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Assuming We Develop the Capability, Should We Bring Back Extinct Species?

By Rebecca J. Rosen

And what about tweaking them a bit in the process to, say, make them less of a threat to humans?

Passenger pigeons (Wikimedia Commons)

Over the last 3+ billion years, billions and billions of different species have come into existence on Earth, perhaps as many as 50 billion. Some scientists estimate that around 90 percent of the species that have ever existed are extinct. Life -- and biodiversity -- as we know them are flashes in Earth's pan.

But even though extinction has always been part of the natural evolution of things on Earth, as climate's have changed, new species have arisen, and meteors have struck, in more recent centuries extinctions have come at human hands, as we've moved into habitats and hunted in the extreme. Over the next century, with climate change becoming more severe, some scientists estimate that as many as half of the species on Earth may go the way of the dodo.

For the time being, once a species is gone, that's it. Extinction is forever.

But what if, suddenly (or not so suddenly, as the case may be), it weren't? What if, through the power of modern genetics, we could re-engineer extinct species and, as is the term of art, de-extinct them? Should we do that?

According to an interview with Ryan Phelan, executive director of a project called Revive and Restore, at the Science Foo conference at the Googleplex earlier this month, there are now three techniques that may someday give scientists that ability: backbreeding (trying to work evolution backward, basically, to select for the traits of a related species), cloning (if enough genetic material exists), and genome editing (selectively manipulating the genome of a related species). None of these can bring back an extinct species yet, but it's certainly possible that in the forseeable future, we'll have to confront the question: should we do it?

There are obviously practical hurdles. Even if we could bring back, for example, the passenger pigeon, we may not be able to get it to flourish in the wild, not least of all because the environmental factors that led, in part, to its extinction have not exactly diminished in the century since.

Paradoxically, there is also an ecological risk: Reintroducing species could, theoretically, disrupt how the ecosystem functions today. With so many variables, it's difficult for scientists to anticipate all of the consequences. For example, in the early 1900s, a shrub known as tamarisk was introduced to Utah to control river-bank erosion. Today it has taken over the habitats for native plants, overgrown acres and acres of beaches, and, with its deep root systems, is threatening the water supply of an already dry region. Now, perhaps reintroducing a once-lost species had a lower risk profile than bringing in a foreign plant, but the relationships of an ecosystem can be very fragile, and who knows how they have changed since the species was last there. This is not a prohibitive reason, just an argument for proceeding with extreme caution.

Phelan sees potential in going even further -- not just de-extincting old species but "improving" them in the process. She says:

> One question is: If you could actually bring back anything, would you bring back the California grizzly bear? A species that could eat people? Well, we recently were at the California Academy of Sciences, up front and personal with "Monarch", the last California grizzly, a beautiful specimen there, and we were joking, and not really joking, saying, "Well, what if you could genome edit the California grizzly so that it didn't like the taste of people?" That would be kind

> of interesting! Big megafauna, good for the land, but take the fear of it out for people. The truth is all of this could someday be possible.

A common line of thinking in these corrective measures is to undo the harm humans have caused. This is compelling, but it's also hard to know what to go back to. Our environment and the natural world around us are not static things that we've messed with since industrialization, but a context we have existed in and have shaped for millennia. As historian William Cronon has persuasively argued, wilderness is a human creation, embodying "a dualistic vision in which the human is entirely outside the natural." Species have been going extinct constantly (though there have been more and less extreme periods). Which species would we pluck out of extinction, and which would we agree were "naturally" extinct?

Perhaps before we get too fancy with reintroducing extinct species into our continuing ecological disaster, we should focus our efforts on protecting the ones we have and the climate and habitats that harbor them -- us included.

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