the weekly anthropocene

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

by Sam Matey

Earth. Sadly, climate change is proceeding apace, with a trio of new studies debuting this January offering new information on the warming Earth. A study from the Chinese Academy of Sciences has found that 2017 was the hottest year on record for the world's oceans, with the Atlantic and Antarctic oceans showing the most warming. A second study, from the University of Arizona, quantified the surge in global surface temperatures between 2014 and 2016, finding that a strong El Nino had released the Pacific Ocean's store of excess heat generated by humans' burning of fossil fuels. A third, from University of California Irvine, found that hottest temperatures of the year have increased by far more than average temperatures, especially in megacities like Paris and Tokyo. Check out goo.gl/JWEv4f for info on the CAS study, goo.gl/dtf67E for the UCI one, and goo.gl/DnhWG8 for the UA one.

Australia (1). North America may be in the depths of winter, but in the Southern Hemisphere, it's summer. And Australia is experiencing a deadly heat wave, with temperatures reaching 42 degrees Celsius (107 degrees Fahrenheit) in Adelaide recently. Local wildlife is suffering: a colony of over 400 flying foxes were found dead from dehydration, and koalas have left the trees to beg for water from passing cyclists (pictured) after their preferred water source, eucalyptus leaves, dried out. For more information about the Australian heat wave and an awesome video of how an Australian zoo is keeping its animals cool, check out goo.gl/XEHePP. Copy and paste goo.gl/VDuZ1v for a video of a concerned Adelaide citizen helping out a thirsty koala.

Australia (2). The red handfish, a strange-looking fish that uses its unique fins to walk instead of swim, is one of the rarest fish in the world. Only about 20 to 40 fish were known to survive, on a stretch of reef near Hobart, Tasmania. Now, a second population of red handfish has been discovered, on a different Tasmanian reef. A diving team participating in the Reef Life Survey found eight handfish within a small area, and estimations of the second population could push the world total of handfish up to 80. For pictures and a video of the discovery, copy and paste goo.gl/1XHGwD. Great news!

Brazil. Researchers from the Instituto Burantan in Sao Paulo have discovered 7 new spider species belonging to the genus *Ochyrocera*, all of them native to the Floresta Nacional de Carajás in northern Brazil. In an amusing twist, they decided to name all seven after fictional characters related to spiders. Thus, the world now has species including *Ochyrocera aragogue*, after Aragog in the Harry Potter series, *O. ungoliant*, after Ungoliant in the Lord of the Rings series, and *O. charlotte*, after the eponymous spider of Charlotte's Web. Check out goo.gl/xg4xLv for a full list and pictures.

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Pacific Northwest. A team of researchers from Oregon State University have discovered that old-growth forests may shield some bird species from climate change. The study, led by Professor Matthew Betts, used data from the North American Breeding Birds Survey to find out which birds were suffering from climate change, and where their populations were declining most. Two species, the hermit warbler (pictured) and the Wilson's warbler, have shown population declines in response to rising temperatures, but were not declining in areas still covered by old-growth forest. Professor Betts and his team are planning experiments to determine how the old-growth forests protect the birds, but he already has some theories. "There are so many more nooks and crannies, cavities in the trees and shady parts in the branches ... you could have them do what we would do on a hot day, naturally buffer themselves," said Dr. Betts to *Scientific American*. This discovery is a fascinating intersection of the traditional land preservation ethic and modern climate adaptation efforts. It also makes saving old-growth forests even more important.

Boston. A new study from the Boston University School of Medicine has linked air pollution to menstrual irregularities. Researchers analyzed data from health surveys and EPA air quality reports and found that 14 to 18-year old girls exposed to air pollution had a slightly higher chance of having an irregular menstrual cycle. "While air pollution exposures have been linked to cardiovascular and pulmonary disease, this study suggests there may be other systems, such as the reproductive endocrine system, that are affected as well," said Dr. Shruthi Mahalingaiah, coauthor of the study. This is another example of the unforeseen effects of humanity's alteration of the planet.

Venezuela. The nation of Venezuela has had a terrible few years. The economy has completely collapsed, inflation is through the roof, corruption is endemic, and looting is common. President Nicolas Maduro is only holding on to power by rigging elections and abrogating the authority of the legislative branch. Now, Maduro is seeking to prop up the Venezuelan economy by selling off the country's national resources, with potentially disastrous consequences for their environment. The Arco Minero initiative, announced in 2016, opens 12% of the country to mining. This area allegedly contains vast deposits of gold, diamonds, and coltan, but definitely contains 198 indigenous communities and several protected areas, including Canaima National Park, a World Heritage Site home to the world's highest waterfall and many endangered species. Most of the mining in the Arco Minero is currently run by organized crime and corrupt elements of the national military, operating with little or no supervision, or regard for environmental protection. Alexander Luzardo, a former Venezuelan senator, told the conservation news site Mongabay that Maduro's plans were a "rushed search for financial income at the costs of the liquidation of resources, with consequences such as deforestation, soil destruction and mercury and cyanide contamination." More news as it develops.

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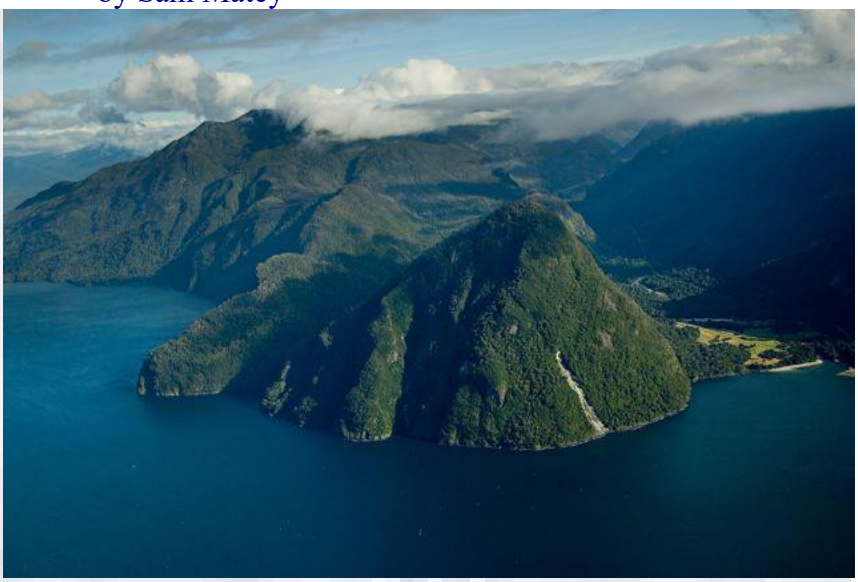

Chile. In an inspiring action to preserve her nation's wildlife, Chilean President Michele Bachelet created two new national parks and expanded several existing ones on January 29th, expanding Chile's national park system by 10 million acres of land. The new parkland includes 9 million acres of Chilean federal land and about 1 million acres donated to Chile by the American conservationist and philanthropist Kristine Tompkins. Ms. Tompkins and her now-deceased husband, Doug Tompkins, had been working to buy and protect land in Chile for years. The newly protected properties, including Patagonia Park and Pumalin Park (pictured), preserve fantastical landscapes including mountains, fjords, forests, rivers, and coastal volcanoes. The area is also home to a diverse slew of wildlife, including pumas, huemul deer, the ostrich-like rhea, and the llama-like guanacos. This wave of protection is a great step forward for conservation in Chile and is an example to the world of how a reasonable government manages its natural resourced. Absolutely spectacular news!

South Korea. A new species of hemlock tree has been discovered in South Korea, the first new species of temperate conifer to be discovered since 2002. *Tsuga ullengensis*, or the Ulleungdo hemlock, lives only on the tiny island of Ulleungdo (pictured) off the eastern coast of Korea, a volcanic cone island less than half the size of Washington DC. The Ulleungdo hemlock is likely critically endangered due to its tiny range, but is unlikely to go extinct, as it now is being grown in several American arboreta. Aside from the intrinsic value of a new species, the Ulleungdo hemlock is interesting as a potential savior of the eastern hemlock, a closely related species native to North America. Eastern hemlocks populations have been devastated by the hemlock woolly adelgid, a Japanese insect that kills hemlocks by sucking out their sap. The Ulleungdo hemlock, like some other Asian hemlocks, can resist the adelgid, and so could be of great value to the American forestry industry. For more info on the Ulleungdo hemlock, check out goo.gl/rnmMAS. Great news!

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Coral Reefs. Coral reefs are probably the world ecosystem most under threat from humanity. Warming temperatures are killing their symbiotic algae, causing "coral bleaching" events. Increased carbon dioxide in the atmosphere is causing ocean acidification, making it harder for them to grow their calcium exoskeletons. Human pollution and overfishing damage them directly. Now, a disturbing new study has found a fourth big threat to coral reefs: ocean plastics. An international research group led by Cornell University has found that humans' plastic trash is a perfect carrier for coral diseases, publishing their results in the journal *Science*. "Plastic debris acts like a marine motorhome for microbes," said the study's lead author, Dr. Joleah Lamb. The researchers found that when corals are exposed to plastic trash, their likelihood of disease increases from 4 percent to 89 percent. This shows that the need to crack down on plastic waste is even greater than we had thought. As Dr. Lamb said: "This study demonstrates that reductions in the amount of plastic waste entering the ocean will have direct benefits to coral reefs by reducing disease-associated mortality." More news as it develops.

South Africa. The city of Cape Town, South Africa, has suffered from severe drought from three years running. Now, they're running out of water. On January 18th, the mayor announced that the city had reached a point of no return, and the city government estimates that Day Zero, when reservoirs finally dip too low to deliver a drinkable supply, will occur on April 12th. Civilians are scrambling to plan for that time, and the city is organizing 200 distribution points to supply water allotments to the metro area's 3.7 million people. When Day Zero arrives, it will be unprecedented: Cape Town will become the first modern megacity to run out of water. Such crises are likely to become more and more common as global temperatures rise. This sobering news is a further incentive to mitigate and adapt to climate change. For more information on the Cape Town water crisis, copy and paste goo.gl/S1m7DW.

Gabon. The Abanda cave system in Gabon is a harsh environment: the caves are dark, hot, and full of a slushy mix of water and bat guano. However, a research team has found that, unbelievably, a population of African dwarf crocodiles appear to be evolving to live in the Abanda caves. These cave crocs live on bats and crickets, and have orange hides, tanned that color by the urea in the bat guano. (Pictured, a cave crocodile next to a normal one). For more information about this astonishing discovery, copy and paste goo.gl/MLWdyu. Fascinating news!