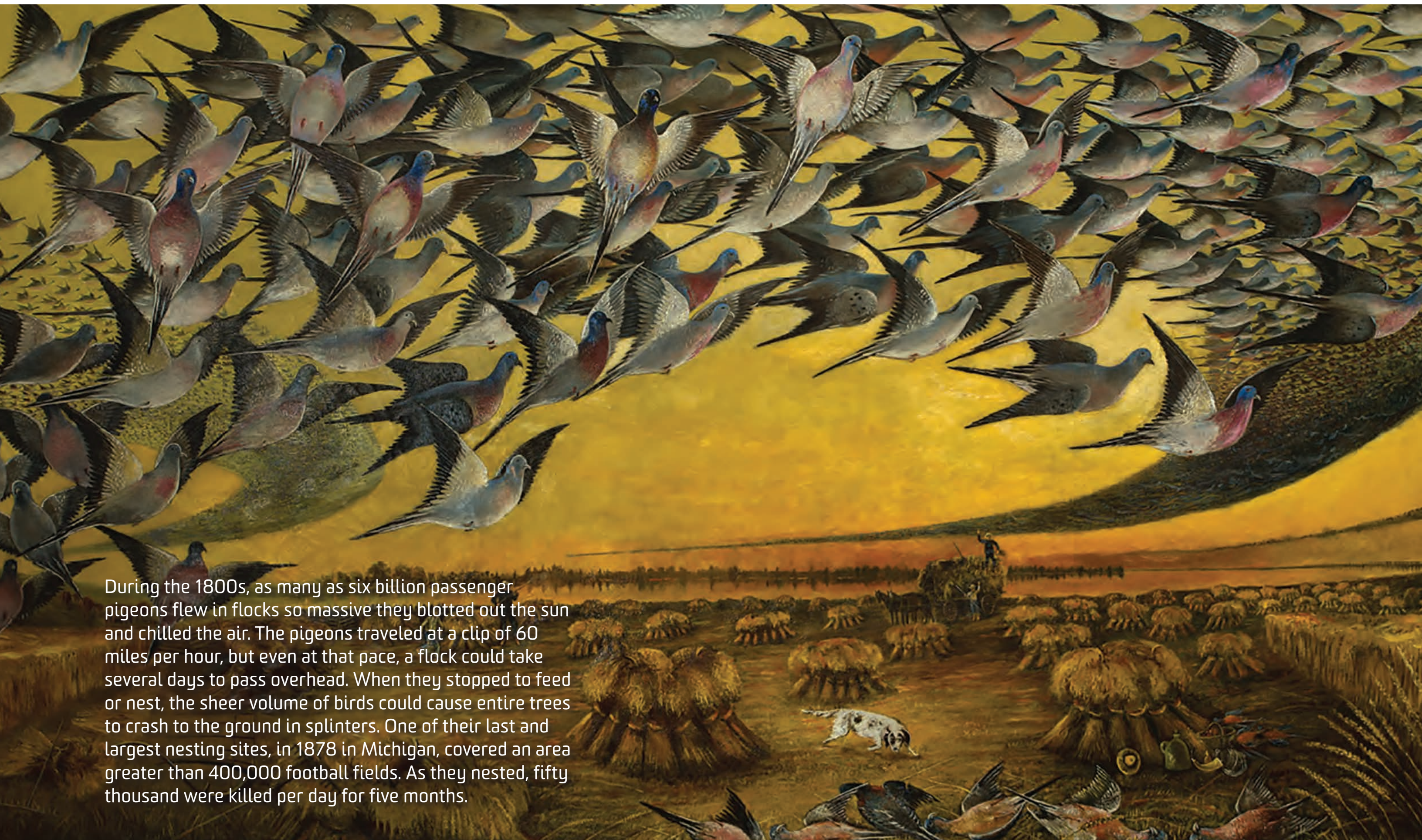
FROM BILLIONS TO ONE *TO NONE*—

A Great 'Feathered River' Across the Sky Vanishes

Once the most populous bird in North America—and possibly the world—its flocks took days to pass, blocking sunlight and breaking trees with its roosting masses; then this "biological storm" of nature vanished forever.

STORY BY **DR. STANLEY TEMPLE**



During the 1800s, as many as six billion passenger pigeons flew in flocks so massive they blotted out the sun and chilled the air. The pigeons traveled at a clip of 60 miles per hour, but even at that pace, a flock could take several days to pass overhead. When they stopped to feed or nest, the sheer volume of birds could cause entire trees to crash to the ground in splinters. One of their last and largest nesting sites, in 1878 in Michigan, covered an area greater than 400,000 football fields. As they nested, fifty thousand were killed per day for five months.

While not showy or physically spectacular, everything passenger pigeons did was in mind-numbing, unbelievable numbers.

In the early 1800s, an estimated 3 to 5 billion passenger pigeons roamed the skies. One in every four North American birds at the time was a passenger pigeon. Lined up beak to tail they'd circle the Earth 23 times.

A super abundant bird, arguably one of the world's most abundant, the extinction of passenger pigeons serve as the ultimate cautionary tale about our relationship with wildlife. Unfortunately 107 years after extinction, most have forgotten. The story needs to be retold—because it provides important lessons for the present and future as we confront unprecedented mass extinctions of species as a result of our actions.

What we know about passenger pigeons comes from observations from the 1800s and earlier explorers, naturalists and people who encountered the bird and were moved to comment. The first written records go back to some of the very earliest European explorers of North America—Cartier, Hudson and Champlain in the early 1500s and 1600s—who all encountered enormous flocks unlike anything seen in Europe.

But most of what we know comes from 1800s naturalists. Alexander Wilson, arguably the first ornithologist in the U.S., said in 1810, "On some single trees upwards of 100 nests were found, each containing one young ... It was dangerous to walk under these flying and fluttering millions of birds, from the frequent fall of large branches, broken down by the weight of the multitudes above, and which, in their descent, often destroyed numbers of the birds themselves."

It's an observation repeated by many—birds gathered in such numbers to literally break branches off trees and in some cases topple trees with their weight.

Probably the best-known account comes from John James Audubon in 1831. He was on a riverboat on the Ohio River when he met an enormous flock of passenger pigeons that flew over him for *several days*, darkening the sky almost continuously. The flock was estimated to contain almost two billion birds.

"I observed pigeons flying ... in greater numbers than I thought I had ever seen them before... The air was literally filled with Pigeons; the light of noon-day was obscured as by an eclipse, the dung fell in spots, not unlike melting flakes of snow; and the continued buzz of wings had a tendency to lull my senses to repose," wrote Audubon.

Imagine if two billion birds flew over *continuously for two days*—there would be dung to contend with! Many recounted passing flocks leaving the land looking as if a snow storm hit. These passing storms of bird droppings periodically fertilized the land as they traveled by.

John Muir wrote in the 1850s: "It was a great memorable day when flocks of passenger pigeons came to our farm... Of all God's feathered people that sailed Wisconsin sky, no other bird seemed to us so wonderful. The beautiful wanderers flew like the winds in flocks of millions... finding their food... in fields and forests thousands of miles apart. How wonderful the distances they flew in a day—in a year—in a lifetime!"

For early settlers, when flocks passed for a day or two it provided tremendous supplies of fresh meat—pigeon pie on the table for days.

Native Americans also harvested the bird. Hunting was a challenge as birds were constantly on the move—you had no idea when or where flocks would appear. Suddenly there was a noise on the horizon, the sky dark with pigeons. After they passed overhead they were gone—offering a very short time to take advantage of the bounty. As a result, Native Americans and early settlers took relatively small numbers and didn't damage passenger pigeon populations.

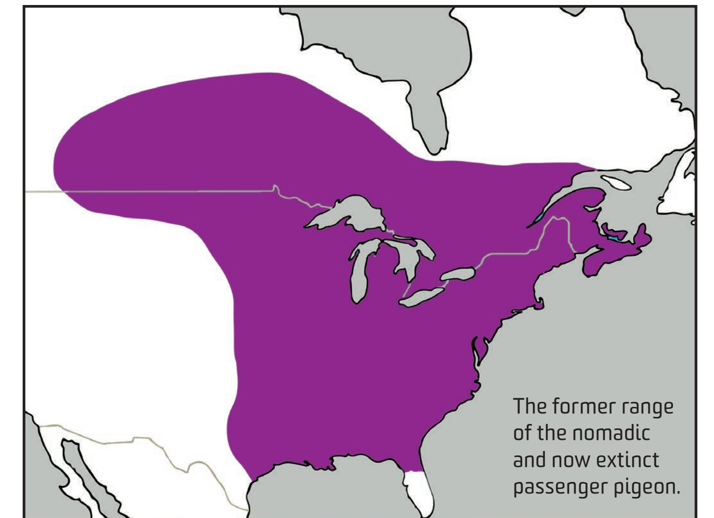
Found in forests of the eastern half of North America, passenger pigeons briefly wandered into the prairie fringes during summer after nesting. During nesting they stopped moving for about a month. For most of the year, they were nomads in deciduous forests. Constantly roaming over vast distances, they didn't settle long anywhere. But at some point, if you lived in the Midwest or East during the 19th century or earlier you'd have been awed by an *enormous* flock passing over. Today, many hundreds of places are named after passenger pigeons, including three streams in Iowa.

They sought large, unbroken deciduous forests for their main, sustaining foods—acorns and beech nuts. They fed on lots of other plant matter, but beech nuts and acorns fueled them. Beech and oak trees are mast species—they don't produce huge crops every year, but do so sporadically in great, heavy abundance when conditions are favorable. Nomadic passenger pigeons flew around the Midwest and East in search of these forest areas overflowing with nuts and acorns. Then they'd consume nuts and acorns before flying to the next area. Strong fliers, they could cover great distances patrolling deciduous forests for unpredictable areas with an abundance of nuts and acorns.

The only time passenger pigeons stayed still was during nesting. Like everything they did, suddenly they would appear, settling in unbelievable numbers as a defense mechanism against predators, quickly building crude nests to lay one egg. Enormous nesting colonies fed on the mast to fatten their babies—the squabs—until these young pigeons became obese part way through development. Then, parents would leave squabs to finish growing on stored, accumulated fats.

It worked perfectly well. Passenger pigeons maintained massive populations for millenia with this life style.

MAP IMAGE: BEN NOVAK



The former range of the nomadic and now extinct passenger pigeon.

PASSENGER PIGEONS IN IOWA

Iowa was the western edge of major passenger pigeon wanderings and the southern edge of the main breeding range. Most state records are from eastern Iowa, especially along the Mississippi River. The species is known to have nested in at least 11 counties.

"My mother tells of immense flocks which visited Winneshiek County in the 1850s, alighting in the timber, where the boys killed large numbers at night by knocking them from the branches with sticks." —Rudolph Anderson, The Birds of Iowa, 1907.

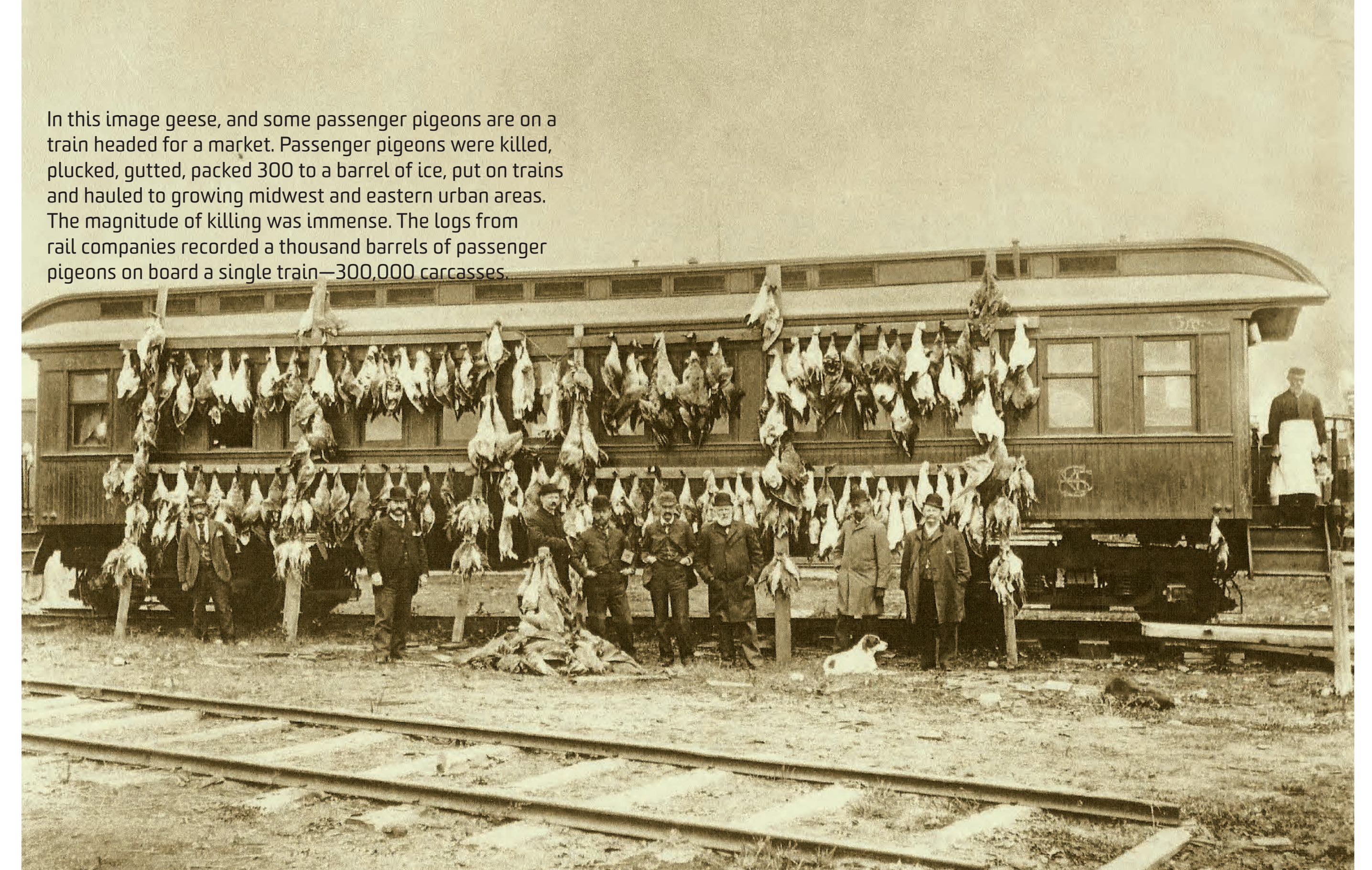
"A rough estimate of the number of birds passing a given point in spring may be useful. The cross-section of an average flock was say, a hundred yards from front to rear, and fifty yards in height, and when the birds were so close as to cast a continuous shadow there must have been fully one pigeon per cubic yard of space . . . or say 30,000,000 for a flock extending from woodland to the other. Since such flocks passed repeatedly during the greater part of the day of their chief flight at intervals of a few minutes, the aggregate number of birds must have approached 120,000,000 an hour for, say five hours, or six hundred million pigeons virtually visible from a single point in the culminating part of a single typical migration." —W.J. McGee describing a flight near Dubuque, in the early 1860s or 1870s.

Ellison Orr, a Waukon naturalist, writes of a nesting area [probably mid-1860s] extending along the Yellow River in Winneshiek and Allamakee counties to the Mississippi River encompassing an area about 20 miles long and two miles wide. Nearly every tree in the area had at least one nest, and larger trees might have one or two dozen nests or more.

"Ed Volkert of Dubuque used a net 30 by 60 feet. He took as many as 1,500 birds in one morning and sold live birds for 10 cents each used as trapshoot targets. Crippled birds were killed and sold by the barrel, which went for a dollar on the market in Chicago."

In 1878, pigeons roosted in Van Buren County across 3,000 acres in countless millions. The last great flight of passenger pigeons in Iowa was probably in 1869; the sky would be filled as far as the eye could see, and numbers were beyond calculations.

An illustrated depiction of a passenger pigeon shoot in northern Louisiana in July 1875. The species went extinct on September 1, 1914 when the last one died in a zoo.



In this image geese, and some passenger pigeons are on a train headed for a market. Passenger pigeons were killed, plucked, gutted, packed 300 to a barrel of ice, put on trains and hauled to growing midwest and eastern urban areas. The magnitude of killing was immense. The logs from rail companies recorded a thousand barrels of passenger pigeons on board a single train—300,000 carcasses.

THE BEGINNING OF THE END

Things went horribly wrong for passenger pigeons in the mid- to late 1800s. They were up against a predator unlike any in the past—market hunters. During the 50-year period after the Civil War, almost every nesting attempt was ruthlessly pillaged by commercial market hunters who killed birds to sell at market. Both adults and nestlings were slaughtered, causing such chaos that very few young were raised. You don't need to be a population biologist to realize killing birds on an industrial scale and preventing reproduction makes extinction a mathematical certainty.

To make matters worse, market hunters tracked and killed birds year-round.

The reason for killing was a thriving demand for pigeons as a cheap source of quality meat. Although hard to imagine today, at that time, there were no legal restraints, seasons or limits. Nothing prevented people from killing wildlife at will. The national mindset thought natural resources were inexhaustible. For a species as abundant as the passenger pigeon, no one imagined that they could be wiped out. Especially in short order.

Market hunting was a major profession. Census data reveals thousands of people described their profession as "pigeoner"—someone who 365 days a year followed and killed pigeons as a profession. It was a slaughter.

While native peoples harvested pigeons for thousands of years, these new pigeoners were greatly aided by two technological advances. The first was the telegraph system. Once in place, market hunters shared passenger pigeon flock locations. Before, it was impossible to track nomadic flocks and know where they nested. Relatively small, sustainable bird harvests done for thousands of years ended. Once the telegraph system came into play, every pigeoner knew the locale of massive flocks and converged upon them.

The second technological advancement was the rail system, which expanded tremendously after the Civil War. Railroads spread greatly within the nesting range of the passenger pigeon. Trains allowed pigeoners to do something new, shipping birds to distant markets rather than selling them locally.

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During this period, in 1871, Wisconsin hosted the largest nesting ever recorded. It covered 850 square miles of central Wisconsin (about the size of two average-sized counties in Iowa.) Accounts described virtually every tree with nesting pigeons—hundreds of millions—if not over a billion in one area. Unfortunately, this was at the peak of market hunting. Market hunters descended in unbelievable numbers. Certainly tens, if not hundreds, of millions of pigeons died that nesting season. Because of massive destruction, very few young were raised.

Just a few historical extracts give an idea of the magnitude: catching 1,200 birds in a single toss of a net. Birds shipped by thousands of barrels. Killing continued day and night. More than 100,000 people participated. Once trains unloaded out east, more gunners rode empty trains back to Wisconsin. In two weeks, 4,000 barrels were shipped—1.2 million birds. It is hard to imagine. One gun dealer sold half a million rounds of ammo during nesting season—likely all used on pigeons.

If the slaughter during nesting seasons wasn't bad enough, the telegraph system now allowed birds to be tracked year-round. Market hunters continued to pursue flocks wherever they went. As smaller numbers were killed, hunters made more profit capturing birds to sell alive. In the 1800s, pigeon shoots were a very popular recreational activity. These gunning contests allowed people to demonstrate shotgun prowess by shooting captured passenger pigeons released and shot for target practice. Each big event required thousands of passenger pigeons.

To catch birds alive, huge nets were erected. Baited with grain, a few live pigeons were added to lure wild flocks. In the language of the day, these birds were known as "stool pigeons," still used in today's vocabulary for someone who deceives their comrades.

Recreational shooting of passenger pigeons continued to the end. And once passenger pigeons were gone, "clay pigeons" or "clays" replaced them, also becoming part of today's vocabulary.

The last big nesting of passenger pigeons, in 1878, covered 400 square miles in Michigan. After that, all accounts are of much smaller nestings, each targeted by pigeoners. Killing continued unabated. Nothing was done to stop the slaughter.

Newspaper accounts show not only the magnitude of birds killed, but ever-diminishing populations. Once-immense flocks that would pass by for days and darken the sky gave way to sightings that, by 1891, became big news when a flock of 20 birds was seen.

Many accounts revealed the pigeon's demise. People were obviously aware birds were disappearing. So why weren't people more concerned? There was the mistaken belief in the inexhaustibility of natural resources at the time, but people were also accustomed to not seeing massive flocks of passenger pigeons every year. After all, these nomadic flocks moved randomly in search of large crops of acorns and beech nuts and might not return again for many years.

The easy explanation of the time was "the pigeons are just somewhere else." Many printed accounts perpetuated this belief. But that idea of "somewhere else" became almost absurd. The most imaginative explanation was from Henry Ford, who opined that passenger pigeons had drowned in the Pacific Ocean trying to fly to Japan. People were in denial, despite the evidence.

A few isolated wild birds were shot in 1900 and 1901. The last one shot was in 1902 in Indiana. In 1909, the American Ornithologists' Union offered a $3,000 reward (nearly $77,000 in today's dollars) for evidence of wild birds. The rewards went unclaimed. None were found.

Eventually, the last passenger pigeon, a female named Martha, was on display at the Cincinnati Zoo. Martha became a global attraction—people came from all over the world to see the last passenger pigeon. She died September 1, 1914.

As a first for humanity, this extinction was known almost to the hour. Martha was 28 years in age—old for a passenger pigeon. She wasn't looking well at noon and when her keeper checked again at 1 p.m., she was dead. She was packed in a large block of ice and shipped to the Smithsonian Institution. From billions to one, now none, forever.

Martha's death was big news. It shocked America and the world. There were still many people alive in 1914 who had once witnessed huge flights of passenger pigeons. Now they woke to the fact of their extinction.

A mounted passenger pigeon at the University of Iowa Museum of Natural History in Iowa City.

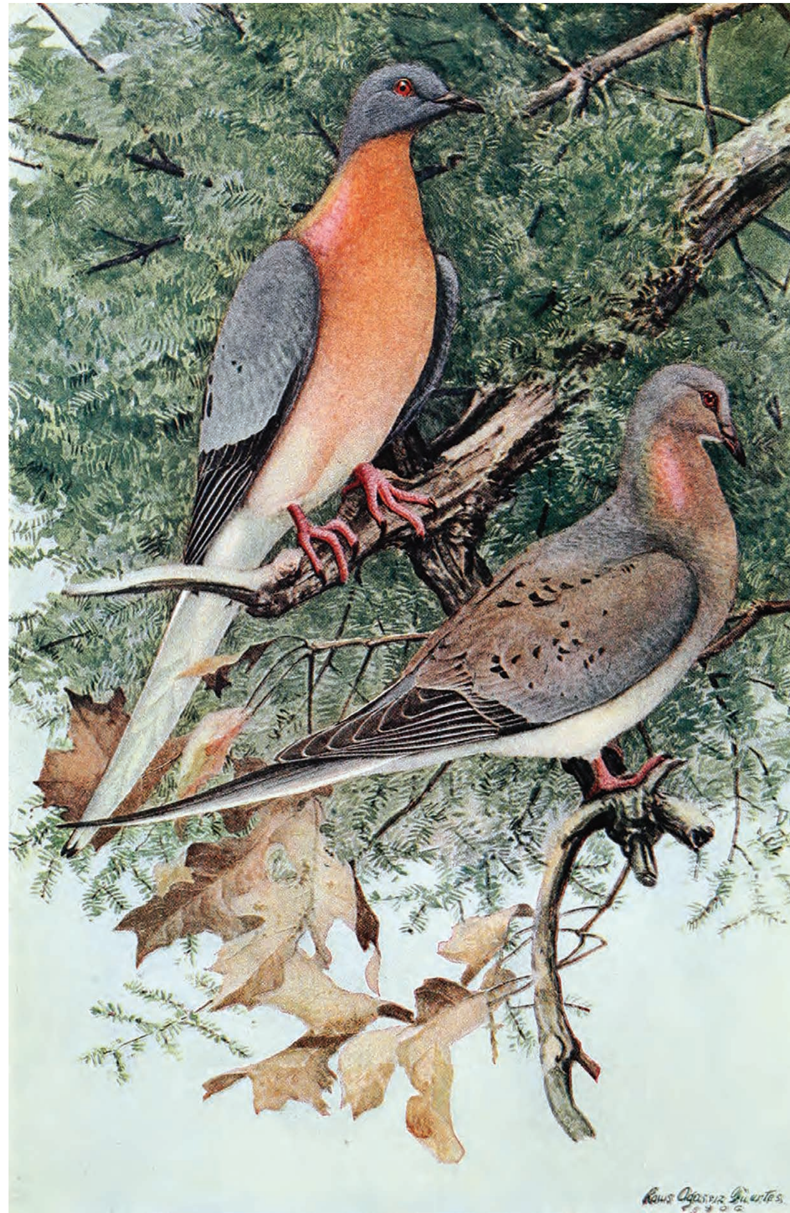
The event helped launch the modern 20th century wildlife conservation movement. It inspired the formation of organizations such as the National Audubon Society, and stirred the first wave of meaningful protection laws. People now understood that wildlife was not inexhaustible.

Enter Iowan John F. Lacey of Oskaloosa. The civil war veteran, lawyer and state representative was elected to congress in the late 1880s. His namesake legislation, The Lacey Act of 1900, was the first federal law to protect wildlife. It made it a federal crime to hunt game with intent of selling across state lines. In 1900, Lacey thought regulating interstate commerce would cripple market hunting because they couldn't transport wildlife across state lines. As he introduced his bill, he commented, as virtually everyone did then, that the passenger pigeon was the catalyst.

While the Lacey Act was too late to save passenger pigeons, it came in time to save bison—hunted down to just a few hundred individuals. It was followed by the Migratory Bird Treaty Act of 1918 that finally protected migratory birds, including ones previously killed for market.

After the pigeon was gone, all people could do was reflect on what had happened to the most abundant bird on the continent, perhaps the world. One place that commemorated the loss of passenger pigeons is near Pikes Peak State Park. Looking across the wide, scenic Mississippi River Valley toward Wisconsin, there sits Wyalusing State Park, where birders erected a monument in 1947 in memory of the passenger pigeon.

It was a remarkable event—the first ever public grieving over the human-caused extinction of a species. On the occasion, native Iowan and conservationist Aldo Leopold was asked to write an essay. Many considered it one of his most moving. It's certainly among the most poignant ever written on extinction. That wonderful essay is included in his 1949 book, *A Sand County Almanac*. It's a beautiful piece of writing worth your read.



ABOVE: A painting of a male and female passenger pigeon from a 1907 book about the species. TOP RIGHT: An 1896 photo of a passenger pigeon that lived in captivity in the aviary of Professor C.O. Whitman, professor of Zoology at the University of Chicago.

SPECIMIN IMAGE: UNIVERSITY OF IOWA MUSEUM OF NATURAL HISTORY

He captured the importance of that monument by saying "for one species to mourn the death of another is a new thing under the sun… Men still live who, in their youth, remember pigeons; trees still live that, 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," he wrote.

Now, several years past the centennial of the extinction, Leopold's prediction has seemingly come true. People no longer remember the tragic story of the passenger pigeon. But our attitudes toward wildlife have changed, and most people now regret causing other species to become extinct.

Today we think if a species is in trouble we'd mount an effort to save them. So why didn't we try to save the passenger pigeon?

Many are shocked to realize passenger pigeons were relatively easy to breed in captivity. But in that era, captive breeding wasn't thought of as a conservation strategy. It was simply a hobby. Some kept passenger pigeons, often to get them to hybridize with other pigeon species. One bird keeper in Milwaukee was successful in breeding them. One of his birds was probably Martha, who ended up in the Cincinnati Zoo.

The passenger pigeon is gone. All we can do is learn from the cautionary tale of what we did to this remarkable bird. Overkilling of plants and animals—faster than they can reproduce—has tragic consequences. Unfortunately, humans have a long, tragic history of doing this over and over and over again. The passenger pigeon wasn't the only bird of North America humans wiped out with overkilling. There was also the great auk, Labrador duck, Carolina parakeet and more. When John Lacey introduced his legislation, he mentioned the passenger pigeon, saying "we have given an awful exhibition of slaughter and destruction, which may serve as a warning to all humankind. Let us now give an example of wise conservation of what remains of the gifts of nature."

Yet today, commercial overkilling of wild species continues on ocean fisheries—Atlantic cod, menhaden, bluefin tuna—and on large animals like elephants and rhinos of Africa.

It's not all gloom and doom. Great comeback stories abound of species overkilled yet saved by conservation—trumpeter swans, fur seals, sandhill cranes, wild turkey, Pacific grey whales and bison. Beaver were almost trapped out for pelts, but recovered with trapping regulations.

But too many species are still in deep trouble as endangered species lists grow worldwide. Habitat losses and ecosystem stresses like climate change threaten many species, but we still haven't gotten over that most brutal form of species extinction—overkill.

A modern lesson from the passenger pigeon's demise is that overkill is never justified. Increasingly we also accept that it is morally wrong. We now know how to harvest resources sustainably. In the 1800s, you could perhaps excuse people who didn't understand sustainable harvesting. They didn't realize that natural resources of the continent and oceans weren't inexhaustible. Today, there is simply no excuse.

A PASSION FOR THE PIGEON

Thousands of observations were made of passenger pigeons. A.W. (Bill) Schorger, a close colleague of Aldo Leopold, spent the second half of his life after his early retirement pursuing his passion—uncovering the wildlife history in early America. His obsession was the passenger pigeon.

He visited archives, museums and libraries ferreting out any reference he could find, especially eyewitness accounts. He found more than 9,000 eyewitness accounts. He published these observations into his book—*The Passenger Pigeon: Its Natural History and Extinction*—which stands as the definitive treatment of the biology and extinction of the passenger pigeon.

CAN YOU IMAGINE THE LOSS?

Today's 10 most common birds in North America (juncos, house and chipping sparrows, mourning doves, robins, starlings, red-winged blackbirds, yellow-rumped warblers, red-eyed vireos and cardinals) all added together fall 150 million short of even the smallest estimated number of passenger pigeons of 3-5 billion. The species went extinct in 1914 due to overkilling.

GET INVOLVED

Learn more about the story and history of the passenger pigeon, other species in decline, and find lessons for schools, documents and more at ***passengerpigeon.org***.