the weekly anthropocene

Dispatches From The Wild, Weird World Of Humanity And Its Biosphere

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Drawdown Diamonds

Consumer diamonds are generally pretty terrible for the world, mined at great energy expense, often with poorly treated labor, and disturbingly often with a portion of the proceeds funding warlords in places like the Congo. Lab-grown diamonds skip the supply chain issues (and are physically identical to naturally formed diamonds) but still are energy-intensive to make. Now, two pioneering companies, the New York-based Aether and the British Skydiamond, are creating diamonds that are not just carbon-neutral but carbon-negative, compressing the carbon from atmospheric carbon dioxide into lab-grown diamonds in a process powered by renewable energy. In Aether's process, each carat of diamond is made from 20 tons of CO2, or about the average person's carbon footprint for a year. (Pictured: an Aether diamond ring). What's really exciting about this process is that it's a high-value, long-lasting product-perfect from a carbon sequestration perspective, as it incentivizes drawdown and is extremely unlikely to be released back into the atmosphere. (And they sell: both Aether and Skydiamond have had to set up a waitlist due to massive consumer demand). Notably, some of the CO_2 Aether uses is bought from Climeworks, a European company that is a pioneer in the field technological carbon sequestration, raising the tantalizing

prospect of a nascent network of companies dedicated to drawing down and finding uses for atmospheric carbon. If this scales up-both the diamonds and the carbonate-minerals method of drawdown generally- it could be a small but

significant part of humanity's eventual victory in the fight against climate change! Great news.

California

In 1924, the last wild wolf in California was shot and killed in Lassen County. In the 2010s, a new pack arose. A male wolf called OR-7 arrived in California in 2011, and eventually founded the Rogue Pack in southern Oregon. A female, LAS01F, traveled hundreds of miles from the Rockies (possibly Wyoming) to arrive in Lassen County in 2015, and had a litter of pups in 2017 with a son of OR-7 who had dispersed south from the Rogue Pack. The wolves kept multiplying, and by 2020 the Lassen Pack numbered at least 15 (pictured, a radio-collared young male of the Lassen Pack born in 2019). All the while, more wolves are dispersing into California from Oregon and elsewhere. This is a wonderful example of how humanity can learn to live with apex predator species in the Anthropocene. Spectacular news!

Seabed Trawling

A shocking new study recently published in Nature has calculated that bottom trawling in fisheries releases vast amounts of carbon dioxide into the atmosphere. Trawling nets disturb seabed sediments, releasing stored CO_2 into the water, where it can contribute to ocean acidification or be released to the

atmosphere. The researchers calculated that this adds up to somewhere between 600 and 1,500 million tonnes of CO_2 released from trawling per year, mostly from the fleets of China and the European Union. For comparison, all global aviation released 918 million tonnes of carbon dioxide in 2019. The good news is that with a little more protection and regulation, this should be a fairly easy carbon source to shut down: the researchers calculated that preventing

easy carbon source to shut down. the researchers calculated that preventing trawling in just 4% of the world ocean would eliminate 90% of the carbon disturbance, as long as the 4% included key high-trawling, carbon-rich areas like the Aleutian Islands, South China Sea, North Sea, and west coast of Africa. Plus, more MPAs would actually increase the fish catch by giving species safe places to breed and recover their populations. Yet another critically important reason to protect the oceans!

Species Translocations

A paradigm-shifting new paper in Conservation Science and Practice has analyzed the history of species translocations for conservation in the US. This broad term encapsulates introducing species to somewhere they've never been before, reintroducing them to historic habitat (a la wolves to Yellowstone), or something in between-the definition is growing fuzzy in an age of climate change and shifted land use, where no habitat is quite like what it was fifty years ago. Moving species to somewhere they weren't found before is a common tool for both conservationists and land managers, but it often is regarded as unambiguously harmful due to high-profile disasters such as the small marsupial-poisoning cane toads in Australia or native snail-eradicating rosy wolf snails in Hawaii. However, the research team behind the new paper (led by Ben Novak of black-footed ferret cloning fame) quantified the use of translocations, and found that they were overwhelmingly successful: 70% of 1,580 threatened and endangered taxa in America have had translocations as part of their recovery plan, with only one instance found where this caused a negative impact somewhere. For example, wild turkeys, threatened by overhunting in the early 20th century, have since recovered their numbers-and also been introduced to states like Oregon and Montana that were beyond their original range. California condors, after their near-extinction experience in the 1980s and subsequent captive breeding program, have been introduced to Arizona, where there are no records of condors later than 10,000 years ago. And small groups of bighorn sheep (pictured) have been moved back and forth between hundreds of sites all over the Rockies in order to help save the species from pneumonia contracted from domestic sheep-a practice which has likely led to excellent genetic diversity.

The researchers also examined the history of biological control agents, where one species (often an insect) is introduced to control an invasive or pest species (often a plant). This has been the source of several famous ecosystem-wide screw-ups, including the cane toad and rosy wolf snail examples above. However, they found that this led to negative ecosystem-level effects in only 1.4% of cases, 42 of the 3,014 examples of biological control agent programs globally-and all of the problem cases were from the 1980s or earlier, indicating that our grasp of the science and practice of biological translocations is improving. There have also been positive unintended consequences: for example, the Eurasian hawk moth was introduced to the American West to combat the leafy spurge (considered a weed), but has since become the single most important pollinator for the endangered western prairie fringed orchid, helping stabilize its population in North Dakota.

There are a multitude of further examples of beneficial introduced and translocated species not covered in this paper. To take a classic example, at-risk monarch butterflies in California seem to enjoy sheltering under the capacious leaves of "invasive" (and often locally derided) eucalyptus trees from Australia, preferentially settling there instead of on local Monterey pine trees. For its part, the Monterey pine, endangered in its Californian homeland, has become a widespread and valuable timber tree in Australia, where it's done so well that some now consider it a weed. This writer has personally learned that critically endangered greater bamboo lemurs commonly benefit from "invasive" species in Madagascar, feeding their babies the berries of the soapbush, a plant that routinely makes lists of the world's 100 worst endangered species. According to the traditional conservation paradigm-the best knowledge we had for a long time-all of these would be negatives, as they aren't the "natural" state of the ecosystem. But in the Anthropocene, with massive, existential shifts such as human-caused climate change upending ecosystems around the globe, it's time to support and celebrate examples of successful "immigrant" species where we can find them-and use all the tools at our disposal to conserve species and help protect and rebuild functioning ecosystems, wherever they are, and with whatever biological "parts" available.

Email Address:
samuel.matey@maine.edu