

Using genes to rescue animal and plants from extinction

September 25 2013, by Blaine Friedlander

(Phys.org) —With estimates of losing 15 to 40 percent of the world's species over the next four decades – due to climate change and habitat loss, researchers ponder in the Sept. 26 issue of *Nature* whether science should employ genetic engineering to the rescue.

The technique would involve "rescuing a target population or species with adaptive alleles, or gene variants, using genetic engineering," write Josh Donlan, Cornell visiting fellow in ecology and [evolutionary biology](#), and his colleagues. The method is "an increasingly viable ... option, which we call 'facilitated adaptation,' [but it] has been little discussed," they add.

To avert mass extinctions, the group thinks that three options, each with its own set of challenges, complications and risks, exist. They are:

- Animals or plants could be crossed with individuals of the same species from better-adapted populations to introduce adapted [alleles](#) into threatened animal or [plant populations](#).
- Direct transfers from populations with adapted genomes could be introduced into the threatened populations of the same species.
- Genes from a well-adapted species could be incorporated into the genomes of endangered species.

The *Nature* commentary draws from a recent National Science Foundation-funded workshop, "Ecological and Genomic Exploration of Environmental Change," in March, where scientists met to understand

issues surrounding climate change adaptation. In those spirited discussions, a hot question emerged: Is managed relocation of animal and plant species really the only approach to averting extinction? Instead of moving plant and [animal populations](#), could genes be moved into populations? "Thus, the term 'facilitated adaptation' was born," said Donlan.

Averting climate change altogether would be a preferable – albeit unlikely – outcome. The scientists fear that implementing genetic solutions could potentially deter other climate change action.

"A serious concern is that even the possibility of using genetic-engineering tools to rescue biodiversity will encourage inaction with regard to climate change. Before genetic engineering can be seriously entertained as a tool for preserving biodiversity, conservationists need to agree on the types of scenario for which facilitated adaptation, managed relocation and other adaptation strategies might be appropriate, and where such strategies are likely to fail or introduce more serious problems," they write.

Joining Donlan on the *Nature* commentary, "Gene Tweaking for Conservation," are Michael A. Thomas, Idaho State University, first and corresponding author; Gary W. Roemer, New Mexico State University, Las Cruces, N.M.; Brett G. Dickson, Conservation Science Partners, Truckee, Calif.; and Marjorie Matocq and Jason Malaney, University of Nevada, Reno. Donlan is also executive director of the Advanced Conservation Strategies, Midway, Utah.

More information: *Nature* paper: [dx.doi.org/10.1038/501485a](https://doi.org/10.1038/501485a)

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