

A Rare Phenomenon of Zombie Fire, That Don't Die

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EDITORIAL

The intense summer heat that drives wild flames in northern boreal woods could be the source of a mysterious and rare phenomenon known as zombie fires. Underground, zombie fires hibernate. The majority of forest fires are normally put out in the winter. However, some fires in the boreal woods, like zombies, refuse to die. They smoulder over the winter, blanketed in snow, surviving on the carbon-rich fuel of peat and boreal soil and advancing very slowly – only 100 to 500 meters through the winter. The fires resurface near the forest they previously burned in the spring, burning new fuel even before the traditional fire season begins. This is problematic not only for persons and property but also for the environment.

After particularly warm summers, these unusual events can flare again the following year, accounting for up to 38% of the total burnt area in some locations. Zombie fires that burn through peat soils are particularly dangerous, releasing up to 100 times more carbon into the atmosphere than a conventional wildfire. Flare-ups the next spring were influenced by the extent and intensity of fires that erupted the previous summer. These fires burn deeper into the organic layer when they are more intense. Fires that are able to penetrate deeper into the earth have a better chance of surviving

the winter. These fires burn ancient soil carbon, thaw nearby permafrost, and diminish boreal forest's ability to act as a global carbon sink, implying that boreal systems are contributing rather than preventing climate change. As boreal forest climate change increases, the frequency of zombie fires may increase, releasing more greenhouse gases from the region's soils, which may hold twice as much carbon as the atmosphere.

While zombie fires are relatively rare, accounting for only 0.8 percent of the total area burned by forest fires in these regions over the 16-year period, although there was a lot of variation. The researchers discovered that after warmer summers that allowed flames to reach deeper into the soil, zombie fires were more likely to erupt and burn bigger tracts of land.

These zombie fires have remained a mystery to science until recently, with most information coming from firefighter anecdotes. An algorithm was developed by a research group to help discover zombie fires in satellite imagery and this finding could aid fire management in better allocating resources within boreal forests and preventing tiny flare-ups from becoming out of hand. Because many zombie fires began around the edge of the previous year's burn scar, for example, fire managers may concentrate their monitoring efforts in that area the year after a huge fire.

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