



the weekly anthropocene



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

By Sam Matey

USA: California. For the past month, California has been fighting record-breaking wildfires. The Mendocino Complex fire, which includes the River Fire and the Ranch Fire, is now the largest fire in the state's history, eclipsing December 2017's Thomas Fire, the previous record-holder. It has now burned over 300,000 acres of land. The three other extremely large fires in the state, the Carr, Donnell, and Ferguson fires, have together also burned over 300,000 acres and killed 10 people. Much of the state is currently covered by a blanket of smoke (pictured, a NASA image of California with the fires highlighted), damaging the local air quality. Fortunately, most of these fires are nearing containment. Unfortunately, the fire season is only about half over, and events like these are likely to become more and more common as the world warms. For a live fire tracker, see goo.gl/j2UHfR. For a study on the matter, see goo.gl/bAHgns.



USA: Chlorpyrifos Ban. Chlorpyrifos is a deadly insecticide invented by Dow Chemical in the 1960s. Essentially a nerve agent, it is commonly used to combat pests on farms and golf courses. Soon, studies found that it was harmful to humans, and home use of chlorpyrifos was banned in the US in 2000. In 2015, the Obama Administration began an effort to completely ban the use of the poison. Unsurprisingly, Trump's EPA attempted to reverse this decision in 2017. Now, a federal court has ruled that the EPA must act to ban chlorpyrifos after all. This is a heartening example of America's institutions still functioning to protect its citizens, despite regressive actions on the part of the current administration. For more, see goo.gl/YiCMBJ.

Dominica. In a bold step forward, the Caribbean island nation of Dominica has resolved to ban several common plastic and Styrofoam products by the end of the year. The banned items include plastic straws, plastic silverware, Styrofoam cups, and Styrofoam containers. Dominica's waters are vital summer habitat for sperm whales, which are known to suffer from plastic pollution. "Dominica prides itself as the 'Nature Isle,'" said the nation's prime minister, Roosevelt Skerrit. "We must in every way deserve and reflect that designation. The issue of solid waste management affects that perception and we continue to grapple with it." This bold action on plastic pollution is consistent with Dominica's long-term goals of becoming the world's first climate-resilient nation. "We have a unique opportunity to be an example to the world, an example of how an entire nation rebounds from disaster and how an entire nation can be climate resilient for the future," said Skerritt last year, after the island was devastated by Hurricane Maria. Dominica's farseeing work to adapt and respond to the challenges of the Anthropocene is an example to the world. Great news! For more, see goo.gl/LQc3Lh.



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Japan. In a fascinating addition to Earth's known biological treasures, a new species of pygmy seahorse has been discovered off the coast of Japan. The "Japan pig" (*Hippocampus japapigu*, pictured) is about the size of a grain of rice, lives in shallow waters, and eats plankton. The species was well known to local divers, but was not known to science until ichthyologist Graham Short began studying seahorses in the area and realized that they were morphologically distinct from other pygmy seahorses. Dr. Short notes that Japan pig seahorses are fortunately not rare, and that their biology means that they will likely stay common. The Japan pig appears to be able to tolerate temperature swings to an unusual extent for a seahorse and is small enough that it is effectively shielded from the threat of collection by humans for Chinese medicines or the aquarium trade. This new species appears well positioned to continue thriving in the Anthropocene, and to continue enriching the world with its existence. Awesome news! Thanks to National Geographic for the awesome image. For more, see goo.gl/Qa6gP3.



Mexico: Sierra Mixe Corn. In southern Mexico, a traditional landrace of maize (known in America as corn) may hold the key to transforming world agriculture. The Sierra Mixe landrace of corn grows much taller than regular corn in extremely nitrogen-poor soil, and has been studied for decades by scientists intent on cracking this enigma. Plants need nitrogen to grow, but they can't use atmospheric nitrogen on their own. Some plants, like legumes (a family that includes beans and chickpeas) have formed symbiotic



relationships with bacteria that "fix" nitrogen into a usable form for them. Other plants, like cereals (including corn, rice, and wheat, the world's three major food crops), don't have these symbiotic bacteria, and need to get their nitrogen from the soil. This is why they need nitrogen-rich fertilizer, and why the world's food security depends on producing huge amounts of fertilizer (1 to 2 percent of the global energy supply is used to make fertilizer). However, a new study published in *PLOS Biology* has found that the Sierra Mixe landrace of corn has its own nitrogen-fixing symbiotic bacteria, which live in the mucous coating of its "aerial roots" (pictured). This biological marvel, described as science fiction-like by some, holds the potential to revolutionize world agriculture. If the bacteria-buddy traits of Sierra Mixe corn can be crossbred into regular corn, the world need for fertilizer could plummet. For more on this fascinating discovery, see goo.gl/KsSyJH and goo.gl/oGNCHS. Thanks to UC Davis for the awesome image!



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Special Guest Article: Funds from the Volkswagen Settlement in Maine

By Kaylei Coombs

As vehicle emission standards are becoming more stringent, one automaker in particular found themselves struggling to comply. Instead of opting to manufacture vehicles with lower or zero tailpipe emissions like many automakers, Volkswagen (VW) attempted to go above the law by installing defeat devices on their 2.0-liter and 3.0-liter diesel engines. These devices allowed the vehicles to pass regulatory standards when undergoing testing, but illegally emitting over 40 times the federal nitrogen oxide (NOx) limit while on the road.



In 2016, the U.S. District Court in Northern California approved the U.S. Environmental Protection Agency (EPA), State of California, and Federal Trade Commission first partial consent decree with VW to settle allegations of installing defeat devices on 2.0-liter engines and approved the second consent decree in 2017 to settle allegations of installing defeat devices on 3.0-liter engines. The class action lawsuit resulted in a settlement of over \$20 billion to fund vehicle buy back and repairs, the Zero Emission Vehicle plan, and state projects to eliminate excess NOx emissions. Based on the number of 2.0-liter and 3.0-liter VW engines in the state, Maine received just over \$21 million.

The \$21 million has been delegated into four designations: state multimodal priorities (40%), Appendix D-2 eligible mitigation actions (25%), Diesel Emission Reduction Act (DERA) (20%), and zero emission electric vehicle supply equipment (15%). The state plans to use the 40% for multimodal priorities to replace state owned ferries and other outdated vehicles that emit more than their fair share of NOx. Appendix D-2 and Diesel Emission Reduction Act (DERA) funds are competitive among government and non-government entities and can be used to replace, retrofit, or repower diesel vehicles with alternate fuel vehicles in an effort to reduce NOx emissions. Maine Department of Transportation (MaineDOT) and the Maine EPA are currently accepting applications for both Appendix D-2 and DERA eligible vehicles. The last funding designation which is being used to fund zero emission electric vehicle supply equipment, will fund electric vehicle charging stations around the state.

Appendix D-2 and DERA have gathered a great deal of interest from local school districts and municipalities who are interested in replacing refuse trucks, school buses, and transit buses with alternative fuel vehicles. Keep an eye out on the roads for new alternative fuel vehicles as U.S. makes strides to move toward fewer NOx and cleaner air. For more information on the VW settlement, please refer to the [Maine Beneficiary Mitigation Plan](#). Also, check out www1.maine.gov/mdot/vw/.