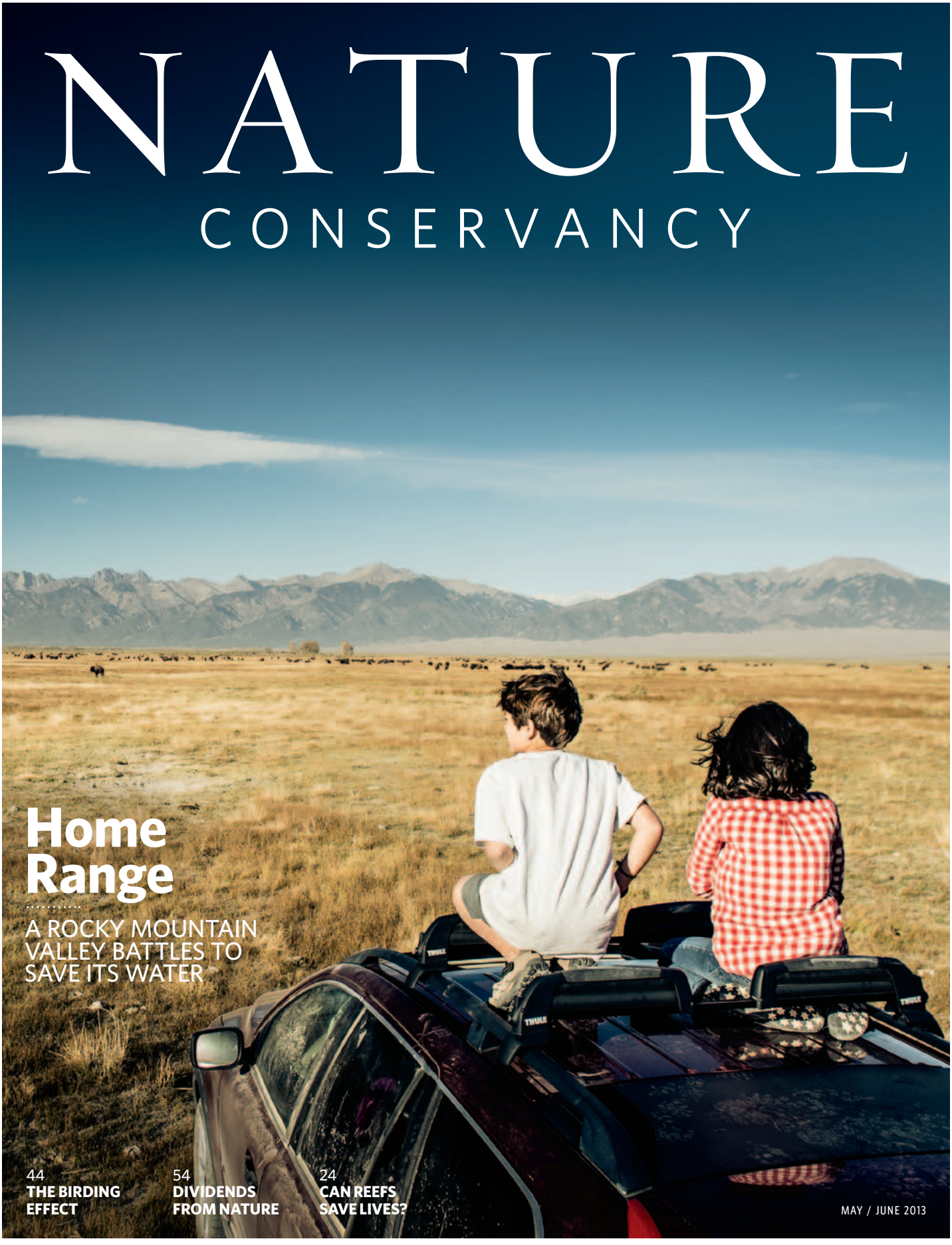
NATURE CONSERVANCY



Home Range

A ROCKY MOUNTAIN VALLEY BATTLES TO SAVE ITS WATER

MAY / JUNE 2013

FEATURES

© DAVE LAURIDSEN

Above: Conservancy scientist Tim Boucher finds inspiration in the sky.

DEPARTMENTS

On the cover: Watching a Conservancy bison herd from a safe distance. © Nick Hall

© NICK HALL

in focus

Joy Ride

Olivia Bell, Audrey Andrews and Anne Bennett take a sand board for a spin at Great Sand Dunes National Park in Colorado. After more than a decade of wrangling over the region's water, the dunes and the surrounding area were protected in 2004.

Page 30: Shifting Ground

© IAN SHIVE

in focus

Setting Things Straight

Clouds roll over Louisiana's Black Bayou Lake near the Ouachita River. In his new book, *Nature's Fortune*, Conservancy President Mark Tercek explains how turning nearby farmlands back to floodplains benefits the river and residents alike.

Page 54: Nature's Fortune

from the president

Beyond the Choir

Green Business: A restaurant serves locally harvested food near Chile's Valdivian Coastal Reserve.

I recently wrote a book, *Nature's Fortune: How Business and Society Thrive by Investing in Nature*, an excerpt of which appears in this issue (see "Nature's Fortune," page 54). Now, as I spread the word about the book's message, one of the first questions I hear from reporters and readers is, "Why did you write this book?" For me the answer is simple. I spend a lot of my time traveling and talking to all kinds of people, many of whom have not thought much about The Nature Conservancy or its mission. Writing a book seemed to be an avenue to reach more of these people faster.

But more specifically, I wanted to reach people who may not have that visceral love of nature that many of us share. And I wanted to reach those who think the conservation of nature is a bit of a luxury item. Yes, let's conserve nature, but after we've paid for everything else. I want to flip that perception. Nature is the foundation of our well-being. It ought to come first. It's what the most vulnerable people among us depend on most. I want people to begin to understand that a healthy natural world drives economic progress and human vitality. Nature is the asset on which our economies, our sustenance, our livelihoods and our ways of life depend—whether we live in a hut on the Serengeti or in a condo in Manhattan. Therefore, we need to invest in our natural capital—our lands and waters—to secure our economic future. That investment is essential, not a luxury.

We conservationists are great at speaking to the choir, but it's not the choir we need to convince. Polling consistently shows that our citizens rank the conservation of nature far down on the list of their priorities—below health, below education, and far below jobs and the economy. We need to start talking about the value of nature in new ways that make it relevant to more people. We need to help our friends and neighbors, our business and government leaders, and our teachers and pastors to better make the connection between nature and how it makes their lives possible, secure and hopeful.

> "We need to start talking about the value of nature in new ways that make it relevant to more people."

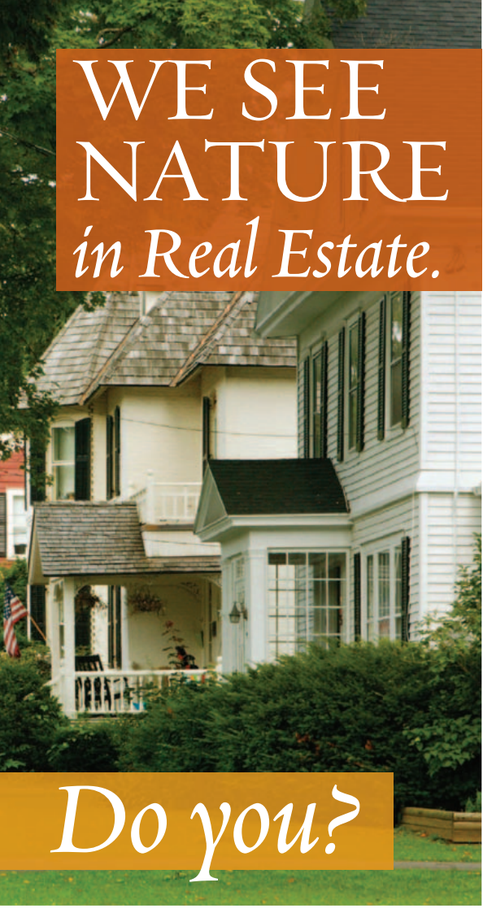
This shift in how we talk about nature can have profound implications. By demonstrating nature's value to those who once stood on the sidelines of conservation, we can develop powerful new alliances and catalyze large-scale investments that will enable us to conserve nature at a scale never before achieved. I came from the business world, and I know how that world works. To write and research *Nature's Fortune*, I partnered with an outstanding scientist and conservation writer, Jonathan Adams. That combination of business and science expertise made for a stimulating collaboration. There isn't a sentence in the book that doesn't represent the hard back-and-forth efforts of both of us. That relationship also reflects the kind of dialogue that is developing between conservationists and forward-thinking business leaders. It's speaking beyond the choir.

Of course, Jonathan and I owe our deepest gratitude to that choir—including the Conservancy staff, partners, volunteers and supporters who generously shared their stories and make possible the work featured in the book.

The Nature Conservancy is now fully committed to building more support for conservation; it's the only way we will be successful in achieving our mission in the decades ahead. We will always cherish our supporters who love nature without need of explanation, but now we collectively need to show others how and why they should value nature as well.

Mark R. Tercek
President & Chief Executive Officer

© NICK HALL; DAVE LAURDISEN



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about us

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WHAT WE DO

The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends. We address the most urgent conservation challenges at the largest scale by pursuing nonconfrontational, pragmatic, market-based solutions. Our vision is to leave a sustainable world for future generations.

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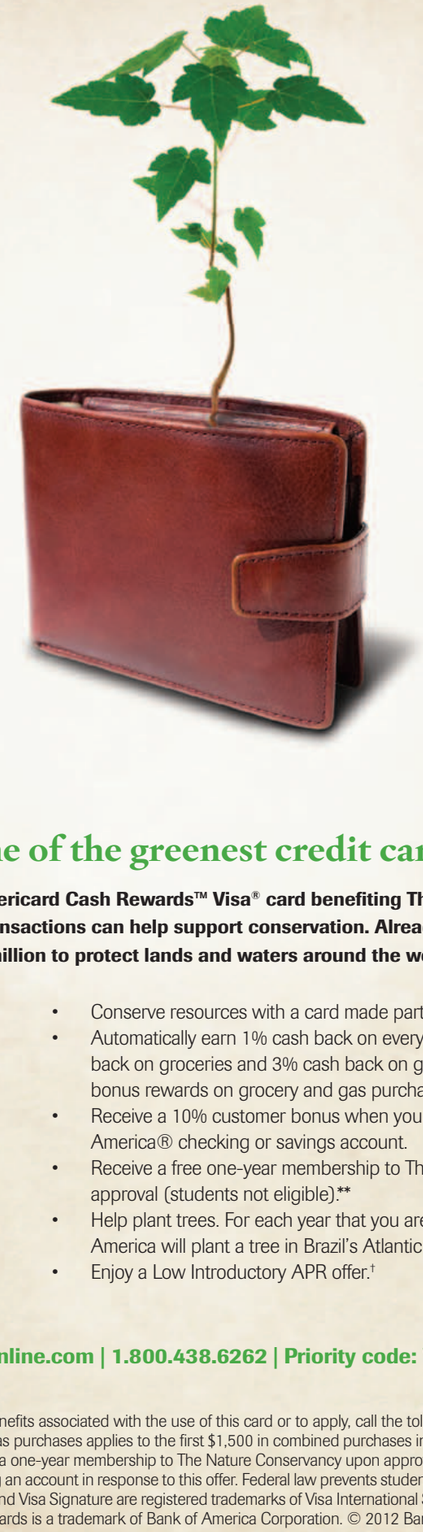

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like no other finite resource on Earth, helps sustain itself and the planet the more of it we consume.

– *Zeke Freeman*

at the magazine

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COVER STORY
Nick Hall

On assignment shooting images of Colorado's San Luis Valley ("Shifting Ground," page 30), photographer Nick Hall spent a great deal of time alone capturing the colorful sunsets at Great Sand Dunes National Park. But at sunrise the frost-covered dunes caught more than the photographer's eye: As the sand warmed and slipped, he says, it made a "deep rubbing kind of hum" that reverberated across the landscape. Hall has contributed photography to *Hemispheres* and *Outside* magazines and has recently created a short film about 10 Russian soldiers accused of cowardice during World War II.

Dave Lauridsen
Photographer Dave Lauridsen traveled to Florida, Maryland and Virginia to create portraits of The Nature Conservancy's Tim Boucher ("The Birding Effect," page 44). Lauridsen's goal was to capture Boucher's dedication—some say obsession—with birds by using light in different and sometimes challenging ways. The two got along so well that, at Boucher's house, his shy pet bird Toodles honored Lauridsen with a rare public appearance. Lauridsen's photos have run in *Sunset*, *Money* and *Cooking Light* magazines.

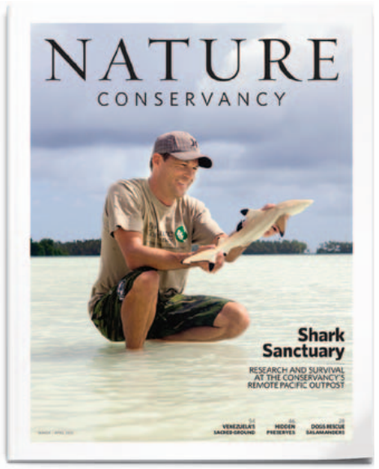
Melissa Milgrom
For writer Melissa Milgrom, profiling Tim Boucher ("The Birding Effect," page 44) meant living on the eccentric Conservancy scientist's schedule—including joining urban birding trips in the early mornings and pedaling along on his nine mile bicycle commute. "I knew this wouldn't be a typical birder story," she says. "His obsessiveness was a great match for mine—we volleyed back and forth all day long, and I loved every minute of it." Milgrom recently published the book *Still Life*, chronicling the work of taxidermists.

Frederick Reimers
The first time Frederick Reimers reported on the Great Sand Dunes—for a story about "sand boarding"—he spent days afterward digging sand from his ears. This time, Reimers got a different taste of the country ("Shifting Ground," page 30), eating organic burgers from cows raised on the Baca National Wildlife Refuge, where cattle grazing helps improve bird habitat by mimicking the former presence of bison herds and grass fires. Reimers has also written for *Men's Journal* and edited *Canoe & Kayak* magazine.

PHOTOS: COURTESY OF CONTRIBUTORS

member forum

Readers Respond to: March/April 2013



On the Cover

As a graphic designer, when I pick up a magazine I immediately think about how I would redesign it. That ended when we received our first issue of *Nature Conservancy* magazine. What a beautifully designed piece: clean, orderly and artistic. Thank you for your beautiful work.
Rick Forgus, Scottsdale, Arizona

Pristine Pages
I was shocked to see advertisements in the March/April 2013 issue of the magazine. The ads totally change the experience. The Nature Conservancy is a wonderful organization dedicated to preserving pristine environments. Please preserve the pristine environment of your magazine.
Alan Berkowitz, Mount Shasta, California

The editor responds:
Like many environmental and conservation organizations, The Nature Conservancy has begun to accept a limited amount of paid advertising in the magazine as a way to offset costs and generate income for the organization. The magazine plays a critical role in helping us report back on conservation successes made possible by the generous support of members. The funds raised from advertising will help cover the costs of the magazine and allow us to use as much of your support as possible to directly advance the Conservancy's work to protect the lands and waters that sustain us.

Little Creatures
Thank you for running the story "Hot on the Trail" (page 28), about salamanders and efforts to protect the little creatures in the forests of New Mexico. I was surprised to learn that they can even survive there.

WRITE TO US

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CHANGE OF ADDRESS

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The story reminded me of family hikes to pick huckleberries on Mt. Rogers in Virginia, where our three children would turn over rocks on the trail, looking for salamanders.
Anne Corley, Mercer Island, Washington

Wondrous Watercolors
The watercolor illustrations by Stan Fellows not only perfectly captured the mood of the excellent article by Hal Herring ("Hidden Gems," page 46), but are outstanding in their own right. Even the illustrations of the accouterments of a day hiker are masterpieces.
James Stovall, Lincoln City, Oregon

Corrections
The photo of a threadfin butterfly fish (page 38) was incorrectly labeled as a raccoon butterfly fish. Also, photographer Tim Calver's work has appeared in National Geographic Adventure *magazine, not* National Geographic.

worldview

© JOEL SARTORE

FOREST HAVEN: Many owl species live in or migrate through the New Jersey Pine Barrens, including long-eared owls like this one, which was photographed at a wildlife rehabilitation center.

NEW JERSEY

A Wise Investment

IN A NEARLY $10 MILLION DEAL that wrapped up this past New Year's Eve, New Jersey acquired more than 5,000 acres in its Great Egg Harbor River watershed after The Nature Conservancy helped negotiate the transaction. In a state where most land is either developed or protected, the property stands out for its sheer size—it's the fifth-largest conservation acquisition in New Jersey history—and for its healthy habitat. A former private hunting club, the property is adjacent to 56,000 acres of state land in the New Jersey Pine Barrens. The land's tidal marshes and forests provide a welcome haven to bald eagles, timber rattlesnakes and several species of owl.

SPOTTED: The io moth's markings deter predators.

EXPLORE

MOTH WEEK RETURNS

Experts and budding naturalists alike can celebrate National Moth Week, which runs July 20–28, by observing the lesser-known species of the Lepidoptera order. (The other lepidopterans are butterflies.) Success could be as close as a front porch light, but more adventurous types may want to visit a local Conservancy preserve. In 2008 at New York's Mashomack Preserve, for example, science teacher Hugh McGuinness observed nearly 18,000 moths of more than 600 species, including one never before classified. Scientists later named the find *Sparganothis mcguinnessi* after him. McGuinness will be back for Moth Week this year.

CLICK: Find instructions for moth-scouting fun in your own backyard at nature.org/ mothweek.

NATURAL TREASURE: The American crocodile roams Turneffe Atoll (below), the Caribbean's largest ring-shaped reef and lagoon. The new 500-square-mile reserve is Belize's largest protected area.

© ALEX HYDE, SIMON WILLIAMS/NPL/MINDEN PICTURES; ROBERTO RINALDI/NPL/MINDEN PICTURES

BELIZE

Setting a Gem

BLACKBEARD AND HIS COMRADES KNEW A TREASURE WHEN THEY SAW it: Turneffe Atoll, off the coast of Belize, was once a hideout for the infamous pirate. In November 2012, the government of Belize made a similarly positive assessment, establishing the new Turneffe Atoll Marine Reserve to protect this ecological gem. Turneffe's reefs, lagoon, mangrove forests and sea grass beds provide habitat for more than 30 species whose numbers are in decline. The atoll attracts fishing and diving enthusiasts from around the world—but development, climate change and unsustainable fishing practices threaten the atoll. In 2011, The Nature Conservancy led a series of workshops with representatives from the government, conservation organizations, the tourism industry and local fishing communities to forge a five-year management plan—thus making the reserve declaration possible.

CAVERNS: An 11,000-acre deal protects more than 50 caves in the Cumberland Mountains.

ALABAMA

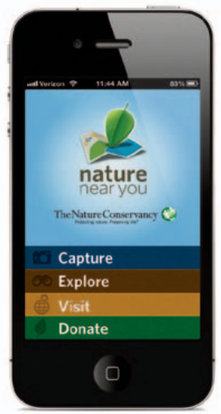
Under the Surface

CONSERVATIONISTS CELEBRATED IN DECEMBER WHEN THE STATE of Alabama acquired more than 11,000 acres in the southern Cumberlands on Jacobs Mountain. The Nature Conservancy negotiated and helped finance the $9 million deal to protect this swath of Appalachian forest, which adjoins the 50,000-acre Skyline Wildlife Management Area. The region's large, unfragmented forests provide breeding habitat for the wood thrush, worm-eating warbler and other migratory birds. But there's more to this land than meets the eye, says Chris Oberholster, who directs the Conservancy's program in Alabama. Below the woods and rugged mountain landscape lie more than 50 caves, large enough for spelunking and harboring creatures adapted to life in the dark, such as the Tennessee cave salamander. Weaving through the area are tributaries to the Paint Rock River, itself a haven for rare native freshwater mussels, such as the Alabama lampmussel. The state plans to open the property for public recreation.

DIGITAL

APPS APLENTY

Connect with The Nature Conservancy's hundreds of nature preserves from the palm of your hand using the Nature Near You app for your smartphone. The free app is available from Google Play and the App Store. The magazine you are holding in your hands is also available in a digital edition for iPad. You'll find the same award-winning stories, plus exclusive photo galleries, videos, audio commentary, interactive maps, virtual trails and more. Download it for free from the App Store.



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409 **The students of Frankton Elementary School in Indiana** have protected 409 acres of rainforest through an annual fundraiser for the Conservancy called Jar Wars. Classes compete by putting pennies into their own jars or sneaking silver coins, which count as negative points, into other teams' jars. The result? After 17 years, more than $20,000 raised—and counting.

MEET THE BOARD

Muneer Satter

A Wall Street veteran takes on the financing of the Conservancy's work.

OUTSIDE IN: I grew up backpacking and rock climbing and going to camps in the Blue Ridge Mountains. I spent a lot of time out of doors. I love the environment and have a passion for it.

THE MONEY GUY: I am chairman of the finance committee. If the Conservancy's scientists think a project is important and the conservation committee thinks it's important, the finance committee is going to do everything we can to try to come up with the money to do that deal.

BIG OR LITTLE? The Conservancy's endowment generates about $80 million of income a year, versus the entire world chewing up the environment. Think about that: Just the U.S. gross domestic product is $15 trillion. We're not big. We're tiny.

WHERE YOUR MOUTH IS: The Conservancy's ability to step forward and risk capital and put it on the line to make a transaction happen catalyzes a lot of people. It causes everybody to stop and say, "OK, let's get this done."

BEYOND FINANCE: Given that there is a limited amount of money, and there is an immense amount of land that has to be preserved, we have to be a lot smarter than just buying land. You can't go buy a barrier reef, for example. We're having to employ strategies to convince people in our country and all over the world that they can help preserve the land they live on in a sustainable way. We are working on innovative strategies in Latin America and China that are not just land-based.

UNDERSTANDING VALUE: How do you put a price on the land that provides water to all of New York City? How do you ever begin to put a price on that? And are the people in New York City really paying for the value that they are receiving? Probably not. Yet they rely on land that they don't normally ever see to sustain them.

GAME CHANGER: I don't know if we ever can, but were we to put a price on carbon, we could suddenly reverse the incentives that drive environmental degradation. You're far better off having thousands of entrepreneurs across the world waking up every day to preserve a forest than you are in a world where people have the opposite incentive.

CURRICULUM VITAE

Length of service
7 years.

Roots
Raised in Texas.

Home
Chicago.

Expertise
Earned a J.D. at Harvard Law School and an M.B.A. at Harvard Graduate School of Business Administration. Worked as an investment banker at Goldman Sachs for 24 years. Retired in 2012 to focus on his family. Currently heads Satter Investment Management, LLC.

Other Interests
Joined the board of the Illinois chapter of The Nature Conservancy in 2001. Joined the organization's national board in 2006 and serves as chairman of the finance committee. Other philanthropic interests include human rights and economic empowerment in developing countries.

CLICK: Find bios of all our board members at nature.org/leadership.

© DAN CHUNG

The Sea Wall Nature Gave You

UNSUNG HEROES: Many low-lying coastal cities, such as Miami, benefit from the wave-breaking action of coral reefs off their shores. The reefs help prevent erosion and decrease storm damage.

LAST SUMMER, I WENT SCUBA DIVING on the coral reefs inside the Sian Ka'an Biosphere Reserve, about two hours south of Cancun on Mexico's Yucatan Peninsula. The coastline there gets thrashed by storms frequently, but I was impressed by how vibrant the reefs were. Huge schools of snapper darted by. There were groupers, lobsters and some cool cuttlefish. But most striking were big branches of new coral sprouting from the broken, storm-damaged parts. These had all grown back since the devastation wrought by Hurricane Wilma, a Category 5 storm, in 2005.

Healthy living reefs act as natural sea walls. They break incoming waves and protect our coasts, and when they are working and managed well, they replenish themselves. This protected reef in a remote area was clearly doing its job, but reefs closer to people are rarely in such good shape. Nearer to Cancun, for example, coastal resort development has increased erosion and pollution, which is smothering the reefs and mangroves.

That sounds like a conservation problem, but it's a major threat to people and property, too.

Most people live near a coast. Aside from natural beauty, the seas offer us enormous benefits in terms of food and transport and helping to moderate the climate. I'm a surfer, so that's my excuse. Nevertheless, living so close to the ocean poses serious risks in terms of storms and flooding, along with major maintenance costs to local communities. Around Cancun, more than $70 million has been spent replenishing the white sand that waves are now washing away in the absence of healthy reefs.

But that's just the most obvious consequence. My colleagues and I recently collaborated with the United Nations University and Alliance Development Works, a consortium of five German development and disaster-relief agencies, to analyze how natural features such as coral reefs affect the outcomes of natural disasters. The resulting *2012 World Risk Report* finds that coral reefs, oyster reefs and mangroves all reduce the risk of harm to people from coastal storms and other hazards. In fact, my research has shown that healthy reefs can reduce the amount of wave energy that would reach the coast by more than 85 percent. So Cancun has more to worry about than the expense of lost sand: Without healthy coral reefs, it will lose its first line of defense against coastal storms.

CLICK

See how we grow young corals to replenish reefs at nature.org/coral.

Most people think we can reduce risks from natural disasters like 2012's Hurricane Sandy only by building sea walls and storm gates, but that's not the case. Around the world, about 200 million people likely benefit from the wave-reducing services of coral reefs. Many of those people live in densely populated island nations such as Indonesia and the Philippines. But it turns out that the United States is also on my top 10 list of nations with large populations likely benefiting from reefs. Here in America we have more than 7 million people, many of them in southern Florida, who enjoy reduced risks from storms and floods thanks to the unseen workings of coral reefs.

"Healthy living reefs are natural sea walls. They break waves and protect our coasts, and when they are working and managed well, they replenish themselves."

Of course, reefs do more than protect people during storms. They provide fish and other resources that sustain people economically. And they become a lifeline when storms cut villages off from other sources of food.

Sadly, a lot of coral reefs are on life support. Over the past 25 years, the world has lost about 30 percent of its corals because of coastal development, polluted runoff and climate-induced bleaching. But even in the Caribbean, which has suffered some of the worst of the damage, we still have a lot to work with.

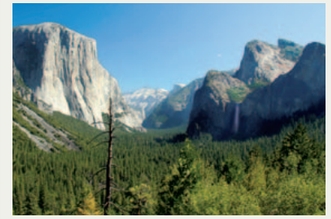
A coral reef is just a living skin of corals on top of a limestone skeleton. So when a coral reef dies, the structure is still there. Our job is to regrow the millions of tiny coral polyps to keep the reef together before the waves break it apart. That's right: It is possible to regrow coral reefs. The Conservancy and partners are already doing it in the Florida Keys and Virgin Islands, where we are raising staghorn and elkhorn corals to replenish damaged reefs.

Again, that may sound like a conservation project, but done right it can make people and property safer. Several years ago, the Conservancy began building oyster reefs in front of marsh preserves along the Gulf Coast. We mastered the design of these reefs to serve as breakwaters, and we created tools so other people could do the same thing. Once homeowners started seeing how well the reefs were reducing erosion, they wanted reefs to help protect their coastlines, too. The coast now has miles of restored reefs. If this work were only a conservation project, we couldn't come close to that scale of interest or support for restoring reefs.

Conservationists are going to have to change how we approach our work, too. We can't afford to focus only on remote and pristine reefs. We are going to have to get right in thick of it—I mean right in front of our towns and cities—if we want to do the most good.

Recently, I received some news from Perdido Beach in Alabama. The town was damaged by Hurricane Isaac in August 2011. Instead of just rebuilding sea walls and replenishing beach sand, Perdido Beach is considering building an oyster reef. Now, that's a sea change. ▪

Michael W. Beck is the lead marine scientist at The Nature Conservancy and a Pew Marine Fellow.

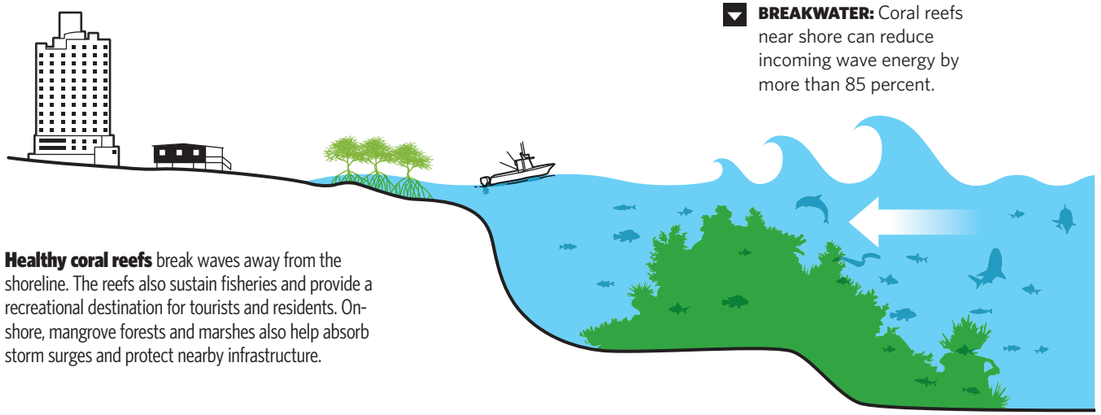


Top: Enjoy two nights at the South Rim of the Grand Canyon; Hike Yosemite Valley & stay overnight at Yosemite View Lodge; Visit pristine Jenny Lake, Grand Tetons

Natural Defenses

People love to live by the sea, but coastal life has its risks—in particular, storms and the waves that come with them. But some coastal communities may enjoy hidden protection. Recent studies have found clear evidence that coral reefs act as natural breakwaters and offer a first line of defense against incoming waves (see "Think About It," page 24). Huge, sturdy and structurally complex, healthy reefs do something that no other breakwaters can: repair themselves.

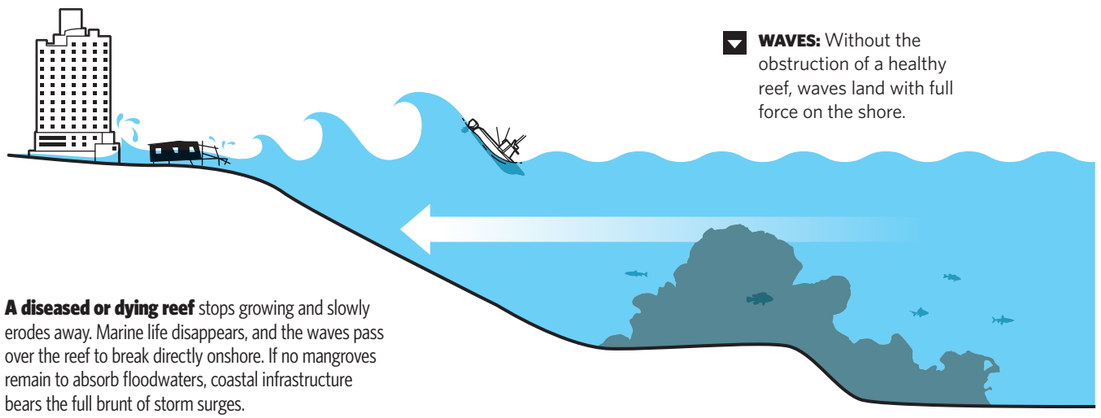
HEALTHY CORAL REEF



BREAKWATER: Coral reefs near shore can reduce incoming wave energy by more than 85 percent.

Healthy coral reefs break waves away from the shoreline. The reefs also sustain fisheries and provide a recreational destination for tourists and residents. Onshore, mangrove forests and marshes also help absorb storm surges and protect nearby infrastructure.

DEGRADED CORAL REEF



WAVES: Without the obstruction of a healthy reef, waves land with full force on the shore.

A diseased or dying reef stops growing and slowly erodes away. Marine life disappears, and the waves pass over the reef to break directly onshore. If no mangroves remain to absorb floodwaters, coastal infrastructure bears the full brunt of storm surges.

ILLUSTRATION © CHRIS PHILPOT; ADAPTED FROM "COASTAL HABITATS AND RISK REDUCTION," BY MICHAEL W. BECK AND CHRISTINE C. SHEPARD, *WORLD RISK REPORT 2012*.

SHIFTING GROUND

A STUNNING LANDSCAPE IS SAVED AFTER A DECADE-LONG WAR OVER ITS WATER

By Frederick Reimers
Photographs by Nick Hall

DESERT WAVE: The ramparts of Colorado's Sangre de Cristo Mountains capture the wind-swept dunes of the Great Sand Dunes National Park.

WHERE THE BUFFALO ROAM: A young visitor holds a garter snake; prickly pear cactus (facing page). The setting sun lights a herd of bison on the Conservancy's Medano-Zapata Ranch (below).

IN THE EARLY LIGHT OF A SPRING MORNING IN 1989, a fellow barged into the Crestone, Colorado, bakery where Christine Canaly worked, hungry for breakfast. The man, it turned out, was vice president of a company that planned to spend $150 million to drill 100 wells and pipe water from the rural San Luis Valley to the Denver suburbs, more than 100 miles away. Those suburbs, he said, would pay top dollar for the water, and the project would be a financial bonanza for everyone in the San Luis Valley.

Canaly was worried by the news. Rumors about such a project had already been swirling through the valley. "People suspected it," she says. "But no one came out and full-blown said it."

A few days later, Canaly drove her Volkswagen Rabbit to pick up 400 pounds of flour from miller and rancher Greg Gosar, and she mentioned the conversation to him. In the arid West, water can be an issue as contentious as sports and religion, and Gosar was concerned himself. "Water rights," he says, "are everyone's business around here."

In fact, Gosar had been chewing over a conversation that he'd had a year earlier. The principal owner of the sprawling, 97,000-acre Baca Ranch, a Canadian oilman named Maurice Strong, had been applying for extensive water rights in the valley. Gosar had asked Strong what he planned to do with the water. "Maurice told me, 'We're going to put in some potatoes, and we're gonna plant quinoa,'" he recalls.

But Gosar didn't quite believe it. And now, talking with Canaly, all the pieces began to fit together. Strong was the head of the same company that Canaly's hungry visitor worked for. And if the massive water-export plan went through, there was a very good chance that the project would suck the valley's farms and streams dry. Gosar was angry.

"Let's go get these guys," he told Canaly.

That was all she needed to hear. Within a few weeks, she and Gosar had formed a group called Citizens for San Luis Valley Water. Then, by happenstance, she met David Robbins, an attorney for the district that supplies water to local farmers.

"He's this imposing, brilliant guy with a huge handlebar mustache," says Canaly. "He told me they were already planning a lawsuit to stop the project. I asked him how he felt about citizens' groups. He looked at me and said, 'I love citizens' groups.'"

The two began putting together a battle plan. Robbins put Citizens for San Luis Valley Water in charge of a campaign to persuade the valley's voters to borrow money to fund the court fight. "We had 25 women working the phones," says Canaly. "We divided up the voter registration list, and everyone knew someone."

The group organized seminars, printed bumper stickers, placed op-ed pieces in local newspapers and held benefit concerts to raise awareness. In a special election a few months later, 92 percent of voters approved a ballot measure to help fight Strong's company, American Water Development, Incorporated (AWDI).

"It was unheard of around here for people to raise their own taxes to help the government with anything," says Gosar. That victory was just the first of dozens that would not only stop the water project, but lead to the creation of a national park, a wildlife refuge and, as of December 2012, the protection of more than half a million acres of land extending south almost to New Mexico.

On a brilliant blue-sky day last October, Heidi Sherk, director of external affairs for The Nature Conservancy in Colorado, is making the rounds of the vast Baca Ranch with Ron Garcia, a U.S. Fish and Wildlife Service refuge manager, and Fred Bunch, a chief of resources management with the National Park Service. They stop the Suburban they're driving beside an irrigation ditch. Miles of grassland are broken only by cottonwood trees and the occasional willow thicket growing alongside the ranch's irrigation ditches. Twenty miles to the west, the dead-flat San Luis Valley tilts up into the forested San Juan range. The jagged ramparts of the 14,000-foot Sangre de Cristos loom hard to the east; to

ROUGH BEAUTY: A scant 7 inches of precipitation per year can push cottonwoods and rabbit brush to the ragged brink of survival.

WORKING LANDSCAPE
Water stands at the heart of geography, history and politics in the San Luis Valley (top); after more than a century in private hands, the Baca Ranch is now shared by three federal public-lands agencies.

the south, the open valley stretches over the horizon into New Mexico.

"Around here, it's always about water," says Bunch, a bear of a man with the demeanor of a children's television host. "The San Luis Valley is a legitimate desert. It only gets 7 to 11 inches of precipitation a year—but it's also a cup full of water." He nods to the mountains bordering the valley. "In the spring, huge amounts of snow melt and run down into the aquifers below us," he says. Historically, that cup filled to the brim each spring, and much of the Baca was a wetland teeming with small, ground-nesting waterbirds well into summer.

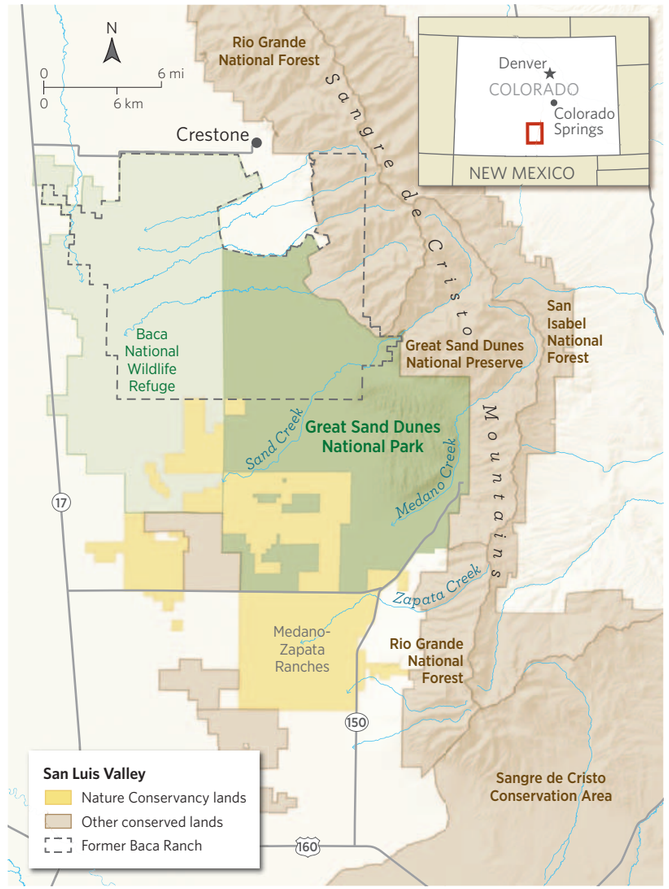
These days, thousands of wells tap the aquifers, making much of the San Luis a patchwork of green irrigated circles planted with barley, potatoes and alfalfa. The water has been meticulously apportioned and is carefully monitored by the state government. Which is why AWDI's plan caused such an uproar. Had the company taken as much water as it planned to, many of the existing farm wells would have been jeopardized, not to mention the rich ecology of the ranch, home to a host of plants and animals, including the slender spiderflower, pronghorns, Wilson's phalaropes and northern leopard frogs.

MORE
View exclusive Zapata Ranch photos in our digital edition app for iPad.

The project would also have threatened the valley's crown jewel, Great Sand Dunes National Monument. The 30-square-mile main field of 700-foot-tall dunes lies a few miles southeast, lapping against the Sangre de Cristos like bright white waves. Over the centuries, westerly winds have blown across the valley and funneled through three mountain passes, dropping sand gathered from an ancient lake that once filled the valley at their base. Creeks that flow out of the Sangre de Cristos feed the sand back to the dune field, says Bunch, "like a sand conveyor belt, ensuring the dunes stay put, walking in place."

But if the project lowered the water table, the creeks would dry up, and the dunes would be lost, taking with them six species found only there, including the Great Sand Dunes tiger beetle, the circus beetle and the clown beetle. "Luckily," says Bunch, "the citizens of the San Luis Valley locked arms against AWDI."

MAP: © XNR PRODUCTIONS



COMPLETING THE PUZZLE: The fight to stop plans to tap Baca Ranch's water set in motion the conservation of more than half a million acres stretching south nearly to New Mexico.

SELF-DEFENSE SQUAD: Community activist and former baker Christine Canaly and attorney David Robbins rallied San Luis Valley residents to keep the Baca Ranch's water close to home.

In 1990, while attorney David Robbins prepared his case, Citizens for San Luis Valley Water held meetings and seminars in the dozen towns scattered across the valley and filled the state's papers with editorials. Three thousand people packed into Ski Hi Park in the town of Monte Vista for a benefit concert by musician Michael Martin Murphey. Even the community's police cars sported anti-AWDI bumper stickers.

In a five-week-long trial in the fall of 1991, Robbins and his team—joined by the National Park Service and the Colorado Division of Wildlife—soundly defeated AWDI. But the victory was short-lived.

One of the biggest opponents of the water project had been a local rancher named Gary Boyce, who wore a duster coat and a holstered six-shooter, drove a purple Humvee, and financed and edited a periodic anti-AWDI newspaper. After AWDI's defeat in court, Boyce and a group of investors bought the Baca Ranch from the company. Then, in an unexpected twist, they announced their own water export project. They also placed two initiatives on the statewide ballot that, their critics maintained, were designed to tie up the valley's farmers in court and empty their pocketbooks with legal bills.

And so Citizens for San Luis Valley Water went back to work. This time its members raised $1 million to fight the initiatives and take up the cause in the media. Nearly every newspaper in Colorado came out against the initiatives, and in the November 1998 election, voters turned them down by 96 and 97 percent, respectively.

By 1999, people in the San Luis Valley were desperate to put an end to the water war. And an elegant solution suggested itself: Take the Baca's water out of play forever by incorporating the ranch into the adjacent Great Sand Dunes National Monument—and, in the process, transform the monument into a national park and create a new national wildlife refuge. Doing that would bring more visitors and revenue to the valley and permanent protection to 97,000 acres of ecologically valuable open land.

The Conservancy had just bought the neighboring 100,000-acre Medano-Zapata Ranch. The valley's leaders asked, if Congress approved the national park and promised funding, would The Nature Conservancy broker the deal? "Between the national park, the Rio Grande National Forest and our holdings, we'd create a 400,000-acre block of contiguous conserved land," says the Conservancy's Sherk.

Suddenly, things started happening quickly. In December 1999, Senators Wayne Allard and Ben Nighthorse Campbell, U.S. Rep. Scott McInnis, state Attorney General Ken Salazar and Secretary of the Interior Bruce Babbit traveled to the monument. The politicians wandered off together into the dunes for a private conference, and there agreed to work together to turn the plan into reality.

Just 11 months later—unheard of for legislation dealing with the creation of a national park—Congress authorized the purchase of the Baca Ranch. Still, legal wrangling continued to hold up the sale. "There were plenty of times we didn't think the deal would go through," says Sherk, who worked to persuade Congress to keep setting aside funds while negotiations dragged on.

Finally, in September 2004—four years after negotiations began—the $35 million deal was completed, marking

GHOST OF *CHINATOWN*

The fight over water in the San Luis Valley echoed one of the most infamous water wars in the West. In the early 20th century, agents from the Los Angeles Department of Water and Power secretly acquired the majority of the water rights in California's Owens Valley, a rich agricultural area 200 miles to the northeast, and then funneled the water into the city via aqueduct, drying the Owens Valley and destroying the area's farm economy. The so-called California Water Wars inspired Roman Polanski's film *Chinatown* and was thoroughly documented by Marc Reisner in the book *Cadillac Desert*. "It was the perfect cautionary tale for us," says Christine Canaly. Citizens for San Luis Valley Water screened documentaries about the water wars, passed out copies of *Cadillac Desert* and even flew in Owens Valley residents to tell their story in person in the packed gymnasium at Alamosa's Adams State College. "We got a lot of mileage out of that," says Canaly. "Nearly every regional paper covered the seminar, and from then on, every op-ed about AWDI and Gary Boyce mentioned Owens Valley."

ROOTED TO THE LAND
Ron Garcia (above, left) manages the Baca National Wildlife Refuge, which was created largely thanks to the efforts of locals like rancher and miller Greg Gosar, who fought to protect the valley's water.

STANDING TOGETHER
Rancher George Whitten (above, left) spearheaded the legal fight to keep water in the San Luis Valley. Today, that water keeps the sands at Great Sand Dunes National Park in place, says park resources chief Fred Bunch.

DRY CROSSING: Kate Matheson, who works at the Medano-Zapata Ranch, crosses a streambed; water has a fleeting presence on the land.

MOUNTAIN SPLENDOR
The Nature Conservancy’s Christina Cheatham explores High Dune (facing page); the Conservancy’s Medano-Zapata Ranch (above) is both a guest ranch and a working cattle and bison operation.

the largest single transaction to date for The Nature Conservancy in Colorado. Great Sand Dunes National Monument nearly quadrupled in size and was upgraded to a national park; the Rio Grande National Forest claimed the alpine portion of Baca Ranch, including 14,165-foot Kit Carson Peak; and 54,000 acres of grassland and wetland habitat became the Baca National Wildlife Refuge.

The regional reaction was jubilant. “The success of the Baca Ranch deal was a tribute to the residents of the San Luis Valley—to their ability to work together and dedicate their efforts to conserve the valley’s water,” says Ken Salazar, who is a native of the valley and, until this March, served as U.S. secretary of the interior. “Protecting the Great Sand Dunes is one of the great conservation accomplishments of our time.”

And even more land has been protected since then. Last year, the 170,000-acre Sangre de Cristo Conservation Area was created after landowner Louis Bacon placed conservation easements on his Trinchera and Blanca ranches, extending protection nearly all the way to New Mexico.

It’s late afternoon, and Fred Bunch steers the Suburban toward Great Sand Dunes National Park. “Oh, wow,” he says, “look at the light on the dunes.” They are practically glowing, spotlighted by rich, low-angle sunlight. Each dune is framed by a sharp crescent of shadow, and the whole field pops against the dark wall of mountains. It’s a remarkable sight, one that, even after 25 years at the park and a lifetime in the valley, Bunch still doesn’t take for granted.

Bunch says he’s grateful for the park, and the wide-open vistas surrounding it—vistas looking across the Baca National Wildlife Refuge and the Conservancy’s Medano-Zapata Ranch. “Our backs were really against the wall—not just the park, but the whole valley,” he says. “A lot of people stepped up to make this happen—locals, politicians, voters, The Nature Conservancy.”

“There’s a saying amongst land managers,” says Bunch, as he leans forward over the steering wheel to get a better view of the orange, glowing dunes. “To be a good steward, you need good neighbors.” ▪

The Birding Effect

Somewhere between Africa and South America, Tim Boucher realized what so many avian enthusiasts already know—being a serious birder means also being a conservationist.

By Melissa Milgrom | Photographs by Dave Lauridsen

BIRDS OF A FEATHER: Of the roughly 48 million bird-watchers in the United States, Conservancy geographer Tim Boucher is one of the 42 percent who pursue this hobby beyond their backyards.

"We have no control over what we are going to see or find," says Tim Boucher, explaining the rush and challenge of birding. "But you can improve your chances by learning their songs and calls, their different habitats, and learning to sit patiently and wait for them to arrive. It's an extraordinary tension."

The most intrepid birders will use any means available to spot birds wherever they reside: on moors, spits, golf courses, garbage dumps or trawlers. But they often get started in public parks or even in their own backyards, which is to say this is a passion that can be pursued wherever birds fly, most anywhere on the planet. In South Africa, where he grew up, Boucher once drove 12 hours to see a rare Egyptian vulture. Today's destination is decidedly less exotic, a 1,557-acre island of open space in the suburbs of Fairfax County, Virginia.

Boucher arrives at Huntley Meadows this October morning and waits for his group in the damp parking lot. The 47-year-old Nature Conservancy geographer is easy to find, standing six-foot-four with a beard and a big smile that says, "Yup, I'm in." His tall frame is festooned with a scope, binoculars and a digital audio recorder for summoning elusive birds. The 12 people he will lead are mostly what the American Birding Association would call "occasional" and "mid-level" birders, people who bird-watch up to five or 50 times a year, respectively. Boucher himself is a birder of the first order, someone who has traveled to 47 countries to see 4,714 of the world's 10,240 species.

As Boucher puts it, the majority of birders probably refer to this preoccupation as a hobby. For him, it's more of a beloved affliction. His goal is to see and hear members of all 227 bird families; he has only 27 to go. Birding dictates his personal travel itineraries, and it fills his house with kitchy-birdy knickknacks. It introduced him to his wife, and it led him to his career in conservation.

DIGITAL MIGRATION: Log and guidebook apps have become common birding tools.

In April and May, the height of bird season, Boucher birds to exhaustion. This time of year is slower, perfect to lead a group. "I enjoy showing people birds, especially beginner birders," he says. "They get such a thrill out of seeing even the most common species, and it's fun to see their reactions—to get them to understand and appreciate the joy of birding and being outdoors."

Today's group consists of some coworkers from the Conservancy's headquarters. They know Boucher as the world-class geographic information systems (GIS) scientist in their office who uses satellite data to monitor the status of healthy and threatened habitats. They also know him as the bird-crazy map guy who has braved civil war and landslides to find and see birds. He has chosen Huntley Meadows for

QUICK DRAW: Turning the pages of a guidebook can prove a slow and clumsy way of identifying animals in the field. Practiced birders can spot a bird and make quick sketches, noting important features such as beak shape, color patterns and tail shape (top, right). Then deeper research can be done after the bird flies away.

today's walk because its wetlands and forest attract some 200 bird species, making it among the best birding spots in metropolitan Washington, D.C.

"Sun is nice, but it shuts down bird activity quickly, especially in the tropics. The best is seasonal, overcast, no wind, no rain," Boucher informs the group as they enter the trail. Today is that kind of day. He pauses as he does before every bird walk, and listens. "The more you bird, the more important your senses become, especially your ears."

Once on the trail, Boucher operates at an energetic pace that reveals his excitement about birds and the opportunity to share them with other people. "In the scope!" he exclaims without actually raising his voice and then patiently waits for each person to observe a downy woodpecker that he has framed in sharp focus. It's easy to imagine Boucher as a professional bird guide. In fact, he once had the opportunity, but instead decided to become a professional conservationist, protecting nature in addition to showing it off. For many people, the line from casual bird-watcher to engaged conservationist is fairly short and direct, but not for Boucher—he's one of the extreme cases. His line goes around the world and through multiple career fields.

As the sun burns off the morning haze, the group follows him on a boardwalk that cuts through wetlands. They spot a good number of birds for this season, including a bald eagle. Later, they watch a hawk attack a robin, a fascinating and sobering reminder of nature's killer instincts.

Boucher points to a tiny mass of slate-gray feathers in a leafless tree. "A black-throated blue warbler," he announces. "Male. Everybody got it?" *The Sibley Guide to Birds* depicts more than 500 warbler plumages. Finding the right page, much less the exact bird, can be dizzying. The group of fledgling birders is suitably impressed by Boucher's keen eye for subtle markings; this specimen has what he calls a dapper look with no wishy-washy colors. Compared with the avian Lady Gagas he seeks in the tropics (birds of paradise in New Guinea, gaudy quetzals in Guatemala), this black-throated blue is a mousy librarian. But for him, the thrill lies less in the spectacle than in witnessing a late-season appearance of the species in Northern Virginia.

"That's the bird of the day!"

Birding is booming. More than 48 million Americans are birders, according to the U.S. Fish and Wildlife Service (USFWS), which tracks wildlife recreation. In 2001 birding was 232 percent more popular than in 1983, and it has gained steadily since. One reason for the surge, ornithologists suggest, is ease of entry: Anybody can become a birder. Although some devotees spend thousands on binoculars and exotic travel, birding requires little exertion or equipment to start.

According to USFWS, bird-watchers contributed $36 billion to the U.S. economy in 2006 (the most recent year for such data) and created 671,000 American jobs while generating $10 billion in state and federal tax revenues. Well-situated spots like Cape May, New Jersey, which sits right in the path of several migration routes, have profited by developing ecotourism; people from all over flock to the state's southernmost tip to observe its bird populations.

A BIRD'S LIFE: Boucher and his wife own roughly 400 books on birds. Above, his office is decorated with colorful GIS maps and mementos from past trips.

Even Hollywood has gone avian. Released in 2011, *The Big Year*, starring Steve Martin, Owen Wilson and Jack Black, is, of all things, a birding comedy; two more birding movies are in the pipeline. Meanwhile, ornithologists have ventured boldly into the public domain, posting sightings and tracking data online for citizen scientists to follow. For John Fitzpatrick, director of the Cornell Lab of Ornithology, "Internet, social media and mobile devices are enhancing the opportunities and the depth of experience."

In the past, the typical birder tended to be white, college educated, female, and aged 40 to 59. She likely lived in the South and earned more than $50,000. Recent documentaries such as *The Central Park Effect* have recast the birder stereotype. In demographic terms, birders today are both younger and older than ever before. They span diverse ethnic and economic ranges, and increasingly live in cities. In spring, Rock Creek Park in Washington, D.C., and Central Park in New York explode with birders.

The downside to this popularity is a lack of general field etiquette among some birders. Research in Peru found that the human voice speaking at 50 decibels—the volume typically used inside a library—reduced bird sightings by more than 30 percent. Seeing this study last year inspired Boucher to pen a good-natured (albeit cathartic) ode to noise reduction entitled "Shut the Hell Up."

Boucher grew up in suburban Johannesburg, where his parents' half-acre garden attracted plenty of birds. On weekends, his family visited nature reserves and his grandparents' farms near Cape Town. Trips to the Limpopo River and the Lesotho Mountains entranced them. Once in the Lapalala wilderness, Boucher leapt out of his chair. His dad thought he'd choked on lunch. In fact, he'd spotted an African finfoot, a white-and-brown waterfowl with bright feet the color of traffic cones.

In high school he excelled at computers and art, but he developed an even more intense curiosity about birds, which was only heightened when he went off to study at the University of the Witwatersrand. During his college years, Boucher and his brother scouted for the South African Bird Atlas Project, a catalog of bird populations that was updated monthly for five years. Although nothing symbolizes freedom more than winged migration, birds were not an intentional escape from the race riots and violence he had witnessed in Apartheid-era South Africa; they were his portal to nature.

After college and a mandatory stint in the army (where he skipped mock battles to go birding), he worked as a computer programmer—a job he refers to as a slow death. Without any reason to stay in South Africa, he and two friends in 1992 took a year off to bird North and South America. On their shoestring journey, Boucher trimmed hedges to earn travel money, got arrested for showering at a campground without paying, ate 30 mangoes a day in Costa Rica and sidestepped civil war in Guatemala.

Boucher eagerly recounts the adventures he has had in decades of searching for birds: 500-pound crocodiles, pelagic trawlers in icy waters and shorebird stew in Alaska. On their honeymoon in Zimbabwe, he and his wife, Ellen Paul (an ornithologist, of course), both quietly ignored the strong scent of a nearby predatory cat as they slipped through hip-high grasses looking for the secretive and rare African pitta. After sighting their bird and returning to their campsite, they each admitted having kept quiet about the lion for fear of ending the expedition early.

But his smile fades when he mentions Ecuador.

Boucher spent the last three months of his birding year crisscrossing that country. It was 1992, and tourist birders were few. "Ecuador was a real turning point because I made an explicit connection between birding and conservation. It was an incredible experience. They are a very peaceful people. The Spanish they speak is very pure and clean. The birding is beyond belief. Hummingbirds, trogons, ant birds—you have to hear them."

He couldn't afford to bird the Galapagos Islands, so he took an overnight bus that got stuck in a landslide, trudged through mud till he found another bus, and rode it to the High Andes, where he saw "incredible birds, things people don't see." He also witnessed inconceivable deforestation. "You could hear chain saws. You could see large cleared areas. Incredible poverty. The entirety of it was life-changing for me."

He returned to South Africa, where he resumed work as a computer programmer and birded with abandon. "I was almost like an addict that couldn't get enough." As he slowly metabolized his birding year, the memory of a harpy eagle he'd seen resurfaced. The harpy is the most powerful eagle, a bird that preys on sloths and monkeys. Boucher had glimpsed one from the window of a bus in Central America. The excitement of seeing a harpy collided with the realization that this raptor could never survive the destruction of its habitat, and he decided that "to watch birds was not enough." And indeed, he'd never work as a bird guide for safaris. "I couldn't bird without conservation," he adds.

In 1995, Boucher quit his programmer job and moved to the United States to study Kentucky warblers, which is how he met his wife. He took a job at a GIS lab, where he learned how to tease information from satellite images and data to depict environmental change. Boucher's years of tracking down reclusive birds gave him an acute sense for spotting areas that will and won't support animal life. He knows how deforestation looks up close, and the satellites have shown him how far and fast it can spread.

LIFE LIST

CLICK: Help us complete our birding bucket list! Nominate your favorite birds at nature.org/mustseebirds.

Ranging from Borneo to his living room, these birds (opposite page) made Boucher's shortlist of favorite sightings.

EGYPTIAN PLOVER

"They are only found on sandy river banks in the Sahel region of Africa, so getting to find one is undoubtedly part of the adventure."

SHOEBILL

"A bird whose taxonomy stops at the family level. We waded through an East African swamp for three hours to find one. Luckily we saw no crocodiles."

ROSE-BREASTED COCKATOO

"Common in Australia, this is the species of bird that we own," says Boucher of his captive-bred pet bird, Toodles. "Or maybe it owns us."

GARNET PITTA

"Notoriously hard to find and even harder to see. I was very lucky to find one in Borneo. My heart almost stopped when I saw it."

EGYPTIAN PLOVER
Pluvianus aegyptius

SHOEBILL
Balaeniceps rex

ROSE-BREASTED COCKATOO
Eolophus roseicapilla

GARNET PITTA
Pitta granatina

CLOCKWISE FROM TOP LEFT: © NIGEL BLAKE; DANIEL HEUCLIN/BIOSPHOTO; JEFFERY K. CHAN; ROMMEL/MASTERFILE

TAKE IT WITH YOU: "Birds are everywhere, part of everyday wildlife," says Boucher. "So the birding never really starts or stops."

Although understanding the interplay of geography and birding is an advantage that Boucher has over even top ornithologists—he can find an unmapped cave and the birds that might nest there—it comes with a price. He says his gift has no off switch. He is doomed to seeing birds not as splendid ornaments but as inhabitants of a shifting, imperiled Earth. "Even when I'm in a car looking out the window, I see the world through the eyes of a remote sensor," he says wistfully. Whereas a normal person understands the landscape from ground level, Boucher can easily imagine it as seen from above, complete with signs of both life and destruction.

The morning after Huntley Meadow, Boucher is in his Bethesda townhouse preparing for his usual bike ride to the Conservancy along the C&O Canal. His home is awash in trinkets, magnets and mugs, all of them bird related. There's Cockatoo Corner in the bedroom, and barred owls on the shower curtain. In the hallway is artwork "painted" by a southern ground hornbill. Ellen Paul is downstairs with the couple's 21-year-old rose-breasted cockatoo, Toodles—short for Attitude, of which this diva has plenty. "When it comes to birds," Paul admits, "there is no grown-up in the house—no one to say, 'No you don't need that because it costs too much.'" Thankfully, they can laugh at their shared obsession, something that saves it from becoming tedious to them or those around them.

When he arrives at work, Boucher kicks off his shoes and stands on a gel mat in an office whose walls are lined with bird photos and maps that he traveled six continents over 15 years to amass. Some of the maps Boucher makes are land cover maps, created from satellite data. Others are gorgeous mosaics that depict the world in ecoregions, which the Conservancy uses to evaluate habitats (most maps, in contrast, parcel the world into political boundaries). One map depicts Yunnan Province in China, where he and a team of scientists went in 1988 to assess the relative ecological health of the region that would later become Great Rivers National Park. It is no small feat to collect the data and translate it visually so scientists and policy makers can decide which areas would most benefit from their conservation efforts.

At Boucher's computer, a digital map shows Freeport, Texas, where he recently forecast climate change for Dow Chemical's coastal factory as part of the Conservancy's work in helping the company develop sustainability plans. Boucher plugs in different variables affecting the coastline along this 12-mile stretch of the Gulf of Mexico: how planting marshes here would mitigate floods, how the site would look in 50 years if they did nothing. "This is what the sea level rise will look like in 2050. If there's a Category 5 hurricane, kiss [everything] goodbye," he says, bringing to mind a picture of the hawk attacking the robin.

Still, looking at the world through a satellite is not how Boucher prefers to spend his off time. Like many other extreme outdoor enthusiasts, he is always planning the next trip. In January, Boucher and Paul tried their luck in Ghana, where they spotted 350 species. The bird of that trip was the yellow-headed picathartes, an "extremely beautiful bird, and a skulker. It exists only in a few places in West Africa," he says.

Their next big itinerary is already in the works. The couple is planning a trip through Borneo, Sulawesi and Halmahera in late summer. They are going after the Bornean bristlehead. "It's one of those magical birds that's in its own family—a monotypic family bird," he says, describing its unusually short taxonomy.

For months, Boucher will study endemic birds' songs and calls to increase his chances of finding the bristlehead. He and Paul will hoard their frequent-flyer miles and find a reliable local guide to lead their expedition. For background research, Boucher will check other birders' online trip reports and their GPS trails, and review maps with the personal perception of a remote sensor. Mostly he will persuade his wife to spend a few thousand dollars and skip work for a couple weeks for this gamble. What if one sees it, and the other doesn't? What if a flood or a typhoon hits? What if the forest is chopped down?

The stakes are high, the trek difficult, the money hard-earned and the bird extremely shy. Boucher is undeterred: "It's very, very localized. But like any gambler, I've increased my chances by knowing when to go, and then I shut the hell up." ■

How to Become a Birder in Three Easy Steps

By Tim Boucher

1 **GEAR UP.** To get started, you need a good set of binoculars and a reliable guidebook. Borrow some 'nocs, then test them out at a local outdoor center or birding store—how they feel in the hand is important. Three of the more popular bird guides are Sibley, National Geographic and Peterson. Start with these guides' smaller, regional editions for your area.

2 **IDENTIFY.** Don't try to memorize all the birds in your guide. Learn the bird families in your area; then you can quickly narrow down any species with a few simple questions: What's its shape and size? What's it doing? What are its defining markings and colors? What sound is it making, if any? Practice this in your backyard.

3 **GO WITH A GROUP.** Your local Audubon chapter, nature center or bird store probably hosts local bird walks. Go on many, and go at different times of the year. When you're ready to try on your own, join online birding forums where users share notes on what they've spotted and where. Springtime mornings are always a sure bet. Take your time, walk slowly and quietly, and look and *listen*.

CLICK: Explore an interactive map of bird habitats at nature.org/birdhomes.

BOOK EXCERPT

By Mark R. Tercek and Jonathan S. Adams

NATURE'S FORTUNE

IN LOUISIANA, SOME FINANCIAL HOLES **ARE BEST FILLED WITH WATER.**

Photographs by Ian Shive

It is one thing to think about taking out levees, but quite another to figure out where and when and how. The Ouachita River north of Monroe, Louisiana, provides a perfect opportunity to show the benefits of restoring floodplains.

The effort centers on a small stream called Mollicy Bayou in the northwest corner of Morehouse Parish. The bayou fed the Ouachita from about 25 square miles of bottomland forest on the river's east side. Thomas Jefferson sent surveyors to the area in 1804, after the Louisiana Purchase added the land to U.S. territory. Low-lying and wet, dotted with sloughs and lakes, settlers found the area less than ideal for farming, so they cleared other areas first for their small farms and later for the larger cotton plantations.

The land remained wild and for a time was a state game preserve. Not until the late 1960s, with growing demand for soybeans, did anyone try to farm the land around Mollicy Bayou. Private investors bought and cleared a neat rectangle about 8 miles long and 3 miles wide, piling the cut trees in heaps and burning them in enormous bonfires. The new owners quickly realized they would need levees and pumps to keep the land anything close to dry enough to plant. They built some 17 miles of levees that nearly surrounded the property.

The levees, 30 feet tall and 150 feet wide at the bottom, kept the Ouachita floodwaters off the soybean fields, now called Mollicy Farms. Unfortunately, they also kept rainwater on them. Where the farmers had dug up the soil needed to build the levee, they left behind an enormous borrow ditch and every time it rained hard, a common event in

BACK TO THE BAYOU: Cypress trees emerge from Louisiana's Black Bayou Lake near the Mollicy Farms preserve, where rice and soy fields have been restored to natural floodplains along the Ouachita River.

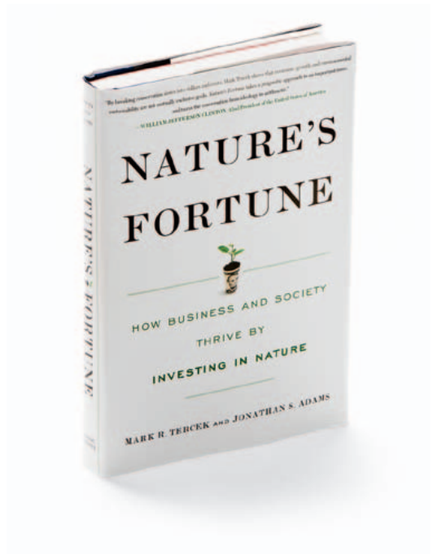
After several farmers went bankrupt, it became clear that the soggy bank of the Ouachita was not the best place to grow soybeans.

northeastern Louisiana, first the ditch and then the rest of the land would start to fill like a vast bathtub. The land managers had to turn on the pumps and dump tons of water laden with fertilizer and topsoil back into the river.

Despite the impressive engineering, after several farmers went bankrupt in the 1960s it became clear that the soggy bank of the Ouachita was not the best place to grow soybeans. Not easily deterred, and still looking to recoup the investment in miles of levees, the owners decided to try growing rice instead. This enabled them to focus on keeping the crop wet instead of dry, but it was still a hard slog. More farmers went under. By the mid-1990s, the only economically sensible option was to sell, and the only buyer ready to pony up cash for unfarmable land was the U.S. Fish and Wildlife Service.

The service already owned a large piece of land just across the river from Mollicy Farms, the Upper Ouachita National Wildlife Refuge. Here you can still see how Mollicy Farms, and indeed thousands of square miles of the Lower Mississippi River Alluvial Valley, once looked. Floods regularly sweep in among the trees of the wildlife refuge, in places climbing 20 feet or more up the trunks.

The floodwaters deposit silt, thus renewing the soil and forests, and then recede quickly enough to avoid killing the established trees. The water also allows fish to leave the mainstem of the river to search for rich sources of food; wade into the forest in a low flood and you will be tempted to scoop the fish up in your hands. People in the region understand



CLICK: For more information about *Nature's Fortune* visit marktercek.com.

how the ecosystem should function, the give-and-take between the Ouachita and the bottomland forest, a rich and complicated relationship that supports ducks and wading birds, cottonmouths and alligators, wild turkeys, deer and black bears.

The Fish and Wildlife Service began buying up parcels of Mollicy Farms in the 1990s and adding them to the refuge. But the new acreage bore hardly any resemblance to the land across the river—a fact not lost on two brothers, Kelby and Keith Ouchley, who grew up near Monroe and knew the woods and waters around Mollicy Farms well. Both had strong conservationist streaks. Kelby, the older of the two, eventually became manager of the wildlife refuge, while Keith got a doctorate in wildlife ecology from Louisiana State University and took over the Louisiana chapter of The Nature Conservancy in 2001.

In those roles, the Ouchley brothers were in a unique position to take on a grand experiment. Kelby managed wetlands projects for the Fish and Wildlife Service and had been instrumental in

purchasing Mollicy Farms. The agency initially had in mind not a full-blown restoration of the floodplain but instead a more straightforward, though still ambitious, reforestation effort: replanting 3 million native trees, such as cypress, water tupelo, willow oaks, green ash and mayhaws.

In 2007, the best place to admire the progress was from atop the levees, but as the Ouchley brothers turned west to look over the intact forest of the refuge, they knew they were standing on the most important obstacle to a functioning floodplain—for people and for natural communities alike.

The levees would have to go.

Taking out a levee is a complicated business, especially at this scale. Tearing down all 17 miles of levees was out of the question; the expense of moving so much earth would be astronomical. But even punching holes in something that large is daunting. Keith Ouchley says he and his brother considered dynamite until they realized that the blasts might shatter windows from Shreveport, Louisiana, to Jackson, Mississippi. Although the Corps of Engineers does not own the levees around Mollicy Farms, it is responsible for the levees that guard Monroe, and would have been most unhappy with the Ouchleys had they put those at risk.

Once the Ouchleys moved past the dynamite idea, their only option was to bring in dump trucks, backhoes and scrapers like those used to grade roads, and gradually whittle the levees down in

HIGH-VALUE HABITAT: Mollicy Farms now provides habitat for species like the American alligator as well as hundreds of thousands of migratory birds, including the pine warbler. Scientists estimate that Mississippi bottomlands like these are 2.5 times more valuable as forested floodplains than as farm fields, when flood mitigation, nitrogen and carbon sequestration, and recreational revenue are taken into account.

WHEN THE LEVEE BREAKS: In 2009, the Conservancy was set to tear down the old levees at Mollicy Farms to restore the former floodplain. But before the bulldozers could do the work, a spring flood washed away parts of the levees and flooded the fields ahead of schedule.

spots until they were level with the river. A more difficult question then arose: where to breach the levees. Getting the answer falls in the domain of a highly specialized field called fluvial biogeomorphology. That mouthful requires computer models, topographic data and aerial survey maps, along with an understanding of the ecology of the bayous.

The result of all the science was a plan for four cuts in the levees, each about 1,000 feet long, at the points where existing or historic streams entered or exited the property. The Fish and Wildlife Service supplied the muscle. The project was eminently shovel-ready, so the federal government chipped in $2.6 million in stimulus money to complete the work.

The breach was scheduled for June 2009, but the Ouachita had its own plans. By mid-May, the river reached the top of the levees. The Ouachita then began flowing over the levees and ultimately burst through in two locations, blowing out two 150-foot gashes. Knowing nothing of fluvial biogeomorphology, the Ouachita made the cuts where it pleased, not where the scientists selected. The river also dug a new lake 60 feet deep and uprooted many of the newly planted trees.

Once the floodwaters receded, work on the planned breaches (the natural ones remained in place, too) began in the summer of 2010. Heavy machinery pushed the earth back into the borrow ditch whence it came, reconnecting the tract's bayous to the Ouachita. Returning the muddy river to its ancient floodplain would become the biggest levee-busting operation ever in North America.

BOOK EXCERPT

The Ouchley brothers are in the early stages of a plan to coax plants and animals back to flourishing as they had when Jefferson's surveyors measured the landscape in 1804. In 50 years, visitors to the former Mollicy Farms will see a hardwood bottomland forest with abundant wildlife and flowing water. From atop what remains of the levees at high water, Mollicy Farms now looks like a large, placid lake. That illusion is easier to maintain if you ignore that it is a lake filled by a raging Ouachita, which at flood stage is a torrent nearly 30 feet deep. The former farm now stores floodwater and takes pressure off the downstream levees.

The return on this investment will not be just in the local environment's improved health, but in the lessons it has for other places as well. Kelby Ouchley likens the whole process—from replanting trees to removing the levees to replumbing the floodplain—to angioplasty.

Scientists from Duke University have added up how much all this could be worth—carbon sequestration, recreation, flood protection and so on—both to the people living nearby and to those on the Gulf Coast and even farther away. Breaching the levees and restoring the forest may make more economic sense than eking out marginal row-crop agriculture. In a 2009 study the researchers totaled all these values across the Mississippi alluvial valley and found that wetlands could be worth up to two and a half times more intact than they would bring if converted to soybeans or cotton.

It will take some time before all those arteries are clear and the patient is healthy again. *Healthy* here is also a relative term. Given how the land around Mollicy Farms was transformed, bringing it back to be indistinguishable from its twin across the river may be too much to ask, at least for now. That may not be the point. A living floodplain may be enough.

There truly are no losers in the restoration of Mollicy Farms. Private landowners had tried and failed to farm the land, sold it, and it is now in public hands. The levees themselves were built not by the Army Corps of Engineers but by the investors, and removing them increased the risk for no one and decreased it for many thousands of people in Monroe. A better example of a win-win would be hard to find. So it is not surprising that no one in the area objected to the plan to breach the levees. Most people were all for it. In part, this simply reflects the near-universal popularity of hunting and fishing in northern Louisiana. Who could object to 25 square miles or so of new hunting and fishing grounds?

That no one in northern Louisiana objects to taking out a levee and flooding an old farm is important. The public response to removing the levees may represent a deeper and more profound shift. Over the past decade, dramatic floods in many places, not just in the United States but around the world, have forced us to rethink our relationship with rivers and to realize that our control over them is tenuous and may indeed be slipping. Scientists now know much more about how rivers and floodplains work. That knowledge enables people to work with nature to enhance both human well-being and the health of rivers at the same time. ▪

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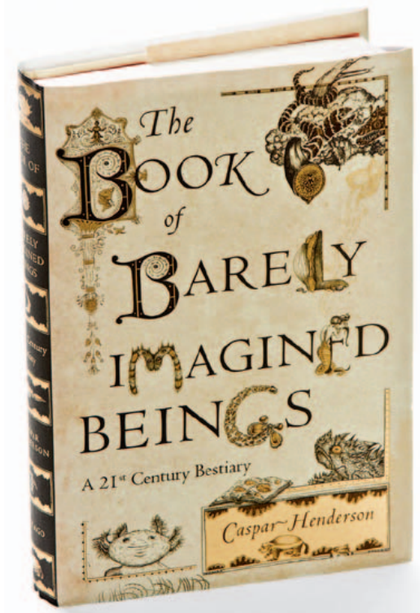
About the Book

This article is adapted from *Nature's Fortune*, which was co-authored by Conservancy President and CEO Mark Tercek (left) and former Conservancy staffer Jonathan Adams. Tercek's background includes 24 years at Goldman Sachs, where he was a partner and ran several business areas, including equity capital markets, corporate finance and real estate. He later led the company's Center for Environmental Markets and the Environmental Strategy Group. Adams is a writer-turned-biologist. In *Nature's Fortune* they offer real-world examples of the dividends earned from smart environmental planning.



Myth and Menagerie

WHEN IT COMES TO NATURE, THE TRUTH IS OFTEN STRANGER and more wondrous than fiction, especially in journalist Caspar Henderson's *The Book of Barely Imagined Beings*. From the axolotl to the zebrafish, the book illustrates the weird and wild histories of unusual—but real—species, including human beings.

Henderson takes his idea from medieval bestiaries, which often described fantastical creatures such as dragons or griffins. Henderson's creatures may not be mythical, but they are just as fascinating. Mysta-ceus jumping spiders, for example, can leap 50 times their body length, making them "much more powerful jumpers with respect to their size than cats." The sea butterfly swims by waving its "feet" like underwater wings. Some swimmers see them moving "like tiny angels" in the ocean. The encyclopedic book offers the reader elaborate illustrations, annotations and much lore. And lurking in the margins is Henderson's suggestion that just as a medieval bestiary's mythical monsters reveal the values of a bygone era, the creatures that fascinate us today reveal much about us. *University of Chicago Press, April 2013*

A Tall, Longleaf Tale

More than a century ago, a longleaf pine forest stretched across the southeastern United States—thought to have run from Florida to Virginia and as far west as Texas. Now a tiny fraction of its original size, the remaining longleaf pine ecosystem is the subject of intense conservation efforts. Released last fall, *Longleaf, Far as the Eye Can See* (writing and photography by Bill Finch, Beth Maynor Young, Rhett Johnson and John C. Hall) tells the story of the rise, fall and tentative regrowth of the forest as conservationists fight to restore it.

Filled with historical and present-day photographs, the coffee-table book chronicles the life of the longleaf from one-winged seed to full-grown "Prometheus pine," which both fuels and withstands frequent wildfires. The lush images and meticulously researched story combine to make the case that restoring longleaf pine is not only possible but worthwhile. *University of California Press, October 2012*

Dreams and Revelations

Familiar Song: A Waorani hunter near Ecuador's Yasuni National Park uses a leaf for a toucan call.

© IAN SHIVE

Coming from my own world of insect repellent and Gore-Tex jackets, the elderly couple lying on the dirt floor beside the stingy embers of a dying campfire in western Amazon made for an arresting sight. Asleep on a single fish-tail palm frond, each wore only a string around their waist—naked to the elements. But as I crawled into the muggy confines of my nylon tent pitched nearby, their snores reassured me that all was well.

Outside the Ecuadorian rainforest, the word "Auca" is regional parlance for these nomadic and reputedly fierce hunter-gatherers. It means savage. The people sleeping just a few feet away from me prefer the name Waorani.

That was my first night inside Yasuni National Park's remote "zona intangible." I had traveled to the most biologically diverse spot on terrestrial Earth with a group of scientists searching for new species and a PBS/National Geographic television crew documenting our expedition.

Among the many books I own on the topic of nature, E.O. Wilson's classic *Biodiversity* stands out. He introduced biodiversity to a generation of students and painted a picture of a planet filled with life, worthy of our reverence. I went to Yasuni to see for myself what Wilson's book cover portrayed: a rainforest cathedral dripping with life.

What I didn't expect to see as part of this rich picture was people.

In the following days, I witnessed again and again a community of individuals living in absolute synchronicity with the forest they inhabit. Their every survival need was met by an almost-perfect knowledge of the materials provided by their surroundings.

Whereas I would trudge through the mud, weighed down by the things I carried, Waorani warriors would stride single-file, each with a spear, a blowgun and a quiver of poison darts, melting effortlessly into the green. They kept only a few exquisitely engineered objects: perhaps a gourd stuffed with dry cotton to fletch the darts and a string of sharp piranha jaws to notch them, the perfect tools for the job.

"Although I had gone to see biodiversity, my biggest realization was that even here, biodiversity pulses with human life."

Their niche in the Amazonian ecosystem was a clear demonstration of how all humans once integrated with their habitats, so slotted into nature that removing people from the forest would tear both apart.

The Waorani treated us with hospitality—and a great deal of ribbing for our awkwardness in the jungle. And although I had gone to see biodiversity, my biggest realization was that even here, biodiversity pulses with human life. People, after all, are entirely absent from Wilson's book cover. To me, the rainforest turned out to be not a cathedral of plants and animals, but rather an environment made more meaningful by the presence of its native inhabitants.

When our trip ended, we made our way back to the border town of Coca and into the Hotel Auca—the Savage Hotel. And though I enjoyed the shower and the clean starched bedsheets, the din of the evening frogs had gone, and the gentle chatter of our Waorani hosts had been replaced by the distant roar of a frontier highway.

My dreams were vivid that night, but I slept poorly.

Sanjayan
Lead Scientist at The Nature Conservancy

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FIELD NOTES

On Assignment

Travel with photographer Ian Shive to Louisiana's Mollicy Farms. Shive was plagued by rain and overcast conditions, but he proved that bad weather can make for beautiful photographs (see "Nature's Fortune," page 54). Learn some of his photography secrets in this video from the field.

CLICK: Access the video in our digital edition app for iPad or at nature.org/mollicy.

HERDING INSTINCT: Bison graze on The Nature Conservancy's Medano-Zapata Ranch near Great Sand Dunes National Park.

From San Luis Valley

"I was enraptured by the fact that back in the day, America would have been covered with millions of these creatures," Hall says of the bison.

When photographer Nick Hall came to Colorado's San Luis Valley to shoot the Great Sand Dunes National Park (see "Shifting Ground," page 30), he says he became a "little obsessed" with the bison grazing at the Conservancy's nearby Medano-Zapata Ranch.

"I was enraptured by the fact that back in the day, America would have been covered with millions of these creatures," he says. "They would have roamed the landscape."

Taking a good shot of the animals, though, was not only difficult but potentially dangerous. Since field biologists had warned him that the animals could become aggressive, Hall kept his distance. But if he couldn't get close, his camera could. He set it up on a tripod on the bison's grazing grounds and stood a safe distance away with a remote trigger.

The trick worked—perhaps a little too well. "I spotted a couple bison licking my tripod," he says. One of the curious animals knocked it over. The camera's lens filter smashed on the ground and the bison scattered, scared by the noise.

Hall hurried to the tripod, worried that they had damaged the camera itself. Luckily, they hadn't. Instead, Hall had captured an image of both an extraordinary animal and its iconic American setting—from the unusual angle of being one of the herd.

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