KENT NISHIMURA/*LOS ANGELES TIMES* VIA GETTY

California wildlife pays the cost of megafires

Wildfires are a natural part of forest life that help to shape diverse habitats. But the extreme 'megafires' that ravaged California in 2020 (pictured) and 2021 were more severe and about ten times more widespread than the yearly average in the region since records began, as Ayars *et al*. report in the *Proceedings of the National Academy of Sciences* (J. Ayars *et al*. *Proc. Natl Acad. Sci. USA* **120**, e2312909120; 2023).

To estimate the impact of these megafires on wildlife, the authors overlaid maps of burned areas and the predicted habitats of more than 500 mammals, reptiles, amphibians and birds. They found that 100 species had more than 10% of their habitat disturbed by fires, with up to 14% of their habitats being heavily burned. Although species that are of particular concern to conservationists were not estimated to be disproportionately affected, the actual impact on each species remains to be determined using data from post-fire surveys.

The authors warn that wildlife could struggle to adapt to increasingly severe megafires that are exacerbated by climate change, unless measures to restore natural, low-intensity wildfires are implemented with more urgency.

Holly Smith

Chemistry

Carbon rings push limits of chemical theories

Przemysław Gaweł & Cina Foroutan-Nejad

Scientists are tantalized by the many forms that carbon could adopt — some of which are predicted to have extraordinary properties. The synthesis of three new all-carbon molecules is therefore a source of excitement. **See p.972 & p.977**

Carbon has the ability to form a variety of covalent bonds, allowing it to adopt an extraordinary number of structural forms known as allotropes. Some of these, such as graphite and diamond, have been widely used for centuries. Others, including graphene, carbon nanotubes and fullerenes, have attracted attention over the past three decades because of their potentially revolutionary technological applications. In this issue, Gao *et al.*[1] (page 977) and Sun *et al.*[2] (page 972) report the synthesis and characterization of three new molecular forms of carbon. The findings shed fresh light on the much-debated properties and structures of all-carbon rings known as cyclocarbons.

Although many allotropes of carbon could potentially be made (nearly 1,200 structures have been predicted from theoretical studies; see www.sacada.info), only a few have been isolated[3]. One group that has inspired scientists consists of two-coordinate materials, in which the carbon atoms bond to only two other carbon atoms; allotropes with three- or four-coordinate carbon atoms are more abundant. Two-coordinate forms of carbon include carbyne, which consists of long, linear chains of carbon atoms and is predicted to have exceptionally high tensile strength[4], and cyclocarbons, which consist of rings of carbon atoms.

Because carbyne is unstable, the long-running quest to synthesize it is fraught with difficulty — sometimes even leading to explosions[5]. But research aimed at making cyclocarbons has met with greater success. In the late 1980s, researchers set out to make cyclocarbons from molecular precursors. This work revealed the pivotal role of these compounds as intermediates in the synthesis of fullerenes[6], but the cyclocarbons could be detected only in the gas phase. The limited success achieved