

events. And, in July, a tornado with unprecedented wind speeds of 230 kilometres per hour span up inside a fire near Redding, California.

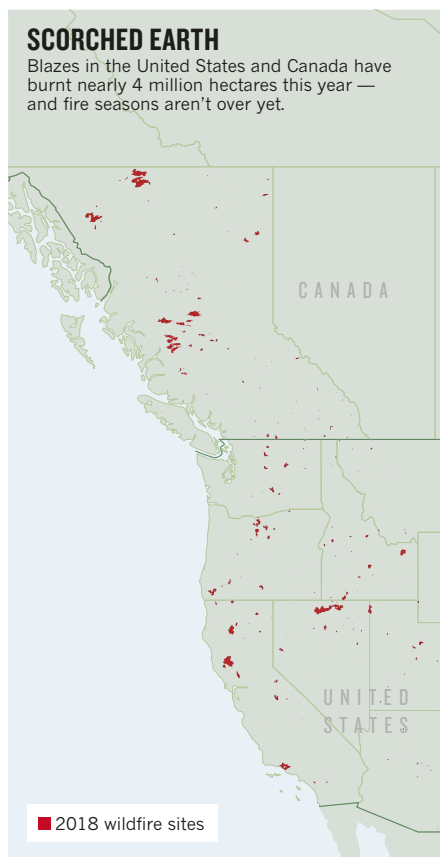
The problem, Moritz says, is that most of the fire models in use today are based on data from the past two or three decades. But it seems that fire behaviour might be shifting in response to climate faster than anybody expected, and that makes it increasingly problematic to extrapolate from past trends, he adds.

BAD BEHAVIOUR

“More frequent, extreme fire behaviour is actually sort of expected, but just saying that it’s going to happen isn’t enough,” says Dave Sapsis, who specializes in fire modelling and behaviour at the California Department of Forestry and Fire Protection (CAL FIRE), based in Sacramento. “We need to refocus some of our research efforts on characterizing the kinds of fire behaviour that cause us the most grief.”

As part of one of the projects, Sapsis is updating the model that CAL FIRE uses to map fire hazards across the state. In use since 2007, the model incorporates information about environmental conditions such as topography, fire history and the type of burnable vegetation in an area. But it doesn’t capture how extreme winds can move through a local landscape. Those winds are the key to understanding urban conflagrations, Sapsis says.

Within the next few months, he hopes to complete work on a detailed record of wind speed and direction across the entire state over



the past 15 years. Those wind maps should help scientists to study recent fires and, ultimately, boost CAL FIRE’s ability to predict the risk of extreme fires in any given locality, Sapsis says.

Climate scientists expect those risks to

increase in the coming decades. California’s Fourth Climate Change Assessment, released on 27 August, projects that the area of land consumed by wildfires in the state each year could increase by 77% by 2100 if global greenhouse-gas emissions continue to rise. On average, more than 286,000 hectares have burnt each year over the past two decades.

FUTURE ON FIRE

The second project, a US\$4-million study that includes Moritz and other scientists at multiple University of California campuses, will explore the future of fire, ecosystems and climate in California. Much of the existing research has focused on extrapolating from past trends. But this study is aiming to create a more realistic picture of how wildfires and ecosystems will evolve by integrating detailed models of fire behaviour, vegetation and climate across the entire state.

This should allow scientists to analyse how more-extreme and variable weather will affect wildfires and how ecosystems will respond to them, says Alex Hall, a climate scientist at the University of California, Los Angeles, and the project’s principle investigator.

A lot of work has focused on tracking average fire trends, Sapsis says. But scientists need to improve their understanding of the extreme blazes, as well as how fire patterns could shift in the future, he adds. This will help government agencies and communities make better choices when it comes to managing ecosystems and human developments in fire-prone areas. ■

SOURCE: WRI/USGS/BC WILDFIRE SERVICE

PUBLISHING

Radical plan to end paywalls

Top European research funders announce ‘Plan S’ to make all scientific works free to read.

BY HOLLY ELSE

Research funders from France, the United Kingdom, the Netherlands and eight other European nations have unveiled a radical open-access initiative that could change the face of science publishing in just two years — and which has instantly provoked protest from publishers.

The 11 agencies, which together spend €7.6 billion (US\$8.8 billion) in research grants annually, say they will mandate that, from 2020, the scientists they fund make resulting papers free to read immediately on publication. The papers would have a liberal publishing licence that would allow anyone else to download, translate or otherwise reuse the work. “No science should be locked behind

paywalls!” says a preamble document that accompanies the pledge, called Plan S, released on 4 September.

“It is a very powerful declaration. It will be contentious and stir up strong feelings,” says Stephen Curry, a structural biologist and open-access advocate at Imperial College London. The policy marks a “significant shift” in the open-access movement, which has seen slow progress in its bid to make scientific literature freely available online.

As written, Plan S would bar researchers from publishing in 85% of journals, including influential titles such as *Nature* and *Science*. According to a 2017 analysis, only around 15% of journals publish work immediately as open access (see ‘Publishing models’) — financed by charging per-article fees to authors or their

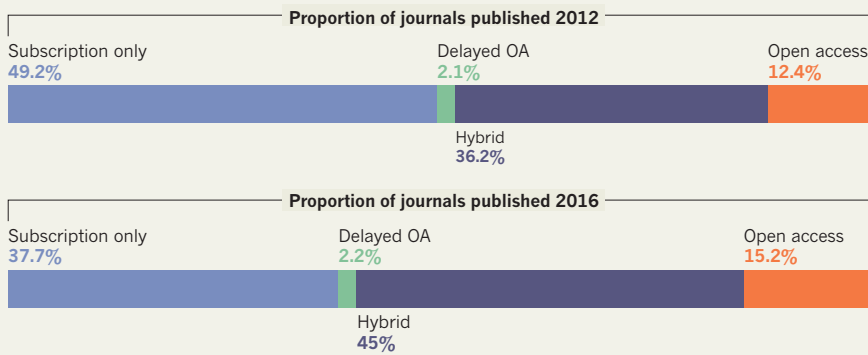
funders, by negotiating general open-publishing contracts with funders, or through other means.

More than one-third of journals still publish papers behind a paywall, and typically permit online release of free-to-read versions only after a delay of at least six months. And just less than half have adopted a ‘hybrid’ model of publishing, whereby they make papers immediately free to read for a fee if an author wishes, but keep most studies behind paywalls. Under Plan S, however, scientists wouldn’t be allowed to publish in these hybrid journals, except during a short transition period. The plan also states that funders will cap the amount they are willing to pay for open-access publishing fees, but doesn’t lay out what charge would be too much.

The initiative is spearheaded by Robert-Jan Smits, the European Commission’s special ▶

PUBLISHING MODELS

Worldwide, the proportion of subscription-only journals* shrank between 2012 and 2016, giving way to more open-access (OA) and hybrid journals.



*From Scopus database. Hybrid journals are subscription titles that allow authors to make individual papers open for a fee. Percentages do not add up to 100% because of rounding.

► enjoy on open access, and was launched by the advocacy group Science Europe (the 'S' in Plan S can stand for 'science, speed, solution, shock', Smits says). National agencies in Austria, Ireland, Luxembourg, Norway, Poland and Slovenia have also signed, as have funders in Sweden and Italy.

Smits says he took inspiration from the open-access policy of the Bill & Melinda Gates Foundation, the global health charity based in Seattle, Washington, which also demands immediate

open-access publishing. Because Plan S forbids hybrid publishing — and because it involves multiple funders — its impacts could be more far-reaching than the Gates policy.

Despite Smits' role, the European Commission hasn't itself signed the plan. But Smits says that he expects the requirements to be integrated into the terms of future research grants from the commission. He also expects more funding agencies to join, and says he will discuss the plan in the United States next month.

Asked for comments on the plan, publishers said they had serious concerns — particularly around the banning of hybrid journals. A spokesperson for the International Association of Scientific, Technical and Medical Publishers (STM) in Oxford, UK, which represents 145 publishers, told *Nature's* news team that it welcomed funders' efforts to expand access to peer-reviewed scientific works, but that some sections of Plan S require careful consideration to avoid "any unintended limitations on academic freedoms". In particular, the spokesperson said, banning hybrid journals — which have broadened the availability of open-access articles — could "severely slow down the transition".

The publisher Elsevier said it supported the STM's comments. A spokesperson for Springer Nature said: "We urge research funding agencies to align rather than act in small groups in ways that are incompatible with each other." Removing publishing options from researchers "fails to take this into account and potentially undermines the whole research publishing system", the statement added. (*Nature's* news team is editorially independent of its publisher.)

Curry cautions that shifting from a subscription to an open-access business model around the world could also bring a new challenge — how scientists in poorer nations will be able to afford to publish open-access work. "That has to be part of the conversation," he says. ■