

# Ecological Transitions

## challenges and reform options for better Protected Area outcomes

### Abstract

New Zealand's protected area network needs an ecological transition to meet the agreed goal of the post-2020 Global Biodiversity Framework under the UN Convention on Biological Diversity to protect at least 30% of its territory through ecologically representative and functional designations. This article examines key challenges and proposes three sets of policy reforms to enable such a transition: improving the current poor representativeness through boundary changes informed by contemporary scientific insights; simplifying designations to align protection strength with ecological contributions; and

replacing the current outdated framework for visitor access with an ecological zoning framework that serves as the basis for proportionate access rules, drawing on the precautionary principle of decision making. Together, these reforms can improve ecological outcomes, while enabling compatible human access to a greater extent than is currently possible. In contrast, current government proposals to radically change conservation legislation in 2026 move in the opposite direction, risking a lose–lose–lose outcome for nature, communities and international commitments.

**Keywords** protected area designations, ecological representativeness, Convention on Biological Diversity, proportional regulations, precautionary principle

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## Introduction and context

Under the post-2020 Global Biodiversity Framework of the 1992 United Nations Convention on Biological Diversity, New Zealand is called to reassess its protected area networks in terms of structure, regulations and management practices. Each ratifying state is asked to contribute to the global target of, by 2030, at least 30% of lands and waters being protected through ecologically representative and functional systems of protected areas and equally effective instruments (Secretariat of the Convention on Biological Diversity, 2022, p.12). Target 8 further calls for reducing climate change impacts on biodiversity. These goals continue the convention's 2004 programme of work on protected areas, expecting states to carry out national gap analyses, informing a shift to representative systems (Secretariat of the Convention on Biological Diversity, 2004, p.9).

New Zealand's protected area network covers about 33% of its territory. Table 1 shows its structure and the spatial footprint of designations. The Department of Conservation oversees most designations. Only about 5% of protected areas are managed by territorial authorities or regional councils, under the 1977 Reserves Act, while 1% are privately owned areas managed under covenants. National parks dominate spatially, covering 11.6% of the country.<sup>1</sup> Stewardship areas cover 9.4% of the national territory but do not classify as specially protected areas, under the 1987 Conservation Act, because their biodiversity values are still to be assessed. This designation currently prioritises human uses, including activities extracting natural resources (grazing, forestry, beekeeping, energy production, mining) (Department of Conservation, 2024a – see discussion of concession categories and 'ability to harvest forestry'). Conservation parks occupy 5.7% of the country. Nineteen other designations account for just 5% of the country's area. Ecological areas – explicitly aimed at representing native ecosystems – make up only 1.48%.

The last column of Table 1 lists the legislative Act regulating each designation. In addition, the Wildlife Act 1953 establishes three other designations: wildlife sanctuaries, wildlife refuges and wildlife management reserves. However,

**Table 1: Protected Area designations and coverage.**

Designation type	Number	Share (%) in PA network	Legal instrument
National parks	13	33.40%	1980 National Parks Act
Stewardship areas	2,632	26.94%	1987 Conservation Act
Conservation parks	67	23.44%	
Scenic Reserves Type A	1,532	4.54%	1977 Reserves Act
Recreation reserves	427	2.59%	
Conservation purposes	72	2.11%	1987 Conservation Act
Ecological areas	44	1.48%	
Wilderness areas	3	1.26%	
Nature reserves	53	1.18%	
Government purpose reserves	265	0.44%	1977 Reserves Act
Wildlife management areas	7	0.24%	1987 Conservation Act
Scientific reserves	99	0.18%	1977 Reserves Act
Amenity areas	17	0.11%	1987 Conservation Act
Local purpose reserves	942	0.09%	1977 Reserves Act
Historic reserves	150	0.07%	
Sanctuary areas	7	0.04%	1987 Conservation Act
Scenic Reserves Type B	24	0.02%	1977 Reserves Act
<b>Total – 'public lands'</b>	<b>7,354</b>	<b>98.13%</b>	
<i>Private PAs with covenants<sup>2</sup></i>	<i>1,015</i>	<i>1.86%</i>	
<b>Total (32.93% of the country)</b>	<b>8,370</b>	<b>100%</b>	

Source: based on Ministry of Foreign Affairs and Trade and Department of Conservation, 2013

they do not feature in Table 1 because they typically exist within the broader designations shown in column one and therefore do not add to the total size of the national protected area network. Other (typically dual) designations made possible by the Conservation Act 1987 are marginal strips and watercourse areas.

Despite its size, New Zealand's network has failed to halt biodiversity decline. Over 3,000 known native species remain threatened, while indigenous ecosystems continue to degrade (Department of Conservation, 2020). Some have argued that public and economic benefits are limited, while many iwi feel excluded by the outdated 'fortress conservation' model, restricting the co-governance expected under the Treaty of Waitangi. Overall, environmental, social, cultural and economic outcomes have been disappointing, reflecting legislative, planning, funding and organisational shortcomings.

In response, the government announced plans in late 2024 to 'modernise' the conservation legislation. The reform plan (Office of the Minister of Conservation 2025) has five components :

- governance of the network: proposes centralising decision making, reducing public input and increasing ministerial discretion over zoning and concessions;
- simplification of the planning system: eliminates regional management tools, introducing two layers only – a single National Conservation Policy Statement and basic 'area plans';
- business concession allocation: expands the range of methods, from reactive to proactive approaches such as tendering;
- concessionaire responsibilities: moves to a one-size-fits-all model, limiting the Department of Conservation's ability to tailor environmental regulations to specific zones, as currently allowed by law;
- land exchanges and disposals: justifications cite both conservation benefits and revenue generation for nature management and new tourism facilities. In Table 1, the designations highlighted in grey are not intended for inclusion in this policy option.

Legislative changes are scheduled for adoption in early 2026. While the proposed reforms emphasise economic flexibility, they risk deepening existing ecological weaknesses

if they are not guided by scientific evidence, international commitments and New Zealand's own policies, particularly the 2020–50 biodiversity strategy (*Te Mana o te Taio – Aotearoa New Zealand Biodiversity Strategy 2020*) and the National Policy Statement for Indigenous Biodiversity, regarding representativeness and ecological sustainability.

#### Objectives, conceptual framework and methodology

This article builds on a multi-year research programme<sup>3</sup> applying multidisciplinary perspectives to examine the structural and policy barriers that prevent an ecological transition of New Zealand's publicly owned protected area system, consistent with the Convention on Biological Diversity objectives. It is guided by two

capture under-represented indigenous ecosystems. He also noted that protected areas are ineffective when they provide strong legal protection (such as national park designations) to areas already extensively represented across the network, while leaving rare, threatened or under-represented ecosystems outside, or under-protected through weak regulations (Kelly, 1980, p.66).

Drawing on Kelly's ideas and an extensive review of recommendations from scientists internationally (e.g., Dudley and Parish 2006) and in Convention on Biological Diversity agreements, it is argued that the ecological transition of protected area networks (including in New Zealand) should start with three reforms.<sup>4</sup> These reforms may be undertaken consecutively, in the order outlined here, but would be more effective when designed

article outlines how a protected area reclassification approach could be implemented in New Zealand. As designation categories need to always define the values to be protected and/or the management objectives, regulatory frameworks may also need revision, to better align requirements with contemporary scientific concepts and societal expectations. The section following applies a conceptual framework developed in a previous publication (Dinica, 2022, pp.83–136) to suggest a way forward. By means of two brief case studies, it also illustrates how current regulations are designed and implemented inadequately, undermining an ecologically effective management of the respective protected areas.

- Transition to ecological zoning and regulation of protected areas, informed by science and the proportionality principle of precautionary decision making. This is discussed in section six.

The precautionary principle means that governments are expected to act to prevent serious or irreversible harm to nature or public health, even if some cause–effect relationships are scientifically uncertain. Whenever the irreversible loss of species, ecosystems or critical ecological functions is at stake, the strong or 'overarching' interpretation of this principle can be invoked, which incorporates the principle of proportional regulations. This posits that policy decisions should match the severity, likelihood and reversibility of environmental harm (see Raffensperger, Schettler and Myers, 2000). The idea of proportional precautionary decision making can also be applied to protected area designations, zoning and regulations. For instance, protected areas or zones within that are ecologically highly represented across the network could be awarded designations that are more permissive to human access, especially if such areas are assessed by scientists as resilient to climate change and other pressures.

#### Transitioning to a functionally representative protected area system

De jure, although New Zealand ratified the Convention on Biological Diversity in 1993, the Conservation Act 1987 and National Parks Act 1980 still lack explicit requirements for capturing a

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objectives. First, it aims to clarify the core structural and regulatory obstacles undermining a transition to a more ecologically functional, representative system. Second, while analysing challenges, the article also outlines several reform options to support ecological transitions, in the realm of both designations and broad regulatory approaches.

In New Zealand, the public protected area network administered by the Department of Conservation and councils has historically been designated ad hoc, responding to protection opportunities, with little input from natural scientists (Thom, 1987; Norton and Overmars, 2012). This resulted in a network with poor ecological representativeness, as explained in the following section. New Zealand scientist G.C. Kelly pointed out this problem in 1980, recommending that protected area boundaries and locations be modified to

jointly and implemented within the same timeframe.

- Change the protected area network's physical structure to improve ecological representativeness: this could be achieved through the addition of land exchanges and, possibly, disposal of areas with highly represented ecosystems (if the network becomes too large for financial sustainability or social support). The current situation, existing initiatives and milestones for New Zealand are discussed in the next section.
- Re-evaluate whether the designation category awarded to each protected area reflects adequately its ecological contributions. This calls for the simplification of designation categories that have been made before (see Norton and Overmars, 2012, p.115) but have not been fleshed out. Section four of this

representative range of ecosystems. Only the Reserves Act 1977 (in section 3) defines a goal to protect ‘representative samples of all classes of natural ecosystems and landscape’. Spatially, reserve designations cover barely 5% of the national network. Some nature or scientific reserves (or zones within them) may also receive designations under the Conservation Act: for example, ecological and sanctuary areas. But such designations do not extend the area where representativeness is a leading designation criterion.

The general policies for national parks and conservation emphasise that protected areas must represent diverse indigenous ecosystems. They affirm that the national network should become a more ecologically effective conservation tool. But current government proposals aim to replace both general policies and all regional conservation strategies with a minister-controlled National Conservation Policy Statement. It is unclear whether the concept of functional representativeness will be central, or at least included, in the new policy.

In reality, scientists report a public protected area network with poor representativeness. Given the complexity of nature, ecological assessments are often made at multiple, complementary scales. Table 2 presents a high-level overview, based on the concept of ‘land environments’ (Leathwick et al., 2003). This incorporates climatic and geographic criteria to show how much of the remaining indigenous cover has some level of protection in the public conservation lands. For New Zealand, scientists argue that maintaining functionality requires protecting at least 20% of the remaining extent of an ecosystem (Walker, Price and Rutledge, 2008, pp.10–11). Below this threshold, species diversity and ecological health start deteriorating exponentially, leading to locally irreversible ecosystem loss. Public deliberations are needed on what constitutes ‘adequate representation’, and on the threshold between moderate and high representation. The thresholds for the categories in Table 2 are suggested to support discussions throughout this article.

The patterns of biodiversity protection under the current network reveal strong biases. Using more familiar names for ecosystems, assessments across multiple

**Table 2. The inclusion in Protected Areas of the original indigenous cover, per land environment (macrolevel ecosystem classification<sup>5</sup>)**

Types of Lands Environments New Zealand	Representation of indigenous biodiversity
<b>Highly represented land environments</b>	
Permanent snow and ice	99%
Southern Alps	96%
Ultramatic soils	93%
Western South Island Foothills and Stewart Island	81.9%
Central mountains	77%
<b>Moderately represented land environments</b>	
Western South Island recent soils	45.4%
South-eastern hill country and mountains	24%
Central dry foothills	22.25%
Northern hill country	22.1%
Central, sandy recent soils	21.3%
Central hill country and volcanic plateau	20.1%
<b>Under-represented land environments</b>	
Central upland recent soils	16.7%
Southern low lands	7.3%
Northern recent soils	5.2%
Northern lowlands	4.8%
Central poorly drained recent soils	1.86%
Central dry low lands	1.2%
Central well-drained recent soils	1.1%
Western and Southern North Island lowlands	0.95%
Eastern South Island Plains	0.65%

Source: based on Leathwick et al., 2003

reviews indicate that ice, alpine and montane environments are highly represented, largely due to their location within large national parks. In contrast, wetland, lowland, and dry and coastal ecosystems are under-represented (Awimbo, Norton and Overmars, 1996; Kelly, 1980). Table 2 shows that nine ecosystems are severely under-represented, while four are only minimally represented (20–22% protection). These disparities indicate that the network remains ecologically unbalanced.

#### **Scientific and policy programmes to improve representativeness**

Historically, scientists in New Zealand have had limited influence over the selection and delineation of protected areas. In the early 1970s, Forest Service scientists proposed the designation of 112 ecological areas,<sup>6</sup> covering 1.29% of the national land area, based on ecological and scientific criteria (Norton and Overmars, 2012). This initiative aimed to address the evident under-representation of key

ecosystems – particularly wetlands, coastal and low-lying environments, and tussock grasslands. However, progress has been slow. Half a century later, New Zealand has only 113 ecological areas, a designation introduced under the 1987 Conservation Act, prioritising ecological values.

The political acceptance of the ecological representation clause in the 1987 Act is widely attributed to G.C. Kelly, a pioneering New Zealand scientist who advocated for a nationwide biological survey of flora and fauna communities. His vision was to inform the identification and correction of representation gaps in the country’s protected area network (Kelly 1980). Kelly’s ideas were partially taken up through the Protected Natural Areas Programme, initiated in 1983. Under this programme, the Department of Conservation and councils commissioned ecological surveys to guide the identification of recommended areas for protection and priority areas for protection. The programme employs an ecological land classification system (applied

nationally, not only across protected areas) that distinguishes among 68 ecoregions and 286 ecological districts (see McEwen, 1987). However, by 2004 only 104 ecological surveys had been completed, leaving many districts unsurveyed (Wildland Consultants 2004).

Despite its potential, the Protected Natural Areas Programme has never been formally adopted as policy, and only some of the recommended areas for protection have received formal designations. In 2001, Bellingham reported that only 13% of the recommended areas were given designations (generally as ecological areas) or became protected through covenants with land owners/users (Bellingham, 2001, p.13). As of now, there are no publicly available updates, detailing any progress with ecological surveys or new legal

The early 'sample' approach embedded in legislation and the Protected Natural Areas Programme to improve representativeness reflects a reductionist and largely static conception of nature, akin to an 'open-air museum' model. This approach is not aligned with the more dynamic, functional understanding of ecological representation required under the Convention on Biological Diversity and embraced by contemporary science. Operationalisations of representativeness still vary across scientific advisory studies conducted for, and by, the Department of Conservation and councils, as do the complementary ecological criteria used to identify new protected areas.<sup>7</sup> New Zealand therefore needs a national strategy to enhance the ecological performance of protected areas, including a single,

explore public concerns and preferences regarding protected area boundaries, designation types and regulatory approaches.

**Improving the designation framework: from ad hoc to a science-informed, streamlined approach**

As noted earlier, in New Zealand the designation categories given to areas have seldom reflected their full range of biodiversity values (Thom, 1987; Kelly, 1980; Norton and Overmars, 2012). This resulted in designations – such as scenic reserves, recreation reserves, amenity areas or stewardship lands – of areas that are ecologically under-represented and which offer many biodiversity values. A consequence has been an under-regulation of many protected areas, because the legal protection mandates do not prioritise the protection of (all) ecological values over human-centric values, such as recreation, tourism, scientific research, education, agriculture, energy production and so on.

The proportionality principle of precautionary decision making could be applied to re-categorise designations so that each area receives a designation that properly reflects a comprehensive analysis of its (current and potential) contributions to a representative and functional protected area system. A suitable designation needs to reflect both:

- an appropriate prioritisation of nature protection (the vertical axis of Figure 1 maps possible prioritisation types); and
- a legal mandate that reflects the protection strength warranted (as suggested along the horizontal axis of Figure 1).

In a previous publication, I suggested that a science-informed prioritisation of ecological values and objectives should be at the heart of a simplified protected area classification, distinguishing three categories (Dinica, 2022, pp.242–5):<sup>8</sup>

- ecological protected areas (EPAs), prioritising ecological protection over anthropocentric uses and values;
- heritage protected areas (HPAs), balancing nature and specific anthropocentric uses such as recreation, tourism and non-extractive land uses (this may involve an adaptive

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protections based on the Protected Natural Areas Programme. The Department of Conservation does not seem to have a strategy to improve representation. New Zealand's fifth national report to the Secretariat of the Convention on Biological Diversity noted a 4.2% expansion of the national network between 2004 and 2012. However, this expansion exacerbated existing imbalances, as it primarily added well-represented ecosystems – mainly through the reclassification of stewardship lands from pastoral tenures (Ministry of Foreign Affairs and Trade and Department of Conservation, 2013, p.42).

**Milestones towards better representativeness**

A first milestone for New Zealand is a refresh of its scientific programmes.

contemporary operationalisation of 'functional representativeness', applied consistently by scientists, authorities and stakeholders. This strategy should include milestones with targets, and guide amendments to all relevant laws and policies to incorporate requirements for protected area representativeness.

For implementation, the government must provide adequate funding for land acquisitions and exchanges. Legislation should be amended to facilitate land exchanges without requiring prior disposal. Changing protected area boundaries is likely to be sensitive, as public trust is low that land disposals will be at least matched by acquisitions of under-represented, rare and vulnerable ecosystems. Timely and inclusive public dialogue should therefore be undertaken, co-led by mana whenua, to

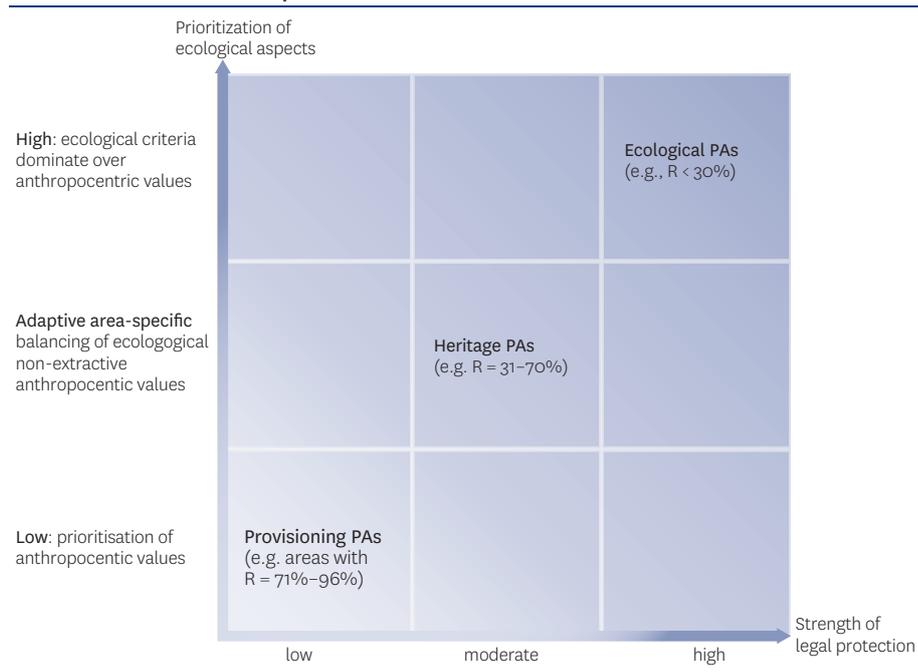
prioritisation of values, on a case-by-case basis); and

- provisioning/ecosystem service protected areas (PPAs), prioritising anthropocentric uses, including some extensive human access, such as minor settlements, and sustainable resource use. Such areas form the bulk of protected areas in Europe and other continents with ancient habitation (Worboys et al., 2015).

Based on that broad classification, I suggest that, in New Zealand, areas containing the ecosystem types listed in the bottom five–seven rows of Table 2 could be protected under ‘ecological protected area’ designations, prioritising the care for the area-specific ‘constellation’ of eco-values and eco-objectives that scientists deem feasible. For them, the authority to approve and revoke designations would rest with Parliament, for higher legal security. In contrast, areas with ecosystems listed in the top five rows of Table 2 may be reclassified across all three categories.

Taking the Southern Alps land environment as an example, of which 96% is currently captured, mainly by national parks, and applying the reclassification approach shown in Figure 1, up to 30% of these areas could be designated as ecological protected areas – an approach similar to that applied to under-represented ecosystems. Scientists would advise on the most desirable locations and boundaries of the new designations. Other areas – say, up to 40% – of the extent currently captured by conservation lands could be designated as ‘heritage parks’, for moderate access and use of natural resources. For this category, authorities would have some discretion to adaptively balance ecological, social, cultural<sup>9</sup> and economic values. For instance, if climate or other pressures deteriorate habitats or key ecological processes in the ecological areas protecting the same ecosystem type (or comparable sets of eco-values), zoning or access conditions in relevant heritage parks may change, to strengthen the support of eco-values. This way, heritage parks may serve as buffer tools for the ecological areas, preserving the same ecosystem(s). Their approval and delisting would rest with entities able to provide some protection from the unreasonable exercise of political discretion to the detriment of

**Figure 1. Recategorizing Protected Areas across an ‘ecological – human benefit’ spectrum**



nature protection. For example, their designation may require the approval of both Cabinet and the New Zealand Conservation Authority, or other institutional arrangements that would offer a legal protection of moderate strength to that designation category, as suggested in Figure 1.

The remaining areas could be designated as provisioning/ecosystem service protected areas. In this example, they would represent the remaining 25% of the Southern Alps land environment, ideally in areas resilient to many possible pressures. Such designations would emphasise the benefit to communities from ecosystem services, permitting sustainable resource use (other than mineral or fossil-fuel extraction), or even small settlements that are sustainably built and managed. This focus could apply to all or selected zones within the area.

Regulations and operational management would still aim to maintain the area’s eco-values of interest, ensuring that social and economic activities in the region contribute to their protection. For provisioning protected areas, suitable eco-objectives might include ecosystem rehabilitation, adaptation of biota to climate change, and enhancing landscape coherence and connectivity. These areas could sustain essential ecological functions and services at broader scales, while

enhancing biome representativeness across the conservation network. To ensure accountability and public support, their designation and revocation could be placed under the joint jurisdiction of the minister and relevant conservation boards. Public deliberations and co-production with mana whenua would be needed to assist decisions on reclassifying protected areas based on a simpler designation framework, underpinned by the proportionality principle of decision making, as proposed here, ensuring that reforms have both scientific evidence and social legitimacy.

#### Improving the range and consistency of nature-protection mandates

Transitioning protected areas to become functionally representative systems requires also the protection of the full range of ecological values that may be present in the managed areas, irrespective of their prioritisation or level of legal protection. Previous publications suggested widening the protection mandates for some or all designation types, as most areas offer multiple ‘conservation values’ (e.g., Kelly, 1980; Cessford and Dingwall, 1999; Norton and Overmars, 2012). But specific proposals on how to organise them in a policy-friendly format are still scant in the wider international literature.

In a previous publication I developed a framework I call the Spectra for the

Ecological Regulation of Protected Areas and Tourism (SERPAT) (Dinica, 2022, pp.91–113). The SERPAT framework synthesises insights from contemporary scientific literature and international biodiversity agreements into an ecological module, comprising two regulatory dimensions. The first concerns the ecological values targeted for protection, distinguishing among four main categories:

- *ecological structures* – evaluations may assess which aspects of nature are prescribed for protection: genetic diversity, species diversity and/or ecosystem diversity;
- *key ecological processes* – here protection may refer to functional processes (energy flows, biogeochemical cycles, food chains), spatial scales (local, regional, global) or process types (abiotic, biotic, mixed processes);

under climate change; and ecological renovation (i.e., introducing new ecosystems when rehabilitating the original ones is unfeasible).

Several Department of Conservation scientists recommended that the department develop a new regulation approach by complementing the visitor-focused zoning frameworks (especially the Recreation Opportunity framework) with a mapping of ‘environmental assets’, to be achieved by mapping the ‘spatial distributions’ of ‘key conservation values’ (Cessford and Dingwall, 1999, pp.1–3, 12). While the authors did not use the term ‘ecological zoning’, they did provide key ingredients for it. The SERPAT framework expands on their recommendations, suggesting that the management plan applicable to a protected area designation should use only one ecological zoning

often prescribe different sets of eco-values and eco-objectives for the same designation, despite expectations that hierarchical instruments should be coherent and consistent across regulatory levels. To illustrate these challenges of narrow and inconsistent mandates, two brief case studies follow.

#### *Approaches in New Zealand and in the Westland and Kaimanawa parks*

This section explains the provisions pertaining to eco-values and eco-objectives emerging from all instruments applicable to Westland Tai Poutini National Park and the Kaimanawa Forest Park. The two designation types were chosen because, as shown in Table 2, they have the largest spatial footprint in the public network. The current research project collected information on several national parks and conservation parks. These two parks were chosen for this article because they offer a balanced picture for protected areas in the North Island and South Island. The findings for the two parks are consistent with those for other designations, which will be reported in future publications.

Overall, as shown in Table 3, the lack of alignment among the planning instruments applicable to each park is striking, as is their limited integration of contemporary scientific concepts and international guidance on nature protection. Across all instruments, the prevailing ecological objectives still mirror early 20th-century priorities of preservation and restoration. In the New Zealand context, these remain relevant. However, so are the objectives of connectivity and landscape integration. Table 1 shows that some designations capture tens of very small areas (ecological areas, nature reserves), even hundreds of sites (scenic reserves, recreation reserves), undermining their functionality. These objectives are only explicitly included in the regional strategies and the Kaimanawa plan. The eco-objectives of biotic persistence to climate change and ecological renovation (which could be valuable from the standpoint of ecosystem services) are missing from all instruments.

With respect to eco-values, both the National Parks Act and Conservation Act embody a narrow and reductionist conception of species diversity, emphasising

## There is a move from early species-focused protection towards a recognition of ecosystem diversity, ecological processes, critical ecosystem services and integrity.

- *critical ecosystem services* – requirements may regard safeguarding supporting services or the regulating services necessary for nature to sustain itself;
- *indicators of ecological performance* – with a focus on ecosystem integrity and ecological health.

For effective protected area regulation and practical management (e.g., pest and weed control), specifying only the ecological values needing protection is insufficient. Scientists recommend articulating also the accompanying objectives, which may apply to one or several related eco-values. The SERPAT framework incorporates seven ecological objectives: preservation (including through the ‘natural recovery’ of degraded areas); proactive restoration/rehabilitation; connectivity among protected areas; landscape integration with neighbouring public/private lands; biotic persistence

framework, for both human access regulation and practical management: this should clarify both the eco-values and associated eco-objectives, for each zone within the designation or for the designation as a whole (when it is small and ecologically ‘homogeneous’).

However, transitions to science-informed ecological zoning require a broader protection mandate in law and implementation policies, as well as greater flexibility for actors (authorities, management partners, and the public engaged in decision making) to define protected area-specific and zone-specific priorities. Currently, legislative and policy instruments do not require the protection of all the above-mentioned categories of eco-values and eco-objectives. This limitation constrains actors’ ability to articulate area-specific protection priorities. Moreover, different laws and policy tools

‘native plants and animals’ while neglecting genetic and ecosystem diversity. References to ecosystem diversity are important because this is strongly linked to the concept of representativeness. The 2020 West Coast Conservation Management Strategy refers to the importance of preventing the loss of ecosystem diversity, genetic diversity and ecological integrity. In addition, ecosystem diversity is also to be safeguarded through restoration/rehabilitation and improved connectivity. The 2014 Westland Tai Poutini National Park Management Plan does not provide an explicit mandate to safeguard ecosystem diversity. Its focus is on preserving or restoring species diversity, critical eco-services and local ecological processes.

The 2002 Tongariro/Taupo Conservation Management Strategy, applicable to the Kaimanawa Forest Park, expands legal requirements by highlighting the importance of preserving or restoring key ecological processes, ecosystem diversity and ecosystem health. However, the 2007 Kaimanawa Park Forest Management Plan adds to the Conservation Act a different, narrower range of prescriptions. It refers to preserving ecosystem diversity and critical eco-services, while restoring ecological integrity in degraded areas. Accordingly, the management plan requirements for neither park are consistent with the higher-level instruments they are supposed to give effect to.

Overall, the analysis shows a slow and uneven shift in regulatory eco-values. There is a move from early species-focused protection towards a recognition of ecosystem diversity, ecological processes, critical ecosystem services and integrity. To ensure a robust mandate for the functional representativeness of protected areas, these newer scientific concepts must be integrated into forthcoming legal and policy reforms. A more ecologically effective protected area system needs the legislation to require managing authorities to spatially identify the full feasible range of eco-values and associated eco-objectives, for each existing and potential designation. This helps inform decisions on: how to eventually reclassify protected areas based on a simpler framework, such as that suggested in the previous section; and how

**Table 3: Summary of eco-values and ecological objectives reflected in New Zealand’s key conservation instruments**

Instrument	Eco-values identified	Ecological objectives identified
<b>Instruments applicable to the Westland Tai Poutini National Park</b>		
National Parks Act 1980	Species diversity (‘native plants and animals’ only)	Preservation, Restoration/rehabilitation
General Policy for National Parks (2005)	Genetic diversity Key ecological processes Critical eco-services Ecological integrity	Preservation, Restoration/rehabilitation
West Coast Conservation Management Strategy	Genetic diversity Ecosystem diversity Ecological integrity Critical eco-services (recognised but not linked to objectives)	Preservation, Restoration/rehabilitation  Connectivity
<b>Westland Tai Poutini National Park Management Plan</b>	<b>Species diversity Critical eco-services Local ecological processes</b>	<b>Preservation, Restoration/rehabilitation</b>
<b>Instruments applicable to the Kaimanawa Forest Park</b>		
Conservation Act 1987	Species diversity  limited recognition for ecological processes	Preservation, Restoration/rehabilitation
Conservation General Policy (2007)	Genetic diversity Species diversity Key ecological processes Critical eco-services Ecological integrity	Preservation, Restoration/rehabilitation
Taupo/Tongariro Conservation Strategy	Species diversity Ecosystem diversity Key ecological processes Ecosystem health	Preservation, Restoration/rehabilitation  Landscape integration
<b>Kaimanawa Forest Park Conservation Management Plan</b>	<b>Species diversity Ecosystem diversity Critical eco-services Ecological integrity</b>	<b>Preservation, Restoration/rehabilitation  Connectivity</b>

to zone PAs ecologically and regulate human access better, based on the proportionality principle of precautionary decision making – the focus of the next section.

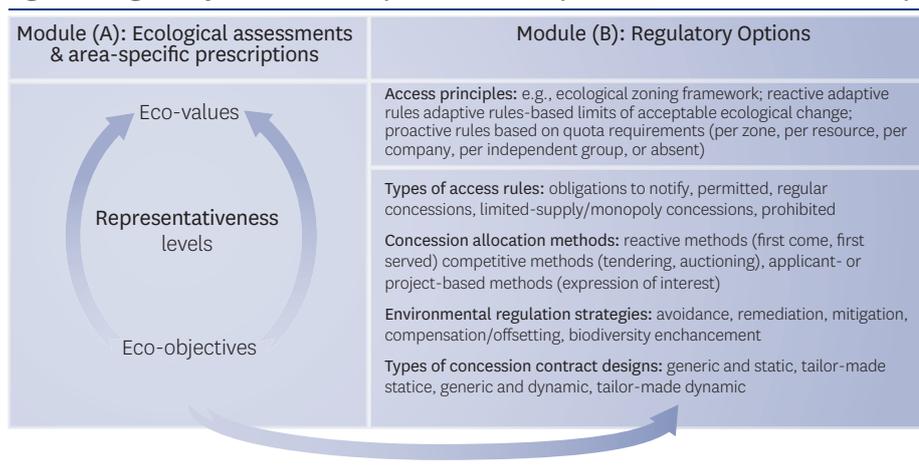
#### Transitioning to ecological zoning and proportional regulations

As foreshadowed earlier, New Zealand needs a new zoning system for protected areas that integrates operational biodiversity management decisions with human access regulations. To date, biodiversity management and access regulation have been zoned based on different frameworks. To regulate access, the Department of Conservation still relies on the Recreation Opportunity Spectrum developed in the United States in the late 1970s (Joyce and Sutton, 2009). This

framework differentiates zones within and across protected areas by considering pre-existing visitor facilities and infrastructure, as well as distance from access points. As a result, areas may be declared ‘wilderness’ and effectively overprotected due to remoteness, despite hosting ecosystems that are already over-represented across the network.

An ecological zoning framework would ideally apply across designation categories and incorporate multiple ecological criteria to capture nature’s complexity (Awimbo, Norton and Overmars, 1996; Walker and Lee, 2004). By applying the proportionality principle of precautionary decision making, the approach operates in a manner similar to that outlined above. Ecological zoning should require zone-specific regulations, with access rules being increasingly

Figure 2: Regulatory dimensions for protected areas (based on the SERPAT framework)



Source: Dinica 2022, 118

stringent where ecosystems are more threatened or under-represented within the network.

Accordingly, areas containing well-represented and resilient ecosystems could allow a wider range of compatible uses, such as recreation, tourism or sustainable agro-forestry. By contrast, under-represented or threatened ecological features would be zoned for stricter protection. This approach avoids both over- and under-regulation, aligning designations and zoning with ecological evidence.

As a regulatory scenario, consider a large protected area containing three ecosystem types, where two are already well represented across the national system (e.g., steep land and mountain podocarp forest), while one, such as a wetland, remains severely under-represented.

The wetland could be zoned as a 'strict nature reserve', with limits on access types and visitor numbers (including independent recreation). This could help safeguard key area-specific priorities for eco-values and eco-objectives, such as the restoration of ecological processes and habitat connectivity within and beyond the area. In contrast, some well-represented podocarp forest areas could be zoned for more extensive access (e.g., tourism unconstrained by visitation quotas). However, mindful of the precautionary principle, other podocarp areas may require strict reserve zoning to ensure that, at the network level, their effective protection meets the recommended minimum 20–30% threshold. Hence, an ecosystem type that is highly represented

across the network may be zoned and regulated differently for human access across protected areas to achieve an appropriate balance between protection and use.

The second column of Figure 2 shows the five regulatory dimensions or 'spectra' proposed by the SERPAT framework, and the regulatory options for each that authorities may choose from to craft contextually effective regulations<sup>10</sup> (planning decisions, concessions, visitation quotas). Regulations are more likely to be contextually effective, and consistent with the proportionality principle of precautionary decision making, when they reflect the constellation of area-specific eco-values and eco-objectives, as well as the representativeness of the protected sites.

**Conclusion**

New Zealand's protected area network reflects strong conservation intent but weak ecological design. Poor representativeness, narrow and inconsistent protection mandates, misaligned designations, and ecologically blind zoning undermine both its ecological effectiveness and feasible opportunities for human access. The reforms proposed here offer complementary pathways for an ecological transition. Implemented together, they could deliver a system that is more coherent, scientifically grounded and publicly legitimate. Achieving this requires political will, institutional innovation and sustained public dialogue – a shared effort to align conservation policy with the biodiversity crisis of the 21st century.

Particularly, the proposed reforms could substantially reduce the administrative burdens associated with zoning, concession allocation and non-commercial access. They would also enhance transparency for stakeholders and provide businesses with greater certainty around investment opportunities. These are outcomes the current government claims to seek; however, its approach instead emphasises ministerial discretion over planning and zoning, coupled with a radical deregulation of concession processes, and lacks an ecological rationale or action plan to safeguard the purported conservation 'net benefits' (Office of the Minister of Conservation 2025).

**Limitations and future research**

The analysis in this article focused deliberately on ecological design, designation logic and regulatory philosophies, rather than on governance arrangements or management actors. Biodiversity protection in New Zealand is not exercised solely by public authorities. It increasingly involves co-governance and co-management arrangements with mana whenua and other actors. However, these dimensions fall outside this article's scope. The reforms analysed here are complex and require sufficient analytical space to be examined coherently. Future publications will extend this work, by examining how the proposed ecological reforms interact with evolving governance arrangements, including co-governance and co-management models, and by analysing the implications for public, Māori and private actors involved in protected area management. More research is also needed on how to improve social support, including from mana whenua, to improve the representativeness of the protected area network and its overall ecological performance.

1 For a map, see Phillips, 2009.  
 2 The post-2020 Global Biodiversity Framework and other implementation decisions under the 1992 Convention on Biological Diversity focus primarily on publicly owned protected areas, as only states are parties to the Convention. Private protected areas (including those owned by Indigenous groups, NGOs or communities) may be incorporated into national implementation programmes, but only with the consent of private actors. At present, the government reports to the Convention secretariat of only on private protected areas for which landowners have entered into biodiversity protection covenants with the Department of Conservation or councils. Former national park Te Urewera and other Māori-owned areas managed for biodiversity protection (whether as a primary objective or not) are therefore not included in Table 1, as they are not reported in New Zealand's submissions

(see Ministry of Foreign Affairs and Trade and Department of Conservation, 2013).

- 3 This programme was partially supported by funding from the School of Government Trust for empirical research conducted between October 2022 and November 2024. The author gratefully acknowledges this support; responsibility for all analyses and interpretations rests solely with the author.
- 4 In a previous publication I developed 11 sets of questions, to guide scholars and practitioners on how to operationalise such reforms. Chapter 1, which is freely available at the publisher's website, offers a thorough analysis of the international scientific literature and Convention on Biological Diversity documents on which the ideas draw (see Dinica, 2022, pp.2–30). Additional guidance and a research agenda pertaining to such reforms is available in chapter 9.
- 5 For brief descriptions of each land environment, see also Walker et al., 2004, pp.61–7.
- 6 As shown in Table 1, 'ecological area' is a designation recognised

under the 1987 Conservation Act, defining it narrowly and vaguely as follows: 'Every ecological area shall so be managed as to protect the value for which it is held' (article 21). Norton and Overmars (2012) argued correctly that an area is likely to have more than one conservation value and recommended amending the law to acknowledge multiple value (Norton and Overmars, 2012, p.115). The designation category of 'ecological protected area' proposed in this article defines these as areas that prioritise the protection of both the ecological values indicated by scientists as potential and present, and their associated ecological objectives (referring to how to safeguard those values). Such prioritisation is missing from the current legal definition of ecological areas in New Zealand, which are open to potentially destructive activities, such as mining.

- 7 For discussion on scientific debates surrounding the 'static' and 'functional' interpretations of representativeness, as well as the need for additional criteria to improve the ecological performance of the protected area network, see Walker and Lee, 2004.

- 8 The names of designation categories are offered as options. National public deliberations may settle on different names. Individual protected areas may even keep their own historical names, if this is important for local communities, or for marketing purposes. This is also practised in New Zealand. For example, the Kaimanawa conservation park is known as the Kaimanawa Forest Park, although legally this designation does not exist any longer.
- 9 Culture is understood here broadly, as people of all ethnicities have cultures. But some areas, or new designations within this category, would reflect Māori interests in lands and responsibilities under the Treaty of Waitangi.
- 10 For conceptual discussions regarding each regulatory spectrum (and options), see Dinica, 2022, pp.114–35. For the framework's application empirically to document regulatory problems and suggest improvement options for protected areas in New Zealand, Hawaii and Tasmania, see Dinica, 2022, pp.142–231.

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