

Genomics of Isle Royale wolves reveal impacts of inbreeding

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Two wolves remain of the old Isle Royale packs. This past fall and winter, the National Park Service brought 13 more wolves to the island. Credit: Rolf Peterson/Michigan Tech

A new paper explores the genetic signatures of a pair of wolves isolated on Isle Royale, a remote national park in Lake Superior. The pair are father-daughter and share the same mother. Such close inbreeding leads to genetic anomalies, which likely are the main driver behind the wolf population crash over the past decade.

In the fall and winter, 13 new wolves were reintroduced to the island. While Isle Royale and its wolves are an extreme example, population genetics have guided conservation decisions for decades. A better understanding of the genetic makeup of the Isle Royale wolves provides insight into how wolf reintroduction will impact the island's population and more generally help conservationists meet challenges with increasingly

fragmented habitat and genetic pools around the world.

The paper, which will publish in *Science Advances* next week, dives into the [inbreeding depression](#) within the Isle Royale wolf population caused by homozygosity. That is, when genes carry identical strains of genetic code they are more likely to cause recessive, or uncommon, traits. Inbreeding can lead to deleterious recessive mutations causing spinal deformities and other [health problems](#), which makes an already tough life of being a wolf on a remote island even harder.

"This new study, including whole-genome analysis of wolves from Isle Royale, directly links specific candidate genes with spinal abnormalities, which became more prevalent as decades progressed and inbreeding became more severe," said Rolf Peterson, research scientist in the School of Forest Resources and Environmental Science at Michigan Technological University.



Michigan Tech ecologist Rolf Peterson has studied the wolves, moose, rabbits, and trees of Isle Royale for decades as a part of the world's longest running predator-prey study, now in its 61st year. Credit: Sarah Bird/Michigan Tech

More information: J.A. Robinson et al., "Genomic signatures of extensive inbreeding in Isle Royale wolves, a population on the threshold of extinction," *Science Advances* (2019). DOI: [10.1126/sciadv.aau0757](https://doi.org/10.1126/sciadv.aau0757) , <https://advances.sciencemag.org/content/5/5/eaau0757>

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