

*CATCHING UP:  
ALIGNING MANAGEMENT, LAW, AND REGULATION  
WITH THE WATERSHED APPROACH*

KEYNOTE ADDRESS

DELIVERED BY

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Good morning. Thank you for the opportunity to address this very impressive conference dedicated to effective management of urban water issues. Water and wastewater utility managers face a wide array of challenges touching upon matters of water quantity, quality and flow regimes, all of which are relevant to restoring the chemical, physical and biological integrity of the waters of the United States.

These challenges go well beyond traditional regulation and management of discharges from big pipes, the so-called point-source discharges, and encompass a daunting range of issues implicating the landscape in which our rivers, streams and lakes are embedded.

Whether it be the need to address unregulated, diffuse runoff from agricultural nonpoint sources such as row crop agriculture, or imperfectly regulated stormwater runoff flowing off impervious surfaces—roads, sidewalks, parking lots, and rooftops—during urban wet weather events, water utility managers have a very full plate, indeed.

Water management at the scale of the surrounding landscape is hardly a new vision, but one long denied in the U.S. The great western explorer of the Colorado River, and second director of the U.S. Geological Service, John Wesley Powell, recognized the importance of watersheds as evidenced by this statement he made to the Montana Constitutional Convention in 1889:

I want to present to you what I believe to be ultimately the political system which you have got to adopt in this country, and which the United States will be compelled sooner or later ultimately to recognize. I think each drainage basin in the arid land must ultimately become

the practical unit of organization, and it would be wise if you could immediately adopt a county system which would be convenient with drainage basins.<sup>2</sup>

No doubt, we will have to live with our existing political boundaries given the sensible conservatism inherent in our constitutional form of government and the passage of time which has sanctioned these arrangements. We will have to manage over, under, around, and through these boundaries by means of imagination, collaboration and partnerships between the public and private sectors and at varying levels of government.

But the fundamental truth remains: you cannot improve water quality without sustainably managing the landscape, the watershed if you will, in both the rural and urban contexts. There are many examples of this basic reality to be found in numerous communities and watersheds, at multiple geographic or spatial scales. Let's look at just two of the biggest interstate challenges facing America today.

I recently had the privilege of serving on a committee of the National Academies' National Research Council on the Mississippi River and the Clean Water Act which looked at the river itself as well as its relationship to the Gulf of Mexico with its ever-growing hypoxic or "Dead Zone."

Today we are gathered within that 41 percent of the land mass of the lower 48 states which drain into the Gulf of Mexico from the Mississippi, Missouri and Ohio River basins. Now that's a watershed!

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<sup>2</sup> Quoted in Daniel Kemmis, *This Sovereign Land: A Vision of Governing the West*, Island Press 2001, p. 177.

In its final report<sup>3</sup>, issued in October 2007, the committee noted that almost 90 percent of the nitrogen flowing into the Gulf of Mexico, the primary cause of its over-enrichment and oxygen depletion ( hence, the “Dead Zone”), comes from unregulated, diffuse, nonpoint source pollution or runoff, including approximately 58 percent from fertilizer and mineralized soil nitrogen. This means that the federal Clean Water Act, enforced largely through state delegated programs, cannot address these concerns because they are not regulated “point sources” or discharge pipes in the water.<sup>4</sup> These sources are beyond the reach of the Act. Therefore, an exclusive focus, end-of-the pipe, on such traditional pollution sources, will not yield any significant improvements in the Gulf of Mexico.

To put it another way, the 2007 Farm Bill, with its massive conservation programs, may be of greater importance to reducing nonpoint source pollution rather than the Clean Water Act. Unfortunately, its conservation benefits may be partially offset by federal subsidies for ethanol production and corn growing which result in more acres planted and treated with more fertilizers and other inputs, resulting in more nonpoint source pollution or runoff.

Moreover, Washington does not effectively target or deploy these vast financial resources in a cost-effective manner to achieve the highest environmental or water quality benefit,

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<sup>3</sup> *Mississippi River Water Quality and the Clean Water Act: Progress, Challenges, and Opportunities*, available at [www.nap.edu](http://www.nap.edu)

<sup>4</sup> I have discussed the limitations of the Clean Water Act, 35 years after its enactment in “The Clean Water Act: An Effective Means To Achieve a Limited End,” *Water Environment & Technology*, October 2007, pp. 33-39.

much less focus them on watersheds of truly interstate or international concern. They distribute these dollars in the broadest manner possible consistent with political necessity.

The Chesapeake Bay, another large-scale watershed, encompassing parts of six states and the District of Columbia, has implemented state-of-the-art water quality criteria for nutrients which are now being implemented in the water permits of all regulated point sources in the basin. However, EPA and its state partners estimate that agricultural nitrogen loads are approximately 40 percent of total nitrogen pollution. This is a combination of atmospherically deposited nitrogen, chemical fertilizer applications, and animal manure applications.

For phosphorus, another nutrient impacting Bay water quality, 45 percent of total loads to the tidal waters come from agricultural lands, primarily due to chemical fertilizer and animal manure applications with atmospheric very minimal.

While agricultural nonpoint source pollution is a major challenge on the Chesapeake Bay, a more ominous challenge is the growth of impervious surfaces—roads, sidewalks, roofs, parking lots—which results in more stormwater runoff and accelerated velocities which destroy streams and tributaries. You might be able to change agricultural practices over time; but once you pave Paradise, it is very difficult to retrofit the urban landscape.

Between 1990 and 2000 impervious surfaces in the Bay watershed increased from 611,017 to 860,004 acres. At that rate, an additional 250,000 acres will become

impervious by 2010 as economic growth and the quest for prime real estate usher in their usual foreseeable consequences: traffic congestion, deforestation, polluted runoff, and the loss of natural systems—terrestrial as well as aquatic.

The Potomac Conservancy recently issued its report, *State of the Nation's River: Potomac Watershed 2007* giving this tributary to the Chesapeake Bay a D+ grade for over all health primarily due to stress from poor land use.<sup>5</sup> Full disclosure: I am a member of the board of this organization.

The amount of the developed land in the watershed has doubled since 1970. In the next 20 years, the population of the Potomac watershed is expected to grow 10 percent each decade, adding one million inhabitants. For every 8 percent increase in population, count on a 41 percent increase in impervious surfaces. Again, this will result in loss of forest cover and an increase in impervious surfaces, more pollution, and something called “urban stream syndrome.”

“Urban stream syndrome” is characterized by “flash flooding,” elevated nutrient and contaminant levels, altered stream morphology, sedimentation from eroded stream banks, and loss of species diversity.

So what is to be done?

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<sup>5</sup> This report is available at [www.potomac.org](http://www.potomac.org)

There is almost no direct regulation, say, of row crop agriculture. Some USDA farm programs require certain best management practices and large livestock operations are permitted. This is not likely to change anytime soon. So conservation dollars to encourage sound practices on the land, derived from either the Farm Bill, state and local government, or private watershed or land trust organizations, will be the tool of choice for some time. Water quality trading between point and nonpoint sources might also accelerate better practices on the land at least cost. State departments of agriculture, land grant colleges, and extension agents will hopefully assist agricultural producers to find cost-effective, even profitable ways of reducing inputs and thereby reduce pollution. And states may choose to use their own legal authorities to pursue regulations to complement and “incentivize” market-based approaches.

Land acquisition of either fee simple interests or conservation easements, by private land trusts or state and local governments, offers new opportunities for addressing watershed issues. Between 2000 and 2005 the private land trust movement doubled in size, now protecting an area 16 and ½ the size of Yellowstone National Park. According to the National Land Trust, it is not out of the question that 49 million acres will be conserved by such trusts by 2015. The Potomac Conservancy has acquired almost 11,000 acres of conservation easements on headwater tributaries of the Potomac River for the benefit of both the river and the Chesapeake Bay.

And according to the Trust for Public Land, the general election of 2006 saw 130 conservation funding measures on state and local ballots, of which 104 passed,

authorizing \$6.4 billion in new funding—a success rate of 80 percent. This was the most money ever raised for conservation in a November election as of that date.

This past November 2008 Minnesota voters approved the Clean Water Land and Legacy Amendment, the largest conservation ballot measure in U.S. history, which dedicates unprecedented funding to protecting water resources, water quality and natural lands.<sup>6</sup> It passed by a margin of 56 percent and will be financed by an increase in the state's general sales and use tax rate by 0.375 percent to generate \$7.25 billion over the next 25 years. These are all indicators of our society's increasing appreciation of the link between land management and water quality.

Of course, New York City's filtration avoidance program in Upstate is still the Mother of All Watershed Plans.

To meet the challenge of urbanization and the explosion of impervious surfaces, protecting open space and residential clustering (“Smart Growth”), Green Infrastructure, and Low-Impact Development (LID) must become the wave of the future in order to avoid or reduce hardening of the landscape and retain water on site, thus eliminating stormwater runoff through infiltration and evapotranspiration.<sup>7</sup>

The goal is to imitate pre-development conditions to the maximum extent possible.

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<sup>6</sup> See “Gaining Voter Support for Clean Water Initiatives,” by Jeff Gunderson, *Water Environment & Technology* (Water Environment Federation), March 2009, p. 16.

<sup>7</sup> A good reference and introduction to these tools is EPA's report, *Protecting Water Resources with Smart Growth*, EPA 231-R-04-002, May 2004.

Urban reforestation, wetlands restoration, green roofs, rain gardens, vegetated curb extensions, permeable pavement, and many, many more techniques need to be utilized and implemented at a scale sufficient to improve water quality and protect stream habitat. They must become the rule rather than the exception in both older cities and newer suburban developments. All of these practices accomplish water quality goals while creating aesthetic benefits and habitat, mitigating urban heat island effect, and reducing energy intensity. They also sequester carbon and avoid or limit gray infrastructure costs. Most of these same benefits are captured through the deployment of agricultural Best Management Practices (BMPs), too.

What's not to like?

Philadelphia, Chicago, and Portland, Oregon, are a few of the communities which are on the cutting edge of this movement. Another entrant to the field, Kansas City, Missouri, has set a goal to plant 10,000 rain gardens.

Right here in the neighborhood, Independence, Missouri has re-vegetated four regional detention basins with native plants which develop dense root systems with tremendous capacity to infiltrate stormwater and remove pollutants, while offering delightful aesthetic benefits to the community. The City has also adopted a Stream Buffer and Setback Ordinance in 2005, a tactic adopted by many communities in the Chesapeake Bay watershed including my adopted hometown of Vienna, Virginia.

In my wife's hometown, the Milwaukee Metropolitan Sewerage District (MMSD), having spent billions (with a "b") on an underground tunnel to capture and reduce combined sewer overflows (CSOs), successfully reducing the number from 50 to 2 per year, still confronts beach closings on Lake Michigan due to stormwater and nonpoint source pollution from impervious surfaces and agriculture. It is promoting disconnection of downspouts and use of rain barrels, and urban reforestation. It is working with The Conservation Fund, a national land trust to buy and restore floodplain lands, both to manage flooding and to reduce stormwater runoff. MMSD's "Greenseams" program has already protected 1,800 acres with more to come.

MMSD hopes to build a broad web of partnerships, including the agricultural sector and local governments, to address water quality issues from a truly watershed perspective. It has promoted the formation of the new Southeast Wisconsin Watershed Trust to provide a credible vehicle for all stakeholders-public, private and not-for profit- to address the land-based stormwater issues in six sub-watersheds in its service area, all tributary to Lake Michigan.

We are not going to make significant progress on the nation's water quality without coming to grips with the land-based threats embodied in agricultural and urban stormwater runoff from impervious surfaces. This is a "town-and-country" problem which can only be solved by taking the watershed approach and developing the

partnerships—public, private, and non-profit—and governance structures necessary for success.

Unfortunately, our legal and regulatory structures have not caught up with current thinking regarding the benefits of the watershed approach in cost-effectively addressing urban watershed issues, wet weather issues most especially. Today, matters such as Combined Sewer Overflows (CSOs), stormwater runoff, traditional point sources and nonpoint sources are still treated as stovepipes, separate and distinct from one another.

To my knowledge only Portland, Oregon, for instance, has actually been able to incorporate, formally, Low-Impact Development (LID) techniques into its Long-Term Control Plan (LTCP) for its CSOs. Several communities (You know who you are!) have had extended discussions with federal and state regulators trying to incorporate LID, green infrastructure and land use changes into their NPDES permits and consent decrees relating to CSOs. There is a great deal of interest, but not a lot of movement in this area. The integration of robust green infrastructure, LID and Smart Growth techniques should be incorporated into consent decrees, LTCPs and permits. This needs to become more routine and not just exceptional or an add-on to a Supplemental Environmental Project (SEP) as part of a court settlement. It needs to become a standard permitting matter rather than an enforcement matter.

Clean Water Services in Hillsboro, Oregon, on the Tualatin River, is a great example of a utility which has been able to adopt watershed-based permitting and trading principles

into the heart of its permits as a means to address issues such as nutrients, bacteria, flow, temperature and Endangered Species Act issues. The Oregon regulators deserve some credit, too. We need to see more of this kind of thing throughout America.

Recently, a committee of the National Research Council issued a report on the nation's stormwater program recommending the use of flow as a common metric in stormwater permitting rather than simply attacking each pollutant or parameter one by one. It also suggested using a watershed-based permitting approach.

While the NRC report does not resolve the many legal issues relating to the authority<sup>8</sup> both to use flow as the key parameter and gather stormwater agencies and sources under one watershed-based permit, it is pointing in the right direction.

Again, EPA has had guidance on the books for at least six years setting out, clearly, how watershed-based permitting could be accomplished in a way which is less costly and more environmentally beneficial than traditional permitting. From my perspective the entire range of urban wet weather issues, not to mention point and nonpoint sources, could be incorporated into a watershed-based permit to save money and to generate multiple environmental benefits stemming from more flexible and extensive deployment of agricultural BMPs, green infrastructure, LID and other non-traditional means of restoring water quality and more natural flow regimes.

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<sup>8</sup> "EPA Seeks General Counsel's Advice On Regulating Stormwater 'Flow'," InsideEPA.com, March 18, 2009, [http://www.insideepa.com/secure/docnum.asp?docnum=3182009\\_stormwater](http://www.insideepa.com/secure/docnum.asp?docnum=3182009_stormwater) (access for subscribers).

Sound standards, adequate monitoring, robust partnerships and a receptive regulatory environment are necessary preconditions for this vision to become a reality.

Aside from the novelty of these approaches, a formidable obstacle is the shortage of staff and resources in EPA regional offices and, most critically, state-delegated programs. State officials are basically trying to keep two assembly lines moving: NPDES permits and TMDLs. Anything new or out of the ordinary, which requires some perceived difficulty or customization, is viewed with apprehension for fear of slowing down the line. Moreover, given the notorious turnover rate among permit writers, the supposed or perceived difficulty is another barrier to adaptation of watershed-based techniques.

Still, the glass is half full. There are many exciting things happening in the area of urban water management as will become evident in the course of this conference. In order to maintain forward momentum in restoring the chemical, physical and biological integrity of our waters and watersheds, water managers and regulatory agencies need to embrace, more fully, policies and practices which put a premium on green infrastructure as much as grey, land as much as water, the nonpoint as much as point sources. They need to focus on sustainable approaches which are less energy intensive, generate multiple environmental benefits and save ratepayers' money, all while enriching the communities in which they are located.

Achieving these goals cries out for creativity and innovation in the realms of law and policy as much as science and technology. This conference certainly offers an

opportunity for all of us to pool our knowledge, experience and expertise in service of more effective watershed management, keeping faith with the vision of John Wesley Powell.

Thank you for your attention.

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