Artificial Intelligence: The Park Rangers of the Anthropocene

We worry about machines going rogue. What if they went green instead?

- **ED YONG, THE ATLANTIC 3/24/17**
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In Australia, autonomous killer robots are set to invade the Great Barrier Reef. Their target is the crown-of-thorns starfish—a malevolent pincushion with a voracious appetite for corals. To protect ailing reefs, divers often cull the starfish by injecting them with bile or vinegar. But a team of Australian scientists has developed intelligent underwater robots called COTSBots that can do the same thing. The yellow bots have learned to identify the starfish among the coral, and can execute them by lethal injection.

These robots probably aren't going to be the saviors of the reef, but that's not the point. It's the *approach* that matters. The work of conservationists typically involves reducing human influence: breeding the species we've killed, killing the species we've introduced, removing the pollutants we've added, and so on. But all of these measures involve human action—some, intensively so. The COTSBots are different: They're of us, but designed to ultimately operate without us. They represent a burgeoning movement to remove human influence from conservation—to save wild ecosystems by taking us out of the picture entirely.

In an intriguing thought experiment, landscape architect Bradley Cantrell, historian Laura Martin, and ecologist Erle Ellis have taken this ethos to its logical extreme, and ended up with what they call a "wildness creator"—a hypothetical artificial intelligence that would autonomously protect wild spaces. We'd create it, obviously, but then let it go, so it would develop its own strategies for protecting nature. Maybe it blocks out human-made light or noise. Maybe it redirects the flow of water or destroys litter. Maybe it deploys drones to cull invasive species. Think Skynet crossed with Captain Planet, or the *Matrix* meets Ranger Rick, or IBM's Watson meets Greenpeace.

Cantrell, Martin, and Ellis have presented their ideas in a provocative new paper called "*Designing Autonomy: Opportunities for New Wildness in the Anthropocene*." To be clear, they're not remotely saying that "it will ever be

technologically, financially, or politically possible to develop and install autonomous wildness creators at meaningful scales." They're not even recommending it. "That's not the direction I want to see us going," says Cantrell. "The paper has a tongue-in-cheek aspect. We make this proposition and immediately pull back."

So, then: *why*?

Because exploring hypothetical futures tell us a lot about the concerns of the present. That's science-fiction in a nutshell. *Ex Machina*, *System Shock*, and *Neuromancer* aren't how-to manuals; in their visions of robotic rebellion, they reflect our fears about our own fallibilities. So what happens when we speculate about AI going *green* instead of going rogue? That tells us something about how the ethical questions that pervade modern conservation, about how we see our role in protecting our remaining wilderness, and about what "wild" even means.

"When people try to maintain natural places, there's a tendency to end up over-curating them," says Ellis. "So even with the best intentions, everything ends up conforming to what human cultures decide is important." For example, my colleague Ross Andersen recently wrote about an ambitious and possibly quixotic plan to re-wild the Siberian steppes with resurrected woolly mammoths. Those large beasts once roamed there, sure, but the architects of this plan have made a judgment call about what those now mammoth-less plains *should* be like. The same goes for the U.S.'s decision to reintroduce wolves to Yellowstone in the 1990s, or New Zealand's plan to kill all rats on the island by 2050, or the starfish-murdering COTSBot. This is a perfect example of possible over-curation, says Ellis, because the crown-of-thorns starfish isn't even an invasive species—it's a native one that occasionally goes through population outbreaks. "The idea that you're going to automatically kill a lot of animals in the name of "protecting nature" is a little disturbing," he says.

"These interventions have been inherently controversial," says Martin. "There's already such an effort to present those decisions about which species get to live in a landscape and which do not as purely technical, when in reality, it's very social and political." Even when we're trying to remove our influence, we're stamping our humanity onto things.

But what if humans weren't running the show? Artificial intelligence has progressed to a point where machines are capable of developing their own behavior, going beyond their original programs. When Google's AlphaGo

system recently beat the world's best Go players, it did so with unconventional strategies, and moves that no human would ever have made. "After humanity spent thousands of years improving our tactics, computers tell us that humans are completely wrong," said reigning human champion Ke Jie.

"That's the interesting thing about bringing in an autonomous learning system that can come up with its own rules," says Ellis, who wonders what such artificial enlightenment look like when applied to conservation. "Maybe there are ways of doing things that have not occurred to us, and *would not*, but could emerge from a learning process that isn't human."

Several projects are already moving in this direction. At Harvard University, Cantrell's team is designing prototypes for intelligently controlling river systems. People are good at diverting or barricading rivers with levees, dams, and flood barriers. But Cantrell imagines something more dynamic—sensors and structures that could more subtly manipulate the flow of water and the pattern of sediment to "protect against flooding, but also sculpt the land in advance of the next flood," he says. The idea isn't to "build one solution, but something that constantly updates itself."

Meanwhile, other groups are developing drones that can plant trees, artificial pollinators, swarms of oceanic vehicles for cleaning up oil spills, or an autonomous, weed-punching farm-bot. Geoengineering—big attempts to counter climate change by manipulating the environment—is also a conceptual predecessor to a wildness creator. It's a way of reshaping ecosystems by introducing something new and letting it run, by changing then relinquishing. Re-wilding projects like the Russian mammoth quest, where scientists introduce long-lost megafauna, are also similar. "You're replacing a species that had a lot of control over its ecosystem—and it's not human control," says Ellis. "Our wilderness creator idea is just intensive re-wilding."

"The publication of a paper on the use of AI on conservation would have been hard to imagine five years ago, but we can now read it in one of the top journals in ecology," says Eric Higgs, who studies ecology and philosophy at the University of Victoria. "It's testament to the fact that we're looking for new ways of addressing rapid change." But he adds that conservationists have learned the hard way that protecting nature is only possible if *people* are invested in caring for their land or protecting local animals. "That human engagement piece has really jumped out as being very important," Higgs says, and the wildness creator concept "is a denial of that."

And in that denial, the concept reflects many of the tensions that underlie modern conservation. “The way we think of conservation is typically to right the wrongs of humans in the environment,” says Cantrell. “We’re cordoning off portions of the Earth to protect it from our influence, or trying to turn back that landscape. And if we take technological solutions down that same line of thought, we get to a point where we’re heavily managing ecosystems just to take the humanity out of them.”

The idea of fully removing ourselves from nature is unachievable. It’s the Anthropocene and humans are here to stay. “Instead, we should be thinking critically and carefully about how to co-exist with other species,” says Martin. And AI, while not supplanting that responsibility, can help us to exercise it. “There are so many technological utopians who are envisioning how tech can improve the lives of humans. Diverting some of that energy to promoting the lives of non-humans would be a worthwhile endeavor.”