

SOLUTIONS

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THE NEW NORMAL?

CLIMATE CHANGE IN AMERICA

PAGE 4

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 our members.



ON THE COVER:

From wildfires in the West to the giant storm that pummeled the East Coast, the United States in 2012 got

a taste of what climate change will bring, unless we act quickly.

Solutions senior writer Rod Griffin examines the human toll exacted by the recent extreme weather and looks at ways to tackle the climate crisis. Special section begins page 4.

Cover: Atlantic City, NJ, Oct. 30, 2012; by Mario Tama/Getty Images

SOLUTIONS

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TALK BACK IN THE WAKE OF SANDY,



“People who didn’t believe in climate change have seen too many disasters in their own neighborhoods to deny it any longer.”

—Deborah Murphy, Thiells, NY

For decades, EDF has been among those warning about the threat of climate change. Sadly, it took a series of weather disasters across the country in 2012 to drive home the consequences of inaction.

So what do we do now? Polls show a vast majority of Americans want government to act on global warming—but they don’t talk much about it. Think of how much we could accomplish if people were more vocal. So we asked our members: How can we mobilize this silent majority? You came back with more than 9,000 responses and a stunning range of ideas. Here’s a sample of the answers we received:

Make climate personal

“Droughts are devastating to the breadbasket states; tornadoes flatten the Midwest; typhoons and hurricanes flood the coasts. The more personal, the more people pay attention.”

—Emma Crawford, Tucson, AZ

“Recruit support from Latinos and other minorities who are becoming the majority in America. Link climate inaction to poor economic recovery. Show how investments in low-carbon transport and urban development create more jobs. Help people understand the connection between what we eat and how much CO₂ we produce.”

—Michael Replogle, Chevy Chase, MD

“Gas rationing, loss of power and the lack of the most basic items are going to be our future. Take a poll, take our pulse, get on social media, give us petitions. Tell us how to use less power.”

—Mary Pendergast, Pawtucket, RI

Connect with people’s pocketbooks

“Keep reminding people of the economic consequences of severe storms to their families. Americans are practical, concrete folks, and vote their pocketbooks.”

—Clara Coen, Chicago, IL

“I would like to see generous tax credits for purchases of hybrid or electric cars, solar panels, windmills and investments in energy efficiency for homes.”

—Lani Kroemer, Phoenix, AZ

“In these times, the economy and jobs are the highest priorities, so the more these are linked to environmental issues, the better. I’d like to see all the environmental organizations work together to lobby both major parties. The lives of future generations and the planet itself depend upon it.”

—Robert Moore, Lawrenceburg, IN

MEMBERS SPEAK OUT

Avoid extremism

"We need to get people of all political persuasions to understand that climate issues affect everyone, everywhere. It's not about Republican or Democrat or Independent, it's about the Earth we all share."

—Susan Salch, Austin, TX



Pablo Martinez-Monrivas/AP Images

What will it take to get Washington to act?

Communicate facts and science better

"I want to see environmental groups spend more time explaining the science of global warming in an understandable way, such as by demonstrating that when the oceans warm even a tiny bit, the impact on weather is huge."

—Alene S. Ammond, Cherry Hill, NJ

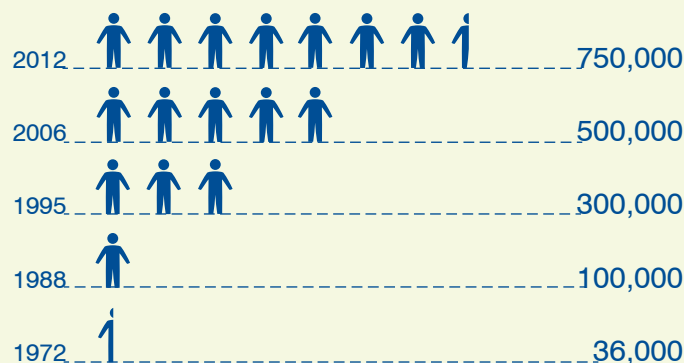
Teach your children well

"I work with children and help spread the word to their parents. It has worked for recycling and can work for climate as well. We owe future generations a safe and clean environment to live in, not the promise of cheaper fossil fuels."

—Ian Leslie, Las Cruces, NM

A GROWING COMMUNITY

EDF members, a strong voice for action



EDF wants to hear from you. Email us at editor@edf.org or visit us at [facebook.com/EnvDefenseFund](https://www.facebook.com/EnvDefenseFund). All comments are edited for clarity and length.

TIME TO ACT ON THE LESSONS OF SUPERSTORM SANDY

By EDF President Fred Krupp

As the death toll in this hemisphere climbed past 250, superstorm Sandy made clear once again that the cost of extreme weather cannot be measured in dollars alone.

Climate change did not cause Sandy but it clearly made the storm worse, with warmer ocean waters and higher sea levels fueling the storm and magnifying its destructive power. Along with 2012's heat waves, pervasive drought and other unnatural disasters, Sandy delivered a message to opponents of climate action: The cost of inaction is far too high to bear.

While it was disappointing to see environmental issues mostly absent from the 2012 campaigns, President Obama put climate change on center stage after the election, saying, "We want our children to live in an America ... that isn't threatened by the destructive power of a warming planet."

I hope this marks the start of a new national dialogue on the defining issue of our age.

President Obama has never made a major address about this grave threat. A call to action from the President could inspire Americans to fully acknowledge the human role, take steps to reduce our impact and demand action from our leaders. As Lincoln once said, "Public sentiment is everything. With public sentiment, nothing can fail; without it, nothing can succeed."

It is past time to get serious. We look forward to working with the administration and the 113th Congress on concrete steps to turn back this threat outlined in our cover story (*see page 4*).

Even with inaction in Congress, there has been progress these past months. The administration has proposed the first-ever rules to cut carbon from new power plants and is lowering pollution from cars; California just launched an ambitious cap-and-trade program for carbon. It's not enough, but it's a start.

In 2013, EDF and our allies will show how a flourishing new energy economy can help stabilize the climate and create jobs in places like California. We will take this evidence to Congress and insist that denial and gridlock on climate be replaced by action.

Nothing gets attention on Capitol Hill like hearing from angry constituents. We need the help of every EDF member, whether it's calling your representatives or writing your local paper. Each of us has an essential role to play.



T. Charles Erickson

A handwritten signature in black ink that reads "Fred Krupp". The signature is fluid and cursive, with a large, sweeping 'F' and 'K'.

A WILD RIDE

A season of extreme weather triggers a national debate on climate resilience—and action



By Rod Griffin

Every year, the weather seems to get weirder. How much more evidence do we need to act on climate change? In this special section, *Solutions* looks at encouraging progress in California and China, and the unpalatable choices we face if we don't move quickly enough.

For many Americans, climate change is no longer an abstraction.

Just ask Montana rancher Scott McRae. In June, it took less than an hour for a wildfire to reduce his pasture to a blackened wasteland devoid of the grasses that sustain his cattle. "I've got 500 mouths to feed with nothing to eat in sight," he lamented. Unusually warm weather and dry conditions fueled the inferno.

In Illinois, meanwhile, more than a quarter of the 2012 corn crop was lost due to searing drought that plagued the Heartland. "Farmers are at the front lines of global warming," said Illinois farmer Keith Bolin, former president of the American Corn Growers Association. "It's a grave threat to rural livelihoods and quality of life."

But the cruelest blow came in October, when Hurricane Sandy walloped the Eastern Seaboard, causing more than 100 deaths. "The storm changed my attitude about climate change," blogged New Jersey resident Chris Yuscavage, whose home survived the storm. "Next

time I might not be so lucky."

Unlike many politicians on Capitol Hill, these ordinary Americans have been forced to grapple with the impacts of climate change.

EDF scientists have been warning about global warming for decades. In fact, our 1999 report *Hot Nights in the City* predicted that a major hurricane would strike New York City and described in uncanny detail what would ensue—from subway flooding to impacts on neighborhoods like Sea Gate, NY.

A 2012 paper in *Nature* projected that climate change could lead to floods that would normally occur only once a century happening every three to 20 years. (New York has had two whopper storms—Irene and Sandy—in just two years.)

"You can't talk about climate change in the abstract," says Dr. Steven Hamburg, EDF's chief scientist. "It's about people and places. Climate change didn't cause Sandy, but it made it worse. The evidence is overwhelming that climate change is happening and that humans are

77% of Americans say global warming should be a priority for the President and Congress

largely responsible.”

Climate change has been making its presence felt from coast to coast. Yet ever since the Senate failed to pass national cap-and-trade legislation in 2010, climate has all but disappeared from the national conversation.

Hurricane Sandy changed that. The devastating storm is a powerful reminder that climate change, which fed Sandy's fury by raising sea levels and warming the ocean waters, isn't going away. Some 80% of U.S. counties have had a federally declared disaster in the last two years.

“We can't say that any one storm was caused by climate change,” says Eric Pooley, EDF senior VP and author of *The Climate War*, “just like we can't say that steroids caused any one home run by Barry Bonds. But steroids sure helped him hit more and hit them farther. Now we have weather on steroids.”

As Sandy's \$80 billion estimated price tag demonstrates, the cost of inaction is far greater than the cost of action. Cities are

considering expensive measures like sea gates and surge barriers to protect against rising seas and more powerful storms. But no amount of infrastructure hardening will ward off catastrophe if we continue pumping too much carbon dioxide into the atmosphere.

Seeds of change

In his post-election victory speech, President Obama spoke of Hurricane Sandy and tackling climate change.

The President's reelection makes it likely that the key climate initiatives of his first term, including ambitious standards for vehicle fuel economy and tough limits on power plant emissions, will remain in place. Those achievements, which EDF helped advance, are critically important but not sufficient, and going further will demand strong bipartisan support.

EDF proposes five steps the President should take in his next term (*see box at right*)—even as we continue to defend EPA's right to regulate carbon. ➤

A CLIMATE TO-DO LIST

President Obama and Congress need to recognize climate change for what it is: *the* defining environmental issue of our time. EDF proposes a five-step action plan—from ideas almost everyone can agree on to ambitious items that would require congressional action.

1 FOCUS THE NATIONAL CLIMATE CONVERSATION

that began in Sandy's wake, and help Americans connect the dots between emissions, climate change and extreme weather.

2 DEPLOY THE CLEAN AIR ACT

to impose common sense standards for climate pollution from new and existing power plants, America's biggest source of greenhouse gas emissions.

3 REDUCE POTENT GREENHOUSE GASES

such as methane from natural gas development and fluorinated gases (used in refrigerants and industry).

4 WIN THE CLEAN ENERGY RACE

by ending subsidies for fossil fuels, promoting energy efficiency and continuing production tax credits for renewable technologies.

5 REENGAGE CONGRESS

to drive meaningful carbon restrictions through flexible, cost-effective approaches such as a cap or well-designed tax.



Helen Richardson/The Denver Post

Across the West in 2012, wildfires scorched 9.1 million acres, an area larger than Massachusetts and Connecticut combined. In Colorado, 600 homes burned as the state endured its worst wildfire season in history.

One priority is to reduce CO₂ emissions, which account for most of the increased warming over the long term. But other greenhouse gases will accelerate warming in the near term, and urgently need to be cut as well. Methane, for instance, the principal component of natural gas, is 72 times worse for the climate than CO₂ over a 20-year time frame. And it leaks from wells, pipelines and equipment across the country.

Shockingly, no one knows precisely how much methane is leaking. That's why EDF and the University of Texas are partnering with nine natural gas companies to measure the leaks. Reducing leakage would quickly produce benefits for the Earth's climate.

Reaching across the aisle

The rapid, effective response to Hurricane Sandy by a Democratic president, an

“Many of the changes we are seeing—particularly melting polar ice and rising sea levels—are happening quicker than scientists expected.”

—Dr. Michael Oppenheimer



Dr. Oppenheimer was among the first to warn of the dangers of a warming planet in the 1980s. The former EDF chief scientist is now a professor of geosciences and international affairs at Princeton.



Heap of trouble: Every day New York City emits 148,000 tons of greenhouse gases. Each blue sphere represents one ton of CO₂ equivalent.

Carbon Visuals

Independent mayor of New York City (Michael Bloomberg) and the Republican governor of New Jersey (Chris Christie) showed the necessity of setting aside partisan politics in dealing with this crisis.

“I think part of learning from Hurricane Sandy is the recognition that climate change is a reality,” said Bloomberg. “It should be enough to compel all elected leaders to take immediate action.”

The stakes couldn't be higher. Globally, the number of extreme weather events is escalating, but “nowhere in the world is the rising number of natural catastrophes more evident than in North America,” according to Munich Re, a reinsurance company.

Since 1980, weather disasters in North America have increased nearly fivefold, prompting Munich Re to recommend taking into account climate risk when setting premiums.

American leadership is also required to create global solutions to this global problem. That's why EDF is working with China and other fast-growing, high-emitting nations on cutting their emissions (*see story, page 9*).

The good news is that the United States is on pace to cut carbon emissions 16% by 2020, roughly what the Obama administration has promised in international climate negotiations. Although the recession and natural gas boom were factors, California's bold

climate law (*see story, page 8*) and strong regulatory steps by EPA have also helped.

Still, more needs to be done. At this point, reasonable people may differ on the details of climate projections. But the time for fundamental disagreement on the reality of climate change is, or should be, over.

If you are 27 years old or younger, you've never experienced a colder-than-average month.

The extreme weather we are seeing today portends an even more uncertain future unless we act. All of us should be listening closely to what nature and the growing numbers of affected Americans are telling us. As Jim Shultz, a Norfolk, VA, resident whose community is threatened by sea level rise, says: “No one who has a house here is a skeptic.”

“A great many people—elected officials, civic and business leaders, journalists—have been hiding from this issue,” says EDF president Fred Krupp. “It's time for them to speak up.” The health and well-being of future generations depend on it.

> TAKE ACTION! Ask President Obama and Congress to make climate action a top priority in 2013, at edf.org/climateaction



PLAYING GOD WITH PLANET EARTH

The high-stakes gamble of geoengineering

By Gernot Wagner

If any good came of Hurricane Sandy, it was that it generated a new national conversation on climate change. The truth is, we will have to get used to ever higher sea levels and more extreme weather, including more destructive storms.

To an economist, global warming is a direct result of the “free rider” effect: All seven billion of us are contributing to global warming, but paying little or nothing toward the damage it causes. But as the obvious damage and costs from warming mount, the same economic forces that drive humanity to ignore carbon pollution will push it to deploy cheap, quick and potentially dangerous technologies aimed at directly manipulating the Earth’s temperature. Call it the “free driver” effect: fixes so cheap we can’t keep ourselves from using them.

Welcome to the Strangelovian world of geoengineering—the science of tinkering with the whole planet. It actually comes in two distinct forms. The less radical one involves taking carbon dioxide, the largest contributor to global warming, out of the atmosphere and storing it on land or in the oceans. That would be



Dr. Gernot Wagner, an EDF staff economist, is the author of *But Will the Planet Notice? How Smart Economics Can Save the World*.

expensive, \$40 to \$200 or more per ton of carbon dioxide, or trillions at global scale.

The second form is what David Keith, a leading thinker on geoengineering, calls “chemotherapy” for the planet. It’s cheap—the equivalent of just pennies per ton of CO₂—and involves reflecting some sunlight back into space. An island nation, or a billionaire losing his beach frontage to rising seas, could afford it.

One commonly discussed option is shooting sulfur particles into the upper atmosphere to shield us from incoming solar radiation. The term of art is “solar radiation management.”

But while an artificial sunscreen might well cool the Earth, it could also alter weather patterns—creating floods here, droughts there and any number of unknowable effects in between. That’s a scary prospect.

It’s also one that will soon be technologically feasible. So EDF is working with Britain’s Royal Society and the Academy of Sciences for the Developing World on a program to safely govern geoengineering research.

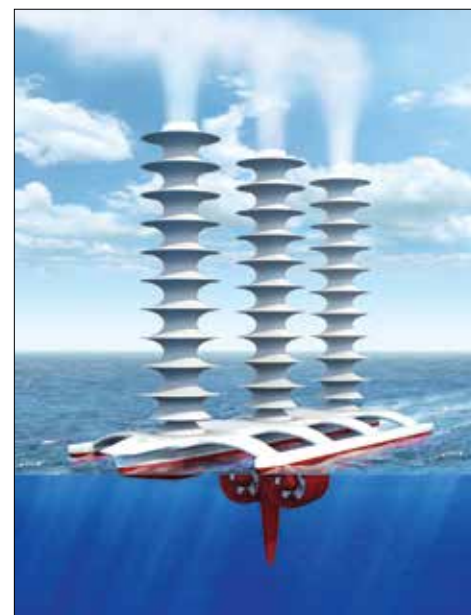
Our belief is that we need to do enough research to understand the risks, before deciding whether or not to do real world experimentation.

“If we reach a crisis point and deploy geoengineering with only a modicum of information,” says Dr. Steven Hamburg, EDF’s chief scientist, “we will be playing Russian roulette with the planet.”

The only real safety—and EDF’s strong

position—lies in tackling global warming by reducing emissions. That is beginning to happen. The European Union has capped its carbon emissions. Australia, New Zealand and South Korea are doing the same. So is California, where EDF helped pass the global warming law, AB 32. China is experimenting with regional cap-and-trade systems.

None of this is sufficient. To curb global warming, the United States must lead all the world’s biggest emitters in reducing carbon emissions. Because, remember, to an economist, the question is not if the “free driver” effect will kick in as the world warms. It’s when.



Science fiction meets climate change: One idea involves shooting reflective particles into the stratosphere to block sunlight.



CALIFORNIA'S CARBON MARKET TAKES OFF

In the Golden State, a bold plan is now a reality

Help wanted: Iron workers for solar and wind projects.

That's the message Stan Martin, a recruiter with Southern California Laborers Union #1184, delivered at a local job fair. "We're getting ready for a lot of work out here in the next ten years," he said.

In fact, job growth in California's clean-tech sector is ten times that of the state's overall economy, thanks to the landmark 2006 Global Warming Solutions Act (AB 32), which EDF co-sponsored and defended in court and at the polls. It calls

for a cap-and-trade market for greenhouse gases starting in January 2013.

"California's law is proof that cost-effective climate action is still possible on a large scale in the United States, even though Congress remains gridlocked," says Derek Walker, EDF's director of strategic climate initiatives.

AB 32 aims to cut California's greenhouse gas emissions to 1990 levels by 2020, with one-third of electricity to come from renewable sources. The cap-and-trade market alone will slash

global warming pollution by an amount equivalent to taking 3.5 million cars off the road.

The basic idea behind the new market is simple. California "caps" the amount of greenhouse gases that some 600 facilities, accounting for about 36% of the state's warming pollution, may emit, and lowers that cap every year. In 2015, transportation fuels and natural gas will also be brought under the cap, expanding the program to cover 85% of statewide pollution.

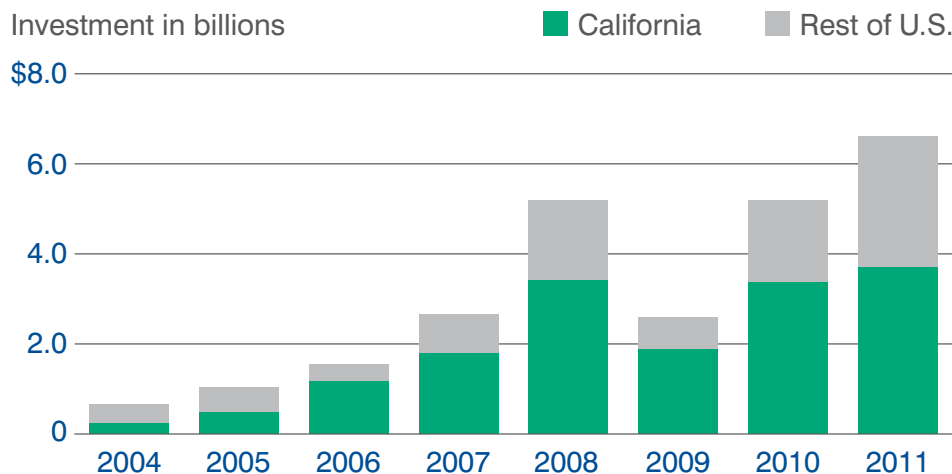
The program gives large emitters a powerful financial incentive to cut pollution. And the trading component creates a market for innovations that will help companies reduce emissions at lowest cost. The first auction for emissions allowances was executed successfully in November.

The declining cap is already helping to drive California's three biggest electric utilities to invest in "smart grid" projects, designed to enable greater use of renewable energy, energy efficiency and electric vehicles. EDF played a key role in guiding those plans in California (and also in New York, North Carolina and Texas).

As California's carbon market grows, the state's economy will only become more efficient, competitive and innovative.

And that means more "Help Wanted" signs.

INVESTING IN CLEAN TECH



Clean-tech venture capital has been surging into California since the Global Warming Solutions Act passed in 2006.

CHINA: KEY TO A GLOBAL CLIMATE SOLUTION



Peggy Jose Fuste/Alamy

“EDF emphasizes poverty alleviation, climate change and low-carbon development, which are the highest priorities for China.”

—Lin Erda, Member, Chinese People's Political Consultative Congress

The road to stabilizing the world's climate leads through China. That means capping carbon pollution—while reducing poverty among millions of farmers.

China burns half the world's coal and is the planet's largest greenhouse gas emitter. It's a linchpin to stabilizing Earth's climate.

EDF is deeply engaged in helping China solve its environmental challenges. Dr. Daniel Dudek, who heads our China program, co-chairs the task force advising the national government on how to meet its ambitious environmental goals.

More than 20 years ago, Beijing called on Dr. Dudek to participate in the country's first experiments with economic incentives for pollution control. Early successes prompted the government to include carbon trading projects in its latest five-year plan.

Laying the foundation for a carbon market

In 2012, China, with EDF's help, laid the regulatory foundation for establishing a national carbon market designed to reward industries that reduce climate pollution.

Beijing designated seven cities and regions—home to 250 million people—for pilot carbon trading, where limits must be met in 2013. The goal is to reduce carbon emissions in China's main economic regions. Shanghai, for example, will focus

on 200 large enterprises in the Yangtze River Delta.

Eventually, China plans to establish a nationwide trading system and link with other carbon markets. “We're helping lay the groundwork to make it happen,” says Dudek.

EDF's work on carbon markets also helps with poverty reduction—China's top priority. Our partner is the State Council's Poverty Alleviation Office, which has representatives in every community. Together, we've created a program where some 500,000 poor farmers in Xinjiang, Sichuan and Shaanxi provinces earn income by reducing carbon emissions, through improved agricultural practices and by turning waste into energy. Already these projects have reduced greenhouse gas emissions by more than one million tons. The goal: to enlist 20 million farm families by 2016.

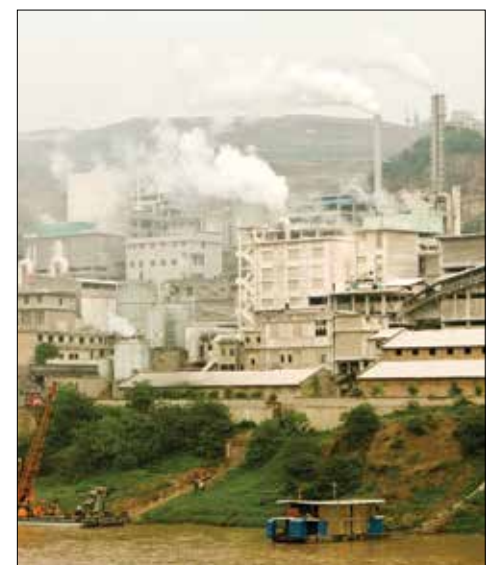
Since environmental enforcement remains weak, EDF helped Beijing devise tougher penalties for water pollution. A similar policy is now being developed for air pollution.

One of the most effective ways to drive change in China is to partner with

companies that directly influence the supply chain. EDF is amplifying these powerful levers. For example in Wuhan, the most populous city in central China, an environmental enforcement officer, frustrated by his inability to stop illegal pollution from a factory, turned to EDF for help. We showed him how to enlist a leading buyer of the factory's products in support of his campaign. The buyer demanded that the factory clean up its act.

“By finding these leverage points, we can rapidly scale change,” says Dudek.

China's environmental transformation will be implemented by a new generation of environmental leaders, many trained through a program EDF set up with China's elite universities. So far nearly 11,000 professionals have graduated from our program.



Karen Hunt/Gettyimages

With EDF's help, China is cutting carbon pollution in the heavily industrialized Yangtze River Delta.

SAVING AN ICON OF THE VANISHING PRAIRIE



USFWS

Every spring, bird lovers travel to Milnesand, NM, to watch male lesser prairie chickens perform their quirky mating dances, which include lifting their tufted feathers into headdresses that female prairie chickens apparently find irresistible.

This species, a key indicator of a healthy prairie ecosystem, once roamed large parts of the West, amid unbroken expanses of shinnery oak grassland and sagebrush. Today, the bird has lost 86% of its historic habitat. Of the one million chickens that thrived in the West in the 1800s, about 37,000 survive on patches of native scrubland in the Texas Panhandle and four neighboring states. Now, booming energy development threatens these few holdouts.

“Seeing the birds on the prairie in Milnesand and then seeing massive oil and gas wells—you realize there is no place for the chickens to go,” says Ted Toombs, EDF’s Rocky Mountain conservation director.

EDF has found a way to preserve sufficient habitat for the birds while allowing needed energy development. Called Habitat Exchanges, the idea is simple. In exchange for using poor quality habitat, say near a road, developers reimburse landowners who restore higher-quality habitat on their property. For the chickens, that means protecting native grasslands and removing fences that harm the low-flying birds.

“Prairie chickens can’t live in cropland and avoid tall structures like transmission

lines,” says David Wolfe, EDF’s Texas regional director. “They can’t live on land littered with poles and wires—so we need to preserve the integrity of the landscape.”

Last year, efforts to save the bird and other Western wildlife seemed destined to collide with the aims of energy developers. Under a court settlement, federal officials must speed up decisions for listing hundreds of species under the Endangered Species Act. The chicken is first in line for protection; a final decision is due in 2013.

“In the past, these kinds of decisions on listing resulted in years of litigation and conflict,” says David Festa, head of our wildlife program.

EDF’s Habitat Exchanges help resolve such clashes between developers and conservationists that have often left farmers and ranchers in the middle. Landowners get income and certainty they can work the land even if the bird is listed. Developers get standardized rules. And the birds get expanded habitat that’s large enough to help the species recover.

“We don’t want to just stop the bleeding,” says Festa. “We want to restore healthy populations.”

EDF pioneered such working lands agreements in 1995 with our Safe Harbor program that today covers four million acres.

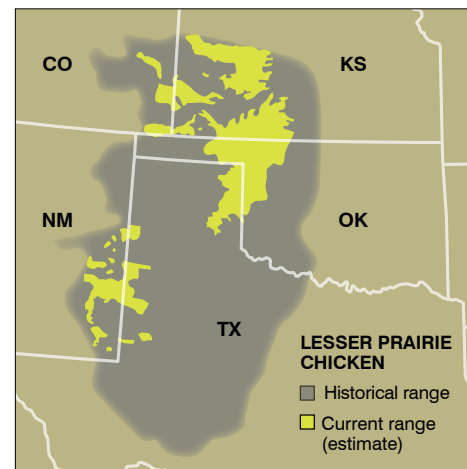
In our latest effort, we’re enlisting major oil and wind companies, farm bureaus and cattlemen’s associations.

Already, Habitat Exchanges are being used to help other rare wildlife. When the dunes sagebrush lizard threatened to stop oil development in New Mexico and Texas in 2012, ranchers and energy companies signed agreements that conserve 88% of the lizard’s habitat. This was enough, wildlife officials determined, to ensure the reptile’s recovery and keep it off the list.

In a rapidly changing West, EDF’s Habitat Exchanges preserve not just wildlife—but also another threatened species: the Western rancher.

“If we are to keep development to a minimum, we need to keep ranching as a viable industry,” says EDF partner Terry Fankhauser, a fourth-generation Colorado rancher and conservationist.

A BIRD’S SHRINKING HOME



Carol Zuber-Matillon



SPOTLIGHT ON CHEMICALS

A conversation with EDF's Sarah Vogel

Doug Kasprisin

Dr. Sarah Vogel is EDF's managing director for Environmental Health. Her new book, Is It Safe? BPA and the Struggle to Define the Risks of Chemicals, is published by the University of California Press. Dr. Vogel recently spoke with Solutions about protecting ourselves from toxic chemicals.

People worry about toxic chemicals entering their bodies. Can we avoid this?

Unfortunately, no. Certainly, there are some simple ways to reduce exposure to potentially toxic chemicals. Like reading labels. But not every chemical is disclosed on product packaging.

The truth is, if you start trying to fix all these problems as an individual consumer, you'll quickly drive yourself mad. And it shouldn't be the responsibility of the consumer to decode labels or test products. The solution needs to be bigger.



FROM MOTHER TO CHILD

99% of pregnant women in the U.S. have flame-retardant chemicals called polybrominated diphenyl ethers in their blood. These chemicals can cause decreased IQ, memory deficits and hyperactivity in children.

We need to demand more—demand information, demand responsibility from retailers. And insist that federal agencies be given authority to make decisions before potentially hazardous chemicals end up in products on the store shelves.

At EDF we believe the emerging science about the links between exposure and disease is key to these solutions. Scientists are now able to look at our blood and tissues and detect synthetic chemicals at lower and lower levels.

This raises a lot of questions. Industry might say, "Just because it's in your body doesn't mean it's a risk." An individual might answer, "Well, you better *show* me that, because it's in my body, and I never gave my consent."

In the last 10–15 years we've learned that people everywhere are being exposed to hundreds of synthetic chemicals—most of which were not around three generations ago. Some potentially toxic chemicals—like BPA and flame retardants—are found in more than 90% of those tested! These chemicals are in the products we use everyday in the home. Flame retardants are in couches and pillows, for example. So nearly everyone is being exposed.

What are your priorities?

We must focus on protecting the vulnerable. I am very concerned about prenatal exposure because small amounts of a chemical can have a big effect at

that crucial early stage of development. Exposure to chemicals then can result in diseases later in life. Many of these—including diabetes, obesity, infertility, breast cancer and behavioral disorders—are on the rise in the United States and around the world. All of these have seen a rapid rise in the past 10–15 years. We know the increase in these diseases can't be explained by our genes alone. So exposure to chemicals—chemicals not around in our grandparent's generation—is definitely a prime suspect.

How is EDF helping the public?

In a nutshell, EDF's health program is looking to get hazardous chemicals off the market and to promote safer substitutes to protect health.

We're supporting market incentives that encourage innovation. With retailers, that means setting ambitious goals to reduce dangerous chemicals and demanding safer products from suppliers. We also work to strengthen current regulations and reform federal law to require chemicals to be tested before they come onto the market. This isn't the case today. Currently, individuals and businesses are the gatekeepers for determining the safety of chemicals. This isn't an effective system—it doesn't promote safer innovations or protect the public's health. We need to change it.

For over a decade EDF has worked to reform the outdated Toxic Substances Control Act (TSCA). This law hasn't been updated for 36 years! In 2012 the Senate finally took up the Safe Chemicals Act, which seeks to reform TSCA. We have great hopes for advancing this reform in the next congressional session.

So what can individuals do?

EDF members can demand that companies look for safer substitutes and redesign their products. And they can demand passage of the Safe Chemicals Act. Finally, they can join two excellent coalitions with whom EDF has worked on these issues for years.

> Safer Chemicals Healthy Families coalition at saferchemicals.org

> Moms Clean Air Force at momscleanairforce.org



Cam Riley

THE REVOLUTIONARY PLOT

Maintaining Jefferson's garden—and yours—in the age of climate change

Thomas Jefferson, author of the Declaration of Independence and America's third president, was also a passionate gardener. "No occupation is so delightful to me as the culture of the earth," he said, "and no culture comparable to that of the garden."

At Monticello, Jefferson's specially designed garden was lovingly restored to its 1812 glory and tended for more than 30 years by master gardener Peter Hatch. Unfortunately, as Hatch makes clear in his new memoir, *A Rich Spot of Earth*, Jefferson's "revolutionary garden" is no longer what it used to be.

Climate change has made it difficult to grow the plants that thrived in Jefferson's time. In a conversation with gardener and EDF writer Dominique Browning, Hatch reveals that many of the summer vegetables Jefferson loved—including beans and squash, cucumbers, artichokes, cabbages and leafy greens—must now be planted in April to avoid Virginia's increasingly hot summers. In addition, Hatch has had to fight "diseases and pests and new weeds that weren't around when I first started at Monticello." These intruders from the south have quirky names like silver goose and Johnson grass, harlequin bugs and thrips. But to a gardener they're no joke.

The new challenges aren't limited to

gardens. Climate change means massive disruptions for tree lovers too. Hatch worries that many historically important trees once dominant in Virginia are in trouble. Hemlocks are under attack from a non-native insect; white pines and other conifers that prefer cooler winters are shifting northward. Diseases and pests are causing sugar maples, ash trees and even oaks to disappear. And, perhaps most upsetting, Virginia's state tree, the flowering dogwood, is growing scarcer.

No matter where you live, you may find, like Peter Hatch at Monticello, that your garden is in a new growing zone, with all new rules for survival. It may seem you can do little about global warming as an

individual, but there are concrete actions you can take to help your garden, and minimize your impact on the planet. Here are a few:

Limit your use of gasoline-powered tools like leaf blowers and lawn mowers.

Each gallon of gasoline you burn puts 20 pounds of CO₂ into the atmosphere.

Avoid synthetic fertilizers, especially those that are nitrogen-based. Their manufacture produces large amounts of global warming pollution.

Have your soil analyzed every three years to avoid overusing fertilizer. It can be done inexpensively through your Cooperative Extension office.

Choose organic weed control and pesticides. Chemical pesticides and weed killers add to global warming pollution and can be harmful to other plants and wildlife.

Rotate every four years to reduce the risk of crop-specific pests and diseases.

Never leave your soil naked. Use cover crops to keep carbon in the soil.

Compost food scraps, leaves and other yard waste and use in your garden.

Plant native species. Native plants are better suited to local conditions and can help wildlife and pollinators thrive.

FRESH FROM THE FIELD

• ***A Rich Spot of Earth: Thomas Jefferson's Revolutionary Garden at Monticello*** by Peter J. Hatch, Yale University Press, 2012, \$35.

• **Union of Concerned Scientists**
The Climate-Friendly Gardener: A Guide to Combating Global Warming from the Ground Up, at ucsusa.org/food_and_agriculture/what_you_can_do/the-climate-friendly-gardener.html

• **The National Gardening Association**
See at a glance which of 11 U.S. "hardiness zones" your garden falls into, at garden.org/zipzone

• **EPA** information on likely climate impacts, sorted by region, at epa.gov/climatechange/impacts-adaptation

• **Cooperative Extension offices**
Find one near you, at csrees.usda.gov/Extension

A NEW CROP OF GREEN BUSINESS LEADERS

Michelle de Arruda's commitment to the environment began with the ominous object she saw in a Ukrainian grocery store. Hanging from the wall was a Geiger counter, used to measure radiation on the store's produce from the Chernobyl nuclear accident.

"It made me mad to see how human neglect can so dramatically affect people's lives," she says.

Michelle was one of 97 EDF Climate Corps fellows for the summer of 2012. Climate Corps pairs graduate students with organizations around the country looking to use energy more efficiently. Embedded at their assigned companies, public institutions and nonprofits, the fellows look for energy savings.

Since the program's start in 2008, Climate Corps fellows have identified more than \$1.2 billion in energy savings—enough to power 150,000 homes.

This year's fellows went to 87 host organizations, including companies like Verizon, Fidelity Investments and Volvo, among many others. Fellows also found savings at public institutions like the New York City Housing Authority.

In addition, EDF Climate Corps alumni are on track to become the green business leaders of tomorrow. More than three-quarters of them now influence sustainability decisions at the organizations where they work.



MICHELLE DE ARRUDA

HOME: São Paulo, Brazil

AGE: 32

EDUCATION: MBA Candidate, University of VA

LAST ACCOMPLISHMENT: As a 2012 Climate Corps fellow, Michelle spent the summer at UNICEF in New York, where she found energy savings in lighting and computer power management. UNICEF is moving ahead with Michelle's recommended projects, which could prevent at least 650 tons of carbon emissions annually, equal to 27,000 propane cylinders used for backyard gas grills.

"My career goal can be described in two words: to matter."



ANI KRISHNAN

HOME: Abu Dhabi, United Arab Emirates

AGE: 25

EDUCATION: Candidate for MS, University of TX

LAST ACCOMPLISHMENT: As a 2012 Climate Corps fellow with the City of Dallas, Ani found 8,000 computers operating without power management software. Putting the computers to sleep at night could save Dallas \$170,000 per year. That will also prevent carbon emissions equal to the amount produced annually by 27 tanker trucks of gasoline. The city is already implementing his recommendations.

"If you're paying attention, it's so easy to save energy."



JASON KLEIN

HOME: Los Angeles, California

AGE: 30

EDUCATION: MBA candidate, UC, Davis

LAST ACCOMPLISHMENT: After college, Jason Klein developed a successful iPhone app that helps drivers stay within speed limits. That entrepreneurial background made him a perfect fit for EDF's Climate Corps program. Working at Verizon Communications' headquarters, he discovered that airflow in the massive data center was not cooling the energy-hungry computer servers efficiently. His recommendations could cut cooling costs by one-third.

"A career centered on finance and energy efficiency falls in my sweet spot."

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To learn more:
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Email legacy@edf.org



Scrubbing the soot from New York City's air

Three years ago, EDF began a campaign to rid New York City of dirty No. 6 and No. 4 heating oils. Just 1% of the city's buildings burn these fuels—which are basically unrefined sludge—but

they spew more particulate matter, or soot, into the air than all the city's cars and trucks combined. The result: 120 preventable deaths each year and millions of dollars in health care costs.



In New York, EDF is helping get rid of dirty fuel oil, a major threat to children's health.

In 2011, our campaign, which included an interactive online map showing 9,500 city buildings that burn dirty oil, helped convince Mayor Michael Bloomberg to create a Clean Heat partnership between his administration and EDF. The partnership is dedicated to converting buildings from dirty oil.

The administration issued rules that will phase out No. 6 oil by 2015 and No. 4 oil by 2030 and announced more than \$100 million in mostly private financing to help buildings convert to cleaner fuels. The impact on asthma, heart disease and other illnesses could be “second only to our achievements in reducing the city's smoking rates,” said Dr. Thomas Farley, the city's health commissioner.

Thanks to NYC Clean Heat, more than 1,100 buildings already have converted and hundreds more are on track to do so in 2013. They include 257 Park Avenue South, home to EDF's national headquarters.

In settlement, BP agrees to pay up for Gulf oil disaster

Nearly three years after BP's Deepwater Horizon oil rig exploded in the Gulf of Mexico, the oil company agreed to a \$4.5 billion settlement with the Justice Department. Most of that amount is for criminal fines—the largest ever in a criminal case.

More than \$2 billion of the settlement will go toward restoring the Gulf, with \$1.2 billion helping to rebuild the Mississippi River Delta, in part through river diversions. EDF and local scientists demonstrated how harnessing the power of the sediment-rich Mississippi could rebuild vanishing wetlands, which buffer storms and nurture fish and birds.

Now we must ensure that BP is held



Louisiana's fragile wetlands get a boost.

fully liable for penalties under civil law, which could run as high as \$21 billion.

This could be crucial to bringing the Gulf coast back to health, since the RESTORE Act, which EDF helped pass in Congress, directs 80% of the civil fines toward Gulf restoration.

Court fight for clean air

Last August, a divided panel of judges on the United States Court of Appeals for the District of Columbia threw out EPA's Cross State Air Pollution Rule.

The rule is designed to limit air pollution from power plants that drifts across state borders. That pollution, mainly sulfur dioxide and nitrogen oxides, contributes to dangerous levels of particulate and smog pollution in many Eastern states.

EPA estimates the rule will annually save up to 34,000 lives and prevent 400,000 asthma attacks, while providing as much as \$280 billion in annual health benefits.

EDF and allies have filed a petition for a rehearing by the full court.

“This rule has been years in the making,” said EDF general counsel Vickie Patton. “We're committed to securing these lifesaving clean air protections.”

Avoiding otter chaos

Healthy ecosystems are exquisitely balanced and easily thrown out of whack.

Consider California's sea otters: They eat sea urchins, holding their numbers in check. That helps keep kelp (a favorite urchin snack) abundant enough to provide food and shelter for fish and invertebrates.



Gary Ellis/Minden Pictures

Sea otters and kelp: Sign of a healthy ecosystem.

If the otter population falls too far, that could set in motion a chain reaction of species decline.

EDF, UC-Santa Barbara and NOAA recently began a collaboration to devise early warning indicators and management tools that will allow regulators to protect

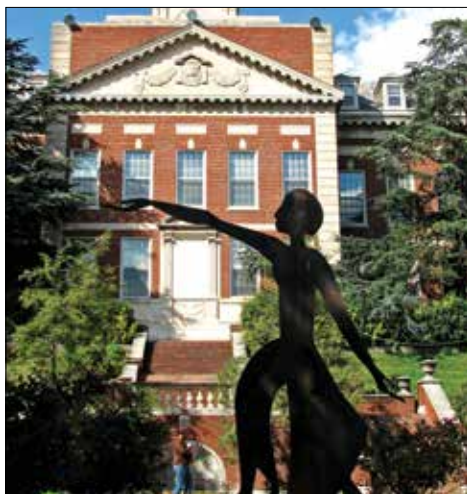
whole ecosystems by showing how key species like sea otters keep the ecosystems healthy and resilient.

"It turns out that human activities like fishing and pollution can push ocean ecosystems past thresholds, causing them to degrade suddenly," says EDF scientist Dr. Rod Fujita.

The project could aid the roughly 2,800 sea otters living in

EDF and Howard University put sustainability in the curriculum

EDF and Howard University, the historically black institution in Washington, DC, have established a partnership to give Howard students access to environmental education and careers. EDF, for its part, will gain access to



T.D. Ford

EDF created a fellowship for Howard students.

a pool of outstanding young people from a premier university.

As part of the partnership, EDF has established yearlong fellowship and internship positions for Howard students. Je'nique Harewood, a native of Trinidad and Tobago and a graduate of Howard's School of Business, was the first intern selected. She worked in EDF's Oceans program.

"For a year, I've worked with highly skilled people while pursuing challenging work," says Harewood. "It's been a great experience."

EDF is also working with Howard to integrate sustainability into the curriculum of its business school.

"Sustainability is a fast-growing career opportunity path in the country today," says Alfonzye Chisholm, director of Howard's Office of Sustainability. "We want to make sure that the sustainability movement is inclusive of all people of color."

California waters.

The population, which once numbered some 15,000 before being decimated by the fur trade in the early 1900s, descends from a single surviving colony off Big Sur.

Stars urge climate action

Actress Julianne Moore has taped a powerful new video for Moms Clean Air Force (MCAF), an EDF project founded to encourage "naptime activism" on the environment. MCAF members are spearheaded by a nationwide community of energetic bloggers from across the political spectrum.

"Too many politicians are only adding hot air," Moore says in her video. "Please tell Washington, we must have a plan for a clean energy future, an end to global warming."

Boxer Laila Ali and actresses Blythe Danner and Christina Applegate are among the other celebrities to make MCAF videos. Last summer, MCAF members helped defeat a bill that would have killed EPA's new rule that limits toxic mercury emissions. More than 50,000 members sent messages to the Senate.

➤ To join MCAF and make your voice heard, go to momscleanairforce.org



Dominique Browning

Actress Julianne Moore: Another mom fighting to stop climate change.

SMALL BOATS, BIG IMPACTS

1 billion people depend on fish for their protein, but **30%** of world fisheries are overexploited and **57%** are on the brink.

Overfishing is usually associated with factory ships on the open ocean. But nearly half the fish that people eat around the world are caught by some 45 million fishermen operating small boats just miles offshore. Many of these subsistence fisheries are unmanaged and in serious trouble.

EDF is working to stop local overfishing by giving fishermen incentives to conserve. In partnership with RARE, a global leader in community-led conservation, we plan to tackle near-shore overfishing in top fishing nations such as Indonesia and the Philippines. Our initiative, called Fish Forever, will use grassroots activism to engage fishermen. The goal: sustainable fisheries that benefit millions of people.

FIRST SUCCESS: BELIZE

In Belize, lobster and queen conch fisheries are in severe decline. EDF teamed up with local partners and introduced catch shares. Fishermen were granted exclusive access to fish in designated areas, giving them an incentive to conserve the fishery. One year later, illegal fishing is down and the government has asked EDF to help expand the program.

The project is helping preserve the largest barrier reef in the Western Hemisphere and could be a model for small-scale fisheries around the world.

