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Indicator M12: Change in protection of naturally uncommon ecosystems

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Robert Holdaway and Susan Wiser

Landcare Research

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Regional Councils' Biodiversity Monitoring Working Group

Auckland Council
Bledisloe Building, Level 2 South
24 Wellesly St
Auckland Central

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Landcare Research, Gerald Street, PO Box 69040, Lincoln 7640, New Zealand,
Ph +64 3 321 9999, Fax +64 3 321 9998, www.landcareresearch.co.nz

Reviewed by:	Barbara Anderson, Landcare Research Kirsty Johnston, Environment Canterbury
Approved for release by:	Fiona Carswell Portfolio Leader – Enhancing Biodiversity Landcare Research

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Overview

In 2010, the Technical Group of the Regional Council Biodiversity Forum worked with Landcare Research to develop the Regional Council Terrestrial Biodiversity Monitoring Framework.[1]

This framework is designed as part of 'a national, standardised, biodiversity monitoring programme, focusing on the assessment of biodiversity outcomes, to meet regional council statutory, planning and operational requirements for sustaining terrestrial indigenous biodiversity'

The terrestrial biodiversity monitoring framework adopts the same approach as the ecological integrity framework designed by Landcare Research for the Department of Conservation (DOC) and consists of three components: (i) indigenous dominance, (ii) species occupancy, and (iii) environmental representation.[2] To inform the framework, there are four broad areas: (i) state and condition, (ii) threats and pressures, (iii) effectiveness of policy and management, and (iv) community engagement.

A standardised monitoring framework ensures that data for each measure are consistent among regional councils, which allows for reliable State of Environment reporting. Furthermore, to enable national reporting across public and private land, it is also desirable that where possible, measures can be integrated with those from DOC'sBiodiversity Monitoring and Reporting System (DOC BMRS).[3] The monitoring framework covers most categories of essential biodiversity variables[4] recommended for reporting internationally, addressing species populations, species traits, community composition, and ecosystem structure adequately, but does not address genetic composition and only in part ecosystem function.

This report contains descriptions of 18 terrestrial biodiversity indicators developed within this framework by scientists who worked with regional council counterparts and representatives from individual regional councils. Each indicator is described in terms of its rationale, current efforts to evaluate the indicator, data requirements, a standardised method for implementation as a minimum requirement for each council, and a reporting template. Recommendations are made for data management for each indicator and, for some, research and development needed before the indicator can be implemented.

The terrestrial biodiversity indicators in this report are designed to enable reporting at a whole-region scale. Some of the indicators are also suitable for use at individual sites of interest within regions. Each indicator is described in terms of a minimum standard for all

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[1] Lee and Allen 2011. Recommended monitoring framework for regional councils assessing biodiversity outcomes in terrestrial ecosystems. Lincoln, Landcare Research.

[2] Lee et al. 2005. Biodiversity inventory and monitoring: a review of national and international systems and a proposed framework for future biodiversity monitoring by the Department of Conservation. Lincoln, Landcare Research.

[3] Allen et al. 2013. Designing an inventory and monitoring programme for the Department of Conservation's Natural Heritage Management System. Lincoln, Landcare Research.

[4] Pereira et al. 2013. Essential biodiversity variables. Science 339, 277–278.

councils. If implemented by all councils, each measure can then be aggregated to allow national-scale reporting (e.g., for State of Environment reports, or for international obligations such as reporting on achievement of Aichi Targets for the Convention on Biodiversity). Individual councils could add additional measurements to supplement the minimum standards recommended.

Three of the 18 terrestrial biodiversity indicators – Measures 1 'Land under indigenous vegetation', 11 'Change in temperature and precipitation', and 18 'Area and type of legal biodiversity protection' – were implemented and reported on for all regional councils in June 2014. An attempt to implement and report two others at that time – Measures 19 'Contribution of initiatives to (i) species translocations and (ii) habitat restoration' and 20 'Community contribution to weed and animal pest control and reductions' – was unsuccessful because the data needed for these indicators was either not readily available or not collected in a consistent way, and investment will be needed to remedy these issues before they can be reported successfully.

9 Indicator M12: Change in protection of naturally uncommon ecosystems

Authors: Robert Holdaway and Susan Wiser, Landcare Research

9.1 Introduction

Indicator M12 reports change in protection (area and type) of naturally uncommon ecosystems. This definition is reduced in scope from the original 'change in extent and protection of habitats or naturally uncommon ecosystems' to avoid overlap with other measures, particularly M9 ('Habitat and vegetation loss') and M18 ('Area and type of legal biodiversity protection achieved on private land'). Spatial data on legally protected areas are available from the Protected Areas Network (PAN-NZ) spatial layer or an equivalent spatial layer maintained by the regional councils. The six classes of legal protection described in M18 will also be employed here (section 15, Table 15-6). A list of naturally uncommon ecosystems is provided in Table 4-1 (section 4.2.2 'Vulnerable ecosystem definition'). The capacity to report change in protection (area and type) of naturally uncommon ecosystems comprehensively in any region is entirely contingent on comprehensive mapping of all naturally uncommon ecosystems in each region (needed for M5). Evaluating this measure (M12) simply involves overlaying these two spatial layers to estimate the area and type of legal biodiversity protection for each ecosystem type. The basic M12 reporting statistics are

- a list of ecosystems to be reported on (based on results of M5)
- dated estimates of extent (ha) occupied by each ecosystem (based on repeat assessment of M5)
- dated estimates of extent (ha) with legal protection, by protection class, for each ecosystem
- percentage of the total area protected for each ecosystem (by protection class, for two time periods)
- percentage change in area protected for each ecosystem (by protection class). This should be expressed as an annual rate of change (hectares per year).

Issues of data access and data sensitivity are important and will need to be taken into consideration, particularly for sensitive ecosystems on private land. The accuracy of the spatial layers used also needs to be considered, and any information derived from these layers should be treated as indicative only and should not be used to guide policy decisions about a particular site without a site visit.

9.2 Scoping and analysis

Indicator M12 was originally defined as 'change in extent and protection of habitats or naturally uncommon ecosystems' (Lee & Allen 2011). We have narrowed this definition to 'change in protection (area and type) of naturally uncommon ecosystems'. This was done to avoid overlap with other measures, particularly

- M9 ('Habitat and vegetation loss'), which measures change in extent of LCDB habitat types and naturally uncommon ecosystems
- M18 ('Area and type of biodiversity protection achieved on private land'), which measures area protected and change in area protected for LCDB habitat types.

By protection, we refer to *legal* protection. We are cognisant of two limitations. First, not all forms of legal protection assure the same degree of protection for conservation purposes. For example, mining can potentially be allowed on certain parts of the land administered by the Department of Conservation (DOC). Second, legal protection does not necessarily directly equate with biodiversity protection. Legal protection does not necessarily guarantee that the ecological condition of a particular site will be good; ongoing degradation to a protected site can proceed for a number of reasons, such as the impacts of exotic plants and animals or disturbances such as fire and climate change.

Assessing the change in legal protection of naturally uncommon ecosystems requires two sets of spatial information available from other measures. Spatial layers of extent of naturally uncommon ecosystems will be derived as part of M5 ('Vulnerable ecosystems'). Spatial data on legally protected areas are available from the Protected Areas Network (PAN-NZ) spatial layer or an equivalent spatial layer maintained by the regional councils (Note: it is recommended that a single national layer such as PAN-NZ is used and continuously updated by all councils; see M18 section 15).

Current extent of legal protection (area and type) can be assessed with single point-in-time spatial layers of ecosystem extent and protected areas. Change in extent of legal protection requires spatial data from two points in time. The requirements for two sets of spatial data and the fact that both ecosystem extent and legal protection are unlikely to change rapidly means that this measure should be reported every 3 years, as the data become available through implementation of M5 and M18.

The caveat that legal protection does not necessarily directly equate with biodiversity protection is relevant for both M12 and M18; both use legal protection for practical reasons. Changes in legal protection may falsely give the impression that some positive action is occurring. Legal protection does not necessarily mean that basic standards of care are in place. For example, it can be difficult for communities to seek external funding for reserves where the Crown is unable to fund any basic actions such as fencing. Another example is the extra process involved to plan actions on land with high degrees of legal protection including restricted access (e.g. nature reserves, scientific reserves). The relationship between legal protection and biodiversity protection therefore needs to be taken into account when interpreting the results of M12.

9.3 Assessment of existing methodologies

A questionnaire was undertaken by phone to assess existing methodologies employed by the regional councils that might be relevant to M12 (see responses in Appendix 9). As this measure is reliant on data from M5 and M18, comments provided on those measures are relevant here as well. In general, change in extent of legal protection of naturally uncommon ecosystems was not currently reported on by any council.

National-level data exist that are relevant to this measure. The PAN-NZ spatial layer is available from the 'Our Environment' website hosted by Landcare Research at http://ourenvironment.scinfo.org.nz/home, and provides the necessary spatial data on legal protection. Draft national-scale layers for naturally uncommon ecosystems are also available from DOC for some ecosystems. Additionally, some councils have mapped the extent of a least a subset of the naturally uncommon ecosystems that occur within their jurisdictions (Bay of Plenty, Waikato, Taranaki); further details are in section 4 (Indicator M5: Vulnerable ecosystems).

9.4 Development of a sampling scheme

A list of naturally uncommon ecosystems, based on Williams et al. (2007), is listed for M5 (section 4.2.2, Table 4-1). Spatial layers of protected areas can be sourced from the national PAN-NZ data layer (see M18: Area and type of legal biodiversity protection; section 15). Indicator M12 simply involves overlaying the spatial layers of both M5 and M18 to estimate the area and type of legal biodiversity protection for each ecosystem type. The six classes of legal protection described in M18 will also be employed here. These six classes form a ranking scale from 0 to 5, with 0 being no legal protection and 5 being a wildlife sanctuary, which is the highest form of legal protection.

9.5 Data management and access requirements

Data storage and data ownership issues will be similar to those listed for M5 (section 4). Spatial data should be stored as shapefiles and compiled as a national data layer, in collaboration with DOC's team that maps rare ecosystems and wetlands. Associated data should be stored in databases directly linked to the spatial shapefiles in a GIS system. All GIS shapefiles should contain sufficient metadata to enable repeat measurements and interpretation by other potential users.

To enable accurate assessments of change over time, efforts must be made to ensure standardisation of field methods, data storage, and data formats across time. This will facilitate rapid and reliable comparison of data over time.

Three aspects of these data raise issues of data access.

1. Many of these ecosystems are highly sensitive and revealing locations to the general public is unwise. This is much the same problem encountered with threatened species. As an example, the New Zealand Speleological Society (NZSS) holds a spatial layer of cave systems throughout the country that could be used to inform mapping of several naturally uncommon ecosystems that are subterranean or semi-subterranean. However, the Society and its members are generally reluctant to provide information to external parties, largely to conserve/protect caves and karst landforms, but also due to cave search and rescue concerns. These give rise to several confidentialty implications: (a) MOUs for data sharing between agencies should be developed governing how any data so exchanged are used; (b) staff within an agency with access to these data may need to be bound by confidentiality agreements; and (c) data display needs to be controlled. One solution might be to hide the specific data points from public view for a specific layer at a certain map scale, but retain the information for

data analyses to calculate the indicator. It is important to recognise that, even with caveats, there can be problems sharing such sensitive information. As the NZSS wrote regarding the use of its cave system data layer:

> *Once specific location data has been placed in a large organisation like DOC, we ultimately lose control of its security. One manager's well-meaning assurances may disappear when he/she leaves or is promoted. Even if the information is kept strictly within the Department, that still makes it accessible to a very wide group of people. This is a case where making sensitive information available for positive management could very easily lead to further degradation, both of the ecosystem of interest and the caves beyond.*

2. Many occurrences of naturally uncommon ecosystems are on private land, so there may be landowner privacy issues as well. This depends on how the data are used and displayed. If the data are used in a general way that does not link a location with a property owner's name, the risk is lower. An even better approach is to keep publicly available information to a broad scale that does not allow for specific locations to be identified with any accuracy.

3. The spatial layers are likely to contain error. At the national scale, current spatial layers of naturally uncommon ecosystems have been created by combining pre-existing spatial layers, by spatial modelling, or by digitisation based on aerial imagery. None of these layers has been ground-truthed. This means that any information derived from them is indicative only and cannot be used to guide policy decisions regarding a particular site without undertaking a site visit.

9.6 Reporting indices and formats

Basic M12 reporting statistics are

- a list of ecosystems to be reported on (based on results of M5)
- dated estimates of extent (ha) occupied by each ecosystem (based on repeat assessment of M5)
- dated estimates of extent (ha) with legal protection, by protection class, for each ecosystem
- percentage of the total area protected for each ecosystem (by protection class, for two time periods)
- percentage change in area protected for each ecosystem (by protection class). This should be expressed as an annual rate of change (hectares per year).

An example of a reporting table combining results from M12 and M18 is given in section 15 (Indicator M18: Area and type of legal biodiversity protection). Here, we provide an example of a reporting table linking M12 to M5 (Table 9-1).

Table 9-1 Example reporting table linking M12 to M5

	Current extent (ha)	Area protected by legal protection class						Total area protected (%)	Percentage	
Naturally uncommon ecosystem		1	2	3	4	5	6		Ecological integrity status	Description of integrity measure assessed
Ecosystem 1										
Ecosystem 2										
(etc.)										
(etc.)										

9.7 References

Lee WG, Allen RB 2011. Recommended monitoring framework for regional councils assessing biodiversity outcomes in terrestrial ecosystems. Landcare Research Contract Report LC144 for the Regional Council Biodiversity Forum Technical Group. 29 p.

Williams PA, Wiser S, Clarkson B, Stanley MC 2007. New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. New Zealand Journal of Ecology 31: 119–128.

Appendix 9 – Summary of input from regional/district council staff

Initial consultation

During the development of this measure, feedback from regional/district councils was sought in relation to the following questions (see Table A9-1 for staff contact details):

1 Do you have a data source for protected areas in your region? Does the Protected Natural Areas GIS layer (available on the Landcare Research 'Our Environment' website) suit your needs or is there a mismatch with what land tenure decisions you feel results in protection?

2 How often do you feel you need to report on this?

3 Are you currently assessing this in any way? How is your data stored?

Table A9-1 Regional/district council contacts and date feedback was received

Council	Name	Date
Auckland Council	Stacey Byers; Craig Bishop	13 November 2012; 17 January 2014
Tasman District/Nelson City Council	Mike Harding	10 December 2012
Bay of Plenty Regional Council	Nancy Willems	11 December 2012
Waikato Regional Council	Craig Briggs / Yanbin Deng	11/13 December 2012
Greater Wellington Regional Council	Philippa Crisp	12 December 2012
Marlborough Regional Council	Nicky Eade	12 December 2012
Horizons Regional Council	James Lambie	9 January 2013
Otago Regional Council	Richard Lord	11 January 2013
Taranaki Regional Council	Rebecca Martin	20 March 2013
Hawke's Bay Regional Council	Keiko Hashiba	21 March 2013

Summary of feedback received

1. Do you have a data source for protected areas in your region? Does the Protected Natural Areas GIS layer (available on Landcare Research 'Our Environment' website) suit your needs or is there a mismatch with what land tenure decisions you feel results in protection?

- Where such assessments are made, each council is collating data sources independently to derive protection layers – usually combining layers depicting public conservation land, QEII covenants, Ngā Whenua Rāhui and council reserves [Nelson City, Bay of Plenty, Wellington, Auckland, Horizons, Taranaki, Hawke's Bay].
- Issue that not all 'protected' areas protected to the same degree

- Information is also only collated for specific areas of interest, not the entire region [Auckland].
- Don't all land have titles with protection status? Why doesn't LINZ manage this?
- There is often supplemental, site-based information on land where the owners are undertaking conservation management, but the land does not have a legal conservation status [Bay of Plenty, Waikato].
- Other councils have layers of SNAs (Significant Natural Areas), but these are not necessarily protected [Marlborough].

2. How often do you feel you need to report on this?

- Auckland Council: 3–5-yearly
- Bay of Plenty Regional Council: Annually
- Nelson City Council: 3-yearly
- Greater Wellington Regional Council: 5-yearly
- Marlborough Council: 5-yearly
- Waikato Regional Council: 5-yearly
- Horizons Council: 5-yearly
- Taranaki Regional Council: 5-yearly
- Hawke's Bay Regional Council: Annually for lowland areas, 5-yearly for the entire region
- Tasman District Council: Don't know
- Otago Regional Council: Don't have the need

3. Are you currently assessing this in any way? How is your data stored?

- Data stored in GIS systems with ancillary data stored in databases or spreadsheets [Wellington, Waikato, Bay of Plenty, Nelson City, Taranaki]
- Some assessments made for specific districts (e.g. Waitakere Ecological District) but data not collated for the entire region [Auckland]