

INVITED VIEWS IN BASIC AND APPLIED ECOLOGY

## On the gap between science and conservation implementation—A national park perspective

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### Abstract

In the conservation of forests and protected areas, a gap lies between scientific knowledge and the management decisions made. From our perspective as scientists studying a national park, who deal daily with both research and administration, we discuss the general reasons for this gap. We provide examples (saproxylic beetles and Norway spruce genetics) to demonstrate the dilemma of practitioners who aim at basing their decisions on evidence. From our experience, the approach of problem solving is crucial, yet in many cases, the bidirectional bridge between science and application is poorly established. We specifically urge governments to organize nation-wide species distribution data; scientists to support the conservation community with new functional approaches, also in combination with Red Lists to identify diversity hotspots and major threats; stakeholders to identify land-use alternatives for scientists to study; state research institutes to increase the proportion of scientists; scientists and governmental authorities to regularly summarize scientific results and conclusions for practitioners; and agencies should foster incentives for scientists to deal with conservation efforts.

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## Zusammenfassung

Im Waldnaturschutz allgemein, wie auch im Bereich von Schutzgebieten im Speziellen, ist eine Lücke zwischen Wissenschaft und Managemententscheidungen zu beobachten. Wir diskutieren hier allgemeine Gründe für diese Situation aus der Sicht von Wissenschaftlern, die in ihrer Arbeit täglich mit beiden Perspektiven konfrontiert werden. Anhand von zwei Beispielen (Totholzkäfer und Fichtengenetik) zeigen wir das Dilemma auf, in dem Naturschutzpraktiker stehen, die ihre Entscheidungen auf eine wissenschaftliche Grundlage stellen wollen. Aus unserer Erfahrung wäre es sehr wünschenswert beide Seiten regelmäßiger zu verknüpfen und eine dauerhafte Brücke zu schlagen. Dazu mahnen wir an, dass öffentliche Verwaltungen anstreben sollten, Verbreitungsdaten von Arten auf nationaler Ebene zur Verfügung zu stellen, die Wissenschaft dem Naturschutz Analysen zu Artenvielfalt, auch auf Basis funktionaler und phylogenetischer Maße, bereitstellen sollte, Hauptgefährdungsursachen in Kombination mit Roten Listen auf nationaler Ebene herausarbeitet werden, betroffene Akteure Landnutzungsalternativen als Grundlage für anwendungsrelevante Wissenschaftsstudien definieren, staatliche Forschungsinstitute mehr Wissenschaftler anstellen, Wissenschaftler und Behörden regelmäßig den Wissensstand für Praktiker aufbereiten und Behörden mehr Anreize für Naturschutzforschung schaffen.

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## The gap

Great progress has been made in using sophisticated scientific methods to set up networks of protected areas in developing countries (e.g., Papua New Guinea; Margules & Pressey 2000). In contrast, the establishment of protected areas in prosperous countries is hindered as it is often determined under pressure from political organizations and interest groups or is based on regional prestige instead of evidence of the existing biodiversity (Knight et al. 2008). Such a situation was the recent designation of hotspot areas for the conservation of biodiversity in Germany, in which the selected areas must be divided more or less equally among the federal states (Ackermann et al. 2012), which has evoked a discussion among ecologists and conservationists on the scientific basis of conservation decisions.

Here, the first problem conservationists are faced with is that new scientific approaches might produce hotspot patterns that diverge from simple patterns of species richness. Such a problem in the designation of protected areas has been recently demonstrated for patterns of fish diversity produced with and without the integration of abundance and functional traits in the analyses (Stuart-Smith et al. 2013). The second problem is the gap between established scientific knowledge and conservation actions. In this case, the scientific community apparently had little interest in science-policy interaction, and likewise the political and administration bodies apparently had little interest in scientific results guiding management policies. As mentioned early on by Lawton (1997), management decisions are without doubt not scientific, but rather are political, economic, ethical, esthetic, or religious. Yet science is required to deliver effective management alternatives for useful allocation of limited conservation resources.

A gap between conservation science and practice is not new (Habel et al. 2013), and several campaigns led by the scientific

community have started (Braunisch, Home, Pellet & Arlettaz 2012; Sutherland et al. 2006), most recently in a workshop during the annual meeting of the Ecological Society of Germany, Austria, and Switzerland (GfÖ) in 2013. In this article, we will outline from the practitioner's point of view how this gap could be closed. We will present examples from practical, every-day, science-policy work in a national park to describe misguided processes and to outline how knowledge transfer could be improved. As the oldest national park in Germany (established in 1970), the Bavarian Forest National Park is a beacon for the establishment and management of protected areas in Central Europe. With its consequent benign-neglect strategy, the park has attracted the interest also of the scientific community for research and education. As a consequence, compared to most other protected areas, one would expect only a small gap between management decisions and the existing scientific knowledge, but this is not always the case.

Four general reasons for such a gap have been identified (Arlettaz et al. 2010). First, conservation practitioners do not acquire relevant information because of the lack of access to international journals (a cost factor), difficulty with the English language, or time restrictions. For non-English-speaking conservationists, the language barrier could be the greatest factor. However, in the USA, where language is not a barrier, only 5% of the conservation practitioners use the information provided by the scientific community (Courtney & Schneider 2013). Our colleagues in conservation administration in Germany regularly bemoan the lack of time to read papers rather than language difficulties. A second reason for the gap is that conservation science regularly deals with issues not relevant for practice, i.e., the treatments investigated are often far from real-world management alternatives. For example, not forest biodiversity at the stand scale but rather forest growth is investigated experimentally in Central Europe (Pretzsch 2002). Also, studies of a single type of object (as e.g. dead wood logs) in forests (e.g. Fischer

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