

Using the Evidence

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The phrase 'evidence-based' is used routinely almost everywhere and our profession is no exception. However, when I hear it I revert to my Scottish *"We're all doomed"* scepticism because it is used too often as a contrivance to make something appear better than it is rather than being a guarantee of up-to-date evidence. Our profession, above all, should pride itself on using only the best evidence to guide management actions. If we do not, we are akin to soothsayers throwing some bones to derive some supposed wisdom.

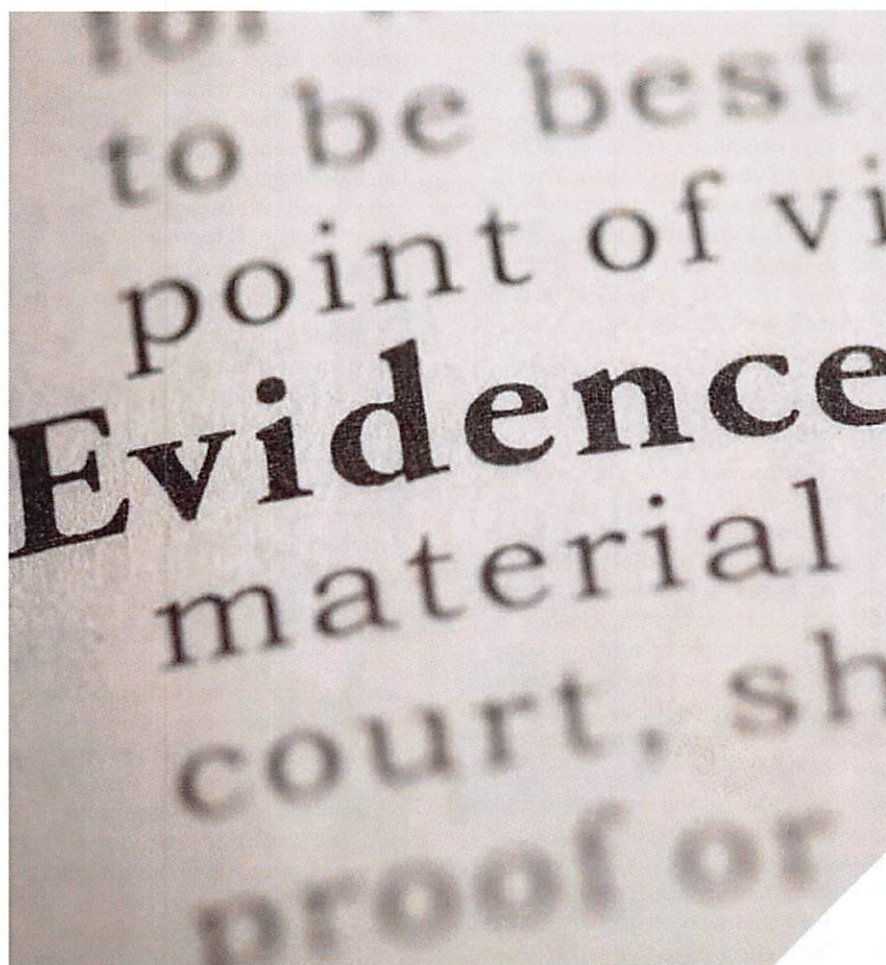
For me there are four issues for us as professionals:

1. the realisation that evidence is needed;
2. the ability to get up-to-date evidence;
3. being able to understand the information obtained; and
4. linking to social science to help resolve conflicts.

Realisation that you need to obtain the evidence

As a profession, we are collecting evidence all the time but how many of us do serious research at the planning stage of a project to ensure the information we collect and use is of the highest quality? As well as identifying partners with complementary expertise, we should critically appraise our own skills. This is where Continuing Professional Development is crucial. Conferences and training courses have a major role here but there are many other ways of updating and extending our skill set. If cost is an issue, be imaginative to find a way to update your skill set, use the internet or, even better, volunteer alongside experts.

Taxonomic identification skills are particularly important in our profession. There has been a massive decline over the last 50 years but many courses are available, ranging from local Wildlife Trust one-day courses to specialised, much longer, accredited identification courses (e.g. the joint initiative between Manchester Metropolitan University and the Field Studies Council to provide training at Masters Level). Courses run



by CIEEM, Plantlife, BSBI and others also provide vehicles for any member of our profession to upskill where their taxonomic skills are weak.

It is beholden on us all to ensure the evidence we collect is accurate, appropriate, comprehensive and of the highest standard in order to guide effective environmental management.

Knowledge acquisition

One of the biggest complaints by environmental practitioners is: *"I can't get hold of the up-to-date evidence I need"*. I'm sorry, but I just don't buy this excuse. Over the last 20 years there has been a complete revolution in the way scientific information is published.

Almost all scientific journals maintain searchable, web-based platforms, and most provide access to back issues. Everyone can read at least the titles and abstracts of almost everything that is published, and much material is free to access; if not, the full version will be available for a modest fee (and yes, the fees are modest). Every year more and more journals adopt an open-access policy as we move towards free availability of all published material (see the Directory of Open Access Journals at www.doaj.org). In the meantime, there is always the fall-back option of emailing the author to ask for a PDF – most authors are very willing to help people in this way – or check your local libraries.

So, really, there is no excuse for not being able to access up-to-date information but how do we find it in the first place? Many rely on 'Professor Google' to search the scientific literature but *Google Scholar* is better. There are many freely-available search engines (see <https://onlinephdprogram.org/academic-research/> for a comprehensive list), some of which provide access to published papers as pdfs. Another easy way to keep up-to-date with key publications is to set up Table of Contents alerts direct to your Inbox. Publishers want you to find and use what they publish and compete to make it as easy as possible for you to find what you are looking for. Take a day to set up some automatic feeds and then make a habit of scanning what comes in.

Understanding the information collected

Never has the need for decision-making that is informed by science and evidence been more necessary but it is not simple. Environmental decision-making often involves a need for information from many different disciplines and the evidence from each one might be conflicting. The hydrologists say "Yes", the geologists say "No", and the ecologists say "Maybe, depends on which taxonomic group you are looking at".

Moreover, science, and especially statistical analysis, has become more complex over the last 50 years and it is sometimes difficult for non-specialists to discern the truth from confusion. Here, there is a need for what is effectively a translation system, where specialists assist in helping the non-specialist get to the nub of the issue. As I see it, there are three ways that collated evidence can be derived, these are:

- a. **Someone else does the collation for you.** This is beyond a simple *Google* search and includes reviews by NGOs or other scientists. Reviews in the peer-reviewed literature are usually balanced but others may be less so – choose your source carefully and judge the information accordingly.
- b. **Somebody provides a summary of the evidence but allows you to come to your own conclusions.** A great example of this is *Conservation Evidence* which is a free online, searchable, information resource database. It publishes research, monitoring results and case studies on the effects of

conservation interventions in its open-access journal; provides summaries of papers published in the wider literature including methods of habitat or species management; draws together synopses of major issues; and publishes an over-arching, free-to-download book *What Works in Conservation* providing expert assessment of the effectiveness of interventions based on the synopses. The user accesses the *ConservationEvidence.com* search engine and gets all the available information on their area of interest, often in summary form. It is then up to the user to read the available information to inform decision-making.

c. **Somebody produces an unbiased assessment of an important question in environmental science.**

No-one can be completely unbiased but you can try and minimise it. This is where the concept of Systematic Review, originally developed by Archibald Cochrane for the medical sciences, will be transformative. The approach has been developed by the Collaboration for Environmental Evidence (CEE), a worldwide partnership with six autonomous centres to date including the Centre for Evidence-based Conservation at Bangor, and partners at Harper Adams and Exeter universities in the UK. These centres carry out Systematic Reviews and Systematic Maps using the approved CEE methodology. Here, a single environmental question is reviewed using a repeatable search methodology which attempts to minimise bias by identifying all the papers that attempt to answer the question. These are subject to a meta-analysis to produce a more robust answer to the question than the individual studies. Importantly, the search protocol and methods are scrutinised by stakeholders and are openly available. The Systematic Reviews/Maps are available in the CEE library and often in the open-access journal *Environmental Evidence*. They aim to become the industry standard over the next 10 years to inform decision-making.

The future

In my view, we must as a profession move towards an evidence-based approach free of bias. However, in our subject area

many practitioners are also motivated by strong feelings based on personal interests or their own ethical agenda. Where this occurs, it is sometimes difficult to stand back and take a measured view. I hope that the development of tools to produce unbiased assessments become the norm to try and remove inherent biases from decision-making. It is also inevitable that future environmental practice will require us to interact with a much greater range of professionals, in particular with social scientists and economists. Good examples include the RELU and BESS programs where inter-disciplinarity has been championed (<http://relu.data-archive.ac.uk/>; <https://nerc.ukri.org/research/funded/programmes/bess/>). Although conflicts will continue, hopefully, the principles to solve such conflict situations identified by Redpath *et al.* (2015) will be used, extended and improved. Compromise will sometimes be necessary but let's accept this and enjoy the camaraderie that ensues from working with other disciplines.

Resources

BESS. <http://www.nerc-bess.net/>.
See also <https://ecosystemsknowledge.net/bess>

Collaboration for Environmental Evidence. <http://www.environmentalevidence.org/>.

Conservation Evidence. <https://www.conservationevidence.com/collection/view>.

Centre for Evidence-based Conservation. <http://www.cebc.bangor.ac.uk/>.

Directory of Open Access Journals. www.doaj.org

Environmental Evidence. <https://environmentalevidencejournal.biomedcentral.com/>.

Online PhD Program. <https://onlinephdprogram.org/academic-research/>

Redpath, S.M., Gutiérrez, R.J., Wood, K.A. and Young, J.C. (2015). *Conflicts in Conservation*. Cambridge University Press, Cambridge.

RELU. <http://relu.data-archive.ac.uk/>

About the Author

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