

Global bird conservation could be four times more cost-effective

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Targeting conservation efforts to safeguard biodiversity, rather than focusing on charismatic species, could make current spending on threatened birds four times more effective, a new study has shown.

The research, by Imperial College London and the Zoological Society of London (ZSL), is the first to link the costs of protecting threatened species with their genetic distinctiveness, measured in millions of years of evolution. It identifies the top 20 [birds](#) for safeguarding maximum biodiversity with minimum spend, of which number one on the list - Botha's Lark - currently receives no conservation spending at all.

The researchers focused on some 200 birds categorised in the International Union for the Conservation of Nature (IUCN)'s Red List as either Vulnerable, Endangered or Critically Endangered, in a study published today [January 5] in *Philosophical Transactions of the Royal Society B*.

They found that if conservation spending on these birds continues along current lines, only 85.9 million years of evolutionary history will be safeguarded, compared to a potential impact of 340 million years.

Dr James Rosindell, from the Department of Life Sciences at Imperial College London, explains: "We found that, spent wisely, £1 can preserve 26 years of bird evolution whilst in the worst-case scenario, it costs £2485 to save just a single year. So for the cost of a cup of coffee you could probably save a branch of evolution as long as your entire life.

However, if you choose to spend your money poorly, you might only save a few hours' worth, not much longer than the time it took you to drink the coffee."

By adapting an approach already in use by ZSL, the researchers categorised the birds in terms of their risk of extinction and their evolutionary distinctiveness, looking not only at how far they had diverged from other species, but also the relative [extinction risk](#) of their relatives. For each species they then calculated the number of years of evolutionary history that could be safeguarded for 50 years by conservation action on that species. Finally, they combined these results with the estimated cost of reducing each species' extinction risk by at least one Red List category within ten years.

The results gave the team a list of the top 20 birds on which conservation efforts should be targeted to maximise the impact of the spend in safeguarding evolutionary biodiversity.

Top of the list was the little known Botha's Lark, a small brown bird that is only found in a restricted part of South Africa and on which no [conservation efforts](#) are made at all. Although not the most genetically diverse of the 200 birds, it gains top place because it would require little investment to protect it, making it a very cost-effective species to target.

The tooth-billed pigeon - a large pigeon with a hooked bill, found only in Samoa - gains second place because it is both evolutionarily distinct and the costs required to protect it are relatively low, although still three times the current spend.

Dr Samuel Turvey of ZSL stresses that this isn't about stopping work on more high profile species, but about highlighting the benefits of better allocation of resources: "Our study looked at overall global spending for each species, and of course, the situation on the ground is much more

complex, with conversation targets chosen for many different reasons. However, if we do believe that preserving biodiversity should be part of our conservation goals, then our study shows that current spending is fundamentally at odds with what we want to achieve."

Laura Nunes, who worked on the research for her Masters in the Department of Life Sciences at Imperial, agrees: "By combining data from different sources, we've been able to link those birds which are theoretically most important in conservation terms with the real world costs of protecting them. The fact that this highlighted such major discrepancies does pose serious questions about how we choose to target our limited [conservation](#) resources to maximise their benefit."

Dr Rosindell adds: "We have to acknowledge that we will never have enough resources to protect all species under threat, so tough choices will have to be made: the 'Noah's Ark' dilemma. However, an encouraging message from our research is that, correctly targeted, we can still do a lot with a relatively small amount of money."

The top twenty birds identified the study were:

1. Botha's Lark
2. Tooth-billed Pigeon
3. Polynesian Ground-dove
4. Tuamotu Kingfisher
5. Christmas Island Frigate bird
6. Chatham Islands Shag
7. Buff-breasted Button Quail
8. Giant Ibis
9. Sangihe Shrike-thrush
10. Forest Owlet

11. Raso Lark
12. Blue-crowned Laughingthrush
13. Santa Marta Parakeet
14. White-collared Kite
15. Marquesan Kingfisher
16. Sociable Lapwing
17. Purple-backed Sunbeam
18. Madagascar Serpent Eagle
19. Liben Lark
20. Thick-billed Parrot

The OneZoom Tree of Life website, devised by James Rosindell and supported by Imperial College London and NERC, enables users to explore the diversity of life on earth and its [evolutionary history](#).

To explore the bird tree of life and see where the birds listed above appear on the tree, see:

www.onezoom.org/ADEPD_birds_nunes_etal_2015.htm

In this visualisation branches show the evolutionary connections between species, which are represented as leaves. The brown branches lead to red leaves corresponding to threatened species that were evaluated by the study. The green branches and leaves show their relationship to all other described species of bird (nearly 10,000 in total).

For an animation that zooms through the evolutionary tree to Botha's Lark, the number one species in our list, see: [species=fringillaris" target="_blank">www.onezoom.org/ADEPD_birds_nu ... a97c030=fringillaris](http://www.onezoom.org/ADEPD_birds_nunes_etal_2015.htm?species=fringillaris&target=_blank)

More information: 'The Price of Conserving Avian Phylogenetic Diversity: A Global Prioritisation Approach' by L. Nunes, S.T. Turvey and J. Rosindell is published in the *Philosophical Transactions of the*

Royal Society B on January 5 as part of a special issue on phylogeny, extinction risks and conservation. Download a copy of the paper: [fileexchange.imperial.ac.uk/file ... c6b/RSTB20140004.pdf](http://fileexchange.imperial.ac.uk/fileexchange/c6b/RSTB20140004.pdf)

Provided by Imperial College London

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