

## “Invasive rabbits have ravaged one of the most remote islands on the planet”

The Kerguelen Islands are at the end of the world. They're in the southern Indian Ocean, halfway between Madagascar and Antarctica. A few dozen researchers inhabit a lonely field station. There's no airstrip. The boat trip from Reunion Island takes 15 days. The climate is harsh, and few plants thrive in the rocky, windswept landscape.

What the place does have, in problematic abundance, is rabbits.

The rabbits, like the human residents, are not native to the islands, which are territories of France. They came in 1874, brought to the Kerguelens by scientists who picked the remote archipelago as a perfect place to observe the transit of the planet Venus as it passed in front of the sun. They stocked an observatory on the 93-mile-wide main island, Grande Terre, with five rabbits as a potential future food source.

When the researchers left, the rabbits stayed, and did what rabbits do, and eventually there were many rabbits and no native predators to keep them in check. And then everything went ecologically haywire — rapidly.

That's the conclusion of a report published Wednesday in the journal *Science Advances*, based on sediment cores from a small lake in the central plateau of Grande Terre. The scientists who examined the cores were interested not just in the Kerguelen Islands but in the deeper question of how invasive species change ecosystems. The Kerguelens are a like a natural laboratory, about as far from human civilization as anyone can get, with only a couple of dozen native plants and not a lot of wildlife other than birds and seals.

From the sediment cores, the scientists were able to extract DNA and put together a timeline of what lived on the island over the course of many hundreds of years. The genetic data showed that the central plateau of Grande Terre had a stable ecosystem, dominated by a cushion-shaped plant called *Azorella selago*, until about 1940. That's when the rabbits reached that part of the main island. When the rabbit DNA appears in the sediment cores, the diversity of native plants suddenly drops off. Erosion increased dramatically.

“The big lesson is that sometimes we can have a strong human impact even in places that are very, very isolated,” said G. Francesco Ficetola, a University of Milan biologist and the lead author of the study.

Another takeaway: The soil erosion that increased when the rabbits started burrowing around eventually leveled off. But the overall ecosystem isn't stable. An effort by the French in the 1950s to introduce a disease to kill off rabbits was only partially successful. Other invasive species have also showed up, including dandelions.

“The system is not in a phase of resilience. There is no capacity (at least as long as rabbit populations are what they are) to return to an initial state,” said soil scientist Jérôme Poulénard of the University Savoie Mont Blanc in an email to *The Washington Post*.

It goes without saying that this research required a great deal of time and effort, starting with the long journey to the middle of nowhere. One boat, the *Marion Dufresne*, travels four times a year to the Kerguelens from Reunion, bringing along supplies, including food and wine (“We are still in France,” Poulénard noted). The scientists were dropped off Nov. 19, 2014, and picked up exactly a month later.

“On your way the sea turns from deep blue under the tropics to metal grey in the roaring 40th [latitude south]. Arriving in the screaming 50th, passing Crozet Archipelago, you're in the Great South with breaking giant waves and an army of large southern birds following the boat — giant petrels,

albatrosses, etc.," reports Poulenard's colleague, sedimentologist Fabien Arnaud, in an email to The Post.

The scientists set up operations on an abandoned fish farm between a large lake and fjord. The wind impeded efforts and at one point capsized a platform that had been used for taking sediment cores from the large lake. The team then switched to a smaller lake that required several hours of backpacking each way. They found themselves in a majestic landscape that was utterly pristine — except for the rabbits. The hike took them through a dusty, pebble-strewn plain that had no vegetation at all and which they nicknamed Mars.

Arnaud said he and three other researchers are going back to the Kerguelens later this year to visit an even more remote part of Grande Terre, where there are no animals or plants at all.

Ficetola said that further invasions of alien species, in combination with climate change, will ensure that the history of ecological transformations on the Kerguelens is not over. And he draws a bigger lesson that applies to the whole planet: When the invaders arrive, things can go south quickly. That suggests that stewards of the environment need to have rapid-response teams when confronted with invasive species.

"Our research shows that we absolutely have to act immediately," Ficetola said. "There is no lag time between the arrival of these invasives and the impact."

[https://www.washingtonpost.com/news/speaking-of-science/wp/2018/05/09/invasive-rabbits-have-ravaged-one-of-the-most-remote-islands-on-the-planet/?noredirect=on&utm\\_term=.3bdab12eb242](https://www.washingtonpost.com/news/speaking-of-science/wp/2018/05/09/invasive-rabbits-have-ravaged-one-of-the-most-remote-islands-on-the-planet/?noredirect=on&utm_term=.3bdab12eb242)