

*THE WATERSHED APPROACH
AND
STRATEGIES FOR IMPLEMENTATION*

AN ADDRESS

BY

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TO THE

CLEAN RIVERS, CLEAN LAKE VI
WATERSHED PLANNING CONFERENCE

DISCOVERY WORLD AT PIER WISCONSIN

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Your Honor, Mayor Barrett, Mr. Brennan, Kevin, Pat, ladies and gentlemen:

It is a pleasure to be with you here today, in my wife's hometown, to celebrate the tremendous leadership of the entire Milwaukee community in urban watershed protection and Lake Michigan restoration. I hope that I can offer you some useful thoughts derived, in part, from my years of experience working on Great Lakes issues and implementing the National Water Program during my tenure at EPA.

I am impressed with your program for this sixth conference on the theme of Clean Rivers, Clean Lake; and I applaud your efforts to apply watershed principles to the entire matrix of urban wet weather issues-stormwater, combined sewer overflows (CSOs), regulated point source dischargers and even unregulated nonpoint sources or diffuse runoff from agricultural areas.

Water management at the scale of the surrounding landscape, basin or drainage is hardly a new vision, but one long delayed 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 his statement 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.²

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. However, we must undertake to manage over, under, around, and through these boundaries by means of imagination, collaboration and partnerships between the public and private sectors and multiple levels of government.

Confronted with the need to integrate land and water, point and nonpoint sources, groundwater and surface water, town and country, water and energy, across multiple jurisdictions by means of public-private partnerships and a diverse group of stakeholders, a water or wastewater utility operator finds him or herself “playing without the ball.” In other words, so many of the tools and authorities he or she needs to address watershed challenges are often in the hands of other players, be they local governments, public works departments, highway commissions, planning and zoning authorities, private property owners, farmers, developers, public and private land managers, urban foresters and land trusts³ to name just a few.

Consider for a moment this list of Low-Impact Development (LID) or “green” infrastructure methods necessary to reduce stormwater runoff, maintain water on site, and

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

³ I have previously discussed the role of private land trusts in watershed protection in both the rural and urban wet weather settings. See G. Tracy Mehan, III, *The Role of Land Trusts in Great Lakes Restoration*, Keynote Address Delivered To The Great Lake Gathering, Milwaukee Art Museum, Milwaukee, WI, October 15, 2008, http://www.gatheringwaters.org/documents/events/2008/GLG/Mehan_speech.pdf (viewed August 26, 2009)

allow for infiltration and evapotranspiration while preserving something approaching pre-development hydrology:

- Use of buffer zones and setbacks
- establishing and protecting opens spaces
- allowing for narrower streets and smaller turning radii in cul de sacs
- eliminating curbs and direct connections
- installing green roofs
- urban forestry
- using porous pavement
- replacing pipes with grass swales
- installing rain gardens
- depressing median islands

Clearly, these techniques are mostly in the control or authority or competence of many different public and private institutions *other than the water or wastewater utility*.

The Milwaukee Metropolitan Sewerage District (MMSD) and its many partners are on the right track in forming the Southeast Wisconsin Watersheds Trust (SWWT) to begin weaving together a watershed partnership. I was privileged to speak to one of the earlier gatherings which lead to its formation. In truth, successful watershed management demands a respect for the science of hydrology and ecology *but also* the social and political realities which John Wesley Powell recognized back in Montana in the late 19th

century. Attending to the human dimension of the watershed, is a necessary condition for success. So, again, I congratulate you all on your pioneering efforts.

The fundamental truth of sustainable water management is that you cannot improve water quality in the 21st century without sustainably managing the landscape, the watershed if you will, in its rural, urban and suburban aspects. There are many examples of this basic reality to be found throughout the country.

The hypoxic or “Dead Zone” in the Gulf of Mexico is caused by polluted runoff draining 41 percent of the land in the lower 48 states from the Mississippi, Ohio and Missouri River basins. 90 percent of the nitrogen flowing into the Gulf, the primary cause of its over-enrichment and oxygen depletion comes from unregulated, diffuse, agricultural nonpoint-source pollution, approximately 50 percent from fertilizer and mineralized soil nitrogen.⁴

Chesapeake Bay is plagued by unregulated agricultural pollution, dysfunctional septic tanks and stormwater runoff driven by the growth in population and impervious surfaces-roads, roofs, sidewalks and parking lots-in that six-state watershed including Washington, D.C. 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 next year.

⁴ National Research Council, *Mississippi River Water Quality and the Clean Water Act: Progress, Challenges, and Opportunities* (National Academies Press 2008), p. 41, available at www.nap.edu. I had the pleasure of serving on this committee which produced this report for the NRC.

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 due to poor land use.⁵

Developed land 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, contaminant and temperature levels, altered stream morphology, sedimentation from eroded stream banks, and loss of species diversity. Basically, you end up putting the stream in a concrete box, robbed of its ability to offer any natural treatment of pollutants or biological life.

Flow management is the primary focus in our efforts to manage urban wet weather issues. As your conference program points out, over 90 percent of your problem with fecal coliform bacteria here in Milwaukee stems from polluted stormwater runoff.

⁵ This report is available at www.potomac.org. Full disclosure: I am a member of the board of the Potomac Conservancy.

Within the six sub-watersheds in the service area of the MMSD, and tributary to Lake Michigan, 37 percent of the annual bacteria load comes from rural nonpoint sources and 56 percent from urban stormwater.⁶

It is flow or stormwater runoff which is at the root of CSOs and agricultural nonpoint source pollution. The solutions to these challenges are not found, exclusively, at the end of the pipe or in big, centralized treatment facilities. They are also grounded in the surrounding landscape in the form of “green” infrastructure techniques--green roofs, urban reforestation, permeable pavement, flood plain restoration, rain gardens--and “best management practices” on the farm.

A changing climate, be it caused by human actions or natural cycles, will make our task even more difficult here in Wisconsin. University of Wisconsin researchers predict that extreme precipitation events will become 10 to 40 percent stronger in southern Wisconsin. CSO events, with resultant overflows into Lake Michigan, will rise by 50 to 120 percent by the end of this century.⁷

⁶ Timothy Bate, William Krill, Troy Deibert, Leslie Shoemaker, and Kevin Kratt, “Milwaukee’s Next Step: Watershed Restoration Plans (*Instead of TMDLs*), Figure 1, a paper delivered to the WEFTEC conference in Chicago, October 2008. It was authored by a member of the staff of MMSD and experts from three supporting consulting firms. A copy is in my possession.

⁷ Jonathan A. Platz, MD, MPH, Stephen J. Vavrus, PhD, Christopher K. Uejio, MA, Sandra L. McLellan, PhD, *Climate Change and Waterborne Disease Risk in the Great Lakes Region of the U.S.*, American Journal of Preventive Medicine, November 2008, p. 451; “Great Lakes’ Study Ups Chances for Waterborne Disease,” Water & Wastewater News, October 10, 2008

The Soil and Water Conservation Society (SWCS) held a workshop here in Milwaukee in November 2006, called “Planning For Extremes,”⁸ which found that design storm events in the Midwest had increased in magnitude by as much as 46 percent with increases in soil erosion ranging between 4 to 95 percent and runoff from 6 to 100 percent which “may be evident on cropland in some locations.”

Unfortunately, our legal and regulatory structures have not caught up with current thinking regarding the benefits of the watershed approach in addressing urban wet weather issues. CSOs, stormwater runoff, traditional point sources and nonpoint sources are still treated as stovepipes, separate and distinct from one another. Rather than managing them systematically, under one watershed-based permit or bubble if you will, they are regulated piecemeal. This is neither cost-effective, nor does it optimize the multiple environmental benefits derived from utilizing “green” or landscape-based approaches which can reduce stormwater runoff, create habitat, mitigate urban heat island effects, sequester carbon, reduce energy consumption and provide aesthetic benefits to neighborhoods.

To my knowledge only Portland, Oregon has been able to incorporate, formally, Low-Impact Development (LID) techniques into its Long-Term Control Plan (LTCP) for its

⁸ Soil and Water Conservation Society, *Planning For Extremes: A Report from a Soil and Water Conservation Society Workshop Held in Milwaukee, Wisconsin, November 1-3, 2006*, p. 10, available at www.swcs.org

CSOs, although Philadelphia is in the launch position to do so, if regulators willing.⁹

There is a great deal of interest, but not a lot of movement in this area to date.

The integration of robust “green” infrastructure, LID and Smart Growth techniques should be incorporated into consent decrees, LTCPs and watershed-based permits. These need to become more routine and not just exceptional or an add-on to a Supplemental Environmental Project (SEP) as part of a court settlement of an enforcement action.

They need to become standard permitting practice rather than an enforcement matter.

They need to be front-end loaded in our regulatory process and not back-end loaded as a kind of after-thought or a cherry on top of the sundae.

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 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 program¹⁰ recommending the use of flow as a common metric in stormwater

⁹ I highly recommend a visit to both Philadelphia and Portland to learn from these communities’ cutting – edge work in LID and “green” infrastructure. A new, very interesting study has been done for the Philadelphia Water Department by Stratus Consulting, *A Triple Bottom Line Assessment of Traditional and Green Infrastructure Options for Controlling CSO Events in Philadelphia’s Watersheds: Final Report*, August 24, 2009. I have provided copies to the conference organizers. The report documents the “wide array of important environmental and social benefits to the community, and that these benefits are not generally provided by the more traditional alternatives.” Executive Summary.

¹⁰ National Research Council, *Urban Stormwater Management in the United States* (The National Academies Press 2008), available at www.nap.edu

permitting rather than simply attacking each pollutant or parameter one by one. It also suggested using a watershed-based permitting approach encompassing multiple jurisdictions.

While the NRC report does not resolve all the legal issues relating to the authority¹¹ to use flow as the key parameter, it is pointing in the right direction. Moreover, it does not fully develop the idea of integrating CSOs and stormwater in a watershed-based permit; but, again, it is pointing in that direction.

EPA has had guidance on the books for at least six years setting out, clearly, how watershed-based permitting¹² could be accomplished in a way which is less costly and more environmentally beneficial than traditional permitting. The same is true for water quality trading which is really just a form of least-cost compliance which can incorporate landscape-based controls on nonpoint sources, thereby saving money and generating multiple, “green” benefits such as habitat and carbon sequestration.

The entire range of urban wet weather issues, including both 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

¹¹ “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 (access for subscribers).

¹² Generally, watershed-based permits are (1) issued on a watershed basis, (2) focused on multiple pollutant sources, (3) targeted to achieve watershed goals, and (4) integrate permit development among monitoring, water quality standards, nonpoint sources and other programs. See “NPDES Watershed Based Permitting, a PowerPoint presentation by Patrick Bradley, LimnoTech, to SWWT on July 13, 2009. Bradley was the leading EPA expert on watershed permits before joining LimnTech last year.

of agricultural BMPs, green infrastructure, LID and other non-traditional means of restoring water quality and more natural flow regimes.

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

A formidable obstacle is the shortage of staff and resources in EPA regional offices and, most critically, state-delegated programs. As one who served in state government for 13 years and federal service for 3 and a half, I am not being critical, just realistic. State officials are basically trying to keep two assembly lines moving as part of their responsibilities to EPA under the terms of their delegation: NPDES or Clean Water Act permits and TMDLs (Total Maximum Daily Loads, a kind of pollution budget for impaired waters). Anything new or out of the ordinary, which requires a major investment of resources or time, is, understandably, viewed with apprehension for fear of slowing down the line and interfering with their commitments to EPA. The historically high turnover rate among permit writers is another barrier to adaptation of watershed-based approaches.

Basically, if you want to pursue watershed-based permitting, you are going to have to put the entire package together, wrap a ribbon around it and present to your state regulators and EPA's regional office as a complete program. That, at least, is my advice. Keep the regulators informed and seek their input on an ongoing basis; but be prepared to do the

lion's share of the work amongst yourselves, i.e., MMSD, SWWT, local governments, interested stakeholders and your consultants.

Since the water or wastewater utility manager is “playing without the ball,” let me offer a few suggestions for other key stakeholders or partners to move the ball of watershed protection down the court:

- Are local tree ordinances and forestry programs aligned with your watershed plans to reduce stormwater runoff and generate other environmental and aesthetic benefits? Urban foresters need to get in the game.
- Are local parks programs looking at land acquisition and management in a way that aligns with watershed goals? Park managers need to get in the game.
- Are local building codes designed to offer incentives for “green” infrastructure or LID techniques on building sites? Public works departments need to get in the game.
- The NRC stormwater report¹³ notes that roads and parking lots constitute as much as 70 percent of total impervious cover in an ultra-urban landscape. Are highway departments and planning and zoning commissions suiting up for this game?
- Conservation design, clustering of housing developments, protection of buffer zones on streams and Smart Growth principles are all within the purview of local governments which are crucial to winning this game.

I will stop flogging the sports analogy, but you get my drift. To paraphrase Pogo, we have met the solution and he is us!

¹³ NRC at p. 5

Restoring and protecting an urban watershed requires a lot more than a well-run water and wastewater utility. It requires a coordinated, systematic approach to managing the city, suburban and rural landscape. To borrow a concept from the old Total Quality Management movement, you need to design excellence *in*, rather than trying to inspect or regulate defects *out*. You need to be proactive and focus on stormwater flow before you pave Paradise, not after the fact. Once you pave Paradise, it is hard to retrofit or mitigate all that imperviousness.

The glass is way more than half full here in Milwaukee and southeast Wisconsin. There are many exciting things happening in the area of urban watershed management as will become evident in the course of this conference. The recent grant from the Joyce Foundation and the involvement of American Rivers is very good news, indeed.

To maintain forward momentum in restoring the chemical, physical and biological integrity of our waters and watersheds, the entire community as well as the regulatory agencies need to embrace 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 while transforming, beautifying and enriching our local neighborhoods and communities.

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.