

# 'Non-native species aren't the boogie man.' Biologist calls for a more balanced view

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Awareness of non-native—often called "invasive"—species has vastly increased over the past half-century, to the point where anyone with a green conscience has heard of them and their negative impacts.

Less recognized are the benefits of [non-native species](#)—and according to Brown University biologist Dov Sax, that needs to change.

In a review article published on Thursday, Oct. 6, in *Trends in Ecology and Evolution*, Sax and two co-authors pointed out that most research on non-[native species](#) focuses on their negative consequences. They argued that long-standing biases against non-native species within the scientific literature have clouded the scientific process and hindered public understanding. In the new article, the authors try to shift the focus to consider the benefits of non-native species for a more balanced discussion.

"Positive impacts of non-native species are often explained as serendipitous surprises—the sort of thing that people might expect to happen every once in a while, in special circumstances," said Sax, a professor of environment and society, and of ecology, evolution and organismal biology. "Our new paper argues that the positive impacts of non-native species are neither unexpected nor rare, but instead common, important and often of large magnitude."

Sax—who is affiliated with the Institute at Brown for Environment and Society—said the study borrows from a recent framework that examines the benefits of biodiversity for people and nature and applies it to non-native species, showing the diverse, frequent and important ways that non-native species provide positive value for people and nature.

"We want to provide a framework for the way that scientists can think about non-native species constructively going forward and explicitly document their benefits," Sax said. "It's only then that we'll be able to accurately and fully compare and contrast them in order to perform the kind of cost-benefit analyses that can be truly helpful in making policy decisions."

The authors, who include Martin Schlaepfer from the University of Geneva and Julian Olden from the University of Washington, recognized that some non-native species, such as introduced pathogens and agricultural pests, involve indisputably large net costs. But they noted that most domesticated species, including food like wheat and tomatoes, fibers such as cotton and wool, and pets including dogs and goldfish, provide large net benefits to human societies. They focused their review on species that are not directly managed by people—so-called "wild" or "naturalized" species, noting that many of these simultaneously provide both costs and benefits for people and nature.

As one example of a non-native species with underappreciated benefits, Sax cited the earthworm. While they can negatively change forest ecosystems, Sax said that earthworms can also augment [organic agriculture](#): Some research has shown that when earthworms are present, there can be a 25% increase in agricultural productivity. The resulting decrease in food cost and increased ability to feed people is a direct economic benefit, Sax said.

Sax also extolled the unexpected benefits of another non-native species—brown trout. Looking at New Zealand as an example, he said most of the non-native species that have invaded the country have negative consequences, and residents therefore focus on eradicating them. Yet the nation has effectively embraced brown trout, Sax said: New Zealanders value the nutritional benefits of eating brown trout and the recreational benefits of fishing [brown trout](#) so much that they've established new environmental regulations to protect the species within their waters.

The framework the authors used to consider non-native species describes a comprehensive range of nature-based values, including intrinsic, instrumental and relational values.

"We posit that this framework provides a useful topology for considering the diverse array of ways that non-natives provide value and use this framework here to illustrate representative, but not exhaustive, examples of these values from diverse ecosystems and regions," they wrote.

The authors advocate using the same framework often used to talk about the benefits of nature, especially the benefit of biodiversity, and apply that to non-native species. "How people relate to nature, to the intrinsic value of nature, to the [ecosystem services](#), to the provisioning of resources—these are all things that we value in native species, and there are also ways to see that non-native species are contributing to these benefits, too," Sax said. "It's not like there's some inherent trade-off: Non-natives aren't the boogie man."

For example, non-native species can be a leading cause of species extinctions, but also contribute, through their own migration, to regional biodiversity; they can reduce certain ecosystem functions, such as water clarity, while increasing others, such as erosion control; they can provide new resources, such as recreational hunting and fishing opportunities.

Yet because of the research bias against non-native species that focuses on threats and harm, Sax said that the net consequences of most non-native species are less certain. That is why he and his co-authors call for a re-evaluation of non-native species, informed by data.

"We argue that long-standing biases against non-native species within the literature have clouded the scientific process and hampered policy advances and sound public understanding," they wrote. "Future research should consider both costs and benefits of non-native species."

**More information:** Dov F. Sax et al, Valuing the contributions of non-native species to people and nature, *Trends in Ecology & Evolution*

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