

Restoring Flows: Financing the Next Generation of Water Systems
A Strategy for Coalition Building



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About American Rivers: American Rivers is the leading organization working to protect and restore the nation's rivers and streams. Rivers connect us to each other, nature, and future generations. Since 1973, American Rivers has fought to preserve these connections, helping protect and restore more than 150,000 miles of rivers through advocacy efforts, on-the-ground projects, and the annual release of *America's Most Endangered Rivers*TM.

Headquartered in Washington, DC, American Rivers has offices across the country and more than 100,000 supporters, members, and volunteers nationwide.

About Ceres: Ceres leads a national coalition of investors, environmental organizations and other public interest groups working with companies to address sustainability challenges such as global climate change and water scarcity. Ceres directs the Investor Network on Climate Risk (INCR), which supports 100 institutional investors with assets totaling \$10 trillion by tackling the policy and governance issues that impede investor progress toward more sustainable capital markets.

Why Build Coalitions for Water Investment?

All around us, the chorus of voices calling for renewed investment in our nation's critical water infrastructure is growing. Yet while the calls amplify, harmony remains elusive.

There is widespread agreement that our water systems desperately need investment if they are to sustain the critical services they provide to economies. As to how those systems should perform, how we should pay for them and how we should value them—there, unanimity dissolves. Yet no matter what price tag we attach to this problem, and no matter what solution we define, one thing is certain: the scale of investment needed demands cooperation rarely experienced in the world of water.

Somehow, we must broker comity and a shared sense of mutual interest between those who use water, those who provide it, those who build and finance our water systems, and those who advocate for the protection of the natural systems that also rely on “our” water.

Our objective is to identify the pathways to this unprecedented cooperation by illuminating the work that is already underway, from the forests of the Mountain West to the vacant lots of the Postindustrial Northeast. By connecting these disparate stories of innovation, experimentation and advocacy we hope to create opportunities for the creation of shared pursuits beyond the boundaries of politics, watersheds and economic sectors that typically define our relationship to water.

This document originates from a convening of water providers, finance experts and NGOs in August 2011, as part of The Johnson Foundation's Charting New Waters. That convening informed *Financing Sustainable Water Infrastructure*, which captured the many concepts that flowed from that diverse gathering. With support from the Russell Family Foundation, Ceres and American Rivers were able to continue that dialogue beyond Wingspread, in a series of interviews conducted during the winter of 2012. This document is an attempt to distill those ideas into a set of high-priority, high-impact strategies that can be jointly pursued by the many stakeholders who have a stake in shaping a more prosperous water future: the utilities who provide water, the financial intermediaries who help capital flow to those water providers, the investors who provide that capital, the NGOs who advocate for better water stewardship and job creation through infrastructure investments, and the foundations who enable cooperation across sectors.

The strategies we outline can bring together environmentalists, economists, water utilities, water users, financial institutions, foundations, investors and labor groups to articulate the value of our water systems to a spending-weary public; to reform the ossified tenets of modern accounting and finance to recognize the crucial role our natural systems play in delivering secure water supplies; and to invigorate

investment in the restoration of natural systems and the renewal of urban neighborhoods, which we now know to be part of our water system.

The challenges before us are immense, but the rewards larger still: creating jobs that cannot be outsourced, revitalizing long-degraded urban communities, restoring the health of polluted waterways so they can create cultural meaning and economic vitality, and bolstering the resilience of natural systems that protect our water supplies.

We hope this is a faithful translation of the messages we heard from the many individuals and organizations working across the country to revitalize our nation's most critical assets. We do not intend for this document to be an exhaustive inventory of issues, opportunities or actors, and the examples we provide may be illustrative more than comprehensive. Undoubtedly there are many efforts, consistent in spirit, which have not been captured through our research. We hope this report, through its examples, will serve as a useful starting point for strategic cooperation. While the details may depreciate, we hope this basic framework will only gain in value as we realize the economic prosperity, the human dignity and environmental vitality we can achieve by pursuing one simple goal: clean water for all.

Areas of Potential Collaboration Examined in this Report

Transparency	Market Formation	Valuing Water
Developing a performance rating system for water utilities	Jumpstarting off-balance sheet financing for distributed systems	Adapting rates to support sustainable systems
Creating robust market information policies and practices	Building support for on-bill financing for distributed systems, water conservation, other services, and upstream watershed improvements	Monetizing Natural Capital/Ecosystem Services
	Piloting market-based watershed improvement programs	Reforming accounting standards to support sustainable capital investments
	Supporting legislation to expand financing options (PACE financing, energy funds for water efficiency projects, lift on private activity caps, removing statutory obstacles to bonding nontraditional water projects)	

Transparency

“Investors have typically valued the traditional monopolistic, essential-service aspects of the water infrastructure sector. Very little data is available on the state of water systems or their sensitivities to declining water demand, volatile supplies, and variable costs of energy and other system inputs. As a result, the market does not factor the risk or resilience of the system into the prices. ... Better data would help the market price more correctly and would help utilities manage their risks by benchmarking themselves against other systems.”

- Financing Sustainable Water Infrastructure

It would be ideal for utilities to be able to benchmark themselves and evaluate their performance against similarly sized peers. The challenge in developing an effective rating system is in identifying specific criteria that reflect environmental, operational, and fiscal sustainability, as well as providing information utilities can use to improve their current operations.

- Paraphrased from an Interview with Cynthia Lane, American Water Works Association

Our water systems are financed through markets that—with varying degrees of efficiency—translate information into prices that motivate behaviors around the way we use water. One major source of financing for water systems in the United States is the bond market. Utility bond offers often contain a great deal of information; however, rarely do they convey a full picture of the environmental, fiscal, and political uncertainty that utilities face. In addition, information used by bond issuers and rating agencies typically contains little evaluation of alternatives, such as efficiency measures and decentralized infrastructure programs that may achieve water supply or quality goals with lower financial exposure. As a result, the bond market routinely funds large capital infrastructure projects without a full analysis of the risks and uncertainties that undermine these projects, and many times without the seekers of capital prioritizing more resilient alternatives.

Likewise, utilities operate in a climate of imperfect disclosure. In this climate, their systems operations are not subject to scrutiny (or reward) based on environmental, community, or financial sustainability. As a result, they currently have little incentive for highlighting their efforts that build resiliency but require “non-traditional” expenditures, and face tremendous political pressure to provide low-cost service with minimal investment demand on rate and taxpayers.

Improving the collection, flow, analysis, presentation and end-use of information has the potential to dramatically alter patterns of private sector investment, as well as the political limitations on utility expenditures and programming. Significant reforms to the types of information required by bond issuers and rating agencies may build preference for more resilient, lower risk water infrastructure projects. Synergistically, improving and rewarding utility disclosure may allow utilities to compete more favorably for public and political approval for their infrastructure renewal and modernization programs.

Performance Rating System

Historically, water utilities have functioned predominately as independent, noncompetitive entities: monopolies with little incentive for benchmarking and communication between them. Utilities have been able to function adequately under this process, however, our aging water infrastructure, the potential impacts of climate change, a growth in new, more distributed technologies, and the current state of our financial markets will change the way utilities are run, what systems they build and how they are financed.

One of the challenges undermining sustainable financing is the limited ability of water utilities to accurately convey information about the advantages of investments in innovative best practices, and to demonstrate these values relative to comparable utilities. Water utilities stand to benefit from an improved capacity to fully portray their value to their governing entities and ratepayers, especially by quantifying the benefits of innovative practices. More complete information and

comparative performance benchmarks will help explain and justify rate adjustments and other investments. However, there are no consistent standards or other tools for distinguishing and acknowledging utilities that are on the cutting edge of financing and technologies.

The creation of a voluntary performance based rating system, similar to the Leadership in Energy and Environmental Design (LEED) model that has transformed real estate developments, would provide the merit and acknowledgment to reward utilities and highlight sustainable behaviors and investments. A utility sustainability rating system could transform the way utilities are designed, built and operated, ultimately creating a more environmentally and socially responsible water sector and fostering competition for private financing. As a voluntary, evolving rate system, utilities would have the opportunity to increase their rating as they mold to the standards outlined in guidelines. Evaluations of the rating system over a designated time frame would allow for the continual elevation of standards.

There are a few interesting models that may be instructive or capable of widespread adoption. One that has some water utility sector participation has recently been launched by the Institute for Sustainable Infrastructure (ISI). ISI was founded by the American Council of Engineering Companies (ACEC), the American Public Works Association (APWA), and the American Society of Civil Engineers (ASCE). Their system, called Envision™, is a collaboration between ISI in Washington, D.C., and the Zofnass Program for Sustainable Infrastructure at the Graduate School of Design at Harvard University. According to the sponsors, “Envision” provides “a holistic framework for evaluating and rating the community, environmental and economic benefits of all types and sizes of infrastructure projects. It evaluates, grades, and gives recognition to infrastructure projects that use transformational, collaborative approaches to assess the sustainability indicators over the course of the project's life cycle.” The authors have not yet interviewed any principals associated with this project.¹

<i>Who's Working on Developing Performance Rating Systems:</i>	
	Alliance for Water Stewardship
	American Rivers
	American Water Works Association
	Institute for Sustainable Infrastructure
	National Association of Water Companies
	ReNUWIt: The Urban Water ERC / Stanford University's Woods Institute for the Environment & Center for Water in the West

¹ See <http://www.sustainableinfrastructure.org/rating/index.cfm>

<i>Needs and Opportunities:</i>	
	In-depth research into available models for benchmarking water utility performance
	Collaborative dialogues between ranking experts, water utilities, and municipal bond investors to synthesize research into a comprehensive set of metrics
	Development and launch of a rating/certification program, possibly through regional pilot program and in concert with other disclosure & transparency efforts

Creating Robust Market Information

The scale of investment needed to revitalize our nation’s water systems is far beyond the revenue stream of a typical utility. As a result, the capital markets will be a considerable source of financing for water projects. If the markets can efficiently incorporate information on the physical and financial strengths of water systems, they can be a powerful driver of the transition to sustainable water management. Yet today’s markets are extraordinarily impoverished with respect to information including the factors that most influence a water system’s financial health, such as pricing of water services, remaining useful life of system assets, rate of water loss and security of water rights. Consequently, utility cost of capital does not strongly reflect the real physical or financial resilience of systems, and today’s markets are not meaningful drivers of sustainable water management.

These failures can be corrected through the infusion of better information, which can be brought to the market through improved disclosure by water systems, use of that disclosure by market intermediaries that provide risk opinions to investors, and development of information platforms for use by investors directly.

Creating more consistent reporting and comparable data on pricing and performance can create a signal for change in the capital markets. That information can also facilitate capital flow into water systems through new markets, by reducing the transaction cost of discovering investment opportunities. For example, investment information platforms like those created for renewable energy markets (Bloomberg’s New Energy Finance is one) can help to spur capital inflows into the water sector by helping investors to identify market transactions related to water and to compare policies related to water pricing and use or the water-energy nexus that lead to successful market transactions.

This work should be closely aligned with the Performance Rating System work, as both seek to drive better information into the water sector.

<i>Who's Working on Creating Robust Market Information:</i>	
	Ceres
<i>Needs and Opportunities:</i>	
	Pilot model disclosure with leading utilities to demonstrate the enhanced information that can be brought to market
	Move rating agencies to revise their rating methodology to more meaningfully capture performance and pricing characteristics that determine utility financial health
	Work with major investor information providers to aggregate data on utility performance, pricing and water use to drive more efficient integration of these data into the existing infrastructure markets and enable expansion of new markets

Market Formation

“On-site stormwater management through “green infrastructure” and “low-impact development” designs is growing rapidly in the United States. ... This represents a significant shift from centralized, publicly-controlled water management and offers both challenges and opportunities for financing. At the same time, stormwater fees (e.g. based on total imperviousness area of individual properties) and credits for holding more stormwater onsite are opening up opportunities for private investment. ... Developing securities to aggregate customer-financed projects—for example, removal of impervious surfaces—is a present-day challenge whose solution could lead to a secondary market for investments that provide a clear public value. Similar private investments could also be developed for water efficiency retrofits and installation of closed loop water systems at the building and even neighborhood scale. Utilities have traditionally seen these as a threat to revenues, but these strategies can also be a powerful tool for sustainable system management.”

- Financing Sustainable Water Infrastructure

Voluntary programs to restore stream flow to rivers require complex, multi-parameter implementation strategies. Currently, most programs focus on the supply side, with only limited effort spent building the demand side, especially for voluntary offsets. We (BEF) are trying to sell a product in this space, and we invest significant capital in marketing this product and attempting create demand. Incentives, innovative marketing strategies, or other tools will likely be needed for this market to mature and generate sought-after environmental outcomes.

- Paraphrased from an Interview with Todd Reeve, Bonneville Environmental Fund

Districts typically design their bond covenants to conform closely to statutory limitations, which means they often don't have discretion to expand the range of projects they can finance through bonding as long as they have outstanding debt governed by narrowly restrictive covenants. Even if state statutes are subsequently liberalized, the districts may still need to comply with the more restrictive contractual

covenants or find ways to amend or extinguish them.

- Paraphrased from an Interview with David S. Goodman, Squire Sanders (US) LLP

Water infrastructure in the United States continues to be constructed by public entities using funds provided either through federal and state programs or through local utility bond issuances. This reliance on public financing remains the default approach to paying for infrastructure repair, upgrade and extension even as its shortcomings become more apparent. Unlike market development in Europe and Australia, the private sector has had a relatively small role in providing water infrastructure services in the United States.² While some communities have entered into a variety of arrangements to “privatize” their water services, there is a wide range of potential roles that private entities may play in the water market that fall short of being an outright full-service provider. In order to make up for the uncertainties and shortcomings of relying solely on public funding, water utilities may find it appropriate, or even necessary, to expand the roles that private entities play in implementing solutions to water infrastructure needs.

In particular, foresight in structuring stormwater management and water efficiency requirements can create space for private finance entities to work with local entrepreneurs to install retrofits that will meet the infrastructure needs without adding to local debt burdens. The very nature of these requirements, which build on incentives to either reduce stormwater discharges or extend available water supplies, will favor distributed, resilient infrastructure that reduces the physical and economic cost associated with centralized systems. Possibilities for on- and off-bill private financing approaches are outlined below. In a similar manner, private capital may come from programs which link upstream watershed protection programs with downstream beneficiaries of healthy watersheds, including drinking water consumers. While the examples discussed in this section rely heavily on water utility participation, other methods such as public-private partnerships may have similar results and are discussed later in this report.

Jumpstarting off-balance sheet financing for distributed systems

As utilities look beyond their own system to the built environment of the communities they serve, some are seeing that decentralized approaches may actually deliver higher value at lower cost for their customers. For example, the City of Philadelphia decided that a fully centralized stormwater system was less desirable for the city’s residents than a centralized system integrated with a network of green infrastructure that yielded the multiple benefits of flood control, water quality protection, temperature moderation, and recreational amenities or aesthetic enjoyment. Many other communities are building green infrastructure alongside grey: San Francisco, for example, is allocating \$600 million of a \$7 billion

² See Standard & Poor’s, “From Public To Private And Sometimes Back Again: The Shifting Dynamics Of Water Utility Ownership,” Feb. 27, 20120.

bonded capital improvement program to green infrastructure, including downspout disconnection and green street retrofits. Similar to San Francisco and Philadelphia, the Northeast Ohio Regional Sewer District (NEORS) is also rolling out a multimillion dollar green infrastructure program, along with grey infrastructure components, for management of both stormwater and combined sewer overflow (CSO) discharges. In one specific project NEORS is partnering with a hotel to help fund the building and maintenance of a green parking lot on a new hotel lot fit with pervious pavement and underground retention. Over the next 18 years, NYC will invest \$2.4 billion in green infrastructure, as well as \$1.4 billion in grey infrastructure as part of an integrated approach to reducing wet weather sewer overflows, saving the city well over \$1.5 billion in deferred costs and over a billion dollars in substitution projects for comparable grey infrastructure capital costs. The common denominator among these programs is that the adaptation to water systems is occurring on private land outside of the asset base of the utility.

The existing markets for financing water systems are not always amenable to financing decentralized systems, particularly if elements of those systems are owned by customers or other private entities. In some states, like Ohio, the statutory definition of water projects limit bondable projects to those that generate assets wholly owned by the water system, thereby excluding projects that improve private land. In other communities, statutory obstacles may not exist but the present level of utility indebtedness may limit the ability to bond finance programs to construct or incentivize these distributed systems. Motivating customers to assume additional indebtedness to retrofit their properties may also prove a significant challenge, both because those customers may have limited financial resources to incur additional debt and because typically the scale of the projects involved are too small to attract commercial lenders. For these reasons, there is significant appeal in accessing private capital to finance these system improvements while remaining off the balance sheet of the utility and its customers.

In many ways the challenge of financing distributed water systems, whether for stormwater retention or onsite treatment, is similar to the financing of energy efficiency or distributed energy generation. Accordingly, innovations that have enabled off-balance sheet financing of energy efficiency projects may be transferable to distributed water infrastructure.³ San Francisco Public Utilities Commission has pioneered the use of PACE program structures to finance water efficiency and conservation measures.⁴ As with energy efficiency finance, for these financing projects to work, there must be some incentive for customers to take on system improvements on their property. Typically this means that the cost of not improving the property to reduce stormwater load or reduce potable drinking water use would need to be sufficiently increased to incentivize the customer to take on improvements on their property. Once this financial incentive is in place, an

³ See Larry Levine, Alisa Valderama, "Financing Stormwater Retrofits in Philadelphia and Beyond," NRDC, February 2012, available at www.nrdc.org/water/files/StormwaterFinancing-report.pdf.

⁴ See https://commercial-pace.energyupgradeca.org/county/san_francisco/overview

investment opportunity is created for a project developer to work directly with the property owner to manage the system improvement. The project developer assumes the upfront costs of the system improvement, and is repaid over time by the customer. Depending on the repayment arrangement, the project developer can be repaid either directly by the customer or via an on-bill assessment collected by the utility (see *On-Bill Financing for Infrastructure Retrofits*).

Recognizing the transferability of financing models from energy efficiency, the Natural Resource Defense Council (NRDC) and EKO Asset Management are presently working with Philadelphia to structure a fund that would channel private capital to the city's distributed green infrastructure program. EKO estimates that a project pipeline of \$50 million would be sufficient to attract family funds and philanthropic investments. If the Philadelphia pilot proves a steady revenue generator, capable of delivering returns to investors and meeting the city's water quality goals, there may be potential to scale investment funds to implement a larger program in Philadelphia and beyond. Ultimately, if the project pipeline could expand to \$100 million or more, institutional investors with more liquid investment needs could participate through securitized assets. To create tradable, liquid investments there may be need for credit enhancement provided by a government underwriter, such as a state or federal agency.

In a different context, this model may also work in locations that have not adopted a stormwater fee but that do have a stormwater regulation, which sets an aggressive on-site retention standard and allows partial compliance with this standard through off-site implementation and trading. In this situation, the role of the utility is to function as a market intermediary between property owners who wish to generate stormwater credits and private entities who wish to provide retrofit installation services. The financial incentive for property owners is the ability to sell stormwater credits on the local market. The financial incentive and reward for the retrofitting entity may be the difference between the market price for credits and the (presumably lower) price they can sell their services to the property owner in exchange for the credit fee. Another incentive may be a long-term contract with the property owner for a portion of the credit proceeds, if the local market functions accordingly.

The authors are not aware of any location in which this type of arrangement has been adopted or considered. However, in communities where stormwater credit markets are contemplated or adopted (such as Washington, DC and communities along the Charles River near Boston) there may be an opportunity to develop a viable program along these lines.

Similar approaches may be applicable in the water efficiency sphere to reduce both drinking water demand and wastewater treatment loads.

For example, Santa Fe has initiated development offsets – requiring property developers to “acquire” water for their development by retrofitting or paying the

city to retrofit old plumbing. The efficiency gain is the water that the developer then has access to for its project. As with stormwater credit programs, there may be sufficient market incentive to support private developer participation as a retrofit provider in this market, even independently undertaking retrofits to “bank” water supply credits. Even without a supply credit program, this approach to performance contracting can be an effective way to pay for efficiency retrofits in communities where water rates are set high enough to reflect actual costs, create sufficient incentive for efficiency retrofits, and shorten the payback period for private entity investment.

Whatever the purpose of the program, off-balance sheet financing approaches could be a fruitful application for foundation program-related investments (PRIs).

<i>Who's Working on Jumpstarting Off-Balance Sheet Financing for Distributed Systems:</i>	
	Charles River Watershed Association
	City of Santa Fe
	DC Department of Environment
	EKO Asset Management
	Environmental Consulting & Technology, Inc. / Geosyntec
	Environmental Trading Network
	Miami (OH) Conservancy District
	Natural Resources Defense Council
	Philadelphia Water Department
<i>Needs and Opportunities:</i>	
	Support assemblage of projects in interested cities to create project pipeline of sufficient size to launch fund
	Provide startup capital to retrofit programs
	Jumpstart similar stormwater retrofit programs in other cities to enable pooling of projects between cities, for eventual securitization
	Work with underwriters, institutional investors to identify standards that would enable off balance sheet retrofit programs to be securitized for investment by institutional investors
	Refine policies and principles for water quality/quantity trading programs to incentivize and fund stormwater and conservation programs
	Develop alternate model business plans for providers, including public, private and public:private partnerships
	Create a learning network of practitioners/financiers
	Develop/pilot educational programs

Building Support for On-Bill Financing for Distributed Systems and Upstream Watershed Improvements

On-bill charges may provide a secure financing mechanism for water infrastructure operations that leverages the existing administrative infrastructure provided by a water utility to efficiently collect fees or rate supplements tied to water infrastructure improvements. When the improvement being financed is provided by an ecosystem, the value of ecosystem services must be valued and costs appropriated to preserve services across the ratepayer base.

On-bill Programs to Protect Watersheds

Drinking water utilities are uniquely dependent upon healthy, functioning ecosystems to provide secure sources of clean, or treatable, water. Some, like New York City and Seattle, rely on the extensive filtration services provided by protected watersheds and reservoirs to deliver high-quality, unfiltered water directly to consumers. By investing in watershed protection efforts, both cities have avoided the capital and operational costs associated with filtration facilities. These avoided costs represent one approach to monetizing the value of watershed ecosystem services. Other municipal water suppliers face increasing risk from watersheds where climate change is undermining the security of the ecosystem services that they count upon for water supply and quality. Western cities like Santa Fe and Denver have watersheds located within mountain forests, and are particularly vulnerable to the impacts of forest fires.

After a pair of disastrous fires in its watershed, Denver Water is facing over \$40 million in water treatment, dredging and other costs related to erosion and sedimentation. The utility has since entered into a cooperative agreement with the US Forest Service to share the cost of a \$32 million forest management program to reduce fire risk through the watershed over the next five years. Denver Water will finance its share through an eventual rate increase.⁵

Fearing a similar threat to its watershed security, Santa Fe has also entered into an agreement with the Forest Service to manage fire risk reduction activities in its watershed. Initially, the city will rely on grant funds to support this program, but will transition to covering costs through its operating budget. Through extensive public education and outreach, the city has built strong public support for the program, which may support an explicit charge as part of local water bills.⁶

⁵ "Watershed Investment Programs in the American West. An Updated Look: Linking Upstream Watershed Health & Downstream Security," Carpe Diem West, November 2011, available at <http://www.carpediemwest.org/sites/carpediemwest.org/files/WIP%20Report%20Design%20FINAL%202011.15.11.pdf>.

⁶ "Watershed Investment Programs in the American West. An Updated Look: Linking Upstream Watershed Health & Downstream Security," Carpe Diem West, November 2011.

The actual costs of these utilities' forest management and erosion control programs represent another face of investment in ecosystem services to avoid future capital and operational costs, and to increase security and reliability of water service. In all cases studied by the authors, these watershed protection projects are financed directly through on-bill increases, or plans to increase, rates charges to water consumers. The difference between the programs is fundamental in the extent to which the ratepayers are knowingly mobilized to participate in this approach to financing. In New York, the portion of a customer's water rate that goes to watershed protection programs is not segregated out from other water supply charges; there is no obvious connection between ratepayer participation and the utility's efforts to protect and capitalize on intact ecosystem services. In the western cities of Santa Fe, Denver, and Salt Lake City, utilities are making a direct effort to involve water consumers in watershed protection. Where utilities believe it may be possible to build public support for their efforts, they may choose to include an obvious line on water bills. Where utilities wish to avoid drawing attention to a potentially controversial program, it may not single out the expenses but instead roll them into overall fixed infrastructure costs on water bills.⁷

Healthy watersheds also provide resilient stormwater and flood management services as well. Milwaukee has embarked on an innovative watershed land acquisition program to reduce future flood risk and protect water quality by purchasing and conserving floodplain properties within the metropolitan area. This Greenseams program is funded by Milwaukee Metropolitan Sewerage District but managed by The Conservation Fund, a public-private partnership that effectively leverages resources and organizational skills.

<i>Who's Working on On-bill Programs to Protect Watersheds:</i>	
	Carpe Diem West
	Denver Water
	Milwaukee Metropolitan Sewerage District / The Conservation Fund
	Salt Lake City Water
	Salt River Project
	Santa Fe Water
	Seattle Public Utilities
<i>Needs and Opportunities:</i>	
	Coordinate ecosystem services/natural capital valuation strategies (described below) with utility watershed protection projects, through pilot, demonstration, or full program implementation
	Develop and pilot education and outreach programs for utility commissioners, municipal leaders, and ratepayers that links upstream and

⁷ "Watershed Investment Programs in the American West. An Updated Look: Linking Upstream Watershed Health & Downstream Security," Carpe Diem West, November 2011.

	downstream resiliency and security
	Create models that dramatize risk scenarios facing watersheds so that utility managers and local leaders can strategically plan investment needs and options
	Expand on early adopters to integrate all of the above into fully informed rates and billing

On-bill Financing for Infrastructure Retrofits

On-bill charges or fees are commonly used by water utilities to repay elements of their capital improvement programs financed on the bond market or to fund work the utility manages on a pay-as-you-go or cash basis. On-bill charges can also be used to pay for programs that are capitalized by third parties, and therefore can be used to direct private capital into stormwater and water efficiency retrofits. Such an approach could involve a contractual arrangement between a water utility and a private investor that agrees to fund, install, and verify performance of retrofits that reduce stormwater discharges or potable water use. The private entity would secure capital to design, install and monitor retrofits in exchange for a financial benefit while fees or charges associated with the work would appear on the participating ratepayer’s bill.

To make use of this method, some form of financial inducement must be present. One possibility is for an “on-bill private developer” approach, for example, where a utility charges a parcel-based stormwater fee against stormwater dischargers, with accompanying credit where the property owner installs retrofits that reduce or eliminate stormwater runoff. The credit provides both the incentive for the property owner to install a stormwater reducing retrofit and the revenue stream for the private entity that contracts with the property owner to do this work.

NRDC’s recent report, *Financing Stormwater Retrofits in Philadelphia and Beyond*, provides further detail on the framework of this approach.⁸ Some of the possible challenges to establishing and implementing an “on-bill private developer” model may be:

- Insufficient private entity access to startup capital
- Perceived or actual administrative costs and obstacles borne by the water utility
- Structural complications with the repayment stream, including the need to comply with or avoid banking laws and regulations.

As with off-balance sheet programs repaid directly to the project developer, on-bill financing approaches that are not fully capitalized by utilities’ capital improvement

⁸ Larry Levine, Alisa Valderama, “Financing Stormwater Retrofits in Philadelphia and Beyond,” NRDC, February 2012, available at www.nrdc.org/water/files/StormwaterFinancing-report.pdf.

programs could be a fruitful application for foundation program-related investments (PRIs).

<i>Who's Working on On-bill Financing for Infrastructure Retrofits:</i>	
	Alliance for Water Efficiency
	EKO Asset Management
	Environmental Consulting & Technology, Inc. / Geosyntec
	Natural Resources Defense Council
	Philadelphia Water Department
<i>Needs and Opportunities:</i>	
	Collaboration between willing utilities, philanthropic funders and private capital providers to develop the components of an off bill private developer program for stormwater or water efficiency retrofits in an appropriate city
	Fund additional research and reporting to build a "how to" toolkit for interested utilities and private parties
	Investigate options for providing capital to private entities who wish to participate in "on bill" programs. Launch pilot program.
	Research opportunities and mechanisms for extending on bill, private developer models to water efficiency and wastewater infrastructure programs
	Removal of statutory prohibitions that would impede on-bill financing for customer improvements or bond financing for programs capitalized and managed by private entities

Piloting Market-Based Watershed Improvement Programs

In addition to the on-bill watershed protection efforts coordinated by water utilities or water districts, there is growing interest in financing programs that support watershed management programs that are privately developed and implemented. These programs could link downstream beneficiaries of secure water supplies and ecosystems with upstream "providers" of services, which create flows or habitats. In the cases studied by the authors, participation in these programs is predominantly voluntary, although requirements for off-site mitigation or compliance in stormwater or wetland impacts may also drive participation. Challenges raised by interviewees include the high administrative, outreach, marketing and accumulation costs that must be borne upfront, before revenue from credit sales; and the inherently limited reach of voluntary programs. In addition, there are concerns that allowing participation as a compliance mechanism may have inequitable consequences in impacted communities and that market rates for credits may be insufficient to fund protective watershed trust or restoration programs.

There are some notable examples whose experiences can inform future efforts. Bonneville Environmental Foundation (BEF) markets Watershed Restoration Certificates to fund voluntary flow restoration efforts. BEF markets credits tied to 1000 gallons of instream flow restored or preserved in select western watersheds. Purchasers of credits are primarily NGOs and water-dependent industries seeking to contribute social value either to offset their own use or meet other “intangible” goals.

The Freshwater Trust and water trust efforts in Sierra Nevada, Colorado, and Oregon watersheds, are pioneering efforts to quantify the economic value of intact, highly-functioning watersheds, and to market credits based on this value to entities that need to mitigate environmental impacts. Credits are available to comply with regulatory compliance, as well as to meet voluntary social capital goals.

<i>Who's Working on Piloting Market-Based Watershed Improvement Programs:</i>	
	American Rivers
	Bonneville Environmental Foundation
	Charles River Watershed Association
	City of Portland, Bureau of Environmental Services
	Freshwater Trust
	Lake Tahoe Regional Planning Authority
	Seattle Public Utilities
	Willamette Partnership
<i>Next steps and opportunities:</i>	
	Investigate opportunities for collaborative efforts between utility groups and water trusts or restoration certificate providers
	Joint ventures (or strategic alignments) between sectors to support market based initiatives
	Focused research and policy efforts to identify obstacles, shortcomings, and propose best practices

Supporting Legislation to Expand Financing Options

The need to address water infrastructure funding shortfalls is gaining significant legislative attention. Studies done by the Environmental Protection Agency (EPA) suggest that water utilities will need a substantial increase in investment to address our nation’s water infrastructure – costs over the next 20 years could exceed \$400 billion, which doubles the current level of investment by the government. Taking into account the cost for needed drinking water infrastructure improvements could raise this number even higher, to a total approaching \$1 trillion.

Currently, water infrastructure is financed almost solely by traditional financing mechanisms: municipal bonds, cash and low interest loan programs at the state and

local level. Most of the 50,000 water systems in the United States are unable to issue their own bonds and are therefore left with limited resources. Given these constraints, some are turning to private equity. While these mechanisms provide utilities with options for the upkeep and replacement of their built infrastructure, they do not provide all of the capital needed to replace and reinvest in our water systems. New forms of capital are needed to supplement our current funding gap and to provide investments in the new innovative technologies and infrastructure that will help drive sustainable water systems.

Legislation supporting the expansion of the financial market for water infrastructure will help to close the funding gap and invest in innovative systems. In the 112th Congress, multiple pieces of legislation have been introduced supporting the expansion of the financial market for water infrastructure. One bill in particular looks to renew federal investments over five years in wastewater infrastructure through the State Revolving Fund and other efforts to improve water quality. This bill would also authorize a Clean Water Trust Fund that would provide capitalization grants for the Clean Water SRFs, encouraging projects utilizing green infrastructure approaches and energy- or water-efficiency improvements. Similarly, a separate bill looks to authorize a Water Infrastructure Financing Innovative Authority (WIFIA) providing low-cost capital to water utilities needing to invest in infrastructure, and to State Revolving Funds. This legislation would also remove water projects from the state volume cap on Private Activity Bonds. Removing this cap would allow water systems easier access to capital from the private sector. Additional opportunities may arise as Congress and water sector advocates consider how water infrastructure legislation can mimic energy efficiency programs to increase innovative technologies. Creating programs like Property Assessed Clean Energy (PACE) could help businesses and utilities pay for the upfront costs of innovative green infrastructure approaches. Amending legislation on energy efficiency programs to include financing for water efficiency could also drive new investments in the water sector.

Another potential legal obstacle was pointed out by bond counsel representing one water utility. Generally speaking, a utility’s authority to issue bonds and incur debt is provided by state laws, which typically proscribe the types of water infrastructure for which the utility may incur debt. In some states, these statutory proscriptions may be quite antiquated and narrow, and may not be amenable to the types of distributed infrastructure which meet contemporary community and water quality needs. Reforming these local laws may be a requisite step to allow utilities to finance green infrastructure or watershed protection activities that reduce financial and water service risk.

<i>Who’s Working on Supporting Legislation to Expand Financing Options:</i>	
	American Rivers
	American Water Works Association

	M3 Capital Partners LLC
	National Association of Clean Water Agencies
	Water Environment Federation
<i>Next Steps and Opportunities:</i>	
	Work with members of Congress to pass legislation expanding the financial market for water infrastructure
	Create programs to help pay for upfront costs of green infrastructure
	Improve energy efficiency programs to include funding for water
	Survey existing state laws to identify where such restrictions exist and identify possible response strategies
	Support efforts to educate utility and legislative leaders about the need for statutory reform

Valuing Water

“Our accounting systems have difficulty recognizing unconventional assets, particularly the natural assets that provide water storage, filtration, and delivery. This makes it difficult to include the value such assets provide on a utility’s balance sheet, or to finance the acquisition or development of these assets.”

- Financing Sustainable Water Infrastructure

We need to ensure conservation and efficiency measures have the same capital available to them as a traditional water supply project. One step is to reform federal accounting standards so water conservation and efficiency projects on the customer side of the meter can be counted as utility investments just the same as traditional projects are. This would make it far easier and more attractive for a utility to finance and plan efficiency measures as a part of its capital improvement program.

- Paraphrased from an Interview with Mary Ann Dickinson, Alliance for Water Efficiency

Many utilities are facing unprecedented gaps between the collected revenue and the costs of protecting public health and the environment. To fill the gap between costs and revenues, many utilities are increasing their rates and fees, an approach that will help meet near-term revenue requirements, but which may counteract utility objectives to maintain affordable and equitable rates. Continuing to provide quality service and balance myriad objectives in the face of these challenges will require strategic and innovative approaches; the sustainability of the industry will depend on it.

- Paraphrased from an Interview with Jonathan Cuppett, Water Research Foundation

The “hard” infrastructure that delivers, treats, and impounds water is regularly counted as an asset on utility accounts. However, there is growing recognition of the value that other types of “infrastructure” provide to our water supply and stormwater management utilities. Healthy watersheds, for example, collect and

filter clean drinking water, can buffer the impacts of drought, storms and fires, and deliver numerous public benefits. Many of these ecosystem services have a quantifiable economic value. Likewise, emerging economic analyses of decentralized, green infrastructure approaches to stormwater management demonstrate the monetized value of the social and environmental services these practices provide. However, accounting standards, inconsistent analytical methodologies and institutional biases prevent utilities from adequately capturing and utilizing the economic value of their “natural capital.” Reducing these obstacles may provide utilities and local communities with decision-making and investment tools that favor investments in more resilient, natural infrastructure.

Adapting Rates to Support Sustainable Systems

In many communities, water rates have not kept pace with the cost of maintaining water treatment and distribution systems. Rate insufficiency is one of the primary culprits behind failing infrastructure, as the ongoing deferral of necessary maintenance has enabled rates to remain low. Beyond simply recovering the cost of providing services, rates must play a more central role in driving sustainable water management. Rates are a powerful tool for driving behavior: although water services are essential, their demand is price-dependent. If the cost of potable water increases, users will adjust demand downward. The same is true for wastewater and stormwater services: if the price of treating customers’ contributions to the system is adapted to reflect the higher marginal cost of greater volumes, customers will adjust the amount of water they offload into the system. Recognizing this price sensitivity, many drinking water utilities now price their services in inclining block rate structures, in which the marginal cost of higher volumes consumed is greater than the baseline rate. Similarly, some wastewater and stormwater utilities are beginning to adjust their rate calculations to reflect the actual volume of water disposed of by their customers.

While the sensitivity of water demand to price can make pricing a very effective driver of water use, it also raises challenges for utilities faced with large fixed costs for infrastructure capitalization. If pricing is too effective, and customers reduce their demand substantially, utilities can actually see their revenues decline. While this decline can be offset by reduced cost to the system of moving and treating water, the need for utilities to protect revenue stability even while pursuing conservation and efficiency is imperative.

Part of the challenge of rate setting for revenue stability is technical in nature. For instance, utilities must set a sufficiently high fixed component of the rate to ensure adequate cash flow for fixed debt service costs while preserving enough price variability depending on the volume consumed that a conservation signal is sent to the customer. Groups like the Alliance for Water Efficiency are taking this challenge head on, working with water utilities and economists to develop empirical tools that can harmonize conservation rate setting and revenue stability. Yet technically

robust approaches to rate setting must also weather the political process, whether before public utility commissions, city councils or water boards. Communicating the need for rate adjustments to the public will be paramount to developing more sustainable water systems.

Similar political support is needed for utilities seeking to finance distributed system improvements or watershed protection through discrete on-bill fee assessments or charges.

<i>Who's Working on Adapting Rates to Support Sustainable Systems:</i>	
	Alliance for Water Efficiency
	Great Lakes Commission (with Jan Beecher, Michigan State University et al)
	Resources for the Future
	Water Research Federation
<i>Next Steps/Opportunities:</i>	
	Research conservation rate structures that provide revenue stability while decoupling cash flows from volumetric sales
	Support local rate processes needed to fund utility capital improvement plans and conservation objectives
	Educate public utility commissions and city councils on the long term financial benefits to ratepayers of conservation pricing
	Advocate for trade associations to create more member support on conservation pricing

Monetizing Natural Capital/Ecosystem Services

Drinking water suppliers with large, relatively intact watersheds are particularly dependent upon the water quantity and quality services provided by these natural systems. By protecting watersheds, these utilities gain the advantages of more consistent, cleaner water supplies, services that can diminish or remove the costs of chemical and mechanical filtration and treatment.

Green infrastructure practices to reduce urban runoff provide similar services, and the economic value of these services also goes uncaptured. There has been some notable progress toward evaluating the full economic value of the ecosystems and community services provided by both natural capital and green infrastructure. Earth Economics' work on the former has delivered comprehensive economic benefits information to decision-makers in the Pacific Northwest and elsewhere. Likewise, Stratus Consulting's Triple Bottom Line analysis for Philadelphia's Green City, Clean Waters program has been instrumental in both supporting that program and shaping similar analysis of green infrastructure and other water infrastructure projects.

Because the effort to monetize, or quantify, the value of natural capital and green infrastructure is relatively new, there remain obstacles and uncertainties about developing these analyses and employing them to guide sound policy and decision-making. Interviewees identified a need for more consistent methodologies and applications of economic benefits valuation. For example, cost-benefit analyses for individual projects are increasingly improved by inclusion of ecosystem and community benefits; however, there is little practice with applying current approaches at this localized scale.

<i>Who's Working On Monetizing Natural Capital/Ecosystem Services:</i>	
	Cascade Water
	Earth Economics
	Industrial Economics
	Katoomba Group's Ecosystem Marketplace
	Philadelphia Water Department
	Resources for the Future
	San Francisco Public Utilities
	Seattle Public Utilities
	Stratus Consulting
<i>Needs and Opportunities:</i>	
	Convening target group of major utilities and economic practitioners/consultants to develop guidelines and best practices for natural capital, ecosystem service, and "triple bottom line" analyses
	Coordinating through the above group or an existing collaboration of water utilities to further analyze watershed natural capital in order to support new on bill financing efforts
	Refining techniques for calculating the ecosystem services provided by wide scale and project specific green infrastructure practices. Disseminating or applying these techniques in partnership with key utilities and/or representational organizations
	Identifying means to engage with and inform infrastructure financing entities (including state SRF and other fund managers) about the importance of these economic factors

Reforming Accounting Standards to Support Sustainable Capital Investments

Although arcane, accounting standards shape how we define water infrastructure. As a result, they can enable or constrain our ability to invest in 21st century systems. A number of groups are focused on amending accounting standards promulgated by

the Financial Accounting Standards Board (FASB) and its sister organization, the Government Accounting Standards Board (GASB).

While our cultural definition of water infrastructure may be rapidly transforming to incorporate the natural systems that provide water services, from water filtration to water storage, our accounting standards are still stuck in the twentieth century. As a result, utilities seeking to enhance natural infrastructure in their portfolio may not see a resulting increase in the value of the assets reflected on their balance sheet. In some cases, the activities undertaken to enhance the function of natural systems may result in a decline in the utility's assets. Such is the case in Seattle, where the Seattle Public Utilities' efforts to remove obsolescent logging roads (assets recognized under current accounting standards) in an effort to reduce sedimentation of the system's water supply (and accompanying filtration cost) resulted in a decline in the system's assets. Recognizing the need for accounting standards to catch up to our new view of water infrastructure, a group of seven utilities in the Water Utility Climate Alliance are working with Earth Economics to engage GASB on appropriate revisions to better reflect the value of natural capital assets on utility balance sheets.

Similarly, the narrow definition of water projects and assets can unnecessarily limit the financing approaches available to water utilities seeking to invest substantially in conservation and efficiency. Demand reduced through conservation and efficiency is now recognized by many utilities as a source of supply—in fact, in many water utility plans, conservation accounts for upward of 20-30% of future supply. Yet accounting standards may deter the capitalization of conservation and efficiency projects, relegating utilities to financing demand management through cash on hand. The Alliance for Water Efficiency is working with water utilities to identify revisions to GASB standards that can allow utilities more financial flexibility for investing in demand management.

Finally, accounting standards for depreciating buried assets, as codified in GASB 34, may contribute to inflated estimates of failing infrastructure and unintentionally dictate asset replacement that does not reflect true investment need. While no structured working group is active on this issue, it may be an important element of accounting standards reform.

While there are a number of groups working on accounting standards revisions to allow for more sustainable systems, these groups are working in parallel, without coordination. A more coordinated approach to amending accounting standards may be advantageous to all parties.

<i>Who's Working on Reforming Accounting Standards to Support Sustainable Capital Investments:</i>	
	Alliance for Water Efficiency
	Earth Economics
	Water Research Foundation
	Water Utility Climate Alliance
<i>Next Steps and Opportunities:</i>	
	Convene players working on various elements of GASB reform to coordinate engagement across the water sector
	Research value of services provided by natural assets and depreciation of these assets to inform GASB standards

Options for Foundation Involvement	National Foundation	Regional Foundation	Community Foundation
TRANSPARENCY			
Developing a performance rating system for water utilities			
Research			
Convening			
Advocacy & Outreach			
Creating robust market information policies and practices			
Research			
Convening			
Advocacy & Outreach			
VALUING WATER			
Monetizing Natural Capital/Ecosystem Services			
Research			
Convening			
Advocacy & Outreach			
Direct Investment			
Adapting rates to support sustainable systems			
Research			
Convening			
Advocacy & Outreach			
Reforming accounting standards to support sustainable capital investments			
Research			
Convening			
Advocacy & Outreach			
MARKET FORMATION			
Jumpstarting off-balance sheet financing for distributed systems			
Research			
Convening			
Advocacy & Outreach			
Direct Investment			
Building support for on-bill financing for distributed systems and upstream watershed improvements			
Research			
Convening			
Advocacy & Outreach			
Direct Investment			
Piloting market-based watershed improvement program			
Research			
Convening			
Advocacy & Outreach			
Direct Investment			
Supporting legislation to expand financing options			
Research			
Convening			
Advocacy & Outreach			

Appendix: Interviews Conducted

Ricardo Bayon, EKO Asset Management Partners
Janet Clements, Stratus Consulting
Jonathan Cuppett, Water Research Foundation
Jennifer Demmerle, Northeast Ohio Regional Sewer District
Mary Ann Dickinson, Alliance for Water Efficiency
Kyle Dreyfuss-Wells, Northeast Ohio Regional Sewer District
Andrew Fahlund, Center for Water in the West, Stanford University
David S. Goodman, Squire Sanders (US) LLP
Steve Grossman, Ohio Water Development Authority
Jennifer Harrison-Cox, Earth Economics
Rosey Jencks, San Francisco Public Utility Commission
Cynthia Lane, American Water Works Association
Frank Law, Water Research Foundation
Larry Levine, Natural Resource Defense Council
Peter Malik, Natural Resource Defense Council
Todd Reeve, Bonneville Environmental Fund
Alan Robertson, American Water Works Association
Rowan Schmidt, Earth Economics
Alisa Valderrama, Natural Resources Defense Council
Brian VanWye, DC Department of Environment
Kimery Wilshire, Carpe Diem West
Bob Zimmerman, Charles River Watershed Association

