DEVELOPING LEARNING LANDSCAPE PARTNERSHIPS: WHY AND HOW TO WORK WITH PROTECTED AREA MANAGERS

Annie McKee[1*], Kirsty Blackstock[1], José Miguel Barea Azcón[2], Paolo Ciucci[3], Michael Hošek[4], Michael Huber[5], Marco Neubert[6], Carol Ritchie[7], Andrej Sovinc[8], Hamish Trench[9], Zsolt Végvári[10], and Kathy Velander[11]

[*]Corresponding author: annie.mckee@hutton.ac.uk

[1]The Social, Economic and Geographical Sciences Group, The James Hutton Institute, Craigiebuckler, Aberdeen, AB15 8QH, Scotland
[2]Agencia de Medio Ambiente y Agua (Consejería de Medio Ambiente y Ordenación del Territorio, Junta de Andalucía). Gerencia de Granada. C./ Minerva 7. Edificio Zeus III, Local. Granada, Spain
[3]Department of Biology and Biotechnologies, University of Rome La Sapienza, viale dell'Universita' 32 - 00185 Roma, Italy
[4]EUROPARC Federation, Krásného 1887, 25263 Roztoky, Czech Republic
[5]E.C.O. Institute of Ecology, Lakeside B07 b, A-9020 Klagenfurt, Austria
[6] Leibniz Institute of Ecological Urban and Regional Development (IOER), Weberplatz 1, 01217 Dresden, Germany
[7]EUROPARC Federation, Waffnergasse 6, 93047 Regensburg, Germany
[8]SOLINE Pridelava soli d. o. o., Seča 115, 6320 Portorož, Slovenia
[9]Cairngorms National Park Authority, 14 The Square, Grantown-on-Spey, PH26 3HG, Scotland
[10]Department of Conservation Zoology, Hortobágy National Park Directorate, H-4024 Debrecen, Sumen u.2., Hungary
[11]School of Applied Sciences, Edinburgh Napier University, Sighthill Campus, Edinburgh, EH11 4BN, Scotland

ABSTRACT

There are many calls for more effective science-policy interaction and knowledge exchange in order to tackle persistent conservation problems; however, more clarity is needed surrounding the roles and practices involved. To address this challenge, we present the outcomes of an iterative, transdisciplinary process between researchers and protected area managers, to identify good practice in the development of what we call 'learning landscape partnerships'. This was achieved by a series of deliberative workshops, informed by the literature, to consolidate pan -European experience of those who manage and study protected areas. The resultant 'learning landscape partnership' model highlights the key role of a 'neglected actor' in such partnerships - the protected area manager. Critically, protected area managers can act as intermediaries in interpreting science for use in conservation. However, this requires the recognition of: the boundary spanning work of individual researchers and protected area managers; the need for support and encouragement by their respective organisations; and the multi-dimensional institutional setting by which the relationship building occurs. Working with protected area managers therefore requires transformation in these three areas. Transformation is rarely straightforward but may be required to respond to the urgent conservation challenges facing our most valuable landscapes.

Key words: Protected areas; transdisciplinarity; environmental governance; stakeholders; boundary organisations

INTRODUCTION

Despite considerable scientific research seeking to address complex, environmental problems, including habitat and biodiversity loss, many of these problems persist (cf. Duckett et al., 2016; Beumer & Martens, 2013). An often repeated demand is for more effective science-policy interactions (Young et al., 2014; Reed et al., 2014). There is a need to focus science on the implementation of policies and plans; shifting from the goal of seeking new 'facts' to focus on supporting environmental problem solving (McKinley et al., 2013; Raymond et al., 2010; Gaziulusoy & Boyle, 2013; Roux et al. 2006). Bertuol-Garcia et al., (2018) argue that ecological science has been slow to recognise the need to move from uni-directional to dialogical processes to close the science-practice gap. The Convention on Biological Diversity encourages interactions between those involved with biodiversity issues, including

scientists, field managers and policy makers (Markussen et al., 2005 in Chandra & Idrisova, 2011). As Nesshöver and colleagues explain, the complexity of biodiversity issues and range of critical questions to be addressed "require a better articulation and mutual understanding between knowledge producers (including scientists) and knowledge users" (Nesshöver et al., 2016: 1209).

Protected area (PA) management organisations are important actors in landscape scale conservation interventions. The International Union for Conservation of Nature (IUCN) defines 'protected areas' as a "clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008)[1]. We use this definition to represent the range of regional, natural, national parks, biosphere reserves, and other designated areas that are landscape scale units supporting multi-functional land use (cf. Scolozzi et al., 2014). PA management is broad in scope, covering a whole spectrum of activities including understanding human behaviour, implementing policy directives, and managing for biodiversity, therefore requiring exchange between researchers (from social and natural science disciplines) and managers. The PA management organisations often must combine statutory responsibilities with supporting market or voluntary-based practices. Given these multiple functions, managers frequently act as integrators of scientific knowledge and management practice (cf. Raymond et al., 2010; Armitage et al., 2011). Furthermore, PA organisations often have a remit to act as knowledge intermediaries, and to promote better understanding of the natural environment and its benefits to human well-being (cf. Moll & Zander, 2013; Spoelstra et al., 2013; Smit et al., 2017).

Whilst PA management organisations (and the individuals who work for them) are required to meet certain environmental objectives, their role as knowledge users was little discussed until recently (see Bertuol-Garcia et al., 2017). Research too often fails to tap into managers' scientific, administrative and lay knowledge, despite known benefits (Irvine et al., 2009; Roux et al., 2015). Indeed, Goulson and colleagues describe "a yawning gulf between the research consensus and practical on-the-ground habitat management" (2011:4) (see also Courter, 2012; Chandra & Idrisova, 2011). This gap between scientists and decision makers with regard to communication of ecological knowledge (Shackleton et al, 2009; Toomey

et al., 2017), inhibits the translation of information, knowledge or research findings into tasks and actions to achieve defined goals (i.e., 'knowledge utilisation'; Crona & Parker, 2012; Chandra & Idrisova, 2011; Braunisch et al., 2012; Cook et al., 2013).

What is less clear is who should translate scientific insights into management actions (cf. Goulson et al., 2011)? Exhortations to ensure that science has more 'impact' fail to explain who scientists are seeking to share their findings with, how these findings will inform management and critically, who will implement the resulting management actions. Our literature search found very few explicit references to science-management interactions; as opposed to science-policy or science-community engagement; particularly with reference to protected areas (see Cook et al., 2012 for an exception). Therefore, in this paper we explore the role of PA managers (as individuals) and their organisations, as intermediaries between science and PA management. We argue that PA managers are neglected, but important, partners with whom researchers should work and PA management organisations are a neglected example of a boundary organisation that can bridge 'science', 'policy' and practice (Franks, 2010). An important distinction emerges regarding the individual PA manager and the PA management organisation. This paper focusses on the development of a good practice model for research - PA manager partnerships, drawing attention to the role of inter-personal relationships, organisational support and the wider governance context in which these partnerships are based.

Thus, the paper presents the outcomes of an iterative, transdisciplinary process between researchers and PA managers, to identify a model of good practice in the development of what we call 'learning landscape partnerships'[2]. The Supplementary Online Material details research initiation by the EUROPARC Federation (EUROPARC)[3] and further understandings of the transdisciplinary approach adopted. The paper proceeds with an outline of the methodology and presentation of
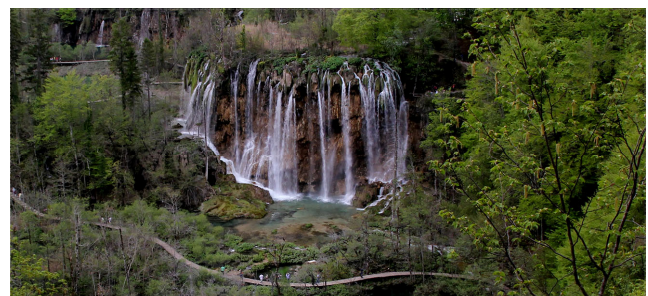
Plitvice National Park in Croatia: managing visitor flows requires cooperation between science and management. © Michael Huber

workshop results, followed by a discussion of these findings considering our focus on inter-personal relationships, organisational context, and boundary/bridging work, plus conclusions relevant for all involved in PA management.

METHODOLOGY

In alignment with transdisciplinary research protocols (Lang et al., 2012), this research adopted a collaborative research design, from problem definition to methodological design, data collection, analysis and interpretation. EUROPARC wished to facilitate in-depth discussions and social learning amongst individuals with experience of interactions between science and PA management, and to generate stronger research- PA management relationships. Figure 1 indicates the main steps of the methodological process, which centred on a series of participatory workshops with participants from conservation science and PA management across Europe. An iterative process which is open to continuous collaborative revision by the research and non-scientific participants can contribute to more accurate decision-making and research outputs (cf. Glass et al., 2013). In this regard, each workshop process was informed by the preceding workshop or existing scientific literature, in order to develop a model

of good practice. This section provides further detail regarding the different stages of the methodological process, including the literature review, workshop phases, and reporting process.

Development of a 'good practice' model

Following formation of the initial collaborative research team (lead and second author, in conjunction with EUROPARC representatives) who agreed on the problem focus and research questions, a systematic literature review was undertaken. Defined combinations of keywords (Table 1) were used to identify relevant scientific literature (about 45 key papers) across a number of online libraries[4].

Table 1. Search terms for systematic literature review

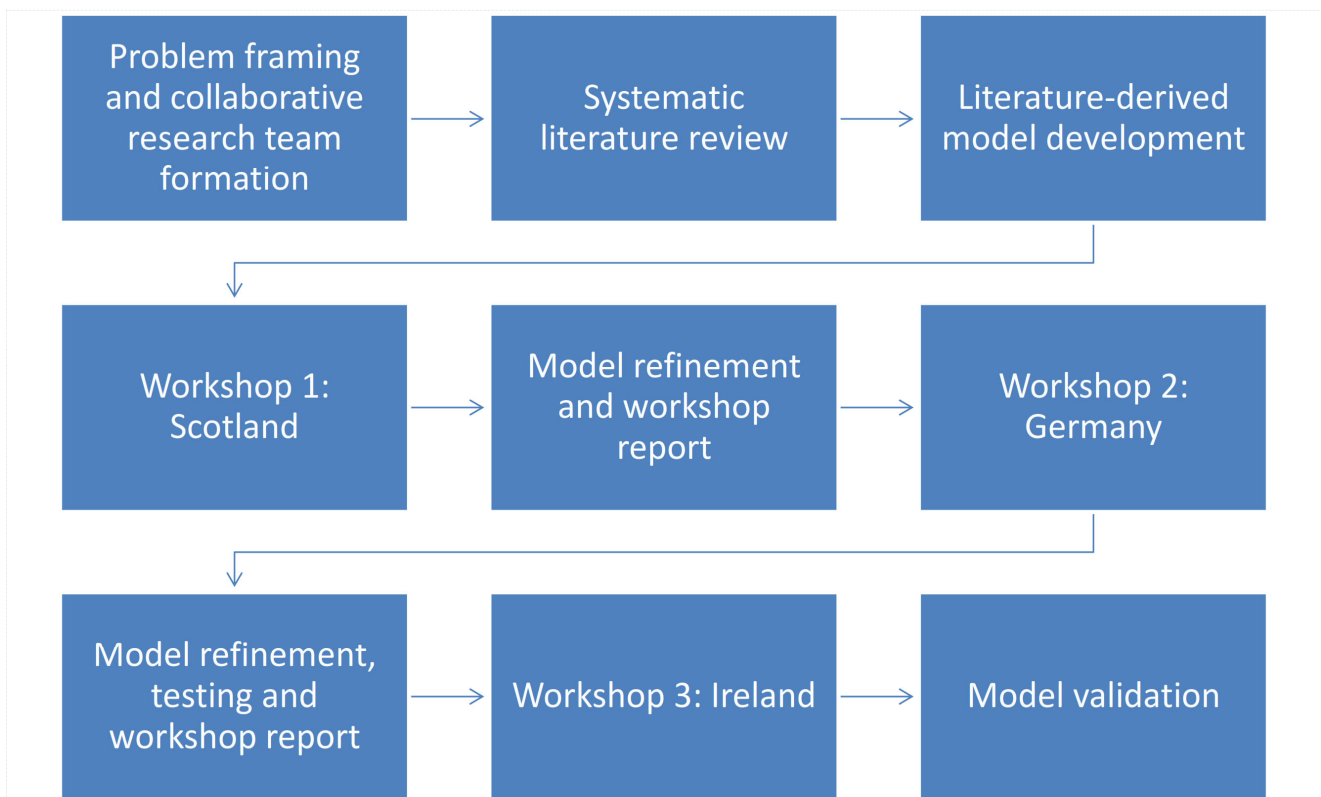| Topic		Key word
Environmental Management		Social Learning
		Partnerships
Natural Resource Management		Knowledge Exchange
	AND	Knowledge Transfer
Protected Area Management		Transdisciplinary
		Action Research
Conservation		

Figure 1. Overview of methodology steps

A schematic model (see Figure 2) summarised diagrammatically the lessons derived from the literature review for creating 'Learning Landscape Partnerships', i.e. a good practice model for science- PA management interactions. This provided the basis for discussion in the first workshop (held in Scotland). Unlike Figure 3, Figure 2 was not co-produced with the workshop participants.

Data collection

A series of three progressive workshops were held to discuss the benefits, challenges, and practicalities of researcher- PA manager partnerships, and improve the 'good practice' model from the literature (Figure 2). A purposive sample was used to identify and recruit individuals, based on their background and expertise related to protected areas, and representing different research institutions, and PA management across Europe. A total of 28 participants originated from University faculties and national parks in Spain, Norway, Italy, Hungary, Austria, Germany, the Czech Republic, Slovenia, and Scotland[5]. All 28 participants acted in an individual and anonymous capacity. The first two workshops were in held Scotland (April 2014) and Germany (September 2014). Five participants who attended the Scottish workshop also travelled to Germany for the second workshop (including the EUROPARC representative), contributing to the integration of knowledge and maintaining the transdisciplinary dialogue. Participants in the final workshop in Ireland (October 2014) were self-selected, because this workshop was a voluntary option for delegates attending the EUROPARC annual conference. Each successive workshop refined the model, building on the outputs of the previous workshop (see Figure 1). The participants in Ireland agreed with the components and structure of Model v.3, co-constructed during the German workshop (see Figure 3).

Each workshop was introduced by the facilitators and EUROPARC representative, who described the rationale and aims of the project, and workshop. The workshop activities included individual participant introductions and short presentations, describing their 'top tips' for developing effective interaction and knowledge exchange between PA management and research. The critical activity of each workshop was participant-led development, testing, and refinement of the 'good practice' model. Evidence is also drawn from supporting activities, such as the role-playing games undertaken during the German workshop. This exercise generated a list of factors that both support and inhibit effective interaction within a 'learning landscape partnership'.

Figure 2. Draft model summarising the key factors required for Learning Landscape Partnerships (literature derived as a starting point for the Scottish Workshop; see Blackstock et al., 2014)]

Each workshop ended with a plenary discussion, summarising the key messages of the workshop, and the next steps of the project overall, as well as the completion of participant evaluations forms (see Figure 1). The evaluation form also sought to capture key lessons that the participants were taking from the workshops, as indicators of social learning (cf. McKee et al., 2015).

Data analysis

Workshop notes were analysed qualitatively through thematic coding (Spencer et al., 2003). Following the analytical ladder (cf. Spencer et al., 2003), all data were inductively coded, with further analysis conducted to explore the concepts upon which this paper focuses, namely: partnerships, organisational contexts; bridging and boundary organisations. This analysis was peer-validated by the participants, and participant-verified reports were published on the project webpage[6]. All outputs can therefore be considered as co-constructed, corresponding with the final phase of Lang et al.'s (2012) conceptual model for transdisciplinary processes. All quotes presented in the following section are direct speech or post-it notes written by the participants.

RESULTS

The co-construction of the revised model was perceived as a positive experience, as recorded in the workshop evaluation forms. Participants highlighted the generation of new contacts, the identification of research gaps from the perspective of PA managers, and the opportunity to learn from multiple viewpoints as the main benefits of their participation. Indeed, the range of expectations, assumptions, and understandings brought by the participants formed the basis for complexity of the final 'model' for learning landscapes partnerships (see Figure 3).
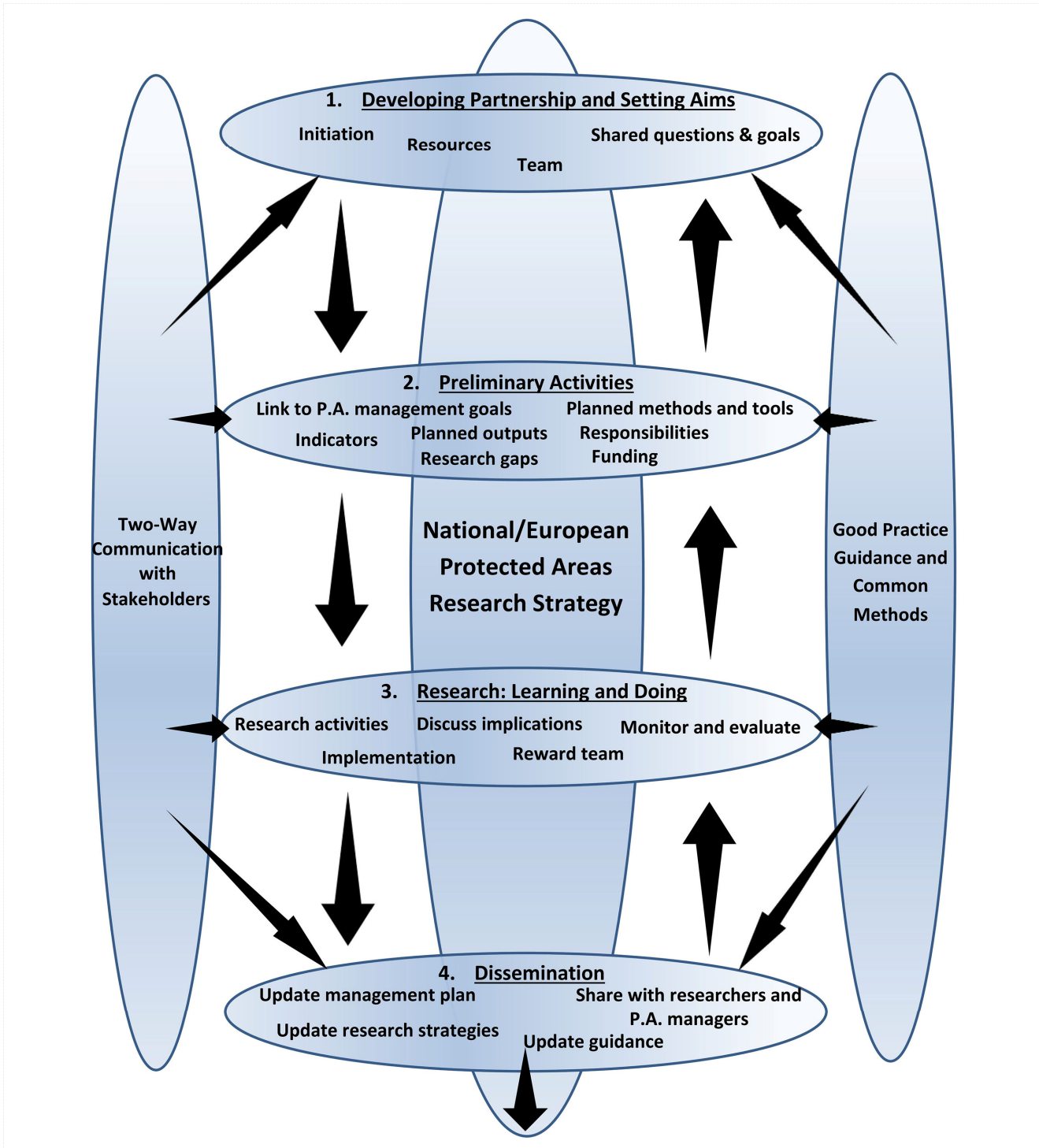

Figure 3. Model v3, illustrating the process of developing learning landscapes partnerships (German workshop)

The model describes the range of aspects underpinning each state of a partnership process, including initial development and aim-setting, early stage partnership activities, main activities such as research processes, and finally dissemination, incorporating monitoring and evaluation. Throughout these stages, two key principles are inter-related and support partnership success: (i) two-way communication with stakeholders; and (ii) good practice guidance and common methods. The model is sequential, with each step aiming to contribute to the outcome of 'better' PA management. However, depending on the previous history of PA management-research partnerships and the context for initiating this partnership, it may be possible to enter the model at different stages (i.e. previous partnerships can be built on and institutional support may be in place). Participants discussed whether the co-produced model represented the ideal (i.e. good practice partnership working between PA management and research) or a synthesis of past experience. It is interesting to note the complexity of the co-produced model of good practice (Figure 3) compared to our original distillation of good practice from the literature (see Figure 2). The complexity may be daunting, but it conveys the reality of transdisciplinary working between PA managers and researchers, within their institutional settings (see also Cilliers et al., 2013). We now draw out

Workshop articipants discuss the benefits, challenges, and practicalities of researcher- PA manager partnerships© Kirsty Blackstock

three aspects of our findings that we believe make a contribution to the debate on how to bridge the science-management gap: inter-personal boundary work; intra- and inter-organisational boundary and bridging; and the need for bridging between protected area and wider governance processes.

Inter-personal boundary work between Protected Area Managers and Researchers

Participants who co-produced the model of good practice believed that the PA manager-research team were responsible for implementing the model at every stage (see Figure 3), suggesting that they felt individuals needed to be boundary spanners. Two aspects of such boundary work stood out – common roles and hybrid identities. Participants identified some common roles for both PA managers and researchers, namely around producing shared research questions, setting up teams, applying for funding and research permissions, making sense of the data, and considering what the information means for their practice. For example, one person role-playing a researcher requested to "meet with park staff to discuss joint proposal", whilst another role-playing a PA manager suggested: "[asking] social scientists to identify stakeholders for the partnership".

Boundary work was identified between PA managers and researchers; within and between the respective organisations in which people worked; and to manage wider institutional drivers and actors. Indeed, many of the workshop participants confounded the neat categories of 'researcher' or 'PA manager'. Several played multiple roles e.g. as both University lecturers and national park employees, or researchers with long-term and close professional relationships with PA managers. Most PA managers had academic qualifications, including PhDs. The 'multiple hats' metaphorically worn by these individuals helped them to understand both roles (i.e. overcoming epistemological differences) and enable positive collaboration. These findings draw attention to the role of bridging organisations and the dynamic multi-level and polycentric knowledge networks in which PA manager-researcher relationships are situated. Our data also reflected some common themes in protected area literature: mutual benefits but also challenges around shared priorities (Underwood, 1998, Rose et al., 2016). For example, working with PA managers, researchers gain access to data, which in turn supports the work of PA management organisations, e.g. the enforcement of protection zones for species and habitats:

> We now have the knowledge to improve the participation of researchers in managing [protected areas]...This improvement will lead to better conservation in practice.

The participants described the difficulty in agreeing shared priorities as a challenge to partnership working between PA management and research. Scientists often have different motivations for research compared to PA managers. PA managers told stories of researchers who changed their focus or failed to engage in ways that allowed their results to have an impact on management. The workshop discussions also implied that identifying shared goals was an ongoing and iterative process; thus:

> Identifying priorities and goals is not a discrete step to take once but needs constant communication to keep people informed of progress and to ensure that the shared priorities are still valid.

This implies a long-term partnership approach is important, but there are challenges that arise around temporal mismatches in establishing shared priorities in different organisations.

Within partnership working there is also a perceived risk regarding shared priorities, as these may not correspond with the PA organisational objectives and/ or the findings may not support the statutory management regimes that the PA manager is required to implement. Indeed, PA manager participants spoke about the risks of engaging closely in research, when results may threaten the status of a protected area or implicitly critique a PA manager. Research participants noted that publicising data can be problematic, because it can be mis-used in management decisions (e.g. when a conservation activity looks like it is not 'cost-effective' and is therefore discontinued). These real-life examples provide a sobering counterbalance to the literature on the benefits of transdisciplinary working.

Whilst inter-personal relationships are important in the literature (Tinch et al., 2018), we were intrigued by the emphasis on the individual researcher or PA manager's commitment to the partnership process, which became a dominant theme of all three workshop discussions and). As summarised:

> Interpersonal relationships are the 'oil' for the machine: informal, long-term relationships are essential to support day-to-day management decisions. Active cooperation is required, which takes time and commitment. Person-to-person links are essential elements of a long-term partnership – one can't link to a 'community' or a 'region'.

A number of negative experiences were used to explain the importance of commitment. Negative experiences were shared by the PA managers recalling researchers who were extractive, failing to thank PA managers for their time and input, and/or not feeding back findings in a useful format, with guidance for management. The role-playing game brought out some heartfelt examples,

such as: "[researchers that are] too busy writing scientific papers to share and explain the results with the protected area manager". These findings demonstrate the emotional and experiential aspects of closing the science-management gap and the demands placed on individuals who boundary-span.

One of the striking findings from the workshop discussions was the emphasis put on 'preliminary activities'; note that in Figure 3, research does not actually begin until the third stage of the 'model'. Participants in Scotland also emphasised the 'ground work' necessary for partnership development, including the need to agree the type of partnership, as well as ensuring shared goals and benefits, from the outset of partnership development. The participants in Germany and Ireland reiterated the important stages of partnership initiation as well as drawing our attention to the extent of preliminary activities necessary prior to stages of 'research, learning and doing'. This requires both commitment by individuals, to undertake successful boundary spanning work, but also the support of their organisations and the wider institutional settings .

Organisational Support

Participants noted that often time and money are needed to engage the 'right' people and agree priorities, before data can be collected and evidence used within a partnership. PA organisations often already lack resources, they recognise the need to create partnerships to pool resources and build capacity (Michaels et al., 1999), but they do not have sufficient resource to build the partnerships themselves. The focus on experience showed that participants recognised that partnership building takes time, but such effort is not always recognised (e.g. by senior management in both PA and research organisations). Whilst time commitment is recognised in the literature (cf. Andrade et al., 2014; Tinch et al., 2018), our findings drew attention to the 'key fight' by participants with their organisations for time for partnership-building, and, crucially, partnership maintenance (e.g. attending committee meetings or workshops) to be funded. Indeed, several participants attended the German workshop during their annual leave, because it was not supported by their organisation's funding model. This lack of support threatens partnerships; whereas partnership working should be 'part of job descriptions' and incentivised.

The wider literature on partnership working (cf. Gonzalo-Turpin et al., 2008) notes the importance of the 'right' participant. Our participants linked this discourse with organisational incentives:

Institutional processes and incentives can ensure we get the 'right' people...For partnership to work it needs support at the 'right' (i.e. senior) level.

Therefore, despite the importance of inter-personal relationships, many participants highlighted the need for formal partnership agreements. Participants recommended the signing of an agreement between PA and research organisations, detailing the obligations of both during, and subsequent to, the partnership process, covering issues like shared intellectual property rights. This is common practice when considering working with indigenous and traditional knowledge in PA conservation (e.g. in Australia (Hill et al., 2012); see also Posey et al., 1995) but less common in Europe. These agreements would help to ensure students and researchers thank key research informants and return research findings to PA managers for their use. The importance of formalising research partnerships is not apparent from our review of the conservation literature (see Cook et al., 2013 for an exception), but was clearly identified as good practice by participants.

Participants identified important contextual differences that influence the degree of control that PA organisations could have over researchers. In some instances, the PA organisations were able to issue licences for research data collection; and this allowed them to try to lever more benefits for their organisation[7]. In other countries, PA organisations do not know what research is being conducted within their boundaries and have a much harder time identifying, let alone working with, these potential partners. Again, this point is not often highlighted in the literature, but could help understand differences in the ability for PA organisations to control and direct applied research in their territories.

Participants also felt research- PA management partnerships required both a long-term repository of formally-recorded information alongside informal relationships that support the interpretation and utilisation of this information. Whilst interpersonal relationships were important, but the benefits of these partnerships need to persist beyond the individuals involved, given that these individuals may leave their organisations. Researchers and PA managers therefore also must invest time in sharing and archiving knowledge within their own organisations, to extend the reach of the insights generated by these partnerships. This was flagged up by the role-playing exercise, whereby a PA manager explained that: "if impressed with the results; will present and spread the results with other protected area colleagues". Furthermore, this insight demonstrates that researchers must be aware of the organisational structures and cultures influencing knowledge use (e.g. PA objectives); rather than solely providing more science to PA managers. These insights, around the need for formal partnership agreements, ability to regulate research, and setting up formal data management processes, goes beyond individual organisational support from PA and research organisations, necessary as this is, and draws attention to other actors involved in PA governance.

Multi-level Bridging and Boundary Work

The findings above identify the need for bridging organisations which ensure that the insights from individual partnerships are not lost once these partnerships end. Indeed, the participants identified the importance of how and when to 'close-down' partnerships as part of the first stage of the 'model' (see Figure 3 and associated guidance in McKee et al., 2014) – something rarely discussed in partnership or PA literature. Of importance was the need to ensure that insights from a prior partnership fed into general guidance for others to use in their PA management. As well as benefits to their own organisations, participants felt that partnerships provide an accessible route to existing networks, therefore avoid replication of research between protected areas and contributing to resource efficiencies. Thus, the right-hand column of Figure 3 requires bridging organisations (e.g. membership organisations such as EUROPARC) to help the model to function.

The Scottish workshop participants questioned how best to interlink new and existing partnerships, to ensure that they have an enduring legacy. This point was further elaborated in Germany when participants highlighted the potential role for bridging organisations such as EUROPARC, to exchange information and develop links between researchers and PA managers. This was confirmed in Ireland, when the workshop discussions affirmed the need for long-term and large-scale PA management and research partnerships, at the EU level. Indeed, this workshop ended with a proposal to EUROPARC to set up a working group to link research and PA management at the European level, working in conjunction with the European Commission. More generally, the action role-play game (as described in Section 2.2) identified several options for bridging organisations to support learning landscape partnerships. For example, NGOs could "review inputs and outputs" and use these to "advise policy makers and policy development/legislation on new viewpoints on protected area management". Research funding organisations, such as the European Commission need to recognise the upfront costs of partnership working;
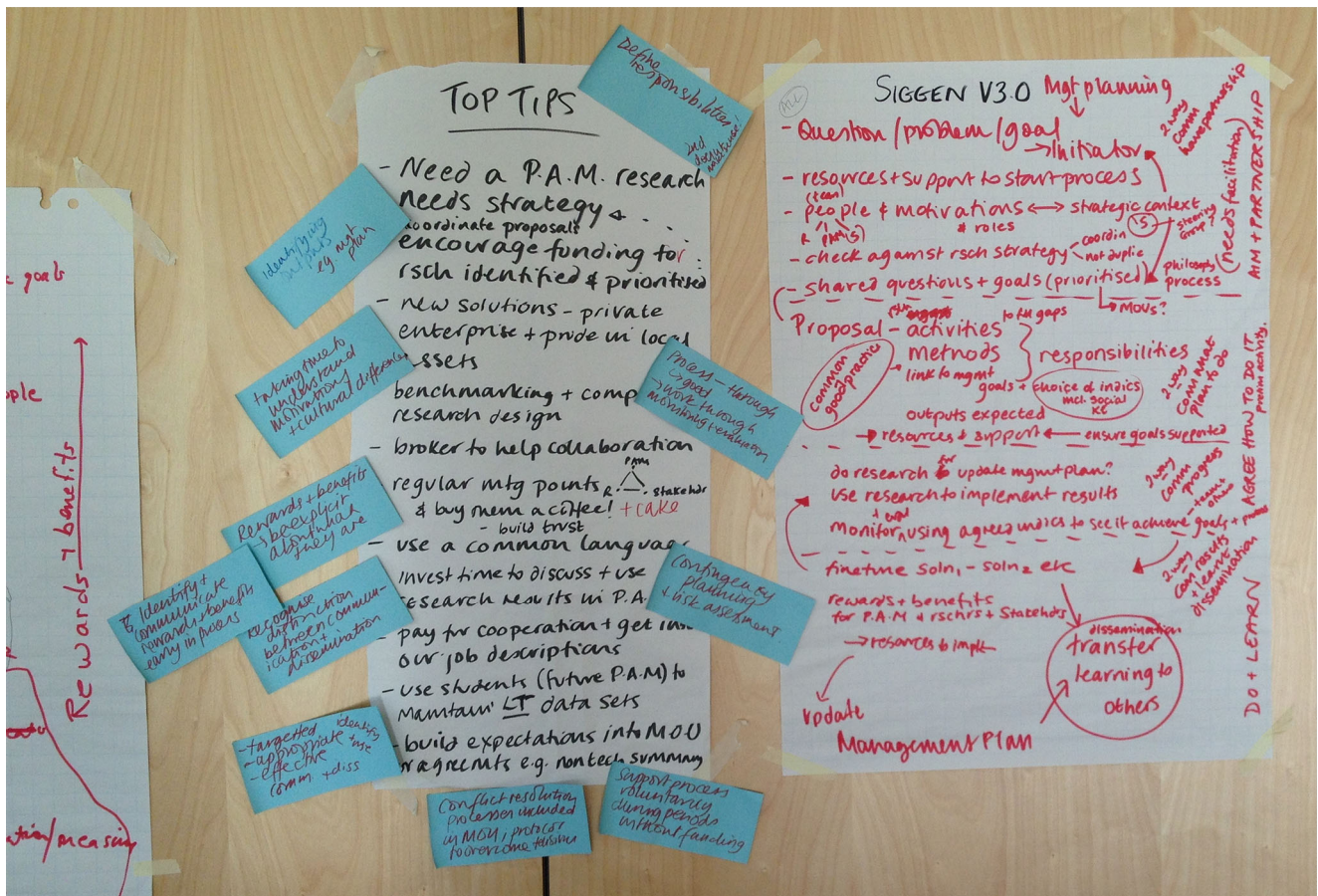
The co-construction of a revised model of developing 'learning landscape partnerships' at a workshop at Siggen, Germany © Kirsty Blackstock

but could "continue to make money available to support a platform on scientific research in protected areas". However, bridging organisations can also impede partnership working, as illustrated in the role-play game "in the case of projects not cooperating – [NGO] initiates international control of their proposals, with financial and other consequences". Funders could also enforce financial penalties e.g. "If tasks are not reached in project, request money is returned (e.g. even if provided a year ago)". Bridging organisations, through their linking and sharing activities, can make learning landscape partnerships both more effective and more efficient in terms of their use of scarce funding.

Participants at every workshop also highlighted the importance of communicating with 'key supporters' throughout the process. Therefore, boundary work in these partnerships does not only involve the PA managers and researchers themselves but requires managing the influence of a wider set of stakeholders (see the left-hand column of Figure 3). The participants highlighted the need to understand the influence of other actors in the PA management 'system', including

auditors, PA management board members, journalists, and government agencies. These actors could enable the learning landscape partnerships through supportive actions. For example, government agencies, in the role-play exercise, could "provide official statistical data beyond protected area, providing regional context"; a policy maker could "provide credibility to the partnership by providing governmental approval", and a journalist can help to disseminate the findings or "write an article on the benefits of National Parks to society". However, the participants also provided examples where these key 'supporters' created difficulties for the partnerships. For example, government agencies could "ignore or not participate in project because it is not in their scope of work," and politicians could "pass a new policy putting solar panels and wind turbines all over the protected areas, as economic growth is more important than biodiversity".

Participants were mindful of the need for local residents and land managers to understand and support PA management, and to be informed of, if not engaged in, PA research projects. In the action role-playing game,

participants hoped that local residents would "become members of partnership stakeholder group". The participants in Germany in particular, repeatedly drew attention to the multi-faceted aspects of communication and relationship maintenance involved. It was clear from their examples that learning landscape partnerships had to consider the potential preferences and reactions of these local stakeholders to the research undertaken. The influence of non-engaged stakeholders is not well discussed in the transdisciplinary literature. Once again, novel and nuanced insights on working with PA managers were gained from listening to their practical experiences.

DISCUSSION AND CONCLUSION

Our findings suggest that PA managers offer an important, unique, and as yet neglected, resource in linking research and PA management. The evidence from participants is that where such partnerships exist, it is much easier for research to have an impact on the management of protected areas. However, successful and long-term research partnerships with PA managers and management organisations are not (yet) common (Bertuol-Garcia et al., 2018). Change is required on several fronts – in terms of the inter-personal interactions between researchers and PA managers; in terms of the support and encouragement provided by their organisations; and in the boundary and bridging work required to support these partnerships through time and across governance levels. This focus on boundary spanning reflects the growing interest in translational ecology and resonates with the findings of Safford et al., (2017) who also found that interpersonal skills, organisational support and information support tools were central to linking knowledge to action.

The findings suggest that PA managers can play three main roles in getting research into practice. Firstly, they, themselves, can use scientific findings to enhance current PA management practices. However, their agency may be limited if their own colleagues, managers, or political systems are not amenable to change, echoing Hegger et al. 2012. Secondly, PA managers can integrate issues and stakeholders' views through their responsibilities for multi-functional and multi-owner landscapes, helping disciplinary researchers to become more aware of the context within which their findings might be used (Blackstock et al., 2011). Thirdly, PA managers can act as intermediaries in translating science for use in conservation management (Goulson et al., 2011; Spoelstra, 2013, Smit et al., 2017). This may be through challenging their scientific partners to explain themselves more clearly; or helping with broader dissemination to the

stakeholders in their areas. Often PA managers may be seen as more 'grounded' than academics; however, the research findings of academic partners can provide credibility. Therefore, researchers and PA managers have complementary but distinct roles in these partnerships. This finding from Europe echoes findings from other protected area contexts such as Africa (Moll and Zander, 2013; Shackleton et al., 2009) and Oceania (Cvitanovic et al., 2015).

It is therefore suggested that the answer to Goulson et al.'s (2011) question about 'who' should translate science into conservation action is researchers and PA managers working together. Our research goes beyond the 'who' to explore the 'how'; building on other endeavours in the same vein (Roux et al., 2015; Cook et al., 2013) from across Europe (Risvoll et al., 2014) to throughout other protected area contexts (Cvitanovic et al., 2015). Our findings suggest that whilst difficult to set up and sustain, so-called 'learning landscape partnerships' offer such an approach. The model of good practice (Figure 3), reflects the experiences of those practicing learning landscape partnerships.

However, the experiential knowledge shared by the participants provides fresh insights, and greater transdisciplinary understanding (see also Jenkins et al., 2012, who also draw attention to the need for 'embedded experiences' and Bednarek et al, 2018 in the wider sustainability domain). In general, there is a need to recognise the potential for 'selfish' research, which exploits PA managers in the researchers' interests (see also Moreno et al., 2014); in turn this means that the optimism of partnership working may be sometimes misplaced. It also reinforces the fact that PA managers and researchers are not homogenous; and that success depends on both personal qualities and the wider context in which one works (cf. Prager, 2010). Equally, it is recognised that researchers and PA managers generate different kinds of knowledge and different ways of framing problems (cf. Berkes, 2009). As such, the paper adds to the literature on closing the science - PA management gap through linking transdisciplinary practices with attention to governance and institutional context. By this we mean not only within organisation support and incentives for partnership, but the need to manage the perceptions and actions of opinion-formers such as the media, local communities, politicians, and businesses. These may be part of 'learning landscape partnerships', but more often, are exogenous influences on how the partnership priorities are set, communicated, and renegotiated. We believe this connection between the specific lived experiences of those contributing to research- PA manager

partnerships and the wider organisational and governance structures that constrain or enable these partnerships is what makes our contribution unique.

The idea of boundary and bridging organisations (Sternlieb et al., 2013; Stringer and Dougill, 2013; Crona and Parker, 2012; Bednarek, et al., 2018) was also useful in lifting the analysis from a focus on 'how to' build relationships between individual researchers and PA managers, to include a multi-level and dynamic understanding of these partnerships in a pan-European context. We suggest that PA management organisations are boundary agents, who link individuals and practice knowledge exchange, using their protected areas, or protected area practices as boundary objects. However, participants highlighted that such boundary work can best be fruitful when aided by bridging organisations and agents; for example, the potential role of EUROPARC as a facilitator providing contact and learning between multiple learning landscape partnerships. This enables individual good practice to be adapted and applied in many different circumstances and provides an arena for ongoing learning and evaluation regarding how to do these partnerships more effectively in different contexts.

Whilst bridging organisations might help to make learning landscape partnerships more effective and efficient in terms of informing good practice internationally, boundary work seems, in this case, to be about managing power relationships with key supporters and stakeholders. These activities speak to ideas about legitimacy and accountability in partnerships (cf. Cvitanovic et al., 2018). Not only do the researchers and PA managers have to be accountable to their organisations, but they must also be accountable to a heterogeneous and fluid network of those with a stake in the protected area. They must earn their legitimacy in order for the insights of the partnerships to influence the behaviours and choices of these other actors in the polycentric and multi-level environmental governance landscape. This adds to the burden of boundary work and also helps to explain the emphasis on partnership development and preliminary work (see Figure 3), before the actual data collection and analysis can start.

ENDNOTES

[1] As stated at: https://www.iucn.org/theme/protected-areas/about (last updated: 2018; accessed 14.8.18). The IUCN defines protected areas according to their management objectives. Please see: http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories/ (last updated: 15.01.2014; accessed: 01.10.14).
[2] The phrase 'learning landscape partnerships' was adopted after the title of the Cairngorms National Park Authority's research strategy (CNPA, 2014), discussions over which were also partly responsible for the initiation of this project.
[3] EUROPARC is an umbrella organisation with around 400 members in 36 countries representing a wide variety of protected areas including regional and national parks, and others designated by European Union policies (e.g. Natura 2000).
[4] An advanced Boolean search was undertaken within various search engines for scientific journal publications, including Web of Science, Science Direct and Wiley Online Library.
[5] Participant numbers include representatives of the research funding body (Macaulay Development Trust), and EUROPARC representatives, but exclude members of the collaborative research team acting as workshop facilitators.
[6] http://www.hutton.ac.uk/research/projects/Learning-Landscape-Partnerships
[7] See for example, the Parks Canada Agency's Research and Collection Permit System: https://www.pc.gc.ca/apps/rps/page1_e.asp (last updated: 27.01.2017; accessed: 14.8.18).

SUPPLEMENTARY ONLINE MATERIAL
Appendix 1: A transdisciplinary approach

ABOUT THE AUTHORS
Annie McKee is a social researcher at the James Hutton Institute, Aberdeen, and was part of the team who facilitated the 'learning landscape partnership' workshops. Annie's research interests include rural governance, agricultural and land use policy, rural community development and achieving sustainable development in rural areas. Annie is experienced in participatory research methods, transdisciplinarity, and knowledge co-production.

Kirsty Blackstock is currently coordinating a work-package on "Integrated and Sustainable management of natural assets" as part of the Scottish Government's Strategic Research Programme 2016-2021. Her particular interests are in the processes and practices of science-policy integration; and how to mainstream the Ecosystems Approach. She has a background in

sociology and has been researching environmental governance in Scotland and abroad for more than twenty years.

José Miguel Barea Azcón is a biologist specialising in biodiversity management at the Environment and Water Agency of Andalusia. He is a member of the technical coordination team of the Global Change Observatory of Sierra Nevada, of the National and Natural Park of Sierra Nevada (Spain) with the participation of the University of Granada. His recent research has focussed on long-term monitoring of mountain ecosystems under global change.

Paolo Ciucci is research scientist at the University of Rome La Sapienza, Italy where he teaches Zoology, Wildlife Ecology and Management. He has an MS in Wildlife Ecology and Conservation from the University of Minnesota and a PhD in Evolutionary Biology. He has expertise in wildlife behaviour and ecology, population assessment and monitoring, spatial ecology, food habits, predation, species-habitat relationships, and habitat modelling. He has conducted research on wolves and bears, especially in relation to conflict management and to facilitate coexistence between large carnivores and humans.

Michael Hošek is Coordinator of International Relations with Krkonose National Park Administration. From 2002 to 2013 he worked for the Nature Conservation Agency of the Czech Republic, where he was Deputy Director from 2006 to 2013. Michael is the EUROPARC Federation Vice President. He has a Bachelor in Horticulture from the University of Life Sciences, Prague, and a Master of Science in Applied Ecology and Environmental Protection, from the University of Jan Evangelista, Usti nad Labem, both in the Czech Republic.

Michael Huber is a consultant for protected areas and nature conservation and holds a Masters degree in Landscape Planning and Ecology. He is head of the E.C.O. working team "International development of protected areas and recognized regions", a frequent lecturer at Klagenfurt University and a member of WCPA. He has worked at the interface between research and management for more than 6 years in Asia, Africa and Europe. His research focuses on human-parks relationship and effectiveness of protected area management.

Marco Neubert is a senior scientist at the Leibniz Institute of Ecological Urban and Regional Development, Dresden, Germany. He studied geography at the Technical University Dresden. He has a PhD in applied remote sensing from the Technical

University of Dresden. Since 2007 he led several national as well as transnational research projects in the field of green infrastructure and climate adaptation of protected areas. His research interests are applied geoinformatics, spatial analyses, landscape ecology, evaluation of environmental and climate impacts, as well as risk and vulnerability analyses.

Carol Ritchie is Executive Director of the EUROPARC Federation. She has worked as a teacher, ranger and park manager in Scotland with almost 30 years' experience. She leads an international team working on diverse topics including health, agriculture, tourism recreation, youth work and nature conservation management all with relevance to protected areas. EUROPARC also has regional and national sections and commissions using members experience to connect policy and practice in order to develop innovative models of protected area site management.

Andrej Sovinc trained as a civil engineer and specialised in wetland management and restoration. He managed the Sečovlje Salina Nature Park and Natura site in Slovenia for 15 years. He lectures in courses on management of protected areas at universities in Slovenia and Austria. He has been actively involved in international conservation; coordinating the IUCN European Action Plan for Protected Areas (from 1995 to 2004) and, since 2012, as European Vice-Chair of WCPA.

Until July 2017 **Hamish Trench** was Director of Conservation and Visitor Experience at the Cairngorms National Park Authority, responsible for land use, conservation, visitor services, education and research. He has experience of National Park management, land management and rural policy. He is currently Chief Executive of the Scottish Land Commission.

Zsolt Végvári coordinates conservation-related research in Hortobágy National Park, Hungary in East-Europe. His primary focus lies in Great Bustard management, waterbird migration, crane behaviour and avian responses to climatic patterns. Additionally, he tutors several MSc students in zoology who are keen on conservation research.

Kathy Velander has worked on projects advising communities on the how, what, when and where of developing ecotourism. Her emphasis is on capacity building and product development, by helping communities to address training needs. Her work spans over 20 countries involving communities from tribal elders in Columbia to urban regeneration in Edinburgh. Her most recent project is with the Scottish Scenic

Routes Initiative that links tourism infrastructure development, employment for young architects and community development.

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RESUMEN

Ha habido muchas peticiones para una interacción más eficaz entre la ciencia y la política y el intercambio de conocimientos para abordar los problemas de conservación persistentes; sin embargo, se necesita más claridad en torno a los papeles y las prácticas involucradas. Para enfrentar este desafío, presentamos los resultados de un proceso iterativo y transdisciplinario entre los investigadores y los administradores de áreas protegidas, para identificar las buenas prácticas en el desarrollo de lo que llamamos "asociaciones de paisajes de aprendizaje". Esto se logró mediante una serie de talleres deliberativos, informados por la literatura, para consolidar la experiencia paneuropea de quienes administran y estudian las áreas protegidas. El modelo resultante de "asociación de paisajes de aprendizaje" destaca el papel clave de un "actor que ha sido desatendido" en esas asociaciones: el administrador de áreas protegidas. Los administradores de áreas protegidas pueden actuar como intermediarios en la interpretación de la ciencia para su utilización en la conservación. Sin embargo, esto requiere el reconocimiento de: la delimitación de la labor de los investigadores y los administradores de áreas protegidas; la necesidad de apoyo y estímulo de sus respectivas organizaciones; y el entorno institucional multidimensional por el cual se produce la construcción de la relación. Por lo tanto, para trabajar con administradores de áreas protegidas se requiere una transformación en estos tres ámbitos. La transformación rara vez es directa, pero puede ser necesaria para responder a los desafíos urgentes que en materia de conservación enfrentan nuestros paisajes más valiosos.

RÉSUMÉ

Nombreuses sont les entités qui appellent de leurs vœux une plus grande efficacité dans les interactions entre science et politique et dans les échanges de connaissances afin d'adresser les problèmes persistants en matière de conservation; cependant, il faut davantage de clarté autour des rôles et des pratiques en cause. Pour relever ce défi, nous présentons les résultats d'un processus itératif et transdisciplinaire entre chercheurs et gestionnaires d'aires protégées, afin d'identifier les bonnes pratiques visant à développer un système que nous appelons le «partenariat d'apprentissage pour le paysage». Ces résultats ont été atteints grâce à une série d'ateliers délibératifs qui cherchaient à consolider l'expérience paneuropéenne de ceux qui gèrent et étudient les aires protégées. Le modèle de «partenariat d'apprentissage pour le paysage» qui en a résulté met en évidence le rôle essentiel d'un «acteur négligé» dans de tels partenariats - le gestionnaire de l'aire protégée. De manière fondamentale, les gestionnaires d'aires protégées ont vocation à jouer un rôle d'intermédiaire dans l'interprétation de la science appliquée à la conservation. Cependant, cela exige la prise en compte de trois éléments: les limites du travail des chercheurs individuels et des gestionnaires d'aires protégées ; le besoin de soutien et d'encouragement de la part des organisations respectives ; et le cadre institutionnel multidimensionnel par lequel se noue l'établissement de relations. Dans le contexte du travail avec les gestionnaires d'aires protégées, il est donc nécessaire d'insuffler des transformations dans ces trois domaines. De telles transformations sont rarement simples mais s'avèrent essentielles pour répondre aux défis de conservation urgents auxquels sont confrontés nos paysages les plus précieux.