

# SOLUTIONS



Vol. 57, No. 1 / Winter 2026

# ONE YEAR IN

Environmental protections are under attack as never before. Here's how EDF is meeting the moment.



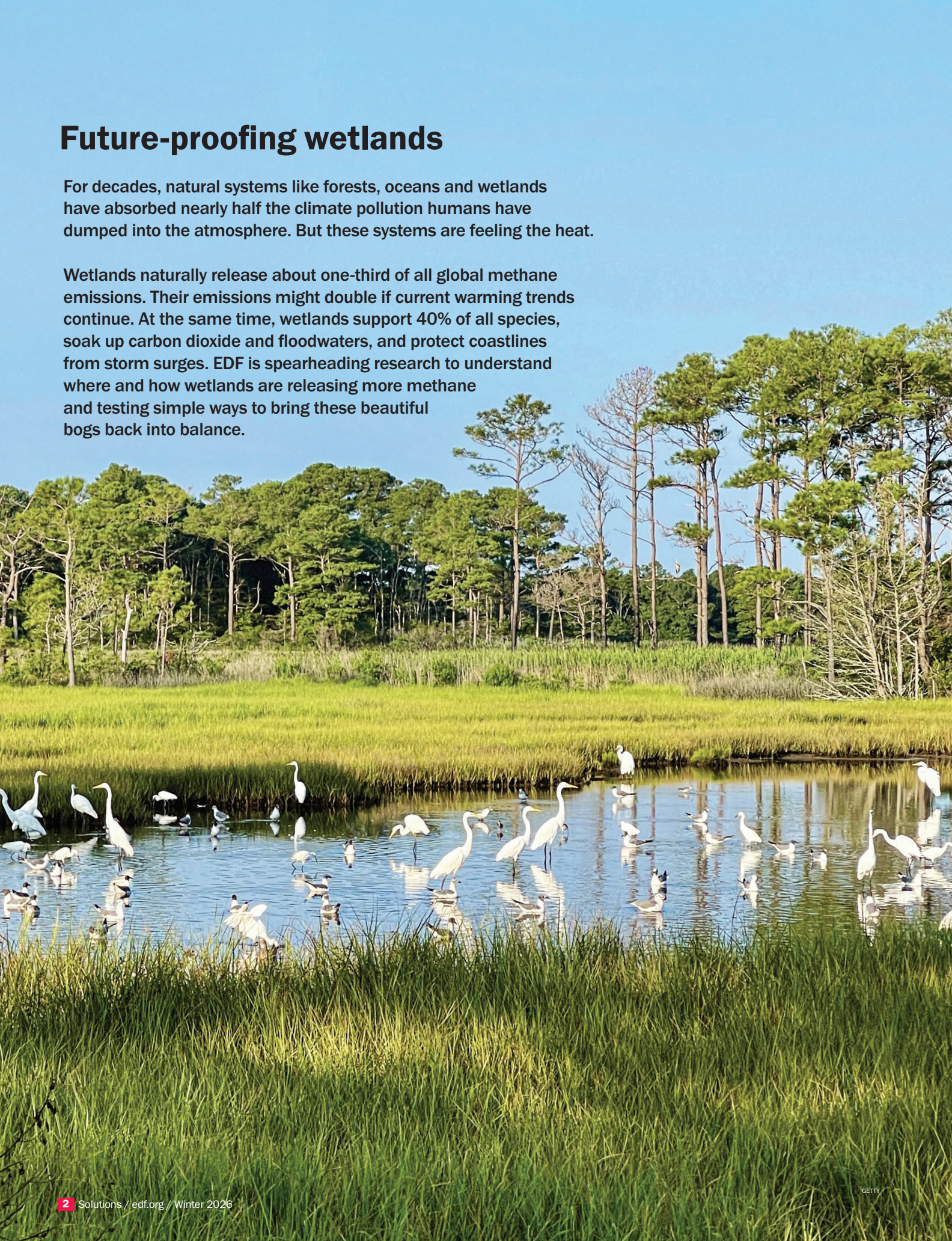
**ALSO INSIDE:** Water-wise farming | Happy cows, healthier climate | Electric school bus financing



# Future-proofing wetlands

For decades, natural systems like forests, oceans and wetlands have absorbed nearly half the climate pollution humans have dumped into the atmosphere. But these systems are feeling the heat.

Wetlands naturally release about one-third of all global methane emissions. Their emissions might double if current warming trends continue. At the same time, wetlands support 40% of all species, soak up carbon dioxide and floodwaters, and protect coastlines from storm surges. EDF is spearheading research to understand where and how wetlands are releasing more methane and testing simple ways to bring these beautiful bogs back into balance.



## Our winning hand



We’ve been dealt a winning hand on clean electricity.

We can make electricity more affordable and less polluting. It’s now cheaper to build and operate a brand-new solar farm than a new natural gas power plant or even to keep an existing coal plant running. And with battery storage now cheaper than ever before, that clean energy can now be affordably delivered even when it isn’t being produced.

Last year, the investment bank Lazard reported that wind and solar installations in the U.S. provide electricity at the lowest cost — even without tax subsidies. The cost of new gas-fired plants has reached a 10-year high and coal remains one of the most expensive ways to generate electricity.

Yet as the administration calls for “energy dominance,” it has canceled new clean energy projects, which made up more than 90% of new electric capacity added in 2024. Blocking wind and solar projects already under construction, canceling support for low-cost clean energy, and ordering aging and costly fossil fuel plants to run past their retirement dates will increase costs for everyone.

We need more clean electricity to meet the growing needs of our economy and reduce the heavy costs that fossil fuel plants impose on our health and the stability of our climate. And we need to be innovative to deploy electricity quickly, efficiently and cleanly. This means clean power and an improved transmission grid.

We also need rules at the federal and state level that incentivize power companies, grid operators and utilities to implement new solutions that can help us more efficiently utilize our existing infrastructure, reduce costs for consumers and fully leverage clean energy resources. For instance, new technologies can send more power through existing transmission lines at minimal extra cost. Adding new lines alongside existing roads and power lines is quicker and cheaper than building them on undeveloped land.

It’s crucial that we pioneer new ways of delivering electricity to homes, businesses and factories. A new law in California that EDF championed for more than a decade now does just that by allowing Western states to connect their electricity markets and create a cheaper, cleaner and more reliable electric system. It’s a move that could save consumers up to \$1 billion a year while cutting climate pollution by 39% (*see page 4*).

EDF is working with partners here in the U.S. and around the world to use bold, innovative strategies and technologies to drive down pollution quickly and affordably, while creating an energy system that benefits us all.

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### SOLUTIONS

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Fred Krupp, EDF President





## A cleaner, more affordable grid

The 13 states that make up the western United States now have the chance to create a cheaper, more reliable and far cleaner electric system. That's thanks to the September passage of California legislation that EDF championed for more than a decade and played a leading role in helping to enact.

At present, the flow of electrons across the region is controlled by more than three dozen separate power authorities. The new legislation, which passed with bipartisan, almost unanimous support, will enable these authorities to connect, creating a West-wide electricity market. "Bigger is better when it comes to electric grids," says Michael Colvin, who leads EDF's California energy policy advocacy. "With a bigger market, you have more opportunities to save money, more chances to overcome extreme weather events that can lead to blackouts, and more options to bring renewable energy online."

A West-wide grid could save consumers up to \$1 billion a year while cutting climate pollution by as much as 39%, according to estimates from the California Energy Commission. Over the next year, EDF will help set up the new market while encouraging utilities from across the region to join.

In previous years, the legislation stalled because stakeholders who supported the idea didn't agree on the details. This time, EDF brought to the table utilities, consumer advocates, public interest groups, transmission providers and others to address their concerns. "This," says Colvin, "was very much EDF taking a big swing and finding a way that worked."



GETTY

## Stronger standards, lower methane

Cutting methane pollution is the fastest way to slow climate change. In New Mexico, where EDF has helped create strong climate and clean air policies, oil and gas sites release less than half the methane pollution than similar sites in neighboring Texas. That's according to new data from MethaneSAT, the groundbreaking satellite EDF helped launch in 2024 that tracked global methane pollution for more than a year.

MethaneSAT measured methane pollution in an area of the Permian Basin that spans both states. (The Permian is the nation's largest oil- and gas-producing region.)

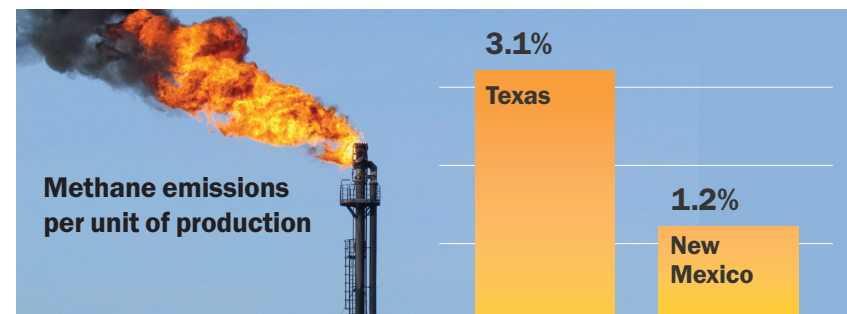
In 2021, New Mexico began requiring a suite of 14 pollution controls in the oil and gas production process; Texas requires only four. The MethaneSAT

data shows methane pollution levels in Texas are more than twice as high as in New Mexico.

"This is the clearest evidence yet that well-designed methane standards are protective," says EDF methane policy expert Jon Goldstein.

New Mexico's Governor Michelle Lujan Grisham championed the benefits of her state's efforts at a September press conference.

"The difference between New Mexico and Texas isn't geology, it's just policy," she said. With the Trump administration aiming to repeal federal methane pollution standards, she said states have the potential to lead on climate and clean air. "We're going to keep validating how important it is for states like New Mexico to stay the course."



ISTOCK AND TINK TANK STUDIO



Climate Corps lessons are now available online.

EDF / CLIMATE CORPS

### Climate essentials for business

EDF's Climate Corps has trained and placed more than 2,000 graduate students at companies, local governments and community institutions around the world to advance climate action. Now, EDF has made some of the program's most important lessons available online, for free. The certificate-granting course, Corporate Climate Action Essentials, helps professionals integrate climate strategies into business decision-making.

## Pioneering climate program ups its game

The Regional Greenhouse Gas Initiative will now bring bigger benefits to communities.

**T**HE BRONX, NEW YORK, HOUSE Sandra England shares with her elderly mother was bitter cold in winter. Though the furnace worked, as soon as it shut off, the temperature in the house dropped fast. That loss of heat concerned England.

"My mother is 80 years old," she says. "She's home all day."

England, a caregiver for older adults, and her mother were also spending around \$5,000 a year on heating oil.

But today, their home is snug and warm, and their heating bill is about half what it used to be — thanks in part to funding from a multistate climate initiative EDF helped launch in 2005.

The Regional Greenhouse Gas Initiative, or RGGI, cuts power plant pollution while generating hundreds of millions of dollars annually for states to invest in communities and businesses. RGGI funding has already supported 8 million families and 400,000 businesses across the Northeast and Mid-Atlantic region.

“RGGI creates a kind of win-win-win. It protects our health, reduces climate change and saves us money.”

— Peter Della-Rocca, EDF energy analyst

A new update to the 10-state compact, finalized last summer, will increase those benefits while cutting climate pollution from power plants by 92% by 2033, compared to a 2008 baseline.

### Bipartisan action to cut pollution

In the early 2000s, New York's Republican Governor George Pataki, concerned about climate change, convened a task force, which included EDF, to consider climate solutions. That group recommended RGGI, and EDF has helped shape the program and defend it in court ever since.

In 2008, RGGI became the country's first "cap-and-invest" program — a market-based solution that sets a declining cap on power plant pollution and requires producers to buy allowances at quarterly

auctions for each ton of pollution they emit.

The states — now including Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont — invest auction proceeds in energy efficiency, clean energy and bill-reduction programs. (Pennsylvania, which joined RGGI in 2019 but whose participation was blocked by state courts, recently withdrew from the program.)

# 46%

The decline in power plant pollution in the RGGI region since 2008.

Source: RGGI, Inc.

Since its inception, RGGI has been an unabashed success. It has helped cut power plant pollution in the region by 46%. RGGI produced \$5.7 billion in economic benefits from 2009 to 2014, according to a study by the Analysis Group, an economics firm.

A separate study by the consulting group Abt Associates found that the program produced \$5.7 billion in health benefits over its first 12 years — including fewer premature deaths, heart attacks and asthma cases.

Investments made in 2023 alone will prevent 7.7 million tons of climate

pollution — equal to emissions from 1.6 million cars — and save residents and businesses more than \$20 billion on energy bills.

"RGGI creates a kind of win-win-win," says EDF senior energy analyst Peter Della-Rocca. "It protects our health, reduces climate change and saves us money."

### Making RGGI stronger

Built into the program's design are periodic reviews to ensure RGGI fulfills its promise and keeps up with the latest scientific recommendations. The new cap, finalized last summer, will reduce power plant pollution by up to 80% by 2030 and 92% by 2033.

In the face of the Trump administration's aggressive attempts to roll back clean energy progress, that's good news. "There's a vacuum of federal leadership," says Della-Rocca. "The RGGI states are picking up the slack."

RGGI's benefits literally hit home for people like England. In 2023, she learned she qualified for free weatherization — new insulation and caulking to keep the drafts out — through New York's RGGI-funded Empower+ program.

"I thought it was too good to be true," she says.

It wasn't. Now she's recommending the program to neighbors and friends.

"I'm actually saving money!" she says.

Liz Galst



The solar array at Maryland's Evergreen Heritage Center received funding from RGGI.

ENERGY.MARYLAND.GOV

### THE WILSON LEGACY

This article honors the memory of Robert W. Wilson, a long-time EDF supporter and champion of harnessing market forces to drive environmental progress. See [edf.org/wilson](https://edf.org/wilson)





# A new wave of hurricane forecasting

Bahamian fishermen are closing data gaps, helping save lives.



Osbourne Stewart is among a growing number of boat captains helping forecast dangerous storms.

ON A CLEAR OCTOBER MORNING OFF Moore’s Island in the Bahamas, fisherman Osbourne Stewart hauls his stone crab traps up from the bottom of the ocean, as he’s done for decades. But this time, his gear is catching more than seafood. Slim sensors embedded into a few of his traps are quietly recording both temperature and depth — data that could make the difference between early preparation for hurricanes and surprise devastation.

“In Hurricane Dorian in 2019, I lost my boat engine and all my traps, and my whole house was destroyed,” Stewart says. “If what I’m doing now helps people better prepare, maybe others won’t have to go through that.”

Through the Fishing Vessel Ocean Observing Network, which EDF leads in partnership with the Bahamas Department of Meteorology and local fishermen, 13 working boats are now gathering vital ocean data across the Bahamas archipelago. Since its launch in late 2024, the Bahamas project has fed real-time data into forecasting models, giving scientists an up-to-date understanding of the warm, energy-rich waters that fuel hurricanes.

What’s happening in the Bahamas is part of an expanding network that’s now active in 13 countries. Around the world, fishermen and scientists are creating a global, people-powered ocean observation system that complements satellites and research vessels. The network is

quickly increasing meteorologists’ ability to forecast storms, track marine heat waves and protect coastal communities.

### Fishing for lifesaving data

Hurricanes are fueled by warm ocean water. “The warmer the water and the deeper that warm pool extends, the more fuel a hurricane can use to intensify,” says Christopher Cusack, who develops ocean technology solutions at EDF.

Satellites and buoys do a fine job tracking the open ocean but miss the near-shore zones where storms often explode in strength before landfall. These monitoring blind spots have limited scientists’ ability to forecast the rapid intensification of storms that have increasingly devastated vulnerable coastal communities in recent years. As a result, says Jeffrey Simmons, acting director of the Bahamas Department of Meteorology, “sometimes we’ll be expecting a Category 2, and then next thing you know, we have a Category 5 on our doorstep.”

Hurricane Melissa, which ravaged the Caribbean in October, was one of the most rapidly intensifying storms on record. “Most models under-forecasted Melissa’s rapid intensification,” says Cooper Van Vranken of Ocean Data Network, which administers FVON. “A FVON network there could have made a big difference.”

The model is both elegant and low-cost: Equip fishermen’s traps and lines with rugged sensors that go along for the

ride. When the gear surfaces, the data is automatically uploaded to the Bahamas Department of Meteorology, then on to the U.S. National Oceanic and Atmospheric Administration, where the information feeds directly into operational models.

Early elements of the network were developed in consultation with NOAA, beginning in 2001. Under the Trump administration, steep budget and staffing cuts have weakened the agency’s ability to collect critical weather data and support modeling efforts — curtailing research into the processes that drive extreme weather. At press time, it was unclear what use NOAA was making of the Bahamian data.

### Local knowledge, global impact

As FVON continues to expand into new regions, it has drawn international attention. In April, IOCARIBE, a United Nations program that coordinates ocean science in the region, urged all Caribbean nations to partner with FVON to expand ocean data collection. The UN’s ocean monitoring agency recently recognized FVON as a vital mechanism for integrating critical fishing-vessel-based observations into the agency’s Global Ocean Observing System.



Fishing boats destroyed in Hurricane Dorian.

“Fishing vessels are the most cost-effective way to collect ocean data at scale,” Cusack says. “This is local action fueling global science — and it’s a blueprint for resilience in an era when every extra hour of warning can save lives.”

Tom Clynes

## Meet Chris Costello:

# EDF’s new chief economist

EDF’S NEW CHIEF ECONOMIST, CHRIS Costello, is an expert on how protecting the environment can lead to economic prosperity. In this interview, he explains why he believes pitting the two against each other is a false choice and why he believes so strongly in the power of economics to turn companies and consumers into problem solvers.

**Q. First, you’re new to EDF’s staff. Tell us about your background.**

**A.** I have a Ph.D. in natural resource economics, and I teach economics at the University of California in Santa Barbara. My work has focused on studying how to balance economic growth with protecting the environment, and how to use market-based incentives to help solve environmental problems. I believe EDF is the very best at putting this into practice. So, when the chance came to join the staff, I jumped at it.

**Q. The Trump administration dismisses concerns about climate change as “alarmist.” What do you think of that approach?**

**A.** I think President Trump knows that climate change is not a “hoax.” But it seems he thinks we have to choose between economic growth and addressing climate change. As an economist, I know that’s a false choice. It presumes you can have prosperity while ignoring the very real costs of climate change, and that tackling warming holds back economic growth. But the economics evidence shows just the opposite.

**Q. As an economist, which climate solution do you think is most promising?**

**A.** We have a mountain of evidence showing that putting a price on climate pollution is the most effective and affordable way to meet our goals. We can do that with carbon markets, which cap the total amount of carbon dioxide companies can release and require them to buy “allowances” for each ton of carbon pollution they produce. The money generated from the sale can be invested in clean energy, reducing electricity prices, and helping better protect communities overburdened by pollution. Carbon pricing is the best way I know to achieve both economic prosperity and climate action.

**Q. You said there’s evidence that carbon markets work. Where are they working?**

**A.** Most people are surprised to learn that carbon markets exist in many countries around the world. The European Union was an early adopter of carbon pricing, and now China is using carbon markets to transition to a low-carbon economy, with EDF experts advising them. The state of California recently reauthorized one of the most innovative carbon markets in the world, and India is on the verge of developing its own market. When you add up all the carbon markets, they cover about one-quarter of all carbon emissions in the world.

**Q. Could we put a price on other greenhouse gases?**

**A.** Yes. In fact, our team is working on ways to bring methane into carbon markets. Methane — the main component of natural gas — has a faster warming effect

than carbon dioxide, so reducing methane pollution slows warming quickly. To reflect the higher, short-term damage methane causes, the price needs to be a lot higher. But we have found that the return on investment from addressing methane leaks is extremely high. It’s one of the best climate investments I’ve seen.

**Q. You recently said that EDF is the ultimate “climate realist.” What did you mean by that?**

**A.** We’re realistic about the costs of climate change and, frankly, the costs of tackling climate change. We care about prosperity around the world, affordability and how to address climate change while still achieving those goals. By grounding our solutions in science and economics, we develop durable, workable solutions to tackle this enormous and consequential challenge.

Vanessa Glavinskas

“ We have a mountain of evidence showing that putting a price on climate pollution is the most effective and affordable way to meet our goals. ”

— Chris Costello, EDF chief economist



Chris Costello at New York City’s 2025 Climate Week.



# STANDING STRONG

Working across the U.S. and around the world, EDF expands the fight for the planet.

By Nika Beauchamp, Joanna Foster, Liz Galst and Vanessa Glavinskas

**J**ANUARY MARKS ONE YEAR SINCE Donald Trump assumed the U.S. presidency a second time. His administration's blistering assault on clean energy, climate action and health safeguards is like nothing we've ever seen before. But EDF is fighting back.

Already, our lawyers have filed dozens of legal challenges against the Trump administration. We've also mobilized nearly 300,000 people to speak out against the administration's indefensible attacks on environmental protection. And we continue to counter its outrageous climate misinformation by reaching out to legislators, the media and our supporters with the truth.

Even as we fight to maintain critical U.S. federal climate and health protections, our experts continue to deliver wins for people and the planet, from California to Texas, from Asia to the Amazon.

The bottom line is this: With each lawsuit filed, every common-sense climate solution advanced, every advocacy email sent, EDF is in this fight to win. The stakes are too high to back down.

Here's a look at what we accomplished in 2025. ▶

## Moving states forward

In September, California Governor Gavin Newsom signed into law two key climate initiatives years in the making. EDF was instrumental in bringing both these historic bills across the finish line.

The first is undoubtedly the nation's most important victory for the climate in 2025: The reauthorization of California's landmark cap-and-invest program, which puts a binding, declining limit on climate pollution in the state, makes polluters pay for their emissions, and invests the revenue in utility bill savings, clean transportation, community green spaces and more.

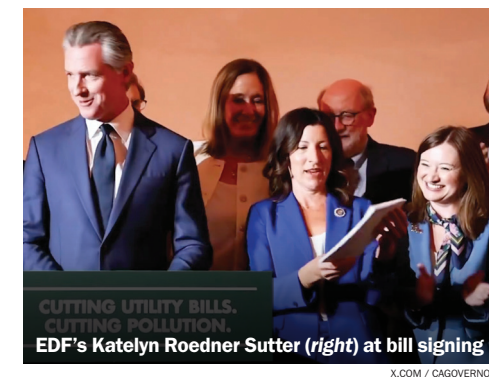
The updated program will put California on track to reach its goal of net zero emissions by 2045, while generating billions for the state to invest. The governor's office cited EDF's work, including a report which documented the \$55 billion in economic growth the program

would bring, as providing critical support for reauthorization.

The other one of these laws, passed with near-unanimous, bipartisan support, lays the groundwork for integrating California's electricity market with other Western states. (See page 4.) A West-wide market will expand access to affordable clean electricity, prevent blackouts and stabilize costs for consumers and utilities.

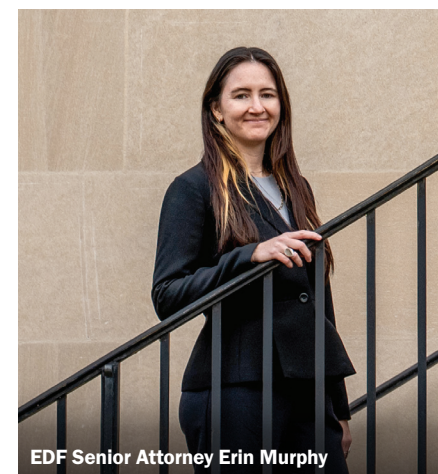
"These are major victories for both the climate and affordability," says EDF's California State Director Katelyn Roedner Sutter.

EDF's ability to develop climate solutions that make economic sense helped score two climate wins in Texas. The state legislature passed a law that for the first time places a limit on the number of years that an oil and gas well can be kept in an inactive status — a limbo state during which a well isn't being used to produce oil and gas but may be leaking. The new



law sets a deadline for when such wells must be revived or plugged. It's a promising step toward reining in pollution from 115,000 inactive wells. Texas voters also passed a ballot initiative to invest \$1 billion a year in water infrastructure. This climate-smart investment will especially benefit rural Texas, where climate change is constraining water supplies and threatening entire communities.

## Exposing the truth



"The public deserves to know who is pulling the strings and influencing the decisions that are going to harm the health and safety of millions of Americans," says EDF Senior Attorney Erin Murphy.

Through legal action, her team is revealing information that the Trump administration has been holding back. At press time, EDF has filed more than 50 Freedom of Information Act requests for records, brought nine lawsuits to compel their release when the administration failed to comply and obtained more than 5,000 pages of internal government documents.

Some of our findings are laying the groundwork for a critical, EDF-led legal effort to defend the Endangerment Finding.

It is the Environmental Protection Agency's long-standing determination, supported by mountains of scientific evidence, that climate pollution harms human health and must be regulated. The Trump administration is aggressively seeking to rescind the Endangerment Finding, which is the foundation for EPA standards limiting pollution from cars, trucks, power plants and oil and gas operations.

Digging through emails and calendars of EPA officials, Murphy's team found information about a secretly convened group of five climate deniers, one of whom discussed climate denial with senior Trump EPA leaders long before the group was formed. The group went on to produce a government report that is riddled with misinformation, in an attempt to undermine established climate science — supporting the administration's efforts to overturn the Endangerment Finding.

Convening an advisory group in this secretive manner is unlawful. When Murphy's team filed a suit challenging the group's formation, the administration hurriedly disbanded it. EDF is working to get the report thrown out.

Murphy's team also secured and published the EPA's annual inventory report on U.S. climate pollution, a congressionally mandated greenhouse gas inventory that the administration failed to release. CBS and other news outlets quickly picked up the story, reporting the basic truth revealed by the data and EDF's analysis: The U.S.

has made progress in cutting climate pollution, but the Trump administration's attacks on clean cars and clean energy threaten to move the country backward.

EDF's FOIA requests also helped reveal information about which polluters, like coal-fired power plants and petrochemical facilities, requested by email "presidential exemptions" from having to comply with clean air rules, an opportunity EPA Administrator Lee Zeldin extended in March. EDF got the information out to the media and created an interactive map so anyone could see which facilities were asking to pollute more. More than 4,000 people have since used the map to send letters to the EPA to object. (And you can, too. Visit [edf.org/maps/epa-pollution-pass/](https://edf.org/maps/epa-pollution-pass/).)

## 500+

The number of facilities EDF has exposed as having requested or received presidential exemptions to create more pollution

Source: EDF

"Someone who recently retired from the EPA reached out to let me know that EPA staff were coming to EDF's website to access data they couldn't get any other way," says Murphy. "It's alarming it has come to that. But we'll keep fighting to get the truth out in the open."

Erin Murphy, Magdalen Sullivan, Ted Kelly and David Villagrana are among many EDF attorneys fighting the Trump administration in court.

GREGKESLER.COM



## Climate wins worldwide



EDF is taking the lead on wildfire science.

ALAMY

Around the world, EDF has continued to drive actions to cut methane pollution, the single fastest way to slow climate change now. In Europe, we're protecting and advancing European Union methane pollution rules that came into force in 2024. EDF and our allies in Europe are using every advocacy tool, from direct engagements in EU member states to immersive art experiences, to ensure this law is implemented swiftly and serves as a model for reducing methane pollution worldwide.

Meanwhile, in China and India, two of 2024's top-three sources of greenhouse gas emissions, EDF is advancing carbon markets — trading systems that help economies cheaply and efficiently reduce planet-warming pollution. China's market, whose launch in 2021 EDF supported and which we continue to advise, now covers 60% of the nation's carbon pollution and 18% of the world's. In India, EDF has contributed modeling and guidance on the design of the country's carbon market, set to open in 2026.

Wildfires are another area where EDF is

making a crucial difference. March saw the launch of the first FireSat satellite, which EDF helped develop to detect wildfires around the world. The satellite's cutting-edge instruments can track fires as small as five square meters in real time. With additional funding, a constellation of about 50 FireSat satellites could monitor fires almost anywhere on the planet every 20 minutes, allowing firefighters to respond to small blazes before they grow into big disasters. FireSat will also enable scientists to understand in unprecedented detail how fires start, spread and drive climate change.

Worldwide, wildfires released 8 billion metric tons of carbon dioxide between 2024 and 2025, equaling the climate pollution from almost 2 billion cars. That pollution exacerbates climate change, fueling a dangerous feedback loop where more warming leads to more fires. "FireSat will give us a valuable new tool to empower smarter, faster and data-driven action across the globe," says EDF's Chief Scientist Steven Hamburg.

## Businesses raise the bar

While the Trump administration attempts to roll back the clock on climate progress, there's a surprising source of quiet leadership: big business. More than 4,000 companies worldwide are now reporting climate commitments, a nine-fold increase over the past five years, according to PricewaterhouseCoopers. EDF is helping companies achieve those goals — and set the bar even higher.

"Climate action makes good business sense in today's world," says Elizabeth Sturcken, who leads EDF's strategy to use companies' power to create change. "Companies face supply chain shocks from supercharged storms. Consumer demand for sustainable products is growing. Gen Z workers are seeking jobs at climate-minded businesses. Internationally, we have even seen deals fall through because of a company's climate pollution."

One area where businesses are taking

a leadership role is in reducing methane pollution from the dairy industry. Dairy livestock are responsible for nearly 10% of methane pollution worldwide. Two of the world's 20 largest dairy companies — Agropur and Savencia Fromage & Dairy — joined other food industry leaders in EDF's Dairy Methane Action Alliance in 2025, agreeing to analyze and reduce their methane hoofprints. Danone, an Alliance founding member, has already reduced methane from its fresh milk supply by 25% since 2020.

As companies' climate ambitions grow, so does demand for EDF's green skills trainings and business resources. Since

President Trump took office in 2025, the number of applicants vying for a spot in EDF's acclaimed Climate Corps program has doubled. The program trains and pairs them with companies and public institutions in the U.S., India and China to help these organizations meet their climate and energy goals.

Also in the last year, more than 22,000 people worldwide have taken advantage of EDF's Net Zero Action Accelerator — a climate skills-building website for corporate workers.

"We're no longer convincing corporate leaders to act on climate," says Sturcken. "We're showing them *how*." ■



A growing number of businesses are working to improve their impacts on the environment.

GETTY

# 4,000+

The number of companies worldwide now reporting climate commitments

Source: PricewaterhouseCoopers

# Saving water, saving the farm



Dwane Roth (left) with his nephew Zion and Zion's growing family

APRIL HARMON

IN SOUTHWESTERN KANSAS, OPEN skies and wide, flat plains make it easy to see what your neighbors are getting up to, which can make it hard to try doing something new.

Dwane Roth felt this pressure one warm night as he watched all of his neighbors, one by one, turn on their irrigation systems. But Roth resisted. Data from his soil moisture probes showed him that there was plenty of moisture deep in the soil. That year, Roth saved millions of gallons of water, without affecting his yield.

A fourth-generation farmer, Roth is at the forefront of data-driven water conservation in Kansas agriculture. It's a role he first took on out of interest, and which he's now convinced is a necessity. He's working with EDF to help spread water conservation strategies to farmers in Kansas and across the grain belt.

## A new necessity

Kansas' farming success is due not only to its rich soils, but to what lies beneath — the Ogallala Aquifer, a 10-million-year-old underground reservoir of water that stretches from South Dakota to Texas. But the Ogallala has been shrinking, as modern irrigation pumps out water far faster than nature can replenish it. Climate change, fueling more frequent and intense droughts, is only making matters worse. If pumping continues at the

current pace, southwestern Kansas will run out of water in the next 40 to 50 years, with some areas running dry in the next two decades.

After some initial skepticism — Roth says he "told the salesman where he could stick those probes" — Roth eventually embraced new technologies. (The probes turned out to be free through a federal program.) Part of his farm became a demonstration project for technologies and practices that use less water, such as bubbler irrigation systems that deliver water directly to the roots of plants.

Today, his nephew Zion runs the family farm, and Roth travels the state and the country, sharing his water conservation experiences and expertise with anyone who will listen.

One of the tools he's excited about is OpenET, an online platform EDF helped develop that has more than 13,000 users — from individual farmers to government water managers — and now covers the continental United States. OpenET provides free, easily accessible satellite-based data on one of the most important

pieces of information farmers need to get irrigation right — evapotranspiration, the movement of water from their land and plants to the atmosphere. Before OpenET, good ET data was hard to get and often cost-prohibitive for farmers.

Currently, farmers who experience crop losses must keep watering while they await a visit from an insurance adjuster — something that can take weeks. OpenET could also help their insurance companies verify such losses remotely, which could save millions of gallons of water. Data from OpenET can also help evaluate water savings from crops that might serve as alternatives to traditional, water-intensive ones.

But changing how things are done on a family farm is often fraught. Roth remembers the first time he changed how he tilled the fields to save moisture and cut back on diesel costs; his father stopped

speaking to him for months.

Those changes were his choice, Roth says, a luxury Zion doesn't have today. "He has to conserve water if he wants to keep farming. Maybe Zion's kids will want to farm one day. My hope is that what we're doing today will at least give them that choice. Without water, the choice is made for them."

Joanna Foster



Water challenges will impact the future of farming in Kansas.

APRIL HARMON





Dairy farmer KSM Dinesh, right, and his family

KSM DINESH

# In India, a winning formula for cows, farmers

By Shanti Menon

**A**FTER COMPLETING DEGREES IN engineering and biotechnology, KSM Dinesh made a surprising request to his father.

“I told my father I didn’t like engineering and wanted to start a cow farm,” says Dinesh. “He gave me a small loan and only six months to try it. So I named the farm after my grandparents, so my father will never let it shut down!”

It was a rocky start — Dinesh knew nothing about cows. He did his own research, consulted a helpful uncle and purchased his first cow in 2017. The animal was so terrified by her long journey to the farm that “she smashed up everything in sight,” says Dinesh. “We were also terrified.”

Over the years, with much trial and error, Dinesh gained his footing, growing his herd and installing a biogas generator to convert manure into electricity. And in 2024, he found his way to a new dairy entrepreneurship program launched by EDF and the Kumaraguru Institute of Agriculture in Coimbatore, in the southern Indian state of Tamil Nadu.

That program proved to be the game-changer that helped Dinesh launch his business — a sustainable dairy farm that sells fresh milk, minimizes waste and reduces climate pollution. He’s now part of a growing effort to bring climate-smart practices to India’s vast, largely informal dairy industry.

## More milk, less methane

India produces more milk, and has more dairy animals, than any other nation in the world. Its 300 million cows and buffalo supply milk for more than 1.4 billion people, nearly half of whom rely on dairy products as a major source of protein. Yet these animals, so essential to India’s food supply and culture, produce on average 33% less milk than cattle worldwide, in part because of a lack of veterinary care and balanced nutrition. They also produce nearly half of India’s emissions of methane, the powerful climate pollutant that is making the planet hotter, faster.

The low productivity and high methane footprint of India’s dairy industry

make life even harder for India’s 80 million dairy farmers, most of whom own just a few cows or buffalo and an acre of land and already see precious little profit from their holdings.

Excessive heat, drought and flooding, made more intense by climate change, puts their crops and animals at risk. Heat stress can reduce an animal’s milk production by 20–30%. By 2085, heat stress could reduce India’s overall milk production as much as 25%, according to a study in the science journal *The Lancet*. That’s a bleak outlook for farmers.

The good news is that simple strategies to keep animals healthier and more productive benefit farmers and the climate.



A balanced diet helps cows produce more milk and less methane.

EDF INDIA



The training program is helping to empower women in rural communities.

SHANTHRA PRAKASH

For example, feeding cattle a calibrated mix of green and dry fodder — all local and seasonally available — is more nutritious than randomly feeding them whatever’s on hand on a given day. This simple change doesn’t require any investment and can boost milk production by 20%, while also reducing methane emissions by 14%, according to research from India’s National Dairy Development Board. Housing structures that use locally available material can protect animals from

## “In villages, the good news also travels fast.”

— KSM Dinesh, dairy farmer

rising heat and humidity. And knowing the basics of modern animal husbandry, with access to affordable feed, medicines and other farm essentials, can help small-holder farmers maintain healthier and more productive livestock.

## Enthusiastic entrepreneurs

Sharing this advice with 80 million people, most of whom have little formal training in animal husbandry, let alone internet access, is no small task.

“Small farmers really have no way to get hold of medicines, supports, supplies, know-how,” says veterinarian Abhinav Gaurav, who leads EDF’s dairy livestock work in India.

EDF’s previous partnerships in India had demonstrated that rural entrepreneurs, given simple training and business support, could efficiently spread money-saving, climate-smart agriculture advice to hundreds of their farmer customers. So

Gaurav worked with local experts to begin training a cadre of dairy entrepreneurs. The three-month program, launched in 2024, has now trained 120 rural entrepreneurs, with 130 more on deck, in dairy science, livestock rearing and business, with a focus on sustainable and climate-smart strategies that also improve bottom lines.

Some of the trainees, like Dinesh, are showcasing these strategies on their own farms, while others, who sell everything from feed to breeding services, are dispensing climate-smart, profit-boosting advice as a way to build trust with their customers as they grow their small businesses.

The program helped Dinesh get federal funding to expand his herd from 30 cows of various breeds to 150 Kankrej cows, a hardy, indigenous breed. He also learned how to improve the nutritional quality of his feed, boosting his milk production. In 2025, with milk flowing, biogas electricity from manure for his small processing plant, and a side business selling excess manure as fertilizer, he was able to launch his subscription-based milk delivery service, making twice-daily deliveries of fresh milk to customers in three cities. The farm’s sustainable ethos is central to his marketing.

Shanthra Prakash, a recent college graduate with a degree in agriculture, used her entrepreneurship training to found a farmer cooperative that unites local women to sell their milk. She recruited and now leads a group of 300 rural women, sharing advice on economic empowerment and climate-smart strategies.

Another graduate of the program, Indumathy, already employed her neighbors to make incense and other organic

products on her farm. She used her training to launch a new business selling a nutrition-boosting feed supplement she developed from sugar cane waste from her fields. She plans to share knowledge with and source raw materials from a network of women in neighboring villages, building a cadre of woman-led, climate-smart businesses.

## A network of millions

Each entrepreneur plans to build a network of about 200 local clients — that means with just the first two batches of trainees, the program has the capacity to reach about 50,000 small dairy farmers with profitable, climate-smart advice. Encouraged by the pilot program’s success, the Tamil Nadu state government has pledged to train 10,000 more dairy entrepreneurs. In Maharashtra, the state where Mumbai is located, the state government has expressed interest in bringing the program to 5,000 Maharashtrian entrepreneurs.

# 300 million

The number of cows and buffalo supplying milk to India’s 1.4 billion people.

Source: Government of India Livestock Census

These additional trainings would extend the program’s reach to 3 million farmers.

India’s National Dairy Development Board, which works with some 40 million dairy farmers nationwide, has also taken an interest. Prakash and a few other trainees are working with NDDB to establish a pilot one-stop shop for dairy farmers outside Coimbatore, where they can bring in their milk to sell cooperatively, buy quality feed at a discount and get climate-smart livestock advice.

Gaurav is also working to bring the entrepreneurship curriculum to the Indian government’s national web portal, where it will be available digitally to anyone with internet access.

It’s a small effort, says Gaurav, but an important proof point that climate progress and economic development can go hand in hand. “We are building evidence to show that this works,” he says. “Entrepreneurship is a driver to start those larger policy discussions.”

Dinesh is also confident that climate-smart dairy strategies will spread. “They say bad news travels fast,” says Dinesh. “In villages, also the good news travels fast.” ■



# Ride on the magic school bus

Despite federal funding cuts, communities can still afford electric school buses. Here's how.

IT'S NO SURPRISE THAT PARENTS, kids, drivers and administrators love electric school buses. They improve kids' health and learning. They cut climate and air pollution. They save schools money on maintenance and fuel. They can even become community life-lines during a power outage — feeding power back to buildings to keep lights on, phones charged and medical equipment running.

Unfortunately, the Trump administration and its allies in Congress have stripped away Biden-era federal funding for electric buses. Federal tax credits were halted, and the Environmental Protection Agency's Clean School Bus program, which has \$2 billion to distribute before October 2026, has failed, at press time, to announce winners of \$1 billion in grants anticipated last year.

"We will be holding EPA accountable for distributing that funding, otherwise it's an illegal impoundment," says Carolina Chacon, who manages the Alliance for Electric School Buses, an advocacy group and EDF partner.

All is not lost, though. "There's a cornucopia of funding options" for motivated schools and communities, Chacon says.

Check out these opportunities. And be sure to connect with EDF-affiliate Moms Clean Air Force for resources to help build support in your area for kids' healthy rides to school.

## SCHOOL BUS ROUTE

### State funding

Since January 2025, state governments have announced more than \$550 million in electric school bus grants, with more funding on the way. California was the leader, awarding \$500 million for electric buses; at least 10 other states, including Montana, Texas and New York, followed suit. For a list of state funding opportunities, check out the Alternative Fuels Data Center webpage from the U.S. Department of Energy.

### Utility support

Utilities are increasingly offering generous grants for both buses and charging hardware. The Illinois utility ComEd, for instance, has already provided \$100 million in rebates for electric vehicles, including school buses, and anticipates granting much more. Georgia Power this summer announced it will fund charging stations for 10 public school districts. The Alternative Fuels Data Center webpage lists utility-financed options as well.

### Green banks

State and regional green banks offer low-cost loans to schools for electric buses, as do commercial banks and credit unions.

### School transportation companies

Companies that administer transportation for districts, like First Student and Highland, often work with districts to apply for incentives and other funding options.

### Bonds

Some school districts, including in Austin, Texas, and Tempe, Arizona, are issuing bonds to help finance electric buses and charging infrastructure. "It's not as common as other kinds of financing, but it's definitely happening," says Chacon.

### Vehicle-to-grid revenue

While not a grant or a loan, revenue earned by selling electricity from buses back to the electric grid during times of high demand can help electric buses pencil out. Check with your local utility to find out if it offers this option.

Liz Galst



## ★ YOU GOT THIS DONE!

# Picturing Ruth Patrick

CHARLIE HODGE HAD NO IDEA HIS mom was a famous scientist until he started 9th grade. "She was always just 'Mom' to me," he says. Then a friend asked if he had seen the photo of his mom, Dr. Ruth Patrick, in their biology textbook. "The last chapter was devoted to her 1948 Patrick Principle study," he says. "I knew she had an important job. But that was the moment I started paying more attention."

Now more kids will learn about Patrick's work, thanks to a new picture book, *Magic in a Drop of Water*, written by Julie Winterbottom and illustrated by Susan Reagan, both EDF members. (Hodge, a pediatrician, also supports EDF in honor of his mother, who passed away in 2013.)

The book's title references the "magic" Patrick discovered at age 5 when she looked through her father's microscope at a drop of pond water. What she saw seemed magical — ornate, single-celled algae with glass-like shells, glistening like jewels. "That excitement never left her," says Winterbottom. "In fact, it propelled her into this amazing career as an ecologist."

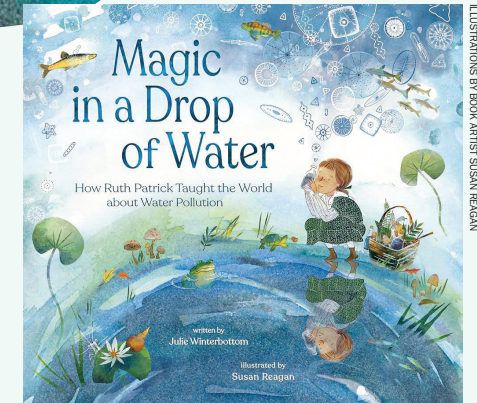
Born in 1907, Patrick persevered at a time when female scientists were seen as less capable than men. Her tenacity led to a breakthrough discovery about biodiversity that changed how ecologists understand pollution — what became known as the "Patrick Principle."

By studying different waterways with a team of researchers, Patrick found that living things can serve as natural indicators of pollution levels. In a healthy stream, many different species flourish. But polluted water allows only a few species to survive and dominate. In very polluted water, nothing survives.

Her work helped change the way scientists monitor water quality and ecosystem health, no longer just measuring levels of contaminants but evaluating the bigger picture.

Winterbottom, who has spent her career writing for children, says this project felt especially urgent.

"Given what's going on in the world, and that our streams and environment — and the planet as a whole — are in so much jeopardy, I wanted to write something that might inspire the next generation," she says.



"I want kids to know that the thing you love to do when you're very young, that you're excited about and passionate about, can actually turn into your life's work," she says. "And that work can leave the world a better place."

Vanessa Glavinskis



WE'RE ALL EARS

Got an environmental success story you want to share? Let us know at [editor@edf.org](mailto:editor@edf.org).

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