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IS CONSERVATION WORKING?

ADVANCING IMPACT EVALUATION TO IMPROVE OUTCOMES FOR PEOPLE AND NATURE

Julia P G Jones
Prince Bernhard Chair for International Nature Conservation

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WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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Fires smoldering after Slash and burn agriculture of dry baobab forest has caused a 97% reduction of this habitat across the island, dry forests, Madagascar.

IS CONSERVATION WORKING?

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Professor Dr. Julia P G Jones
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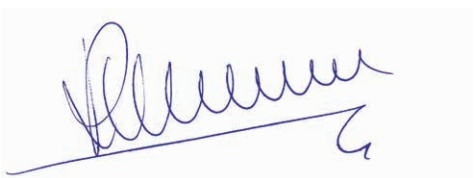
FOREWORD

Today we face the double emergencies of human-induced climate change and the loss of biodiversity, threatening the well-being of current and future generations. Despite this, these are still not top priority on many international agendas. The Prince Bernhard Chair for International Nature Conservation at Utrecht University aims to change this by strengthening the connections between conservation science, policy and practice.

It has been 35 years since the Foundation Chair Prince Bernhard established this Chair to mark the 75th anniversary of His Royal Highness Prince Bernhard and to honour of his role in international conservation efforts. Previous Chair holders have all been internationally recognised scientists whose work has impacted nature conservation in countries all over the world, including the protection and sustainable management of tropical forests.

We are proud to welcome a new Chair holder, Professor Dr Julia Jones. She is Professor of Nature Conservation at Bangor University in Wales where her research focuses on measuring the impact of conservation efforts. We are looking forward to working with her to forge new connections and explore exciting new research topics over the next 4 years.



Professor Dr. Rens Voesenek
Head of the Department of Biology,
Utrecht University

Utrecht University

INTRODUCING THE NEW CHAIR

Professor Dr. Julia P.G. Jones

I am delighted to have been appointed to the Prince Bernhard Chair.

It is a huge honor to be following in the footsteps of the scientists who have held this chair before. All are giants of conservation science and all have made huge contributions in their fields. I am also very excited about the opportunity to work closely with WWF the Netherlands: an organization with a very substantial reach in practical conservation efforts. The position also opens up a whole new network of potential collaborators at Utrecht University and works as a springboard for new collaborations in the rest of the Netherlands.

During my tenure as chair, I particularly hope to bring more recognition for the social aspects of conservation into conservation teaching at Utrecht University. Many conservationists still come from biological backgrounds. While training in ecology and related disciplines is vital, conservation is an inherently interdisciplinary endeavor, and this should be reflected in the training our students receive.

On the research side, I intend to focus my attention on working with nature conservation practitioners to improve how they measure the effectiveness of their work. My ultimate aim is to contribute to making conservation more effective and more equitable.

Thank you for putting faith in me.

Professor Dr. Julia P. G. Jones
Professor in Conservation at the School of Natural Sciences,
Bangor University, Wales

PRIFYSGOL BANGOR UNIVERSITY

Mijnheer de Rector Magnificus.

We are living through a nature emergency. One of the best measures we have of this is WWF's Living Planet Index, which shows that monitored wildlife populations have declined, on average, by nearly 70 per cent since 1970 [1].

In response to this catastrophic loss of biodiversity, a wide range of conservation efforts are being implemented around the world. However – and this might surprise those of you who don't work in conservation – despite billions having been spent on conservation interventions over the last few decades, we know remarkably little about what works and what doesn't.

Finding out whether conservation is working, and developing methods to allow us to understand this critical question better, has become the major focus of my research over the last five years. It has been a remarkably satisfying journey: full of opportunities for learning new methods, working with people across disciplines, and playing with data (which I love). However, I also believe that this work on conservation impact evaluation has a vitally important role to play in improving the outcomes from conservation, for the sake of both people and nature.

Understanding whether an intervention is working or not depends on causal inference: the process of determining the effect of something in a broader, often quite complex, system. To do this we need to estimate the counterfactual: what would have happened in the absence of the intervention [2]. The counterfactual is inherently unknowable as it cannot be observed, but there are a range of approaches which can be used to estimate it. A randomized experiment (where units are randomly allocated to being exposed to an intervention or not) is often seen as the gold standard in impact evaluation [3]. However, in the context of conservation interventions this often isn't practical – so we use other approaches to approximate the counterfactual, and therefore to estimate the impact of the intervention [4-6].

A global-scale analysis using data from 27,000 populations of waterbirds which have been monitored annually for decades shows that protected areas are having a mixed (and rather disappointing) impact [10].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In December 2022, world leaders are meeting in Montreal for the much-delayed COP15. They're gathering to agree the details of the Global Biodiversity Framework which will lay out global targets for nature conservation for the next decade.

High on the agenda is discussion of what has become known as 30 by 30 (a global initiative to conserve 30 per cent of the Earth's surface for nature by 2030). This is a major extension from where we are now. Currently, after rapid expansion partly driven by earlier global targets, 17 per cent of land and nearly 8 per cent of marine areas are, at least on paper, under some sort of protection [7].

If there is to be a major investment in expanding the world's protected area network, it seems reasonable to ask whether existing protected areas are delivering on their goals. This was the aim of a recent study led by my colleague Hannah Wauchope.

Are protected areas working?

There has been an explosion of robust impact evaluations looking at the effectiveness of protected areas in slowing habitat loss [8,9]. When I say 'robust', I mean impact evaluations which explicitly consider the counterfactual (i.e. what would have occurred if the protected area had not been gazetted). Our work was the first global-scale study to look at the impact on species populations.

We made use of an incredible dataset of 27,000 populations of waterbirds which had been counted annually for at least 10 years (most for 30 or 40 years). It's impossible to talk about this paper without acknowledging the thousands of volunteers around the world who have been out in all weathers counting birds on their 'patch'. This analysis of course would never have been possible without their efforts.

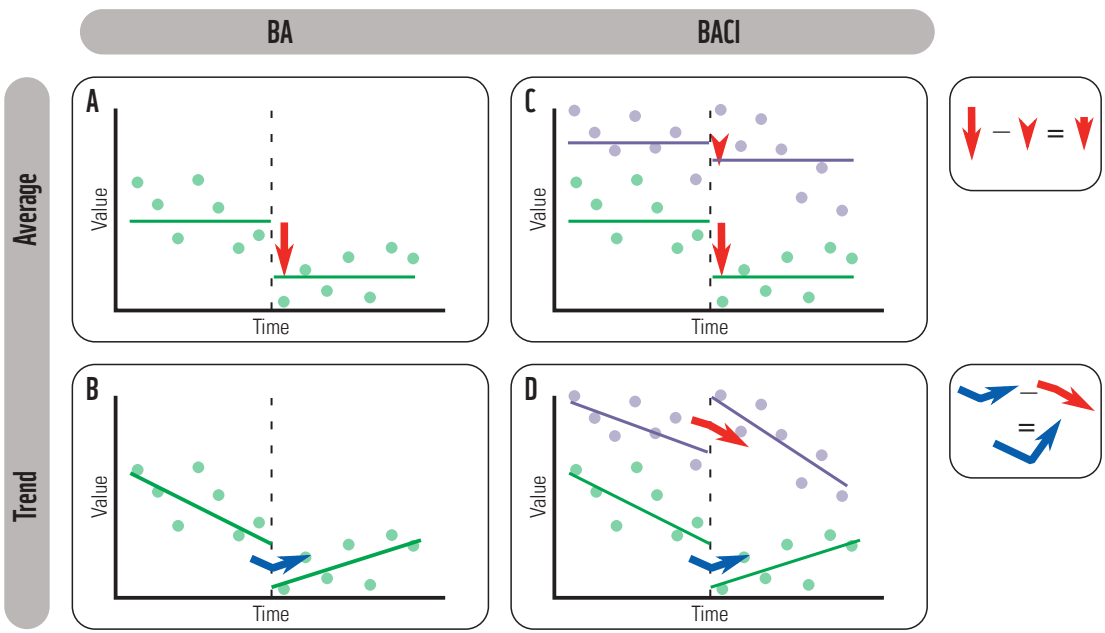
We carefully matched sites which had become protected areas during the time series with otherwise similar sites where no protected area was introduced. This gave us a set of intervention and control sites.

Estimating the impact of a protected area on a population isn't that easy. When Hannah Wauchope and I started working together we realized we needed to go beyond the sort of impact evaluation models we were familiar with. This is because we needed to consider the change in trends, as well as any change in mean, before and after the intervention was implemented [5].

In the example (Figure 1A), imagine the data shows counts of birds over time. Here we are fitting a model which just allows the mean to vary before and after the intervention. This would suggest the intervention has reduced the population. The data in Figure 1b shows identical data, the only difference is the model we are fitting allows for a change in trend before and after the intervention. This difference in modelling approach flips the result completely. Using this approach we would have drawn the opposite conclusion: that the intervention has resulted in a positive impact on the population (Figure 1B)[5].

Of course, this sort of simple before/after comparison is not a good way to estimate the counterfactual. This is because other things may be changing alongside the intervention. To isolate the effect of the intervention we need to use our control sites and consider how the change in slope before and after compares between the control and intervention sites (Figure 1 C & D). This is the Before After Control Intervention (BACI) framework for estimating the counterfactual.

Figure 1:
The inference drawn from a data set depends on whether we assume that an intervention (dashed line) will change the mean in a population (A and D), or the trend in a population (B and D). The left-hand column shows a Before After (BA framework), while the right-hand column shows a full Before After Control Intervention (BACI) framework. Adapted from Wauchope et al. (2020)[5].



When considering change in trends in a BACI framework, there are a number of different patterns in the data which would be interpreted as a positive, neutral or negative impact of protection (Figure 2A). If we look at the light blue case (an example of a pattern which indicates a positive impact of protection), we can see a treatment and control population both declining until conservation is introduced, then the control population continues to decline while the population exposed to the intervention starts increasing. That would be unambiguously interpreted as a positive impact. But other patterns would also suggest a positive impact (blues). Similarly, there are a range of patterns which would indicate that protection had no impact on the population (grey and yellow), or even a negative impact (reds).

The main result from the paper (Figure 2B) is that the impact of protection on trends in waterbirds is very mixed. This plot shows the 864 protected sites included in the analysis along the x-axis, and the proportion of species at that site which appear to have experienced a positive impact (blue colours), no impact (greys and whites) or a negative impact (reds, black). There is certainly no overwhelming pattern of lots of blue.

The same pattern is visible if we look at the data by species (Figure 2C). This time the x-axis shows the 67 species included in the analysis while the y-axis is the proportion of sites at which each species is found for which we found a positive, neutral or negative impact of protection. Again, we don't see a dominance of blue colours.

The overall conclusion of this work is that protected areas are having a decidedly mixed (and overall, rather disappointing) impact on waterbirds.

Of course, there are caveats to this finding. The most important is that although this study is at a global scale, the data mostly represent North America and Europe.

This paper ended up on the cover of Nature and has received a lot of attention. The paper is a valuable reminder to those involved in the 30 by 30 debate that a focus solely on expanding protected areas, without a focus on quality, won't deliver benefits for nature.

However, studies at this scale are inevitably of limited practical value as they lack the nuanced site-based insights needed for improving how conservation functions on the ground. For that, detailed studies of specific conservation initiatives (designed in a way to maximize learning) is what is needed.

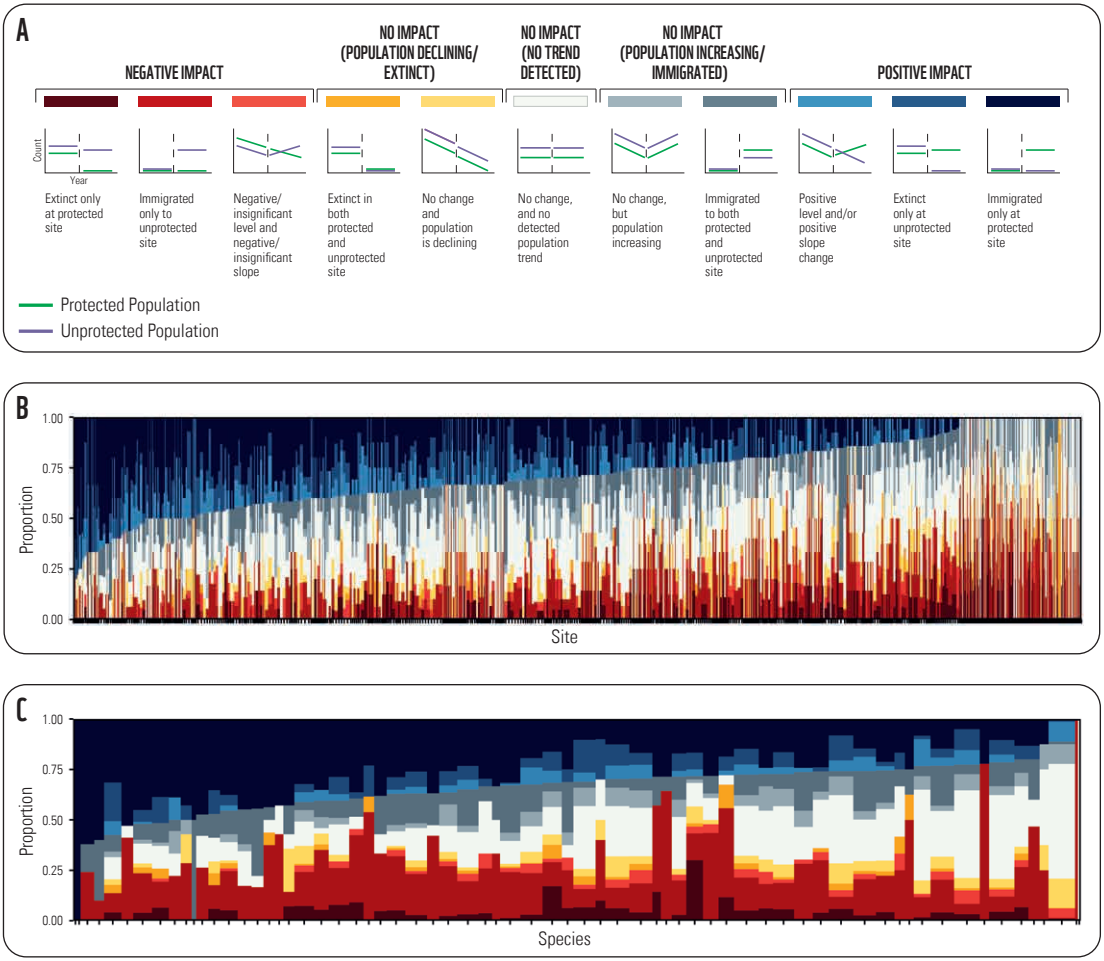


Figure 2:
The impact of protected areas on waterbirds. Panel A shows how various patterns of data in a BACI framework would be classified. B and C show the proportion of populations (n = 7,313) showing various responses to protection, according to site (B; n = 864) and species (C; n = 67), when calculated in a BACI framework. Each vertical bar comprises species or site, and the proportions of the populations in each category are shown on the y-axis. Bar width is scaled to the number of populations of that species or site in the dataset (log scaled in the case of species) with a wider bar indicating that the species or site has more populations. Each colour represents a different way in which a population can respond to protection, and an example of each response is shown in A. Adapted from Wauchope et al. (2022)[10].

Can payments for ecosystem services slow deforestation and improve water quality?

The Watershared scheme, implemented by the NGO Natura Bolivia, incentivizes upstream farmers in Bolivia to conserve forests and keep cattle out of riparian forest, with the aim of reducing deforestation and improving downstream water quality [11]. When Natura Bolivia started working in a new area in 2010, it took the extraordinary step of randomly offering Watershared agreements to some of the 120 communities in the area and not to others [12]. This 'Watershared Randomized Control Trial' was truly groundbreaking; very few conservation organizations take the step of randomizing roll-out of their interventions to allow such robust impact evaluation.

At the start of the project Natura Bolivia had quantified water quality and run household surveys in both control and treatment communities. My research group ran the research at the end of the five years of the experiment, repeating this in control and treatment communities. The randomized design allowed us to find out a lot about what had changed as a result of the payment scheme over the first five years, and what hadn't.

I'm going to summarize the results of many years work by my research group in a single paragraph. We asked three main questions about the effectiveness of the scheme over the first five years. Firstly, did Watershared slow deforestation? The short answer was no (but see Wiik et al. (2019) [13] for more information). Secondly, did it improve the quality of drinking water available to local communities? Again the short answer was no: while excluding cattle did reduce E. coli contamination of water locally, there was no measurable difference between the water supplies reaching communities in treatment and control areas [14]. Finally, did Watershared change environmental values among the population and change livelihoods? Watershared increased pro-environmental values [15] and also resulted in some changes in livelihood practices [16]. Together these may deliver longer-term impacts.

The Watershared intervention aims to improve water quality by slowing deforestation and keeping cattle out of riparian forest. The NGO Natura Bolivia took the remarkable step of rolling out its intervention as a Randomized Control Trial [13,16,17]: this has given insights into how the conservation agreement scheme functions, and has led to improvements [18].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One of the key insights from our research was that insufficient land, and often the wrong land, was enrolled in any particular catchment to expect the Watershared agreements to have substantial impacts on downstream water quality [14]. Natura Bolivia has since adjusted the way it offers agreements within a catchment to ensure the right land is enrolled.

The key message from this work is that despite the generally rather negative results (the scheme hadn't influenced either deforestation or water quality after the first five years), the impact evaluation provided insights into why. Natura Bolivia has applied this learning to improve its intervention, and Watershared – following adaptation and evolution directly informed by our research – is being rolled out in a number of countries in Latin America by Natura Bolivia's partners [18].

How effective has conservation been in Madagascar?

In the last part of this essay I want to explore the effectiveness of conservation in Madagascar. I've worked in Madagascar for 22 years. I spent three happy years living in a small village in the eastern rainforests, two hours' walk from the nearest road. I was there to do research, but of course got involved in the lives of my neighbours. The relationships I built have been foundational to my whole career and my understanding of how conservation and people are so intertwined. Over the last two decades I've continued to work in partnership with forest-edge communities, conservationists, researchers and government agencies.

Madagascar is well known for incredible biodiversity, but also for the incredible pressures facing that biodiversity. Some years ago, on the eve of the last presidential election I led a rather dramatic call to action [19]. Our paper emphasized that this was the last chance for Madagascar's biodiversity – that without dramatic change, many unique species and habitats would be lost forever.

However, despite the many very serious challenges, my recent research has shown that conservation in Madagascar is making a difference. This year I published three impact evaluation papers from Madagascar which together tell quite a hopefully story. In the next sections, I'll explore three lines of evidence which give some cause for optimism.

Madagascar's unique biodiversity faces many threats including a) artisanal mining (Picture: Rosey Perkins) and b) shifting agriculture [19].


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Covid lockdowns provide evidence that protected area management in Madagascar is making a difference

In March 2020 Madagascar, like much of the world, locked down. Normal protected area management was interrupted. This provides a natural experiment to explore the impact of the normal functioning of Madagascar's protected areas.

Fires, often associated with clearing land for agriculture, are a major threat to Madagascar's protected areas. Fires can be monitored easily with satellites and are highly variable (between seasons and between regions). This is of course because precipitation is also very variable between seasons and regions.

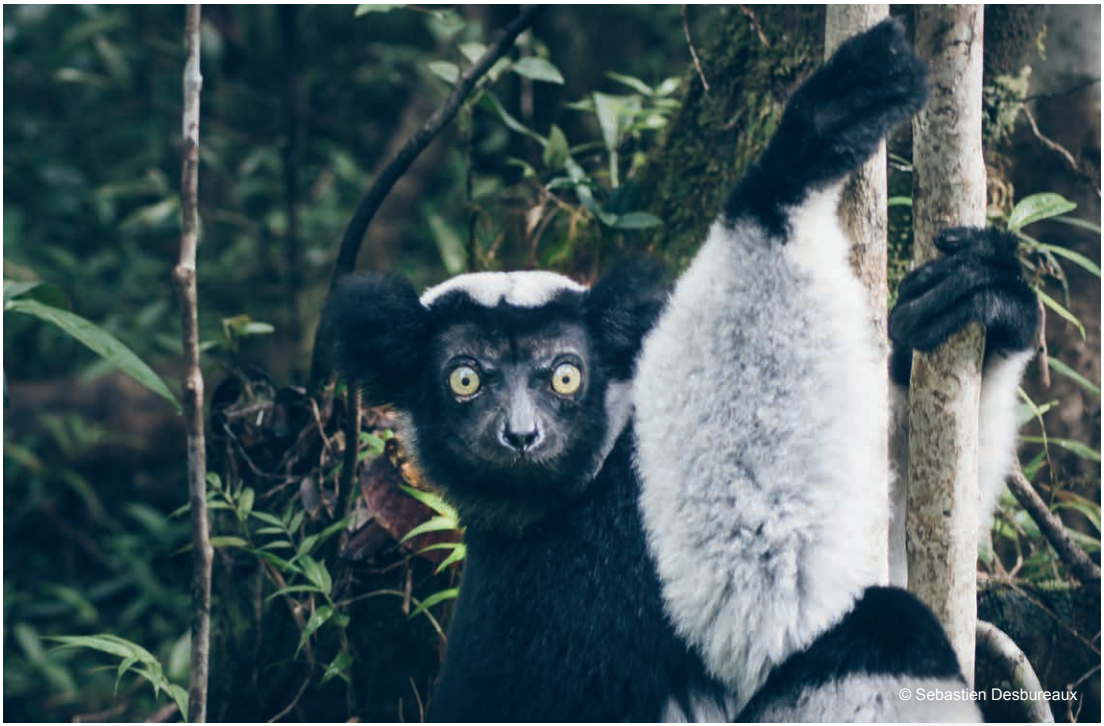
Using climate and fire data we built a model which estimates the 'expected' burns in Madagascar's protected areas each year [20]. Most years 'expected' fires match 'observed,' i.e. there are no 'excess fires'. We do see occasional periods of excess fire in the dataset, but these are associated with the instability which accompanies presidential elections. From March to July 2020, however, we see the most substantial period of excess fires in the whole dataset. Interestingly, fires quickly returned to normal after lockdown lifted, despite economic recovery not yet starting (tourism, for example, remained closed until well into 2021).

The message from this work is that despite the many challenges faced by protected areas in Madagascar, 'normal' management makes a significant difference. Madagascar's protected areas need more support, but they're worth supporting as they are successfully controlling threats to some extent.

Forest carbon projects in Madagascar are among the most effective in the world

Trees are the ultimate carbon capture and storage technology. Therefore, slowing deforestation is hugely important to help stabilize the global climate. REDD+ (Reducing Emissions from Deforestation and Degradation) is an international funding mechanism which aims to lock up carbon by avoiding deforestation and degradation of tropical forests.

The Ambatovy mine in eastern Madagascar resulted in the clearance of more than 2,000 hectares of hugely important forest which is home to many endemic species including the world's largest extant lemur, the indri. Analysis shows the mine's biodiversity offsets avoided as much deforestation as was caused by the mine [22].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We carried out a study to explore whether REDD+ projects are effectively slowing deforestation and forest degradation. This involved evaluating a systematic sample of REDD+ projects around the world (including three from Madagascar) to explore their effectiveness [21].

The Malagasy projects are remarkably successful. Across all 41 projects in our sample, about 65,000 hectares of deforestation which would have otherwise occurred was avoided. Forty-three per cent of the total was provided by the three Madagascar projects.

This impressive result shows that Madagascar can achieve effective forest conservation with political will (and, of course, international financial support).

The biodiversity offsets associated with a major mine delivered 'No Net Loss' of forest

Finally, I'll present evidence that the biodiversity offsets associated with a high-profile mine in Madagascar were successful.

The Ambatovy mine is one of the biggest ever investments in Madagascar. It represents US$9 billion of investment, and is a major contributor to the economy. The location of the mine in the eastern rainforests is very important for biodiversity, with various endemic species. The mine needed to clear about 2,000 hectares of forest. Therefore, there was international and national concern about the impact of the mine on biodiversity.

Ambatovy made high-profile commitments to 'No Net Loss' of biodiversity. This means that they needed to offset the losses due to the mine through protecting or restoring biodiversity elsewhere. Ambatovy's approach was to generate gains in biodiversity to offset the loss caused by the mine by carrying out conservation activities designed to slow deforestation driven by small-scale farming in other areas.

Our estimates suggest that by the end of 2021, the Ambatovy offsets had already avoided more deforestation than the mine caused through its direct impacts [22]. This is a very positive result which is getting a lot of international attention.

A view over the landscape in The Comoros (an archipelago nation between Madagascar and Mozambique), taken while I was working with a local conservation organization called Dahari.

Of course, there are important caveats to this positive result. Firstly, forest cover is a very imperfect proxy for biodiversity. Therefore, while Ambatovy committed to deliver 'No Net Loss' of biodiversity, what we have demonstrated is that they have delivered 'No Net Loss' of forest. These are clearly not equivalent [22]. Another important point is that where deforestation is driven by poor subsistence agriculture, conservation is often achieved by excluding the people involved in it. Unfortunately, despite substantial efforts by the mine to deliver development support to compensate for this 'economic displacement', our evidence suggests that the desperately poor farmers living around the offsets sites have borne a real cost for this conservation [23, 24].

Madagascar will use its mineral wealth to fund development. It's one of the poorest countries in the world and this development is desperately needed. However, this work shows that with appropriate regulation it can be done in a way which minimizes impacts on Madagascar's incredible natural heritage.

A dose of conservation optimism

The last thing I want to do is come across as a Pollyanna who's excessively cheerful in the face of what is a real crisis. While we're winning many battles it often feels like we're losing the nature conservation war. However, it's valuable to look for the bright spots and know what's working, as that's where the lessons lie. Some optimism is important. Martin Luther King, who had such an enormous influence on the civil rights movement in the US, famously said 'I have a dream', not 'I have a problem'[25].

Madagascar's forests and biodiversity face an existential crisis. However, despite the problems and many failures the country has suffered, there have also been successes. This is worth emphasizing. Conservation urgently needs to build on these successes.

Recently I was in The Comoros (an archipelago nation between Madagascar and Mozambique) working with a local conservation organization called Dahari. Dahari want to learn the lessons of the Watershared Randomized Control Trial to inform the design of their own conservation agreement scheme. Seeing this dynamic and innovative small conservation organization learning from previous impact evaluations to design better conservation projects gives me hope for the future of conservation. (And of course, from a personal perspective, there is nothing more satisfying than seeing my research being put into practice).

Nature faces many challenges. However, there is also a groundswell of support to turn the tide on biodiversity loss. If conservation science can provide high-quality information on which efforts work and which do not, this can inform better conservation action. Nature certainly needs it.

Ik heb gezegd.

The Comorian NGO Dahari are learning from the Watershared Randomized Control Trial in Bolivia in designing their own conservation agreement scheme on the island of Anjouan.


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Thank you also to the board of the Prince Bernhard Chair Foundation, especially Alex van Hooff, Saskia Cox, and Fleur van Heek. Special thanks to WWF the Netherlands who fund the chair and provide strategic direction. Monique Grooten and Dr Rosamunde Almond from WWF the Netherlands have been particularly helpful since my appointment and I look forward to deeper collaboration in the future.

The work I present here represents a very substantial effort by a wide range of my fabulous collaborators. Special thanks to the lead authors of the papers I showcase: Dr Edwin Pynegar, Dr Emma Wiik, Dr Patrick Bottazzi, Dr Sarobidy Rakotonarivo, Dr Johanna Eklund, Alejandro Guizar-Coutiño, Dr Tara Grillos, Katie Devenish, Dr Hannah Wauchope and Dr Cecile Bidaud. However, I also want to thank the many 100s of collaborators and students I have had the pleasure to work with over the past two decades. I have learned from every one of them.

While I am looking back, I find myself reflecting on the influence of Professor Andrew Balmford, my PhD supervisor and a critical early academic mentor. More recently, Professor EJ Milner-Gulland has be a model of the type of academic I want to be. In Madagascar I have benefitted from deep and rich collaborations with a wide range of conservation scientists and practioners especially Dr Sarobidy Rakotonarivo, Professor Bruno Ramamonjisoa and Julie Razafimanahaka.

Bangor University has been an incredibly supportive place to build a career. I thank especially Professor Morag McDonald, Professor Nia Whitely, Professor John Healey, and the members of the conservation science group.

Thank you finally to Deri, Anwen, and of course Neal. They support me in so many ways (practically and intellectually), every single day.

Sunset at the Analamazaotra Special Reserve, Madagascar.

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THE FOUNDATION CHAIR PRINCE BERNHARD

The Prince Bernhard Chair was founded by the Foundation Chair Prince Bernhard in 1987 on the 75th anniversary of His Royal Highness Prince Bernhard and has been associated with Utrecht University ever since. The Chair was initiated in honour of Prince Bernhard's crucial role in international conservation efforts.

The Chair aims to strengthen the link between conservation science and practice, while opening new avenues for multidisciplinary approaches by:

1) Stimulating innovative interdisciplinary research and driving science-based international conservation/restoration efforts,
2) Training Dutch and international students (BSc, MSc and PhD) and supervising researchers (including postdocs) in international aspects of nature conservation,
3) Raising awareness of pressing conservation issues and research and establishing policy priorities.

The activities of the chair are carried out in close contact with the University of Utrecht (UU) and external partners, such as the World Wide Fund for Nature in the Netherlands (WWF-NL).

Previous chairholders include:
Jaboury Ghazoul (2015-2020), Bill Laurance (2010-2014), Jack Putz (2004-2009), Jeffrey Sayer (1994-2003) and Norman Meyers (1987-1992).

2015 - 2020: Professor Jaboury Ghazoul
Jaboury Ghazoul, Professor in Ecosystem Management from ETH Zürich, graduated in Marine and Environmental Biology at the University of St Andrews, Scotland. He took his PhD in Evolutionary Ecology at the same university. After a year of working in Vietnam as scientific coordinator for Environmental Exploration, and a three year postdoc with CIFOR and the Natural History Museum in London, he became a lecturer and later a senior lecturer at the Imperial College London. In 2005 he was appointed Professor of Ecosystem Management at the ETH Zürich. His main research interests are pollination ecology and plant reproduction, ecosystem services in agroforestry systems and, more generally, conservation ecology of tropical trees in landscape mosaics. His wider interests include geology, marine biology, political history, walking aimlessly in the Scottish Highlands and, above all, family.

2010 - 2014: Professor Bill Laurance
Professor Laurance is an internationally respected researcher with a professorship at James Cook University in Cairns, Australia. He is also attached to the Smithsonian Tropical Research Institute in Balboa, Panama. He has spent a quarter of a century living and working in the Amazon, the Congo Basin in Africa, New Guinea and Southeast Asia. In March 2012, Professor Laurance was awarded with the prestigious Heineken prize for Environmental Sciences for his outstanding contribution to ecology in general and the conservation of tropical forests in particular. As Chair holder, Professor Laurance studied the relationship between the science and practice of nature conservation and shared his knowledge with conservationists, students, researchers and policy-makers around the world.

2004 - 2009: Professor Francis E. (Jack) Putz
Professor Putz is an internationally renowned expert on tropical forest ecology and management. His practical experience stems from forest research in Asia, South America and Africa. He is an advocate of "conservation by use" and challenges some of the claims made by conservation organizations for "fortress protection" in protected areas. He also argues that conservation of tropical forests cannot be separated from their developmental, social and economic contexts. He made a strong plea for sustainable forest management in the tropics. He is now a Distinguished Professor in the Department of Botany at the University of Florida, United States, and is a frequent guest lecturer in tropical countries.

1994 - 2003: Professor Jeffrey A. Sayer
Having started his professional career as ecological scientist in Zambia, Jeffrey Sayer gradually moved from field work to research management. He is mainly active at the challenging interface of science, conservation, and development and he has worked for both major conservation organizations, such as WWF and IUCN and development organizations, including the World Bank and the United Nations. He was also Founding Director General of the world-leading forest science institute, CIFOR (1993 - 2001). During two terms as the Prince Bernhard Chair, he focused on the scientific bases for conservation and sustainable management of tropical forests.

1987 - 1992 Professor Norman Myers
Norman Myers became world-famous for pointing out hidden conservation problems to a wider public. He was the inventor of "the hamburger connection", the link between cheap meat and Amazonian deforestation. He also introduced the term "biodiversity hotspots" for threatened regions with high diversity, which is now a leading principle for investment choices in conservation. Professor Myers won numerous awards for creating public awareness of conservation problems and has been an advisor to UN agencies, World Bank and conservation organizations. While in Utrecht, he stimulated hundreds of students to pursue environmental issues in their studies. In 2007, TIME magazine named him as one of the Heroes of the Planet. He died October 2020, aged 85.

Nature matters deeply. We therefore need a proper understanding of which conservation interventions work, and which do not to ensure that resources and efforts are directed towards the best possible outcomes, both for people and for our precious planet.

Julia P G Jones