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FEATURES

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A BLACK-BILLED MAGPIE on fresh-fallen snow at Badlands National Park.

©MATT BRASS

COVER:
A TREE SWALLOW at Manassas National Battlefield Park in Virginia. Nearly 170 bird species have been documented in the park, which is located along the Eastern Flyway.

©ERIC LEE

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LAUREN MONROE JR., a Tribal councilman for the Blackfeet Nation, prepares to release a wild herd of bison onto Blackfeet land adjacent to Glacier National Park.

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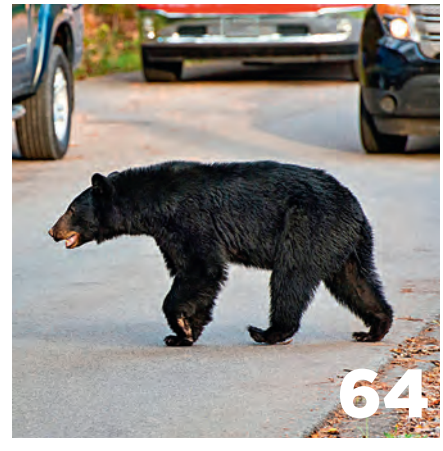

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CLOCKWISE FROM TOP: PHOTO COURTESY OF HUNTER D'ANTUONO/FLATHEAD BEACON; ©CAROLYN FRANKS/SHUTTERSTOCK; PHOTO COURTESY OF STEPHANIE PANLASIGUI; ©ERIC VANDERWERF.

DEPARTMENTS

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ON THE WEB

Follow NPCA on social media platforms and get park news, travel tips and more on NPCA's blog: **npca.org/blog.**

Saying Their Names

©KATHY SMITH PHOTOGRAPHY

Had history unfolded differently, Emmett Till might have marked his 82nd birthday on July 25 of this year. Tragically, as you likely know by now, the vivacious boy with bright eyes and an infectious smile never lived to see his 15th birthday. Instead, Emmett was brutally murdered in 1955 in Mississippi. When Emmett's mutilated body was returned to his native Chicago for the funeral, his mother, Mamie Till-Mobley, bravely insisted on an open casket to let the world see the utter cruelty of his killing. The public outcry that followed helped spark the Civil Rights Movement.

Emmett's senseless murder is one of the most difficult and horrible episodes in modern American history. But it's also a story of courage and resilience.

For all too long, Emmett's story has not gotten the attention it deserves in history books and in the places where the tragedy unfolded. Now, we can take some comfort in the July 25 designation of the Emmett Till and Mamie Till-Mobley National Monument. The park's three sites in two states will preserve that story for generations to come: Graball Landing, near Glendora, Mississippi, where Emmett's body was believed to have been pulled from the Tallahatchie River; the Tallahatchie County Second District Courthouse, in Sumner, Mississippi, where the killers were acquitted, only to later admit to the murder; and Roberts Temple Church of God in Christ in Chicago, Illinois, the site of the memorial service.

For years, NPCA and our partners were committed to honoring the legacy of the Till family and the far-reaching impact of their story through the creation of this national monument. So, to be able to attend the White House proclamation ceremony alongside NPCA Senior Director of Cultural Resources Alan Spears was deeply moving.

Alan is not only one of the most passionate park advocates you'll ever meet — he's also one of the most eloquent. His words, from an NPR interview, powerfully capture what that moment meant.

"We say their names to make sure that we honor their lives and that we remember them, and as long as their names are spoken, they will never be forgotten. We do that by saying Emmett's name and by saying Mamie's and by remembering," he said. "That gets us there. It doesn't get us all the way, but it gets us there, or at least a little bit closer."

With gratitude,
Theresa Pierno

Editor's Note

EMMETT TILL at his home in Chicago, 1955.

Hopeful Days

When you're around long enough as a journalist, you write or edit stories about things that could happen in the far-off future. The possibility may seem remote, but then, sometimes, that future arrives. In 1996, as a writer at a New York City weekly, I wrote a story about the effort to legalize same-sex marriage, a proposition that had little political traction then. When I recently pulled out the yellowing clip, I saw that an advocate had told me that marriage equality in New York was a distant dream. "At least a generation away," he had said. But in 2011, the state's Marriage Equality Act went into effect, and in 2015, a Supreme Court decision made marriage equality the rule of the land.

At National Parks magazine, I've occasionally had the pleasure of seeing the future arrive — most commonly when it comes to establishing national park sites. We've published stories about many parks, from Katahdin Woods and Waters to Birmingham Civil Rights national monuments, that started out as beautiful visions with uncertain prospects but ultimately became reality. This summer, it happened again. In 2019, the magazine cover read, "Emmett Till was murdered 64 years ago. Is it time for a national park that recognizes him and tells the story of the civil rights struggle in Mississippi?" The answer, as you probably now know, eventually turned into a resounding yes. On July 25, President Joe Biden signed a proclamation establishing the Emmett Till and Mamie Till-Mobley National Monument. (Read more about the designation and NPCA's campaign on p. 3.)

Progress can seem elusive, but occasionally, something happens that fills you with optimism and makes you wonder, what are the next big things we are writing about now that humans, in all their fallibility, will finally address? As conservationists who just witnessed a long summer of floods, wildfires and record-breaking heat, we must ask: Could the climate crisis be one of those things? Will a day come when the calls to confront climate change are vindicated by a just, global solution? Some days, despair wins out. At other times though, hope blooms anew, and it feels like anything is possible.

Rona Marech
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NationalParks

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WHO WE ARE
Established in 1919, the National Parks Conservation Association is America's only private, nonprofit advocacy organization dedicated solely to protecting, preserving and enhancing the U.S. National Park System.

WHAT WE DO
NPCA protects and enhances America's national parks for present and future generations by identifying problems and generating support to resolve them.

EDITORIAL MISSION
National Parks magazine fosters an appreciation for the natural and historic treasures found in the parks, educates readers about the need to preserve those resources, and illustrates how member contributions drive our organization's park-protection efforts. The magazine uses the power of imagery and language to forge a lasting bond between NPCA and its members, while inspiring new readers to join the cause. National Parks magazine is among a member's chief benefits. Of the $25 membership dues, $6 covers a one-year subscription to the magazine.

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MAKE A DIFFERENCE
Members can help defend America's natural and cultural heritage. Activists alert Congress and the administration to park threats, comment on park planning and adjacent land-use decisions, assist NPCA in developing partnerships, and educate the public and the media. Sign up to receive Park Notes, our monthly email newsletter at npca.org/join.

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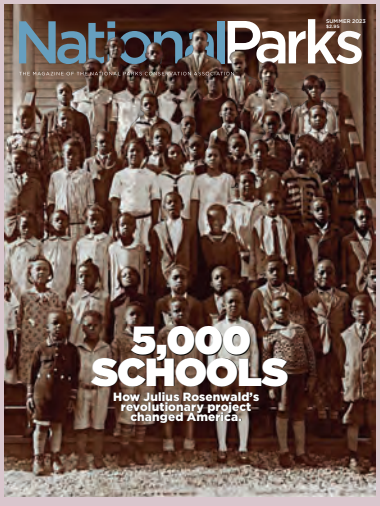

'MONUMENTS TO TRUTH'

Thank you for the insightful articles on Shenandoah National Park ("A Monumental Effort") and the Sand Creek Massacre ("Second Take"), which tell parallel stories of displacement and victimization. We can no longer rely on our schools and their textbooks for historical accuracy. National parks are not just about preserving the beauty of our country, but also the harsh realities of its formation. I, for one, am extremely grateful for these monuments to truth.

YVONNE NANTAIS
Raleigh, NC

The Summer 2023 issue is exceptional. I so appreciate NPCA's efforts to present and clarify the histories of these American lands. From the feature on Julius Rosenwald's creation of schools for Black children during segregation ("Remembering Rosenwald") to the piece about the memorials honoring families displaced by the creation of Shenandoah National Park to the story on the inclusion of Indigenous voices to tell the Sand Creek Massacre story, the issue did an amazing job casting a critical light on so many faulty narratives. I appreciate your role in my own personal growth related to understanding our nation's history.

KATE VANSKIKE
Spokane, WA

READING THE SIGNS

Thank you for the excellent "Remembering Rosenwald" article! Two years ago, I was driving across the rural Piney Woods of East Texas when I decided to stop and read all the historical markers, at least those on the right side of the road. I recall there was one about a Rosenwald school for African American children. How nice, I thought. Thanks to your article, I now have a greater appreciation for Julius Rosenwald and his remarkable contribution. Rosenwald's unselfish philanthropy should be made widely known to inspire others to do good for our fellow Americans.

CINDY PRICE
Conroe, TX

I am 93 years old and knew nothing about Julius Rosenwald and Booker T. Washington's collaboration to build 5,000 schools for African American children. That story should be included in all American history classes, and these two men should be officially recognized for this important contribution.

BETTY M. LADWIG
Wichita, KS

Kudos to Rona Kobell for her excellent article in the Summer 2023 issue about Julius Rosenwald. In a classic case of "you don't know what you don't know," I confess that I was virtually unaware of Rosenwald's revolutionary project of building 5,000 schools for Black students across 15 Southern states during the Jim Crow era. For what it's worth, up until several years ago, I was similarly unaware of Juneteenth and so many other events, institutions and movements relating to African American history. Live and learn. So, on a personal level, I find it truly heartening to read

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that NPCA is supporting the effort to create a Julius Rosenwald and Rosenwald Schools National Historical Park. By any standard, it's the right thing to do. Best wishes with the campaign.

ED DAVIS
Oscoda, MI

CABIN MEMORIES

Kristin Henderson's excellent article about the mountain people who were forced out to create Shenandoah National Park brought back 30-year-old memories. I was with some hiking friends staying at Corbin Cabin, which is part of the park but is managed by the Potomac Appalachian Trail Club, when I came across a journal. The book included an interview between famed Appalachian Trail hiker and author Ed Garvey and the original owner of the cabin, whose property had been condemned by the Park Service. The owner said the amount of money he received as a result of the condemnation process was less than the cost of repairs he had recently made to the cabin, including the replacement of the roof. I am really glad to hear the Park Service is finally memorializing those who were displaced to create a wonderful national park.

RON TIPTON
Rockville, MD
Tipton was NPCA's senior vice president of programs/policy from 1999 to 2013.

CLARIFICATION

Thank you to several readers who pointed out that both the David Berger National Memorial in Ohio and Touro Synagogue National Historic Site in Rhode Island are affiliated with the National Park System and honor Jewish Americans.

Echoes

"Protecting Indigenous lands is important for future generations to understand our country and to respect the Pueblos' sacred culture."

NPCA President and CEO Theresa Pierno, as quoted in AZ Central, about a 20-year ban on new oil and gas activities on federal lands within 10 miles of Chaco Culture National Historical Park. NPCA applauds the move — announced by Secretary of the Interior Deb Haaland this June — and will continue to advocate for a permanent ban to protect this landscape's outstanding cultural and archaeological sites.

"We don't want to fight every permit that comes up. There's going to be more. This isn't going to be the end. And so what we need to do is put some protections in place."

Kristen Brengel, NPCA's senior vice president of government affairs, explaining to NPR's "All Things Considered" how irresponsible siting of a massive wind project could impair the natural, historical and cultural resources of parks. Hundreds of turbines, up to 700 feet in height, could soon mar the viewshed and historical footprint of the Minidoka War Relocation Center in Idaho, where 13,000 Japanese Americans were imprisoned during World War II. Only a fraction of the incarceration camp has been preserved as a national historic site.

"Today's designation ensures that these lands and waters can remain healthy and sustainable for future generations."

Theresa Pierno, NPCA's president and CEO, celebrating President Joe Biden's August designation of Baaj Nwaavjo I'tah Kukveni — Ancestral Footprints of the Grand Canyon National Monument. This action protects nearly 1 million acres in northern Arizona from uranium mining, preserving important wildlife habitat, at least 3,000 cultural and historic sites, and the ancestral and current homeland of a dozen Tribes.

PHOTO: CHACO CULTURE NATIONAL HISTORICAL PARK, NEW MEXICO.

PHOTO COURTESY OF HUNTER D'ANTUONO/FLATHEAD BEACON

MORE THAN a century after the American bison population was nearly obliterated, the Blackfeet Tribe released a herd of nearly 50 bison on Blackfeet land adjacent to Glacier National Park. These are the first free-roaming bison ever to be unleashed onto the North American prairie by a sovereign Tribal government.

'How We Heal'

The Blackfeet Nation's effort to restore bison reached a milestone this summer with the release of a free-roaming herd onto sacred lands adjacent to Glacier National Park.

In the end, it was as simple as swinging open a gate.

First out was a rust-red calf, legs unsure against the solid ground of a Rocky Mountains meadow. Then in an instant a whole herd of shaggy bison surged, hooves flashing, tails up, eyes wide, a long-awaited storm of buffalo power thundering into the wild.

These "iinniiwa," as they are known to the Blackfeet Tribe, are the first free-roaming bison ever to be unleashed onto the North American prairie by a sovereign Tribal government. In the blue-sky warmth of a fine June day, the herd of nearly 50 flowed like a river across prairie grassland. A wake of dust trailed them over a wildflower rise, and they disappeared single file into timber a mile to our west. Last we saw them, they were heading toward Glacier National Park.

And the land knew exactly how to welcome them back.

"We no longer have to ask permission to be Blackfeet," Tribal councilman Lauren Monroe Jr. declared as the dust settled. "We will live it, and we will live it without fear."

Blackfeet always have been buffalo people. For Tribal members, iinniiwa were, are and will remain a sacred source of food, spiritual nourishment, tools, shelter and clothing. Buffalo are life. (While bison species and buffalo species are distinct, Native American communities often refer to American bison as buffalo.)

The U.S. government understood fully the importance of bison to Plains Indian Tribes, including to the Siksikaitsitapi people of the Blackfoot Confederacy, which is why, throughout our nation's Indian Wars, the unofficial policy was to slaughter the animals as a path to subjugating the continent's First Nations. During the 1800s, North America's bison population was devastated, butchered from vast herds of at least 30 million animals to fewer than 1,000 buffalo by 1889. At the same time, the Tribe's cultural ceremonies celebrating iinniiwa were banned by the U.S. Code of Indian Offenses. Those prohibitions weren't lifted until 1978, long after the herds were ravaged and far too late to avoid a profound ecological and cultural collapse.

Old prejudices persist, and wild buffalo remain a source of deep controversy. Bison are treated, generally, as livestock rather than wildlife and contained behind fences. Even down in Yellowstone country, where they roam freely within the national park, buffalo are killed or captured when they wander too far beyond park boundaries. In the 113 years since Glacier was made a park, there has never been a single buffalo within its boundary. Until now.

It is no accident Blackfeet chose to release this wild herd along a spectacular Montana mountain front they call "Mō'okăkkin," the Backbone of the World. Standing at the head of this craggy spine is Chief Mountain, "Ninnāasʟŭkoō," where the Blackfeet spirit of Thunder lives on a sacred summit that stands square and broad as a buffalo's shoulders. Chief Mountain's summit also is home to the borderline between the Blackfeet Indian Reservation and Glacier, a contested boundary that cleaves the peak just as surely as it does Blackfeet lifeways. The border runs through lands that were taken from the Blackfeet Nation in 1895, and that the Tribe continues to claim as Blackfeet territory.

In the context of this history, these wild buffalo seem not unlike a kind of

Trojan horse — packed inside them are Blackfeet expressions of sovereignty, treaty rights and land claims. They also represent language, tradition and cultural practice. Conservation. Biology. Beavers, elk and cutthroat trout. Song and sacred ceremony. Entire watersheds. The age-old buffalo economy.

They carry the heavy burden of our collective expectations.

The seeds for the release were planted 150 years ago when, as the buffalo slaughter raged around him, Atatíče captured a small remnant herd of iinniiwa on what is today the Blackfeet Indian Reservation. It was an act of optimism, perhaps, of defiance certainly, and likely of desperation. Later, in 1907, his growing captive herd was transferred to Elk Island National Park in Alberta, Canada, where it now numbers about 400.

The relentless pursuit of cultural survival begun by Atatíče was amplified by Blackfeet leaders in 2016. That year, the Blackfeet Nation brought home 87 bison calves from Elk Island, direct descendants of the wild buffalo captured back in 1873. Over a half-dozen years, those 87 calves have grown into a strong Tribal herd — the genetic reservoir now spilling over to rewild the Blackfeet-Glacier front. "They are our ancestors," said Helen Augare, who leads the Native Science Field Center at Blackfeet Community College. "And they are our future."

Many people spent many years carefully planning the bison release. Wildlife biologists and Blackfeet elders. National Park Service managers and Tribal traditionalists. There were constant meetings, countless and complex details. NPCA is among the many partners who worked alongside the Tribe for more than a decade. I personally have been involved, in one way or another, for most of the past 40 years, since I was a sophomore in college.

Despite the long history, as the reintroduction approached, concerned ranchers and local land managers still were asking their Blackfeet neighbors questions about what might happen once the buffalo were released. Tyson Running Wolf told them not to worry. The herd would wander the prairie lands, the Blackfeet leader said. They would eat grass and cool themselves in pothole wallows. Grizzly bears would chase them. So would wolves. Blackfeet would hunt them. In other words, Running Wolf assured them, it would be much as it has been for the past 13,000 years.

For traditional cultures, these are simply the rhythms of the land. You can't grow a healthy prairie grassland, after all, without wolves, wildfire and iinniiwa. Wolves push the buffalo so they don't overgraze; buffalo trim and fertilize the grassland so energy flows to deep-seated roots; fire scours dry chaff so nutrients can cycle back into the soil. Together, these are the bioengineers sculpting the physical and cultural landscapes. And this Ninnāastǐkoō area, Running Wolf said, is one of the few remaining places on the planet where full restoration may be possible. Chief Mountain is a modern miracle, he said, where the cultural fabric remains intact, where Indigenous lifeways persist, where the natural systems remain unbroken and where there are few, if any, industrial pressures. Chief Mountain is, to borrow a well-worn Montana phrase, the last best place, and these iinniiwa are our last best hope.

Though decades in the making, the final decision to release wild buffalo came so quickly as to feel like a surprise. In the end, there weren't any bureaucratic hoops or federal approvals. It was simply a Blackfeet decision, made by Blackfeet leaders on Blackfeet land and on behalf of Blackfeet cultural survival.

And so it felt surreal, dreamlike even, when all that effort and controversy was distilled into the mundane creak of a gate. Opening the fences felt vaguely dissident, marking, in some ways, a subversive rewilding, a defiant affirmation of Indigenous rights and Tribal sovereignty.

"It's fitting that the first one that jumped out was a calf," Augare said. "This is how we rebuild. This is how we restore. This is how we heal."

In a statement released afterward, Blackfeet leaders wrote, "Today we are expressing our sovereignty, claiming our reserved rights, reversing this ecological deterioration, overturning this incalculable cultural loss, righting historic

LEADERS of the Blackfeet Nation at the bison release.

PHOTO COURTESY OF HUNTER D'ANTUONO/FLATHEAD BEACON

wrongs, and preparing a powerful path for a successful future — the path of the Iinniiwa."

These woolly pioneers are a beginning. More wild buffalo will be restored, here and elsewhere along Glacier's front, ranging with wild wolves and grizzly bears, unburdened by borders. "These bison," Glacier's leadership team announced, "will be treated as any other wildlife in the park and be allowed to roam freely on the landscape."

That Glacier's managers were on hand to welcome iinniiwa home is testament to how the disputed borders of the previous century are being softened. Already, Glacier and Blackfeet leadership partner to a limited degree to manage wildfire, wildlife and invasive species in their shared borderlands. Now, with the release of wild buffalo, leaders from both sides of the boundary are looking toward a new era of enhanced co-management in the area. They're drafting formal agreements to share bison management, of course, as well as to build new cultural, economic and conservation partnerships.

Restoring native species to their native habitats is rare indeed, let alone restoring sacred animals to sacred lands. In this age of extinction, the currents of "progress" flow strongly in one direction. But Ninnāastŭkoō is an exception to the rule. The Blackfeet iinniiwa release is that rarest of gifts — a two-way tide that carries us into the future while simultaneously returning what was lost to the past, laying the groundwork for both reconciliation and renaissance.

When it comes to restoration, America's national parks represent both a problem and a promise. There is not a national park site in America that does not sit on someone's traditional territory. And because we tend to establish parks on transcendent landscapes that inspire a sense of awe — and because those same landscapes have inspired that same mystical awe for millennia — national parks, more than other public lands, sit disproportionately on sacred lands.

"This mountain front may be someone's park, or someone's vacation," Monroe said, "but this is our cultural homeland. This is where we were given the gifts of life itself."

And so that is our work: to transform, through this rumbling herd, the problem of that borderline into the promise of how we might move beyond boundaries. The deceptively simple swing of the gate has turned this borderland into a model for modern land management where science and traditional knowledge reside side by side, where culture and nature weave tight as a Blackfeet blanket, and where neighbors share stewardship.

If the first century of parks was about protecting, then the second century must be about connecting. Connecting the countless species that make natural systems whole. Connecting the migratory corridors between ecosystems. Connecting conservation and culture. Connecting people to place. Connecting the heart and the head.

It was easy to imagine how this might be a new beginning, standing on Blackfeet land in the fresh light of a summer day with the smell of bison in the air. The clouds boiling up over Chief Mountain promised a very real change in the weather. Back in Washington, D.C., where so much of this history began, the winds already are shifting. Native Americans sit for the first time at the head of the National Park Service and Department of the Interior, just as Chief Mountain still sits at the head of the Backbone of the World. Watching iinniiwa run free, I could feel the arc of history circling on itself, perhaps.

But the herd was heedless of our hopes and expectations, these propitious political winds. All they knew was that, for the first time in their lives, there was no fence blocking the horizon. Wild nature doesn't care about human-made boundaries. She's a nomad, and she needs to move.

As the iinniiwa disappeared, charging toward Ninnāastŭkoō's eastern flanks, I was struck by how strange it was that, for the first time in seven generations, none of us knew where they were — or where they'd be tomorrow. We'd finally loosed control. The buffalo will do as they please now and follow their own lead. As it should be.

THE BLACKFEET chose to release the wild herd near Chief Mountain, a sacred summit divided by the long-contested border separating Glacier National Park and the Blackfeet Indian Reservation.

PHOTO COURTESY OF HUNTER D'ANTUONO/FLATHEAD BEACON

MICHAEL JAMISON has worked with Blackfeet Nation leadership for nearly 40 years to protect wild nature, traditional lands and cultural practice. He currently serves as campaign director for NPCA's Northern Rockies Region.

Lead Proof

A recent ballistics discovery at Fort Necessity National Battlefield confirmed where the French and Indian War began.

A HAND-COLORED WOODCUT depicting George Washington's 1754 attack on a French encampment near Fort Necessity in Pennsylvania.

For 30 years, Brian Reedy has been plagued by one question: Where, precisely, did the first shots of the French and Indian War take place? This May, the Fort Necessity National Battlefield volunteer-turned-full-time-staffer got his answer.

Historians largely agree that the opening salvo of this epic contest, which ignited over the control of riverways in the American colonies but spilled over onto four other continents as Britain and France's imperial sparring intensified, occurred at Jumonville Glen in southwestern Pennsylvania. The site, which has been part of the park since the 1970s, is located 7 miles from the main fort. Written accounts indicate that a 22-year-old George Washington, accompanied by 33 soldiers and up to a dozen Native American allies and acting under the British flag at the request of Virginia Gov. Robert Dinwiddie, surprised a contingent of Frenchmen after traveling all night in lashing rain. The ensuing attack, which Reedy called "15 minutes that changed the world," left all but one of Washington's opponents dead or captured. (Washington's side suffered just one fatality.) Though the repercussions of that 1754 confrontation rippled far and wide, from the French retaliation at Fort Necessity just weeks later to the ensuing years of all-out war to the American colonists' eventual uprising against British rule, no physical evidence had surfaced to verify the location of the so-called Jumonville Affair.

"It was always an assumption" that the skirmish took place on the 15 acres owned by the park, said Reedy, the park's chief of interpretation. But it also could have occurred farther down the forested ravine.

This spring, Reedy's years of doggedly nudging management paid off with a monthlong archaeological investigation. First, a team of four cadaver dogs scoured the park-owned ground. To avoid potentially disturbing the unmarked graves of the 14 people who died in the 1754 clash, the archaeologists excluded the two areas flagged by the canines from the next phases of the work, which included mapping, using laser light to create high-resolution images of the land and, finally, metal detecting. Jumonville Glen's varied past — prior to Park Service acquisition — added a certain junk-drawer quality to the search. Reedy said they unearthed coins, lipstick cases, toys, tools from past logging activities and plenty of bullets from 20th-century hunters. They also waded through countless false positives in the form of beer and soda can tabs. "Pull tabs and bullets give off the same beeping sound from a metal detector," he said.

In the end, the crew of 20 or so people — including Reedy and William Griswold, an archaeologist for the Park Service's Northeast region — managed to haul off loads of garbage and uncover five .60- or .70-caliber bullets, the size used in the muskets of the 18th century. These misshapen projectiles are, in Reedy's words, "quite possibly, or literally, the first bullets fired in the French and Indian War."

Now, a graduate student at Indiana University of Pennsylvania is analyzing the marblelike balls in hopes of pinpointing where the lead was mined. This information could help determine which guns fired the recovered ammunition, Griswold said. And because the field crew attached precise GPS coordinates to the artifacts they collected, they may be able to work backward to ascertain which side fired which shot. Perhaps, he said, this data — coupled with additional research — could shed light on other long-standing mysteries surrounding the Jumonville Affair. Was it an ambush? Who took the first shot? Were the Frenchmen soldiers or diplomats?

Once these unassuming lead plugs have surrendered as many secrets as modern technology can glean, they'll likely go on display for special occasions, according to Reedy, who still gets excited remembering their weight in his hand. "To actually hold something that has been in the ground for 269 years and the last time it was held by a human being was when it was loaded into a musket and fired in anger is way cool," he said. "It ranks up there with holding your kids for the first time."

—KATHERINE DEGROFF

Park staff would like to remind visitors that it is illegal to hunt for artifacts in national park sites and/or remove them.

A Stitch in Time

Volunteer crafters use yarn to highlight climate change in national parks.

PHOTO COURTESY OF KATHLEEN RODERICK

THESE TEMPESTRIES, or temperature tapestries, illustrate the daily highs at Theodore Roosevelt National Park in 1916 (left) and 2016 (right).

People have long associated colors with temperatures. The higher the thermometer climbs, the redder the hue on weather maps. By contrast, blues and purples pop to mind if we shiver in a cold breeze. In 2017, when a group of fiber artists sought a way to illustrate a changing climate, they turned to the color spectrum. With 365 rows and 32 shades of yarn they created a fuzzy way to materially show warming temperatures, calling the result a "tempestry."

Picture a scarf, then divide the long rectangle into individual rows, one for each day of the year. Starting with January temperature data for a specific location, crafters — knitters, crocheters or weavers — use a color of yarn that represents the high temperature of each day as they build row upon row toward December. Each 5-degree increment, from a bone-chilling minus 30 degrees Fahrenheit to a blistering 121 degrees, is assigned its own unique hue. The outcome is a cozy, touchable bar graph.

The tempestry creators — Emily McNeil, Asy Connelly and Marissa Connelly — were inspired to record climate data in textiles for posterity, but also to provide a new window into what can be a complicated topic for those who do not relish poring over scientific reports. McNeil and Marissa Connelly bring the knitting expertise (McNeil managed a yarn shop in Washington before moving to New York), while Asy Connelly is the data guru, connecting the team with National Oceanic and Atmospheric Administration information.

The trio founded a business — The Tempestry Project — to provide kits for crafters interested in creating their own tempestry, with premeasured colored yarn and data printed in neat rows. Their first year, they sold 40 kits. By 2018, it was 500. Now, they routinely sell hundreds of kits per year.

Ironically, I am one of those people who like to pore over weather data. My career revolves around effectively communicating science to the public, plus I'm the daughter of a climate scientist, so I've seen firsthand how inaccessible the subject can be for the people most impacted. When I tried my hand at a tempestry (after stumbling across the business online), I fell in love with the process from the very first stitch. The ease of immersing myself in data appealed to both my scientist and fiber artist sides.

I knitted in the evenings for weeks to finish my first tempestry, which

showcased the White Mountains of New Hampshire, where my mom works. Soon after, I purchased a tempestry representing Gulf Islands National Seashore for my great-aunt. That got me thinking: I wished I could see tempestries for Acadia, Everglades and Grand Canyon national parks, as well as the dozens of other national park sites that have shaped my outlook on the natural world.

I wondered whether a tempestry collection focused on climate change in our national parks would be a compelling way to make the crisis real for people. Soon enough, I landed on an ambitious goal: to inspire a community of park-loving crafters to make tempestries for at least 50 national parks, either those closest to their hearts or parks that they wanted to visit someday. Critically, each park would have two tempestries, one from 2016 (the year of the Park Service centennial) and one from a time in the past, such as 1916 or 1966. Once completed, each pair would be photographed in its national park setting to juxtapose the weather data with the landscape itself.

The Tempestry Project team posted a call for volunteers on social media, and I wrote about the initiative for National Parks Traveler in April of 2019. Karen Templer, a crafting influencer, picked up the story and shared it with her blog followers, hailing the project as "data-nerdery in knitted form." Volunteers immediately started rolling in, and I directed the effort, from coordinating the kit orders to arranging the photography. The tempestries proved to be a labor of love that often took months. If crafters couldn't photograph their yarn creations in the park they represented, they shipped the tempestries across the country to volunteer photographers or Park Service staff.

From start to finish, the process unfolded over more than three years, with a government shutdown (which temporarily barred access to the weather data) and a pandemic in between. Today, the national park tempestries — representing more than 50 sites as planned — have been displayed in parks, libraries and bookstores in half a dozen states, with more exhibits in the works. To my delight, I even had the chance to turn the collection into a book, which came out in the summer of 2022.

The power of the project centers around the crafters' tactile connection to the data and the ability to compare then-and-now temperature patterns at a glance. Looking at the crocheted tempestries for Theodore Roosevelt National Park in North Dakota, for example, summer heat waves extend literal inches longer in the one for 2016 than the one for 1916. Compare that with the tempestries for Voyageurs National Park, Minnesota, which show higher peak temperatures in 1975, but an overall warmer spring, summer and fall in 2016.

Put simply, these handcrafted graphs are approachable. I set up a small exhibit in my local library, using 12 tempestries to represent six locations. Before I had finished carefully laying out the fiber pieces, a woman and her teenage son approached with a friendly wave. I explained how to make tempestries, then pointed to the Point Reyes National Seashore pair. Right beneath my fingers I could show them how 2016 had a warmer spring and fall compared with 1966. Then I flipped to Point Reyes in the book and showed them a photo of one of the tempestries in front of the seashore's dramatic Californian coastline. They left the library intent on researching tempestries and climate change online. This is precisely the sort of exchange I'd hoped the project would spark.

"While knitting and photographing for this project, the tempestries provided a visible and tangible entry point for friends, family members and even strangers into a conversation about climate change," said California-based Stephanie Panlasigui. Panlasigui not only knit the Glacier National Park tempestries, she also photographed others' work in a few of the parks in her state, including Yosemite National Park and Golden Gate National Recreation Area. She explained the project, her fingers flying with two needles and yarn, to acquaintances, fellow patients in a doctor's office waiting room and colleagues while on work trips.

The Tempestry Project team said they were surprised by how emotional the park collection proved to be. "We've seen people slowly paging through the book and abruptly stop, hand over mouth, looking deeply at a picture that caught their eye — perhaps of a park they visited as a child, or took their children to, or even got married in," the founders wrote in an email.

The National Parks Tempestry Project gave me hope on days when coverage of environmental catastrophes felt overwhelming. So many people contributed their time and crafting expertise to create tempestries and push the climate change conversation forward. Our work doesn't live in academic journals, nor is it reliant on news cycles or social media impressions. It lives in our homes, at our fingertips, in our personal exchanges with family and friends. Each person we reach is one more voice that can encourage climate action, strengthening the movement for a more resilient future for our parks and our communities.

ERIKA ZAMBELLO is a writer and fiber artist based in Florida.

WATERED DOWN

A Supreme Court decision jeopardizes the country's streams and wetlands.

In May, the Supreme Court narrowed the scope of the Clean Water Act of 1972, dramatically limiting the reach of this landmark federal law that was enacted to prevent and reverse pollution in the nation's waters, including the National Park System's 150,000 miles of rivers and streams. The high court's controversial decision revolved around which water bodies should be considered "waters of the United States" and thus monitored, maintained and restored under the oversight of the U.S. government. (This review role is critical because 18 states have fewer than one full-time employee dedicated to wetland monitoring.) Under the new interpretation, any waterway without a "continuous surface-water connection" to a navigable waterway has lost federal protections. The result? Intermittent streams, such as those in the arid Southwest or those that serve as headwaters to major rivers, including the 2,300-mile-long Missouri, as well as wetlands that are hydrologically linked below ground, are at risk of degradation. These water bodies — already threatened by a changing climate — play vital roles in flood and sediment control, provide irreplaceable habitat for plants, fish and other wildlife, contribute to the health of larger watersheds, and support the country's $788 billion outdoor recreation industry. The court's decision "prioritizes polluters over clean drinking water for millions of people and jeopardizes the waters that flow through our communities and our national parks," said Chad Lord, NPCA's senior director of environmental policy and climate change. Here's a snapshot of what's at stake in national parks and beyond.

Water Bodies That Could Lose Protections

60 MILLION
ACRES OF U.S. WETLANDS, INCLUDING NEARLY 1 MILLION ACRES IN FLORIDA'S BIG CYPRESS SWAMP

35%
OF THE WATERS IN THE BASIN OF THE TONGUE RIVER, AN IMPORTANT TRIBUTARY OF THE YELLOWSTONE RIVER

UP TO 51%
OF THE STREAMS IN MASSACHUSETTS' LOWELL NATIONAL HISTORICAL PARK AND 25% OF ITS WETLANDS

UP TO 77%
OF THE STREAMS IN SAINT CROIX NATIONAL SCENIC RIVERWAY IN WISCONSIN AND MINNESOTA

UP TO 60%
OF WETLANDS WITHIN THE CHARLES RIVER WATERSHED, AFFECTING THE HEALTH OF BOSTON HARBOR ISLANDS NATIONAL RECREATION AREA

35%
OF THE STREAMS IN COLORADO'S FLORISSANT FOSSIL BEDS NATIONAL MONUMENT

Did you know?

90% OF ALL FISH CAUGHT RECREATIONALLY IN THE U.S. DEPEND ON HEALTHY WETLANDS FOR PART OF THEIR LIFE CYCLE

MORIBUND RAZOR CLAMS on Olympic National Park's Kalaloch Beach. A nuclei-infiltrating bacteria causes the clams' cells to burst, killing most of the animals as they reach adulthood.

NPS

A Clam Conundrum

Olympic National Park's razor clam population has been struggling for years. Is disease to blame?

THE DIE-OFFS HAPPEN every few years, in grisly and odiferous fashion. Rafts of razor clams pile up on Kalaloch Beach, the 4-mile stretch of sand that hugs Olympic National Park's western coast, accumulating along the wrack line like flotsam. Some turn up flaccid and gooey, tissues spilling listlessly from long, narrow shells. Others arrive as empty cases, their innards having been scavenged by gulls. In the worst years, tens of thousands can wash ashore.

For years, biologists with the National Park Service, the state of Washington, the Quinault Indian Nation and the Hoh Tribe have sought to understand the die-offs. Each summer, they pump seawater into sections of beach, liquefying the sand and impelling clams to float to the surface, where they can be measured and counted. Few Kalaloch clams, they've found, survive into adulthood these days. "The average size of adult clams is getting smaller and smaller," said Steven Fradkin, a coastal ecologist at Olympic. "And it's basically because they're just not living long enough to grow."

The clam crisis began in the summer of 1983, when Pacific razor clams — bivalves that burrow into sandy intertidal zones from California to Alaska — inexplicably vanished from Washington's coasts. The previous year, scientists had estimated that 20 million clams inhabited the state's beaches; now their digs turned up nothing but sand. "We have seen drop-offs in population before, but never anything as dramatic as this," one official told reporters. Before long, a stunning 95% of Washington's razor clams had disappeared.

Making sense of the die-off fell to Ralph Elston, a shellfish researcher who examined the gills of some 2,000 razor clams from the affected beaches under a microscope. It was immediately obvious to Elston that something was wrong. Enormous bacteria, larger than any then known to science, had infiltrated the nuclei of the clams' cells, swelling them to monstrous proportions. When the membranes of the engorged cells burst, countless new bacteria spilled forth, perpetuating the cycle of infection. For the bacteria, it was an ingenious survival strategy; for the clams, which use gills both to breathe and to filter food particles from the water, it was disastrous.

"There really wasn't any precedent," Elston recalled. He called the bizarre

new organism Nuclear Inclusion X — NIX, for short.

As the years passed, NIX seemed to fade away, and clam numbers on most of Washington's beaches recovered, including on Kalaloch, where thousands of clammers once flocked annually to gather the Olympic Coast's bounty. But in 2006, Kalaloch's clam population cratered again and continued to behave erratically in the years that followed. Bumper crops of baby clams occasionally pockmarked the sand; in 2015, for instance, the Park Service estimated that a whopping 138 million young clams settled on Kalaloch. But bigger clams — those larger than 3 inches, the minimum length for harvest — remained scarce, and dying clams soon began to wash up once more. When researchers surveyed the beach in 2016 and 2017, they found that nearly all of the babies had died before reaching adulthood.

As Kalaloch's clams suffered, the Park Service took action to protect the survivors, including by limiting or prohibiting recreational clamming nearly every year since 2006. (The park's recreational closures don't affect subsistence harvest by Native Tribes such as the Quinault and Hoh, whose members have the right to gather clams from Kalaloch and other beaches within their traditional territories.) At first, Fradkin said, locals were peeved, but not even avid clammers want to dig up 2-inch pipsqueaks. When the park briefly permitted a test harvest in 2015, the reaction was dismay: "We got roundly thrashed by the public for opening a dig on a beach with such puny little clams," Fradkin said.

Although Fradkin suspected that NIX was primarily to blame for the minute mollusks, other forces were hard to rule out. Maybe the region's recovering sea otters were scarfing down adult clams, or ocean acidification caused by excess carbon emissions was impairing their ability to grow shells. A 2020 study that examined clams along eight Washington beaches also found that Kalaloch's bivalves contained the most microplastics, perhaps because of its exposure to pollution from Seattle or the shipping industry.

"We got roundly thrashed by the public for opening a dig on a beach with such puny little clams."

Recent research, however, strongly suggests that NIX is indeed the main culprit. In 2022, a group of scientists published a study showing that, while most Washington razor clams carry NIX, those at Kalaloch are infected with roughly 10 to *1,000 times* more bacteria than clams elsewhere. The researchers also drew upon years of surveys to show that young Kalaloch clams had by far the lowest survival rates in the state. This evidence, along with study of the tissue, seem to indicate that NIX is killing young clams before adulthood. "Kalaloch had consistently higher infections and observations of the gill cells bursting open, and it's the only one of these beaches that seems to have these consistently failing cohorts of clams," said Maya L. Groner, a disease ecologist at the Bigelow Laboratory for Ocean Sciences in Maine and the study's leader.

Yet the questions about NIX still outnumber the answers. For example, why does Kalaloch have such astronomical infection rates compared to other beaches? Although Fradkin and Groner are quick to admit they don't know, they speculate that it may have to do with Kalaloch's position along the Olympic coast: Beaches farther south have different nearshore water movement patterns, and a plume of freshwater that spills from the Columbia River may protect those areas from marine pathogens.

Another burning question: How might the decline of Olympic's razor clams ripple through the ecosystem? The Olympic Peninsula is an underwater biodiversity hotspot, home to more than 750 marine invertebrates and seaweeds, from basket stars to sea cauliflower — more species than any other stretch of the Pacific Coast. Razor clams, in their quiet, stolid way, play a pivotal role within that extravagant littoral ecosystem. Clams improve water quality by sifting algae and other particulates through their gills, and their own bodies feed animals from shorebirds to coyotes. Rarely do we think of shellfish as keystone species, yet razor clams are no ordinary bivalve. "They're a really important link in the food web," Groner said.

And then there's the most vexing mystery of all: Why did NIX first pop up in the 1980s, and why has it lingered? One theory, raised by Fradkin, is that humans have fundamentally altered the structure of marine ecosystems. As commercial fishing has depleted the ocean of tuna, salmon, rockfish and other large predators, some food webs have suffered "microbialization" — a shift from a community run by big, backboned animals to one dominated by microorganisms. Perhaps NIX has profited from a similar downsizing, or from warming ocean temperatures that have stressed clams' immune systems. Either way, the pathogen may exemplify the havoc we've wreaked upon our oceans — and portend more transformations to come. As Fradkin put it, "This is just one of an endless grab bag of weird changes that we're going to be seeing through our lifetimes."

BEN GOLDFARB is the author of "Crossings: How Road Ecology Is Shaping the Future of Our Planet" and "Eager: The Surprising, Secret Life of Beavers and Why They Matter."

©JACK JEFFREY

HAWAIIAN HONEYCREEPERS, such as this colorful ʻākohekohe, were once widespread in the Aloha State, but avian malaria — a disease transmitted by the invasive southern house mosquito — has killed nearly all the birds that contract it.

Buzz Kill

A high-tech mission to save critically endangered forest birds takes flight at Haleakalā National Park.

HONEYCREEPERS WERE ONCE a familiar sight throughout the Hawaiian Islands. Decked out in brilliant red, yellow, orange or green feathers, dozens of species of these melodic birds flitted through the forest from sea level to tree line, dipping their beaks into flowers for nectar or cracking open berries in search of the larvae within. "When the first Hawaiians came here, they would have been greeted with a chorus, just an abundance of these birds," said Lukanicole Zavas, an outreach manager at the American Bird Conservancy. And by pollinating native plants and keeping insect populations in check, "Hawaiian honeycreepers helped facilitate the beautiful biodiversity once found on all the main islands," she said.

But unfortunately, hundreds of years of human activity have taken a grave toll on Hawaii's honeycreepers. "It's stark to think that I've lived in Hawaii almost my whole life, and I didn't see a single Hawaiian honeycreeper until I was in college," Zavas said. "And even then I had to climb way to the tiptops of mountains to see them."

It's a familiar story: Roads, homes and ranchland have replaced much of the birds' forest habitat. Also, introduced predators such as rats and mongooses go after their nests. But by far the most devastating introduction was avian malaria. Since the mosquito-borne disease made its appearance in Hawaii in the early 20th century, it has churned through honeycreepers on every island, causing their red blood cells to rupture and killing nearly all of the birds that contract it. Today, most of the honeycreepers that remain can be found only in remote, high-elevation forests that have historically been too cold for the southern house mosquito, the invasive insect that spreads the disease. (Hawaii had no mosquitoes at all until 1826, when a whaling ship carrying some in its hold docked on Maui. Within decades, mosquitoes and the diseases they carry had spread to every island.)

One such honeycreeper redoubt can be found in Maui's Kīpahulu Valley within Haleakalā National Park. For decades, as honeycreeper species such as kiwikiu and ʻākohekohe have disappeared from the rest of the island, biologists have been keeping tabs on what's seemed to be a pretty steady population of these birds within about 11 square miles of forest, spanning parts

of Kīpahulu and surrounding protected lands above 5,000 feet of elevation.

"Ten years ago, everywhere we'd go search for kiwikiu in that forest, they were there," said Chris Warren, the forest bird program coordinator at Haleakalā National Park. Warren knew the birds' overall situation was dire: Of the 20 or so honeycreeper species once found on Maui, only six remain on the island and half are threatened or endangered. But he could take a little comfort in the fact that the birds still had a stronghold, high on the mountain, where malaria and mosquitoes couldn't touch them.

Until, alas, they could. By 2019, surveys in the Kīpahulu Valley were turning up malaria-positive mosquitoes above 5,000 feet — and malaria-positive birds at all elevations. That same year, Warren was part of an effort to reintroduce the critically endangered kiwikiu to a patch of restored forest on the southern shoulder of Haleakalā, Maui's 10,000-foot volcano, in an area that was thought to be above the mosquito line. "We spent seven or eight years planting, fencing, removing invasive species, trying to improve that habitat as best we could before the translocation," Warren said. Of the 14 birds released in October 2019, 10 were dead of malaria by November, and the remaining four vanished.

The culprit? Climate change. "Now we're understanding that warmer temperatures and changes in precipitation patterns have allowed mosquitoes and malaria to encroach on the last places these birds have," Warren said. "They're out of mountain. They don't have anywhere left to run." In just the past decade, the ʻākohekohe population has gone below 2,000, and kiwikiu have sunk from some 500 to possibly 150. "All of the remaining kiwikiu in the world collectively weigh about as much as one gallon of milk," Warren said.

The birds' decline has continued despite decades of efforts to save them. Conservationists have tried excluding humans from vast areas of the island, fencing off honeycreeper habitat to keep out feral goats and pigs, trapping and poisoning predators, replanting forests, translocation, and breeding birds in captivity. But none of these strategies has halted the spread of malaria. After the failed kiwikiu reintroduction in 2019, scientists realized they needed "a change of mindset," Warren said. "We realized we have to do something about the mosquitoes."

So Warren and his colleagues at Haleakalā looked at a vast array of possible solutions, from the conventional (hosing the forest with pesticides) to the Sisyphean (draining all the puddles where mosquitoes breed) to the futuristic (using gene editing technology to engineer malaria-proof mosquitoes or birds). Those ideas were quickly dismissed. In the end, following extensive consultation with experts and interested members of the public, they settled on a strategy known as the incompatible insect technique, or IIT.

Counterintuitively, IIT works by releasing many *more* mosquitoes into the forest. The new arrivals are all males, and they're bred in a lab to carry a particular strain of a bacteria called Wolbachia in their reproductive organs. The bacteria, several different strains of which are already present in a range of insect species on Maui, produce proteins that interrupt the development of mosquito embryos formed when the introduced males breed with wild females, which don't carry a similar strain of Wolbachia in their own sex cells. If you release enough "incompatible" male mosquitoes in an area — somewhere between 10 and 20 lab-bred males to every wild female — the females will have a slim chance of encountering males with which they can produce viable offspring. IIT, which has been deployed around the world against mosquitoes that spread human disease since the late 1960s, can cut a local mosquito population by more than 90% within weeks or months.

"This technique is very powerful," said Zhiyong Xi, an IIT expert at Michigan State University who's one of the advisors to the Park Service on this project. "It's not like a traditional chemical, because insects eventually develop resistance to those. So when you continue using chemicals, eventually you select a highly resistant mosquito population, and then you're not able to further push down the population."

Pesticides, of course, can also kill beneficial insects, while IIT precisely targets the troublesome mosquito. And male mosquitoes don't bite, so there's no risk that

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THE LUSH LANDSCAPE of Haleakalā National Park's Kīpahulu District. Hawaiian honeycreepers used to thrive here at elevations above 5,000 feet, but recent surveys indicate malaria-positive birds have appeared in this avian stronghold as well.

the lab-raised cohorts will worsen the spread of avian or human disease.

Still, Xi is accustomed to a certain amount of wariness about IIT. "People worry: how can you spread a bacteria in our community? But Wolbachia is not a normal bacteria like in people's minds. It cannot cause infection," he said. That's because, unlike bacteria that cause infectious disease, Wolbachia can only live within their hosts' sex cells and is only transmitted from a mother to its offspring. When a Wolbachia-carrying bug dies, its Wolbachia die with it and can't spread to other organisms in its environment. And Wolbachia can only infect invertebrates, so mammals and other species are in the clear.

Warren added that since regulations were introduced in the 1970s, no intentional, regulated biocontrol program has "attacked native species or had unintended negative consequences. The truly problematic species are those introduced without regulation or unintentionally introduced." Regardless, the Park Service's plan for Maui's mosquitos doesn't entail introducing any species that aren't already widely distributed in Hawaii. Even the specific bacterial strain used to breed the incompatible male mosquitoes at Haleakalā is Maui-grown: Scientists in a lab in California isolated a strain of Wolbachia from another species of mosquito on the island, the Asian tiger mosquito. They then bred a population of Maui's southern house mosquitoes, dosed them with antibiotics to kill off their existing Wolbachia colony, and injected the incompatible strain from the Asian tiger mosquito into the southern house mosquitoes' sex cells. This step can be a bit fiddly, Xi acknowledged — the needles the lab uses must be very small — but "once one mosquito is generated carrying this bacteria, then all you need to do is breed this mosquito" to generate a line of southern house mosquito that's incompatible with Maui's invasive bugs, Xi said.

But breeding zillions of mosquitoes in a lab in California is just the start. Next, the incompatible males must be carefully separated from the females and kept alive long enough to be shipped across the ocean. Then they will be packed into the bellies of drones and released, tens of thousands at a time, across east Maui's dense, trackless forest at regular intervals. The Park Service released its first batch of mosquitoes into a small study area this spring. The agency plans to deploy the drones this fall and gradually expand its coverage as it works out the kinks in its process and gathers data on the treatment's effectiveness. (A statewide working group is meanwhile considering other areas where IIT could save species on the brink of extinction, such as on Kauai, where the population of an endemic honeycreeper called the 'akikiki fell from 500 in 2018 to 10 in 2023.)

At least for now, the Park Service only plans to use IIT in the areas on Maui where honeycreepers are already taking refuge. So even if a single application of incompatible males eradicates the local mosquito population, Warren said that bugs from elsewhere on the mountain will eventually move back in, meaning the Park Service will need to keep this routine up "until some other tool comes along that is somehow better or more permanent." If nothing is done, these species could go extinct within the next 10 years, Warren said, and for the time being IIT is the park's best option: "Right now, we can do this at a scale that will save these birds."

JULIA BUSIEK has worked in national parks in California, Colorado, Hawaii and Washington state. She lives in Oakland, California.

As the magazine went to press, fires were devastating Maui, and the human toll was still unknown. At that time, it appeared the fires had not affected the Kīpahulu District of Haleakalā National Park though they did cause the park's closure.

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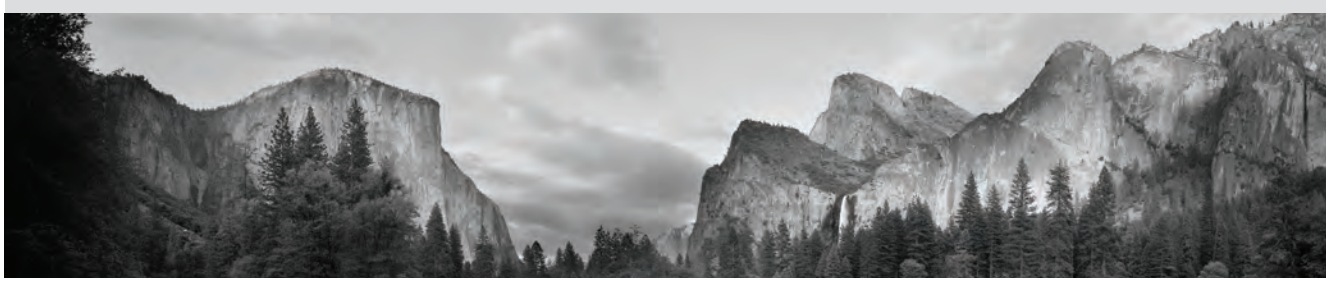

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A.

B.

I guess I was a little bored. For the past hour, I'd been on the phone with Daniele, the head of my office in Italy, reviewing our latest purchases of Italian gold, Murano glass and Italian-made shoes and handbags.

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ON THE BRINK

What happens when erosion, rising seas, a national park and a beach community collide?

By Melanie D.G. Kaplan

COURTESY OF JOHN MCCORD, COASTAL STUDIES INSTITUTE, ECU

Shortly after sunrise in mid-January, I parked my car behind a few pickup trucks on South Shore Drive in the village of Rodanthe, North Carolina — one of seven villages on Hatteras Island. Wearing a lightweight jacket and shin-high yellow rubber boots, I walked past mounds of sand and piles of wood planks toward a house raised about 20 feet on temporary risers that looked like giant Jenga blocks. Workers busied themselves around the construction site, and in the background, trucks grunted and generators hummed, drowning out the sound of the Atlantic Ocean.

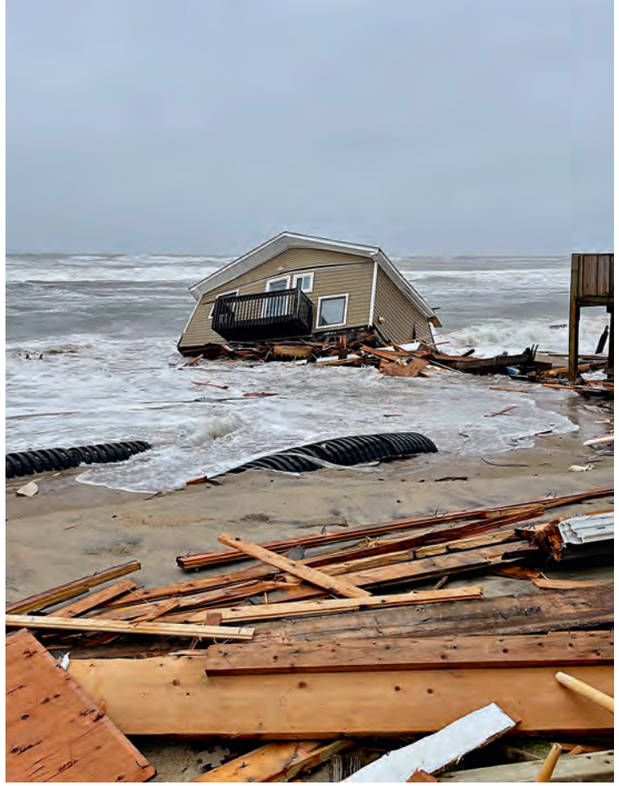
This cheery, aqua-colored house, with two stories and five bedrooms, belongs to Cindy Doughty, a retired nurse. She and her late husband were enthusiastic world travelers, but over the years, they had fallen in love with the simplicity and calm of the area. They kept returning, and two decades ago, the couple purchased their own place. Their vacation home, where they brought their kids (and later, their grandkids) looks out to Cape Hatteras National Seashore, which protects 75 miles of Atlantic coastline in the Outer Banks.

Doughty recalled how her family used to lug gear out a long boardwalk and over a dune to reach the surf. But over the years, the distance between the ocean and Doughty's house shrank, and that's when her troubles began. First, a storm blew out some stairs from the house; that was a relatively easy thing to fix. But in 2019, a hurricane came through and wiped out the entire dune between her house and the ocean.

"Once that was gone," Doughty said, "water came up under the house with every storm." In February 2022, a house on Ocean Drive, 300 yards to the north, collapsed into the water, hungry waves devouring the entire structure and then spitting two-by-fours, drywall, shingles, tar paper and furniture onto the shoreline for miles. Large chunks of concrete slammed into Doughty's house and broke the oceanside door. Then when two more homes fell a few months later, the detritus destroyed the back of her home. Water lines snapped, the pilings broke, and the house became uninhabitable.

Doughty had a seasonal job managing a clothing shop in Duck, about an hour away, so she slept in her boss's guest room for several months. Some evenings, she returned to Rodanthe and sat in her home, alone. There wasn't any electricity, but the moon reflected off the ocean and lit up the house. She thought about how she used to keep her bedroom sliding door open, the sound of the waves lulling her to sleep.

"This sounds silly, but I wanted to keep the house company," Doughty said. "I know every detail of that house like I know the wrinkles on my face. It was heartbreaking to see it all hurt and busted up." Yet she was luckier than most: The home was on a double lot, so she had room to shift it away from the water, like scooting back your beach towel as the tide comes in. Moving her house, she decided, was the only option.



CAPE HATTERAS NATIONAL SEASHORE/FLICKR

A PRIVATE HOME collapses along Ocean Drive, littering Cape Hatteras National Seashore with debris (opposite page). Below: The water-locked village of Rodanthe, which is squeezed between the ocean and the sound. A home-moving company is preparing the turquoise house in the foreground for relocation. Previous pages: Sand cuts off Highway 12, the main thoroughfare through Cape Hatteras, in the wake of Hurricane Earl last September.

I arrived in Rodanthe when Doughty was mid-move. I'd traveled there not only to talk to homeowners but also to learn more about the messy situation that washes up when coastal erosion, private homes and a national park cross paths. A warming climate — which is causing rising seas and more intense, frequent storms — has been catastrophic for coastal regions around the world. Here in the Outer Banks, a string of fragile barrier islands, the sea has been engulfing beach homes one by one, which is a nightmare for homeowners and a disaster for the local government and the National Park Service. Beaches covered with dangerous debris are terrible for wildlife, and viral videos of house collapses are awful for tourism. Even if most of the beach is unsullied, "if you're in Iowa and you're deciding about the Outer Banks and see news of 2 miles of Rodanthe covered with debris from fallen houses, you're going to go somewhere else," said Bobby Outten, the manager of Dare County, which stretches along 110 miles of the coast.

But the search for solutions has laid bare some inherent tensions between those with competing priorities. On the one hand, the Park Service is in the business of protecting this beautiful, beloved beach and the wildlife here — from hundreds of bird species to five endangered or threatened species of turtles. Because the shoreline has shifted so dramatically and the national seashore's boundary is based in part on that shifting shoreline, it is likely that some Rodanthe homes in danger of collapse now partially or completely sit inside the national park site. Moving or removing the houses, which would please many environmentalists, likely would be the best way to protect the seashore.

On the other hand, many owners of imperiled homes are reluctant — or unable — to move their houses. They tend to prefer the idea of beach nourishment, an engineering feat and temporary fix that involves adding tons of sand to the eroding shoreline to protect residences.

Figuring out what to do will require answering some important questions: Where exactly are the national seashore boundaries today in relation to private property? What is an appropriate role for the Park Service, which once actively protected the coast from erosion? What are the responsibilities of homeowners, some of whom made the decision to buy oceanfront properties in recent years even though waves were pushing toward the houses and the low selling prices underscored how risky the investments were? Should the government or anyone else bail them out? By the time I arrived in Rodanthe, the tight-knit village was consumed in a heated debate about all of this. As I looked at Doughty's house, I began to understand the complexity of the situation.

I waded into the surf to take a picture of the house. As I stepped backward to frame my shot, I looked behind me to gauge the incoming waves. In the seconds I turned away from the surf, a wave snuck up, dumping icy saltwater into my boots and soaking my jeans. I laughed out loud. And I felt certain that the mighty, unpredictable ocean was laughing back.

PEOPLE WHO VACATION in the Outer Banks — or OBX, as the area is known — talk about the destination as though it's from another time: tranquil, quaint, wholesome. Even in places where

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MOVING A HOUSE typically requires demolishing the lower level. Then, the structure is shored up with steel beams, detached from its pilings, lowered onto giant dollies and towed to a new location, said Theresa Matyiko, president of Expert House Movers. During transport, everything has to make way, including overhead wires (opposite page).

the Banks are more developed, the area is worlds apart from much of the Maryland, Delaware and New Jersey shores, with their high-rise hotels and bustling boardwalks. Those who seek an even slower pace head to the national seashore, which extends along the coastline from just south of Nags Head to the southern terminus of Ocracoke Island. Visitors to these islands tend to follow similar summertime rituals: They rent homes, stock up on groceries, play on the beach by day and grill on the deck by night.

After I visited Doughty's home, I drove to Whalebone Junction — the northernmost point of Cape Hatteras National Seashore — to meet the park's superintendent, David Hallac, who had agreed to show me around Rodanthe. Under overcast skies, we headed down Highway 12, a two-lane road where sand regularly blows or washes onto the pavement, like watercolors bleeding outside an ink line. This is Hallac's ninth year working in the Outer Banks, where he also oversees Fort Raleigh National Historic Site and Wright Brothers National Memorial. Among locals, he has earned a reputation for fairness and peacemaking. He is soft-spoken and smiles a little as he talks, as though he's sharing a secret. Rob Young, director of the Program for the Study of Developed Shorelines at Western Carolina University, called him a "superhero superintendent" with one of the hardest jobs in the Park Service. Together, Hallac and I headed toward Ocean Drive, where three residences collapsed in 2022.

The unincorporated village of Rodanthe sits about halfway down Hatteras, jutting out into the Atlantic Ocean. Young said the village is in an especially exposed and vulnerable spot. Here, the shoreline moves 10 to 15 feet every year — triple the rate on some other parts of the island. Along the 2 miles at the northern end of Rodanthe, the dry sand part of the beach that is owned by the Park Service is virtually gone — as are the dunes that once protected homes and roads. Of course, the problem isn't limited to Rodanthe. Cape Point, at the south end of Hatteras Island, for instance, has probably moved more in the last three years than Rodanthe has since 1950. But that isn't newsworthy because there aren't any structures at risk.

In developed areas across the United States, erosion is leading to devastation: Homes are falling into the ocean in Cape Cod, Massachusetts, and railroad tracks are shifting along the coast in San Clemente, California. The shorelines would recede without climate change, according to experts, but sea-level rise accelerates the problem. The National Oceanic and Atmospheric Administration projects as much sea-level rise in the next 30 years as we've recorded in the past century. By 2050, "moderate" flooding, which the agency defines as "typically damaging," is expected to occur an average of 10 times more often than it does today, and a study published earlier this year shows seas along the Southeast and Gulf coasts have risen at unprecedented rates.

Braxton Davis, the director of North Carolina's division of coastal management, said imagery from 2020 showed that 764 of nearly 9,000 oceanfront structures in the state were at risk at that time. He estimated that at least 20 have collapsed over the past two decades.

When a house collapses, debris can stretch 20 miles along the national seashore, making it unsafe for beachgoers. "It renders miles of beach unusable," said Julie Furr Youngman, a senior attorney at the Southern Environmental Law Center who works on coastal protection and water quality issues. "It's not just the risk of people being hurt during the actual collapse that's so terrible," she said. "It's the raw sewage, boards with nails and insulation. Even cleaning up the largest items takes a long time; fully cleaning up the smallest items like nails, broken glass and scraps of carpet has proven nearly impossible." In one count, the Park Service found 33 exposed septic tanks and drain fields.

Ideally, owners of at-risk homes would have contractors lined up before their houses fall, and crews would get to work immediately. But it doesn't usually work that way. After some of the recent collapses, the Park Service has had to step in.

"You've got park staff out there cleaning up when they should be doing other things," said Emily Jones, NPCA's Southeast regional director. "You just don't want to see anybody get hurt being on the beach."

On our stroll, Hallac and I mostly avoided the beachfront, instead walking on the sand behind several homes. "You can't walk on the beach anymore at high tide because the water is under the houses," he said. "I'm concerned because just a few weeks ago, you could walk in front of these houses."

Cape Hatteras National Seashore was established 70 years ago, but for decades, few paid much attention to the park boundaries; after all, those lines — and the water — were football fields away from houses. But natural and human-caused forces have brought those park boundaries (between the mean high and mean low water marks, informally known as the wet sand beach) under some of the oceanfront homes on some days. One homeowner, Jeff Munson, told me that before he moved his house, he would stand on the deck and feel like he was on a cruise ship.

"When houses are intact behind a dune, that's private property,"

DAVID HALLAC, the superintendent of Cape Hatteras National Seashore, Fort Raleigh National Historic Site and Wright Brothers National Memorial, walks along the beach in Avon, one of seven villages on Hatteras Island. Western Carolina University's Rob Young called Hallac a "superhero superintendent" with one of the hardest jobs in the Park Service.

©ERIN SCHAFF/THE NEW YORK TIMES/REDUX

said Young. "But you go onto the beach, and that's Cape Hatteras National Seashore. The problem is that the shoreline is shifting, and homes are effectively moving into the national park."

Hallac gave the houses a wide berth. Though technically some of these houses may sit on land he manages, he's sensitive to the concerns of homeowners. He explained that pinpointing the national seashore boundaries is more complicated than simply looking at the wet sand because the shoreline is so dynamic. A formal survey may be required to make the determination between federal land and private property. We walked by a grill mostly buried in the sand. His staff had put up signs here saying the beach was closed, but they washed away.

A biologist by training, Hallac thinks a lot about the resident wildlife. "Imagine you're a shorebird and you forage in the swash zone," he said as we lumbered across the sand. "Or if you're a turtle trying to nest and there are two-by-fours buried in the sand."

As we strolled, I picked up a couple of real estate flyers. One read, "Front Row Seats," for $459,000. "Views, views, views," I read off the paper. Later, I learned from a realtor that five people bought oceanfront properties in Rodanthe in the first half of this year.

Hallac and I were walking back to the car when a lanky man with a tape measure clipped on his waistband and a pencil behind his ear stopped us. The contractor didn't want me to use his name because his view might not be popular, but he told Hallac he was frustrated with investors who now expect bailouts. "Why didn't they just go to Vegas?" he asked.

More than once, as if reciting a mantra, Hallac said, "There's no silver bullet." The lack of a solution keeps him awake at night.

According to Stan Riggs, a geologist who has been studying the North Carolina coast for 60 years, barrier islands like the Outer Banks are "mobile piles of sand." They are essentially large sandbars, only slightly above sea level, that absorb the impact of surges and protect the mainland from extreme weather. With each storm surge, waves wash over the barrier islands; over time, the overwash moves the islands toward the coast. Or at least that's how it's supposed to work. But on Hatteras, that movement is altered by human-made structures — the homes, roadways and bridges that have been built to support a growing population and millions of annual visitors.

I went to visit Coastal Studies Institute Executive Director Reide Corbett on Roanoke Island, just north of the national seashore, and he pulled up an interactive map showing coastal erosion over the decades. He pointed out that most of the Outer Banks are also eroding from the sound side, albeit at a slower rate. "The islands are doing this," he said, pushing his palms together to demonstrate "coastal squeeze." Other communities around the country are dealing with similar issues, but that squeeze is particularly dramatic here. The Outer Banks "could be a canary in the coal mine," Corbett said.

Cape Lookout National Seashore, about 100 miles southwest of Rodanthe as the crow flies, provides a compelling comparison. Those islands, accessible only by boat for the most part, are wild and undeveloped, with no paved roads and no human residents. They are also among the healthiest islands in the world, said Riggs.

"Once you quit trying to fool with it," he said, "nature builds those islands. They belong to the ocean."

Hallac had given me a helpful lesson on the history of local coastal management when we were driving around. In 1936, Congress passed a beach improvement act that made it federal policy to help protect beaches from erosion. That same year, the Park Service took over a massive dune-building effort from the Civilian Conservation Corps on the Outer Banks. Thousands of workers installed several million feet of fencing, and they planted grasses as well as millions of trees in hopes of halting erosion. From the beginning, it was understood that this Great Wall of Carolina, as critics later called it, would have to be continually reconstructed.

In the decades after Cape Hatteras National Seashore was established, scientists began to better understand barrier islands. Experts concluded that the dune projects were actually preventing the movement of sand and worsening erosion. So in the '70s, the Park Service reversed course and stopped trying to hold back the ocean.

These days, there are three standard responses to shoreline erosion. One — building hard structures such as jetties and sea walls — was banned in North Carolina in 2003 because those structures ultimately cause an increase in erosion in other areas of the beach. The second is retreat or relocation of existing buildings, parking lots and roads, which essentially means allowing the coast to be reshaped. The third is beach nourishment. Young said nourishment is an economic lifesaver for hundreds of coastal communities, noting that Miami, Virginia Beach and Wrightsville Beach, North Carolina, wouldn't have beaches today if not for these projects.

In 2011, Nags Head was partway through a major nourishment project when Hurricane Irene hit. After the storm subsided, county officials were gobsmacked to find no damage to houses or hotels, no flooding, no sand on the roads. Suddenly, many locals, including those who had previously dismissed the idea of nourishment, wanted in.

As helpful as nourishment is for tourism and local economies, these projects are controversial. For starters, the process does not stop erosion. "Our present economic approach to development on the barriers is not sustainable over the long term, and nourishment projects don't help one bit — they just make people feel good for a brief period," said Riggs.

The new beaches may last three to five years, depending on storm activity and erosion rates, before more sand is needed. "This is a forever game," Young said. "It's like something out of Dante's 'Inferno.'" He's concerned that nobody has a Plan B or knows the ecological impact of trying to build "one giant beach from southern Maine to South Padre Island, Texas."

Beach nourishment work is also expensive. NOAA's database shows that the U.S. has spent close to $9 billion on nourishment in the last century, sometimes paying $10 million or more per mile. A report commissioned by Dare County, released in May, estimated that nourishing just over 2.5 miles of beach in Rodanthe would cost $40 million.

Although undertaking beach nourishment in a national park is permissible if the project meets the stringent criteria required for a permit, neither federal law nor park management policy point toward nourishment as an appropriate first-choice solution, said Furr Youngman, the environmental lawyer. She stressed that most of these projects are not compatible with the Park Service's mission — to preserve "unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations."

Hallac said the Park Service doesn't generally use beach nourishment unless one of its buildings or a road used by staff and visitors needs protection. "We don't have anything in Rodanthe that needs to be protected," he said. "It's not that beach nourishment is a priority or not; it's just not our role to protect neighboring communities."

Park policy calls for looking at the best available science, trying to forecast where the shoreline will be in the future and determining what makes sense for park structures on a case-by-case basis, Hallac said. In 1999, the iconic Cape Hatteras Lighthouse, which was built 1,500 feet from the ocean in 1870, was moved a half-mile inland after the water came as close as 120 feet.

The Park Service's approach isn't always popular. Homeowner Daniel Kerlakian purchased an oceanfront house in Rodanthe in 2021 and has spent most of the last two years repairing storm damage and reinforcing his home. Kerlakian loves national parks but is frustrated that the Park Service isn't rebuilding the shore. "I strongly believe that the national seashore is not a national seashore in front of Rodanthe anymore," he said, "because the park failed to maintain it."

Homeowners, many of whom rent out their properties, face difficult decisions. Some may be hoping the government comes through with funding for beach nourishment or for relocation or removal of their houses. Or they are waiting until their houses fall in the water, at which time — and not a minute before — they may be able to collect insurance money.

Others, whose homes have been declared uninhabitable, are crunching numbers to see if they can come up with the funds to cover their mortgage and move their home without rental income, which can reach $5,000 a week at the height of the season. Even if they have the financing in place, relocation is complicated. Multiple permits must be in order. Weather, tides and nesting turtles can hold up the process, sometimes for months.

Last September, Expert House Movers moved Doughty's house 200 feet westward, and when I visited, it was in its new location, waiting to be lowered onto new pilings. At the current rate of erosion, Doughty bought herself — for a couple of hundred thousand dollars — a decade and change.

One solution the Park Service is exploring, according to Hallac, is buyouts of the homes teetering on the shoreline. Young has estimated it would cost $43 million to buy the 80 properties

SERENDIPITY, the house featured in the movie "Nights in Rodanthe," as pictured in 2008 before being moved back.

within 300 feet of the high-tide line. (Young's report shows only one of the 80 is a primary residence.) Buying out homes will give Rodanthe a viable beach for 15 to 25 years at about one-third the cost of nourishing a similar stretch of beach for that same period. Based on the numbers, Young said buyouts are a no-brainer. But first, homeowners must agree to sell, and he can't think of one coastal community that has done this. "This is such an important conversation, and it's absurd to me that this is still such a controversial idea," he said.

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Riggs said that if we want healthy barrier islands in the future, we must move off the oceanfront and let the barrier respond to the ocean dynamics. "This doesn't mean we abandon the barriers," he said. "We just need to get smarter about how and where we live on a barrier island."

Many people aren't happy with the idea of managed retreat, but today we have what Young calls unmanaged retreat. "Doing nothing is an option that shouldn't be on the table," he said.

ONE EVENING DURING my visit, Dare County Manager Bobby Outten led a public meeting at the community center in Rodanthe. The one-room building was packed: Close to 100 people, including the sheriff, sat or stood. A virtual crowd watched online. Outten ran through a slideshow explaining beach nourishment and how projects have been funded in the past — using revenues generated partly from an occupancy tax. He explained that the county's nourishment fund, currently $6 million, won't come close to covering a Rodanthe project. He said he would like to see a nourishment project in the village but has exhausted his search for funding.

After the meeting I returned to my Airbnb, a small apartment on the sound side of Rodanthe. I queued up "Nights in Rodanthe," the 2008 movie with Richard Gere and Diane Lane. Much of the story takes place at an inn and was shot on location in Rodanthe. At several points, I paused the movie to watch and re-watch waves dancing under the house, which seemed lovely, romantic even. I also now understood that only in Hollywood is water under a house desirable. The large house, once called Serendipity, has since been moved away from the ocean. The next morning, on my way out of town, I stopped to see it. The road was full of sand, and the pavement looked like it has been punched with a wrecking ball. Serendipity is currently on the market for $1.5 million.

This spring, the North Carolina Coastal Resources Commission approved changes in the rules about permits for replacing or moving septic systems on public beaches, which will add hurdles for homeowners who wish to reinstall systems in vulnerable areas. The commission also approved rules that would require real estate disclosures about flood history and flood risk. Meanwhile, homeowners, the Park Service and various experts continue their efforts to figure out the best way forward.

BACK HOME, almost two months after my visit, I talked to Doughty, who said her contractor recently poured the concrete for her house's foundation. The next morning, she emailed a few overhead shots someone had sent her from Rodanthe. In one picture, the deep green ocean pushed large waves up under homes that Hallac and I had walked behind.

A few hours later, she called to tell me that one of the houses had fallen into the ocean. I was surprised how sad I felt hearing this news. The ocean quickly spread debris between the north end of Rodanthe and the south end of Avon. Park Service employees would eventually remove 70 pickup truckloads of wreckage from the beach.

In the days after the collapse, I watched videos from the Island Free Press and local TV stations showing the house after its pilings gave way but before it broke apart in the waves and its pieces looked like Tinkertoys in a jacuzzi. For that short time before the ocean had her way, the house sat tilting east, surrendering to the sea, a rental sign still clinging to its shingles.

MELANIE D.G. KAPLAN is a Washington, D.C.-based writer. She is working on a nonfiction book, "Science & the Hound," to be published in 2025.

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‘PEACE, LIFE & TINGLY HAPPINESS’

We carefully planned a visit to South Dakota to photograph Badlands National Park. A winter storm changed everything.

By Matt Brass

A BIGHORN SHEEP grazes near Sage Creek Basin in Badlands National Park's North Unit (left). Previous pages: The windswept grasslands near the park's Pinnacles entrance after the storm.

SNOWY SPIRES dominate the view from Cedar Pass Lodge, the only restaurant and lodging facility (outside of campgrounds) in the park.

For nearly a decade, when my kids were small, our family made an annual summer road trip from our home in Tennessee to Colorado. We loved the cool weather and majestic views of the mountains. One year, almost as an afterthought, we decided to return home via South Dakota. After driving 10 hours out of our way, we arrived in Rapid City tired and a little cranky, only to discover that the motorcycle rally in nearby Sturgis was in full swing and hotels were booked. Someone suggested we try to get a campsite in Badlands National Park. Out of other options, we heeded the advice and headed east.

As we pulled into the campground, we were greeted by a purply-pink sunset illuminating an otherworldly landscape. I was stunned. I'd never seen anything like it. Over the next several years, the Badlands became my favorite part of our summer routine. Mornings and evenings in the park never ceased to take my breath away.

Over time, I began to read about the history of the area. Biographies of Lakota figures such as Red Cloud, Sitting Bull and Crazy Horse offered insight into the lives of Native Americans in the region and conflicts between Tribes and white settlers. The intensity of winter was central to many of these narratives. That caught my attention. In the Badlands, summer was

BISON CAN withstand temperatures as low as minus 40 degrees Fahrenheit and winds up to 50 miles per hour. They're pictured here near the park's Roberts Prairie Dog Town, a vast labyrinth of tunnels and mounds.

far from accommodating. Searing heat, gale-force winds and sudden storms could instantly put you in your place. I wondered: What must winter be like?

Well, this past year, I decided to find out. My brother, a filmmaker whose family had accompanied us on one of our summer journeys, decided to join me. In December, we loaded up our smallest and most fuel-efficient car and embarked on the 20-hour drive, arriving after dark on a Sunday. The evening was mild and pleasant, and the skies were clear, so we spent a few hours photographing stars at the east end of the park's North Unit before calling it a night.

My three-day itinerary was fairly structured. On Tuesday, I was to meet with a Lakota guide and explore the South Unit, which is co-managed by the Park Service and Oglala Sioux Tribe. Wednesday would be a tour of the fossil sites with a park ranger. Monday was our only open day, so we made the most of it. While photographing the North Unit from top to bottom, we saw only one other human, Phoenix. A Navy veteran, he had, in his own words, pretty much messed up his first life — now he was trying to start a second one. He gave us a few details, but mostly talked about what he called a journey to find "peace, life and tingly happiness."

We chatted for a good while, marveled at the bison and conversed with a black-billed magpie. Then we went our separate ways. As he got into his car, he shouted over his shoulder, "Remember, the journey is the destination!"

We drove on. We spotted a small group of bighorn sheep and had an extraordinary encounter with a bobcat. We finished the day at the visitor

IN THE AFTERMATH of Winter Storm Diaz, the author's brother battles blizzard winds to hike to an overlook (above). Left: Phoenix, a Navy veteran the brothers encountered on their first day in the park.

WIND-CARVED snowdrifts stretch toward rocky pinnacles near the Ben Reifel Visitor Center (above). Left: A porcupine lumbers through the snow. Opposite page: A bobcat, a creature deemed "ghostly elusive" by author Richard NeSmith, pauses near a park trailhead.

center chatting with the staff about the impending storm and the potential it had to disrupt our Tuesday plans.

Little did we know. For the next hundred hours, Winter Storm Diaz would pummel the High Plains with snow and wind. The subsequent whiteout conditions and closed interstate trapped us in our rental house just a few miles from the park, where we were unable to do much of anything other than eat Pop-Tarts and watch Netflix. On Tuesday, we didn't even try to get out. On Wednesday and Thursday, we crept toward the park in our two-wheel-drive car — at times holding open the door to see the yellow line and stay on the road — but we were forced to turn around well short of our goal. Friday, blizzard winds continued but were weakening, and we were able to make it to the gate. We left our car outside the park and hiked to an overlook as the wind continued to blast prairie snow off the plateau and into the rugged ravines and canyons below. The warm purples and pinks of the summer had been replaced by December's icy palette of blues and whites glistening in a sun we had not seen for nearly a week. I was as stunned as I'd been on my first visit to the park. Captivated, we wandered for hours through the deserted landscape.

When the sun started to dip in the sky, we turned into the 35 mph winds and, clutching our icy cameras, headed back to our car. On the way, a porcupine sauntered by. The trip certainly did not turn out as we planned, but for a little while, at least, we'd found it: peace, life and tingly happiness.

MATT BRASS recently retired from his job as vice president of creative at an ad agency specializing in sustainability and the environment after a 17-year run. Since then, he's founded a company, Smoky Outfitters, that creates art about destinations around the U.S., including many national parks. Based in Knoxville, Tennessee, Brass continues to pursue photography and document his adventures in the great outdoors. To learn more, go to mattbrass.com.

For decades, advocates have defended Manassas National Battlefield Park from one threat after another. Now with the specter of a massive data center project looming, they may be facing their biggest fight yet.

BATTLE LINES

KYLE HART, CLAD IN A VEST AND BOOTS, a blade of grass between his lips, gestured to the surrounding fields and described a war. He identified the players, called out decision-makers for incompetence and reckless choices, and stressed the importance of holding the line.

Though the land on which we stood was steeped in Civil War history and hallowed by soldiers' blood, that's not the battle Hart, NPCA's Mid-Atlantic program manager, was railing about. He was referring to a modern-day brawl between local preservationists and international developers. "This is the biggest, most impactful land use decision in the history of northern Virginia," he said.

I might have been skeptical of Hart's rhetoric if I hadn't spent the previous month learning about Manassas National Battlefield Park's latest foe: the Prince William Digital Gateway. The innocuous-sounding name pertains to a proposal that would turn more than 2,100 acres of farmland adjacent to the park into a corridor of data centers with a square footprint the size of three Pentagons (or more if developers hit their maximum development capacity). Current plans call for 40-odd warehouses, climbing 70 or more feet in the air. Chock-full of hot, humming servers that run 24/7, data centers are designed to ensure uninterrupted access to all the digital trappings of our 21st century lives — from emails and streaming TV to podcasts, Zoom meetings and social media posts.

These buildings aren't just eyesores — they're energy and water hogs. Each data center relies on diesel generators in the event of power outages, can consume as much

BY KATHERINE DEGROFF | PHOTOS BY ERIC LEE

A CANNON OVERLOOKS open fields and zigzag fencing at Manassas National Battlefield Park in Virginia.

KYLE HART, NPCA's Mid-Atlantic program manager, stands on Brawner Farm, a section of the park abutting the proposed data center corridor. Here, on the evening of Aug. 28, 1862, Union and Confederate soldiers let loose a barrage of shots, resulting in what one private called "a continuous sheet of flame."

water as a town of 50,000 people and can burn through 10 to 50 times more electricity than a typical office building. Nearly a quarter of the energy supplied by Virginia's largest electric utility goes to data centers.

During my research, I'd spoken to passionate, angry and confused advocates, all determined to fend off the development. It's not straight NIMBY-ism, they argue. Most understand the societal demand for data centers but believe that the unregulated industry needs guardrails. Maybe, they say, these things shouldn't be placed near homes, schools or parks. NPCA is one of the groups pushing for a full-scale examination of the impacts of the industry. That understanding could then inform standards about where to put data centers, how to build them and what measures to take to best protect people and the environment.

"You can't save everything everywhere, and nobody's arguing that. ... You certainly need data centers. This is just a really poor choice of a location."

"You can't save everything everywhere, and nobody's arguing that," said Jim Campi, chief policy and communications officer for the American Battlefield Trust, which owns a 20-acre parcel within the proposed corridor. "You certainly need data centers. This is just a really poor choice of a location." The larger Manassas landscape functions as vital recreation space and wildlife habitat, Campi said, and it preserves Civil War history as well as the story of the Reconstruction era, when Native Americans and freed slaves established settlements and cemeteries in the area. These archaeological resources, some of which still need documentation, could vanish if bulldozers rumble through.

"You're looking at a site that is mentioned in social studies books across the country," said Blaine Pearsall, a member of the Prince William County Historical Commission. "Who's making the decision to say we're willing to give this up so that we can have this particular industry in this location?"

Ostensibly, the decision rests with the county board of supervisors, but Pearsall's question points to the flurry of political machination, uncertainty, mistrust and fear surrounding the project. According to Hart, a data center corridor at the scale being considered would turn the countryside adjacent to Manassas into something resembling the New Jersey Turnpike. It would financially benefit those selling to the developers but would undo decades of work by historians, neighbors, recreationists and Congress, he said.

I considered that comment as I stood on the brow of a hill within the park. It was spring in Virginia, and the battlefield, 5,000 acres at the outermost edge of Washington, D.C., sprawl, was alive with birdsong and filtered sunlight. I'd expected to glimpse the orderly grid of a neighborhood in the distance, but fields, forest and fence lines stretched to the horizon. A few cannons served as a visceral reminder of what took place some 160 years before.

Manassas commemorates not one, but two Civil War battles. In July of 1861, around 60,000 Union and Confederate soldiers clashed in what many consider the first major battle of the war. "It was the first chance that these armies got to test each other," Hart said. The Confederate victory convinced the Union that the rebel uprising they hoped to quash quickly would be a long and protracted affair. The second battle, just 13 months later, fits within a larger three-week campaign that concluded at Antietam with the war's deadliest one-day battle.

To place the Battle of Second Bull Run (also called the Battle of Second Manassas) in context, I reached out to Gary Gallagher, emeritus director of the University of Virginia's John L. Nau III Center for Civil War History. Union forces had achieved a series of coups that spring, taking Nashville and New Orleans and threatening Richmond, the Confederate capital. Had the Confederates — led by Stonewall Jackson and Robert E. Lee — not been victorious in the Seven Days Battles near Richmond, and then at Manassas in August, the war might have concluded with a brokered peace. "It would have been a restoration of the Union as it had been before," Gallagher said, meaning the South could have continued with business as usual, that is, with nearly 4 million people still enslaved. That was news to me: I'd never considered a Civil War without an Emancipation Proclamation. Gallagher spoke a little more about this precarious moment before emphasizing the park's role as a classroom. "You can't understand any of these battles by reading maps and even reading the best prose about them," Gallagher said. "You have to go to the places."

While the park protects much of the land involved in these two engagements, it doesn't cover it all. In 2006, the federal government identified a Manassas Battlefield Historic District spanning more than 6,400 acres; roughly 1,300 acres lie outside park boundaries and along Pageland Lane, the epicenter of the proposed development. There, in the sultry heat of 1862, troops prepared for yet another clash. Nurses and doctors established field hospitals. And there, too, lie the unmarked graves of a few hundred soldiers who died of a measles outbreak.

Some of the proponents of the data center, including landowners set to make upward of $1 million an acre by selling to the developers, say that this area has lost its rural character because of a long-existing transmission line or because traffic has increased on the road at the heart of the proposed corridor. It's true that the power structures loom over the fields and dawdling tourists might get passed by other motorists, but there's no mistaking the pastoral feel, preservationists say. While driving on Pageland Lane to reach the park, I spotted horses grazing, and the biggest building visible was a barn. And on our trek across Brawner Farm, a corner of the park that witnessed some 22,000 injuries and deaths, Hart and I saw no one, but spied the tracks of deer and raccoon intermixed with those of horse and hiker. At one point, Hart squatted down and pointed out the skinny, three-pronged track of a female turkey in still-wet mud. "This one's real fresh," he said.

PROPONENTS OF THE digital gateway reference these transmission towers, which march along the park's western boundary, to support their argument that the area is no longer rural.

Past is Prologue

Ann Bennett, land use chair for the Sierra Club's Great Falls chapter, calls this recent data center proposal the "fifth battle of Manassas." Five, I learned, may be a conservative number.

Manassas faced its first threat, in the form of housing development, within a decade of its 1940 establishment. Park staff managed to secure a boundary expansion, pulling more acreage under the park's umbrella of protection, before dodging the next curveball: the routing of Interstate 66. Then, in the 1970s, Mar-

ELENA SCHLOSSBERG compared data center developers to 21st-century robber barons (above left). "They absorb the tools of government and the levers of power so that they can operate in ways that totally cut out citizens," she said. Above right: Kathryn Kulick called the recent expansion of data center proposals a "vicious problem" in northern Virginia and believes the Manassas battlefield will never recover if the digital gateway moves forward. "There is no doubt in my mind: It will destroy that park," she said. Below: A visitor walks toward the Stone House, one of three wartime structures still standing in the park.

riott Corp. proposed a "Great America" theme park catty-corner to National Park Service land. History buffs recognize the nearly 500-acre site for its association with General Lee, who set up shop there on Stuart's Hill during the second battle. Despite its import, the property lay beyond park borders. The board of supervisors thought a simple rezoning of the area would clear the way for the project and boost the county tax base. But a legal challenge to the hasty rezoning effort and a federal request for an environmental impact study pushed the company to abandon its amusement park plans.

Park proponents didn't really have their resolve tested, though, until 1986 when a developer targeted the same wedge of land for an office park and a 1,000-home subdivision. Rolland Swain, then the Manassas superintendent, raised his concerns with the developer, John T. Hazel, who made a series of concessions to appease the Park Service and residents, from halving the number of homes to limiting building height. When Hazel failed to secure an office tenant, however, he changed tack, scrapping the original plan in favor of a 1-million-square-foot mall. The incongruity of a giant shopping center at the doorstep of a historic battlefield outraged locals. NPCA took a stand against the development, and the National Trust for Historic Preservation followed suit. Soon the threat to Manassas made national headlines.

THE MANASSAS MUSEUM SYSTEM, MANASSAS, VIRGINIA

ANNIE SNYDER fought for decades to protect the Manassas battlefield from a series of threats (left). Right: Jennie Dean, a woman born into slavery along Pageland Lane, started Manassas Industrial School for Colored Youth after being emancipated. Some critics say the data centers would make it difficult to preserve the area's African American history.

Annie Snyder, a seasoned preservationist who was then owner of Pageland Farm — 185 acres within the Manassas Battlefield Historic District — stepped into the fray. Her Save the Battlefield Coalition organized a public rally with protesters sporting "Stonewall the Mall, Save Manassas" buttons. They also conducted a door-to-door blitz, securing over 75,000 signatures that Snyder presented to Congress.

In November of 1988, after Hazel had broken ground, Congress finally took action, passing a bipartisan bill that absorbed those 500-some acres into the boundaries of the national park. Gordon J. Humphrey, then a New Hampshire senator, said he found it difficult to approve the move as a conservative Republican, "but it seems warranted in this emergency case."

The loss of Chantilly (the neighboring county's only Civil War battlefield) to development, and the near loss of a piece of the Manassas battlefield mobilized like-minded groups and helped shape the modern preservation movement, Gallagher said. The timing was fortuitous, as another threat would soon require this newly forged collective to fine-tune their organizing skills.

Kathryn Kulick had just moved to the area when she heard that Disney planned to open a theme park near Manassas. "If anybody does a good job of being secretive about acquiring land, it's Disney," she said. Kulick, who today serves on the county's historical commission, described how Disney quietly snatched up land before announcing in 1993 their vision for a 3,000-acre "Disney's America" amusement park less than 4 miles from Manassas battlefield.

The county (and the state) embraced Disney's proposal, which included a history-based theme park, as well as resort hotels, a campground, a golf course and over a million square feet of retail space. "Disney seemed unstoppable," author Joan M. Zenzen wrote in her book "Battling for Manassas." But then, the president of the National Trust for Historic Preservation decried the development in a column published in The Washington Post, and renowned historian David McCullough began volunteering his time for the cause. Donations from the likes of the du Ponts and Mellons funded lobbying trips to Virginia's capital, where advocates — including representatives from the Sierra Club and the Piedmont Environmental Council — spoke ardently about the importance of preserving the still-rural landscape. Wealthy landowners, intent on keeping the anticipated hordes of Disney visitors at bay, exerted their considerable influence. Snyder and about 100 others even protested at the "Lion King" opening in Washington.

As public awareness grew, so did support for preservation. Disney's plan involved funneling visitors through a Civil War-era village before they could hop on steam trains to explore other periods of American history. Such a simulacrum sounded reasonable to some, but others found the Disneyfication of history offensive, and one attraction, designed to make park-goers experience life as a slave, especially rankled. "Eleanor Holmes Norton"— the D.C. congressional delegate — "and some other elected officials said, 'You're going to do *what*?'" Kulick recalled.

Eager to save its image, Disney backed out of its plan in 1994.

Though the Washington suburbs continued to accelerate toward the town of Manassas and its famous park over the next two decades, the area around the battlefield escaped relatively unscathed. That was largely due to the county's 1998 adoption

A DATA CENTER COMPLEX in Sterling, Virginia, complete with industrial cooling equipment and water tanks (top). Above: Under the current digital gateway plan, Pageland Lane (pictured) would turn into a four-lane, divided road, with data centers and substations along its length. According to an early viewshed analysis done by the county, any buildings over 35 feet tall would be visible from key points within the park. "Will people still choose to go there as much?" asked longtime park advocate Ann Bennett. "I don't know."

of a comprehensive plan that identified a "Rural Crescent" with 10-acre minimum lot sizes. Kulick called the Rural Crescent, which was established to prevent rampant subdivisions and promote agricultural use, "the most effective land use planning tool ever." (The Rural Crescent was abolished last year when the county updated its comprehensive plan.)

Then in 2012, a plan for a parkway gained traction. The initiative centered around expanding Pageland Lane from a two-lane road into a commuter thoroughfare. The county, hoping to sway the Park Service, promised to close two existing routes through the battlefield to non-park traffic in exchange for the park's support for the new road. Even though the proposal would have paved 4 acres of the park and an additional 12 acres of historic district, the Park Service backed the plan.

NPCA and park neighbors challenged the development. This time, Snyder's daughter Page led the charge. "Our front two fields lie in the path of the proposed bi-county parkway," she said at a 2013 rally. "In those fields are two Civil War mass burial sites and likely many other undocumented graves. We cannot pretend that they are not there, and we cannot disrespect them."

A government shutdown, a change in administration and a regulatory snag ultimately relegated the parkway to the collective backburner. (Unsurprisingly, the data center plan requires expanding Pageland Lane, further provoking opponents who call the parkway a "zombie" road for its inability to die.)

Data Center Mania

In 2021, the first rumors of a data center corridor started circulating. At that point, northern Virginia already claimed the title of data center capital of the world, with Loudoun County — Prince William's northern neighbor — boasting the highest concentration of the new-age warehouses, around 26 million square feet powered by Amazon, Google and Microsoft, among others. And while Prince William seemed destined to be next, park advocates hoped the proximity of the battlefield, the area's designation as a historic district zoned for agriculture and its position within the Rural Crescent would lead the county government to dismiss the digital gateway idea out of hand. Instead, the board of supervisors jumpstarted the approval process, ushering in a period of marathon public meetings and reviews from an alphabet-soup of local and state agencies.

In a matter of months, the initial scale of the corridor ballooned from some 800 acres to over 2,000. Brandon Bies, then-superintendent at the park, penned a letter to Prince William Board of Country Supervisors Chair Ann Wheeler, calling the project "the single greatest threat to Manassas National Battlefield Park in three decades." (Wheeler, a vocal supporter of the data centers, could not be reached for comment.)

To this day, the plans and players remain cloaked in secrecy. Questions about basic facts, such as the anticipated number and location of buildings, have swirled and gone unanswered. Nondisclosure agreements between decision-makers, landowners and the developers were signed. The county archaeologist's finding that full build-out could result in the destruction of the cultural landscape was omitted when it came time to give presentations to the public, and no one knows whom to blame. "It's an atrocity how this stuff happens," Kulick said.

Last November, less than a year after Bies' fiery rebuke of the project, the board of supervisors adopted an amendment to the county's comprehensive plan, propelling the project forward. Now, the board must decide whether to rezone the acreage. If that happens, 100 willing landowners are teed up, having already signed contracts with QTS Realty Trust and Compass Datacenters, the developers, who didn't respond to National Parks' queries.

In an unexpected twist, not only are Page Snyder and her neighbor MaryAnn Ghadban (allies in the fight against the parkway) among those selling, but they are spearheading the effort, according to local news outlets. "Without question," a 2022 Prince William Times article stated, Snyder and Ghadban "started the ball rolling." Wearied by decades of fighting to protect their farms, foreseeing a continued erosion of the area's rural character, and lured by the cash, they organized landowners and courted a willing developer, according to the story. (Ghadban, who declined to comment, cited hesitancy over speaking to a magazine affiliated with NPCA. Snyder couldn't be reached, but she wrote in a letter to a Virginia senator that there is "no future in farming" on Pageland Lane.)

High Stakes

Scrambling to match the pace of this highly secretive industry, NPCA and its allies hired consultants, commissioned studies, reached across party lines and established working groups. Kulick helped form a regional homeowners association umbrella group whose members represent some 150,000 households. The goal, she said, is to educate and inform the public: "There's so many people that don't even know."

Critics say the data centers would threaten water quantity and quality (via impervious surface runoff and sedimentation, for example), contribute to air pollution and exceed the limits of the power grid. On that last point, Elena Schlossberg, founder of the Coalition to Protect Prince William County, is particularly passionate. "When the data center industry talks about green energy, it makes me just want to throttle someone, because there's no amount of solar or wind that will ever compensate," she said. A 2015 study partially funded by the International Energy Agency states that each data center consumes about as much as 25,000 homes, so "we are going to have to rely on more coal and more natural gas in order to meet the demands," Schlossberg said. This could derail Virginia's goal of 100% renewable energy by 2050 and entail construction of additional substations and transmission lines financed by ratepayers.

"The planning horizon for the National Park Service is 500, 1,000 years. ... But we're dealing with decision-makers at the local level who often don't have a planning horizon that extends much beyond the next election."

Another worry for those opposed to the project is its potential impact on the cultural resources of the area. Schlossberg reminded me that significant historic events unfolded here during the era of Reconstruction. She spoke about Jennie Dean, a woman born into slavery, who established an industrial school after emancipation to help freed men and women achieve economic freedom as well. The developers have indicated a willingness to reserve a small plot for interpreting the African American history in the area, but Schlossberg says that's inadequate: "It deserves more than a plaque," she said. "Who's going to walk a trail amidst data centers and AC generators and transmission lines and substations? Nobody."

Data centers also emit a hum that Dale Browne characterizes as a "noisy, miserable thing to live next to." A retired IT director for a global financial telecommunications company, Browne understands the role data centers play in modern society. He's also the president of a Prince William homeowners association that abuts four new Amazon data centers, so he's well-versed in where they *don't* belong. His community is situated near a municipal airport, train tracks and a highway, but the nonstop, low-frequency noise of data centers is categorically different than the sounds of that other infrastructure, he said. After the first few buildings went online in 2022, residents began complaining of headaches and heightened stress. They told him they had to move their babies' nurseries and home offices into their basements. "People hear it through their walls, can feel it in their walls," Browne said.

And yet, the developers' master corridor plan continues to highlight recreation. Illustrations depict trails wending through the outskirts of the digital gateway, and promotional photos show

families exploring lush forests. The developers pitch the plan as having the potential to "fulfill unmet community needs," which perplexes their adversaries who point out that the park currently offers 40 miles of trails and the adjacent state forest boasts an additional 5. Figures on early maps indicated that 800-some acres of "open space" would result from the development, but Hart calls that "intentionally nebulous."

"The only open space that is actually being delivered by this development is land that isn't buildable anyways," said Hart. In short, it's undevelopable floodplain. And the two large parks present in early plans were absent from the developers' most recent application. Hart called those "hollow promises made by the developers to ram this project through the approval process."

MORE THAN half a million people visit the Manassas battlefield every year.

Data center proponents, including several county supervisors, frequently cite local jobs as a prime benefit of the development. But one supervisor, Bob Weir, calls foul. "I'm not buying the PR campaign — a very expensive PR campaign — that the people behind the gateway are putting out," Weir said. He believes most of the construction jobs will go to specialized crews from out of state. Once the data centers are operational, possibly in 2030, "you've got more security guards than you have technicians," he said. (The developers estimate that the buildings — which eventually could number 40, though that figure remains in flux — might each create 10 to 20 jobs. While opponents question this accounting, it's still a far cry from the thousands of jobs Disney promised in the '90s.)

One of the central issues with data centers, in the view of John Hennessy, the retired chief historian of Fredericksburg and Spotsylvania National Military Park and an authority on Manassas history, is the lack of third-party, empirical analysis of the industry's long-term impact. "And you're going to experiment on park boundaries?" he asked. "It just makes no sense to me."

Hennessy said it comes down to a difference in mission and perspective between the Park Service and the local government. "The great challenge of managing a national park in the Eastern United States," he said, "is that the planning horizon for the National Park Service is 500, 1,000 years. ... But we're dealing with decision-makers at the local level who often don't have a planning horizon that extends much beyond the next election."

Holding the Line

Using lessons learned from previous Manassas campaigns, NPCA and its allies are pulling out all the stops to defeat the latest threat. The county's volunteer-based historical commission is picking apart flimsy archaeological, noise and viewshed studies while formulating comments on the rezoning applications. They've also proposed the inclusion of two farms within the federally recognized historic district — and the data center corridor — as county registered historic sites, a status that should convey added protection. Kulick's homeowners group has joined civic organizations from neighboring jurisdictions to draft construction and design standards for data centers that they anticipate bringing to Fairfax, Fauquier, Loudoun and Prince William counties for adoption. These would dictate everything from height and noise limits to siting requirements.

Last fall, a coalition tried to pass bills in the Virginia General Assembly that would initiate a statewide evaluation of industry impacts and prohibit the construction of data centers within 1 mile of a national park unit. None succeeded.

Despite the setbacks, public sentiment seems to be swinging in favor of preservation. In a recent NPCA-commissioned survey, 86% of northern Virginia residents said they would support legislation that would place a data-center-free buffer around park sites. This is welcome news for those counting on this November's election to upset the pro-data center balance on the board of supervisors.

Back at Manassas last May, Hart regaled me with tales of sledding behind the park's Stone House as a child and reminisced about getting engaged on a hill above Bull Run. On the way back to our vehicles, he pointed to the green leaves of some waist-high milkweed, reminding me that monarch butterflies exist because of this very plant. Then, he shifted his focus back to the issue at hand. If we allow data centers next to a national park site, in a nationally recognized historic district, he said, then the industry will essentially have carte blanche to do whatever it wants, wherever it wants. "If this industry is going to get reformed," he said, "it starts right here."

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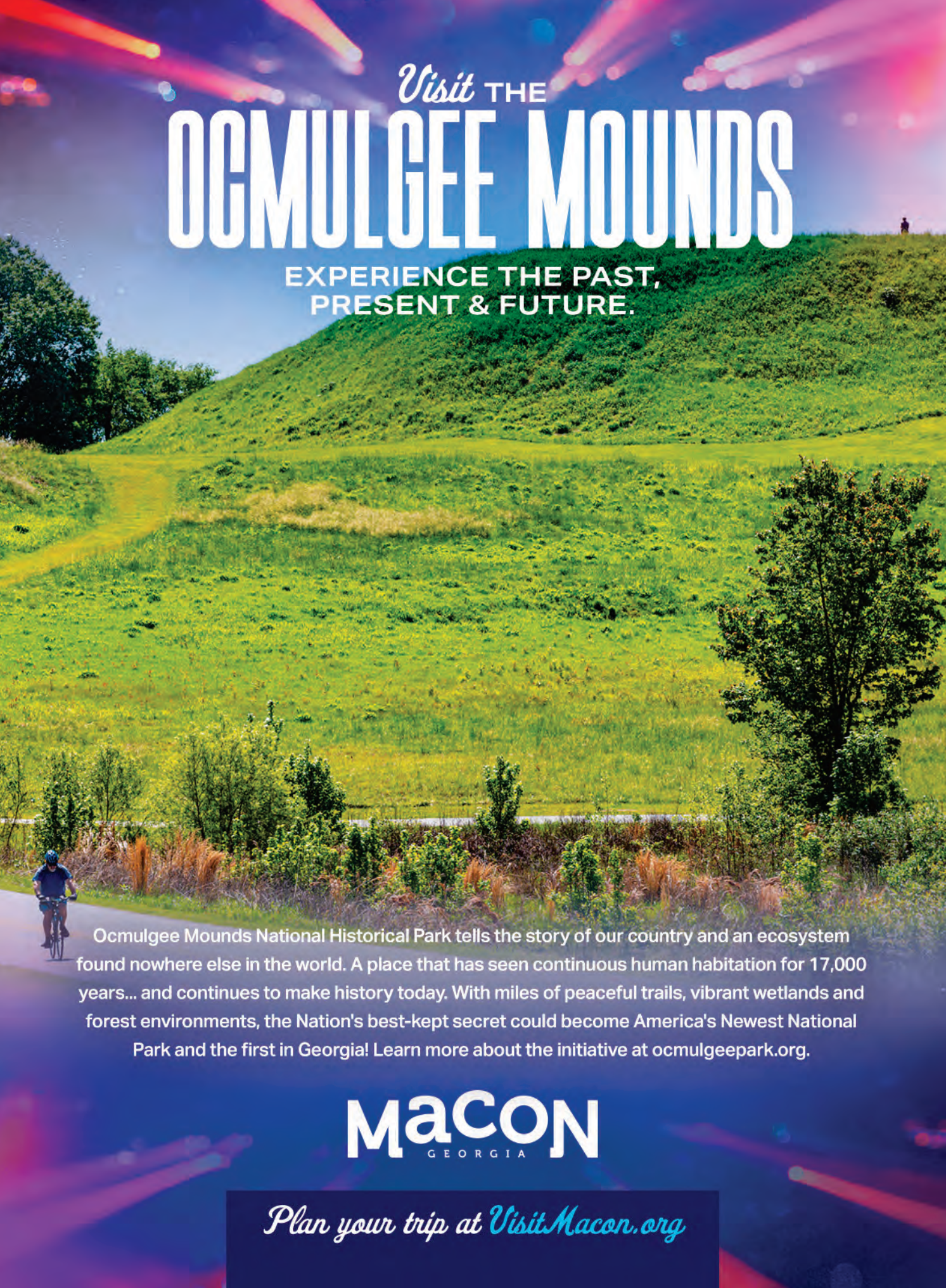
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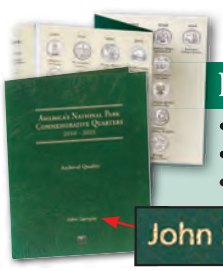

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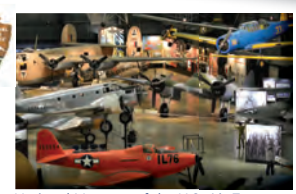

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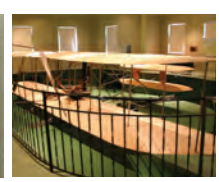

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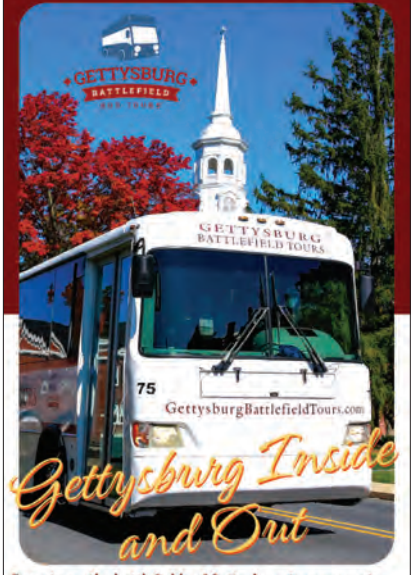

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Courtesy Jeremy Hess

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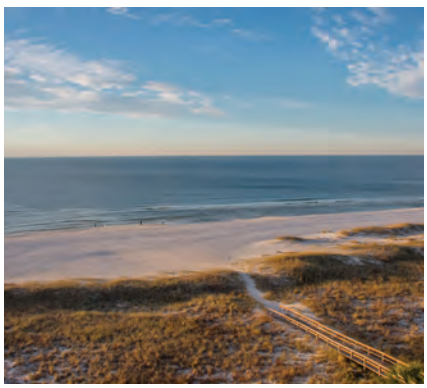
You're familiar with our dramatic past that makes Gettysburg one of our nation's premier historic travel destinations. The awe-inspiring landscapes of Adams County set the scene for a wide range of activities, including a tour of our rich history.

Make that history come alive with the many dining destinations available for you to enjoy. When taking a break from visiting our fantastic sights, enjoy seasonal farm-to-table menus and period-specific food that will connect you to your experience. We have contemporary meals prepared by award-winning chefs, or you can grab a quick bite at one of several restaurants. Be sure to keep tabs on us as you plan your visit, as even more dining options are being added this year.

When it's time to lay down your head at night, we have cozy bed and breakfasts, rustic cabins, luxurious inns, or your go-to hotel with all the amenities. Bringing the whole family for a relaxing getaway without big city itineraries? We have special guest houses for that very reason. You'll find accommodations of every type in Gettysburg, whether you want to stay in walking distance to everything or escape to a quiet retreat.

No trip to Gettysburg is complete without experiencing its rich history. Witness the hallowed battlefield and feel the full weight of its solemn significance. Among the monuments and memorials, the enormous impact of our past truly resonates. Pause for a moment of inspiration in the Soldiers' National Cemetery where President Abraham Lincoln delivered his stirring "Gettysburg Address."

The past has brought us here, but the present waits for you in Gettysburg.



Courtesy Gulf Shores & Orange Beach Tourism

EXPERIENCE THE ALABAMA GULF COAST

Gulf Shores and Orange Beach are the ideal destinations to experience the natural wonders of the Alabama Gulf Coast. The area features 32 miles of beautiful beaches and scenic trails, all waiting to be explored. Choose from outdoor activities like biking, hiking, paddleboarding and kayaking to traverse through the area. Whether you love being out on the water, lost in the trails, or just soaking up the sun, this is the spot for you. Discover the beauty of the Alabama Gulf Coast and escape into a world of wonder.

Alabama's beaches are unmatched. The area's sugar-white beaches offer you the chance to relax and explore. You can lounge in the sand, snorkel through the turquoise waters, or hop on a boat and dive in the Gulf. The possibilities for reconnecting with nature are endless on the Alabama Gulf Coast.

At the center of Gulf Shores and Orange Beach lies Gulf State Park. A destination in itself, this exceptional park offers 6,150 acres spanning across both beach towns and boasts nine unique ecosystems. You'll love feeling the rush of the coastal breeze as you bike through its captivating trails or glide across the calm waters of Lake Shelby in your kayak. With so many activities inside Gulf State Park, it's the perfect spot to discover the irresistible charm of the native wildlife and picturesque landscape of the area.

Courtesy Springfield CVB

EXPERIENCE ROUTE 66 SPRINGFIELD STYLE

Already know as a Route 66 city, Springfield welcomes the new Gate 2 Experience at the historic IL State Fairgrounds. Enjoy this year-round, free experience where you will walk the entire Illinois Route 66 corridor in microform. Marvel at the Legends Neon Sign Park with new and restored neon signs, lit nightly from Dusk-10:30pm, a paved brick road, a 25' tall, gray steel Route 66 Giant, drive-in theater replica and interpretive signs highlighting each Route 66 community from Chicago to the Chain of Rocks bridge, including the bridge! All of this and a host of other Living Legends and Landmarks await your next trip.Take part in the 14th Season of History Comes Alive, a 10-week, interactive history program throughout sites in historic downtown Springfield. If you are a foodie, don't miss the History Cooks series on Friday afternoon at the Lincoln Home National Historic Site. Music lovers will be entertained by the ever popular Troubadours again this year. Tuesday evenings will feature the amazing flag lowering ceremony at the Lincoln Tomb with the 114th Regiment Illinois Volunteer Infantry Reactivated and one lucky attendee will receive the flag that evening. This and so much more makes Springfield the ideal and affordable place to venture this summer.

HISTORIC TRAVEL **DESTINATIONS**

THE TRAIL STARTS HERE

Courtesy MDMountainside.com

Allegany County, the Mountain Side of Maryland, beckons outdoor recreation enthusiasts, with Rocky Gap State Park, Green Ridge State Forest, the majestic Potomac River, and the C&O Canal National Historical Park and Towpath and Great Allegheny Passage bike trails. The mountainside has gained a well-deserved reputation as a regional arts destination with flourishing Arts and Entertainment districts, a rich theater community, vibrant public art murals and displays, and DelFest, a music festival which calls Allegany County home. Enjoy three centuries of American history from George Washington's Trail to the start of the country's first federally-funded road, the National Road, and no trip is complete without a scenic excursion on the Western Maryland Scenic Railroad. A true getaway, this region tucked in the Appalachian mountains boasts a handful of charming bed and breakfasts, a large selection of chain hotels, beautifully set campgrounds, and a casino resort. No matter your interest, passion, or idea of fun, you'll find a trail for just about any type of adventure here.

Courtesy Scott Shigley for site design group, ltd.

EXPLORE HISTORIC PULLMAN

America's Stories Live Here

Since 1973, Historic Pullman Foundation (HPF) has preserved Pullman's buildings, stories, documents and artifacts, and educated the public on its history. Celebrating its 50th anniversary in 2023, HPF now serves as the official nonprofit 'Friends Group' of Pullman National Historical Park (PNHP). Chicago's first national park is significant for its connection to railroad innovation, two watershed moments in American labor history, its impact on urban planning, and its role in the economic empowerment of Black workers.

History buffs, national park fanatics, train enthusiasts, and families alike: explore HPF and PNHP's vast list of guided and self-guided tours, exhibits, speaker events, and more throughout the year. Get your next national park stamp at Pullman National Historical Park and plan your Historic Pullman visit today. www.pullmanil.org | www.nps.gov/pull

MARIPOSA COUNTY: THE HEART OF YOSEMITE AND MORE

Autumn in Yosemite Mariposa County offers the perfect opportunity for outdoor enthusiasts and nature lovers to explore Yosemite National Park and its surroundings. Fewer visitors and more affordable lodging allows travelers to immerse themselves in nature's splendor with a sense of tranquility and solitude.

Hiking along the numerous trails allows travelers to witness stunning vistas around Yosemite Valley, including Half Dome, El Capitan, North Dome, and Cathedral Rocks, all beautifully enhanced by the warm colors of the season. Before the snow returns, the High Sierra is accessible via Glacier Point Road, famous for its views of Yosemite Valley as well as Vernal Fall and Nevada Fall. Tioga Pass also offers a high-altitude trek with inspiring views of Half Dome from Olmsted Point and Tenaya Lake surrounded by granite domes.

Beyond the national park, the quaint towns within Mariposa County exude an authentic Western charm. The town of Mariposa boasts historic Gold Rush era buildings, award-winning museums and artisan shops. Visitors can sample locally-produced apple cider, olive oil, coffee and beer or savor the local cuisine in restaurants that range from homey to elegant.

Whether it's star gazing, witnessing the wildlife preparing for winter, or simply enjoying the peaceful ambiance, Yosemite Mariposa County in autumn promises an unforgettable and soul-soothing experience for anyone seeking a connection with nature's beauty. Visit Yosemite.com

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A GRIZZLY BEAR and her cubs cause a traffic jam at Grand Teton National Park in Wyoming.

Killer on the Road

Cars helped make national parks America's most beloved landscapes — and wreaked havoc on wildlife. What will it take to repair the damage?

THE ELK SPRAWLED on the shoulder of Highway 20, a slender thread of blood unspooling slowly from one nostril. We found her on a warm evening near Yellowstone Lake in the summer of 2009, my lone season working for the National Park Service. She'd been hit by a car, one of thousands that cruised through Yellowstone National Park that day, and her shattered legs — those slim, powerful appendages on which she'd forded rivers, evaded wolves, migrated with her herd — bent at angles that made me nauseous. She tried to lift her head, then lowered it with a moan. I'd been returning from a job site with colleagues when we came across the elk, and now I climbed back into our truck to escape the awful scene. Briefly, I lifted my eyes to the rearview mirror and saw a ranger lift his rifle. It seemed a small mercy that he only needed one shot.

Death on the road is a commonplace tragedy in and around national parks. By definition, parks are protected areas where animals are, in most cases, safe from hunting, development, fossil-fuel extraction and other pressures. Yet they're also tourist paradises that host hundreds of millions of visitors each year, the large majority of whom arrive by car — a mode of transportation that snuffs out nonhuman life wherever it rolls. In a 2010 paper, researchers estimated that vehicles kill an astonishing 29,000 critters every year in Saguaro National Park alone, most of them reptiles and amphibians. Highway 89, the gateway to Grand Teton, is notoriously lined with deer, elk, moose and grizzly carcasses. The irony is thick: We visit parks to celebrate nature but may inadvertently participate in its destruction along the way.

In a sense, the road conundrum embodies the tension that has tugged at the Park Service's heart since its founding in 1916. The agency was famously tasked with simultaneously conserving "wild life" and "provid(ing) for the enjoyment" of visitors. Stephen Mather, its first director, made his personal priorities clear: Building roads through parks, he declared, would "enable the motorists to have the greater use of these playgrounds." Mather pushed for the construction of more than a thousand miles of park roads, among them iconic thoroughfares such as Glacier's Going-to-the-Sun Road. Parks became what the historian David Louter called "windshield wildernesses" — landscapes whose spectacular scenery could be experienced from behind the wheel.

As traffic swelled, however, the auto-centric model exacted a toll on the very animals national parks were established to protect. Visitors killed endangered

Florida panthers in the Everglades, desert tortoises in Joshua Tree and bison in Yellowstone. In Yosemite alone, cars hit 300 black bears between 1995 and 2012. Such incidents endanger humans, too: Animal collisions kill around 200 drivers per year nationally, and car crashes are the second-leading cause of death in national parks.

Cars and roads are harming wildlife populations in myriad other ways, scientists have found. Denali's fabled park road disrupts the seasonal movements of Dall sheep; the grumble of motorcycles along Going-to-the-Sun disturbs migrating songbirds. In a 2019 study, scientists found that anthropogenic noise pollution was evident in more than a third of recordings from 66 park sites, and that planes and cars are the worst offenders.

The Park Service has been working toward solutions, but a comprehensive fix remains elusive. While many parks have reduced speed limits and expanded signage warning drivers to watch out for wildlife, those measures haven't solved the problem. As one conservationist put it in 2013, park roadkill risks becoming a "conservation failure."

National parks aren't alone in being plagued by roads. I've spent the past decade researching the environmental toll of our national transportation infrastructure for my book "Crossings: How Road Ecology Is Shaping the Future of Our Planet," and I've learned that it's virtually impossible to account for all the ways roads can distort nature. An estimated 1 million animals are crushed by cars every day in the U.S alone; highways genetically fragment populations of grizzly bears and mountain lions; and de-icing salt turns freshwater ecosystems salty. Even the microscopic particles shed by our tires cause damage by poisoning salmon.

These crises can feel utterly intractable: The 4-million-mile road network in the U.S. isn't likely to contract anytime soon, and nearly all of us drive. In the course of my reporting, however, I also found that solutions exist, some of which the Park Service — which, unlike the Federal Highway Administration or state transportation departments, has wildlife conservation written into its enabling legislation — and its allies are perfectly suited to implement (and in some cases have already set in motion).

For one thing, we need to build more wildlife crossings: bridges and underpasses, flanked by roadside fences, that permit animals to safely traverse highways. One ideal candidate for crossings is Pigeon River Gorge, where I-40 runs past Great Smoky Mountains National Park. As traffic has increased within the gorge, collisions with black bears have spiked, and critters from coyotes to salamanders have been denied access to habitat. A coalition of nonprofits, including NPCA, has conducted research that will help agencies figure out where to build new crossings and retrofit existing culverts to permit animals to sidle under the interstate. And North Carolina's legislature has expressed interest in setting aside money for passages, proof that the political appetite for wildlife crossings is catching up with the ample science that supports them.

In addition to averting dangerous crashes, the Pigeon River Gorge crossings may someday allow animals to seek new habitats as the Southeast warms. And connecting parks with broader landscapes is fast becoming a national movement: The same spirit animates the Wallis Annenberg Wildlife Crossing, a 210-foot-long bridge that will span Los Angeles' massive U.S. 101 freeway. The roughly $90 million overpass, slated for completion in 2025, will allow inbred cougars in the Santa Monica Mountains National Recreation Area to mingle and mate with cats from other corners of Southern California. On an ever-warmer and more densely trafficked planet, safeguarding wildlife in parks inescapably requires confronting the highways beyond their borders.

Of course, we also need to protect animals from cars within park boundaries. In 2021, the Park Service and its partners released the Roadkill Observation and Data System, a smartphone app that allows citizen scientists to report carcass sightings. The app

THREE BUS LINES offer free transportation for Denali National Park summer visitors, reducing the number of personal vehicles on roads. Similar systems are in place at Acadia, Glacier and Zion national parks, among others.

isn't just designed to occupy your kids as you road-trip around Bryce Canyon and Zion; it's a scientific tool that will, in theory, help park managers pinpoint collision hotspots that might benefit from wildlife passages. We park visitors cause roadkill and are thus morally obliged to assist in its prevention.

Once, the idea of tackling the ecological impacts of roads in national parks would have been implausible for one simple reason: It can be expensive. (For example, a typical underpass can cost upward of a half-million dollars; an overpass usually runs $6 million or more.) But funding isn't the obstacle it used to be. The 2021 Infrastructure Investment and Jobs Act created a pilot $350 million grant program to support efforts by states, Native Tribes and agencies such as the Park Service to identify collision hotspots and reduce incidents. And then there's the 2020 Great American Outdoors Act, which allotted more than $6 billion to repair crumbling roads and other park infrastructure. If the Park Service is planning to reconstruct a decrepit highway, why not include an underpass for elk or upgrade a culvert for cutthroat trout in the process? "As those dollars are being invested, there's a huge opportunity to look at connectivity," said Bart Melton, director of NPCA's wildlife program.

In my view, the Park Service would also be wise to reduce the number of cars that travel its roads. To be sure, many parks are already blessed with public transportation options: Places such as Denali and Zion boast long-standing, extensive bus systems, and Rocky Mountain, Grand Canyon and Glacier are among the parks with shuttles to beloved trailheads. But virtually no park boasts a bus system that covers its entire road network, and all too many vast parks, including places such as Yellowstone and Olympic, have virtually no public mass transit. We're largely stuck with windshield wildernesses; one of the best things we can do for wildlife now in many places is to reduce the number of windshields.

©JOEL SARTORE

A WILDLIFE CROSSING in Canada's Banff National Park. The park boasts six such overpasses and 38 underpasses, as well as some 50 miles of fencing along the Trans-Canada Highway. Since their installation, these safety features have reduced wildlife-vehicle collisions in the park by more than 80%.

The Park Service and its supporters also need to do everything they can to prevent the construction of new roads that threaten the integrity of park ecosystems. Take Ambler Road, a proposed 211-mile track that the state of Alaska wants to build to transport copper ore from open-pit mines — plowing across 26 miles of Gates of the Arctic National Park and Preserve along the way. Conservationists fear that the road, and the gargantuan mining trucks that may someday rumble along it, will disrupt the migrations of the Western Arctic's caribou, a notoriously skittish species whose herds are already in precipitous decline. In the past, we built roads through parklands without comprehending the damage we'd inflict upon our wildest places; today ignorance is no longer an excuse for heedless construction.

More than a century after the Park Service's creation, road management remains among its most vexing contradictions. This wouldn't have surprised Stephen Mather, who, for all his automotive boosterism, also understood the damage that vehicles could inflict: A highway through southern Yellowstone's Thorofare region, he once cautioned, "would mean the extinction of the moose." The road was never built, and today the Thorofare remains the farthest you can get from a road in the contiguous U.S., around 20 miles — a reminder that parks, for all their asphalt, can still provide sanctuaries on our paved planet.

BEN GOLDFARB is an environmental journalist whose book, "Crossings: How Road Ecology Is Shaping the Future of Our Planet," will be published by W.W. Norton & Company on September 12.

That Was Then

©AP PHOTO/BETH A. KEISER

MAMIE TILL-MOBLEY, a fierce advocate for justice for her murdered son, stands before his portrait in her Chicago home in 1995. President Joe Biden established the Emmett Till and Mamie Till-Mobley National Monument in July.