the weekly anthropocene

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

Great Barrier Reef. Australia's Great Barrier Reef is in terrible shape. Stricken by the triple threats of warming seas (which cause coral bleaching), ocean acidification, and pollution, the reef is experiencing mass coral die-offs. In 2016, 67% of the corals in the reef's northern 700 kilometers died (pictured, bleached Great Barrier Reef coral). It is doubted whether this vibrant ecosystem will be able to survive the age of humanity. However, a new study published in *Nature Geosciences* offers some hope. An international research team extracted rock cores from the Australian seafloor that held fossilized corals and sediments laid down over the past 30,000 years, together making up a rough history of coral activity in the area. They found that the Great Barrier Reef has experienced five "near-death experiences" in the past 30,000 years, potentially similar to how the reef is suffering now. These, however, were due to changes in sea level near the beginning and end of the last ice age. When glaciers expanded, sea levels fell, leaving the corals "high and dry," and when glaciers melted, the corals were suddenly too deep to get enough light. The researchers found that although the reef appeared to die off in the short term, surviving corals managed to rebuild the reef at the new sea level within 2,000 years. This is highly encouraging, as it appears that the Great Barrier Reef can and has survived catastrophic die-offs in the past. This raises hopes that it may do so again, even if not on human timescales. For more on this story, check out goo.gl/REngba.

Mountain Gorillas. A new census of the mountain gorilla (*Gorilla beringei beringei*, pictured) population in the Virunga Mountains found that the area was home to 604 gorillas, in 41 social groups and 14 solitary males. This is a highly encouraging increase, up from 480 gorillas in 2010 and 250 in the mid-1980s. In addition to the 400 individuals living in the only other mountain gorilla population (in Bwindi Impenetrable National Park, Uganda), this brings the total world mountain gorilla population to over 1,000 individuals, a major milestone. "This represents one of the rare success stories in conservation. The population of mountain gorillas in the Virunga Volcanoes has more than doubled in the past three decades, despite intensive threats of poaching, habitat degradation, and civil conflict," said Dr. Martha Robbins, gorilla expert. For more, see goo.gl/SN5eRY. Great news!
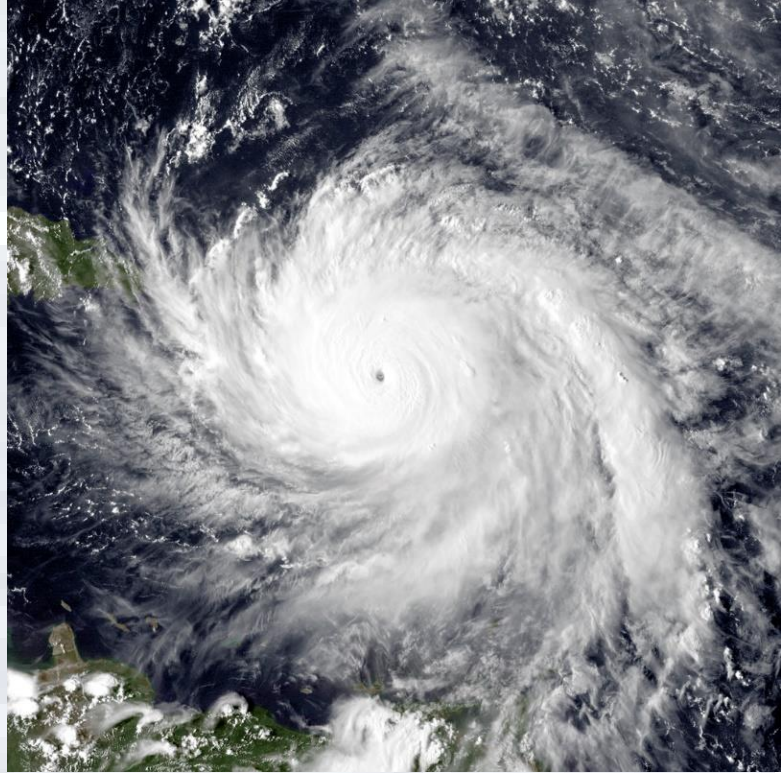
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Hurricanes, Part 1: Puerto Rico. On September 20th, 2017, Hurricane Maria (pictured) devastated the American commonwealth of Puerto Rico. Homes were destroyed, the electrical grid was devastated, and tens of thousands of American citizens were displaced. However, the official death count was just 64 individuals as of late 2017, a figure that many felt to be implausibly low. Now, a new study published in the *New England Journal of Medicine* has found that the death toll is orders of magnitude higher. The research team surveyed 3,299 randomly chosen Puerto Rican households to obtain an independent estimate of mortality rates. Their results indicated that 4,645 people died as a result of Hurricane Maria, although the researchers caution that even this figure may be an underestimate. This means that actual death tolls are likely at least 72 times higher than official death tolls. For comparison, CNN reports that 2,753 people died in the World Trade Centers on 9/11. Hurricane Maria was a national disaster of an epoch-making scale and has been shamefully underreported and under-addressed due to the Trump Administration's negligence and mainland America's ignorance of Puerto Ricans' citizenship status and ongoing plight. Furthermore, this case is an example of how even in a developed nation like the United States, climate change-related disasters like Hurricane Maria can devastate infrastructure, cause untold human tragedy, and paralyze government response. For more information on the new, shocking mortality rate study, see goo.gl/ceWdUu. For more on the complex relationship between the 2017 hurricane season and climate change, check out goo.gl/aUnYjh.

Hurricanes, Part 2: The Future. Another new study, this one published in the *Journal of Climate*, evaluates how climate change will likely affect future hurricanes. The research team estimated the Atlantic Ocean temperatures of 2100 if the Earth keeps warming at its current rate, then computer modeling to evaluate how 22 hurricanes that struck between 2002 and 2013 would have responded to those warmer conditions. They found that the hurricanes of the future Atlantic will be stronger, wetter, and slower, with 24% higher rainfall, 6% stronger winds, and 9% slower speed. These factors are likely to make storms more damaging. For more on this new study, see goo.gl/wgCWpb.
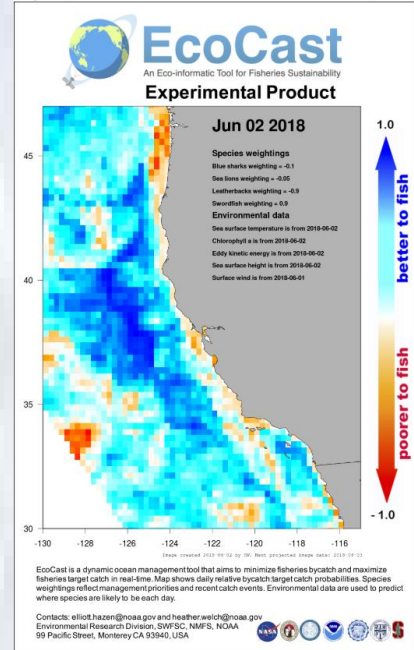
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New Tools: EcoCast. A team of researchers have created an online tool that tells fishers where the best places to fish are-every day. Currently, unwanted catch, or "bycatch," accounts for up to 40% of a fisher's catch. Bycatch often includes endangered species like dolphins and sea turtles. The EcoCast tool (pictured) uses satellite data, fisheries records, and species tracking information to show fishers the spots where their target species are plentiful, but protected species are not. "By pioneering a way of evaluating both conservation objectives and economic profitability for sustainable U.S. fisheries, we're simultaneously advancing both conservation and economic objectives," said Dr. Elliott Hazen, NOAA research ecologist and lead author of the paper describing EcoCast. This is an excellent idea, and exactly the kind of innovative solution needed to solve the problems of the Anthropocene. For more, see goo.gl/SXWkSx or coastwatch.pfeg.noaa.gov/ecocast/. Photo credit: EcoCast, NOAA.

EcoCast

An Eco-informatic Tool for Fisheries Sustainability

Experimental Product

Jun 02 2018

Species weightings
Blue sharks weighting = -0.1
Sea lions weighting = -0.05
Leatherbacks weighting = -0.9
Swordfish weighting = 0.9
Environmental data
Sea surface temperature is from 2018-06-02
Chlorophyll a is from 2018-06-02
Eddy kinetic energy is from 2018-06-02
Sea surface height is from 2018-06-02
Surface wind is from 2018-06-01

better to fish / poorer to fish

EcoCast is a dynamic ocean management tool that aims to minimize fisheries bycatch and maximize fisheries target catch in real-time. Map shows daily relative bycatch:target catch probabilities. Species weightings reflect management priorities and recent catch events. Environmental data are used to predict where species are likely to be each day.

Contacts: elliott.hazen@noaa.gov and heather.welch@noaa.gov
Environmental Research Division, SWFSC, NMFS, NOAA
99 Pacific Street, Monterey CA 93940, USA

New Defenses: TrailGuard. A TrailGuard is a tiny camera, designed to be hidden in a protected area to keep watch for poachers and traps. TrailGuards are different from commonly used camera traps because they are easily concealable and send real-time alerts to protected area managers when their algorithms detect human figures. Now, a TrailGuard being tested in Tanzania's Grumeti Game Reserve has led to the arrest of three poachers, the dismantling of 34 snares, and the finding of the poacher's camp: a strong real-world case of this new device's potential utility to protected areas worldwide. The next generation of TrailGuards is planned to be even cheaper and easier to install. For the full story, check out goo.gl/Zk96XH.

New Inventions: Enhanced Crop Production. Scientists at the University of Essex have found a way to increase crop production by 47% simply by boosting production of a naturally occurring plant protein. The researchers found that increasing the H-protein in plants' leaves led to increased efficiency in an enzyme-recycling process known as photorespiration, greatly increasing yields. The research team was working as part of the Realizing Increased Photosynthetic Efficiency, or RIPE, project. RIPE, supported by the Bill and Melinda Gates Foundation, seeks to meet the food needs of Earth's growing population by genetically engineering higher-yield crops. "Improvements obtained with the individual trait described here, brings us one step closer to meeting the imminent food demands of 2050 -- Additionally, by combining this trait with other successful traits in RIPE, we can make the yield gains needed to feed this century's growing population," said Professor Christine Raines, Principal Investigator of the new study. "We are committed to developing these sustainable technologies as quickly as possible and ensuring that the farmers and communities who need them most have global access." Spectacular work! For more, see goo.gl/Wqnu3y.

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2018 Election Special: Maine Gubernatorial Campaign. On June 12th, Mainers will vote in the Republican and Democratic Party primaries to choose nominees for governor. The outcome of these primaries, and of the general election on November 6th, will have substantial implications for the future of the state. Even disregarding other vital issues such as gun control, the opioid epidemic, and healthcare expansion, the parties' candidates are clearly divided by their stances on environmental issues. None of the four Republican candidates prioritize environmental issues (a catch-all term here used to include renewable energy, land conservation, and pollution control issues) on their campaign websites. Indeed, one of them, Mary Mayhew, actively advocates financially penalizing conservation land trusts and opposing renewable energy development. In sharp contrast, five out of seven Democratic candidates (Adam Cote, Mark Dion, Mark Eves, Janet Mills, and Betsy Sweet) prioritize environmental issues on their campaign websites, propounding common-sense, innovative environmental policies ranging from investing in electric-vehicle infrastructure to joining the U.S. Climate Alliance. Any of these five candidates would be a substantial improvement over Maine's current governor, Paul LePage, who has vetoed pro-solar power and anti-pollution bills, supported oil drilling off Maine's coasts, and denied the existence of climate change.

However, one candidate stands out. Adam Cote is a 20-year National Guard veteran, an attorney, and the CEO of Thermal Energy Storage of Maine, a company that works to reduce energy waste. In 2013, President Obama's White House named him a "Champion of Change" for his work in "advancing clean energy and climate security." His plan for a sustainable Maine is by far the most detailed and ambitious of any 2018 candidate for governor. Mr. Cote advocates increasing screening for water pollutants, joining the U.S. Climate Alliance, and, most impressively of all, making Maine the first 100% renewable energy-powered state in the nation in 10 years! This is the kind of innovative, far-thinking leadership we need in the Anthropocene. This newsletter endorses Adam Cote for Governor of Maine and encourages its readers to vote for Mr. Cote in the Democratic primary on June 12th.

South Portland, Maine. Saturday, June 9th, is World Oceans Day. To celebrate, Maine Conservation Voters (MCV) is hosting a beach cleanup at Willard Beach (pictured) in South Portland from 1 to 3 PM on that day. The Blue Ocean Society is providing all cleanup materials-no need to bring anything but yourself and the willingness to work to make the world a better place! For directions to Willard Beach, check out goo.gl/maps/CWcKRZZ7LPt. For more information on the cleanup, contact Samuel.matey@maine.edu or egonyalcv@gmail.com.

Waldoboro, Maine. Work on the Waldoboro Collective project is proceeding apace! Since the last update, a sink system and an organic garden have been built. Desired materials that would aid progress include: a circular saw, a pancake air compressor, Tyvek house wrap, lumber, T-111 siding, windows, and Roxul insulation. If anyone is interested in donating any of these materials or volunteering, contact Samuel.matey@maine.edu or oconnorutexas@gmail.com. More news as it develops!