WATER MONITORING IN THE AGE OF INFORMATION

Remarks

by

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Good morning and thank you for this opportunity to address this very necessary workshop of the New Jersey Water Monitoring Coordinating Council.

While this is only my second trip to New Jersey, my memories of my last trip here are happy ones since I had the opportunity to enjoy your great beaches and shores on a visit to Barnegat Light, on Long Beach Island, home of the second tallest lighthouse in the country, I am told.

I am grateful for the opportunity to discuss a topic which has occupied my thoughts for many years. That is, how do we bring ambient water quality monitoring to the forefront of water management? I also look forward to hearing your thoughts on this issue of paramount concern to all of us who want to protect and restore the chemical, physical, and biological integrity of our nation's waters.

First, I would like to provide the context for my interest in and support for water monitoring as a top priority of watershed management. This has to do with my belief in the power of information and its role in effective environmental policy and management, generally.

An important milestone in my appreciation of the power and effectiveness of information-based environmental policies was the enactment, by Congress, of the Emergency Planning and Community Right to Know Act (EPCRA) in 1986. This law established the Toxic Release Inventory (TRI) first published in 1989, encompassing 329

chemicals, later increased to 600 in 1995. The initial inventory stunned EPA which, after various adjustments, came in at approximately 7 billion pounds. In the first week after the TRI became available through the National Library of Medicine, 225 subscription requests were logged from organizations all over the country. A list of the top five hundred emitting companies appeared on two pages of USA Today on August 1, 1989.

The publication of this inventory—then and now—is monitored closely by corporations, environmental groups, EPA, state regulatory agencies, and the media. It was the basis for new restrictions on 189 hazardous air pollutants (HAPs) in the Clean Air Act Amendments of 1990.

While concurrent and prospective regulations contributed to steady reductions in the TRI, the mere assemblage and publication of this information was a key driver for pollution prevention, toxic use reduction, and generally improved environmental performance. I cannot tell you how many corporate Environmental, Health, and Safety (EHS) officials have told me how they work hard to get to the bottom of the emissions rankings. Their focus on pollution prevention and general good housekeeping is sharpened by the TRI just being out there in the public domain.

Thus, from 1998 through 2004, the amount of toxic chemicals released has declined by 45 percent as reported by EPA just last Wednesday (April 12th). Not bad for a law with a relatively light touch at least in terms of traditional regulation.

The Environment and the Age of Information

A friend and former EPA colleague, Daniel Esty, Professor of Environmental Law and Policy at the Yale School of Forestry and Environmental Studies and the Yale Law School, has provided us with a vision of a data-rich, information-based environmental policy regime of the not-too-distant future:

"What if each increment of SOx or NOx emitted from a smokestack could be tracked to where it landed downwind? And what if the 'fate and transport'…of nitrogen and phosphorous in runoff from farm fields or suburban lawns easily could be determined? Would things not be different if automobile emissions of volatile organic compounds (VOCs), particulates, and other pollutants could be 'tagged' and traced as they flowed from tail pipes to the 'receptors' that absorbed them?"

Professor Esty insists this is not a farfetched vision. "Computers, wireless communications, remote sensing, and other technological breakthroughs are reshaping every facet of modern life by vastly increasing our capacity to collect, disseminate, and utilize information," he maintains.

Dan Esty sees environmental harms becoming more visible and easier to trace with better modeling and prediction of impacts. Environmental protection becomes, in his words, "more data-driven, empirically grounded, and analytically rigorous. And heightened

transparency will draw participants into environmental decisionmaking and democratize the policy process."[1]

This new Age of Information, in the realm of environmental policy, will present new and varied options to policy makers and stakeholders at the federal, state, and local levels, as well as in the private and not-for-profit sectors. Transaction costs, say, for market-based approaches such as trading will be reduced. Private parties, in the vanguard of the land trust and corporate sustainability movements, will anticipate, supplement, or even eliminate the need for regulatory action in light of new data and information, readily accessible to all.

But let's return to the present realities which vex us.

The Clean Water Act and the Wrath of the Gods

The recently deceased Peter Drucker, the godfather of management theory and practice, once said, "Whom the gods would destroy, they first give forty years of success." He made this statement with reference to the imperative for institutions—private, public, and not-for-profit—to change in the light of new circumstances.

33 years after the enactment of the nation's Clean Water Act (CWA), we are creeping up on that 40-year mark. And the gods are not pleased. We see a flattening out of the

[1] Esty's seminal article, *Environmental Protection in the Information Age*, appears in the April 2004 issue of the New York University Law Review.

upward curve of progress. We confront seemingly intractable problems, primarily coming from our inability to grapple with diffuse, polluted runoff, so-called nonpoint source pollution, which in its agricultural aspect is mostly unregulated, and only imperfectly so in its urban or stormwater aspect.

The numbers are, no doubt, familiar to all of you. 39 percent of assessed river miles, 45 percent of assessed lake acres, and 51 percent of assessed estuary square miles are impaired—not meeting water quality standards. Of course, the very adequacy and accuracy of these assessments are the subject of lively debate. Hence the reason for our gathering here today. The hypoxic zone in the Gulf of Mexico, the Chesapeake Bay, and many other bodies of water are impacted largely by nonpoint source pollution or stormwater runoff.

A quarter of the total nitrogen load to the Chesapeake comes from atmospheric deposition, 75 percent of it falling on the land and then running off into the water. In Michigan, my adopted state, all 11,000 inland lakes are under fish consumption advisories for mercury, close to 90 percent of it coming from the air.

As we have all come to understand, just about any human activity on the land can generate diffuse, polluted runoff. Suburban lawn care, paving of impervious surfaces, row crop agriculture, livestock operation, golf courses, construction, and industrial activity—all are examples of the many sources of contaminants such as sediment, nutrients, pesticides, and pathogens.

With respect to these numerous sources, throughout the watershed, water quality managers are "playing without the ball." So many of the activities generating pollution or disruptions of natural flow regimes are often within the province or control of other persons or entities such as USDA, local governments, private businesses and individuals.

We are seeing, clearly, the insufficiencies of the old categories of water management. A theologian once said that truth is symphonic. At the risk of mixing metaphors, water quality managers need to act like a kind of conductor of numerous jurisdictions, authorities, and stakeholders who or which can help address the many challenges to protecting our waters and the entire watershed upon which they depend.

Knowing the Score

But a conductor cannot lead the orchestra, and an orchestra cannot follow the conductor, without a score. Translated into water quality terms, all the stakeholders in the watershed need to know the object of all their strivings and a means of guiding and measuring the success of those watershed protection efforts. In other words, they need to have sound, attainable water quality standards as well as a robust, functioning system of ambient water quality monitoring.

Water monitoring and assessment programs in the United States are at a historic turning point. We have collected years of data of all types and sources, yet today we cannot

describe, in a scientifically defensible way, the quality of our water. That is at least the case at a national scale. Moreover, we cannot quantify the progress we have made to date in cleaning those waters, nor where we need to go to fix remaining problems. We are "flying blind" or, probably, by the seat of our pants, when it comes to making decisions about how best to address water quality problems and allocate our limited resources for cleanup, pollution prevention, and restoration.

Farm Bureau chapters in the two states in which I served as a government official used to complain bitterly about the inadequacies of and technical difficulties with such measures of water quality as exist today. So it was a sobering, uncomfortable, experience for me when EPA released its *Draft Report on the Environment 2003*. The chapter on water quality, which was intended to address the condition of U.S. waters and watersheds, concluded that "…at this time, there is not sufficient information to provide a national answer to this question with confidence and scientific credibility." With the exception of coastal areas, the report is agnostic on the question of the health of the waters of the U.S.

As Reverend Ike said, lack of money is the root of all evil. That is at least part of the problem as documented in reports by the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). States are operating with half the needed resources. In Michigan we were able to restore a robust monitoring program by including $45 million in a state bond issue in order to guarantee a dedicated revenue stream over 15 years. But opportunities like that do not come along that often. We have

all experienced those budgetary crises in which water monitoring is one of the first things put on the chopping block.

Still, the gaps in our monitoring program remain. GAO, the National Academies, the National Research Council, the National Academy of Public Administration, and the H. John Heinz III Center for Science, Economics, and the Environment have all pointed out that because of the lack of comprehensive, national-level data, potentially serious pollution problems are going undetected. Moreover, data gaps limit the states' ability to carry out key management and regulatory activities; and we cannot document whether our nation's pollution programs are improving water quality.

There are, of course, understandable historic and statutory reasons for our predicament. The first decades after passage of the CWA, at the direction of Congress, were focused almost exclusively on imposing, end of the pipe, technology-based effluent guidelines on the point sources through the permitting process. Congress did not want to allow any "paralysis by analysis" and declined to match control requirements to the receiving water's water quality or lack thereof. This was a sound political judgment at the time. Most of the progress these past decades resulted from this clear direction to regulate the point sources of pollution without delay. The law basically said: Just do it! If there was monitoring to be done, it was generally for purposes of compliance, again, end of pipe.

Only after the imposition of these technology-based requirements, often inadequate to achieve the designated uses for swimming, fishing, and drinking would the water quality-

based standards kick in. We are now right in the midst of this transition stage in which we are coping with a new era of nonpoint sources, water quality standards, TMDLs, and, our fledgling system of ambient water quality monitoring.

I can tell you that the failure to track progress, or to target resources, hurts the National Water Program and all of the state programs which are delegated to carry out the CWA. Policy makers and budget appropriators are constantly seeking some validation that investments are yielding results and are performance-based. OMB, the Hill, EPA's Chief Financial Officer, and the public are demanding outcomes before they will part with limited taxpayer dollars. Whether we like it or not, we all sink or swim together in this respect.

For all these reasons, I say, again, that establishing a robust ambient water quality monitoring program is of paramount importance. It will validate our efforts in restoring the waters of America and, hopefully, yield greater political support. It will allow for effective, targeted mobilization of limited resources by all levels of government, especially local governments which are the major players in the area of land use. The private and not-for-profit sectors (watershed organizations, land trusts, soil and water districts) will focus their resources on the same priorities and measurements of progress.

I believe there are four critically important steps we need to take to achieve our goal of better monitoring for better water management.[2] Happily, I believe this workshop

[2] I offered a more detailed description of these recommendations in my article, "Monitoring is the Key," Water Environment & Technology (Water Environment Federation), November 2003, p. 24.

embodies the four steps I am going to outline. Chalk it up to the fact that great minds think alike! Here they are:

First, we need to improve and strengthen state monitoring programs so that they can generate credible, comparable, comprehensive information.

Second, we must develop and promote the use of multiple monitoring tools such as statistically based surveys, predictive monitoring, and remote sensing to support the full range of water quality decisions. Statistically based surveys, for example, provide a scientifically rigorous way to sample a subset of waters and then provide an estimate of the quality of all waters.

Third, we must improve electronic data systems to manage and share monitoring information and make data more accessible to the public.

Fourth, and perhaps most importantly, we must build stronger partnerships at the federal, state, and local levels to facilitate the sharing of comparable data and the use of multiple monitoring tools. Something like the New Jersey Water Monitoring Coordinating Council would do the trick, I should think. With all due respect to Reverend Ike, money is a necessary but not a sufficient condition of success in this undertaking. Without effective coordination we could waste a lot of money without achieving the goal.

Given the inevitable limitations on available resources, the pressure to monitor performance or results coming from policy makers, and the need to inform the many and varied stakeholders involved in watershed protection—public, private, and non-profit—I am persuaded that almost all other priorities in the National Water Program are secondary to the necessity of developing sound water quality standards and a system of monitoring progress, or lack thereof, against them.

I know that this may sound like an extreme position, but I fear we are losing the support of the public and their elected representatives, at both the state and federal levels, because of our inability to demonstrate, clearly, what progress we have made and how we can pinpoint the next steps to cost-effectively restore the waters of the United States. *Tempus fugit* ("Time flies").

T.S Eliot once said that between the idea and the reality falls the shadow. We are a long way from creating an optimal system of ambient water quality monitoring which accounts for the biological and physical components of the ecosystem along with the chemical. But hope is a virtue. And, with any luck, the gods will reward both our hopes and our hard work as we manage the entire watershed in this challenging, exciting Age of Information. Thank you for your attention.