

Extreme fires and heavy rainfall driving platypuses from their homes

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Australia's emerging pattern of severe mega bushfires and heavy rainfall may be driving platypuses from their homes, a new study by University of Melbourne researchers has shown.

Analysis of platypus DNA in rivers and creek water samples collected before and after the Black Summer 2019–2020 megafires suggest Australia's beloved semi-aquatic monotremes might be abandoning severely [bushfire](#)-affected areas for up to 18 months after a [fire](#), especially if [heavy rainfall](#) has followed the fire.

The study uses the recent technique of environmental DNA sampling, where animal DNA is collected from water, soil, air, or snow rather than directly from the animal itself. This helps scientists indirectly record hard-to-spot animals like the platypus, which are shy, low in number and venture out mostly at night.

The survey, published in the journal *Biological Conservation*, is the first landscape scale study of how platypuses might respond to increases in bushfires and rainfall caused by climate change.

Lead researcher Dr. Emily McColl-Gausden, from the Faculty of Science, said the results suggest that a combination of severe bushfire followed by heavy rainfall hit platypus the hardest.

"We simply don't know how the platypus responds to bushfire. We assume because they are near water, they will be relatively unaffected. While there is more work to do, our research tells us that severe fire followed by intense rain is the worst combination for platypuses," Dr. McColl-Gausden said.

"Fire might not directly kill platypus because their burrows protect them. But when there is rainfall after a fire, as happened in 2019–2020, unstable soil, dead plants and ash and debris can wash into rivers and creeks. This kills the yabbies, aquatic invertebrates and insect larvae that platypus rely on for food and may force them to abandon the site.

"While the platypus may eventually come back, we don't know the effect

of repeated bushfires, whether on their reproduction and life cycle, the survival of their young, on their food security, or on the impact of being forced to move their burrows to more suitable sites. We don't know if the platypus may one day leave the area for good."

Researchers repeatedly sampled 118 sites in Victoria and NSW, 57 of which were later affected by the 2019-2020 bushfires. This allowed researchers to have a comparison between fire-affected and non fire-affected sites. They collected samples before the fires, within six months after the fires and between 12 and 18 months after the fires, giving them data from three points in time.

Across fire-affected sites, there was a 78% chance a platypus was in an area before the fire, and a 72% chance one year after the fire, before rising again to 79%.

Watersheds are areas of land that drain rainwater into local streams and creeks. When there was heavy rainfall across a site's watershed and that watershed experienced high severity fire across a quarter or more of its area, the probability that platypus lived at a site fell to less than 10%, indicating that platypus had died or had abandoned the area.

"In Australia, fire helps shape animal and plant distributions. But there is evidence that a new pattern is emerging, where fires are more frequent, bigger, and more severe due to warming and drying trends," Dr. McColl-Gausden said.

Environmental DNA sampling is a useful addition to traditional methods that use humane traps to hold platypus until they can be recorded. While traps give scientists useful data such as age, sex and [general health](#), environmental DNA sampling allows researchers to rapidly monitor large areas of land after a natural disaster like a bushfire.

"Thousands of species of animals live in areas affected by the 2019–2020 mega fires," Dr. McColl-Gausden said.

"Systematic surveys will help us understand how platypus and other native species might be harmed by increases in the number, scale and severity of bushfires, and what governments and the community can do to reduce the cumulative effect of more frequent and more severe bushfires. We need to include this surveillance as part of our normal emergency response."

More information: Emily F. McColl-Gausden et al, The power of eDNA sampling to investigate the impact of Australian mega-fires on platypus occupancy, *Biological Conservation* (2023). [DOI: 10.1016/j.biocon.2023.110219](https://doi.org/10.1016/j.biocon.2023.110219)

Provided by University of Melbourne

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