

Leveraging the Great Lakes Region's Water Assets for Economic Growth

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The growth of the Great Lakes region was enabled by access to the abundant resources of the lakes and their waterways, which were used (and abused) as a critical input to industrial processes, and as a shipping conduit for bulk commodities. Today, sustainable fresh-water use and emerging “clean-tech” water systems and applications present the region with new opportunities to capitalize on its water assets. At the same time, the region’s 10,000 miles of lakefront, coupled with thousands of miles of regional rivers, streams, and inland lakes are an increasingly valuable amenity: In 2007, 2.7 million jobs were linked to the waters of the Great Lakes, accounting for \$150 billion in compensation.² As these waters are cleaned and made available for development, recreation, and tourism, they enrich the region’s quality of life and can help stimulate economic growth.

With the right set of policies and supports, the federal government can leverage the Great Lakes region’s research and innovation capacity and unique freshwater assets to advance the new technologies needed to solve growing water infrastructure, treatment, and rehabilitation challenges—in the United States, and around the world. With the \$500 billion-and-growing global water technology business sector up for grabs, federal investments in this area could pay significant national dividends.

America’s Challenge

The Earth’s water resources are vast, but only 0.08 percent is available for human use and 600 million people currently face water scarcity. This number is expected to increase as much as five-fold, to between 2.8 billion and 5.1 billion people by 2025.³ Across the globe in most human-dominated watersheds, we see major aquifers depleted, half of all wetlands drained, desertification on a vast scale, and degraded water quality. The U.S. government projects that by 2013, 36 states could experience water shortages despite decreased use by the agriculture sector through more efficient irrigation practices.⁴ The intersections of climate change, natural resource loss, pollution, population growth, and global economic recession has accentuated the crisis.

The water challenges we face as a nation are numerous, and can be grouped into three areas:

Ecosystem contamination and restoration: Degraded ecosystem and habitat quality in our nation's waterways are growing and troublesome issues. Nowhere are they more apparent than in the Great Lakes, where in 2009, four of the 10 most contaminated beaches in the nation were located. The Great Lakes have been plagued with repeated invasions of alien species resulting in dwindling fish stocks; increasing beach closings (over 3300 days in 2009) due to pathogens from urban waste and stormwater discharges;⁵ chemical contamination in 42 Areas of Concern and virtually all urban waterways; widespread fish consumption advisories; and a loss of 50 to 70 percent of wetlands.⁶ In addition, climate change is reducing ice cover, which when combined with greater frequencies of severe weather, is leading to both increased lake evaporation (and thus lower lake levels) and greater runoff from land, resulting in increased nutrient and pesticide loadings and widespread toxic algal blooms and hypoxia ("dead zones").

Water and wastewater infrastructure: Our aging water and wastewater treatment infrastructure needs major enhancement and innovation to maintain and improve adequate public health protection. Drinking-water distribution is the most energy-intensive part of the water infrastructure, yet 20 percent of treated drinking water volume leaks from the system due to deteriorated infrastructure. An estimated \$972 million is needed to upgrade wastewater and stormwater systems in the Great Lakes region alone.⁷ Meanwhile, our water is increasingly unsafe: A recent *New York Times* survey of 45 states revealed 62 million Americans have been exposed since 2004 to drinking water that did not meet Safe Drinking Water Act standards, a situation that U.S. Environmental Protection Agency (EPA) Administrator Lisa Jackson recognizes as unacceptable.⁸ From January 2009 to January 2010, five cities (Detroit, Cleveland, Buffalo, Milwaukee and Gary) released 41 billion gallons of untreated sewage and stormwater into the Great Lakes.⁹ In 2009, the American Society of Civil Engineers graded both wastewater and drinking water systems a D-, the lowest ratings of any infrastructure category.¹⁰

The Environmental Protection Agency estimates capital funding needs of at least \$500 billion for the nation's water and wastewater systems.¹¹ Yet the State Revolving Fund, which states use for infrastructure, received only \$9.5 billion from Congress between 1997 and 2008.¹² American businesses and consumers pay for existing water and wastewater infrastructure through usage-based bills and taxes, but the vast majority of households pay less than 2 percent of their household income for water—an investment that is 50 to 100 percent lower than other industrialized countries.¹³

Supplies, conservation, and use: Water use is the largest factor in energy production and conservation. Yet, the clean-water technologies in use at coal-fired plants to reduce air emissions contribute tens of thousands of gallons of wastewater to adjacent rivers. In 2004 the Great Lakes' thermoelectric sector withdrew 30.75 billion gallons per day.¹⁴ Meanwhile, water shortages continue to

grow in areas of the United States that, until recently, were magnets for business, tourism, and retirees. Over allocation of Colorado River water in a changing climate remains an ongoing worry for Western states that depend upon it as a major source, while every summer drought brings near-catastrophic loss of water supplies to major metropolitan areas in varying parts of the country.

Limitations of Existing Federal Policy

Across the country, metros increasingly struggle to provide clean, fresh water for consumers, agriculture, and industry and to maintain and improve water ecosystem health in the face of antiquated water infrastructure and pollution threats. While the federal government has stepped up its effort to clean and restore this vital resource, existing water policy is too fragmented and weak to fully address regional and national challenges, or effectively support new ways of overcoming them.

Current water policies are uncoordinated and scattered. Because of the diversity of climates, hydrology, and ecosystems across the United States, water issues are typically viewed as local and regional problems and managed through a multitude of state, regional and local agencies—some with conflicting goals and practices. The piecemeal nature of federal policies and the division of responsibilities among agencies with conflicting missions can exacerbate these problems. For example, while most people recognize the Clean Water Act, Safe Drinking Water Act, and Water Resource Development Act as key federal “water statutes,” aspects of federal farm, energy, and transportation laws can have more profound and longer-lasting impacts on the quantity and quality of water. Competition and lack of agency coordination make it rare that water issues are viewed holistically, however, or addressed in a comprehensive manner.

Congress and the Administration have taken several (imperfect) steps to remedy these issues. Senate bill S. 1005 (the Water Infrastructure Financing Act of 2009) authorized \$39 billion to pay for critical water infrastructure needs and EPA’s WaterSense Program, a voluntary product-labeling program that sets standards for water-efficient products. And the Department of Interior recently announced the WaterSMART (Sustain and Manage America’s Resources for Tomorrow) program, which seeks to establish a new sustainability strategy for the United States. But while these initiatives recognize the importance of water issues at the national level, actual policy changes remain inadequate. No bills have passed both the House and Senate in the 111th Congress addressing the water needs discussed above.

Funding for ecosystem restoration, infrastructure, and pollution control in the Great Lakes region is inadequate. The Great Lakes and their waterways face numerous threats to their ecological health and economic utility, a result of point and non point sources of pollution, crumbling water and wastewater systems, growing numbers of aquatic invasive species, and myriad other stresses. All told, the Great Lakes Regional Collaboration (GLRC) estimates that

it would take an estimated \$26 billion in initial capital and operation costs to fully address these issues.¹⁵ Existing and proposed funding for Great Lakes restoration—including \$475 million in the FY 2010 budget, a proposed \$300 million in the FY 2011, and another \$3.2 billion over five years proposed in the Great Lakes Ecosystem Protection Act—will, if appropriated, give a substantial boost to state and regional efforts, but still falls far short of the total needs. For example, the GLRC estimates that \$15.3 billion alone will be required to improve municipal wastewater treatment facilities and improve drinking water quality within the Great Lakes region.¹⁶

Federal policies do not reinforce governance structures that would help align state and local policy in support of sustainable water supply and conservation practice. The federal government should be supporting the Great Lakes Water Resources Compact and the Great Lakes Water Quality Agreement. The Compact addresses the problem of fragmented state and local water laws, essentially creating a region-wide common water law regime. Those laws were intentionally constructed in a way that benefits the industrial communities of the Great Lakes. The negotiations on the Great Lakes Agreement offer an opportunity to employ existing binational structures (rather than creating new ones) and tackle many of the issues identified in this brief. The Great Lakes Restoration Initiative (GLRI) now being funded and implemented by Congress and the Obama Administration has advanced the coordination of various federal programs and agencies to address watershed issues as a whole. With ongoing funding and implementation, the GLRI can be an effective mechanism for providing ongoing policy guidance and inter-agency coordination. To be effective as a policy guide GLRI funding must be ongoing, and predictable and commensurate to address the large-scale federal/state and local funding needs to restore the ecosystem and infrastructure.

Federal policies and investments in water research and innovation are lacking. New technologies will be needed to provide effective barriers against new and evolving pollutants from pathogens, nutrients (nitrogen and phosphorus) and trace contaminants (metals, industrial chemicals and pharmaceuticals), as well as to combat growing challenges to the availability of freshwater. As with energy use, virtually all residential, commercial, and industrial buildings, engineering and design systems, and appliances and other durable goods that use water—i.e. whole communities and industries—will have to be reengineered for greater water efficiency and reuse. Overall, far more research is needed to drive innovations in the technologies and policies needed to reshape our management practices in order that they can effectively contend with challenges not contemplated when the current system was conceived, designed, and built. But federal water research and innovation policy are lacking resources, focus, and a comprehensive, coherent strategy to speed development of solutions. Funding for scientific research is quite limited in current and proposed appropriations, for example, and no funding is provided for technology development and water conservation.

A New Federal Approach

Given the nature and scale of the issue, the federal government needs to focus on creating a national framework for managing the nation's water resources, and invest in the research and innovation needed to understand and develop new technologies for solving complex regional, national, and global problems. With its huge supply of fresh water, strong research capacity, and growing expertise in water technologies, the metros of the Great Lakes region can substantially contribute to, and benefit from, such efforts. Specifically, the federal government should:

(1) Create a Freshwater Policy Task Force (FPTF). Mirroring the Interagency Ocean Policy Task Force (OPTF), the federal government should create a Freshwater Policy Task Force (FPTF) charged with protecting, restoring, and improving the management of national fresh water resources. Through this vehicle, the administration should order a full review and analysis of federal water-related statutes, with the goal of understanding how the full breadth of federal laws and programs impact water-supply reliability, quality, and ecosystem integrity, and how federal policy and investments can best support water innovation and economic development.

(2) Explore new approaches to regional governance of existing water-related statutes. As mentioned above, increased support is needed for current bi-national regional regimes (i.e., Great Lakes Water Resources Compact, Great Lakes Water Quality Agreement) and the GLRI initiative as a policy shaping tool. A revival of the "River Basin Commissions" that were dissolved during the Reagan administration would provide a decentralized structure for reconciling competing and incompatible federal laws. These regionally-based commissions could provide a framework to better harmonize sometimes conflicting activities of federal agencies in major watersheds, such as the Great Lakes and their major rivers, as well as provide a roadmap for local and state decision-making and resource allocation. In addition, competitive federal grant and loan programs could require or incent regional collaboration around, for example, developing green water infrastructure systems, watershed restoration, etc.

(3) Reform and enhance federal investments. First, the federal government needs to increase funding of the State Revolving Loan Funds (SRF) for water and wastewater infrastructure. An approach identified in the failed Senate bill S1005 (The Water Infrastructure Financing Act of 2009) would amend the Federal Water Pollution Control Act and Safe Drinking Water Act by reforming and increasing investment in the SRF. This bill also provided for WaterSense authorization and funding, mimicking the very successful EnergySaver program. By increasing SRF funding, the flow of money would be more stable and available longer-term to tackle the immense number of issues discussed above. In addition, GLRI funding should be continued and increased to adequately restore the Great Lakes ecosystem.

But the federal government must also encourage states and localities to stop retrofitting aging infrastructure and technology and invest infrastructure design that is more efficient and actually returns useful resources (energy, reusable water, nutrients) to users. Current funding projections for such changes are insufficient, however. For example, American Rivers found that demand for “green” infrastructure projects from the clean water and drinking water State Revolving Funds this past year exceeded availability by an average of 1.5 and 1.2, respectively.¹⁷ The Great Lakes Restoration Initiative (GLRI) is providing a good start to restoring the Great Lakes by focusing on reducing the number of “Areas of Concern,” expanding waste minimization and pollution prevention projects, reducing new invasive species, enhancing habitat restoration, and improving lake-wide monitoring and management. The GLRI, however, does not provide funding for water and wastewater infrastructure, nor does it support innovative water-related technologies, or other critical research.

(3) The federal government should create a set of interdisciplinary, multi-sector Water Innovation Centers (WICs). One of the products of a new FPTF would be to frame the mission and criteria for a set of regionally-based centers that would focus on (1) improving national water policy, (2) researching, developing, and commercializing new clean-water technologies, including water infrastructure, treatment, and conservation systems, (3) developing a predictive understanding of how human and natural drivers influence delivery of ecosystem services, and (4) developing and disseminating best practices and tools for enhancing sustainability and conservation. The WICs should be university-based, but include government and stakeholder scientists in a consortia-type atmosphere. They should be located to span the variety of water contexts across the nation—including the Great Lakes region—and should focus both on creating technical solutions to regional problems, as well as on governance analyses related to more effective water use, conservation, and restoration strategies. They could provide the research and analysis needed to better understand where critical infrastructure needs are, where technological innovation will be cost-effective, what governance policies and structures will support and motivate environmentally appropriate development and use, where investments would best energize economic development, and how results should be measured. In doing so, the WICs could provide the intellectual underpinning necessary to break the existing political deadlock over national water policy.

The WICs could also build toward a plan for federal investment in water research and innovation policy that will create proactive solutions for water-based economic development and sustainability and its vital connections to other issues such as energy. For example, the centers could develop standards that define success in ecosystem restoration or sustainability of a water supply in addition to more common performance measures and metrics to assess the actual accomplishments of different approaches to water policy. A national-scale monitoring effort to track changes in water-supply reliability, disputes over water,

overall economic costs/benefits of water investments and ecosystem integrity could be part of such a strategy.

Conclusion

The FPTF and the WICs would provide a starting point for a long-needed change in how the nation manages its water resources—and would help build a greener, more sustainable next economy. The benefits are measurable: A recent analysis by the Alliance for Water Efficiency estimates that total economic output per \$1 million of investment in water-efficiency programs is between \$2.5 million and \$2.8 million. The Alliance suggests a \$10 billion investment in water-efficiency programs would augment gross domestic product by \$13 billion to \$15 billion, increase employment by 150,000 to 220,000 jobs, and save 6.5 to 10 trillion gallons of water.¹⁸ With the right sort of investments, the Great Lakes region can become a global leader in smart water use and technology problem-solving, while boosting its economy in the process.

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