CHAPTER NINE

The use of evidence in decision-making by practitioners

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9.1 Introduction

Conservation practitioners are usually tasked with a very diverse set of activities within their job. A typical week for a reserve manager might involve managing staff, volunteers, contractors and budgets; liaising with people both within and outside of their organisation; dealing with health and safety and other legal obligations; taking part in a range of meetings; and replying to numerous emails about a wide range of topics. If the site is heavily visited, there will invariably be many tasks regarding visitors. In addition, practitioners also have to decide how best to manage their site for conservation.

In this chapter, we describe the processes that organisations and practitioners use to make conservation decisions, the trade-offs between resources spent monitoring and carrying out conservation management, and the types of information practitioners use to inform these decisions. We then discuss ways to ensure that decisions at sites are based on good evidence. We combine literature and theory on what constitutes best practice for reserve management with our practical experience. While our examples are focused on conservation land management at the site level, these frameworks and processes are generally applicable to decision-making in many other conservation contexts.

9.2 Types of conservation decisions made by practitioners

Decisions about the conservation management of sites are often complex. There are several reasons for this. First, many types of habitat management aim to achieve multiple objectives, and these will differ between sites. For example, a fire regime might aim to prevent an area of grassland from

https://doi.org/10.1017/9781108638210.009 Published online by Cambridge University Press

succeeding to scrub, while also aiming to maintain or increase plant species richness and provide a continuity of suitable conditions for particular bird species. Habitat management can also involve using different techniques in combination. For example, a wetland might be managed using a combination of livestock grazing and water-level control, while an area of dwarf-shrub heath might be managed through a combination of grazing, cutting and burning. Good management of sites, therefore, rarely involves simply implementing 'off-the-shelf' conservation actions. Furthermore, even where a single technique is used to benefit a single species (or group of species), practitioners usually still need to tailor the details of how it is implemented to the specific circumstances at their site.

Finally, decisions can also involve trade-offs between ecological, social and economic factors, and there may also be great uncertainty about the risks and benefits of each option. Meanwhile, practitioners are often working with limited resources, the scientific evidence may be conflicting, multiple decision-makers and stakeholders might have different preferences and opinions, and people inherently often do not make rational decisions.

9.3 Decision-making processes used by conservation organisations

The conservation management of nature reserves and other protected areas is usually the product of several levels of decision-making: strategic-level decisions, site-level management planning and what we will call 'day-to-day decision-making' by practitioners. Decisions taken at each of these levels are influenced by the decision-making process, the people involved in decisions and the evidence used to inform them (Table 9.1).

Decisions at the strategic level focus on the overall aims of the reserve network in which individual reserves sit, as well as the formulation of policies within which these reserves operate. An example of a policy might be an organisation's approach to allowing wildlife hunting on its land, including the range of acceptable methods allowed. Strategic decisions are discussed elsewhere and we will not focus on these here (Margules & Pressey, 2000; Pressey et al., 2007; Wilson et al., 2009).

Site-level management planning processes (or site action planning) help practitioners develop objectives for reserves and identify the management actions needed to achieve them. For example, they might help decide the aims of managing a wetland, the desired water-level regime and proportions of swamp and open water, and the frequency of cutting the swamp vegetation needed to achieve these. These processes are also used to decide what monitoring is needed to determine whether the actions are achieving these objectives, or to detect other important changes, particularly those that might trigger management actions.

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Table 9.1 *A summary of factors that influence conservation management decisions at different levels*

Components of a decision	Strategic-level decisions	Site-level planning decisions	Day-to-day decisions
Frequency, context and potential consequences	These are made infrequently to set long-term, overarching aims and objectives for a network of sites, and policies within which sites operate. They require high-level planning and foresight, because the consequences of strategic decisions are high. They set the context within which site-level decisions are made	These commonly occur on a five-year cycle, but may be reviewed more frequently. They determine which management actions to implement to achieve agreed goals and objectives for individual sites. This planning stage is crucial, because it provides the context within which day-to-day management decisions are made	These often need to be made quickly, with the details of decisions often important in determining whether or not conservation actions will be successful
Decision-support tools and planning processes	Frameworks and methods to assist with strategic decisions include prioritisation decision support tools, horizon-scanning exercises, discussions or structured expert elicitation	Adaptive management/ management planning processes which include decision theory, multi-criteria decision analysis, structured decision-making, risk analysis and evidence-based decision-making	Usually none
Decision-makers involved	Strategic directors and managers, and sometimes funding bodies, policy-makers, boards of governors. Scientists may also be involved	Varies greatly depending on the organisation, but in addition to practitioners, their line managers, scientists, advisers, specialists and other	Site-based practitioners and, if they are unfamiliar with the technique, then also through discussion with fellow practitioners and advisers

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Table 9.1 (*cont.*)

Components of a decision	Strategic-level decisions	Site-level planning decisions	Day-to-day decisions
		stakeholders can be involved, together with other stakeholders	
Information used	Informed by the strategic objectives and vision of the organisation, as well as government policy and law. Ecological, economic, social and political factors would be considered	Information about the conservation status of species and habitats, threats, effectiveness and costs of management actions, along with social and economic factors, objectives of the protected area network, organisational policies and available resources	Personal experience, colleague's advice or a quick internet search would often be the basis of day-to-day decisions

Finally, the actions agreed through the site-level planning decisions are implemented via 'day-to-day decision-making' by practitioners. For example, a practitioner wanting to install boxes to provide roosting habitat for bats would need to decide which trees would be suitable, and at what height and orientation on the tree the boxes would be most effective.

9.3.1 Site-level management planning processes

Management planning processes and frameworks help practitioners make conservation decisions and ensure that the decisions made are based on logic. We provide two examples of organisations' management planning procedures in Box 9.1.

The procedures used by different organisations to set priorities and create management plans vary according to differences in their organisational structure, objectives and culture. However, in our experience, effective management and decision-making systems include the following six features.

1. They involve a range of people who, collectively, possess the expertise and knowledge needed to make well-informed decisions. They include site-

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Box 9.1. Examples of management planning processes used by different conservation organisations

Royal Society for the Protection of Birds (RSPB): *a land-owning, science-based conservation non-governmental organisation (NGO) in the UK, whose 215 reserves comprise mainly intensively managed cultural landscapes.*

The overall aims for the RSPB's nature reserve network are set out in its Reserves Strategy,[1] which is usually reviewed every five years. The strategy lists the particular species and habitats that the network aims to benefit, together with, for example, how the organisation aims to use the network to help people connect with nature. This strategy therefore sets the context within which the objectives of individual reserves are made.

Each RSPB reserve has a management plan, based on a standard template. This plan is 'owned' by the site's practitioners, but its preparation involves a meeting with key individuals to agree on the long-term vision and objectives for the site, together with subsequent discussions. These key individuals are the practitioner's line manager, an ecological adviser, a land agent and, if required, other scientists and specialists. Preparation of the plan can also include discussions with members of the local community.

Each management plan contains the reserve's long-term vision, objectives, management and monitoring actions and five-year work programme. The Features–Attributes–Factors framework is used to decide these actions (Box 9.2). The draft management plan is checked and approved at both regional and national levels of the organisation and, if the site is a nationally designated site for protection, also by the relevant statutory agency.

Each reserve reports the progress towards achieving its management objectives annually and this report is audited by ecological advisers. An annual site-based meeting is also held at all key sites, involving site-based staff, their manager and an ecological adviser to help resolve any outstanding issues and plan work for the following year. Sites that are failing to make good progress are discussed with regional and national staff and a plan is developed to resolve any issues.

New Zealand Department of Conservation (DOC): *A government agency responsible for the conservation and management of native species, ecosystems and a third of the land in New Zealand.*

Conservation management in New Zealand is guided by the New Zealand Biodiversity Strategy and Action Plan[2] and the draft Threatened Species

[1] http://ww2.rspb.org.uk/Images/rspbreserves2012_tcm9-326414.pdf
[2] www.doc.govt.nz/nature/biodiversity/nz-biodiversity-strategy-and-action-plan/

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Box 9.1. (cont.)

Strategy,[3] which are produced by DOC. This is in addition to management plans for broader landscape management issues, National Parks, site-based management prescriptions for ecosystems and species[4] and Threatened Species Recovery Plans.[5] An annual '5-year Statement of Intent' sets out the longer-term directions for the DOC, as well as the management actions to be undertaken that year.

These plans are written variously by managers, policy staff, scientists and operations staff within the organisation, in partnership with Tangata whenua (NZ's indigenous people) and in consultation with the public, private landowners, relevant agencies and organisations. Collectively these plans outline objectives, targets or goals (often quantitative), time-bound management actions, research priorities and monitoring activities. They inform annual operational work programmes and provide the basis for output and outcome monitoring and annual reporting.[6]

The planning process for DOC ecosystems and threatened species management focuses on producing specific, consistent and transparent action-based work projects in priority order to best meet agreed outcome-based objectives. Some of these outcome objectives include condition of ecosystems and long-term persistence of threatened species. Projects list the actions required to mitigate key pressures at sites. These projects are embedded directly into the Department's Business Planning software, and when budgets are agreed the approved projects are simply 'activated' in the software and are then available for operations staff to work on. Key elements include having stable, overarching, outcome-based objectives; having standardised database entry of prescriptions that feed directly into the Department's business planning processes; and having the ability to identify the most cost-effective set of prescriptions based on different priorities. Research, monitoring and evaluation of management are built into the planning and decision-making processes through DOC's Biodiversity Monitoring and Reporting System. This system helps to identify changes and monitor success.

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[3] www.doc.govt.nz/get-involved/have-your-say/all-consultations/2017/draft-threatened-species-strategy-consultation/draft-threatened-species-strategy/
[4] www.doc.govt.nz/about-us/our-role/managing-conservation/natural-heritage-management/identifying-conservation-priorities/
[5] www.doc.govt.nz/about-us/science-publications/series/threatened-species-recovery-plans/
[6] www.doc.govt.nz/about-us/our-role/corporate-publications/annual-reports-archive/

based practitioners, their line managers and other advisers, scientists, experts and other stakeholders.

2. They involve an explicit process that helps identify appropriate actions. A variety of frameworks are used in management planning to help aid decision-making. We describe two examples in Box 9.2. Other methods used to help practitioners identify solutions for complex environmental problems include structured decision-making (Gregory et al., 2012), multi-criteria decision-making (Davis et al., 2003) and risk analysis (Pollard et al., 2008).
3. Practitioners are involved in the decision-making and have 'ownership' of the final management actions. There are many examples of site management plans that have been produced by consultants and other people not involved in managing the site, which just sit on shelves gathering dust. Practitioners typically have a lot to do, and want to focus on managing their sites. Therefore, decision-making frameworks need to be as straightforward and unbureaucratic as possible, while still ensuring that decisions are the result of a logical process.
4. Decisions should be underpinned by good scientific evidence. Evidence-based decision-making involves the integration of scientific research, expertise and local knowledge (Sutherland et al., 2004; Walsh, 2015). Scientific evidence can be obtained from scientific studies, reviews, summaries of evidence, decision support tools or advice from scientific advisors. In cases where evidence and data are limited, all available knowledge, including expertise and opinion, can be used for initial management decisions. This should be accompanied with monitoring, evaluation and experimentation where possible to learn and generate the required evidence.
5. The contents of the site management plan are checked and 'signed off' by colleagues who are involved in producing it. This ensures that standards are maintained, and that the contents of the management plan are sensible, feasible and consistent with regional, national and in some cases international priorities. It also helps to ensure 'buy-in' from relevant people in the rest of the organisation, some of whom might be involved in allocating resources for the site.
6. They include a process for evaluating and reviewing whether the site is achieving its objectives and, if not, helps identifies what to change. This process is a key component of adaptive management (Runge, 2011; Westgate et al., 2013; Murphy & Weiland, 2014), which has been adopted in principle by many conservation organisations and agencies. However, research suggests that successful implementation of adaptive management remains elusive in many projects (Keith et al., 2011; McFadden et al., 2011).

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Box 9.2. Examples of two frameworks used in site-based decision-making

Pressure–State–Response. This framework has been widely used to develop environmental indicators, e.g. by Birdlife International for monitoring Important Bird Areas (Organisation for Economic Co-operation and Development, 1993; Birdlife International, 2006). It identifies negative pressures on habitats and species at a site; the state these habitats and populations are in; and what responses are required to reduce, or prevent, the impacts of these pressures.

For example, for an area of forest the *pressures* might be illegal logging and hunting; it might define the *state* of the forest in terms of its extent and population abundance of key species, while the *response* or interventions might be changes in conservation designation or protection and other projects aimed at preventing illegal logging and hunting.

Features–Attributes–Factors. This is the UK government's framework for identifying actions to carry out in protected areas (JNCC, 2004). The first step is to identify the important conservation *features* at the site. These features can be species, assemblages of species, habitats or, more rarely, processes.

The second step is to identify the best measures of condition of these features, and to set targets (or target ranges) for them. These measures of condition are called *attributes*. Commonly used attributes for a species will be its population size and productivity. Attributes for a habitat might include measures of its structure and of the abundance of positive or negative indicator species.

The final step is to identify the main *factors* that are thought to determine whether a feature's attribute will achieve its target condition and to set targets (or target ranges) for these factors. For a species, factors that might affect whether it attains its target population size could include levels of illegal persecution or its food supply. For a habitat, factors that might affect whether it attains its target condition might include levels of nutrient run-off and the management regime.

9.3.2 Day-to-day decision-making

To implement actions agreed in a site's management plan, practitioners still need to make frequent decisions about the details of the interventions. Consider this example about protecting the nests of ground-nesting waders in the UK. The scientific evidence shows that predator-exclusion fencing can

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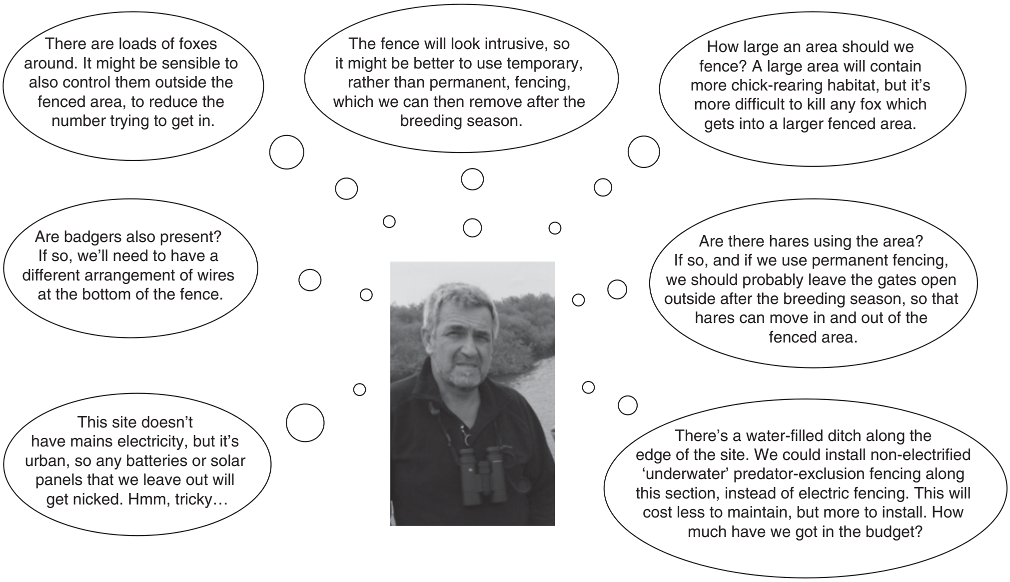

Figure 9.1 Decision-making at sites often involves taking account of a range of site-specific factors. Here, an ecological adviser ponders over details of the design of predator-exclusion fencing used to protect ground-nesting waders. Photo by Malcolm Ausden. (A black and white version of this figure will appear in some formats. For the colour version, please refer to the plate section.)

be used to increase the nest survival and overall breeding success of ground-nesting waders (Sutherland et al., 2018) and the site's management plan includes an action to install predator-exclusion fencing. However, practitioners still need to consider many minute details before installing the fencing, to address local circumstances and try to maximise the effectiveness of the fencing (Figure 9.1).

When making decisions about the details of site management, a practitioner or their adviser will usually have a mental image of what they consider to be ideal habitat for a particular species or set of species. They will then compare the habitat present at a site with this ideal state and, based on a combination of past experience and other information, identify what they think needs to take place. This process will typically involve a visual assessment of the site, together with information from surveys and monitoring, the presence and population trends of key species, and their own and others' experience of the impacts of management actions in the past and at other sites.

9.4 Monitoring information used in decision-making

The resources that practitioners have available for monitoring (i.e. staff time and money) usually come from the same 'pot' as those used for carrying out

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conservation work. Therefore, practitioners must make a trade-off decision. They need to conduct sufficient monitoring to reliably inform whether actions are having their desired effect, but not so much that it unnecessarily diverts resources away from the conservation work itself. Similarly, practitioners need to target surveillance efforts to detecting changes that, if they occur, would trigger conservation action. This is a different approach to that of a conservation scientist, who may be interested in investigating the underlying mechanisms causing a change, the effectiveness of an action (or set of actions) and in disentangling the effects of different actions. To do this would usually involve replicates and controls, and detailed monitoring sufficient for the results to be published.

These trade-offs are important to get right, because monitoring and surveillance can be expensive. For example, on the RSPB's reserve network, monitoring, one-off surveys and surveillance are pared down to the minimum considered necessary to reliably inform management and contribute data to a small number of national monitoring schemes. Despite this, they still cost an estimated 7% of the total costs of maintaining this reserve network.

The type and quality of data collected during monitoring depends on the management question. At the one extreme, detailed monitoring is not needed to determine whether cutting grass reduces its height. At the other extreme, considerable resources can be required to determine levels of predation, or changes in the botanical composition of species-rich grassland. Practitioners and their advisers may invest more resources into monitoring if they are using a novel technique, applying a standard technique in a novel situation, if there is a high level of uncertainty about the results, or if the results are difficult to observe visually. The results would then ideally feedback into the planning processes to inform future decisions, and also be written up and disseminated to other practitioners.

9.5 Information used by practitioners to inform decision-making

Multiple studies have investigated the types of information used by practitioners from the UK, South Africa, Australia, Brazil and the USA, their level of access, and which sources they find most useful (Pullin et al., 2004; Pullin & Knight, 2005; Cook et al., 2010, 2012; Seavy & Howell, 2010; Bayliss & Randall, 2011; Young & Van Aarde, 2011; Matzek et al., 2014; Walsh, 2015; Giehl et al., 2017). These have shown that practitioners use a wide range of sources to inform conservation management decisions, with 'personal experience' the most common source of information usually reported. For example, practitioners from government and non-government agencies in the UK and South Africa said they use personal experience, monitoring data and advice from scientific advisors and managers most frequently when making management decisions (Walsh, 2015). Management plans, policy documents and decision support tools were less-frequently used. In contrast, scientific papers and unpublished research were rarely used directly to inform decisions (Walsh, 2015).

However, given the complexity of the types of decisions that practitioners make, we need to be cautious in concluding, from the results of simplified surveys, that most conservation decisions are based on personal experience, rather than scientific evidence.

First, as described in Section 9.3, practitioners' decisions usually, but not always (see Pullin et al., 2004), take place *within the context* of 'higher-level' decisions, which have involved different people and thereby been based on different sources of information, potentially including scientific evidence.

Second, as described in Section 9.2, conservation management often involves the use of a combination of methods to benefit a wide range of species, tailored to specific circumstances at a site. Therefore, even if the decision to undertake an action (or set of actions) is underpinned by scientific evidence, the details of how best to implement it will usually require an additional 'layer' of personal experience and ecological 'nous' and expertise.

Third, 'personal experience' in any case consists of a mixture and accumulation of experiential and scientific knowledge, which is difficult to disentangle. An experienced practitioner may have read a relevant scientific paper a decade ago, or been informed of best practice that was itself based on scientific evidence. However, having since carried out the same or similar management activity for many years, they may now consider their source of information to be 'personal experience'.

Scientific and ecological advisors provide an important link between science and practice by giving practitioners direct advice and bite-size information chunks of up-to-date, relevant scientific research. There is clear evidence of the value of advisers in increasing the effectiveness of conservation actions (Ingram, 2008; Ewen et al., 2013). While a scientist will typically have in-depth knowledge of a particular subject area, a good ecological adviser will have a broader range of knowledge and experience of conservation management across multiple sites. Most importantly, good ecological advisers will have the ability to translate the results of science into practical management advice, which will involve their experience of the use of similar management actions at other sites.

On RSPB reserves, practitioners place a higher value on the advice given by dedicated ecological advisers than on advice provided by scientists, although the latter is still highly valued (Figure 9.2). The full role of these ecological advisers entails:

- providing ecological advice to practitioners, through the management planning process, project teams and other ad-hoc means;
- 'signing off' all important ecological decisions made on these reserves;

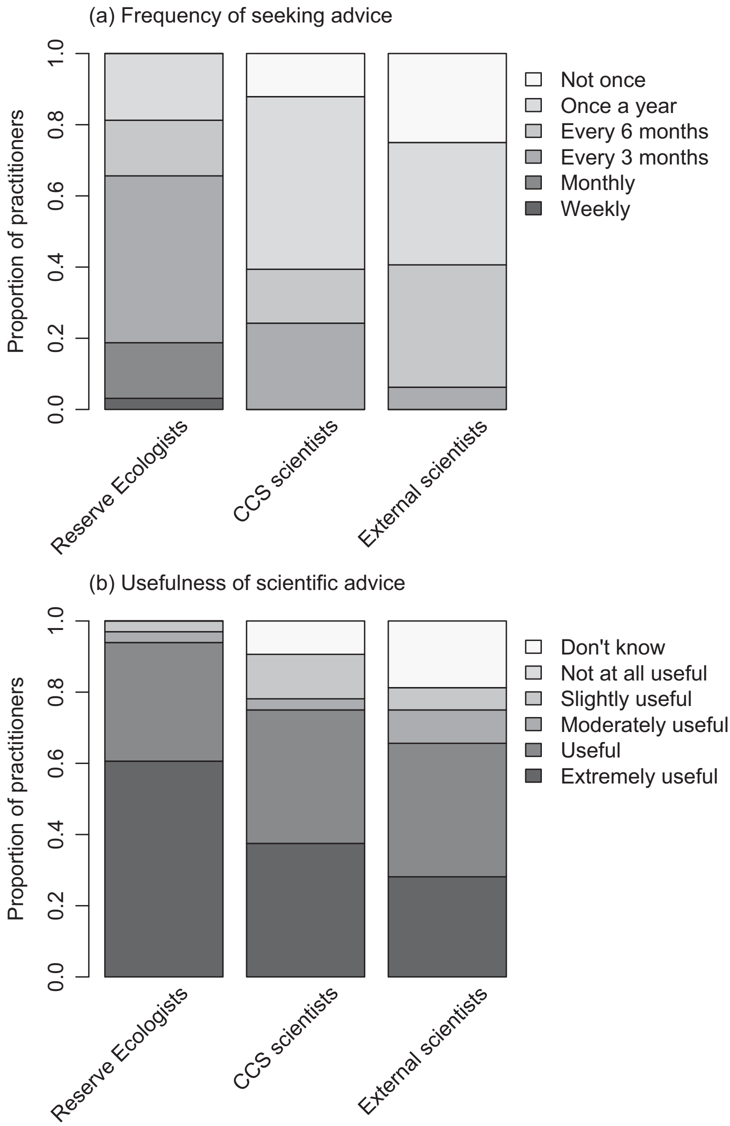

Figure 9.2 The frequency with which 36 RSPB practitioners (mainly site managers and conservation officers) seek scientific advice from Reserve Ecologists (in-house ecological advisers), Centre for Conservation Scientists (CCS, in-house conservation scientists) and external scientists, and their perceived usefulness of this scientific advice from each source. There was a 78% response rate (46 practitioners were invited to participate) and survey methods are described in Walsh (2015; Chapter 4). (A black and white version of this figure will appear in some formats. For the colour version, please refer to the plate section.)

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- annually auditing the effectiveness of reserve management; and
- developing and encouraging the use of best practice, both within and outside the organisation.

These advisers need to have credibility with practitioners, many of whom will have a more detailed knowledge of, and close emotional attachment to, the land on which advice is being given. Similar advisers also have a critical role within government agencies, which provide grants to landowners through agri-environment and land management schemes.

The cost of providing these services by the dedicated ecological advisers at the RSPB is about 4% of the total costs of managing the reserve network. Therefore, if the provision of this advice increases the cost-effectiveness of reserve management by more than 4%, employing these advisers is a good use of conservation resources.

9.6 How important is it to use scientific evidence in decision-making?

There is an underlying assumption that decisions based on scientific evidence are more effective than those based solely on personal experience. However, there is little evidence in the conservation field to support the assumption that scientific evidence improves conservation outcomes. In the medical field, however, there are several examples where medical procedures and drugs that were once considered 'best practice' were found to be ineffective or caused severe unintended consequences once the scientific evidence had been collated and synthesised (Sackett & Rosenberg, 1995; Morris et al., 2011).

The best evidence demonstrating the impact of using scientific evidence for conservation decisions comes from a study that measured practitioners' likelihood of using different methods of reducing predation on birds before and after providing them with a summary of scientific evidence about the efficacy of each intervention (Walsh et al., 2014). After reading the summarised scientific information, each participant was asked whether they were more or less likely to use each intervention. On average, practitioners changed their likelihood of using 46% of the interventions shown. Practitioners were more likely to use effective interventions after reading the evidence and less likely to use ineffective actions, suggesting access to the summarised scientific evidence could improve some conservation decisions. Even so, most participants said they would continue using their existing method(s), which they still considered to be the best solution for their set of circumstances (Walsh et al., 2014).

The importance of scientific evidence will vary according to the type of decisions being made. For example, we would hope that a practitioner would check the latest scientific evidence on the best way to control a newly arrived, invasive non-native species. We would not, though, expect an experienced wetland manager to check the scientific literature every time they make a decision about manipulating water levels, although it would still be valuable for them to keep up-to-date with the results of new research. This might be via scientific summaries, magazines, or other information sources that synthesise new research into an accessible format, through meetings with relevant societies and by talking with scientific advisors.

We also suspect that the extent to which resources are wasted on implementing ineffective, non-evidence–based interventions varies greatly in different situations. In the case of widely adopted management interventions carried out by science-based organisations with good systems of planning and adaptive management, most interventions are likely to be *underpinned* by good evidence, but with actions tailored with personal experience to suit the site's specific circumstances, and achieve its often complex objectives.

On the other hand, it is possible that ineffective interventions are implemented more frequently where there is less access to scientific advisers and the results of published science (e.g. Giehl et al., 2017). Another situation where ineffective interventions may also be more widespread is where a developer and their consultants put in place compensatory or offsetting measures that enable them to proceed with development, but have little or no interest in whether these measures prove effective (e.g. Harper & Quigley, 2005; Chapter 4). The consequences and wasted resources of ineffective interventions will be amplified if they are integrated into policy, and widely applied through standardised prescriptions, as occurred when the scientific evidence was not consulted while designing some European Union agri-environment scheme prescriptions (Dicks et al., 2014).

9.7 Ways to increase the use of scientific evidence in decision-making

Despite the infrequent direct use of scientific papers by most practitioners, and the perceived low level of usefulness of scientific papers in informing decision-making, it is striking that practitioners typically value advice given to them by scientists (Walsh, 2015). Therefore, any lack of evidence-based decision-making in conservation is clearly not driven by practitioners' aversion to the use of scientific evidence.

However, there are a number of barriers to the use of scientific papers by practitioners (Walsh et al., 2019). Only a small proportion of papers published in ecological journals contain information that is useful for practitioners (Matzek et al., 2014), while the results described in many papers are often fairly incomprehensible to most people outside of academia, often due to the complex statistical techniques used. In addition, many scientific papers are unavailable to practitioners due to publishers' paywalls, although the increase in open-access journals will help with this (Fuller et al., 2014). Therefore, given that scientific papers on their own are unlikely to bridge the gap between science and practice, this leaves two complementary approaches. The first is increasing the synthesis and translation of scientific research into more easily accessible, practical information. The second is ensuring that decision-making processes involve advisors and scientists who help interpret the science and ensure that decisions are based on sound evidence.

Systematic reviews published through the Collaboration for Environmental Evidence are considered the most robust, unbiased level of evidence (Chapter 7). While systematic reviews are invaluable in informing medical practice and are becoming more popular in environmental management, they are often of limited use to conservation practitioners, because their conclusions are usually too generic (Cook et al., 2013). To return to our previous example, a meta-analysis might conclude that predator-exclusion fences usually increase nesting success of a range of bird species, across a range of habitats (e.g. Smith et al., 2011). However, practitioners are unlikely to be interested in their effect across a range of species and habitats. Instead, they will usually be more interested in knowing how to maximise the effectiveness of fencing at protecting a particular species against a specific predator, or set of predators, under similar conditions to those which occur at their site (see Figure 9.1). Because of this, summaries of scientific research that evaluate the success of more specific actions may be of greater use to practitioners. Examples of these include Conservation Evidence synopses (www.conservationevidence.com/synopsis/) and 'What Works in Conservation' (Sutherland et al., 2018).

In addition to the use of evidence summaries, in our experience, the most favoured forms of communication about the effectiveness of conservation actions by practitioners are: one-to-one advice; practical management workshops; practical management handbooks and case studies; visiting sites where the interventions have been implemented; and discussions with fellow practitioners who have practical experience of implementing the technique.

In conclusion, we suggest five key requirements to delivering effective conservation interventions at a site. These are:

- ensuring there are sufficient resources;
- ensuring good decision-making, planning processes and adaptive management are in place, and that these involve people who have relevant expertise;
- employing skilled ecological advisors who can keep up-to-date with the relevant scientific and other literature, spread best practice and who are able to advise practitioners on site-specific solutions based on a combination of science and experience;

- developing projects and collaborations with in-house conservation scientists and universities; and
- employing skilled and knowledgeable practitioners who care about the effectiveness of what they are doing, keep up-to-date with accessible forms of information and who are subsequently able to make informed ecological decisions on a day-to-day basis (as well as being able to do a myriad of other things).

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