



the weekly anthropocene



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

By Sam Matey

American Climate Policy: New State-Level Actions. After the landslide victory of pro-climate action candidates in the 2018 midterm elections and the inspiring advocacy and consciousness-raising of rising star Congresswoman Alexandria Ocasio-Cortez (D-NY), the prospects for substantive action against climate change in the United States look better than ever before. States continue to take the lead, with the new Democratic governors of **New Mexico, Illinois, and**



Michigan joining the U.S. Climate Alliance, a coalition of 19 states and Puerto Rico that has pledged to uphold America's Paris Agreement emissions reduction commitments. (Map: US Climate Alliance members as they were just before Michigan joined). Newly Democratic-governed Nevada, Wisconsin, and Maine may also join soon! Also in **Maine**, a slew of climate action bills are up before the Democratic-controlled legislature, including proposals to incentivize homeowner and community solar energy projects, expand investment in offshore wind power, and one refreshingly bold "Green New Deal for Maine" bill that would require to Pine Tree State to get 100% of its energy from renewables by 2030! More news here as it develops.

Most surprisingly, the newly inaugurated Trump-anointed Republican governor of **Florida**, Ron DeSantis (pictured), has emerged as an unlikely environmental champion. Within days of taking office, he signed a far-reaching executive order that instituted much-needed reforms. DeSantis' order allocated \$2.5 billion to Everglades restoration and protection, created the post of a state Chief Science Officer, established a Blue-Green Algae Task Force to deal with toxic algae blooms, created an Office of Environmental Accountability and Transparency to monitor all state agencies' environmental actions, and, amazingly, created an Office of Resilience and Coastal Protection to try to protect Florida from sea level rise! All this progressive, sensible, much-needed environmental action from a man who wholeheartedly supports Trump and his notoriously senseless and retrograde climate policies. The executive order even says to prepare for sea level rise without mentioning climate change! Credit where credit is due, though: this writer strongly disagrees with Ron DeSantis' entire political ideology, but he is at least doing something to try to protect Florida and Floridians from the challenges of the Anthropocene. If this makes it viable for other conservative politicians to take action to deal with the effects of climate change, even if they don't acknowledge the causes, that's a huge step forward.



For more on the US Climate Alliance, see www.usclimatealliance.org. For more on Maine climate action, see goo.gl/fhFvLw. For more on DeSantis' lapse into sanity, see goo.gl/Dp361W.



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Global Weirding: Bizarre Climate Change Impacts. The world is still changing rapidly due to climate change. Recent news items underscore the unpredictable and startling nature of these shifts. First, a new study (led by NASA) used satellites' ice-penetrating radar to discover an **enormous cavern** under the Thwaites Glacier in West Antarctica. This cavern is about two-thirds the size of Manhattan and is nearly 1000 feet tall. The cavern likely used to contain 14 billion tons of ice, most of which appears to have melted over the last three years. This has disturbing implications for future sea level rise and the fate of the glacier as a whole.

Second, while the eastern US freezes due to displaced Arctic air, Australia is suffering a **massive heat wave**. January 2019 was the hottest month in Australian history, with the national average temperature for the month exceeding 30 degrees Celsius (86 degrees Fahrenheit). Some towns got it even worse: Birdsville, Queensland, survived 10 consecutive days above 45 degrees Celsius (113 degrees Fahrenheit). Damages associated with the heat wave include drought, mass die-offs of hundreds of thousands of fish in the Darling River, and the burning of over 2.5% of the island state of Tasmania by massive wildfires. Scientists concur that climate change is to blame for these unprecedented conditions.

Finally, a keystone species is being devastated by a **deadly new disease** that appears to be benefiting from warmer ocean waters. Sea star wasting disease (SSWD) is a horrific plague that causes sea stars (aka starfish) to literally disintegrate into mush, sometimes with their arms walking off on their own beforehand. Since about 2013, it appears to have completely obliterated populations of the sunflower star (*Pycnopodia*



helianthoides, pictured) in almost all of its Pacific Ocean range, with Californian and Oregonian populations disappearing completely, Washington State populations declining by 99.2%, and Alaska serving as a last redoubt for the species. This is a big deal, as sunflower stars were incredibly common just ten years ago, and they have a huge influence on their ecosystem. They are major predators of sea urchins, which are in turn major predators of kelp, meaning that without sunflower stars, the entire kelp forest habitat of the West Coast may be under threat. This out-of-the-blue "sea star apocalypse" is a horrifying harbinger of the tragedies of the Anthropocene.

All three of these stories remind us that climate change is not a simple, linear warming increase in temperature: it's shaking up the Earth system like a snow globe, and the most surprising changes are likely still ahead. Stay tuned.

For more on the Antarctic cavern, see goo.gl/QMzyqP. For more on the Australian heat wave, see goo.gl/qx4XoR. For more on the sea star pandemic, see goo.gl/roasCw.



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Amazing Animal Life. A trio of recent research projects have revealed some fascinating new findings about the lives of some of the incredible animals with which we share the Earth. First, a new study published in *Integrative Organismal Biology* found that **alligators** (*Alligator mississippiensis*) eat stones to use them like divers' weight belts, helping them stay underwater longer with less effort. The researchers tested the dive times of seven young alligators before and after they (voluntarily) ate some small stones. They found that having the extra weight in the alligators' stomachs gave them an average of 35 minutes extra dive time—a 88% increase! Before this study, it was thought that alligators ate stones accidentally or possibly in order to help crush their stomach contents for easier digestibility.

A second study found that **whale sharks** (*Rhincodon typhus*, pictured), the largest fish in the world, are actually omnivores. Whale sharks filter feed like whales instead of hunting prey like most other sharks (hence their name), but it was thought that they still got most of their food from zooplankton and fish that they strained from the water. The researchers analyzed the stable isotope composition of blood and tissue samples from 13 whale sharks (8 wild and 5 captive), and found that they actually getting over 50% of their nutrients from algae and other aquatic plants, making



them omnivorous. (Stable isotopes, or different forms of elements like carbon and nitrogen, exist in different proportions in different life-forms. Animals' isotopic ratios are primarily determined by what other life-forms they eat, to such an extent that isotope ratios can be used as a “fingerprint” indicator of the diet of a given animal). This is a valuable and fundamental addition to our still-sparse knowledge about these amazing creatures.

Thirdly, and perhaps most surprisingly, a team of Chinese researchers shed light on the history of the beloved **giant panda** (*Ailuropoda melanoleuca*). Pandas are an evolutionary oddity: they're related to bears, which are generally generalists who eat many different things, but they exclusively eat bamboo, which severely limits their range. The researchers conducted isotopic analysis on ancient panda bones to find that surprisingly recently (between 11,000 and 5,000 years ago), pandas ate more than bamboo and likely lived more places than bamboo forests. It's still unclear when and why their rapid specialization took place, and the researchers reserve judgment, but it could have been due to the human population in China at the time pushing pandas into marginal habitat. In short, it's possible that one of the most iconic endangered species in the world only assumed its current form thanks to humanity—a fascinating thought.

All three of these new studies showcase the astonishing complexity of animal biology and behavior, and underline the value of learning about our fellow beings. For more on the alligator study, see goo.gl/UQrUKj. For more on the whale shark study, see goo.gl/za1skV. For more on the panda study, see goo.gl/je9dNB.