

Catalyst

Volume 22, Summer 2022

How to Fight Disinformation

A science-based guide

Wildfires Threaten Drinking Water

North Korea's Nuclear Weapons

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The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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Gratitude and Stubborn Optimism



As I reflect on my first year at the Union of Concerned Scientists, my overriding emotion is gratitude—to our dedicated staff, to our board of directors and National Advisory Board, and to our many members and supporters. Thank you for your enduring commitment to science in service of people and our planet, and for shouldering your part of our work together.

Recent research by Dr. Dorceta Taylor at Yale University shows that just 8 percent of the 2,700 US environmental organizations are led by people of color. As the only BIPOC female leader of any Big Green, I register the responsibility of my role every day—especially the responsibility to center solutions that create more just and equitable outcomes for people of all races and incomes, now, and for future generations.

In the past years, we have seen many challenges: a tidal wave of disinformation across issues of science and democracy, increased partisan divisions, to say nothing of the war in Ukraine, cascading climate impacts, the ongoing pandemic, and economic upheaval. And this summer, just when we felt we were approaching our breaking point, the Supreme Court ruled to limit the Environmental Protection Agency's ability to set standards to reduce carbon emissions from power plants—impeding its efforts to address climate change. This troubling ruling results in a challenging contradiction: the agency that the court has recognized is tasked with the obligation to act has been significantly curtailed in its courses of action.

But UCS isn't giving up. The ruling doesn't strip the EPA of all regulatory power, and we'll double down on the avenues still available to us—for just one example, vehicle emissions standards. We've been at the center of some of the biggest policy fights in generations, and we're going to carry the lessons we learned forward. I couldn't be prouder of the contributions we've made, particularly at the state level.

For example, a recent report by our Climate and Energy team modeled how 26 states can meet 100 percent of their electricity needs through renewables as soon as 2035, reaping enormous benefits for public health and their economies.

(continued on p. 20)

WHAT OUR SUPPORTERS ARE SAYING

Here's a sampling of recent feedback from the UCS Facebook page (www.facebook.com/unionofconcernedscientists) and Twitter feed (www.twitter.com/ucsusa). Find us also on Instagram (www.instagram.com/unionofconcernedscientists).

ON THE UNITED STATES SURPASSING 1 MILLION DEATHS FROM COVID-19

 @kbjurgens:
A collusion of disinformation amounting to malfeasance.

 Pàdraig Mac Gheangaich:
We should have panels of scientists and other relevant experts with the authority to overrule politicians on matters of expertise. If we leave it up to politicians, they'll just insist everything is opinion and ignore science, and the public will suffer the consequences.

ON HOW TO SPOT AND STOP DISINFORMATION (SEE P. 8)

 Marilyn B. Saul:
I'm quietly notorious for not commenting on posts from many of my Facebook friends because of the issues you stated.

 Algy Goosen:
We should be teaching kids the basics of critical thinking throughout their [school] curriculum. They should feel free and open to question everything they learn about, including from their teachers and their parents.

 Jen Fries:
People forget that the algorithms don't actually read our posts. They don't know if we are denouncing something as disinformation. They only detect that it is getting shares and clicks. That is what causes them to get higher visibility and causes more content like it to be promoted as well.

ON UCS ANALYSIS DETAILING HOW STATES CAN MEET 100 PERCENT OF THEIR ENERGY NEEDS FROM RENEWABLE RESOURCES BY 2035

 @jheartney:
2035 is a pretty modest goal, TBH. Lots of places will meet it no matter what, just because renewables are cheaper.

 @rebelthriver75:
This is brilliant. Easily explainable data that we can use in our everyday conversations.

 Len Kralik:
We need to DRASTICALLY reduce our energy consumption. We cannot just build more production whilst increasing our usage. We will never catch up.

ON 2021 BEING THE BEST YEAR YET FOR SOLAR POWER INSTALLATIONS (SEE P. 7)

 Hana Packard:
I wish more people would understand and support that green sustainable tech is the real long-term innovation for the environment and humankind. Not short-term tech that causes environmental, societal, and ethical issues.

 Erik Hamilton:
That looks like independence to me and likely to almost any homesteader, too! Sadly, a certain class of politicians and oligarchs are desperately opposed to individuals being energy independent in a sustainable manner.



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Using science to defend against this growing threat

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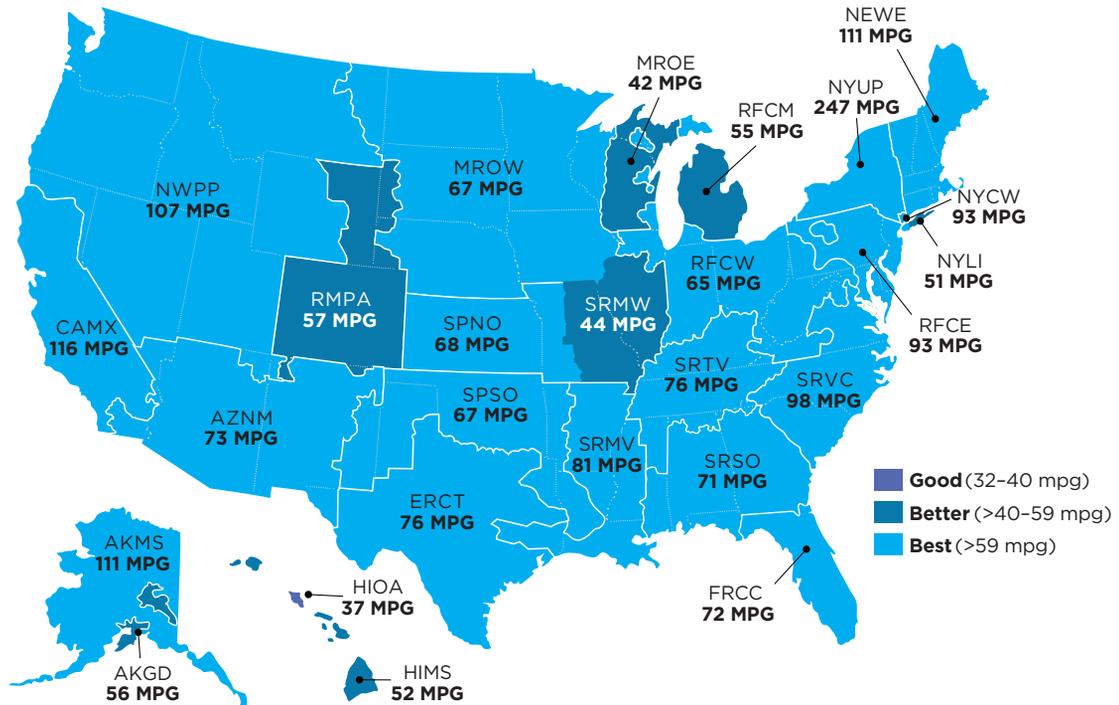
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From Coast to Coast, EVs Are Getting Even Cleaner



Driving the average new electric vehicle produces as much global warming emissions as a gasoline vehicle with a fuel economy rating of 91 miles per gallon—far surpassing even the most fuel-efficient gasoline cars on the market today. (Acronyms refer to electricity grid regions.)

Electric vehicles (EVs) cost less to operate and maintain than gasoline vehicles and have low or no tailpipe emissions. But given their large batteries and the emissions associated with electricity generation, people often ask if EVs are indeed a climate-friendly choice. The answer, according to the new Union of Concerned Scientists report *Driving Cleaner*, is a resounding “yes!”

Driving Cleaner is UCS’s third investigation of vehicles’ “life cycle” emissions (that is, all the emissions from the materials and electricity used to make the vehicle, the energy used to power it, and the disposal or recycling of materials after its retirement). All three analyses found that

everywhere in the United States—even in regions with fossil fuel-heavy electricity generation—the average new fully electric car results in lower global warming emissions over its lifetime than a comparable gasoline-powered car.

But, because today’s electricity grid is much cleaner than it was 10 years ago, *Driving Cleaner’s* findings illustrate impressive gains. For example, *more than 90 percent* of people in the United States today live in areas where driving the average EV produces lower emissions than the most fuel-efficient gasoline car on the market—compared with less than half of drivers in 2012. Driving a new electric

pickup truck—which was not even an option for drivers until the past year—produces emissions equivalent to a 76 mpg gasoline version. As the report notes, these gains are sure to increase further as more fossil fuel-based electricity generation is replaced by wind and solar power.

To speed these additional climate benefits and to encourage more drivers to choose electric vehicles, the report recommends bringing even more renewable energy onto the grid, developing robust battery recycling programs to help reduce manufacturing impacts, and making EVs more accessible and affordable.

The report is being released at a time when gas

prices are at or near all-time highs and climate change is affecting communities across the country. As report author David Reichmuth notes, “Passenger cars and trucks are one of the largest sources of US global warming emissions. Shifting away from gasoline vehicles is one of the biggest ways in which individuals can make a difference in fighting global warming, so we need policy changes and investments to make buying and using EVs easier for everyone in the United States.”

Read our analysis at www.ucsusa.org/resources/driving-cleaner, and enter your zip code at www.ucsusa.org/EVtool to see how different types of vehicles stack up in your area.

UCS Expert Recognized for Beltway Clout

The May issue of *Washingtonian* magazine named Rachel Cleetus, acting deputy director of the UCS Climate and Energy Program, as one of Washington, DC's 15 most influential people in the "climate and environment" category—part of the magazine's broader coverage of the 500 most influential people in the nation's capital. The piece cited Cleetus's powerful testimony before Congress explaining why more laws are needed to force fossil fuel companies to disclose the climate risks of their actions.



During a congressional hearing last year, Rachel Cleetus presented testimony about the importance of addressing climate change in order to make our nation's financial systems more resilient.

"We sought out smart, innovative people who care about issues and spend a lot of time thinking about them,"

the magazine's editors wrote in explaining their criteria. "They have deep subject-matter expertise and signifi-

cant understanding of how DC works, with the goal of getting action. And yes, they're all wonks in one way or another."



Women Making History

On March 29, UCS President Johanna Chao Kreilick joined Vice President Kamala Harris at the vice president's residence in Washington, DC, for an event to commemorate Women's History Month. Chao Kreilick, who joined UCS last year (see p. 2) and has worked on climate and justice issues for more than 30 years, was one of more than 200 women leaders from across the country who were invited to attend this special event.

Advocating for More Inclusive Federal Advisory Committees

One year ago, President Biden's "Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking" ordered federal agencies to review and analyze the practices and membership of their science advisory committees. This spring, UCS organized a sign-on letter endorsed by 10 scientific, professional, and academic organizations, asking 24 science agencies about their progress toward more inclusive science advice.

So far, the Environmental Protection Agency appears to have made the most significant effort to make its science committees more diverse. The agency issued press releases last summer noting that it had staffed both its Clean Air Scientific Advisory Committee and Science Advisory Board with the largest number of women and people of color in the committees' histories.

But much more work is needed to ensure that practices instituted now will last through future administrations. UCS is continuing to work with the scientific, professional, and academic communities, with federal agencies, and with the White House Office of Science and Technology Policy to ensure that this charge is taken seriously and that underrepresented scientists have a seat at the table. The full text of the letter is available at <https://bit.ly/3H4VjPH>.

Helping Workers Survive “Danger Season”

At UCS, summer isn't just summer anymore. We think of it as “Danger Season.” Our climate scientists coined this term to emphasize the connection between climate change and the risks that summer now routinely poses: extreme heat, severe drought, out-of-control wildfires, and intensifying storms.

Danger Season may seem like a simple enough concept: a threat to everyone from those breathing wild-fire smoke to those wading

through hurricane floodwaters. But with these climate impacts colliding and cascading, UCS scientists aim to help people in the United States understand who is at greatest risk, and how to adequately prepare each year. This includes negotiating for greater investment in a just and resilient future during the federal budgeting process—which happens to occur during Danger Season.

And while the dangers may be limited to the summer

months, the impacts can be felt for years, particularly by those displaced by wildfires (see p. 14) and hurricanes. Likewise, our preparations for Danger Season must be proactive and sustained year-round, particularly by promoting clean energy policies and helping working-class communities and communities of color become more resilient and energy independent. These concerns drove UCS staff to work with a coalition of grassroots partners in Oregon to support the passage

of what could be the nation's strongest rules for protecting outdoor and indoor workers from extreme heat and wild-fire smoke.

UCS submitted written testimony drafted by Principal Climate Scientist Kristy Dahl to Oregon's Occupational Health and Safety Administration supporting adoption of the rules, and in a major win for the team—and for Oregon's workers—the rules were adopted this spring. Employers in the state will now be required to protect their workers from hazardous conditions that are becoming increasingly more common.

At the federal level, because of recent UCS research on the effects of extreme heat on outdoor workers, the national Occupational Safety and Health Administration (OSHA) invited several UCS scientists to attend an event in Philadelphia this spring with Vice President Kamala Harris and Labor Secretary Marty Walsh. At the event, Vice President Harris, citing UCS research in her remarks, announced a new OSHA initiative to protect workers in high-risk occupations. The agency will conduct workplace heat inspections nationwide, beginning with the more than 70 industries where workers are most exposed to extreme heat.

With your help, UCS will keep pushing for equitable, effective policies that help people build resilience in the face of Danger Season.

WHILE THE DANGERS MAY BE LIMITED TO THE SUMMER MONTHS, THE IMPACTS CAN BE FELT FOR YEARS, PARTICULARLY BY THOSE DISPLACED BY **WILDFIRES AND HURRICANES.**



Solar Energy Installations Expand Nationwide



According to analysts at Wood Mackenzie and the Solar Energy Industries Association, the US solar industry installed some 23.6 gigawatts (23.6 million kilowatts) of generating capacity in 2021—making last

year solar energy's biggest year of growth yet in the United States. For the third year in a row, solar represented the biggest source of new US electric generating capacity, accounting for nearly

half (46 percent) of all new capacity built last year.

Also noteworthy: big increases in the number of solar installations in 2021 occurred in blue and red states alike. Texas accounted for the most new solar capacity overall, installing 77 percent more in 2021 than it had the year before, and more than four times as much as in 2019. Equally notable were dramatic increases in Illinois, Indiana, and Virginia.

These numbers are especially impressive considering lingering uncertainty around federal and state policies that provide incentives for solar, and that global supply and demand issues drove solar installation prices higher in 2021.

UCS Helps Move Clean Trucks Forward

The state of Connecticut joined a growing number of states—including Massachusetts, New Jersey, and New York—in passing legislation that will speed the adoption of electric medium- and heavy-duty trucks. The rules were initially pioneered in California, where UCS played a central role in turning them into law. Then, along with coalition partners and members of the UCS Science Network, we worked hard to build support for their passage in these additional states. The legislation will reduce global warming emissions and deliver cleaner air by speeding the deployment of electric trucks and slashing pollution from diesel trucks now on the roads.

In a related effort, UCS continues to work toward national truck emissions standards, most recently by mobilizing staff and Science Network members to attend and testify at Environmental Protection Agency (EPA) hearings on the issue. UCS Senior Vehicles Analysts Dave Cooke and Sam Wilson testified on the importance of stringent emissions limits, and UCS and our partners mobilized so many people to testify that the EPA had to extend the scheduled two-day hearings to a third day.

Documentary Details Exxon's Climate Deception

Black Gold, a hard-hitting, three-part documentary now available on the Paramount+ streaming service, presents an in-depth look at the devastating scope and impact of ExxonMobil's climate deception campaign—and the work UCS conducted over the past 15 years to expose it. In the second episode, UCS Editorial Director Seth Shulman discusses his work on the 2007 UCS report *Smoke, Mirrors, and Hot Air*, one of the first to reveal ExxonMobil's intentional climate disinformation campaign. The filmmakers also make good use of the internal documents UCS released along with our 2015 report *The Climate Deception Dossiers*.

The documentary's final episode touches on the growing number of lawsuits against ExxonMobil and other fossil fuel companies, as well as corporate shareholder efforts to hold these companies accountable for their role in causing—and knowingly deceiving the public



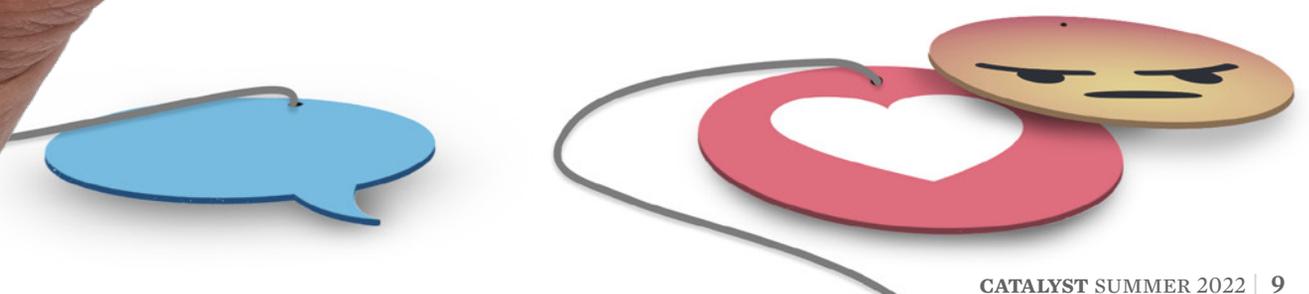
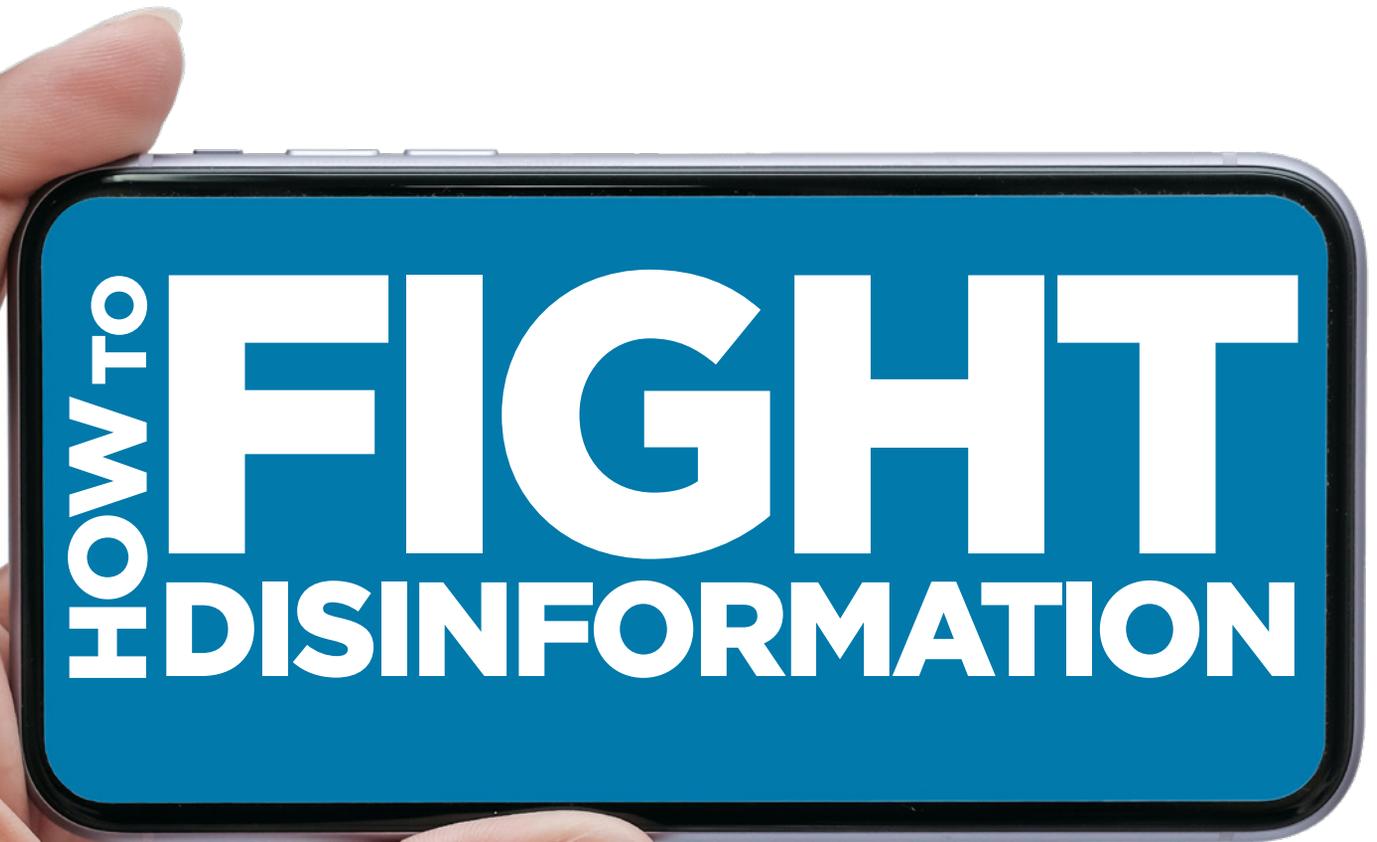
In this still from the documentary *Black Gold*, UCS Editorial Director Seth Shulman discusses his investigation of ExxonMobil's practices.

about—our climate crisis. The trailer for *Black Gold* is available at <https://www.youtube.com/watch?v=f4jYzVKxzPA>.



UCS has been exposing disinformation and the forces behind it since 2004; now we're arming the public to defend themselves from this insidious threat.

BY BRYAN WADSWORTH



The road that led Sophia Marjanovic to her role as bilingual senior organizer with the Center for Science and Democracy at the Union of Concerned Scientists was neither straight nor easy. But what has guided her consistently from an early age is a search for justice—using science to hold people with power accountable for their misdeeds.

Her search began on the Fort Peck Reservation in Montana, where she expected that science could help her community stand up to the oil companies that had been despoiling the landscape for generations. “The top killer of women in our community is cancer,” she says. “Babies were being born blue, and the children were all sickly. Since I saw no one doing anything about it, I figured it’s up to me to get educated to try and document what’s happening.”

After completing her PhD in immunology and microbiology, Marjanovic learned how to lobby legislators and worked on multiple political campaigns, where she witnessed the growing influence of disinformation, including Russian meddling as early as 2009. In the 2020 election for Georgia’s US Senate seats, Sophia witnessed the disinformation growing more ominous: “There were threats,” she says. “People were being told that they were going to go to jail if they voted for two Democrats.”

Now, at UCS, Marjanovic is working with journalists, community organizers, and data scientists to show how disinformation on a wide range of issues—climate change, the government’s COVID-19 response, voting rights, racial justice—can be traced back to a relatively small network of bad actors working to further the interests of fossil fuel companies, far-right politicians, and others, including Vladimir Putin.

A GROWING THREAT—AND A GROWING RESPONSE

Russia’s president has justified his invasion of Ukraine by telling his people that Ukraine’s leaders—including Volodymyr Zelenskyy, who is Jewish—are Nazis. A former US president has convinced millions of voters that the 2020 election was rigged, and that changes are needed to make it easier to overturn elections. When disinformation like this distorts the thinking of large numbers of people, it’s easy to see how democracy, our environment, and even global security are threatened.

UCS has been monitoring and exposing purveyors of disinformation ever since our 2004 report *Scientific Integrity in Policymaking* revealed a pattern within the George W. Bush administration of suppressing or misrepresenting scientific findings that didn’t align with the White House’s ideological goals. The findings of that report and the outcry that followed identified a need that few people knew existed at the time, and led to the creation of the Center for Science and Democracy at UCS. As an independent watchdog, the Center works to ensure government policymaking is informed by the best available science—a role that has become even more important

in recent years as the scope of disinformation has grown.

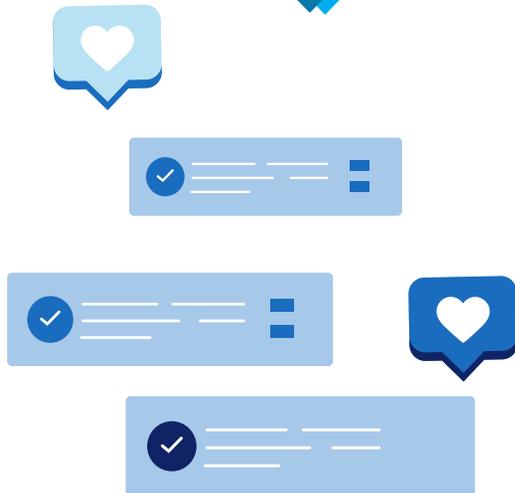
The expertise we have built up in the Center offers a perspective that almost no other organization can provide. We have surveyed federal scientists about political interference in their work. We have built a network of more than 20,000 scientists willing to advocate in defense of their colleagues and science itself. We have documented the disinformation tactics used by corporations in multiple industries. We have connected the dots between groups that spread disinformation about climate science and the fossil fuel companies that fund their work. And we have provided the scientific underpinning for legal cases that seek to hold these companies liable for deceiving shareholders and the public about the damage they knew their products were causing.

Now UCS is training both scientists and pro-science activists how to recognize disinformation, and how to push back against it.

EVEN DISINFORMATION HAS A BASIS IN SCIENCE

The goals of disinformation (false information that bad actors intentionally create and share) are to distract people from the truth, to drive a wedge between people so they don’t unite in opposition, and to make people feel powerless and disengaged from the process by which important decisions are made—decisions that have a direct impact on people’s well-being. This allows those who spread disinformation to keep profiting from business as usual, and to shape political leadership and institutions that will support the status quo.

Because of a phenomenon called the illusory truth effect, the more times information is repeated, even if it is a lie, the more likely it becomes that people will accept it as truth, even when it is being disputed.



As communications strategist Sabrina Joy Stevens, founder of consulting firm Sabijoy Creative Solutions, explains, purveyors of disinformation turn our basic instincts against ourselves. Humans are “wired to overfocus on things that could be potentially threatening,” she says, so when we see or hear an outrageously false statement, “we really want so badly to correct misperceptions.” This instinct could have contributed to the trend observed in a 2018 study published in *Science* whereby, on Twitter alone, lies were 70 percent more likely to be retweeted than true stories, and those lies routinely reached 10 times as many people as the truth—in some cases, 100 times as many.

Sharing disinformation on social media, even in an attempt to debunk it, is not just a mistake—it’s what the forces behind the disinformation want. Because of a phenomenon called the illusory truth effect, the more times information is repeated, even if it is a lie, the more likely it becomes that people will accept it as truth, even when it is being disputed. This effect is magnified by social media algorithms that record everything we click on, everything we share, and then give us more of the same information with which we interact. In other words, according to Stevens, “Every single action you take is a vote for what you and your whole network is going to see more of.”

Furthermore, given how much disinformation is already out in the world, just presenting someone with the facts is unlikely to change their mind if their worldview or sense of self does not align with yours. The facts need to be put in a context that makes sense based on what that person values. “The context matters in some cases more than the actual substance of the issue,” Stevens says. “You want to make sure that things are packaged in the form of a story because that’s how our brains retain information.” (See the sidebar on p. 21 for more tips.)

STOPPING DISINFORMATION STARTS WITH RECOGNIZING IT

Consider the source of a controversial claim—if it’s difficult to determine where the information originated, or the source has something to gain financially or politically by sharing it, that should raise suspicion. So too if the claim involves conspiratorial thinking, scapegoats a particular group, or fails to cite anyone with expertise on the subject.

Conversely, more credible information will clearly distinguish between fact and opinion, support its claims with links to relevant and independent expertise, avoid stereotypes, treat people who have differing points of view with respect, and disclose its sources of funding.

(continued on p. 21)

What Are North Korea's Nuclear Capabilities?

INTERVIEW WITH DR. JEFFREY LEWIS

After a quiet period following an agreement to stop nuclear testing in 2018, North Korea resumed testing weapons earlier this year. What have you observed about these latest tests?

JEFFREY LEWIS: Over seven days in January, the North Koreans launched different kinds of missiles. Short-range missiles, missiles off railcars, regular old missiles we've seen before, a cruise missile, and then ultimately, an intercon-



DR. JEFFREY LEWIS is the director of the East Asia Nonproliferation Program at the Center for Nonproliferation Studies, a division of the Middlebury Institute for International Studies. He is the author of *Paper Tigers: China's Nuclear Posture* (IISS, 2014) and the founder of ArmsControlWonk.com, the first-ever blog and podcast on disarmament, arms control, and nonproliferation. Hear more from Dr. Lewis on the UCS *Got Science?* podcast at <https://www.ucsusa.org/resources/north-korea-missile-launches>.

tinental ballistic missile [ICBM] that's capable of hitting Alaska and Hawaii. So, it's something old, something new, something borrowed, and at least one thing that makes me blue.

Your team uses satellite imaging and other research to learn about the country's arsenal and capabilities. Were the ICBM launches successful?

JEFFREY LEWIS: They did two tests, and the first one failed, blowing up over Pyongyang. The second one succeeded. After the second, successful one, North Korea claimed it had been the Hwasong-17, which can carry multiple warheads anywhere in the United States, and they released a video of the launch. But when we measured the shadows and looked at the angle and altitude of the sun, we could tell that video was from the failed test, which was in the morning, and not the successful test, which was in the afternoon. What that means, we think, is that North Korea tested the [Hwasong-17] first and it blew up, and then they may have tested a different, older missile second, and that succeeded.

If the Hwasong-17 didn't work, what they would've tested was the Hwasong-15, which can put a nuclear warhead anywhere in the United States—but just one. I wouldn't get too excited about this failure. The North Koreans will learn from it, they'll fix the problem, and they will eventually work it out.

What do you believe was the point of these tests?

JEFFREY LEWIS: Their focus this time around has been on testing an array of new short- and medium-range systems. Back

in 2017, when we had the real crisis with North Korea, it was about them testing their ability to hit the United States with a nuclear weapon: a deterrent. I think we're seeing the shift to short- and medium-range systems now because they're afraid of an invasion. Now that they have a deterrent, they want an insurance policy. And that's the ability, if an invasion starts, to use nuclear weapons against US forces in South Korea and Japan.

Do you think that's the primary motivation for Kim Jong Un and North Korea to resume its nuclear testing program?

JEFFREY LEWIS: Yes. The fundamental problem is that North Korea is afraid of being invaded and there is nothing we can do or say that will make them believe us [that the United States will not invade], and certainly nothing we can do or say that will assure them more than their own nuclear weapons. And so, we have to learn to live with the fact that they are a nuclear-armed state.

How has the Biden administration responded to the ICBM test?

JEFFREY LEWIS: The Biden administration has responded like every other presidential administration, which is to say, "This is unacceptable," and then get on with the business of accepting it. Politically, leaders aren't willing to take the hit of admitting it. But ultimately, it's what we have to do. Even if North Korea is nuclear-armed, even if North Korea will never abandon its nuclear weapons, it doesn't mean we shouldn't talk to them. Because now, we have an enormous shared interest with them in avoiding a nuclear war.

The fundamental problem is that North Korea is afraid of being invaded and there is nothing we can do or say that will make them believe us.

Do we know how many nuclear weapons North Korea has?

JEFFREY LEWIS: We have a general idea, because we can see the nuclear reactors they have, and we can see some of the enrichment facilities they have. These are the factories that make the material that goes into a bomb. We know that there's enough material for tens of nuclear weapons, but whether that's 30, 40, 50, 60, it's much harder to say.

We do know how powerful the nuclear weapons are because North Korea has tested six of them. They've tested a number of what we would call fission devices, which are like the bomb dropped on Nagasaki, same size. But, more importantly, North Korea tested a thermonuclear weapon which is much, much, much larger. It was more than 100 kilotons, which is about 10 times bigger than the bombs dropped on Hiroshima and Nagasaki, and comparable in size to the typical US nuclear weapon.

North Korea is notoriously secretive about its military activities. How are you so sure about its nuclear capabilities?

JEFFREY LEWIS: One weird aspect of my scholarly career is watching a country proceed along a well-understood technical path. So, from a scholarly or historical perspective, there's nothing unusual about what they've done.

North Korea has been openly signaling that it was going to conduct this test for years. In January 2021, Kim Jong Un made clear that they had completed development of a missile with multiple warheads and that they would be testing it. That September, he went to a defense

exposition, and he gave a speech in which he reiterated all of that.

If you were watching this all along, it was like Chekhov's gun. It was there in the first act and we always knew it was going to go off.

What are you watching for now that these tests have concluded?

JEFFREY LEWIS: North Korea has a very ambitious agenda of things that they want to do. I think we'll see the Hwasong-17 tested again. They're going to launch a reconnaissance satellite. And this may take a while, but North Korea has said it has plans to put a nuclear-powered submarine at sea.

Shifting to another nuclear-armed state: in the wake of the Russian invasion of Ukraine and threats from President Putin, how worried do

we need to be about Russia deploying nuclear weapons?

JEFFREY LEWIS: If the United States and NATO do not get drawn into direct conflict with Russia, I think the most likely outcome is that this ends with nuclear weapons not being used. If the two parties do get sucked into direct conflict, then I would say all bets are off. Someone asked me . . . there's a bottle of Scotch on the shelf, do I pull it down and chug the whole thing? Right now, I'm at one shot to steady the nerves. But the risk is much higher than it needs to be.

The big lesson that I would draw from this is that leaders make bad decisions. I think we like to imagine the people in charge know what they're doing, but I can say with absolute certainty that the people at the top are no smarter than the people you meet every day. And they make the same bad decisions over and over again. {C}

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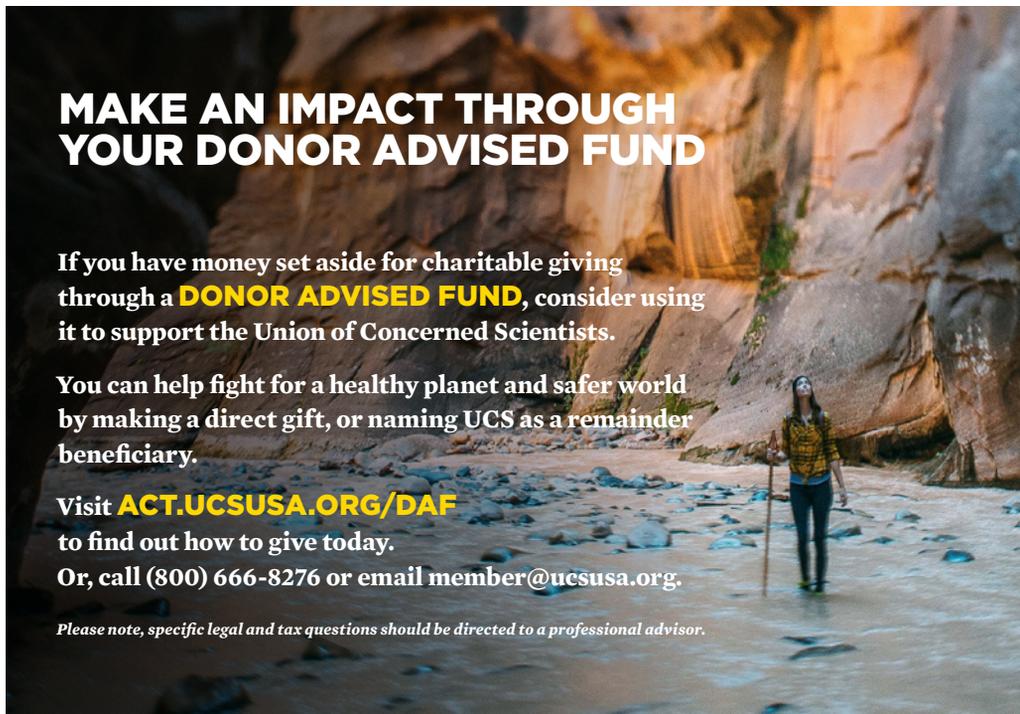
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Please note, specific legal and tax questions should be directed to a professional advisor.





THE PERSISTENT WILDFIRES



THREATS POSE TO OUR DRINKING WATER

New UCS work investigates the long-lasting impact of wildfires on water quantity and quality.

BY CANA TAGAWA

I can still remember sweltering summer days of my childhood spent in the town of Paradise, California, nestled in the Sierra Nevada foothills north of Sacramento. My grandmother would sit me down to explain how important it was to conserve our water supply. Short showers were a must and lawns were a useless extravagance. At the time, my eyes would glaze over, except when she mentioned the terrifying word “wildfire.” Then the hairs on the back of my neck would stand up, and I’d realize how serious it was to try to protect the water we had.

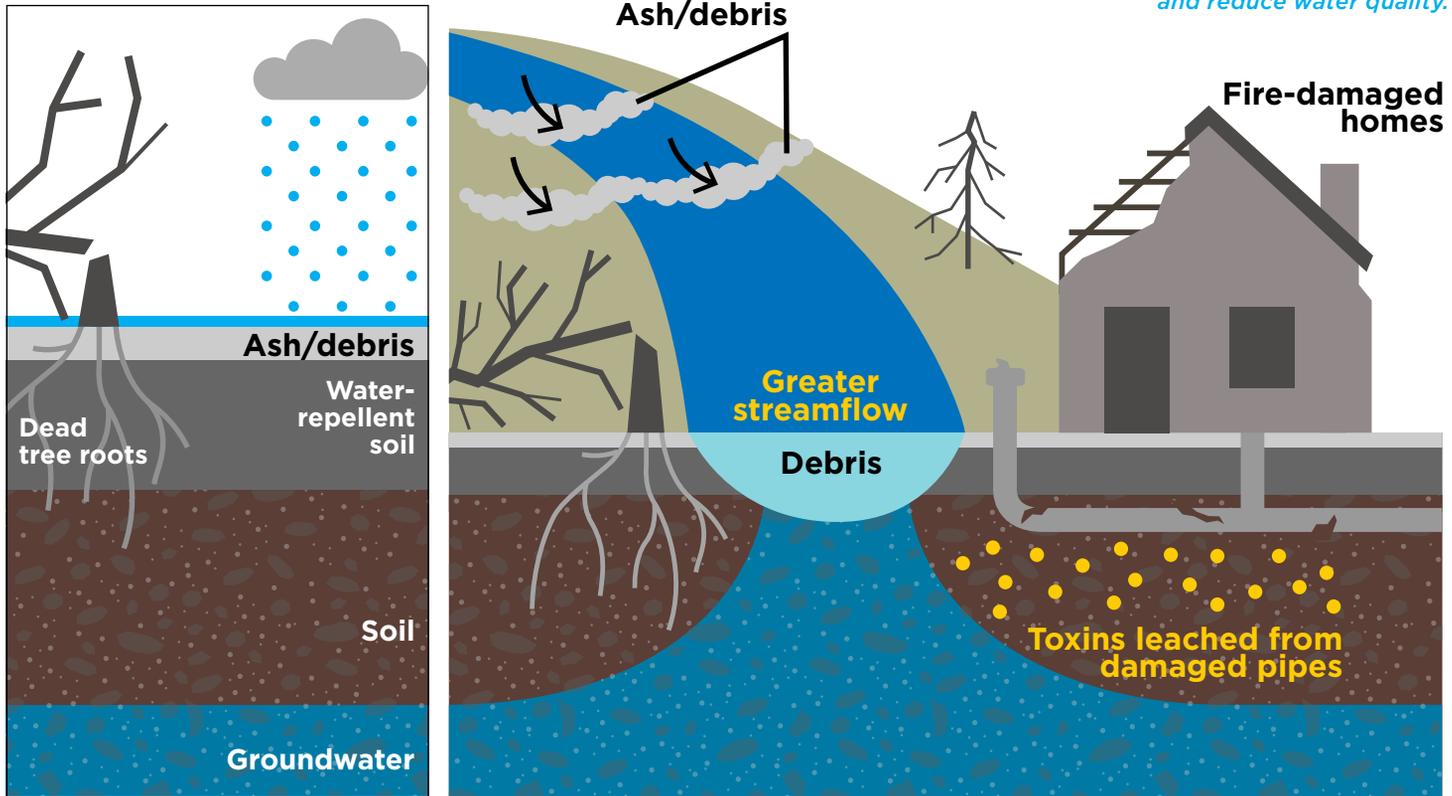
Those days in my grandmother’s house were the last I will ever get to spend there. In 2018, Paradise was hit by one of the biggest and deadliest wildfires in the state’s history. At least

85 people died. Four years later, the town is still recovering but my grandmother will not be rebuilding her home.

Until the fire wreaked havoc on my grandmother’s town and destroyed the house where I spent much of my childhood, I had thought of wildfires and water in only one way: that drier seasons with less water made wildfires more likely than I wanted to consider. But new work by a team at the Union of Concerned Scientists is investigating the intersection of wildfire and water issues more closely. It shows that, in addition to the devastation and air pollution wildfires cause, they can pose a lingering threat to a region’s water quantity and quality—sometimes for years after a fire is extinguished.

WILDFIRES AFFECT WATER QUALITY AND AVAILABILITY

By changing soil properties, killing vegetation, and damaging roots, wildfires can worsen erosion; increase the transport of soil, sediment, debris, and other material into waterways; damage water distribution systems; and reduce water quality.



It's an important piece of the story because climate change is making wildfire seasons longer while also making wildfires bigger and more intense. Already, over the past five years, California has experienced its five largest wildfires on record, including the 2020 August Complex fire that burned more than a million acres. Other factors increasing the intensity of wildfires include, paradoxically, longstanding US policy to extinguish all wildfires (which results in more fuel to burn), the curtailment of intentional "cultural" burns by Indigenous peoples that historically clear underbrush, and the pressures of human development.

With wildfires affecting more and more people each year, and drought conditions already threatening water supplies in the West, there is an urgent need to understand how these megafires are harming basic resources such as water, as well as what we can do to better protect water resources in wildfire-prone areas such as my grandmother's town.

UNDERSTANDING THE WILDFIRE-WATER CONNECTION

Wildfires disrupt entire ecosystems, with far-reaching ramifications (see the diagram above). The first level of disruption begins with the water cycle and soil. Plants and their roots stabilize the soil and take water from it. This process regulates how much water is in the soil, which is more important than most people realize. If wildfires burn these root systems and char the soil

itself, rainwater is more likely to be repelled than absorbed by the soil, potentially causing floods and landslides.

As water runs off of burnt land, it can transport all kinds of harmful substances into streams, rivers, and lakes: sediments, heavy metals and other toxins from human-made objects, and nitrates that can cause toxic algal blooms. In California, about 60 percent of the water supply comes from surface water sources, some of which are vulnerable to this kind of contamination after a wildfire.

IMPROVED FOREST MANAGEMENT

What can be done? One key strategy is to improve forest management—something UCS has long advocated. After a century of wildfire suppression in western North America, a vast amount of vegetation has built up that, when dried by rising temperatures, is extremely flammable. Strategies that reduce this wildfire fuel, such as prescribed fires, cultural burns, and forest thinning, could reduce the severity of wildfires and help protect water sources.

"We know that those prescribed fires don't have the same negative impact on water resources as very large and intense, uncontrolled wildfires, so increasing the amount of land that we're treating will help," says Kristy Dahl, a principal climate scientist for the UCS Climate and Energy program.

UCS Western States Climate Fellow Carly Phillips adds that partnerships with federal agencies and local tribes are helping to reintroduce and expand cultural burning in parts of California and Oregon. She says these efforts should be encouraged in other areas.

PROTECTING WATER RESOURCES

There are many proactive steps communities can take to protect their water resources, starting with equipping water treatment plants to better deal with the vastly increased amounts of sediment and contaminants that are likely after a wildfire. And, because aboveground power lines are frequently responsible for igniting wildfires, communities can press to bury these lines—a costly intervention best made as part of a holistic approach that considers the overall resilience of the electricity grid.

Another sensible step is for states to require heat-tolerant pipes for homes and buildings in fire-prone areas, which would better protect water supplies.

Most importantly, communities need to make sustainable water management choices that take climate change and the increasing likelihood of wildfires into account.

VULNERABLE WATER, VULNERABLE PEOPLE

UCS is currently working to bring more attention to the threat wildfires pose to water supplies that are already strained in many parts of California and other US states. The science on the nexus between wildfires and water is still emerging and, as UCS Senior Bilingual Water and Climate Scientist Pablo Ortiz explains, it needs to point us toward a future that is both safe and equitable, since the problem affects so many of the most vulnerable people in our society.

Ortiz says more people need to realize how dire the water situation is in many parts of California and throughout the



A volunteer unloads drinking water for wildfire evacuees in Oregon in 2020. Wildfires can affect water quality and quantity for years—or even decades—after a fire has been extinguished.

western states, and how wildfires are becoming more commonplace in other parts of the country. As he puts it, “If my brother’s room is on fire with my brother in it, how long will it be until it’s close enough for me to take action?”

“Close to 1 million people in California today already lack reliable access to clean drinking water supplies,” he adds. “Wildfire impacts are just adding more people to that list.” {C}

Learn more at www.ucsusa.org/resources/wildfire-water-western-united-states.

RESIDENTS ESCAPING COLORADO WILDFIRES RETURN TO WATER WOES

In the dead of winter earlier this year, the towns of Louisville and Superior in Boulder County, Colorado, experienced firsthand what wildfires can do to local water supplies.

During the devastating Marshall Fire, which began on December 31, 2021, and grew into one of the most destructive wildfires in Colorado history—more than 1,000 buildings were destroyed—Boulder County ordered residents of Louisville and Superior to boil all tap water for at least one minute before using it.

Not only did contaminants enter the water system from the burning of houses and

human-made materials, but the towns were also forced to switch their water systems to untreated non-potable water to meet the heavy water demand from firefighters working to put out the fire.

Since many people in the county lacked heat or power or both, they needed to wear layers of outdoor clothing inside their homes and had no way to boil their tap water. Others found their water shut off so that pipes wouldn’t freeze. This led to trips to the grocery store to buy bottled water, and families lining up to receive pallets of bottles for bathing and drinking.

New Guide Helps Scientists Support Climate Litigation

By Seth Shulman

As the number of climate-related lawsuits brought against fossil fuel companies continues to rise, so does the need for robust and powerful science to support and underpin these cases. That's why the Union of Concerned Scientists partnered with the Climate Science Legal Defense Fund to publish a guide explaining how scientists can get involved, what kinds of roles they can play, and how they can avoid mistakes in the courtroom.

As Dr. Delta Merner, lead for the UCS Science Hub for Climate Litigation, explains, "Given that the courtroom is a new arena for most scientists, we hope the guide can help prepare them to confidently participate in legal proceedings and make sure they have the skills needed to most effectively inform climate litigation."

MANY WAYS TO ENGAGE

What to Expect When You're an Expert Witness: Ways to Engage and How to Avoid Common Pitfalls describes how climate scientists, social scientists, and other technical experts can serve as case consultants, providing legal teams with background

Judges hearing cases on climate change may require the expertise of climatologists, historians, economists, and hydrologists, to name just a few.

information or interpreting specific scientific materials. They can participate by submitting an amicus curiae, or "friend of the court" brief, providing the court with scientific information or a specific perspective or insight into an existing case. And they can serve as expert witnesses, helping judges and juries understand



Scientists can lend their expertise to climate-related lawsuits in various ways, including by presenting or interpreting scientific data for judges and juries.

the science underlying the arguments in a case. Judges hearing cases on climate change may require the expertise of climatologists, historians, economists, and hydrologists, to name just a few.

opinions and testimony they offer hew firmly to their actual expertise and to methodologies they have carefully and defensibly applied and explained.

Scientists should also be prepared for the possibility that the climate litigation they engage with could result in public records requests. That means needing to practice good "digital hygiene" to limit their risks, such as always maintaining a clear delineation between professional and personal email accounts and keeping sensitive communications limited to phone calls or video chats.

Armed with this advice, a growing community of experts can confidently engage in the courtroom with the potential to make a real difference.

The guide is available at www.csldef.org/resource/expert-witness-guide-part-2.

On Resilience, Climate Change, and . . . Tigers?

By Chris Bliss

Climate resilience—the state of relative safety from climate harm—is a tough concept to explain. The details are varied and complex. And yet, as a political goal, it’s painfully urgent.

Imagine the climate crisis is a tiger that’s chasing us. When it reaches us, it bites, in the form of heat waves, hurricanes, and other climate impacts.

We need to slow the tiger down through **climate mitigation**: immediate, deep cuts to global warming emissions. Without that, we don’t stand a chance.

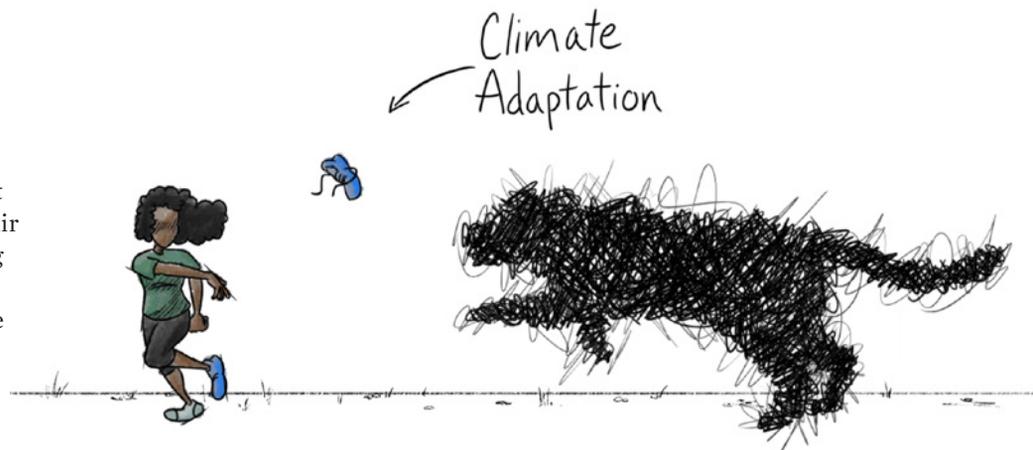
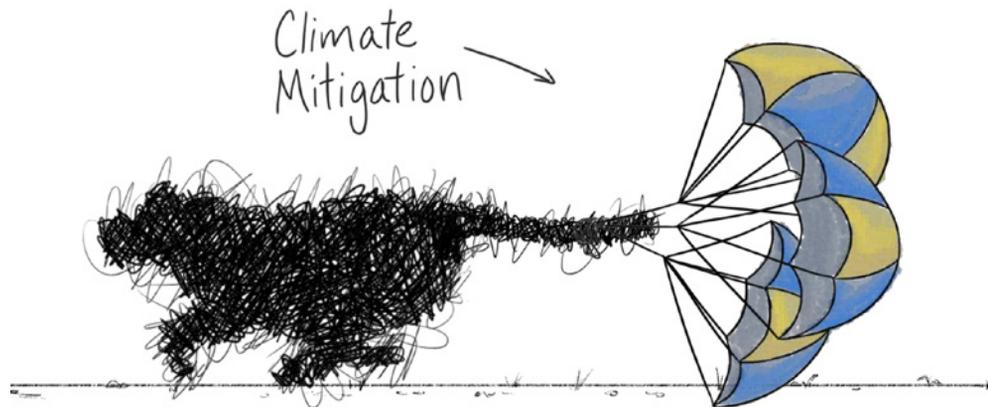
But the tiger’s teeth and claws are already here. Climate change is actively causing and compounding problems across the country, and it’s worsening. So we also need **climate adaptation**.

Creating a safe distance between us and the tiger is the work of **climate resilience**. It involves both mitigation *and* adaptation: addressing the root causes of the crisis and prioritizing the immediate needs of the communities and people most at risk. Actions can range from installing air conditioners in schools to tackling housing insecurity, poverty, and social justice.

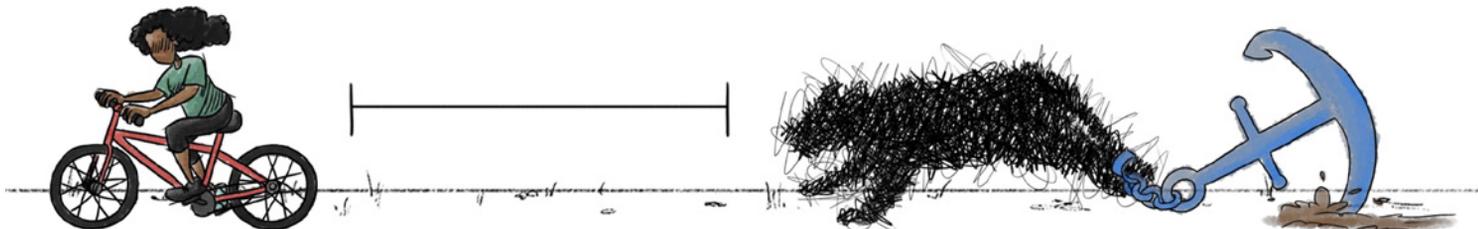
Yes, it’s big. But that’s the reality of the climate crisis we face.

Watch the tiger in action and learn more about climate resilience here: <https://act.ucsusa.org/tigervideo>.

Chris Bliss is the web/creative director at UCS. **Editor’s note:** No tigers were harmed in the writing of this article.



Climate Resilience



Gratitude and Stubborn Optimism

(continued from p. 2)

And our Clean Transportation team partnered with local groups in Connecticut, Massachusetts, New Jersey, and New York to pass legislation in each of those states that will speed the adoption of electric trucks, promising cleaner air and significant reductions in global warming emissions.

We've also delivered some powerful punches combining a left hook of science with a right hook of the law: our Climate Accountability team has played a vital role in the success of ongoing litigation to hold Big Oil to account in both the United States and globally. And, as the invasion of Ukraine has shown these last few months, our global security and nuclear energy experts continue to be at the top of the world's list of go-to sources on nuclear security issues.

I respect how seriously UCS staff and members of the UCS Science Network have taken the work of deepening relationships with a range of environmental justice and civil society partners. We can do nothing alone, and we're making excellent progress in building coalitions that can win. There's still much more we can do—including taking advantage of an unprecedented opportunity to shape the federal farm bill in the coming year.

In all our work, I'm mindful that incrementalism and solo action aren't enough. We will need to continue joining

with others, testing assumptions, and remaining open to improvements in our thinking.

To quote systems scholar Joanna Macy and global climate leader Christiana Figueres, I'm mindful, too, of the need for "active hope" and "stubborn optimism." Our jobs at UCS can often feel like pushing a boulder uphill, but I've seen how the struggle can deepen our sense of shared purpose and how mistakes and misunderstandings, when addressed with courage and integrity, can create the conditions for a deeper connection with others. It is these connections that we need to continue to build and strengthen to make meaningful progress on climate change, nuclear security, and preserving our democracy.

There's nowhere I'd rather be doing this work than at the Union of Concerned Scientists. And there's no team I'd rather be working with than my remarkably talented, dedicated, vocal, intelligent, passionate colleagues—and each of you. As we muster our stubborn optimism to face the challenges ahead, we fight knowing truth is on our side in this defining moment for human history. {C}

Johanna Chao Kreilick is the president of UCS.

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How to Fight Disinformation

(continued from p. 11)

If you think you're dealing with disinformation, the first thing to do, as mentioned above, is not share it, retweet it, or comment on it. Research suggests the best approach involves the following steps:

Inoculate. This simply means preparing ourselves and alerting others for the likelihood that we will encounter disinformation on certain topics. When we are already on guard, we think more critically.

Amplify. Share accurate stories from credible sources.

Report. All the social media platforms let users flag content that violates their guidelines. There are also research-focused organizations that accept reports from users, and use the information to track and trace disinformation to its source.

Talk. Building relationships through one-on-one conversations has proven to be the most effective method of combating disinformation. By being patient with someone, you can work through their emotions and find common ground. If someone is operating in bad faith, you'll spot it quickly. Avoid wasting time with these folks.

Activate. Remember that the people who care about the planet outnumber those trying to preserve the status quo, so focus on the solutions and help others see that we can create a better world if we unite in action.

PUTTING THE TOOLS TO WORK

UCS staff presented this advice and much more to nearly 300 UCS supporters during an eight-hour webinar in April. At the end, about three-quarters said they would be willing to help train their peers and their community. We then trained a group of 27 scientists to track and counter disinformation in partnership with community organizers who will craft a response tailored to their local needs.

Marjanovic says it gives her hope to see how many people—including scientists—are invested in countering disinformation. "People who are engaging with UCS want to advance science," she says, "and the thing about scientists is that most of us believe in telling the truth. Truth-tellers hold the people who like to lie accountable." As more people learn how to effectively disrupt disinformation, she continues, "the stronger we're going to be at advancing scientific skills and innovation, and that leads to the solutions that all of us deserve in order to be safe and healthy."

UCS has created various resources on how to fight disinformation, all of which are available at www.ucsusa.org/resources/how-disinformation-works.

And, if you're willing to go a step further, fill out the form at <https://secure.ucsusa.org/a/2022-disinformation-take-action-form> to join UCS and our grassroots partners in defending voting rights. (C)

THE DOS AND DON'TS OF REFUTING LIES AND ATTACKS

- DO** use individual stories to humanize trends and statistics
- DO** say what is true, while emphasizing what is possible
- DO** use what's happening in the news to share sensible solutions
- DO** meet people where they are, to lead them somewhere better
- DO** name names—the bad actors spreading disinformation and what they hope to achieve
- DO** report disinformation to the social media platform where it appears, and to community leaders or experts whose opinions are respected

- DON'T** repeat: instead of repeating false information while trying to debunk it, replace it with an accurate, aspirational, and actionable message
- DON'T** prioritize facts and statistics over stories
- DON'T** create an air of doom-and-gloom—you don't want people to feel the situation is hopeless
- DON'T** be too focused on advancing your own agenda
- DON'T** manipulate your audience through fear and anger
- DON'T** shame people—it makes them less receptive to anything you have to say



Can We Avoid a Global Food Crisis?

By Ricardo Salvador



Vladimir Putin's war on Ukraine is already a humanitarian nightmare, but it also threatens to upend agriculture on a large scale, affecting markets for wheat and

other cereal grains, oil seeds, and fertilizers. There have been ominous signs that the disruption may lead to a global food calamity, and even in the best-case scenario, the number of the world's hungry—currently standing at 815 million (1 in 10 people)—is likely to rise.

Ukraine's wheat crop accounts for 7 percent of global wheat exports and Russia accounts for another 18.4 percent. This means that one-quarter of the world's traded wheat could be unavailable due to production losses, trade restrictions, and international sanctions. Worldwide supplies were already limited due to drought in Argentina and the United States, and farmers, processors, and speculators have driven up prices since the start of hostilities.

The higher cost of fossil fuels resulting from sanctions against Russia will also add to food costs. Opportunists on all sides—those who sell fuel and fertilizers to farmers, and those who process, transport, and sell food—will be able to exploit tightened global supplies of oil and wheat, contributing to an inflationary spiral.

KEEPING THE WORLD FED

As governments seek to avert a food crisis because of the war, they must also recognize that today's food and farming



Today's food and farming systems are highly vulnerable to disruption from a variety of threats, and worldwide supplies of wheat are now threatened by drought and the war in Ukraine.

systems are highly vulnerable to disruption from a variety of threats. Future crises may be triggered by extreme weather and shifting growing conditions driven by climate change, or by new military conflicts or pandemics. Our food systems must be made nimbler and more resilient to all these threats.

First, the United States and other countries should diversify their trade networks and invest in sustainable production systems that prioritize local food security. This includes minimizing dependence on imports and subsidizing the cost of staple foods—including fruits and vegetables, not just commodity crops like corn, soy, and wheat.

Second, we need to wean agriculture off its dependence on climate-warming fossil fuels. The Ukraine war serves as a lesson that this dependence makes all of us vulnerable, to both global petropolitics and to a planet that could become uninhabit-

able. The droughts that have constrained wheat production in North and South America, for example, are driven in part by human-induced climate change.

Just as there are viable and lower-cost alternatives to fossil fuels in the energy and transportation sectors, the agricultural sector has better options too. Extractive approaches to agriculture should be replaced with agroecological approaches that work with nature instead of against it to regenerate the basic resources needed to grow nourishing food, while providing an equitable livelihood for farmers and farmworkers. Here in the United States, the Agriculture Resilience Act is one proposed policy solution that would help get us there. {C}

Ricardo Salvador is director of the UCS Food and Environment Program. Read more from Ricardo on our blog, *The Equation*, at <https://blog.ucsusa.org>.

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