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Climate change threatens genetic diversity, future of world's caribou

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Caribou in southern and eastern Canada may disappear from most of their current range in 60 years if climate change takes the toll on their habitat that scientists predict in a paper appearing online Dec. 15 in the journal *Nature Climate Change*.

Scientists looked at reservoirs of genetic diversity in caribou and whether that diversity was linked to stable habitats. They found that caribou populations in the most climatically stable areas had the greatest genetic diversity and note that future climate forecasts bode ill for both caribou habitat and their

genes.

"Caribou can respond to habitat change in three ways," said Kris Hundertmark, co-author and wildlife biologist-geneticist at the Institute of Arctic Biology at the University of Alaska Fairbanks. "They can move to new, suitable habitat, adapt to the changed habitat or die."

Caribou populations are predicted to become more isolated and fragmented as climate change shrinks habitat and as caribou have fewer opportunities for genes to flow between individuals and herds, explained Hundertmark.

"When a population loses genetic diversity, they lose the ability to adapt to change," Hundertmark said, adding that although Alaska herds are expected to fair slightly better at least in the near future, they are still facing significant challenges.

"Climate change in Alaska means we're going to see more fires and while that's good for moose, it's really bad for caribou," said Hundertmark, "because it's going to burn lichen beds that can take at least 50 years to recover and reduce viable caribou habitat."

Hundertmark and then-graduate student Karen Mager who collected 655 tissues samples from 20 of Alaska's 32 herds developed genetic profiles of Alaska's caribou. The two credit a successful collaboration with state and federal fish and game biologists and hunters over several years with making sample collection possible.

The scientists, part of a

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