Unlocking the Benefits of Environmental Data for RM Reform

High level valuation of New Zealand's environmental data architecture and its role in resource management

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ALLEN + CLARKE

Acknowledgements:

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Context

The success of any resource management (RM) system depends on the availability of accessible, high-quality, and timely environmental data. Aotearoa New Zealand's proposed resource management reforms represent a fundamental shift from a more precautionary system to one that is more permissive. Without access to timely and robust data, a more permissive system creates risks of unforeseen consequences. This report presents a high-level valuation of New Zealand's environmental data system and outlines a strategic investment approach to support the RM reforms.

The report highlights three main points:

1. If implementation of the RM reforms relies on our current environmental data system then there is a considerable risk that environmental outcomes will worsen with consequential impacts on economic outcomes. All of the economic benefits from the reforms could be eroded by the costs to the economy arising from avoidable environmental degradation.
2. Sustained investment in improved environmental data is crucial for ensuring the sizeable economic gains that are hoped to be achieved through the reforms. These gains were reported by Castalia (2025) and are discussed below. The analysis confirms that investing in improving the availability of high quality environmental data can create a single high confidence source of truth, which avoids applicants having to source or duplicate data or reports and speeds up applications and approvals through the system.
3. Improved environmental data itself will support economic growth as people can operate more confidently within environmental limits in the short-term, as well as potentially unlock further development opportunities and protect gains in the longer term. Implemented well, allocation of resources could be more effectively measured and allocated faster to support economic growth, or avoid situations of over-allocation that cost more to fix in the long run.

Findings

The analysis by Castalia identified that the RM reforms proposed by the Expert Advisory Group could unlock $14.8 billion in economic growth over 30 years by removing regulatory barriers and accelerating development approvals. This initial estimate of the gains comes from reducing administrative costs through centralisation, removal of duplication, and other process improvements, illustrating that the reforms will deliver substantial benefits even before considering dynamic effects from the new system.

However, the fundamental change in approach to allow more permissive decision-making will increase the demand for timely, robust environmental data, as decisions will be made faster with fewer upfront controls. Unless the supply of data is improved, this shift creates significant economic risks, including:

- incomplete or inaccurate information leading to poor decision-making that causes environmental damage, undermines market confidence, or places assets at greater risk of damage from climate-related events, for example

- inability to detect and address environmental degradation before it becomes a major issue and imposes economic costs
- reduced confidence and investment certainty for businesses and households
- potential for costly policy corrections and regulatory interventions.

The shift from a more precautionary to a more permissive resource management system can be expected to change how businesses and investors operate. While in the short-term there may appear to be more opportunities for investments, taking a medium to long-term view of the real costs and benefits of investments is needed to ensure that their real value is protected. Under the new system, economic actors need as much certainty as possible that their investments won't be undermined by:

- unexpected resource constraints discovered after capital is committed
- regulatory clawbacks when environmental limits are breached
- stranded assets from degraded natural resources
- loss of market access due to environmental compliance failures.

Our analysis shows that improved environmental data could support a conservative estimate of at least $1.3 billion to $1.9 billion over 30 years in benefits (additional to the administrative efficiency gains) in the resource management system through reduced environmental degradation and fewer pollution-related harms. Even using this intentionally conservative estimate, the economic case for greater investment in data is compelling: a 0.3% degradation in ecosystem services caused by poor decision-making would negate the $14.8 billion in economic benefits expected from the RM reforms.

When accounting for the broader economic impacts of decisions informed by that data, the scale of benefits from investing in environmental data rises sharply. Computable general equilibrium (CGE) modelling indicates that poor environmental data can lead to suboptimal investment in renewable energy, resulting in up to 4.7 million tonnes of additional CO_2 emissions and a $1.2 billion reduction in national income for example. On the other hand, more efficient capital formation enabled by better data could increase national income by over $400 million per year by 2035. These findings suggest that the true economic contribution of better environmental data may be closer to $1 billion per year when the wider impacts on investment decisions, emissions, and productivity are fully accounted for.

In a similar vein, our international case study analysis found that the availability of high quality information about the environment can have sizeable economic benefits beyond the improved protection of resources (see Appendix 1 - Report 1 International Case Studies). For example, Australia's National Water Information System (Bureau of Meteorology) has been found to deliver $67-287 million annually in benefits, and the benefits from earth observation from space contributed $38.57 billion to Australia’s GDP in 2023/24 with substantial job creation as a result. While it is not possible to undertake specific analysis in the New Zealand context until more information is available on the specific measures being considered, there is a strong likelihood that investing in environmental information will have enduring economic benefits.

Investment Roadmap

The Ministry for the Environment has identified 6 data-relevant packages as part of the roadmap for the reforms. These packages are:

1. ***Underpinning***: the foundational work upon which the other packages will rely, including standards, data agreements, and clarity of the purpose and legislative mandate (via Environmental Reporting Act amendments and new RM Acts) for collecting and using the data. All other 'packages' rely heavily on the quality of the data, which requires investment into data cleaning, management, architecture and quality assurance, as well as 'hardware'.
2. ***E-plan***: bringing together spatial data sets such as land use, land cover and infrastructure, and new standard zones, linked to key boundaries (i.e., cadastre, LGAs), with the first step underway for natural hazards and adaptation datasets. Over time, this would develop into a 'Plan-Builder' function, drawing on standard zones, rules and Artificial Intelligence (AI);
3. ***E-consent portal***: ensuring consents are lodged in a consistent format, linked to cadastre and property details, with key data captured (i.e., activity type, processing timeframes and costs), leveraging E-Plan data to automatically generate notification requirements, draft information requests, draft decisions and conditions based on standard zones and rules, or refer to other entities for input (i.e., iwi or NZTA).
4. ***System performance:*** an evolution of the current National Monitoring System (NMS) in a digitised form, focused on the core targets of the new RM legislation (i.e., speed and number of consents, types of activities, costs), compliance monitoring, and natural and built environment targets (i.e., biophysical limits, density targets). It would also draw on operational data from the E-Consent Portal, Planning Tribunal and Compliance Regulator, as well as the Environment Court. This type of reporting would help regulatory stewardship oversight of how the system itself is performing, aiding more responsive improvements and course-correction.
5. ***Data investment***: Ongoing, targeted investment into data across different domains and interests, including government, private sector, research entities, interest groups (i.e., catchment groups, iwi / kaitiaki). This supports a range of decision-makers with current, high quality, focused data to help manage risks (i.e., adaptation), and leverage opportunities (i.e., resource allocation 'headroom', certification of assets and products, and paperless trade exports.
6. ***Digital twin and data analytics*****:** a virtual representation of a real-world entity or process, comprising three key elements: a physical entity in real space; the digital twin in software form; and data that links the first two elements together. The benefits of a digital twin include being able to run scenario testing of different development or environmental outcomes and generate significant insights through integration of different disciplines. This is useful for more informed decisions, public engagement, and investment confidence. Data analytics would draw on increasing amounts of data to identify patterns, trends, opportunities and issues that could be better reported, addressed or leveraged.

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1 Strategic Context: Data as the Foundation of RM Reform

1.1 The Shifting Approach to Resource Management

The Resource Management Act 1991 (RMA) is being replaced by a Natural Environment Act and a Planning Act, signalling a fundamental shift in approach from a precautionary, environmental effects-based system to one that is more permissive, focused on operating up to environmental limits. The Expert Advisory Group (EAG) blueprint states on page 10 in its report, *Blueprint for resource management reform: A better planning and resource management system,* that this change aims to "unlocking development capacity for housing and business growth" and "enabling primary sector growth and development" while still "safeguarding the environment and human health."

The current RMA requires extensive information before activities commence. Under this system, environmental data comes from sources such as state of the environment monitoring and investigation of specific issues, as well as the monitoring of consents and, to a lesser extent, permitted activities. As shown in Figure 1, this ‘ex-ante’ system can operate with significant data gaps and uncertainty. The proposed new RM system shifts the emphasis to ex-post controls with an emphasis on monitoring environmental outcomes and compliance with permitted activities. Under this system, existing data gaps and uncertainty are likely to have a much greater importance on both the economy and the environment, creating the potential for greater market failure. Examples of specific risks include:

- unexpected resource constraints discovered after capital is committed
- regulatory clawbacks when environmental limits are breached
- stranded assets from degraded natural resources
- loss of market access due to environmental compliance failures.

On the other hand, the potential benefits of better data are much greater than under the precautionary approach as the role of data in decision-making increases.

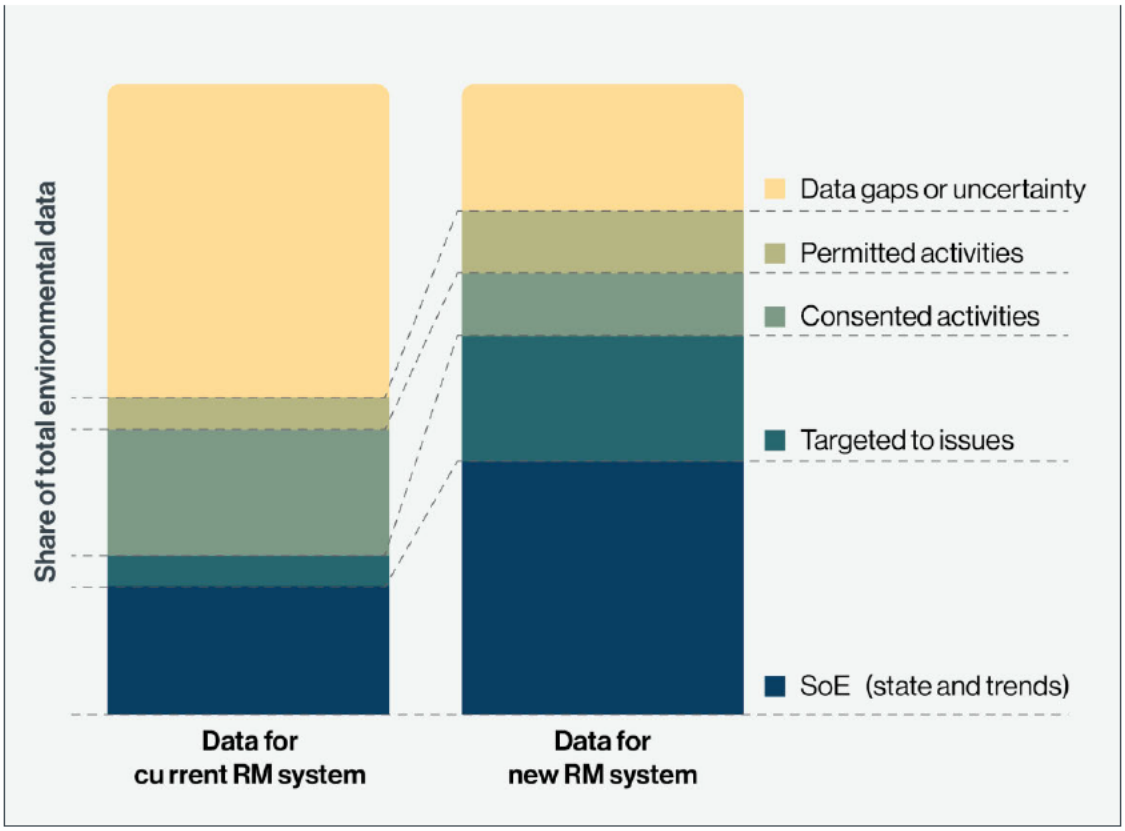

Figure 1[1]: Conceptual comparison of environmental data sources and gaps under ex-ante and ex-post RM systems

This shift from one RM system to another has profound implications for the design and use of the environmental data system. The new RM system's success depends on having the appropriate tools to support it. There are inherent risks in transferring a tool, such as the current data system, that has already been shown to be flawed to a task that 1) it was not designed for and 2) requires much better performance (i.e., the new system settings will require faster, more precise decision-making by more people). The future environmental data system will support an RM system that has to accurately define limits within which economic activities can occur, detect when these limits are being approached, and trigger effective responses – particularly given the time lags involved and the possible irreversibility of environmental degradation with flow-on impacts on economic outcomes.

1.2 Current State of Environmental Data

Multiple stakeholders have identified significant limitations in New Zealand's current environmental data system, including:

- **Fragmentation:** Data is dispersed across agencies with inconsistent standards and limited integration
- **Inadequate coverage:** Significant spatial and temporal gaps in monitoring networks
- **Poor accessibility:** Data is often difficult to locate, access, and use

[1] *Note: The percentages in Figure 1 are educated guesses and for illustrative purposes only.*

- **Limited interoperability:** Incompatible formats and systems prevent integration and analysis
- **Insufficient resourcing:** Monitoring and data management are often deprioritised

The Parliamentary Commissioner for the Environment summarised many years of reports to Parliament on the environmental reporting systems that New Zealand's environmental information system is:

> ***Complex*** *– environmental information is collected by a wide range of organisations for a wide range of purposes.*
>
> ***Fragmented*** *– hundreds of different organisations hold and use (and often collect) environmental information to enable them to carry out their functions. These organisations include:*
>
> - *Over a dozen central government agencies including the Ministry for the Environment (MfE), Stats NZ, the Ministry for Primary Industries, the Department of Conservation, Land Information New Zealand (LINZ), the Environmental Protection Authority (EPA), Taumata Arowai, the Ministry of Business, Innovation and Employment, the New Zealand Transport Agency, the Ministry of Transport, KiwiRail, the New Zealand Defence Force, and others.*
> - *78 local government organisations (regional councils, unitary authorities, and territorial local authorities) through their statutory and non-statutory functions.*
> - *The science and research sector, including CRIs, universities, and independent science organisations. In particular, three CRIs – Manaaki Whenua Landcare Research (MWLR), NIWA and GNS Science – hold many nationally significant and second-tier databases.*
> - *Farmers, foresters, catchment groups, primary sector processors and other environment-related businesses all collect information to inform their business decisions, demonstrate to customers their sustainability, and meet regulatory requirements.*
>
> ***Dispersed*** *– anyone trying to build a comprehensive picture of the lie of the land at any specific location (e.g. a catchment) needs to contact several organisations to access that information.*
>
> ***Plagued by duplication and overlaps*** *– multiple organisations hold similar information or parts of the same information. For example, aspects of sea-level rise data are held by LINZ, GNS, NIWA and regional councils.*
>
> ***Plagued by significant gaps*** *– there are many areas where we don't know enough about what is happening. For example, incomplete understanding of our native biota, combined with scant data (often distributed across multiple databases in various*

agencies), poses challenges for both New Zealand's biosecurity services and conservation efforts.

***Opaque** – it is often not clear what information exists, where it is held and by whom. Poor documentation makes it hard to assess the quality and robustness of some existing information.*

***Poorly accessible** – much existing information is difficult to access due to commercial considerations, privacy, and data sovereignty issues. Lack of data digitisation is another reason for poor accessibility.*

***Lacking in strong leadership** – New Zealand lacks an 'environmental information' champion with expertise and a national remit, clear responsibility, or adequate and ongoing funding for stewardship and coordination across the breadth of national environmental information. Further, environmental information is not treated as an asset or as 'infrastructure' that enables better decisions.*

***Lacking standardisation or compatibility** – inconsistencies plague the way environmental data are collected, analysed, reported, and stored. As a result, many ad hoc and bespoke solutions have been developed, making it difficult to aggregate information from different sources.*[2]

1.3 The Economic Imperative for Better Data

The economic case for the RM reforms operates from three distinct but complementary perspectives: administrative efficiency gains, short-term net gains from increased economic activity, and protection against costly environmental degradation. Each perspective is summarised below.

1.3.1 Administrative Efficiency and Process Improvements

Analysis of the RM reforms by Castalia (2025) estimated efficiency gains of $14.8 billion over 30 years. These benefits primarily stem from streamlined processes, reduced duplication, and faster decision-making. Digital platforms like e-plans and e-consent portals can significantly reduce transaction costs in the resource management system and increase the capacity of council resources to focus on higher order issues and outcomes.

[2] Parliamentary Commissioner for the Environment. (2025, April). *A federated system to improve environmental information* [PDF]. https://pce.parliament.nz/media/ksxlm5rj/pce-note_federated-environmental-information-system-april-2025.pdf

1.3.2 Short-term net gains

The proposed RM system is expected to result in faster and more certain decisions under the new resource management system. This unlocks immediate gains: projects get approved more quickly, investment flows faster, and compliance costs fall. The result is expected to be a boost to jobs, housing, infrastructure, and regional development.

But increased activity is also where the risk lies. Faster decisions without sound information can lead to poor outcomes and costly mistakes that lead to greater costs in the future, making the gains illusory. Environmental data provides the foundation for quick decisions that are also good decisions.

1.3.3 Protecting Economic Gains Through Environmental Knowledge

The third economic rationale for environmental data investment is protecting the gains from improved administrative efficiency and faster decision-making. The RM reforms aim to streamline and accelerate development, but these gains are only secure if we understand and respect the environmental limits that underpin and enable them.

Environmental data enables decision-makers to avoid actions that could undermine future economic performance. It protects valuable assets such as productive land, clean water, and coastal infrastructure from degradation and ensures development maintains long-term resilience while avoiding future liabilities.

Beyond avoiding harm, good environmental data identifies opportunities to unlock additional economic value through restoration and improved environmental performance.

Environmental knowledge helps to ensure that the short-term economic development doesn't become tomorrow's costly problem. It provides the confidence needed for sustainable development and the foresight to adapt as conditions change. Without robust environmental data, the economic benefits of the RM reforms remain vulnerable to environmental risks, policy reversals, and escalating remediation costs that could eliminate the projected gains.

1.4 Data as an Enabler of Economic Confidence

The economic value of environmental data extends beyond preventing environmental degradation; it enables growth and development by providing certainty. When investors, business owners, and property owners understand environmental constraints and opportunities with more precision than currently exists, they can:

- make better targeted decisions that are less likely to be reversed, have unintended impacts, or require costly changes later, supporting durable, stable investment
- avoid costly retrofits or relocations due to unforeseen environmental issues
- identify innovative solutions that work within environmental limits
- reduce financing costs by showing environmental risk management

- leverage environmental assets for new economic opportunities.

> *A useful example of data as an enabler is the Australian Government's powerful **Exploring for the Future Data Discovery Portal**[3], which allows users to access data and information (e.g., radiometric data for most of the Australian Continent), and apply a range of assessment tools to support evidence-based decisions.*

The economic value of land increasingly depends on the ability to sustainably generate income within environmental limits. Access to clean water, functioning ecosystems, and reliable climate and soil conditions are prerequisites for productivity. By providing clear information about these conditions, environmental data supports both economic growth and environmental protection. The data also needs to be aligned with the potential uses. For example, property owners will be best supported when data that improves the understanding of landscapes is supplied at the 'within property' scale (i.e., 1:10,000 scale). In this way, the system can capture variation in biophysical characteristics, such as soils, that allow for more targeted decision-making and support the intent of the RM reforms.

As noted in the recommendations in paragraph 485 of the Report from the Expert Advisory Group on Resource Management Reform, *Blueprint for resource management reform: A better planning and resource management system* 2025:

> *It is vital that the planning and environmental management system is underpinned by better environmental information and data than is currently available. The environmental data and information system needs to be more coherent and deliberate in the data it collects, able to provide the right data at the right time to help decision-makers, and be accessible to all who want to contribute, access and use data.*

1.4.1 Environmental data influences on probable futures

In the conceptual graph below, the vertical axis represents the condition of the economy AND the environment as the two are inextricably linked (up is improving, down is degrading). The horizontal green line represents the current state under the precautionary RM system.

[3] https://www.eftf.ga.gov.au/data-discovery-portal

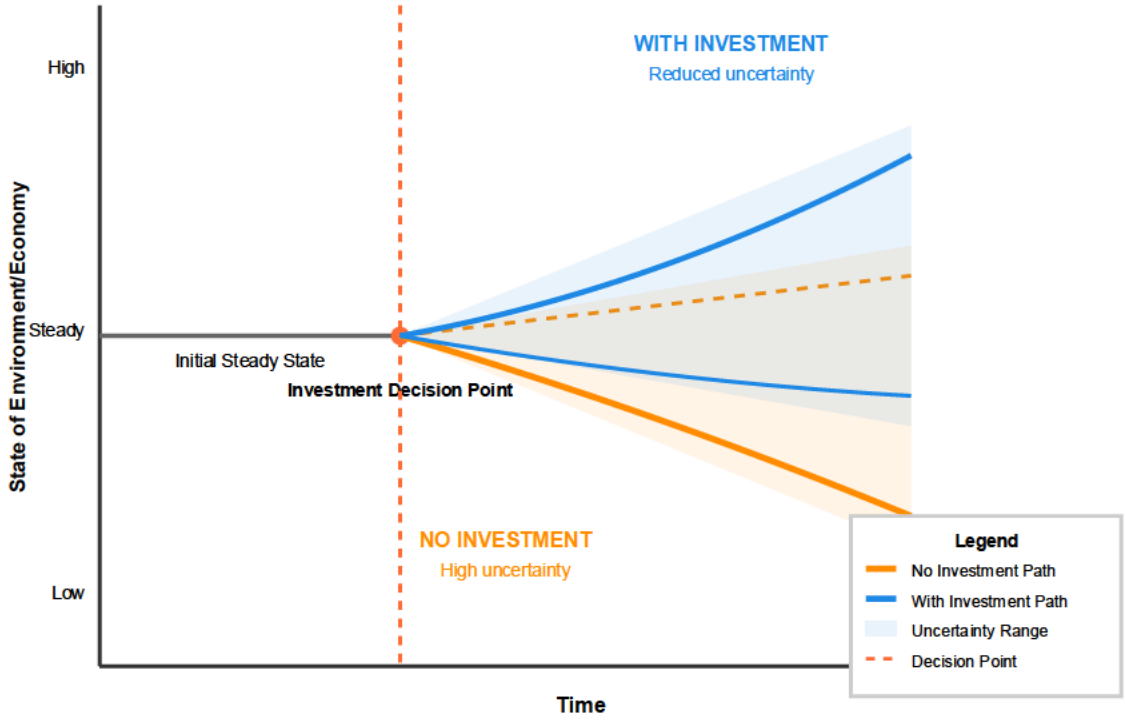

Figure 2: Conceptual influence of data on environmental and economic outcomes

The diverging pathways are indicative of the different futures.

- We shift to the ex-post system with our current data, then there is a high probability of a significant worsening of the environment that undermines all $14.8 billion of the administrative benefits for economic growth from the RM reforms
- We invest in more and better environmental data that helps improve our knowledge of the environment and the effects of our activities, meaning we can make better decisions that significantly reduces the risk of unnecessary environmental degradation and the economic costs associated with it, such as losses in productive land and poor health outcomes.

2 The Strategic Opportunity

The RM reforms create a once-in-a-generation opportunity to address the issues discussed in Section 1 by developing an integrated fit-for-purpose environmental data system that supports both economic growth and environmental protection. This requires a fundamental shift in how we think about environmental data; not as an operational cost, but as strategic infrastructure that enables better decisions and creates value across the economy. It needs ongoing investment and refinement to unlock economic growth in a way that does not cause unnecessary degradation of the environment.

2.1 The Environmental Data Value Chain

Environmental data does not deliver benefits at the point of collection. Its value emerges through a sequence of transformations from raw data to information that delivers insight and enables action. Understanding this value chain is essential for designing effective investments.

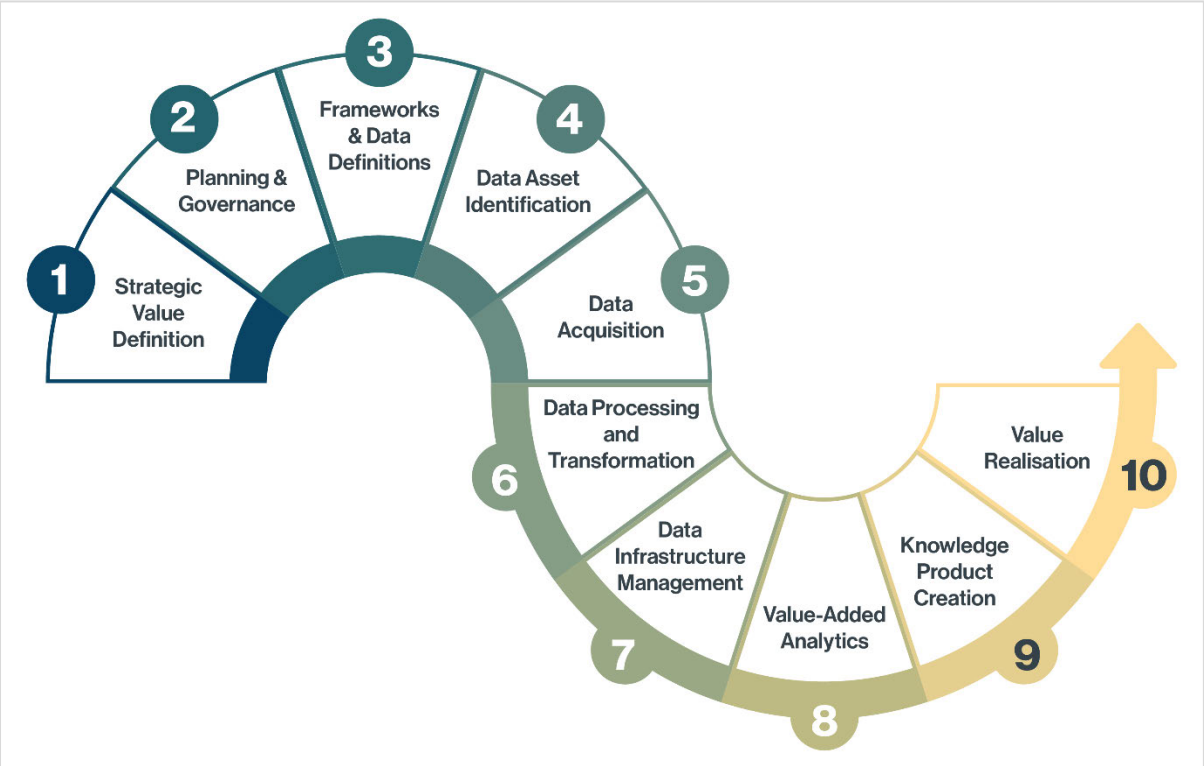

Figure 3: Data value chain

From Inputs to Action

The environmental data value chain has ten key stages:

1. **Strategic Value Definition:** Defining the national priorities for the environmental data system AND articulating the specific value expected from individual decisions for specific investment. This includes identifying where data can unlock economic, environmental, cultural, and social benefits — from supporting national planning and

reporting to enabling faster, more robust decisions by councils, developers, iwi, and others

2. **Planning & Governance:** Establishing frameworks, roles, and oversight mechanisms
3. **Frameworks & Data Definitions:** Creating standardised classification systems and measurement standards
4. **Data Asset Identification:** Cataloguing existing resources and identifying critical gaps
5. **Data Acquisition:** Collecting high-quality environmental data through multiple channels
6. **Data Processing and Transformation:** Converting raw data into standardised, validated formats
7. **Data Infrastructure Management:** Building systems for secure storage and accessibility
8. **Value-Added Analytics:** Applying sophisticated techniques to extract actionable insights
9. **Knowledge Product Creation:** Developing accessible outputs tailored to different users
10. **Value Realisation:** Leveraging data to create tangible benefits across multiple domains

Each stage requires specific capabilities, investments, and governance arrangements. Weaknesses at any point break the chain and prevent value from being realised.

2.2 The 'Decision-First' Approach

To maximise the value of environmental data investments, we recommend a "decision-first" approach to the design and use of the environmental data system. Instead of starting with what data we can collect, it starts with what decision-making needs to be supported:

1. **Identify critical decisions** that need to be made (by whom, when, with what consequences)
2. **Define the knowledge products** needed to support those decisions
3. **Determine what analytics** are required to generate those products
4. **Specify the data** needed to enable those analytics
5. **Design the infrastructure** required to collect, store, and process that data

This approach ensures that investments are targeted to the highest-value use cases and avoids collecting data that is less likely to contribute to better decisions. As will be discussed

later, it also supports investment in data to support a range of decision-makers with current, high quality, focused data to help manage risks (i.e., adaptation), and leverage opportunities (i.e., resource allocation capacity, certification of assets and products, and paperless trade exports).

2.3 Data as Strategic Infrastructure

To correct the issues with the current environmental data system, environmental data should be recognised as strategic infrastructure that enables better decision-making across the economy. Like physical assets, such as built infrastructure, it requires:

- Long-term investment planning
- Ongoing maintenance and renewal
- Clear governance and stewardship arrangements
- Standards to ensure interoperability and quality
- Equitable access provisions
- Benefit monitoring and reporting

Taking an infrastructure approach to environmental data ensures that investments will create enduring value and contribute to national resilience and productivity, as well as support greater innovation in the eventual uses of that data once collected and analysed.

3 Quantified benefits: the economic case for investing in environmental data

To estimate the value of improved environmental data systems in general terms, we developed an analysis framework that quantified three distinct benefit streams:

1. **Efficiency gains in the RM system:** Reduced administrative and compliance costs through streamlined processes, standardised requirements, and improved decision-making
2. **Avoided environmental degradation:** Preservation of ecosystem services across the landscape through better-informed management decisions
3. **Reduced pollution-related harms:** Lower health and wellbeing effects from earlier detection and mitigation of pollution

The framework incorporated a five-year lag before benefits begin to accrue, reflecting the time required to develop and implement new systems. It used a conservative discount rate of 2% and applied Monte Carlo analysis to generate confidence intervals around the estimates.

3.1 Benefit Estimates

Our analysis shows that improved environmental data systems could generate benefits with a net present value ranging from **$1.3 billion to $1.9 billion over 30 years**.

Table 1: Estimated 30-year net present value of benefits from improved environmental data, $m

Source of benefit	Central estimate	95% confidence band
Resource management savings	780	(560 / 1,000)
Slower ecosystem degradation	700	(500 / 850)
Less harm from pollution	150	(100 / 180)
Total benefit	**1,630**	**(1,330 / 1,900)**

n.b. confidence intervals are not additive

These estimates are deliberately very conservative and represent only a portion of the total potential benefits of environmental data. They do not include many indirect benefits that are difficult to quantify, such as improved business confidence, increased property values, or enhanced international reputation. Further, they do not attempt to quantify the impact of the decisions made with better data, only the contribution of better data to those three stated outcomes quantified in this model. This intentionally conservative approach aims to highlight the significant benefit from environmental data alone to support the case for significant investment in environmental data.

3.2 Benefits scale rapidly when accounting for wider impact of better decisions

When accounting for the broader economic impacts of decisions informed by that data, the scale of benefits from investing in environmental data rises rapidly. Computable General Equilibrium (CGE) modelling provides some understanding of the macroeconomic risks and benefits of insufficient environmental data. In one scenario, poor weather and climate data combined with regulatory uncertainty resulted in suboptimal investment in renewable energy where we relied on the same mix of electricity generation from coal and gas as was used in the June and September quarters of 2024 – approximately 8% and 10% respectively, compared to a Baseline projection for 2035 of 0% and 3.5%. This scenario would lead to a reduction of national income by $1.2 billion by 2035 and result in 4.7 million tonnes of additional CO2 emissions. Even a one-year delay in renewable energy investment could lead to $315 million in emissions costs that were potentially avoidable with sufficient data.

A second CGE scenario examining the impact of improved data systems on investment efficiency shows that a modest 2% improvement in capital formation efficiency (through reduced use of engineers, lawyers, planners, etc. and increased use of data services) that resulted in a 20% more efficient use of capital could generate over $400 million in additional national income by 2035.

These findings suggest that the true economic contribution of better environmental data may be closer to **$1 billion per year** when the wider impacts on investment decisions, emissions, and productivity are fully accounted for.

3.3 The risk of not investing in data

The potentially larger economic benefit comes from avoiding costly environmental mistakes that could undermine economic growth. This is particularly critical during the transition phase from a more precautionary to a more permissive resource management system

Our analysis, based on ecosystem services valuation from de Groot *et al*. (2012) translated to the New Zealand context, shows that the country's inland wetlands, indigenous forests, grasslands, and coastal systems provide ecosystem services worth approximately $341 billion annually. This result means that a 0.3% degradation in these ecosystem services would erase the administrative benefits of the RM reforms reported by Castalia (2025). This emphasises the importance of basing any investment decisions in environmental data to underpin the reforms on potential future uses of high-quality information – the better the information, the more certainty can be given to current or potential users, and vice versa.

The implication is that, while the potential efficiency gains from improving RM systems can be sizeable and result in economic growth, such gains may well be illusory if they come at the cost of a relatively small increase in environmental degradation, which will in turn cause a loss in administrative efficiency and erase short-term gains.

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4 Six Data-relevant Investment Packages for the RM System

The Ministry for the Environment has identified six complementary packages of investment to support the RM reforms. Each package is intended to address specific needs in the environmental data value chain while creating the foundation for delivering both administrative efficiency gains, short-term economic gains, and longer-term environmental protection.

To realise the full benefits of an improved environmental data system, structured, ongoing investment in data must be an integral part of the development of the systems and processes needed for the RM reforms. This integrated investment approach is essential because:

- Administrative systems alone can deliver process efficiencies but risk environmental degradation that could eliminate economic gains
- Environmental data investment increases the value of system investments by providing the certainty needed for confident decision-making
- Combined investment enables both administrative efficiency benefits and protection of the $14.8 billion in projected economic gains.

Understanding environmental capacity through better data is essential for the success of the proposed reforms.

4.1 Overview of packages

4.1.1 Underpinning: Enabling Success

Value Chain Focus: Strategic Value Definition, Planning & Governance, Frameworks & Data Definitions

The Underpinning package establishes the core infrastructure, standards, and governance arrangements needed to support all other packages. It creates the connective tissue that enables an integrated approach to environmental data.

Key components include:

- National data standards and interoperability frameworks
- Clear governance and stewardship arrangements
- Data sharing agreements and access protocols
- Quality assurance and metadata standards.

Benefits:

- Improved data consistency and quality
- Enhanced ability to integrate and analyse data across sources
- Reduced duplication and inefficiency

- Support for innovation and new applications.

4.1.2 E-Plan: Digital Spatial Planning

Value Chain Focus: Data Infrastructure Management, Knowledge Product Creation

The E-Plan package brings together spatial datasets such as land use, land cover, and infrastructure with the new standardised zones required by the RM reforms. It provides a single digital interface for accessing planning information, ensuring consistency and reducing duplication across councils.

Key components include:

- Integration of environmental constraints mapping (hazards, biodiversity, etc.)
- Property-specific planning requirements linked to cadastral boundaries
- Standardised zones and rules for consistent application
- Future development of AI-assisted "Plan Builder" functionality.

Benefits:

- Reduced time and cost for preparing and updating plans
- Improved consistency and quality of planning decisions
- Enhanced transparency and accessibility for all users
- Lower compliance costs for businesses and property owners, including reduced costs for consent applications, and potential reductions in planner, engineer, and legal time and costs.

4.1.3 E-Consent Portal: Streamlined Permissions

Value Chain Focus: Data Processing, Knowledge Product Creation, Value Realisation

The E-Consent Portal creates a standardised digital platform for lodging and processing consent applications. It leverages data from the E-Plan to automate routine assessments and ensure consistency across jurisdictions.

Key components include:

- Standard formats for applications linked to cadastre and property details
- Automated generation of notification requirements and draft conditions
- Structured data capture of consent details (activity type, processing times, costs)
- Integration with other regulatory processes and stakeholders.

Benefits:

- Faster processing times for straightforward applications
- Reduced administrative costs for councils and applicants

- Consistent application of rules and conditions
- Increased capacity for council RM staff to 'lift up' to more strategic opportunities
- Improved data for system monitoring and performance improvement.

4.1.4 System Performance: Measuring Success

Value Chain Focus: Value-Added Analytics, Value Realisation

The System Performance package builds on the current National Monitoring System to create a comprehensive framework for tracking the effectiveness of the RM system. It focuses on key indicators aligned with the goals of the RM reform.

Key components include:

- Real-time dashboards showing consent volumes, processing times, and costs
- Monitoring of compliance with environmental limits and development and infrastructure targets
- Integration of data from the E-Consent Portal, Planning Tribunal, and Compliance Regulator
- Regular reporting and feedback mechanisms.

Benefits:

- Early identification of implementation issues or unintended consequences
- Evidence-based approach to system improvement
- Enhanced accountability and transparency
- Support for adaptive management and continuous learning.

4.1.5 Environmental Data Investment: Filling the Gaps

Value Chain Focus: Data Acquisition, Data Processing, Data Infrastructure

The Environmental Data Investment package addresses critical gaps in environmental monitoring networks and data collection. It establishes a more comprehensive and consistent approach to gathering the data needed to support the RM reforms. It leverages data and investment across different sectors, from government to Public Research Organisations, catchment groups, and the private sector.

Key components include:

- Expanded baseline monitoring of key environmental indicators
- Nationally consistent standards and methodologies
- Support for diverse data sources, including iwi/hapū monitoring
- Modernised monitoring technologies (sensors, remote sensing, etc.)

Benefits:

- More accurate definition and monitoring of environmental limits
- Reduced uncertainty in decision-making
- Improved ability to detect and respond to environmental changes
- Enhanced understanding of cumulative effects
- Greater access to data to drive greater private sector innovation and economic opportunities.

4.1.6 Digital Twin and Data Analytics: Insight Generation

Value Chain Focus: Value-Added Analytics, Knowledge Product Creation

The Digital Twin and Data Analytics package leverages advanced technologies to extract maximum value from environmental data. It enables sophisticated modelling and analysis to support complex decisions.

Key components include:

- Virtual representations of environmental systems
- Scenario testing and predictive analytics
- Integration of data across domains and sources
- Advanced visualisation and communication tools

Benefits:

- Enhanced ability to understand complex environmental interactions
- Support for long-term planning and investment decisions
- Improved public engagement and understanding
- More effective targeting of interventions and investments

4.2 Integration and Interdependencies

While each package delivers specific benefits, their full value is realised when they work together as an integrated system. Key interdependencies include:

- E-Plan provides the spatial context needed for the E-Consent Portal
- System Performance relies on data from both E-Plan and E-Consent Portal

- Digital Twin and Data Analytics build on the data collected through Environmental Data Investment
- All packages depend on the standards and governance established in the Underpinning package

This integrated approach ensures that investments create a coherent system rather than isolated capabilities.

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6 Implementation Roadmap

Planning investment in a modular, rolling manner allows data collection and use to be prioritised based on the evolving needs of the RM system. As more high-quality environmental data becomes available, it will enhance the value of digital platforms like the e-plan and e-consent portal by enabling more confident decision-making. Over time, better data will improve system performance, which in turn will generate more demand for data to support more nuanced decisions and more ambitious regulatory responses, such as water markets, to manage the use and development of limited resources.

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Phase 1: Foundation (Years 1-2)

- Establish data standards and governance arrangements
- Develop core infrastructure for data sharing and integration
- Enhance baseline monitoring for critical environmental domains
- Implement initial E-Plan functionality and plan for potential integration with environmental data.

Phase 2: Integration (Years 3-4)

- Expand monitoring networks and data acquisition
- Implement E-Consent Portal s 9(2)(f)(iv)
- Develop enhanced analytics capabilities
- Establish comprehensive performance monitoring

Phase 3: Advanced Capabilities (Years 5-7)

- Implement Digital Twin and advanced analytics building on improved environmental data now being collected and made available.
- Expand integration with external systems and data sources
- Develop predictive modelling and scenario analysis tools
- Enhance decision support capabilities

Phase 4: Continuous Improvement (Years 8-10)

- Refine and enhance all system components
- Expand coverage and granularity of monitoring
- Develop new applications and use cases

- Evaluate benefits and adjust investment priorities

This phased approach allows for learning and adaptation while ensuring that early investments create value and build momentum for the broader transformation.

7 Recommendations and Next Steps

By taking a strategic approach to environmental data, the government can ensure that the RM reforms deliver their intended economic benefits while safeguarding our natural environment for future generations. The investment needed is modest compared to the potential returns, and the costs of inaction are potentially substantial for both the economy and the environment. The following recommendations, next steps and suggested approach to benefits tracking and governance are critical to delivering the potential value of environmental data in the new RM system.

7.1 Key Recommendations

1. **Adopt a strategic approach to environmental data** that recognises its role as critical infrastructure for the RM reforms and treats it as a strategic asset rather than an operational cost.
2. **Implement a decision-first approach to environmental data investment** that starts with identifying critical decisions, their intended purpose, and then uses the data value chain to determine what data, analytics, and infrastructure are required to support those decisions effectively. This includes determining data access arrangements and decisions on whether specific data should be publicly available, kept internal, or provided to specified users depending on its intended purpose.
3. **Commit to rolling investment in environmental data** that scales with the implementation of the RM reforms. As the system shifts from ex-ante to ex-post regulation, comprehensive environmental intelligence becomes increasingly critical. Initial front-loading of environmental data investment should be included in RM system implementation to provide confidence in decision-making during the system transition, recognising that investing in environmental data will help to safeguard the administrative improvements and short-term economic net gains from the reforms.

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5. **Rapidly improve state-of-environment monitoring** as part of the staged investment in e-plan and e-consent systems. This should provide a stronger baseline for monitoring under the new ex-post system and create a framework for ongoing prioritisation of investment across the five environmental domains (air, land and soil, freshwater, coastal water, and indigenous biodiversity).
6. **Build adaptive capacity into data systems** that can evolve as the RM reforms are implemented and experience is gained. Apply the decision-first approach iteratively, with

regular reassessment of what decisions need support and what data capabilities are required.

7. **Establish clear governance arrangements** that define roles and responsibilities for data stewardship, quality assurance, and system oversight, with a focus on promoting data sharing and integration across agencies.
8. **Develop a comprehensive benefits monitoring framework** that tracks the realisation of benefits and informs ongoing investment decisions, ensuring resources are directed to the highest-value opportunities and that benefits stack as data is used for more decisions.
9. **Take a coordinated, integrated approach to the six packages** maintaining ongoing emphasis on environmental data needs, recognising that benefits compound as data is used for more decisions, reducing uncertainty and avoiding unnecessary environmental degradation. Early engagement with key stakeholders, including local authorities, iwi/hapū, industry, and environmental groups, is essential to ensure the system meets their needs and leverages their capabilities and knowledge.

7.2 Immediate Next Steps

Immediate next steps include:

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- Develop data standards and protocols for key environmental domains, with a focus on those most critical for implementing the RM reforms.
- Identify quick wins that can demonstrate value and build momentum, such as integrating existing datasets or enhancing the accessibility of current monitoring information.
- Engage with local authorities to understand their needs and capabilities, and to develop transition plans that support their adoption of the new systems and processes.

7.3 Benefits Tracking and Governance

To ensure that investments deliver the expected benefits, we recommend establishing:

- A Benefits Realisation Framework that defines key metrics and targets for each investment package and tracks progress against them.
- A Governance Board with representation from key stakeholders to oversee implementation, monitor progress, and make strategic decisions about investment priorities.
- Regular Progress Reporting to Ministers and stakeholders, highlighting achievements, challenges, and emerging opportunities.

- A formal Review and Evaluation Process after each implementation phase to assess outcomes and refine the approach for subsequent phases.

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