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A new decision-making tool for conservation managers

A tool to help conservation managers prioritise their actions to protect wildlife has been developed. The tool, based on a mathematical model, can provide guidance on conserving endangered species as well as dealing with pests and diseases. It may help conservation managers understand how best to use their limited resources.

It is estimated that around a quarter of all European species are under threat of extinction. Under its Biodiversity Strategy to 2020[1], the EU is committed to completely halting the loss of biodiversity by the year 2020 – this relies on stopping or reversing the decline of species under threat.

Thus, conservation managers face a tough challenge, both in Europe and around the world. They must make difficult decisions when allocating limited resources, in order to achieve the best results for their investments. A common problem is deciding how long efforts to save a species should continue after the species has become undetectable – this applies to large mammals, as much as to insects, plants and birds, as even tigers and rhinoceroses can be difficult to track down.

The researchers developed a decision-making tool that can help provide solutions to these problems. The tool has a broad scope – it can be used when making decisions about how to conserve endangered species, but also about how to manage pests or diseases that affect wildlife populations. This is because the model used by the researchers views colonisation by a threatened species in the same way as a disease outbreak or a pest invasion. Under the model, each is an "infection" at a specific location (or "node") and requires a management strategy – for a threatened species, the aim would be to increase its presence, whereas for a pest species or disease, the aim would be to decrease its presence.

Under the constraints of the tool, wildlife managers could choose to do one of three things: employ a management strategy, monitor for presence of the species or disease, or nothing. The researchers demonstrate that by using their tool it is possible to identify switching points between the different strategies in order to optimise use of resources. In other words, their tool carries out a form of cost-benefit analysis, predicting when it will become more efficient to monitor than to manage, and when it will become more efficient to do nothing than to monitor. Much depends on the economic costs of a particular management strategy, according to the researchers.

Crucially, the model accounts for the difficult cases where species (or diseases) appear to have disappeared. Although the assumption that detection is always "perfect" – meaning that if a species is present it can definitely be found – leads to a simpler management strategy, it is unrealistic. With imperfect detection, the model applies several rounds of management, rather than one, before switching to monitoring.

The research provides a "general rule of thumb" for setting conservation management priorities, with potential practical applications in biosecurity and human health as well as conservation.

1. EUROPA. (2011). European Commission adopts an EU biodiversity strategy to 2020. European Commission: Environment. [Online]. Available: http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm [Accessed: 16th June 2011].

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