the weekly anthropocene

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

March 2 2022

Ukraine

Occasionally, the world faces an event so epoch-making that it temporarily displaces climate change (in this writer's opinion) as the most important issue facing humanity. The early, uncontrolled spread of COVID-19 pandemic, before the amazingly rapid development and extraordinary life-saving success of the COVID vaccines, was such an event. Vladimir Putin's brutal and unprovoked invasion of Ukraine is another. This is vitally important not just for the moral clarity of the event itself-a one-man-rule autocracy invading a peaceful democracy with no provocation is as straightforwardly good versus evil as it gets-but because of its implications for world order, potentially threatening the "Long Peace" of relatively low conflict deaths worldwide since World War II.

There is so much to share about this fight. How ordinary Ukrainian civilianshave displayed incredible courage in defending their country, from joining the army en masse to blocking Russian tanks with their bare hands. The incredible defense of the city of Kyiv. The inspiring leadership and heroism of President Volodymyr Zelenskyy. The brave Russian protesters risking arrest or worse to condemn their ruler's aggression.

Particularly heartening for this writer, the West has been surprisingly strong, united, and forthright in standing up for our sacred values of peace, freedom, and democracy. The Biden Administration has responded brilliantly, strategically disclosing classified intelligence to undermine Russia, sending up to $600 million worth of weapons to Ukraine immediately, asking Congress to authorize $6.4 billion more in weapons and aid, stationing more US troops in our vulnerable NATO allies in Eastern Europe, and coordinating a unified response with our

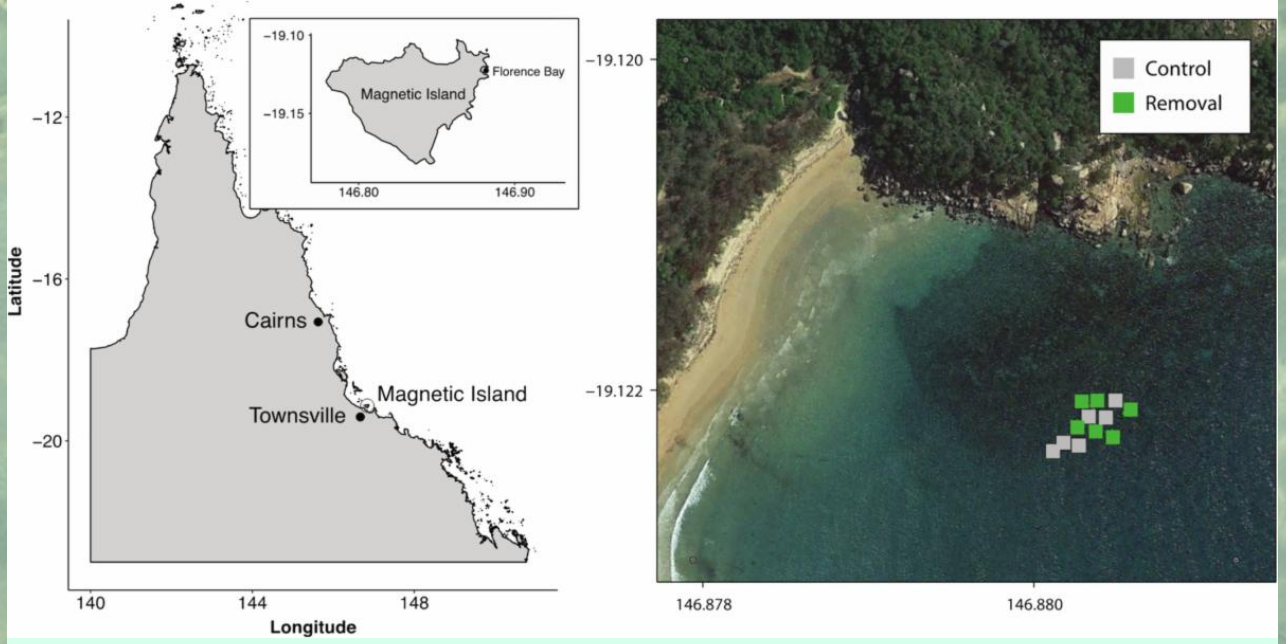
allies-basically everything short of sending Americans to directly fire on Russian troops, which would risk nuclear war. The European Union announced that it would send $500 million worth of weapons to Ukraine (the first time ever that the EU has involved itself in a war as a group), banned Russian planes from entering its airspace, announced that all member states would accept Ukrainian refugees for up to 3 years without the need to apply for asylum, and banned Russian state-owned media channels. European Commission President Ursula von der Leyen said that Ukraine belongs in the EU and they want them to eventually join. Germany completely revamped its foreign policy and increased its defense spending to more than 2% of GDP, something which America had been asking it to do for decades. The American Fed and the EU Central Bank moved together to deploy economically devastating central bank sanctions and exclusion from the SWIFT money transfer system against Russia. (Here are two good explainers on the complexities and impact of those actions). Keep in mind that economic sanctions against Russia may well lead to increased gas prices, wheat prices, and inflation-this is no one's fault but Putin's.

The energy dimensions of the crisis are also fascinating: Russia supplies a lot of natural gas to Europe, coal to Asia, and oil to the world, so the US and EU have scrambled to find alternative sources to defend against a possible cut-off, from American exports to a deal with Qatar. Germany is considering keeping its nuclear plants (a source of carbon-free energy) open longer to reduce its need for gas, a much-needed step. Long-term, of course, a Europe and world primarily powered by renewable energy will be much more self-reliant and less vulnerable to the geopolitics of transporting burnable fossil fuels. From the Suez Crisis to the Persian Gulf to Russia today, the need to transport fossil fuels has been a key security vulnerability for decades. Along with stabilizing our atmosphere and preventing thousands of deaths from air pollution, the renewables revolution will free us from the need to worry about sending money to oil-producing dictators. If you read just one of the many, many links in this newsletter, check out CarbonBrief's amazing rundown of the Russian invasion's effect on energy markets and climate policy worldwide. Key quote: "Clean technologies are peace-keeping and patriotic. Putin hates them."

Here's a list of organizations to donate to that aid Ukraine's defense, and here's the National Bank of Ukraine's emergency fund to donate directly to the Ukrainian army. (This writer wired $50).

This newsletter will not regularly cover ongoing events in Ukraine (our main focus, is, after all, the relationship between humanity and Earth's climate and biosphere) but wanted to take this opportunity to publicly make clear its stance on this historic struggle between democracy and dictatorship. The 20th century saw the world learning the hard way that letting European dictators invade peaceful democracies can lead to truly horrific outcomes. This time, we can nip it in the bud. Glory to Ukraine!

Weeding Coral Reefs



The corals around Magnetic Island, off the coast of Townsville, Australia, were, like most of the Great Barrier Reef, greatly damaged by overlapping environmental crises: climate change-induced heatwaves causing massive coral bleaching, compounded by everything else harming corals, from ocean acidification to overfishing to waste dumping to disease-carrying plastics. By 2018, the reefs in the island's Florence Bay were dying or dead, and had become completely overgrown with *Sargassum* seaweed. This "sets in stone" the reef's decline and prevents even the possibility coral regrowth, as any new coral larvae that manage to be born have no place to cling onto and grow-or if they do find one, they quickly wither in the shade of the seaweed. This is not an isolated incident: for context, a landmark study published in 2021 found that half of the world's coral has died since 1950 (due to heatwaves, bleaching, acidification, overfishing, dredging, etc.) and another study found that algae (including seaweed) cover has increased on two-thirds of the world's coral reefs. It's also important to note that *Sargassum* isn't "bad" here, it's fine alongside healthy coral reefs and can host amazing ecosystems in its own right; but when it grows over damaged coral it's the "final nail in the coffin" for a reef.

Then, a group of researchers from James Cook University led by Dr. Hillary Smith decided to see what happened if they just...pulled the seaweed off. The researchers partnered with volunteer local scuba divers (citizen science!) to manually "weed" twelve 270-square-foot underwater plots of algae-encrusted reef (see map above). They removed more than 190 pounds of seaweed, about 90% of what had grown there. They then found that under the scientists' care, these tiny little patches of the Great Barrier Reef saw a threefold increase in new coral babies (known as "recruitment") in both 2019 and 2020 compared to the un-weeded areas, even in the midst of a new Great Barrier Reef mass bleaching event in 2020. (Request a PDF of the full study here). Although this specific method of "weeding" coral reefs by hand can't possibly scale up to all the damaged reefs in the world (you'd need a literal army of full-time scuba divers) it could be critical to help keep alive "islands" of coral, perhaps keeping towns dependent on coral tourism afloat longer or preserving particularly ecologically unique locations. As Dr. Smith said, "“Restoration is more a stop-gap to buy time for large-scale action on emissions and something that can be implemented on local scales for high-value reefs.” Every tool in our arsenal to help keep coral reef ecosystems alive in the Anthropocene is needed!

Regrowing Tropical Forests

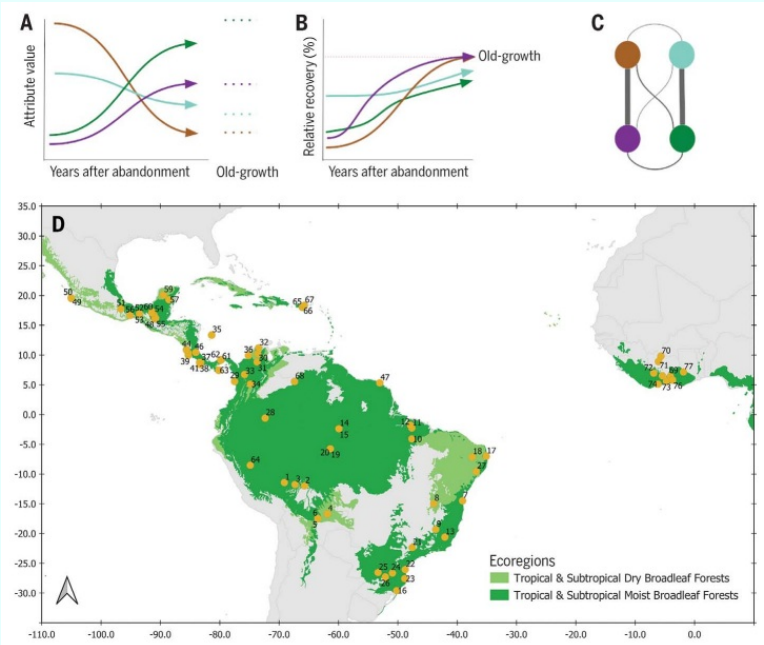


Fig. 1. Study approach to analyze recovery of different forest attributes. (**A** to **C**) Absolute recovery of SF attributes toward OGF values (A) can be standardized to relative recovery rates (B), which express how close each SF attribute is to OGF values, thereby allowing direct comparisons across attributes, such as in network analyses (C), which show how recovery is coordinated across forest attributes. The widths of paths among attributes indicate the strength of the coordination. The different colors indicate attribute category: soil (brown), plant functioning (purple), structure (green), and diversity (turquoise). (**D**) Map of the 77 study sites in the neotropics and West Africa (for site numbers, see table S1). Potential forest cover is shown in green.

A new study from over 80 contributing researchers analyzed data from 77 sites in the Americas and West Africa where tropical forests were regrowing after the destruction of original forests, forming "**secondary tropical forests**." (Here's the full free PDF from ResearchGate). The sites had widely different origins, with some just starting recovery and some having been regrowing for over a century, becoming new old-growth forest. The researchers found that different aspects of the forest ecosystem returned at different rates. For example, soil nutrients and richness recovered quickly, with carbon and nitrogen levels in the soil and density of the soil reaching "90% of levels in untouched forests after 1 to 9 years." Factors such as the density of trees' wood and the presence of nitrogen fixing tree species took between 3 and 27 years to approach old-growth conditions, while it took between 27 and 119 years for the secondary forests to match the original forests on some metrics like "largest tree size." (*Pictured above*: Figure 1 from their study, with "SF" meaning secondary forest and "OGF" meaning old growth forest. The colors represent measured forest ecosystem attributes: "soil (brown), plant functioning (purple), structure (green), and diversity (turquoise)".).

Overall, though, all of these factors of recovery were found to occur much faster than previously thought, often with no human intervention. “Nature will take care of it if we let it,” said contributing ecologist Saara DeWalt. “Restoration of tropical forests should rely on natural regeneration. It’s the most efficient way to do it. It’s the most ecologically efficient. It’s the most economically efficient.” Essentially, if we just *stop destroying* tropical forests (and make sure there's enough seeds around as a starting point) they can regrow their key ecological functions on their own. (It's also worth noting that natural forest regeneration may not look like we expect and may benefit from other Anthropocene factors: researchers have found that non-native guava trees in Kenya and African tulip trees in Puerto Rico served as key nuclei to build biodiverse new secondary forests).