Interim Regulatory Impact Statement: Water security and water storage

Coversheet

Purpose of Document	
Decision sought:	*This interim analysis has been prepared to support Cabinet decisions on which proposals should be progressed to public consultation on freshwater national direction amendments relating to water security and water storage.*
Advising agencies:	*Ministry for the Environment (MfE)* *Ministry for Primary Industries (MPI)*
Proposing Ministers:	*Minister Responsible for RMA Reform* *Minister of Agriculture* *Associate Minister for the Environment*
Date finalised:	*12 March 2025*

Problem Definition

Freshwater is already scarce at critical times in much of New Zealand, and water security is becoming increasingly important in a changing climate as the natural availability of water declines and/ or becomes more unpredictable. The gap between water demand and supply is expected to increase in future if no action is taken to manage demand or improve supply. Adaptation options, such as water storage, will be needed to maintain and improve water security and remain resilient.

Executive Summary

Scope

The scope of this interim RIS is deliberately narrow to deliver on commitments in 2025 as part of Phase Two of the Government's resource management reform programme (amending national direction).The options in scope are those that involve changes to the resource management system to improve water security and better enable water storage.

The main issue raised during engagement was access to and allocation of freshwater. This is beyond the scope of Phase Two and will be considered in Phase Three (replacement of the Resource Management Act 1991).

The Fast Track Approvals Act 2024 and the Building (Dam Safety) Amendment Regulations 2024 have recently been implemented to make it easier to build large scale water infrastructure and reduce regulatory requirements for smaller scale on-farm storage. Those changes are out of scope of this interim RIS.

Process/ targeted engagement

The options outlined in this interim RIS have benefited from initial targeted engagement with stakeholders (council representatives, industry representatives, and environmental non-government organisations (eNGOs)) and iwi/Māori.

Targeted engagement with regional councils took place in July 2024 to gather general information about region-specific water storage plans and practices. This was followed by targeted engagement with other key stakeholders and iwi/ Māori partners between November 2024 – February 2025, which informed our understanding of the policy problems and development, and assessment of the proposals contained in this interim RIS.

This RIS is intended to support Cabinet decisions on which proposals should be progressed to consultation. Further information is needed to inform final option development and cost-benefit analyses, which we intend to seek during public engagement.

Options considered

Options considered in this interim RIS include:

Option 1 – Status quo – Council strategies and resource management plans

Under the status quo, water security and water storage is managed at the regional scale through regional strategies and the council resource management plans (objectives, policies and rules).

Option 2 – National direction

Under this option national direction for water security and water storage could be amended or created. These options are not mutually exclusive and can be delivered as stand-alone or combined options, and either at the same time or sequentially.

Option 2A – High-level policy direction – amend National Policy Statement - Freshwater Management (NPS-FM)

This option is to amend the NPS-FM to provide direction to councils on how to provide for water security and / or manage water storage activities through their plans. This could be achieved by amending existing objectives and policies or introducing new objectives and policies.

Option 2B – National Environmental Standards (NES) – amend the National Environmental Standard for Freshwater (NES-F) or develop a new NES for water storage

This option is to develop national environmental standards that set out conditions that must be met to build water storage. It could leverage existing regional and district plan provisions to drive national consistency. The proposed option is to develop a NES for off-stream (e.g., on farm) water storage.

Option 3 - National guidance or strategy (non-regulatory)

This option considers non-regulatory approaches in addition to, or instead of, the above options.

Option 3A – National guidance

This option is to develop non-regulatory guidance instead of a NES (Option 2B) to support consistent implementation of high-level policy direction (Option 2A).

Option 3B - National water strategy

This option is to take a strategic and integrated approach that considers both natural and built storage at different scales. This could help address water security and

support effective planning, prioritisation and a programme of action to prepare for future climate risks and ongoing demand for water.

Assessment of options

There is no preferred option at this stage. Based on a preliminary assessment, options to amend or create national direction (Options 2A and 2B) are likely to best address the problem and meet the policy objectives. These options would either direct councils to address water security and better enable off-stream water storage through their regional plans or by setting consistent national standards. If such standards are met, this could remove the need to obtain a resource consent.

Feedback from public consultation on the proposals is expected to contribute to the final analysis and evidence base.

Limitations and Constraints on Analysis

This interim Regulatory Impact Statement (RIS) has been informed by targeted engagement, to support development of options for public consultation. Following public consultation, feedback will inform final advice and options included within the final RIS, to support Cabinet decision making.

This analysis in this interim RIS is constrained and limited by several factors, including:

- Scope
- Compressed timeframes
- Stakeholder engagement
- Concurrent policy changes affecting the status quo
- Data and evidence limitations

Scope

The Government's coalition agreements and manifesto commitments include making it easier to build water storage, particularly for the primary sector.

The options explored to address the policy problem have been informed by the scope of change determined by Coalition agreements, Ministers and feedback received during targeted engagement.

The scope is limited to options that can be progressed through the Government's National Direction work programme ('Phase Two' of the Government's resource management reform programme), specifically through freshwater management instruments under the Resource Management Act 1991 (RMA).

The high-level objectives and criteria for the options analysis in this interim RIS (including how to assess and weigh criteria) have been decided for the National Direction work programme to ensure consistency, so there is no ability to tailor them for this specific policy area.

Compressed timeframes

Cabinet decisions and Ministers' commissioning set timeframes under which this proposal has been developed, with options anticipated to be progressed as part of the National Direction work programme with an expected delivery date of mid-late 2025. These constrained timeframes impact the quality of the data and evidence (ie, relying on data/ evidence that is readily available, with limited ability to procure further evidence), as well as our ability to engage meaningfully with stakeholders and partners.

Stakeholder engagement

Initial feedback on these proposals is limited and is summarised at the end of Section 1.

Targeted engagement on policy options was undertaken from November 2024 – February 2025. We received different levels of feedback from different groups. Regional councils shared information about region-specific water storage plans and practices through discussions held mid-2024 and later during targeted engagement. Public consultation will be important to ensure that stakeholder and iwi/ Māori views are reflected in the development of policy options and recommendations in the final RIS.

Concurrent policy changes affecting the status quo

This analysis considers the status quo as per legislation that is currently in place. However, the Government has announced its intention to amend and replace multiple legislative instruments (as part of the resource management reform programme) that will change the status quo in terms of freshwater management, once passed. These include, but are not limited to, the replacement of the RMA itself, amendments to the freshwater farm plan system, and amendments to (or new) national direction instruments covering four key areas: infrastructure and energy, housing, farming and primary sector, and emergencies and natural hazards. There remains a high level of uncertainty as to what these changes will be and when they will be implemented, but in some cases (particularly the introduction of a new RM system) they will significantly impact the future status quo.

Data and evidence limitations

The current state of New Zealand's water availability and security was explored by MPI in 2021/22 resulting in a series of reports on the role of water within the food and fibre sector and rural communities.[1] These reports, along with strategies prepared by some regional councils[2], provide a reasonable information base about water security.

Information about water storage, and the different scales of storage in New Zealand, is more limited.

A nationally consistent database[3] of smaller-scale, privately developed water storage is not available. Nor is data on users' preference of water storage type and size. Also, there is insufficient knowledge on the extent, type and size of such storage, volumes of water stored and the use of stored water. Limited anecdotal evidence is available on the necessity for storage on newly developed lands.

Evidence is available on the amount of funding required to support feasibility studies, limited availability of suitable sites to build larger storage infrastructure, and time delays and costs imposed by resource consent processes in developing community and regional scale storages.

At this stage, there is limited data to inform a cost-benefit analysis on the options assessed as most likely to meet the objective sought in relation to the specific proposals in this interim RIS). The policy options will be subject to further refinement after public consultation) and updated for inclusion in the final RIS.

[1] https://www.mpi.govt.nz/about-mpi/our-work-at-mpi/fit-for-a-better-world-accelerating-our-economic-potential/water-availability-and-security/

[2] For example, the Waikato Water Security Strategy, Hawke's Bay regional water security programme, and Wairarapa Water Resilience Strategy

[3] A compilation of the physical location, size, use, ownership, age, supply source, etc.

Responsible Managers	
Nik Andic *Manager/ Kaiwhakahaere]* *Freshwater* *Natural Environment Policy* *Ministry for the Environment*  *12 March 2025*	*Claire McClintock* *Manager* *Water and Adaptive Farming Policy* *Ministry for Primary Industries*  *12 March 2025*
Quality Assurance (completed by QA panel)	
Reviewing Agency:	*Ministry for the Environment Manatū Mō Te Taiao and Ministry for Primary Industries Manatū Ahu Matua*
Panel Assessment & Comment:	*This Regulatory Impact Statement (RIS) has been reviewed by a panel of representatives from Ministry for the Environment Manatū Mō Te Taiao and Ministry for Primary Industries Manatū Ahu Matua. It has been given a 'partial meets' rating against the quality assurance criteria for the purpose of informing Cabinet decisions.* *The Panel notes that the RIS sets out well the context and the options within the limited time available for analysis. The Panel expects that data provided through the consultation process will support further analysis to support decision-making.*

Section 1: Diagnosing the policy problem

What is the context behind the policy problem and how is the status quo expected to develop?

Context - Water security[4]

1. Water is a finite resource that is under increasing pressure in New Zealand.

2. New Zealand's climate change trends show that the country is getting warmer and drier (with some regional variations), and more prone to climate extremes (floods and droughts). The frequency of these events is increasing rapidly.[5] Water availability is becoming more variable and water security much less reliable.

3. The quality, availability and security of freshwater is critical to food and fibre production and processing, community resilience, and the health of the natural world on which we all depend.[5]

4. New Zealand's food and fibre sector is the largest contributor to merchandise export revenue ($56.9 billion forecast, year to 30 June 2025) accounting for 10% of the GDP and 12.4% of the workforce.[6] The sector is the biggest out-of-stream water user accounting for 75% of consumptive water takes allocated.[7] Demand for water are projected to grow as the agriculture sector continues to grow to achieve the Government's 2033 double export goal.

5. Secure and reliable access to water is important to maintain current investments and encourage and support future investments in optimal land and water use choices, high value processing, and for reducing exposure to climate-related events such as droughts and floods.

6. Access to freshwater is also critical to improving the utilisation of under-developed Māori owned land (e.g, transitions of areas that are under low productivity pastoral land uses to higher value uses).

7. There are numerous ways of achieving water security including:
   - storing water from supply-rich periods for use during periods of high demand using methods such as flow harvesting, rainfall harvesting, and managed aquifer recharge
   - adopting practices and technology that increase water use efficiency (includes fixing leaks, water-use efficient appliances, precision irrigation practices)
   - matching land use to current water security (crop selection, etc.)
   - enabling water trading between users
   - adapting a dynamic water allocation process that efficiently switches between supply sources – groundwater, river, storage - to avoid depletion and over-exploitation of one source
   - exploring options for water transfer between and within catchments.

[4] Water security is defined as "the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, and for preserving ecosystems", MPI Information Paper No: 2021/04.

[5] Water Availability and Security in Aotearoa New Zealand - Supporting the sustainability, productivity, and resilience of the food and fibre sector, 2021. MPI Information Paper No: 2021/04. Ministry for Primary Industries.

[6] Situation and Outlook for Primary Industries December 2024, https://www.mpi.govt.nz/dmsdocument/66648- Situation-and-Outlook-for-Primary-Industries-SOPI-December-2024

[7] Hydropower is also a major (non-consumptive) user of freshwater in New Zealand i.e., water does not leave the river but its flow is delayed/controlled. Kelly, Geoff (June 2011). "History and potential of renewable energy development in New Zealand". Renewable and Sustainable Energy Reviews. 15 (5): 2501–2509. doi:10.1016/j.rser.2011.01.021.

Context - Water storage

8. Of all options available to improve water security, water storage is one of the most widely explored and adapted in New Zealand and elsewhere. Water storage can give farmers and growers the confidence to invest in higher value land use options, state-of-the-art technologies, improved management practices, and product supply chains that boost employment in rural communities. It is the main option considered in this interim RIS to align with the Government's coalition agreements related to water storage within the resource management system.

9. The relevant coalition agreements are:
   i. amend the Resource Management Act 1991 (RMA) to make it easier to consent new infrastructure including renewable energy, allow farmers to farm, get more houses built, and enable aquaculture and other primary industries;[8]
   ii. cut red tape and regulatory blocks on irrigation, water storage, managed aquifer recharge and flood protection schemes;[9] and
   iii. remove the need for farmers to obtain a resource consent to build larger-scale water storage schemes on land.[10]

10. These commitments have been addressed in part by the introduction of the Fast Track Approvals Act 2024 and the Building (Dam Safety) Amendment Regulations 2024, which make it easier to build water infrastructure of regional and national significance and reduce some regulatory requirements for smaller scale on-farm storage, respectively.

11. The options considered in this interim RIS relate to those commitments which could be progressed through the resource management reform programme.

Water storage type and scale

12. Water storage can be broadly classified into three classes based on location, numbers of users and use type (figure 1)

Figure 1: Scale of storage

Scale of storage	Location	Number of users	Use type
Smaller-scale	Off-stream	Single user	Single use type
Community storage[11]	In-stream or off-stream	Multi-user	Multiple uses
Regional-scale storage[12,13]	Mainly in-stream	Multi-user	Multiple uses

[8] Coalition agreement New Zealand National Party & ACT New Zealand

[9] Coalition agreement New Zealand National Party & New Zealand First.

[10] Action 46 in National's '100 point economic plan' as agreed to be progressed in the National/ACT and NZ First coalition agreements

[11] 'Community storage' includes: a group of water users such as irrigators, irrigation schemes, or a community of domestic water users. Generally, the water users are located within the vicinity of storage and water delivered via exclusively managed piping network or open channel races.

[12] 'Regional scale storage' consists of: large storages such as dams that are constructed across rivers. The water users may not be located within the vicinity of the storage and may be served by a combination of river network and exclusively managed piped network and open channel races. While the structure may be governed at a regional level, access to water and availability vary widely between water users.

[13] For example, these include: earthworks; construction of dam/ structure; disturbing river beds; vegetation clearance; loss of rivers or wetlands; damming and diversion; creation of barriers to fish passage; risk of flooding or failure; water takes; and discharges of water, sediment other contaminants.

13. Smaller scale water storage can support water security and reliability at the local scale (e.g. one or a few farms), whereas larger community-scale storage can be used for a wide range of uses (eg, irrigation, maintaining environmental flows, fire-fighting, drinking water, flood protection, stock water and others).

14. The appropriate size, or scale, of water storage and volumes that could be stored in an area are driven by a range of factors including:
    - climatic and hydrological conditions
    - biophysical constraints (availability of suitable land)
    - type of land uses
    - types of users (e.g. primary sector, domestic water)
    - use frequency (e.g. summer versus all-year-around)
    - policy settings (ease of implementation).

15. Using a range of water storage options (in an integrated system, both natural and built) can enhance resilience to climate change and improve security of supply. Advances in storage infrastructure now allow storage ponds and reservoirs to be built in a wider number of locations and ground conditions.

Legislative framework

16. The RMA has provisions that apply to water security and water storage. The Building Act 2004 also has provisions that apply to water storage.

17. The RMA manages the use of natural and physical resources, including land, soil, freshwater and the coastal marine area. This includes provisions for National Direction (e.g., the National Policy Statement for Freshwater Management (NPS-FM) which states objectives and policies for the management of freshwater). Provision of water storage involves a range of activities and associated environmental effects[14] that may require a resource consent under the RMA or may otherwise be regulated through regional and/or district plans.
18. Smaller scale and community-scale water storage is largely managed at the regional scale through council plans and rules.[14] District and regional plans distinguish whether an activity is permitted (can be carried out without a resource consent if specified conditions are met) or requires a resource consent. Appendix A sets out the high-level resource consenting process for water storage under the RMA.

19. The Building Act also defines and sets rules for the construction and safety of dams. A building consent is required for all structures that meet the definition of a large dam[15]; and the construction of any dam must comply with New Zealand's Building Code. The Building (Dam Safety) Regulations 2022 also apply to large dams.

20. The only policy proposals considered in this interim RIS are those within the resource management system.

Interdependent government work programmes

[14] In relation to water storage, resource consenting is generally triggered if specified permitted activity conditions cannot be met. Permitted activity conditions (contained within regional plans) typically address a number of matters, including: height of dam/ structure, volume/ depth of water being held, ecological effects and risk/ consequences of failure.

[15] A dam that has a height of 4 or more metres and holds 20,000m3 volume of water or other fluid.

21. This interim RIS sits within the broader Government work programme for reforming the resource management system [CAB-23-MIN-0473 refers].

22. The Minister Responsible for RMA Reform is taking a phased approach to reform the resource management system. Phase Two[16] includes developing or amending RMA national direction to unlock development and investment in infrastructure and primary industries while achieving good environmental outcomes.

23. The reform of the resource management system is guided by the following objectives [ECO-24-MIN-0022 refers]:

    Making it easier to get things done by:

    - *unlocking development capacity for housing and business growth;*
    - *enabling delivery of high-quality infrastructure for the future, including doubling renewable energy;*
    - *enabling primary sector growth and development (including aquaculture, forestry, pastoral, horticulture, and mining);*

    while also:

    - *safeguarding the environment and human health;*
    - *adapting to the effects of climate change and reducing the risks from natural hazards;*
    - *improving regulatory quality in the resource management system;*
    - *upholding Treaty of Waitangi settlements and other related arrangements*.

24. The Government's combined national direction programme is part of the Phase Two RMA reforms. This combined programme includes a single process for decision-making and engagement and includes the proposals considered in this interim RIS.

25. The scope of the national direction programme includes targeted amendments to 14 existing, and the creation of seven new, national direction instruments, bundled into three packages (primary sector, housing and urban development, and infrastructure/energy). All freshwater related proposals sit within the primary sector package [ECO-24-MIN-0112 refers].

Engagement with stakeholders and partners (iwi/ Māori)

26. Targeted engagement with various stakeholders[17] and iwi/Māori[18] informed the development of policy options in this interim RIS (see more below for detailed feedback). The feedback highlighted a range of matters related to, but broader than, building water storage. Some matters are beyond the scope of what could be considered in this phase of the resource management reform programme including:

    - Access to, and allocation of water
    - Duration of resource consents
    - Groundwater recharge and storage
    - Other legislation (e.g., the Building Act)

What is the policy problem or opportunity?

Problem definition

[16] Phase One of the RMA Reform was to repeal the Natural and Built Environment Act and Spatial Planning Act – this was completed in December 2023.
[17] Engagement with regional councils, the primary sector and environmental non-governmental organisations.
[18] Engagement feedback was based mostly upon other aspects of freshwater management - no specific feedback on water storage was received.

27. Freshwater is already scarce at critical times in much of New Zealand, and water security is becoming increasingly important in a changing climate as the natural availabilty of water declines and / or becomes more unpredictable. The gap between water demand and supply is expected to increase in future if no action is taken to manage demand or improve supply. Adaptation options, such as water storage, will be needed to maintain and improve water security and remain resilient.

Nature, scope and scale of problem

Water availability and use

28. In New Zealand, hydropower and the primary sector are the two largest users of freshwater.

29. Hydropower accounts for 55% of electricity produced and is a non-consumptive water user (i.e., water does not leave the river but its flow is delayed or controlled). The primary sector accounts for almost 75% of consumptive water allocated (i.e, water removed from the source for use on land).[19]

30. MPI's Water Availability and Security information paper[20] highlights various challenges associated with water availability and security for food and fibre sector under current and climate change conditions. The need for water in primary production varies with land use types and crops.[21]

31. Pastoral agriculture requires water for livestock water and milking shed washdown purposes. Pasture for livestock production has a relatively constant demand for water, varying in response to daily and seasonal weather conditions. Pastoral agriculture can cope with lower reliability of supply due to the ability of pasture to withstand soil moisture deficits for a period.

32. Arable, vegetable, vine and tree crops have different water needs as they pass through vegetative growth, grain and fruit development and maturing stages. The exact water requirements depend on the stage of the crop. Reliable supply to meet demand at each stage is critical for crop success.

33. Processors of agricultural products are also significant water users. In most cases their water requirement is time sensitive. Product must be processed quickly after leaving the farm or orchard to stabilise shelf-life, ensure product reaches the market fresh, or avoid negative impacts on animal welfare.

34. Reliably supplying water for existing uses and realising the potential for new uses is dependent on developing sufficient capacity to store water because of the need for very high water supply security to de-risk investments.

35. Predicted extreme events, low rainfall and associated low river flows will impair the supply of water and supply reliability. Warmer and drier conditions mean more water will be needed to maintain soil moisture which consequently increases the water demand from agriculture. Population growth, urbanisation and increasing domestic water needs also aggravate the challenges of water scarcity in New Zealand.

36. New Zealand's primary sector is seeking to double export value over the next decade. In moving forward, availability of irrigation and reliability of supply will be critical factors concerning emerging intensifying water scarcities in New Zealand due to climate change.

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[19] Kelly, Geoff (June 2011). "History and potential of renewable energy development in New Zealand". Renewable and Sustainable Energy Reviews. **15** (5): 2501–2509. doi:10.1016/j.rser.2011.01.021.

[20] https://www.mpi.govt.nz/dmsdocument/47770-Water-Availability-and-Security-in-Aotearoa-New-Zealand

[21] IrriCalc, a water demand simulation model, provides irrigation demand for selected crops across the country. The model can be accessed at https://mycatchment.info/

37. In those parts of New Zealand used for intesive farming or where most people live, water for consumptive water takes tends to be fully allocated. The most heavily used aquifers are reported to be fully or over-allocated.

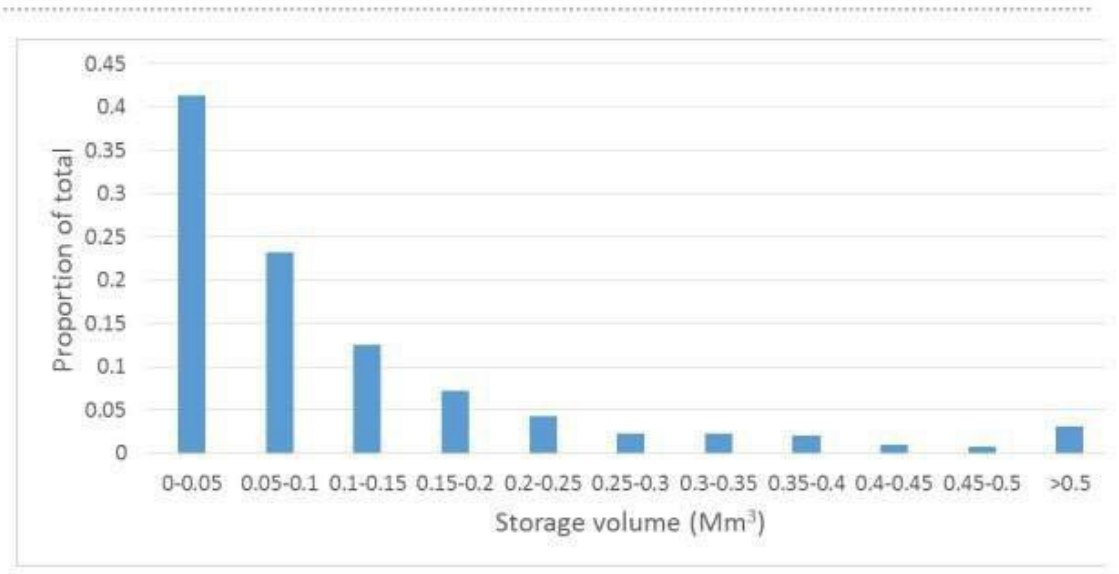
Water storage – summary of different scales, costs and irrigation water demand

Water storage – size / scale

38. Water storage available in New Zealand includes smaller scale, community and regional scale storage. Among other factors, the size of water storage is dependent upon demand volume and timing, and the volume and timing of supplies.

39. An estimate from 2021 indicated that 182 million m^3 of water storage (capacity) is available across New Zealand.[22] Figure 2 shows a distribution of these storages by volume. More than 40% of storage may be categorised as farm scale as they store less than 50,000m^3 of water.

Figure 2: Water storage volume distribution, whole of New Zealand [23]



40. There is no data about the size of water storage that prospective water users/ farmers are seeking to build. As storage size increases the construction cost per unit volume of water stored decreases. Thus, when it comes to storage size, besides land cost and building regulations, farmers need to balance between storage, built cost, crop demand, and storable allocation.

41. Under current rules in most regions, the size of water storage that can be built without the need for a resource consent is typically limited to a maximum allowable capacity of 20,000m^3 (ranging from 5,000m^3 to 20,000m^3) and a maximum structure height or water depth of four metres above ground (ranges from 1.5 to 4 m).[24]

[22] Water Availability and Security: National-Scale Assessment (mpi.govt.nz)

[23] https://www.mpi.govt.nz/dmsdocument/47773-Water-Availability-and-Security-National-Scale-Assessment

[24] This also corresponds to the definition of a large dam under the Building Act 2004, namely: large dam means a dam that has a height of 4 or more metres and holds 20,000m^3 or more volume of water or other fluid https://www.mpi.govt.nz/dmsdocument/47773-Water-Availability-and-Security-National-Scale-Assessment The costs are not regionally corrected and are for standard off-stream installations.

Storage and delivery development costs

42. Water storage development costs vary between storage type, and by region. Generally, the storage cost is expressed in dollars per cubic meter of water stored. Based on a technical report on water availability and security commissioned by MPI in 2021[24], the capital cost of storage infrastructure was estimated to be $15 per cubic meter for storages less than 1 million m^3 and $5 per cubic meter for storages larger than this. The cost includes intake and spillways and excludes land cost and feasibility and operational costs. earthwork compared to paddock dams.

43. Other costs that are not included here are abstraction infrastructure (including fish screens and fish passages), resource consent and reticulation, and these costs are storage and location dependent. Where the users are geographically scattered, reticulation costs could be significant. An example from Tasmania indicates that construction of every kilometre of piped network could cost AUD$1 million.[25]

44. In New Zealand, where many existing community and regional storages are built around stock water reticulation networks (e.g. Waimakariri Irrigation Scheme, North Canterbury), the additional delivery cost has been negligible thus far, but this is likely to change for any future developments that do not have access to such pre-existing networks (e.g. Te Tai Tokerau, Northland). Based on the 2021 technical report commissioned by MPI, in New Zealand, the distribution network development cost was estimated to be $5,000 per ha of land serviced. This does not include any of the operational and maintenance cost.

45. Besides being expensive to build, smaller scale storages, owing to their size and frequency of use, need to be refilled more often (every few days to weeks based on use intensity) than other storage types. Smaller scale storage lose a disproportionate volume of stored water to leakage and evaporation. The frequent refilling adds to energy costs, and where supplies are unreliable, the storage may never get refilled as often as needed.

46. Community and regional scale water storage requires significant pre-development investigative cost, as well as post-development maintenance and operational cost. However, by encompassing multiple uses (flood protection, hydropower generation, irrigation, environmental flow, domestic and industrial water, and others) the development, maintenance and operational costs can be spread across a cross section of users.

Modelling irrigation water demand and storage refill frequency

47. To evaluate the sufficiency of smaller scale water storage on different land uses, a desk-top analysis, using an irrigation water demand model (IrriCalc[26]), was undertaken. This estimated irrigation demand of an average farm across four irrigated regions (Northland, Hawke's Bay, Canterbury and Otago) for pasture, and a few regionally dominant crops (apple, grapes, avocado and stone fruit, selected vegetable crops).

48. A storage volume of 20,000m^3 was assumed for this exercise to correspond to smaller-scale water storage, where a resource and building consent was unlikely to be required.[27] Based on publicly available regional data on farm sizes[28], we chose an average farm size for each crop type within each region. The estimated irrigation water demand was used to test sufficiency of storage volume assumed (20,000 m^3) and the

[25] https://psnews.com.au/federal-government-commits-150m-to-tasmanias-great-south-east-irrigation-scheme/149022/

[26] IrriCalc was developed and maintained by Aqualinc Limited, Christchurch. The online tool could be accessed at https://mycatchment.info/

[27] The Building Act defines large dams as above 20,000m3. All large dams require a building consent and are subject to the dam safety regulations. Most regional councils have also adopted this size threshold for the purposes of a resource consent.

[28] https://figures.nz Farms engaged in the vegetable growing industry (outdoors) in New Zealand - Figure.NZ

frequency of refill per irrigation season. An irrigation reliability of 95% was assumed for this study, as horticultural crops need reliable water supply. Summarised results are available in Appendix B.

49. The estimates from the model showed that 20,000m^3 of water storage, with up to three refills per irrigation season, would meet the irrigation demand of a15 ha farm under apple, avocado, grapes, and stone fruit, or selected vegetables (potato, cabbage, carrot, lettuce, and cauliflower). However, a storage of 20,000m^3 was found to be too small to service an average sized pastural farm (160 ha). For a pastoral farm, the assumed storage size would only meet a very small proportion (less than 6%) of annual demand. The number of storage refills vary between seasons as climatic conditions and use intensity vary.

Stakeholder feedback

50. MfE and MPI conducted engagement with regional councils in July 2024 to gather general information about region-specific water storage plans and practices. This was followed by targeted engagement with regional councils, the primary sector, iwi/ Māori and environmental non-government organisations (eNGOs) between November 2024 – February 2025. These engagements focused on the wider review and replacement of the NPS-FM, including policy options for water storage.

51. The above targeted engagement showed a general support for national direction instruments to address water security through water storage. There was also a call to recognise the benefits of storage and for regulatory certainty to encourage investment in water storage. Public consultation is planned for early 2025 as part of the integrated national direction programme.

52. Feedback from the targeted engagement is summarised below.

Regional councils

53. MfE and MPI officials held a series of meetings in July 2024 with four regional councils[29] followed by targeted engagements between November 2024 - February 2025, with a broader group of regional councils. The key themes and matters raised, and information and intelligence gathered on regional approaches to water storage at these engagements are listed below:

    a) Councils indicated that the main barrier to building water storage is the take and use of water. This includes the ability to obtain a resource consent to take water, the duration of the consent and any associated consent to discharge contaminants.

    b) Councils tend to be permissive about the construction of dams on farms (off-stream), but the development of in-stream dams is unlikely to be straightforward for a variety of reasons.

    c) Some councils expressed concern and doubt about the problem we are seeking to address. Depending on the region, provision of water storage can be very enabling, and therefore, there is no demand for large water storage in their regions. In the view of some councils there is no need for national regulations as they already have good regional rules.

    d) Regional councils were generally supportive of an amendment to the NPS-FM to direct councils on recognising the importance of water security and allow regional plan rules for water storage to be developed for local circumstances.

[29] Northland, Waikato, Otago and Greater Wellington regional councils.

e) Funding was identified as a greater barrier than regulations (eg, building a dam is generally funded by a bank), due to tension between the consent term and the cost of dams on farms. Scheme irrigation dams can be slightly easier, as these are funded by multiple areas. Longer-term consents are needed to get the funding.

f) Some councils have also developed water strategies which identify water storage as one part the solution to improve water resilence and security:

- Waikato Water Security Strategy – focused on managing demand, enhancing supply and improving ecosystem resilience
- Hawke's Bay regional water security programme – to ensure long-term, climate-resilient and secure supplies of freshwater, for all
- Wairarapa Water Resilience Strategy – to manage demand and supply in a comprehensive and integrated way.

Primary sector

54. Key themes and matters raised include:

a) Primary sector bodies noted that the barrier to water storage is more about the take and use of water than with the construction of water storage. A distinction between the damming of water and the construction of storage was sought.

b) There needs to be better balancing of the long and short-term risks and benefits by councils when making resource management decisions.

c) Addressing water security is critical; and consideration is needed for where water storage can be used to as part of adapting to climate change.

d) There needs to be improvements to regulatory certainty around resource consenting.

e) Some concerns exist regarding the overlapping of matters between the RMA and the Building Act 2004.

f) There is a need for precise terminology around the type and scale of water storage being addressed as part of government proposals.

g) There needs to be a consideration of policy that would enable water transfer within catchments.

h) There needs to be consideration of the interface between water storage and wetlands in low lying land.

Iwi/ Māori

55. Māori have rights and interests in freshwater; and any policy proposals that relate to freshwater are of interest. The Crown has obligations in relation to Te Tiriti o Waitangi, Treaty settlements and other agreements related to freshwater.

56. Targeted engagement discussions focussed on the broader scope of freshwater management direction, and we did not receive substantial feedback on water storage.

eNGOs

57. Targeted engagement discussions focussed on the broader scope of freshwater management direction, and we did not receive substantial feedback on water storage.

What objectives are sought in relation to the policy problem?

58. The policy proposals/ options in this interim RIS are part of Phase Two of the reform of the resource management system which is guided by the following objectives [ECO-24-MIN-0022 refers]:

    Making it easier to get things done by:

    a. *unlocking development capacity for housing and business growth;*
    b. *enabling delivery of high-quality infrastructure for the future, including doubling renewable energy;*
    c. *enabling primary sector growth and development (including aquaculture, forestry, pastoral, horticulture, and mining).*

    while also:

    d. *safeguarding the environment and human health;*
    e. *adapting to the effects of climate change and reducing the risks from natural hazards;*
    f. *improving regulatory quality in the resource management system;*
    g. *upholding Treaty of Waitangi settlements and other related arrangements.*

59. The objective sought in relation to the specific proposals in this interim RIS is:

- *To maintain and improve water security to support growth and development in a changing climate.*

Section 2: Deciding upon an option to address the policy problem

What criteria will be used to compare options to the status quo?

60. The options presented in this interim RIS will be assessed using the following criteria:

Criteria	Description
Effectiveness	• Does the option achieve the objectives? • Does it provide a solution to the identified problem?
Efficiency	• Is it providing enough flexibility to allow local circumstances to be adequately taken into account/ addressed at the local level? • Is it cost-effective?
Alignment	• Does the option integrate well with other proposals and the wider statutory framework?
Implementation	• Is the option clear about what is required for implementation by local government/ others and easily implemented?
Treaty of Waitangi	• Refer to the Treaty Impact Analysis (TIA) for further information (see **Appendix D**).
Note the 'Description' column in this table has been updated 11 June 2025, after formatting resulted in the incorrect detail being included in the previous version published 29 May 2025.	

What scope will options be considered within?

61. The scope of this interim RIS is deliberately narrow, to deliver on the Government commitments in 2025 as part of the integrated national direction work programme.

62. The options in scope are those that involve changes to the resource management system to improve water security and better enable water storage.

63. The following matters are outside of scope as part of this analysis:

a) Freshwater allocation (allocating water and managing discharges to water), as allocation is being considered as part of Phase Three of the resource management reform programme)[30]

b) Groundwater recharge and storage as there is not a good understanding on how and where water can be stored below ground, where water could be sourced to recharge groundwater, and how much and when the stored water could be abstracted

c) Other legislation that applies to water storage (eg, Building Act 2004).

What options are being considered?

Option 1 – Status quo – Council strategies and resource management plans

[30] Phase Three of resource management reform involves the replacement of the existing RMA with new legislation

64. Under the status quo, water security and water storage is managed at the regional scale through regional strategies and the council resource management plans (objectives, policies and rules). Each regional council can set its own objectives, policies, rules (and specified conditions as part of the rules). Water storage activities will require a resource consent(s), unless a council allows the activities to be undertaken without a resource consent.

Option 2 – National direction

65. National direction for water security and water storage could be amended or created in different ways. These are not mutually exclusive and can be delivered as stand-alone or combined options, and either at the same time or sequentially.

Option 2A – High-level policy direction – amend National Policy Statement - Freshwater Management (NPS-FM)

66. This option is to amend the NPS-FM to provide direction to councils on how to provide for water security and/ or manage water storage activities through their plans. This could be achieved by amending existing objectives and policies or introducing new objectives and policies.

67. This could include:

    a) Provisions that address water security: provision of a new objective or policy requiring councils to consider the broader issue of water security (including climate change adaptation) that also includes and considers the benefits of water storage. This would signal the need for a long-term approach to water security and require councils to consider how they manage demand and increase availability using all options such as water storage, managed aquifer recharge, water transfers, and high flow harvesting. This would also consider food, energy, and domestic and industrial water use securities and bring together both consumptive (eg, irrigation) and non-consumptive (eg, hydropower) uses;

    b) Provisions that address better enabling of water storage: provision of a specific objective and/ or policies aligned to government commitments (eg, allow water storage to be built on land without the need for a resource consent – also known as ‘off-stream’ storage);

    c) Provisions that address efficiency and effectiveness of water use: use of an existing objective or policy from a regional plan that addresses the efficiency and effectiveness of water use (eg, enable the development of off-stream storage, or storage more generally, and Community Irrigation Schemes that improve and maximise the efficient and effective allocation and use of water).

    d) Provisions that address climate change adaptation and resilience: provision of broader objectives and policies to support climate change adaptation and resilience (ie, water storage) and environmental enhancement (ie, constructed wetlands), (eg, facilitate and encourage the construction of freshwater infrastructure that enhances the environment and supports climate resilience (as a catch-all policy for water storage, wetlands and other mitigation systems);

    e) Provision of an exisitng NPS-FM objective or policy: use of an amended version of an existing NPS-FM objective or policy to address water security (and by extension water storage) (eg, *Policy 4: Freshwater is managed as part of New Zealand’s integrated response to climate change*. This includes improving water security by managing demand, enhancing supply and improving resilience.

68. An example of the format for the replacement NPS-FM (based on the NPS-FM 2017) could be:

- *Objective 1 - to enhance water security by managing demand, enhancing supply and improving resilience*

    - *Policy 1a (among others) - by every regional council making rules that encourage and enable water storage, including off-stream water storage*

69. The benefits of high-level policy direction through amendments to the NPS-FM include that it:

    a) provides clear direction on the importance of water security and water storage generally, ensuring it is given more weight in freshwater and land use planning and decision-making;

    b) focuses on the desired outcome without being overly prescriptive;

    c) allows for some flexibility for councils to respond to local pressures and priorities when giving effect to the objectives and policies in the NPS-FM;

    d) is the easiest and quickest of the options to develop.

70. The limitations with this option include that:

    a) as the objective and policies are subject to regional council interpretation and implementation, it may result in inconsistency between regions (this could be mitigated by supporting guidance or national standards as per options below);

    b) the time needed to progress plan changes means it may take longer to implement (councils have until December 2027 to notify plans, then changes take effect some time afterwards);

    c) without a national standard that is practical, affordable and workable or guidance underpinning the policy direction, regulatory barriers at the regional level may remain.

Option 2B – National Environmental Standards (NES) – amend the National Environmental Standard for Freshwater (NES-F) or develop a new NES for water storage

71. This option is to develop national environmental standards that set out conditions that must be met to build water storage. It could leverage existing regional and district plan provisions to drive national consistency.

72. This option could potentially apply to any type of water storage, although the location and scale of the storage would determine the complexity of the standards and whether an activity could be 'permitted' or require some form of resource consent.

73. Amendments could either be made to the existing NES-F or a new NES could be created. Another option is to develop a new standard for a broad group of similar activities that relate to environmental enhancement and climate change resilience (e.g. water storage, wetlands, edge of field mitigations).

74. NESs have more prescriptive requirements than high-level national direction (ie, as per Option 2A above). To simplify the development and testing of new standards, existing regional and district plan provisions could be reviewed and adopted (where appropriate).

75. The proposed option is to develop a NES for off-stream water storage. Off-stream water storage is generally considered to have lower environmental risks than in-stream storage, making this type of storage more suitable for permitted activity standards. This would mean the NES are based on provisions that have enabled off-stream water storage.

76. Most councils have some form of a permitted baseline for activities required to provide for smaller-scale in-stream and/ or off-stream water storage (typically less than 20,000m^3 volume); and there is some commonality across many of the standard permitted activity conditions in regional plans (see Appendix C for an example rule from Environment Canterbury).

77. There is also regional variation regarding how water storage is managed, and often the full suite of activities[31] that are needed for the provision of water storage are not all classed as 'permitted activities' in regional plans (ie, activities that are allowed to occur without a resource consent). Further, there are other differences across regions that relate to the number of rules and conditions associated with water storage, the extent to which they are permissive or restrictive, and the thresholds for permitting an activity. For example, the maximum structure height or water depth thresholds for water storage (ie, to occur as a permitted activity) ranges from 1.5m – 4m depth and a volume of water ranging from 5,000m^3 – 20,000m^3).

78. The following is a list of the matters or environmental effects that councils typically address in permitted activity conditions (to varying degrees, depending on each individual council) for in-stream and/ or off-stream water storage:

    a) The size of catchment area
    b) The height of dam/ structure
    c) The volume/ depth of water being held
    d) The effects of the water storage upon neighbouring properties, other legal water takes, natural course of river, flood risk and carrying capacity, erosion
    e) Environmental and hydrological effects, including upon ecology, including fish passage and spawning
    f) Structural integrity of the water storage (nature, age and condition)/ consequences of failure
    g) Fault lines/ landslip risk/ land instability
    h) Contaminants (eg, sediment, fertiliser)

79. The benefits of a NES for water storage include:

    a) simplifying the resource management process - it could provide for national consistency by identifiying the range of activities that are required for water storage and that can occur without the need to obtain a resource consent (as long as specified conditions are met);

    b) if existing 'enabling' rules and conditions are adopted this will simplify the development of the standards meaning they can be implemented more quickly than starting from scratch;

    c) once enacted it has immediate effect and can provide a high level of certainty and consistency that off-stream water storage can be built without the need for a resource consent(s) (subject to standards being met).

80. The limitations with this option include that:

    a) most regional councils already have enabling provisions for both or either off-stream or in-stream storage (eg, permitted activity rules for water storage construction and/ or damming and diversion of water), meaning new national standards may not have much of an impact.[32]

[31] Provision of water storage involves a range of activities and associated environmental effects that may require a resource consent under the RMA or may otherwise be regulated through regional and/or district plans. These include: earthworks; construction of dam/ structure; disturbing river beds; vegetation clearance; loss of rivers or wetlands; damming and diversion; creation of barriers to fish passage; risk of flooding or failure; water takes; and discharges of water/ sediment/ other contaminants.

[32] However, only about 50% of regional councils provide specifically for off-stream water storage as a permitted activity.

b) as a NES cannot permit an activity that would have significant adverse effects on the environment, it will require the development of permitted activity standards[33] which may be challenging, particularly for larger scale water storage;

c) there is limited ability to permit activities in the absence of prescriptive conditions;

d) there may be insufficient time to properly develop, test and implement new standards in 2025, and a rushed process risks regulations that don't work as intended;

e) it provides limited flexibility to respond to differences between regions (depending on how the standards are drafted).

Option 3 - National guidance or strategy (non-regulatory)

81. Non-regulatory approaches can be in addition to, or instead of, the above approaches.
82. Regulatory provisions are often accompanied by guidance to support implementation and interpretation, and/or to provide the broader system context.

Option 3A – National guidance

83. This option is to develop non-regulatory guidance instead of a NES (Option 2B) to support consistent implementation of high-level policy direction (Option 2A). It could provide a consistent set of standards for councils to adopt while also providing for regional flexibility where required. It could also set out the intent of the policy and the rationale / evidence to support the standards, to make it easier for councils to implement national direction.

Option 3B - National water strategy

84. This option is to take a strategic and integrated approach that considers both natural and built storage at different scales, to help address water security and improve resilience. Changes to water management in one area can impact other areas. For example, small-scale water storage can be relatively easy to design, develop and implement. However, it could limit the opportunity for changes in water allocation needed for future water supply, including the development of community and regional scale water storage schemes.
85. A water security strategy could support effective planning, prioritisation and a programme of action to prepare for future climate risks and ongoing demand for water. It could help identify where water is needed and at what scale, and what type of storage would be most suitable
86. Examples of water security strategies include:
    - Regional strategies like the Waikato Water Security Strategy focused on managing demand, enhancing supply and improving ecosystem resilience;
    - State-wide strategies like South Australia Water Security Statement with priorities that are enabling and will contribute to enhancing water security and meeting the state's growth targets; and
    - National strategies like the Germany National Water Strategy 2023 which includes the steps necessary to meet the long-term challenges for water management.

[33] RMA Section 43A - Contents of national environmental standards:
(3) If an activity has significant adverse effects on the environment, a national environmental standard must not, under subsections (1)(b) and (4),—
(a) allow the activity, unless it states that a resource consent is required for the activity; or
(b) state that the activity is a permitted activity

How do the options compare to the status quo/ counterfactual?

	Option 1 - Status quo – Council resource management plans	Option 2A – High-level policy direction – amend NPS-FM	Option 2B - Amend the NES-F or develop a new NES	Option 3A – National guidance	Option 3B – National water strategy
Effectiveness	0 There is no change under the status quo so this will not achieve the objective.	+ This provides a partial solution to the problem through clear direction on the importance of water security and water storage. Unlikely to immediately achieve the objective – this is a long-term approach.	+ This could achieve the objective if national standards provide for all of the activities associated with building off- stream water storage, as well as adequately mitigating the adverse effects of activities associated with off-stream water storage. Water takes and discharges would still need to be consented.	0 This could achieve the objective if councils already have enabling policies (or option 2A is implemented) and councils support and adopt non- regulatory guidance. However, given that guidance is optional and voluntary, the uptake may be limited.	0 This is unlikely to achieve the objective in the short-term, but may provide a longer- term solution to addressing water security and improve resilience.
Efficiency	0 Councils will continue to have the flexibility based upon their local circumstances. It is not always cost-effective for prospective water users seeking to build water storage.	+ This provides high level direction focusing on the outcome without being overly prescriptive, which provides flexibility for councils to address water security and better enable water storage for their regional conditions. Cost-effectiveness will depend on council implementation.	+ This provides limited flexibility to respond to differences between regions depending on how the national standards are developed. This is expected to be cost effective for applicants seeking to build off-stream water storage, as national standards would remove the need for resource consents.	0 This could provide a consistent set of standards for councils to adopt while also providing for regional flexibility, where required. Could be cost effective for applicants seeking to build off-stream water storage if councils remove the need for resource consents. However, given that guidance is optional and voluntary, the uptake may be limited.	0 This could support effective planning, prioritisation and a programme of action to prepare for future climate change risks and ongoing demand for water at both the national and regional scale. This requires further assessment to understand cost effectiveness.
Alignment	0 This does not align with the wider strategic direction to reduce red tape and regulatory blocks on water storage.	+ This aligns with the wider strategic direction and statutory framework	+ This aligns with the wider strategic direction and statutory framework	0 This aligns with and would support the statutory framework, but has no legal basis	0 This aligns with and would support the statutory framework, but has no legal basis
Implementation	0 Councils already have their existing arrangements, so implementation is clear and well understood.	0 National policy sets clear direction for councils on what needs to be implemented at a regional level. There is flexibility in how councils choose to implement national policy which may mean implementation requirements are not clear at a regional level. Guidance or standards would support implementation and regional consistency of outcomes.	0 This will take time to implement given the need to develop and test standards. The requirements as part of the standards will be clear, but there is a risk of being overly prescriptive. Once developed, the standards can have immediate effect. National standards would be developed in consultation with regional councils and others to make implementation requirements clear.	0 This will take time to develop, test and implement. It may be difficult to implement without national policy direction or existing council policies.	0 Further work is needed to develop this option and understand implementation requirements.
Treaty of Waitangi	0	Refer to TIA (see Appendix D).	Refer to TIA (see Appendix D).	Non-regulatory options were not considered in the TIA.	Non-regulatory options were not considered in the TIA.
Overall Assessment	0	+ This high-level policy direction meets all criteria and provides clear direction for councils on the importance of addressing water security and better enabling water storage. This could make it easier to build water storage depending on how councils implement the policy and whether this option is combined with others.	+ National standards meet all the criteria and could remove the need for resource consents, making it easier to build off- stream water storage.	0 Guidance would need enabling policies. As guidance is optional and voluntary, the uptake may be limited.	0 A water strategy is a longer-term option that could be developed at any time and support the other options discussed. It could help identify where water is needed and at what scale, and what type of storage would be most suitable.

Key for qualitative judgements	++ much better than doing nothing / the status quo / counterfactual	+ better than doing nothing / the status quo / counterfactual	0 about the same as doing nothing / the status quo / counterfactual	- worse than doing nothing / the status quo / counterfactual	- - much worse than doing nothing / the status quo / counterfactual

What option is likely to best address the problem, meet the policy objectives, and deliver the highest net benefits?

87. There is no preferred option at this stage. This is an interim RIS intended to inform decisions to release a discussion document for public consultation. Feedback from public consultation on the proposals is expected to contribute to the final analysis and evidence base.

88. Options to amend or create national direction (Options 2A and 2B) are intended to improve water security and better enable off-stream water storage. These options would either direct councils to address water security and better enable off-stream water storage through their regional plans or by setting consistent national standards. If such standards are met, this could remove the need to obtain a resource consent.

89. Non-regulatory options (Options 3A and 3B) could either support, or in the case of guidance, replace regulated national standards (Option 2B).

90. A combination of options that includes policy or strategic direction (Option 2A and Option 3B) plus standards (Option 2B or 3A) may best achieve the outcome of improving water security and better enabling water storage, including off-stream water storage (potentially at any scale).

91. Feedback from those with water security challenges, those wanting to build water storage and councils who currently manage water storage will be critical to understand which of the options (or even new options) could work best within the current (and future) resource management system.

What are the marginal costs and benefits of the preferred option?

92. As outlined above, there is no preferred option at this stage. The options outlined in this analysis will be subject to refinement after feedback through public consultation. A cost-benefit analysis for the preferred option will be included in the final RIS (ie, post public consultation).

Section 3: Delivering an option

How will the new arrangements be implemented?

93. Implementation of policy changes varies depending on which option is chosen, or which combination of options is chosen. Implementation of all options will include public notification and access to relevant documentation. The table below summarises the implementation arrangements for each option.

Option	Implementation arrangements
Option 2A – High-level policy direction – amend NPS-FM	The proposed change requires an amendment to national direction (NPS-FM). The updated NPS-FM is expected to be gazetted in late 2025. Regional councils are required to give effect to national direction through their regional plans (via a plan change process). Councils have until December 2027 to notify their plans. The policy changes will then be implemented when regional plans are in place. Plan changes take around 1.8 years from public notification to process.[34]
Option 2B - Amend the NES-F or develop a new NES	The proposed change requires an amendment to, or development of new, national direction (NES). The changes will take immediate effect when gazetted (expected late 2025). National standards will supersede regional council rules in plans. Regional councils will be responsible for monitoring and enforcing the national standards.
Option 3A - Guidance	The proposed change is non-regulatory and requires the development of guidance. This will be developed by government with input from regional councils and all water users (including farmers) as the affected groups to which guidance would apply. Guidance will be published.
Option 3B – Water Strategy	The proposed change is non-regulatory and requires the development of a strategy. This will be developed by government with input from regional councils, water users and other interested parties. Implementation of the strategy will be dependent on the content and actions

[34] https://planning.org.nz/Category?Action=View&Category_id=1227

How will the new arrangements be monitored, evaluated, and reviewed?

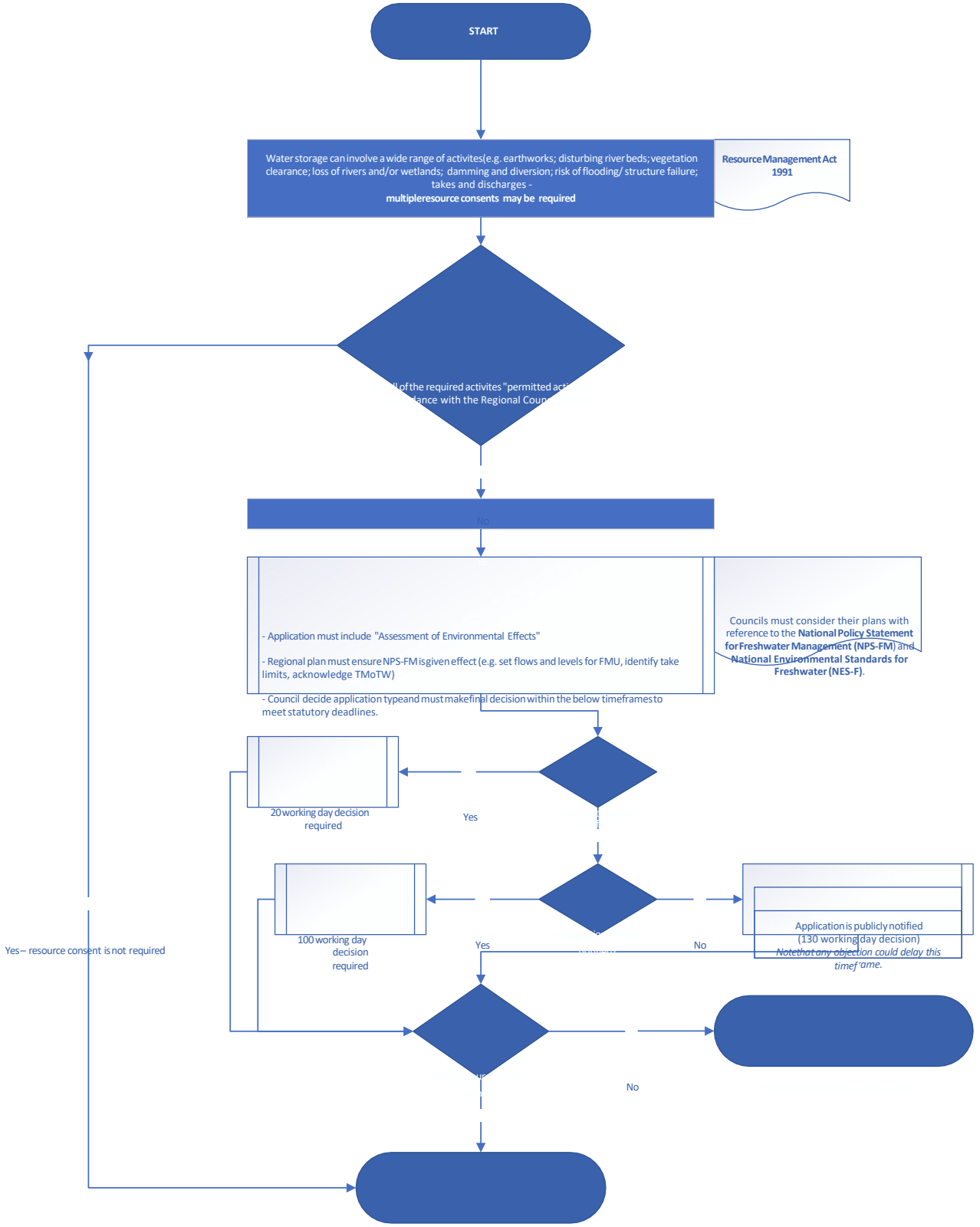
94. Monitoring, evaluation and review will vary depending on which option is progressed, and this section will subsequently be more detailed in the final RIS.

95. If a regulatory option is progressed, the Ministry for the Environment and the Ministry for Primary Industries will monitor the effect of the proposal by liaising with regional councils to determine whether:

    - it has been effective in addressing water security and/ or better enabling water storage

    - any unintended consequences have arisen.

Appendix A:The resource consenting process (at a high-level) for water storage development under the Resource Management Act 1991



*NOTE:
- All new dams must comply with the NZ Building Code regardless of their size.
- Alldamsmust compliant with the Building Act 2004
- Depending on size, somedams must comply with the Building (Dam Safety) Regulations 2022.

Appendix b: Water demand data analysis – for Northland, Hawke's Bay, Canterbury and Otago (desk-top analysis)

To evaluate the sufficiency of water storage on different land uses, a desk-top analysis was conducted using a water demand model (IrriCalc[38]). The results are summarised in Table 1 below. For this analysis, the four largest irrigated regions of the country (Northland, Hawke's Bay, Canterbury and Otago) were selected.

The IrriCalc model is widely used by regional councils in their catchment water allocation processes. We considered pastoral land and regionally dominant horticultural (apple, avocado, grape, stone-fruit) crops for this analysis. We used a storage volume of 20,000m^3 (as this is the typical storage size permitted to be built without the need to obtain a resource and building consent). Assuming a 95% irrigation reliability, an average horticultural farm would need significantly fewer refills than an average pastoral farms. The majority of refill need to occur between October and March when the demands are higher, and supplies are less reliable. As refill frequency increases, energy cost increases. Where supplies are variable, refill events may be impacted, making storages unreliable.

Parameters of the analysis:

a) The four regions were chosen for their diversity of climate, projected changes to water supplies owing to a changing climate and availability of water and land resources to develop storage. They also represent regions where most irrigation occurs. The dominant crop types and average farm size within each region were based on StatsNZ data. See: Agriculture | Stats NZ
b) The IrriCalc model was used to derive irrigation demand for pastoral and horticultural crops. The model simulates daily irrigation demand based upon soil, climate and crop type. Daily demands are summarised at quarterly and annual scale. An irrigation reliability of 95% was used. IrriCalc irrigation demand estimates for various crop types and regions can be accessed at https://mycatchment.info/
c) A threshold storage volume of 20,000m^3 was used as that is the typical storage size permitted to be built without the need to obtain a resource and building consent. Based on annual water demand volume and the maximum storage capacity (20,000m^3), for each crop type, the number of times the storage would need a refill was estimated. No water loss from leakage and evaporation was assumed.
d) Average farm size and dominant crop type data for each region was derived from StatsNZ data available at https://www.stats.govt.nz/indicators/farm-numbers-and-farm-size-data-to-2022/

[29] IrriCalc was developed and maintained by Aqualinc Limited, Christchurch. The online tool could be accessed at https://mycatchment.info/

Table 1 - Water demand analysis for four regions (Northland, Hawke's Bay, Canterbury and Otago)

			Quarterly Irrigation demand (m^3)					
Region	**Dominant crop type**	**Average farm area (ha)**	**Q1 (Jul-Sep)**	**Q2 (Oct-Dec)**	**Q3 (Jan-March)**	**Q4 (Apr-Jun)**	**Total annual irrigation demand (m^3)**	**Frequency of refill per annum**
Hawke's Bay	Apple	15	0	4,500	9,750	600	14,850	1
Canterbury	Apple	15	0	22,050	34,950	3,600	60,600	3
Northland	Avocado	15	0	3,000	30,750	3,000	36,750	2
Hawke's Bay	Grape	15	0	5,700	3,750	0	9,450	1
Canterbury	Grape	15	0	8,850	8,850	150	17,850	1
Marlborough	Grape	30	0	20,400	25,200	600	46,200	2
Hawke's Bay	Pasture	160	0	244,800	292,800	24,000	561,600	28
Canterbury	Pasture	160	12,800	416,000	462,400	38,400	929,600	46
Otago	Pasture	160	46,400	524,800	528,000	44,800	1,144,000	57
Hawke's Bay	Stone fruit	15	0	11,850	26,550	1,650	40,050	2
Otago	Stone fruit	15	0	38,700	51,000	5,100	94,800	5

Appendix C: Environment Canterbury provides both off-stream and in- stream storage as a permitted activity in the Canterbury Land and Water Regional Plan

Dams and Damming section

Rule 5.154

The damming of water in the bed of a river and the constructing, using, altering, maintaining and operating of dam structures within the bed of a river, including any damming or impounding of water outside the bed of a river or natural lake is a permitted activity, provided the following conditions are met:

1. *For the damming or impounding of water outside the bed of a river or natural lake:*
    a. *the volume of water impounded is less than 20,000 m^3; or*
    b. *the maximum depth of water impounded above ground level (measured as the maximum vertical distance between the crest of the dam and the ground level immediately adjacent to dam) is less than 4 m; and*
    c. *if the volume of water impounded is greater than 1,000 m^3, the design and construction of the dam is certified by a Recognised Engineer; and*
    d. *the land is not contaminated or potentially contaminated.*

2. *For the damming of water in the bed of a river and the constructing, altering, using, maintaining and operating of dam structures within the bed of a river:*
    a. *the volume of water impounded is less than 5,000 m^3; and*
    b. *the maximum depth of water is less than 3 m; and*
    c. *the dam does not impound the full flow of the river; and*
    d. *any existing passage of fish is not impeded; and*
    e. *the damming of water does not cause water flow to fail to meet any limits in Sections 6 to 15 or fall below the minimum flow for the surface waterbody if the waterbody is subject to a minimum flow as set out in Sections 6 to 15; and*
    f. *the dam is not located in a river listed as a high naturalness river in Sections 6 to 15 or in the mainstem of any river; and the damming does not prevent water being taken by any domestic or stock water supply, or reduce the reliability of supply of any existing legally authorised water take.*

Appendix D – Replacement of National Policy Statement for Freshwater Management 2020: Interim Treaty Impact Analysis

The Interim Treaty Impact Analysis for the freshwater package can be accessed here.