



Black Rhino

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Necropolitics and Wildlife

One Lockean principle that most across the political spectrum can agree with is that the administration of death is a hallmark of society (even if it is not a hallmark in which we take pride). Locke thought of it in a very limited manner, primarily as a judicial act as punishment for an injustice. Unfortunately, numerous power constellations have means to decide who or what is to die, when, and for what reason(s), to transform these decisions into law or policy, and then muster the power to enforce them. Consequently, this chapter could go in many different directions to illustrate the scope and the depth of necropolitics. In truth, this should be a multivolume set, but we leave that for a more ambitious scholar, and limit ourselves to some timely illustrations.

Those Who Are About To Die

Before we get to the necropolitics of wildlife, we should start with a few illustrations in the human world. The military is an obvious yet arbitrary place to start. CAE suggests beginning with the 1960s political icon of necropolitics, Robert McNamara—and not just for his role in the quantification and escalation of the war in Vietnam, but for where he originally made his name in World War II. McNamara served from 1943 until 1945 with the Army Air Force Office of Statistical Control, where he administrated a

bomber command of B-29s for which he developed schedules that allowed their dual use as bombers and as transports in India and China. However, McNamara's crowning achievement was that he and his team, slide rules in hand, devised the most effective and efficient (i.e., in terms of maximizing death) way to bomb Japan. Given that the cities of Japan were primarily made of wood, McNamara believed that firebombing would have the most devastating effect and maximize civilian casualties (missions aimed at killing noncombatants were called "morale" bombings). Guided by the bureau's calculations, the US Air Force burned to death upward of nine hundred thousand Japanese—one hundred thousand in Tokyo alone. For these war crimes, McNamara received a Legion of Merit (an Armed Forces medal given for "exceptionally meritorious conduct in the performance of outstanding services and achievements").

The battle of the calculator can go the other way. Today, North Korea is calculating how much death it must be able to produce in order to assure its sovereignty. The North Korean oligarchy (a small network of postwar first families) has now intergenerationally transformed North Korea into an impregnable fortress. They know that they are too weak and isolated ever to leave it, but they can make sure no one hostile ever gets in. Since the cease-fire, the immediate threat has been bombardment and surgical strikes, primarily from the US and regional rivals. They answered by moving military operations deep underground, and by deploying massive, well-protected artillery emplacements that could devastate Seoul. Whatever type of military assault comes their way, short of full invasion, they can immediately retaliate with an equal or greater deadly and destructive outcome. The hope is that the threat that fortress North Korea has created will escape a full-scale invasion until their nuclear program can be completed. Once it is, the calculations of death will make even a full-scale assault impossible because the violence could lead to global devastation. Although they cannot venture out of the castle, they can maintain their regime and their borders without outside interference, no matter how determined an adversary might be. North Korea is a fascinating case to those interested in the topic of necropolitics, in that its organization of life (biopolitics) is subservient to its grand necropolitical initiative.

Taking a step down from the military, the police are the next related category to consider. At present, ground zero of this necroadministration is the disproportionate killing of young black men, consistently demonstrating that "all lives matter" is at best poorly aspirational in the US. What disturbs CAE is the thought that protest may not be effective in curbing this unac-

ceptable tendency in policing. We are convinced that it will help to ensure better treatment of protesters, that it may diminish racism in a general sense, and that it may even affect police policy and organization, but we are skeptical as to whether it will change the courts, which is where the problem confirms its perpetuation. As we have seen since Rodney King, the courts are immune to protest or riot. As long as an officer may offer the testimony “I *felt* my life was in danger,” or “I feared for my life,” and as long as such a phrase can function as magic words that excuse any act of violence, the problem will not stop, because the acts are consistently forgiven by the court and have modest social consequences for the shooter. CAE brings up this example because it is so different from the necropolitics we see in war. The lynchpin of this problem is that the subjective state of the perpetrator is allowed a legitimacy and an acceptance that is rare in necropolitics. Usually, necropolitics is administered through the calculating language of science, technology, engineering, and mathematics (STEM). As a means to distance administrators from the fact that subjects will die given certain calculations, forms of organization and acceptable behavioral tendencies are instituted. For example, those making the calculations or finding the “solutions” to problems are not expected to consider any controversy surrounding any decision. Under veiled threat, and present reward, they are excused from the politics of what they are doing. Moreover, subjects are eliminated from the process and represented as objects (usually in the form of numeric representation—see Appendix 1). That which can trigger emotion or aversion is minimized. But in the case of judicial review by jury, the opposite is at work; emotional response rather than “reasoned” assessment carries the day. No one knows how far the “feared for my life” defense can be taken. “I had to shoot all five people in the car because I felt my life was in danger.” A subjective state cannot be disproven (feelings are facts), and testimony must be accepted on its face. Blue lives really do matter given this striking level of privilege.

Switching back to the STEM approach when examining racial policy in regard to necropolitics, CAE can point to the absence of environmental justice in areas primarily inhabited by black and brown people—meaning that all corporate externalizations (in this case, pollutants left for public cleanup) seem to make their way to landfills and remediation centers that are always conveniently located in poor, typically black or brown, neighborhoods. If we go to ground zero in the US, we would land in Louisiana, the most polluted state in the nation. The state has put all its financial hopes for its industrial base into one basket, and that is nonrenewable

energy extraction and refinement. Given that Louisiana has no competing investment beyond tourism, the sole center of economic power—the extraction industry—has completely seized political power. It is either exempted from paying taxes, or pays at a very reduced rate. Perhaps more significantly, there is also no state enforcement of pollution standards. Only the overstressed federal Environmental Protection Agency can act, and they do not. Perhaps because it is a lost cause, perhaps because only the poor are suffering—but for whatever reason, the toxins continue to flow, particularly down the stretch of the Mississippi River between Baton Rouge and New Orleans now and probably forever known as “Cancer Alley.” Along this eighty-five-mile corridor, town after town has died or is dying a slow death. People have no recourse, as the corporations own the state and local governments. The best outcome is to be bought out of one’s home (as in Norco, Louisiana), and that is a terrible outcome. Imagine being forced from a family home, often after generations of living there, losing one’s community, and doing so in poor health from years of exposure to an array of toxins. For others it is much worse—it is simply exposure and death. All calculated; all understood by the industry. Land is needed for the extraction industries’ toxic processes. This land needs to be close to the base ingredients but as far as possible from those who might object with sustained and funded vigor. The point of intersection is usually where those who are most defenseless reside. Having control of the zoning laws, the industry can buy up property in the designated area and degrade resistance through the slow poisoning of the resident population.

To dovetail to another related necropolitical subject, do these unfortunate residents have access to healthcare to reinvigorate their poisoned bodies? Overwhelmingly, no, they do not. But as usual, whether it is with social or environmental justice, Louisiana is a beautiful test site. In 2010 when the Affordable Care Act was enacted, the Louisiana governor (a cancer in himself whose name CAE will not repeat) refused the federal dollars to expand Medicaid (health insurance for the poor). He was replaced in 2016 by Democrat John Edwards. Within two weeks of his inauguration, Edwards signed an executive order to accept federal money and expand Medicaid. The consequences were immediate:

On June 1, 2016, the expansion began, and within one year 378,564 people had enrolled in the program.

50,622 members received preventative care.

Nearly 5,000 women completed diagnostic breast imaging, such as mammograms, MRIs, and ultrasounds, and 63 were diagnosed with and treated for breast cancer.

2,276 patients were newly diagnosed with hypertension.

More than 11,500 new members received a flu shot.

4,474 Louisiana Medicaid enrollees had colonoscopies. Out of that number, 1,126 had precancerous polyps removed.

Yet this swing in the distribution of healthcare is probably not going to last if the conservatives in the US congress finally get their way. Attempts are being made to repeal the Affordable Care Act or at least stop the expansion of Medicaid. Given the first two bills proposed as replacements, according to the nonpartisan Congressional Budget Office (CBO), somewhere between twenty-two and twenty-four million people will lose their health coverage. For the grand majority of those losing healthcare, the enactment of this legislation is going to affect quality of life and life expectancy, but even more shocking is the CBO prediction that over the next ten years, 208,500 people will die due to lack of care. It is one thing to remove access to a “product” (which is how the conservatives think of healthcare), but the 208,500 figure represents the outright taking of lives, and cannot be described as anything other than that. Again, this is why God is so important in the necropolitics of conservatives in the US. Religion tempers the cynicism of needing to maintain power at any price, by allowing the belief that God wants to punish those who failed to lead a just and providential life (idlers), and reward those who have been loyal to His command (in this case with tax breaks) for they will fulfill the world’s potential. (After all, the plutocrats are the opportunity and job creators.) Death, for conservatives, is a natural regulating power in the Malthusian sense, i.e., death by neglect (although they are every bit as willing to dole out death through active command, as in war or via the death penalty).

This idea of healthcare stands in sharp contrast with that of the American Medical Association (AMA). Not that the AMA has always walked a straight and shining path, but it has shown a level of ethical responsibility seldom seen in healthcare in the US in its support of the Affordable Care Act. As is to be expected, the AMA’s view is quantitatively based, but perhaps this is one example where quantity is a better trajectory than quality. We can see the basic assumption in old yet ongoing medical processes like triage. Given finite time and supplies, prioritize services that save the

most lives with the resources available. Single-payer healthcare systems are based on this same idea. While more unique treatments, both operational and pharmaceutical, may be under-resourced, preventive and standard care is available to all, which in turn increases average life span. For medical outliers, this system is less than ideal, as the lives of this marginal class of people are almost certainly shortened. This is the failed side of a necropolitics of utility in a system of limited resources; however, the alternative, in which medical treatment and medicine is distributed so that those who can pay get full coverage and those who can't get nothing, leaves even more to be desired. Given its class position, the AMA is taking the odd step of devoting itself to collective interest over individual interest.

CAE could go on and on with example after example of necropolitics at work, but we will instead stay on point. In Chapter 1, we touched upon the lack of an intentional necropolitics in the environmental movement, and we will now examine necropolitics as bureaucratized and articulated through the managed (intentional) death of wildlife.

The Nonrational Organization of Care for the Wild

Wildlife management, when distilled to its basics, often comes down to two general objectives: conditions leading to a low probability of population collapse or explosion should be maintained, and alien species should be kept out of the system. Accomplishing these objectives allows for the preservation of the delicate balance that is indicative of a healthy environmental gestalt. However, managers will be the first to say that nature (environment and wildlife) is always changing and evolving and with that comes a terrain of shifting equilibrium. In addition, species are introduced into and removed from the system (naturally, postnaturally, and artificially), and populations are artificially contracted or expanded on a regular basis. Management models used for the purpose of maintaining healthy environments have primarily emerged out of STEM culture. They seek to be objective and quantitatively based (and to a large degree they are), but as we shall see, aesthetics and ideology always find a way to insert themselves into both theory and practice, not to mention the nonrational desires and biases inserted through various public pressures.

From the point of view of maintaining a stable environment that is biodiverse (which, as we have seen, is an aesthetic and economic imperative), deer in the Northeastern US and Quebec, Canada, are counterproductive creatures in relation to these objectives. There are two primary reasons the

deer population has run out of control: human determination to eradicate wolves in the region, and the fact that humans have unintentionally engineered rural land to be as perfect for deer as it is for humans. Considering that the uncontrolled herds are wiping out the plants that constitute their food source and allowing for the explosion of the few plants they will not eat (black cherry trees and hay-scented ferns are among the worst culprits), they can now be considered ecological pests. Unfortunately, “pest” is not the language of science even though it is used by biologists and conservation experts. “Pest” is ultimately an aesthetic term that describes whether a creature provokes a subjective state of annoyance in humans. A pest for one person is a charismatic animal for another, an important food resource for a third, and an object of sacrificial amusement for a fourth. An odd alliance of pressures coming from hunters (both food and trophy) on the one hand, and “save the deer” proponents on the other, is forcing wildlife managers to allow the deer to remain overpopulated. The public demand is that deer should be readily available whether a person wants to view them or kill them. Many of the “saving” campaigns do at least understand the dangers of having an exploding deer population and suggest nonlethal means for relocation, which is where they break with the hunters. The managers are happy to let the hunters harvest the deer, especially if they will shoot females. For some resource-oriented deer hunters this is a fine idea, but the rest of the hunters want a trophy buck, whose death does not help to reduce the population (unless the bucks are severely pressured and there are not enough to service all the does; unfortunately, when bucks become that rare, the effort to find them becomes too great and hunters tend to move on). What is left is an ongoing ecological problem that is not being solved and that makes a person wonder whether democracy and rational land and wildlife management can coexist.

A similar situation arose in the Galápagos Islands in the 1990s with feral goats. In the sixteenth century, the Galápagos Islands were seeded with goats and pigs by whalers and pirates who needed food caches. The islands were a convenient place for them to stop, and they also liked to eat the Galápagos giant tortoise. The tortoises were especially appealing because they could be stored alive for extended periods with little trouble. The goats and pigs added variation to the sailors’ diet. As these practices disappeared, the need for the goats did as well, and the goat population exploded. On the island of Isabela, the goats were naturally penned in by a volcanic rock barrier of extraordinarily hostile terrain. Unfortunately, some goats made the crossing over the rock sometime in the 1970s. By the 1990s, this relatively small

goat population had boomed into a destructive horde that threatened a broad variety of plant, insect, and animal populations all over the island. The goats had eaten the environment to a point of near desertification. For the most part, no one cared about most of these vulnerable life forms, but there was one that was so charismatic that it had to be saved—the aforementioned tortoise. In order to bring the devastated environment back to one that was suitable for tortoises, the goats had to be eradicated. If the goats were gone, biologists and conservationists correctly believed that the environment would heal itself. This was the policy that came out of the Tortoise Summit held in the UK in 1995 to address the goat problem. As was to be expected, there was some pushback on the idea—the goats had as much right to be there as the tortoises—but it was not enough pressure to sway the decision of the experts. The eradication program, Project Isabela, began in 1997. The goats were to be wiped out, not just on Isabela where they had reached pest status, but on all the islands as a preventive measure. This initiative seemed more than reasonable, as it would save a variety of rare and vulnerable tortoise species at the expense of an animal that, due to its usefulness to humans, was among the most successful mammals on earth.

One thing that can be said with certainty about those who inhabit STEM culture is that once they have a mandated, clear objective, nothing will distract these actors from their mission, and in the Galápagos their mission was to kill every single goat. Killing the first 90 percent was not difficult. Herds were rounded up by helicopter and shot on site. The final 10 percent was a bit more difficult. As the goats became rare, they became harder to find, so a great deal of effort was required to root out this small band of survivors. The search was an expensive undertaking, so a more efficient means for finding the goats had to be formulated. Since female goats will not herd when raising kids, the solution was to capture some female goats without kids, sterilize them, and artificially put them into extended heat for 180 days. (This, of course, is animal cruelty, but that was a distraction to be overlooked. Humane action is often a first casualty once eradication orders have been operationalized.) Next the goats were fitted with radio collars and released. Due to their social nature, these “Judas” goats (770 were used on Isabela) would find other goats, and vice versa, and the herds could then be tracked, rounded up, and shot. This was repeated every two weeks until the population dwindled to one herd made up entirely of Judas goats. In 2006, the eradication of all the islands was completed—approximately 250,000 goats were dead. CAE

should also mention that all other introduced species were also eradicated, including pigs, donkeys, and rats.

While the eradication program was happening, another problem was brewing. The fishermen in the area were doing very well for themselves harvesting sea cucumbers, and did it to the point of overfishing, causing the park service to step in and put limits on sea cucumber harvesting. This led to an uprising among the fishermen who felt their survival was threatened. The policy of putting sea cucumbers before people infuriated them, and they struck back with violent demonstrations, burning park service buildings, blockading roads—and, just to show they were serious that people should come first, they began slitting the throats of tortoises. To make matters even worse for the park service, the fishermen also started reintroducing goats to the islands again (a very subversive form of biological warfare). To counter this measure, the small herd of Judas goats (Isabela by then had 266) got to stay for monitoring and control purposes. The park service learned that policy by expert advice alone is probably not the best way to govern, and they did begin to integrate various communities and stakeholders into park and environmental decision-making processes. In the case of the fishermen, the uprising fizzled as many discovered they could make more money ferrying tourists around the islands with their fishing boats.

Parks from Africa to the Americas make necropolitical policy for the wildlife in the parks—everything from culling to eradication. Given that death is a fundamental part of management with the goal of sustainability, why not turn it into an asset? Park service officials who need to be paid for their service can do this grim work, thereby depleting the parks' budgets, or people who want to do it and are willing to pay for the privilege can do it, thereby growing the park's resources. For this reason, some parks grant licenses to hunters to come into the park and eliminate that which, according to park policy, needs to be eliminated. However, for those concerned with the humane treatment of animals, it is hunting that should be eliminated.

In 2014–15, this particular form of public pressure came to bear on Dallas-based hunter Corey Knowlton, who won a “conservation auction,” giving him a license to kill an endangered black rhino (approximately five thousand are left in the world). The price he paid for this hunt was 350,000 USD, with the majority of the proceeds going to the Namibia Ministry of Environment and Tourism (which is also the institution that

granted the license). The ministry had, at the time, identified seventeen other rhinos that needed to be put down. For the International Fund for Animal Welfare and the Humane Society International, this was unacceptable, as it was for many who object to hunting on its face. There was not much that either of these organizations could do to intervene in a hunt occurring in Namibia, but other protesters threatened the lives of Knowlton and his family, who required security services during the planning stages of the hunt. Knowlton did go through with the hunt, which was supervised by local professional hunters sanctioned by the government, and was filmed by CNN.

Knowlton, a professional hunter himself, believes that he has a stake in the continuation of the species, and that through hunting he can help—and not just because of the money that goes to the park to protect the rhinos' habitat and the rhino itself from poachers. The black rhinos tagged by the ministry for hunting were old and could no longer contribute to the gene pool, but they could subtract from it. These rhinos are fiercely territorial, and will not hesitate to kill a younger rhino unlucky enough to cross their path. Conservationists see this need for hunting as a necessity, especially in the case of an endangered species. Old rhinos who are out of the gene pool cannot be allowed to kill those who can grow the species. Letting old black rhinos live will lead to an overall net loss to the species. A more humane means could be used to dispatch the animals, but at the loss of license money (that ecotourism, however, could potentially make up for). In the end, there is no rational way to solve the conflict between fundraising conservation hunting and anti-hunting groups. It will be decided by emotion, aesthetics, and regional norms and traditions.

These colliding moments between the rational and the nonrational are probably most representative of how a less formal necropolitics becomes policy. As long as biodiversity remains essentially an aesthetic choice, this should continue to be the case. In 1995, wolves were reintroduced into Yellowstone National Park. Reintroducing a predator to control grazers and browsers that if left unchecked can be quite destructive was a rational policy. But there was also a nonrational reason. Since we are no longer agrarians, we like the idea of wolf packs roving the park. They are an awe-inspiring part of the scenery. We see them as free, strong, and noble. The wolf truly seems to inspire this projection along with empathy that comes from this very anthropomorphism. This is an all-too-human mix of reason and desire, which we can find as far back as the writings of one of the first systemic conservationists, Aldo Leopold, who described his

thoughts and feelings about wolves in this now-famous quote from his book *A Sand County Almanac* (1949):

We reached the old wolf in time to watch a fierce green fire dying in her eyes. . . . I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.

The Evolving Organization of Care for the Wild

Biologist, ecologist, and wildlife manager Allan Savory provides a very interesting model of a never-say-die approach to the dying. It took nearly a lifetime, but he may have found a solution to the problem of desertification—green ecosystems being transformed into desert, much as we saw in the Galápagos example. The common wisdom is that the primary cause is overgrazing by domesticated animals like cattle, sheep, and goats. Growing up in southern Africa, Savory “loved the land and wildlife more than [he] hated livestock.” As a game officer in Rhodesia (now Zimbabwe) in the 1950s, there was not much he could do about the entrenched ranching industry, but he could get livestock out of the parks and protected areas in the hopes that their absence would stop desertification. When the desertification process did not stop, the blame fell to one of the great wild grazers: the elephant, which was thought to be not only overgrazing but also stomping the ground to death. Savory and a team of government-sanctioned experts believed the best way to stop the desertification process in the park was to shoot elephants to get the population down to a level that would sustain the land. This policy was enacted, approximately forty thousand elephants were exterminated, and desertification still did not stop. Savory later said, “That was the saddest and greatest blunder of my life.”

This is the problem we began with in the introduction. Ecological systems are so complex that scientists and wildlife managers are often working with little more than educated guesses combined with trial and error, in the hope that what appears to be the obvious answer is in fact the right answer in managing land and wildlife. In this case, killing wild grazers was not the right answer to desertification when massive tracts of land are involved. The companion policy for stopping desertification is the burning of grasslands in order to rejuvenate them. This leaves the soil bare, releases the carbon held within it, and releases pollutants into the air. Worldwide, billions of acres go up in flames. Needless to say, this solution is also rather undesirable. Leaving these relative failures behind,

Savory's new hypothesis is to mimic nature through what he calls "holistic planned grazing," which involves reestablishing large herds in vast grassland areas combined with simulated predatory attacks that keep the animals moving. With this type of "naturalized" movement, the grasses will be fertilized, mulched, and stamped enough to not only rejuvenate, but also hold water and carbon in the soil and break down methane. In test areas of fifteen million hectares on five continents, the mimicking process, according to Savory, seems to work in reversing desertification. Savory goes on to claim that if all the grasslands can be restored, enough carbon can be taken out of the atmosphere to return to preindustrial levels, ending human-created climate change. This all remains to be seen, but this model is an interesting assemblage.

The punchline here, however, is where to get the animals for this massive undertaking. There are not enough wild grazers left, but there are the domesticated grazers who are among the most successful species on earth: cattle, goats, and sheep. And there are plenty on every continent where they are needed. Love your cows and get ready for the price of meat to come down and for protein-rich diets to become more common among those with few economic resources. Of course, we have been told for decades that one of the best ways to contribute to a reduction in climate change and maintain biodiversity is to become vegetarian. And those forces are mustering with furious objections to Savory's claims. The counterforces state that Savory's experiments cannot be replicated, nor can his mimicking strategy scale under most grassland conditions. The opposition can be summed up in the punchy slogan "There are no beef-eating environmentalists." This may be true. We have no idea if such a plan could work, but CAE still likes Savory because of *how* he is thinking. He is not saying that we must eliminate humans, but asking how we fix the environmental crisis with the materials and know-how we currently have. He is working on a different kind of assemblage to revive multiple parts of the environment. This is a model for how problem-solving around the environment should occur. Unfortunately, CAE believes that this debate will be argued on an emotional basis, but it could eventually be solved on a rational basis through data analysis combined with economic pressures. Unlike with deer populations, aesthetics will have a smaller role.

While in this section on the organization of care through trial-and-error initiatives, CAE would like to comment on art and environmental care. Recently, the nonprofit initiative Robots in Service of the Environment (RSE) has attempted to solve the lionfish problem in the Caribbean and the Atlantic.

By means unknown, the lionfish has found its way into these waters. It is quite adept at reproducing and has no known predators in these oceans. Consequently, the population is exploding. The fish is edible and does appear on some menus, but is never in consistent enough supply to really establish a niche in the seafood industries. The fish does not school, so it is not ideal for commercial net fishing, and is mostly killed by divers spearfishing. RSE has created a robot that can swim up to the lionfish (who, owing to its lack of predators and its great defense system of poison quills, is not afraid of other creatures, natural or artificial); the robot then shocks it, and sucks it up into a container that can hold up to ten fish. Clearly, the lionfish catcher is just a proof-of-concept machine. It cannot be used commercially. Catching ten fish at a time is not going to disrupt the expansion of the lionfish population, even with a thousand of the robots on patrol.

However, perhaps we are looking at this machine in the wrong way. CAE believes we should see it as robotic art. The robot is about potential, and holistic thinking—suggesting a possible symbiotic relationship between engineers, the fishing industry (perhaps amateur), marketers, and restaurateurs. The project is about making new assemblages that can suggest a path to a better environment. It is what the artist Tania Bruguera calls *arte útil*, or useful art—tools and devices made by creative people who rearrange intersectional disciplines to make them do what they normally do not. While this project may not be a triumph in engineering or economy, it is a very solid glimpse of what the area of robotic art and the environment might look like in this century. This project is of particular interest because it appears to be the first, or among the first, examples of positive necropolitical robotic art.

The Rational Organization of Care for the Wild

We live in the Anthropocene. Wilderness is no more, but generally speaking, in the human-occupied zone there has not been much wilderness for decades. Lands often thought of as wilderness have been managed using techniques such as control (reduction or removal of species), harvesting (hunting and fishing), introduction of species and pathogens, controlled burns, and barriers and fencing. Some or all have been used worldwide in an effort to bring a rational method of care to wilderness, rendering it no longer wilderness. Just as wilderness no longer exists, neither does a system of wildlife management that enjoys scientific or public consensus. What does exist are various models popular among wildlife professionals—that, as with most disciplines, constantly mutate with theoretical fashion. When

these models are applied, we cannot be sure how well they are going to function at a material level, and every wildlife bureaucrat knows this. Moreover, as we have mentioned with regard to STEM culture, even when those involved recognize controversy (usually political in nature), they do not account for it in their models, which is yet another reason why the functionality of a policy once it hits the ground is unknown and can bring surprisingly unexpected results. What biologists and wildlife managers are expressing in their models is *what* they would do, and *why* they would do it in a certain way, in order to meet a given environmental objective that at root is actually political and cultural.

CAE believes there are three basic theoretical perspectives in regard to wildlife management, each of which can be broken down into more nuanced theories. The first and oldest perspective is scenic preservation (especially as it applies to parks), which includes the preservation of land and charismatic animals. This perspective is mostly aimed at managing human interaction with the land, which is usually the most destructive factor. It seeks to control the quantity of humans accessing the land, what they may do on the land (e.g., look as opposed to impact), and how the space is developed (if at all). Development would include roads, trails, campsites, lodges, water delivery and distribution, etc. This objective, the first of its kind, is no longer the most significant priority; it is still a major factor, but other elements have become of greater concern.

The second perspective is based in support of biological diversity. This can mean either species diversity or habitat diversity (usually the latter). This perspective would also include those who frame the primary objective of management as “genetic variability.” The professionals advocating for this directive are very prone to intervention to maintain or improve the environment relative to the objective. The problem is that protection parameters are set in accordance with what are believed to be indigenous species. On face value this sounds good, but as we know, ecosystems, like the members in them, change over time, so what is the temporal designation that marks the status quo? Should it be when humans first inhabited the area? When white people first saw it? When those of a scientific persuasion started to catalog it? Or the way it exists the day management begins? This of course then spills into the consideration of the traditional cultural norms associated with the area, and what people should be allowed to do and when. Fortunately, these questions are always some other agency’s problems to sort out. Until then, they can be ignored, and an arbitrary date will be assigned from which management will proceed.

The final perspective, and this is the most recent, advocates for a more systemic and process-based approach. A complex set of evolutionary, physical, genetic, behavioral, and ecological processes should be maintained in conjunction with compatible or co-evolved populations. Consequently, this approach is a little more open-ended in terms of what belongs in the system, and does not seek to fight change in habitats or communities as long as the processes remain healthy. This is an interesting yet paradoxical model in that it is compelled by wildness, but also by intervention. It seeks to create an assisted form of evolution that understands that natural and cultural processes cannot be disentangled. “Compatibility” appears to be the first operative term for loosening the interpretive possibilities for this prime objective. The second key term that loosens the model is “process.” While the first two perspectives discussed above focus on “states,” this one accepts the results the processes yield until results outside the parameters of “acceptability” are predicted to appear (population collapse or explosion). For example, the snowy owl has been moving farther south in its winter migration and often staying south for longer before returning to the tundra. The prey populations do not seem to be suffering, and the owl population, while growing, has not achieved pest status. Its impact on the overall environmental processes is negligible. So while the owl may not be indigenous to these southern areas (at times as far south as Washington, DC), no control policy is necessary. On the other hand, necrointervention has been activated for the nonindigenous Burmese python in the Florida Everglades, because it is decimating the indigenous marsh rabbit.

Given these perspectives, how is necropolitical policy expressed in terms of rational analysis? One key problem that wildlife managers have to address is extinction. Populations go extinct for two primary reasons. The first is driven extinction. Some fundamental change in the environment drives a population down and finally to extinction. These drivers are powerful, so even as the decrease in population increases food resources and possibly lowers predation where applicable, the population continues to collapse. Short of an obvious environmental catastrophe, or a generally known problem like habitat fragmentation (and its spinoffs), these drivers are difficult to identify.

The second type is stochastic extinction—when chance events have terminal consequences. This tends to affect small populations. Because the populations affected are small, numerous variations and fluctuations that would not bother a large population come into play, making the identification of the destructive variable(s) extremely difficult. Moreover, this random form may occur via demographic or genetic malfunction. Causes

could be anything from skewed sex ratios or age demographics to chance emergence of recessive genes that reduce a creature's fitness.

What is the solution to these types of extinction? Essentially, experts who study the creature and/or local habitat in question attempt to establish a comprehensive list of possibilities as to why the collapse is happening. Possibilities might include introduced predators, lack of food, unregulated commercial and recreational hunting, environmental contaminants, competition from introduced species, or introduced diseases. Hypotheses are prioritized and experiments are designed to test these hypotheses. If a factor is identified, and done so in time, corrective measures are taken.

In the case of a population close to collapse, rescue and recovery is the tactic used. Endangered creatures are captured and bred in captivity. Some creatures are amenable to this activity, while others are not. For those who are, once the population is large enough, approximately twenty or so creatures can be released as a test to see if the cause of extinction was properly identified, or if not identified, to see if the driver is still at work. The released creatures are a trial-and-error suicide squad. The likelihood is that the variable has not been identified, so everyone involved is simply hoping for the best as the radio-banded creatures are sent back into the wild. In spite of all the spectacle of science and the good intentions behind it, if the problem is not obvious, extinctions are often too complicated to solve. Populations undergoing stochastic extinctions are in heaps of trouble.

More typical of wildlife interventions are control initiatives. One form is a tactical response to a temporary problem in a system, such as too many feral cats or raccoons in a suburban area. They can be captured and relocated or killed. The event is short-lived, and the environment is returned to a stable state where the creature is downgraded from a pest designation to being an acceptable part of the ecological community. The second form of control is much more serious, in that it is aimed at moving a stable system into a different one that is considered more desirable, and yet is often more unstable. This type of action can easily become a powder keg when charismatic animals are targeted, although not necessarily so (for example, the control policy for deer in New Zealand is noncontroversial). With most cases involving noncharismatic animals, there are few complaints (as with the control of potential Zika virus-carrying mosquitos through the use of pesticides and control techniques such as manipulating fertility with genetically engineered males). The same could be said of other rodents or insects requiring control programs. These control initiatives are strategic

plans that will continue from year to year in order to maintain the desired environment. Creature density is lowered, and the new density is enforced so long as the desired effect is achieved. The reduction of creature density is the means to an ecological end, and not an end in itself. Reducing the negative effects of the offending creature on others or to the landscape itself is the goal of control and is also how success is measured. This is what distinguishes control initiatives from sustained-yield harvesting (hunting as described in the example of the deer). The former is a management action while the latter is an objective.

Many nonlethal forms of control are available for use. These include fertility manipulation, genetic engineering (usually to disrupt the reproductive cycle), immunocontraception, fencing and barriers, alarming, and even food intervention (to keep an animal from eating a food source that needs protecting, managers can distribute an accessible food source that the animal prefers to the original vulnerable source). These forms of control comply with the imperative that the use of control be humane. In light of this imperative, the problem of the humane stirs itself whenever we talk about control through direct killing, along with its cousin sustained-yield harvesting. Here, the traditional method is still used: death by firearms (or bows for some hunters). Whatever method is used, given the complexity of attempting to move from one stable system to another—in which the original is overwhelmingly likely to be the more stable of the two—mistakes are going to be made. The desired outcome may not occur (as in the elephant example), meaning the designated pest animal is not actually a pest, or the control has an unintended effect on nontarget species. The one optimistic takeaway is that professional controllers know when they do not know, when they are making an educated guess, and usually, rather soon into the process, whether it is having the desired effect.

Before concluding, CAE would like to look to the near future and mention the development of a new technology that could radically change the necropolitics of control in the realm of environmental management and its relationship to public health. Scientists and engineers from all over the greater academic universe of biology are attempting to harness the power of extinction. They have found a way, at least theoretically, that a species can be totally eliminated through engineered gene drives. These synthetic gene drives allow for a desired gene to spread through a species that sexually reproduces, by radically skewing the probability that it will be passed on to the next generation. In the wild, naturally occurring gene drives tend to increase fitness, but in the lab they can be made to decrease fitness and

even bring about species elimination, and do so in relatively few generations. The production of these synthetic forms of gene drives has been hyper-accelerated by the creation of CRISPR gene-editing technology.

Consequently, this development has caught the attention of the US military. The military is interested in knowing how gene drives could be weaponized and what, if any, defensive measures could be taken against the use of such biological weapons. DARPA is throwing a considerable amount of money at these two problems. The former problem speaks for itself. If a set of genetically modified creatures capable of changing the genetic makeup of a species to the point of causing eradication does exist, one of its functions is as a weapon. The latter is the problem still in need of investigation. DARPA wants to know what can be done in the case of bioterror (when fit creatures with gene-drive modification are released into the environment by a hostile power). Just as important, what can be done in the case of bio-error (if this weapon escapes the laboratory, how can a genetic spill be contained or reversed)? Unfortunately for DARPA, and they should know from past forays into bioweaponry, biological agents never prove sufficiently predictable.¹

The other players are a small number of foundations concerned with global public health. The most significant is the Gates Foundation, which has already invested tens of millions of dollars into the research. In relation to gene drives, the foundation is interested in one thing: how to stop mosquito-borne diseases, with a big emphasis on malaria. The hope is that this technology will eliminate the various species of mosquito that carry the diseases. The Gates Foundation wants to save millions of people² and, of course, to keep from having to replicate the more than 39 billion USD already spent by the foundation since 2000 on trying to reduce, by various means, the harm malaria causes. They believe that the human death toll provides a very compelling reason to throw caution to the wind and move development and trials along at maximum speed. Of the more than 3,500 species of mosquito, around thirty will need to be eliminated, but the foundation and its allied laboratories are focusing on *Anopheles gambiae* (the primary carrier of malaria in sub-Saharan Africa). This represents a major necropolitical gamble, in that no one knows what will happen in various regional and local ecosystems when this species is eradicated—yet we do know what will happen to poor human populations in Africa if malaria is allowed to continue on its present trajectory. To complicate matters further, there is no rational way to make a decision about this matter. Science cannot help us here.

From an anthropocentric perspective, this may be a bet worth taking, but if ecological catastrophe follows it will not have been a smart thing to do from any perspective. For the sake of argument, let's assume the best—then what? If intentional extinction becomes an accepted mechanism of control, what might happen given present-day aesthetic and economic prejudices? Had this technology been available a century ago in the US, CAE is fairly certain that no wolves, big cats, foxes, or other predators that attack livestock would be left today. This technology expands the use of control beyond the limits of populations to include species. Moreover, it transforms the use of control as a conservationist strategy or tactic aimed at a specific locale into a global action (although there are conditions, such as on remote islands, where it might be used in a specific manner). A brave new world could be coming.

In the case of wildlife, we have the capacity to speak about necropolitics in a reasoned way, and among professionals this does happen. Yet even within this bubble, an underlying troubling consensus also exists that so little is known about the complexity of ecological systems that it is difficult to know what to do. Moreover, once these experimental forays of trial and error reach stakeholders—many of whom do not share a belief in scientific models for economic, political, or moral reasons—the process becomes even more unmanageable as more purified ideological forces work to shape objectives. Even in this nonhuman realm of wildlife management, where necropolitics should be the least conflicted, no common language is shared, and even the most rational scientific process cannot be purged of ideologically based pressures, choices, and biases.

Notes

1. Gene-drive technology may not work in the wild. If we continue with the example of the eradication of specific species of mosquitoes, the first problem is producing mosquitoes that are fit enough to compete and reproduce in the wild. Considerable effort is being applied to this problem, and it appears probable that it will be solved. The other, larger, problem will be natural resistance. DNA configurations that confound the gene drive might naturally emerge.

2. According to UNICEF, approximately one million people die each year, and over three hundred million suffer from the disease.