

COMMENT

BIODIVERSITY Agree on variables to track from space for conservation—target audit **p.403**

BIOGRAPHY A wild ride with group-theory giant John Horton Conway **p.406**

FICTION Kim Stanley Robinson mines interstellar travel for human frailty **p.407**



FILM Psychology's most infamous experiments on the big screen **p.408**

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A 200-kilometre pipeline from a Madagascan mine will result in the loss of biodiverse forest, which the company plans to offset.

Stop misuse of biodiversity offsets

Governments should not meet existing conservation targets using the compensation that developers pay for damaging biodiversity, say **Martine Maron** and colleagues.

Biodiversity offsetting involves trying to compensate for the damage to species and habitats caused by development such as expanding cities, constructing mines and building dams, by creating an 'ecologically equivalent' benefit elsewhere¹. For instance, since 2008, the French construction company Oc'via and its partners have invested millions of euros to manage around 1,700 hectares of farmland in

southern France to improve the habitat of little bustards (*Tetrax tetrax*). Why? To compensate for a high-speed rail project that will damage the birds' habitat².

Interest in offsetting has surged over the past decade (see 'All the rage'). Billions of dollars are spent each year on planning and implementing offsets, and schemes are now under way in nearly 40 countries. As the approach has gained

popularity, governments rich and poor have increasingly recognized that industry money generated by offsets can help them to achieve conservation targets to which they have already committed³ — such as those under the Convention on Biological Diversity (CBD).

Yet such a diversion of offsets would be, in effect, an admission of failure. To be valid, an offset must yield conservation benefits ▶

▶ that would not otherwise have occurred. Thus, either the offsets are valid but the targets are not truly met, or vice versa.

Three of us (M.M., B.G.M. and J.E.M.W.) are involved in an effort by the International Union for Conservation of Nature (IUCN) to develop guidance and global standards for biodiversity offsetting⁴. A draft report is expected in October. We think it is crucial that the IUCN provide clear rules on the use of offsetting so that existing international agreements on the protection of biodiversity are not compromised. We also recommend that future international conservation agreements explicitly require separate accounting of protected-area outcomes achieved through offsets.

NO NET LOSS

Biodiversity offsetting schemes vary. They can involve removing threats from an existing habitat — by giving an area protected status, say — or restoring habitat, for instance by planting trees. In some cases, offsets are required by law. Australia, for example, often requires developers to offset their impacts on threatened species and native vegetation.

Other offsets are negotiated case by case. Arrangements can be driven by a project's proponents, to generate social licence to operate, or by the lending requirements of funding organizations. For example, an expert panel assembled by the World Bank — which helps to fund large development projects in poor countries — proposed that the Loma Mountains National Park in Sierra Leone be established to offset the damage to forest caused by the completion of the country's Bumbuna dam in 2009⁵.

Most offset schemes aim to achieve 'no net loss' of biodiversity. This does not necessarily mean that biodiversity stops declining, because the goal of an offset is to neutralize only the loss attributable to a particular development⁶. For instance, QIT Madagascar Minerals (QMM), a subsidiary of

multinational mining company Rio Tinto, has committed to protecting at least enough forest to offset the 1,665 hectares of rare littoral forest that will disappear as a result of the operations of its ilmenite (a titanium-iron oxide) mine in Madagascar. In this case, 'no net loss' will mean maintaining the baseline annual rate of forest loss — which QMM estimates to be 0.9% per year⁷.

EXISTING COMMITMENTS

Only biodiversity benefits that are additional to a baseline scenario (what would have happened without the impact or the offset) count as valid offsets. The baseline scenario must reflect both probable future threats and any genuine future intentions to redress those threats. Too many schemes overlook the latter.

Take the commitments made under the CBD. In 2010, the 196 nations that are party to the convention agreed on the Aichi Biodiversity Targets.

Target 11 is to conserve — through establishing and managing protected areas — at least 17% of the world's terrestrial areas (including inland water) and 10% of coastal and marine areas by 2020.

Numerous governments are starting to use offsetting schemes to conserve and manage such protected areas. In 2008, for instance, the Australian state of New South Wales set up a fund of around Aus\$530 million (US\$400 million) to protect threatened woodlands on Sydney's Cumberland Plain to offset the effects on biodiversity of the city's expansion. Both developers and the government contribute to the fund, which is used to buy conservation agreements with landholders, as well as land for new protected areas.

“For wealthier nations strict controls should be imposed on the use of funds from biodiversity offsetting.”

Yet no mechanism exists to audit protected areas that are funded in this way separately from other newly protected areas that should count towards Australia's national targets.

Similarly, the Cobre Panama copper-mine project (financed by the mining corporation First Quantum Minerals, among others), is expected to result in the loss of around 5,900 hectares of forest from Central America's Mesoamerican Biological Corridor. This region has one of the highest concentrations of threatened species on Earth. To compensate, the company will contribute to the costs of managing two existing national parks (Santa Fe and Omar Torrijos), and a new protected area to be established nearby⁸. The Panamanian government can list these national parks when reporting the country's progress towards its previously agreed conservation targets without having to declare the concomitant damage to biodiversity caused by the mine.

HONEST ACCOUNTING

For some developing countries, such as Mozambique, the Aichi and other conservation targets may prove beyond reach⁹ owing to the needs of a poor and fast-growing population. In such cases, honest withdrawal from such commitments would be understandable; at least this would validate the use of offsets to fund the management of protected areas.

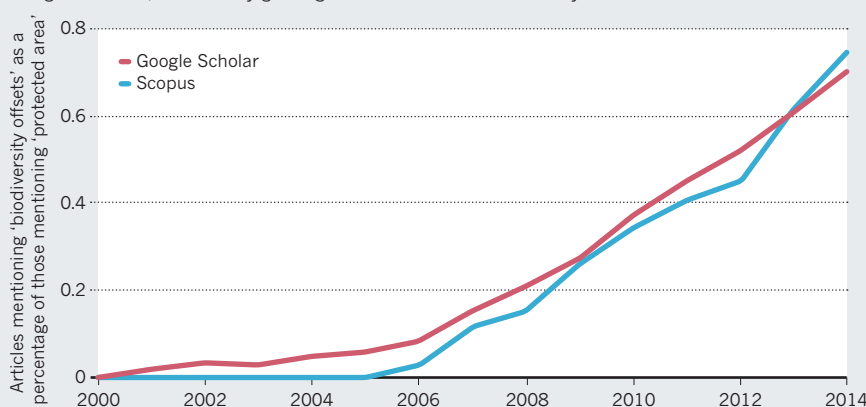
For wealthier nations — where such a withdrawal is harder to defend — strict controls should be imposed on the use of funds from biodiversity offsetting. For instance, in the past few years, the Australian government has started requiring that mining companies and other industries pay millions of dollars into government-managed funds to counterbalance the effects of new port infrastructure on water quality in the Great Barrier Reef Marine Park and World Heritage Area¹⁰. We argue that this money must be used only for actions to improve water quality beyond that expected for standard protected-area management. Otherwise, the government would be, in effect, withdrawing from its international commitments under the CBD and the World Heritage Convention.

It is reasonable, and often desirable, for offsets to fund new protected areas and their management. But these offset-funded protected areas must be tallied separately — and alongside the losses that trigger them.

A more robust system for ecological accounting is feasible, as demonstrated by REDD+, the United Nations Framework Convention on Climate Change policies for reducing emissions from deforestation and forest degradation. REDD+ offers incentives for developing countries to conserve trees and reduce the growth in global greenhouse-gas emissions. Although the details

ALL THE RAGE

In the past decade, the concept of biodiversity offsetting has gained popularity with businesses and governments, indicated by growing use of the term in the scholarly literature.



ANALYSIS: M.M., ET AL. DATA SOURCE: GOOGLE SCHOLAR/SCOPUS

USGS of REDD+ mechanisms and funding are still being developed, the signatories have agreed on the need to establish realistic baseline rates of forest loss from which to calculate emissions reductions (see go.nature.com/gofoch).

With care, offsets can help to reconcile development and conservation. But if they allow governments to renege on their commitments by stealth, biodiversity offsets could cause more harm than good. ■

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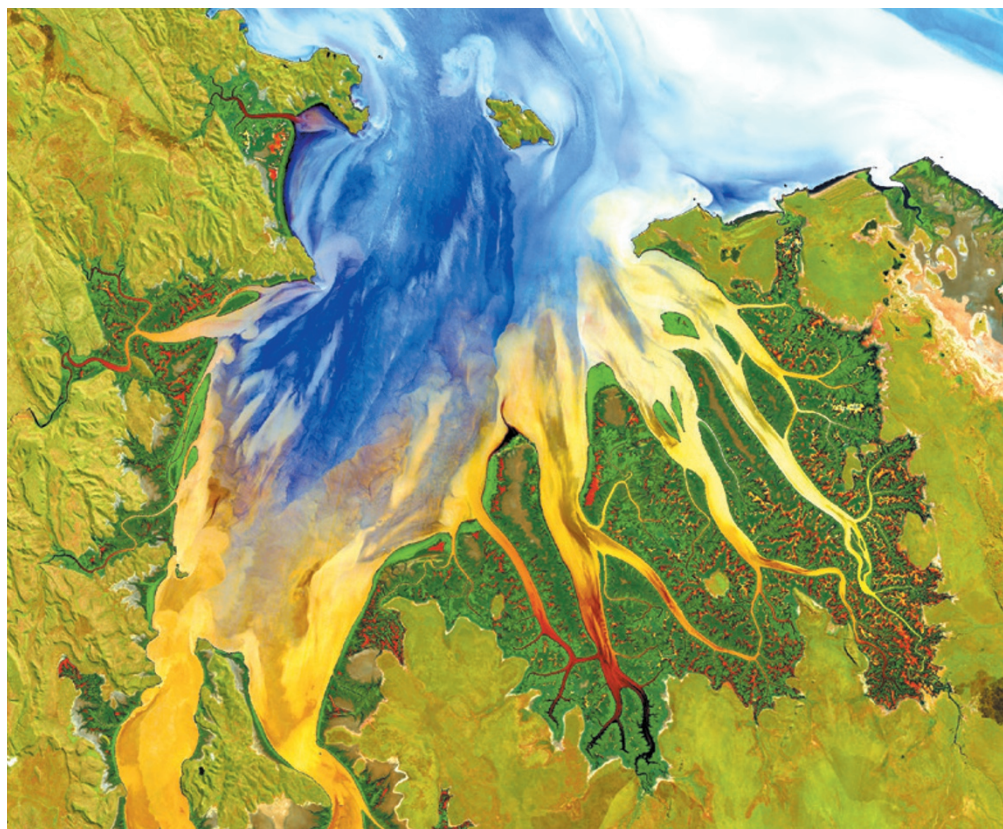
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Estuary sediment and vegetation patterns in Australia, captured by NASA's Landsat 8 satellite in 2013.

Agree on biodiversity metrics to track from space

Ecologists and space agencies must forge a global monitoring strategy, say **Andrew K. Skidmore**, **Nathalie Pettorelli** and colleagues.

Global biodiversity loss is intensifying. But it is hard to assess progress towards the Aichi Biodiversity Targets for 2011–20 set by the Convention on Biological Diversity (CBD). Target 5, for instance, aims to halve global deforestation rates by 2020; but reliable indicators for deforestation that can be monitored remotely have not been developed or agreed on. National biodiversity monitoring programmes differ widely, most data sets are inconsistent, and few data are shared openly.

To focus priorities, ecologists have proposed classes of 'essential biodiversity variables' — including species traits and populations, and ecosystem function and structure¹. But measuring these on the ground is laborious and limited.

Satellite remote sensing is crucial to getting long-term global coverage. It can rapidly reveal where to reverse the loss of biological diversity on a wide range of scales in a consistent, borderless and repeatable manner². Quantities such as vegetation productivity or leaf cover can be measured across continents from space. But there is no agreement on how to translate these measurements into metrics that are relevant for biodiversity monitoring.

We call on conservation and space agencies to agree on a definitive set of biodiversity variables and how these will be tracked from space, to address conservation targets. Methods to derive these variables and the set of satellites needed to observe them must also be decided, to ensure continuous ▶