Research finds Hudson Bay Lowlands have undergone enormous environmental changes in the past two decades

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The Hudson Bay Lowlands have undergone major climate changes in the past two decades. Credit: K. Rühland.

(Phys.org) —Research co-led by researcher Dr. Kathleen Rühland and Queen's professor John Smol on climate change in the Hudson Bay Lowlands has been published in the prestigious international journal, *Proceedings of the Royal Society B*. Dr. Smol was also recently named a Change Maker by Canadian Geographic.

Due to the persistence of sea ice, the lakes in the Hudson Bay Lowlands have remained one of the Earth's last Arctic holdouts from the effects of

global warming – until recently.

In just two decades, temperatures in the area have increased at an exceptional pace, resulting in pronounced responses in the plant and animal life of the region.

"When it comes to the bigger picture, this temperature increase in the Hudson Bay Lowlands is an example of just how fast change can happen," says John Smol, professor in the department of biology at Queen's. "Our infrastructure isn't ready. It's another piece of evidence that we're in big trouble and we haven't done anything about it."

The rapid changes that took place in this region are reflected in the biota of lakes, an early warning signal of the repercussions that the steep rise in temperature will have on plants and animals of the area. For example, the large store of carbon in the region's vast peatlands will be impacted, as will the polar bear population that depend on the Hudson Bay sea ice and permafrost. First Nations people will also find it harder to follow their traditional fishing and hunting routes.

"In fifteen years the climate has flipped," says Kathleen Rühland, Queen's Biology research scientist and lead author of the paper. "For example, the response to warming can be detected at both ends of the food chain, at the bottom among primary producers, as well as at the top, as polar bears are replaced by killer whales (a relative newcomer to Hudson Bay) as the apex predator."

"What happens in the Arctic will eventually happen in non-Arctic regions" says Dr. Smol. "Continued warming at the rate and magnitude currently underway will undoubtedly lead to more pronounced ecosystem responses, the effects of which can cascade throughout the entire ecosystem."

Provided by Queen's University