

Effects of growing beaver population on habitat and methane gas emissions

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There are consequences of the successful efforts worldwide to save beavers from extinction. Along with the strong increase in their population over the past 100 years, these furry aquatic rodents have built many more ponds, establishing vital aquatic habitat. In doing so, however, they have created conditions for climate changing methane gas to be generated in this shallow standing water, and the gas is subsequently released into the atmosphere. In fact, 200 times more of this greenhouse gas is released from beaver ponds today than was the case around the year 1900, estimates Colin J. Whitfield of the University of Saskatchewan in Canada. He led a study in Springer's journal *AMBIO* about the effect that the growth in beaver numbers in Eurasia and the Americas could be having on methane emissions.

The fur trade of the sixteenth to nineteenth centuries nearly led to the extinction of beaver populations worldwide. After trapping was limited and conservation efforts led to the re-introduction of these animals into their natural ranges, the number of North American (*Castor canadensis*) and Eurasian (*Castor fiber*) beavers grew. The North American beaver has also been introduced to Eurasia and South America (specifically the archipelago of Tierra del Fuego); establishment of these populations has, in effect, created an anthropogenic greenhouse gas source in these landscapes.

Beavers are skilled at building dams in rivers to create standing open-water ponds and neighboring wetlands. Such ponds are generally shallow, with dams seldom being more than 1.5 metres high. Carbon

builds up in the oxygen-poor pond bottoms and methane is generated. This climate warming gas cannot adequately dissolve in the shallow water and is released into the atmosphere.

According to Whitfield, it has long been known that release of methane from beaver ponds to the atmosphere is more intense than for other types of wetlands. To quantify [methane release](#), his team estimated the size of the current global beaver population. They also determined the area covered by beaver ponds.

Whitfield's team found that global beaver numbers have grown dramatically, to a population of over 10 million. The Eurasian population could grow by an additional four million. In the process of population recovery, beavers have dammed up in excess of 42,000 square kilometres of aquatic pond areas, which are bordered with over 200,000 kilometres of shoreline habitat.

Parallel to the increase in beaver populations is also a notable increase in methane emissions because of their pond-building efforts. At the end of the 20th century, beaver activities contributed up to 0.80 teragrams (or 800 million kilograms) of methane to the atmosphere each year. This is about 15 percent of what wild cud-chewing animals, such as deer or antelope, contributed.

"The dynamic nature of beaver-mediated methane emissions in recent years may portend the potential for future changes in this component of the global methane budget. Continued range expansion, coupled with changes in population and pond densities, may dramatically increase the amount of water impounded by the beaver," says Whitfield. "This, in combination with anticipated increases in surface water temperatures, and likely effects on rates of methanogenesis, suggests that the contribution of beaver activity to global [methane emissions](#) may continue to grow."

More information: Whitfield, C.J., Baulch, H.M., Chun, K.P., Westbrook, C.J., "Beaver-mediated methane emission: The effects of population growth in Eurasia and the Americas", *AMBIO*. [DOI: 10.1007/s13280-014-0575-y](https://doi.org/10.1007/s13280-014-0575-y)

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