NICHOLAS ROBINSON – HE'S A REAL EVERYWHERE MAN

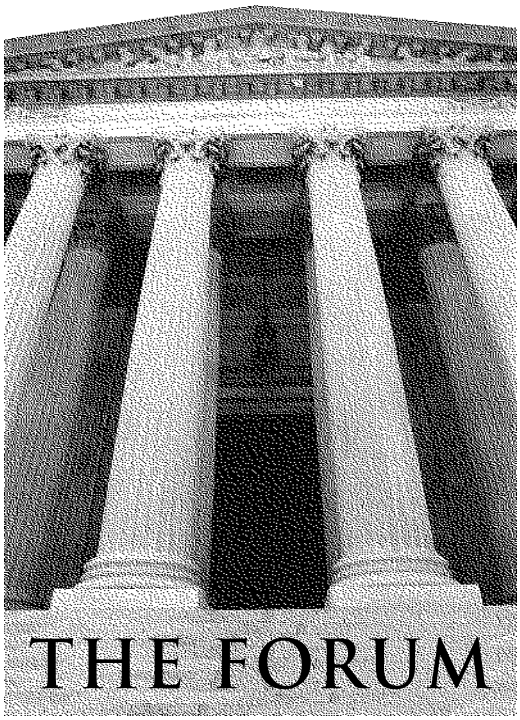
THE Environmental Forum®

THE POLICY JOURNAL OF THE ENVIRONMENTAL LAW INSTITUTE®

VOLUME 21, NUMBER 6 NOVEMBER/DECEMBER 2004

The Untold Story Of EPA's Response To Terrorism

THE AGONY OF CRITICAL HABITAT
THE ETHICS OF ENGINEERED NATURE



Could Giving Up On Pristine Nature Be A Positive Step?

Fifteen years ago, Bill McKibben startled environmentalists and Americans more broadly with his book *The End of Nature,* which concluded that there was no place on the planet unaffected by humans. Further, worsening environmental problems, mainly global warming, threatened not only an end to the pristine ideal but to the sustainability of the global ecosystem — nature.

Four years ago, Brad Allenby, then vice president for environmental health and safety of AT&T, wrote in this magazine that the environmentalist response to global warming, the Kyoto Protocol, "is fundamentally flawed." Using an end-of-pipe regime — a regulatory response — will cause large and unnecessary disruptions to society, as well as the natural systems society is linked to. Moreover, climate change is primarily an ethical issue, Allenby said

Thus he introduced Earth Systems Engineering and Management. ESEM recognizes that the earth is a system — or, rather, many closely coupled systems — and needs to be managed as such. These systems include the global carbon, water, and nitrogen systems — all now dominated by humanity and thoroughly integrated with our technology and economic and social systems — our agriculture, our energy, our cities, our manufacturing, our water supply. Considering the natural without the human is dysfunctional and doomed to failure.

Today, Allenby, now a professor of civil engineering at Arizona State University, makes an even bolder assertion. ESEM recognizes that for many if not most of our worst regional problems, *there is no going back to a pristine state of nature.* There are only ESEM solutions, those that accept human systems as part of an ongoing solution, and recognize that the future of these "path-dependent" regional systems can only be planned by accepting ethical responsibility for their future paths.

This is the case with the Everglades, with the Baltic Sea, with regional forest management plans, and it will have to be the case with the Aral Sea. That does not mean that environmental values such as avian biodiversity in the Everglades are ignored — but it does mean they have to be made explicit, and planned for, and balanced against the other forces at work in these regional systems. Humans have to finally take responsibility for what they have done, and are doing, in ways that are realistic and ethical.

For readers of this magazine in particular, says Allenby, with an ESEM approach, the policy question changes from, "How do we get back to the past?" to "What kind of world do we want?" thus dramatically changing the nature of the policy debate.

Brad Allenby
Professor of Civil Engineering
Arizona State University

"The question is not whether we should begin ESEM, because we have been doing it for a long time, albeit generally unintentionally. The only question is whether we will assume the ethical responsibility for what we are already doing."

René Castro Salazar
Minister for the Environment, Energy, and Mining (1994-98)
Costa Rica

"Professor Allenby's proposal is, by definition, a 'weak' sustainable development approach. Costa Rica seeks to be the first country to pursue a 'strong' sustainable development path, superior for humanity and for the global ecosystem."

William M. Eichbaum
Vice President, Endangered Spaces
World Wildlife Fund - U.S.

"I believe the simplicity of ESEM is founded on a false set of assumptions and an unfortunate view of the ethical nature of humankind's responsibility for the global commons. Also, there is a third way which will work."

David Rejeski
Director, Foresight in Governance Project
Woodrow Wilson International Center for Scholars

"Whether we have irrevocably changed earth's systems is not in doubt. The issue of whether we can return to an earlier pristine state is moot. What remains is a larger challenge: How to address a 100-year ethical failure undermining our fundamental relationship with the planet."

More Humility, And Try To Get It Right This Time

DAVID REJESKI

In 1893, the American historian Fredrick Jackson Turner published his famous essay on the closing of the American Frontier. The frontier, Turner argued, that geographic and psychic place over the next mountain, was gone, eroded by the westward progression of man. He delivered his thesis at the Chicago World's Columbian Exposition, a lovefest to all things modern, surrounded by displays of carbonated soda, Cream of Wheat cereal, and the latest in electrical appliances. An interesting juxtaposition of idea and artifact: nature pushed against the wall by the forward march of technological progress.

At that point in time, any illusions about pristine, yet-to-conquer lands disappeared. The tools were at hand to engineer the earth. Let's call this Earth Systems Engineering and Management I, the intro course. By 1893, we had steam power, electricity, chemical synthesis, and the internal combustion engine. We had the telegraph, and the beginnings of a global information infrastructure

after the first successful transatlantic cable was laid in 1858. The impacts of our early engineering attempts had already gone global. The Swedish chemist Svante Arrhenius described that basic mechanism behind global warming in the late 1890s.

But most important, we had systematized invention. The greatest innovation of the late 19th century was the development of a rational approach to the process of innovation itself. Thomas Edison's laboratory in New Jersey was a testimony to this new approach to applied research. We became serious about the concept of management: the management of research, the management of production, the management of people, and the management of just about anything that succumbed to quantification.

Our so-called control of nature was a hollow victory, and some saw it coming, like Emerson, Thoreau, and later John Muir, H. G. Wells, and Lewis Munford. But for the most part, humans applied technology with a vengeance to unruly natural problems. Engineering ruled, and engineering schools flourished (Columbia University launched its engineering school in 1864, Stevens in 1870, Lehigh in 1885, Tulane in 1894, and Tufts in 1898).

But ESEM 1 evolved in an ethical vacuum. There was no public debate about when, how, or whether to intervene in large natural systems. Systems analysis did not exist, let alone systems analysis with an ethical bent. By the time Aldo Leopold talked of his "land ethic" in 1949, large swathes of the natural environment were under the control of the engineers, including many major rivers and parts of the Everglades. Social theorists like E. F. Schumacher, architects like Paolo Soleri, planners like Ian McHarg, and designers like Victor Papanek challenged people to reflect about the social and ethical dimensions of their interventions, but their impact was short-lived.

Providing an ethical fix for engineering proved difficult. Attempts to "humanize" the profession bordered on the comical. In the late 1960s, many engineering schools introduced liberal arts into their curriculum, forcing recalcitrant geeks to study the great philosophers.

Now comes ESEM 2, the advanced course (no prerequisites required). ESEM 1 was largely a top-down, messy affair compared with what the future has in store for us mortals. Now that we have sequenced the human genome and can manipulate matter at an atomic and molecular level, bottom-up engineering of the earth can take off in earnest. The civil engineers, the old alpha males of the built world, will take a back seat to the nanotechnologists and microbiologists. But, as Bill Joy recently noted, "good science is not necessarily beneficial science." The same holds true for engineering.

Once we start engineering DNA and moving atoms at a nanoscale, the ability to duck the responsibility for our actions quickly erodes. Sure, we can always outsource ethics to a bunch of social scientists and philosophers — a technique pioneered by the Human Genome Project and now applied to any new field we think may throw embarrassing moral issues our way. This pretty much ensures that the scientists and engineers will have a free reign to work their magic on earth's systems free of nagging ethical doubts. If this technique does not work, setting up a "commission" or "task force" is a good diversionary tactic and bound to keep the press away from the halls of science and engineering.

But the speed of change requires that ethical issues be anticipated and addressed upstream in the discovery process and who exactly has that responsibility? Or wants it? In addition, the convergence of disciplines — nano and biotech or nano and infotech — means that tricky social challenges will emerge between disciples, areas where few policymakers dare to venture.

So ESEM 2 is likely to follow ESEM 1 down that old twisted path of ethical irresponsibility, with an occasional detour forced on us by pangs of conscience about responsibilities to future generations. Today, however, given the tools of engineering, the stakes are much higher. Whether we have irrevocably changed earth's systems can no longer be in doubt. The issue of whether we can return to an earlier pristine state is moot. As Harvard biologist E. O. Wilson once noted, trying to "engineer" complex ecosystems is like trying to unscramble eggs with two spoons. What remains is a larger challenge: How to address a 100-year ethical failure undermining our fundamental relationship with the planet. We might start with a little humility and a collective commitment by our universities and governments to getting it right this time around.

David Rejeski is Director of the Foresight and Governance Project at the Woodrow Wilson International Center for Scholars in Washington, D.C. He is also a member of the EPA Science Advisory Board.