the weekly anthropocene

dispatches from the wild, weird world of humanity and its biosphere

By Sam Matey

USA: Hurricane Michael. On October 10th, Hurricane Michael (pictured) made landfall on the Florida Panhandle. Michael was the third strongest storm in US history as measured by pressure, had the fourth strongest wind speed, and was the strongest storm ever to strike the United States in October. It was the most devastating storm in the Florida Panhandle's history, and continued to spread destruction across the Southeast after landfall. The death toll currently stands at 19 people from 4 states, with many still unaccounted for.

Hurricane Michael intensified rapidly: from Monday the 8th to Wednesday the 10th its wind speed increased by 80 mph in 48 hours, likely due to unusually warm ocean temperatures in the Gulf of Mexico giving the storm extra energy. "The chance of a category 4 or 5 is higher now than it was in the past," said Dr. Adam Sobel, director of Columbia University's Initiative on Extreme Weather and Climate. "And the likelihood for rapid intensification is increasing as well. Both of these were true for Hurricane Michael." In short, in the Anthropocene, this kind of storm is simply the new normal. For an in-depth look at how climate change strengthened Hurricane Michael, see goo.gl/vgXcoF.

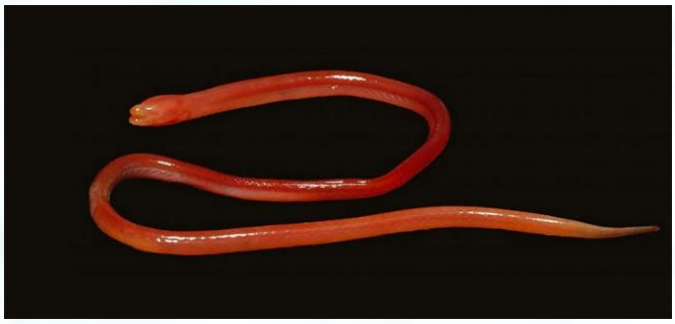
USA: Save Our Seas Act. In an uncharacteristically non-destructive move, President Trump has signed into law a bipartisan environmental protection bill. The Save Our Seas Act, aimed at combating oceanic plastic pollution, reauthorize the marine debris program of NOAA (the National Oceanic and Atmospheric Administration), gives NOAA the authority to declare a severe marine debris event that will require a coordinate cleanup, and urges the State Department to work with other nations to develop global solutions to this issue. Great news!

New Solutions: Carcinogen-Busting Bacterium. 1,4-Dioxane is an industrial solvent that the EPA has classified as a "likely human carcinogen." It's present at thousands of American groundwater sites, and it's extra-hard to get rid of because it tends to coexist with another toxin, 1,1-Dichloroethylene. Now, researchers at the New Jersey Institute of Technology have found a bacterium capable of efficiently degrading the deadly duo. Azoarcus sp. DD4 quickly breaks down 1,4-Dioxane and can disperse freely through water, making it an ideal "cheap and green" cleanup solution. Field demonstrations could begin by early 2019. Great news! For more, see goo.gl/rLqC9v.

the weekly anthropocene

dispatches from the wild, weird world of humanity and its biosphere

By Sam Matey



New Species: Pink Swamp Eel. A new species of swamp eel has been discovered in the mud near a stream in the state of Meghalaya, India. *Monopterus rongsaw* (pictured) is hot pink, blind (like all other swamp eels), and known from only one specimen. Swamp eels are thought to be common, but only approximately 25 species are known to science due to their reclusive habits. Fascinating news! For more, see goo.gl/a9UA4G.

Brazil. On October 7th, right-wing congressman Jair Bolsonaro advanced to the second round of Brazil's presidential election. He took 46% of the vote, much more than anticipated and just short of a one-round victory. His opponent is Fernando Haddad, who took 29% of the vote in the first round. Given these numbers, Bolsonaro is extremely likely to be Brazil's next president. This is terrible news. Bolsonaro has pledged to pull Brazil out of the Paris Agreement, abolish Brazil's Ministry of the Environment, ban NGOs such as the World Wildlife Fund and Greenpeace from the country, and open indigenous lands to mining, among much else. He is strongly supported by Brazil's "bancada ruralista" (agribusiness lobby), which has a long history of advocating massive deforestation in the Amazon. (Just recently, the bancada ruralista forced the elimination of 11 new protected areas in the Brazilian state of Rondonia by attaching the anti-protection measure to an emergency funding bill). It is to be hoped that Haddad manages to win, or that Bolsonaro's radical agenda is constrained by the legislature. For more, see goo.gl/XcekBZ and goo.gl/H3C9th.

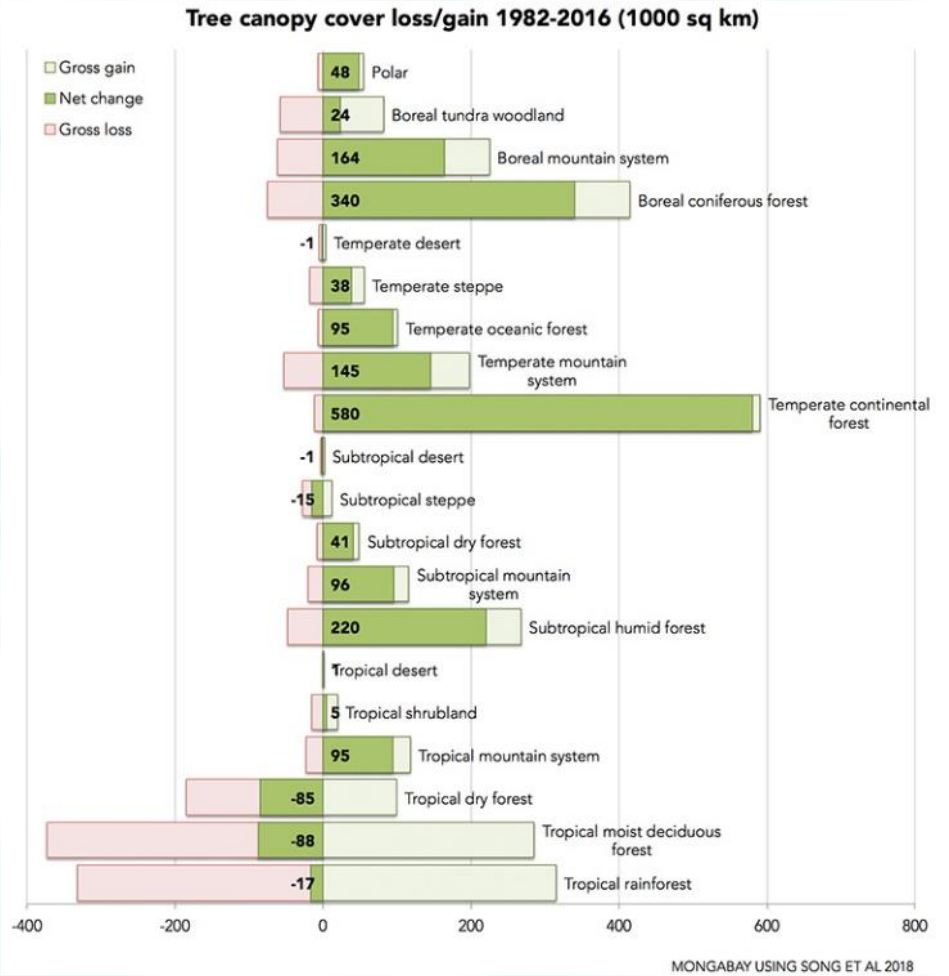
Science Spotlight: Development and Environmental Progress.

With the effects of climate change being felt every day, science-denying obscurantist leaders ascendant in America and Brazil, and a new IPCC report warning that the world is on track to warm much further, it's easy to succumb to pessimism about the future. However, I feel optimistic about our future, for one major reason: economic and technological development, particularly in still-developing parts of the world like sub-Saharan Africa. This seems counterintuitive: surely economic development is inextricably linked with the burning of fossil fuels, the logging of

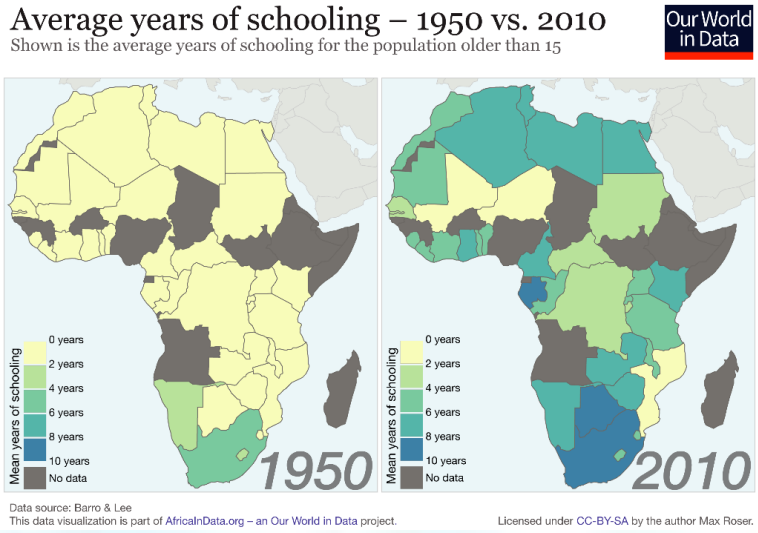
forests, the poisoning of rivers, and all the rest of the litany of ills that humanity has inflicted on the world? That's indeed true. But, fascinatingly, it becomes less true over time.

Steven Pinker, a Harvard cognitive scientist and analyst of civilizational trends, describes a U-shaped "environmental Kuznets curve," in which poor countries harm the environment more as they begin to develop their economies, but eventually peak and reduce their impact as they grow into rich countries. As Pinker neatly summarizes it: "If people can afford electricity only at the cost of some smog, they'll live with the smog, but when they can afford both electricity and clean air, they'll spring for the clean air." As countries grow richer and more educated, their citizens' values, and the issues they care about, climb the hierarchy of needs. If a family is fed, sheltered, clothed, and secure, they can begin to think about less immediate concerns like whether their nation is overusing their natural resources, the impact of pollution upon air quality, or the survival of the other life-forms that share their world.

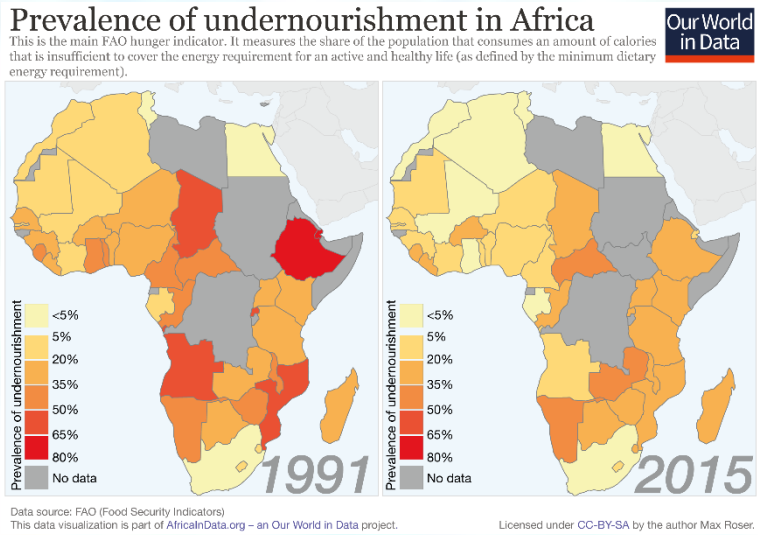
This sounds abstract, but the effect is evident for a multiplicity of data at a variety of scales: a classic example is rate of population growth, which increases in developing nations, peaks, and decreases as the nation becomes an affluent country. An arguably even more important example is deforestation. From an ecosystem services point of view, forests are water-purifying carbon sinks that provide habitat for thousands of species; they're about as important an environmental resource as it gets. In a developing nation like Uganda, they're often subject to clearing to make way for farms, overhunting for bushmeat, and logging for charcoal-burning stoves, among much else. In developed



nations like the United States or France forests are actually expanding rapidly as agriculture becomes more efficient, technology makes the use of wood in stoves a localized hobby rather than a daily necessity for millions, and environmental laws and "sustainable use" practices permeate the culture. (Their attendant species are also benefiting from this trend-animals like white-tailed deer, beavers, and black bears used to be rare in New England, but are now commonplace). A report released in August 2018 (and covered then in this newsletter!) underscores that developed nation/developing nation divide: temperate and boreal forests (most common in North America and Europe) have expanded since 1982, while most tropical forests (most common in South America, Africa, and South Asia) have lost ground (see graph).



That's why one new set of data, although not immediately obvious as being connected to environmental issues, has me very encouraged. Our World in Data, a program by Oxford University, recently released a new compilation of data on sub-Saharan Africa's rapid development. Average years of schooling (see graph), literacy rate, and GDP per person have all increased across the continent, often dramatically, while malaria deaths and prevalence of undernourishment have declined. A generation of Africans is growing up who are healthier, wealthier, and wiser than their ancestors, and that augurs well for the future of the continent's environmental and human resources. Civilization is facing many new challenges in the Anthropocene, from sea level rise to intensifying storms to oceanic plastic pollution. Fortunately, humanity is growing better equipped to deal with them at the same time.



For more, I strongly recommend that you view the full presentation at **africaindata.org/**.