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The Keystone State Minus Keystone Species

I've lived in Pennsylvania my whole life. Until recently, however, it never occurred to me that mountain lions once lived here too. Sure, I knew about the Pitt Panther and the Penn State Nittany Lion, but it didn't mean anything to me. Mascots are just mascots, I thought. Growing up in Philadelphia, I sure never saw anything even remotely resembling Gritty or the Phillie Phanatic roaming the streets. I haven't seen any eagles there, either, despite the name of our NFL team. I mean, it never crossed my mind that the mascots of PA's two biggest universities actually meant anything, but they do. They're poignant reminders of the animals that used to live here.

Now, I'm a student at Pitt, so I see a whole lot more nods to the big cats that once prowled the state. I walk past the iconic Pitt Panther statue almost every day on the way to class. Every time I visit the nearby Schenley Park, I cross the Panther Hollow Bridge, which is guarded by four oxidizing mountain lion statues, their fanged maws locked in eternal snarls. Seemingly everywhere I go, I'm surrounded by echoes of Pennsylvania's ecological past.

According to the Pennsylvania Game Commission, the state's last wild mountain lion was killed in 1847. Since then, there have been only scattered—and mostly unconfirmed—reports of the animals in the commonwealth. They're gone—locally extirpated, along with gray wolves, PA's other dominant predator species of yesteryear. Unfortunately, this development has caused some serious damage to local forests—damage which, until recently, went entirely undetected.

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As a kid, I spent a lot of time in the woods. I grew up near Wissahickon Valley Park, a fairly large tract of forest in Northwest Philadelphia. Valley Green, it's called locally. I hiked there. I biked there. I fished there. It was a huge part of my childhood, and it shaped my idea of what a forest is. I mean, if you were to ask me what a forest looks like, I'd describe one like Valley Green. It'd have tall, thick trees; a bare, leaf-covered ground; and almost nothing in between. Incidentally, I'd describe almost every other forest I've explored in Pennsylvania the same way, including the aforementioned Schenley Park, Ohiopyle State Park, and several others.

Here's the problem with that: it's not what forests are supposed to look like – not in Pennsylvania, anyway. Forests here are supposed to be full and dense and have many different layers of vegetation that stretch from floor to canopy. They shouldn't just have big trees with nothing in between them. They should be dense, tangled, and teeming with life, but they aren't. Like I said, almost every forest I've seen is sparse and largely devoid of life.

The man who introduced me to this idea is Nathan Brouwer. He's a plant ecologist and biological science professor here at Pitt. He explained that deer are to blame for the creeping destruction of PA's forests. There are too many of them, and their constant grazing leaves local forests a shadow of their former selves. White-tailed deer, in huge numbers, eat just about all of the young trees and shrubs and other low-to-the ground plants that should fill the void between mature trees, leaving forests much emptier than they should be. They just aren't meant to sustain this level of concentrated herbivore activity.

As I mentioned earlier, mountain lions and wolves—two of deer's biggest predators—have been unnaturally absent from Pennsylvania for a while now. This, Brouwer claimed, is why deer have been able to wreak such havoc on the state's forests. Predators, he

explained, play a crucial role in the "ecology of fear." Essentially, the presence of predators brings balance to ecosystems in more ways than just typical prey-eating. As long as predators are around, prey animals are afraid. As long as prey animals are afraid, they don't spend all their time eating, instead spending much of their time hiding from and watching out for predators. This phenomenon naturally prevents the large-scale grazing that's destroying Pennsylvania's woodlands. In the absence of predators, deer are able to eat with impunity.

It isn't just a lack of small to medium-sized plants that poses a threat to PA's forests, however—it's also a lack of native plants. As forests lose their native plant life, they become barren and lifeless—relative to the way they should be, anyway. When this happens, it creates a niche that can be filled by invasive plants, which local animals generally don't eat. This is because most of these unfamiliar plants are not yet naturalized, meaning that the environment they've invaded hasn't quite adjusted to their presence. This means that invasive species can spread like wildfire, eventually covering much of the forest.

Strangely, native species can be just as threatening to local forests as invasive ones. Oftentimes, when deer clear a forest of the plants they like to eat, the ones that are left behind – whether because they're poisonous or bad-tasting or otherwise inedible to deer – are left to take over the now-empty forest. Native plants, when allowed to spread without the natural biodiversity and competition of a healthy forest, can form what Brouwer called a "recalcitrant understory" which means low-to-the-ground plants like ferns form such a thick blanket of vegetation on the forest floor that they block out all sunlight and suck up all nutrients, preventing smaller plants from taking root.

I witnessed this phenomenon myself on a recent trip to Allegheny National Forest, an area of largely undeveloped wilderness in North Central Pennsylvania. In some places of the

forest, large, leafy ferns are the only ground-level plants that are visible. Often, it's not even possible to see the ground through the impenetrable carpet of ferns. It looked like how forests out west are supposed to look. In particular, it reminded me of California's redwood and sequoia forests. Brouwer, a West Coast native, reminded me that as magnificent as those landscapes are, Pennsylvania's forests should not look like them. They're two very different environments. Deer, he said, have completely reengineered PA's forests, and not for the better—all because the Keystone State is missing some of its keystone species.

Mountain lions and wolves, once crucial predators of local deer populations, have all but vanished from the state. Outside of sanctuaries, zoos, and the occasional alleged mountain lion sighting (often actually a house cat), they simply don't exist here anymore. They were driven north and west by the expansion of civilization. Humans and predators just don't mix. According to Henry Kacpryzk, a former curator at the Pittsburgh Zoo, bounties were placed on these animals as the American wilderness was tamed. The ecological impacts of their absence weren't known, and they posed a threat to people and livestock, and animals like wolves have been treated as evil monsters since time immemorial, so the government saw fit to eliminate them. Deer populations have gone largely unchecked ever since. The few predator species that remain in the commonwealth—namely coyotes and black bears, are too small and too few in number, respectively, to effectively control deer numbers. In less than four centuries, humans disrupted an ecosystem that had been stable for hundreds of thousands of years.

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Can the damage be undone? According to Kacpryzk, it's a long shot. Throughout the 1990s, he was part of a largely unsuccessful effort to reintroduce red wolves to the Alligator River National Wildlife Refuge in North Carolina. The animals, he said, never fully reestablished

themselves. Many were hit by cars or otherwise killed due to human activity. According to the U.S. Fish and Wildlife Service, in 2023, at least one of the animals was hit by a vehicle, and another was even shot by an unknown person. He attributed the program's failure to incompatibility between wolves and humans. The process of raising the wolves before their reintroduction, even, was complicated. Special accommodations—including outright "meanness" and "ugliness" toward the animals so that they learned to fear humans, and remote feeding so that they didn't come to associate people with food—had to be made in order to prevent the wolves from endangering themselves or people by straying too far into human-occupied areas.

There have, however, been examples of successful wolf reintroduction programs across the country. For example, wolves were absent from Yellowstone National Park from 1926 to 1975, when the process of reintroducing them to their former stomping grounds began. Additionally, efforts to reintroduce or bolster endangered populations of wolves in other natural habitats across the country have been largely successful. Through such programs, wolves have begun to reacclimate to other (mostly northern) states including Washington, Oregon, Montana, Wyoming, Wisconsin, and Michigan.

Of course, reintroducing natural predators like wolves to deer-heavy environments has environmental effects, as well as human ones. Most importantly, environments to which natural predators are reintroduced will slowly begin to bounce back to the way they once were. Essentially, it's possible to undo the damage that has been done by human ecological intervention.

It isn't just predators that need to be reintroduced, either. It's also important to teach deer to fear humans again. Brouwer hypothesized—though he admitted that this claim was not proven—that deer are somehow passing on the knowledge, from generation to generation, that

the worst thing most humans will do to them is take a picture. It used to be that humans needed to hunt deer to survive, so in a deer's mind, a human was just as big of a threat as a wolf or a mountain lion was. Today, this is not the case. Hunting levels have been on the decline in Pennsylvania, and I—along with many others – treat deer sightings as more of a fun and regular novelty than a real wildlife encounter.

Like I said, I've experienced this issue firsthand. Throughout my life, deer have been a relatively common occurrence, to the point where I often just ignore their presence entirely. I recently took a stroll through Schenley Park with the intention of spotting deer. I had to walk for less than 10 minutes before I saw one—a small fawn that walked with the gait of a puppy whose feet are too big for it. It was well-hidden, its drab coat nearly matching the gray-brown shades of the surrounding forest. In fact, its presence was only initially betrayed by the bright white fur on the underside of its tail. As I watched the animal I noticed that it was accompanied by two adults—it's parents, I guessed—a doe and a large buck with one broken antler. I continued to watch the animals, who glanced at me briefly before returning to their grazing. As I watched, amazed, several more deer seemed to emerge from thin air. I counted at least 10 additional does, but there may have been more. Several of them walked within 20 feet of me, reacting with no more than a casual glance. One of the animals strolled toward me, stopped about 15 feet away, and, while staring directly at me, brazenly peed on the leaf-covered ground, seemingly in defiance of my presence.

Even driving to school as a kid, I passed probably half a dozen deer crossing signs every day, which seemed normal to me. After all, that's the way things have been for my entire life. Lately, however, I've been considering how many more deer crossing signs I see than bear, wolf, or elk crossing signs. The latter, to my knowledge, don't exist, because there aren't enough of

those animals to warrant them. It's one thing to see a deer crossing sign while driving through a stretch of rural wilderness. It's another thing entirely to see one while driving through the outskirts of Philadelphia and the surrounding suburbs.

Today, deer largely coexist with humans, though their relationship is more mutually detrimental than beneficial.

In 1999, the Pennsylvania Department of Transportation reported 2,408 deer-vehicle collisions (DVCs) statewide in their annual Pennsylvania Crash Facts & Statistics publication. A decade later, in 2009, there were 2,923 such collisions. In 2019, there were 4,346. And in 2022?

4,533.

And those are just the accidents that were reported to PennDOT by Pennsylvania law enforcement. According to the Times, thousands more DVC claims were filed with State Farm Insurance Company from July 1, 2022 to June 30, 2023. But how many?

153,397.

That's more than any other state in America.

And those are just the accidents that involve a vehicle directly colliding with a deer.

According to Pittsburgh area news channel 90.5 WESA, a total of 1,315 more indirect deer-related accidents—accidents where a deer caused a vehicle to crash, but was not directly involved in the collision—occurred in 2022, bringing the total number of deer-related accidents to 5,848 statewide.

Across the 4,533 DVCs that occurred in Pennsylvania in 2022, six humans were killed. Including indirect deer-related accidents, that number rises to nine people killed and 1,264 injured, according to 90.5 WESA.

Clearly, the deer problem needs to be solved, for the sake of both human safety and environmental protection. According Jeannine Fleegle, a Wildlife Biologist in the Deer & Elk Section of the PGC, the organization's main goals are healthy forests, healthy deer, and reduced deer-human conflict. She claimed that, as people, we do, in fact, have the ability to somewhat control how much deer can actually impact the environment. The only reason we haven't, according to Brouwer, is because this issue wasn't actually recognized until very recently. It used to be that the government only monitored deer populations in order to prevent them from getting too low, not too high. Now that the problem is better understood, the solution lies in taking action. According to Kacpryzk, the best way to do this is to encourage healthy hunting habits. Unfortunately, Fleegle informed me that Pennsylvanians aren't hunting as much as they used to. Total PA general hunting license sales fell from 925,029 in 2010 to just 844,826 in 2022. Things don't seem to be going very well on the hunting front.

Fortunately there is hope. According to Pittsburgh area news publication TribLIVE, city-sanctioned, tightly-controlled deer hunts have been underway in city parks. In Pittsburgh's Riverview and Frick parks, carefully-selected archers—hand-picked by the city and the U.S. Department of Agriculture—will be allowed to bow hunt deer in an effort to bring down the threat of overpopulation. City officials hope that this issue will cut down on urban deer populations, which affect much larger volumes of people than rural deer issues do.

The hunters were picked after an intensive review process, according to Senior Pittsburgh Park Ranger Erica Heide. First, she said, 60 archers were picked—30 hunters and 30 alternates. Then, the 60 carefully-selected candidates were brought to a shooting range and had to shoot several small targets with 100% accuracy in order to be selected for the program.

Four deer were killed by hunters on the program's first day, August 30, according to the Pittsburgh Post-Gazette. This statistic hints at a possible major success of the program to tackle the deer problem. Since then, 76 more deer have been harvested between Frick and Riverview Parks, according to Heide. She also said the benefits of this new hunting program extend far beyond deer population control. In the months since in-park hunting began, 47 deer have been donated to local foodshare programs and food pantries. Each hunter of the 30 selected was required to donate only one, so they're clearly going above and beyond. Each deer, Heide said, feeds about 200 people, and 7,680 meals went to people in need from the 1,920 pounds of meat that were harvested from the hunt. Pennsylvania is one of the biggest hunting states in the country. Heide thought it was important to take advantage of that expertise to curb the problem.

There aren't really any other solutions, either, she said. The two main alternatives are deer birth control and castration, but deer birth control is illegal in PA and castration is expensive and dangerous. Plus, neither of those problems addresses the current deer population, which is already too high. Hunting kills two birds with one stone.

But there are many people throughout Pittsburgh who disagree with the new hunting policy. According to the Post-Gazette, many city residents fear that the use of dangerous hunting weapons in relatively crowded city parks could raise the risk of accidental injury. Other citizens complained that it's "barbaric" to kill the animals that "belong there," a sentiment which exemplifies the need for better public awareness of the problems caused by too many deer. I didn't know that deer were a problem until very recently, either. People need to understand that this is a real issue, and that the unfortunate reality is that many of these deer have to go.

According to Kacpryzk, public opinion is also one of the main reasons why the Alligator River initiative failed. According to him, that's one of the reasons why the program has experienced issues such as the wolf being shot in 2023. Clearly, it's an important factor.

Heide isn't the biggest fan of deer hunting, either. As a self-proclaimed environmentalist, she said that it was unfortunate to have to kill anything. She also said that this was a necessary evil to protect local parks and forests, as deer overpopulation only exacerbates existing problems caused by the invasive Emerald Ash Borer beetle, which feeds on trees, and climate change. Adding deer to the equation, she said, is like pouring gasoline on a fire. And that fire is rapidly spreading. After all, white-tailed does are able to reproduce at about six months of age, and 85% of births are twins or triplets. According to Heide, deer double their population every two to three years.

It isn't just city park hunting that's being used to cull urban deer populations, either. Well, in a sense, it is, just not in the way people think. According to Officer Philip Ferry of the PGC, the USDA has specially-appointed sharpshooter teams whose job it is to enter deer problem areas—city parks, in this case—and stealthily eliminate deer at night. Ferry said that the sharpshooters are good at what they do – they hunt the deer, clean up, and are out by the time the sun rises. And nobody's any the wiser. I was amused by this revelation, as his description conjured up an image of a hardcore, anti-deer special ops team strategically combing city parks at night. In reality, that apparently isn't too far off, though little is known about these teams.

Clearly, however, since the city feels the need to introduce civilian daytime hunting, the USDA sharpshooters aren't enough. They're just one piece of Pennsylvania's deer population control puzzle.

But the clock is ticking. If something isn't done soon, there could be serious consequences, Brouwer warned. If deer-caused ecological damage continues to go unchecked, he said, many critical plant species would become much rarer than they already are. When interesting plants become rare, he said, and when invasive or unhealthy plants are allowed to almost completely take over forests, the forest becomes less and less vibrant and diverse. As a plant biologist, it was only natural that he would lament that PA's forests could soon become dull and uninteresting. And worse, it becomes more likely that Pennsylvania's once-lush forests will become empty, open woodlands—even more so than the ones I grew up playing in.

Things could be worse, but things could be a lot better too. Pennsylvania's forests could be restored to their former beauty and natural health. So long as the public continues to be made aware of this issue and people continue to do something about it, I'm confident that things will get better. Deer will return to their natural niche in the environment. Natural predators will return. Pennsylvania's forests will return to their former, healthy, natural glory. The mascots and statues that call back to a forgotten age of wild beauty will cease to be memorials of what once was, and will instead become reminders of PA's triumph over ecological disaster.