Addressing New Zealand's Biodiversity Challenge

A Regional Council thinkpiece on the future of biodiversity management in New Zealand

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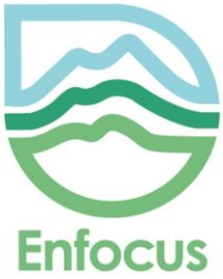

Gerard Willis

#1886721

Preface

Our native flora and fauna is a taonga that does much to define us as a nation. It's also under threat, and we are losing ground in many cases. This timely thinkpiece suggests how we could better manage our indigenous biodiversity, with a particular focus on the role and work of regional councils.

New Zealand is a true biodiversity hotspot. Our animals and plants evolved over 80 million years in isolation without mammalian predators. So we have many unique species that occur nowhere else on earth. New Zealand also has a relatively short history of development, so our indigenous biodiversity is still very much in evidence, and entwined in our social and cultural identity.

This country is recognised as a world leader in the management of pests and saving species. Over the past few decades many players across a range of fronts have poured time, effort and money into saving and protecting our indigenous biodiversity. We all know of great projects where good progress is being made.

However, the hard truth is that we urgently need to develop and refine new options and measures to ensure New Zealand has the best biodiversity protection system in the world to protect what is uniquely ours.

The good news is that we have favourable winds to assist our endeavours:

- A rise in community conservation, philanthropic interest and investment in the environment.
- National-scale initiatives like Predator Free 2050 and wilding conifer management.
- Development of new technologies for controlling pests.
- A range of new strategies and action plans plus changes to legislation.

So now's the time to think strategically about the future: What do we want to achieve? What's the battle plan? Who will provide the necessary leadership? How will we know if we are succeeding? What systems and structures are needed to support success?

This thinkpiece canvasses all the big questions and proposes a way forward. The intention is to provoke thinking, discussion, debate and ultimately change. It's been prepared for regional and unitary councils because of their role in biodiversity management, particularly on private land. It follows a report in 2015 that defined the term 'biodiversity' and set out the roles of public agencies and others in its management.

This second stage identifies five 'shifts' necessary to enhance the contribution regional councils can make – steps that will make the greatest difference to halting biodiversity decline in New Zealand and protecting what is important.

Turning the tide will not be easy or simple. That may be why much has been written on the problem of biodiversity decline and much less written about possible solutions. However, we cannot allow complications and difficulties to overwhelm and paralyse us. We must work together on the things that will make the greatest difference.

There cannot be a one-size-fits-all solution. Threats vary and require different interventions depending on situation, location and context. However, a core message here is that the most urgent need is more active management.

This requires a focus on actively managing the threats associated with biodiversity decline. And it almost always requires working alongside people, whether they're individual landowners or communities. It means taking proactive and positive measures, such as fencing, pest and weed control or planting, to protect and enhance indigenous biodiversity.

When you get people involved with biodiversity management, they invariably expand their knowledge about our native flora and fauna, and value it more highly. There is much research to suggest that working alongside people gets more effective results than forcing them with regulations, which at best can only ever achieve passive protection of biodiversity.

Regional councils understand the concept of active management well. We are leaders in this area, with a long history of developing and implementing work programmes whose success rests on community buy-in. This comparative advantage sets us apart from others in the area of biodiversity management on private land.

This think-piece's recommendations cover:

- The need for strong leadership and clarity of roles and responsibilities.
- The need for agreement on where we should focus our efforts at national, regional and local level.
- The importance of a plan and delivering joined-up action across all players.
- The need to understand what success looks like, and how to measure it.
- The need for modern, fit-for-purpose frameworks, including legislation, to help to achieve our goals.

Regional councils are keen to work with others to enable the necessary changes to improve New Zealand's biodiversity system. Some of these recommendations are just enhancements of 'business as usual'. But others are new ideas that will challenge current thinking. Leadership and initiative will be required to make them reality.

This think-piece is a result of work by the Regional Councils Chief Executive Bio-Sub Group and the Bio-Managers Group, with the expert assistance of Gerard Willis from Enfocus.

Rob Phillips, Bill Bayfield, Basil Chamberlain, Vaughan Payne, *Regional Chief Executives Bio-sub Group* and **Stephen Hall**, *Bio Managers Convenor*

Contents

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Executive Summary

Executive Summary

This report follows an earlier (2015) report for regional councils on roles in biodiversity management, referred to here as the "Stage 1 Report". That earlier report focused on defining the term biodiversity and setting out the respective roles of public agencies and others in the field of "biodiversity management".

This report looks at the strategic picture for biodiversity management and identifies five "shifts" necessary to enhance the contribution regional councils can make.

The strategic context

Continuing decline. While there is an abundance of information on particular aspects of biodiversity management (the state of key indicator species, success with particular projects, progress with particular responses) there is surprisingly poor information on the state of biodiversity as a whole. Nevertheless, it is well accepted that the weight of evidence and expert judgment points to the continued decline in biodiversity almost 20 years on from that issue being identified as New Zealand's most pervasive environmental issue and some 16 years on from the publication of the New Zealand Biodiversity Strategy (NZBS) with its goal of "halting the decline". The only conclusion that can be drawn is that central and local government, and New Zealand collectively, has suffered *intervention failure* and that business as usual will not be good enough if we are to maintain indigenous biodiversity.

Biodiversity: a wicked problem. Biodiversity loss has many of the characteristics of a "wicked" problem.

- It is complex, poorly understood and resists clear definition.
- It has many causes (i.e. multiple threats) meaning there is no single solution but rather multiple types of intervention are required.
- It probably cannot be solved by existing means, meaning that new tools are required (including both technological tools and policy mechanisms).
- It is challenging because it requires changes in behaviour and attitudes across a range of agencies, communities and individuals.
- Some interventions can cause perverse or unwanted outcomes. This can be the case as a result of both regulatory and non-regulatory intervention.

- Unwanted actions by individuals are often a result of economically rational decision-making (when considered at the level of the individual) because costs are not born solely by the individual undertaking the action.
- It involves many stakeholders across the public and private sector and communities and individuals with very different priorities and values.

Changing threats to biodiversity. Biodiversity faces multifarious threats. These may broadly be grouped as anthropogenic (the effects associated with human development and resource use) and non-anthropogenic (largely the effects of plant and animal pests). Regulation can be used to address many anthropogenic threats and operational investment is necessary to address non anthropogenic threats (along with regulation when humans are exacerbators). The nature of the most dominant threat varies considerably across the country and by type of environment. Where there is intense pressure for land use change and intensification (for urbanisation and other uses) anthropogenic threats can dominate. However for much of the country recent decades have seen a change in the predominant threats from land clearance to plant and animal pests. These threats do, and have the potential to further, wreak landscape-wide ecological havoc on biodiversity values.

Complexity of legislation and agencies' roles. Numerous public agencies have a role in managing threats to biodiversity. While there are no obvious gaps in the coverage of powers and responsibilities the overall distribution of roles lacks an obvious coherency. Most of the numerous governing statutes predate the concept of the maintenance of biodiversity being the driving purpose. The only public agency with a specific statutory function to maintain biodiversity is regional councils[1]. A defining characteristic of the current system is that despite biodiversity maintenance being a largely aspatial concept, management is very much defined by whether it is undertaken on public conservation or private land. Despite a plethora of plans and strategies for, or relating to, biodiversity under a range statutes, there are few mechanisms that take a genuinely coordinated and "tenure neutral" approach to prioritisation and management. This likely handicaps the overall system's ability to deliver the best biodiversity return on investment.

Seeds of change. Perhaps the most significant trend in biodiversity management since the NZBS was published has been the considerable growth in community based groups (and iwi) involved in community projects, some of which are of considerable scale. Moreover, there has been a burgeoning not just in the number of groups and projects from the non-governmental sector but there has been the clear emergence of significant *corporate and philanthropic sector* interest in biodiversity. A number of well-resourced, professionally managed charitable foundations have stepped in to identify and provide catalytic funding of projects (in partnership

[1] *Territorial authorities' function in respect of biodiversity is limited only to the control of land use. Regional councils' biodiversity function is not limited to any of its "control" functions but is a stand alone function able to be given effect to through any methods (regulatory or non regulatory) available to them.*

with other agencies, iwi and groups) in many parts of the country and set ambitious goals and targets. In many ways this initiative has filled a growing hole in public sector leadership and funding. DOC has been at the forefront of creating partnerships with the private and community sector through its conservation partnerships initiative.

At the same time, advances in technology for operational biodiversity management (including improvement in trap technology, toxic agents and their delivery, and fertility and biological control) are opening up the potential to achieve goals more effectively and at significantly reduced cost, making previously unachievable outcomes potentially realistic.

Traditional and evolving roles of regional councils. Regional councils have core strengths in the design and implementation of operational pest management programmes. They have good science capability and a long track record of working with communities and community groups to achieve environmental outcomes. Despite that, they have been (with some exceptions) largely absent from the evolving national and project-specific discussion around biodiversity management. They are not routinely considered by DOC in conservation planning and have very low visibility within the corporate/philanthropic sector. Regional councils and their ability to take pest management beyond the conservation estate is a key part of any effective response to biodiversity loss, but they are currently not as effective in that regard as they might be. While there are examples of regional councils strongly asserting their place in biodiversity management along side other key players, the regional sector as a whole could do more.

Changing nature of central government intervention. There are three particularly apparent developments in the way government intervenes in biodiversity management.

- Firstly there is the reduction in OSPRI investment in possum control, with regional councils potentially having to manage areas previously managed by OSPRI to maintain biodiversity gains.
- Second is the 'Predator Free NZ' initiative, signalling a more ambitious intent and the defining of a significant role for the non-government players. This is an arms-length funding/leveraging model.
- Third is the restart of a process to develop a national policy statement on biodiversity.

Greater acceptance of Māori interests in biodiversity. Māori have always asserted interests in biodiversity and the protection of those interests under the Treaty of Waitangi. Recent developments, such as the Waitangi Tribunal's WAI 262 decision, Treaty settlements and new iwi leadership structures, have served to grow and strengthen the actual and potential role of Maori in biodiversity management. These advances reinforce the need for new biodiversity initiatives to include partnerships with iwi and hapū.

Five required shifts in biodiversity management

Given the strategic context, the ability for regional councils to make a more effective contribution to halting decline in biodiversity will require a number of strategic shifts. Shifts are required in the overall management system and in regional councils' participation in that system.

The following five shifts are proposed to support regional councils making a more effective contribution to maintaining biodiversity than has been achieved in the past. It is important, however, to record that there is significant variation between regional councils in terms of the extent to which they are affected by the strategic context outlined earlier in this report. Each region has different strengths and faces different challenges. Auckland in particular, being a unitary authority with very significant financial resources, the regulatory powers of both a regional and district council, a relatively modest land mass to manage, but with very substantial parks and reserves of its own, plays a different role in biodiversity than any other region. For these reasons Auckland Council is more ambivalent about some of the legislative and leadership changes proposed in shifts 1 and 5, and considers that these need to be examined alongside other less sweeping approaches, including improvements within the existing or 'tweaked' statutory and structural context. All Councils support the increased operational delivery, collaboration and coordination proposed in shifts 2-4. The following shifts need to be read with that qualification in mind.

Shift 1 – Stronger leadership and clearer lines of accountability

The perennial issues in biodiversity management are who has the overall leadership role and where do the responsibilities of other players begin and end? Currently these questions do not have straightforward answers.

We need to shift from a situation where there is incomplete and unclear leadership for biodiversity off public conservation land to an operating environment where:

- leadership is clear and that leadership role is accepted and exercised collaboratively in the best interests of biodiversity, regardless of land tenure.
- there are much more clearly defined boundaries around roles and responsibilities that delivers greater confidence to take action, and avoids the potential to pass off of responsibility to another party that is inherent where fuzzy lines of functional responsibility exist. In short, more clearly defined roles will improve accountability.

There are many agencies and other parties involved in biodiversity management but no established forum within which issues associated with boundaries of responsibility, a collective agenda for action, or co-ordination of activities can be discussed and resolved. There seems to be a case for a new leadership structure that brings together key players for collective strategic decision-making.

Objective

The national biodiversity management system develops clear system-wide leadership at both national and regional levels.

That such leadership fosters functional collaboration rather than competition in the identification, prioritisation and delivery of biodiversity projects.

Actions

1) Promote investigation of options for new national leadership models for biodiversity management including a *National Biodiversity Management Authority* comprising all major statutory and financial stakeholders (including local government and iwi representation) with:
    a) A governance role (including recommending and overseeing the changes required to enhance performance and ensure on-going clarity of roles and direction); and
    b) A limited management role. (Establishing priorities and co-ordinating delivery against those priorities; raising awareness of, and financial support for, biodiversity across all sectors; and overseeing the national response to monitoring biodiversity).
2) Ensure that any new biodiversity leadership entity has clear mandate from, and is accountable to, government Ministers, preferably through the entity and its roles and function being recognised in statute.
3) Develop leadership arrangements at the sub national level that encourage collaboration in the undertaking of biodiversity responsibilities, including in the planning, prioritisation and implementation of specific projects (using Nature Central as potential model).

Shift 2 – Building on what regional councils do best

There is a need to focus the energy and resources of the regional sector on the key contemporary issues for which it is best suited to respond. That is, they need to embrace, promote and grow their role as operational managers responsible for maintaining (including advising and working with others to maintain) the *quality* and ecological integrity of key habitats and ecosystems off the public conservation estate – that is upon private land.

Regulatory (and policy making) roles will continue to be important, but at the national scale the big action and the big potential gains for biodiversity from regional council intervention will, in most areas, come from being bigger and better operational managers. The control of plant and animal pests (and other risks that require positive action) needs to be recognised as the core dimension of biodiversity management at the regional level. Biodiversity management needs to be recognised and embraced as a core role for every regional council.

That shift has implications for the way (and the place) the regional role in biodiversity is defined in statute. It also has implications for the way regional councils define and discuss their own role and communicate that role to other players.

Objective

Regional councils are regarded by the government, private sector and communities as an expert authority in working with private land owners and iwi in planning and undertaking operational management to achieve "on the ground" action that furthers biodiversity objectives.

Actions

1) Regional councils clearly define and promote the core roles of regional councils in biodiversity management as:

    a) Investor in, and/or deliverer of, and/or supporter and enabler of operational programmes to protect and improve the ecological integrity of a network of sites off public conservation land that, in combination with sites on the public conservation lands, represent the full range of habitats and ecosystems;

    b) Regulator of many (but not all) of the activities that effect freshwater and marine habitats; and

    c) Regulator of activities that effect terrestrial habitats where that role is not undertaken by territorial authorities (with territorial retaining the default role).

2) Regional councils promote legislative change that more clearly articulates the role of regional councils as outlined in 1 above.

Shift 3 – Better information for better management

Better information is the key to better decision-making. Two dimensions of biodiversity management demand better information to allow managers to better target sources and understand the challenge. These are *prioritisation* (where to expend effort) and *monitoring outcomes* (knowing how much to intervene and how effective intervention has been).

A. Prioritisation: The first realisation about operational biodiversity management is that not everything can be managed. The very concept of biodiversity encourages a focus on thinking about maintaining the *diversity* of species and ecosystems rather than every example or every specimen. In other words, there is a need to focus on managing threats to a network of sites that represents the full range of ecosystems and habitats and in so doing provides the best chance of maintaining the full range of species.

There is currently no consistent approach to prioritisation amongst regional councils or between regions and other players. Different approaches, criteria, and scales are applied with significant reliance on professional but inherently subjective assessment. Recently, DOC has begun to prioritise sites on and off conservation land using more sophisticated approaches. Some regional councils have adopted similar approaches and decision-support tools. However, at this point prioritisation is still not undertaken consistently or comprehensively across the various management agencies. All of that calls into question whether "NZ Inc" is investing optimally such that it achieves the maximum benefit it can from the available resources.

We need to achieve a strategic shift from that fragmented and inconsistent approach to one that is much more systematic, rigorous and universally applied (regardless of land tenure).

B. Monitoring outcomes: The ability to sustain long-term, continuing investment in biodiversity (whether from the public purse or the private sector) depends on the ability to tell a convincing and reliable story about the need for that investment and the effectiveness of past and future investment.

As noted above, information on the overall state of biodiversity is poor. At the national level biodiversity state indicators (as used for past state of environment reporting) are not fit for purpose. Regional monitoring is patchy with variable indicators used. In the absence of quality, reliable information regional councils and others operate in an environment of some uncertainty and cannot properly target or "size" their intervention, potentially leading to a misallocation of resources.

Accordingly, we need to achieve a shift from reliance on piecemeal, case study and, on occasions, anecdotal information to the use of comprehensive and robust indicators within a systematic monitoring framework

Significant work has already been completed by DOC and by regional councils adopting (in principle) 18 biodiversity indicators. Three of

those are already measured nationally for regional councils. The indicators are intended to be applied within the DOC-promoted three-tier monitoring programme. Tier 1 is largely a new concept of broad-scale/landscape wide field survey at 8km grid points. The approach has already been adopted by DOC.

Although state and condition monitoring is undoubtedly critical, the regional sector needs to come to collective view about the need for, and value of Tier 1 (whole of landscape) monitoring for effective regional scale "state and condition" monitoring. At least some of the value of the comprehensive (whole of country) Tier 1 monitoring network accrues to those responsible for national scale reporting (central government agencies). Less controversially but more importantly, regional councils need to progress implementation of all agreed indicators. This includes determining how state and condition indicators that rely on field-based assessment might be best implemented and at what scale. Tier 2 monitoring may resolve those issues but details of that part of the programme do not appear to have been confirmed at this point. Further, the approach needs to be broadened out beyond terrestrial monitoring to encompass the freshwater and marine domains.

A final key required shift in information gathering and management is the need to move away from an ownership ethic whereby important information is tightly held by individual organisations towards a biodiversity data commons.

Objective

There is a consistent approach to prioritising sites to inform biodiversity management across the landscape regardless of tenure or region that assists NZ Inc to invest optimally to secure biodiversity outcomes.

Implementation of a standardised biodiversity monitoring programme across all regional councils that allows for comprehensive reporting consistent with that of the Department of Conservation. Reporting should cover the state and condition of biodiversity, threats and pressures faced by biodiversity, effectiveness of interventions and community engagement.

Actions

1) Regional councils agree on the pan sector adoption of a *spatial prioritisation tool* and on the protocols for the consistent use of that tool to ensure consistency across the sector in the identification of the regional network of sites. (Note that the Zonation software tool is the leading contender having been already used by a number of councils).

2) Regional councils promote the use of the same spatial prioritisation tool (and protocols for use) on public conservation land.

3) Regional councils and DOC effectively and consistently communicate the concept of, and principles underpinning, prioritisation to ensure all stakeholders understand the strategy and its importance in optimising outcomes for NZ as a whole.

4) In developing and funding biodiversity monitoring programmes promote the principles that:

    a) Those responsible for managing the threat should also be responsible for monitoring the effect of that management intervention (conversely those not responsible for managing the threat ought not be responsible for monitoring the outcome); and

    b) If an outcome is nationally important then it is important to monitor the achievement of that outcome nationally.

5) Implement the 18 recommended indicators for terrestrial biodiversity monitoring (including, regardless of the outcome of action 6 below, ensuring monitoring includes adequate state and condition monitoring for all key biodiversity sites).

6) Consider further the value proposition of investing in the completion of a Tier 1 (broad scale) monitoring system if there is confirmation of:

   a) Government's long term commitment to a corresponding system on public conservation land; and

   b) a contribution of the cost of the programme from national agencies that reflects the value of the information for national reporting (relative to any benefits that accrue regionally).

7) Further develop the regional biodiversity monitoring programme to cover freshwater and marine habitat in a manner similar to that taken for terrestrial environment.

8) Consider further the feasibility of establishing a data commons for biodiversity information.

Shift 4 – Planning and delivering joined up action

Experience to date indicates that even with better prioritisation the task off the conservation estate has a cost that is likely to exceed current regional council investment. Fortunately there are many players involved in biodiversity. By aligning the activities of other players it is possible to marshal available resources towards (and grow the resourcing available for) agreed priorities.

Currently, too much biodiversity planning occurs in parallel to, rather than in partnership with, the biodiversity activity of other agencies and organisations and thereby fails to capture the maximum benefits from the available funding.

Accordingly, regional councils need to achieve a strategic shift towards much closer collaboration with other players including community groups, iwi, DOC and the private/philanthropic sector. Similarly, DOC and others need to recognise the value of engaging with regional councils and more regularly involve them in conservation/ biodiversity planning.

Collaboration is difficult to impose and is typically best achieved through the fostering of strong professional relationships. However, building a culture of partnership amongst public agencies by providing them with shared statutory objectives and an obligation to work in partnership with others (as is, for example, codified in Australian legislation) may be a useful start.

More collaboration will assist but an increase in investment in biodiversity will also be critical. Partnerships that involve leveaging new investment are becoming commonplace and regional councils need to position themselves to be part of that future.

Objective

All public, private sector and iwi entities work to a common understanding of the priorities for biodiversity management, and collaborate to delivering on those priorities in the most efficient and effective way possible.

That there is a significant increase in the overall level of investment in biodiversity (from public and/or private sources).

Actions

1) Prioritise sites for operational management across the region taking a tenure neutral approach (in conjunction with the Department of Conservation).
2) Develop operational plans for the management of the regional network sites and projects in collaboration with the Department of Conservation, iwi and community and private sector players. In doing so identify opportunities for synergies and efficiencies in achieving management objectives.
3) Operate and invest in such a way as to secure an overall increase in the level of funding for biodiversity investment.
4) Advocate for new biodiversity/conservation planning mechanisms (such a species and habitat management/recovery plans) that take a tenure neutral approach to the identification of required actions and which specify roles for all relevant agencies.
5) Support and encourage the development, commercialisation and uptake of new technology for more effective and efficient pest management.

Shift 5 – Modern, fit for purpose frameworks

The current legislative framework for biodiversity management comprises a patchwork of statutes from different eras and philosophies. While there is no evidence of gaps in the necessary *powers* available to functionaries, there is an apparent:

- lack of coherence in the framework;
- an absence of focus on biodiversity maintenance as a driving *purpose*; and
- lack of clarity about respective *functions*.

Overall, the legislative framework does not provide for the clear leadership for biodiversity management (particularly off public conservation land) and does not expressly acknowledge or encourage the need for partnerships and collaboration between relevant parties.

This report suggests a need for a shift from that situation to a modern, integrated, fit for purpose biodiversity management statute, coherently linked to other statutes. However, it is beyond the scope of this report to develop that position further. It is important only to record that in the absence of a broader look at the overall framework there is a need to reconsider the legislative role of regional councils.

In that regard, one of the most obvious oddities of the current framework is that the "maintenance of biological diversity" only appears in the RMA and only then as a *function* of councils (i.e. not part of the purpose and principles). Oddly, regional councils have very limited ability to "maintain biological diversity", given that such a broad and ambitious goal is also dependent of the exercise of the many functions and powers that rest with other agencies.

In addition, the regional council biodiversity role sits oddly in the RMA, given that the most significant contributions most regional councils make to the maintenance of terrestrial biodiversity are in the form of substantial operational investment in active management (largely plant and animal pest control over key ecological sites and, in some cases, landscape-wide).

Objective

A statutory framework for managing biodiversity that is coherent and fit for purpose, according functionaries clear and distinct roles and responsibilities according to a common purpose.

Actions

1) Advocate for a review of the institutional and legislative framework as it applies to biodiversity management, to ensure a it is fit for purpose. Such a review should evaluate the value of integrated, single purpose biodiversity management statute, with a values-based purpose of maintaining indigenous biodiversity and with a full suite of functions, powers and tools to be exercised according to consistent principles and processes;

and, in the absence of such a broad review:

2) Promote reconsideration of how biodiversity is provided for within the RMA, with a key considerations being whether "the maintenance of biodiversity" ought to be a Part 2 matter rather than a function; and

3) Ensure the Conservation Act establishes the "maintenance of biodiversity" as a purpose of the legislation and as a primary role for DOC – including, importantly off the public conservation land (in partnership with others).

4) Support regional councils being given a function in biodiversity management that transcends the RMA, acknowledging the non-regulatory and operational focus of regional council's intervention in managing threats to biodiversity maintenance and restoration.

PART A

Context

A

Purpose of the Report

This report was commissioned by regional councils. Its purpose is to:

- assist regional councils establish a collective view about the most appropriate and effective regional council roles and functions in biodiversity management; and
- offer guidance and direction on how regional councils might fulfil those roles more effectively

PART A: Context

A discussion of what biodiversity and biodiversity management is and is not was set out in the Stage 1 report and is not repeated here.

What is important to set out at the outset of this report is the broader strategic environment within which regional councils must undertake their biodiversity-related functions and how that continues to evolve.

Background

The Stage 1 Report

A first stage of this report (*Biodiversity: Roles and Functions of Regional Councils*) was produced in October 2014.

That report defined "biodiversity" and reviewed the role(s) prescribed in legislation for regional councils (and others) in respect of biodiversity management.

That Stage 1 report also produced broad guidelines on what *must* be done, what *should* be done and what *may* be done by regional councils to fulfil the biodiversity functions (noting that the guidelines will be dependent on the circumstances that apply in each region).

Recognising that the guidelines only went part way to resolving issues identified by the report, it recommended that a second stage be undertaken to examine the:

1) strategic issues in biodiversity management and possible solutions, notably legislative and or policy change to:
    a) resolve legislative confusion; and
    b) more clearly define respective roles and responsibilities.
2) operational questions outlined in the report (focussed on how regions might best deliver their biodiversity responsibilities with current arrangements) and associated responses.

This report responds to that recommendation.

Continuing decline: Intervention failure?

The 1997 State of the Environment Report was seminal in identifying biodiversity loss or decline as *"New Zealand's most pervasive environmental issue"*.

Despite little quantitative information on that overall decline, the conclusion served to galvanise action on the NZ Biodiversity Strategy (NZBS) that New Zealand was required to produce under the Convention on Biological Diversity (CBD). That strategy was published in 2000, with the sub title of "*Our Chance to Turn the Tide*" and a primary goal of "halting the decline".

Under that heading were two sub goals:

- Maintain and restore a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhance critically scarce habitats, and sustain the more modified ecosystems in production and urban environments and do what else is necessary to
- Maintain and restore viable populations of all indigenous species and sub species across their natural range and maintain their genetic diversity.

The critical point is that the strategy sought the full range of habitats and ecosystems as a means to maintaining and restoring populations of species.

Action to implement the NZBS

As noted in the Stage 1 Report, the NZBS led to (or coincided with) a raft of initiatives aimed at New Zealand lifting its game to try and achieve the NZBS goal. This included:

- $187 million in new funding over the five years 2000/01-2004/5 (75% of which went to government agencies with the balance allocated for landowner and community activity
- Amendment to the RMA to provide local authorities with the express function of "maintaining biodiversity"; and
- A major policy and consultation process looking at biodiversity and private land, and the value of a National Policy Statement (NPS) on biodiversity to guide and direct decision-making under the RMA.

The NZBS contains 147 actions most falling to central government agencies and territorial authorities and regional councils. Territorial authorities and regional councils have carried out their statutory functions under the RMA, and most regional councils and unitary authorities have invested in operational programmes (mostly through pest management under the Biosecurity Act) as outlined in the Stage 1 report.

In light of those efforts and now 15 years into a 20 year strategy, one of the obvious questions is: has the NZBS and associated initiatives since 2000 halted the decline or even meaningfully contributed to that goal?[2]

[2] *The NZBS was reviewed in 2005. It has not been reviewed since. That 2005 review drew on little quantitative data regarding "the decline". Given that it was conducted just five years after the NZBS was published that is understandable. That said it did note progress on a range of response activities, as have subsequent SoE Reports.*

The current state of biodiversity

Biodiversity is notoriously difficult to monitor. The reality is that whether things have got better or worse depends on what you are measuring where, and compared to what baseline.

In reality, the oft quoted 1997 conclusion was based on very limited data – mostly an ad hoc collection of specific species studies and coarse data on land use cover.

The state of biodiversity was again reported on in the 2007 New Zealand State of the Environment Report. Although new indicators (including distribution of indicator species) were used to report on the state of biodiversity, these too provided limited ability to assess change since 1997 with most indicators making obvious (and obviously stark) comparisons between the state of biodiversity today and that of several decades ago.

Environment Aotearoa 2015 is the latest (and a new) approach to environmental reporting. Again, new indicators have been used providing (in some cases at least) more reliable measures of the state of biodiversity. Some of these provide assistance in determining progress since the renewed focus on biodiversity in the late 1990s.

Key conclusions are:

- Although the rate of loss of indigenous forests has slowed considerably, it has not stopped entirely. Between 1996 and 2012, New Zealand lost a further 10,000 hectares of indigenous forests.
- Of the six categories of indigenous vegetation monitored, five declined in area between 1996 and 2012 (between 0.2% in the case of indigenous forest and 3.1 percent in case of scrub)[3].
- Almost two-thirds (45) of New Zealand's 71 rare ecosystems[4] are classified as threatened under the red-list criteria of the International Union for Conservation of Nature.
- At least 40 (and perhaps as many of 110) of all known indigenous plant and animal species are extinct, and around 40% of those remaining are classified as threatened or at risk of extinction (that rises to over 70% for reptiles, bats, marine invertebrates and freshwater fish; and over 80% for frogs and birds.)
- The extinction risk for a number of land species worsened between 2005 and 2011, including 30 plant, 11 bird, and one bat species. The extinction risk for eight species of birds, three species of weta, and one bat species improved (largely as a result of intensive species recovery programmes). The consistently worsening threatened status of reptiles and freshwater fish is illustrated in Figure 1 below.

A revised set of actions to implement the NZBS were recently approved by Government. (See the New Zealand Biodiversity Action Plan 2016-2020 which can be found at: http://www.doc.govt.nz/Documents/conservation/new-zealand-biodiversity-action-plan-2016-2020.pdf)

[3] Only alpine vegetation recorded a small increase.

[4] These ecosystems are generally small (ranging from less than 1 hectare to 1,000 hectares), but each has distinct environmental conditions that support unique communities of plants and animals, many of which are rare and threatened. Therefore, they make a significant contribution to national biodiversity.

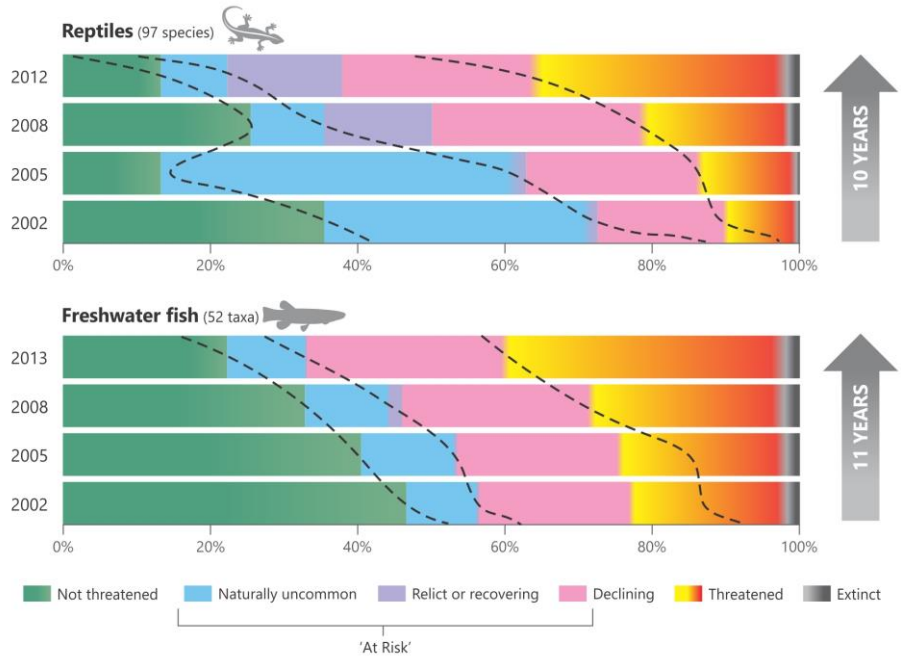

Figure 1: Change in threat status of reptiles and freshwater fish 2000-2012

Biodiversity loss is, of course, a complex issue. Overall, the likely reality is that the situation for some species and/or in some areas has improved since 2000, while others will have declined significantly.

Despite that, and in the absence of integrated quantitative indicators, most commentators on biodiversity draw on a range of information and experience before concluding that the biodiversity decline continues (by which they ostensibly mean that more and more species are moving to a state where their long term survival in the wild is imperilled).

That has been achieved notwithstanding significant "response" activity. For example the 2007 SER for example noted that:

- An increase in public conservation lands (Crown conservation land and council protected land) from 8.06 million hectares in 2004 to 8.42 million hectares in 2007[5].
- An increase in the number of QEII covenants to 2,600 covenants covering 82,933 hectares (up from 1,500 covenants covering approximately 49,000 hectares in 2000)[6].
- An increase in the area under sustained management of pest species by the Department of Conservation (DOC). For example the area subject to DOC possum control increased 60% between 2000 and 2006 (to over 1 million hectares).

So, despite many localised and species-specific successes at a national scale, the only conclusion that can be drawn from the available information is that we have experienced *intervention failure*.

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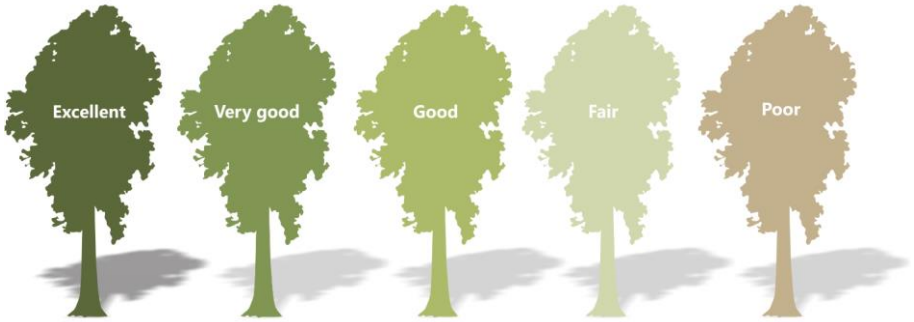
[5] *The latest reported data (2010) show that between 2006 and 2009, legally protected conservation land increased by 408,600 ha or 4.9 per cent. About three-quarters of this increase was from land acquired and protected through the High Country Tenure Review.*

[6] *The latest data (2015) shows 4,082 registered covenants covering over 181,000 hectares.*

Given the length of time now lapsed since the allocation of roles and responsibilities and the establishment of other institutional arrangements, it is probably fair to cite the oft-used edict that *"if you always do what you've always done you will always get what you have always got"*. In short, the decline continues 15 years on from the issuing of a national biodiversity strategy and, in the absence of some form of system change, there is no reason to think that decline will not continue.

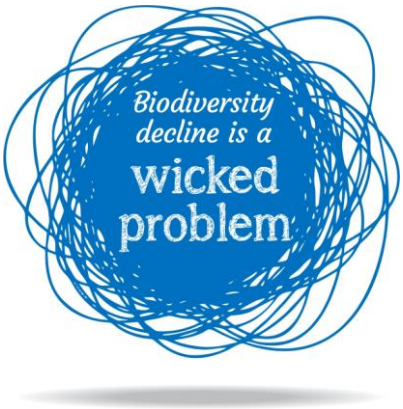
Biodiversity information remains poor

An important secondary message from the review of the state of biodiversity (as can be determined from published information) is that the state of information about biodiversity and the evaluation of the effectiveness of past intervention remains poor.



What we have learnt: Biodiversity decline as a wicked problem

Biodiversity loss and the effort to arrest the decline displays many, if not all, the characteristics of a "wicked problem".



1. Complexity

Biodiversity decline is complex, poorly understood and resists clear definition. Just understanding and communicating what "biodiversity" means in practical terms remains far from clear or universally accepted. Communicating what is happening to biodiversity is challenging and there remains a gulf between the scientific interpretation and lay (or even policy managers') understanding.

2. No single cause

There is no single cause, and hence no single solution, to biodiversity loss. As discussed later in this report there is a wide range of threats (and threats such as climate change still emerging) to biodiversity. For different species and in different environments there are different primary threats and hence a need for differing responses.

3. Inadequacy of established methods

Our established methods and policy responses have proven broadly inadequate (although not necessarily ineffective in individual instances). This is probably true at all levels, from technical field tools to strategic national responses such as public ownership of a vast public conservation estate.

We have, for example, the highest percentage of public conservation land of any OECD country. However, its extent and the extent of remaining vegetation is not representative of biophysical environment and hence biodiversity values. It is significantly under-representative of lowland areas (where 57% of New Zealand's

threatened species are found). Much of New Zealand's threatened biota occur only on privately owned land (for example 20% of all threatened vascular plants are not found within public conservation land). The inconvenient truth of that is that the maintenance of biodiversity cannot be left to management of public conservation lands.

Moreover, we know that plant and animal pests are, in most places, the greatest threat to biodiversity and yet the vast majority (>90%) of public conservation land is not subject to intensive pest control.

There is a range of other technical tools and policy interventions employed which individually address specific threats effectively but:

- by themselves, are inadequate given the full range of threats present; or
- are ineffective at any more than a highly localised scale due to the level of intensity at which they have been, or are able to be, used (often due to high cost).

4. Potential for perverse outcomes or unwanted consequences

Biodiversity management is a highly technical pursuit that requires significant knowledge of both natural and social science.

We know from experience and monitoring, for example, that single species pest control can lead to other adverse ecological consequences. For example, control of possums alone in native habitats often results in increases in numbers of rats. Likewise, control of rats alone, or rats and possums, often results in increases in mouse numbers[7]. Similarly the removal of rabbits can lead to prey switching by mustelids with adverse consequences for native birds. Hence well meant but not well thought through interventions can have unwanted consequences.

In addition, there is always the risk that poorly implemented regulatory responses could lead to perverse outcomes. Certainly there have been threats of such behaviour in the past when regulatory responses have been introduced and communities consider themselves unfairly treated. There are also examples of some local councils becoming highly reluctant regulators because of very strong public reaction to past regulatory efforts.

[7] *Sweetapple & Nugent 2007.*

5. Multitudinous values

The field of biodiversity is characterised by many different stakeholder groups – from both the public and private sectors and from iwi. Many have, as their first priority, the maintenance of indigenous biodiversity. For others that outcome is not high on the priority list.

In some cases indigenous species are themselves an economic or cultural asset which, many would argue, is there to be used to create wealth or be used for culturally valued purposes. For others indigenous species are simply seen as getting in the way of "productive" use of resources. Some introduced species, while posing major threats to biodiversity are considered a valued resource by some people. A variety of values also abound about the use of various pest control measures based on differences of view about the humaneness of management control and/or the wider risks to the environment (from the use of, for example, toxins such as 1080).

Even between public sector agencies tensions exist between the over-ridding values that should be brought to bear on key policy decisions effecting biodiversity outcomes.

The huge variety of values often needs to be reconciled to make progress within a management system governed within a political process. However, the difficulty in doing so can lead to delay in acting, conflict and litigation.

6. The required change is challenging

Given the nature of the threats faced by biodiversity, and the importance of private land, effective biodiversity management involves people engaging in positive action (e.g. pest and weed control, fencing, rehabilitation/restoration), not just preventing people from undertaking adverse acts. From a public policy perspective, eliciting positive action is a great deal more challenging than simply stopping negative action.

If we are to genuinely maintain biodiversity (and the ecosystem health on which it relies), the area of private land that needs to be managed "sympathetically" is vast. Biodiversity values are pervasive and interdependencies complex. Healthy and sustainable terrestrial and freshwater ecosystems require the protection and enhancement of the large scale tracts of remnant vegetation (that are the priority because they are representative of ecosystems and habitats not otherwise protected on public conservation land). But long-term resilience also requires broader ecosystem management. This might include protection and enhancement of riparian margins, fish passage throughout rivers and streams, maintaining and enhancing ecological corridors and "stepping stones" – all of these supporting movement of biota, nutrients and energy across landscapes so as to support, and build connectivity between, isolated populations. It is unrealistic to think that the public purse will extend to achieving these myriad benefits. If success, or even partial success, is to be achieved private individuals, corporates and community groups will need to play a significant role (and to achieve that leverage public agencies may also need to greatly increase existing levels of investment).

Accordingly, managing biodiversity means managing people. It means collaborating, combining resources and synchronizing action. It also means raising people's awareness of what they have and the value of it, and motivating (and where necessary) incentivising and supporting people to engage in positive management. A significant

part of that is encouraging ethical behaviour, which has been defined as simply "doing the right thing when no one else is watching - even when doing the wrong thing is legal[8]. That is no easy task and takes dedicated, sustained effort.

The challenge is compounded when biodiversity management off public conservation land is managed, in large part, through devolution to local government. While the devolved model has many strengths, the propensity for the extent of required investment in biodiversity in a particular locality to be inversely related to the size of the local authority responsible is a major hurdle to progress. Sustained progress on biodiversity off public conservation land is in large part dependent on addressing the potential for costs to fall disproportionately on smaller, less well-resourced communities.

Although positive action is essential, so is prevention or minimisation of harmful action. Halting or limiting damage and loss off public conservation lands is also critical. In that regard, underlying economic drivers continue to undervalue biodiversity, while the real cost to biodiversity from resource use and development are seldom factored in to decision-making. The reality is that there is often value to be extracted from the modification or outright destruction of habitat (whether that is through discharges, flow regime modification or land clearance) or from unsustainable harvest of biological resources. Hence on-going pressure on biodiversity should be no surprise.

[8] *A Sand Country Almanac, Aldo Leopold, 1987.*

Changing nature of threats faced by biodiversity

The story of biodiversity in New Zealand is not a new one. It has been rehearsed many times, over several decades. It is a story that begins when human's first set foot on a land isolated from other land masses (and hence land mammals) for some 80 million years. Subsequently, impacts on habitat and biodiversity were greatly accelerated with the arrival of Europeans, the steady increase in trade and accompanying exposure to other risks, and the industrialisation and Europeanisation of the New Zealand's primordial landscape.

The legacy of the change wrought presents its own challenges to the long-term viability of ecosystems. Some habitats and ecosystems may be beyond the tipping point and recovery will require more than stopping negative externalities of resource use. It will require positive intervention. However, many threats are on-going and evolving.

The on-going challenges biodiversity faces and the causes of loss and decline can be characterised in many different ways. In reality, the main threats depend in large part on the environmental domain – i.e. whether in the marine, coastal, freshwater or terrestrial environmental.

In general terms, and from a national perspective, the risks and threats can be characterised as follows[9]:

1) Threats *not directly anthropogenic* in nature, being the predation, grazing, competition and disease associated with plant and animal pests which in turn fall into two categories:

   a) *External threats* – new species coming in to the country (border incursions or the deliberate introduction of new species that prove to be ecologically damaging).

   b) *Internal threats* - increases in the distribution of pest species already here and/or the density of existing pest populations.

2) *Anthropogenic* threats being:

[9] *The division of direct threats into anthropogenic and non-anthropogenic is a necessary simplification. In reality, the threats interact and many anthropogenic threats can be indirect. People can, for example, be exacerbators of non anthropogenic threats like pests and weeds. Similarly, climate change (an anthropogenic generated phenomenon) can lead to a range of ecological responses that may not be obviously "anthropogenic".*

a) *Habitat destruction* – e.g. land/vegetation clearance, piping of streams, draining of wetlands.

b) *Habitat deterioration* – e.g. fragmentation and isolation of remnant habitats, flow modification, stream bank and water quality decline, eco toxic contaminant levels.

c) *Hunting* and/or unsustainable use including the negative externalities of harvest – e.g. unsustainable fishing, by-catch, trade in species.

d) Grazing of domesticated/farmed animals

The relative significance of these threats varies by region, environment type and over time.

Whether on-going threats are directly anthropogenic or not is relevant because on-going anthropogenic threats can be managed by *regulating* to avoid, remedy or mitigate negative externalities. Legacy issues and on-going non-anthropogenic pressures generally require *operational intervention*.

Threats to terrestrial biodiversity

In the terrestrial domain, large-scale clearance of indigenous forest is now largely a thing of the past thanks to a combination of:

- National regulation (in the form of the Part 3A of the Forests Act - which requires any indigenous timber milled to be sustainably harvested).
- District plan rules that protect some areas of remnant indigenous forest.
- Regional plan rules that have regulated land clearance for soil conservation and water quality reasons.
- Government exiting the indigenous forestry business through the disestablishment of the NZ Forest Service and in 2008 the winding up of Timberlands West Coast (an SOE charged with managing the native and exotic forests on the West Coast).
- A significantly diminished resource (in terms of harvestable timber).
- Changing attitudes towards native forest generally.

That is not to say that some loss has not continued. As noted earlier from 2006 to 2012 New Zealand lost around 1,500ha per year of its 6,400,000ha indigenous forest, as well around 1,000ha per year of regenerating forest. Of some significance, land in pasture (i.e. land devoted to pastoral farming) actually decreased over the same period. However, it would appear that losses are the result of many small scale land use changes possibly for forestry and or agriculture displaced by urbanisation and/or horticultural land use expansion (two land uses that have increased in footprint over the same period).

In areas of significant urban and coastal development pressure (such as Auckland) these threats probably remain the greatest pressure on local biodiversity values. That may also be true in areas subject to intensification of primary production systems (for example where land use intensification has been enabled by land tenure/pastoral lease reform)[10]. In many cases these continuing losses are of habitat types that are the most depleted having suffered the greatest historic clearance (such as wetlands) and/or are naturally rare or uncommon.

However, at the national scale, while there is a need to remain vigilant about such losses, it is generally and increasingly held that the far greater threat to terrestrial biodiversity is now from plant and animal pests – the non anthropogenic threats and, to some extent, the continued grazing of remnant native vegetation by farmed animals. That is, the main threats to terrestrial ecosystems over large parts of New Zealand might be best characterised as arising from legacy damage and ecological negligence rather than on-going wilful destruction.

Recent public statements would seem to indicate that national agencies share that assessment:

- *Environment Aotearoa* notes that the most harmful mammalian pests, possums, rats, and stoats, are now found across at least 94 percent of the country.
- The Parliamentary Commissioner for the Environment (PCE) in her review of *Environment Aotearoa,* noted four areas as standing out for particular attention (in terms of needing a government response). One of these was the sustained predator attack faced by native birds and animals.
- In announcing the "Predator Free NZ" (see Case Study 2, Part B) initiative in July 2016, (which might be seen as a direct response to the PCE's remarks), the Prime Minster acknowledged that *"rats, possums and stoats kill 25 million of our native birds every year, and prey on other native species such as lizards and, along with the rest of our environment, we must do more to protect them"*.
- In his speech to the 2016 RMLA conference, the Minister for the Environment Hon Nick Smith noted that *"there was a time when the key risk to biodiversity was forest clearance and poaching, but today the threat is overwhelmingly pests"*.
- Biosecurity 2025 Direction Statement for New Zealand's biosecurity system, (November 2016) reinforces the importance of biosecurity in managing both legacy and new pests if we are to maintain biodiversity values.

Threats to freshwater biodiversity

The threats to freshwater biodiversity are also many and varied.

Of concern in many areas is the deterioration of habitat quality caused by land use change and intensification resulting in higher sediment and contaminant loads, loss of riparian vegetation/shading, higher water temperatures, stream bank erosion and modification of stream and lake beds. These effects can combine to increase nuisance biological growths (periphyton and macrophytes). Further, land use change is often associated with higher demand for water leading to modified (lower and/or less variable) flow regimes.

[10] *In the MacKenzie Basin, for example, just 6700ha was intensively farmed (irrigated) in 1990. By 2016 that had increased in 74,700ha.*

The result can be habitat that is suited to a narrower range of macroinvertebrates, fish and other freshwater species.

Another pressure is the loss of connectivity up and down and between waterways and the sea. Most of New Zealand's indigenous fish are diadromous meaning they need access to the sea to complete their life cycles. Dams and stream crossing points that inhibit fish passage can lead to reduction in available habitat.

In fast growing urban areas on-going land development is often associated with the piping of streams reducing available freshwater habitat.

Some freshwater species (especially eels and juvenile galaxiid species[11]) are also subject to fishing pressure in many areas.

In addition to these anthropogenic threats and pressures, many freshwater species face predation, habitat modification and competition for food from a range of well-established pest and sports fish.

Although there are both anthropogenic and non-anthropogenic pressures, unlike terrestrial biodiversity the dominant threats to freshwater biodiversity at the national scale are likely to be anthropogenic.

Threats to coastal and marine biodiversity

A wide range of pressures threaten the quality of near shore coastal habitats. These include sedimentation of low energy estuarine areas and the build up of eco toxic contaminants in sediment (as a result of, in particular, contaminated storm water discharges in to the coastal environment[12]). Other threats to habitat include direct human modification from actions such as oil spills, reclamation, dredging and off shore dumping.

The harvesting of marine species including both commercial and recreational fishing and shoreline shellfish collecting is an obvious pressure on both targeted species and in terms of associated by-catch of non-target species, marine mammals and seabirds.

Specific activities in the marine area, including shipping and aquaculture pose other threats (the former the threat of ship strike to marine mammals in confined waters and the later posing risk of habitat modification and biosecurity respectively).

Introduced marine pests, including pathogens and toxic organisms, pose another threat to marine species and/or the quality of marine habitat.

In summary, biodiversity faces multifarious threats. Different threats require different responses. Some are and will remain regulatory, but increasingly the focus (particularly outside areas of acute development pressure) is on complementing regulation with significant operational investment.

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[11] *Whitebait.*
[12] *The effects of ecotoxic contaminants in marine sediments are still largely unknown.*

Complexity of agencies' roles

The various roles of parties in biodiversity management can be difficult to explain and rationalise into neat boxes. That is in large part because roles have grown and been added to over time, as new issues and new threats have emerged and new agencies or new roles been established to address them (generally though single issue/threat legislation).

It is also important to note that although it is common to refer to "biodiversity management", in fact most activity discussed under such a heading would be more accurately described as management of *the threats to biodiversity*. Thinking about agencies' roles as being differentiated according to the threat being addressed is one of the most useful ways to rationalise what is a very complex picture of agencies' respective responsibilities.

The scope of what public sector agencies do in managing threats to biodiversity was discussed in the Stage 1 report and is further reviewed and evaluated in Appendix 1 of this report.

In broad terms, agencies manage threats by managing species directly, protecting and enhancing key habitats and protecting the ambient environmental conditions on which healthy functioning ecosystems rely (noting that species and key habitats do not exist in isolation from the broader environment). That occurs variably across land, freshwater, the coast, and the marine area (i.e. outside 12NM), resulting in a complex mosaic of roles (some regulatory, some non regulatory) which should (in theory) be contributing to a common goal.

While there do not appear to be any obvious gaps in available powers and responsibilities, the allocation of mandatory functions is much more limited and the overall system lacks an obvious coherency. That is not surprising given the large number of statutes from different eras that define the overall management framework.

Three defining characteristics stand out.

- First, there is no common statutory purpose across the various statutes. Currently, only the 2000 NZBS and the 2016 NZBS Action Plan exist to pull the threads of management together into a coherent national effort.
- Second, the legislative framework, and practice under that framework, remains sharply divided by tenure. That is, there are tools, plans, programmes and powers that apply on public land and those that apply on private land. While there are some notable efforts to encourage collective joint effort across the landscape, these tend to be the exception rather than the rule.

- Thirdly, and closely related to the above, the framework provides roles for many players and involves many plans for (or which have significant implications for) biodiversity. These include conservation management strategies, conservation management plans, national park management plans, reserve management plans, species recovery plans, regional biodiversity strategies, regional policy statements, regional plans, district plans, pest management plans, pathway management plans, iwi management plans, operational pest plans and more). Despite that, there appears too few mechanisms to ensure alignment between all that planning

How local government intervenes

As noted, the full and complex picture of agencies' respective roles is discussed in Appendix 1. In terms of regional councils' roles, these are perhaps best characterised by considering the legislation from which the functions or powers derive. In that regard regional councils:

- Have a general *function* to maintain biodiversity under the **Resource Management Act** (RMA) and accompanying *powers* to *regulate* land use, the discharge of contaminants to land and water, the damming, diversion and abstraction of water along with the discharges to and occupation to the coastal marine area.
- *Powers* under the **Biosecurity Act** (BSA) to *regulate and/or carry out operations* (pest management) to achieve biodiversity outcomes through plans prepared under that Act.
- Can secure a mandate through the **Local Government Act** (LGA) to expend financial resources to carry out pest management *operations* or other non regulatory methods (regardless of whether a pest or project is provided for under a plan prepared under the BSA)

In practice, few regional councils' regulate land use for biodiversity. Regulation in the name of water management, though undertaken for multiple purposes, is a major contributor to freshwater biodiversity.

Almost all regions intervene through operational pest management programmes, either focused on key sites/habitats or broad scale (landscape wide) efforts against a single pest (typically possums) with multiple objectives. This type of activity is very effective but resource-constrained and requires on-going investment to maintain gains.

How DOC intervenes

The role of the DOC is difficult to summarise and would probably be described differently depending on who was doing the describing.

DOC has fairly clear statutory roles set out in the Conservation Act. In summary these include:

- To manage public conservation lands for conservation purposes
- To preserve indigenous freshwater fisheries and freshwater fish habitat
- To advocate for conservation
- To promote the benefits of conservation for present and future generations
- To prepare and disseminate public information on conservation

As outlined in Appendix 1, DOC also administers the Wildlife Act and Marine Mammals Protection Act, amongst other Acts, that provide power and functions for management of species (populations and individuals) across the landscape.

In short, there is a very clear role for DOC in managing public land. The Conservation Act describes a role for DOC that extends beyond looking after public conservation land, but it does so in fairly limited (and passive) terms.

The advocacy role seems capable of broad interpretation allowing the exercise of leadership in biodiversity issues, but in practice is generally regarded as having been given effect to largely through participation as a submitter (and appellant) in statutory planning processes. In exercising that role, the broader opportunity for partnership and collaboration with the regional sector has often been eroded.

In more practical terms, DOC has a clear role in managing threatened species and to that end is involved in a range of species protection and recovery programmes. While those programmes are generally restricted to public land that is not exclusively the case.

Tracking DOC's investment in biodiversity accurately over recent years is difficult due to the way finances are reported and projects carried over from year to year. While a detailed analysis of the investment has not be attempted for this paper it is clear from some feedback received that some districts have experienced significant DOC staffing decline in their regions with, reportedly, adverse implications for the ability to sustain partnership projects with smaller local authorities and communities. DOC, however, reports year on year increases in field capacity and $70 million in new biodiversity funding since 2013. It is fair to say that there is differing perception regarding this issue and, at minimum, room for better communication.

Although DOC's role off public conversation land is limited, in practice its role varies from place to place. DOC would justifiably argue that in some places, at least, it is increasing work off public conservation land through its partnership arrangements with commercial and philanthropic sponsors (see discussion in Shift 4).

The other important element to DOC's conservation planning is the New Zealand Conservation Authority (NZCA). The NZCA is an independent statutory body consisting of thirteen members appointed to represent various interests in the use and management of public conservation land. The functions of the NZCA are set out in the Conservation Act, National Parks Act and Reserves Act and focus on the approval of conservation management strategies and national park management plans. NZCA also advises on other issues and initiatives affecting public conservation land. The NZCA has no direct role outside off public conservation land.

The NZCA is one of the few existing multi-stakeholder leadership forums in the field of biodiversity management. However its membership would suggest that its role and purpose is less to do with furthering biodiversity objectives and more to do with ensuring the appropriate balance is struck between the various interests in the use and management of public conservation land.

Seeds of change

Rise of the private sector

Historically there has been a tendency to think about the private sector role in biodiversity as being about enthusiastic individuals and community groups engaged in local small-scale projects.

One of the most significant developments since the NZBS is the evolution of the role and contribution of the private sector.

Private sector involvement is now at all levels of biodiversity management, from the traditional hands on weeds pulling, trap setting community and membership based groups, to well resourced place-specific trusts (e.g. Maungatautari Ecological Island Trust, Karori Sanctuary Trust) that make a significant contribution to the network of protected areas, by intensive management and restoration of specific high value areas and biodiversity education services. Other organisations (generally charitable trusts) have established to work on/fund biodiversity issues across a region or in respect to a particular species (such as, for example, the NZ Kiwi Foundation).

However, the most significant change over the past decade has been the emergence of well-resourced and strategically focussed philanthropic organisations, with their own strategic investment programmes (funding, for example, major initiatives such as Project Janszoon). The Tomorrow Accord and the Next Foundation, Morgan Foundation, Aotearoa Foundation and the Tindall Foundation are other examples. The corporate sector has also been a funding partner of a number of biodiversity/conservation initiatives. In brief, the private and philanthropic sector is now a significant source of funding and leadership in high profile projects.

The emergence of this sector has enabled the development of programmes involving multiple funding partners including Living Water (a partnership between DOC and Fonterra) and Zero Invasive Predators (an initiative supported by dairy processing companies, DOC and other philanthropic funders).

It seems that the national agenda for achieving step changes in biodiversity is increasingly set not by public agencies but by private sector organisations.

Emerging technologies

Driven by both the need to respond to public concern about the humaneness and public safety of traditional pest control methods, and by the need to find more cost effective control methods, work continues on new technologies for effective pest control.

A number of new technologies appear to be nearing commercialisation, which could mean a step change in the ability to control a range of key pests cost effectively and hence the ability to set more ambitious goals for intensive biodiversity management.

These emerging technologies generally fall in three categories[13].

Improved trap technology

Incremental improvements have recently been made to traditional traps. Some involve simple modification but the perhaps the most important have been the development of auto-resetting traps (that reset up to 24 times – in the case of stoat traps), hence significantly reducing trap-servicing labour costs.

Another recently commercialised technology is the remote monitoring of traps to detect set-off rates using wireless networks. Again, this technology has the potential to significantly reduce trap-servicing labour costs.

A move from food based to pheromone-based lures is another potential development that could improve catch rates.

Improved toxicants and toxicant delivery

Significant improvements are being made to toxicants used to control vertebrate pest populations, with the aim of having available for use toxicants that are more species-specific, more humane, do not bio-accumulate and are generally safer to use[14].

Although these toxic agents are not necessarily more effective, they offer a much improved long term solution and are likely to be associated with reduced compliance costs given their greater safety.

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[13] *Much of the information that follows is sourced from Challenges for Pest Management in New Zealand, The Royal Society of New Zealand, 2014, and Innovative Developments for Long-term Mammalian Pest Control, Blackie, HM, MacKay, JWB, Allen, WJ, Smith, DHV. Barrett, B, Whyte, BI, Murphy, EC, Ross, J, Shapiro, L. Ogilvie, S, Sam, S, MacMorran, D, Inder, S and Eason CT, Society of Chemical Industry, 2013.*

[14] *Para-aminoproppiophenone (PAPP) was registered for use as in 2011 and represents the next generation in vertebrate toxic agents (although it is only effective on mustelids and feral cats). Sodium nitrate (SN), works similar to PAPP by preventing red blood cells from carrying oxygen and research has shown promising results of that substance on possums and feral pigs. An alternative research stream involves using toxins extracted from native plants (e.g. tutu and karaka). Research on that programme continues by Maori groups and scientists at Lincoln University. That programme offers the potential to develop control agents that have a basis in matauranga Maori and hence likely to receive broad support from iwi. Norbormide derivatives offer promise as a species-specific toxicant for rats.*

At least as important as less hazardous toxicants, are improvements in the way those toxicants are delivered. The effectiveness of traditional delivery mechanisms (bait stations and aerial application) can be sub optimal, due to issues such as bait degradation, sub lethal dosage, bait shyness or baits being taken by non target species. These issues can lead to boom/bust cycles and the need for regular repeat applications to maintain biodiversity gains.

These problems have led to the development of resetting toxicant delivery systems[15]. Recent trials of such systems have shown very promising results for both mustelids and possums.

The use of GPS is now allowing for more accurate aerial application of baits and for monitoring coverage of ground based operations.

Long life (weather resistant) bait coatings for hard baits used in bait stations is another technology with promise, particularly for the control of Norway rats. Long life bait coatings prolong the life of the bait and can significantly reduce bait station servicing costs.

Overall, new technologies allow kill rates to be maintained or enhanced using much less toxic bait as used in the past.

Fertility and biological control methods

The ability to control the fertility of possums has been around for more than a decade. The difficulty has been how to transmit the fertility control agent (vaccine) to and between possums. While the initial delivery systems proved unsuccessful, more recently the use of the Vaccinia virus to transmit the fertility control agent shows promise. The other possibility is the Trojan female technique[16] which aims to produce infertile males through the mitochondrial line. Other genetic and genomic technologies are being researched.

While many of these technologies are encouraging and may allow us to pursue goals previously considered wildly ambitious, none currently offer assurance of a "silver bullet". We can dare to dream bigger than before but we cannot defer action on the basis that better technology is "around the corner".

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[15] Essentially, a device that can be left in the field for extended periods (potentially years) that deliver a palatable toxic paste onto the abdomen of the pest which then grooms the paste off resulting in exposure to a lethal dose. The delivery mechanisms can be designed to be species-specific.

[16] For explanation see http://www.landcareresearch.co.nz/publications/newsletters/kararehe-kino/kararehe-kino-issue-22/the-trojan-female-technique-a-novel-nonlethal-approach-for-pest-control

Traditional and evolving roles of regional councils

Regional councils have traditional strengths in four areas.

1) **Science and knowledge communication**. Most regional councils retain high level of technical expertise in staff and policy interventions are generally informed by rigorous application of scientific knowledge. In addition, regional councils have proven adept at communicating scientific knowledge to affected communities and steering community dialogue towards supporting scientifically robust interventions.

2) **An operational capability**. Regional councils have had a long-standing role in catchment management and pest management, both of which require a significant operational and contracting capability. This has led to an organisational culture and skill set that is effective in reliably and efficiently delivering on-the-ground results particularly in the planning and implementation of pest control operations. (Noting that in recent years most councils have transitioned from having in house operational pest management capability to contracting out most, or all, of the "on the ground" pest work).

3) **Networking and engagement with landowners, iwi and communities**. A great deal of regional council work relies on the ability to engage with landowners, iwi and community/catchment groups and develop shared solutions to environmental problems. The ability to encourage community action (involving both landowners and wider stakeholders) is a recognised strength.

4) **Technical expertise in water management**. Regional councils are the only public sector organisation outside Crown Research Institutes that maintain a significant technical capability in water science (including aquatic ecosystem health).

The Stage 1 report highlighted the extent to which biodiversity has evolved to become a major (and in some cases regarded as a "core") role for regional councils.

Despite that, they have been (with some exceptions) often absent from the evolving national and project-specific discussion around biodiversity management. They are not routinely considered by DOC in conservation planning and have very low visibility within the corporate/philanthropic sector.

Two recent examples highlight the point. While DOC provided regular updates at the Chief Executives' Environment Forum (CEEF), regional council officers were not involved or consulted on the government's recent announcement of the "Predator Free NZ" (see Case Study 2) initiative, despite the apparent expectation that regional councils would be an important source of funding and the main operational agency outside public conservation land.

Another example is the recent release of the Draft Kiwi Recovery Plan for 2017-27. A significant amount of current kiwi habitat remains outside of the conservation estate (mainly in Northland, Waikato, Taranaki and Bay of Plenty regions). Amongst other matters, the Recovery Plan identifies issues and identifies objectives and actions for kiwi populations on production, forestry and urban land (i.e. private land). Yet regional councils are not identified as having any significant role in these or other areas where they have a recognised expertise and in many cases are already active (including investing heavily in pest control)[17].

In summary, regional councils and their ability to take pest management beyond the conservation estate is a key part of any effective response to biodiversity loss. However, that appears not to be well recognised with a continuing rift between "conservation" initiatives and the work of regional councils. While there are examples of regional councils strongly asserting their place in biodiversity management along side other key players, overall, the regional sector could do considerably more in that regard.

[17] *This may well reflect the fact that despite twelve authors and over 50 named contributors, the only regional council input into draft Recovery Plan was by a contribution by Auckland Council. The Draft Kiwi Recovery Plan was prepared by Kiwis 4 Kiwis rather than DOC.*

Changing nature of government intervention

Historically, government intervention in biodiversity has been as outlined above (and Appendix 1). Further, central government has made a contribution to OSPRI[18] that has had a significant biodiversity dividend.

Currently, three initiatives are changing the nature of that involvement.

Funding available for TB Possum control

OSPRI's TB Free is programme is undertaken according to the National Pest Management Plan (TB Plan). That Plan was reviewed in 2015 and changes were made to the overall goal to eradicate TB from New Zealand (from cattle by 2026, possums by 2040 and biological eradication by 2055). This involves changes to the operational plan including a new approach to risk-based vector control (largely possum control). These changes essentially mean OSPRI is progressively pulling out of broad scale possum control in areas where possums have been reduced to, and sustained at, very low levels leading to localised Tb eradication.

As a result, funding levels have been adjusted. Total annual funding[19] is to be reduced from $80 million per year to $65 million per year for the next two years and to $60 million for the following 13 years. The funding profile indicates that possum control funding will remain around $50 million per year until around 2030 (representing a reduction of between $10-15 million per year) when funding levels drop off sharply (See Appendix 2).

To the extent that this translates to withdrawal of possum control from key areas of high biodiversity value, regional councils may need to pick up possum control (or pick it up earlier than expected) to maintain biodiversity gains achieved through past TB control operations. Carefully planned transitional arrangements between OSPRI and regional councils will be important to ensure the low possum legacy can be maintained at least cost.

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[18] OSPRI is the not-for-profit limited company established on 1 July 2013 on the merger of the Animal Health Board and NAIT. Shareholders are DairyNZ, Beef+Lamb New Zealand and Deer Industry New Zealand.
[19] The programme is to be funded 40% by the Crown and 60% by industry (currently funded DairyNZ, Beef and Lamb, Deer Industry NZ and livestock exporters).

Predator Free NZ

In July 2016 the Government announced the "Predator Free New Zealand" initiative. The initiative takes the notion of a predator free New Zealand, currently promoted by the Predator Free NZ Charitable Trust (which supports community volunteers and conservation groups) and grows it into a commercially structured and government-supported programme. The programme aims to leverage significant financial contribution from private sector and local government conservation partners.

The goal is to make New Zealand possum, rat and stoat-free by 2050 (with a range of interim goals).

In a departure from past practice, while DOC is to remain the Government lead agency, the initiative is to be driven through new Crown entity - "Predator Free New Zealand Ltd". Predator Free NZ Ltd has roles to foster investment in conservation programmes and distribute $28 million[20] (over four years) of government funding (by assessing applications against criteria and leveraging funding at a rate of $2 for every $1 of Crown funding). Predator Free New Zealand Ltd will be governed by a board representing various stakeholder groups and technical competencies (currently being appointed).

The initiative signals a shift in thinking from maintaining "islands" (safe havens for biodiversity) to making all of New Zealand safer for New Zealand's bird (and other animal) species – albeit the former strategy remains as key component in delivering the ultimate goal. The likely need to work from a base of localised eradications potentially creates a potential new role in maintaining project border control to address the risk of pests re-establishing in areas from which they have been eradicated.

Perhaps even more significantly it signals a shift in recognition that central government remains just one player in delivering biodiversity outcomes and that the overall system needs to create a place for, in particular, the philanthropic sector to play a role.

Underpinning all of that is a shift in government's approach to biodiversity based on a growing base of understanding and support from the community and the desire to consider new, potential more effective, ways of delivering biodiversity outcomes.

National Policy Statement on Biodiversity

Over the years several aborted efforts have been made to develop a national policy statement (NPS) on biodiversity. The latest effort was announced by the Minister for the Environment who, in August 2016, said that the Government would fund a collaborative process for the development of a National Policy Statement (NPS) on Indigenous Biodiversity. The Land and Water Forum was seen as the model for this process.

The terms of reference for the "Biodiversity Collaborative Group" (BCG) has a membership comprising Federated Farmers, Forest and Bird, Environmental Defence Society, NZ Forest Owners Association and the Iwi Leaders Forum. Paralleling the LaWF process, the Ministry for the Environment and local government will have "observer" status.

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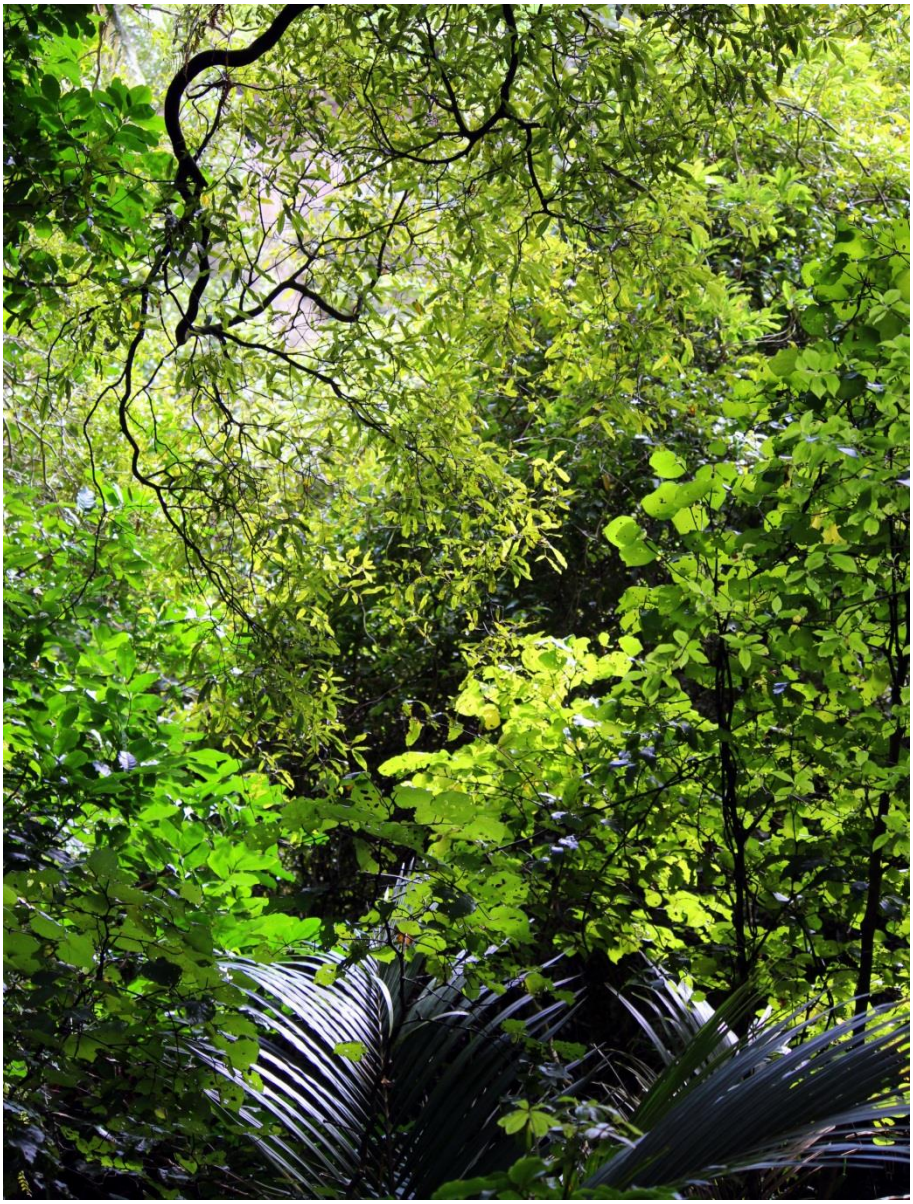
[20] *$6 million of the $7 million available annually is for direct investment in large scale management projects with a further $1 million to be directed to research and development.*

The BCG has the role of developing a NPS on Indigenous Biodiversity and making recommendations on supporting and complementary measures to address agreed issues and opportunities for biodiversity.

The development of an NPS on biodiversity will have direct implications for how regional councils undertake functions under the RMA. It would not though directly affect operational programmes that derive from councils' Biosecurity Act and LGA mandates. It will be important for the BCG to understand that an NPS of biodiversity (despite having a scope that extends across land, freshwater and the coastal area) can only address a subset of the threats faced by biodiversity (given that many threats cannot be managed under the RMA) and hence can only ever be one part of the solution to biodiversity decline.



Greater acceptance of Māori interests in bodiversity

Maori have always had range of interests in the indigenous flora and fauna that make up New Zealand's biodiversity. These interests include the exercise of kaitiakitanga, traditional and customary use, and flora and fauna as the inspiration for many forms of cultural expression.

Those interests are protected by Article 2 of the Treaty of Waitangi.

The extent to which those long-asserted interests are being formally recognised and expressed in words and deeds of central and local government continues to grow and evolve is best reflected in the following developments:

- The report of the Waitangi Tribunal in relation to the WAI 262 claim (Ko Aotearoa Tēnei) was released in 2011. The Wai 262 claim has been described as one of the most complex and far-reaching claims ever to come before the Waitangi Tribunal. Although often referred to as the indigenous flora and fauna claim, or the Māori cultural intellectual property claim, in fact Wai 262 claim is really much broader. Nevertheless, the report made a series of recommendations in relation to genetic and biological resources and toanga species; the relation of Māori with the environment; and taonga and the conservation estate. These recommendations call for amendment to a range of statutes that govern biodiversity management to better recognise Māori interests and preserve Māori culture and identity that derive from the relationships with biological resources.

It is not clear the extent to which many of these recommendations will be adopted but the report has raised the profile of the issues and heightened expectations for a greater partnership approach to managing biological resources.

- Through the allocation of quota, the return of sites and waterways, the introduction of "statutory acknowledgements" and development of partnership arrangements, Treaty settlements have resulted in iwi and hapū (and constituent Māori corporate interests) being increasingly central to the success of future biodiversity management.
- Other governance arrangements that have developments to forge a stronger partnership between the Crown and Māori including, in particular the Iwi Chairs Forum and its constituent Conservation Iwi Leaders Group.

These developments strengthen the actual and potential contribution of Māori to biodiversity management and reinforce the need for partnership with Māori involvement in future biodiversity initiatives.

PART B

Five shifts for enhanced management

B

PART B – Five shifts for enhanced management

The following five shifts are proposed to support regional councils making a more effective contribution to maintaining biodiversity than has been achieved in the past. It is important, however, to record that there is significant variation between regional councils in terms of the extent to which they are affected by the strategic context outlined earlier in this report. Each region has different strengths and faces different challenges. Auckland, in particular, being a unitary authority, with very significant financial resources, the regulatory powers of both a regional and district council, a relatively modest land mass to manage, but with very substantial parks and reserves of its own, plays a different role in biodiversity than any other region. For these reasons Auckland Council is more ambivalent about some of the legislative and leadership changes proposed in shifts 1 and 5, and considers that these need to be examined alongside other less sweeping approaches, including improvements within the existing or 'tweaked' statutory and structural context. All Councils support the increased operational delivery, collaboration and coordination proposed in shifts 2-4. The following shifts need to be read with that qualification in mind.

Shift 1 – Stronger leadership and clearer lines of accountability

Every cause needs strong leadership. When the roles and responsibilities are fragmented across multiple agencies that leadership is even more critical.

Leadership is an often used but seldom defined concept in public policy. In truth it can mean many different things. At the generic level leadership is a process of social influence which maximizes efforts of others (in this case government agencies, local government, the private sector and individuals) towards achievement of a goal.

In that sense many players within the biodiversity management sector should, and do, exercise leadership. We have if you like a disaggregated leadership model.

However, from a more pragmatic management perspective, leadership in biodiversity management means:

- setting the agenda for action;
- identifying the strategic and operational issues and collaborating with others to define and implement solutions;
- ensuring roles and accountabilities are clear and performance is measured and course corrections made where necessary;
- taking responsibility for filling gaps and responding where and when others' roles and responsibilities are inadequate or unclear

One of the perennial issues in biodiversity management is who has the overall leadership role and where do the responsibilities of other players begin and end? Currently these questions do not have straightforward answers. Certainly, as discussed earlier, they cannot currently be found in statute.

While leadership in biodiversity can be seen at all levels, there remains a view the DOC's relative absence of positive involvement off public conservation land represents significant deficiency in the effectiveness of the wider biodiversity management system.

There is leadership in different parts of the system, but there is simply no existing structure that provides leadership across the whole sphere of biodiversity management. DOC involves others in various ways (including through the multi-stakeholder NZCA) but that multi-stakeholder model is not expanded beyond the management of public conservation land. There would appear to be a need for a formal collective leadership structure that brings together key leaders in the management of public conservation land, private land, marine and freshwater environments, central and local government, public and private sectors and, importantly, Maori.

In short, we need to shift from a situation where there is incomplete and unclear leadership for biodiversity off public conservation land to an operating environment where:

- leadership is clear and that leadership role is accepted and exercised collaboratively in the best interests of biodiversity, regardless of land tenure.
- there are much more clearly defined boundaries around roles and responsibilities that delivers greater confidence to take action, and that avoids the potential to pass off of responsibility to another party that is inherent where fuzzy lines of functional responsibility exist. In short, more clearly defined roles will improve accountability.
- There is a formal structure that can exercise leadership across the entire biodiversity management system and deliver the leadership shift described above.

NATURE CENTRAL

CASE STUDY 1

Nature Central

Nature Central is a formal agreement between DOC and Greater Wellington, Horizons and the Hawkes Bay Regional Council to work in partnership to achieve better outcomes and greater efficiencies. Rather than a detailed set of procedures, it is a "declaration of intent" to seek ways of working collaboratively to achieve better results for collective regional interests. That is, it is not a single "project", but a general approach and philosophy to work together collectively to achieve shared goals.

Nature Central was initiated in large part because of the particular responsibilities and established relationships of key individuals. The partnership encompasses both biosecurity/pest management and RMA related work. An early key to success was the appointment of a full time programme coordinator to identify areas and issues where a coordinated approach could lead to identifiable value for the partner organisations. An initial stocktake of what each agency was doing opened eyes to the actual and potential duplication of effort (particularly in research) and to the opportunities to share knowledge and experience (agencies had been working without full knowledge off what each other was doing or had previously done).

Overall, Nature Central has been regarded as a valuable opportunity to coordinate across four organisations and significant collaboration has resulted. Other benefits have included the development of better protocols around the management of resource consent applications (DOC and Greater Wellington) which have streamlined processes. More recently Nature Central have provided the mechanism to discuss and invest in multiparty, large–scale biodiversity projects.

Nature Central is described by DOC as an example of its new operating model in action – working collaboratively with councils to help to achieve DOC's vision. That is, DOC's interest in participating in Nature Central is to grow the impact of what it does by working with others, and working across whole landscapes at the scale of ecosystems irrespective of administrative boundaries or land tenure.

As such, Nature Central is a good case study of the kind of shift discussed as Shift 4 below as it is about achieving greater collaboration and working across traditional boundaries. However, it is about more than a single project and about achieving objectives by inspiring and working with others and hence it also a great example of good (collective) leadership at the (multi) regional level. Nature Central provides a platform to change work culture, with a goal of co-ordinated inter-regional co-operation becoming 'standard practice' in each of the partner organisations.

The risk with "voluntary" arrangements such as Nature Central is that as key personnel move on enthusiasm can wane as individual organisational work programmes take priority. On going success for Nature Central is said to be reliant on the partnership being "institutionalised" in some manner either through enduring commitment to a shared resource (i.e. a partnership coordinator) or through cementing participation into work programmes and job descriptions (and/or potentially in law).

Shift 2 – Building on what regional councils do best

For many people, and many communities, the whole concept of biodiversity is associated with regulation – often unwelcome regulation.

Since the RMA was enacted in 1991 there has been direct focus on regulating for the protection of significant sites (i.e. section 6(c) significant natural areas or "SNAs") as the principal response to biodiversity protection. Regulating to protect remnant vegetation or require habitat restoration, or biodiversity offsets associated with the granting of resource consents, has become commonplace particularly through the exercise of territorial authority functions (i.e. by territorial and unitary authorities)[21].

As discussed earlier in the report, while regulation to protect habitats and ecosystems from anthropogenic threats will remain a valid and important response, insofar as terrestrial biodiversity is concerned at least, the most pervasive and immediate threats to biodiversity *at the national scale* are undoubtedly non anthropogenic. Those threats are the, in some cases, rapid geographical spread of plant and animal pests (such as wilding conifers) and or significant increases in population densities of predators and browsing pests along with some plant pests.

Making progress towards the goal of maintaining indigenous biodiversity is arguably more dependent on developing a constituency of support for positive action and effectively engaging in that active management at the required level, than it is on instituting more, or more rigorously applied, regulatory responses.

Hence, a key shift that is required if we are to make better, more rapid and more durable progress towards maintaining our indigenous biodiversity is to reposition the discussion about biodiversity to centre it on the need for active management, particularly aggressive pest control.

That is critical in communicating the key message that biodiversity management is not merely a passive role involving reacting to development proposals. Rather it requires *active intervention*. The focus and communication messaging around biodiversity needs to shift from a compliance focus to a focus on winning hearts and minds and a constituency of support for active management.

These required shifts position regional and unitary councils at the centre of the biodiversity debate, being agencies with the clear comparative advantages in that field.

Some useful first steps in that regard have been made by the government through its announcement of support for Predator Free NZ (see Case Study 2). While an important initiative in terms of repositioning the debate and acknowledging some key risks, for the reasons discussed below, by itself it is insufficient.

[21] *This emphasis has been reinforced to some extent by previous attempts at issuing National Policy Statement (NPS) on indigenous biodiversity. By their very nature NPSs are be given effect to by regulatory means (i.e. through the inclusion of provisions in regional and district plans and in the consideration of resource consents).*

CASE STUDY 2

Predator Free NZ/Predator Free Wellington

The Predator Free NZ initiative discussed previously provides a good case study of a number of "shifts" discussed in this paper.

The goal to make New Zealand possum, rat and stoat-free by 2050 recognises the criticality of pest (predator) management for the future of biodiversity in New Zealand and the insufficient attention to this in the past.

The establishment of a new Crown entity - "Predator Free New Zealand Ltd" recognises the need for strategic, collaborative leadership in biodiversity that extends beyond the leadership currently provided by DOC (noting it does not have a role beyond investing Crown funds in regional projects and research into breakthrough technology).

PFNZ is fundamentally conceived as a means of pooling central government, local government and private sector resources to achieve a commonly desired outcome. It acknowledges the growing number of large-scale predator control projects around the country, and the benefits to be had from locating all those initiatives around a common goal and framework of government support.

The PFNZ initiative recognises that delivering on the goal of a predator free New Zealand relies on technological advances. Hence $1million of the Crown's annual funding is to be directed to funding for breakthrough science research (with funding allocated by Predator Free NZ Ltd).

For all that, "Predator Free New Zealand", though a major step forward, has limited terms of reference. As noted earlier in this paper, threats to biodiversity extend well beyond predation by the three specified predators (which do not even include all mustelids). Predation by other predators such as feral cats and ferrets, browsing by pests like wallabies, goats, deer, and other ecological disruptors such as pest fish and plant pests (such as wilding pines) pose major challenges and equally required coordinated responses. The PFNZ approach may, however provide a model a broader leadership response to biodiversity in the future.

Importantly, though PFNZ provides leadership in the sense of establishing a goal and collaborative approach that inspires others. Wellington, for example recently announced its own "Predator Free Wellington" initiative, being a joint venture between Wellington City, Wellington Regional Council and the Next Foundation, that builds of the success of the community based pest free Crofton Downs initiative. Initially the focus will be on eradicating rats and stoats from the Miramar Peninsula (possums have been eradicated form the peninsula since 2006). The intention is to extend the programme out from that base to the wider Wellington City area. The regional council will continue pest management operations (particularly in rural parts of the City and in key native ecosystems) and the City Council will continue operations in parks and reserves, but significant involvement of community and voluntary groups will be a major contributor (including on council reserves). In that way public leadership delivers cross community action towards a common goal.

Shift 3 – Better information for better management

Better information leads to better decisions and better, more effective and efficient management interventions. That is true both in terms of deciding *where* to intervene (i.e. deploy resources and focus energy) and in determining the *need and extent* to intervene, the best form of intervention and the effectiveness of intervention.

Achieving a consistent and systematic approach to prioritisation

One of the reasons biodiversity decline as a "wicked" problem is because of the sheer size of the task. We cannot afford to manage every species and every ecosystem in every location as a priority. For that reason, prioritisation (at least for active management/operational investment) is a necessary evil in a world of limited resources. The alternative to prioritisation is ad hoc-ism and the risk that scarce resources will be dissipated with a lesser benefit for biodiversity than might have otherwise been achieved.

Part of the reason we have experienced intervention failure at a national scale can attributed to:

1) the lack of consistency in prioritisation across management agencies, including across regional councils; and

2) The approaches previously adopted to prioritisation have not been based on a rigorous assessment relevant to achieving biodiversity maintenance goals.

We need to shift from that inconsistent and sub-optimal approach to prioritisation to a rigorous, systematic and properly targeted approach underpinned by clear goals about what we are trying to achieve.

Tools for prioritisation

Prioritisation has a long history in conservation management. It goes back at least as far at the Protected Natural Areas Programme (PNAP) formulated to give effect to the Reserves Act. The PNAP resulted in recommended areas for protection (RAPs) based on ground surveys and professional judgement in accordance with a list of criteria applied at the ecological district/region scale.

The desire for greater objectivity and national perspective, along with a need to achieve a higher degree of prioritisation, led to the development of geospatial tools to provide the scientific rationale for consistent site selection. The first generation of those tools was Land Environments NZ (LENZ). LENZ is a land classification system that can be used as a predictor of ecosystem type, on the basis that areas with similar physical/landform and climatic characteristics (what LENZ characterises and maps) will have similar species compositions. It was used as the basis of one of the key "national priorities".

National Priorities For Protecting Rare And Threatened Native Biodiversity On Private Land

The statement of National Priorities For Protecting Rare And Threatened Native Biodiversity On Private Land was published by the Ministry for the Environment in 2007, after the failure of to finalise a draft national policy statement (NPS) that would have been proposed.

Those priorities are:

- National Priority 1: To protect indigenous vegetation associated with land environments, (defined by Land Environments of New Zealand (LENZ) at Level IV), that have 20% or less remaining in indigenous cover.
- National Priority 2: To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity.
- National Priority 3: To protect indigenous vegetation associated with 'originally rare' terrestrial ecosystem types not already covered by priorities 1 and 2.
- National Priority 4: To protect habitats of acutely and chronically threatened indigenous species.

While an important step forward, it is generally held that LENZ does not provide the degree of granularity needed to ensure properly targeted intervention. Similarly the national priorities, though adopted by many regional councils in their RPSs, are generally regarded as not adequately serving the purpose of protecting a full and representative range of habitats and ecosystems.

The way forward for prioritisation

Theoretically, effective prioritisation would involve having:

- a single approach (preferably based on a single decision-making/decision/ support tool), agreed across all regional councils (and wider) as the appropriate means of prioritisation (being one that, used properly, can ensure that the sites selected are properly representative of the full range of the country's ecosystems and habitats).
- all agencies prioritising sites for operational investment (and possibly for broader purposes) use that agreed decision-support tool and do so in a consistent manner (using consistent settings and protocols[22]).

Only through such an approach can we be sure that the available "biodiversity dollar" is devoted to secure maximum benefit. That is not to say that particular councils cannot go beyond the collectively agreed priorities should they wish, but that should not be at the expense of those collectively agreed priorities.

As noted earlier, we are not currently in that situation. Although there are some signs of convergence, historically different councils have used different approaches from each other and from DOC, and/or there are consistent criteria used but application has relied on high levels of professional judgement and hence variation. However, a possible way forward does not seem far away in the sense that two initiatives are well advanced and being applied by some regional councils.

[22] *Although allowing for some regional variation to reflect local circumstances.*

Ecosystem and ecosystem threat classification

There has been well-established and commonly used species and species threat classifications for many decades[23]. However the same is not true for ecosystems. There is no agreed taxonomy for ecosystems. Although ecosystems are commonly classified in individual studies, they are not done so consistently and typically each study can adopt different ways of describing ecosystem types and of differentiating between different types of ecosystems[24]. That means that comparing between studies to assess priorities is difficult or impossible.

The difficulty this creates for prioritisation is well described by Singers and Rogers 2014[25], who, in the introduction to their report to the Department of Conservation on the subject state:

"One of the goals of the New Zealand Biodiversity Strategy is to 'maintain and restore a full range of remaining habitats and ecosystems …' (DOC and MfE 2000: goal 3). However, although many environmental agencies and individuals can contribute to this goal, any investment decisions are currently being made in the absence of a comprehensive list of ecosystems or a systematic threat ranking. Therefore, classification of the full range of ecosystem types for New Zealand is overdue."

The Singers' and Rogers' work was produced for DOC, but is designed to apply nation-wide (i.e. not just across public conservation land) to address that lacuna in the biodiversity technical management framework. It proposes 152 classified ecosystem types nationally.

A definition of "ecosystem" is *a biological community of interacting organisms and their physical or abiotic environment* and consistent with that the Singers and Rogers' system is based on a synthesis of biotic and abiotic data.

An ecosystem classification system is important, not just for individual regions to have a coherent means of conceptualising their individual challenge, but also to ensure a consistent and coordinated approach can be taken across the country. Such a comprehensive classification system is a core data layer in any prioritisation process. The Singers and Rogers' classification system has already been applied to map ecosystem types across much of the North Island.

In terms of ecosystem threat classification, one approach that is gaining some traction in New Zealand[26] is the International Union for Conservation of Nature's (IUCN) recently proposed quantitative approach to ecosystem-risk assessment.

The approach proposes criteria to assess the risk of ecosystem loss based on properties of the ecosystem, including the degree to which it is geographically restricted, the presence of serious on-going threats, and observed declines in geographic extent, ecological function, and ecosystem processes. The assessment protocol and threat categories mirror those of the well-established IUCN Red List of species.

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[23] *The threatened species classification system dates from the 1950s.*
[24] *In Auckland for example, various studies over the years had resulted in over 1000 different (but over lapping) ecosystem types being defined. Applying the Singers' and Rogers' system reduced that to 35 discrete ecosystem types.*
[25] *A classification of New Zealand's terrestrial ecosystems, Nicholas J.D. Singers and Geoffrey M. Rogers, Science for Conservation 325.*

[26] *It has been used by Auckland Council and applied nationally to naturally uncommon ecosystems.*

These new ecosystem classification and threat ecosystem classification tools are relevant here because they are important building blocks for the application of spatial prioritisation modelling as discussed below.

While this report supports the consistent adoption of an agreed ecosystem classification system for use across New Zealand, it does not endorse any particular system and recognises that further development may be required to ensure we have a fit for purpose tool that is quantitative and can be repeatable spatially and over time. Advice from DOC indicates that it considers that further work is yet required to develop such a classification system.

Spatial prioritisation

As noted above, spatial prioritisation is important if we are to identify sites that will ensure the maintenance of a full range of ecosystems and habitats in the most cost-effective manner[27].

There is a range of spatial prioritisation software tools available that allow the sifting and sorting of various input data and undertake a multi criteria assessment analysis that rank areas accordingly. The software already being used by DOC, and that has been used by some (North Island) regions, is *Zonation*. Zonation is special-purpose (free) software built for solving various problems around spatial conservation resource allocation.

Zonation is not a decision-making tool but rather a decision-support tool. It allows a management agency to use spatial layers describing biodiversity features and threats[28] to identify the 'best' parts of the landscape to protect or manage to efficiently achieve representation goals.

Using the software allows a regional council to ask key questions like:

"if we want to maintain a full range of the region's ecosystems, but we can only afford to proactively manage 'X%' of our remaining indigenous cover – where should we focus our efforts?"

It does that by continuously ranking grid squares (at a scale chosen by the user) across a region by removing the least contributing area/ecosystem and recalculating the grid ranking.

It allows for a "team selection" approach, meaning that site selection is based on comparison with sites already selected (unlike traditional 'score and rank' systems). To use a sporting analogy, if your two best players are halfbacks, you don't want to select them both. Rather, you take account of who you've already selected when picking the next player). Zonation allows you to do that and in that sense it is a potentially very powerful decision–support tool.

Ranking can take account of multiple factors, including for example:

- spatial variation in condition and/or cost (i.e. sites with higher costs can be ranked lower);

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[27] *It is important to note that this may be different to the identification of significant natural areas under section 6(c) of the RMA being sites typically identified as requiring regulatory protection. It is also important to note that this approach should provide for sufficient redundancy to ensure we guard against the potential for catastrophic loss.*

[28] *For example, vegetation cover (LCDC or local survey data), pest distribution, past logging, species distribution (where available) etc.*

- constraints on size and shape (i.e. small or vulnerable shaped areas can receive lower ranking); and
- connectivity across landscape or along rivers (e.g. manuka-kanuka buffering a wetland can be accorded higher weight than a standalone patch).

Importantly, it also allows for differential weighting to be accorded to different parameters. For example, it could give a greater weighting to lowland forests and wetlands recognising their high levels of loss across our landscapes (applying the ecosystem threat classification information would have the same effect).

Consistent use of the tool in a national sense would require the agreement on a range of minimum data layers, weightings and other model settings and related protocols.

Applied in that way across all public and private land within New Zealand would complete the required shift away from inconsistently and almost certainly sub-optimally targeted current prioritisation. Theoretically, it would enable a targeted, science-informed and tenure neutral approach to be taken to ecosystem and habitat management across New Zealand, in a way that ensured a full representative range of ecosystems and habitats was managed at the lowest cost.

DOC already has a nationwide approach to prioritisation of ecosystem management units across public conservation land and some private land using the Zonation spatial conservation planning tool. However, only in some regions (see Case Study 3 below) is this currently done in collaboration with regional councils.

CASE STUDY 3

Prioritisation in the Bay of Plenty Region

In 2013 the Bay of Plenty Regional Council and DOC agreed to work together more effectively to protect and improve the state of biodiversity in the Bay of Plenty. Part of that "Biodiversity Partnership" involved both parties agreeing to the shared goal "Maintenance and/or restoration of a full range of the Bay of Plenty's indigenous ecosystems to a healthy functioning state" (which is aligned with Goal 3 on the NZBS).

To understand where effort is needed to achieve that goal a shared "regional ecological priorities list" was developed as a key tool for prioritising funding and staff time. The final shared list is not designed for regulatory purposes and only captures a fraction of biodiversity considered significant under the Regional Policy Statement.

Spatial prioritisation software (Zonation)[29] was applied using data layers for potential ecosystem's (developed specifically for the region by Singers 2014), existing cover (LCDB4), condition data (using available indicators such as historic logging and known pest extents), and some management data. Species data was not used in the model.

Rarer and more threatened ecosystem types were given a higher weighting in the model, resulting in a greater proportion of remaining extent being identified for those ecosystem types (i.e. modelling identified high proportions of remaining cover for rare and threatened types but lower proportions of common types).

A key point is that the exercise was intended to provide better representation of the full range of ecosystems. It was not designed to represent the 'cream of the crop' in terms of condition.

The ranked list produced has since been refined to identify a draft set of 414 ecosystem priority sites covering 150,492 hectares representing ~20% of indigenous cover in the Bay of Plenty region. A further 16 species sites were added to the list based on expert opinion (being sites that did not necessarily rank highly for ecosystem values, but which provide habitat for threatened species).

Seventy–four of the 414 sites (representing 60% of the total area of the 414 sites) are on public conservation land. Forty-five percent of the total area identified (as ecosystem and species sites) that is privately owned is protected by either Nga Whenua Rahui or QEII covenants.

The 414 sites identified using Zonation provide much better representation of the full range of ecosystem types in the region (including the "national priorities") than DOC's existing Ecological Management Units, or BOPRC's current qualitatively selected High Value Ecological Sites alone.

The HVE sites deliver average ecosystem representation of 29.5% compared to the average of 63.9% delivered by an equivalent geographic extent implemented from the top-ranked sites identified by the Zonation-led analysis

[29] *Other regional councils including Waikato have also used the zonation tool and general approach used by Bay of Plenty.*

Better information enabling better decisions

Although conventional wisdom is that New Zealand is suffering on-going and serious decline in biodiversity, there is actually a paucity of credible, comprehensive "state and condition" data at the national or regional scales to support that assertion, or to allow the monitoring of change to the state of biodiversity over time.

There are many very good case studies of particular species or particular areas/projects. There is also some good (and improving data) on the extent of *responses* to the decline (e.g. extent of protected areas and extent and effectiveness of pest control). However, we simply do not yet have in place a dedicated, systematic monitoring system for the state of biodiversity more broadly.

In the absence of that information regional councils and others operate in an environment of some uncertainty.

- Agencies can be deceived by results that show good (or poor) results from monitoring of a small numbers of sites.
- Prioritisation can consequently be misplaced by a misunderstanding of habitats and ecosystems in greatest decline.
- Agencies cannot respond authoritatively to criticisms and concerns about their performance in biodiversity management.

Accordingly, we need to achieve a shift from reliance on piecemeal and anecdotal monitoring to the use of comprehensive and robust indicators within a systematic monitoring framework.

The indicators we use need to be designed specifically to measure biodiversity and not simply be used because they represent the information that is available.

Monitoring using a pan landscape plot network

The deficiency outlined above has been recognised at national and regional levels. Considerable work has been done over recent years in designing appropriate biodiversity monitoring programmes[30].

In 2011 regional councils commissioned Landcare Research to develop a monitoring framework for terrestrial biodiversity. Now completed, that is based on 18 indicators in a "pressure/state/response" framework[31].

While many indicators can be implemented now, several of the key state/condition indicators were conceived to apply within a new, standardised field-

[30] *Much of this is described in the 2015 Environmental Management and Reporting (EMaR) Biodiversity/Biosecurity Scoping Report. (Note, EMaR) is a joint central government/regional council initiative to improve environmental monitoring generally for national environmental reporting purposes.*

[31] Recommended monitoring framework for regional councils assessing biodiversity outcomes in terrestrial ecosystems, *Landcare Research May 2011.*

sampling programme operated at a broad scale (i.e. across the landscape). That is referred to as "Tier 1" monitoring).

"Tier 1" monitoring provides a landscape-wide assessment of biodiversity across an 8km x 8km grid with surveys carried out on a 20m x 20m plot. An annual sample of plots is selected randomly for assessment. This approach is designed to provide unbiased sampling of the landscape in contrast to an approach that would see monitoring confined only to high value, actively managed sites.

Although details of Tier 2 monitoring programme are not available, it appears that it involves many of the 18 indicators being applied at the site-specific scale (i.e. regionally defined key environmental areas or significant natural areas).

The proposal for a pan landscape (Tier 1) monitoring programme is understandable in that it potentially fills a significant hole in terrestrial biodiversity monitoring and presents a much more systematic approach to assessing the state of terrestrial biodiversity as a whole[32].

The proposal does, however, raise a number of implementation issues.

1) While ecologically compelling, it does go beyond the idea that regional councils core interest in biodiversity is to ensure the on-going viability of a network of representative sites.

2) There are no coercive powers available to any party that would compel regional councils to adopt the Tier 1 grid survey approach in full or at all. The proposal relies on collaboration and a willingness to act collectively in the national interest.

3) There is clearly a cost associated with implementation that, while manageable for many councils may be difficult for other councils to absorb (certainly within existing budgets)[33].

4) It requires access to private land and the benefit of surveying for biodiversity in the middle of a highly modified environment (e.g. dairy pasture or potato paddock) might be lost on some landowners.

5) Because of 1 above, at least some of the benefit of Tier 1 monitoring accrues to those responsible for national scale reporting (i.e. the Ministry for the Environment, Statistics NZ and the Department of Conservation[34]) yet the costs will fall exclusively on regional councils.

6) Based on interviews undertaken for this report, at least some DOC personnel have questioned the investment in Tier 1 monitoring due to value for money concerns[35].

The challenge that lies ahead is to complete the shift to a systematic monitoring programme while ensuring good alignment between where the costs and benefits fall.

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[32] Monitoring biodiversity only on managed sites has been described as being analogous to monitoring crime rates only within gated communities.

[33] Costs have been estimated by multiplying the number of plots requiring monitoring by regional councils (i.e. those not monitored by DOC or MfE (LUCAS) by the average cost per plot. Unfortunately the cost per plot varies considerably depending on how accessible the plot is but it may average around $4,500 giving a total cost of around $2million per year (on the basis that 20% of plots are monitored each year). This would fall unevenly across regions dependent on, for example, the extent of public conservation land.

[34] DOC is responsible for meeting New Zealand's commitment to monitor and report as a signatory to the UN Convention on Biodiversity. MfE and Statistics NZ are jointly responsible for environmental reporting the preparation of synthesis reports (including reporting on the state of New Zealand's biodiversity and ecosystems).

[35] Although this is countered by those who argue that the cost represents less than 3% of DOC's natural heritage budget.

While regional councils should meet the costs of Tier 2 monitoring off public conservation land consistent with their function under section 35 (2)(a)(i) of the RMA, there is a case that the benefits of Tier 1 monitoring of terrestrial biodiversity extend beyond assisting regions to carry out their limited functions under the RMA in respect of terrestrial biodiversity. Hence some contribution from central government may be justifiable.

There is also a need for consistency between the Tier 1 monitoring being undertaken on and off public conservation land requiring some overall formalised coordination mechanism.

While Tier 1 monitoring has merit, further evaluation of the proposal may be prudent before there is collective commitment to the programme across the regional sector. Whether or not Tier 1 monitoring is rolled out as a comprehensive national grid network, state and condition monitoring of some kind (for example, across a more limited number of high value sites) will be important.

Freshwater

Monitoring of biodiversity of freshwater ecosystems is both less developed and more complex than terrestrial biodiversity monitoring.

In terms of habitat quality regional councils monitor water quality and quantity (and have specific responsibilities in that regard under the NPS-FM). Many will also be monitoring riparian issues such as stock access and the extent of riparian vegetation.

Regional councils do not, however, generally monitor the composition/ abundance/ health of freshwater species (other than macro invertebrates). A recent stocktake of freshwater fish monitoring (by central government agencies, regional councils, universities, CRIs and commercial organisations)[36] found that:

The results show that multiple agencies and organisations across New Zealand monitor fish populations to one degree or another. However, the focus is almost exclusively on a limited number of sites on wadeable rivers.

A recurring survey theme was that councils believe fish monitoring is important, however the majority of fish monitoring is not part of a representative regional network; instead, it largely appears to be undertaken as part of resource consent processes or other one-off investigations.

Overall, the approach in freshwater mirrors (but is even less developed) than the terrestrial environment.

Tier 1 and 2 approach applied in terrestrial environments could theoretically be applied in freshwater. To that end, the Department of Conservation recently scoped a Tier 1 approach to monitoring in Northland's freshwater habitat. Other than that, however, there is no systematic programme for freshwater biodiversity monitoring or even standardised approach to monitoring freshwater fish.

[36] *Freshwater Fish Monitoring in NZ: A Stocktake, Collins Consulting June 2016.*

This issue has been under discussion within the Environmental Monitoring and Reporting (EMaR) group, which has proposed a suite of freshwater monitoring indicators[37].

Funding decisions for extending the Tier 1 and Tier 2 monitoring system to freshwater environments are understood to be pending.

Hence there is no real issue about what freshwater monitoring could or should be undertaken. The issues and uncertainties are around where responsibility should lie given DOC's (and the NZ Fish and Game Council's) statutory responsibility for freshwater fish (excluding those in the QMS) under the Conservation Act, regional councils' role in water quality and biodiversity generally, and central agencies' roles in state of the environment reporting.

The shift we need to make includes a shift from that state of uncertainty and variability of practice to one of certainty and consistently accepted freshwater monitoring responsibilities.

Coastal

Monitoring of biodiversity in the coastal environment is at least a patchy and piecemeal as in the freshwater environment, but overall is even less developed. There is some monitoring and research work of marine mammals by DOC and universities. Any other monitoring DOC undertakes tends to be focussed on marine protected areas. There is some monitoring of fish stocks (those in the QMS) by the Ministry for Primary Industries.

Marlborough District Council does some monitoring of "significant natural marine sites" in partnership with DOC (using a drop camera to assess the spatial extent of reefs and species composition), but that appears to be an outlier in the regional sector.

Most regional monitoring in the coastal marine area is limited to water quality (in terms of its suitability for supporting recreational values) and marine sediment.

MPI recently took the initiative on this significant hole in biodiversity monitoring by releasing the National Marine Environment Monitoring Programme[38], which aimed to review current levels of marine environmental monitoring and evaluate the possibility of developing a comprehensive long-term marine environmental monitoring programme for New Zealand's marine environment.

Despite that initiative, uncertainty remains over the regional councils' role in coastal biodiversity monitoring. There would seem to be a clear logic in regional councils monitoring the effectiveness of their policies. In other words, if they have sought, for example, to protect the biodiversity of high value marine areas (as Marlborough has proposed), then they ought to be responsible for monitoring those high value areas. Similarly, where there

[37] *EMaR Biodiversity/Biosecurity Scoping Report, July 2015.*
[38] *Hewitt et al (2014). Development of a National Marine Environment Monitoring Programme (MEMP) for New Zealand. New Zealand Aquatic Environment and Biodiversity Report No. 141. 126p.*

is a threat to the marine biodiversity that is managed by regional councils (e.g. sediment accumulation in estuaries) they should monitor the effect of their policies on that threat. However, many of the threats to marine biodiversity are managed by other agencies (MPI in particular) and any monitoring in the marine space hence needs to be a collective effort to which regional councils ought to contribute but not lead.

We need to shift to a position where there is acceptance of marine biodiversity monitoring responsibilities of all parties and clarity about the lead agency.

Sharing and availability of biodiversity-relevant data

A final "information" issue relates to the tendency for information on biodiversity to be closely held amongst many different agencies and local authorities. This includes information at all levels, from the results of trapping programmes to significant new research. There are few effective means of searching and sharing the data that exists across central government, local government, iwi and community groups. The likely result is that much information that might improve the effectiveness of our intervention goes unused.

While not explored in detail as part of this project, the idea of a "data commons" for biodiversity information deserves further consideration. A data commons would involve establishing a platform for open access to a comprehensive set of biodiversity information. There is no doubt that we need to shift to a position where we enable far better data integration and reuse to improve effectiveness of biodiversity management.

Shift 4 – Planning and delivering joined up action

Prioritisation is critical to making the biodiversity role tractable at the regional level. However, even with very rigorous prioritisation, the task remains a very large one - one that is probably beyond the existing biodiversity budgets of most regional councils.

Bay of Plenty, for example, has been one of the first regional councils to prioritise using the Zonation tool. As noted in Case Study 3, after some iteration, some 414 sites were identified as ecosystem priority sites. Those sites cover 52,508 hectares of private land (some sites consist of both public and private land). Although the regional council has 121 Biodiversity Management Plans (which dictate where active management is focused), only 46 relate, in whole or part, to the priority sites and they only cover around 3,681 hectares (7%) of all privately held ecological priority sites. The regional council has been managing a total of 9,357 hectares across its previously prioritised "High Value Ecosystem Sites" (HVES). That means that, even with reprioritisation of resources to the newly identified sites, there is a significant gap between the area that has been prioritised using Zonation and the area that has previously been able to be actively managed.

A similar situation arises for public conservation land. DOC has Environmental Management Unit (EMU) programmes implementing some form of management over approximately 27,149 hectares of the 98,062 hectares of ecosystem based priority sites in public ownership (28%).

This situation calls for two shifts:

1) Greater coordination and collaboration at strategic and operational levels between all parties engaged in biodiversity projects to get best value for the investment; and

2) Increasing the level of investment in biodiversity by New Zealand as a whole.

Greater collaboration between regional councils and DOC

Currently, despite some specific examples to the contrary, the regional sector as a whole has a generally low level of collaboration with DOC on biodiversity projects off public conservation land.

Greater collaboration between DOC, regional councils and other groups has been talked about for many years. A number of initiatives such as regional biodiversity strategies and multi agency forums, such a Nature Central (see Case Study 1), have attempted to foster such collaboration. Those initiatives seem to have had limited success. All parties appear to agree that there is scope for a significantly greater level of collaboration between DOC and regional councils.

Whether that is best driven through more formalised linkages between the plans and strategies of respective parties (such as joint regional biodiversity strategies for example), or simply through fostering of stronger professional relationships between, for example, DOC Regional Operations Directors and Regional Council management is a moot point and probably requires further analysis. What is clear from experience to date is that such collaboration is unlikely to emerge (at least not uniformly) from the bottom up. There appears to be a need for collaboration to be driven from a national level initiative.

Regional councils' relationship with the private sector

Regional councils generally do not have a high profile with, and are not well connected to, the philanthropic sector in particular. DOC has developed those relationships over recent years and as a consequence significant private sector resources have been directed in DOC (mostly conservation estate-based) projects. This relationship is typified by the recently agreed *Tomorrow Accord* between DOC and the Next Foundation where the Foundation agrees to fund or part fund enhancement/restoration projects, while DOC agrees to take over long-term management to maintain gains made. The Accord states that Foundation funded projects will be "primarily on public land and will result in public benefit"[39].

Regional councils' work off public conservation land has, by contrast, seldom benefited from the same level of private sector investment.

Regional councils need to achieve a strategic shift towards much closer (institutionally embedded) collaboration and partnerships with the private/philanthropic sector. While regional councils probably continue to outspend the private/philanthropic sector in biodiversity, that investment is largely invisible to the audience outside the immediate region. The philanthropic sector needs to gain a much better understanding the role, operational capability and expertise of regional councils. To achieve that, regional councils need to more effectively promote their expertise in operational management and their worth as a potential investment partner.

Increased regional funding to leverage funding from others

The shift described above to greater collaboration with DOC and the private and philanthropic sectors needs to achieve, or be accompanied by, an increase in overall investment. As we have seen from the Predator Free NZ initiative and the funding approach of philanthropic organisations, the general dynamic is that each player will be looking to leverage increased investment from other funding partners.

This may require regional council sector to lift its investment in biodiversity management as a means of securing increased investment from others. It will also mean that regional councils need to account for, and measure their investment in biodiversity in a much more reliable and consistent way than has been the case to date.

Collaboration and alignment of objectives between regional councils, DOC and the philanthropic sector and the overall lifting of investment levels is possible, and there are existing examples (see Case Study 2 and 4).

In summary, the shift that is required is the shift from such collaboration being the exception to it being commonplace across all regions.

[39] *The Tomorrow Accord can be found at: http://www.nextfoundation.org.nz/news/the-tomorrow-accord*

CASE STUDY 4

Hawkes Bay Regional Council's Cape to City predator control and ecological restoration project

Hawke's Bay's Cape to City project is one of only a handful of existing initiatives that demonstrate the joined up action and leveraged funding across land tenure that is critical to on-going success in biodiversity management.

The Cape to City project was initiated as a collaborative partnership, led by the Hawkes Bay Regional Council (HBRC) under the auspices of its regional biodiversity strategy. Building on its four year sister project Poutiri Ao o Tane (2011-2015), Cape to City is a five-year project (beginning in 2015) that involves predator control and restoration works over the entire 26,000 hectares between Havelock North and Waimarama Beach. This area comprises around 150 properties, many of which are sheep and beef farms, as well as areas of high value public conservation land and Cape Sanctuary – one of New Zealand's largest privately funded sanctuary areas. About 80% of the control work involves trapping of feral cats, mustelids, stoats and possums (with the other 20% of activity consisting of use of PAPP and night shooting).

One of the key distinguishing features of the $6m project is that it represents a true partnership between HBRC ($1.5million - including staff time), the Aotearoa Foundation ($2.3million), DOC ($1.6m), Landcare Research ($1.2million) and Cape Sanctuary ($600K annually).

A central theme and objective of the project is to develop and ground truth an approach to controlling predators at a landscape scale that is financially and socially sustainable. That is, an approach that can be applied at scale, acceptable to the community and effective at ultra low cost - and hence can be maintained over a long time period (i.e. until predator eradication is possible).

Another key feature of Cape to City is that it integrates working farmland into a broad scale conservation management programme – something that is critical delivering meaningful and enduring biodiversity gains.

One of the means of achieving the goal is reliance on landowner participation. There appears to be high levels of support for such participation, based on the value landowners place on biodiversity and also due to benefits for stock health (toxoplasmosis in sheep being a significant issue in the area due to high infection rates amongst feral cats)

However, achieving significant reductions in the time/cost of checking traps is considered to be critical to achieving the objectives of the programme. For that reason it is proposed to introduce wireless technology that will allow traps to be monitored from the home or office. A wireless node is placed on each trap in a network. When a trap is activated, the node sends a signal to a central hub, and this information is then sent via satellite to cloud servers. After processing, the data will be provided to users through a web portal, email and mobile applications running on smart devices detailing which traps have been triggered*.

This technology requires an upfront capital investment in establishing the wireless infrastructure in the field, but allows for much reduced operating cost for individual land owners/pest managers.

Cape to City provides a good example of how achieving transformational change in predator pest management will require close partnership and collaboration between public and private sectors. This is likely to be critical to the ability to fund the initial capital cost of the new transformational technology, such as wireless trapping.

** the same technology was introduced to important sites in Auckland earlier this year*

Shift 5 – Modern, fit for purpose frameworks

As noted in the Stage 1 Report (and summarised in section 4 of this report), the framework of institutional arrangements for the management of biodiversity is a patchwork of statutes of different ages and philosophies, ascribing roles to a range of agencies on the basis of particular threats in particular environments. Almost all those statutes pre-date the concept of biodiversity being incorporated into the common resource management lexicon.

As a result, there is a lack of an overarching legislative coherency or framework and resulting overlapping and unclear mandates.

Anomaly in current framework

There is a fundamental anomaly with the way the legislation provides for the management of the risks to biodiversity. That is, the only place where the maintenance of biodiversity is provided for either as express goal of statute or a function of any agency is the RMA. However, as indicated in Figure 3 of Appendix 1, the RMA is only one part of the response to the threats faced by biodiversity. Furthermore, as previously discussed, perhaps the most important response in the terrestrial environment (the delivery of active management of representative habitats and ecosystems) is not a method that gains its statutory authority from RMA.

Neither the term "biodiversity" nor "biological diversity" (or any goal of maintaining biodiversity) appears in the Conservation Act despite that statute being the governing statute for DOC (and governing the management of around a third of all New Zealand's land, as well as elements of the freshwater fish management regime).

DOC has a function to preserve freshwater fish, yet has limited tools to do so. Most of the threats to freshwater fish are managed by other statutes or are not managed at all (freshwater fish are not protected under the Wildlife Act). Eels are managed in accordance with the QMS system under the Fisheries Acts.

A related point is the anomaly that is the management of juvenile galaxiid species (whitebait). Despite these species having the same threatened status as kiwi they are managed under regulations the (Whitebait Regulations) that allow fishing without limit as to quantity of take or restriction on sale (restrictions apply to gear that may be used, fishing practices and time and seasonal access). The result is a management regime that is significantly more permissive than that applying to introduced sports fish (and arguably other indigenous fish species managed under the quota management system).

Many components of the overall framework (e.g. the Wild Animals Control Act, the Wildlife Act and the Reserves Act) are now approaching 40 years old and have no express purpose of contributing to any overarching goal of maintaining indigenous biodiversity (despite them containing important powers in that regard).

Thus, the final shift that is required is to move from the existing framework to one that is modern, properly aligned and coherent and which provides for clear leadership and coordinated action. This paper does not discuss the full range legislative change that might be warranted to give effect to that goal. Rather it focuses on the statutes of most direct relevance to regional councils.

In passing, however, it is worth noting the Australian Federal *Environment Protection and Biodiversity Conservation Act 1999* brings together relevant federal level biodiversity management functions into a single "umbrella" statute, and has as one of its main objects "*to promote the conservation of biodiversity*". The Act is a weighty piece of legislation that defies summary here. However, some key means by which it recognises and provides for priority species/communities/habitats is set out below.

The Australian Environmental Protection and Biodiversity Conservation Act

The Environmental Protection and Biodiversity Conservation Act makes the Australian Government responsible for identifying and protecting matters of national environmental significance (NES). These include a range of priorities, including internationally important wetlands (Ramsar wetlands), listed migratory species, and listed nationally threatened species and ecological communities.

The Act accordingly requires the Minister to list threatened "ecological communities"[40] and makes it an offence to undertake any new or intensified activities that may have a significant impact on those listed "critically endangered" and "endangered communities" (activities existing prior to listing can continue). Separate provisions enable the Minister to keep a register of "critical habitats" (being habitats critical to the survival of a listed threatened species or listed threatened ecological community). Again, it is an offence to knowingly inflict significant damage to a critical habitat.

Importantly though, listing (or registration in the case of critical habitat) as described above, does not simply have regulatory implications. Other non-regulatory actions follow. The Act provides, for example, that if Commonwealth land containing critical habitat is sold, a covenant must be included to protect the critical habitat. There must be documented "approved conservation advice" in respect of each listed species or communities. Further, the Minister may develop Recovery Plans for listed threatened species and ecological communities and Threat Abatement Plans for key threatening processes.

The Act contains a range of objects and principles that have a clear biodiversity focus and which expressly recognise the role of indigenous Australians in biodiversity management. Significantly, there are express objectives to recognise the Commonwealth role and to promote a partnership approach to environmental protection and biodiversity conservation.

Biodiversity in the RMA

The regional council function in respect of biodiversity under the RMA is unusual in that an objective of "maintenance" is embedded within the function itself.

That is problematic when various functions and powers important to effective biodiversity management are spread across a wide range of agencies.

Whether biodiversity is maintained or not is dependent on the actions of many players, including statutory and regulatory authorities, in respect of which regional councils have no control.

[40] *Threatened species and threatening processes are similarly provided for.*

For that reason alone, there is a strong argument that for the purpose of section 30 of the RMA (functions of regional councils) the objective of "maintenance", should be decoupled from the function. As a matter of principle, regional councils should not have a function if the legal ability to manage land (in the case of DOC), and the tools required to address particular threats, are outside their control.

It is rather odd that regional councils could be held to account (politically, if not legally) for failing to deliver the maintenance of biodiversity whereas, on the face of the legislation, DOC could not.

Maintenance of biodiversity as a statutory goal

A more rational approach would be to include the objective of maintaining biodiversity as a Part 2 matter (indeed that is where it already sits buried in the definition "intrinsic values").

One option would be to replace section 6(c) (being the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna) with "the maintenance of indigenous biodiversity". The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna could then be a purpose for which territorial authorities could control the effects of land use (effectively replacing section (b) (iii) – being the maintenance of indigenous biodiversity).

The functions of regional councils under section 30

Given the existing structure of Section 30 (the functions of regional councils) it is difficult to articulate a single biodiversity function. That is because, given their habitat and environmental management roles, regional councils do not manage biodiversity by managing biodiversity directly, but rather by managing uses of resources and associated activities that may negatively affect biodiversity (i.e. they manage certain *threats to biodiversity*).

That being the case, biodiversity is more properly a theme that runs across a range of listed functions (e.g. discharges, water takes, disturbance of stream beds etc) rather than being a function it its own right.

There are a number of possible solutions to this conundrum. One would be to replace section 30 (1) (ga) with a more specific and realistic function such as:

(ga) <u>contribute to</u> the maintenance of indigenous biological diversity by:

a) Identifying, and facilitating the protection of, ecologically significant areas of indigenous vegetation and habitats of indigenous fauna that are representative of the range of habitats and ecosystems existing in each region;

b) Exercising the functions of section 30 (1) (a) to (g) to support the essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience[41]

[41] *This wording is taken from the existing definition of "intrinsic values" provided in section 2 of the RMA.*

The above wording is indicative only could take a variety of forms. A less expansive formula might, for example, be:

(ga) the establishment, implementation, and review of objectives, policies, and methods to manage threats to the maintenance of indigenous biological diversity that arise from any of the matters that are the subject of section 30(1) (d) to (g).

An amendment to section 30 such as described above could solve the issue of regional councils being ascribed the unrealistic role of the maintenance of biodiversity *per se*. However it would not solve the issue of regional councils' primary response to terrestrial biodiversity being operational in nature, with the authority for that operational expenditure deriving not from the RMA but from the Local Government Act and Biosecurity Act.

A role for regional councils under the Local Government Act?

The suggestion that biodiversity management is bigger than the RMA opens the question of whether regional councils (at least) ought not have a specific legislative function in respect of biodiversity under the Local Government Act (LGA).

While that is conceptually possible, the current structure of the LGA only provides for specific functions (aside from the general function of giving effect to the purpose of local government in section 11) in respect of *core services*. The obligation under section 11A is for a local authority to have regard to the contribution certain services make to its communities. While managing threats to indigenous biodiversity could be added as another such core service (to sit alongside public transport services and management of natural hazards), the benefit of biodiversity is as much national as local and it would seem to sit oddly in a list of core services that are inherently local in nature.

While the idea should not be dismissed entirely, it may be that it is more appropriate for the regional council role in biodiversity (encompassing but not limited to the role under the RMA) to be set out in whatever umbrella legislation eventually replaces the current patchwork of statutes that forms the current framework.

Should regional councils control land use for biodiversity?

The other perennial issue in biodiversity management is whether regional councils should control land use for the purpose of the maintenance of biodiversity. The issue of whether they can or cannot do so is discussed in Appendix 1. In short, recent case law has reversed previously widespread understanding amongst many regional councils that they could not do so unless that function was transferred to them.

There are some benefits of regional councils having the land use control the function, including the ability to control existing uses and to better co-ordinate regulatory and operational methods. However, the implications of regional councils having that function are that territorial authorities would not. That could be problematic in the sense that:

- territorial authorities' control of subdivision plays a significant part in protecting remnant vegetation through covenants and consent notices, as well as through the use of bonus and transferable rights to secure legal protection and enhancement of habitat; and
- if territorial authorities were to lose the land use function in respect of biodiversity entirely, the dynamics of their involvement in biodiversity conservation debates could change

dramatically with a much greater likelihood of economic development objectives taking precedence.

While a hybrid approach might be possible where regional councils assume responsibility for specified sites of more than local significance, that would lead to a complex management regime.

As it stands, the law provides for either to exercise the function, with the RPS tasked with stating the local authority responsible in the whole or any part of the region for that function (section 62 of the Act). Hence there is no obstacle to achieving the benefits of regional council management where and when the scale of those benefits warrants the transfer.

For those reasons, at least under the framework that currently exists, the status quo for land use control seems the preferable approach.

The role of DOC under the Conservation Act

The role of DOC under the Conservation Act has been discussed previously. To recap, DOC has no statutory function to maintain biodiversity generally. Only regional councils have that. The Conservation Act itself has no purpose statement (unlike the RMA or the Australian Environment Protection and Biodiversity Conservation Act).

DOC though is the national agency charged with providing advice to Government on conservation and hence biodiversity matters. The question that arises is whether the Conservation Act ought not provide for a broader role for DOC, clarifying it's overall responsibility for biodiversity and imposing some general obligations for how it exercises that leadership.

That might parallel the statutory articulation of obligations that the Director-General (being the Chief Executive of MPI) has for pest management under the Biosecurity Act.

Section 12A of that Act states:

Director-General provides overall leadership

1) The Director-General provides overall leadership in activities that prevent, reduce, or eliminate adverse effects from harmful organisms that are present in New Zealand (**pest management**).

2) The ways in which the Director-General provides leadership include—

   a) promoting alignment of pest management within the whole biosecurity system:

   b) overseeing New Zealand's systems for pest management and measuring overall system performance:

   c) facilitating the development and alignment of national pest management plans and national pathway management plans:

   d) promoting public support for pest management:

   e) facilitating communication, co-operation, and co-ordination among those involved in pest management to enhance effectiveness, efficiency, and equity of programmes.

It is important to note that the responsibility for overall leadership in pest management under section 12A does not absolve other parties of their responsibilities. Regional councils have their role in providing regional leadership set out in section 12B.

A similar provision in the Conservation Act in respect of the Director General's responsibilities for leadership in biodiversity might provide useful legislative clarity.

PART C

Next steps and conclusions

C

PART C – Next steps and conclusion

Although much has changed and continues to change since the release of the NZBS in 2000, biodiversity faces on going issues at technical, operational and strategic levels.

This paper identifies five strategic shifts that need to occur if we are to get better value for our biodiversity investment and better position future interventions. In many cases these shifts are not entirely new but rather highlight some of the best practices adopted in particular regions, or which have been promoted by regional council working groups. However, in other cases the shifts do represent a bolder agenda for change.

The shifts identified could be a useful way of organising a variety of responses at national and regional levels. However, as an initial means of advancing these ideas further the following five objectives and associated actions are recommended. These are designed to respond to the five identified shifts.

Objective - Leadership

That the national biodiversity management system develops clear, system-wide leadership at both national and regional levels.

That such leadership fosters collaboration rather than competition in the identification, prioritisation and delivery of biodiversity projects.

Actions

1) Promote investigation of options for a new national leadership model for biodiversity management, including a National Biodiversity Management Authority comprising all major statutory and financial stakeholders (including local government and iwi representation) with:
    a) A governance role (including recommending and overseeing the changes required to enhance performance and ensure on-going clarity of roles and direction)
    b) A limited management role (establishing priorities and co-ordinating delivery against those priorities; raising awareness of, and financial support for, biodiversity across all sectors; and overseeing the national response to monitoring biodiversity).
2) Ensure than any new national biodiversity leadership entity has clear mandate from, and is accountable to, government Ministers, preferably through the entity and its roles and function being recognised in statute.
3) Develop leadership arrangements at the sub national level that encourage collaboration in the undertaking of biodiversity responsibilities, including in the planning, prioritisation and implementation of specific projects (using Nature Central and as potential model).

Objective – Building on what regional councils do best

Regional councils are regarded by the government, private sector and communities as an expert authority in working with private land owners and iwi, in the planning and undertaking/contracting of operational management to achieve "on the ground" action that furthers biodiversity objectives.

Actions

1) Regional councils clearly define and promote the core roles of regional councils in biodiversity management as:

   a) Investor in, and/or deliverer of, and/or supporter and enabler of operational programmes, to protect and improve the ecological integrity of a network of sites off public conservation land that, in combination with sites on the public conservation lands, represent the full range of habitats and ecosystems;

   b) Regulator of many (but not all) of the activities that effect freshwater and marine habitats; and

   c) Regulator of activities that effect terrestrial habitats where that role is not undertaken by territorial authorities (with territorial authorities retaining the default role).

2) Region councils promote legislative change that more clearly articulates the role of regional councils as outlined in 1 above.

Objective – Better information for better management

There is a consistent approach to prioritising sites to inform biodiversity management across the landscape regardless of tenure or region that assists NZ Inc to invest optimally to secure biodiversity outcomes.

Implementation of a standardised biodiversity monitoring programme across all regional councils that allows for comprehensive reporting consistent with that of the Department of Conservation. Reporting should cover the state and condition of biodiversity, threats and pressures faced by biodiversity, effectiveness of interventions and community engagement.

Actions

1) Regional councils agree on the pan sector adoption of a spatial prioritisation tool and on the protocols for the consistent use of that tool, to ensure consistency across the sector in the identification of the regional network of sites. (Note that the Zonation software tool is the leading contender having been already used by a number of councils).

2) Regional councils promote the use of the same spatial prioritisation tool (and protocols for use) on public conservation land.

3) Regional councils and DOC effectively and consistently communicate the concept of and principles underpinning prioritisation, to ensure all stakeholders understand the strategy and its importance in optimising outcomes for NZ as a whole.

4) In developing a funding biodiversity monitoring programmes promote the principles that:

a) Those responsible for managing the threat should also be responsible for monitoring the effect of that management intervention (conversely those not responsible for managing the threat ought not be responsible for monitoring the outcome; and

b) If an outcome is nationally important then it is important to monitor that achievement of that outcome nationally.

5) Implement the 18 recommended indicators for terrestrial biodiversity monitoring (including, regardless of the outcome of action 5 below, ensuring monitoring includes adequate state and condition monitoring for all key biodiversity sites).

6) Consider further the value proposition of investing in the completion of a Tier 1 (broad scale) monitoring system if there is confirmation of:

a) Government's long term commitment to a corresponding system on public conservation land; and

b) a contribution of the cost of the programme from national agencies that reflects the value of the information for national reporting (relative to any benefits that accrue regionally).

7) Further develop the regional biodiversity monitoring programme to cover freshwater and marine habitat in a manner similar to that taken for terrestrial environment.

8) Consider further the feasibility of establishing of a data commons for biodiversity information.

Objective – Joined up action

That all public agencies, private sector and iwi entities work to a common understanding of the priorities for biodiversity management, and collaborate to delivering on those priorities in the most efficient and effective way possible.

That there is a significant increase in the overall level of investment in biodiversity (from public and/or Private sources).

Actions

1) Prioritise sites for operational management across the region taking a tenure neutral approach (in conjunction with the Department of Conservation).

2) Develop operational plans for the management of the regional network sites and projects in collaboration with the Department of Conservation, iwi and community and private sector players. In doing so identify opportunities for synergies and efficiencies in achieving management objectives.

3) Operate and invest in such a way as to secure an overall increase in the level of funding for biodiversity investment.

4) Advocate for new biodiversity/conservation planning mechanisms (such a species and habitat management/recovery plans) that take a tenure neutral approach to the identification of required actions, and which specify roles for all relevant agencies.

5) Support and encourage the development, commercialisation and uptake of new technology for more effective and efficient pest management

Objective – Statutory framework

That statutory framework for managing biodiversity is coherent and fit for purpose, according functionaries clear and distinct roles and responsibilities according to a common purpose.

Actions

1) Advocate for a review of the institutional and legislative framework as it applies to biodiversity management, to ensure a it is fit for purpose. Such a review should evaluate the value of integrated, single purpose biodiversity management statute, with a values-based purpose of maintaining indigenous biodiversity and with a full suite of functions, powers and tools to be exercised according to consistent principles and processes;

and, in the absence of such a broad review:

1) Promote reconsideration of how biodiversity is provided for within the RMA, with a key considerations being whether "the maintenance of biodiversity" ought to be a Part 2 matter rather than a function; and

2) Ensure the Conservation Act establishes the "maintenance of biodiversity" as a purpose of the legislation and as a primary role for DOC – including, importantly off the public conservation land (in partnership with others).

3) Support regional councils being given a function in biodiversity management that transcends the RMA, acknowledging the non-regulatory and operational focus of regional council's intervention in managing threats to biodiversity maintenance and restoration.

Appendices

Appendix 1 - Roles in biodiversity management

In describing the actual and required roles in biodiversity management across the full management system, three dimensions are relevant:

- The focus of management intervention (as discussed below);
- The geographic dimension (where the role is exercised i.e. on private land, public conservation land, freshwater or marine environments); and
- The nature of the intervention and, in particular, whether that is a regulatory and/or operational.

These combine to present a complex picture, but one necessary to understand if roles are to be clearly defined and discussed with a common understanding.

The focus of intervention

At a conceptual level, given the NZBS goal and the threats identified earlier in this report, there are three areas of (related) focus in biodiversity management[42].

1. Protecting and enhancing high value habitat, or ***habitat management***. *In situ* conservation is widely regarded as the most effective, less risky way to maintain species and species richness. Maintaining sufficient good quality habitat, that is representative of the full range of habitat types that once existed, will be the best way of ensuring the on-going survival of the full range of species. Habitat management requires management of the full range of threats to particular sites. It includes:
    - Legal protection of sites and the management of activities that may be undertaken on those sites to ensure the maintenance of their ecological integrity (managing the *quantity* of habitat available); and
    - Active management of sites (such as fencing, plant and animal pest control, restoration/enhancement planting) to improve the *quality* of the habitat.
2. To the extent that protecting habitats is not sufficient to protect a species, targeted intervention in what might, for simplicity, be termed ***species management*** (because the focus is on protecting individual species rather than ecosystems or habitats). This includes a number of roles and tasks to address a range of actual and potential risks and threats including:
    - *Species recovery interventions* - instituting breeding programmes, translocations to build population resilience, area management for species recovery.
    - *Legal protection* of species and the policing of those protections (essentially protection of risks associated with those who would hunt or trade sell/trade species).
    - *Managing the commercial/cultural harvest* of particular species. Some species are harvested for commercial gain or recreational use and it is important that any such

[42] *These roles and their statutory/legal basis is further set out in the Stage 1 Report.*

harvest is managed to ensure any take is sustainable (marine fish, indigenous timber and whitebait being obvious examples).

3. Interventions to address other *threats* and pressures through ***environmental management*** (i.e. the management threats that are not specific to a species or a specific habitat, but rather the broad "ambient" environmental conditions) including:

    - Managing biological risks that are either:
        - New to NZ (through border management and incursion response and through managing the lawful introduction of new species/organisms); or
        - Within New Zealand but contained or otherwise not widespread (i.e. the control of the deliberate introduction of certain species into areas where they are not currently present).
        - Pest management focussed on landscape (rather than key site) management (including, for example, management of aquatic pests or broad scale possum control).
    - Interventions to ensure wider *ecosystem health*. These are multi-faceted and therefore difficult to define but include managing the following:
    - water quality and quantity, fish passage, riparian management and soil conservation as they affect ecosystem health.
    - Risks posed by hazardous substances in the environment management (i.e. of use and disposal of agrichemicals to minimise risk of bio-accumulative toxic substances out of the food chain of indigenous species).
    - The effects of human activity on ecological processes – including the loss of ecological resilience. This includes general vegetation/habitat protection and/or restoration (i.e. not specified representative sites, but other features in the landscape that support the movement or particular part of the feeding or life cycle of an indigenous species). Examples include the protection of restoration of stepping stones, ecological corridors and key seasonal food sources.
    - Negative externalities of sustainable harvest (e.g. by-catch)

These three roles are depicted in Figure 2.

Figure 2 – Response interventions to maintain biodiversity

Species management versus habitat management: a complex relationship

Figure 2 is based on a distinction being drawn between species management (largely the preserve of DOC) and habitat management, being the focus of regional councils' effort.

The distinction is used as a convenient means of differentiating roles. In reality, however, the distinction is not nearly as clear-cut. As discussed above, the distinction is based on whether the focus of management/intervention is on the recovery or protection of a particular species (generally these will be species that are on the threat classification list). Habitat management, on the other hand, focuses not on the actions directly associated with a particular species (such as a breeding programme, targeted predator protection or translocations to (re)establish a new population) but on:

- the existence of habitat and the quality of habitat needed to ensure that species' on-going survival; or
- more broadly on the existence of habitat that ensures the on-going viability of the ecosystems that habitat supports.

In practice, both DOC and regional councils are involved in habitat management, since DOC manages habitat for reasons other than the needs of a particular threatened species.

Similarly, the distinction drawn does not imply that regional councils ought not be interested in species. They must be - biodiversity is ultimately about species (even habitat is simply a collection of species and the biophysical elements on which they rely). What it means is that the regional council response to the threat to species is focused on managing the extent and quality of habitat.

An example is provided by the Cape to City project (see Case Study 4). Research conducted as part of that project is showing significant recovery in native invertebrate and lizard populations on farmland. Similarly, tui numbers have quadrupled and bellbird trebled in urban bird counts. Thus, although the project is not specifically designed to be a "species recovery programme" (in the conventional sense), it does add significantly to the size and health of populations. This will

not be an isolated example, but will be occurring elsewhere in response to regional pest management work. Hence, collectively regional councils are adding value to species management, even if they don't happen to be actively translocating kiwi (for example).

Further complexity arises because in some cases improving the quality of habitat involves reintroduction of a species lost to that habitat that forms an important ecological function (e.g. seed dispersal).

Geographic boundaries of roles

Figure 3 provides a schematic representation of the distribution of current roles in biodiversity, based on the three dimensions of biodiversity management shown in Figure 2 and divided by relevant spatial domain (the marine area, land managed for conservation purposes by the Department of Conservation (DOC), all other land and freshwater). The real situation is more complex than portrayed in Figure 3, but it nonetheless provides a framework to think about respective roles.

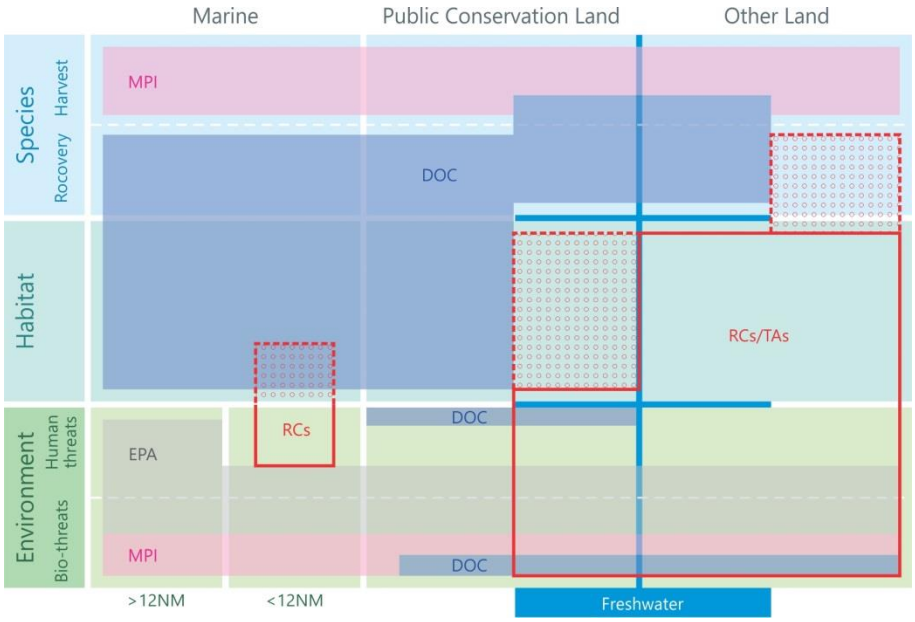


Figure 3 – Schematic distribution of broad scale biodiversity roles

Figure 3 shows *species management* dominated by:

- DOC with its substantial investment in recovery/protection programmes, and responsibilities to protect indigenous animals (excluding fish) under the Wildlife Act and indigenous fisheries under the Conservation Act: and
- MPI (with its roles in ensuring sustainable fishing under the Fisheries Acts, and sustainable indigenous forestry under Part III of the Forests Act).

An area of overlap is indicated representing DOC's role in managing whitebait fishery (under the Whitebait Regulations), which is an anomaly in terms of agency responsibility for sustainable harvest. An area shown by a dashed red line and red spots reflects the current discretionary investment by several regional councils in species recovery operations.

In terms of *habitat management* DOC dominates, being responsible for securing and policing marine reserves and marine mammal sanctuaries in the coastal/marine environment (under the Marine Reserves Act and Marine Mammals Protection Act respectively), and managing the large conservation estate on land. Regional councils and territorial authorities are shown occupying the space denoting "other land" and freshwater. That indicates the roles that territorial authorities play in protecting and identifying sites (terrestrial habitats and ecosystems) off public conservation land under the RMA and, in the case of regional councils, operationally managing specific sites under the Biosecurity Act (BSA) and/or Local Government Act (LGA) and freshwater habitat under the RMA (and potentially the BSA/LGA). The red dashed line and red spots extending into the marine space indicates that at least one unitary authority is proposing to protect specific marine habitats through its resource management plan (although, in accordance with section 30 (2) of the RMA it will be unable to control fishing for the purpose of managing fisheries resources[43]). The red line extending over public conservation land indicates that there are occasions when, for operational efficiency reasons, regional councils may undertake operations on land within conservation estate. Furthermore, there are examples (at least in the case of Auckland) of councils investing in biodiversity programmes on public conservation land in the absence of DOC having the resources to invest itself.

The roles in environmental management are complex and are greatly simplified by Figure 3. The figure shows human threats to ecosystem health managed predominately by regional councils and territorial authorities (through the control of activities involving the use of land and freshwater under the RMA). This includes public conservation land (although in practice regional councils only control risks to freshwater across that area). It also includes the coastal marine area (out to 12NM). For completeness, Figure 3 shows that outside 12NM the Environmental Protection Authority (EPA) is responsible. The EPA is also responsible for the introduction and use hazardous substances (including substances that may be ecotoxic in the environment) nationwide and hence is shown occupying a role across all domains.

The EPA also manages biological risks to ecosystem health thorough its control of the introduction of new organisms into NZ and hence its role is shown as extending into that area. The threat of unintentional introduction of foreign organisms into NZ is managed by MPI under the Biosecurity Act, which applies broadly. DOC also has a role in terms of managing the deliberate release or relocation of species already present in NZ to areas where they may not already be present and where they might pose an ecological risk. Those responsibilities are undertaken under the Wild Animal Control Act and freshwater fisheries regulations. DOC also has a role in terms of regulating the farming of high ecological-risk species (mustelids) under the *Wildlife (Farming Unprotected Wildlife) Regulations*. The regional role is also shown as extending over bio-threats, reflecting regional councils' landscape-wide (i.e. not site specific) operational investment in, and regulation of, pest management under the BSA/LGA.

The figure does not attempt to depict the efforts of individuals, community groups or corporates, although it is acknowledged that they play a significant role in both species and population management.

[43] *Although it may control fishing (e.g. bottom trawling and dredging) for purposes others than managing fisheries resources (e.g. to maintain indigenous biodiversity).*

Regulatory versus operational roles

Despite the best efforts of Figure 3, it is apparent that roles in biodiversity management do not fall into neat boxes. While there are no obvious gaps there are overlaps and inconsistencies in how roles/powers are distributed across multiple players.

The lack of a "tidy" demarcation of roles is even more apparent in the fact that some of the roles depicted in Figure 3 are purely regulatory, others purely non regulatory (i.e. restricted to operational functions), while some are a combination of both. Similarly some are mandatory while others discretionary.

This is most obvious in the red box depicting the local authority area of responsibility. Figure 3 does not differentiate between regulatory and operational (or other non regulatory) roles, but in reality regional councils roles occur that red box in limited ways.

Regional council roles

In simple terms, regional councils apply regulatory methods within the red box where:

- the threat is anthropogenic;
- there is a clear legal mandate for such methods; and
- the regulatory function is not otherwise being (or better) exercised by another authority.

Hence, in broad terms the general practice is that they regulate to maintain the quality of freshwater ecosystems and habitats, and they apply operational methods to maintain and enhance terrestrial ecosystems and habitats. The absence of significant regulatory intervention in terrestrial habitat management by most regional councils, despite case law confirming they have the power to do so, is due largely to that role being undertaken by territorial authorities.

The area indicated by the dashed red line shows the extent of power to regulate. In most cases that power is seldom exercised. The smaller dashed area in "bio-threats" represents the power of regional councils to regulate for pest control on public conservation land using "good neighbour" rules.

The regulatory role in managing land use for biodiversity under the RMA

Section 30 (2) of the RMA sets out the purposes for which a regional council may control land use. That section does not specify the maintenance of biodiversity as one of those purposes. However, section 30 (1) (ga) refers to regional councils' function to establish objectives, policies and **methods** (emphasis added) to maintain indigenous biodiversity. Section 68 (1) states that a regional council may, for the purpose of carrying out any function, include rules in a regional plan.

While this initially caused some uncertainty about the ability of regional councils to write land use rules to protect biodiversity values, the matter was clarified by the High Court in *Property Rights in New Zealand Inc v Manawatu-Wanganui Regional Council [2012] NZHC 1272*. That decision confirmed that regional councils could control land use (i.e. have land use rules) to protect and manage terrestrial biodiversity, as well as rules that relate to freshwater and coastal indigenous biodiversity.

Although that was confirmed in 2012, few regional councils have adopted the land use rule making role. That is largely because territorial authorities have historically filled that part of the management system and continue to do so.

Unitary authorities are an exception. They generally regulate land use for biodiversity protection using district council rule making powers, but in at least one case (Auckland) using regional rule making powers (the authority to do so having recently been confirmed by the Auckland Independent Hearing Panel). Horizons Regional Council also uses regional rule making powers.

The picture as it relates to *species management* is similarly complex. There is no express statutory obligation for either regional councils or territorial authorities to engage in species management – being a field of endeavour that requires operational investment rather than regulatory intervention.

However, there is nothing that prohibits any council from doing so[44] and they have a general mandate to undertake such activity (subject to usual Local Government Act processes) under the broad function of *the establishment, implementation, and review of objectives, policies, and methods for maintaining indigenous biological diversity* included as section 30 (1) (ga) of the RMA.

Whether species management (as defined in this report) is an appropriate role for councils to adopt is a matter for individual councils and their constituent communities.

To the extent that regional councils do engage in species management as a discretionary add-on to core biodiversity responsibilities, species management will require operational investment (people on the ground to undertake work).

As discussed elsewhere the distinction between "species management" and "habitat management" can, in any event, be blurry.

Although there are complexities and exceptions (as noted above) it is fair to say that in practice the core regional council roles centre on:

- Regulating to protect and enhance the *quality and quantity* of freshwater and marine habitat (and broader, supporting environmental quality); and
- Operational investment to enhance the *quality* of habitat (particularly terrestrial habitat).
- Regulating to protect and enhance the quantity of terrestrial habitat where territorial authorities are not undertaking that role (or in the case of unitary councils).

[44] *Assuming they secure required permits as some species management powers (such as translocations) are not available to regional council without DOC consent.*

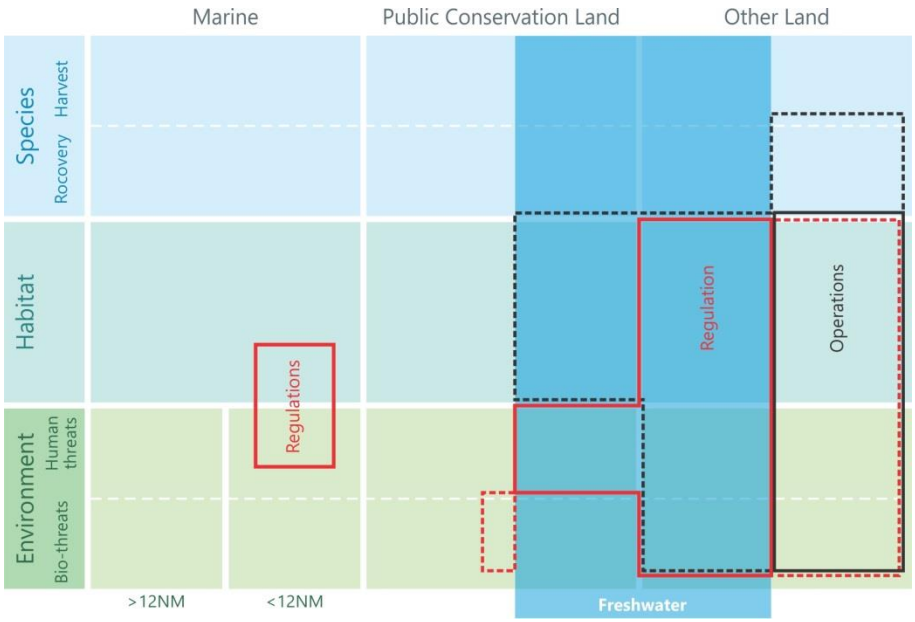


Figure 4 – Schematic summary of regional councils roles in biodiversity management

Territorial authorities

For territorial authorities the opposite is generally true. That is, territorial authorities regulate to maintain the extent and quality of terrestrial ecosystems and habitats. That is generally achieved by district rules that control the clearance of (generally) defined areas of indigenous vegetation, control the location of development that would prose threats to habitats and ecosystems, and provide an incentive to protect and/or enhance areas of significant vegetation (such as rules that provide land subdivision rights in return for the protection of remnant forest or the re-establishment of wetland).

To the extent that territorial authorities are engaged in freshwater biodiversity management, it will generally be operational in nature (such as organising and funding urban stream care groups). However, territorial authorities do have the power to control any of the effects of land use and development (including for the purpose of maintaining indigenous biodiversity – not limited to terrestrial biodiversity)[45].

The role of territorial authorities in *species management* is similar to regional councils. The key difference is that territorial authorities' function under the RMA is narrower than that ascribed to regional councils. The territorial function implies the use of a single method (regulation of land use) when it states *"the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of ….maintenance of indigenous biodiversity"*. Hence there is no mandate under the RMA for territorial authorities to be involved in biodiversity management (including species management) in a manner that relies on methods other than regulation of land use. Having said that, provided it follows the (LTP) process to secure a mandate from its community, a territorial authority can always invest in operational/non regulatory programmes including biodiversity programmes.

[45] *There are at least two examples of territorial authorities attempting to control agricultural land use intensification for water quality reasons.*

Some have done so, though for many, lack of a separate and specific statutory mandate will limit the priority that can be given to such investment proposals.

Unitary authorities of course do not face that limitation having the broader mandate under section 30 of the RMA (in addition to the Section 31 powers).

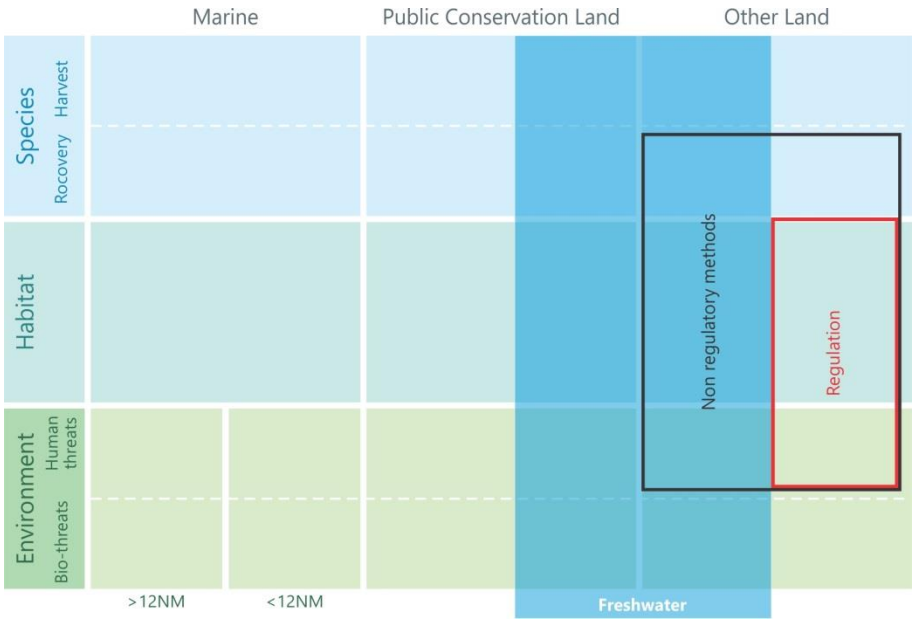


Figure 5 – Schematic summary of territorial authority roles

Appendix 2 – OSPRI Funding changes

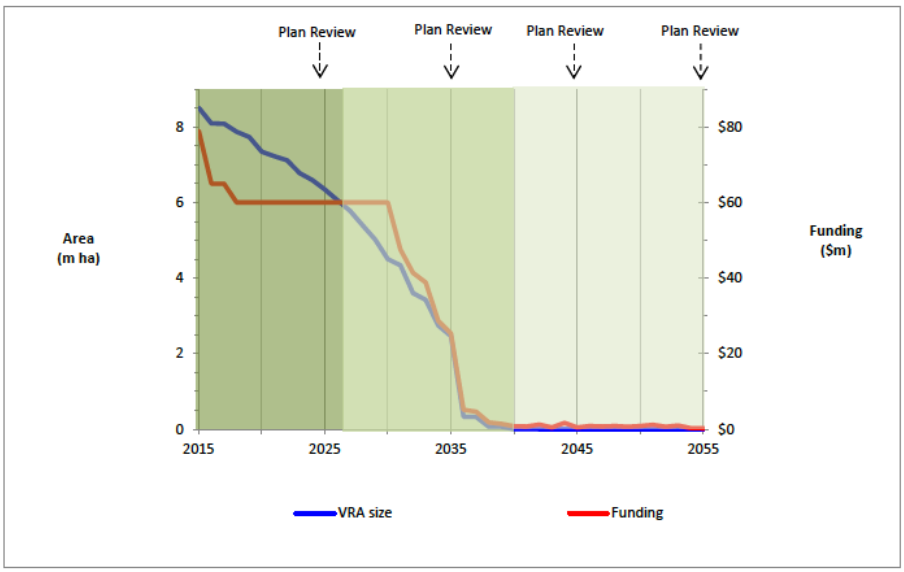


Figure 6 – OSPRI Total Funding profile

Source: Letter from OSPRI Chair, Chris Kelly to Minister Nathan Guy, 30 September 2015

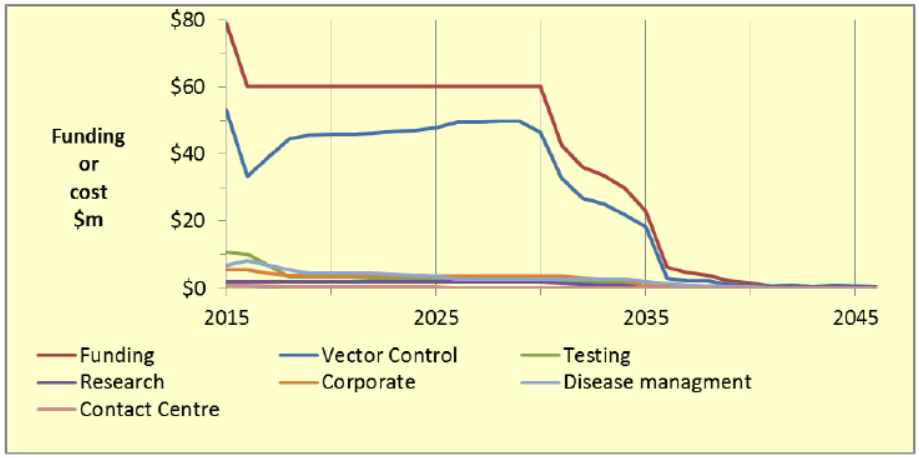
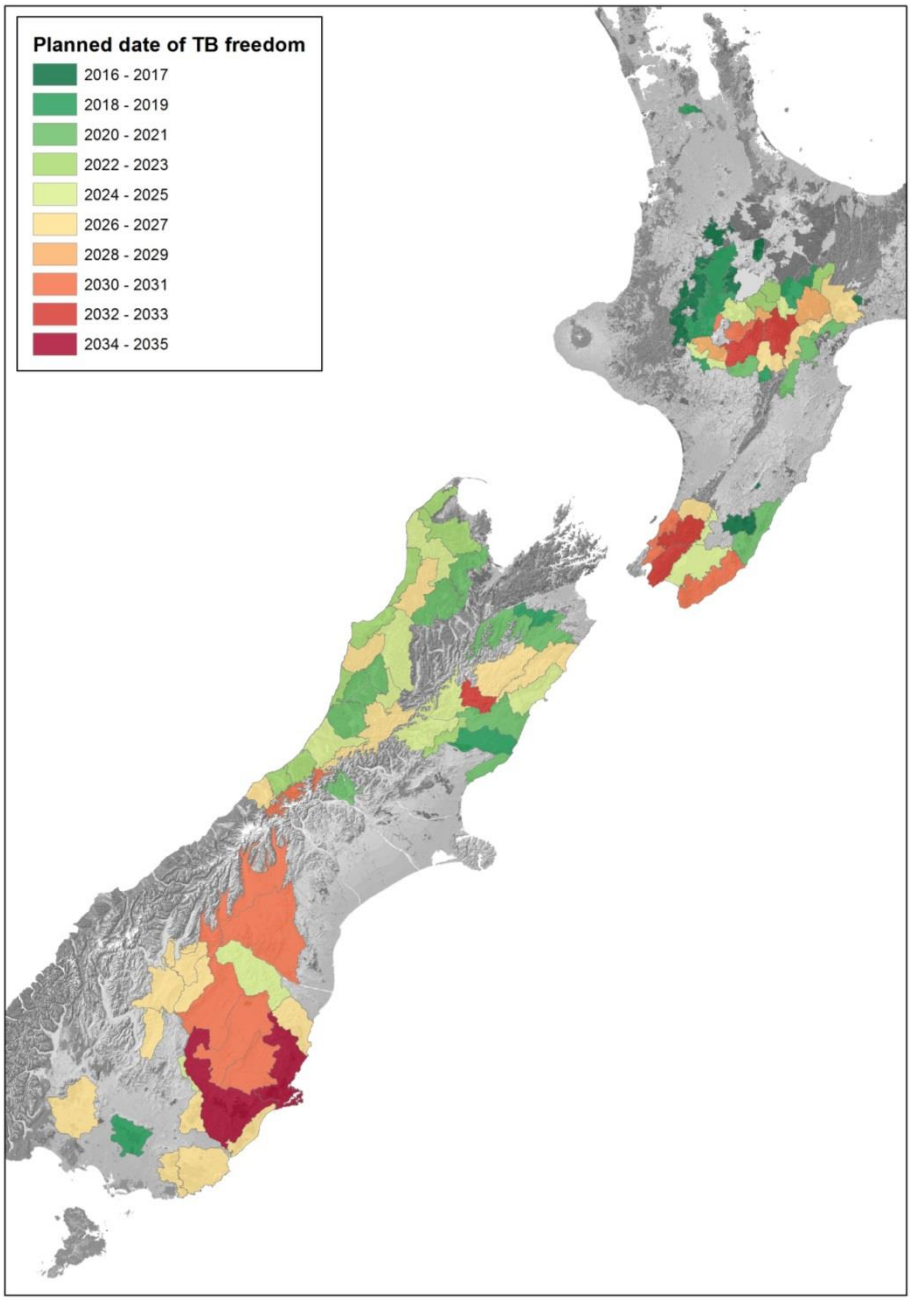


Figure 7 – OSPRI Funding profile breakdown

*Note Figure B was prepared before funding was adjusted to $65 for the first two years

Source: G Nugent, Landcare Research, 19 June 2015

Figure 8 – Timeline of areas expected to be Tb Free



Source: Tb Free National Operational Plan 2016-2055

Figure 8 indicates those areas and dates of expected OSPRI funding withdrawal


NORTHLAND
REGIONAL
COUNCIL

Auckland
Council

Taranaki
Regional Council

Waikato
REGIONAL COUNCIL

Bay of Plenty
REGIONAL COUNCIL

GISBORNE
DISTRICT COUNCIL

HAWKE'S BAY
REGIONAL COUNCIL

horizons
regional council

greater WELLINGTON
REGIONAL COUNCIL

Nelson City Council
te kaunihera ō whakatū

tasman
district council

MARLBOROUGH
DISTRICT COUNCIL

THE WEST COAST
REGIONAL COUNCIL

Environment
Canterbury

environment
SOUTHLAND

Otago
Regional
Council