Beyond Noah: Saving Species Is Not Enough

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Having attended the World Parks Congress (WPC) in Durban, we read Brooks et al.'s (2004) essay with interest. We were dismayed, however, by their dismissal of the role that nonspecies components of biodiversity play in the design of protected area systems. And we worry that the essay's appearance in a feature devoted to the WPC gives an incomplete, if unintentional, impression of the outcomes from Durban.

Certainly species data are essential to conservation planning, but these data alone are critically inadequate for two main reasons. First, the world's protected area network must also represent other important aspects of biodiversity (e.g., ecosystems, habitats, and ecological processes), and the WPC affirmed this broader goal. The resulting Durban Accord states that maximizing representation and persistence of biodiversity in comprehensive protected area networks should take place by

> . . . focusing especially on threatened and under-protected ecosystems and those species that qualify as globally threatened with extinction under the IUCN criteria. This will require that; Systematic conservation planning tools that use information on species, habitats and ecological processes to identify gaps in the existing system be applied to assist in the selection of new protected areas at the national level;. . . (WPC 2003).

The protected-area network should also ensure that "Viable representations of every terrestrial, freshwater and marine ecosystem are effectively conserved within protected areas" (WPC 2003).

Clearly, if protected areas are to successfully represent the full diversity of life on Earth, they must be based on a variety of available biodiversity data and ecological approaches, not solely on the limited species information currently available. Using only a species-based approach to conservation planning prevents governments and conservationists from addressing the most important tenets of the Durban Accord, whereby protected areas are expected to conserve the diversity and inherent value of all biodiversity and of ecosystem goods and services, in addition to acting as safeguards for the representative ecosystems, habitats, and species.

Second, available species data are inadequate for planning protected areas because only a tiny and highly biased fraction of the world's species diversity has been documented. Only 1.7 million of the planet's potential 100 million species have been described (Gewin 2002). We understand the geographic ranges of an even smaller percentage of the world's species, 0.2% at best, and most of these are vertebrates (C. Hilton-Taylor, personal communication). Even a concerted effort over the next crucial decade will not appreciably change these numbers. The bias toward vertebrate taxa precludes defining conservation priorities using species critical to maintaining structures, functions, and services of ecosystems, such as plants and invertebrates. Just as a formulaic protection of 10% of the world's ecosystems would fail to guarantee coverage of all species, including all known taxa will not guarantee coverage of all biodiversity.

Besides focusing on saving the relatively few species with known distributions, we must also look to conserve the diversity of ecosystems to incorporate many unknown and poorly studied species and communities that are distributed according to environmental gradients, as well as to conserve ecological and evolutionary processes necessary to sustain biodiversity. Brooks et al. dismiss the use of broad-scale attributes because they are "dependent on the primary variables used to produce them and the cutoffs applied to distinguish between any two units." These statements are true—investigators have combined broad

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environmental data in a variety of ways to develop environmental classifications. This technique does not invalidate the approach, however, and there are ways forward to more rigorous and standardized approaches (Ferrier 2002). Several classification approaches have already proved successful in representing important components and patterns of biodiversity, and the literature is growing (e.g., Ward et al. 1999; Cushman & McGarigal 2002; Mac Nally et al. 2002; Oliver et al. 2004; Su et al. 2004).

So are species data or broad-scale habitat data more important for designing comprehensive protected area networks? Both are necessary. A more important question is: how do we best integrate information and approaches and build protected-area systems that adequately represent the taxonomic and ecological diversity of species, habitats, and ecosystem services? Several organizations have already developed methods to do this. Ecosystems and umbrella species are used as "coarse filters" to capture likely gradients in species diversity, communities, and the ecological processes that operate across landscapes. A fine filter is then applied to capture those elements of biodiversity that are not well represented by the coarse filter, such as individual endangered species, rare communities, and wide-ranging species (Groves et al. 2002, 2003). Several other exciting methods of combining species and habitat information are being developed. For example, Ferrier (2002) has developed techniques that model patterns of richness and beta diversity in poorly known taxa based on fitted environmental gradients. Although these models do not fully explain the variance in species patterns, they can allow the typically silent majority of species (i.e., plants and invertebrates) and ecosystems to help guide conservation priorities.

We agree with Brooks et al. that coarse-filter approaches should not be the sole focus. By themselves, they may fail to capture many species and communities, such as those that are rare and endangered. These fine-filter targets are irreplaceable features. There is an urgent need to increase the depth and breadth of natural history so that we can improve the quality of fine filters, which are currently limited to a few taxonomic groups.

Brooks et al. close their essay with a plea that "conservation biology shake itself free from armchair environmental classification and undergo a massive renaissance of natural history." This statement, and indeed their essay, implies an either-or choice. We agree that natural history is critical to conservation. We are committed natural historians who have studied and published on the natural history and conservation of species ranging from fish to bellbirds, macaws, bees, tigers, rhinoceros, and butterflies in many parts of the world. It is precisely our cumulative experiences in many data-poor areas, however, that convinces us that species data are simply insufficient to inform conservation planning at larger spatial scales. Ecological classifications offer a critical complement to species data in defining protected areas for biodiversity. In the end, we need to inform conservation investment decisions through a broad array of information, knowledge, and approaches. How can we afford not to?

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