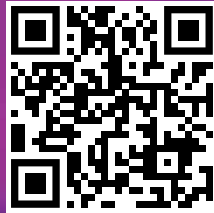


# Revealed!

**Methane pollution from America's largest oilfield is heating the planet. EDF is finding the leaks and holding companies accountable.**



**Hold your smartphone camera up to the code and follow the link to bring this cover to life.**

**Methane leaking from oil and gas storage tanks near Pecos, Texas on January 12, 2020.**

SHARON WILSON / EARTHWORKS

**7** At last: Help for California's monarchs

**12** Wildlife in the bayou, ten years after the BP spill

**15** Lobstermen plan for the future

**18** Five ways to break your plastic habit



# Lessons learned

**Fifty years after the first Earth Day, there's much to celebrate, including the bipartisan passage of the Clean Air Act, the Clean Water Act and the Endangered Species Act. Thanks to these sensible laws, America's air and water are substantially cleaner. Today, EDF — with its 2.5 million members and activists — is driving toward a 100% clean economy. Young people are more passionate than ever about healing the environment. We'll need every one of them as we confront the existential threat of climate change.**

# Taking stock



Fifty years ago, I was helping organize a program for the first Earth Day at my high school in Verona, New Jersey. I was already passionate about the issue, but I couldn't have dreamt that, years later, I would be leading a global environmental organization. Nor could I have imagined the complexity of the challenges we face today.

Even in the midst of the devastating coronavirus pandemic that has upended so many lives around the world, this 50th anniversary of Earth Day is still a moment to take stock of the progress the environmental movement has made — progress that gives me hope for the future, despite the tough battles ahead.

Our cars, our air and our water are cleaner. The ozone hole is on the mend. Corporations, once vilified, have contributed. Walmart, for example, has worked with its suppliers to remove 23 million pounds of hazardous chemicals from consumer products, and other retailers have followed suit. Many young people today have never heard of acid rain, because EDF helped cut its major cause — sulfur dioxide emissions from power plants — by 88%, saving hundreds of thousands of lives in the process.

The first Earth Day put information in people's hands, and information is power. Today's new technologies and communications amplify that. For example, an EDF affiliate is building MethaneSAT, a satellite that will reveal where oil and gas operations around the world are emitting methane, the gas that causes more than a quarter of today's global warming. Our goal is to cut those emissions 45% by 2025, 75% before 2030, creating as great a near-term climate benefit as closing one-third of all coal plants worldwide (*See p. 11*).

Even before MethaneSAT launches, we're using other new technologies to monitor and reduce methane emissions in the Permian Basin, one of the world's top-producing oil and gas regions. EDF's work will show how to reduce this pollution everywhere (*See cover story, p. 8*).

These are just a few of the reasons why, 50 years into the modern environmental movement, I believe the cause of a sustainable earth is winnable — but far from won. To succeed, we need all hands on deck, and we must build the political will to implement effective policies. That's why I'm heartened by the engagement of young people in the fight against climate change (*See p.17*).

We embrace the moral clarity that this new generation brings to the climate crisis, and we will do our part to learn from them — and from the hard-won lessons of the past — to find the durable solutions the world so urgently needs. Thank you, EDF members, for being part of this effort.

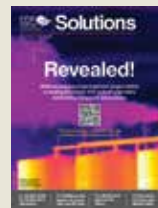
*Fred Krupp*  
EDF President



## A MESSAGE ABOUT COVID-19

The novel coronavirus crisis was gathering force as this issue went to press. Our hearts go out to all who are suffering. We urge everyone to follow instructions from public health officials. EDF is taking steps to keep our staff safe and our work on track, and to minimize delays in acknowledging your support and inquiries while we work from home. Please be safe.

## On the cover: See it live!



To see how infrared video makes invisible climate pollution visible, use your smartphone camera or QR code app to scan this interactive cover. Then read senior writer Shanti

Menon's story on how EDF is uncovering and measuring leaks of methane and toxic air pollution in the Permian Basin, where industry oversight is minimal and communities pay the price.

Footage by Earthworks

## Solutions

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# FIELD NOTES

GETTY



Paraguay's Itaipu dam

## Hydropower's surprising climate impacts

A new study by EDF climate scientist Dr. Ilissa Ocko shows that some hydroelectric dams can be worse for the climate than fossil fuels. Hydropower enjoys a reputation as a clean energy source, but dams, in addition to disrupting people and wildlife, also release climate pollution — carbon dioxide and methane — mainly as vegetation in the reservoir decomposes.

Earlier studies that examined the climate impacts of hydropower overlooked the

short-term climate punch delivered by methane, which is 84 times as powerful as carbon dioxide in the first 20 years after its release.

"We care about climate change now as well as 100 years from now," says Ocko.

When she examined emissions from some 1,500 dams that represent nearly half the world's hydropower, she looked at short-term as well as long-term climate impacts. Ocko found more than 200 facilities that caused more

warming than coal power when compared over a 10-year time period.

Some 3,700 new dams are in the works worldwide, many in regions like West Africa and India, where Ocko found a larger proportion of hydropower worse for the climate than coal.

Avoiding new hydropower in very hot places and using deep, not wide, reservoirs — such as in mountainous locations — could shrink hydropower's climate impact.

They say

We say



By 2030 Microsoft will be carbon negative, and by 2050 Microsoft will remove from the environment all the carbon the company has emitted either directly or by electrical consumption since it was founded in 1975."

— Brad Smith,  
President, Microsoft



Microsoft has set an audacious goal. To really shift the needle on climate change, we need 1,000 other Microsofts to turn rhetoric into action."

— Elizabeth Sturcken,  
Managing director,  
EDF+Business



## Reality check

The last time atmospheric carbon dioxide levels were at 412 ppm, there were trees near the South Pole. That was more than 2.6 million years ago.



## Hooking vets on conservation

EDF has partnered with Project Healing Waters to take disabled military vets fishing at Flower Garden Banks Marine Sanctuary south of Galveston, Texas. The project has helped build support for marine conservation and science-based fisheries management.

KATIE HAUKEBO

## A step forward on lead

The drinking water crises in Flint, Michigan and other cities underscored the need to replace lead pipes so we can secure safe drinking water for all communities. These emergencies strengthened calls for an updated Lead and Copper Rule from the Environmental Protection Agency to protect communities from lead-tainted water. A new draft rule was unveiled in October, and although it has serious

drawbacks, it represents a step forward. The proposed rules would, for example, require the government to compile a national inventory of lead pipes supplying drinking water to homes.

EDF prepared detailed comments on the draft, call-



SIBBCO

ing on the government to fix the proposal's flaws before finalizing the rule. Stay tuned!

## Administration loses in court

The administration has lost a major court battle with California on environment. In 2017, Quebec and California entered into an agreement to coordinate their cap-and-trade programs and accelerate pollution reductions. The Justice Department went to court to block the agreement, arguing it requires congressional approval. EDF and NRDC joined the case and filed a brief in defense of the pact. In March, the judge agreed with us and rejected the claim. But it's not over: Additional administration claims that the agreement is unconstitutional will be argued in the future. Count on EDF and our allies to continue defending climate policy.



MARIA BRUK

## A new voice for clean air

Karina Cedillo grew up playing soccer next to a chemical plant. Bad smells and occasional lightheadedness were part of living in the neighborhood. Now she's majoring in environmental science — the first in her family to go to college — and hopes to work in Washington, D.C. to change environmental policy.

As a member of EDF's Environmental Youth Council, a National Academy of Sciences-funded program that educates teens in industrial Houston neighborhoods about air quality and civic engagement, Cedillo and her classmates learned how to read data from air quality monitors provided by EDF and used that information to get a no-idling policy instituted at school. EDF also brought students to Washington to meet their congressional representative, a trip that inspired Cedillo to speak out about environmental justice.

"If we start talking, they will start listening," she says. "We don't have to accept that whatever happens, happens. We can vote."



**IN THE COURTS**

**27** Active cases EDF is fighting to protect, defend and enforce vital public health and environmental safeguards

**17** Times administration has lost in court for failing to do adequate climate analyses

## MEET EDF



JOHN RAE

## Emilie Litsinger, oceans crusader

### Why did EDF open an office in Indonesia?

Indonesia is the second-largest wild fish producer in the world, after China. To end overfishing, we need to work in places that matter most.

### Your connection to Asia?

I was born in the Philippines and lived there until I was 12. When I was diving as a kid, I heard dynamite blasting underwater. The beauty of the reef — and lifeblood of fishing villages — struck me.

### What are some challenges?

In Indonesia — and elsewhere — there are limited institutions to support sustainable fisheries management. We're helping change that by working with government and local partners.

### Any accomplishments you are particularly proud of?

Working with government and communities, we have implemented a fishery management plan for blue swimming crab in Lampung Province that could be a model for other fisheries.

### Other work experiences?

I worked with fishermen in New England, who taught me how to listen, negotiate and weigh tradeoffs. That is what fisheries management is all about.



Local groups used the National Environmental Policy Act to protect Canyons of the Ancients National Monument.

## Rescuing a landmark environmental law

**I**N 2008, EDF AND ALLIES SUCCESSFULLY fought the controversial Yazoo Pumps flood control project that would have destroyed up to 200,000 acres of prime Mississippi wetlands. With support from thousands of EDF members who wrote letters to the EPA and the U.S. Army Corps of Engineers, we prevailed in blocking the ill-conceived project.

The law under which we fought off the Yazoo Pumps is the National Environmental Policy Act, often called the Magna Carta of environmental law. Fifty years ago, both the House and Senate passed NEPA by huge bipartisan majorities. The act, signed into law by President Richard Nixon, requires that nearly every highway, bridge, pipeline and other major federal project undergo environmental review.

The law ensures that communities have a voice in planning and can protect themselves from dangerous or poorly designed federal projects by mandating environmental impact statements and allowing for public comment.

NEPA is now under serious threat. The White House Council on Environmental Quality, which oversees implementation of the law across 80 government agencies, has proposed regulatory changes

that would weaken NEPA in a number of ways, including by narrowing the range of projects that require review and by imposing strict new deadlines on completing studies.

The CEQ's revisions would eliminate the need for agencies to consider the cumulative impacts of projects. That means, for example, agencies would not have to examine whether a pipeline, mine or other fossil fuel project would worsen climate change.

"The proposal would punch loopholes in long-standing protections," says Vickie Patton, EDF's general counsel. "It would put communities at risk."

To make the changes, the CEQ is required under law to hold public hearings, but slots for testimony were filled within minutes, limiting public input. EDF joined with 323 other environmental and health groups calling for greater transparency. "We consider this censorship of climate science and public comment," says Patrice Tomcik, project manager for EDF affiliate Moms Clean Air Force.

NEPA critics often cite environmental review as the reason for stalled projects, but a 2016 study commissioned by the U.S. Department of Treasury analyzed 40 major transportation and infrastructure

projects whose completion had been delayed and found that a "lack of public funding [was] by far the most common factor hindering [their] completion."

Every state can claim a NEPA success story, and often projects are improved after review. When seismic testing was proposed for oil and gas leases in the Canyons of the Ancients National Monument in Colorado, for example, citizens groups were able to use NEPA to work with the Bureau of Land

Management and the leaseholders to steer clear of significant cultural features and fragile habitats.

In recent years, courts have halted or delayed numerous federal actions under NEPA for failing to take into account climate impacts. Examples include the Keystone XL pipeline and plans to expand coal mining and oil and gas drilling in the Powder River Basin of Montana and Wyoming. EDF is currently in court using NEPA to challenge the repeal of the Waste Prevention Rule, which would have cut methane emissions from natural gas facilities on federal and tribal lands.

**“The proposal would punch loopholes in long-standing protections. It would put communities at risk.”**

— Vickie Patton, EDF's general counsel

"For half a century, NEPA has given citizens a mechanism to protect their communities," says EDF Attorney Rosalie Winn. The law has been so successful that more than 100 nations have enacted national environmental policies modeled after it. Adds Winn: "We will work to ensure this bedrock law continues to deliver critical health and environmental protections to Americans."

Rod Griffin

# For California's imperiled monarchs, a haven in an orchard

**W**ILDFLOWER MEADOWS IN brilliant profusion once blanketed California's Central Valley. But when the valley was turned over to miles of row crops and development, it wasn't long before butterflies and other native pollinators began to decline.

Today, monarch butterflies still spend the winter in the forested groves along the California coast, but fewer than 29,000 came in the winter of 2018-2019. By contrast, in the 1980s, 4.5 million monarchs wintered here.

Scientists attribute the crisis to pesticides, climate change and the disappearance of habitat. A desperate search is underway for land to grow pollinator habitat and bring back these vital species.

Daniel Kaiser, EDF's director of Western Conservation, had an idea. Why not engage farmers to create native habitat among the valley's thousands of acres of orchards?

He approached Ben King, a pecan farmer in Colusa County and owner of Pacific Gold Agriculture. King quickly agreed to plant a pollinator-friendly cover crop on his pecan orchards and persuaded a neighboring business, ByPass Farms, to do the same. The two farms

recently planted 325 acres of a unique cover crop that included eight native perennial wildflowers, including milkweed. The crop is designed to bloom in the spring when monarchs breed, and in the fall when they migrate and need food.

We're calling the project Orchards Alive. It's part of a multistate EDF effort to restore monarch habitat on farmlands.

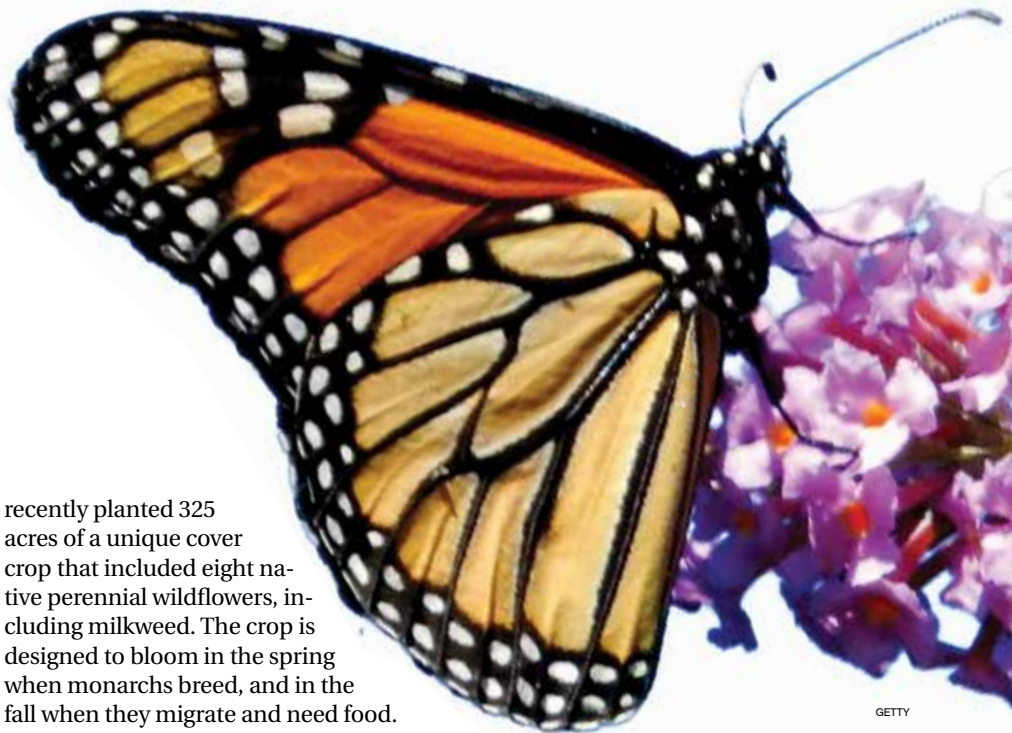
"Time is running out for native pollinators," says Kaiser. "The conservation and agriculture communities need to team up and incorporate insect habitat into commercial food production because we can't save pollinators without the help of farmers." A decision on whether to list the monarch butterfly under the Endangered Species Act is expected in December.

**“Nature has a beautiful way of providing answers.”**

— Ben King, pecan farmer

Biodiversity has not traditionally been a goal of orchard management. "What you usually see is a moonscape of bare soil," says Kaiser. "But pecan orchards are ideal for wildflowers."

That the project is unusual doesn't faze King. His great-grandfather arrived in California on wagon trails in 1860, and the family has farmed along the Sacramento River ever since. "It's an experiment," says King. "But I've got some pioneer blood in me. And I want to help the monarch."



GETTY

The project is funded in part by \$3 million in state funding for monarchs and other pollinators that EDF helped win in 2018. "Once we get the system going, the perennial wildflowers won't need to be replanted," says Kaiser. "It's a great opportunity to create benefits for pollinators on a large scale."

EDF will use its habitat quantification tool to measure wildflower diversity. Our partner, the National Center for Appropriate Technology, is tracking the abundance of beneficial insects and pollinators. The U.S. Department of Agriculture is monitoring soil health.

For farmers, the presence of beneficial insects mean less spraying. Wildflowers attract ladybugs, voracious predators of the aphids that plague pecan trees. Native flowers also improve soil microbial diversity and sequester carbon.

"Our orchards will restore the natural ecosystem of this area as it was 150 years ago," says King. "It takes an organization like EDF to jump-start this and provide leadership. EDF is visionary and collaborative. They don't judge people."

If all goes well, EDF will expand the wildflower program to pistachios and other tree nuts.

"It's an adventure," says King. "Nature has a beautiful way of providing answers. If it weren't for EDF, I wouldn't have gotten into this. Some things may not work. But unless somebody's a pioneer, you won't get settlers."

Peter Klebnikov



PIERRE KATTAR / COLLABORATE UP

Ben King, extending the welcome mat to monarchs



# Mission: Methane

By Shanti Menon

An EDF-led research team is targeting America's largest oil field, uncovering big leaks of climate-warming methane and toxic air pollutants. Our work is driving new accountability in an underregulated industry.

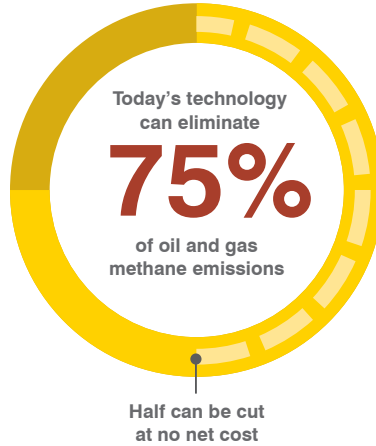
NICK SIMONITE



**F**ROM 1,000 FEET IN THE AIR above southeastern New Mexico, the single-engine prop plane banks hard left, descending over a cluster of oil and gas well pads. As the plane spirals down to 200 feet and back up again, flight scientist Mackenzie Smith watches data pour in from the Picarro laser spectrometer at the back of the cabin, indicating elevated levels of methane downwind. Near ground level, she pulls out an infrared video camera that reveals a plume of methane streaming from what looks like a malfunctioning flare, designed to burn excess gas. Smith's analysis shows it's emitting more than a ton of methane per hour. Left unchecked for a year, this single leak would have the same 20-year climate impact as a year's pollution from 150,000 cars.

Colorless, odorless methane, the primary component of natural gas, is responsible for at least one-quarter of today's global warming. It often leaks undetected, along with other harmful air pollutants such as cancer-causing benzene and smog-forming chemicals, from oil and gas sites. While fixing most leaks is relatively simple, finding them is not. Tens of thousands of potentially leaky flares, valves and other bits of oil and gas machinery dot the Permian Basin — a region half the size of California — yet most leak detection is left to just a handful of state inspectors and company employees

who can't possibly cover such a vast area. As the administration weakens limits on oil and gas industry pollution, EDF is pulling back the curtain on the industry's methane problem. Our ambitious new campaign to measure methane and other air pollution in the Permian Basin is driving action that will hold companies accountable and protect communities in oil and gas country.



Source: International Energy Agency

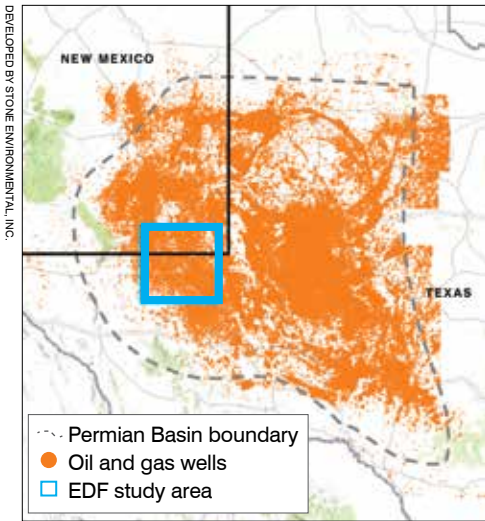
**By air, by land, by outer space** “You can't solve climate change without solving methane,” says Mark Brownstein, head of EDF's Energy program. The world's top-producing oilfield is a good place to start. Oil production in the

Permian, which extends hundreds of miles from southeast New Mexico through west Texas, grew about 250% from 2012 to 2019. More than half of all drilling rigs in the U.S. are located here.

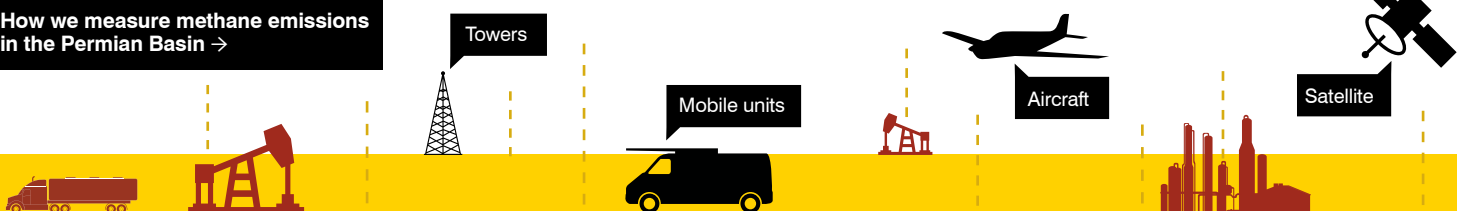
“It's a very large area, hard to get to, and it's packed with oil and gas sites,” says EDF scientist Dr. David Lyon. “Very little research has been done here.”

Lyon led the design of an ambitious, year-long research project to spot and measure methane leaks over a portion of the basin covering more than 8,000 oil and gas facilities in New Mexico and Texas. EDF partner Scientific Aviation will conduct 100 days of flights in the area, mapping and measuring pollution from small clusters of sites. Meanwhile, researchers from the University of Wyoming are traveling over hundreds of miles of dusty oil patch roads in a mobile laboratory, measuring methane and toxic air pollutants from individual facilities. Pennsylvania State University is using five stationary monitors to track changes in methane pollution across the basin year-round. In addition, EDF and partners are using satellite data to measure pollution from the basin.

Until recently, data analysis and publication in a scientific journal would have taken years. Now, researchers have sophisticated algorithms to speed up analysis, and EDF will release results to the public in near real time on the web.



How we measure methane emissions in the Permian Basin →





**Tough neighborhood: Penny Aucoin is speaking out on oil and gas pollution.**

“We’re working at a speed that allows for immediate impact,” says Lyon, “so that leaks can be fixed.”

There’s much work to be done. Previous EDF research has indicated that companies and the EPA have drastically underestimated methane pollution. If companies take swift action to fix leaks, methane pollution in the Permian will begin dropping by the end of the year.

### A haze over boomtown

The recent discovery of vast, new oil and gas reserves in the Permian has radically changed the town of Carlsbad, New Mexico, until recently best known for Carlsbad Caverns National Park. Signs of the boom are everywhere. The highway leading into town is lined with new motels and intersections are clogged by tanker trucks and 18-wheelers. Outside town, the Big Dipper is barely visible on a cloudless night, dimmed by glaring lights on drilling rigs and the orange glow from

20-foot-tall flares that burn excess gas. On some days, a brownish haze lingers over the horizon.

That haze has become a familiar sight to Penny Aucoin, who lives with her husband Dee George and daughter Skye in what used to be a quiet outpost just outside the city limits. Now the family home — two trailers, a chicken coop and a small yard littered with toys — is practically surrounded by oil and gas activity. Giant flares burn all around the house, one just 300 feet from her fence.

The family suffers from headaches and constant sinus problems. Aucoin’s teenage son Gideon, who now lives in Roswell, New Mexico, started suffering severe nosebleeds after the drilling started. Doctors recently removed a growth on George’s tongue and are monitoring him quarterly.

“We used to have friends over for game night, but they don’t come anymore,” says Aucoin. “I don’t blame them.”

One recent night, an explosion in front of their house sent the couple running into the yard at 2:38 a.m., into a mysterious chemical rain.

“It was so dark we couldn’t see anything, but we could hear it. A *whooooosh*, like a train.” Aucoin and George struggled to get their panicked flock of chickens and pet goat under cover. The explosion turned out to be a rupture in a pressurized pipe carrying wastewater — a potentially toxic mix of salt and chemicals that’s a byproduct of drilling.

Oil workers stopped the leak after about an hour, and then worked all day to bioremediate the soil and power-wash the trees, house and cars. They helped Aucoin rinse off her chickens in a bucket with dish soap and warm water.

“They said, ‘Don’t worry, it dissipates fast,’” says Aucoin. “Just keep the chickens out of the yard for a few days. And don’t eat the eggs for a few weeks. And don’t eat the chickens.”

Aucoin still doesn’t know exactly what was in the water, and in fact nobody knows. EDF research has revealed how little is understood about oil and gas wastewater. Of the chemicals that have been identified thus far, fewer than half have been studied for safety or toxicity.

“What’s happening here is not just bad for my family, it’s bad for everyone,” Aucoin says. She traveled to Dallas last year to testify at the EPA’s only public hearing on a proposal that would eliminate oil and gas methane safeguards and weaken protections against smog-forming air pollutants. EDF and our powerful grassroots allies, including Earthworks and New Mexico Interfaith Power and Light, who work closely with affected communities in Carlsbad and elsewhere,

**“What’s happening here is not just bad for my family, it’s bad for everyone.”**

—Penny Aucoin  
Carlsbad, NM





**Above the fruited plain: Nearly 100,000 oil and gas well pads dot the Permian Basin.**

also spoke out against the proposal.

“If we’re not responsible in how oil and gas gets taken out of the ground and we’re willy-nilly throwing this stuff in the air, it’s going to keep heating this planet,” says Aucoin. “This is about future generations. It’s about my kids and my kids’ kids.”

### Driving an industry cleanup

By exposing the extent of the industry’s methane problem and pinpointing the parties responsible, EDF is driving state and industry action to cut pollution.

New Mexico is already taking steps to rein in methane and other oil and gas pollution. Under new Governor Michelle Lujan Grisham last year, the legislature restored authority to state oil and gas regulators to impose fines for spills and other violations. Previously, thousands of violations resulted in zero fines. The state is also creating its first rules to reduce oil and gas methane pollution as it works to cut climate pollution statewide at least 45% by 2030. EDF’s research is helping guide those efforts.

“With data pouring in from multiple sources, we’ll see where methane emissions are coming from in the state and take steps for abatement,” wrote Lujan Grisham in *Wired*. She wants her state

to enact the most protective methane standards in the nation.

While New Mexico seeks to craft its own protections, Texas, under its current political leadership, is certainly not. That’s why federal standards are critical. Yet the EPA proposed rollbacks that would allow an extra 5 million metric tons of methane, 1.2 million metric tons of smog-forming chemicals and over 43,000 metric tons of hazardous air pollutants every year.

EDF is pushing for strong state and federal methane rules and helping change the oil and gas industry. More than a dozen companies have pledged to reduce methane pollution to near zero by 2025. Last year BP started using drone-mounted sensors to check for methane leaks in U.S. operations, including the Permian, and announced it will use continuous methane monitoring technologies in new operations worldwide. One intriguing development: Soon after EDF’s Permian research began, the industry announced plans to test the first collective methane monitoring system across the basin.

“I want to see more accountability,” says Aucoin. “It’s sad that someone has to go through what I go through to be heard. I think the science should be enough. We’ve suffered enough.”

## Eyes in the sky

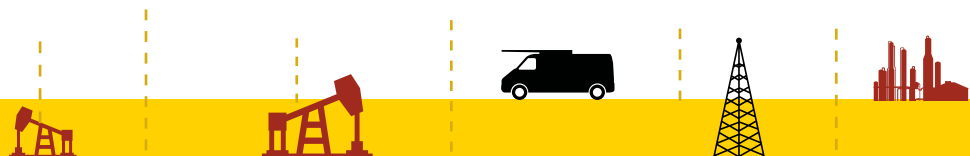
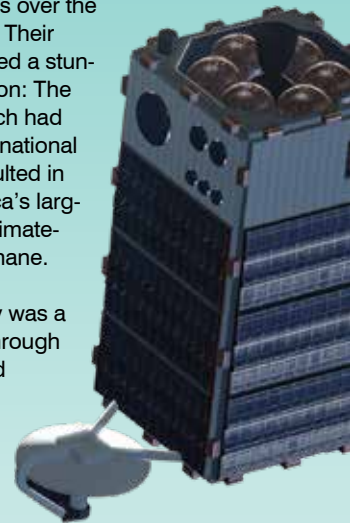
When news surfaced of an explosion at a natural gas facility in Ohio in 2018, EDF senior scientist Dr. Ritesh Gautam contacted colleagues in the Netherlands who were looking at atmospheric methane data using a new satellite. They discovered the satellite had recorded unusually high methane concentrations over the affected area. Their analysis yielded a stunning conclusion: The accident, which had received little national attention, resulted in one of America’s largest leaks of climate-polluting methane.

The discovery was a major breakthrough in a novel field where EDF is a leader: using satellites to identify and measure

methane pollution. In 2022, EDF’s subsidiary MethaneSAT will launch a new satellite with greatly enhanced capacity to make these measurements. It will allow for rapid quantification of even low-level (but widespread) and unreported pollution — not just blowouts. MethaneSAT will collect data over regions that produce at least 80% of the world’s oil and gas, capturing 200 images per day. A cloud-based data platform will then produce maps of methane emissions rates — a first. The resulting data will be made public to drive fast climate action.

MethaneSAT will be slightly bigger than a washer/dryer and weigh about 750 pounds. Blue Canyon Technologies is building MethaneSAT’s “bus” — the hardware that controls and powers the satellite. Ball Aerospace is building the instrument that will detect methane at lower concentrations than was previously possible.

Says Mark Brownstein, head of EDF’s Energy program: “With MethaneSAT, no one will be able to claim ignorance anymore.”



# A finely balanced ecosystem hangs on

By Tasha Kosviner

**F**ROM LAKE TO SWAMP, AND MARSH TO BARRIER ISLAND, the rich habitats of the Mississippi River Delta give rise to a spectacular flowering of life.

But 10 years ago, disaster struck. The BP Deepwater Horizon oil rig exploded, killing 11 workers, spewing 200 million gallons of oil into the Gulf of Mexico and killing more than a million birds. The disaster landed on a region already under stress. Rising waters, increasingly brutal storms and degradation from energy production have precipitated a land loss crisis in coastal Louisiana.

One effect is a dramatic shift in water salinity as salt-water encroaches into fresh. Without action, creatures whose survival depends upon a delicate balance face a stark future, as shown by the level of threat assessments for the next 20 years if no action is taken.

EDF helped direct money from the \$20.8 billion BP settlement into coastal restoration, and plays a lead role in helping guide Louisiana's 50-year, \$50 billion plan to restore the coast, protect livelihoods and preserve the habitats of some of Louisiana's most iconic bellwether species.

**NEXT ISSUE:** How EDF is using lessons learned in Louisiana to protect storm-battered states up and down the U.S coast.



**Bald Eagle**  
Level of threat: Low/Medium

MINNENPICTURES

The population of America's national bird rebounded from less than 500 pairs in the 1960s to more than 10,000 today. That spectacular turnaround is attributed to a federal ban on the toxic pesticide DDT — a legal battle won by EDF. But the bald eagle's perch at the top of the food chain depends on a thriving food web below, now under threat from land degradation and biodiversity loss. Today, \$130 million of oil spill funds are being used to restore key bald eagle habitat.



**American Alligator**  
Level of threat: Medium

GETTY

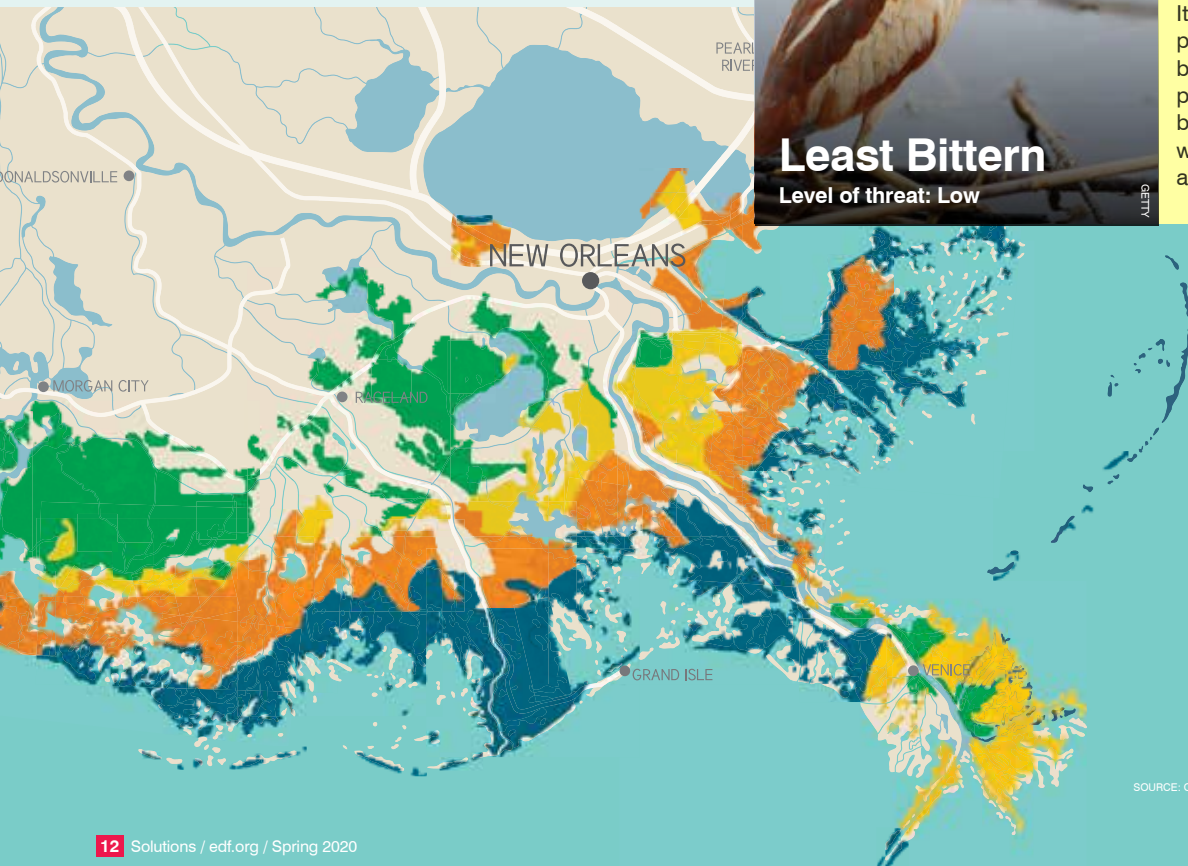
The American alligator was a fixture of Louisiana's wetlands until the 1900s, when overhunting and habitat loss caused a dramatic decline. The species was listed as endangered in 1967 but recovered following state and federal intervention. Alligators can survive up to three years without food. But if their freshwater habitat gets too salty, they stop eating and will eventually starve — just one reason EDF's work to preserve this land is so critical.



**Least Bittern**  
Level of threat: Low

GETTY

One of the world's most diminutive herons, this secretive species is among the millions of migratory birds that pass through Louisiana's rich habitats each spring. Its private nature makes population assessment tricky but one thing's for sure — protection of the fresh and brackish Louisiana marshes, where the least bittern nests and feeds, is critical.



SOURCE: COASTWIDE REFERENCE MONITORING SYSTEM, LOUISIANA

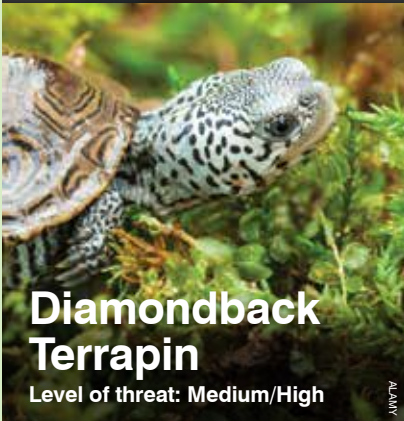


## Reddish Egret

Level of threat: Medium

MINDEN PICTURES

Favoring the narrow fringe of tidal flats and lagoons along the Delta, the reddish egret is one of the rarest — and showiest — of North American egrets. A year-round Louisiana resident, it's famed for a bizarre dinner dance — a lurching, zigzagging performance before spearing its prey — and a head-tossing, bill-clacking mating ritual. Coastal erosion has contributed to the fact that fewer than 3,000 breeding pairs remain in North America.

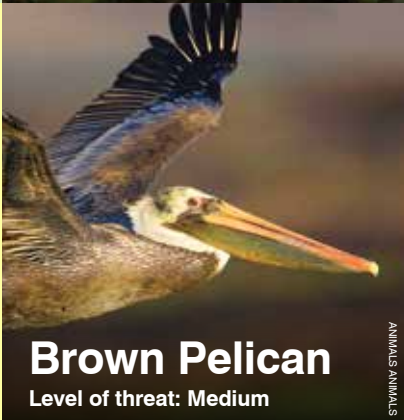


## Diamondback Terrapin

Level of threat: Medium/High

ALAMY

This decorative reptile favors brackish waters where freshwater and seawater meet. It stays hydrated by slurping fresh water off the surface or opening its mouth to the sky during rainfall. When it does swallow saltwater, a specially adapted gland in its neck filters the water and prevents dehydration. But the terrapin is facing a loss of marsh and estuarine habitat and is listed as a vulnerable species in Louisiana.

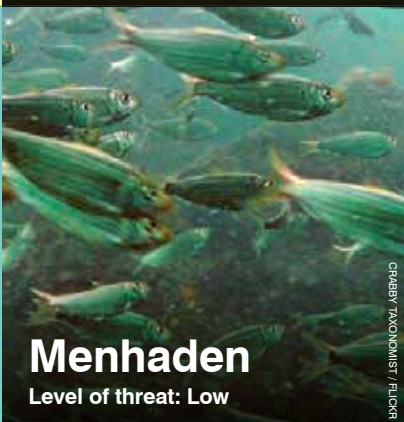


## Brown Pelican

Level of threat: Medium

ANIMALS ANIMALS

The sight of oil-drenched, beach-bound pelicans is one of the enduring and painful images of the Deepwater Horizon disaster, which killed 12% of the pelican population in the Gulf. But things are beginning to look up for Louisiana's state bird, which fossils suggest has been around for 30-40 million years. Money from the BP settlement has helped rebuild Queen Bess Island, a critical breeding ground and home to 6,500 of the birds.



## Menhaden

Level of threat: Low

GRABBY TAKONOMIST / FLOCKER

Gulf menhaden is one of the nation's largest fisheries, supplying much of the fish oil we use. It's also critically important for ecosystem health, acting as prey for key recreational fisheries such as Spanish mackerel, as well as dolphins, sea turtles and eagles. A filter feeder that helps keep waters healthy, the menhaden make full use of the region's varying salinity. After spawning at sea, the young drift inland to mature in brackish and freshwater estuaries.



# Is EDF in your estate plans?

**We know you care about the environment from your support of our work. Why not take it to the next level by supporting EDF into the future?**

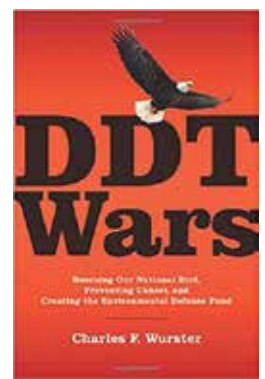
**Contact us today to learn more about including EDF in your estate plans and receive a copy of *DDT Wars* signed by the author, EDF co-founder Dr. Charles Wurster.**

**You'll also receive:**

- A lifetime subscription to *Solutions*, EDF's quarterly newsletter
- Our special quarterly Osprey Legacy Society eNewsletter
- Invitations to special events and webinars
- Recognition in our annual report when you join the Osprey Legacy Society

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edf.org/legacy**

Book supplied upon request.



- Freshwater marsh
- Intermediate marsh
- Brackish marsh
- Saline marsh
- Ocean



The American home contains products with formaldehyde and perchlorate, both particularly harmful to children.

## A tale of toxic chemicals

**F**ROM DAY ONE, PRESIDENT TRUMP AND HIS POLLUTER-friendly political appointees at the Environmental Protection Agency have been undermining the nation's recently enacted chemical safety law, the Toxic Substances Control Act. Reformed in 2016 thanks to a strong bipartisan coalition led by EDF, the law was designed to protect Americans from hazardous chemicals. Instead, the administration is letting hundreds of risky or untested chemicals stay on the market, or enter it for the first time. EDF is demanding that the administration fully implement the law, and we're backing these demands with legal action.

### A court win

EDF and our allies recently won an important victory when a federal court ruled that the EPA had failed to follow key parts of the chemical safety law. The ruling signaled that, as required by the new law, the agency must prepare risk evaluations of chemicals to protect public health and the environment.

We're now targeting two of the most dangerous under-regulated chemicals, formaldehyde and perchlorate.

### ■ EDF to the EPA: Follow the science!

Trump's EPA has sidelined a key scientific assessment of formaldehyde that demonstrates a link between it and several cancers.

Formaldehyde is found in carpets, glues, insulation and paints. First the EPA's political leadership blocked the release of the nearly completed safety assessment for almost two years. Then it put any future assessment under the control of political appointees instead of EPA scientists. EDF is helping the House Science Committee hold the agency accountable.

"Formaldehyde is a cash cow for the chemical industry," says EDF scientist Dr. Richard Denison. "But industry profits have come at the expense of people's health."

### ■ Suing for food safety

Perchlorate, an ingredient in rocket fuel, impairs the functioning of the thyroid, critical for brain development. The chemical impairs the thyroid's ability to use iodine from the diet.

Nevertheless, the chemical is approved for use in plastic food packaging and food processing equipment. From there, perchlorate migrates into food. A 2016 study from the Food and Drug Administration found that virtually all types of food contain perchlorate. For years, EDF has worked to get the Food and Drug Administration to ban perchlorate from our food. The agency rejected this request in 2017 and again in 2019.

EDF and others are suing. We demand the FDA get rocket fuel out of our food.

*Charles Miller*

# Sea change: Maine's lobstermen cultivate kelp

IT'S A FRIGID FEBRUARY DAY, AND THE calm water in Muscle Ridge Channel shimmers in the sun. On his 42-foot lobster boat, *Thrasher*, Bob Baines scans the horizon, searching for his buoys. But he's not checking his lobster traps, he's tending his crops.

Baines' four-acre "farm" starts seven feet underwater and descends almost to the ocean floor. His crop: brownish sugar kelp, dangling from ropes, undulating in the current.

The kelp, which can grow six inches a week, is an edible variety of seaweed. If all goes well, in May, Baines will cultivate as much as 65,000 pounds of kelp, to be sold at Whole Foods, Legal Sea Foods and Sweetgreen, a popular salad chain.

Baines is one of an expanding group of Maine lobstermen looking for ways to weather climate change and diversify their operations. The Gulf of Maine, which stretches from Nova Scotia to Cape Cod, has warmed faster than 99% of global oceans, according to a recent study in *Science*.

"Climate change is wreaking havoc on fisheries," says EDF scientist Dr. Jake Kritzer, who works with fishermen to improve climate resilience. "We need to



JESSE BAINES / ATLANTIC SEA FARMS

plan for the future." Lobsters remain quite abundant for now, but they are increasingly moving into Canadian waters and there's greater volatility. Last year, landings in Maine dropped 16%, to their lowest point in a decade.

"Winters are less harsh, summers are warmer, and lobster shells are not as strong as they used to be," says Baines, a lobsterman for 40 years. With changing industry practices and warming waters forcing lobstermen to go 20 to 30 miles offshore, an environmentally friendly crop like kelp makes economic sense.

"Kelp farming seems a great way to generate spring income," says Baines. "If I can make this work for me, then other younger guys can also do it."

Lobster still makes up three quarters of Maine's fishing revenue, but aquaculture can help fishing communities continue to thrive.

"Kelp is sustainable on so many levels," says Briana Warner, CEO of Atlantic Sea Farms, a Maine kelp company that helps local fishermen get into the business. "It is great for human health and helps sustain liveli-

hoods in danger of disappearing."

For Maine lobstermen, kelp farming is a natural fit. Farming takes place in the winter and spring, lobster fishing in the summer. They already have all the necessary gear, and they understand the currents and tides.

## Is kelp the new kale?

Ocean scientists call kelp farming a zero-input food source because it doesn't need soil, fertilizers or pesticides to flourish. It also reduces ocean acidification, improves water quality and creates habitat for other marine life.

Maine is a small piece of the \$11 billion global seaweed market, but the U.S. market for this high-nutrient superfood is poised to take off. According to a recent study, seaweed aquaculture is one of the fastest growing maritime industries in New England. "Americans are growing a taste for seaweed," says Warner, "but they want a clean product." Over 98% of the edible seaweed on the U.S. market is grown in Asia, with little or no environmental oversight. Maine kelp could be a fresh alternative.

Baines chuckles at the thought that he's harvesting sea vegetables. "It was never on my radar," he says, "but we fishermen adapt. If you don't, you'll be left behind."

Rod Griffin



ROD GRIFFIN / EDF

"We fishermen adapt," says Bob Baines.

# MADE IN CHINA SUSTAINABLY

China manufactures 35% of the world's goods and is also the world's leading greenhouse gas emitter. Rising above international tensions, EDF is helping China's factories plot a route to a cleaner future.

**I**F YOU'VE EVER WRESTLED WITH AN IKEA flat pack — and given IKEA's estimated one billion customers, it's likely you have — consider where all those pieces come from and what their environmental impact might be.

That question was uppermost on Haorong Lu's mind when he joined IKEA for a summer fellowship in 2018. Lu's job was to analyze the environmental practices of Chinese factories that supply IKEA — and it was a big one: 22% of the furniture giant's extensive product range is made in China.

"It was kind of overwhelming," he reports. "I had to learn many different industries in just 10 weeks."

Lu's fellowship was part of Climate Corps, EDF's innovative program that has, since 2008, paired more than 1,000 top-tier graduate students with more than 500 leading companies, cities and

institutions to help solve environmental challenges. Eighty of those fellows have worked in China helping multinationals such as Walmart and Coca-Cola, as well as Chinese companies such as BYD and Lenovo, identify nearly half a million tons of CO<sub>2</sub> emissions reductions.

EDF is well-placed to drive environmental innovation in China. This year sees the expected rollout of the country's national carbon trading system, which we helped establish. At the same time, we have trained leaders from more than 800 factories and purchasing companies in energy efficiency and other environmental measures. We have also helped establish and highlight better environmental practices among 50 pilot factories and worked with regional governments on setting and enforcing standards.

The work supports EDF's theory of corporate change: by setting ambitious goals — such as Walmart's commitment to remove a gigaton of emissions from its supply

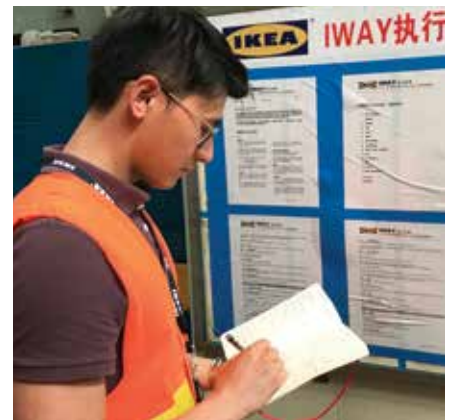
chain by 2030 — and rigorously measuring and transparently reporting on progress, the world's largest companies will drive climate progress at scale.

"Emissions from supply chains are more than five times that of a company's direct operations," says EDF's Xixi Chen. "To reach their climate goals, companies must engage suppliers."

As Lu discovered, the challenges in China are complex. The majority of factories are small- and medium-sized enterprises that lack the expertise or the infrastructure to measure and manage their energy use. The coronavirus and China's 2019 economic downturn have also diverted factory owners' attention away from environmental concerns.

Climate Corps fellows are up for the challenge. By the end of 10 weeks, Lu had analyzed key industries and created a guide for factory owners to engage their vendors — IKEA's so-called sub-suppliers — in IKEA's sustainability goals.

Corporate sustainability demands are but one driver for change. China's increasingly stringent environmental laws mean factories that fall short risk closure.



**Climate Corps fellow Haorong Lu**

EDF, the first foreign environmental nonprofit officially registered in China, advised on those policies and helped train 58,000 officials to enforce them.

Long term, EDF aims to help integrate environmental considerations into China's Belt and Road Initiative, a vast plan to facilitate construction and infrastructure projects in more than 100 countries across Asia, Africa, Europe and Oceania. "Given the environmental challenges facing the globe, it is critical China and the United States, as the world's two largest economies, join hands and lead," says EDF's director of global strategy, Zhuli Hess.

*Tasha Kosviner*



## THE WILSON LEGACY

*This feature honors the memory of Robert W. Wilson, a longtime EDF supporter and champion of harnessing market forces to drive environmental progress. See [edf.org/wilson](http://edf.org/wilson)*





## Can we agree?

Jim Tripp, 80, was for many years EDF's General Counsel. He participated in the first Earth Day as a young lawyer working at the U.S. Attorney's Office in New York. Seattle high schooler Jamie Margolin, 18, founded the fast-growing youth climate movement, Zero Hour, which works with other global activists like teenage Greta Thunberg to inspire millions of young people to speak out on climate across the world. Generations apart, they agree on the urgency of the climate threat but differ in their approach.

**Solutions:** Earth Day turns 50 on April 22, 2020. Jamie, what will you be doing?

**Jamie:** Since coronavirus prevents us rallying in person, I will be joining Earth Day events online, to lift up the youth voice and represent my organization, Zero Hour ([thisiszerohour.org](http://thisiszerohour.org)), which organizes marches, mobilizations, actions and summits for climate justice.

**Solutions:** Jim, when did you recognize global warming as the crisis it is today?

**Jim:** In 1985 EDF's then-chief scientist, Michael Oppenheimer, organized a conference in Italy that was really the start of the scientific community taking the problem seriously. But most in my generation, including myself, did not read the available information as requiring dramatic action. That's certainly changing, although climate denial is still a problem today. How does Zero Hour handle that?

**Jamie:** I ignore climate deniers because there aren't enough to really matter. Climate apathy is a much bigger problem.

**Solutions:** How do we tackle the climate crisis?

**Jamie:** As a young person whose future is being destroyed, we need to end fossil fuel extraction today. Every ounce of oil that is dug up is another nail in the coffin for our planet. We need people to understand that the risk of doing nothing is losing everything.

**Jim:** We need to continue to fight in court and also work with corporations and governments to create policies that make a low- or zero-carbon economy possible. Some companies, including a few oil companies, are moving in the right direction with investments in offshore wind. But we need to press for much more.

**Jamie:** The only right direction for an oil company is to switch to a different mode of business. Having a bit of investment in wind just doesn't cut it. There's no middle ground.

**Jim:** I'm not sure I see it that way. It takes time to switch from one economic model to another. Companies need to know it makes financial sense.

**Jamie:** I agree businesses need to make money. But I have an issue with the current system of economic growth, where profit is the only consideration. The earth doesn't have time.

**Jim:** I agree with you there.

**Solutions:** Is a radical shift in the economy achievable in the brief time we have?

**Jim:** We have to place ourselves on a war footing. During World War II, our economy underwent a dramatic transformation from production of domestic goods to war-oriented manufacturing. We have the means of converting our economy, and the technologies exist. The question is, will we?

**Jamie:** There are moments when I feel really hopeful and moments when it's overwhelming. But with action comes hope. My advice is to take whatever skill you have, whether you're an artist, scientist, writer, dancer or engineer, and put it to use for the climate. When I'm at a rally and I feel that raw energy of people wanting change, that's when I feel we can do this.



## Join us!

Take your fight against climate change to the next level and become an EDF monthly donor.

Learn more at  
[edf.org/EcoPartners](http://edf.org/EcoPartners)

# Start using less plastic, today

It's not easy, but with some ingenuity you can ditch plastic — and urge companies to do the same.

**P**LASTIC POLLUTION HAS INFILTRATED VIRTUALLY EVERY ecosystem on our planet, from the Amazon rainforest to the Arctic. The production and incineration of plastics, which are made from oil and gas byproducts, creates as much yearly climate pollution as aviation. In the next 30 years, plastic manufacturing is expected to more than triple worldwide. So how do we change the future by reducing our use of plastic? Start with what you can replace most easily — and push companies to provide better alternatives for everyone.

## ■ Where to start

A good first step is to carry reusable bags to the store and keep a water bottle and cutlery handy. To take your purge to the next level, keep track of when you use plastic throughout the day, advises EDF's Theresa Eberhardt, who works to make corporate supply chains more sustainable. About four years ago, Eberhardt decided to cut plastic from her personal life. "From the time I woke up to the time I went to bed, I listed the things that came in plastic that I would have thrown away or recycled," she says. "It was really shocking."

Eberhardt's first steps were small, swapping out shampoo bottles and milk jugs for plastic-free alternatives. "You can't do everything at once," she stresses. "That journey started years ago and I'm still on it. I don't think there's an endpoint."

## ■ Food shopping and storage

If your grocery store has a bulk section, use glass jars or reuse plastic bags to shop for bulk staples. Choose fruits and vegetables sold by the pound instead of prepackaged, and bring glass containers to the deli counter to get your meat and cheese. Milk sold in a glass bottle might be more expensive up front, but you'll often get a deposit back when you return the container.

At home, use silicone containers instead of plastic food storage bags and wax-based wraps in place of plastic wrap or foil.

When you eat out, bring your own container for leftovers.

Raise the bar: Avoid packaging altogether by making your own non-dairy milk at home. For oat milk, blend oats and water. Strain. Voila!

## ■ Personal care and cleaning products

Avoid plastic bottles by using soaps, shampoos and conditioners that come in solid bar form. Look for mouthwash tablets packaged in glass bottles and switch to powdered laundry detergent instead of liquid. Women can look for tampons with cardboard applicators or consider switching to a menstrual cup.

Raise the bar: Try combining bar soap, borax and washing soda (available in most big box and hardware stores or online) to make your own laundry detergent.

## ■ Buy less and buy it secondhand

When Eberhardt does make a purchase like a set of Legos for her daughter, it's often secondhand. Ask your friends and neighbors for hand-me-downs or browse websites such as thredUP, Craigslist and Facebook Marketplace for reusable items instead of buying more plastic.

## ■ Grow your impact

If there's a product you love that uses plastic packaging, tell the company you'd like to see them use less. And if you see a brand cutting back on plastic, tell them you appreciate the change. "Companies really have a lot of responsibility and opportunity to create a big impact," Eberhardt says. "Pushing companies to do more has an outsized benefit."

A shopping service called Loop ([www.loopstore.com](http://www.loopstore.com)) offers a milkman-style delivery of products free of plastic packaging from big brands like Clorox, Colgate, Dove and Häagen-Dazs. The initiative, powered by the recycling company TerraCycle, is currently available in the northeastern U.S. and Paris. Most products run above retail price, but the service hopes to become more affordable as it scales up.

*Lexi Krupp*



GETTY

## LEARN MORE

*Inconspicuous Consumption: The Environmental Impact You Don't Know You Have*, by Tatiana Schlossberg

*Green Gone Wrong: How Our Economy Is Undermining the Environmental Revolution*, by Heather Rogers

## ASK AN EXPERT

## Let's get America's trains back on track

Dear EDF,

Your cover story on transportation and its effect on climate change (Up, Up and Away, Solutions, Winter 2020) was very well done. However, I am concerned there was no mention of rail transportation. I believe rail transportation is the most environmentally friendly way to move people and freight. Amtrak is a grossly underutilized means of moving large numbers of people and needs all the support it can get. I thank EDF for its continuing battles to protect the environment.

Sincerely,  
Stedman H. Stephens,  
Richmond, MA

**Jason Mathers, EDF's director of vehicles and freight strategy, says:**

I agree that rail has a vital role in reducing emissions. Moving goods by rail is about three and a half times more fuel efficient than by truck. A few years ago, EDF collaborated with the Massachusetts Institute of Technology, Ocean Spray Cranberries and Caterpillar to demonstrate the benefits of choosing rail over truck.

EDF has chosen to focus its efforts on electrifying large trucks because global emissions from these vehicles are on pace to increase by two gigatons a year by 2050. Already, trucks, ships and planes account

for over 80% of the anticipated emissions growth from transportation. Broad adoption of electric trucks would enable this sector to make deep emissions reductions.

Electric trucks and increased use of rail are both critical components in the transition to a 100% clean economy. Best of all, they work well together. Freight rail is most competitive for trips of 500 miles or more. Electric trucks are best suited for trips of 200 miles or less. This unified approach reduces greenhouse gases and can improve air quality in local communities, especially

around rail yards where electric trucks can be used to deliver freight to trains. Together, electric trucks and trains can give us significant carbon reduction benefits using existing technology.



BETTY

## EDF MEMBER SPOTLIGHT

## Bringing clean energy home

Michael Heffler lives in beautiful Lambertville, New Jersey, a woodsy town on the Delaware River not far from George Wash-

ington's historic crossing point. The town is also directly on the route of the controversial PennEast pipeline, a project recently blocked — but not killed — by a federal court. EDF is fighting PennEast and several other unnecessary pipelines.

Heffler joined a town committee working to oppose the pipeline, an effort that inspired the new mayor to appoint him as a volunteer environmental adviser. "I wanted to do something practical that would support clean energy in our town," says Heffler. With help from Concord Engineering, an energy advisory company, Heffler found a way for New Jersey towns to combine their purchasing power at energy auctions to lower their electricity costs and also demand a greater percentage of renewable

energy instead of natural gas. "We realized we could expand clean energy all along the pipeline route," says Heffler.

Heffler has been an EDF member since 1992. "EDF is practical, and I respect that," he says. "It's the only organization I found that was effectively working with corporations to make a positive change. From my career in the tech industry, I know how hard that is."

Thanks to Heffler's legwork and the efforts of town council members, nine towns along the proposed PennEast route are not only opposing the pipeline — they're also poised to buy more renewable energy and less natural gas, saving hundreds of thousands of dollars to boot.



CAROL HEFFLER

“The earth has music for those who listen.”

— William Shakespeare

