

Monitoring conservation management

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1 Introduction

This guidance focuses on monitoring nature conservation management, typically in habitats with a cultural history of management. Most habitats of conservation value can be allocated to one of the following categories:

1. Habitats subjected to regular and intensive management disturbances, typically on some form of rotation, e.g. intensively managed dry heaths, arable land, and drainage ditches;
2. Semi-permanent habitats that are subjected to regular management disturbances, e.g. meadows, pastures and forest; and
3. Naturally formed habitats, e.g. dunes, fens, raised bogs and lakes, impacted by direct or indirect disturbances as a result of human activities.

Habitats in categories 1 and 2 have a long history of cultural management and their condition will be strongly linked to how they are managed. Developing projects to monitor conservation management in these habitats should be relatively straightforward, though we need to be aware of the management rotation for habitats in Category 1.

Large expanses of 'near-natural' habitat of that do not fit into these categories should probably be considered wilderness and are beyond the scope of this book. Perhaps our only interference with these increasingly rare habitats should be to a) give them the highest level of protection, b) buffer them, as best we can, from the effects of human activities, and c) provide the opportunity for expansion. If the value of the habitat is simply its ability to be self-sustaining, we should not have any expectations of it. As such, research and surveillance programmes are more appropriate in wilderness situations than the form of monitoring being recommended here.

1.1 What do we mean by 'conservation management monitoring'?

We use the phrase 'conservation management monitoring' to mean recording the condition of habitats or species against clearly defined and measurable management aims. However, this also aligns well with Hellawell's (1991) generic definition of the word 'monitoring', which is:

"Intermittent (regular or irregular) surveillance carried out in order to ascertain the extent of compliance with a predetermined standard or the degree of variation from an expected norm."

This distinguishes monitoring from other forms of ecological investigation, such as:

- *Survey*, which is typically a 'one-off' descriptive exercise, perhaps to describe the habitats on a site or to map the distribution of a species;
- *Surveillance*, which is a repeatable survey, often used to detect trends in habitats, populations and environmental change;
- *Research*, which is carried out to increase our knowledge about a species or habitat, perhaps through ecological modeling, population viability analysis and demographic studies.
- *Experimental management*, which is a form of research developed to determine the effects of different management practices;
- *Environmental impact assessment*, which assesses the likely effects of a development or incident.

- *Natural history recording*, which tends to be data collected on an *ad hoc* basis during site visits, these data typically contribute to historical archives.

Data from any or all of these sources can be valuable for informing conservation management decisions. It is always important to be clear, however, which of these activities (all of which can be claimed to be embraced within the broad church of monitoring) we are referring to. There is a case for referring to the monitoring recommended in this set of guidance as 'Management monitoring' - a term used by the management and monitoring teams undertaking this work at Krkonoše NPA in the Czech Republic (Hurford & Březina. 2017).

2 Monitoring the effects of conservation management

Conservation management projects that incorporate a monitoring component represent good practice in nature conservation, especially where our management actions directly link to maintaining the conservation value of the habitat. In wilderness, or semi-wilderness situations, or true re-wilding projects, this type monitoring is less appropriate, unless we are having a direct management input.

In Europe, however, most conservation management actions take place in habitats with a long history of cultural management, such as grassland, forests, heaths, sand dunes, fens, mires, watercourses and lakes.

Since the early 1800s, the conservation value of these habitats has suffered as a result of changing agricultural practices; atmospheric depositions, urban development and spread; industrialisation; commercial forestry operations; the leisure industry; and, in smaller and less accessible habitats, neglect. In the UK, for example, we know that:

- The vast majority of species-rich meadows and pastures have been ploughed-up and reseeded as permanent leys;
- Large areas of heathland have been lost or degraded through overgrazing and afforestation;
- Many fens have been drained;
- All of our raised mires have been damaged by peat-cutting, drainage and/or afforestation;
- Many native deciduous forests have been felled, neglected or both;
- Many of our lakes and watercourses have suffered from either acidification or eutrophication;
- Many small ponds have been lost through drainage or neglect;
- Farmland bird populations have crashed;
- Arable plant populations are in steep decline;
- Bees populations are crashing;
- Many butterfly species are declining, both in numbers and in range, as a result of habitat loss and degradation; and
- Bat populations have also suffered large declines.

This list is neither exhaustive nor exclusive to the UK: many European countries have experienced similar declines and several of these are global issues. In response to these losses, many of the more important sites for nature conservation in Europe are now part of the Natura 2000 network. The great challenge is to secure the management of these sites so that their conservation interest is secure into the future. Habitat degradation is now a greater threat to these sites than habitat loss.

Many conservationists still believe that, if we protect a site from development, natural processes will provide habitats of high conservation value: this 'non-interventionist ideology' has recently resurfaced under the sexier title of 're-wilding'. This may be the case where large areas of wilderness persist, but it is a flawed concept when dealing with habitats that have been shaped, or impacted, by cultural activities. If we want to restore the conservation interest associated with these habitats, we have to manage them appropriately. It is no secret that if we neglect a species-rich hay meadow it will soon become rank and species-poor before turning to scrub and eventually woodland (Grime, 2001 etc.). When managing habitats with a cultural management history, first we must decide what we want the management to achieve, and then we must carry out the management. Subsequent monitoring will tell us whether the management is achieving its aims and will give us an opportunity to adjust the management if we don't see the expected response.

3 Decision-making and accountability

Deciding what to manage for, and then monitoring to see whether the management has been successful, has represented a change of culture for conservation managers since the introduction of the Habitats Directive in 1994. However, if we are aware that a threatened habitat or species is declining and do not respond, we are making a management decision that will almost certainly lead to further degradation or loss, so we might as well make a positive management decision and learn from it. In this respect, the Habitats Directive has been a catalyst for good practice in conservation management.

The one certainty in nature conservation is that the resources for management and monitoring will be limited. There is never sufficient funding to do everything that we would like to do. Even from a 'monitoring' perspective, we could put a case for needing a) compliance monitoring to check that the land manager is adhering to the management agreement; b) environmental monitoring to keep tabs on factors such as the water table, atmospheric deposition and soil pH; c) surveillance to detect species and habitat trends etc etc. Ideally, we would have the resources to do all of these things and to carry out the necessary management. However, if we only have the resources to do one thing, then a condition assessment for a habitat or species will tell us initially if things are not as we would expect them to be and provide a prompt to make an appropriate response, which might require additional information.

At best, compliance monitoring will provide us with an indication of whether the land manager is conforming to a management agreement. It will not tell us anything about whether that management agreement is maintaining the conservation value of the site. By contrast, the condition of the vegetation can always tell us something about how the management of the site.

Environmental monitoring is generally an expensive process carried out on a national or regional scale, rather than on individual sites. There are few examples of site-specific limits for pollution that serve as an early warning of threats to habitats or species, though some alerts are in place to protect vulnerable bird populations at Doñana in SW Spain. There is no doubt that surveillance of environmental factors provides valuable background information for conservation managers, but we rarely have enough site-specific information to trigger management decisions. Again, it is perhaps more practical to detect the impacts of the critical environmental factors by assessing the condition of the habitat/s.



Surveillance also has a role to play in informing conservation management, but seems best adapted for detected national or international trends. It has not yet proved to be an effective tool for prompting site-based nature conservation actions.

Therefore, conservation management monitoring fills an important niche by facilitating timely and appropriate management decisions that will deliver effective conservation: surveillance has never done this because it tends to be a research tool with no trigger for management action. Applying site-specific conservation management monitoring projects is good practice because it prompts us to:

- Consider why our sites are important;
- Prioritise our resources for managing the most important habitats and species;
- Consider how to recognise when a habitat or species is in optimal condition;
- Consider how to recognise when a species or habitat is under threat; and
- Provide feedback that allows us to make a timely and appropriate management response, critically before irreparably damaging the habitat or species.

There are also longer-term benefits. By stating why a site is important, and clearly defining what we want our management to achieve, we will overcome the problems linked to management discontinuity. There are always risks attached to a change of conservation manager, and this can have a dramatic impact on the conservation value of a site. Each individual will have their own views on why a site is important, often based on their own particular interests. As such, unless we clearly identify the management priority on the site and where to focus the management effort, there is a real possibility that the management will reflect the interest of whoever is responsible for it.

The primary aim when developing the monitoring methods recommended here was to reliably assess the condition of the habitats and species as efficiently as possible. This means:

- Focusing on what we need to know – and not what it would be nice to know;
- Using existing knowledge to identify the key attributes;
- Minimising the potential observer variation, by using measurable attributes; and
- Using survey information combined with logic to identify the most appropriate locations to monitor.

This monitoring approach is underpinned by logical inference drawn from our existing knowledge of the sites and the habitat or species. The methods were designed to answer practical questions about conservation management in cultural habitats.

They were not developed for research purposes, though the issues of measurability and observer variation are relevant to any ecological sampling exercise. The problems of measurability are outlined in some detail in the section on 'Minimising observer error'.

Finally, this guidance centres on issues relevant to managing and monitoring threatened habitats and species on sites protected for nature conservation, i.e. those sites that provide a refuge for species that are struggling to survive in the wider countryside. Failing to protect these habitats and species on sites designated as nature conservation areas will seriously diminish the potential to restore the wider countryside.



References

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