensible and rigorous set of guidelines and legislative requirements, creating clear guidance both to the regulator and the practitioner. This creates a consistent approach that can be adopted throughout land use planning and consenting around the country. Such a framework (though with a wider scope) should be established in New Zealand to allow a level of consistency and shared understanding and acceptance of risk tolerance.
55. It is essential the community, decision makers, the public sector and insurance companies have a collective understanding of risk, to then inform conversations around what levels of risk are acceptable. Without alignment in the understanding of risk, the management of risk will become fractured, ineffective, and costly – and the public will continue to have an extremely poor understanding of potential risk from natural hazards.
56. The NPS-NHD also doesn't account for residual risk, as discussed above (whereby measures to reduce risk make a risk low, but a residual risk can then have catastrophic consequences, such as occurred in Pakowhai in Hawke's Bay whereby stopbanks provided protection from most floods but then became a significant hazard themselves when overwhelmed). This is a significant gap in the NPS.
57. Despite risk categorisation for planning decisions, it is likely public perception of risk will still be misguided if there is no communication of risk. For example, an area might be inherently high-risk but when protected by a stopbank it might become 'low risk'. The hazard – the river – is still there and could still cause significant damage to the community behind the stopbank (as per Pakowhai, or Puketapu, or Taradale during Cyclone Gabrielle) but the community may not understand the nuance of the residual risk. Again, this was noted by the Parliamentary Commissioner for the Environment after Cyclone Bola, who said “Public perception of river control schemes has been that the schemes offer an absolute standard of flood protection...”.¹³ If the public do not understand risk, and if risk categorisation varies across the country, this could worsen the impact of future floods, make

¹² <https://cdn.boprc.govt.nz/media/741561/2018-02-13-australian-geomechanics-society-2007-landslide-risk-management-australian-geomechanics-vol-42-no-1-march-2007-complete-version-for-notification-web.pdf>

¹³ <https://pce.parliament.nz/media/lr2n4g4x/inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf>

recovery more difficult, and frustrate future needs for nature-based interventions (such as making room for rivers) or managed retreat.

58. To this end, we recommend the NPS-NHD include a policy directing councils to provide information on risk to communities in a way they can readily access and understand (this would be similar to NPS-FM Policy 14 direction that “Information (including monitoring data) about the state of water bodies and freshwater ecosystems, and the challenges to their health and well-being, is regularly reported on and published.”)
59. As noted elsewhere, simply categorising risk does not remove the risk. Even though the proposed NPS-NHD directs decision-makers to favour development in lower risk locations, it still provides easy loopholes for decision-makers to allow development – for example where “risk is reduced to a tolerable level”, “there is a functional or operational need for the new development”, “there are no practicable alternatives for the new development”, and “risk is reduced to as low as reasonably practicable” (Policy 5). These loopholes could very likely result in status quo development, with every applicant or council arguing their way through restrictions based on these ‘pathways’ through the policy. The NPS-NHD should not provide such easy pathways through its direction.

(Q11) What are the pros and cons of directing decision-makers to assess the likelihood, consequence and tolerance of a natural hazard event when making planning decisions?

Pros:

60. Assessing likelihood and consequence will enable better land use decisions, and hopefully empower communities to make more informed decisions. However, as noted elsewhere, some direction should be given as to what sort of likelihood events need to be assessed (e.g., at least 1% AEP events). Attention should also be given to how likelihood and consequence will change over time with climate change, and direction should be given as to how this is to be factored into decision making (such as how often reassessments of risk should be undertaken).
61. Assessing consequence could help deal with residual risks, such as discussed above in relation to Pakowhai during Cyclone Gabrielle in particular. I.e., a council should consider that even though a stopbank exists and has resulted in low likelihood of flooding, the stopbank may have exacerbated the consequence of flooding in an ‘over-design event’, therefore a ‘protected’ area could still be a moderate or high-risk area (e.g., Pakowhai). We note for this to provide useful direction to decision-makers, it needs to be clear how proposed policies 2 and 5 interact to ensure that natural hazard risk is continually being assessed throughout a development proposal process, not just prior to it. E.g., where a developer simply proposes a stopbank to reduce the likelihood of flooding a high-risk area (to pass the requirements of policy 5) the consequence of that stopbank being overtopped should then be assessed, as the stopbank could create residual risk that is then also intolerable.

Cons:

62. While it is valuable to assess tolerance to risk to make decisions as a community, **tolerance to risk should not form part of an assessment of risk itself**. Tolerance to risk is something to discuss after the risk itself is assessed.
63. The NPS-NHD talks about risk tolerance but there is no clear definition of what ‘tolerable’ or ‘intolerable’ risk is apart from relatively vague references to loss of property and/or potential loss of life. In practice this will likely differ substantially amongst decision-makers and the wider community. While community consultation is valuable, this is not an appropriate way to manage risk.
64. Tolerance may be a legitimate factor when it comes to how councils respond to risks. But allowing new development to occur in high-risk natural hazard areas based on subjective judgements about tolerability, or people’s actual or perceived willingness to bear that risk, is concerning – especially when those who are assessing tolerance may not be the ones who then have to actually live with (tolerate) that risk. Over-estimating tolerance could also frustrate opportunities for ecosystem restoration of / retreat from, higher risk locations.

(Q12) What are the pros and cons of directing decision-makers to adopt a precautionary approach to decision-making on natural hazard risk?

65. As above, we support the inclusion of taking a precautionary approach.
66. Weather, flood, and inundation modelling is inherently uncertain, so using a precautionary approach will maximise the potential to keep people out of harm’s way and enables sustainable (and economically sound) investment.
67. A precautionary approach (i.e. erring on not developing higher risk areas) maintains scope for nature-based solutions, such as wetland restoration and making room for rivers, in these areas. This can then have significant economic, cultural, social, and environmental co-benefits.

(Q13) What are the pros and cons of requiring natural hazard risk as a matter of control for any new development classified as a controlled activity in a plan, and as a matter of discretion for any new development classified as a restricted discretionary activity?

Pros:

68. As per the above answers, directing councils to ensure natural hazard risk is a matter of discretion through development decisions will ensure councils can make better decisions about land use planning and proactively implement nature-based solutions, making room for rivers, water sensitive

design, urban-greening, and ecological corridors (for example). This has many social, economic, cultural, and environmental co-benefits and will ensure communities are safer from natural hazards.

69. It will assist councils in avoiding the frustration of any potential needs for managed retreat from or ecosystem restoration (i.e., development of nature-based solutions) in hazard prone areas, such as floodplains and historic wetlands.
70. It aligns with requirements in the act and documents under it (e.g., the NPS-FM, NPS-IB, National Adaptation Plan, TMOTT, etc.) to consider climate change in decision making.
71. As noted above, we consider an NES would be useful to give councils immediate discretion to consider natural hazard risk as a matter of control.

(Q14) What are the pros and cons of requiring planning decisions to ensure the specific actions to address natural hazard risk outlined in policy 5?

Pros:

72. Policy 5 provides scope for decision makers to decline development in high-risk areas. However, the direction is weak and has many loopholes, and it relies on councils making plan changes before they can exercise this discretion.
73. Policy 5 provides direction to enable development in low-risk areas, meaning this should be favoured over high-risk areas (noting this must still need to be subject to other tests to ensure adverse effects on the environment are avoided). High-risk areas (steep hillsides, floodplains, historic wetlands, etc) should therefore be more readily available for ecosystem restoration and implementation of nature-based solutions - i.e., native afforestation, wetland restoration, making room for rivers, which then decrease hazard risk in 'downstream' areas, for example.

Cons:

74. As discussed above, simply requiring planning decisions to ensure that "risk is reduced to a tolerable level" (6(a)) or that "mitigation measures" are used to reduce risk (6(b)) in high and moderate risk areas could continue to worsen risk exposure for communities, particularly to residual risks, and continue to degrade the environment. For example, a development may be allowed to go ahead in a high or moderate risk area on the basis that it will include the construction of a stopbank to 'protect' it. While this could protect the development from small/moderate floods, it may not protect it from large/extreme floods, which will increasingly be experienced under climate change. These large floods would be less likely than small floods, but the consequence would be much greater. In this way, stopbank construction, enabled by the direction in proposed NPS-NHD, could create a serious residual risk (as well as path dependency).

75. Brierley et al. (2022)¹⁴ provide commentary on this phenomenon:

“this policy framing establishes and perpetuates undue confidence in the totality of flood protection. This, in turn, encourages further development, thereby raising land and property values and initiating an unending cycle that necessitates on-going investment in flood protection at all costs (cf., Donaldson, 2021). Ultimately, all flood defenses have limits, and incentivizing development on naturally vulnerable land serves only to engineer disasters into the future (Tobin, 1995). Eventually, regulating structures will fail or require prohibitively expensive maintenance.”

76. We note (again) the words of the PCE following Cyclone Bola, who wrote (1988):

“Public perception of river control schemes has been that the schemes offer an absolute standard of flood protection and unwise intensive development behind stopbanks has often been encouraged.”¹⁵

77. As currently worded, Policy 5 will create problems for future planners to try and untangle and could continue to result in people being in harm’s way - and miss opportunities to implement nature-based solutions in high-risk areas.

78. Policy 5 needs to be much stronger in directing development away from high-risk areas and should not provide so many loopholes for significant residual risk to be created (and exacerbated). It provides too many pathways around the requirement to avoid development in high-risk areas.

79. The first pathway (at 6(a)), being to reduce risk “to at least a tolerable level”, is problematic in that tolerance is subjective and there it is unclear who decides on tolerance vs. who then has to tolerate the risk.

80. Other ‘pathways’ include (ii) “functional or operational need”, (iii) “no practicable alternative”, and (iv) reducing risk “to as low as reasonably practicable”. These are low tests that will readily be overcome by developers keen to develop high-risk areas – if not at a council level, then through subsequent Environment Court appeals. These policy tests are not sufficiently stringent to avoid development in high-risk locations, and will continue to lead to problematic development that creates path dependency and frustrates future efforts on managed retreat, nature-based solutions, and ecosystem restoration. These loopholes need to be closed or tightened significantly so only very specific types of development can occur.

¹⁴ <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1624>

¹⁵ <https://pce.parliament.nz/media/lr2n4g4x/inquiry-into-flood-mitigation-measures-following-cyclone-bola-december-1988-small.pdf>

81. Policy 5 also includes an allowance for development that “is not a new hazard-sensitive development” to occur in high-risk areas (5(a)(i)). We understand this provides for industrial and commercial development, such as ports, farm infrastructure, and other industrial activities. While we appreciate that some development by nature would only ever occur in a high-risk area (such as a port in an area at risk of sea level rise) and would usually be for uninhabited development, we consider this provision inappropriate.
82. Providing for unjustifiable development in these areas through (5(a)(i)) does not keep people out of harm’s way and frustrates the ability for these areas to be zones of retreat, including for ecosystem retreat (such as where an estuary may need to retreat inland to continue to provide habitat for native species).
83. There are many types of development that would be allowed through (5(a)(i)) that are extremely vulnerable to natural hazards and could cause significant harm to the natural environment. For example, many wastewater treatment plants, chemical storage facilities, fertiliser factories, and electricity substations are already located in high-risk locations. This has created serious issues during flooding. For example, during Cyclone Gabrielle in Napier, the Redclyffe substation flooded (cutting off power to most of Napier), the Ravensdown fertiliser factory flooded (polluting water), a large composting yard flooded, and the Awatoto wastewater treatment plant was flooded and bypassed for months. All of these pieces of infrastructure could arguably be consented in their current locations under proposed Policy 5.
84. As proposed, Policy 5 will not ensure future-proofed design-making. Instead, it will continue to allow for problematic placement of infrastructure and create significant future costs. It will also create the potential for significant pollution events, with potentially serious adverse effects.
85. Stronger direction is needed to
- a. deter development of all types of infrastructure in high-risk areas
 - b. Prevent developers simply reducing risk “to as low as reasonably practicable” but then continuing to develop in at-risk areas
 - c. recognise the potential need for those areas to be restored as part of a nature-based hazard mitigation measure or for retreat of ecosystems that need that space.

(Q15) What is the potential impact of requiring decision-makers to apply this framework in their decision-making? Will it improve decision-making?

86. As per above answer.

(Q16) What are the pros and cons of providing direction to decision-makers on the types of mitigation measures that should be adopted to reduce the level of natural hazard risk?

Pros:

87. Directing a preference for nature-based solutions will ensure that these measures, which are often more cost-effective and have environmental, social, and cultural co-benefits, will be given consideration in the first instance over engineered mitigation measures.
88. Directing a preference for nature-based solutions is consistent with the National Adaptation Plan, the Emissions Reduction Plan, and Te Mana o Te Taiao (Aotearoa NZ Biodiversity Strategy), as well as the purpose of the RMA, the NPS-FM, and NPS-IB.

Cons:

89. While Policy 6(a) states a preference for nature-based solutions, it has the caveat that this only applies “where possible”. It is unclear what the test for “where possible” is. Policy 6 also applies a test of “over the life of any new proposed development”. As noted elsewhere, it could be that an engineered solution is considered the “most effective” mitigation over the life of a development, but it would be much more cost-effective and co-beneficial to use a nature-based approach over a longer period of time. This should be recognised by the NPS-NHD. Policy 6 should be strengthened to make nature-based solutions the absolute priority in providing natural hazard mitigation.
90. Policy 6 states that “...natural hazard mitigation measures [should] not exacerbate natural hazard risks in other areas...”. It is unclear if and how this applies residual risks (discussed above), where a mitigation measure might remove some small/moderate hazards (such as small floods) but could exacerbate the impact of large/extreme hazards (floods like Cyclone Gabrielle).
91. In our view, it is much more sustainable and safer for communities, as well as more enabling of nature-based solutions (and therefore better for the ecology of rivers and wetlands, for example), to keep communities out of harm’s way where possible. The direction in the NPS-NHD needs to be very clear that a mitigation measure should create significant residual risk, including behind that piece of mitigation itself. This should apply particularly strongly where new mitigation measures are proposed (new stopbanks, for example).
92. Even where mitigation such as stopbanks already exist, going forward a developer should have to use mitigation methods that reduce the inherent risk while not increasing residual risk. For example, if a developer wanted to increase the height of a stopbank to manage risk under Policy 5, this should largely be ruled out as an option as it would make the consequence of that stopbanks being overtopped larger.¹⁶

¹⁶ <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1624>

93. Strong direction should be given that would drive the developer to have to look at ways to reduce risk while maintaining or reducing residual risk, such as creating a wider corridor for the river between the existing stopbanks or using upstream mitigation measures such as native forest planting and wetland creation to hold water upstream. This is internationally accepted as best practice (e.g., see the UK's natural floodplain management^{17,18}).
94. This approach provides the best ecological outcomes and greatest potential for ecosystem restoration. Again, this approach was noted by Brierley et al. as the preference for river management in their recent paper (2022),¹⁹ which included the statements "working against nature does not work", "[we] may inadvertently be manufacturing future disasters", and "moving out of harm's way saves lives".

(Q17) Does policy 7 appropriately recognise and provide for Māori rights, values and interests? Why or why not?

95. We support the intent of Policy 7 and note recognition of Māori rights, values, and interests is consistent with the concept of Te Mana o te Wai and its application to managing rivers and floodplains (and their natural hazard risk), and support that.
96. We note Policy 7 appears significantly limited in scope given it applies only to specified Māori land and we question whether this is sufficient to appropriately provide for Māori rights, values, and interests. We suggest decision-makers listen to Māori to determine whether this is sufficient.

(Q18) Can traditional Māori knowledge systems be incorporated into natural hazard risk and tolerance assessments?

97. Yes. Māori/Iwi have a long history of living with nature in Aotearoa, including living with natural hazards such as flooding. There is a significant body of knowledge about where and how rivers flood, for example, that Māori/Iwi hold which will be critical to keeping communities safe in the future, and in restoring our landscapes appropriately (such as restoring wetlands where they were destroyed, etc.).

(Q19) Does the requirement to implement te Tiriti settlement requirements or commitments provide enough certainty that these obligations will be met? Is there a better way to bring settlement commitments into the NPS?

98. We are not placed to respond to this question.

¹⁷ <https://www.gov.uk/government/news/natural-flood-management-part-of-the-nations-flood-resilience>

¹⁸ <https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>

¹⁹ <https://wires.onlinelibrary.wiley.com/doi/epdf/10.1002/wat2.1624>

(Q20) Is the implementation timeframe workable? Why or why not?

99. The discussion document states that “until a local authority makes a plan change, decisions will rely on existing plans including their rules to trigger the need for consent.” This will not be sufficient to ensure future development and communities are kept out of harm’s way, and that sufficient progress can be made on implementing nature-based solutions to help us rapidly adapt to the impacts of climate change (while trying to reverse and slow the biodiversity and climate crises).
100. By way of example, Forest & Bird presented a submission to Hawke’s Bay Regional Council on their long-term plan in 2021, in which we emphasised the significant narrowing of river corridors between stopbanks and the flood risk this had created. We also emphasised the need to adopt nature-based solutions to flood management. Despite this, development in Hawke’s Bay is still being proposed in flood-prone locations.²⁰ Councils need the ability to decline this sort of development immediately, lest it frustrate future planning decisions and create significant risks to communities, while taking up valuable spaces where ecosystems could be restored (or retreat to).
101. Another example is the area of Hawke’s Bay zoned as category 3 for voluntary buyouts following the cyclone that had originally been opposed for development by both local and regional councils. Those councils now face costs of buyouts, despite never wanting that development to go ahead.
102. Ideally, the Policies in the proposed NPS-NHD policies would have immediate effect. To that end, **we suggest that an NES be written to immediately implement proposed Policy 4 in particular.**
103. Policies in the NPS-NHD could also have near-immediate effect by requiring them to be written into regional/district plans under section 55 of the RMA as a matter of priority. This would drive planning decisions towards keeping people out of harm’s way and implementing nature-based solutions (assisting with implementation of the NPS-FM, NPS-IB, NZCPS, National Adaptation Plan, Emissions Reduction Plan, and TMOTT).

(Q21) What do you consider are the resourcing implications for you to implement the proposed NPS-NHD?

Local / Regional Government

104. Councils will need significant investment support to assist with the implementation of nature-based solutions to help mitigate flood risk, particularly in high-risk locations where development would increasingly be restricted. While some of this could be financed by developers (who would be required to provide mitigation, with a preference for nature-based solutions), councils will also need

²⁰ <https://www.rnz.co.nz/national/programmes/checkpoint/audio/2018878658/planned-hawke-s-bay-development-on-flood-prone-land-dumb-regional-councillor>

to be proactive in initiating managed retreat and ecosystem restoration to mitigate flood risk. This could involve acquiring land in high-risk areas, which would come at a cost, as well as doing things like shifting/rebuilding stopbanks further back from rivers, initiating large-scale native afforestation projects, and restoring wetlands. Central government support will be needed, or alternative financing arrangements.

105. Resources may also be required to assist councils (particularly those smaller councils with smaller rates bases) with flood hazard mapping, LiDAR surveys, and community engagement and education on natural hazard risk, etc. Currently, many flood and risk assessment processes are funded by one-off grants. This is insufficient to manage main natural hazard. We need a coordinated and centrally funded approach to ensure the best outcomes for everyone. We recommend a national approach to flood risk mapping, risk assessment, and flood response be funded by central government.
106. Council functions may also have implications for resourcing. Currently there is a separation of critical functions relating to climate mitigation and adaptation actions between regional councils and territorial authorities (TAs), despite the issues overlapping significantly. For example, regional councils are responsible for management of rivers, river beds, and flood protection – i.e., keeping floodwaters away from communities. But TAs are responsible for the zoning of land for housing – i.e., potentially keeping communities away from floodwaters (but also for enabling development). This separation leads to conflicting decision-making, such as were a TA wants to enable housing intensification in a low-lying area but a regional council wants to avoid flood risks. To help address this issue, council functions should be more integrated, and responsibilities and outcomes should be better aligned. i.e., all decision makers should be working towards the same plan – intensifying ‘safe’ areas for communities and housing, while restoring higher-risk areas for biodiversity (and other) gains or managing them in a way that they can be used for production without compromising environmental health. Council funding should also be more well aligned, so that ratepayers’ investment is not being pulled in different directions and is instead being utilised to achieve a sustainable, well-planned future.

Community

107. We see communities as being engaged in natural hazard decision making in several ways – the most important being
- a. active participation in understanding the need for potential retreat and in making decisions related to it and
 - b. active participation in implementing retreat and nature-based solutions to help adapt to climate change or restore areas following retreat.
108. Communities, including community groups and non-governmental organizations (NGOs), will need substantial financial support to facilitate this. For example, community groups (and local

councils supporting them) will need resource to ensure they have the best information in front of them to understand natural hazard risks, and to enable facilitation of groups that can discuss and decide on potential managed retreat, including developing policies and plans which can be translated into local rules and initiatives.

109. Where retreat occurs and ecosystem restoration replaces the previous land use, or where nature-based solutions form part of managed retreat, community groups may need resources to support that too. For example, many local conservation groups are critical to restoring wetlands and forests, which help slow climate change and provide nature-based solutions to buffer communities from hazards. By earmarking resources to enable community participation in proactively engaging in managed retreat and ecosystem restoration initiatives, both central and local government will empower and engage with communities. This approach may yield additional benefits, such as fostering collaborative relationships and facilitating meaningful consultations, enhancing cultural and social connections, and savings costs, all while enhancing at-place resilience and deepening community understanding of adaptation.
110. A good example of this comes from Auckland Council. Following the events of early 2023, they released a plan called 'Making Space for Water'. This initiative seeks to enable managed retreat, while also enabling nature-based solutions throughout the region. The council has prioritised community-led flood resilience and the establishment of blue-green corridors throughout the region. Making Space for Water creates a living example of engaging with communities to enable nature-based solutions in New Zealand. Programs such as this should be promoted and resourced throughout the country, with significant investment from central government.

(Q22) What guidance and technical assistance do you think would help decision-makers to apply the proposed NPS-NHD?

111. The further development of nationally relevant and available tools, such as the NIWA Drought Forecasting Tool,²¹ the EQC Natural Hazards Portal,²² and National Seismic Hazard Model.²³
112. Development of a national guideline for acceptable risk would also be useful (as noted earlier in this submission).
113. Government should undertake mapping and analysis to show the significant provision of mitigation of hazards by existing natural assets (such as native forests, wetlands, dune, etc.). Currently, councils continue to undervalue these 'in situ' nature-based solutions and they continue to be lost or given very limited protection, despite the requirements of the RMA. Councils need to

²¹ <https://shiny.niwa.co.nz/drought-forecast/>

²² <https://www.naturalhazardsportal.govt.nz/s/>

²³ <https://www.gns.cri.nz/research-projects/national-seismic-hazard-model/>

see the value of these natural assets and have clear justification not to let them be lost - and to restore them (and *require* the restoration of them) during development.

114. Guidance on how to implement nature-based solutions in Aotearoa, including case studies. While such documents exist overseas (e.g., the UK^{24,25}), New Zealand largely lacks this. We need example case studies (which there are many of in Aotearoa now) as well as existing guidance (e.g., Application of Room for the River for NZ Rivers & Streams;²⁶ Sponge Cities: Can they help us survive more intense rainfall?²⁷) to be brought together in a useful resource that councils can use to direct and require better development through their plans.

SUBMISSION ENDS

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

²⁵ <https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>

²⁶ NZ River Managers Guidelines, <https://www.resilientrivers.nz/files/1691018720694.pdf>

²⁷ <https://helenclark.foundation/publications-and-medias/sponge-cities/>