

# Why the Passenger Pigeon Went Extinct

[audubon.org/magazine/may-june-2014/why-passenger-pigeon-went-extinct](http://audubon.org/magazine/may-june-2014/why-passenger-pigeon-went-extinct)

4/17/2014



Passenger Pigeon. Field Museum of Natural History, Chicago. Photo: Photograph by Marc Schlossman/Panos Pictures

*"Men still live who, in their youth, remember pigeons; trees still live who, in their youth, were shaken by a living wind. But a few decades hence only the oldest oaks will remember, and at long last only the hills will know."*

—Aldo Leopold, "On a Monument to the Pigeon," 1947

**In May 1850**, a 20-year-old Potawatomi tribal leader named Simon Pokagon was camping at the headwaters of Michigan's Manistee River during trapping season when a far-off gurgling sound startled him. It seemed as if "an army of horses laden with sleigh bells was advancing through the deep forests towards me," he later wrote. "As I listened more intently, I concluded that instead of the tramping of horses it was distant thunder; and yet the morning was clear, calm, and beautiful." The mysterious sound came "nearer and nearer," until Pokagon deduced its source: "While I gazed in wonder and astonishment, I beheld moving toward me in an unbroken front millions of pigeons, the first I had seen that season."

These were passenger pigeons, *Ectopistes migratorius*, at the time the most abundant bird in North America and possibly the world. Throughout the 19th century, witnesses had described similar sightings of pigeon migrations: how they took hours to pass over a single spot, darkening the firmament and rendering normal conversation inaudible. Pokagon remembered how sometimes a traveling flock, arriving at a deep valley, would “pour its living mass” hundreds of feet into a downward plunge. “I have stood by the grandest waterfall of America,” he wrote, “yet never have my astonishment, wonder, and admiration been so stirred as when I have witnessed these birds drop from their course like meteors from heaven.”

Pokagon recorded these memories in 1895, more than four decades after his Manistee River observation. By then he was in the final years of his life. Passenger pigeons, too, were in their final years. In 1871 their great communal nesting sites had covered 850 square miles of Wisconsin’s sandy oak barrens—136 million breeding adults, naturalist A.W. Schorger later estimated. After that the population plummeted until, by the mid-1890s, wild flock sizes numbered in the dozens rather than the hundreds of millions (or even billions). Then they disappeared altogether, except for three captive breeding flocks spread across the Midwest. About September 1, 1914, the last known passenger pigeon, a female named Martha, died at the Cincinnati Zoo. She was roughly 29 years old, with a palsy that made her tremble. Not once in her life had she laid a fertile egg.

This year marks the 100th anniversary of the passenger pigeon’s extinction. In the intervening years, researchers have agreed that the bird was hunted out of existence, victimized by the fallacy that no amount of exploitation could endanger a creature so abundant. Between now and the end of the year, bird groups and museums will commemorate the centenary in a series of conferences, lectures, and exhibits. Most prominent among them is Project Passenger Pigeon, a wide-ranging effort by a group of scientists, artists, museum curators, and other bird lovers. While their focus is on public education, an unrelated organization called Revive & Restore is attempting something far more ambitious and controversial: using genetics to bring the bird back.

Project Passenger Pigeon’s leaders hope that by sharing the pigeon’s story, they can impress upon adults and children alike our critical role in environmental conservation. “It’s surprising to me how many educated people I talk to who are completely unaware that the passenger pigeon even existed,” says ecologist David Blockstein, senior scientist at the National Council for Science and the Environment. “Using the centenary is a way to contemplate questions like, ‘How was it possible that this extinction happened?’ and ‘What does it say about contemporary issues like climate change?’”

**They were evolutionary geniuses.** Traveling in fast, gargantuan flocks throughout the eastern and midwestern United States and Canada—the males slate-blue with copper undersides and hints of purple, the females more muted—passenger pigeons would search out bumper crops of acorns and beechnuts. These they would devour, using their sheer numbers to ward off enemies, a strategy known as “predator satiation.” They would also outcompete other nut lovers—not only wild animals but also domestic pigs that had been set loose by farmers to forage.

In forest and city alike, an arriving flock was a spectacle—“a feathered tempest,” in the words of conservationist Aldo Leopold. One 1855 account from Columbus, Ohio, described a “growing cloud” that blotted out the sun as it advanced toward the city. “Children screamed and ran for home,” it said. “Women gathered their long skirts and hurried for the shelter of stores. Horses bolted. A few people mumbled frightened words about the approach of the millennium, and several dropped on their knees and prayed.” When the flock had passed over, two hours later, “the town looked ghostly in the now-bright sunlight that illuminated a world plated with pigeon ejecta.”

Nesting birds took over whole forests, forming what John James Audubon in 1831 called “solid masses as large as hogs-heads.” Observers reported trees crammed with dozens of nests apiece, collectively weighing so much that branches would snap off and trunks would topple. In 1871 some hunters coming upon the morning exodus of adult males were so overwhelmed by the sound and spectacle that some of them dropped their guns. “Imagine a

thousand threshing machines running under full headway, accompanied by as many steamboats groaning off steam, with an equal quota of R.R. trains passing through covered bridges—imagine these massed into a single flock, and you possibly have a faint conception of the terrific roar,” the *Commonwealth*, a newspaper in Fond du Lac, Wisconsin, reported of that encounter.

The birds weren’t just noisy. They were tasty, too, and their arrival guaranteed an abundance of free protein. “You think about this especially with the spring flocks,” says Blockstein, the ecologist. “The people on the frontiers have survived the winter. They’ve been eating whatever food they’ve been able to preserve from the year before. Then, all of a sudden, here’s all this fresh meat flying by you. It must have been a time for great rejoicing: The pigeons are here!” (Not everyone shouted with joy. The birds also devoured crops, frustrating farmers and prompting Baron de Lahontan, a French soldier who explored North America during the 17th century, to write that “the Bishop has been forc’d to excommunicate ’em oftner than once, upon the account of the Damage they do to the Product of the Earth.”)

The flocks were so thick that hunting was easy—even waving a pole at the low-flying birds would kill some. Still, harvesting for subsistence didn’t threaten the species’ survival. But after the Civil War came two technological developments that set in motion the pigeon’s extinction: the national expansions of the telegraph and the railroad. They enabled a commercial pigeon industry to blossom, fueled by professional sportsmen who could learn quickly about new nestings and follow the flocks around the continent. “Hardly a train arrives that does not bring hunters or trappers,” reported Wisconsin’s *Kilbourn City Mirror* in 1871. “Hotels are full, coopers are busy making barrels, and men, women, and children are active in packing the birds or filling the barrels. They are shipped to all places on the railroad, and to Milwaukee, Chicago, St. Louis, Cincinnati, Philadelphia, New York, and Boston.”

The professionals and amateurs together outflocked their quarry with brute force. They shot the pigeons and trapped them with nets, torched their roosts, and asphyxiated them with burning sulfur. They attacked the birds with rakes, pitchforks, and potatoes. They poisoned them with whiskey-soaked corn. Learning of some of these methods, Potawatomi leader Pokagon despaired. “These outlaws to all moral sense would touch a lighted match to the bark of the tree at the base, when with a flash—more like an explosion—the blast would reach every limb of the tree,” he wrote of an 1880 massacre, describing how the scorched adults would flee and the squabs would “burst open upon hitting the ground.” Witnessing this, Pokagon wondered what type of divine punishment might be “awaiting our white neighbors who have so wantonly butchered and driven from our forests these wild pigeons, the most beautiful flowers of the animal creation of North America.”

Ultimately, the pigeons’ survival strategy—flying in huge predator-proof flocks—proved their undoing. “If you’re unfortunate enough to be a species that concentrates in time and space, you make yourself very, very vulnerable,” says Stanley Temple, a professor emeritus of conservation at the University of Wisconsin.

Passenger pigeons might have even survived the commercial slaughter if hunters weren’t also disrupting their nesting grounds—killing some adults, driving away others, and harvesting the squabs. “It was the double whammy,” says Temple. “It was the demographic nightmare of overkill and impaired reproduction. If you’re killing a species far faster than they can reproduce, the end is a mathematical certainty.” The last known hunting victim was “Buttons,” a female, which was shot in Pike County, Ohio, in 1900 and mounted by the sheriff’s wife (who used two buttons in lieu of glass eyes). Almost seven decades later a man named Press Clay Southworth took responsibility for shooting Buttons, not knowing her species, when he was a boy.

Even as the pigeons’ numbers crashed, “there was virtually no effort to save them,” says Joel Greenberg, a research associate with Chicago’s Peggy Notebaert Nature Museum and the Field Museum. “People just slaughtered them more intensely. They killed them until the very end.”

**Contemporary environmentalism arrived too late** to prevent the passenger pigeon’s demise. But the two

phenomena share a historical connection. “The extinction was part of the motivation for the birth of modern 20th century conservation,” says Temple. In 1900, even before Martha’s death in the Cincinnati Zoo, Republican Congressman John F. Lacey of Iowa introduced the nation’s first wildlife-protection law, which banned the interstate shipping of unlawfully killed game. “The wild pigeon, formerly in flocks of millions, has entirely disappeared from the face of the earth,” Lacey said on the House floor. “We have given an awful exhibition of slaughter and destruction, which may serve as a warning to all mankind. Let us now give an example of wise conservation of what remains of the gifts of nature.” That year Congress passed the Lacey Act, followed by the tougher Weeks-McLean Act in 1913 and, five years later, the Migratory Bird Treaty Act, which protected not just birds but also their eggs, nests, and feathers.

The passenger pigeon story continued to resonate throughout the century. In the 1960s populations of the dickcissel, a sparrow-like neotropical migrant, began crashing, and some ornithologists predicted its extinction by 2000. It took decades to uncover the reason: During winters, the entire world population of the grasslands bird converged into fewer than a dozen huge flocks, which settled into the *llanos* of Venezuela. There, rice farmers who considered the dickcissels a pest illegally crop-dusted their roosts with pesticides. “They were literally capable, in a matter of minutes, of wiping out double-digit percentages of the world’s population,” says Temple, who studied the bird. “The accounts are very reminiscent of the passenger pigeon.” As conservationists negotiated with rice growers during the 1990s—using research that showed the dickcissel was not an economic threat—they also invoked the passenger pigeon extinction to rally their colleagues in North America and Europe. The efforts paid off: The bird’s population has stabilized, albeit at a lower level.

Today the pigeon inspires artists and scientists alike. Sculptor Todd McGrain, creative director of the Lost Bird Project, has crafted enormous bronze memorials of five extinct birds; his passenger pigeon sits at the Grange Insurance Audubon Center in Columbus, Ohio. The Lost Bird Project has also designed an origami pigeon (like the one bound into this magazine) and says thousands have been folded—a symbolic recreation of the historic flocks.

The most controversial effort inspired by the extinction is a plan to bring the passenger pigeon back to life. In 2012 Long Now Foundation president Stewart Brand (a futurist best known for creating the *Whole Earth Catalog*) and genetics entrepreneur Ryan Phelan cofounded Revive & Restore, a project that plans to use the tools of molecular biology to resurrect extinct animals. The project’s “flagship” species is the passenger pigeon, which Brand learned about from his mother when he was growing up in Illinois. Revive & Restore hopes to start with the band-tailed pigeon, a close relative, and “change its genome into the closest thing to the genetic code of the passenger pigeon that we can make,” says research consultant Ben Novak. The resulting creature will not have descended from the original species. “[But] if I give it to a team of scientists who have no idea that it was bioengineered, and I say, ‘Classify this,’ if it looks and behaves like a passenger pigeon, the natural historians are going to say, ‘This is *Ectopistes migratorius*.’ And if the genome plops right next to all the other passenger pigeon genomes you’ve sequenced from history, then a geneticist will have to say, ‘This is a passenger pigeon. It’s not a band-tailed pigeon.’”

Revive & Restore plans to breed the birds in captivity before returning them to the wild in the 2030s. Novak says the initial research indicates that North American forests could support a reintroduced population. He hopes animals brought back from extinction—not just birds but eventually also big creatures like woolly mammoths—will draw the public to zoos in droves, generating revenues that can be used to protect wildlife. “De-extinction [can] get the public interested in conservation in a way that the last 40 years of doom and gloom has beaten out of them,” he says.

Other experts aren’t so sanguine. They question whether the hybrid animal could really be called a passenger pigeon. They doubt the birds could survive without the enormous flocks of the 19th century. And they question Novak’s belief that the forests could safely absorb the reintroduction. “The ecosystem has moved on,” says Temple. “If you put the organism back in, it could be disruptive to a new dynamic equilibrium. It’s not altogether clear that putting one of these extinct species from the distant past back into an ecosystem today would be much more than introducing an exotic species. It would have repercussions that we’re probably not fully capable of predicting.”

**Blockstein says he wanted** to use the 100th anniversary as a “teachable moment.” Which eventually led him to Greenberg, the Chicago researcher, who had been thinking independently about 2014’s potential. The two men reached out to others until more than 150 institutions were on board for a yearlong commemoration: museums, universities, conservation groups (including Audubon state offices and local chapters), libraries, arts organizations, government agencies, and nature and history centers.

Project Passenger Pigeon has since evolved to be a multimedia circus of sorts. Greenberg has published *A Feathered River Across the Sky*, a book-length account of the pigeon’s glory days and demise. Filmmaker David Mrazek plans to release a documentary called *From Billions to None*. At least four conferences will address the pigeon’s extinction, as will several exhibits. “We’re trying to take advantage of every possible mechanism to put the story in front of audiences that may not necessarily be birdwatchers, may not necessarily even be conservationists,” says Temple.

The commemoration goes beyond honoring one species. Telling the pigeon’s story can serve as a jumping-off point for exploring the many ways humans influence, and often jeopardize, their own environment. Today an estimated 13 percent of birds are threatened, according to the International Union for Conservation of Nature. So are 25 percent of mammals and 41 percent of amphibians, in large part because of human activity. Hydropower and road construction imperil China’s giant pandas. The northern bald ibis, once abundant in the Middle East, has been driven almost to extinction by hunting, habitat loss, and the difficulties of doing conservation work in war-torn Syria. Hunting and the destruction of wetlands for agriculture drove the population of North America’s tallest bird, the whooping crane, into the teens before stringent protections along the birds’ migratory route and wintering grounds helped the wild flock build back to a few hundred. Little brown bats are dying off in the United States and Canada from a fungus that might have been imported from Europe by travelers. Of some 300 species of freshwater mussels in North America, fully 70 percent are extinct, imperiled, or vulnerable, thanks to the impacts of water pollution from logging, dams, farm runoff, and shoreline development. Rising sea temperatures have disrupted the symbiotic relationship between corals and plant-like zooxanthellae, leading to a deadly phenomenon called coral bleaching. One-third of the world’s reef-building coral species are now threatened.

If public disinterest helped exterminate the passenger pigeon, then one modern-day parallel might be public skepticism about climate change. In an October poll by the Pew Research Center for the People and the Press, only 44 percent of Americans agreed there was solid evidence that the earth is warming because of human activity, as scientists now overwhelmingly believe. Twenty-six percent didn’t think there was significant proof of global warming at all. In another Pew poll, conducted last spring, 40 percent of Americans considered climate change a major national threat, compared with 65 percent of Latin Americans and slimmer majorities in Europe, Africa, and the Asia-Pacific region.

This denial of both the threat and our own responsibility sounds eerily familiar to those who study 19th century attitudes toward wildlife. “Certainly if you read some of the writings of the time,” says Blockstein, “there were very few people who put stock in the idea that humanity could have any impact on the passenger pigeons.” (Audubon himself dismissed those who believed that “such dreadful havoc” as hunting would “soon put an end to the species.”) Today attitudes toward climate change sound similar, continues Blockstein. “It’s the same kind of argument: ‘The world is so big and the atmosphere is so big; how could we possibly have an impact on the global climate?’”

Even the political rhetoric of those who don’t want to address climate change aggressively has 19th century echoes. “The industry that paid people to kill these birds said, ‘If you restrict the killing, people will lose their jobs,’ ” notes Greenberg—“the very same things you hear today.”

Project Passenger Pigeon might not change the minds of hardcore climate skeptics. For the rest of us, though, it could serve as a call to take responsibility for how our personal and collective actions affect wildlife and climate. Maybe a close look at the history of human folly will keep us from repeating it.

*This story is in the May-June 2014 issue with the title "Billions to None."*