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Freshwater Policy Evaluation:

Understanding the barriers and enablers of effective assessment

New Zealand Freshwater Sciences Society
Ngā Kohinga Wai o Aotearoa

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Contents

Summary

New Zealand's freshwater policies set requirements to achieve the integrated and sustainable management of freshwaters and rely on effective measurement of outcomes to ensure public accountability. However, the effectiveness of these policies is not always clear. When we consider whether policies have been effective or not, we often look to changes in the environment, such as river water quality, or the communities of invertebrates or fish that inhabit our freshwaters. But to understand policy effectiveness at time scales that help us guide decisions and correct our course if necessary, we need:

- information on expected environmental changes (outcomes). While state of the environment monitoring systems are generally in place to collect this data, they are unlikely to provide sufficient information to inform policy effectiveness evaluation.

- information to determine the causes or drivers of those outcomes. This might include data on organisational processes, relationships built, shifts in attitudes and behaviours, regulatory processes, and on-the-ground actions such as restoration or changes in land use intensity.

Evaluating the success of interventions depends on having robust baseline data and well-designed monitoring and reporting systems for **both** types of information. It also depends on having methods of collating, storing and sharing the relevant data in an accessible way.

Evaluation isn't just nice to have; it helps us achieve our outcomes. It helps us determine whether policies and other interventions are operating as intended, hence justifying (or not) current management efforts and informing the next round in the ongoing policy-making cycle. When budgets are allocated to actions or policy changes without also considering evaluation, there is a risk that resources are directed into areas that are less effective than others.

This report highlights factors that make policy evaluation easier or harder across four themes. These are summarised in the table below:

Theme	Enablers	Barriers
Legislated reporting and accountability	Understanding the value of evaluation Good practice standards and guidance, e.g. on performance reporting	Competing priorities, especially policy development and implementation

Theme	Enablers	Barriers
SMART objectives and outcomes	Consensus on the goal and timeframes (both short and long-term) Solid evidence base informing the long-term outcomes and milestones to be achieved along the way	Unclear intervention logic Steps in implementation process not well mapped out Uncertainty or disagreement about feasibility of objective or timeframes for achievement
Equipping ourselves with information	Understanding and predicting future uses for data and information Investment in data management and reporting mechanisms Collaboration between model builders and decision makers Being realistic about viable applications and limitations of models	Cost of monitoring Monitoring not initiated or poor compliance with reporting requirements Lack of systems to collate data (e.g. consenting data) Survey and monitoring design not tailored to evaluation needs Mistrust of model outputs Complexity and communication difficulties Permitted activities 'flying under the radar'
Understanding catchment processes and intervention effectiveness	Research Investment in capability and capacity Targeted funding	Complexity of catchment management Unquantified influences affecting achievement of the objective, such as historical land use, climate variability or changes in land use intensity.

Ecosystems are complex, and it's unrealistic to expect evaluations to resolve all the uncertainties. However, evaluations can help us make more informed decisions about the choice and implementation of policy instruments and other interventions. Therefore, effective freshwater policy evaluation is crucial for ensuring New Zealand's water management efforts meet the needs of the environment, present and future generations, and the economy. Addressing barriers and leveraging enablers will help create more accountable and transparent policy assessment processes.

Part 1. Introduction

Understanding progress towards freshwater outcomes

Significant effort and investment go into improving environmental conditions, yet we often lack clarity about whether these efforts are achieving their intended results. Evaluation—that is, assessing the environmental outcomes of policy and management actions—can help us understand what is working, and why. But evaluation is not always conducted. It can be complex, optional, and expensive, and it requires a willingness to uncover findings that may be uncomfortable or politically sensitive. Resources are often prioritised for implementation or policy reform, rather than for understanding impact.

Measurable environmental improvements typically take time. Disentangling the causes of observed changes also demands sustained effort and robust information. For these reasons, effective commissioning and use of freshwater knowledge, science, and modelling are essential parts of the evaluation process. This report explores the actions, behaviours and institutional settings that shape how well this science–policy interface supports evaluation.

Aims and scope

This project explores the barriers and enablers of effective freshwater policy evaluation, with a focus on how evaluations are carried out and what makes them easier or harder to do well. By evaluation, we mean efforts to determine whether policies and related interventions have achieved their intended environmental outcomes.

Freshwater policy continues to evolve; see pages 17-18 for an overview of the development of the National Policy Statement for Freshwater Management (NPS-FM). The most recent version has not yet been fully implemented, and the Government has indicated it will be reviewed and replaced. Nonetheless, much of what has been learned remains relevant. This report considers evaluation in relation to both current and earlier iterations of the NPS-FM, offering insights that may support future practice regardless of changes in policy direction.

The term "policy" is used broadly in this report to include regulatory frameworks, funding arrangements, and other interventions designed to influence freshwater outcomes. Similarly, we take a wide view of "policy evaluation" to encompass the full range of mechanisms that aim to assess effectiveness.

People hold different values, experiences, and expectations about what freshwater management should deliver, and for whom. There are diverse views on what good outcomes look like, and how best to achieve them. This report does not assume a single shared vision but instead focuses on how evaluation systems can better reflect this diversity and support transparent, evidence-informed decision-making.

What this report does not cover

This report does not cover the following topics in detail, which other authors have examined:

- Barriers and enablers of policy implementation.[1]

- The role of science in the development of policy.[2,3]

This project reviews and synthesises existing evaluation efforts; it does not itself assess the effectiveness of specific policies or regulations.

We acknowledge that freshwater policy and evaluation are shaped by political decisions. While this context is crucial, the focus of this report is on the practical and institutional aspects of evaluation, rather than on analysing political dynamics. Where relevant, we note when political considerations have affected the evaluation landscape, but a detailed examination of the political economy of freshwater policy is beyond the scope of this work.

Structure of the report

Part 2 contains a summary of useful frameworks and good practice on the evaluation of environmental policy. It describes why policy effectiveness evaluation is important, and how different types of evaluation can help with learning and accountability.

Part 3 describes how New Zealand's environmental management system is structured at the national, regional and district levels. We touch on requirements for public accountability, reporting and evaluation at the different levels of government. Then, we set out key freshwater policy developments in recent years. Finally, to provide a foundation for understanding barriers and enablers for evaluation, we briefly summarise recent progress on implementation and evaluation of freshwater policy.

In **Part 4**, we discuss the enablers and barriers identified during the course of the project, with case studies and examples.

Part 5 contains a succinct summary of the enablers and barriers for evaluation.

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[1] Kirk, N., Robson-Williams, M., Fenemor, A., & Heath, N. (2020). Exploring the barriers to freshwater policy implementation in New Zealand. *Australasian journal of water resources*, *24*(2), 91-104.
[2] Koolen-Bourke, D., & Peart, R. (2024). *Science for Policy: the role of science in the National Policy Statement for Freshwater Management*. Environmental Defence Society.
[3] Rouse, H. L., & Norton, N. (2017). Challenges for freshwater science in policy development: reflections from the science–policy interface in New Zealand. *New Zealand Journal of Marine and Freshwater Research*, *51*(1), 7-20.

How we carried out the work

Literature review

The analysis of barriers and enablers for evaluating freshwater policy effectiveness was conducted through a structured review of published reports. A systematic search of regional council websites and publicly available government reports was conducted to locate relevant documents about policy effectiveness evaluation.

Information on planned and completed evaluations was collated and grouped by theme and policy instrument. The following research questions were considered:

- How was effectiveness evaluation planned and implemented, for policies with different implementation timescales and theories of change?

- What were the areas of uncertainty or gaps in the evidence base that could be used to inform evaluation?

- How were different forms of information and knowledge included in the process?

Findings were categorized into barriers and enablers under common themes, with a focus on identifying recurring issues.

Engagement

To identify and gather information on key themes, short interviews were conducted with people working in science, policy and evaluation. The participants were recruited using a snowball sampling technique: referral-based recruitment starting with a small group of participants identified by the report author and colleagues.

Part 2. Why do we need to evaluate policy and other interventions?

Effectiveness evaluation—that is, understanding whether actions are having their intended effect—requires planning and dedicated effort to gather the necessary monitoring data and evidence. The payoff is that it helps to achieve outcomes.[4]

Evaluation answers such questions as:

Was that intervention successful and a good use of resources? Why/why not?”

Policy effectiveness evaluation can be used to aid:

- accountability: showing others that the policy has been effective

- learning: examining what went well or less well and how it could be done better.[5]

Further information on evaluation for learning and accountability is provided in Table 1.

To ensure that the effort put into evaluation is worth it, there are some principles of good practice that provide guidance. For instance, rather than waiting until after a policy has been implemented or an action is completed, it's more effective to build evaluation in before and during, as well as after implementation.[6]

However, evaluation is rarely done thoroughly, or if it is, evidence is not always acted upon. An OECD report identified some common challenges for conducting policy evaluation that include the:

- limited use of evaluation results in policy making

- absence of a strategy for policy evaluation that promotes a whole of government approach

- limited availability of human resources (capacity and capability)

- lack of an integrated approach to evidence management, including data.[7]

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[4] OECD (2020). *Improving Governance with Policy Evaluation: Lessons from Country Experiences*. OECD Public Governance Reviews.
[5] Ibid.
[6] HM Treasury (2020). *The Magenta Book: Central Government guidance on Evaluation*. Pages 12-13
[7] OECD (2020). *Improving Governance with Policy Evaluation: Lessons from Country Experiences*. OECD Public Governance Reviews.

Table 1. Characteristics of evaluation for learning and accountability.[8, 9]

Learning: *Was that policy successful? Why/why not?*	Accountability: *Was that policy an effective use of public resources?*
- Helps to understand why and how a policy was or has the potential to be successful or not, by providing an assessment about the reasons and causal mechanisms leading to policy success or failure. - Contributes to the quality of decision making by providing insights on how to improve links between policy formulation, implementation and outcomes. - Helps to manage risk and uncertainty (of the intervention and its implementation). - Improves current interventions by providing the evidence to make better decisions (and feed into performance-management and benefits-realisation work). - Helps gain a general understanding of what works, for whom and when, and generate examples for future policy making. - To develop evidence to inform future interventions.	- Helps improve transparency. - Provides legitimacy for the use of public funds and resources. - Provides citizens and other stakeholders with information whether the efforts carried out by the government, including allocated financial resources, are producing the expected results. - Evidence should be generated that can demonstrate an intervention's impact or wider outcomes. - Evidence of its effectiveness is also needed for scrutiny from public accountability bodies. (e.g. Parliament)

Frameworks for understanding policy effectiveness

To be able to evaluate a policy or other interventions, it is necessary to clarify which aspects of the problem the intervention is intended to address, and to make explicit the outcomes and impacts that it seeks to produce.

Policies are based on a "theory of change" – that is, "*how activities are understood to produce a series of results that contribute to achieving the final intended impacts*."[10] Phrases such as "intervention logic" or "causal chain" have similar meanings. Understanding the theory of change can help to evaluate the effectiveness of policies that have recently been introduced, as they can help to identify measurable intermediate steps, even if the eventual outcomes of the policy will take some time to materialize.[11] This is akin to formulating a hypothesis that can be tested.

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[8] HM Treasury (2020). *The Magenta Book: Central Government guidance on Evaluation*.

[9] OECD (2020). *Improving Governance with Policy Evaluation: Lessons from Country Experiences*. OECD Public Governance Reviews.

[10] Rogers, P. (2014). *Theory of Change*. Methodological Briefs: Impact Evaluation 2, UNICEF Office of Research, Florence.

[11] Kautto, P., & Similä, J. (2005). Recently introduced policy instruments and intervention theories. *Evaluation*, *11*(1), 55-68.

Different frameworks use different words for the steps or stages involved: the terms "outcome" and "impact" for example, might be swapped around compared to their position in Figure 1 below. But the different frameworks all draw distinctions between the immediate actions taken, the early or medium-term results, and the long-term consequences.
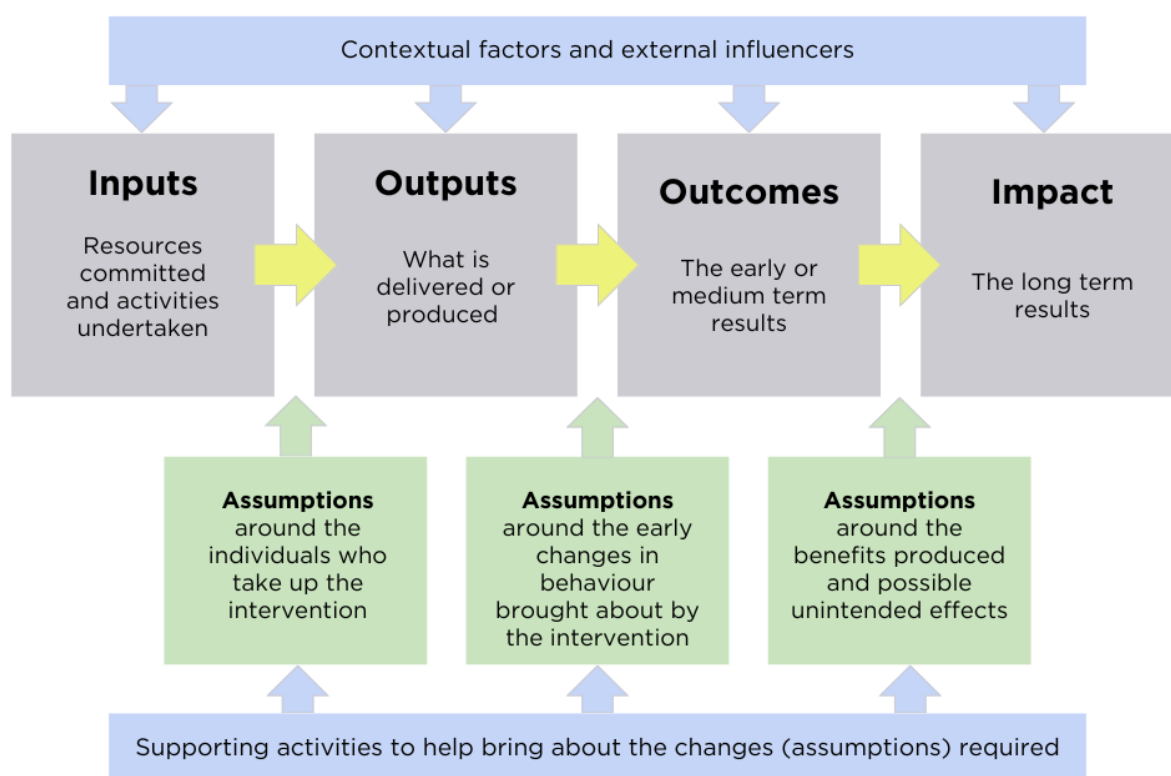
Figure 1. Theory of change.[12]

A theory of change can support an effectiveness evaluation by identifying:

- specific evaluation questions, especially for steps in the theory of change where further evidence is needed

- relevant indicators that will show progress

- intermediate outcomes or milestones, especially in situations where outcomes will take a long time to achieve

- contextual factors that should be addressed in data collection and analysis.[13]

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[12] Adapted from: HM Treasury (2020). *The Magenta Book: Central Government guidance on Evaluation*.
[13] Rogers, P. (2014). *Theory of Change*. Methodological Briefs: Impact Evaluation 2, UNICEF Office of Research, Florence.

Environmental policy is particularly challenging to evaluate

Readers may be familiar with the DPSIR (Driver – Pressure – State – Impact – Response) framework[14], which can be used to analyse and report on environmental issues. When we assess policy effectiveness, we zoom in on the response aspects of the DPSIR framework.

Evaluation of environmental policy can be particularly difficult, because:

- Change can occur over long time scales.

- Action may be required by multiple organisations, or involve a complicated series of steps, or both, to get to the intended result.

- Many different factors and drivers, often interacting in complex ways, influence ecosystems.[15,16]

Considering these challenges, Olsen (2003) developed a framework for evaluating policy effectiveness with a specific focus on catchment management. In catchment management, the first steps in the theory of change typically involve creating the organisational enabling conditions, ways of working or funding arrangements that will allow subsequent steps to occur (Figure 2).[17] Changes in behaviour are presumed to follow, whether on the part of organisations or individuals. Changes in attitudes or priorities may also play a role. Eventually, we expect to measure the effect of these changes on environmental or social indicators, contributing to broader outcomes.

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[14] European Environment Agency. (1995). *Europe's Environment: the Dobris Assessment*. European Environmental Agency, Copenhagen.

[15] Mickwitz, P. (2003). A framework for evaluating environmental policy instruments: context and key concepts. *Evaluation, 9*(4), 415-436.

[16] Hewitt, J., Bulmer, R., Clark, D., Couzens, G., Ellis, J., Gladstone-Gallagher, R., Lohrer, D., Pilditch, D., & Thrush, S. (2022). *Reframing environmental limits for estuaries*. National Science Challenges: Sustainable Seas | Ko ngā moana whakauka.

[17] Olsen, S. B. (2003). Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean & coastal management, 46*(3-4), 347-361
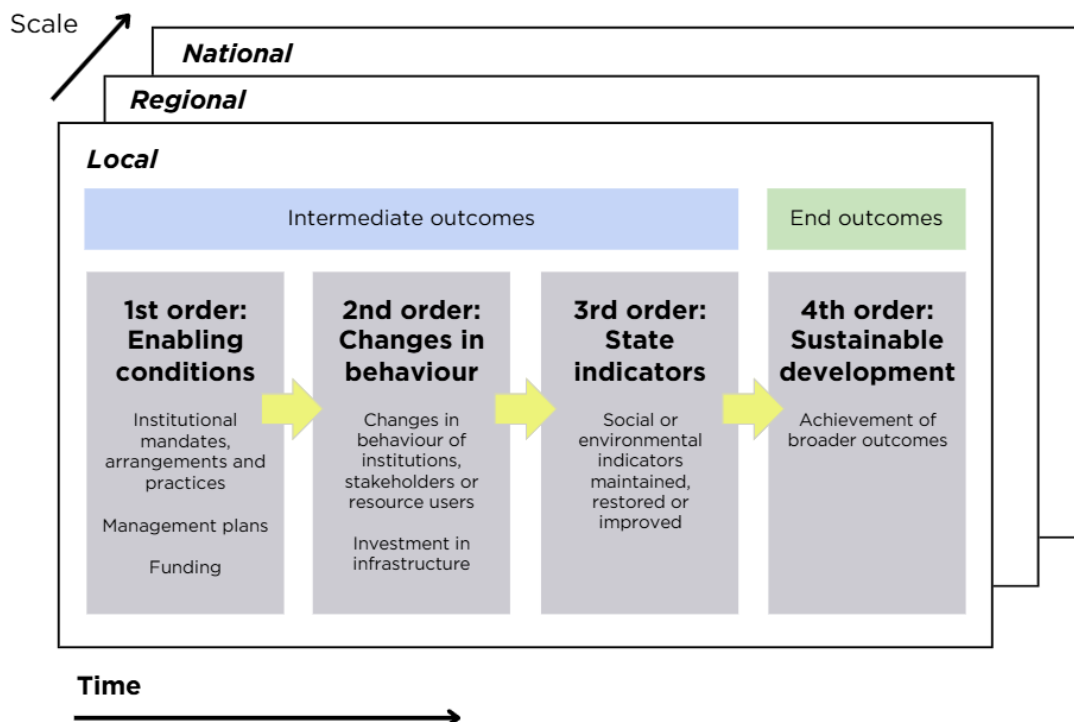
Figure 2. The four orders of catchment management outcomes.[18,19]

Building on this framework, New Zealand-specific guidance for performance monitoring and reporting of freshwater policies was published in 2013.[20] The guidance focussed on requirements for councils and recommended the following principles and processes for effective performance monitoring:

1. **Clear measurable outcomes** that are specific, measurable, achievable, relevant, and time-bound.
2. **Clear measurable outputs/activities**. These are the policy implementation activities, such as a new rule in a regional plan, communication of the new rule, and ensuring compliance.
3. The **logic** underpinning why a policy will lead to a specific outcome. The author noted that this was often done informally and recommended a process for explicitly identifying steps and assumptions leading to a policy outcome. When outcomes will take a long time to be achieved, it's helpful to identify intermediate steps or milestones.

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[18] Olsen, S. B. (2003). Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean & coastal management*, 46(3-4), 347-361

[19] Mortimer, C. (2013). *Telling the performance story: policy performance monitoring & reporting guide for freshwater management.* Landcare Research review LC1479 for Ministry of Business, Innovation and Employment

[20] Ibid.

4. A **monitoring framework** and baseline information showing the state of relevant indicators before the policy is implemented. This information can then feed into an analysis of the data to evaluate the policy, and reporting of the conclusions.
5. Processes that **close the evaluation–action loop** to ensure performance findings can be acted upon.

The guidance noted that articulating intervention logic is challenging because:

- there is not always evidence behind each step in the intervention logic

- there may be political risk if intervention logic forces agencies to create targets that may then not be reached

- some milestones may have no baseline or monitoring data to track progress.

Twelve years on from the publication of this guidance, there is evidence that these areas continue to be challenging. We discuss this further in Part 4.

Part 3. The freshwater policy landscape

The environmental management system and its accountability arrangements

New Zealand's environmental and resource management system is spread across central and local government (Figure 3). Other authors have described this system in detail.[21] Notably, achieving freshwater and other environmental outcomes depends on a series of actions by many different organisations who work at different spatial scales and are accountable to different people.
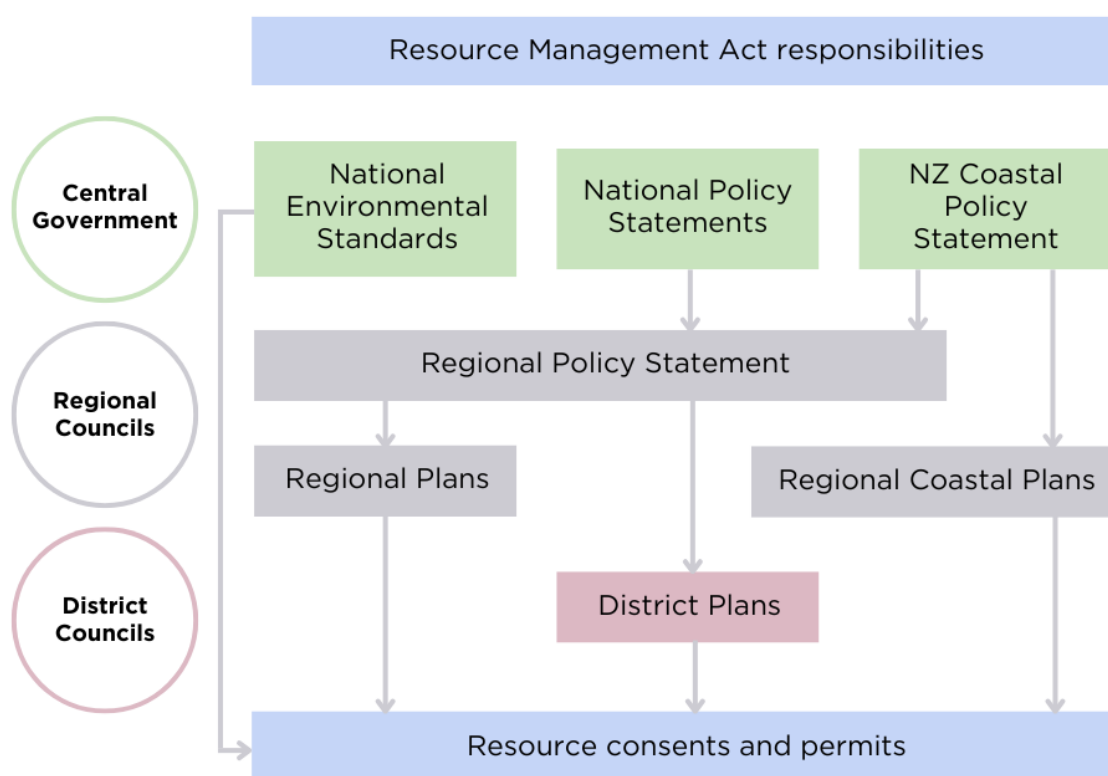
Figure 3. Resource management responsibilities of central government, regional and district councils.[22,23]

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[21] See, for example: The Controller and Auditor-General. (2011) *Managing freshwater quality: Challenges for regional councils.*

[22] Note, unitary councils have responsibilities of both regional and district councils.

[23] Adapted from: Te Kōkiringa Taumata | New Zealand Planning Institute. (2020) *Guide for Internationals: The New Zealand Planning System*.

Central government

Central government organisations like the Ministry for the Environment (MfE) report on their performance and progress through:

- annual reports on financial and non-financial performance

- hearings held by parliamentary select committees, such as estimates and annual review hearings, as well as specific briefings and inquiries

- New Zealand's Environmental Reporting series published by MfE and Stats NZ, such as *Our freshwater 2023*[24]

- commissioned reports on specific topics.

Independent oversight is provided by the Parliamentary Commissioner for the Environment, who has a broad mandate to investigate and report on environmental issues.

Regional and unitary councils

Regional and unitary councils report progress towards freshwater outcomes in their:

- State of the Environment monitoring reports

- Section 35 plan effectiveness evaluations. Under Section 35 of the Resource Management Act 1991 (RMA), every council must monitor the efficiency and effectiveness of policies, rules, or other methods in its policy statement or its plan and prepare a report on this at least every 5 years.[25]

- annual reports, where councils are required to report on their financial and non-financial performance.

- commissioned reports on specific topics.

Freshwater policy

Since the NPS-FM was introduced in 2011, national-scale freshwater policy has been under development and revision. A timeline of NPS-FM versions and amendments is provided in Table 2 below, including key changes to related regulations.

Implementation of freshwater policy has continued during this time. For example, while the NPS-FM 2020 had an original deadline for implementation of 2024, this was

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[24] Ministry for the Environment & Stats NZ (2023). *New Zealand's Environmental Reporting Series: Our freshwater 2023.*
[25] Note, the requirement for councils to complete separate Section 35 reports was recently clarified by a High Court decision on Environmental Law Initiative v Environment Southland.

subsequently extended to 2027,[26] meaning that the policies are, in the main, not yet implemented. Some requirements have since been amended or removed (see Table 2).

Table 2. Key requirements and changes to the NPS-FM and related regulations.[27,28,29,30,31]

Year	Key requirements of NPS-FM and related regulations
2011	Requirements: • Councils to set freshwater objectives and limits for water quality and quantity. • The overall freshwater quality in a region to be maintained or improved. Deadlines • Councils were to implement as soon as reasonably practicable, but by 2030 at the latest • An independent review was to occur five years after enactment.
2014	NPS-FM updated and replaced: • Te Mana o te Wai was recognised. • Two compulsory values were introduced: ecosystem health and human health for recreation. • The National Objectives Framework was introduced, with some national bottom lines for the compulsory values. Deadlines • Councils were to implement by 2025, with possibility to extend to 2030. • An independent review was to occur in 2016.
2017	NPS-FM amended: • National targets for swimmable lakes and rivers were introduced. • Direction for Te Mana o te Wai in freshwater management was increased. • Direction was provided for monitoring macroinvertebrates, managing nitrogen and phosphorus, and considering economic well-being. • Regional councils were required to improve water quality in terms of human health. Deadlines • Councils were to implement by 2025, with possibility to extend to 2030. • An independent review was to occur in 2020.

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[26] Resource Management Act 1991. Section 80A

[27] Ministry for the Environment. (2020). *History of the National Policy Statement for Freshwater Management*

[28] National Policy Statement: Freshwater Management 2011

[29] National Policy Statement for Freshwater Management 2014 (Updated August 2017 to incorporate amendments from the National Policy Statement for Freshwater Amendment Order 2017)

[30] New Zealand Government. (2017). *Changes made to the National Policy Statement for Freshwater Management 2014 in the 2017 Amendment*

[31] Ministry for the Environment. (2024). *Resource Management (Freshwater and Other Matters) Amendment Act 2024.*

Year	Key requirements of NPS-FM and related regulations
2020	Essential Freshwater policies and regulations: • National Policy Statement for Freshwater Management 2020 (NPS-FM) • National Environmental Standards for Freshwater 2020 (NES-F) • a new freshwater planning process (FPP) • a freshwater farm plan (FW-FP) system • Resource Management (Stock Exclusion) Regulations 2020 • amendments to the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010. The main changes to the NPS-FM included: • Direction was provided for giving effect to Te Mana o te Wai. • An expanded National Objectives Framework was introduced. • Measures were added to avoid further loss or degradation of streams and wetlands. • Additional monitoring and reporting requirements were added. Deadlines • Councils were required to submit plans to the Freshwater Planning Process by the end of 2024. • The independent review clause was removed.
2022-2023	• Removal of Clause 3.33 and Appendix 5 of the NPS-FM (Specified vegetable growing areas) • Minor amendments
2024	Changes made through the Resource Management (Freshwater and Other Matters) Amendment Act 2024, including but not limited to: • Amending RMA s80A to restrict notification of freshwater planning instruments (regional policy statements and plans that give effect to the NPS-FM 2020) until the earlier of the date when a new NPS-FM takes effect, or 31 December 2025. • Excluding the hierarchy of obligations within Te Mana o te Wai from consideration in resource consenting. • Pausing the roll-out of freshwater farm plans until work to improve the system is finalised. • Repealing the low slope map and associated requirements from stock exclusion regulations. • Repealing permitted and restricted discretionary activity regulations and associated conditions for intensive winter grazing. The Act replaces these with standalone regulations on riparian setback and critical source areas.

Implementation and evaluation progress

Central government

Planning for monitoring and evaluation

In 2023, the Ministry for the Environment (MfE) reported on progress towards implementing the 2020 Essential Freshwater package, including implementation of policies and regulations as well as $407.3 million of investment through the Jobs for Nature programme. The report notes:

> "*Most of the actions discussed are targeted at stopping further degradation of these resources. While it may be too early to know if we're reversing the trends identified in the Our freshwater 2023 report, these actions are first steps toward achieving longer-term objectives.*"[32]

The report describes implementation progress of some regulations and policies; for example, the nitrogen cap and intensive winter grazing, which are discussed in further detail on page 35 of this report in the context of resource consents as sources of information for policy evaluation.

For policies and regulations at an earlier stage of implementation, such as stock exclusion regulations, freshwater farm plans and reporting the taking of water, the progress report summarises upcoming implementation timeframes and requirements. Case studies are presented highlighting the involvement and achievements of councils, tangata whenua, farmers and growers, and communities. A summary of councils' progress towards creating freshwater plans is provided (see further detail under *Regional councils and unitary authorities* on page 22). Finally, the report outlines actions completed towards supporting the implementation of the programme, categorised under its three outcomes (summarised in Table 3 below).

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[32] Ministry for the Environment. (2023). *Essential Freshwater progress report.*

Table 3. Summary of actions (not including funding of restoration initiatives) reported by the Ministry for the Environment towards the three outcomes of the Essential Freshwater programme in 2023.[33]

1. Stop further degradation of freshwater	2. Start making immediate improvements so water quality improves within five years	3. Reverse past damage, to bring our waterways and ecosystems to a healthy state within a generation
Contributing towards Outcomes 1 and 2: • New Zealand Fish Passage Assessment Tool • Module updates and technical guidance for intensive winter grazing • Guidance on nitrogen cap for farmers and regional councils		Contributing towards Outcome 3: • Workshops about Te Mana o te Wai delivered to tangata whenua and councils • Guidance for implementing the NPS-FM sediment requirements • A kete (toolkit) for implementing mahinga kai in the context of the NPS-FM • Upcoming rollouts of freshwater farm plans
Contributing towards all three outcomes: • Guidance on interactions between the National Environmental Standards for Plantation Forestry and NES-F • Calculator research to assess distances to set drainage back from wetlands • Guidance on wetlands definitions in the NPS-FM and NES-F • Guidance on excluding pasture from the definition of natural inland wetlands in the NPS-FM • Wetland delineation hydrology tool for Aotearoa New Zealand • Wetland mapping methods: proof of concept		

As of mid-2023, MfE had begun progress towards designing a reporting framework for the Essential Freshwater package, but it was not yet in place. MfE noted that it was, at the time, developing an Essential Freshwater Reporting Strategy "*which will identify the key elements in scope, contributing players, data sources, deliverables and responsibilities, as well as the intervention indicators required to effectively report on the package.*"[34] The strategy was to include:

- short-term indicators to track progress and monitor performance for the implementation of the Essential Freshwater package workstreams

- long-term indicators to track progress and determine whether the objectives of the Essential Freshwater package have been met or are in the process of being met.

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[33] Ministry for the Environment. (2023). *Essential Freshwater progress report.* Pages 44-53
[34] Letter from James Palmer, Secretary for the Environment, to Leeanne McAviney Assistant Auditor-General, Sector Performance. May 2023.

Understanding progress: Select committee briefing on freshwater outcomes

In 2023, the Environment Select Committee initiated a briefing to investigate the progress towards addressing freshwater quality issues in New Zealand.[35] The Committee identified six government agencies that have roles in making substantive contributions to freshwater quality:

- Ministry for the Environment - Manatū Mō Te Taiao (MfE)

- Ministry of Business, Innovation and Employment - Hīkina Whakatutuki (MBIE)

- Ministry for Primary Industries - Manatū Ahu Matua (MPI)

- Department of Conservation - Te Papa Atawhai (DOC)

- Department of Internal Affairs - Te Tari Taiwhenua (DIA)

- Land Information New Zealand - Toitū Te Whenua (LINZ).

Of these organisations, MfE has the largest responsibility for contributing to the management of freshwater, through:

- administering the Resource Management Act 1991 (RMA) under which freshwater is managed

- leading policy and advice on national direction

- supporting implementation of policy and monitoring its progress

- administering funding initiatives.

The Committee concluded that when examining performance information relating to water quality, it was difficult to assess "*not only what agencies are doing but whether their activities are part of a comprehensive plan of mutually supporting policies.*" It recommended several changes intended to clarify the progress being made by government agencies towards achieving freshwater policy outcomes:

- develop a shared set of cross-agency outcomes relating to freshwater quality

- put in place adequate cross-agency coordination and oversight arrangements to ensure alignment in pursuing those outcomes

- routinely tag expenditure that relates to freshwater quality to facilitate accountability to Parliament

- undertake an assessment of the scale of investment needed to meet freshwater outcomes

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[35] Environment Committee. (2023). *Briefing on environmental outcomes – freshwater. Interim report of the Environment Committee.* New Zealand Parliament.

- provide specific detail in accountability documents about freshwater outcomes, key activities, and progress

- formulate a cross-agency plan to better understand the impacts of agencies' collective activities on freshwater quality

- provide a "dashboard" report by March 2024 that sets out progress towards environmental outcomes relating to freshwater.

Several of these recommendations, if taken up, would contribute towards understanding the effectiveness of freshwater policy.

Shortly after the Committee published its recommendations, elections resulted in a change in government. In its response to the Committee's recommendations, the Government rejected the Committee's recommendations in full, noting contextual changes such as new direction on freshwater policy, ongoing work by the Treasury on public accountability performance reporting, changes in Science, Innovation and Technology priorities, and an increased focus on outcomes in Select Committee scrutiny.[36]

Regional councils and unitary authorities

In June 2022, Te Uru Kahika | Regional and Unitary Councils Aotearoa provided a progress report on regional planning implementation of the NPS-FM.[37] The report highlighted progress made by all councils across several areas:

- progressing working relationships with tangata whenua

- advancing understanding of community priorities

- completing working versions of Freshwater Management Units

- completing the information to inform baseline attribute states and moving the information to web-based hubs.

- progressing the identification of Māori freshwater values and incorporating mātauranga

- assessing options for achieving load reductions.

Most councils had planned to conduct wider public engagement on options, limits and potential plan provisions in 2023, with some councils conducting plan changes during 2023 (Greater Wellington (provisions relating to water infrastructure), Gisborne (Waiapu and Waimata), Otago, Southland and West Coast). This progress report reflects the

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[36] *Government Response to Interim Report of the Environment Committee: Briefing on environmental outcomes – freshwater.*
[37] Te Uru Kahika | Regional and Unitary Councils Aotearoa. (2022). *Progress Report: Regional Planning Implementation of the NPS-FM*

stage that councils were at in their implementation, working towards submitting plans in 2024. This deadline has since been extended to allow for further changes to the NPS-FM.

Several regional and unitary councils have published reports under Section 35 of the RMA, relating to freshwater management that assess the effectiveness of plan provisions relating to previous iterations of the NPS-FM:

- Waikato Regional Council (2024)[38]

- Horizons Regional Council (2023)[39]

- Auckland Council (2022)[40]

- Tasman District Council (2019/20).[41]

Each council determines their approach to effectiveness evaluation, and identification of enablers or barriers is not specifically required. Hence, there are varying levels of detail provided about the factors supporting or hampering the assessments. Nevertheless, many Section 35 reports provide insight into the enablers and barriers faced when evaluating freshwater and other environmental policy, as well as other actions; these are discussed in the next section.

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[38] McKenzie, A., Richardson, C. (2024). *Assessing the effectiveness and efficiency of the Waikato Regional Plan.* Waikato Regional Council Policy Series 2024/04

[39] Shirley, L. (2023). *One Plan Section 35 Evaluation: Freshwater Provisions*. Horizons Regional Council.

[40] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2022). *Auckland Unitary Plan RMA Section 35 Monitoring: B7.3 Freshwater systems and B7.4 Coastal water, freshwater and geothermal water*. Auckland Council Technical Report TR2022/14.

[41] For example: Mason, G., McGlinchey, L. (2020). *Tasman Resource Management Plan Efficiency and Effectiveness Evaluation. Chapter 33: Discharges to Land and Fresh Water*. Tasman District Council | Te Kaunihera o te tai o Aorere.

Note, reports on other chapters of the plan are listed under "Plan review documents" here

Part 4. Barriers and enablers

Themes covered in this section

This section is organised by theme, with enablers, barriers and recommendations for each theme:

- Legislated reporting and accountability.

- Knowing what good looks like: SMART objectives and outcomes.

- Equipping ourselves with information.

- Understanding catchment processes and intervention effectiveness.

Legislated reporting and accountability

The importance of policy effectiveness evaluation

Evaluating the effectiveness of freshwater policies is widely acknowledged as important, yet it often takes a back seat to more immediate policy development and implementation tasks, and we still lack a comprehensive understanding of the effectiveness of freshwater policies. When budgets are constrained, organisations tend to focus on fulfilling their core legislative responsibilities. In this context, effectiveness evaluation may be perceived as discretionary. When budgets are allocated to actions or policy changes without also considering evaluation, there is a risk that effort is not directed in the most effective way.

Performance reporting: knowing how well we're doing

There are several legislated reporting and accountability requirements under New Zealand's environmental management and public accountability systems. One aspect of this is that government organisations are required to report publicly about what they intend to achieve and what they have done towards their broader aims and objectives; for example, in annual reports for central government organisations and annual reports and long-term plans for local government. Although performance reporting focusses on everything an organisation does, rather than policy effectiveness specifically, good performance reporting requires a similar way of thinking about outcomes, impacts and milestones as described in Part 2 above. The Auditor-General has recommended that when reporting their performance, public organisations should:

- consider how they will assess, monitor, and report the impact and difference they can make through their services

- consider what mix of quantitative and qualitative approaches is appropriate

- tell a story over time

- give a meaningful picture of progress towards impacts and outcomes.[42]

Performance reporting and policy evaluation, then, require similar types of planning and thinking about how progress will be demonstrated towards outcomes, and commitment to gathering supporting information and evidence.

Existing legislative requirements for reporting and evaluation

The Resource Management Act 1991 (RMA) mandates that councils report at least every five years on the efficiency and effectiveness of policies, rules, and other methods in their regional policy statements and plans (as described on page 16). The NPS-FM 2020 builds on this by requiring councils to:

- Establish methods for monitoring progress toward achieving environmental targets, including measures informed by mātauranga Māori and indigenous flora and fauna indicators.[43]

- Develop and review action plans every five years, covering both regulatory measures (e.g., amendments to policy statements and plans) and non-regulatory measures (e.g., collaborative initiatives with tangata whenua and community groups).[44]

- Respond to degradation trends by taking action to halt or reverse environmental decline. If an action plan is developed for this purpose, it must include an evaluation of effectiveness.[45]

Some policies include additional reporting and evaluation requirements, such as:

- Fish Passage: Councils must prepare action plans with remediation targets for instream structures and specify how their effectiveness will be monitored.[46]

- Synthetic Nitrogen Fertiliser Use: Dairy farmers are required to submit annual reports on fertiliser use to regional councils.[47]

- Freshwater Farm Plans: Farm operators are required to produce farm plans which are certified and audited. Certifiers and auditors are required to provide information to regional councils[48] (note, at the time of writing, these requirements were being amended).

At the time of writing this report, the NPS-FM 2020 and related policies and regulations were at different stages of implementation. While we may not yet be able to detect

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[42] The Controller and Auditor-General. (2022). *Good practice in reporting about performance.*
[43] National Policy Statement for Freshwater Management 2020. Clause 3.18
[44] National Policy Statement for Freshwater Management 2020. Clause 3.15
[45] National Policy Statement for Freshwater Management 2020. Clause 3.20
[46] National Policy Statement for Freshwater Management 2020. Clause 3.26.
[47] Resource Management (National Environmental Standards for Freshwater) Regulations 2020. Subpart 4
[48] Resource Management Act 1991, Part 9A

changes in environmental indicators, we are potentially able to draw conclusions about the intervention's progress if the degree of implementation is monitored robustly. These different ways of informing effectiveness evaluations are discussed further in *Equipping ourselves with information* on page 27.

Previous versions of the NPS-FM included a requirement for an independent review five years after enactment, with monitoring data collection starting two years prior. However, these reviews were not conducted outside of policy reform programmes, and the requirement was removed from the 2017 and 2020 versions.

Knowing what good looks like: SMART objectives and outcomes

The importance of SMART objectives in policy evaluation

Effective policy evaluation relies on well-defined objectives that clearly outline what changes a policy aims to achieve and how success will be measured. SMART objectives—those that are Specific, Measurable, Achievable, Relevant, and Time-bound—provide a strong foundation (and testable hypotheses) for assessing policy effectiveness by clearly defining expected outcomes and measurement criteria.[49] Without them, evaluation efforts can be hindered by vague or unquantifiable goals, making it difficult to determine whether policies are achieving their intended outcomes. This is especially the case for New Zealand's freshwater management system, which relies on effective measurement of outcomes to ensure public accountability and has been described as "performance improvement-through-measurement".[50]

Guidance on best practices in policy evaluation highlights the value of SMART objectives in ensuring measurable and transparent reporting on progress.[51] When objectives are clear and measurable, policymakers and stakeholders can track achievements, identify gaps, and adjust strategies accordingly.

Case Study: Waikato Regional Plan

A recent evaluation of the Waikato Regional Plan demonstrates both the benefits of SMART objectives and the challenges posed by vague policy provisions. The evaluation found that water quality targets for Lake Taupō were being met ahead of schedule, largely due to the nitrogen cap and trade scheme implemented in 2011 under Variation 5:

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[49] Mortimer, C. (2013). *Telling the performance story: policy performance monitoring & reporting guide for freshwater management.* Landcare Research review LC1479 for Ministry of Business, Innovation and Employment

[50] Tadaki, M. (2024). Limits to measurement: Rethinking the role of monitoring in environmental governance. *Environment and Planning E: Nature and Space.* Vol. 7(4) 1647–1671

[51] HM Treasury. (2020). *The Magenta Book: Central Government guidance on evaluation.* Pages 12-13

"Lake Taupō's water quality for ecological health is generally satisfactory to excellent and achieving water quality targets ahead of schedule."[52]

This example highlights how clearly defined targets, such as those that had been set for Lake Taupō water quality, allow for tracking of changes in environmental state. However, the evaluation also noted significant challenges, including a lack of sufficient data to assess the long-term economic and social impacts of the policy. This emphasises the need for comprehensive evaluation frameworks that go beyond environmental indicators.

Equipping ourselves with information

While SMART objectives set clear targets, we must be deliberate in identifying the types of information needed to evaluate progress toward achieving them. Policies operate through various causal pathways, and measurable environmental changes may take years to materialize. Evaluating the effectiveness of freshwater interventions is challenging because environmental changes can result from both policy actions and factors such as historical land use, climate variability and changes in land use intensity. To attribute these changes to specific policies or actions, we need:

- Information on expected environmental changes (outcomes). While state of the environment monitoring systems are generally in place to collect these data, they are unlikely to provide sufficient information to inform policy evaluation.[53]

- Information to determine the causes or drivers of those outcomes. This includes data on organisational processes, relationships built, shifts in attitudes and behaviours, regulatory processes, and on-the-ground actions such as restoration or changes in land use intensity.

Evaluating the success of interventions depends on having robust baseline data and well-designed monitoring and reporting systems for **both** types of information. It also depends on having methods of collating, storing and sharing the relevant data in an accessible way.

Collaborative approaches to freshwater management

As discussed in Part 2, successful freshwater policy implementation depends on partnerships, institutional arrangements, and funding. Correspondingly, early

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[52] McKenzie, A., Richardson, C. (2024). *Assessing the effectiveness and efficiency of the Waikato Regional Plan.* Waikato Regional Council Policy Series 2024/04. Page 63

[53] McDowell, R., A. Noble, M. Kittridge, O. Ausseil, C. Doscher, and D. P. Hamilton. 2024. Monitoring to detect changes in water quality to meet policy objectives. *Scientific Reports, 14(1),* 1914.

implementation efforts often focus on building relationships and establishing decision-making processes rather than immediately achieving environmental outcomes.[54]

The Treaty of Waitangi – Te Tiriti o Waitangi provides the foundation and basis guiding our approach to freshwater management, and the NPS-FM explicitly requires collaboration with Treaty of Waitangi partners as well as community stakeholders. Evaluating the effectiveness of collaborative policies requires an approach that reflects this reality, by ensuring that tangata whenua have the opportunity to partner on the evaluation. The importance of partnerships and relationships to improving freshwater management practices was noted by the Auditor-General in a performance audit of regional councils' freshwater management practices.[55]

As well as building and maintaining relationships, there is a need to trust and draw upon different sources of information. This was summed up by Taylor (2023) in a report commissioned by the Parliamentary Commissioner for the Environment:

> *"Giving effect to [Te Mana o te Wai] will require confidence and trust in sources and types of data that draw on mātauranga (best information) and tikanga (best practice), as well as 'scientific' information and other knowledge and practice systems".[56]*

In addition, when policies are developed alongside communities, evaluation frameworks should align with community aspirations. For example, if a community aspires to increase recreational access to a river, evaluation might include indicators beyond water quality, such as perceived usability and connection to place.

This emphasis on relationships is evident in the Ministry for the Environment's (MfE's) *Essential Freshwater Progress Report* (2023), which highlights the roles played by various groups in achieving freshwater management actions:

- Regional councils – translating national direction into action

- Tangata whenua – making decisions and managing freshwater

- Farmers and growers – applying the rules for freshwater use

- Communities – discussing local needs for freshwater.[57]

By taking a partnered approach to evaluation frameworks, we can ensure that success is measured in ways that reflect the needs and values of Treaty partners and others.

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[54] Mortimer, C. (2013). *Telling the performance story: policy performance monitoring & reporting guide for freshwater management.* Landcare Research review LC1479 for Ministry of Business, Innovation and Employment

[55] The Controller and Auditor-General. (2019). *Managing freshwater quality: Challenges and opportunities*.

[56] Taylor, L. (2023). *Te Mana o te Wai, Te Oranga o te Tāngata.* Report prepared by E Oho! Awakening Aotearoa for the Parliamentary Commissioner for the Environment.

[57] Ministry for the Environment. (2023). *Essential Freshwater progress report.*

The role of data in evaluation

SMART objectives provide a strong foundation for effectiveness evaluation, but without sufficient monitoring data, it is impossible to track progress. To assess whether policies and other actions achieve their intended outcomes, monitoring systems must be in place to establish baseline conditions and measure changes over time.

Freshwater policies and regulations in New Zealand rely on different causal pathways, meaning that policy effects may take varying lengths of time to become evident. Some regulations, such as those requiring immediate changes in land use, can have relatively quick impacts. Others, like the policies in the NPS-FM, require regional councils to develop and implement plans. Given the time it takes for regional plans to be developed, adopted, and applied through resource consents and other kinds of interventions, detecting policy-driven environmental improvements may take years. Some examples of different causal pathways are provided in simplified form in Figure 4 below.

If monitoring systems are not set up early enough, progress may be difficult to evaluate, forcing reliance on incomplete data. This issue was highlighted in Environment Canterbury's assessment of the Canterbury Water Management Strategy:

> "We have not identified key Canterbury species to monitor nor do we conduct regular fish monitoring to enable us to show if we are meeting the goal. The data we do have, however, show that the native fish habitat and populations identified in the Department of Conservation's 2017 Conservation Status of New Zealand Freshwater Fishes continue to decline."[58]

Another challenge arises when there is poor compliance with reporting requirements. For example, Auckland Council noted that water metering and reporting compliance dropped from 86% in 2013 to 25% in 2022.[59] In these situations, addressing the data gaps can provide useful input for future decision-making.

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[58] Environment Canterbury. (2025) *Ecosystem health and biodiversity.*
[59] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2022). *Te Aroturukitanga o te Mahere ā-Wae ki Tāmaki Makaurau | Auckland Unitary Plan Section 35 Monitoring: B7.3 Freshwater systems and B7.4 Coastal water, freshwater and geothermal water. Summary Report*. Page 13

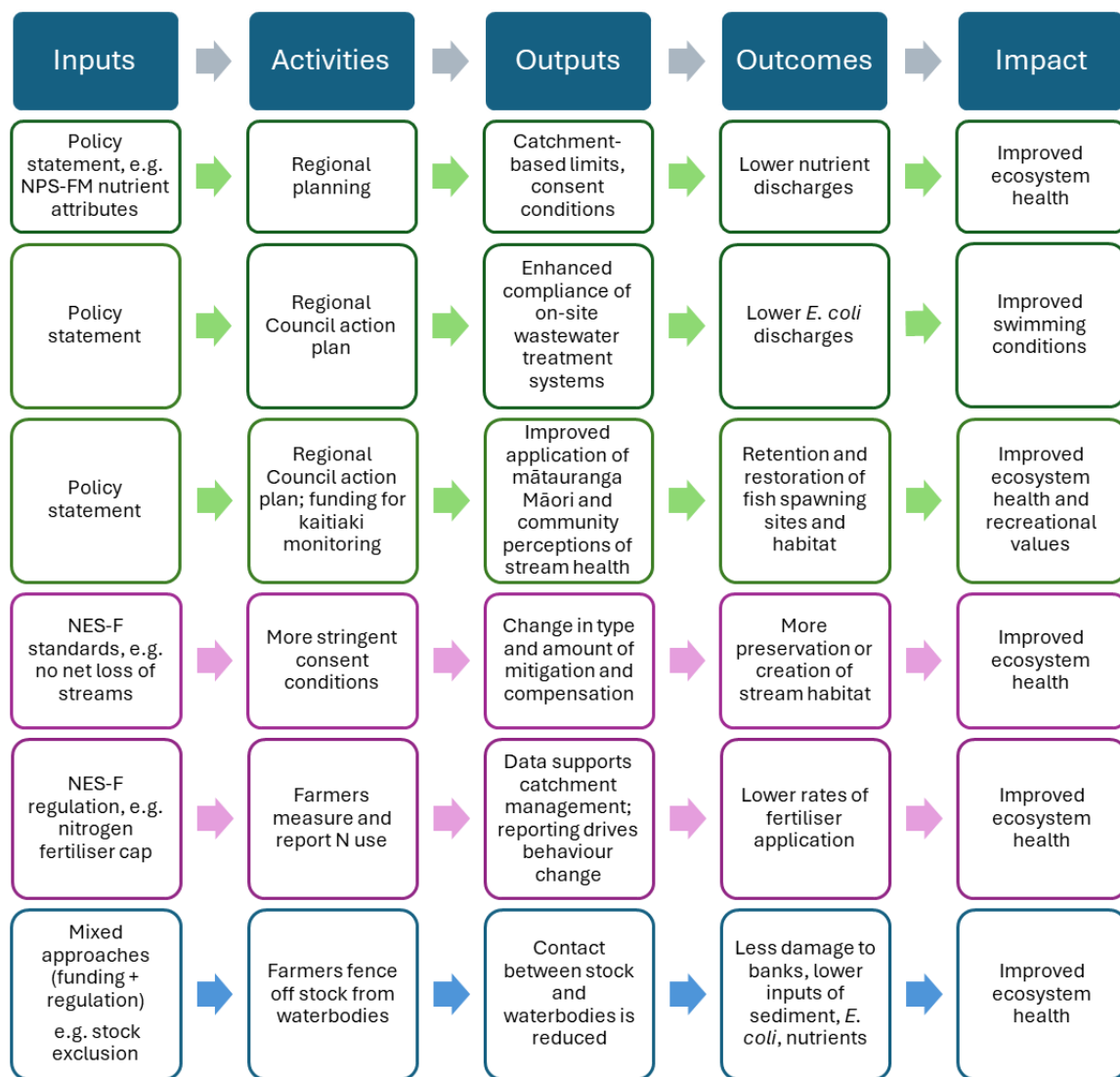| Inputs	Activities	Outputs	Outcomes	Impact
Policy statement, e.g. NPS-FM nutrient attributes	Regional planning	Catchment-based limits, consent conditions	Lower nutrient discharges	Improved ecosystem health
Policy statement	Regional Council action plan	Enhanced compliance of on-site wastewater treatment systems	Lower *E. coli* discharges	Improved swimming conditions
Policy statement	Regional Council action plan; funding for kaitiaki monitoring	Improved application of mātauranga Māori and community perceptions of stream health	Retention and restoration of fish spawning sites and habitat	Improved ecosystem health and recreational values
NES-F standards, e.g. no net loss of streams	More stringent consent conditions	Change in type and amount of mitigation and compensation	More preservation or creation of stream habitat	Improved ecosystem health
NES-F regulation, e.g. nitrogen fertiliser cap	Farmers measure and report N use	Data supports catchment management; reporting drives behaviour change	Lower rates of fertiliser application	Improved ecosystem health
Mixed approaches (funding + regulation) e.g. stock exclusion	Farmers fence off stock from waterbodies	Contact between stock and waterbodies is reduced	Less damage to banks, lower inputs of sediment, *E. coli*, nutrients	Improved ecosystem health

Figure 4. Examples of simplified causal pathways in New Zealand freshwater management policy and regulations.

The role of models in freshwater policy evaluation

Models are a crucial tool in freshwater management, helping to make sense of the data, fill spatial knowledge gaps, predict future outcomes, and support policy evaluation. They allow decision-makers to test different management scenarios and assess whether policy interventions are likely to achieve intended environmental outcomes. By defining trajectories of change and establishing measurable milestones, models can also contribute to the development of SMART objectives.

Field measurements are often seen as more reliable than models, but all data contain some level of uncertainty. Measurements taken at specific points in time, such as monthly water quality samples, only provide a snapshot. We need models to help us understand the data: these can range from simpler statistical models, such as averages or trends, to more complex computational models or expert panel assessments. MfE

has recently reinforced that both modelled and field data are valid forms of environmental monitoring and that they are complementary and interdependent.[60]

Not all models are computational. Expert panels are also used for aggregating knowledge and making decisions based on the best available information. For example, Greater Wellington Regional Council made use of expert panel assessments to predict environmental impacts of freshwater management scenarios to inform the Whaitua process, a community-led collaborative process to address a number of land and water management issues and to carry out obligations under the NPS-FM.[61]

Barriers to the use of models in regulatory contexts

Despite their value, models remain underutilized in regulatory processes. A report by the Parliamentary Commissioner for the Environment found that while models are commonly used in regional planning, they are rarely applied to compliance monitoring, enforcement, or assessing plan effectiveness. Only six councils reported using models for compliance, and no councils reported using them for direct enforcement or formal policy evaluation. The Commissioner found that this represents a missed opportunity, as reusing models in this way could help determine whether policies are delivering their intended results.[62] There is also a need to tailor the use of models to enable tāngata whenua to be involved to the extent they would consider appropriate.[63]

Several barriers contribute to this underuse:

- Complexity and communication challenges – Many non-modellers find models difficult to interpret, particularly when underlying assumptions and processes are not well explained.

- Lack of trust in model outputs – Uncertainty in model predictions can lead to scepticism, especially if there is no clear guidance on how to evaluate model accuracy.

- Limited integration with regulatory frameworks – Most councils rely on direct field measurements for compliance, rather than leveraging models as a complementary tool.[64]

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[60] Ministry for the Environment. (2023). *Developing, adapting and applying environmental models in a regulatory context in New Zealand.*
[61] Greer, M., Ausseil, O,. Clapcott, J., Farrant, S., Heath, M., Norton, N. (2020). *Whaitua Te Whanganui-a-Tara Water Quality and Ecology Scenario Assessment*. Report prepared by Aquanet Consulting Limited for Greater Wellington Regional Council.
[62] Parliamentary Commissioner for the Environment. (2024). *A review of freshwater models used to support the regulation and management of water in New Zealand: Summary for policymakers*.
[63] Taylor, L. (2023). *Te Mana o te Wai, Te Oranga o te Tāngata.* Report prepared by E Oho! Awakening Aotearoa for the Parliamentary Commissioner for the Environment.
[64] Ministry for the Environment. (2023). *Developing, adapting and applying environmental models in a regulatory context in New Zealand.*

To overcome these barriers, regulators and decision-makers can work closely with model developers to understand key aspects of models, including:

- their assumptions and underlying logic

- the degree of predictive accuracy and uncertainty

- their viable applications and inherent limitations

- their integration into monitoring programmes.[65]

Case study: Auckland Council's Freshwater Management Tool

Auckland Council's Freshwater Management Tool demonstrates how models can inform decision-making and identify SMART objectives (that is, testable hypotheses) that can be used as a basis for policy evaluation. The tool integrates process-based and intervention-optimisable models to simulate contaminant generation and transport, helping to target management actions effectively.[66]

One example of its application is the Mahurangi East Land Restoration Project, a joint initiative between Auckland Council and Ngāti Manuhiri Settlement Trust.[67] The tool was used to develop action plans for six sub-watersheds, identifying cost-effective interventions to achieve target sediment reductions. Key outputs included:

- $0.21 million for highly erodible land management (e.g., space-planted poplars)

- $3.44 million for riparian management (e.g., 5 m setbacks with native planting)

- $0.03 million for wetland restoration (e.g., fencing and planting).

Restoration efforts are now underway, with ongoing monitoring to track environmental outcomes.[68] This case study highlights two key benefits of using models in freshwater management:

1. Long-term impact forecasting: Models help link restoration actions to expected environmental benefits, especially when measurable changes take years to materialize.

2. Collaborative decision-making: The project demonstrates how models can support co-governance partnerships, ensuring interventions align with mana whenua priorities.

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[65] Ibid.
[66] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2024). *Freshwater Management Tool V1.0 | Healthy Waters & Flood Resilience*
[67] Nowell, P., Muller, C., Stephens, T., Kpodonu, T., Patel, M., Brown, N. (2023). *Accounting for change: A pioneering approach to optimised catchment action planning using the Freshwater Management Tool*. In: *Diverse Solutions for Efficient Land, Water and Nutrient Use*. (Eds. C.L. Christensen, D.J. Horne and R. Singh). Occasional Report No. 35. Farmed Landscapes Research Centre, Massey University.
[68] Ngāti Manuhiri Settlement Trust. (2024). *Mahurangi Land Restoration Programme Pānui - August 2024.*

Nowell et al. (2023) emphasized the tool's potential for improving policy evaluation, particularly in situations such as catchment restoration where there are long time delays between implementation of actions and measurable environmental results.[69] In helping to guide decision-making and produce predictions about expected outcomes, model predictions provide a hypothesis that can be tested via other lines of evidence, provided the right kind of information is collected to support that assessment.

The role of resource consents in policy evaluation

Resource consents are a primary mechanism for councils to influence environmental outcomes, as they set legally enforceable conditions on activities that impact freshwater. Analysing how consents are granted and whether conditions are met provides valuable insights into policy effectiveness.

Policy evaluation is well supported when information on the intended processes and outcomes is collected and structured in a way that aligns with the policy objectives. For example, Auckland Council was able to use consent data to evaluate the impact of its plan provisions to prevent the loss of natural stream habitat, finding gaps in its decision-making process:

> "Analysis of the consent decisions indicates there are decision making gaps in assessing relevant policy matters. It appears the AUP [Auckland Unitary Plan] is not fully effective in limiting stream and wetland loss to instances where the specified criteria have been met."[70]

However, consenting data are not always structured in a way that supports evaluation. If data are not aligned with the planning framework, it can be challenging to assess whether consent conditions align with policy objectives. For example, location data are essential for linking interventions with environmental outcomes.

An assessment of the effectiveness of the Waikato Regional Plan found that:

> "The way resource consent and resource consent/permitted activity monitoring/compliance data is gathered, organised and reported on is not aligned with the Regional Plan policy framework. These data sets provide limited in-depth understanding of whether environmental results anticipated through the Regional Plan are being achieved."[71]

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[69] Nowell, P., Muller, C., Stephens, T., Kpodonu, T., Patel, M., Brown, N. (2023). _Accounting for change: A pioneering approach to optimised catchment action planning using the Freshwater Management Tool_.
[70] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2022). _Te Aroturukitanga o te Mahere ā-Wae ki Tāmaki Makaurau | Auckland Unitary Plan Section 35 Monitoring: B7.3 Freshwater systems and B7.4 Coastal water, freshwater and geothermal water. Summary Report_. Page 16
[71] McKenzie, A., Richardson, C. (2024). _Assessing the effectiveness and efficiency of the Waikato Regional Plan._ Waikato Regional Council Policy Series 2024/04. Page 11
https://www.waikatoregion.govt.nz/assets/WRC/PS202404.pdf

Using consenting data at the national scale

National-level policy evaluation faces additional challenges due to inconsistencies in data coverage and reporting across regions. However, recent initiatives have aimed to improve the use of consenting data in environmental policy evaluation.

For example, a recent report documents the processes and challenges involved in using consenting data from MfE's National Monitoring System[72] to evaluate the effectiveness of the National Policy Statement for Highly Productive Land, as a workable example at the national scale.[73] The report identified key barriers, including the lack of:

- a standardised system for sharing geographic data

- a common vocabulary in resource consents across councils.

Similar challenges exist in tracking the implementation of NES-F regulations. For example:

- Nitrogen fertiliser use – In the first year of regulation, few farmers applied for consent to exceed nitrogen limits. However, six months after the reporting deadline, only 40% of dairy farms had submitted required reports, with regional compliance rates ranging from under 30% to over 60%.[74]

- Intensive winter grazing regulations – Satellite and consent data showed a shift away from high-risk practices. However, few consent applications were received, raising questions about whether farmers had changed their practices, submitted consents late, or simply not complied.[75]

These cases illustrate the challenges involved in collecting and aggregating data and information that could be used to inform policy evaluation.

Evaluating the effects of permitted activities

Compared with activities that require resource consent, permitted activities[76] (such as onsite wastewater treatment and small-scale water abstraction) are difficult to track

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[72] Note, this is a system run by the Ministry for the Environment to capture information on resource consents and plan changes.

[73] Curran-Cournane, F., Goodwin, E., Roper, S., Chatterji, P., Kidd, J., van Lier, J., Ransom, M., Lu, W., Borra, L. (2024). *Towards evidence-informed policy evaluation: Exploring National Monitoring System data to inform effectiveness of the National Policy Statement for Highly Productive Land*. Wellington: Ministry for the Environment.

[74] Ministry for the Environment. (2023). *Essential Freshwater progress report.* Pages 21-22

[75] Ibid. Pages 18-19

[76] Definition: "*A permitted activity can be carried out without the need for a resource consent so long as it complies with any requirements, conditions and permissions specified in the Resource Management Act, in any regulations, and in any applicable plans or proposed plans*." Source: Environment Guide (2021). *Resource consents and processes.*

because there is no default reporting mechanism. This creates challenges in assessing their cumulative environmental impact.

For example, onsite wastewater treatment systems (e.g., septic tanks) in Auckland are mostly unmonitored, with only 900 of the city's 45,000 systems requiring consent.[77] Recognising this gap, Auckland Council introduced a Water Quality Targeted Rate to fund a compliance programme for educating owners and ensuring system maintenance.[78] The programme has resulted in improved record keeping by requiring property owners to provide maintenance records for their onsite wastewater systems, which Auckland Council is using to track success and prioritise the work of its compliance staff.

Similarly, water abstraction for stock drinking water is generally allowed as a permitted activity, meaning councils lack data on total water use. Catchment water allocation limits do not necessarily account for permitted activity abstraction, which poses a challenge for understanding how much water is needed to ensure ecological health, and how much is available to allocate to consent applicants.

Horizons Regional Council has noted that stock water takes will likely increase as exclusion rules are applied, noting the need to record information on permitted activity abstraction in the future:

> "In some cases, abstraction will still meet permitted activity criteria, in others, consent will be required [...]. Consideration of the impact and recording of permitted activity abstraction will be needed as part of the freshwater review, particularly in over-allocated catchments." [79]

These examples highlight the importance of improving data collection on permitted activities to fully understand their environmental effects. One mechanism for doing this might be to incentivise reporting on permitted activities through planning rules.

Understanding catchment processes and intervention effectiveness

The challenge of attribution in freshwater policy evaluation

One of the biggest challenges in freshwater policy evaluation is determining whether observed environmental changes are the result of policies or other management

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[77] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2022). *Te Aroturukitanga o te Mahere ā-Wae ki Tāmaki Makaurau | Auckland Unitary Plan Section 35 Monitoring: B7.3 Freshwater systems and B7.4 Coastal water, freshwater and geothermal water. Summary Report*. Pages 23-24

[78] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2024). *Safe Septic - onsite wastewater system compliance programme*.

[79] Shirley, L. (2023). *One Plan Section 35 Evaluation: Freshwater Provisions*. Horizons Regional Council. Page 102.

interventions, or other factors such as changes in the climate or resource use patterns. Without this understanding, it is difficult to assess whether policies and other actions are effective or need adjustment.

For example, Auckland Council has noted that many water quality issues stem from past land use changes, making it difficult to isolate the effects of recent policies:

> "*Many of the issues with water quality, and related ecosystem health, reflect the history of land use change and contaminant inputs, and cannot be directly attributed to particular actions under the AUP [Auckland Unitary Plan] in the last five years. Factors that affect water quality include consents granted before the AUP was operative, climate change, and national regulations*".[80]

Similarly, even well-designed interventions may take years to show measurable results due to legacy contaminants ("load to come"), long consent timeframes, and climate variability—all of which can obscure or delay policy-driven improvements. The more factors influence a system and the more these factors interact with each other, the more difficult it is to attribute observed changes to policies.[81]

Barriers to freshwater improvement that we need to understand

Some features of catchments and the resource management system are more difficult to directly influence but will affect the speed and effectiveness of freshwater improvement, and our ability to evaluate the effectiveness of interventions.

Historical contaminants
Groundwater can take a long time to travel through catchments, which can result in correspondingly long time frames for clearing contamination out of the system and achieving water quality improvements.[82] [83] This is often referred to as the "load to come", referring to the nutrients contributed by past land uses that are currently making their way through rock and sediment, and will not show up in surface water bodies for years or even decades.

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[80] Auckland Council | Te Kaunihera o Tāmaki Makaurau. (2022). *Te Aroturukitanga o te Mahere ā-Wae ki Tāmaki Makaurau | Auckland Unitary Plan Section 35 Monitoring: B7.3 Freshwater systems and B7.4 Coastal water, freshwater and geothermal water. Summary Report*. Page 10

[81] European Environment Agency. (2016). *Environment and climate policy evaluation*. EEA Report No 18/2016

[82] Scott, L., Scott., M., Pearson, A., Wilkins, B., Tregurtha, J., Kreleger, A. (2023). *"How long will it take?" A summary of information about nitrate time lags in Canterbury*. Environment Canterbury Science Summary: R23/02. Environment Canterbury Regional Council | Kaunihera Taiao ki Waitaha

[83] Morgenstern, U., Moreau, M., Coble, M. A., Johnson, K., Townsend, D. B. (2023). *Groundwater and surface water conceptual flow from environmental tracer signatures in the Pukekohe and Bombay area.* Prepared by GNS Science for Auckland Council.

Consented activities

In a regional planning context, activities that already have a resource consent are typically allowed to continue until their consent is due for renewal (although there are mechanisms for councils to proactively review consents). Consent time frames of up to 35 years may be granted. The implication is that new planning provisions may not affect some activities for several years, which is relevant to consider when designing SMART objectives and milestones.

Weather and climate influences

Climate and weather influence freshwater ecosystems in multiple ways. For example, while drier weather may reduce the instance of some undesirable events such as wastewater overflows, periods of warmer, more settled weather and lower flows will encourage growth of nuisance (and sometimes toxic) microalgae and exacerbate stressful conditions for stream biota. Another example is that changes in rainfall patterns may increase erosion and river sedimentation.

Climate patterns such as the El Niño–Southern Oscillation can make it harder to understand cause and effect relationships between land use and water quality, making evaluation more difficult. For example, a recent study found that climate patterns swamped land use effects at 10-year timescales. However, associations between land use and water quality were clearer using a 20-year timescale for analysis.[84]

Understanding the effects of catchment interventions

Ecosystems are complex, and it's unrealistic to expect evaluations to resolve all the uncertainties. However, evaluations can help us make more informed decisions about the choice and implementation of policy instruments and other interventions.[85]

Since it is impractical to monitor every waterway, scientific knowledge and past research help predict intervention effectiveness. A recent literature review found strong evidence that riparian planting, constructed wetlands, and fish passage remediation improve water quality and biodiversity. However, gaps remain in understanding the effects of ecological corridors, wetland restoration, and certain land management

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[84] Snelder, T. H., Fraser, C., Larned, S. T., Monaghan, R., De Malmanche, S., & Whitehead, A. L. (2021). Attribution of river water-quality trends to agricultural land use and climate variability in New Zealand. *Marine and Freshwater Research*, *73*(1), 1-19.

[85] Mickwitz, P. (2003). A framework for evaluating environmental policy instruments: context and key concepts. *Evaluation*, *9*(4), 415-436.

practices.[86] Evaluation could be aided by research into benefits of different interventions and an understanding of how applicable they are to other areas, beyond targeted case studies.

The Parliamentary Commissioner for the Environment has highlighted broader issues in linking data, science, and policymaking, noting gaps in environmental monitoring, inconsistencies in reporting, and challenges in data accessibility.[87]

Access to specialist knowledge is essential for freshwater management, but councils and community groups often face funding and resource constraints. An example of an initiative that aimed to address these barriers was the Access to Experts programme, supported by the Essential Freshwater Fund. The programme was established to assist councils, iwi, and community groups in accessing technical expertise.[88]

Case Study: Horizons Regional Council's Sustainable Land Use Initiative

Horizons Regional Council evaluated the effectiveness of its Sustainable Land Use Initiative and Whanganui Catchment Strategy, which promote sustainable land management through voluntary farm plans, riparian planting, and sediment control measures.[89] By combining water quality monitoring with geographic records of completed interventions, the council found weak but positive evidence that these measures contributed to water quality improvements—although changes in land use intensity and climate also played a role.[90]

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[88] Ministry for the Environment. (2023). *Essential Freshwater progress report.* Page 60

[89] Shirley, L. (2023). *One Plan Section 35 Evaluation: Freshwater Provisions*. Horizons Regional Council. Pages 18-21.

[90] Snelder, T. (2018). *Assessment of recent reductions in E. coli and sediment in rivers of the Manawatū-Whanganui Region. Including associations between water quality trends and management interventions.* Prepared by LWP for Horizons Regional Council.

Part 5. Key findings

Based on the research conducted for this project, we suggest that the following enablers and barriers are relevant for effectiveness evaluation of freshwater policy and other interventions.

Effectiveness evaluation is easier when it is:

- a built-in requirement of the policy or funding

- resourced to happen in a timely way to be able to support accountability, inform ongoing implementation and further policy development

- informed by specific, measurable, achievable, relevant and time-bound objectives

- mindful of the importance of Treaty of Waitangi partnerships and community buy-in

- informed by information about the achievement of intermediate steps or milestones in the intervention logic, not just the long-term environmental outcomes

- supported by evidence of causal pathways (that is, evidence that supports our understanding that actions will have a particular result), including evidence provided by modelling.

And effectiveness evaluation is more difficult when:

- evaluation is not prioritised, whether due to competing demands, perceptions of "not being the right time", or other factors

- there is a lack of knowledge or evidence about the intermediate steps that are needed, or the timeframes required, to achieve the desired environmental outcome

- monitoring is not initiated or there is poor compliance with reporting requirements

- data are not collected or structured in a way that supports evaluation

- models are not used to their potential due to mistrust, complexity or a lack of collaboration

- influences such as the effect of climate patterns are not quantified.