

Return of the Vultures

Gyps vultures are at risk of global extinction within our lifetimes. Three species native to the Indian subcontinent are listed as 'Critically Endangered': the most extreme category of risk. Work by Professor Rhys Green and colleagues at the Department of Zoology in Cambridge has focused on identifying the causes of this rapid decline as well as developing coordinated, international conservation solutions to try to stabilise and eventually recover vulture populations before it is too late.



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Squabbling over a cow carcass tearing voraciously at rotting flesh, it is hard to believe Gyps vultures are threatened with global extinction. However, they have been declining at rates faster than the dodo's plummet to extinction. Although the vulture decline was observed as early as the mid-1990s, it baffled researchers for nearly ten years. The usual suspects in bird population declines - deliberate killing, habitat loss, pesticides, pollutants and infectious diseases - were all declared innocent.

It was not until 2004 that researchers in the USA and Pakistan proposed that the anti-inflammatory medicine diclofenac was responsible for the decline of one species in Punjab, Pakistan. Prof. Green and colleagues extended this work for two vulture species covering a wider geographical area including India and Nepal, concluding that diclofenac was a likely culprit for all three vulture declines. The team also used demographic simulation modelling to demonstrate that even small amounts of diclofenac were sufficient to cause the plunge in vulture numbers. But how were vultures being

contaminated? The answer lay in their food chain. Diclofenac was used widely to treat livestock, particularly water buffaloes and cows. When they die, religious traditions mean that they are not eaten by people. Instead, the scavenger vultures feed on their carcasses, indirectly consuming toxic diclofenac, leading to kidney failure and eventually death.

Based on their results, Prof. Green and colleagues communicated the need for urgent action, to eliminate diclofenac from vulture food sources and raise awareness among vets, farmers and the public. The team also proposed using the vulture safe drug meloxicam which they found was as effective as diclofenac. As a precaution, they emphasised the importance of establishing a captive breeding conservation programme to help maintain wild vulture populations. This is especially important as any improvements in vulture numbers are likely to occur slowly due to their long lifespans and low breeding rate of about one chick every two years.



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Responding to Prof. Green and colleagues' research, the governments of India, Nepal and Pakistan implemented a manufacturing and import ban on diclofenac for veterinary use in 2006. Although a very positive step forward, progress in vulture numbers was slow. Follow up work by Prof. Green's team found diclofenac was still present in cattle carcasses despite the ban- veterinary use was continuing illegally with available human diclofenac. In response, the Indian government strengthened the ban to include imprisonment, later banning the manufacture and sale of large diclofenac vials intended for humans.

Given the large geographic area and the slow effect of the diclofenac ban, it became clear that experiences from different countries could provide valuable information if the vulture conservation strategy was carefully coordinated. Saving Asia's Vultures from Extinction (SAVE) was set up in 2011 as an international consortium of conservation agencies, with Prof. Green as a co-founder and Chair of the Technical Advisory Committee. SAVE acts as a forum to promote awareness, run workshops, fundraise, influence governments and their policies and maximise interactions between local and international researchers bringing together a range of expertise. The SAVE initiative also jointly oversees the India/Nepal/Pakistan captive breeding programme and vulture safe zones, which are areas of high awareness activity, zero diclofenac tolerance and where old cows are farmed as an eventual, clean vulture food source. SAVE made a major breakthrough in 2012 when the governments of Bangladesh, India, Nepal and Pakistan made a regional declaration to their commitment to vulture conservation backing key strategies proposed by SAVE. This cross-government collaboration is a highly significant, rare achievement in wildlife conservation and will help ensure a coordinated conservation strategy across borders. Although bringing the Gyps vultures back from the brink of extinction is a priority in itself, their decline has had a

significant impact on human health and society. Their role as scavengers in the ecosystem eating readily available flesh keeps wild dog numbers down. The vulture decline has indirectly caused an increase in the number of dog bites, with the potential of transferring rabies, generating approximately £9 billion in health costs from 1992–2006. Other consequences include increases in the numbers of rats, which can carry plague, and the contamination of local water supplies from rotting, uneaten carcasses.

Looking ahead

Although vulture populations are still under serious threat, with increasing and continued coordinated efforts the outlook is starting to look positive. Vulture numbers continue to be stable or slowly increasing and the captive vulture breeding programmes have been highly successful, with the first batch of birds born in captivity released in 2016-2017. Their survival in the wild will be carefully monitored because it is a critical test of public and government support for the eradication of diclofenac from their diet.

Despite ongoing conservation efforts, new threats continue to arise. Prof. Green and colleagues have recently found evidence that the negative impact of diclofenac may extend to eagles and that another similar drug, nimesulide, still in legal veterinary use in India, may also be toxic to vultures. Diclofenac has also recently been approved for veterinary use in Spain and Italy, putting 90% of European vultures at risk. To protect these birds and their ecosystems a concerted international effort is necessary to ban veterinary diclofenac use, promote the use of meloxicam, establish drug safety before use, educate the public and continue to build upon the existing vulture safe zones and breeding programmes until vulture populations soar again.

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For more information...

www.zoo.cam.ac.uk/directory/rhys-green

<http://save-vultures.org>

www.bio.cam.ac.uk/impact