

OUR LAND AND WATER

Toitū te Whenua,
Toiora te Wai

What is Our Land and Water?

Our Land and Water is a National Science Challenge. National Science Challenges are dedicated and designed to break new ground in areas of science that are crucial to New Zealand's future. In our case, this means, tackling the biggest science-based issues and opportunities facing our country in the area of primary production, and the complex relationship it has with our precious land and water resources.

Enhancing New Zealand's primary sector production and productivity while maintaining or improving land and water quality is our aim. The vision for Our Land and Water is that New Zealand is world-renowned for integrated and successful land based primary production systems, supported by healthy land and water and capable people. We already have research programmes underway including **Land Use Suitability** that specifically target our aim and are working towards our future vision. The Challenge research is structured around three interlocking themes, one of which is Innovative resilient land and water use in which the Land Use Suitability programme sits.

Research Timeline

June 2016: Land Use Suitability funding approved

June 2016: Land Use Suitability research underway

June 2019: Land Use Suitability research complete

Why do we need research about Land Use Suitability?

The need for simultaneous improvements in primary sector productivity and in environmental performance are driving changes in land and water policy and management in New Zealand. These changes have been encapsulated in the phrase "managing within limits". Managing within limits refers to managing resource use for sustainable production, without exceeding limits such as water takes and contaminant discharges. Implementing these changes will require a shift from the traditional focus on land-use capability for production, to a broader view that accounts for land-use effects on economic, environmental, social and cultural (EESC) values at whole-catchment scales. We call this broader view 'land-use suitability'.

Land Use Suitability (LUS) tools intend to contribute to two important functions in the government and primary sectors, land-use effects management and land evaluation. Land-use effects management is a function of central and local government, and is strongly influenced by regional and catchment plans that set out policies and rules needed to regulate contaminant discharges and deliver on land use-dependent objectives. In contrast, land evaluation refers to assessments of land parcels in terms of their potential for specific land uses. Land evaluations are undertaken by a range of stakeholders with interests in the profitability of use of land parcels, including land owners, investors, banks, and rural professionals.

*The research will combine information from **three processes**:*

1. Contaminant losses from land-use.
2. Responses of receiving environments to contaminant loading
3. The use of intervention systems to increase receiving environment resilience

A distinguishing characteristic of the LUS concept is feedback from receiving environments to upstream land parcels that are contaminant sources. The feedback includes the economic, environmental, social and cultural (EESC) values present in receiving environments, the contaminants to which those values are vulnerable, and physical conditions in the receiving environment. Collectively, the intrinsic characteristics of receiving environments determine their resilience (i.e., their capacity to resist or recover from perturbations caused by land use pressures). Natural resilience can be enhanced by human “interventions” that reduce the concentration or exposure of land use pressures in receiving environments or reduce the magnitude of adverse responses.

Outcomes and assessment tools

In view of recent land use change and agricultural intensification in New Zealand, stakeholders in water and land management should benefit from incorporation of LUS in land-use effects management and land evaluation. However, a quantitative, customised LUS assessment to underpin every land-use decision would be prohibitively expensive. Instead, highly transferable tools are needed that can use national-scale spatial information to evaluate and categorise LUS in any catchment. The first tools developed in the LUS programme will take form as a classification systems based on national-scale environmental datasets. In the development of classification systems, quantitative data are converted to categorical or ordinal data. As a result, extrapolations based on classifications are also categorical or ordinal. Categorical and ordinal predictions are lower in precision than quantitative predictions. Therefore, the primary use of the LUS classification will be as a screening tool.

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