

SCIENCE AT NRDC

NRDC



Science is at the core of NRDC's work to protect people and the environment. We use science to identify environmental and public health problems, to understand causes and contributing factors, to help forge effective solutions, and to monitor and evaluate progress after action is taken. We rely largely on existing and emerging scientific knowledge, and when that is insufficient, we work to fill critical information gaps by conducting or sponsoring needed research.

Because NRDC's scientific capacity is complemented by deep expertise in policy and the law, we also play a critical role in bridging the gap between scientists who develop the information and decision makers who apply that information to create sound policy.

Science is not the only tool that NRDC uses, but whether we are standing before a judge, standing up to corporate polluters, or standing with the public, it is one of our strongest.

"SCIENCE, THE LAW, AND PEOPLE HAVE GUIDED AND POWERED NRDC SINCE OUR BEGINNINGS IN 1970.



SCIENCE GAVE US THE REASON TO ACT, THE LAW GAVE US THE MEANS, AND PEOPLE GAVE US OUR PURPOSE."

— **JOHN ADAMS**, NRDC FOUNDING DIRECTOR

NRDC'S SCIENTIFIC TEAM

More than 60 scientists work at NRDC, making up nearly a quarter of our program staff. They bring tremendously diverse expertise to our work, in fields including biology, oceanography, forestry, geology, chemistry, toxicology, physics, economics, engineering, public health, and more. In terms of numbers and fields of study, our scientific team is comparable to a university faculty. This enables NRDC to understand and tackle almost any environmental or public health issue that comes up.

Our scientists are deeply embedded in NRDC's work. Every NRDC program, from Oceans to the Center for Market Innovation, has one or more staff scientists. In addition, many of our policy advocates, legislative analysts, and attorneys have some scientific background and regularly use it in their work.

NRDC magnifies its own scientific capacity by working with scientists from universities, national laboratories, government agencies, other non-governmental organizations, and the private sector. These collaborations increase the quantity and quality of our work, enable us to conduct specialized research, bring complementary disciplinary expertise to bear on a problem, and allow for expert review and critique.



COLLABORATIVE SCIENCE VALIDATES ENVIRONMENTAL POLICY

Seventeen years after passage of the Sustainable Fisheries Act, which required the National Marine Fisheries Service to develop and implement plans to “rebuild” overfished populations of cod, rockfish, flounder, and other species, NRDC scientist Lisa Suatoni teamed up with researchers from Columbia University to ask the question: Has it worked? Analyzing data for 44 fish stocks, they found that nearly half of them showed strong increases since rebuilding plans were put into action. Most of these stocks could now be designated as “rebuilt,” and commercial fishing revenues from the rebuilt stocks were more than 50 percent higher than when rebuilding began. With this scientific evidence of the effectiveness of the new approaches to fisheries management, NRDC will be able to make a strong case for continuing these successful practices when the Magnuson-Stevens Fishery Management and Conservation Act is up for reauthorization.

During her two-year fellowship, economist Maria Bowman is working with NRDC's Food and Agriculture team to investigate the economic costs and benefits of antibiotic use in U.S. livestock production.

“Working at NRDC has shown me how powerful the combination of science and advocacy can be to effect change in public policy.”

THE SCIENCE CENTER: A HUB FOR SCIENTIFIC ACTIVITY AT NRDC

NRDC's Science Center brings additional resources and organization-wide integration to our science-based work. Staffed by experts in environmental biology, public health, engineering, and science communications, the Science Center supports targeted research projects, facilitates engagement and collaboration with scientists at other institutions, and oversees four postdoctoral Science Fellows who work directly with NRDC programs. It manages independent peer review of NRDC's publications—which ensures the scientific accuracy of all NRDC material—and works with our scientists and programs to help them communicate more effectively about science and how we use it.

This unique unit reaches across all of NRDC's issue areas to strengthen our scientific team and extend our reach to partners and audiences outside the organization.

WHAT WE DO

NRDC scientists are multitalented and versatile. On any given day, our activities can range from conducting original research to analyzing data collected by others, applying science to develop policy solutions or engaging the public on how environmental issues impact their daily lives.



RESEARCH

For some issues, notably pollution and public health, NRDC scientists design experiments and collect data to investigate new concerns or to fill information gaps for issues we are already working on. We then use results of these studies to identify problems, demonstrate the need for further research or monitoring, or provide evidence for necessary action. While NRDC has a national and even international reach, much of our research is small scale and local, which helps bring the issue close to home for people and communities.

ANALYSIS

For much of our work, NRDC scientists rely on analyzing the enormous amounts of data that are collected by universities, government agencies, and industry. Our analyses can detect and compare patterns, identify relationships among variables, illuminate causes and effects, and even make predictions about the future. Whether it's summarizing a large, complex dataset or probing existing information to answer new questions, these types of analytical efforts are the backbone of our work.

SCIENCE ON A SCHOOL BUS PROTECTS CHILDREN'S HEALTH

In 2001, groundbreaking research by NRDC scientist Gina Solomon showed that children riding in school buses were exposed to diesel pollution levels that were more than 20 times higher than levels considered a significant cancer risk by the U.S. Environmental Protection Agency. And it wasn't just children. Truckers, port workers, and people living near ports or high-traffic areas were all being exposed to high levels of diesel pollution. Armed with these findings, NRDC worked with the Union of Concerned Scientists, the American Lung Association, California's Coalition for Clean Air, and others to push the California Air Resources Board to measure and evaluate the health impacts of diesel pollution. Next, we helped advance measures to reduce diesel pollution, such as requirements to upgrade or retire old, polluting school buses



and incentives for alternative fuels and advanced technology. Many of the diesel cleanup programs developed in California have now been adopted nationally, and in areas where these cleanup policies are in place, diesel concentrations are

measurably lower today than in the past. Collectively, these policies have led to pollution reductions that prevent more than 50,000 premature deaths per year in the United States.

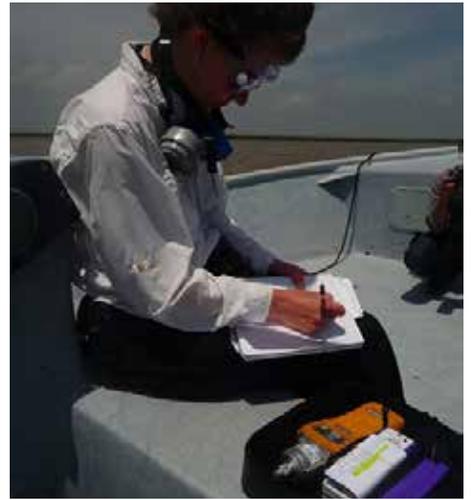
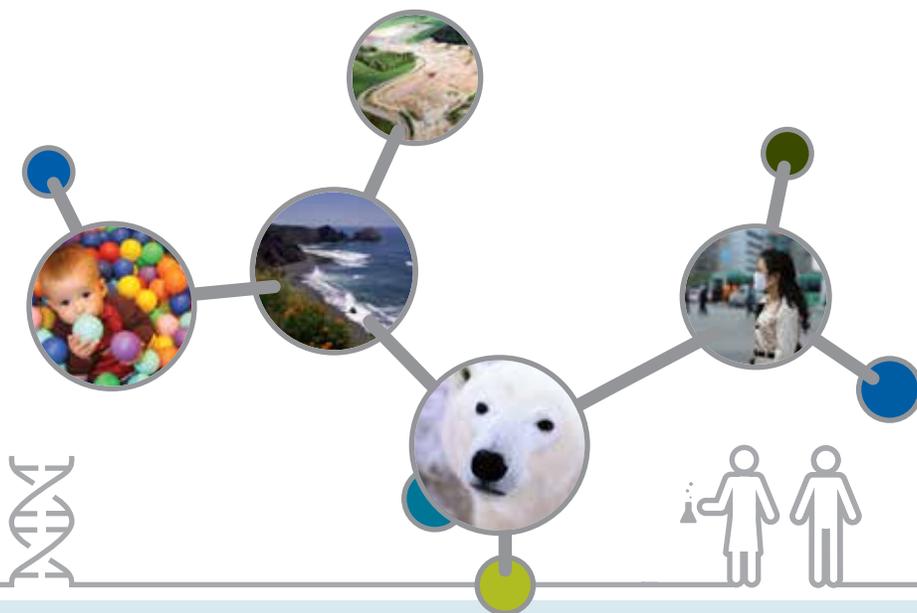
SCIENTIFIC ANALYSIS SETS THE BAR HIGHER FOR ENDANGERED SPECIES PROTECTION

The Endangered Species Act is a powerful tool to protect plants and animals and their habitats. But to use this law effectively, the ways scientists classify animals as species, subspecies, and populations matter. How can we know



that we're protecting the right animals in the right places if we don't use these animal identification systems consistently? Suspecting that both government agencies and the property rights groups who regularly challenged ESA listings were using scientific information inconsistently, NRDC scientist Sylvia Fallon conducted a comprehensive assessment of how genetic information was being used in endangered species decisions. Her findings, published in the journal *Conservation Biology*,

changed the way the U.S. Fish and Wildlife Service evaluates species and makes listing decisions. Today, Sylvia's paper and the recommendations it contains are cited as a scientific standard for use of genetic information in endangered species listing decisions.



SYNTHESIS

With expertise in so many subjects, our scientific team is uniquely able to weave information from diverse research threads, multiple data sources, and analyses that examine issues from different angles into a coherent picture. Used in conjunction with NRDC's policy, legal, and legislative expertise, this capacity fuels our ability to craft creative, comprehensive, evidence-based solutions to the complex challenges we face today—a hallmark of NRDC.

COMMUNICATION

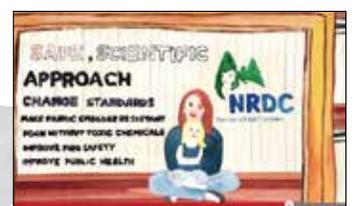
NRDC scientists understand that it is not enough to do research, answer questions, and solve problems. It is essential to share the results (and why they matter) with other scientists, policy experts, decision makers, the media, and the public. We use a variety of communications tools—from scientific journal articles, technical reports, and white papers to blogs, videos, social media, and public meetings—to deliver our message.

SYNTHESIZING SCIENCE WINS SPECIES PROTECTIONS

In 2004, a “biological opinion” issued by the U.S. Fish and Wildlife Service wrongly concluded that a plan for higher water exports from the San Francisco Bay Delta would not harm the estuary’s habitat or jeopardize endangered fishes like delta smelt. NRDC and a coalition of fishing and environmental groups sued to overturn the plan, arguing that there was strong scientific evidence that fish populations were declining and that water diversions were partly to blame. Testimony by NRDC Science Center Director Christina Swanson, which combined analyses of fish biology, estuarine ecology, and water diversion management with proposed changes to water export operations to protect the fish and their habitat, was instrumental in winning the case. The court threw out the flawed biological opinion and ordered that the proposed new protections be implemented immediately. When the new biological opinion was completed two years later, nearly all of the NRDC-proposed protections were made permanent.

GETTING THE WORD OUT ABOUT TOXIC CHEMICALS IN YOUR HOME

NRDC scientist Sarah Janssen—a medical doctor and expert on toxic chemicals—had worked for years with university researchers, public health advocates, and policy experts to eliminate the use of toxic and unnecessary flame retardant chemicals in household furniture. But after learning that her own couch contained more than a pound of chlorinated tris, a known carcinogen banned from use in children’s pajamas more than 30 years ago, she knew she had to find another way to get the message out. Working with the Science Center’s science communications specialist, Perrin Ireland, she told her story in a short, powerful video that reached more 40,000 viewers on YouTube. Combining the scientific information with her own personal story, Sarah raised public awareness and understanding about a serious but obscure environmental hazard that touches almost everyone. She also identified a solution and a way for everyone to engage by supporting California’s newly proposed regulations for flammability standards in furniture and other products.



FROM SCIENCE TO ACTION

Just as science-driven, evidence-based medicine advanced our ability to treat and cure disease, science is the foundation of NRDC's advocacy for evidence-based policies and actions. We put science into action in three ways: strategically to guide and shape our long-term priorities, proactively to develop and strengthen policies and practices to achieve those long-term priorities, and reactively to reshape and refine the actual implementation of those policies and to measure progress of our actions.

For example, our strategic assessment of climate change science showed us that the best tool to reduce this global environmental problem is clean energy: We need to use renewable energy, energy conservation, and energy efficiency to reduce use of fossil fuels and emit less heat-trapping carbon pollution. To figure out how to achieve this objective, NRDC used proactive research, analysis, and synthesis to develop policies that will result in reduced fossil fuel consumption, such as higher fuel efficiency standards for cars and trucks, energy efficiency standards for appliances, and carbon pollution standards for power plants. To promote adoption of these policies and track progress, our reactive scientific analyses have, for example, demonstrated how strong fuel efficiency standards have contributed to the economic recovery in the U.S. auto manufacturing industry, how consumers have lowered their utility bills with more-efficient appliances, and how reductions are being achieved in carbon pollution over time.

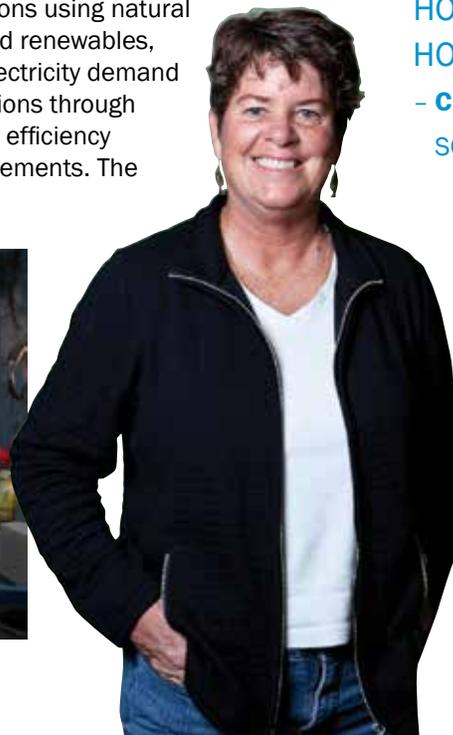
HARD DATA AND CREATIVE THINKING CRAFT A BLUEPRINT FOR CLEANER ENERGY

NRDC climate scientist Dan Lashof knew that power plants are the largest producers of carbon dioxide in the country—and our best opportunity to achieve significant carbon pollution reductions in the next few years. With a team of engineers, economists, and policy experts from NRDC and partner organizations, he examined the problem from all sides—emissions, energy supply and demand, health impacts, and economics. Combining hard data with creative thinking, Lashof's team identified state-by-state emission reduction strategies that flexibly combined power plant emission controls, shifts to lower or zero emissions using natural gas and renewables, and electricity demand reductions through energy efficiency improvements. The

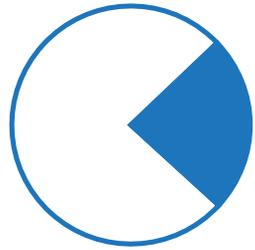
result, tested using the same economic models as those used by the U.S. Environmental Protection Agency and detailed in a comprehensive technical report [link], was a blueprint for a 26 percent reduction in power plant emissions by 2020 relative to 2005 levels. Six months later, when President Obama presented his plan to reduce emissions from existing power plants, NRDC's work provided strong analytical support for his proposal.

“WE USE SCIENCE AS A COMPASS TO POINT US IN THE RIGHT DIRECTION, AS A MAP TO SHOW US HOW TO GET THERE, AND AS A GAUGE TO MEASURE HOW FAR WE’VE COME AND HOW FAR WE STILL HAVE TO GO.”

**– CHRISTINA (TINA) SWANSON, PH.D.,
SCIENCE CENTER DIRECTOR**



NRDC'S SCIENCE STAFF

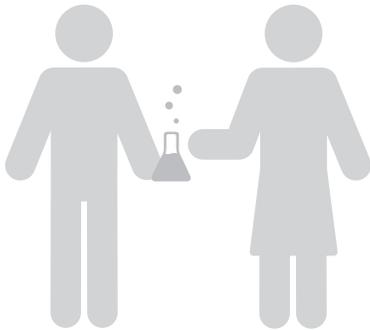


SCIENTISTS MAKE UP
24%
OF NRDC'S PROGRAM STAFF

TOTALLING
67
SCIENTIFIC EXPERTS

- 22 Ph.D
- 33 MSc.
- 8 MPP
- 2 MPH
- 2 Bsc.

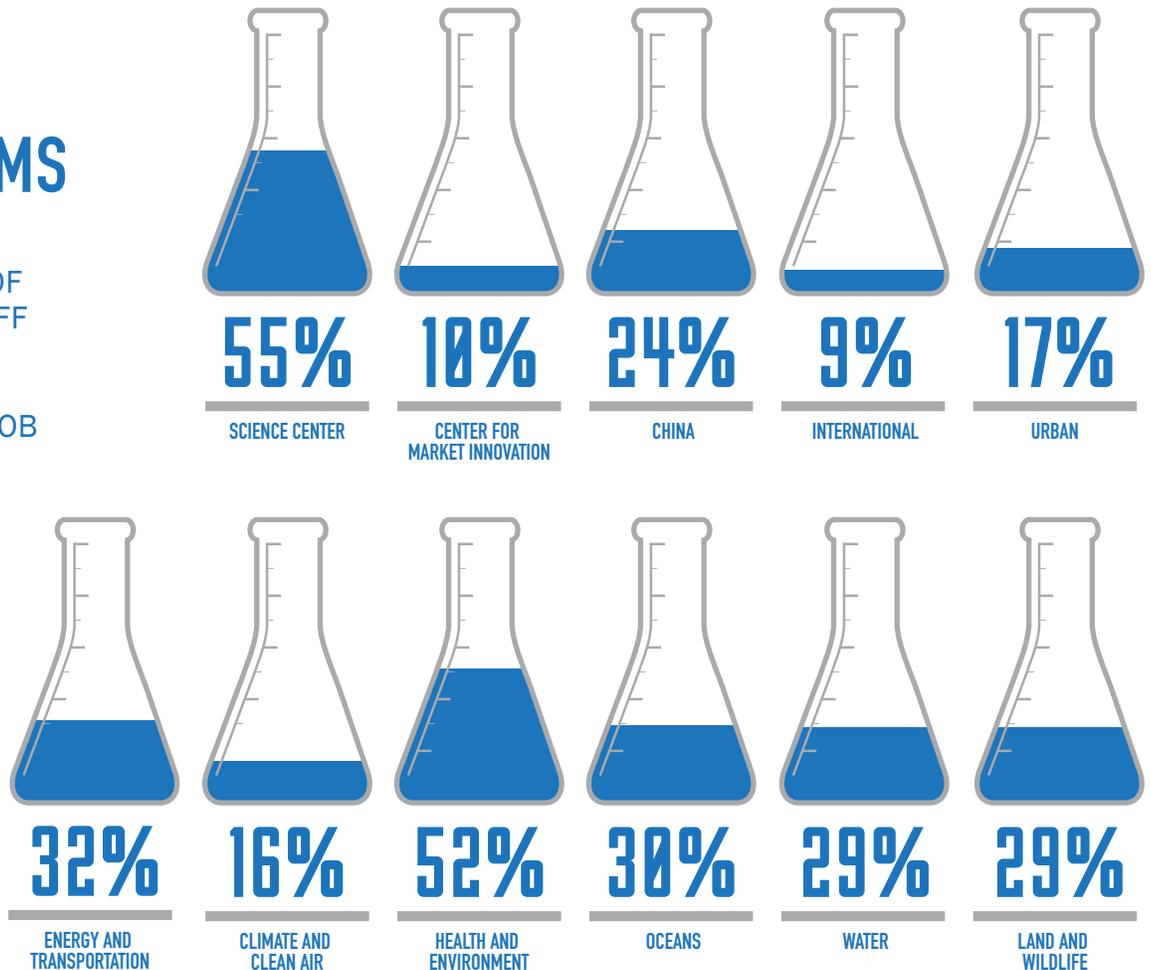
IN A RANGE OF SCIENTIFIC DISCIPLINES:



 BIOLOGY	 OCEANOGRAPHY	 FORESTRY	 GEOLOGY	 CHEMISTRY
 TOXICOLOGY	 PHYSICS	 ECONOMICS	 ENGINEERING	 PUBLIC HEALTH

SCIENCE IN NRDC PROGRAMS

PERCENTAGE OF PROGRAM STAFF IDENTIFIED AS SCIENTISTS BY TRAINING OR JOB TITLE



EFFECTIVE, RESPECTED, AND TRUSTED

Science empowers NRDC's work on all of our priority issues, from protecting wild places to building a clean energy future, and in all arenas where we engage, from local communities threatened by pollution to international treaty negotiations. In turn, science is empowered at NRDC, put into action by our coordinated team of scientists, policy experts, lawyers, advocates, and communicators. This potent combination has made NRDC a creative problem solver, a credible source of information, a trusted partner and fierce opponent, and a forceful advocate for effective solutions to the challenges facing our environment and society.



This report was prepared by the NRDC Science Center Committee:

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About NRDC

The Natural Resources Defense Council (NRDC) is an international nonprofit environmental organization with more than 1.4 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Bozeman, MT, and Beijing and works with partners in Canada, India, Europe, and Latin America. Visit us at www.nrdc.org and follow us on Twitter @NRDC.



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