



the weekly anthropocene

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

Antarctica. Adélie penguins (*Pygoscelis adeliae*, pictured) live in vast colonies on the coasts of Antarctica. Due to climate change, most of these colonies are in decline: rain instead of snow leads to floods that drown nests and eggs and cause chicks to freeze to death. Now, scientists have discovered a sign of hope for the species: two massive new colonies in the remote Danger Islands archipelago that together are home to over 1.5 million penguins. As described in a study published in *Scientific Reports*, a

team of researchers used satellite imagery to identify areas with widespread guano staining, then used a drone to count nests in the area. Dr. Heather Lynch, biostatistician and coauthor of the study, was amazed by the results. “It’s insane how many penguins there are in such a small area.” The new colonies are the third and fourth largest known in the world, and unlike other colonies do not appear to be declining. This may be due to local conditions: a nearby vortex of seawater pins sea ice to the islands, making the penguins’ sea ice habitat last longer. The new colonies are already being considered by the international working group CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) as justification for establishing a marine reserve in the area. This discovery offers new hope for Adélie penguins and is an excellent example of how scientific data collection can be integrated into protection plans. For more information, check out goo.gl/SxciEz. Great news!



Indonesia. Marine biologist and National Geographic Explorer Lisa Becking has discovered some unique natural treasures: jellyfish lakes. On an expedition to the Raja Ampat islands (pictured) of West Papua, Indonesia, Dr. Becking and her team discovered 42 new marine lakes, four of which contained jellyfish. Before this expedition, only 200 marine lakes (small bodies of landlocked seawater) were known, very few of which contained jellyfish. Dr. Becking is now working to establish sustainable ecotourism in the area. For more information, copy and paste goo.gl/ZdmWhV. Great news!

Australia. Australian malacologist Dr. Amanda Reid has discovered a new species of “pygmy squid,” a tiny cephalopod no bigger than a thumbnail. Hallam’s pygmy squid (*Idiosepius hallami*, named after Reid’s son Hallam) is native to seagrass and mangrove habitat. For more information and some cute pictures, check out goo.gl/Azgz6n. Fascinating news!



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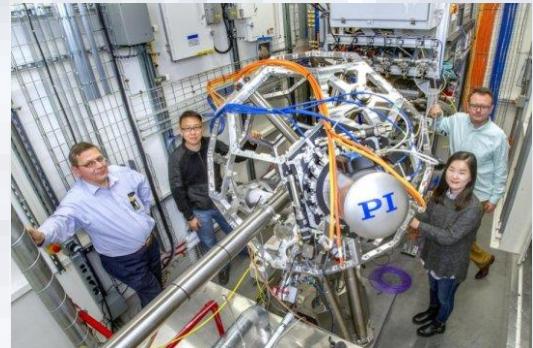
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Kwajalein Atoll. Kwajalein Atoll, in the Marshall Islands, is a vital American military outpost. The atoll is home to the Ronald Reagan Ballistic Missile Defense Test Site (pictured), a critical site for space support programs and testing missile defense technologies, several of which could potentially be used to defend against North Korean missiles. Now, Kwajalein is at risk from climate change-induced sea level rise. A new study commissioned by the Department of Defense found that the Defense Test Site is likely to be swamped by sea water at least once a year, which will damage expensive equipment. The study also projected a “tipping point” for the island around 2035, after which all of Kwajalein’s freshwater supply will be contaminated by seawater, making the island uninhabitable. “We were very surprised. Most of the historical publications … have generally been end-of-century, 2100, 2150, things like that,” said the lead author of the study, USGS research geologist Curt Storlazzi. “We’re talking about in people’s lifetimes; we’re talking about in expected life spans of construction, and so that was shocking.” This new data is an urgent reminder of the threat climate change poses to vital American infrastructure. For more information, see goo.gl/gVkjX9.



Rapa Nui. In a spectacular piece of marine conservation news, Chile has established the Rapa Nui Marine Conservation Area, protecting 286,000 square miles of ocean surrounding Rapa Nui (better known as Easter Island, home of the moai). In September 2017, the islanders voted to establish the marine reserve, with a majority of 73% in favor. Now, the MPA has been officially created, protected 142 marine species found nowhere else in the world and 77% of the Pacific’s fish abundance. For more information, see goo.gl/gni4QT. Wonderful news!

Energy. Researchers at the Department of Energy’s Brookhaven National Laboratory have invented a new method of converting carbon dioxide, a greenhouse gas, into carbon monoxide, a molecule that can be used as fuel. They found that single nickel atoms could function as electrocatalysts to kick off the conversion reaction, opening the door to wide-scale production of fuel from pollutants. “To apply this technology to real applications in the future, we are currently aimed at producing this single atom catalyst in a cheap and large-scale way, while improving its performance and maintaining its efficiency,” said Dr. Sooyeon Hwang (pictured, at right). This technology has astonishing potential and is an inspiring example of human ingenuity. Amazing news! For more information, check out goo.gl/CMCN8L. Absolutely excellent news! (Thanks to Brookhaven National Laboratory for the awesome picture).





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The Amazon: Forest Code. In a controversial, 6-5 ruling, Brazil's Supreme Court has upheld the constitutionality of a 2012 law that weakened the nation's Forest Code, allowing more deforestation. The 2012 "New Forest Code" allows the reduction in size of Areas of Permanent Protection and gives amnesty to landowners who illegally cleared forest: anti-environment policies that the Supreme Court has just perpetuated. The new ruling allows agribusiness groups that have already illegally destroyed parts of the Amazon Rainforest to escape punishment and get authorization to clear even more land. This is a highly disturbing move that further imperils the already beleaguered Amazon. Let us hope that Brazil's 2018 elections result in a more environmentally educated government. (Thanks to WWF Global for the awesome map).



The Amazon: Andean Dams. A new study published in *Science Advances* identified 142 dams already extant or under construction in the Andean headwaters of the Amazon River, with 160 more in the planning stages. These dams trap sediments from the mountains that normally flow into the Amazon, and the researchers behind the study estimate that if all of the new dams were built, sediment transport into the Amazon could stop completely. This would disrupt the natural flood cycles and block fish migratory routes, which aside from the ecological damage could impact the food security of up to 30 million people. The researchers recommend that the governments of the Amazon region work together to protect their common rivers. For more, see goo.gl/wZkyNA. More news as it develops.

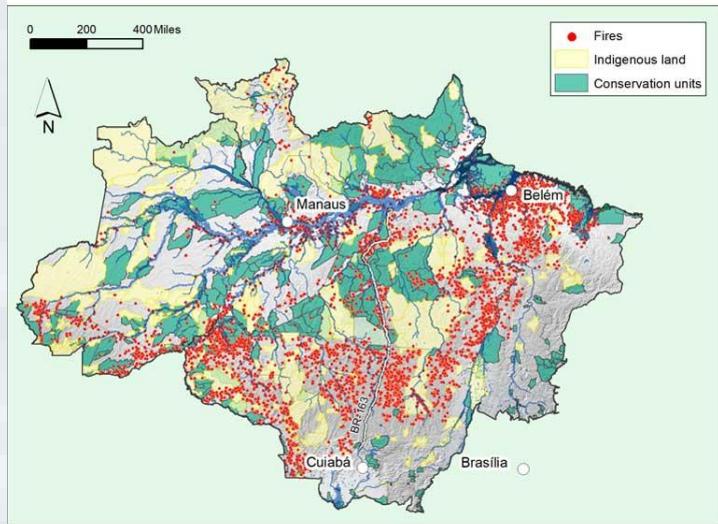
The Amazon: Burning. Drought has caused a rapid rise in forest fires in the Amazon. A new study published in *Nature Communications* found that Amazonian fires are becoming increasingly common, likely due to the increasing number and severity of droughts. Despite an overall 76% decline in deforestation rates between 2003 and 2015, the 2015 drought led to fires being 36% more common than in the previous 12 years. The researchers calculated that forest fires in Brazil (pictured on next page, Amazonian fires occurring from August 2016 through July 2017) currently release about 450 teragrams of carbon per year, or about one-third of the estimated emissions from deforestation. Researchers believe that the fires are caused by a combination of drier, hotter conditions due to climate change, fragmented forests due to deforestation, and illegal fire-setting by agribusiness companies. "With more droughts, it is very likely that fire incidence will also increase if no policy actions are taken to curb ignition sources," predicted Luiz Aragão, lead author of the new study. For more information, copy and paste goo.gl/xUkMWn. Sobering news.



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The Amazon: Tipping Point. For decades, it has been known that the Amazon produces much of its own rainfall, with the forests seeding the air with water through evapotranspiration. This raised the question of a “tipping point”: at what point would deforestation reduce rainfall by enough to fundamentally change the Amazon region’s biome, switching its climate regime from rainforest to savanna? Historically, this has been estimated at 40% of the Amazon deforested: we are currently at 17%. Now, several prominent Amazon scientists have reanalyzed the tipping point metric, taking into account climate change, increasing fires, and higher carbon dioxide concentrations as well as deforestation. They conclude that the tipping point may be closer to the 20-25% range, with the massive Amazon droughts of 2005, 2010, and 2015 being the “first flickers” of the climate shift. This would be an extremely dangerous event, releasing vast amounts of carbon dioxide as well as irrevocably changing an ecosystem that is one of the jewels of this planet. For more information, see goo.gl/t2ScCN. More news as it develops.



USA. In another sign of scientific illiteracy and general incompetence, the Trump administration has lifted a ban on the importation of elephant trophies from Africa. This action will encourage the hunting of elephants, a sentient endangered species. For more information on this latest manifestation of malevolent stupidity, check out goo.gl/6dkBVh. Discouraging news.

Chad. Renowned NGO African Parks has agreed to manage Chad’s Ennedi Natural and Cultural Reserve (pictured). This 15,444-square-mile protected area is home to over 525 species, a plethora of migratory birds, a small population of crocodiles, and incredibly ancient rock art. This new partnership should help protect it for the future. For more information and some pictures, see goo.gl/2Cp92c. Great news!



Beetles. A new report from the International Union for the Conservation of Nature reveals that saproxylic beetles (a type that depend on dead wood) are dying out around the world. 22% of saproxylic beetle species are threatened by extinction in the EU, mostly due to logging and removal of fallen trees. This could threaten local ecosystems. For more info, see goo.gl/wKhye4.