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Back from the Brink

How NRDC Helped Save the Ozone Layer

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About NRDC

The Natural Resources Defense Council is an international nonprofit environmental organization with more than 1.2 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, Chicago, San Francisco, and Beijing. Visit us at www.nrdc.org.

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Back from the Brink: How NRDC Helped Save the Ozone Layer

High above our heads lies a fragile layer of ozone, a rare form of oxygen that blocks the sun's cancer-causing ultraviolet rays. In 1974 a pair of scientists discovered that man-made chemicals called chlorofluorocarbons, or CFCs, were eating away at this protective layer, exposing every person on Earth to higher risks of skin cancer, cataracts, and other illnesses.

At that moment, we stood at the brink of a global catastrophe—the first worldwide atmospheric pollution crisis. This is the story of how we stepped back from that brink—how the ozone layer was saved.

Twenty years ago, in September 1987, the nations that produced CFCs agreed on the Montreal Protocol, a treaty intended to save the ozone layer. Under that treaty we eliminated nearly all CFCs and a host of other ozone-destroying chemicals. More than 190 countries stepped up in this effort, and millions of lives were saved. The ozone layer is now on the mend, though there is more to do before it is fully healed.

NRDC was there when the battle to save the ozone layer began, and our scientists and lawyers have played crucial roles in winning that battle for decades. Now, on the 20th anniversary of the world's most effective environmental treaty, it's worth reflecting on what has been accomplished and on the lessons we can learn as we tackle the next great crisis of worldwide air pollution: global warming.

Act I: Discovering Ozone Depletion and Banning CFC Aerosol Sprays

Ozone—O₃—is a molecule made up of three atoms of oxygen. Down here on the ground, ozone is formed from car and power-plant exhaust and is toxic to breathe. But a natural layer of ozone developed in the stratosphere over millions of years. By screening out harmful ultraviolet (UV) radiation from the sun, the ozone layer made it possible for life as we know it to evolve.

In 1974 the physical chemists F. Sherwood Rowland and Mario Molina discovered that CFCs could weaken the ozone layer. Millions of pounds of CFCs—then used mainly as propellants in aerosol spray cans—were being released into the air each year. They were virtually indestructible in the lower atmosphere. But Rowland and Molina, in work that later earned them the Nobel Prize in Chemistry, found that when CFCs reached the stratosphere and were hit by ultraviolet radiation, they broke apart, freeing chlorine free radicals.¹ These free radicals attack ozone and turn it into ordinary oxygen, which is unable to screen out dangerous UV radiation. As the ozone layer weakens, more UV radiation reaches the ground, causing skin cancer, cataracts, and a host of other harms to people, animals, plants, and man-made materials.

NRDC saw the danger and took on the challenge immediately. NRDC scientist Karim Ahmed and attorney Tom Stoel organized a press conference at which Rowland brought his and his partner's findings to the attention of the media and the public.

Ahmed and Stoel then petitioned the Food and Drug Administration, the Environmental Protection Agency, and the Consumer Product Safety Commission to ban the use of CFCs in aerosol cans. Ahmed testified before Congress and state legislatures advocating a CFC aerosol ban. Oregon was the first state to pass laws to ban CFC spray cans in June

of 1975. The public responded, however, even before governments and agencies acted. Sales of aerosol sprays dropped off rapidly, declining 25 percent in the first six months of 1975.²

Industry reactions varied. In 1975, a major manufacturer of aerosols, S.C. Johnson, announced that it would stop using CFCs. But DuPont and other CFC manufacturers defended their chemicals by attacking the accuracy of Rowland's and Molina's findings. They set up their own scientific task forces and asked government agencies to hold off on regulatory action. Some industry representatives even attacked the two scientists personally, questioning their motives.

A report by the National Academy of Sciences report in the fall of 1976 confirmed the Rowland-Molina ozone theory and called for a ban on aerosols within two years.³

In the spring of 1977, after reviewing the science, a committee representing various federal agencies concluded that CFC spray cans should indeed be banned. Later that year, Congress strengthened the Clean Air Act, giving enforcement agencies the authority to ban chemicals that threatened public health and welfare by damaging the ozone layer. Though CFC aerosol usage was already way down, the EPA officially banned nearly all aerosol propellant uses of CFCs in 1978.

As the CFC controversy played out on the national level, NRDC took its first steps to urge an international phase-out of CFC aerosols. In 1975 Tom Stoel asked the United Nations Environment Program (UNEP) to play a role in establishing international scientific consensus.⁴ Another NRDC attorney, Alan Miller, worked with Stoel and researcher Breck Milroy to develop an international study of the legal tools for controlling CFCs in various countries.⁵

International talks began in 1977 at a UNEP-sponsored conference attended mainly by the world's industrialized nations. Some countries, particularly Canada and the Scandinavian nations joined the United States in banning CFC aerosols. The other European nations and Japan, however, resisted making any commitments and called for more research.



Mario Molina and F. Sherwood Rowland
Mario Molina and F. Sherwood Rowland

Act II: The Bumpy Road to the Montreal Protocol

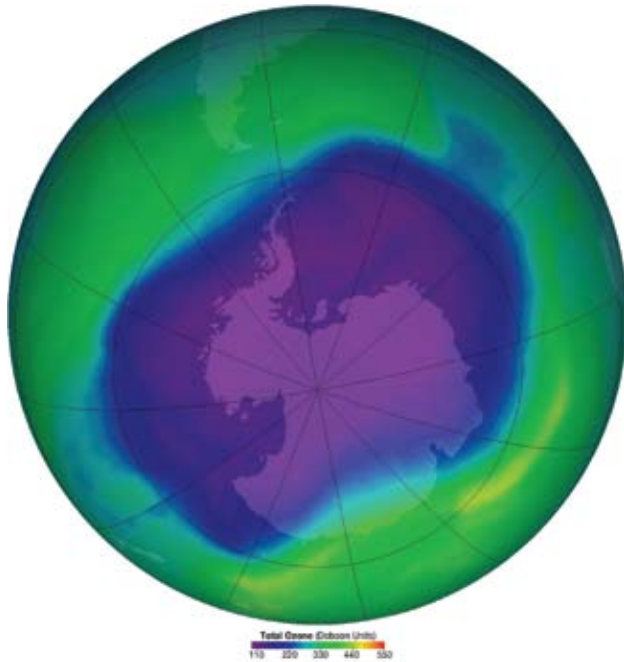
After the U.S. aerosol ban in 1978, there was a general misconception that the problem had been solved.⁶ To be sure, the ban led to a reduction in CFC production and emissions in this country. But CFCs were still being used in refrigerators and air conditioners and in industrial applications, and those uses were growing. Moreover, other ozone-depleting chemicals called halons were being used in fire protection systems. In 1980 the EPA published its findings that because of these uses, CFCs still posed a danger to the ozone layer and to public health and welfare.

But the real atmosphere then fell victim to an abrupt change in the political atmosphere as President Jimmy Carter handed over the reins to Ronald Reagan, who came into power in 1981 with a strong anti-regulation philosophy. At the same time, the National Academy of Sciences confused matters by issuing a report that underestimated CFC production growth and miscalculated future ozone depletion.⁷ The international negotiations begun in the late 1970s petered out in 1985 with an agreement that lacked any new control measures.⁸ Countries did agree to reconvene in later that year, however, to try again to reach consensus on real steps to protect the ozone layer.

NRDC kept up the pressure for action. Alan Miller laid the groundwork for a lawsuit against EPA, and in 1984 attorney David Doniger filed that suit, arguing that, given the agency's finding of danger, the Clean Air Act required EPA action against non-aerosol uses of CFCs. NRDC and EPA settled the lawsuit with an agreement on a Stratospheric Ozone Protection Plan.⁹ The plan set a schedule for completing a risk assessment and holding a series of national and international meetings to build consensus on further action among businesses, environmental organizations, and governments. The plan was carried out by an EPA team led by John Hoffman, Steve Seidel, and Eileen Claussen.

The EPA risk assessment had a dramatic impact. Looking over the next century, EPA demonstrated that the ozone layer was likely to weaken sharply under the assault of steadily rising CFC production. EPA projected hundreds of millions of skin cancer cases and millions of avoidable deaths in the United States alone.¹⁰

Meanwhile, scientific evidence of damage to the atmosphere continued to mount. British scientists reported, and NASA satellites confirmed, the near-complete loss of stratospheric ozone over Antarctica every September, when sunlight returns to the South Pole.¹¹ The strong image of the Antarctic ozone hole increased the public's sense of the severity and urgency of the problem.



Starting in 1985, NRDC's Doniger took part in a series of small meetings between governments, companies, and environmental organizations, to pave the way for the resumption of negotiations on a meaningful international treaty. During this same period, NRDC learned that companies had come up with an array of new alternatives to CFCs in refrigeration, insulating foams, electronics, and other uses. Suddenly, the problem that companies said had no solution had plenty of solutions.

Attitudes began to change. At a conference in 1986, an industry trade association and DuPont issued a public statement acknowledging the availability of commercially viable alternatives and calling for an international agreement to limit growth in CFC production. Speaking at the same conference, Doniger proposed a bolder plan: a worldwide phaseout of CFCs in ten years, with an 85 percent reduction in the first five years.

Doniger also testified before Senate and House committees on the emerging science and on the

urgent need for action.¹² He worked with champions in Congress—Senators Max Baucus and John Chafee and Representatives Henry Waxman and Sherwood Boehlert—to write proposed legislation to phase out CFCs in the United States. Other congressional leaders, such as Senator Al Gore, called for U.S. diplomatic leadership to forge an effective international ozone treaty. Doniger and his colleague David Wirth represented NRDC as nongovernmental observers when international negotiations resumed in Vienna in 1985. There Doniger and Wirth led an international coalition of environmentalists urging delegates to adopt a global phaseout of these chemicals. Under the leadership of EPA head Lee Thomas and State Department officials, the United States took a strong position in the treaty talks, advocating a 90 percent phaseout of CFCs over 10 years.

Then came a counterrevolution. Not yet ready for a phaseout, the CFC industry lobbied members of the Reagan administration to intervene. Officials in the Office of Management and Budget sought to reopen and question EPA's risk assessment and the phaseout policy that followed from it. One official suggested that skin cancer be classified as a "self-inflicted" disease.¹³ For several weeks, the direction of U.S. policy remained in doubt.

The turning point came when Interior Secretary Donald Hodel urged President Reagan to abandon the idea of an international treaty and rely instead on a policy of "personal protection" in which people would be encouraged to wear hats and sunglasses.¹⁴ Doniger broke the story of the "Ray-Ban Plan" to the *Washington Post*, the *Wall Street Journal*, and the TV networks. Hodel became a laughingstock, and the United States continued to push for a phaseout.

Consensus on an international treaty came together in Montreal in September 1987. Twenty-four countries agreed to cut CFC production 50 percent over 10 years.¹⁵ The United States ratified the Montreal Protocol the following year.¹⁶

NRDC applauded the Montreal Protocol but at the same time cited the need to move to a full phaseout of CFCs. A few months before ratification of the treaty, a major scientific study revealed that ozone depletion was occurring two to three times more quickly than predicted.¹⁷ The new data were not considered in the Montreal negotiations. When the EPA issued regulations under the Clean Air Act to cut CFCs by only 50 percent, Doniger brought a new lawsuit seeking stronger action.¹⁸ He also testified at congressional hearings, noting that neither the Montreal Protocol nor the EPA regulations had taken into account the Antarctic ozone hole. Closing the ozone hole would require a complete phaseout.



Act III: From Half Steps to a Full Phaseout

As the 1980s came to a close, NRDC continued the fight for stronger ozone protection on three fronts. First, NRDC, working with other environmental organizations, negotiated agreements with several industries to hasten their phaseout of CFCs. NRDC also worked with the auto repair industry on a standard for recycling CFCs when servicing car air conditioners, instead of letting them escape into the atmosphere. Several states eventually adopted these recycling requirements.

Second, NRDC successfully pushed for an amendment to the Clean Air Act. The new law, enacted in 1990, mandated the complete phaseout of CFCs and other powerful ozone-depleters. It established recycling requirements and a program to assure the safety of chemical substitutes. The new law even provided phaseout dates

for a second generation of ozone-depleting chemicals called HCFCs.

Third, NRDC worked to strengthen the Montreal Protocol, an effort that led to the London Amendment of 1990, under which parties to the treaty agreed to a complete CFC phaseout.¹⁹ Industrial and developing countries reached a precedent-setting schedule for phasing out developing countries' CFC production after a grace period of 10 extra years; they also set up a fund through which industrial countries would help developing nations cover the extra costs. As a result, China, India, and other major developing countries joined Montreal Protocol and agreed to a full phaseout.

The international phaseout schedule was further accelerated in 1992 in Copenhagen, where 87 countries agreed to ban CFC production by 1996.²⁰ The Copenhagen Amendment also added methyl bromide—an ozone-destroying pesticide—to the list of controlled chemicals. In 1997, countries agreed to phase out methyl bromide entirely by 2005, with limited exemptions for the most critical uses.²¹

Looking back, it is clear that most of the goals of the Montreal Protocol have been achieved. With few exceptions, nations have met their phaseout commitments on time. At the 20-year mark, scientific experts report that the production of 95 percent of all ozone-depleting chemicals has been eliminated.²² Though it will take until late in this century, there's a good chance that the Antarctic ozone hole will disappear and that the ozone layer will be healed worldwide.²³

As a side benefit, the CFC phaseout has been the most effective step yet taken to slow global warming. Because CFCs are heat-trapping gases, their virtual elimination has delayed the onset of global warming by approximately a dozen years.²⁴

Act IV: Unfinished Business—Methyl Bromide and HCFCs

But the job isn't finished.

The United States—the world's largest producer and user of the pesticide methyl bromide—was on track with its phaseout schedule through 2003, with production of the chemical reduced by 70 percent. Since then, however, playing to a few chemical makers and tomato and strawberry growers, the Bush administration has demanded thousands of tons of production exemptions each year. While the United States shirks its obligations, most other countries have eliminated their methyl bromide use or cut it by 90 percent or more.²⁵

The U.S. government has persisted in exemption demands on behalf of methyl bromide producers and users, even after NRDC published government data showing that American companies have huge stockpiles of the chemical on

hand.²⁶ NRDC has sued EPA for violating the Clean Air Act, and Doniger continues working within the Protocol to cut down the size of the annual exemptions granted to U.S. industry.

A new problem is the fast-growing use of methyl bromide in treating wood pallets and packaging to guard against invasive pests like the Asian longhorned beetle, a practice that has not been altogether effective. NRDC and several states are suing the U.S. Department of Agriculture to force a serious look at alternative packaging materials that could eliminate the bugs without any harm to the ozone layer.

HCFCs pose a different challenge. They are being phased out under the Montreal Protocol in industrial nations, and a freeze on production in developing countries will take effect in 2015. The problem is that production of these chemicals is growing much more quickly than expected in China and India, fueled both by rapid economic growth in those countries and by exports to industrial and developing nations.²⁷

At the urging of NRDC and other environmental groups, the United States has joined a half dozen other countries in proposing to tighten the HCFC phaseout schedule in both industrial and developing countries. China and India are playing a careful game, looking for additional financial support before agreeing to tighter requirements. These proposals will be the focus of attention when the countries meet in Montreal this September to celebrate the 20th anniversary of the ozone treaty. NRDC will be on hand in Montreal to press for faster action on HCFCs and on methyl bromide.

NRDC Awards for Ozone Protection

NRDC has received several esteemed awards for its work on ozone layer depletion, demonstrating leadership and dedication to solving this potentially disastrous global problem.

The Montreal Protocol Partners Award: During the celebration of the 20th Anniversary of the Montreal Protocol, the United Nations Environment Programme will present the Montreal Protocol Partners Award to NRDC recognizing our work on ozone layer protection and our critical role in the development and/or implementation of the Montreal Protocol.

The EPA Stratospheric Protection Award: David Doniger and Alan Miller received the EPA Stratospheric Protection Award in 1991 and 1992, respectively. The EPA established this award to recognize exceptional leadership, personal dedication, and technical achievements in protecting the stratospheric ozone layer. Thus far, the award has been presented to 509 individuals, organizations and teams from 42 countries.

The EPA Best-of-the-Best Stratospheric Protection Award: David Doniger and Alan Miller will be the recipients of the Best-of-the-Best Stratospheric Protection Awards on the occasion of the 2007 20th Anniversary of the Montreal Protocol. All award winners have demonstrated passion for stratospheric ozone protection, actions that have reduced and eliminated emissions and strengthened national and Montreal Protocol policy, leadership that inspires others, collaboration, capacity building, and/or strategic networking.

Lessons Learned

Success in the battle to save the ozone layer offers at least three lessons for those engaged in the fight to curb global warming.

First, recent attempts to discredit the science behind global warming resemble the efforts made in the 1970s to discredit Rowland and Molina and the science of ozone depletion. An industry campaign against the pair's findings delayed action against most CFC uses for nearly 15 years. The ozone layer would have suffered less damage and been easier to repair if nations had acted earlier. The lesson in the fight to curb global warming is that we cannot afford to delay acting any longer.

Second, industry officials exaggerated the difficulty of replacing CFCs. They were slow to acknowledge and adopt CFC alternatives. But in the late 1980s, industry changed its tune, and since then it has flourished. New refrigerators use no CFCs and far less energy than those made 30 years ago. Electronic components are made now to higher standards without CFC solvents. Fire protection systems have been reengineered without halons. The same pattern will follow when companies become fully committed to energy efficiency and clean energy technology.

Third, the United States played a vital leadership role on the international level in the battle to save the ozone layer. The EPA and the State Department led efforts to negotiate a strong Montreal Protocol. With the notable exception of recent behavior on methyl bromide, the United States has maintained its leadership for more than 20 years. Contrast this with the Bush administration's all-out opposition to the Kyoto Protocol and any serious efforts to curb global warming. To sum it up: The lesson from Montreal is that curbing global warming will not be as hard as it looks.

In the fight against global warming, the world stands at a crossroads. We can either continue down a business-as-usual path with dirty, outdated technologies, or we can move toward a low-carbon economy with energy efficiency and clean technologies. The United States can continue to be an obstacle, or our country can once again be a leader. As we take on the biggest environmental challenge of our time, the Montreal Protocol serves as an inspiration and a valuable reminder that we can indeed prevail.

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