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# PRACTICE INSIGHTS

Co-designed Projects in Ecological Research and Practice

# Co-designing a toolkit for evidence-based decision making in conservation: Processes and lessons

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### Abstract

- 1. Improving the effectiveness of conservation practice requires better use of evidence.
- 2. Since 2004, researchers from the Conservation Evidence group (University of Cambridge) have engaged with over 1100 named practitioners, policymakers, funders and other academics from across the world to identify needs and develop a range of principles, tools and resources to embed evidence in decision making. The goal of this engagement (the Conservation Evidence Programme) was to deliver improved conservation practice leading to benefits for nature and society. Together, we developed a theory of change with five key strategies for delivering change, alongside a freely available Evidence Toolkit to support decision makers in achieving that change.
- 3. The authors describe the toolkit, a collection of freely available tools and resources developed by the collaborative programme, and how co-design, employing different levels of partner engagement, enabled its development.
- 4. Reflecting on our experiences highlighted a number of insights and recommendations, including the need to identify where deep engagement is a necessary condition for success; the importance of collective agreement of the roles of different partners; the need to consider how to facilitate uptake of new tools or practices, particularly where that requires changes to organisational practices or culture; and the importance of establishing processes/channels for ongoing engagement

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with stakeholders, with a willingness to be flexible and open to incorporating new suggestions and perspectives as needed.

5. The Conservation Evidence Programme has enabled practitioners, funders and policymakers to become part of a network of forward-thinking organisations that is working collaboratively to help drive more effective conservation practice through improved evidence use.

#### KEYWORDS

co-design, conservation evidence, conservation practice, co-production, decision support tools, research implementation gap, stakeholder engagement

## 1 | INTRODUCTION

There is widespread acceptance that better use of evidence can improve the effectiveness of conservation practice (Legge, 2015; Sutherland, 2022). We define evidence as 'relevant data, information, knowledge and wisdom used to assess an assumption' (Salafsky et al., 2019). Its use is vital to ensure that limited resources are not wasted on ineffective or harmful actions, which may lead to project failure, the demotivation of practitioners and the erosion of confidence of funders (and policymakers) in organisations' ability to deliver successful conservation (O'Brien et al., 2021).

The Conservation Evidence Programme arose from the concerns of practitioners (those making on-the-ground decisions or recommendations for conservation programmes), policymakers and funders that conservation practice is less effective than it could be, does not learn from experience in a systematic manner, and does not attract sufficient funding to deliver change on the scale reguired (Sutherland et al., 2004). In 2004, the Conservation Evidence group organised a workshop to address those concerns with United Kingdom-based organisations including the Royal Society for the Protection of Birds, Butterfly Conservation, NatureScot and The National Trust. That workshop conceptualised the creation of a database of synthesised global scientific evidence for the effectiveness of management actions (www.conservationevidence.com). It also initiated a programme of work, led by the Conservation Evidence group, which has expanded in scope thanks to nearly two decades of engagement between international academics, practitioners, funders and policymakers. We (all partners contributing to the programme including the authors) aim to develop easily accessible principles, tools and resources (the Evidence Toolkit) to overcome barriers to evidence use (e.g. access to relevant evidence, individual/organisational capacity to use evidence; Walsh et al., 2019) and ensure more effective decision making in conservation practice to benefit nature and society.

In this paper we (1) present the conceptual underpinnings of the Evidence Toolkit, (2) discuss the use of co-design to develop the toolkit, (3) describe the tools and resources that make up the toolkit and how they relate to the strategies introduced in (1) and (4) provide recommendations for co-design.

# 2 | IDENTIFYING PATHWAYS TO DELIVER CHANGE

The Conservation Evidence group, with input from partners including the 'Evidence in Conservation Practice Working Group' (see below) and authors, developed (1) a situation analysis describing the threat posed by ineffective conservation practices to both conservation and human well-being targets (Kunming-Montreal Global Biodiversity Framework, 2022 used to standardise our targets) and a series of contributing factors, including how relevant evidence may not exist or be accessible, be used poorly, or ignored (Figure 1a); and (2) a theory of change highlighting strategies for improving practice through the use of evidence to deliver on the targets (Figure 1b). The principles, tools and resources that make up the Evidence Toolkit developed through the Conservation Evidence Programme have been co-designed with the conservation community to help deliver these strategies (Figure 2). Both the theory of change (Figure 1b) and toolkit have been developed iteratively: as one solution was developed by a group, new problems or gaps were identified, and new projects developed to address these.

# 3 | CO-DESIGNING THE EVIDENCE

Co-design—the process of producing usable outputs through collaboration between knowledge users and creators (Meadow et al., 2015)—has been vital to the development of the Evidence Toolkit, with the principles, tools and resources arising from engagement with individuals from a range of different communities of work (academics, practitioners, policymakers and funders). The general approach to co-design involved engaging early with partners to identify problems and potential solutions; designing, testing and disseminating those solutions; and seeking commitments to adopt new tools or practices wherever possible. There was variation in the type and frequency of engagement between partners for different toolkit elements, though most were produced through consultative, collaborative or collegial engagement (Meadow et al., 2015; adapted from Biggs, 1989). In consultative modes of engagement,



# (b)

**FIGURE 1** (a) Situation analysis, indicating the threat posed by poor/ineffective conservation practices to conservation and human wellbeing goals (Kunming-Montreal Global Biodiversity Framework, 2022) with contributing factors and (b) theory of change showing five key strategies for evidence use to deliver improved conservation practice and help deliver on those goals.



FIGURE 2 Five key strategies for evidence use and associated elements of the Evidence Toolkit that deliver on each. Years indicate when the first toolkit element for each strategy was delivered; all strategies are ongoing. Numbers next to each element are used to refer to each in the text; full references are provided in Supporting Information.

researchers consult with stakeholders at key project stages to diagnose problems and find solutions, and the question of interest (or project goals) can originate either from stakeholders or researchers. In collaborative modes of engagement, stakeholders are central in defining project goals and are engaged continuously throughout the process. Collegial engagement goes a step further by seeking to also strengthen the capacity of stakeholders to conduct their own research (see Meadow et al., 2015 for more details).

As an example, the Evidence 2 Decision (E2D) tool was developed through a largely consultative process (although stakeholders represented their own views; see Meadow et al., 2015). Discussions with organisations engaged through the 'Evidence Champion Programme' (organisations that commit to evidence-based conservation, and in return receive training, support and stronger links with Conservation Evidence and other Evidence Champions) highlighted the need for a tool to facilitate evidence use in decisions. This resulted in the E2D support tool, which guides users through transparently documenting different types of evidence and reasoning used when making a decision to achieve a specific objective. Researchers created a prototype tool that was refined following feedback and user testing with staff at these organisations. The tool was disseminated through practitioner-focused outlets and published in a scientific journal (Figure 2: 4.5).

The Mangrove Restoration Tracker Tool (Figure 2: 2.1), to improve reporting and learning from restoration projects, emerged from a collaborative mode of engagement between the Conservation Evidence group and organisations that are members of the Global Mangrove Alliance. Over 100 academics and practitioner organisation staff (from 25 countries), through a series of webinars, developed a framework of key questions needed to describe a mangrove restoration project from inception, through implementation to monitoring. This framework was critically evaluated during three, 5day workshops with field practitioners from Fiji, Mexico and coastal East Africa (Kenya, Tanzania, Mozambique and Madagascar). Finally, a tool was developed and trialled at sites in Mexico. It will be available in at least four languages.

A number of elements of the toolkit (Figure 2: 2.2, 3.2) emerged from the 'Evidence in Conservation Practice Working Group'. This was a collegial mode of engagement, whereby a group of 73 practitioners, funders, government representatives and academics (25% global/non-UK) explored how the conservation community could better incorporate evidence use into conservation planning and evaluation processes. Two co-chairs and five organising committee members represented organisations from different subject areas (e.g. farming, habitat restoration) and sectors (academia, nongovernmental organisations, funders, policymakers). That committee convened multiple workshops for the working group that developed ideas for sub-projects. Those were co-designed by smaller groups from the working group. Outputs included a publication highlighting the need for funding to include tests of actions, to generate more evidence (Figure 2: 2.2), and another in which funders outlined a process for and committed to asking applicants to reflect on evidence for the effectiveness of actions (Figure 2: 3.2). The work of this group is ongoing.

# 4 | THE EVIDENCE TOOLKIT

Below we describe the toolkit elements that contribute to each of the five, ongoing strategies highlighted for delivering improved conservation practice (see Figure 2 for timeline; Table S1 for descriptions and citations).

# 4.1 | Strategy 1: Make synthesised assessments of effectiveness of conservation actions accessible

Evidence of the effectiveness of conservation actions is not readily accessible to decision makers. To address this, the Conservation Evidence group created the Conservation Evidence database (www.conservationevidence.com). Using subject-wide evidence synthesis (Figure 2: 1.4) we systematically search the literature and summarise results from (and provide citations for) each study testing the effectiveness of an action. So far, we have reviewed evidence for >3600 actions and made this freely available on the website (Figure 2; 1.1), with collaboration from over 380 international academics and practitioners. Practitioner feedback indicated preference for an 'overall effectiveness category' for each action resulting in the addition of expert assessments of the summarised evidence for each action and publishing of What Works in Conservation (Figure 2: 1.2), involving a further 230 experts. Feedback also resulted in the inclusion of non-English language evidence from searches of 326 journals in 16 languages (Figure 2: 1.1). User feedback has driven a re-design of the website to provide clearer messaging and easier navigation, and a global list of evidence sources was created to aid accessibility (Figure 2: 1.6). A set of recommendations and tools for improving cost reporting have also been developed (Figure 2: 1.3, 1.5), as practitioners highlighted the need to know the cost-effectiveness of management actions.

# 4.2 | Strategy 2: Encourage further and improved testing of actions

Evidence is lacking for many conservation actions, taxa and geographical locations (e.g. Christie et al., 2020). To address this, and in response to calls from practitioners, the Conservation Evidence group launched the Conservation Evidence Journal to enable free, open-access publication of tests of actions (Figure 2: 2.4), and produced an article template to aid the process (Figure 2: 2.6). Partners have also co-designed tools and resources to help overcome some of the barriers to testing actions faced by individuals and organisations (including capacity and access to skills). These included guidance for how practitioner organisations might embed tests of effectiveness into their wider conservation practice (Figure 2: 2.3) and for identifying testable knowledge gaps (Figure 2: 2.5) and a tool that facilitates improved reporting and learning from (before and after monitoring of) mangrove restoration projects (Mangrove Restoration Tracker Tool; Figure 2: 2.1). In addition, funders and practitioners developed collective commitments to support and carry out testing of effectiveness of actions (Figure 2: 2.2) and Conservation Evidence developed an 'Evidence Champion Programme', where organisations commit to evidence-based conservation including testing (Figure 2: 2.7).

# 4.3 | Strategy 3: Strengthen societal expectations of evidence use

Over the two-decade programme, it became increasingly clear that changing practices requires that society demands that evidence is used in conservation decision making. To address this, the Conservation Evidence group worked with conservation funders and journals to develop and publish their processes and commitments to demanding evidence use in funding applications (Figure 2: 3.2) and manuscript submissions (Figure 2: 3.4). The Conservation Evidence group, with input from 65 authors from partner organisations, produced the open-access book, '*Transforming Conservation: A Practical Guide to Evidence and Decision Making*' (Figure 2: 3.1) to ensure free access to the resources and techniques needed to embed evidence in decision making, including checklists for ensuring better evidence use in practice (Figure 2: 3.3). To further strengthen an expectation of evidence use, and facilitate access to that evidence, the Conservation Evidence group has worked with a range of organisations to link their databases with that of Conservation Evidence (Figure 2: 3.5).

# 4.4 | Strategy 4: Facilitate use of evidence in decision making

Through workshops and discussions with organisations engaged through the Evidence Champion Programme (and more broadly), practitioners highlighted that often they do not have time to consult the broad range of evidence that could guide their decision making. Therefore, partners co-designed a framework to enable decision makers to develop a strategy for evidence use that considers time constraints, the consequences of a wrong decision and the uncertainty of action effectiveness (Figure 2: 4.1). Partners also developed frameworks for assessing a wide variety of types of evidence (including local and indigenous knowledge; Figure 2: 4.7), and a range of tools that help incorporate multiple evidence pieces into decision making, including the 'Evidence 2 Decision tool' (Figure 2: 4.5), multicriteria analysis for decision making (Figure 2: 4.4) and bespoke evidence synthesis (Figure 2: 4.8). Many conservation decision makers rely on guidance documents to identify best practice, but a review of United Kingdom and Ireland guidance documents suggested that they are often not based on the best available evidence and often out-of-date. Therefore, partners co-produced a set of principles for evidence-based guidance (Figure 2: 4.2) to inform the development of guidance documents (e.g. Figure 2: 4.3). To broaden the reach of the Evidence Toolkit, partners developed a set of principles for producing evidence-based biodiversity business plans (Figure 2: 4.6).

# 4.5 | Strategy 5: Build capacity for evidence use and generation

In response to demand for training from engaged partners to improve evidence use, we co-produced teaching materials and provided them for free, in nine languages, through Applied Ecology Resources. A total of 117 educators from 23 countries published an article highlighting the need for these materials along with a commitment to use them (Figure 2: 5.1). Partners also created a list of conservation organisations that have created a specific role considering or collating evidence, recognising that dedicated roles may be required for organisations to adopt more evidence-based practice (Figure 2: 5.2).

# 5 | LESSONS LEARNED AND RECOMMENDATIONS FOR CO-DESIGN

# 5.1 | Select appropriate mode of engagement

Over the past two decades, Conservation Evidence has gained substantial experience in a range of ways to work with and across stakeholder groups on a variety of topics and challenges relating to the development of the toolkit. The mode of engagement adopted for designing and delivering different elements of the toolkit was at times chosen deliberately, at other times pragmatically, and sometimes emerged organically as part of collaborative work. For some elements, a collegial mode of engagement was necessary for making progress. For example, securing commitments from funders, journals and practitioners to change their practices and embrace evidencebased conservation (Figure 2: 2.2, 2.7, 3.2) required working together as partners, building mutual trust and sharing knowledge and experience to empower those organisations to enact change. For other elements, deep engagement (i.e. collaborative or collegial modes; Meadow et al., 2015) was not a necessary condition, but spending additional time and resources was considered a worthwhile investment to develop more usable tools (Dilling & Lemos, 2011). For example, the tool for reporting costs (Figure 2: 1.3) was led by a small group of researchers, and while engaging a range of stakeholders at key stages was important, it was produced using a relatively small investment of resources and time. In contrast, producing the Mangrove Restoration Tracker Tool (Figure 2: 2.1) involved deeper engagement with a larger number of partners and significant investment of time and resources. In these examples, availability of resources was a key factor determining the type of engagement and techniques used. However, we suggest that careful monitoring is needed to reveal whether additional investment in deep engagement results in greater uptake of a tool (and impact on practice). Getting the right balance between investing in co-design through deep engagement, or delegating tasks to a limited number of partners is crucial for delivering usable products within time and budgetary constraints.

Therefore, we recommend that project partners identify project elements for which deeper engagement is a necessary condition for success and prioritise resources in those areas. This includes carefully (and realistically) considering project priorities, the availability of resources and capacity of individuals or organisations to participate throughout the development of each element.

#### 5.2 | Agree upon well-defined roles

Some tools could have been produced more quickly had an individual/ team been designated to deliver them. This raises the issue of leadership in co-designed projects. It is difficult to imagine that this decadesspanning programme of work would have been possible without continued and sustained commitment from the Conservation Evidence group. While toolkit elements were co-designed through meaningful collaboration and engagement with a range of partners, Conservation Evidence championed the broader vision and was the one constant in an otherwise dynamic arrangement of partners. The role of leadership is hugely important for successful co-designed projects (Conservation Learning Initiative 2022; https://conservation-learning.org/), though this may come in a range of forms. For example, some collaborative projects have had success through sharing responsibilities via collaborative or distributive leadership (Imperial et al., 2016), or through establishing 'collaborative organisations', which enact the aims of the collaboration (Imperial, 2005). Furthermore, where possible roles/responsibilities should reflect priorities of partners. For example, academics are often more motivated by publications than practitioners, so should expect to be responsible for those aspects.

Therefore, we recommend that to avoid delays or conflicts, all project partners collectively agree on their individual roles (including leadership) early in the project, including what is required in terms of time, resources, knowledge and other inputs. This can be documented and signed off by partners.

## 5.3 | Address multiple barriers to uptake

The Conservation Evidence database (Figure 2: 1.1) was conceived collaboratively and developed with input from over 500 academics and practitioners. Yet making evidence accessible (Figure 2: Strategy 1) by providing this freely available resource did not precipitate a revolution in evidence-based practice; uptake has been slow. Given that realisation, and work with stakeholders to better understand barriers to evidence use in conservation, it was apparent that adopting a new tool may first require changes to organisational practice and culture (Walsh et al., 2019). That motivated the development of further principles, tools and resources that help remove those barriers and facilitate the transition to evidence-based practice.

Therefore, we recommend that project partners carefully consider how they can facilitate the uptake of new tools and practices, including providing support and training that is carefully tailored to different end users. One key step is to establish where there is a real need for, and belief in, the types and quality of the outputs being developed, while recognising that opinions on the best approach will vary between individuals and organisations due to differences in experience, expertise, geography and requirements.

### 5.4 | Plan for continued engagement

Sustaining relationships over time and practising iterative engagement (Lemos & Morehouse, 2005) with partners has been vital, enabling the improvement of existing tools and development of new ones to add to the toolkit as additional needs were identified. For example, the Conservation Evidence database has been enhanced over the years through user testing and feedback, including through the addition of *What Works in Conservation*.

Therefore, we recommend establishing processes or channels for continued communication between stakeholders, and to be flexible and open to incorporating new suggestions and perspectives as needs evolve. Consider how these channels will be maintained if engaged individuals move on from partner organisations.

# 6 | CONCLUSIONS

By bringing together the wider conservation community, the Conservation Evidence Programme co-designed a toolkit to facilitate change in conservation practice. The process enabled practitioners, funders and policymakers to become part of a network of forwardthinking organisations benefiting from sharing ideas, successes, challenges and plans for additional solutions.

We adopted a dynamic approach to co-design, whereby the broad aims were delivered via a number of smaller projects, enabling different partners to engage to varying degrees, depending on their specific needs, interests and constraints. Through co-design, the programme developed tools and resources to closely meet the needs of stakeholders and gained commitments to use them, thereby helping to overcome barriers to evidence use. By maintaining our collaborative relationships, the Conservation Evidence Programme will continue to help drive more effective conservation practice by improving and embedding evidence use.

## AUTHOR CONTRIBUTIONS

All authors contributed to earlier discussions identifying gaps and contributed to the creation and testing of principles and tools. All were involved in the writing of the manuscript and gave final approval for publication.

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The authors declare no conflict of interest.

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### DATA AVAILABILITY STATEMENT

No data produced for this manuscript.

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#### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**Table S1:** Evidence Toolkit showing the strategy each element is targeting (see Figure 2 in main text) and providing a brief description

of each element, the numbers used to refer to each in the main text and citations.

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