

Forest fires help power the nitrogen cycle

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When fire burns down a forest, nitrate levels go up, and the effects are persistent, according to recent research from University of Montana scientists. They found that charcoal deposited during fire events has the potential to stimulate the conversion of ammonia to nitrates, an important step in the nitrogen cycle.

Led by Patrick Ball, the research team found that a type of bacteria that transforms ammonia into nitrates was found in greater abundance in recently burned sites, despite the fact that the "recent" [fire](#) was twelve years prior to the sampling period. In addition to the bacteria, the burned sites had greater rates of nitrification, meaning that nitrogen was being processed more quickly through the ecosystem than without a fire.

The study was reported in the July/August 2010 [Journal of Environmental Quality](#), published by the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America.

Nitrogen is often a limiting nutrient in coniferous forests soils of the western United States, where this study was conducted. The research results reveal a link between fire, charcoal deposition, nitrification, and abundance of nitrifying organisms in coniferous forests of the inland Northwestern US.

Conducted on soils from sites that had been exposed twice or three times to fires in the last 94 years, the research team was able to demonstrate that charcoal can stimulate nitrate production well after the heat pulse

and substrate pulse (and increased ammonium) has abated.

Additionally, an analysis of the bacterial community, though [gene sequencing](#), revealed shifts in community structure based both on fire history and soil type. This suggests that these soils are possibly shifting toward supporting microbial groups typically found in more productive soils such as those in adjacent open mountain meadows.

More information: View the abstract at www.agronomy.org/publications/.../abstracts/39/4/1243

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