

Navigating spaces between conservation research and practice: are we making progress?

Article

Published Version

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Jarvis, R. M., Borrelle, S. B., Forsdick, N. J., Perez-Hammerle, K.-V., Dubois, N. S., Griffin, S. R., Recalde-Salas, A., Buschke, F., Rose, D., Archibald, C. L., Gallo, J. A., Mair, L., Kadykalo, A., Shanahan, D. and Prohaska, B. K. (2020) Navigating spaces between conservation research and practice: are we making progress? *Ecological Solutions and Evidence*, 1 (2). e12028. ISSN 2688-8319 doi: 10.1002/2688-8319.12028 Available at <https://centaur.reading.ac.uk/93322/>

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To link to this article DOI: <http://dx.doi.org/10.1002/2688-8319.12028>

Publisher: Wiley

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FROM PRACTICE

Navigating spaces between conservation research and practice: Are we making progress?

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Abstract

1. Despite aspirations for conservation impact, mismatches between research and implementation have limited progress towards this goal. There is, therefore, an urgent need to identify how we can more effectively navigate the spaces between research and practice.

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2. In 2014, we ran a workshop with conservation researchers and practitioners to identify mismatches between research and implementation that needed to be overcome to deliver evidence-informed conservation action. Five mismatches were highlighted: spatial, temporal, priority, communication, and institutional.

3. Since 2014, thinking around the 'research-implementation gap' has progressed. The term 'gap' has been replaced by language around the dynamic 'spaces' between research and action, representing a shift in thinking around what it takes to better align research and practice.

4. In 2019, we ran a follow-up workshop reflecting on this shift, whether the five mismatches identified in the 2014 workshop were still present in conservation, and whether progress had been made to overcome these mismatches during the past 5 years. We found that while there has been progress, we still have some way to go across all dimensions.

5. Here, we report on the outcomes of the 2019 workshop, reflect on what has changed over the past 5 years, and offer 10 recommendations for strengthening the alignment of conservation research and practice.

KEYWORDS

actionable knowledge, conservation mismatch, conservation research and practice, environmental impact, evidence-informed policy and practice, knowing-doing gap, research-implementation gap, transdisciplinary research

1 | INTRODUCTION

Conservation has long been described as a mission-driven discipline (Soulé, 1985). Yet despite rapid scientific progress in conservation knowledge, biodiversity decline and environmental degradation continue to worsen (Cook, Mascia, Schwartz, Possingham, & Fuller, 2013; IPBES, 2019; Knight et al., 2008; Tittensor et al., 2014). The continued shortfall between knowing and doing has inspired efforts to better align research and practice in conservation (Arlettaz et al., 2010; Toomey, Knight, & Barlow, 2017). Navigating the spaces among research, decision-making, and action is crucial for generating evidence-informed policies and practices that deliver conservation impact (Nguyen, Young, & Cooke, 2016; Rose et al., 2019). We acknowledge that professional researchers are not the only sources of conservation knowledge (Moon, Adams, & Cooke, 2019; Rose, 2018) and that the needs of practitioners will not be met by simply following advice presented in peer-reviewed scientific papers that has not been adequately co-developed with relevant practitioners, agencies, Indigenous peoples, or local communities (Dedual et al., 2013; Weeks & Packard, 2002). Instead, we discuss the systemic obstacles that researchers and practitioners face while making efforts to align their work and deliver effective evidence-based action.

In 2014, RMJ and SBB brought together researchers and practitioners for a workshop during the Society for Conservation Biology (SCB) Oceania Conference to explore mismatches between conservation research and practice, and to identify potential strategies for aligning them (Buschke, Botts, & Sinclair, 2019; Jarvis, Borrelle, Breen, & Towns, 2015). The workshop identified five mismatches between knowing

and doing in conservation: spatial, temporal, priority, communication, and institutional. In 2019, RMJ and SBB led a follow-up workshop at the International Congress for Conservation Biology (ICCB) to reflect on the pervasiveness of the five mismatches identified in the 2014 workshop, whether the conservation community has made progress towards better aligning research and practice, and what more still needs to be done. This paper is a reflection of the two workshops and the relevant intervening literature. The aim of this analysis is to support the work of conservation community by acknowledging the positive feedback loop between knowing and doing in conservation, while focusing attention on ways researchers and practitioners can better align their work.

As interest in the research-implementation gap has grown in the conservation community, thinking and language around better aligning research and practice has begun to shift. In 2014, research exploring the 'research-implementation gap' was built upon the foundations of the now-debunked, one-way, information-deficit model, in which conservation knowledge was assumed to pass linearly from researchers as 'knowledge producers' to practitioners as 'knowledge users' (Toomey et al., 2017). By 2019, new language was emerging to better represent the collaborative and interdependent relationship between research and practice and the different ways knowledge is generated, shared, and used by researchers and practitioners. The term 'gap' was being replaced and reconceptualized as the 'spaces' between research and practice instead (Alston, 2019; Toomey et al., 2017; Walsh, Dicks, Raymond, & Sutherland, 2019; Wowk et al., 2017). Far more than semantics, this shift in characterisation mirrors a shift in thinking; realising that not all conservation problems are tractable, and acknowledging

how values, and not only facts and evidence, determine conservation priorities, actions, and effectiveness (Buschke et al., 2019). The spaces between research and practice are now increasingly conceptualized as dynamic spaces, processes, and relationships that can be built to better coordinate research and action (Buschke et al., 2019; Maas, Loyola, Toomey, & Knight, 2019; Sutherland et al., 2019; Toomey et al., 2017). The 2019 workshop provided an opportunity to reflect on the progress made towards overcoming the mismatches identified in 2014 in the context of this reconceptualization and shift in thinking.

The 2019 workshop brought together 12 researchers, five practitioners, and one individual who identified themselves as representing a funding agency and not in either category. The distribution of experience was similar at both the 2014 and 2019 workshops, with both groups composed of mostly early- to mid-career individuals and several more established professionals. The 2019 workshop lasted approximately 1 hour across the lunchbreak of the ICCB conference and conference attendees could choose to participate if they wished. After being briefed on the background and purpose of the workshop, participants were encouraged to reflect on the information provided about the five mismatches identified in 2014, whether they believed progress had or had not been made towards overcoming them, and to provide case studies and examples where relevant. Next, participants were asked to select a particular mismatch for group discussion, where they reviewed different perspectives around the progress that had been made towards resolving their selected mismatch, and shared the results of their discussion back to the larger group. RMJ and SBB facilitated discussion across all participants around the different ideas of progress, what still needs to change to better align research and practice, and the most important issue to overcome. The outcomes of the 2019 workshop were documented and written up as this publication. All workshop participants were invited to co-author this paper to further reflect and expand upon the points made at the workshop, and 12 researchers and three practitioners chose to take part.

The purpose of this manuscript is twofold: (1) review progress towards resolving mismatches between research and practice, and (2) offer recommendations for how we can further navigate these spaces going forward to improve conservation impact. We recognize that work across knowledge and practice varies widely across contexts, cultures, and geographies, and we will not have identified all possible barriers and solutions. We also acknowledge that this manuscript is informed by the personal opinions and experiences of the co-authors who chose to take part in the workshop, who are predominantly Western-trained, and that the recommendations made are most relevant for similar contexts, with potentially limited applicability to dissimilar contexts.

2 | SPATIAL MISMATCH

Spatial mismatch occurs when research is conducted at a different spatial scale or geographic extent than is relevant for conservation practice. In 2014, workshop participants highlighted how researchers work at multiple scales, with many working at global scales due to the

broader scope of grants, funding, and increased likelihood of publication (Jarvis et al., 2015). Practitioners were more likely to work at refined, local scales, where they felt they were better able to integrate local, place-based knowledge into decision-making and involve communities in conservation more effectively. In 2019, workshop participants had mixed thoughts on how much spatial mismatch has been overcome in the past 5 years.

Some workshop participants did not believe spatial mismatch is as much of an issue in 2019 as in 2014, likely because local-level research is increasingly being translated into other contexts and at larger scales. For example, the Australasian Genomics Wildlife Group works to generate species-specific conservation outcomes, such as for the Tasmanian devil, while also being recognized as a global leader for translating genomic tools to threatened species management around the world (Wright et al., 2020). Likewise, genomics studies of salmonid species demonstrate a range of successful research–practice collaborations that are context relevant while also providing translatable global insights (Garner et al., 2016; Piccolo, 2016). Workshop participants noted how more general conclusions from socio-ecological case studies have also been shown to provide insights at multiple scales (Magliocca et al., 2018) and how lessons learned from ‘bright spots’ could be shared to replicate conservation successes in other areas (see Cvitanovic & Hobday, 2018).

However, several participants argued that spatial mismatch continues. Participants agreed that global and large-scale research is important but noted that the information it provides is often unable to meet the needs of practitioners. There were several reasons given for this, including that practitioners perceive most researchers as being too inflexible or time limited to translate their (often generalized) research in a way that could help inform more localized action towards particular issues (Kadykalo, Cooke, & Young, 2019; Nguyen, Young, Corriveau, Hinch, & Cooke, 2019; Weeks & Packard, 2002). Several researchers stated that while they would like to increase their work with practitioners at more local scales, this still risks putting them at a career disadvantage in the current job market; large-scale projects and global studies are still more likely to secure research grants and be accepted in high-impact publications. Despite this, practitioners in the workshop did note many productive collaborations with researchers at smaller scales that have tended to result in more actionable information, and called for greater investment in research at practitioner-relevant scales. Practitioners also observed that researchers nearing completion of a project were much more likely to shift their focus to a brand-new project, rather than work with practitioners to replicate this success in other areas, contexts, or at scale. This mismatch was thought to be driven by research organisations and scientific journals still tending to favour novelty over replication, even where replication may provide additional conservation benefits.

3 | TEMPORAL MISMATCH

Temporal mismatch occurs when the timelines of researchers and practitioners are not aligned, where decision-making and policy windows

open and close before research can be completed to meet their information needs, or where the temporal scope of research and practice differs. In 2014, researchers noted that their work is often responsive to knowledge gaps previously identified in the literature. Practitioners characterized themselves as being more reactive and focused on the present and ready to tackle new conservation issues as they emerge in their projects (Jarvis et al., 2015). In 2019, workshop participants agreed that this temporal mismatch still tends to occur because of the slower academic research cycle, even when research is forward looking or focused on emerging problems. Participants also noted how researchers' timelines are often constrained by the funding cycles driving their research (Martinson, Crain, Anderson, & De Vries, 2009), whereas practitioners' timelines are generally driven by operational constraints and project mandates. Short-term grant timelines were also identified as working against activities that build long-term trust and understanding necessary for researchers and practitioners to better align their work.

In 2019, participants communicated that there has been increasing engagement in more interactive models of research and knowledge production that promote better alignment in the temporal scope of research and uptake into practice. There are now numerous examples of researchers and practitioners aligning the temporal context of their work by identifying research questions collaboratively, co-designing conservation projects, and co-producing relevant and actionable conservation knowledge to solve emerging issues (Miller & Wyborn, 2020; Wyborn, 2015). The International Whaling Commission (IWC) was provided as an example in which temporal mismatch was addressed by bringing together researchers and practitioners to identify long-term issues and solutions, and to develop shared frameworks for cetacean research, conservation, and management going forward (IWC, 2016). Conservation genetics was also cited as an important example of a field that is able to forecast impacts and help facilitate management responses that can be proactive rather than reactive (Taylor, Dussex, & van Heezik, 2017). However, participants also noted that many conservation genetic studies still do not place their results into the broader context of conservation management and practice. This lack of implementation-relevant research appears fairly widespread across conservation topics (Mair et al., 2018).

Participants noted that while there tends to be greater collaboration between researchers and practitioners in 2019, research continues to supply information more slowly than the demands of practitioners (as noted by Kadykalo et al., 2019; Wiens, 2008). Practitioners often work in contexts where decisions have to be made rapidly to manage threatened species or ecosystems, and the urgency associated with the conservation crisis can make an approach that takes time for research to be completed less viable (e.g. Bottrill et al., 2008; McMahon, Teeling, & Höglund, 2014). For example one practitioner described an experience where management actions for a rapidly declining population were needed urgently, so decisions were ultimately taken without research support. Although researchers wanted to contribute with population viability analyses, they were

unable to complete these within the window of opportunity for the translocation of individuals to a new secure site.

4 | PRIORITY MISMATCH

Priority mismatch occurs when there is misalignment in the topical relevance of the information generated by researchers and the information needs of practitioners. In 2014, researchers identified how they often focused on ecosystem dynamics and threats to species, whereas practitioners tend to focus on how best to work within the local and social systems for more effective conservation outcomes. In 2019, workshop participants agreed that although alignment of research and practice had improved since 2014, mismatches between differing priorities still occur. Participants noted that research still tends to focus on improving the understanding of conservation issues through the refinement of methods and models, whereas practice often focuses on improving the implementation of conservation actions to deliver impact.

More often than not, conservation problems are driven by social, economic, and political pressures that require the social sciences to understand and overcome (Moon & Blackman, 2014). In 2019, workshop participants noted that there has been a marked increase in interdisciplinary, transdisciplinary, and social science research, which likely reflects increasing research interest in how to implement evidence and improve conservation practice (see Bennett et al., 2017; Kadykalo et al., 2019; Velasco et al., 2015). However, one practitioner highlighted that while they often find huge eagerness for integrating local and social questions into undergraduate or masters research projects (e.g. Archibald, McKinney, Mustin, Shanahan, & Possingham, 2017), this interest is rarely reflected at higher levels. The practitioner noted that despite being approached by over 40 students (some assuming supervision capability in the practitioner's organisation), they were unable to create new relationships with established academics. Such an approach does appear to be changing, however, with funding agencies and grant schemes putting more emphasis on social and knowledge systems and the centring of Indigenous peoples and local communities in their review process (MBIE, 2017; USAID, 2015). There has also been an increase and diversification of funding sources working to better align research and practice towards joint priorities (e.g. DORA: <https://sfedora.org> and EKLIPSE: Knowledge and Learning Mechanism on Biodiversity and Ecosystem Services; http://www.eclipse-mechanism.eu/about_eclipse). However, the sole participant representing a funding agency at the 2019 workshop noted that the systems being built to better align research and practice do not yet adequately account for local, private, and public sectors in this process.

Despite Indigenous communities and knowledge systems sustaining biodiversity across the world for generations, they have often been sidelined from Western models of conservation and decision-making (Rayne et al., 2020). This is changing, with Western-trained researchers and practitioners increasingly working to de-centre their own Western perspectives to centre Indigenous peoples, rights, knowledge,

processes, priorities, and practices instead (Lyver et al., 2019; Sterling et al., 2017; Rayne et al., 2020). For example, one workshop participant noted how their Aotearoa New Zealand-based research group worked in partnership with Māori (Indigenous peoples of Aotearoa New Zealand) iwi (tribes) and hapū (subtribes) to co-develop projects integrating local knowledge and conservation genomics to address specific questions and priorities (Collier-Robinson, Rayne, Rupene, Thoms, & Steeves, 2019; Rayne et al., 2020). However, such an approach is still not the norm and far more needs to be done. Indigenous-led and co-led approaches developed through authentic partnerships and investment are critical (Ataria et al., 2018; Rauika Māngai, 2020; Rayne et al., 2020; Sterling et al., 2017; Wehi, Beggs, & McAllister, 2019).

5 | COMMUNICATION MISMATCH

Communication mismatch occurs where there is a lack of knowledge or information shared between researchers and practitioners. In 2014, researchers stated that they had little to no knowledge of the projects being implemented by practitioners or which conservation actions had been successful or unsuccessful in the past. Practitioners emphasized that they often had limited access to research findings due to prohibitive subscription rates of academic journals. Workshop participants generally agreed that this communication mismatch still exists in 2019, but that researchers and practitioners are finding other ways to share information in formal and informal settings. As a result, participants generally believed that communication between researchers and practitioners had improved between 2014 and 2019.

In 2019, data are being collected in a more centralized and systematic way (i.e. <https://www.conservationevidence.com/>), and the rise of social media and online networking has brought more researchers and practitioners together. A series of new journals, such as this journal, *Ecological Solutions and Evidence*, and others such as *Environmental Evidence*, *Conservation Science and Practice*, and *Conservation Evidence* have emerged with clear aims around knowledge sharing across research and practice, and preprints on repositories such as *bioRxiv* ([biorxiv.org](https://www.biorxiv.org/)) and *EcoEvoRxiv* ([ecoevorxiv.org](https://www.ecoevorxiv.org/)) are gaining traction with practitioners as well as researchers (Alston, 2019). Open access research is burgeoning, and some funders now enforce an open access policy (e.g. Plan S in the European Union). However, participants at the 2019 workshop noted that compulsory open access could have major ramifications for researchers who are unable to pay, further exaggerating inequity of access between research groups, institutions, and countries (Burgman, 2019). It is important to recognize that open access data may counter the wishes of Indigenous peoples and local communities who may not want information and knowledge to become publicly available (e.g. TMR, 2020; Kukutai, Carroll, & Walter, 2020). Open access data is not appropriate where the anonymity and confidentiality of participants, locations, and programmes may need to be protected. Mutually agreed ethical safeguards (Chauvette, Schick-Makaroff, & Molzahn, 2019) and data management plans (e.g. Curtin University, 2020) were suggested by workshop participants as potential solutions for overcoming any uncertainty around data storage, access, and use.

Alternative approaches to enhance communication beyond open access scientific journals are important to ensure communication can be aligned in as many ways as possible while remaining appropriate for all parties and the specific context in which knowledge sharing and generation took place. Universities are increasingly evaluating this scholarly public engagement alongside research, teaching, and administration when determining new hires and promotions (Tachibana, 2017), which has encouraged more researchers to engage in different communication activities. Practitioner organisations are also increasingly recognising the importance of strengthened engagement in processes of communication and co-creation between researchers and practitioners (i.e. TNC, 2019 and USAID, 2018). Some funders now require a strong communication plan that connects research to decision-making and implementation as part of the application (i.e. MBIE, 2019; NSC, 2019; SNAPP, 2019). Researchers are increasingly writing policy and practice briefs to further disseminate their research findings in a format that is more relevant and usable to the potential end-users (i.e. Borrelle et al., 2018; Cawardine et al., 2014; Jarvis and Young 2019; SNAPP, 2020; Sterling et al., 2016). Popular summaries are becoming increasingly widespread including newspaper articles, TV and radio interviews, plain language summaries (i.e. People and Nature), research blogs (i.e. ConservationCorridor.org), media outlets (i.e. The Conversation), podcasts (i.e. Conserv'Session, The Eyes On Conservation Podcast), education-focused activities (i.e. Skype a Scientist), and alternative journals, such as *Frontiers for Young Minds*, where research articles are read and reviewed by children and teenagers.

Despite diversification of communication, there are still a number of hurdles to overcome to truly align communication across research and practice. Researchers and practitioners often use different mechanisms to communicate their work, and there remains a distinct lack of published evidence about the effectiveness and replicability of conservation actions despite widespread investments in monitoring and evaluation of conservation outcomes. A lack of knowledge about who is doing what in conservation is persistent within research and practice communities, as well as between them. While there has been progress made towards open access where appropriate (Alston, 2019; Rabesandratana, 2018), participants in the 2019 workshop identified a lack of time to search the evidence base as a greater barrier than access to publications, a constraint that has also been noted in the literature (Lemieux, Groulx, Bocking, & Beechey, 2018; Nguyen et al., 2019; Young, Nguyen, Corriveau, Cooke, & Hinch, 2016). Practitioners are often engaged in monitoring and evaluation activities that could contribute to the evidence base on conservation, but frequently lack the time, resources, or incentives to share their data with the research community or publish their work in the scientific literature. Participants noted that this mismatch could be overcome through the strengthening of systems for data sharing from practitioners to researchers, so that the onus is not on practitioners to find time to publish. Instead, practitioner-led data repositories and stronger collaboration with researchers to publish these results could help push information drawn from practitioner data and experiences into the evidence base (see Dubois, Gomez, Carlson, & Russell, 2020; Gillson et al., 2018).

Language was also noted as a considerable barrier, especially where research is overly technical; research papers written for other researchers are not likely to be utilized by practitioners if they cannot get around excessive jargon used in a scientific journal article. Practitioners may not always be able to objectively assess the quality and applicability of research to their situation, or may place excessive trust in researchers instead (Gossa, Fisher, & Milner-Gulland, 2015; Kadykalo et al., 2019; Lacey, Howden, Cvitanovic, & Colvin, 2018). While researchers are making their work more available in general, they need to do more to ensure their findings are relevant for particular people, places, and institutions, are translated into the appropriate languages, and are presented in an accessible way (Amano, González-Varo, & Sutherland, 2016).

6 | INSTITUTIONAL MISMATCH

Institutional mismatch occurs when the rules, norms, and priorities of research- and practice-focused organisations diverge. In 2014, researchers felt they were not allocated enough time to engage in dissemination activities while also conducting their research. Instead, researchers felt pressure from their respective institutions to publish their findings and move on to the next research project (Jarvis et al., 2015). Practitioners highlighted how their organisations often had considerably less funding and resources than academic institutions, which resulted in them having fewer opportunities for knowledge exchange, learning, and staying up to date with emerging research. Further, conservation projects are usually funded by clients, organizations, and foundations who expect tangible real-world deliverables and may place less value on publishing in the academic literature. Workshop participants in 2019 believed that institutional mismatch has not improved much since 2014.

There was a general view among workshop participants that institutional transformation remains a challenge in 2019, but there are promising signs of progress. Common themes for better institutional alignment included the breaking down of barriers between disciplines and institutional mandates, the definition of commonly shared values, and space for researchers and practitioners to interact freely in a broad adaptive space (i.e. Colloff et al., 2017). The Puget Sound Partnership provides an example of such an approach, where a strategic research plan was developed to guide scientific review, synthesis, and research investments alongside the implementation strategy (Biedenweg, Harguth, & Stiles, 2017; Koontz & Thomas, 2018). Another example is demonstrated by the extended peer community of conservation planners in South Africa (Buschke et al., 2019), which includes more than 1,000 individuals across several sectors. Establishing such a vibrant community requires investment to develop bridging agents, encourage opportunities for shared learning, and create pathways to effective collaboration (Buschke et al., 2019; Roux, Nel, Cundill, O'Farrell, & Fabricus, 2017).

Even when the infrastructure for cross-institutional collaboration exists, collaboration can be stifled when individuals are constrained by their disciplinary paradigms. This is where educational opportunities

can prepare individuals for the transdisciplinary interface between research and practice. This training may be in the form of research fellowships and graduate programmes that require academic and practitioner mentors (i.e. the David H. Smith Conservation Research Fellowship). Similarly, co-appointments of staff across research- and practice-focused institutions can also help overcome institutional mismatches and are becoming increasingly common (i.e. co-appointments between NIWA and Victoria University of Wellington in New Zealand, and Professors of Practice appointed across Conservation International and Arizona State University in the United States). Increased interest in co-design and co-production reflects a greater need for transdisciplinary work across research and practice (Miller & Wyborn, 2020; Wyborn, 2015) but can come with its own difficulties, both related to the financial and time costs of undertaking co-production, and the potential risks to researchers, practitioners, and partners where it is not done well (see Oliver, Kothari, & Mays, 2019; Sutherland, Shackelford, & Rose, 2017; Rose et al., 2019). There has also been progress with emerging boundary organisations and knowledge brokers working in the spaces between research and practice, while aligning the work of research- and practice-led institutions (Cvitanovic, Löf, Norström, & Reed, 2018; Posner & Cvitanovic, 2019; Roux et al., 2017). However, based on the viewpoints expressed at the 2019 workshop such approaches are still uncommon in the conservation sector.

While there has been an increase in initiatives focused on aligning the mismatches between different institutions, participants at the 2019 workshop felt there has been little real change in this space. Practitioner organisations continue to face challenges balancing the need for rapid tangible actions alongside activities that build, use, and evaluate the evidence base for conservation decisions, or processes that build knowledge exchange and learning with researchers (Dubois et al., 2020). Despite research funders and universities increasingly calling for on-ground or policy outcomes, institutional rules, norms, and incentive systems continue to reward individual outputs with a fast turnaround over collaborative efforts that may require increased time and resources. Such an approach only reinforces a model that rewards research publications over activities promoting use and uptake of the knowledge generated through research (Gossa et al., 2015). Institutions must be willing to provide the significant time and resource requirements to make collaboration, co-production, and boundary work mainstream.

7 | ARE WE MAKING PROGRESS?

In 2019, workshop participants were able to point to a number of examples of progress towards better alignment between research and practice, but there were mixed perceptions about how much progress has been made in real terms across the mismatches identified in 2014. Workshop participants broadly agreed that the last 5 years have brought an improved understanding of factors contributing to mismatches between research and practice, and what we can do to overcome them. However, persistent challenges remain and progress is still needed across all dimensions (Figure 1). When asked to identify

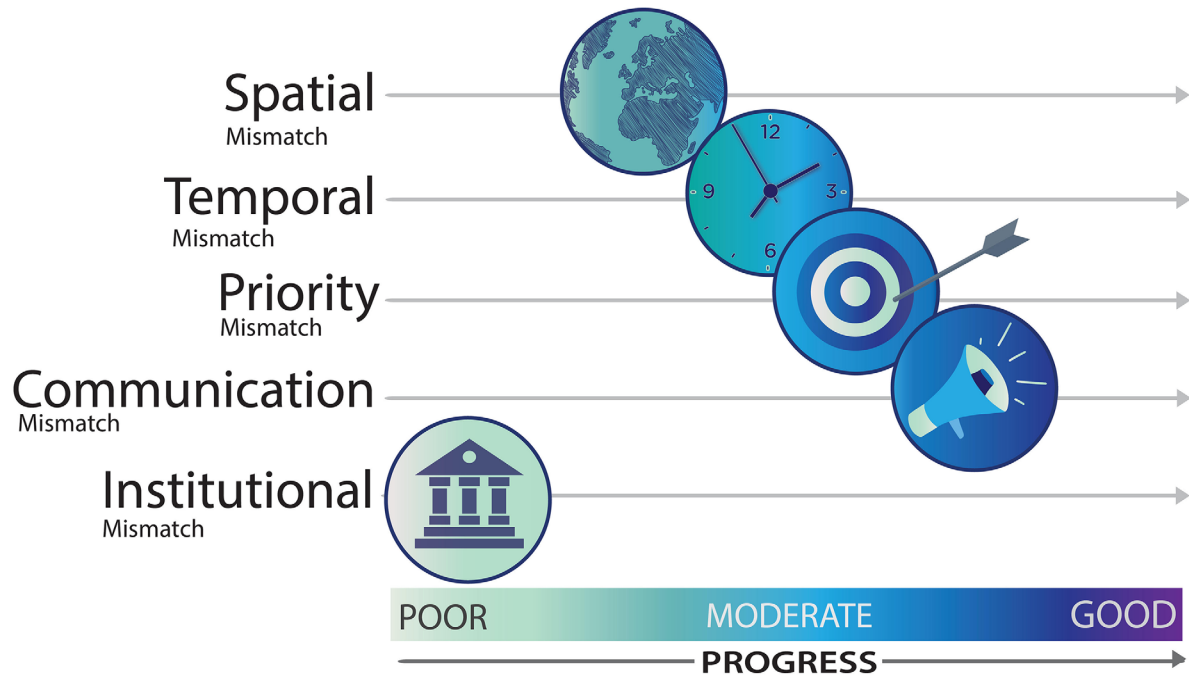


FIGURE 1 Progress being made towards aligning spatial, temporal, priority, communication, and institutional mismatch across research and practice

the most important issue to overcome, workshop participants initially identified priority, communication, and institutional mismatch as central issues in almost even numbers. Following deeper discussion, workshop participants agreed that institutional mismatch is the overarching barrier to effectively navigating the spaces between research and practice (see also Jarvis et al., 2015; Rose et al., 2019). Better aligning the institutional values, rules, and norms that currently constrain our abilities to build sustainable relationships between researchers and practitioners could enable better alignment of scale, temporal, and priority mismatches while opening up new pathways for communication and collaboration.

Progress towards aligning these mismatches and effectively navigating the spaces between research and practice is likely to be multifaceted. Looking forward, the group offered a number of potential and partial solutions (Box 1). The 10 strategies identified here each a call for strong, deliberate, and sustained action to better align the spaces between research and practice for conservation impact. As conservation researchers and practitioners, we can work towards the 10 strategies made here individually and collaboratively, but we must also challenge our institutions to better support this broader community of practice through the creation of effective and collaborative spaces that can help achieve shared conservation goals (Keeler et al., 2017).

We acknowledge that these 10 recommendations (Box 1) were identified by a predominantly Western-trained cohort in our workshop who self-selected to take part in this exercise while attending the International Congress for Conservation Biology (ICCB). The resulting group was made up of 12 researchers, five practitioners, and one funder, and the outcomes of this workshop will be informed by their opinions and experiences. We also acknowledge the broad wealth of knowledges,

perspectives, priorities, practices, values, experiences, and approaches that exist and how knowledge and practice varies widely across cultures, geographies, and contexts. We recognize the strategies identified here may have potentially limited applicability to the range of contexts and ways of knowing that exist beyond the knowledge and experiences of those who attended the workshop. Still, we hope the 10 strategies identified here, and work toward implementing them, will encourage a meaningful shift in how work is done in the spaces between knowledge and action in the conservation community.

Since 2014, the 'research-implementation gap' has been reconceptualized as the spaces, processes, and relationships between research and practice. Reconceptualizing our understanding in this way is important because it changes the narrative and inspires new ways of thinking about solutions. Work in this area will keep evolving and we hope the 10 recommendations identified in this paper can be used to start important conversations and inform these processes. Real problems are solved by dialogue, negotiation, and building long-term and trusting relationships. Authentic partnerships are crucial to improve how we design research for implementation and deliver positive conservation impact. Such an approach must be backed by funding and elevated as institutional priorities if we are to navigate the spaces between research and practice to achieve our conservation goals.

8 | CONCLUSION

The 2019 workshop provided the opportunity to reflect on the five mismatches between conservation research and practice identified in 2014. While some participants felt progress towards bridging these

BOX 1. Ten strategies to better align research and practice for conservation impact

| Action | Approach | Example references |
|--|---|---|
| 1. Nurture relationships | Prioritize time and resources for researchers and practitioners to share knowledge, brainstorm potential collaborations, and nurture relationships. | Jarvis et al., 2015; Toomey et al., 2017 |
| 2. Make conservation evidence more available | Strengthen the systems for data sharing and make more conservation evidence open access and publicly available. | Sutherland et al., 2019; conservationevidence.com |
| 3. Share and replicate successes | Encourage learning about what does and does not work to replicate success in other areas, contexts, and at scales. | Cvitanovic & Hobday, 2018; Magliocca et al., 2018 |
| 4. Contextualize outputs and communications | Encourage research and practice outputs for different audiences and the public (i.e. policy and practice briefs; social media; public media), avoid jargon, translate into the appropriate languages, and communicate in appropriate cultural contexts. | Amano et al., 2016; Reed, 2018; Kadykalo et al., 2019 |
| 5. Diversify funding | Diversify funding sources working to better align research and practice towards joint priorities. Dedicate funding towards work aimed at replicating success in other areas, contexts, and at scale. | Arnott, Kirchhoff, Meyer, Meadow, & Bednarek, 2020; SNAPP, 2019 |
| 6. Co-design, co-produce, and co-appoint | Collaboratively identify research questions, co-design conservation projects, and co-produce relevant and actionable conservation knowledge where time and resources allow. Increase co-appointments between research- and practice-led institutions. Invest in building authentic relationships and co-design processes. De-centre Western models of conservation and invest in Indigenous-led and co-led research and practice. | David H. Smith Conservation Fellows; Sutherland et al., 2017; Wyborn, 2015; Wehi et al., 2019; Rayne et al., 2020 |
| 7. Improve accessibility of conferences and events | Break down the barriers to entry of conservation congresses, conferences, meetings, and events to diversify who gets to attend and take part in the knowledge sharing, network-building, professional learning, and agenda-setting activities that take place. | Brosius, 2004; Tulloch, 2020 |
| 8. Increase knowledge exchange and boundary work | Increase knowledge exchange activities and boundary work between research- and practice-led institutions. | Cvitanovic et al., 2018; Posner & Cvitanovic, 2019; Roux et al., 2019 |
| 9. Expand adaptive management | Encourage adaptive management processes to improve how evidence is used and evaluated, decisions are made with incomplete information, and actions are adjusted as new knowledge and evidence becomes available | Dubois et al., 2020; Gillson, Biggs, Smit, Virah-Sawmy, & Rogers, 2018; Gregory et al., 2012 |
| 10. Champion diversity, kindness, and inclusivity | Incentivize collaboration by fostering a more diverse, kind, and inclusive approach to research. | Kindness in Science movement in New Zealand; Powell, 2018; Nature, 2018 |

mismatches had been made, many believed more work is needed to truly navigate the spaces between research and implementation. Collectively, the conservation community can better match research and practice with the recommendations presented here by building more equitable and authentic relationships and by developing new ways to collaborate and share conservation evidence. Simultaneously, we must challenge our institutions and ourselves to redefine success, including how we navigate those spaces between research and action, else we risk continuing to strive for a mission-driven illusion rather than real-world solutions.

ACKNOWLEDGEMENTS

The authors would like to thank the International Congress for Conservation Biology (2019) for supporting our workshop, and everyone who participated. We would also like to extend our thanks to the Editor, Associate Editor, and anonymous reviewers whose comments improved the manuscript.

AUTHORS' CONTRIBUTIONS

RMJ and SBB conceived of the ideas and designed the workshop. RMJ and SBB co-facilitated the workshop and led the writing of the

manuscript. All authors participated in the workshop and contributed critically to the drafts. All authors gave final approval for publication.

DATA AVAILABILITY STATEMENT

This manuscript does not use data, therefore no data are archived.

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How to cite this article: Jarvis RM, Borrelle SB, Forsdick NJ, et al. Navigating spaces between conservation research and practice: Are we making progress?. *Ecol Solut Evidence*. 2020;1:e12028. <https://doi.org/10.1002/2688-8319.12028>