A Symphonic Approach to Watershed Management

Luncheon Address

By

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Straddling the Divide: *Water Supply Planning in the Lake Michigan Region*

Holiday Inn—Merchandise Mart

Chicago, Illinois

February 16, 2005

Sponsored by

Southern Lake Michigan Regional Water Supply Consortium

Good afternoon. Thank you for inviting me to speak with you today on a favorite topic.

The waters of this nation, most especially the Great Lakes and environs, are treasures of great value. Unfortunately, many citizens and policy makers fail to appreciate just how valuable they really are.

Adam Smith, the 18th-century philosopher generally credited with laying the foundation of modern economics, described the paradox of diamonds and water: how could it be that water, so essential to life, is so cheap while diamonds, used only for adornment, are very costly? Smith used these concepts to illustrate basic principles of supply and demand and demonstrate that prices reflect relative scarcity. It might be useful to assess the value Americans place on water or, more precisely, on the means of treating and delivering it.

While I was still at the Office of Water at EPA, our economists calculated the amount American households spent on soft drinks relative to drinking water and wastewater charges. On average, they spent $707 a year on carbonated soft drinks and other, non-carbonated refreshment beverages. This compared with an average of $474 a year per household spent on water and wastewater charges (these are based on 2001 figures). U.S. households pay roughly six-tenths of one percent of income for water infrastructure charges, the lowest among developed countries. So at least in economic terms, our prices and expenditures hardly reflect the true value of water.

Yet, there are signs that cannot be ignored, signs that will usher in a water-constrained era which will necessitate better management of both the supply side and the demand side of water policy. A recent GAO survey of state water managers indicated that, even under normal or non-drought water conditions, 36 states anticipate water shortages in localities, regions or statewide within the next 10 years. Under drought conditions 46 states expect shortages over the next decade. Moreover, increasing population and declining groundwater levels indicate that the freshwater supply is reaching its limits in some locations while freshwater demand is increasing. The building of new, large reservoir projects has tapered off, and existing storage is threatened by age and sedimentation.

The USGS does report some good news in that U.S. water use overall has stabilized since 1985. However, fresh groundwater withdrawals are up 14 percent as of 2000. Whereas surface water had provided 74 percent the public water supply in 1974, it is now down to 63 percent. And while self-supplied domestic water withdrawals, mostly wells, represents only 1 percent of total freshwater withdrawals, groundwater makes up 98 percent of this category of use. Robert Glennon, in his book *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters,* observes that more than half of the population of the United States relies on groundwater for their drinking water supply. According to a graphic in his book, 70 percent of the population of Wisconsin, 46 percent of Michigan, 64 percent of Indiana, and 33 percent of Illinois all depend on groundwater for drinking water as of 1995. Clearly, water below the surface is increasingly a precious commodity.

Lake Michigan presents an interesting case in light of the pressure on tributary groundwater, say, in southeast Wisconsin. Also, the Supreme Court decree regulating the diversion at Chicago caps that withdrawal at 3200 cubic feet per second if memory serves me correctly. This limit is a function of ecological, legal and political realities. Climate is another variable which may impact quantitative aspects of the Great Lakes ecosystem if it hasn't already.

There are also challenges aplenty in terms of the quality of the water available to Americans for their use and enjoyment. As reported by state water programs for the year 2000, approximately 45 percent of waters assessed are not clean enough to meet basic uses such as fishing and swimming. 39 percent of assessed rivers, streams, and lakes are not safe for fish consumption due in many cases to air deposition, as in the case of mercury, or contaminated sediments as in the case of PCBs.

The quality and quantity of surface water and groundwater, as well as the overall integrity of the hydrologic cycle, are diminished by human activities on the land throughout the watershed. Diffuse, polluted runoff from parking lots, streets, sidewalks, golf courses, construction sites, and agricultural operations carry sediment, nutrients, oil and other contaminants into rivers, streams and lakes. When development occurs rainfall flowing to groundwater is reduced from 37 percent to approximately 15 percent because

hard, impervious surfaces prevent water from seeping into the ground thus failing to filter pollutants and replenish groundwater.

Generally speaking, a parking lot might be 95 percent impervious. Even a residential lawn might be 40 percent impervious due to soil being compacted during construction and landscaping. So, it is easy to see that between 1982 and 1997 the percentage of developed watersheds (at the 8-digit HUC level) nearly doubled from 5.4 percent to 9.5 percent. That is, they had 15 percent or more of their area developed to urban land cover. Land consumption occurred at more than twice the rate of population growth nationally.

In addition to quantity and quality concerns, the disruption of the natural flow regime or hydrograph can hurt water supply, water quality, and the ecological integrity of our waters in terms of water temperature, channel geomorphology, and habitat diversity. Flow has been described as a kind of "master variable" with five critical components regulating ecological processes in river systems: the magnitude, frequency, duration, timing, and rate of change of hydrologic conditions. Looking at water management though this prism, we can see that issues such as nonpoint source pollution, especially stormwater, urban development, surface water quality and groundwater supply all begin to collapse into one another.

A famous theologian once said that "Truth is symphonic." In other words, to arrive at the whole truth, and nothing but the truth, you must harmonize or account for many different

but related parts of a very complex piece. In view of the complexity of water management in the 21st century, a complexity I have only touched upon today, this seems to me to be a compelling, useful metaphor whether your primary focus is on water quality or water quantity, human health or ecology, surface water or groundwater.

As we come to grips with a growing population in the face of water scarcity, we need to look at our water resources comprehensively rather than compartmentally.
For too long we have focused on different aspects of water management to the exclusion of others. Just think of the ways our laws and our practice of water management has conceptualized the resource:
Water quantity versus quality
Land versus water
Chemical versus the physical and biological components of the ecosystem
Supply versus demand management
Political versus hydrological boundaries
Point sources versus nonpoint sources of pollution

At the risk of flogging this metaphor, it will be necessary for someone or some thing to "conduct" this symphony of stakeholders, jurisdictions, disciplines. Someone or some thing must "compose" or assemble partnerships across jurisdictional and, as in the case of southern Lake Michigan, watershed boundaries and demonstrate leadership in mobilizing the public, private, and not-for-profit sectors of society.

These partnerships, in turn, will drive progress toward appropriate water management regimes at multiple levels of society and our federal system of governance. Indeed, the federal government is a necessary partner, but it will be, should be a limited one due to the predominantly regional and local nature of the challenges especially that of land development.

Alexis de Tocqueville, one Frenchman who will never go out of fashion in this country, toured America in the early 19th century. His book, *Democracy in America,* is universally applauded as one of the most insightful studies of the American character and its democratic institutions, warts and all. One of his critical insights was to discern the genius Americans displayed in forming voluntary associations, intermediate institutions which mediate between solitary individuals and large, centralized government. He captured this insight in this famous passage:

> Americans of all ages, all conditions, and all dispositions constantly form associations. The have not only commercial and manufacturing companies, in which all take part, but associations of a thousand other kinds, religious, moral, serious, futile, general or restricted, enormous or diminutive. The Americans make associations to give entertainments, to found seminaries, to build inns, to construct churches, to diffuse books, to send missionaries to the antipodes; in this manner they found hospitals, prisons, and schools. If it is proposed to inculcate some truth or to foster some feeling by the encouragement of a great example, they form a society. Whenever at the head of some new undertaking you see the government in France, or a man of rank in England, in the United States you will be sure to find an association.

Isn't this what we are actually seeing here at this conference this week? Isn't this at the heart of the Southern Lake Michigan Regional Water Supply Consortium?

I have often said that watershed management, for it to be successful, must work socially and politically, not just hydrologically. This observation applies to the southern Lake Michigan region since it is tied together across both political and watershed boundaries by common linkages—economic, social, and hydrologic, especially in terms of tributary groundwater, I suspect. As I observe your work here today, I am reminded of an old Latin saying my grandfather used to quote: *Age quod agis*. Do what you're doing! Continue this dialogue and mutual engagement on the fundamental issues of water management in this region in an inclusive, patient, scientifically sound manner.

I am a native of the Missouri River Basin. My initial experiences there, both as a lawyer and a government official, impressed upon me Mark Twain's purported quote that whiskey was for drinkin' and water was for fightin'! Having had the good fortune of marrying into the Great Lakes region, as well as eight years of professional experience working on its environmental protection, I can tell you that Mark Twain got it wrong. Historically, going back to at least the Boundary Waters Treaty of 1909, the citizens of the Great Lakes have demonstrated an aptitude for managing these common resources at a regional and binational scale. This historical experience bodes well for meeting and overcoming the challenges to effective stewardship of these resources, no matter what side of the watershed divide you might find yourself.

A recent article in the Sydney Morning Herald (January 13, 2005), featured the following headline: "Do or dry, Sydney: cut water use by half or face a crippling shortage."

The article indicated that water experts in Australia, a very dry place, maintain that Sydney needs to more than halve its water consumption to prevent "a dire water shortage in 25 years…" The article stated that "Water experts say the answer lies in a huge change in personal and industrial attitudes to water use, not just water restrictions." It would appear that the relative priority of diamonds and water is about to reverse itself in Sydney. An extreme case like this will certainly generate thinking outside the box. Hopefully, a region as rich in water resources as southern Lake Michigan will not have to face a situation as difficult as this. Nevertheless, this should be a cautionary lesson, or at least a spur to greater effort to engage our fellow citizens and leaders, be they in business, government, or academia, in a well orchestrated effort to adequately value and effectively manage our surface and groundwater resources.

In conclusion, I urge you, collectively, to pick up the baton, tap the lectern, and commence the symphony!

Thank you for allowing me to participate in this very significant enterprise which will benefit the people of the Lake Michigan region and, no doubt, offer lessons for the rest of the country.