

# Charismatic mammals can help guide conservation

Formula combines flagship species with lesser-known groups to measure value of hotspots.

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24 December 2013



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Does highlighting the plight of charismatic species help conservation efforts as a whole?

Lions, elephants and other charismatic species are not by themselves good indicators of biodiversity hotspots. But a new analysis suggests that studies of tourist-pleasing big mammals can be part of a cocktail of indicators that produce useful maps for conservation planning.

Scientists at conservation organizations often focus their research on large, interesting animals that the public — and donors — love, such as pandas, tigers and gorillas. One rationale is that because many of these 'charismatic megafauna' thrive only in large, rich, biodiverse areas, their distribution can act as a proxy for the diversity of whole ecosystems, from microbes up, which is extremely difficult to measure. Conservationists have argued that actions intended to preserve one iconic animal can have an 'umbrella effect' and save less-glamorous species that thrive in its shadow.

However, some studies have cast serious doubt on the reality of the umbrella effect. A 1998 review<sup>1</sup> by Daniel Simberloff, a biologist now at the University of Tennessee in Knoxville, noted that "whether many other species will really fall under the umbrella is a matter of faith rather than research". And a report<sup>2</sup> in 2000 found that maps of the ranges of the 'Big Five' African mammals popular with tourists — lions (*Panthera leo*), leopards (*Panthera pardus*), elephants (*Loxodonta africana*), African buffalo (*Syncerus caffer*) and rhinos (*Diceros bicornis* and *Ceratotherium simum*) — were "not significantly better for representing the diversity of mammals and birds than choosing areas at random".

So Enrico Di Minin and Atte Moilanen, population biologists at the University of Helsinki, decided to construct a formula that would combine the ranges of the Big Five with other information to make truly useful maps. Their analysis appeared on 9 December in *Journal of Applied Ecology*<sup>3</sup>.

## Diversity challenge

The duo focused on KwaZulu-Natal, a South African province long known to be a biodiversity hotspot, where the Big Five roam among forests, thickets, bushveld and grasslands. The researchers made thousands of maps at 200 × 200 metre resolution using 662 biodiversity measures, each describing the distribution of a habitat type or of a species. They considered species that conservationists care about most: the endangered, the rare and especially the endemic, meaning the plants and animals that live in KwaZulu-Natal and nowhere else.

Di Minin and Moilanen found that the distributions of the Big Five, on their own, did not do a great job of predicting where one might find high biodiversity for other species. In particular, the areas with lots of the charismatic mammals were not necessarily the same places that were rich in invertebrates, reptiles, amphibians or plants.

But the researchers also created maps that overlapped several layers of data, showing the distribution of the Big Five as well as those of key birds, reptiles and amphibians. Moreover, they added a layer of information concerning the diversity of habitat types within each unit of surface area they considered. They found that, for a given amount of land, areas that included as much of this diversity as possible also included a high percentage of the area's plant and invertebrate diversity.

Thus, even in places — and there are many — where data about plants and invertebrates are lacking, information on charismatic megafauna can be useful if it's supplemented by information on additional animal groups and habitat types may be a reasonable surrogate for all the rest of biodiversity, from bugs to trees to molds to microbes.

The “more layers” approach to measurements of biodiversity seems to work in every land- and seascape, says ecological modeller Hugh Possingham of the University of Queensland in Brisbane, Australia. “There are now many surrogacy studies like this one. If you add more layers you get a better result. If you have got more data, use it,” he says.

But why use charismatic megafauna at all, if these species are so bad at predicting where less-alluring biodiversity is found? Di Minin says that a map is more useful when it explicitly includes the economically important large animals. “A big proportion of the tourists visiting South Africa are attracted by the big guys. These guys are generating a lot of cash,” he says. The important question, he adds, is “how can we use them to protect more biodiversity?”

*Nature* | doi:10.1038/nature.2013.14396

## References

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