



# RESOURCES FOR THE FUTURE

## 50 YEARS OF PATH-BREAKING RESEARCH

2002 marks our 50th anniversary. Throughout the year, we'll be taking a look at past achievements, hearing from special members of the RFF family, and keeping you up to date on upcoming anniversary events.

Come help RFF celebrate  
**50 YEARS** of  
PATH-BREAKING RESEARCH

October 15, 2002

The Ronald Reagan Building  
and International Trade Center  
Washington, DC

Join policymakers, journalists, academics, corporate executives, and environmental advocates at an all-day symposium designed to spur your thinking and imagination on the key obstacles and opportunities the world faces over the next half-century.

Speakers at the symposium, moderated by **Thomas Friedman**, Foreign Affairs Columnist for the *New York Times*, will include:

**Sergey Brin**, Co-Founder & President, Google Inc., on the *Promises and Perils of Technology*

**Lawrence. H. Summer**, President, Harvard University on *Governance and Global Markets*

**Robert M. Solow**, 1987 Nobel Laureate in Economics and Professor, Department of Economics, Massachusetts Institute of Technology, on *The Power of Ideas in the Public Policy Process*

**The Honorable Michael O. Leavitt**, Governor of Utah, and **Bill McKibben**, Author, *The End of Nature on 21st Century Environmentalism*  
*and*

**Christie Todd Whitman**, Administrator, U.S. Environmental Protection Agency

The symposium will be followed by a cocktail reception and black-tie gala. We hope to see you there! You can find out more on our special 50th Anniversary website:  
[www.rff.org/50th\\_anniv/save\\_oct\\_15.htm](http://www.rff.org/50th_anniv/save_oct_15.htm).

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# The Best of RESOURCES

IN EACH ISSUE, WE'LL BE HIGHLIGHTING ARTICLES FROM RESOURCES THAT HAVE STOOD THE TEST OF TIME.

## CONFRONTING FUTURE ENVIRONMENTAL CHALLENGES

*Allen V. Kneese*

*In a 1990 article honoring Earth Day's 20th anniversary, the late Allen V. Kneese offered a forward look at this country's environmental problems. Now twelve years later, his ideas are still very much on target. Always a graceful writer, Kneese also was noted for his creative approach to problemsolving and his generosity to his colleagues. He was among the first to promote the use of economic incentives to foster environmental change, an idea that was integrated into the 1990 Amendments to the Clean Air Act in the form of tradable permits for sulfur dioxide.*

The early 1970s saw the greatest outpouring of legislative initiatives ever on a single issue—the environment. Just a few months after the first Earth Day on April 22, 1970, President Nixon proposed the establishment of the Environmental Protection Agency, which would consolidate federal environmental programs. Earlier that year he signed legislation that established the Council on Environmental Quality and required environmental impact statements for large federal projects. Over the next 20 years, Congress would enact over 20 major environmental laws.

Perhaps more important than these legislative actions, however, has been the fundamental change in the attitude of the American public toward the environment.

The environmental concern that began emerging in 1970 has now so thoroughly penetrated American society that even industry has seen the need to cooperate in preserving environmental quality.

However, much of the environmental agenda of the 1970s and 1980s remains unfulfilled. Automotive and industrial emissions still diminish air quality and water quality has not improved much. Experts and private citizens still debate how and where to manage hazardous and household solid wastes.

Efforts to deal with these and emerging environmental problems will be complicated by several factors. First, sources of pollution are widespread and sometimes diffuse. Second, the effects of most kinds of pollution on human health and the environment are uncertain. Along with the first factor, this uncertainty makes the costs and benefits of environmental protection measures difficult to gauge. Third, some environmental problems are global in scope and cannot be managed through domestic efforts alone; international cooperation is required if they are to be effectively controlled.

For example, today the major pollutant in U.S. waters is from nonpoint sources, primarily agriculture. Runoff from cultivated land can contaminate water with agricultural chemicals, as well as deplete oxygen in water and add excess nutrients and salt to it. In addition, soil eroded from farmland can silt up reservoirs, destroy fish habitat, and constrict river channels, leading to increased flooding. It is likely that future water quality improvement will be possible only through further control of nonpoint sources of pollution.

## Milestones in RFF'S HISTORY

**1952** As a "sentinel" for America's natural resources, RFF receives initial funding from the Ford Foundation "to support the conservation, development, and use of natural resources."

**1958** In a landmark book, John Krutilla and Otto Eckstein recognize the need to identify all the consequences of dam construction and stream channelization.

Scientists now recognize that agricultural activities have far-reaching impacts on the environment. They even affect the earth's carbon cycle, which in turn affects weather and climate. For example, burning trees to clear land for cultivation releases carbon dioxide, which contributes to global warming and may reduce the earth's ability to absorb carbon through photosynthesis. As the effects of agricultural activities on the environment becomes clearer, the United States and other countries must determine which circumstances are likely to permit both indefinite development of profitable agriculture and environmental protection.

#### FACING THE FUTURE

Thus far, efforts to deal with both civilian and military nuclear wastes in a decisive way have come to naught. For some years, the Department of Energy (DoE), which is responsible for nuclear waste disposal in the United States, has been trying to find a place to store the most dangerous nuclear wastes—those that must be isolated from ecological systems for at least 10 thousand years. The search for a geological formation suitable for long-term storage of high-level nuclear waste has come to focus on Yucca Mountain in Nevada. However, political resistance from Nevada plus doubts about the geological integrity of the site have led to a standoff between the state and DoE.

Waste storage is not the only issue. Soil contamination exists at federal nuclear weapon facilities, including Hanford in Washington, Rocky Flats in Colorado, and Savannah River in Georgia. No one knows how much it

would cost clean up these sites or whether it is possible to do so for any amount of money. At present, the objective of nuclear waste management is to better shield the environment from nuclear waste than it has in the past. The estimated costs for doing so range into the hundreds of billions of dollars.

Discussion of this new generation of concerns often proceeds under the terminological umbrella “sustainable development,” a concept that spans a range of moral and economic considerations. Broadly defined, sustainable development encompasses continued improvements in the well-being of people in developed countries, improvements in the well-being of people in the developing countries, and protection and maintenance of a safe and attractive environment.

These goals cannot be achieved without a better understanding of the natural world than we now possess and a much greater ability to put that understanding into practical use through technology. Thus we have no choice but to make technology serve human interest better than ever before. In this context, the conventional distinctions among natural resources, the environment, and human resources blur. Indeed, the central focus becomes human knowledge, skills, and innovative and adventurous behavior, all of which are beyond our present ability to measure and assess, despite their clear importance. What we do know is that education is a prerequisite for most of them. That may be our greatest challenge for Earth Day 1990.

**1962** Harvey Perloff, Lowdon Wingo, and Wilbur Thompson begin work at RFF that leads to the creation of the field of urban economics.

**1966** Francis Christy and Anthony Scott's trailblazing work applies the principles of resource economics to the world's fishing stocks.

**1972** RFF Board Member Maurice Strong, Secretary General of the U.N. Conference on the Human Environment, organizes the first international conference focused on balancing development and environment needs, advised throughout by RFF's Hans Landsberg.

# Reflections

Molly K. Macauley

Movie, book, and fan club data show that *Star Trek* and *Star Wars* have over 30 million followers. I'm not one of them.

And yet, I spend a lot of time thinking about “out there”—space. I think of space as not just a place, but also a pretty important natural resource subject to scarcity, just like water, air, the oceans, and our forests. Space also is increasingly experiencing the effects of congestion and pollution. And, because it is an inherently global resource, these problems are international in their scope.

RFF has enabled me to apply the concepts and practical solutions that it has pioneered in addressing scarcity, congestion, and pollution. The issues confronting domestic and international space policy are fundamentally the same and can be addressed using RFF's “toolkit.”

In keeping with RFF's 50th anniversary year, it's interesting to recall that RFF actually pioneered innovative research in the economics of space. RFF-sponsored research in the early 1970s led to the publication of *The Invisible Resource: Use and Regulation of the Radio Spectrum*, by economics professor Harvey Levin. In the foreword, Joseph Fisher, then president of RFF, wrote: “When it was suggested to RFF's Board of Directors ... that it approve a grant in support of research for the work that has now resulted in this book, one of the directors suggested that, while the matter was really quite ‘far out,’ it was proper for a nonprofit research organization to make ‘venture capital’ available for such a purpose.”

Levin concluded that market-like mechanisms, rather than administrative hearings, would better allocate the increasingly crowded electromagnetic spectrum, or airwaves, to their myriad uses (ranging from radio, TV, and everyday telecommunications to wildlife tracking, astronomy, garage door openers, and national defense).

Levin's research paved the way for a change of

heart at the U.S. Federal Communications Commission, which in early 1995 conducted its first auctions of portions of the spectrum. By 1997, auctions had brought in more than \$22 billion and, more important, according to the *Economic Report of the President* for that year, the auctions got spectrum “quickly into the hands of service providers” and “rapidly promoted the use of innovative, advanced telecommunications technologies throughout the country.”

Years later, RFF funded my research on the use of economic approaches to managing another space-related resource, the nation's space transportation infrastructure, which consists of both government-owned resources (the space shuttle) and privately owned resources (conventional unmanned rockets). The research pointed out the advantages of granting vouchers to space scientists involved in astronomy, astrophysics, and other disciplines to enable them to choose their most appropriately sized and cost-effective form of space transportation for their payloads, rather than have government bureaucrats make this decision for them. In 1997, the U.S. Congress included a demonstration program for space transportation vouchers in its appropriations bill for the National Aeronautics and Space Administration. Much of the inspiration, as well as practical details in my work, were inspired by Levin's research.

The field of space economics and policy has grown from one or two economists during Levin's career to include scholars at Cal Tech, MIT, the Wharton School, and other institutions. I deeply appreciate the home that RFF has given me for space research, and the rich research environment that RFF offers for learning about and applying its legacy of theoretical, empirical, and policy contributions to one of our relatively new frontiers.

**Molly K. Macauley is a senior fellow at RFF.**

**1987** RFF creates the Center for Risk Management to help regulatory authorities identify, rank, and reduce threats to human health and the environment.

**1982** Paul Portney, John Mullahy, Alan Krupnick, and Winston Harrington begin a sustained research program on the effects of air pollution on human health and the way individuals value reduced risks of illness and death.

**1995** Katherine Probst and colleagues produce a series of publications shedding light on the Superfund program, focusing on how much cleanups will cost and who will bear these costs under alternative liability systems.