

The WOLVES of ISLE ROYALE

With scientists' help, an island's top predator is coming back from the brink of extinction

ISLAND WOLF PACK
The Isle Royale pack, historically about 25 strong, has been dwindling in recent years.

AS YOU READ,
THINK ABOUT how changes in the wolf population affect other parts of the Isle Royale ecosystem.

Last September, a small airplane landed on a remote island in Lake Superior to make a very special delivery. Workers hauled a large crate off the aircraft. Inside was a lone male wolf. Just a few days earlier, he'd been captured in the woods of Michigan's Upper Peninsula, examined by a veterinarian, and fitted with a GPS tracking collar. Then he was loaded onto the plane and flown to this island, which would become his new home.

The wolf is one of several that scientists have released in Isle Royale National Park in the past year. Historically, a pack of about 25 wolves has lived on the island. But over the past decade, their numbers have steadily declined. At the same time, the island's moose population has skyrocketed. Before researchers began bringing new wolves to the island, only two members of the pack remained. And it takes more than two wolves to keep the ever-growing number of moose in check.

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Video

Skill Builders

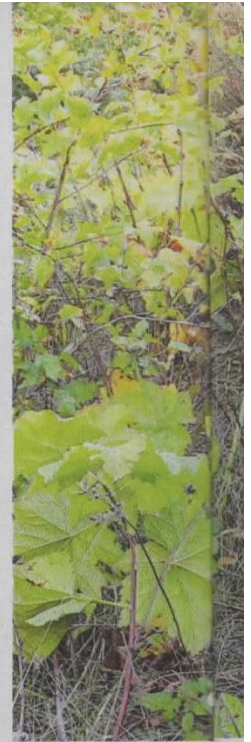
Leveled Text



BUILT TO HUNT
Sharp vision, a keen sense of smell, and powerful jaws help these predators survive.



MEASURING UP: Biologists measure a gray wolf captured on the mainland in September 2019.



DENTAL CHECKUP: A veterinarian examines a captured wolf's teeth.

Apart from wolves, there are no other predator species big enough to take down a moose on Isle Royale. “On the one hand, it’s delightful for the moose. They don’t have to worry about being killed,” says Doug Smith, a wildlife biologist who works for the National Park Service (NPS). “But on the other hand, their end is in sight.” Eventually, the thousand-plus moose on the island will consume much of its vegetation. “They’re going to eat themselves out of house and home,” says Smith.

To help Isle Royale’s wolves recover and keep the island’s *ecosystem* in balance, the NPS decided to intervene. It’s been airlifting healthy wolves to the island, a few at a time, to help the

population rebound. Within the next few years, the NPS plans to relocate 20 to 30 adult wolves to Isle Royale.

STRANDED PACK

Wolves first arrived on Isle Royale in the middle of winter 70 years ago. They traveled from the mainland over an ice bridge that formed on Lake Superior. When spring arrived, the bridge melted, leaving the pack stuck on the island. Luckily, there were plenty of moose for the wolves to eat, and the pack thrived.

But over time, *inbreeding* decimated Isle Royale’s isolated wolf population. Members of the small pack mated with one another. Over generations, the wolves on the island became closely related. This increased the chances of offspring inheriting the same *genes*—units of hereditary material—including those for unhealthy traits, from both parents (*see Passing On Genes, right*). As a result, each new generation of wolves had more and more health problems. Crooked spines and extra vertebrae and ribs became common among the wolves. These abnormalities made it difficult for them to survive in an already harsh environment.

“This has been a long-term issue for the wolves on the island,” says Rolf Peterson, a wildlife biologist at Michigan Technological University. He and other scientists have been closely studying the island for more than 60



SET FREE:
A female
wolf emerges
from her
crate on Isle
Royale, her
new home.

years as part of the longest-running study of predator-prey relationships. During that time, the researchers collected detailed data on how the island's wolf and moose populations fluctuate (see *Predators and Prey*, p. 25). It revealed a close connection between the survival of the two species.

CLIMATE IMPACT

Land animals can come and go from Isle Royale only in the coldest of winters, when ice bridges form. Decades ago, these icy pathways were available for about 50 days each winter. They allowed members of the Isle Royale pack

to leave the island and wolves from the mainland to reach it. Once on Isle Royale, the new wolves would mate with the island pack, helping to increase its *genetic diversity*. Boosting the variety of genes within the population lessened the effects of inbreeding.

In the past 20 years, though, warmer winter temperatures have made ice bridges scarce. This has limited wolves' ability to leave the island and chances for new ones to visit. "Fewer ice bridges stopped the trickle of new genes that arrived from time to time," says John Vucetich, a wildlife biologist who now heads the decades-long Isle Royale wolf study.

PASSING ON GENES

Inbreeding resulted in Isle Royale's wolves inheriting the same *recessive* genes from both parents. A recessive gene's trait—for example, black fur in wolves—won't be expressed if an organism has only a single copy of that gene. Traits caused by *dominant* genes, like gray fur, on the other hand, show up in an offspring even if it inherits only one copy. A chart called a Punnett square can illustrate the chances of offspring having a particular trait.

1 Recessive genes for black fur are shown with a lowercase letter (g). Dominant genes, for gray fur, are shown with an uppercase letter (G).

2 One parent's genes for a trait are across the top. The other's are along the left.

3 The inside squares combine the letters above and to the left of each. They show the resulting traits of potential offspring.





MOOSE CROSSING: A moose on Isle Royale wades across water.

ISLE ROYALE

Isle Royale National Park is a 45-mile-long island that can be reached only by boat or aircraft. It is isolated in the vastness of Lake Superior off the coast of Michigan.



By 2018, only a male wolf and his daughter, both of them born of the same mother, remained on the island. Meanwhile, all around them, the moose's numbers were increasing—along with their appetites. The moose ate saplings of various tree species, preventing them from growing into mature trees. In time, that would cause severe and potentially irreversible damage to the island's forest. It would also disrupt the lives of other island species and set the moose up to starve. There was one obvious way to avert the disaster: Bring back the predators.

THE RIGHT WOLVES

As of September 2019, 17 wolves inhabited Isle Royale—the 15 introduced by the



NPS plus the original father-daughter pair. Conservationists want the wolves to breed so their numbers will grow. The lack of variation in genes led to the original pack's near extinction in the first place. Researchers know it's important that new wolves brought to the island have a diverse genetic makeup. That's why the scientists have taken pains to relocate animals from unrelated packs from the far-flung areas of Minnesota, Canada, and Upper Michigan.

Mark Romanski, the park's chief of natural resources, says he's blown away by the relocated wolves' resilience. Just hours after undergoing capture and air travel to the island, they trot right off into the forest on the trail of their future pack mates, he says. These wolves, "will almost certainly know what to do when they encounter a moose."

A MATTER OF TIME

Even with more wolves on Isle Royale, it's going to take time to slow the momentum of the island's flourishing moose population. "You've got to keep in mind that there are now 17 wolves versus 2,000 moose, plus all the uncounted calves born this past summer," says Sarah Hoy, a wildlife ecologist who studies the wolves with Peterson and Vucetich.



CLOSING IN: Wolves on Isle Royale prey upon a moose, which can weigh up to 1,000 pounds.

When Vucetich and a team of biologists went to Isle Royale to do research in the late spring of 2019, they were amazed by the huge number of moose they encountered. And they were alarmed about the damage the moose were doing to the forest, in particular to balsam fir trees. "It's now hard to find any balsam fir in a forest where it used to be abundant," says Vucetich.

JOINING THE PACK: Biologists release a wolf on the island in February 2019.



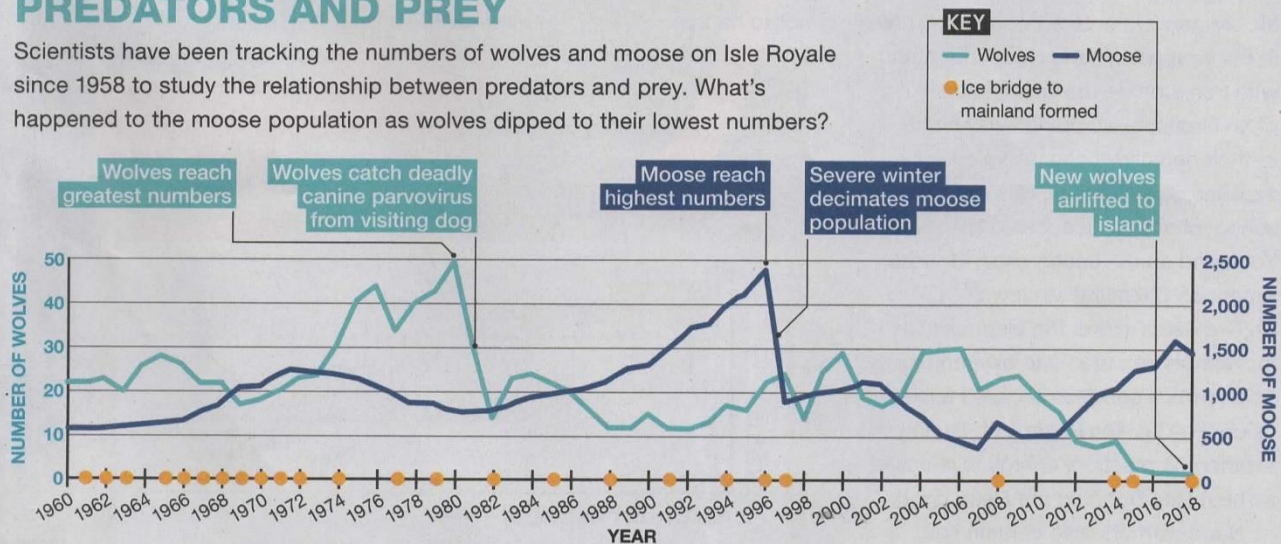
Predators that rely on stealth, like wolves, are harder to glimpse than plentiful, lumbering moose. But scientists can learn what the elusive animals are up to by looking for their pawprints and *scat*, or droppings. "All the new wolves are also wearing GPS collars so that the National Park Service and researchers can track their movements and see if they're alive," says Hoy. The collars also help scientists determine if the wolves are joining the pack and choosing mates.

The team didn't see any wolves during their trip early in 2019. But for the first time in years, they heard howling in the distance at night. It's a sound that bodes well for a healthier Isle Royale. ❄️ —*Kimberly Y. Masibay*

ANALYZING & INTERPRETING DATA: What might moose numbers on Isle Royale look like 10 years from now?

PREDATORS AND PREY

Scientists have been tracking the numbers of wolves and moose on Isle Royale since 1958 to study the relationship between predators and prey. What's happened to the moose population as wolves dipped to their lowest numbers?



SOURCE: NATIONAL PARK SERVICE