



Review of monitoring approaches to deliver healthy ecosystems for Scotland's protected fresh waters and wetlands

Richard Gosling, Neil Coles, Sarah Halliday, Sayali Pawar, Andrew Black, John Rowan
University of Dundee, Nethergate, Dundee, DD1 4HN, Scotland, UK

Aim of the project

NatureScot is committed to playing a key role in reversing the decline in freshwater biodiversity in Scotland. This effort aligns with Scotland's goal to safeguard 30% of its land and sea by 2030. The organisation has identified that to deliver healthy ecosystems, a wider understanding of the pressures and threats to our freshwaters and wetlands is required. The aim of this project is to make recommendations on a monitoring framework that will achieve this.

To accomplish this, the project undertook a review of approaches taken to better understand ecosystem health elsewhere in the world. The approach taken brought this review alongside engagement with key partners in Scotland who are invested in the protection of our ecosystems. Through a series of interviews and an online workshop, a common understanding of 'healthy ecosystems' (**Box 1**) was developed, along with an identification of current monitoring practices and the opportunities available to NatureScot to improve its current monitoring programme.

Box 1

Defining healthy ecosystems

Ecosystem health is a measure of the capacity of an ecosystem to maintain its structure and function over time in the face of external stress.

In the context of freshwater and wetland protected areas restoration in Scotland, healthy ecosystems are defined as having reached the least degraded and most ecologically dynamic state possible.

Key Findings

1. Monitoring to inform the delivery of healthy ecosystems should recognise that freshwater and wetland ecosystems are open and unstable systems that are rarely free of pressures.
2. There are existing tools and techniques, and examples of frameworks to utilise them, that NatureScot could use to assist in transitioning towards developing a healthy ecosystem approach to monitoring.
3. Indicators of pressures on ecosystems are valuable as they generate stakeholder-relevant evidence to inform decision-making on the management of protected areas.

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4. A structured monitoring framework would extract value from a wide range of existing datasets, from a diverse set of partners, that are currently underused.
5. To be able to effectively use this wider ecosystem evidence, a common system for joining together NatureScot's and partners' data, in both space and time, should be developed.
6. By strengthening existing and developing new partnerships to deliver collaborative monitoring and data sharing, and by harnessing new technologies there is the potential to increase the overall value of ecosystem monitoring
7. Using greater automation and citizen science provides the potential to expand monitoring capacity and, at the same time, enhance a sense of stakeholder ownership.
8. Data sharing can provide access to monitoring that captures long-term trends and risks that could help improve an understanding of ecosystems and discriminate between local and global threats at different levels of severity.

Recommendations

The project recommends that a framework that would allow the flexible use of data from a wider range of sources and scales is developed. This framework would combine these data to identify what is wrong with the health of an ecosystem and use indicators of pressure and threats to point to why it is wrong. The main project report provides an example of such a framework and presents guidance on how such a monitoring approach could be used to inform management that would deliver healthy ecosystems.

For NatureScot to transition to this broader landscape approach (Figure 1), the following key steps have been identified:

1. Working with monitoring partners to assess the availability, format, and accessibility of existing healthy ecosystem indicator data.
2. Building the necessary skills to collate, interpret and apply a wider ecosystems dataset.
3. Developing a data integration approach that will synthesis ecosystem data across a range of data types and scales.
4. Evaluating the policy, resource, and legislative implications of a new monitoring approach.

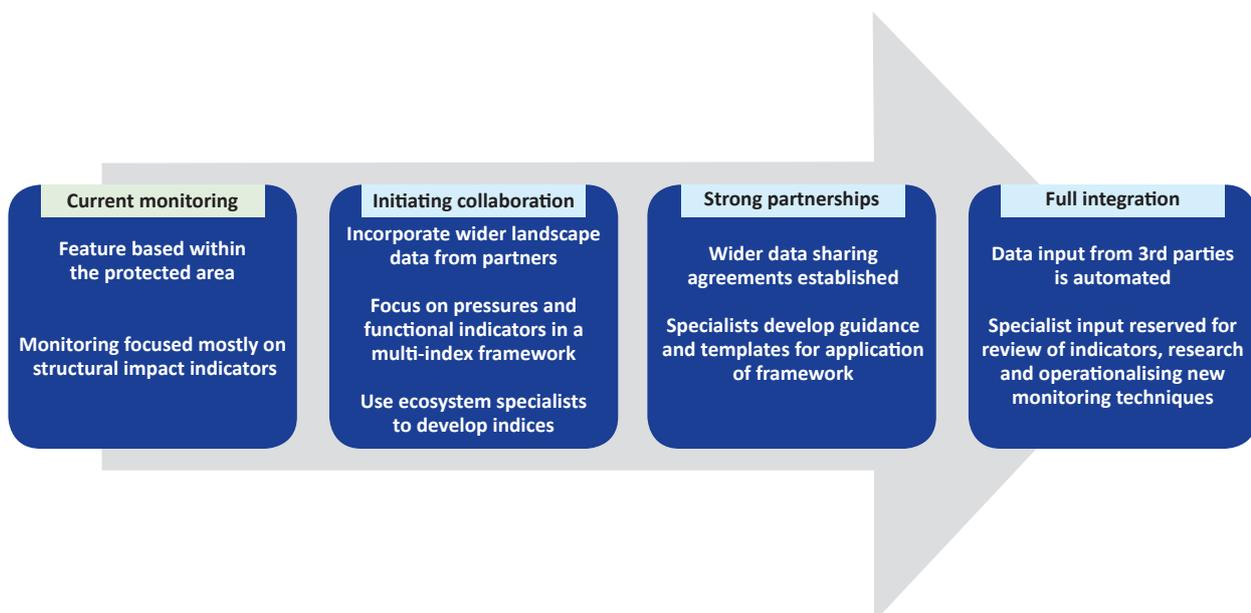


Figure 1: Roadmap for monitoring to inform the delivery of healthy freshwaters and wetlands in Scotland