movements are strong in the USA when the Congress will not bring significant climate legislation to a vote and many polls have detected declining support (http://www.aei.org/paper/politics-and-publicopinion/polls/polls-on-the-environment-energy-globalwarming-and-nuclear-power-april-2013/).

Expanding the conservation toolbox

One strategy we have recommended to supplement traditional approaches is partnering with business. Clearly there are risks to this strategy; however, we see hopeful signs. The number of businesses issuing sustainability reports grew from 26 in 1992 to nearly 6000 in 2012 (http://www.corporateregister.com/downloads). Mainstream investors increasingly factor environment and sustainability information into investment decisions (https://www.bsr.org/reports/BSR_Trends_in_ESG_Integration.pdf). A 2012 survey of 4000 business leaders revealed that nearly half of the companies involved changed their business practices to be more sustainable, with reasons ranging from customer preference (52%) to concerns about resource scarcity (37%). The top benefits realized from pursuing sustainability were better brand reputation and improved innovation. The growing importance of corporate brand and reputation provides a lever with which to influence corporations to take conservation seriously. Working with business is one of many potential strategies to try to achieve success on a scale that really moves the needle. We are not sure it will work and we certainly acknowledge the risks, but we think that some new approaches are needed.

In an ideal world, conservation would prevent all extinctions. Assuming it cannot, we need some way to prioritize what and where to protect. We have advocated prioritizing places where protecting nature can improve conditions for poor and vulnerable communities. We think such a strategy will grow people's appreciation for both the instrumental and the intrinsic values of nature. Similarly, protected areas will continue to be important, but protected areas alone are not likely to be enough and must be supplemented with new strategies. Challenging a field to do better is not an attack or 'denigration' but is an attempt to encourage innovation and experimentation. We stand by our hypotheses that conservation will do better by embracing benefits to people and working with, rather than against, corporations. Let outcomes on the ground be the arbiter of this debate.

References

1 Doak, D.F. *et al.* (2013) What is the future of conservation? *Trends Ecol. Evol.* 29, 77–81
2 Mascia, M.B. and Pailler, S. (2011) Protected area downgrading, downsizing, and degazettement (PADDD) and its conservation implications. *Conserv. Lett.* 4, 9–20
3 Andam, K.S. *et al.* (2008) Measuring the effectiveness of protected area networks in reducing deforestation. *Proc. Natl. Acad. Sci. U.S.A.* 105, 16089–16094
4 Leisher, C. *et al.* (2013) Land and forest degradation inside protected areas in Latin America. *Diversity* 5, 779–795
5 Hansen, M. *et al.* (2013) High-resolution global maps of 21st-century forest cover change. *Science* 342, 850–853
6 De Santo, E.M. *et al.* (2011) Fortress conservation at sea: a commentary on the Chagos marine protected area. *Mar. Policy* 35, 258–260
7 Beymer-Ferris, B. and Bassett, T. (2011) The REDD menace: resurgent protectionism in Tanzania's mangrove forests. *Global Environ. Change* 22, 332–341
8 Sandel, M.J. (2012) *What Money Can't Buy: The Moral Limits of Markets*, Farrar, Straus & Giroux
9 Marvier, M. and Wong, H. (2012) Winning back broad public support for conservation. *J. Environ. Stud. Sci.* 2, 291–295

Moving forward with effective goals and methods for conservation: a reply to Marvier and Kareiva

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We welcome the added nuance that Marvier and Kareiva have included in their response [1] to our analysis [2] of New Conservation Science (NCS). However, we take issue with multiple points that they raise. In particular, we do not believe that our arguments in any way 'pit good values against each other' or that we have painted conservation to date as a string of unqualified success stories. Nonetheless, we are glad that they now appear to embrace many of the same fundamental goals, strategies, and motivations that have long characterized conservation. If this were the message put forth in previous articles and interviews, NCS would not have stirred up the acrimony and confusion that has, in our view, hindered progress and disheartened many in the conservation community.

Marvier and Kareiva still stress the effectiveness of human-centered conservation. We reiterate that we believe that this strategy has always had an important

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0169-5347/$ – see front matter
 http://dx.doi.org/10.1016/j.tree.2014.01.008

role in protecting nature. However, we remain concerned about the substantial risks associated with efforts to conserve nature by fulfilling human needs and appealing to corporate responsibility. Further shifting the limited capacity of conservation towards efforts that prioritize embracing development and advancing human prosperity will come at the expense of other approaches and still leave much of nature imperiled.

We remain unclear on whether the intent of NCS is to increase support for efforts to safeguard nature or to shift the fundamental goals of conservation. If these goals are still the conservation of biodiversity and natural systems, then we agree with Marvier and Kareiva that 'outcomes on the ground [should] be the arbiter of this debate.' In addition, although the available evidence indicates that using multiple strategies will yield the greatest payoffs for nature conservation, we urge natural and social scientists to carefully scrutinize the relative effectiveness of different approaches for achieving long-term results.

Let us all now all return to the important work of conserving the natural places and natural resources on which all species, including humans, depend.

References

1 Marvier, M. and Kareiva, P. (2014) The evidence and values underlying 'new conservation'. *Trend Ecol. Evol.* 29, 131–132
2 Doak, D.F. *et al.* (2013) What is the future of conservation? *Trends Ecol. Evol.* 29, 77–81

Research safeguards protected areas: response to Florens

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In a recent letter, Florens [1] criticised the current actions of the Mauritian government for the conservation of biodiversity. Beyond the general critic, the author argued that researchers and conservation workers may have a negative impact on threatened biodiversity when they collected biological material in a careless way. We obviously agree with Florens's attempt when he writes 'Authorised sampling of critically endangered species for research and conservation in particular should be carefully planned and carried out [...]' [1], and we think that any people who act for the conservation of threatened biodiversity would fully agree.

Sampling of critically endangered species should be performed using appropriate techniques and methods (i.e., demonstrating a minimum risk for the sampled specimen) and only when this collection is necessary. As pointed out by Florens, extensive collection of critically endangered species may cause definitive damage and may directly threaten the maintenance of a taxon in the wild. The spread of material collections (e.g., xylotheque, DNA bank collection, and herbarium) is a good alternative for avoiding multiple samplings on the same individual.

Florens offered several examples for illustrating 'unfavourable sampling' with dramatic consequences for conservation. Two of these examples concerns endemic and critically endangered *Dombeya* species from Mauritius, that is, *Dombeya sevathianii* Le Péchon *et* Baider [2] and *Dombeya mauritiana* Friedmann [3], which are currently represented in the wild by eight specimens and one specimen, respectively [2,4]. According to Florens, specimens of both species died because of infection. For *D. sevathianii*, the disease would result from a supposedly untreated injury subsequent to a sampling of wood tissue that we did [5]. We are therefore accused of indirectly killing the specimen type of this critically endangered taxon [1]. For *D. mauritiana*, despite previously admitting 'the exact cause of extinction of the species in the wild is not fully understood' [4], Florens argued that the disease is a consequence of 89 cuttings sampled [1].

In these provided examples, Florens asserted approximations and mistakes and his letter perfectly illustrates the fact that accusations of any type of scientific malpractice must be properly researched and backed up by strong evidence. Indeed, Florens did not provide any analyses or results for justifying that both specimens died from infection, nor the link that he made between the injuries (i.e., subsequently to the wood sampling or the cuttings) and the putative infection. Moreover, by omitting large parts of the sampling protocol used for wood sampling of *D. sevathianii*, Florens's attempt (i.e., 'untreated injury') is simply false. The wood samples were collected using the method described in Boura *et al.* [5] and the subsequent injury had been treated using a devoted healing mastic. Besides, several studies did not show any significant effect of wounds caused by wood sampling on tree mortality [6,7]. Although trees are major components of ecosystems, their death remains poorly understood, often multifactorial and always difficult to predict [8,9]. In both cases

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0169-5347/$ – see front matter
 http://dx.doi.org/10.1016/j.tree.2013.12.007