

California rising

The Golden State keeps driving climate progress despite all the backsliding in Washington.

Page 8

A monarch butterfly with vibrant orange wings and black markings is perched on a cluster of small, pink milkweed flowers. The background is a clear, bright blue sky. The butterfly's wings are spread, showing the characteristic pattern of black veins and spots. The flowers are in various stages of bloom, with some showing yellow centers. The overall scene is a close-up, highlighting the intricate details of the butterfly and the plant.

Airbnb for butterflies

Monarchs have been vanishing from the United States and the biggest culprit is the disappearance of milkweed, a casualty of herbicide use on farms. EDF members have responded. Your contributions are helping pay for the restoration of milkweed and other pollinator habitat on California, Missouri and Texas farms. This will help the monarchs complete their epic migration.

Unnatural disasters



In late summer, as wildfires scorched the American West, massive hurricanes swamped the Caribbean, Texas and Florida. Americans responded: Neighbors rescued neighbors; people across the country sent prayers and donations. In flooded Houston, EDF scientist Elena Craft swung into action to protect people from a toxic plume (*see story, p. 6*).

Although we call such tragedies natural disasters, there's a lot about them that is *unnatural*. Because carbon dioxide has built up in the atmosphere through decades of burning fossil fuels, the planet is warming, increasing the intensity of extreme weather events.

Earlier in the year, researchers at NOAA warned that the hurricane season in the Atlantic basin "could be extremely active." The cause: warmer surface water temperatures in the Atlantic. The warmer temperatures fuel heavier rain, stronger winds and higher storm surges.

In Texas, we saw what happens when you ignore science and don't plan for the future. The government let people down when it dismissed climate models and allowed building in wetlands, which absorb water and reduce the damaging effects of storms.

The reason typically given for doing nothing on climate change is that it would create a drag on the economy. But California has proven this claim to be false. The state economy has grown even as carbon emissions dropped. And recently, with EDF's help, the Golden State passed bipartisan climate legislation, extending its historic cap-and-trade program and charting a path toward clean energy that other states are now following (*see story, p. 8*).

A different reality holds sway in Washington, where the Environmental Protection Agency is facing radical budget cuts, demanded by President Trump and EPA administrator Scott Pruitt, who claims it's "insensitive" to talk about the effect of climate change on storms. When disaster strikes, EPA plays a critical role, helping communities deal with life-threatening emergencies such as chemical spills. It was no surprise then, that this fall, state and local officials cried out for EPA's assistance.

That's one reason why it's so irresponsible for the administration to demand budget cuts at EPA which could cripple its ability to help Americans weather intensifying storms. We can't let the federal government move us backwards into a dangerous and dirtier era. Congress needs to support a strong EPA to protect our health and fight global warming.

This year, on EDF's 50th anniversary, we called on members to turn up the heat on the administration and Congress. You responded as never before, helping us advance successful challenges to the administration's agenda.

With you by our side, we'll be even more effective in the next 50.

Tued Krupp
EDF President



Finding the ways that work

Environmental Defense Fund's mission is to preserve the natural systems on which all life depends. Guided by science and economics, we find practical and lasting solutions to the most serious environmental problems.

Our work is made possible by the support of more than two million members.



On the cover:

As Washington abandons action on global warming, California has stepped up and reinforced its bipartisan commitment

to a low-carbon future. *Solutions* senior writer Rod Griffin explores how the Golden State is embracing the clean energy revolution, charting a path forward for the nation and the world.

Cover: Getty

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FIELD NOTES



REUTERS/BRIAN SIVCOER

Energy Secretary Rick Perry hasn't let science—or economics—interfere with his embrace of coal. “You put the supply out there and the demand will follow,” he absurdly claims.

Countering coal propaganda

When Energy Secretary Rick Perry ordered a study on grid reliability in April, Jim Marston, head of EDF's clean energy program, smelled a rat. He was sure the report, ostensibly commissioned to look at whether renewable energy makes the power grid less reliable, was actually intended to prop up the coal industry at the expense of the environment and public health.

Marston has tangled with Perry in the past. He led the fight that thwarted the former Texas governor's effort to fast-track 11 dirty coal-fired power plants in 2007.

Marston's suspicions that the study was a ruse proved correct. It twists the facts to reach a predetermined

conclusion. Says Marston, “An early leaked draft that was written without political interference came to a different conclusion,” finding that the grid is handling clean energy seamlessly as it transitions away from coal.

Nonetheless, the report will likely be used to justify new coal subsidies and block clean energy progress.

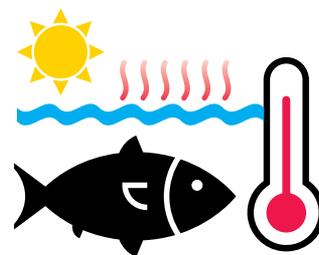
“This study means consumers could be forced to pay for more polluting, uneconomic energy,” says Marston. “We won't stand for that.”

Our legal team is vigorously defending existing federal policies on renewables as well as states' rights to set clean energy requirements.

Fish feel the heat

In recent years, rising ocean temperatures and acidification have contributed to shifts in marine life around the world, significantly affecting ocean ecosystems and causing difficulties for fishermen. Ocean temperatures are the warmest since record keeping began in 1880.

An EDF study shows that while some species will be harmed by climate change, others will thrive. Off the U.S. East Coast, warm water species like black sea bass have moved north. Lobsters, once abundant in Long Island Sound, have become scarce



there. Baby puffins are starving as they struggle to swallow the odd-shaped butterfish that have supplanted herring in the Gulf.

These changes are impacting fishermen: “Fishermen may need to travel quite a distance to catch species they've traditionally fished nearby,” says EDF scientist Kristin Kleisner.

“I don't know anybody in the country who would build another coal plant.”

—Gerry Anderson, CEO of DTE Energy, an operator of coal-fired plants



FOUNDATION UNIVERSITE GRENOBLE ALPES

RACING TO SAVE CLIMATE RECORDS

With glaciers melting at an alarming rate, scientists in the Ice Memory expedition are racing to preserve ancient ice samples. The samples will give future scientists access to millennia of climate history, such as rainfall trends and atmospheric conditions. The archive will be housed in Antarctica.

UK's first coal-free day since Industrial Revolution



From before the time of Dickens, coal fueled Great Britain. But those days are gone forever. Coal now accounts for just 2% of energy generation, and for one day this April, the country went completely coal-free. The UK has pledged to cut coal usage entirely from its power production by 2025.



SHUTTERSTOCK

The Plains Indian tribes lived among the greater sage grouse, hunting them for food and mimicking the males in ceremonial dances.

Saving the iconic sage grouse

Booming energy development across the American West has put the greater sage grouse at risk. Over the last century, the bird's population has dropped 90%.

Several years ago, EDF began an effort with conservation groups, energy companies and state wildlife agencies to develop a science-based plan to save the bird across its 11-state range. Landowners in Colorado, Wyoming and Nevada

stepped up to help the bird.

Unfortunately, the Trump administration wants to open millions more acres to development, threatening this cooperative effort. Its review of the plan to protect the bird ignores the scientific consensus. Gov. Matt Mead, the Republican governor of Wyoming, criticized this fact. "Let's look at what the states have done, and what biologists, folks who know this, are telling us," he said.

Viva EDF Cuba!

Since 2000, EDF has been working with Cuban scientists and decision makers on issues ranging from coral reef conservation to sustainable fisheries management. Fortunately, these scientific initiatives will continue despite the Trump administration's new restrictions on U.S.-Cuba relations. We're working with Cuban partners on a new three-year community-based fisheries management project, and have begun scoping work on sustainable agriculture.

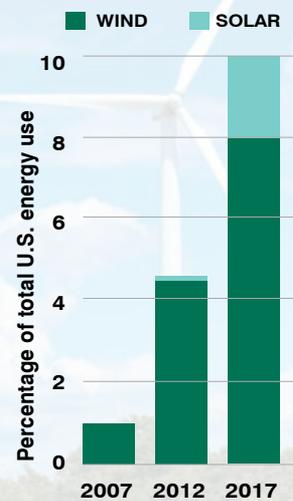
"It's in both nations' interest to protect the marine life we share," says Dan Whittle, director of EDF's Cuba program.



ISTOCK

Milestone!

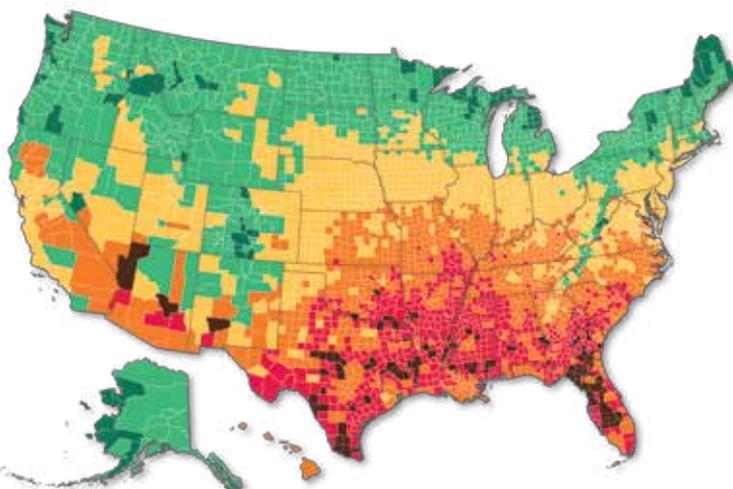
Renewables hit 10% of U.S. energy generation



SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION, MARCH 2017

Where climate change will hurt the most by century's end

The U.S. South and Southwest face greater risk of economic damage than other places from extreme weather such as wildfires and stronger storms (see p. 17). States with hot climates stand to suffer more, with Florida taking the brunt, as it also must deal with sea level rise.



Predicted damage 2080-2099 (percent of county GDP per year)



SOURCE: SCIENCE, 2017

SMALL BUSINESS CHAMPIONS

Supporting big change

Big businesses hold the power to effect big change. But it's up to others all along the supply chain to help. Organic baby food company Happy Family Brands knows sustainability doesn't stop at what goes into a product. That's why the company, which supplies Walmart and other big chains, turned to EDF's free online Green Freight tool for guidance on further reducing their impact.

"EDF really helped me identify what was possible," said director of sustainability Katie Clark.

The result? The business switched 30% of its inbound shipping from road to rail, reducing annual carbon emissions by 150 tons.

Nice work, Happy Family!



Deadly wake-up calls in Texas, Florida

By Leslie Valentine and Charlie Miller

Monster hurricanes Harvey and Irma proved we're not prepared for the ravages of climate change. Here's how EDF swung into action in Houston.

AS HURRICANE HARVEY pummeled the Texas coast this August, EDF toxicologist Elena Craft foresaw a danger no one was talking about: toxic emissions could easily spew from the vast hub of petrochemical plants surrounding Houston.

Anticipating a shutdown of air quality monitoring in the storm's chaos, Dr. Craft hired a mobile van carrying monitoring equipment. The unit quickly identified a large plume of benzene, a known carcinogen, and reported the findings to Texas officials. In fact, the monitor found elevated levels in every place tested.

As rains driven by climate change kept coming, gas pipelines ruptured and fires broke out at industrial facilities. Houston residents began complaining of nausea and dizziness. With the danger to public health becoming clear, EDF and our allies jumped into action. As Craft monitored the state's toxic emissions, she became

increasingly alarmed as releases exceeded limits by seven million pounds.

"In just two weeks we suddenly had a year's worth of exposure to a toxic brew in the air," says Craft. "And these chemicals have a cumulative effect on health."

Armed with the best research and expertise, EDF worked with City of Houston officials and contacted news agencies to bring the emergency to public attention. Soon reporters from across the country were calling. Craft's expertise has made her a go-to person both for the media and for environmental advocates.

We're now working with the Harvard School of Public Health to deploy 200 sensors to measure emissions, and with Rice University and Houston health officials to establish a registry to track health impacts in Harvey's wake.

For years, EDF has spearheaded a coalition to lower air pollution in the region, most recently highlighting the fact

that a mere 3% of violations at petrochemical facilities have resulted in a fine. "We often turn to Elena for help on these issues," says Adrian Shelley, director of the Texas office of Public Citizen.

But this latest crisis is beyond anything we have seen.

Awash in chemicals

Harvey inundated Superfund sites in Houston, raising concerns about releases of dangerous chemicals such as lead, arsenic, benzene and polychlorinated biphenyls into bayous, rivers and Galveston Bay. Many plants in the area were damaged and 14 Superfund sites were flooded, elevating the risk of toxic exposure.

Despite the dangerous situation, the Texas environmental agency and EPA did not come to inspect the sites for days and only did so after pressure from EDF and our allies. By mid-September, Texas officials had still not deployed their mobile air quality unit, which was sitting idle.

The storm quickly highlighted the danger of weakening EPA. An explosion at a chemical plant outside Houston, owned by the French company Arkema, exposed large flaws in the regulation of chemical safety, risk disclosure and

emergency planning. Only heroic action by workers prevented a possible leak of sulfur dioxide, which could have affected more than one million residents.

Under former President Obama, following a series of deadly accidents, including an explosion at a Texas fertilizer plant, EPA strengthened chemical safety plans to prepare for emergencies such as Harvey. The new standards, which EDF helped promote, were set to take effect in 2017. But after President Trump was inaugurated, Arkema and its industry trade association, the American Chemistry Council, objected.

Shortly after, EPA Administrator Scott Pruitt suspended the safety improvements, signaling to companies that they need not comply with them. That suspension is now being challenged in court, with EDF's ally Air Alliance Houston among the plaintiffs.

The failure to address climate

In the aftermath of Harvey, Houston residents set an inspirational example for the rest of America on how to overcome divisions and help neighbors.

The same cannot be said of many public officials. "Harvey and Irma's devastating impacts were a disaster waiting to happen," says EDF climate scientist Scott Weaver. "Scientists have long predicted that climate change would make hurricanes more intense, but we have failed to plan for them adequately."

A warmer Earth means more water will evaporate into the clouds. More moisture means more precipitation. The daily surface temperature of the Gulf of Mexico never dropped below 73 degrees last winter, for the first time ever. Harvey sucked energy from these warm waters, and took aim at Houston.

The failure to plan for climate change has been magnified by the Trump administration's policies. Trump and Pruitt have virtually banished climate change from the government's lexicon and proposed to eliminate the Clean Power Plan, the most ambitious U.S. effort to reduce power plant emissions.

Just ten days before Harvey's landfall, Trump signed an executive order undoing an Obama-era rule that required federal agencies to consider future flood conditions when planning infrastructure projects. He also disbanded a climate advisory panel designed to help officials integrate federal climate change analysis into long-term planning.

Slashed EPA budget won't help

Against that backdrop, the huge budget and staffing cuts envisaged at EPA would severely weaken the agency's ability to respond to disasters.

EPA helps communities deal with public health threats, including life-threatening emergencies like explosions, fires and toxic releases. When disasters strike, states desperately need the federal government as a full partner. Trump and Pruitt are seeking to reduce EPA's workforce by 3,000 positions, out of a total of 15,408. The reductions would undermine EPA's mission because the staff's expertise and support have proved crucial in protecting public health and responding to environmental disasters.

Trump's proposed budget would cripple other key agencies that will respond to the coming climate change-driven storms. Cuts would hit the Federal Emergency Management Agency (FEMA), the National Weather Service, which forecasts extreme storms, and the National Oceanic and Atmospheric Administration, whose research helps coastal residents prepare for disaster.

"EPA works hand-in-glove with FEMA," says EDF director for strategic planning Elgie Holstein. "It's a royal hypocrisy that as Trump congratulates Texas state officials on the great job they are doing, the state's senators and congressmen come to Washington to cut essential programs."

The administration could learn from next-door Louisiana, which is seeing dramatic land loss on its coast and responding to it effectively. EDF is working with the state's policy makers on coastal

HARVEY THE COST OF FAILURE

8,600

houses built in the floodplain since 2010

7 million

pounds of toxic chemicals released into the air from shutdown/startup of facilities

1 million

people displaced from their homes

\$200 billion

estimated cost of damages

\$929 million

cuts in emergency preparedness requested by President Trump

restoration and promoting natural infrastructure such as barrier islands and wetlands. We're sharing our work with planners around the country.

Storms remind us of who we are. Perhaps Harvey will finally shift Congress' position on climate change. A 2013 study of New Jersey residents clobbered by Hurricane Sandy found that even among climate doubters, support for the environment grew.

As they rebuild, Texas, Florida and other states will need to confront questions our leaders have avoided too long. With the 2018 elections around the corner, Harvey could reverberate in the halls of Washington long after this hurricane season has blown its course.



Not only during hurricanes: In Miami, sea levels have risen roughly 10 to 12 inches over the past century, making flooding the new normal.

Welcome to



The

By Rod Griffin

With the Trump administration doing all it can to reverse progress on climate change, the Golden State is forging ahead. With help from EDF, this leader in environmental innovation has doubled down on its commitments and invited other states to do the same, sending a strong signal to the nation and the world.

AT A PG&E SUBSTATION, 50 miles north of Sacramento, California's largest utility recently made history by deploying its first lithium-ion battery storage facility. The energy system features 22 brand new Tesla powerpacks, each about the size of a refrigerator.

It attracted little press, unlike the rollout of Tesla's new mass-market electric vehicle, the Model 3. Nonetheless, the new facility, along with the Model 3 and other recent clean energy breakthroughs, are part of an exciting energy revolution.

The powerpacks are helping solve one of the biggest challenges of wind and solar energy—intermittent supply. Using Tesla's technology, the utility will be able to call upon the stored energy in the bat-

teries to meet surges in demand.

Advances like these, spurred in part by California's bold leadership on climate change, are transforming the nation's automobile industry and electric grid, enabling renewable energy to reach scale. Many experts believe that within a few years home batteries will be commonplace, and electricity will be part of the sharing economy, like Airbnb or Uber. When a utility needs extra electricity, it will be able to call on the battery in your home or hybrid car to power your neighbor's appliances, and it will pay you for the power you are providing.

For more than a decade, EDF has been working with California to lay the groundwork for the new clean energy economy. In 2006, we cosponsored the

landmark Global Warming Solutions Act (AB 32), which set an economy-wide cap on greenhouse gas emissions, including a cap-and-trade program for the state's largest polluters. California also set rigorous standards for cleaner cars, renewable energy and low-carbon fuels, thereby unleashing the current wave of innovation.

With the Trump administration's anti-environmental stance, some feared the state's momentum would stall. Instead, the opposite has happened. In July, the California legislature voted to extend the state's cap-and-trade program, which had been set to end in 2020. The declining cap guarantees emissions reductions and is a central component of California's ambitious plan to cut planet-warming emissions 40% below 1990 levels by 2030.



future starts here

The extension, along with a companion bill that addresses local pollution, passed by a two-thirds majority, the threshold needed to avoid legal challenges. “Republicans and Democrats set aside their differences, came together and took courageous action,” said California Gov. Jerry Brown. “That’s what good government looks like.”

Underlying California’s actions is defiance. “We’ve got the scientists, we’ve got the lawyers, and we’re ready to fight,” Gov. Brown said after Trump was elected. Responding to threats to cut funding for climate research, he added, “California will launch its own damn satellite!”

California’s determination to tackle global warming came as climate change ravages the state. A year after rains ended a five-year drought, the worst in a millennium, torrential rains in 2017 damaged the state’s infrastructure, such as the Oroville dam. Then came a heat wave, followed by raging wildfires.

The vote to extend cap-and-trade was backed by Democrats, Republicans,

environmentalists and businesses—a sharp contrast to the partisan acrimony that has stalled climate efforts in Washington.

“This success demonstrates that it is possible to strike a balance between environmental, economic and health concerns while ensuring equity for communities like mine that are disproportionately impacted by pollution,” said Eduardo Garcia (D-Coachella), the bill’s sponsor. “We have created a model for the world, and EDF was an instrumental partner in this effort.”

Our staff lobbied lawmakers to make sure the legislation remained strong. We gained support from key parties, with a high-profile strategy that included an oped by EDF president Fred Krupp, Gov. Brown and the president of the state’s Chamber of Commerce, Allan Zaremberg. As the vote approached, Dr. Nat Keohane, EDF’s VP for Global Climate, met with lawmakers and advised on the bill’s final design.

“EDF listened to all sides and helped

forge compromise,” said Assembly minority leader Chad Mayes (R-Yucca Valley).

The idea behind cap-and-trade is

A CLEAN-ENERGY SUCCESS STORY
Percentage change since 2000 (California)

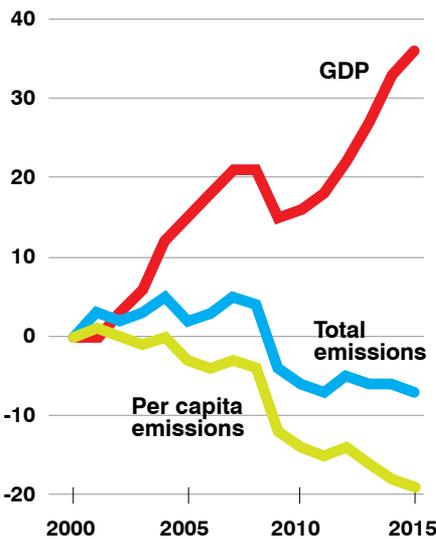




PHOTO: CALIFORNIA GOV

Revenues from California's cap-and-trade program go to projects ranging from affordable housing and clean transportation to preserving Northern forests that act as carbon sinks.

simple. The legislation caps greenhouse gases emitted by the state's largest polluters, and lowers that cap over time, creating a market for innovations to help companies cut emissions at lowest cost.

Since 2006, California's greenhouse gas emissions have gone down 8% even as gross domestic product has surged 15%. The state's economy has grown from the world's eighth largest to sixth largest—and added 1.3 million jobs.

In the recent legislation, a priority for EDF was passage of the accompanying bill that requires an increase in local air pollution monitoring and enacts stricter penalties for polluters. There's also a new requirement for refineries and other large industrial facilities to upgrade their equipment to cleaner technology.

"This package demonstrates to the nation and the world that California can address climate change without leaving

communities behind," says Quentin Foster, EDF's California climate director.

Contrary to the warnings of critics, hundreds of companies are moving to California to plug into the new energy economy. The state has attracted more venture capital investment for clean tech than the European Union and China combined. Even the state's manufacturing base is experiencing a boost.

For example, China-based BYD, the world's largest electric bus manufacturer, recently opened a production facility in Lancaster, CA, outside Los Angeles, that now employs 700 people.

"We view California as an enlightened state," says Macy Neshati, senior vice president at BYD Heavy Industries, a U.S. subsidiary. "We expect to double our work force over the next year and a half."

In July, BYD received an order from the Los Angeles Metropolitan Transit

Authority for 60 new zero-emission electric buses. The city plans to eventually replace its entire 2,200-strong bus fleet with electric. The Lancaster plant is also churning out buses for other cities, including Atlanta, Indianapolis and Miami.

Here comes the sun

Of all the changes transforming California, the solar boom may be the most striking. Nearly five million homes in the state are now powered by the sun. And it's not just Malibu millionaires who are solarizing.

In the low-income San Diego neighborhood of Broadway Heights, nearly half of the 192 homes have rooftop solar panels, partly financed by the state's cap-and-trade program. Since getting new panels, resident Jimmie Martin has seen his electric bill drop by \$100 a month.

"I'm going to put some of my savings back into the community," he says, "and increase my church tithe."

The solar industry in California employed 100,000 people in 2016, 25% more than the preceding year and nearly twice the number of coal miners nationwide.

The influx prompted Fresno Ironworkers Local Union 155 to triple the size of its apprenticeship program. One new apprentice is 20-year-old Norma Alvarado, who is installing solar power in the Central Valley. Alvarado used to work at McDonald's earning minimum wage. "This program is my way forward," she says. "And I feel like I have a part in solving the air pollution problem."

All eyes are on California

Can the Golden State sustain its Midas touch as it slashes its emissions? So far, the outlook is promising. California

Pioneering change



Setting the stage

Gov. Reagan creates the California Air Resources Board, which will become the state's chief enforcer of climate change policy.

Efficiency rules!

The California Energy Commission sets the nation's first energy use standards for new buildings.



Smog check

New rules require that drivers get their cars tested for emissions. Today, the program removes 400 tons of pollutants from California's air every day.

Clean car standards

EDF helps California pass first-of-its-kind legislation to reduce GHG emissions from cars and light trucks (other states follow lead).

Cap on carbon

Gov. Schwarzenegger signs the Global Warming Solutions Act, cosponsored by EDF. The law sets an economy-wide cap on emissions.



Market kickoff

California's cap-and-trade program goes into effect.

1967

1978

1984

2002

2006

2013

“We have created a model for the world, and EDF was an instrumental partner in this effort.”

— California Assemblyman Eduardo Garcia

already gets more than a quarter of its electricity from renewables and is on track to meet its commitment of 33% by 2020.

But the state’s progress doesn’t stop there. One-third of its proposed emission reductions will come from curbing climate pollutants other than CO₂, including hydrofluorocarbons from air conditioners and methane from oil and gas operations. After EDF helped expose the huge Aliso Canyon methane leak last year, the state passed new methane rules for oil and gas production facilities that are the strongest in the nation. But no matter how much progress California makes, the United States will fall short of its goals under the Paris climate agreement unless more states and ultimately the federal government take strong steps on climate.

The good news is that many are. Nine North-eastern states are part of a regional a cap-and-trade program that has helped reduce emissions from power plants in the region by 40% since 2008. In August, the states agreed to cut an additional 30% by 2030. Twenty-nine states now require their utilities to obtain power from renewable sources, and at least 240 cities and

counties have joined the “We are Still In” campaign to commit to the Paris accord.

Meanwhile, foreign dignitaries pass through Sacramento on a regular basis seeking advice on how they might launch their own carbon markets. Gov. Brown has invited leaders to a global climate summit in San Francisco in 2018.

The hope is that the combination of market forces, wider use of cleaner fuels and aggressive actions by states, businesses and cities can fill the void left by the Trump administration.

Says Tim O’Connor, an attorney in EDF’s Climate and Energy Program: “No one person—not even the president of the United States—can put the brakes on the momentum for climate action.”



California’s success in putting a price on carbon helped give China the confidence to launch its own carbon trading system, the world’s largest. EDF helped lay the groundwork.

KRISTEN ARNOLD



The art of the possible

EDF California climate director Quentin Foster grew up in the low-income Watts neighborhood of Los Angeles. “I had to fight,” he says, “and to dream and believe that I could do, and be, more.” Foster was the first in his family to graduate from college—and then go on to graduate school.

As a child, he knew first-hand the costs of living in an unhealthy environment, having suffered from asthma. “I can recall going outside with my friends to play,” he says. “And guess what? We all had inhalers.” Today, his dream is to help fix the global climate and to improve environmental conditions in California’s poorer communities.

Foster is in the right place to effect real change. “We have to turn back climate change and be just as vigorous in addressing local air-pollution issues,” he says. “We need to make sure we are not leaving behind the most vulnerable, impacted communities.”

This summer, as the state legislature debated two bills to tackle global climate change and local air pollution, he hunkered down with staff in our Sacramento office trying to find common ground, not just between Democrats and Republicans, but between businesses, unions, agricultural interests, environmental groups and environmental justice advocates.

In the end, Foster helped pass critical legislation that begins to bridge the gulf between the various contentious factions on climate change. “The legislation isn’t perfect,” he says, “but it’s a huge step forward.”



Low-carbon fuels

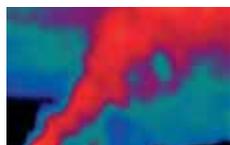
Cap-and-trade program expands to include production of transportation fuels.

2015

Ratcheting up

California extends its emissions reduction goal to 40% below 1990 levels by 2030.

2016



Plugging methane leaks

After EDF helps expose the Aliso Canyon methane leak, the state passes the nation’s most stringent methane rules for oil and gas production facilities.

2017

Doubling down

With EDF’s help, California extends its cap-and-trade program and passes companion legislation improving local air quality.



2017

ISTOCK

Present at the creation

By Art Cooley

Fifty years ago this October, EDF was born. Art Cooley, one of our founders and still a trustee, recounts the early days, when a tireless group of scientists went to court to save our great birds of prey. Their victory laid the foundations for the battles we fight—and win—today.



WAS IN THE ROOM WHERE IT happened. It was the fall of 1967 and the room was my living room on Long Island. There were ten of us. On October 6 of that year (after some difficulty coming up with the \$37.00 incorporation fee), we had signed papers establishing the Environmental Defense Fund, and unanimously passed a motion that we would “proceed with all due caution.” And then we voted at my house to sue 52 cities in Michigan to stop their spraying of elm trees with the insecticide DDT. It was our first lawsuit as EDF.

Our action was prompted by a recent victory in which we supported a lawsuit to stop the Suffolk County Mosquito Commission from spraying DDT on salt marshes on Long Island. In our research, we had discovered DDT in the eggshells of osprey. We argued that the precipitous decline of osprey, as well as other birds of prey such as bald eagles and peregrine falcons, was caused by the chemical, which produced thin eggshells, reducing offspring.

Publicity surrounding the case prompted the Suffolk County Legislature to ban the use of DDT. A year later, the New York State Legislature banned DDT.

In Michigan, all but one of the cities we sued agreed to give up DDT, in part because they couldn’t find scientists to contradict our evidence that the insecticide was endangering the survival of birds of prey. The publicity surrounding our victory alerted activists in Wisconsin who were also battling DDT. They invited us to present our anti-DDT case in front of an administrative law judge. We did and won; DDT was banned in Wisconsin.

So what next? Why not sue the federal government and get DDT banned nationwide? So much for proceeding with “due caution.”

Our federal DDT case was ultimately assigned to the newly formed EPA. Again we prevailed, as William Ruckelshaus, the first EPA administrator, banned DDT in 1972. Our victory, and the story of EDF’s early years, was immortalized by my EDF co-founder, Charles Wurster, in his 2015 book *DDT Wars* (available on Amazon). Today, thanks in part to the ban on DDT, birds of prey have rebounded in a spectacular way.

- Between 1970 and 2016, it is estimated that the population of adult bald eagles in the U.S. rose from 15,000 to 143,000.

- The peregrine falcon population in North America has more than doubled since 1970 to an estimated 40,000 birds today.
- And when it comes to osprey, there are now estimated to be 310,000 in North America - more than a tripling of the population since 1970.

Finding the ways that work

In its early years, EDF was built on a stool with two legs—science and law. Our unofficial motto was “Sue the bastards!”

We bolstered our commitment to science when Dr. Michael Oppenheimer was hired as chief scientist in 1981 with a brief to be “in charge of the air quality in New York City and beyond.” One can only imagine what he thought “beyond” meant. In retrospect it meant becoming one of the nation’s leading scientists on global warming.

In 1984, Fred Krupp was hired as EDF’s executive director. When asked by the interviewing committee, “Fred, aren’t you a little young for the job?” Fred paused and said, “I will do something about that every day I am on the job.” He is a man of his word because his hair color now matches mine.



PHOTOS FAR LEFT: T. CHARLES ENCKSON; OTHERS CLOCKWISE FROM LEFT: OFFSET, TW. VANJIRK; PHOTOSEARCH.COM

Opposite page: EDF's founders, left to right: Dennis Puleston, Charles Wurster and Art Cooley. Clockwise from above: the bald eagle was on track to extinction before DDT was banned; acid rain emissions are down 85% since 1990, when EDF helped pass a law to address the problem; last year, we won reform of the U.S. chemical safety law, protecting families.

Fred had the notion that the marketplace might be friendly to the right environmental approach, so he hired the economist Dr. Dan Dudek.

Fred reportedly said, "I wasn't sure if Dan was loony or the greatest visionary I had ever met, but I took a chance and hired him." Dan led us into cap-and-trade programs for acid rain in 1990 and later carbon emissions.

Fred raised the then-radical idea that businesses were not necessarily the enemy, as many environmentalists then believed, and in fact could be very helpful. His first venture with a business was McDonald's. In the 1990s, EDF helped McDonald's eliminate more than 300 million tons of packaging, much of it styrofoam, and reduce restaurant waste by 30%. Other restaurants quickly followed suit.

A legacy of accomplishment

EDF was now a solid four-legged stool comprising science, law, economics and partnerships, and this allowed us to take on ever more complex environmental challenges.

Over the past 50 years, EDF has achieved some remarkable results.

Among them:

- Substantial revision and strengthening of America's formerly disastrous chemical safety law.
- Cap-and-trade programs for CO₂ in California, Quebec and Ontario, as well as in China.
- Secure fishing rights adopted in more than 60% of U.S. fisheries, as well as in Belize and Sweden.
- Elimination of lead in gasoline.
- Widespread use of landowner incentives to help save imperiled species.
- Helping reduce deforestation in the Amazon by 70%.

Looking to the future

Today, one would have to be living under a rock to be unaware of the large-scale assault on our environment. At times, the work we do can seem daunting, the stakes impossibly high. But I believe that EDF, together with its allies in the environmental community, has the resolve to overcome the obstacles that stand in our way.

Today, by being EDF members, we are all in the room where environmental progress continues unbroken.

Have you included EDF in your will?

Make a lasting contribution toward protecting the planet for generations.

Contact our Planned Giving team to learn more, and join the Osprey Society today.

Toll-free: 1-877-677-7397
legacy@edf.org | edf.org/legacy



PHOTO: ERIC SAMBOL



ISTOCK

In the courts, reason for hope

EPA Administrator Scott Pruitt is pursuing an aggressive agenda to undo environmental protections. EDF's dedicated team of attorneys has mobilized to fight back.

AS ATTORNEY GENERAL OF Oklahoma, EPA Administrator Scott Pruitt sued EPA 14 times to attack vital protections for public health and the environment. Now, nine months into the Trump administration, Pruitt's destructive agenda is in full swing.

Does that mean Pruitt and Trump are unstoppable? Not by a long shot.

EDF and our allies are pushing back, and we've scored some solid victories. A dramatic win on the Senate floor preserved the Interior Department's long-overdue limits on methane pollution on public and tribal lands.

In the courts, we've deployed our deep bench of attorneys to defend key environmental protections. In June, after the administration lost the methane battle in the Senate, Pruitt abruptly suspended methane standards for new and modified oil and gas facilities nationwide. EDF and a coalition of health and environmental groups filed suit asking for an emergency stay to block the decision, and we were later joined by a large coalition of states and municipalities. In July, a three-judge panel of a federal appeals court struck down Pruitt's decision. These nationwide limits on oil and gas pollution are now in full effect.

We won a major victory when Pruitt reversed course and decided not to

suspend implementation of air-quality standards for ground-level ozone (more commonly known as smog). More than 115 million Americans still breathe air with unhealthy levels of smog. Pruitt initially said he needed an additional year to gather information—widely seen as an excuse to stall. EDF and our allies sued, and we were joined by attorneys general from 16 states. Pruitt backed down.

"Facts and law matter," says EDF general counsel Vickie Patton. "We will hold Pruitt accountable for his reckless decisions."

Our legal strategy has several elements:

Ensuring transparency

After EDF attorneys filed many Freedom of Information Act (FOIA) requests, we received information on 1,900 climate-related pages and files scrubbed or modified from EPA's website under Pruitt. This included vital information about climate impacts on human health. We've made these records available on our website to ensure that EPA's hard-earned science information is preserved (edf.org/transparency). We also filed a FOIA request to see Pruitt's schedule,

which had been kept hidden from the public—an abandonment of decades-old transparency policies observed by administrators from both political parties. In response to our FOIA request and other public pressure, Pruitt finally released the schedule in late September. It revealed that he met regularly with executives from mining, fossil fuel and auto industries, sometimes shortly before he made decisions favorable to them.

Defending bedrock protections

We are also going to court to make sure Pruitt enforces existing law, including the "good neighbor" protection under the Clean Air Act, which limits air pollution that crosses state lines. In August, EDF and our allies notified EPA that we will sue to make sure the agency responds to a Maryland petition seeking to curb pollution from 36 coal-fired plants in five upwind states. About 70% of Maryland's smog comes from these upwind states.

Standing up for clean energy

We are successfully defending the right of states to pursue clean energy. Three recent victories over industry challenges in New York, Connecticut and Illinois provide a solid legal foundation in that ongoing defense. EDF filed friend-of-the-court briefs in all three, joined in some cases by other environmental groups and consumer advocates.

Formidable challenges lie ahead as the Trump administration continues to flout laws and policies intended to protect the American people.

"EPA has undergone the government equivalent of a hostile takeover," says Patton. "With the support of our members, we are prepared to fight and win."

Charlie Miller



JOHN PALE

EDF general counsel Vickie Patton: "We are prepared to fight and win."

A spoonful of sustainability

From farm to table, there are environmental costs to food production at every step of the way. EDF works with partners to cut emissions and protect ecosystems all along the supply chain. Here are some of the ways we are championing a better bowl of corn flakes and milk.

ON THE FARM



Reducing pollution

More than half of crop fertilizer can end up in our air and waterways. The result: greenhouse gases and ocean dead zones. EDF promotes careful targeted application of fertilizer to reduce runoff and cut 9 million metric tons of emissions a year.

Promoting healthier land

90 million acres of U.S. land is farmed for corn, some of which becomes corn flakes. But farming can be hard on land. EDF works with farmers and advisors to reduce erosion by encouraging no-till, cover cropping and unfarmed buffer zones.

IN THE FACTORY



Cutting air pollution

Processing and packaging cereal and dairy causes 125 million metric tons of carbon emissions annually. EDF's Climate Corps fellows have worked with 40 leading consumer packaged goods companies, identifying ways to improve energy efficiency and cut emissions.

Tackling toxic chemicals

Toxic chemicals enter food during the manufacturing process. Phthalates, linked to decreased IQ, and perchlorate, known to impair infant brain development, have both been found in milk. EDF is campaigning for more research and a ban on the use of these chemicals.

IN TRANSIT



Fighting carbon emissions

Shipping dairy and cereals across the U.S. causes two million metric tons of carbon pollution a year. EDF's Green Freight team shows businesses large and small the route to cleaner modes of transport, less energy waste and streamlined shipping strategies.

Working in the boardroom

Global production and use of all consumer products creates more than 60% of the world's carbon emissions. But EDF knows big business can effect big change. That's why, in April, we helped Walmart launch Project Gigaton, a plan to reduce their supply chain emissions by one billion tons by 2030. EDF is helping suppliers like Smithfield Foods and Land O'Lakes work toward this goal. Now the pressure to lower emissions will be felt throughout the 100,000 companies that comprise Walmart's global supply chain.





STOCKS/COM

"I don't like it. I told you, I don't like it!"

A new front in the war on lead

An EDF report shows that some baby foods contain toxic lead. We're pressing manufacturers and the FDA to pinpoint the source and fix the problem.

MORE THAN 30 YEARS AGO, EDF won the fight to get lead out of gasoline. Americans' blood lead levels have dropped precipitously in one of the biggest public health victories of the postwar era. Now, scientists have come to believe there is no safe level of lead in the human body.

So what is lead doing in baby food?

That's the question raised by a new EDF report that found 20% of baby food samples had detectable levels of lead, including fruit juices, cookies and root vegetables such as carrots.

"Every child's food should come unleaded," says Dr. Sarah Vogel, EDF vice president for Health. "Food is a poorly understood and often overlooked source of lead exposure."

Lead is a potent neurotoxin, and children are especially vulnerable. Lead exposure can result in lower IQ, memory problems, possible hearing loss and behavioral problems like hyperactivity.

EDF's study found that more than one million children consume lead in excess of Food and Drug Administration (FDA) limits. According to the American Academy of Pediatrics, "The key to preventing lead toxicity in children is to

reduce or eliminate persistent sources of lead exposure in their environment."

Scientists don't know precisely where the lead in baby food is coming from. Nor do they know why lead is more frequently found in some types of baby food than in food intended for older children and adults. And unfortunately, FDA provides no information about which baby food brands are most commonly tainted.

Parents can take action by asking baby food companies what they are doing to address the problem and whether they regularly test their food for lead. Experts also recommend that parents consult their pediatricians for advice on how to reduce lead exposure.

The EDF study was based on a decade's worth of FDA data, and we have filed a Freedom of Information Act (FOIA) request to pry loose more data and more information on products, which we expect to publish in a new report later this year. We're also working with manufacturers of baby food to identify the source of the lead in their products and learn what can be done about it. The initial EDF report resulted in a flood of

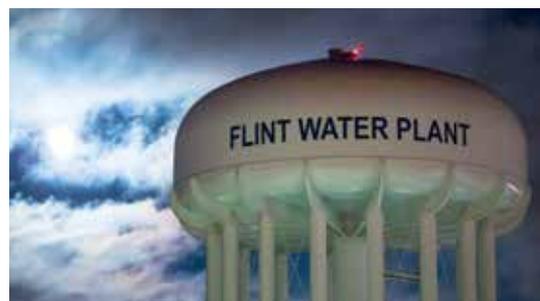
press coverage, including news reports on more than 100 television stations.

Drinking water is another worrisome avenue for lead exposure, and EDF is involved here, too. In 2015 the nation learned about the public health crisis in Flint, MI, when high levels of lead were found in the city's drinking water. What most people don't know, however, is that some six million homes across America are also at risk because, like the residents of Flint, they get their drinking water through lead service pipes.

EDF is working with communities in the Midwest and Northeast to remove lead water pipes. We're also testing drinking water for lead in several child care centers nationwide, with the goal of finding effective solutions for the centers.

"We'll never recover the IQ points that children lost to lead exposure," says Tom Neltner, EDF chemicals policy director. "But we can make sure that tomorrow's kids are better protected."

Charlie Miller



GETTY

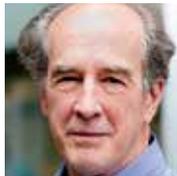
Beyond Flint, six million homes are at risk of lead in drinking water in the U.S.



ALBERT

Chicago now houses the largest urban solar installation in the United States.

Anatomy of a clean energy victory



Dick Munson oversees EDF's Clean Energy work in the Midwest.

LA TE LAST YEAR, AFTER HARD-fought negotiations, EDF and its coalition partners in Illinois felt sure we had reached the finish line on passage of a strong energy bill. The Future Energy Jobs Bill would spur some \$15 billion of investment in new wind and solar projects and reduce the power sector's greenhouse gas emissions 56% by 2030—even more than the Obama administration's Clean Power Plan would have.

But, just days before the vote, Illinois legislators told us they were inserting subsidies for money-losing coal plants. Coal lobbyists, evidently, had gotten to these legislators. Rather than accept a bill that was a vehicle for pollution, EDF and its partners decided to walk away.

That might have been the end of the story, but we pulled out all the stops—with EDF members at the center of the action—and got the coal subsidies scrubbed from the bill. Only three weeks after Donald Trump's election, Illinois Republican governor Bruce Rauner signed the bipartisan legislation.

The battle for clean energy has shifted and is now being played out in states like Illinois, where real progress is being achieved even in divisive times.

The story began 18 months before, when the utility Exelon requested huge

subsidies for its nuclear reactors. Sensing a negotiating opportunity, EDF and allies began building the Illinois Clean Jobs Coalition, reaching out to consumer advocacy, labor unions, environmental justice and other groups. We introduced our own renewable-focused legislation, which included funding for solar development and job training in low-income communities.

A political stalemate followed. The fossil fuel interests and utilities lobbying for subsidies had locked up many votes, but so had we. It became clear that neither side would get what it wanted. That's when the Clean Jobs Coalition and others joined to hammer out the Future Energy Jobs Bill.

Early on, we began to organize monthly meetings of EDF's Chicago-based members. We kept our 70,000 members in Illinois abreast of the negotiations and on high alert. Members mobilized within 12 hours, sending some 2,000 emails and personalized letters to the governor and legislators.

"I'm so grateful to EDF for giving me clear guidance on what I could do," says Mark Kraemer, an EDF member and a bass violinist in the Chicago Symphony Orchestra.

Days before the vote, we organized six hours of testimony from health groups, faith leaders and consumer advocates against coal subsidies. The final package, I'm happy to report, contains no coal subsidies. Without the help of thousands of EDF members, this victory would not have been possible.

THE WILSON LEGACY

Where climate change will hurt most

By Frank Convery, EDF Chief Economist

"Posterity be damned: what has posterity ever done for me?" Boyle Roache, an 18th-century Irish politician, captured a universal truth. Most of us heavily discount the future. This basic fact goes far to explain why the risks of climate change have failed to take hold in the popular imagination.

But the future is getting closer. Not only are destructive storms like Harvey, Irma and Maria here today, but an emerging literature on the impacts of climate change is beginning to transform our understanding of what is in store, when and where. For example, a recent paper in *Science*, "Estimating economic damage from climate change in the United States," integrates climate science, econometric analyses and other data to pinpoint where and how much harm could occur in local economies.

That damage won't be distributed equally. The biggest burden is likely to be felt in the South, while the Pacific Northwest and the Northeast will show modest gains. Agricultural yields could fall by 30-90% in Texas, parts of the Midwest and California—but may increase in the Pacific Northwest.

There is no uncertainty that climate change is caused largely by humans. But we are only beginning to learn where the damages will be, when they will occur and how catastrophic they will be. The emerging picture isn't pretty. Reports like this one provide guideposts in planning for resiliency as the planet changes.



SHUTTERSTOCK

California vineyards will be hard-hit.

This regular column 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

Become a citizen scientist

With the Trump administration cutting budgets for science, the need for accurate scientific data has never been greater. You can help by becoming a citizen scientist—and you don't need a Ph.D. to make a difference. Technological advances mean that from behind your computer, in your neighborhood or out on a trail, you can now count, measure, analyze, identify—and share. Here's how.



Monitor butterfly migration

Monarch butterfly populations are in steep decline. Help scientists collect data by tracking and tagging them along their migration route from North America to Mexico.

When? Mid-August to November

Where? The lower 48 states

Learn more: monarchwatch.org

Monitor mountain birds

The woodland hills of New England are magical on early spring mornings. Help Mountain Birdwatch and identify mountain breeding birds by learning their songs with the help of a training CD.



When? June mornings

Where? Specific trails in the mountains of New England

Learn more: bit.ly/2xRsXrx

Save the redwoods

Use your smartphone to report the plants and animals spotted among the Californian redwoods. The information helps scientists better understand species distribution and predict where future redwoods will thrive.



When? Year-round

Where? Redwood forests on the Californian coast

Learn more: bit.ly/2fka5tf

Test your local waterways



Residents of over 140 countries are testing water quality in their local streams, rivers and lakes for EarthEcho Water Challenge. Order testing kits and share your findings online.

When? March 22 to December 31

Where? Local water bodies

Learn more: worldwatermonitoringday.org



Record historical weather data

Computers can't read the spidery handwriting in 19th and 20th century ships' logs, but you can. Help transcribe information on historic weather patterns and sea ice conditions to aid scientists with climate modeling.

When? Anytime

Where? From your computer

Learn more: oldweather.org

Track humpback whales

Boaters can help gather information about the population, health and movements of humpback whales by photographing their distinctive tails, which are then matched to those in a registry.



When? Year-round, depending on location
Where? Between the North Atlantic and the Caribbean

Learn more: caribtails.org

Observe growing plants



Project BudBurst needs you to collect data on the timings of the leafing, flowering and fruiting of plants. Scientists use the data to track how plants respond to climate change.

When? Year-round

Where? Countrywide

Learn more: budburst.org

These are only a few of the projects out there. Browse Scistarter.com and Zooniverse.org for hundreds more. Let us know your personal favorite at editor@edf.org

EDF is not responsible for the work of these organizations. Please exercise your own discretion—and have fun!

CREDIT



OFFSHOOT

Because the environment can't speak out, we must

Assaults on the environment won't end until we convince our lawmakers to stand up for what's right. Our political affiliate, EDF Action, asked members to tell us how they're fighting for change in the 2018 elections.

I have joined several climate change organizations, initiated discussions with city council members and the mayor, will meet with a congressman next week about climate change and am using Facebook as a forum for climate change and renewable energy education.

James M., AZ

My wife, Elsa, and I have started a nonprofit (voterise.org) charged with getting Utah's 18-29 year-olds to register and vote. While nonpartisan, we will be dealing with the issues that affect this demographic, like the environment.

Richard G., UT

I'm currently lobbying for a change from using pesticides to organic management on municipal grounds. I also have an environmental e-list of people I forward three e-actions daily to—many of them sponsored by EDF!

Pamela U., OH

We are 84, and after 40 years of work, and 20 years of vol-

unteer leadership, we retired a second time. The 2016 election has us re-engaged on climate change and health care. We expect to be still working at our present level and urge everyone else who understands and cares to do the same.

Milton and Shirley N., OR

I have been an Election Officer for 14+ years here in our mobile home park. A lot of hours are required for each election -- training class, set-up time, a day that starts at 6 am. I do it so I can help make a difference in this important time.

Mary Lou C., CA

Though I vote Republican, I am pushing back when it concerns the air I breathe, the water I drink or the land I live on. It's kind of disappointing that politicians want to drill holes in everyone's backyard and pollute.

Moises F., MA

Next year, 2018, will be the first in which I'm eligible to vote (I'm 17 now), and I plan to encour-

age all of my friends and many of my classmates to vote as well. The environment depends on young voters, so I will contribute as many as I can.

Cielle W., MI

I'm interested in starting a service to drive people to the polls on Election Day.

Jane B., MN

Write my congressional representatives weekly about my position on the environment. Be positive! Enlighten those who need direction on how to combat attacks on our planet. Forget the personalities and concentrate on the issues.

John F., FL

My partner and I write blog posts for the Huffington Post. We will be writing about the environment during 2018.

Robert B., NY

I will study who is running, their standing on environmental issues and share this knowledge with family and friends.

Doreen V., CA

Letters

We can still save the warbler



ALAMY

I appreciate you touting the revival of the black-capped vireo (Spring, 2017). It's always good to hear of private landowners being good stewards.

This success is not solely due to private efforts. In Texas, we have used public funds to set aside the Balcones Canyonlands preserve for the black-capped vireo and the golden-cheeked warbler.

While the vireo is recovering, this is not the case for the warbler. There are very strong political pressures funding poor science to declare the bird recovered, so valuable habitat can be developed. We need to stay vigilant, and not roll back protections prematurely,

Sarah J., TX

David Wolfe, EDF director of conservation strategy, responds:

I completely agree with you on threats to the golden-cheeked warbler. The science on the warbler is clear: habitat for the bird continues to disappear in fast-growing Central Texas and the species warrants its endangered status.

We're working with Texas landowners who are earning income by participating in programs to conserve warbler habitat. Delisting the species would only disrupt these efforts (see edf.org/warbler).

1967 – 2017

**Thank you, EDF members
for 50 years of support**

Together we help people and nature prosper

