Meeting Report

New England Regional Freshwater Forum:
Moving Toward Integrated Water Planning and Management

May 30–31, 2012
The Langham Hotel
Boston, Massachusetts
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Introduction

On May 30 and 31, 2012, thirty-six participants representing diverse interests gathered for the Charting New Waters New England Regional Freshwater Forum at the Langham Hotel in Boston. While technical solutions for many of New England’s freshwater challenges are available, existing governance structures and fragmented decision making regarding water are impeding the development and implementation of innovative, holistic solutions. This Forum brought together water experts and stakeholders from New England and other regions of the United States to explore the concept of “one water” – that is, planning and managing public drinking water, groundwater, stormwater, and wastewater as an integrated system – as a pathway to holistic, resilient solutions. “One water” also includes the integration of water management with transportation, energy, land use, and waste management planning in ways that protect public health and restore balance between the built environment and natural hydrologic systems. Forum participants identified the following key ingredients and recommended actions as necessary to move toward one-water integration:

- Define the problem broadly;
- Engage the right people;
- Forge partnerships and build capacity;
- Invest in trust building;
- Create regulatory flexibility for innovation;
- Educate, involve, and connect the public; and
- Secure funding for project implementation.

The New England Regional Freshwater Forum was the second Charting New Waters regional forum seeking to highlight innovative freshwater solutions and share them among leaders in different regions of the United States and with federal decision makers.¹ The regional forums are the latest phase of work for Charting New Waters, a network of more than 500 stakeholders and experts who have provided input through meetings and conversations organized by The Johnson Foundation at Wingspread and are dedicated to catalyzing new solutions to U.S. freshwater challenges. Charting New Waters participants include voices from business, agriculture, academia, environmental organizations, and local, state, and federal governments. The initial phase of work led to the release of Charting New Waters: A Call to Action to Address U.S. Freshwater Challenges, a consensus report issued on September 15, 2010. That report can be downloaded at [http://www.johnsonfdn.org/aboutus.Chartingnewwaters](http://www.johnsonfdn.org/aboutus.Chartingnewwaters).

Meeting Overview

Lynn Broaddus, Director of the Environment Program for The Johnson Foundation at Wingspread, welcomed participants and provided background about the Foundation, Charting New Waters, and the genesis of the New England Regional Freshwater Forum. She explained that Charting New Waters seeks a new path for freshwater challenges.

¹ See Appendix A for the New England Regional Freshwater Forum meeting agenda, Appendix B for speaker biographies, and Appendix C for the participant list.
management through innovative, integrated freshwater solutions that are grounded in collaborative problem solving and cut across traditional boundaries. Integrated policy and management solutions, along with innovative, co-beneficial strategies and outcomes, are the hallmarks of the new course Charting New Waters sees for freshwater management and resources in the United States.

Broaddus noted that achieving one-water integration is more than an engineering challenge, it is a governance challenge. The Forum discussion focused on fundamental governance questions regarding how to achieve integration, rather than questions about what the exact goal should be. For the purposes of the Forum, governance was defined broadly to encompass regulatory issues as well as inter-agency and cross-jurisdictional coordination and collaboration; leadership from nongovernmental organizations; public involvement in planning processes; infrastructure financing strategies; public messaging and communications; and communication between technical experts and elected officials. In response to pre-meeting consultations with experts and stakeholders in New England, the Forum was designed around the following objectives:

- Examine key governance and coordination challenges facing New England watersheds;
- Learn about successful freshwater planning and management strategies and lessons from other regions of the United States; and
- Identify principles, recommendations, and actions to advance integrated planning and management in New England and beyond.

Three watershed case examples set the stage for the discussion of freshwater governance challenges in New England. The three cases covered were Great Bay in New Hampshire and Maine; Cape Cod, Massachusetts; and the Charles River in Massachusetts. The cases were presented by stakeholders representing different sectors that are involved in planning and management in each watershed. Presenters offered their perspectives on the governance factors they believe are inhibiting or facilitating progress in restoring water quality and implementing solutions in the respective watersheds. The cases served as touchstones throughout the Forum, with participants referring to them as they discussed strategies for advancing integrated one-water planning and management in New England and beyond.
To gather additional input from Forum participants, all attendees were offered an opportunity to provide additional thoughts via a web-based survey immediately following the Forum. Approximately half of the 36 participants responded to this survey. Themes and highlights from both the discussion and the survey results are integrated into this summary.

Case Example Overviews

Great Bay, New Hampshire and Maine

The case of Great Bay was presented by Carl Deloi, Chief of the Wetlands and Information Branch at the U.S. Environmental Protection Agency (EPA) Region 1; Peter Wellenberger, Great Bay–Piscataqua Waterkeeper with the Conservation Law Foundation; and David Cedarholm, Town Engineer for Durham, New Hampshire. At 1,023 square miles, the Great Bay watershed encompasses all or part of 52 communities in two states – 42 in New Hampshire and 10 in Maine. The Bay is fed by the Piscataqua River, which forms the boundary between Maine and New Hampshire, and several other tidal rivers. A rare inland estuary of national significance, Great Bay is a National Estuary Research Reserve and part of the National Estuary Program. Situated in a high-growth area, Great Bay is suffering from high nutrient loading, which is causing a dramatic increase in nuisance algae, severe declines in eelgrass biomass and oyster populations, and dissolved oxygen impairments in tidal rivers. Nutrient loads are coming from multiple sources – 70 percent nonpoint sources, 27 percent wastewater treatment plants (WWTPs), 2 percent atmospheric deposition, and 1 percent groundwater – and need to be reduced by 30 to 45 percent to meet water-quality standards. The majority of the most reactive and controllable form of nitrogen – dissolved inorganic nitrogen – comes from the WWTPs in the watershed.

See Appendix D for the post-Forum survey questions.

See Appendix E for more background on Great Bay.
The presenters highlighted the following key governance challenges for Great Bay:

- The EPA’s Region 1 has proposed three National Pollutant Discharge Elimination System (NPDES) permits, but has not yet issued any. A related general permit for Small Municipal Separate Storm Sewer Systems (MS4) is under development for municipalities in the watershed, but has not yet been issued.
- A coalition of five municipalities is challenging the EPA’s proposed WWTP nitrogen discharge limit of 3mg/L, arguing that it is prohibitively expensive to achieve. Collectively, the five municipalities are responsible for 80 percent of the WWTP point-source discharges in the watershed. The same group is legally challenging the state of New Hampshire’s nutrient criteria development process.
- The municipalities that are challenging the proposed discharge limits and those that are willing to initiate efforts to improve water quality have different perceptions about the precision of water-quality standards and nutrient criteria. Those willing to initiate efforts are working with the EPA and state regulators to enhance the precision of the science and relative conclusions and to collaboratively develop integrated, watershed-based approaches to permit compliance in an ongoing, adaptive manner.
- Land use and regional development patterns are significant contributors to nutrient loading problems and must be addressed as part of restoration efforts, for those efforts to be successful.
- The diffuse nature of decision-making power in the executive and legislative branches of New Hampshire state government – as well as the fragmentation of responsibility across multiple agencies and town-level control over many decisions – creates many hurdles to progress on water issues.
- The costs of upgrading municipal facilities are large and particularly difficult for municipalities to handle in the wake of greatly diminished federal and state funding in recent years.
- New Hampshire’s economic model (i.e., property taxes as the main revenue source, no sales tax, no income tax) makes it difficult to raise sufficient public funds to address water infrastructure problems and related issues.
- The EPA is proposing a combination of extended compliance schedules, integrated permitting, continued scientific investigation, innovation to control costs, and sub-watershed planning to address the current challenges in Great Bay.

**Cape Cod, Massachusetts**

An overview of the freshwater challenges facing Cape Cod was provided by Andrew Gottlieb, Executive Director of the Cape Cod Water Protection Collaborative; Valerie Nelson, Director of the Water Alliance; and William Hinchey, Town Administrator for Yarmouth, Massachusetts. Cape Cod covers 412 square miles of land encompassing 15 towns. It has 794 miles of coastline with 46 embayments, all of which are included in the Massachusetts Estuaries Project. Many coastal embayments on Cape Cod are suffering from eutrophication and are experiencing rapid declines in ecological health. The primary cause of eutrophication problems is an overabundance of nitrogen discharged within the watersheds of the embayments. Stormwater, leaching lawn fertilizers, and agricultural runoff contribute varying levels of nitrogen, but 85 percent of controllable nitrogen comes from onsite wastewater disposal systems (e.g., Title V septic systems). There are 133,000 developed parcels of land on the Cape and about 121,000...
septic systems. Only four towns have publicly owned WWTPs, and only 6 percent of properties on the Cape (with 15 percent of total sewage) are connected to treatment facilities. Ecological damage from the septic systems results in the loss of eelgrass, coastal fisheries, spawning grounds, shellfish beds, and recreational uses, causing negative impacts on tourism, offshore marine ecology, fishing and shellfishing operations, and local tax bases.  

During the Forum, the presenters highlighted the following key governance challenges in the region:

- The Cape’s historical land use and development patterns – in particular the reliance on onsite septic systems – have led to the current embayment pollution problems, but clarity regarding the source of the problems has not helped interested parties coalesce around common solutions.
- Because there are so few municipally owned treatment facilities on Cape Cod, federal regulators have historically exercised only limited oversight under the Clean Water Act. Pending Clean Water Act litigation may compel the EPA to play a greater regulatory role in the area than it has to date. The lack of regulatory activity, along with high costs and a lack of broadly accepted engineering solutions and political will, have led many communities to let wastewater problems languish and compound.
- The availability of state, federal, and/or grant funding and the presence of a consent decree and/or broad public outreach and support have been key factors driving some towns on the Cape – such as Dennis in 1990 and Chatham in 2008 – to approve the development of wastewater treatment plants, while a lack of all three of those factors led to the defeat of a treatment plant proposal in Yarmouth in 2011.
- Towns on the Cape tend to engage in town-by-town planning rather than coordinating across jurisdictional boundaries to develop potentially more cost-efficient, regional solutions.
- Some stakeholders on the Cape are interested in exploring decentralized wastewater solutions rather than conventional, centralized treatment facilities, which tend to be very expensive. Such an approach could involve a new structure of water governance on Cape Cod that would empower town-level decision makers by engaging local citizens and technical experts in

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4 See Appendix F for more background on Cape Cod.
identifying flexible, long-term solutions, with the EPA providing technical assistance in addition to regulatory oversight.

- For serious action to occur, political leaders on Cape Cod must coalesce around a common definition of the wastewater problem and establish a broad consensus about an effective, affordable, and sustainable solution that complies with applicable regulations.

**Charles River, Massachusetts**

The elements of success in the effort to restore the Charles River were described by Bob Zimmerman, Executive Director of the Charles River Watershed Association (CRWA); Arleen O’Donnell, Vice President of the Eastern Research Group; and Ken Moraff, Deputy Director of the Office of Ecosystem Protection in the EPA’s Region 1 office. The Charles River watershed covers 308 square miles and encompasses 35 cities and towns, with the 80-mile river running through 23 of those towns and emptying into Boston Harbor. Efforts to clean up the Charles River began in the late 1960s and accelerated dramatically in the mid-1990s, with a wide range of agencies, nongovernmental organizations, municipalities, universities, businesses, and volunteers collaborating on restoration efforts. A comprehensive monitoring program launched by the CRWA in 1994 made it clear that point-source discharges were the primary cause of water-quality degradation in the Charles. The EPA’s Region 1 then exercised its regulatory authority to issue 10 consent decrees and fine violators, while facilitating collaboration among key parties through its Clean Charles Initiative. The formation of the Massachusetts Water Resources Authority (MWRA) and development of the long-term control plan to reduce combined sewer overflows (CSOs) from the city of Boston were additional key factors. While sewage and bacteria have been greatly reduced and recreation on the river has increased tenfold since the mid-1990s, the Charles still faces pollution challenges such as
stormwater runoff and increasing CSO activations related to intensifying rainfall patterns, eutrophication, and low in-stream flow and habitat degradation caused by human water demand and wastewater infrastructure.\(^5\)

At the Forum, presenters highlighted the elements of successful freshwater governance in the Charles River case, as well as remaining challenges, as follows:

- Comprehensive, watershed-based restoration strategies take years to carry out, making persistence and perseverance critical to achieving holistic watershed solutions.
- Motivating action on environmental protection and restoration is easier when economic benefits can be demonstrated.
- Science-based, nongovernmental watershed organizations that solely focus on studying and enhancing a particular watershed can play strong roles in catalyzing and coordinating holistic solutions.
- Water leaders and decision makers across sectors should be open-minded to the idea that existing infrastructure is not necessarily the infrastructure that will be needed for the future.
- Building relationships and partnerships with influential leaders (including those with opposing interests), and leveraging those relationships strategically, can have a significant effect on watershed outcomes.
- Regulators have a role to play in creating a flexible legal environment that allows for shared leadership among diverse stakeholders.
- Public awareness and grassroots support can be generated through the use of visibility tactics like the EPA’s “river report cards” and the water-quality flagging system used by the CRWA.
- A transformational shift toward “green” infrastructure and the enactment of residual designation authority by the EPA’s Region 1 is likely to drive future governance challenges in the Charles River watershed.\(^6\) While the management regime will give municipalities new tools for MS4 permit compliance, those municipalities will have to develop new capacities and skills to apply the tools effectively and help newly regulated private entities comply in a cost- and time-efficient way. The EPA’s challenge will be to apply the Clean Water Act regulatory structure in a manner that allows for local input and offers adequate technical assistance and decision support so that regulated entities can achieve economies of scale through collaboration while complying with federal regulations. Municipalities will also need to integrate stormwater management measures with broader community development goals in an inclusive manner that communicates the rationale behind those measures and maximizes the likelihood they will be accepted.

**Getting to “One-Water” Integration**

Keeping in mind the governance challenges and successful strategies described in the New England case examples, participants spent the balance of the Forum sharing insights and exploring ideas for moving toward integrated, one-water planning and management. While the discussion was grounded in

\(^5\) See Appendix G for more background on the Charles River.
\(^6\) For more information about residually designated discharges in the Charles River watershed, see http://www.epa.gov/region1/npdes/charlesriver/index.html.
the challenges facing the New England region, experts from other parts of the United States also introduced practical examples and models from their own experience. The discussion revolved around the following overarching “how” questions:

- How do we make the transition to a holistic, one-water management framework?
- How do we transition from old infrastructure to new infrastructure, or an effective hybrid thereof?
- How do we integrate disciplines within the water sector (i.e., wastewater, stormwater, drinking water, groundwater, environmental flows) and beyond the typical water sector (i.e., transportation, energy, land use, waste management, etc.)?

Key freshwater governance challenges that emerged from the full-group discussion included: defining water challenges in terms that resonate broadly; communicating complex solution proposals in understandable ways that illustrate benefits that go beyond just clean water; establishing decision-making processes for water management that involve key stakeholders and the public in ways that educate and build capacity and trust in the final outcomes; creating regulatory flexibility that allows for innovation without compromising legal accountability; and financing water projects. The balance of this section outlines key principles or “governance ingredients” identified by Forum participants that collectively hold the potential to overcome such governance challenges and advance integrated freshwater planning and management in New England and beyond.

**Define the Problem Broadly**

Recent extreme rainfall events driven by climate change have wreaked havoc on New England’s waterways and water infrastructure. Most notably, Hurricane Irene caused severe flooding throughout the region in August 2011, with Vermont suffering widespread devastation. Recent scientific studies suggest that the region will continue to see more intense precipitation than it has historically, rendering much existing infrastructure inadequate.\(^7\) There is growing recognition among the public of this reality and an emerging desire to be more resilient to flooding threats, and sustain the quality of life New Englanders enjoy. This broad concern about natural hazards and community well-being offers local leaders in New England an opportunity to facilitate a transition toward integrated water planning and management. Highlighting water management as a key component of resilience to extreme weather is one potentially effective way to frame water challenges in a broader context that would resonate more with the public than would focusing on technical solutions to specific water problems.

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Furthermore, the concept of resilience can be used as a motivational framework to encourage the implementation of new technologies that offer holistic, integrated solutions. For example, emerging wastewater treatment system technologies can capture and reuse waste streams (e.g., biosolids for energy generation and nutrients for fertilizer) and infiltrate treated water back into the groundwater table. Such disruptive innovations can simultaneously enhance resilience to changing energy availability and the depletion of nutrient resources such as phosphorous, while making river base flows more resilient to drought. Drawing attention to the interdependency of various infrastructure systems – water, energy, waste management, transportation, and land use – can create opportunities to address freshwater and other community challenges simultaneously.

**Engage the Right People**

Moving toward one water will require people from diverse disciplines, who may not be used to working together, to break out of their respective silos, examine the intersections between them, and think creatively about how to leverage resources and generate multiple benefits through integration. The right people must be engaged in planning and management decisions – from influential experts and elected officials, to managers and implementers on the ground, to citizens and consumers. State and local legislators have the ability to change laws and ordinances to create pathways for innovative solutions, while experts and managers can help regulators shape new rules and policies so that they are practical.

The presence of an objective convenor that has no direct stake in decision making, as well as a willingness among interested parties to engage with historical adversaries and share recognition for success, are also important ingredients to achieve integration. As an example of how this can work, the California Stormwater Quality Association (CASQA) assists the State Water Resources Control Board and municipalities throughout the state of California in implementing the NPDES stormwater mandates of the Clean Water Act. The CASQA – a mission-driven nonprofit association – coordinates opportunities for shared learning and collaborative development of best management practices by a diverse range of stormwater management organizations and professionals, including cities, counties, special districts, industries, and consultants throughout the state.8

**Forge Partnerships and Build Capacity**

Partnerships aimed at improving freshwater management are often catalyzed by regulatory drivers and self-interest on the part of regulated municipalities, businesses, or property owners. However, getting to one-water integration will require thinking beyond regulations to forge unconventional, mutually beneficial partnerships and build greater capacity for innovation. As an example, the City of Cincinnati spent time educating city engineers about green infrastructure approaches to stormwater management before they engaged in a collaborative planning process with the Metropolitan Sewer District of Greater Cincinnati (MSDGC) to determine new ways to reduce combined sewer overflows in Mill Creek. To formalize

8 For more information about the California Stormwater Quality Association, see www.casqa.org.
cooperative partnerships like these between public agencies, or between public agencies and private entities, memoranda of understanding may be needed. Such partnerships may involve capacity-building measures and cross-pollination by swapping and embedding staff across agencies, as the MSDGC has done with the City of Cincinnati to implement CSO control projects. Training and certification courses such as those being developed under the Federal Buildings Personnel Training Act, which includes curriculum on water efficiency, also offer opportunities to build staff capacity.  

**Invest in Trust Building**

Water leaders and decision makers must invest time and energy building trust among stakeholders and the public in order to enhance freshwater management. Constituents and ratepayers will have more trust in proposed freshwater solutions if they are engaged early in the planning process, and if the process is conducted in an open, transparent manner. New England communities have an opportunity to build upon the democratic tradition of town meetings and engage citizens in water project planning, including scoping and defining the problem and evaluating solution options. A key aspect is to balance urgency, on the one hand, with time for careful deliberation, on the other, so that stakeholders will buy into the process and be more likely to support the outcomes. As evidenced by the Basin Roundtable and Interbasin Compact Committee statewide water planning process in Colorado, creating structures and processes for diverse stakeholders to engage in joint fact-finding and collaborative problem solving over time can help build trust between interests as historically opposed as Western ranchers and environmental advocates. In the case of CASQA, regulators and municipal managers built trust over the course of several meetings and discovered they shared a common understanding of stormwater quality management based on complementary experiences of regulating and managing stormwater quality over more than 20 years. That trust and common understanding is expected to lead to a new generation of smarter stormwater permits in California that work better for regulators and permittees and for improving stormwater quality.

**Create Regulatory Flexibility for Innovation**

Technological and policy innovation is crucial for addressing freshwater challenges in New England and throughout the United States, but it must occur within existing legal and regulatory frameworks. The EPA and state agencies are obligated to ensure compliance and accountability for environmental outcomes under cornerstone environmental laws such as the Clean Water Act. These agencies must base permit decisions and regulatory enforcement on the best-available science, or face the threat of litigation. At the same time, many disruptive technologies and policy innovations are emerging that demand flexibility from regulators. For instance, on Cape Cod there is growing public interest in decentralized wastewater treatment systems. In the Charles River watershed, some stakeholders are pushing for the EPA to further

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9 For more information about the curriculum being developed under the Federal Buildings Personnel Training Act, see https://www.fbo.gov/spg/GSA/PBS/PHA/GSAandDOE/listing.html.
10 For more information about the Interbasin Compact Committee and Basin Roundtables, see http://cwcb.state.co.us/about-us/about-the-ibcc-brts/Pages/main.aspx/Templates/Home.aspx.
expand its exercise of residual designation authority so that the agency will be able to regulate stormwater runoff on a wider range of properties. And in the District of Columbia, DC Water is working to retrofit the Blue Plains Advanced Wastewater Treatment Plant so that it will be the first plant in the nation to generate electricity while treating sewage sludge.\textsuperscript{11}

Leadership is needed from regulatory agencies to create conditions that motivate and allow municipalities and industry to go “beyond the permit” and experiment with more sustainable freshwater solutions. Since “sustainability” is not a specific performance criterion in existing environmental laws, regulators and implementers must collaborate to identify opportunities for regulatory flexibility that allow for innovation and adaptive management. As an example, the Metropolitan Sewer District of Greater Cincinnati was able to negotiate a three-year study within the scope of its consent decree, which allowed the MSDGC to conduct a collaborative planning and alternative evaluation process that resulted in potentially better CSO reduction projects. These projects are being implemented as part of Project Groundwork, a program of the MSDGC that is focused on developing an innovative, comprehensive, long-term CSO control plan that integrates drinking water works, wastewater treatment, and stormwater management and generates a range of community benefits beyond clean water. The original consent decree called for more conventional and expensive underground storage tunnels to control CSOs.\textsuperscript{12} The Cincinnati example shows that opportunities can exist to identify and implement innovative solutions within existing regulatory requirements at an acceptable level of risk and uncertainty.

**Educate, Involve, and Connect the Public**

Constituents often do not understand or appear to care about freshwater challenges, making public education and messaging a critical element of any initiative to address water pollution or supply issues. Despite the inherent complexity of water challenges, experts and decision makers must find ways to educate the public about these challenges and explain potential solutions in simple terms that are grounded in science and illustrate how the solutions will actually work. Experts and leaders also need to involve citizens in defining problems, evaluating solution options, and implementing demonstration projects. In Durham, New Hampshire, for example, the Department of Public Works engaged local high school students in the construction of a 1,000-square-foot rain garden to control stormwater runoff.\textsuperscript{13} Other promising strategies include engaging citizens in monitoring programs through the use of “crowd source” data-gathering tools (such as smart phone applications) and engaging artists in the creation of public art that connects people to their watersheds. Simply raising the visibility of water problems and linking them to everyday things people care about (e.g., drinking water, hygiene, swimming, boating) can also help citizens understand their stake in solving those problems. One longstanding success story is the Charles River Watershed Association’s system of using different color flags at boathouses along the river


\textsuperscript{12} For more information about Project Groundwork, see [http://projectgroundwork.org](http://projectgroundwork.org).

\textsuperscript{13} For more information about the Town of Durham’s rain garden project, see [http://forenh.org/2012/05/15/plant-donations-and-volunteer-gardeners-wanted-for-orhs-rain-garden-project](http://forenh.org/2012/05/15/plant-donations-and-volunteer-gardeners-wanted-for-orhs-rain-garden-project).
to indicate water quality, thus raising public awareness about the link between water quality and recreation.\textsuperscript{14}

Lack of appreciation for water resources, combined with tight municipal and state budgets, can present serious challenges for gaining approval of water-related investments in New England and other regions. Citizens and ratepayers are more inclined to support clean water legislation, utility rate increases, and/or investment in public water infrastructure if they are connected to and care about the resource. For example, Rhode Island is one of the poorest states in New England, yet every clean water referendum in recent years has passed with more than 60 percent of the vote. This is because the public understands the challenges facing Narragansett Bay and feels connected to the resource, due in part to public messaging delivered by Save the Bay.\textsuperscript{15} By contrast, leaders in the Great Bay watershed have had difficulty gaining traction on solution implementation, as large segments of the public do not perceive the urgency of nutrient-loading problems, partly because the Bay is difficult to access and many people live in relatively distant sub-watersheds.

**Market and Demonstrate the Value of Water**

Defining the value of water in broad terms – encompassing benefits to ecosystem health as well as economic and community health – is a promising strategy for overcoming public skepticism about investment in water projects. Demonstrating direct links between environmental protection and restoration and economic benefits is a potentially powerful tactic for gaining support for water quality and supply investments. In the case of the Charles River, improved water quality (i.e., a cleaner river and harbor) was quickly followed by economic development and revitalized recreation opportunities, as well as a corresponding downturn in skepticism about investment in the cleanup effort. As clear as the connection may seem, however, the Charles River cleanup still offers only anecdotal evidence of the link between river restoration and economic and community development.

What is needed are better valuation methodologies that enable quantification of the economic, as well as ecological and social, benefits of clean water in a rigorous manner and that can effectively inform investment decisions. Such methods could be applied in planning processes to weigh technical solution options (e.g., centralized versus decentralized), set investment priorities, and develop long-term planning scenarios (e.g., lifecycle analyses) that project return on investment in more dynamic ways than focusing narrowly on meeting water-quality standards or nutrient criteria targets. In addition to valuation methods for scenario planning, the implementation and evaluation of innovative, on-the-ground pilot projects like the Littleton (Massachusetts) Smart Sewering Strategy have the potential to demonstrate how investment in innovative water management projects can generate ecological, economic, and social benefits for

\textsuperscript{14} For more information about the CRWA’s flagging system, see http://www.crwa.org/water_quality/daily/programhome.html.

\textsuperscript{15} For more information about Save the Bay, see http://savebay.org.
communities. Together, better scenario-planning methods and demonstration projects can generate greater public support for investment in integrated freshwater solutions.

Secure Funding for Project Implementation

Freshwater is ultimately a local issue, and municipalities and utilities must secure funding to implement collaborative processes and projects that will advance integrated planning and management. Integration and innovation in the water sector will require stable, long-term revenue streams, and communities are seeking options for securing that funding. Rather than citing lack of adequate financing as a reason to defer action, leaders need to be creative and demonstrate resolve to secure funds and make necessary changes to improve water management. They need to identify major funding sources, whether directly meant for water or not, and find ways to leverage funding for relevant water projects.

The EPA’s Clean Water and Drinking Water State Revolving Funds (SRF) remain the largest sources of clean water financing in the nation, but the implementation of these funding streams could be improved to ensure that funds are put toward sustainable infrastructure projects rather than into repairing infrastructure that is not built for today’s storms or tomorrow’s energy constraints. Altering the terms of loans to create incentives for innovation, and limiting disbursements (consistent with existing law) to municipalities that are planning for integration, are tactics that could help advance one water. In addition, some SRF funds could be disbursed as innovation grants rather than loans, which municipalities may have difficulty repaying. In general, government procurement and grant mechanisms could be revised to incorporate design standards and performance criteria that favor sustainable approaches, which could help drive a transition toward more environmentally sensitive project designs and integrated solutions.

While SRF loans are an important funding source, the money available is not adequate to help municipalities thoroughly address insidious infrastructure problems associated with antiquated, broken water systems. Municipal agencies and utilities must find ways to engage one another as well as property owners in partnerships to generate lasting revenues for water infrastructure. One promising strategy is to charge parcel-based stormwater fees based on impervious surface area and then use the revenues to finance a stormwater enterprise fund; this strategy is increasingly being used in cities around the country that are subject to MS4 permits. In Washington, DC, for example, the District Department of the Environment instituted such a fee in 2010 so that all property owners are now paying into a dedicated fund. Much of that money is being spent on green infrastructure implementation within the MS4 zone of the city. DC Water instituted a similar impervious area charge to help fund the long-term control plan for the combined sewer zone of the District.

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17 For more information about the District Department of the Environment’s stormwater fee, see http://ddoe.dc.gov/service/changes-districts-stormwater-fee.
18 For more information about DC Water’s impervious area charge, see http://www.dcwasa.com/customercenter/IAB.cfm.
Another area of opportunity for towns is to partner with real estate developers, in order to leverage private dollars for the implementation of innovative water infrastructure solutions that will support new development. For example, new developments may offer opportunities for decentralized wastewater treatment systems that generate energy from biosolids, saving on energy costs and even generating revenue. In addition, because water is connected to decisions made in many sectors, there may be opportunities for municipal agencies to leverage water funding against funding for transportation or energy projects.

### Conclusion: Messages from New England

The Charting New Waters regional forums aim to ground truth the principles and recommendations from the September 2010 *Call to Action*, highlight and transfer knowledge about innovative solutions that may be replicable or instructive across regions, and identify messages to carry forward to regional leaders and federal decision makers. At the New England Regional Freshwater Forum, participants from within the region as well as individuals from Seattle, the San Francisco Bay Area, Denver, Cincinnati, and the District of Columbia shared ideas about how, in terms of governance, to move toward one water or integrated water planning and management.

One of the key messages from the Forum is the idea that true one-water integration must cover upstream and downstream, permitted and non-permitted sources of pollution. In other words, all members of a community must have “skin in the game” of solving freshwater challenges in their watershed. Regulatory gaps must be filled so that everyone carries some responsibility. In an effort to accomplish this, for example, some towns in New England have already adopted or are considering adopting stormwater fees based on impervious surface area. Also, EPA Region 1 is considering expanding NPDES permit residual designations to address larger privately owned infrastructure so that these sources are effectively regulated, municipalities are not unfairly burdened, and more property owners are paying into the stormwater management revenue stream. Nonpoint source pollution originating from rural areas remains a challenge in the region.

Another key message is that effective communication with consumers and ratepayers is extremely important. Contextualizing needed water investments within broader frames of reference, such as sustainability or community resilience, can make them more palatable. Emphasizing the value of water and the range of benefits that
innovative, holistic water projects can provide a community can also be powerful. Examples include demonstrating that wastewater treatment systems can recover energy from biosolids or waste heat, using treated water for industrial cooling, and capturing phosphorous from the waste stream for re-use as fertilizer. Moreover, state and municipal water management agencies and programs need to seek funding for water projects using a systems thinking lens. They need to look to related areas such as energy, waste management, transportation, and land use to locate funding sources and figure out how to leverage those sources to address water issues while tackling other challenges. Examining and showing, through demonstration projects, how water problems affect multiple dimensions of a community and how creative investments and solutions can generate flexible, long-term environmental, economic, and social benefits can foster greater public understanding of and support for solutions.

Some of the messages heard during the Colorado Regional Freshwater Forum were reiterated by participants in New England. Most importantly, decision makers and managers must remain cognizant that water is ultimately a local issue and that “one size does not fit all watersheds” when it comes to federal rules and policy. Regulatory flexibility is essential for allowing regions and municipalities to craft innovative freshwater solutions that will work within the context of their specific governance processes and structures while adhering to federal law. Stable and sustained federal funding for SRF programs is critical for helping to finance the tremendous water infrastructure needs in New England. Communities also need federal investment in research and development of water technologies, as well as technical assistance to support pilot projects aimed at implementing innovative solutions. Finally, participants urged federal policy makers to take leadership in breaking down silos between different disciplines that impact freshwater resources and help shift the water planning and management paradigm toward integrated systems approaches that consider the range of public policy elements that affect, or are affected, by water.

**Taking Action**

At the conclusion of the Forum and via the follow-up survey, individual participants indicated specific actions they intend to take as a result of the meeting. One participant offered to organize an expert working group to develop a template for regulatory flexibility (drawing on consent decree language, schedules, etc.) that would ensure that innovative approaches are still accountable for compliance. Other actions mentioned included evaluating whether joint MS4 permitting can work in New England, and developing a staff swap program with interested agencies and organizations. The New England Water Works Association plans to explore the formation of a New England-based water foundation to serve as a regional problem-solving hub. Several participants said they intend to carry the concept of one water and ideas from the Forum back to their respective organizations to help motivate change. Others noted new relationships formed and ideas hatched at the meeting upon which they planned to follow up.

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Individual participants, primarily through the post-Forum survey, also suggested the following specific actions that federal agencies could take to help New England states address freshwater governance challenges and move toward one water:

- Develop a framework and policy guidelines for a long-term water planning process that can be embedded into permits and consent decrees, and outline an optimal approach for fostering innovation and ongoing learning while managing scientific uncertainty and providing assurances that reasonable progress toward environmental benchmarks will be made.
- Establish new policies in key agencies such as the EPA, U.S. Army Corps of Engineers, and U.S. Forest Service that encourage and support government regulators and managers collaborating with local implementers to create opportunities to test innovative solutions.
- Have the EPA exercise residual designation authority so that stormwater regulations impact new and existing development in a balanced, fair manner and runoff from more properties gets included in municipal management regimes.
- Revise stormwater permitting rules so that the implementation of green infrastructure is required (including retrofits), which could perhaps be done by defining “maximum extent practicable” as “low-impact development.”
- Have the EPA expand the Integrated Municipal Stormwater and Wastewater Planning Approach Framework to also consider energy recovery and nutrient pollution.
- Support third-party demonstration projects to test the efficacy and economic viability of completely new approaches to stormwater and wastewater collection and treatment.
- Create a unified federal approach to nutrient reduction.
- Develop and enact policy to address nonpoint source pollution.
- Explicitly incorporate water management considerations into regulations, policies, and funding programs in related areas such as transportation and energy.
- Establish an EPA program office for the restoration of New England coastal watersheds, similar to the Chesapeake Bay or Great Lakes program offices.

New England possesses the human resources needed to determine and design optimal technical solutions to the freshwater challenges facing watersheds in the region. However, a suite of governance challenges hinders the ability of experts and stakeholders to unlock and implement innovative solutions on the ground. Often the main hindrances are lack of public buy-in and inadequate financing, as well as project designers and utility managers who are averse to change. The New England Regional Freshwater Forum illuminated a number of strategies for overcoming different aspects of these core governance issues and moving toward integrated one-water planning and management in the process. Several participants conveyed that the Forum involved the most diverse group of interests they had ever seen convene to deliberate about how to improve freshwater management in New England. Clearly there is a diversity of stakeholders with great passion for New England’s waters and impatience at the pace of change to address their degradation. This energy and vision, combined with the innovative and entrepreneurial spirit of the region, makes the desired solutions within reach.
APPENDIX A

Agenda

New England Regional Freshwater Forum: Moving Toward Integrated Water Planning and Management

May 30–31, 2012
The Langham Hotel, Wilson Room
250 Franklin Street
Boston, Massachusetts 02110
617.451.1900

Introduction

New England exemplifies freshwater challenges that many regions of the country are facing. Intensifying rainfall events, longer droughts, aging infrastructure, degraded water quality, diminishing groundwater supplies, and more stringent expectations from regulatory agencies, along with increasingly tight public budgets, are causing regional leaders to seek new solutions. The slate of freshwater challenges in the region demands holistic solutions that address multiple problems while avoiding unintended negative consequences and producing multiple benefits. While technical solutions for many of New England’s water challenges are available, existing governance structures and fragmented decision making regarding water are impeding innovation and implementation. The Charting New Waters New England Regional Freshwater Forum will explore the concept of “one water” – planning and managing our public drinking water supply, groundwater, stormwater, and wastewater as an integrated system – as a pathway to achieving holistic solutions. Together, Forum participants will identify cross-cutting principles and broadly applicable recommendations about how and why to operationalize the “one water” concept in New England and beyond.

Objectives

- Examine key governance and coordination challenges facing New England watersheds;
- Learn about successful freshwater planning and management strategies and lessons from other regions of the United States; and
- Identify principles, recommendations, and actions to advance integrated planning and management in New England and beyond.
Agenda

Wednesday, May 30, 2012

9:30 a.m. Registration & Continental Breakfast

10:00 a.m. Welcome
Lynn Broaddus, Director, Environment Program, The Johnson Foundation at Wingspread

10:10 a.m. Introductions and Agenda Review
John Ehrmann, Senior Partner, Meridian Institute

10:30 a.m. Presentation: Background on Charting New Waters & New England Regional Freshwater Forum
Lynn Broaddus
Provide background on The Johnson Foundation, Charting New Waters (CNW), and the regional freshwater forums. Review how New England’s experience relates to the content of Charting New Waters: A Call to Action to Address U.S. Freshwater Resources. Review key framing concepts for the Forum and explain how CNW will utilize the outcomes of the Forum.

11:00 a.m. New England Case Example Overviews
For each New England case example, one representative will briefly review the key water-quality and governance challenges facing the watershed. Then two additional representatives from the watershed will offer their perspectives about governance factors they believe are inhibiting or have facilitated progress on restoring water quality and the implementation of solutions that will address the complex water challenges ahead. The following cases will be covered:

- Great Bay, New Hampshire and Maine
  David Cedarholm, Town Engineer, Town of Durham, NH
  Carl Deloi, Chief, Wetlands & Information Branch, U.S. EPA Region 1
  Peter Wellenberger, Great Bay–Piscataqua Waterkeeper, Conservation Law Foundation

- Cape Cod, Massachusetts
  Andrew Gottlieb, Executive Director, Cape Cod Water Protection Collaborative
  William Hinchey, Town Administrator, Town of Yarmouth, MA
  Valerie Nelson, Director, Water Alliance
12:00 p.m. New England Case Examples: Questions and Answers
Presenters of the three New England case examples will answer other participants’ questions about the cases.

12:30 p.m. Lunch in Esplanade
Participants will move to the Esplanade for a buffet lunch.

1:30 p.m. Challenges & Opportunities in New England Freshwater Governance
Curt Spalding, Administrator, U.S. EPA Region 1
Katherine Baer, Senior Director, Clean Water & Water Supply Program, American Rivers

Two participants will reflect upon the three case examples presented and initiate a discussion about common governance challenges and opportunities. Discussion questions include:
- Are there common institutional challenges influencing the ability of New England municipalities to better integrate water planning? What are the most critical impediments?
- What are the common characteristics among successful strategies in the region?
- What strategies and tactics hold the most promise to bolster ongoing or emerging efforts to restore water quality in New England?

3:00 p.m. Break

3:15 p.m. Getting to “One-Water” Integration: Part I
Geoff Brosseau, Executive Director, California Stormwater Quality Association
Wendi Goldsmith, Chief Executive Officer, Bioengineering Group

Drawing on insights from the New England cases, participants will engage in facilitated discussion about successful strategies and lessons learned from their experience confronting similar governance challenges in their respective regions and locales. Specific discussion questions to explore include:

Management System Design
- In what configurations and at what scale is coordinated planning and management feasible?
- Should technical solutions drive the design of governance structures, or vice versa?
What factors should decision makers consider when deliberating whether to implement centralized or decentralized management approaches?

Communications and Implementation

- What are the key drivers or “hooks” that will motivate decision makers to support a move toward integrated water planning and management (e.g., cost-effectiveness, changing weather, disaster mitigation)?
- What information do technical experts need to package and communicate proposed engineering solutions so that elected officials and the public will accept the associated financial costs?
- To what extent can litigation and/or consent decrees serve as a catalyst for achieving integration?

5:15 p.m. Day 1 Wrap Up

*John Ehrmann and Lynn Broaddus*

Provide a summary of key themes and highlights from Day 1 and set the stage for Day 2.

5:30 p.m. Adjourn

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**Thursday, May 31, 2012**

8:00 a.m. Continental Breakfast

8:30 a.m. Welcome, Agenda Review, and Day 1 Recap

*John Ehrmann and Brad Spangler, Mediator, Meridian Institute*

8:45 a.m. Getting to “One-Water” Integration: Part II

Building upon Day 1 discussions, participants will discuss potential pathways to overcome the practical and political challenges and opportunities associated with gaining buy-in for and achieving implementation of integrated freshwater management solutions. Key dimensions to consider include:

- Existing regulatory structures and obligations;
- Facilitating coordination and managing complexity;
- Financing strategies; and
- Communications and public messaging.

10:00 a.m. Break

10:15 a.m. Taking Action Toward “One Water”

Forum participants will identify cross-cutting principles and broadly applicable recommendations for action, as well as practical action steps to help advance integrated “one-water” planning and management in New England and beyond.
11:45 a.m.   Wrap Up and Next Steps
Provide a summary of key themes and highlights of the Forum and review next steps for meeting follow-up and Charting New Waters.

12:00 p.m.   Adjourn to Lunch
New England Regional Freshwater Forum: Moving Toward Integrated Water Planning and Management

May 30–31, 2012
Boston, MA

Participant Biographies

Katherine Baer, Senior Director, Clean Water & Water Supply Program, American Rivers

Katherine Baer is Senior Director of American Rivers’ Clean Water and Water Supply Program, where she leads national water policy work to ensure clean and reliable water. Her work focuses on advancing green infrastructure, water efficiency, and other innovative approaches to achieve water infrastructure that is resilient in the face of climate change. As part of this work, Katherine has worked with utilities, states, and local communities to increase the use of green infrastructure as an effective method to reduce stormwater, flooding, and sewer overflows and to incorporate these techniques as part of climate adaptation strategies. At American Rivers she has participated in the Aspen Institute’s Dialogue on Sustainable Infrastructure and the EPA’s Climate Ready Utility Workgroup; she also serves on the Boards of the Clean Water America Alliance and the Clean Water Network.

Before joining American Rivers, Katherine worked as a policy analyst focusing on toxics reform for the Center for Progressive Reform, a legal think tank. Prior to that she served as Director of Headwaters Conservation for the Upper Chattahoochee Riverkeeper in Georgia, where she worked on policies for stream buffer protection, reservoir water-quality standards, and stream restoration. Katherine has an M.S. in Conservation Ecology from the University of Georgia, a J.D. from the University of Maryland, and a B.A. in Environmental Studies from Stanford University.

Geoff Brosseau, Executive Director, California Stormwater Quality Association

Geoff Brosseau has been an environmental management consultant since 1989, specializing in water quality, particularly stormwater and wastewater. He provides assistance to local and state agencies in California in the areas of association development and management, program development and management, best management practices, special studies, expert witness services, guidance manuals/training, and small business and public education.
Geoff has assisted more than 25 municipalities throughout the state in developing and implementing virtually every aspect of their stormwater programs. Most notable among these municipalities are the city of Palo Alto and the city and county of San Francisco, both known and nationally recognized for their innovative and proactive water pollution prevention programs.

In 1994, Geoff became part-time Executive Director of the Bay Area Stormwater Management Agencies Association (BASMAA) – a consortium of the eight countywide urban runoff programs in the San Francisco Bay Area, representing 96 agencies, including 84 cities and seven counties. Local municipalities started BASMAA to facilitate information sharing and cooperation and to develop products and programs that would assist them in meeting their NPDES permit and Clean Water Act requirements. BASMAA’s work covers the full breadth of stormwater-related topics, including monitoring, new development, public information/participation, commercial/industrial, illicit discharges, flood control, TMDLs, and permitting. Over the last few years, BASMAA has been intimately involved in the development of TMDLs for the San Francisco Bay Area – in particular, working closely with Regional Water Board staff to develop implementation details for TMDL pollutants such as PCBs, mercury, and pesticides. BASMAA also worked closely with the Regional Water Board to develop a regional stormwater permit for all Phase I communities in the Bay Area – consolidating six area-wide permits (including one EPA-issued permit) into one permit for 76 permittees and aligning compliance schedules that were previously up to four years out of phase across the six permits.

In early 2004, Geoff was also hired to be the part-time Executive Director of the California Stormwater Quality Association (CASQA) – a statewide organization similar to BASMAA. CASQA is composed of stormwater quality management organizations and individuals, including cities, counties, special districts, industries, and consulting firms throughout the state. CASQA was originally formed in 1989 as the California Stormwater Quality Task Force to advise the State Water Board on stormwater discharge issues and recommend approaches to stormwater quality management in California. In this capacity, CASQA has assisted and continues to assist the State Water Board with the development and implementation of stormwater permitting programs. CASQA:

- publishes major guidance documents, including the four-volume set of California BMP Handbooks/Portal, the Municipal Program Effectiveness Assessment manual, and white papers on hydromodification and quantifiable measures;
- administers the state’s Construction General Permit Training Program;
- puts on quarterly meetings and webcasts and an annual conference; and
- tracks, analyzes, and provides comments on a wide variety of regulations, policies, and plans at both the state and national level that affect the management of stormwater quality.

David Cedarholm, Town Engineer, Town of Durham, New Hampshire

David Cedarholm has been the Town Engineer for Durham, New Hampshire, for seven years and is responsible for managing all of Durham’s infrastructure, compliance with wastewater and stormwater discharge permits, water withdrawal permits, and associated coordination with the University of New Hampshire, with which the town shares much of its infrastructure. David holds degrees in Geology from the State University of New York and in Water Resource Engineering from the University of New Hampshire and has been a licensed professional engineer for 15 years. He is also on the Board of Selectmen in Lee, New Hampshire, where he lives with his wife and two teenage daughters.

Jeffrey (Jeff) Chapman, Senior Technical Leader, IBM

Jeff Chapman is a Senior Engineer responsible for water and energy systems, including Ultra Pure Water, working from IBM’s semiconductor manufacturing location in Burlington, Vermont. Jeff is a member of the Technical Leadership Council for IBM. He provides technical support in executing IBM’s plans for “green” solutions to benefit clients in their goals to improve their impact from water and energy usage worldwide. Jeff’s area of focus is using Advanced Water Management techniques to improve reliability, process control, and process efficiency and reduce costs. Jeff is currently adapting energy usage analytics for deployment in Vermont’s smart grid.
Jeff has held a variety of leadership positions within IBM, both managerial and technical, and is a founding member and former chair of the IBM Burlington Technical Review Board. Jeff has supported IBM’s semiconductor and hard-drive business worldwide. Prior to joining IBM, he worked for Monsanto and a Massachusetts municipality. Jeff is the Chair of the Ultra Pure Water group for the International Technology Roadmap for Semiconductors, working with industry experts to forecast future water quality requirements for the semiconductor industry.

Jeff has broad experience on water projects within and outside of IBM. He has provided technical support in geographies spanning from the North Slope of Alaska to the Far East and Europe. His experience with water ranges from industrial and municipal wastewaters to semiconductor-grade Ultra Pure Water.

Jeff holds a B.S. in Chemical Engineering from Pennsylvania State University, and an M.S. in Environmental Engineering from the University of Alaska.

Nancy S. Cole, Outreach Director, Climate and Energy Program, Union of Concerned Scientists (UCS)

Nancy S. Cole is the Director of Outreach for the Union of Concerned Scientists’ Climate and Energy Program. In this role she is responsible for the development and implementation of the department’s strategic outreach agenda, with particular attention to ensuring that UCS-produced products are useful to policy makers, that the scientist-authors are prepared to effectively interact with the non-scientific public, and that the findings are widely distributed to the public.

Nancy joined the UCS’s staff in 1992 and has held a number of positions in the organization during her 20-year tenure. She began as an outreach specialist in a renewable energy campaign, which resulted in her 1995 book Renewables Are Ready: People Creating Renewable Energy Solutions. She also designed and established the UCS’s innovative Science Network, a nationwide network of nearly 2,000 experts with climate, biodiversity, economic, engineering, and health expertise who work with the UCS at the science/policy interface.

Prior to joining the UCS, Nancy was with the nonprofit corporate responsibility organization INFACT, serving as Executive Director for eight years. During her tenure, she oversaw the development of a new international corporate responsibility campaign, the establishment of four campaign organizing offices, and the production of the Academy Award-winning documentary Deadly Deception.

Nancy has a law degree from the University of Minnesota and currently lives in Cambridge, Massachusetts, with her spouse and daughter.

Alexandra (Alex) Davis, Counsel, Vranesh and Raisch, LLC

Alex Davis is a water attorney with the firm of Vranesh and Raisch, LLC, whose practice focuses on water-related issues with an emphasis on water rights. Before joining Vranesh and Raisch, Alex was the Assistant Director for Water at the Colorado Department of Natural Resources (DNR). During that tenure, she was the Director of the Interbasin Compact Committee, and she served on the Colorado Ground Water Commission, Colorado Water Conservation Board, Western States Water Council, Western Governors Association’s State–Provincial Steering Committee, Governor Ritter’s South Platte Task Force, Colorado Foundation for Water Education Board, and Colorado Supreme Court Water Rules Committee. Prior to joining the DNR in 2007, Alex was the First Assistant Attorney General for the Water Rights Unit of the Colorado Attorney General’s Office. She previously served seven years as an Assistant Attorney General litigating water rights cases for the State Engineer’s Office, the Colorado Water Conservation Board, and the Colorado Division of Wildlife. Alex also served for one year as a Special Assistant U.S. Attorney in Billings, Montana, representing U.S. Department of Interior agencies in the Montana general water rights adjudication. Alex is a graduate of Pitzer College in Claremont, California, and the University of Colorado School of Law.
Carl Deloi, Chief, Wetlands & Information Branch, U.S. EPA Region 1

Carl Deloi is a career employee at the U.S. Environmental Protection Agency in Region 1’s Boston office and is currently the Chief of its Wetlands and Information Management Branch. He graduated from Fairfield University with a degree in Philosophy and from the University of Connecticut, Storrs, with a degree in Civil Engineering. His graduate studies were done at Northeastern University. During his 35-year career at the EPA, Carl has acted in several managerial positions, including Chief of Region 1’s Superfund Support Program, Region 1’s New Hampshire State Director, Acting Deputy Director of the EPA’s Office of Ecosystem Protection, and Acting Deputy Director of Region 1’s Office of Environmental Measurement and Evaluation. Over the last 18 months, Carl has been working almost full time in New Hampshire’s Great Bay watershed trying to implement watershed-based solutions to water-quality impairments in the estuary. He lives in Plaistow, New Hampshire, with his wife and two children.

Shawn Dent, Principal Water Resources Engineer, CDM Smith

Shawn Dent is a professional civil engineer specializing in water resources planning, computer modeling, and design. Over the past 22 years he has completed a multitude of projects nationally and internationally involving master and facility plans, innovative treatment facility design, sewer and water system analysis and designs, hydraulic evaluations, and water-quality studies. Shawn is extensively published and has recently written a planning and management chapter in a Water Environment Federation Manual of Practice. He has led municipal and industrial water resource projects, including more than half a billion dollars in capital projects. He has assisted many clients in developing optimized and cost-effective programs to develop new facilities, operate and maintain existing facilities, and meet critical level-of-service goals. Shawn is a leader in the use of modeling software for all aspects of the water cycle, from an individual facility level to multistate watersheds.

Bruce Douglas, Vice President, Natural Systems Utilities, LLC

Bruce Douglas is a nationally respected environmental engineer, hydrogeologist, and soil scientist. He has 29 years of experience in integrated water management at the project, municipal, and regional level. He has played a lead role in municipal water (water supply, wastewater treatment/reclamation, water reuse, and stormwater) feasibility studies, facilities planning projects, and distributed water management projects in the Northeastern United States and California. He has also led national and state demonstration projects in integrated water resource management, decentralized water resource capacity development, and risk assessment for water quality management in Vermont, Massachusetts, New York, Rhode Island, New Jersey, and California. Bruce has trained government officials, engineers, and scientists in alternative wastewater management analysis in Asia and evaluated wastewater reuse opportunities in the Middle East. He is a Professional Engineer licensed in the state of Vermont and holds an M.S. in Plant and Soil Science from the University of Vermont and a B.S. in Hydrology from the University of New Hampshire. He currently focuses on water and energy project development and implementation in the northeastern United States for Natural Systems Utilities, LLC.

John Gilbert, President, Synchrony Advisors, LLC

John Gilbert brings three decades of experience as an environmental engineering practitioner, business leader, and consultant. His background includes 15 years of senior-level business management as founder/CEO of a $10M environmental engineering firm with three offices, serving clients in the northeastern United States and nationally.

As CEO, John was responsible for oversight of accounting and financial management; benchmarking and reporting procedures; legal and risk management; human resources management; information technology systems; health and safety processes; and quality assurance practices. He led business development efforts, successfully implemented an internal ownership transfer from founder to senior management team, and implemented an Employee Stock Ownership Plan as a key element in ownership transfer.
John earned a B.A. with honors from Williams College and an M.S. in Civil Engineering from Tufts University. He is a 1998 graduate of Leadership New Hampshire and served as a facilitator and presenter of the Environment Day in that program for several years. John has business management training in Pathways to Principal, Balanced Scorecard, Predictive Index, Lean Manufacturing, and Vested for Growth best management practices. He has lectured at Franklin & Marshall College and Southern New Hampshire University on environmental and business management topics.

As a leader in the nonprofit sector, John has served on a number of boards supporting diverse areas of interest, including conservation, affordable housing, religious, and youth sports organizations. His contributions have included serving as an interim executive director; board chair; chair of finance and audit, development, coaching, and executive search committees; and member of finance, asset management, development, project, and policy committees. He has spoken on these matters at regional and statewide conferences of nonprofit organizations. In addition, he serves as Chair of the New Hampshire Water Council and of the Governor’s Commission on Water Sustainability.

John has partnered with for-profit and nonprofit businesses to improve sales, profitability performance, financial stability, sustainability, and critical operational issues. He has extensive experience and expertise in board leadership, governance, and organizational and financial management issues in difficult economic environments.

Wendi Goldsmith, CEO & Founder, Bioengineering Group

Wendi Goldsmith is founder and CEO of Bioengineering Group, a Salem, Massachusetts-based firm whose mission statement is “Building Sustainable Communities on an Ecological Foundation.” Wendi has been a pioneer in the field of ecological restoration and the application of sustainability principles to site planning, development, and resource management. She has led R&D programs for the U.S. Department of Defense, developing methods for evaluating and optimizing renewable energy and efficient infrastructure and building and site design. Her roles span the planning of large-scale infrastructure projects and multi-state watershed management and restoration projects, as well as the design of stabilization and ecological enhancement treatments for riparian sites compromised by solid and hazardous waste. She facilitates interdisciplinary collaborative design teams in adopting effective climate change adaptation strategies, serving as co-convenor of a June 2012 NATO Advanced Research conference on the topic, hosted in Iceland. Bioengineering Group has been recognized with many awards for business success, for promoting STEM (science, technology, engineering, and mathematics) to girls and women, for environmental engineering, and for 20 years of leadership in sustainable design. A hallmark of its projects is stewardship and creative use of onsite resources, delivering triple-bottom-line value.

Wendi is a graduate of Yale University, where she earned degrees in Geology & Geophysics and Environmental Studies. She later went on to pursue a Master’s Degree in ecological landscape design at the Conway School and a second Master’s in Plant and Soil Science at the University of Massachusetts.

Andrew Gottlieb, Executive Director, Cape Cod Water Protection Collaborative

Andrew Gottlieb has a B.A. from Harvard University and an M.B.A. from Boston University. He has more than 20 years of environmental protection experience in government and elected terms in municipal office. As Chief of the Office of Commonwealth Development, Andrew coordinated Massachusetts’ energy, housing, environmental, and transportation policies. During his 16 years at the Massachusetts Department of Environmental Protection, he conceived the successful estuaries preservation program and built an innovative revolving fund into the nationally recognized model for watershed protection funding. He was twice elected to the Mashpee Board of Selectmen and also served as a Water and Sewer Commissioner.

Andrew is currently the Executive Director of the Cape Cod Water Protection Collaborative. He is also a Principal of Serrafix Corporation, where he provides financing and program development expertise to municipalities undertaking energy conservation initiatives.
Ben Grumbles, President, Clean Water America Alliance

Ben Grumbles is the President of the Clean Water America Alliance, an organization focusing on uniting people and policy for water sustainability. Possessing one of the broadest and most diverse memberships in the country, the Alliance has public- and private-sector leaders focusing on quality- and quantity-related water issues both above and below the surface. The Alliance also focuses on the connections among energy, land, food, and transportation as they relate to water, and the need for an integrated “one-water” management philosophy.

Ben has had an extensive career in water and environmental policy. He has served as Director of Arizona’s Department of Environmental Quality, Assistant Administrator for Water at the EPA, and in the U.S. House of Representatives on both the Transportation and Infrastructure Committee and the Science Committee. While at the EPA, he helped to launch their water-efficiency program (WaterSense), as well as other initiatives on green infrastructure, water and climate change, wetlands, and pharmaceuticals in water.

Ben has a Masters Degree in environmental law from George Washington University, a J.D. from Emory University Law School, and a B.A. from Wake Forest University.

George Hawkins, General Manager, DC Water

George Hawkins, General Manager of the District of Columbia Water and Sewer Authority (DC Water), was named to the post in a unanimous vote September 3, 2009, by the board of directors. With an operating and capital budget of nearly $800 million, DC Water provides drinking water delivery and wastewater collection and treatment for a population of more than 600,000 in the District of Columbia, as well as the millions of people who work in or visit the District. DC Water also treats wastewater for a population of 1.6 million in Montgomery and Prince George’s counties in Maryland, and Fairfax and Loudoun counties in Virginia. The Authority operates the world’s largest advanced wastewater treatment plant at Blue Plains, with a capacity of 370 million gallons per day and a peak daily capacity of more than a billion gallons. DC Water’s service area covers 725 square miles.

At DC Water, George has launched an ambitious agenda that complements a vast 10-year program to improve aging infrastructure and comply with ever-more-stringent regulatory requirements. DC Water is designing and implementing a $2.6 billion program – the Clean Rivers Project – to nearly eliminate overflows of sewage and stormwater into the Anacostia, the Potomac, and Rock Creek. DC Water is also investing $950 million to achieve the next level of nutrient reductions and help restore the Chesapeake Bay. In addition, DC Water is implementing a $400 million digester program to help manage solids being removed from reclaimed water that will become the region’s biggest source of renewable energy, reduce the volume of biosolids by almost half, and disinfect the biosolids to be clean enough to sell as fertilizer at retail stores. The digester project will be the first in North America to use the CAMBI treatment process, and the largest installation of CAMBI in the world. Finally, George has gained approval from the board of directors to triple the rate of DC Water’s program to replace water and sewer infrastructure, which in many cases was installed generations ago.

In parallel to these capital expenditures, George is leading a cultural change within DC Water. He has launched the Team Blue program to engage front-line staff in improving the enterprise, connected to the BlueStat process to evaluate business processes with benchmarks and performance statistics. DC Water recently rebranded the enterprise to strengthen connections to the public, and has launched a Facebook page, Flickr and YouTube pictures and videos, and a customer-oriented Twitter account. George is also building a new and strong relationship with local and national environmental advocates to work in tandem to achieve the next generation of water-quality improvements.

Prior to joining DC Water, George served as director of the District Department of the Environment (DDOE), a $110 million agency with 300 employees. The DDOE performs city, county, and state environmental functions for the nation’s capital. The agency is responsible for providing energy
assistance to District residents; reviewing development applications for compliance with environmental requirements; monitoring and enforcing air- and water-quality standards; regulating the use and disposal of toxic substances; preserving the District’s natural habitat for fish and wildlife; and developing and implementing stormwater management regulations to minimize runoff pollution into District waterways.

George implemented the Anacostia 2032 Plan to transform one of the most polluted rivers in the country into an environmental gem that will drive economic revitalization. He also led the District’s efforts in reducing childhood exposure to lead hazards, negotiated the nation’s most stringent federal permit to reduce pollutants from stormwater runoff, and managed the nation’s most successful low-income energy-assistance program, including conservation and weatherization. He launched and chaired the Mayor’s Green Team, which coordinated the District Government’s sustainability program across more than 40 agencies. In 2008, George launched the Mayor’s Green Summer Job Corps, a group of several hundred District youth engaged in environmental cleanups and public education. In 2009, the program grew into the largest green jobs program for youth in the country, serving more than 5,000 young people with a focus on energy and stream ecology and in neighborhood-based cleanup programs.

Prior to coming to the District, George was executive director of New Jersey Future, a nonprofit organization that, under his leadership, came to be recognized as the state’s foremost advocacy group promoting smart growth. While there, he worked the governor's office to focus development on transit stations and urban areas. George also served as executive director of the Stony Brook–Millstone Watershed Association, where he built an award-winning program to improve local zoning and master plans to both target growth and protect critical ecosystems. He has also held senior positions with the EPA, including Senior Assistant Regional Counsel and Special Assistant to the Regional Administrator. He served Vice President Gore on the National Performance Review, playing an integral role in streamlining and strengthening environmental protection programs at the EPA and the Occupational Safety and Health Administration.


William (Bill) Hinchey, Town Administrator, Town of Yarmouth, Massachusetts

Bill Hinchey is the Town Administrator in Yarmouth, Massachusetts, a community on Cape Cod with an annual population of 23,000 and a seasonal population of 60,000. He is charged with the day-to-day supervision of more than 300 full-time employees separated into eight major municipal departments and 16 divisions, including Fire, Police, Water, and Wastewater.

Upon completion of his graduate studies, Bill's first municipal experience as a chief administrative officer (CAO) included the supervision of the Uxbridge Sewer Treatment Facility, a key component of the Blackstone River cleanup initiative in the 1970s. Later, while serving as the CAO of the town of Dennis in the mid- and late 1980s, he had the opportunity to be immersed in the Cape's adamant political opposition to the Boston Harbor Outfall Pipe. Coincidentally, through family ties in the Greater Boston area, he became acutely aware of the significant financial impact on families of the Boston Harbor cleanup.

While serving as Town Manager in the late 1990s and through 2011 in Chatham, Massachusetts, also on Cape Cod, Bill had the opportunity to coordinate the planning, approval, and construction of Phase 1 of a $300M wastewater facility which, upon completion, will provide sewers for two-thirds of the community. The implementation of this project will provide the requisite environmental protection as defined in the Massachusetts Estuary Project. The construction and operation of this facility has been funded through an innovative combination of grants, municipal debt, and user fees. The plan was unanimously passed by Town Meeting. To date, the Chatham facility is the largest sewer treatment facility on Cape Cod.
In 2011, Bill was hired in Yarmouth and participated in a wastewater project for that community. The project was of similar magnitude to that in Chatham. Once again, an innovative fiscal plan was developed that minimized the fiscal impact of the project on local taxpayers. Less than four years after the unanimous approval of the Chatham sewer project, project funding for Yarmouth was summarily defeated by Town Meeting. Attention on the Cape has since been directed toward a regional wastewater solution.

Anthony Iarrapino, Staff Attorney, Clean Water Advocate, Conservation Law Foundation

Anthony Iarrapino is a Staff Attorney at the Conservation Law Foundation (CLF) who resides in Montpelier, Vermont. He works in the CLF’s Clean Water and Healthy Forest Program, focusing on the protection of Lake Champlain, the Green Mountain National Forest, Boston Harbor, and New England’s other natural treasures. Anthony has won precedent-setting Clean Water Act cases in Vermont’s environmental court and in federal district court. Working in coalition with citizens and other environmental NGOs, he helped secure legislative victories to designate approximately 48,000 acres of wilderness in the Green Mountain National Forest, to strengthen the enforcement of environmental laws in Vermont, and to protect Vermont’s heritage of open government and freedom of information from attempted expansion of government secrecy.

In 2008, Anthony accepted the Clean Water Network’s “Aqua Award” on behalf of the CLF for “Organization of the Year” in recognition of stormwater pollution cleanup strategies that Anthony and his colleagues successfully implemented in Vermont and other New England states.

Prior to joining the CLF in 2005, Anthony spent two years as the law clerk for Hon. Denise R. Johnson, Associate Justice of the Vermont Supreme Court. Anthony also worked as an aide to former U.S. Congressman Martin T. Meehan. Anthony received his B.A. magna cum laude from Boston College in 1998 and his J.D. summa cum laude from Vermont Law School in 2003. He is admitted to practice law in Vermont and Massachusetts.

Curt Johnson, Senior Attorney and Program Director, Connecticut Fund for the Environment and Save the Sound

Curt Johnson received his J.D. from the University of Connecticut School of Law and was awarded a Masters in the Study of Law, Summa Cum Laude, focusing on environmental law, from Vermont Law School.

Curt was an attorney with the firm of Murtha, Cullina, Richter, and Pinney for three and a half years before joining the Connecticut Fund for the Environment (CFE) as an attorney in 1993. As Program Director, Curt has led the CFE and Save the Sound team to achieve environmental results in protecting our rivers, Long Island Sound, and our air and water by bringing together people, groups, and elected leaders.

Most recently, Curt and his team have focused their clean water work around a few key themes. In collaboration with the cities of Bridgeport and New Haven, they recently issued a feasibility engineering analysis of the role green infrastructure can play in eliminating combined sewer overflows in those cities. (See http://www.ctenvironment.org/pdf/livable-communities/GI%20Scan.pdf.) Save the Sound is now supporting these cities in seeking approximately $7 million in clean water funds to implement perhaps the largest green infrastructure demonstration projects in New England, designed to reduce combined sewer overflows by about 12 million gallons annually. His team continues to build the “carrots” (a robust state clean water fund financing mechanism) and “sticks” (a strong adjudicatory and regulatory presence) necessary to move our shared vision of a clean and healthy Sound into practical reality.

Curt serves as the Connecticut Co-Chair of the Citizens Advisory Committee to Long Island Sound’s National Estuary Program, co-founded the Environmental Law Clinic at the University of Connecticut School of Law, and recently served as President to the Hamden Land Conservation Trust.
EkOngKar (E.K.) Singh Khalsa, Executive Director, Mystic River Watershed Association

E.K. Singh Khalsa has more than 25 years of professional experience in environmental protection and restoration and low-impact and brownfields development, as well as a broad understanding of the public policy issues associated with these arenas. Throughout his career, E.K. has navigated a wide variety of environmental, design, planning, and engineering challenges in pursuit of an intelligent approach to land use and environmental restoration.

E.K.‘s background includes extensive training and experience in environmental science and due diligence, including: water supply development and protection, wetlands delineation and regulation, stormwater management system design and installation, soil and groundwater preservation and restoration, as well as hazardous waste investigation, management, and remediation. He has broad experience and background in land use planning, zoning, and regulations and with commercial site planning and development, residential subdivision design and construction, and professional land surveying and engineering.

Prior to his work as Executive Director of the Mystic River Watershed Association, E.K. served as Director of Development for the Hallmark Companies, where he was responsible for overseeing and managing the multidisciplinary project teams responsible for a variety of major real estate development projects.

E.K.‘s education includes a B.A. from the University of Oregon and post-graduate work in environmental studies, land use planning, and real estate development at Harvard University’s Graduate School of Design, Northeastern University, Boston University, and the University of Alaska.

Christopher (Chris) Kilian, Senior Attorney & Director, Conservation Law Foundation’s Vermont Advocacy Center and Clean Water and Healthy Forests Program

Chris Kilian is a Senior Attorney and Director of the Conservation Law Foundation’s Vermont Advocacy Center and Clean Water and Healthy Forests Program. Chris is responsible for planning, management, funding, and implementation of a New England-wide advocacy program addressing the protection of forests, water resources, and wildlife. He has significant experience with state and federal environmental laws, including the Federal Clean Water and Clean Air Acts, Federal Power Act, National Forest Management Act, and National Environmental Policy Act. His primary area of expertise is clean water law, having handled matters at the state and federal level under a wide range of provisions of the Clean Water Act.

Since joining the CLF in 1999 as a Staff Attorney, Chris has been responsible for litigation, negotiations, and advocacy in numerous judicial, administrative, and legislative matters. His work has been recognized with the Clean Water Network’s national Aqua Award for “Clean Water Organization of the Year for 2009.”

Prior to his work at the CLF, Chris spent eight years with the Vermont Natural Resources Council as Water Program Director and, ultimately, General Counsel. In 1998, Chris received the Charlie Shaw Conservation Partnership Award from the National Wildlife Federation for his precedent-setting advocacy to force the removal of an operating hydroelectric dam that had destroyed a landlocked Atlantic salmon run in Vermont’s Clyde River.

Chris received his B.A. in Political Science from the University of Rochester and his Juris Doctor and Master’s in Environmental Law from Vermont Law School, cum laude.

Susannah (Susy) King, Director of Water Quality Programs, New England Interstate Water Pollution Control Commission (NEIWPC)

Susy King has been managing NEIWPC’s water-quality division since 2011. She works on initiatives related to water-quality standards, total maximum daily loads (TMDLs), nutrients, mercury, monitoring and
assessment, and wetlands. Managing these programs involves overseeing staff, facilitating discussions, and coordinating projects. Susy is the coordinator of a five-state/EPA workgroup tasked with revising the Long Island Sound TMDL, an effort to reduce nitrogen inputs to the Sound in order to meet dissolved oxygen criteria. She also serves as project manager for NEIWPCC’s partnerships with the New York–New Jersey Harbor Estuary Program, Hudson River Estuary Program, and Hudson River National Estuarine Research Reserve.

Prior to becoming director of NEIWPCC’s water-quality programs, Susy served as an environmental analyst in the division (2004–2011) and as watershed manager (2011). She was responsible for coordinating national, regional, and state policies and programs pertaining to water-quality standards, nutrient criteria, TMDLs, mercury, and aquatic nuisance species. This included coordinating NEIWPCC’s water-quality standards, nutrient criteria, TMDL, and mercury–fish workgroups, as well as serving on the Northeast Aquatic Nuisance Species Panel. Susy was the primary author of the Northeast Regional Mercury TMDL, a seven-state plan to reduce atmospheric deposition of mercury. She also worked with NEIWPCC’s member states on a Clean Water Section 319(g) Petition and Management Conference as a tool to implement the mercury TMDL.

Susy holds an M.E.M. in water resources from Duke University and a B.A. in environmental studies and chemistry from Middlebury College.

**MaryLynn Lodor, Environmental Program Manager, Metropolitan Sewer District of Greater Cincinnati**

MaryLynn Lodor has been Environmental Program Manager for the Metropolitan Sewer District (MSD) of Greater Cincinnati since June 2010 and has been working for the MSD since May 2009. MaryLynn oversees sustainability and sustainable infrastructure initiatives, which are the part of the MSD’s Environmental Program in which sustainable solutions are identified through the Sustainable Watershed Evaluation Process within the MSD and with various partners, for optimum CSO reduction and community benefit. MaryLynn has been leading the Communities of the Future Initiative for the MSD since May 2009; this initiative adheres to the triple bottom line in project development and watershed planning to leverage the MSD investments and create better project outcomes. Through the initiative, the MSD attempts to link Wet Weather efforts with community revitalization and integration to attain triple bottom line outcomes for the community.

**David Mears, Commissioner, Vermont Department of Environmental Conservation**

David Mears was appointed Commissioner of the Vermont Department of Environmental Conservation by Governor Shumlin in January 2011. Previously, David held a number of positions in state and federal government, including in Texas as an Enforcement Coordinator in the Texas Water Commission, as Assistant Attorney General in the Texas Office of the Attorney General, and as Senior Attorney for Water Quality with the Texas Natural Resource Conservation Commission. He left Texas to serve as the Energy and Environmental Policy Director with the Texas Office for State–Federal Relations in Washington, DC, then served as both a Trial Attorney and Counselor for State and Local Affairs with the U.S. Department of Justice, Environment and Natural Resources Division. Following his time at the Department of Justice, he was appointed Senior Assistant Attorney General and Chief of the Ecology Division in the Washington Office of the Attorney General.

Immediately prior to his appointment as Commissioner, David was a Professor of Law at Vermont Law School, a U.S. Fulbright Scholar in China, and Director of the law school’s environmental and land use law clinics. David has a degree in environmental engineering technology from Cornell University, and Juris Doctor and Masters of Environmental Law and Policy degrees from Vermont Law School. He lives in Montpelier with his wife Nancy Mears and their three children.
Ken Moraff, Deputy Director, Office of Ecosystem Protection, EPA Region 1

Ken Moraff is Deputy Director of the Office of Ecosystem Protection in the EPA’s New England regional office, with responsibility for federal clean air, clean water, and climate change programs in the six New England states. He has led major environmental projects, including the Boston Harbor and Charles River cleanups. He has also served as manager of the EPA New England’s enforcement program and as a staff attorney. He is a graduate of Cornell University and Harvard Law School.

Valerie I. Nelson, Director, Water Alliance

Dr. Valerie Nelson is the Director of the Water Alliance, a coalition of advocates for and experts in 21st century water management innovations. The Alliance is committed to a restoration of the Water Commons and the use of integrated infrastructure that mimics and works with nature at all scales. Valerie is Chair of the Decentralized Systems Advisory Committee at the National Decentralized Water Resources Capacity Development Project hosted by the Water Environment Research Foundation, and she served two terms on the Gloucester City Council. She was the Director of the Lighthouse Preservation Society and was a Lecturer and Visiting Assistant Professor at the Harvard Kennedy School of Government and M.I.T. Valerie’s degrees in Economics include a B.A. from Harvard University, an M.Sc. from the London School of Economics, and Ph.D. from Yale University.

Mark Newton, Vice President, Corporate Social Responsibility (CSR), Timberland, LLC

Mark Newton is Vice President of CSR at The Timberland Company. Mark leads Timberland’s diverse global team responsible for managing the organization’s four areas of focus within CSR: environmental stewardship, global human rights, community engagement, and transparency and reporting.

Mark joined Timberland following eight years with Dell, Inc., most recently serving as Executive Director of Global Sustainability, where he was responsible for balancing the company’s growth strategy to minimize impacts on natural and human resources across the value chain. During his tenure with Dell, he directed global policy development, stakeholder engagements, and corporate strategies on environmental and social issues.

Prior to joining Dell, Mark led Environmental Technology programs at Apple and Motorola and was a principal scientist for DEKA Research and Development Corp. Mark holds a Bachelor of Science in Industrial Chemistry from Keene State College, and a Master of Science and a Doctorate in Chemistry from the University of Texas at Dallas.

Mark has served on the advisory boards of Clean Production Action, Carbonfund.org, and Austin Community College and as a business advisor to ChemSec, The Carbon Disclosure Project, the Johnson Foundation, Katerva, and the World Resources Institute.

Paul Niedzwiecki, Executive Director, Cape Cod Commission

Paul Niedzwiecki is Executive Director of the Cape Cod Commission, a regional land use planning and regulatory agency. The Commission’s mission is to manage growth, protect Cape Cod’s unique environment and character, and foster a healthy community for present and future generations.

Before joining the Cape Cod Commission in 2007, Paul served as Assistant Town Manager for the town of Barnstable, leading revitalization work for downtown Hyannis including setting up the region’s first “Growth Incentive Zone” that succeeded in encouraging redevelopment and economic development in a 450-acre downtown area.

Previous experiences include serving as Special Assistant District Attorney and Chief Financial Officer for the Cape and Islands District Attorney’s Office; Vice President and General Counsel for the Commonwealth Corporation; and Chief of Staff for Massachusetts State Senator Henri Rauschenbach. Paul also conducted a private legal practice and served in the United States Marine Corps.
Arleen O’Donnell, Vice President, Eastern Research Group, Inc.

Arleen O’Donnell is Vice President of Eastern Research Group (ERG), where she leads Natural Resources Management and State Support business practices. She manages contracts with the EPA and NOAA and directs projects on a number of water resources and climate initiatives, including the Gulf of Mexico Restoration Strategy for the EPA; coastal erosion studies for the U.S. Army Corps of Engineers; climate adaptation projects for NOAA and the U.S. Department of Justice; a national coastal wetlands protection initiative for the EPA; and an analysis of water resources management approaches for the United Kingdom.

Prior to joining the ERG in 2008, Arleen was Director of Environmental Affairs for the Massachusetts Audubon Society (1983–1989) and after that served for more than 18 years (1989–2007) in senior management positions at the Massachusetts Department of Environmental Protection, ending in the role of Commissioner. During this time she was instrumental in developing the state’s comprehensive water resources protection and management programs, policies, and regulations. She launched the state’s Clean Water Strategy, developed the state’s Watershed Initiative in cooperation with watershed associations, and created key cornerstones of the state’s water resources management program, including stormwater and water conservation standards, Integrated Water Resources Management Guidance, and the first conceptual plan for identifying stressed basins.

Arleen holds a B.S. in Biology and Environmental Science and an M.S. in Civil Engineering and Urban/Environmental Policy.

Dave Paris, Water Supply Administrator, Manchester Water Works

As Water Supply Administrator for Manchester Water Works, Dave Paris is the water supply division leader. The division is responsible for providing tap water for the greater Manchester area of approximately 160,000 people, who live in communities ranging from Derry to Hooksett, New Hampshire. These responsibilities include the day-to-day operations of a 50-million-gallon-per-day advanced water treatment plant, which recently became among only 11 facilities in the U.S. awarded the highest recognition by the Partnership for Safe Water. Additional responsibilities include the maintenance and operation of numerous booster pump stations and storage facilities, as well as the management of 8,000 acres of watershed properties to the north and east of Manchester surrounding Lake Massabesic. The Manchester Water Works Water Supply team includes maintenance, operational, laboratory, enforcement, forestry, and engineering professionals all dedicated to the goal of providing safe, clean, and affordable drinking water to our customers.

Professionally, Dave has had a long career that includes service as immediate Past President of the New England Water Works Association, past president and treasurer of the New Hampshire Water Works Association, former trustee of the Water Research Foundation, member of the U.S. Department of Homeland Security Water Sector advisory committee, and founding manager and treasurer of the Water Information Sharing and Analysis Center. He has also served on a wide variety of American Water Works Association committees and councils concerned with both water quality and policy.

Cameron Ross, Senior City Planner, City of Cincinnati, Ohio

Cameron Ross is a Senior City Planner and has been with the city of Cincinnati’s Department of City Planning and Buildings since 2008. He has more than eight years of professional experience in nonprofit, public, and private planning and environmental agencies in Cincinnati, the Midwest, and the Southeast. Cameron is currently the project manager for a $2.4 million HUD Sustainable Communities grant that is developing a new Land Development Code for the city that will streamline the development process and consider a broader spectrum of sustainable development options, including stormwater management. He is also the department lead for a variety of projects related to environmental, transportation, and infrastructure planning issues in the city. Cameron is a LEED Accredited Professional who received his Masters education in Urban Planning from the College of Design, Architecture, Art, and Planning at the
University of Cincinnati and a Bachelor of Science in Environmental Biology from the University of Southern Mississippi.

**Joel Sisolak, Advocacy and Outreach Director, Cascadia Green Building Council**

Joel Sisolak joined the Cascadia Green Building Council in October 2008 where he continues his work of 17 years in the nonprofit sector promoting social and environmental sustainability. Prior to joining Cascadia, he directed an environmental organization that partnered with local public and private agencies to protect King County, Washington’s primary drinking water supply. He has also served in various consulting and leadership roles with organizations promoting affordable housing, habitat conservation, and the arts. Joel brings rich experience with and a strong commitment to collaboration with public and private organizations in the stewardship of the region’s natural capital. Joel holds a masters of urban planning from the University of Washington with an emphasis on sustainable land use and infrastructure. When he’s not working, spending time with his wife and daughter, or off planting trees with some habitat restoration effort, Joel dabbles in acrylic painting and organic gardening.

**Sarah Slaughter, President, Built Environment Coalition**

Dr. Sarah Slaughter is President and founder of the Built Environment Coalition, a nonprofit organization focused on community-based field tests and evaluations of advancements to the built environment. She was most recently the Associate Director for Buildings and Infrastructure in the MIT Energy Initiative (MITEI), coordinating research across MIT focused on improving the built environment. Before her work with MITEI, she was co-founder and head of the Sustainability Initiative in the MIT Sloan School of Management, focusing on strategies for sustainable organizations and communities. Previously, Sarah was founder and CEO of MOCA Systems, Inc., a construction program management company based on the construction simulation software system from her MIT research. At MIT, she was a professor in the Department of Civil and Environmental Engineering, focusing on innovations for the built environment. Earlier, she was a professor of Civil and Environmental Engineering at Lehigh University and conducted research at the NSF Center for Advanced Technology for Large Structural Systems (ATLSS).

Her current research focuses on innovations for sustainable and disaster-resilient infrastructure and the built environment. Sarah is currently a member of the National Academies National Research Council Board on Infrastructure and the Constructed Environment and the National Academies DOD Standing Committee on Materials, Manufacturing, and Infrastructure, and she is a National Academy Associate. She also serves on the Massachusetts Sustainable Water Management Advisory Board, the Sustainability Committee in the International Facilities Management Association, and several national advisory committees and editorial boards of professional publications. She also currently serves on the boards of directors for Retroficiency, Inc., ERG, Inc., and the Charles River Watershed Association. Sarah is a recognized expert in the field of sustainable facility assets and in innovations in the built environment. She received her S.B., S.M., and Ph.D. from the Massachusetts Institute of Technology.

**H. Curtis (Curt) Spalding, Regional Administrator, U.S. EPA Region 1**

Curt Spalding has extensive experience in the environmental protection field as an advocate, policy analyst, and administrator. For almost 20 years, he served as Executive Director of Save the Bay in Rhode Island, a nationally recognized, 20,000-member environmental advocacy and education organization. He established the Narragansett BayKeeper and Habitat Restoration programs, which reconnected Save the Bay to ecologically important bay issues, and he oversaw the successful completion of the $9 million Explore the Bay Campaign and construction of the Save the Bay Center at Fields Point in Providence, Rhode Island.

Since joining the EPA leadership team in February 2010, Curt has been leading a holistic approach to finding environmental solutions in New England. He has emphasized efforts in environmental justice and green economy. Curt has focused efforts in the region on three cross-cutting initiatives: Climate Change, Stormwater, and Communities.
Curt has been heavily engaged in preparedness efforts for flooding in New England. He has also been involved in a number of pilot projects working on sustainability in communities around the region. Urban revitalization is a priority for Curt, and you can see it coming to fruition in places such as Holyoke, Massachusetts, and Bridgeport, Connecticut.

Curt received his bachelor’s degree from Hobart College and an M.P.A. from the State University of New York at Albany.

Jonathan Stone, Executive Director, Save the Bay

Growing up in the Boston area with four brothers and a father who loved the ocean, Jonathan Stone was destined to be on the water. His father, the founder of the New England Aquarium, had his boys on Buzzards Bay in southeastern Massachusetts from the time they could walk. Together, they filled their summer days fishing for tautog, tickling puffer fish, swimming through eelgrass, and snorkeling in the then clean waters of the Bay.

Over time, however, the landscape changed, and a new, more sobering reality set in. A dramatic shift was taking place in the health of the Bay – a shift fueled by many of the same threats facing Narragansett Bay today: pollution, climate change, and coastal development. The Bay was growing sicker. And Jonathan grew increasingly determined to change that.

After working in Seattle and Boston through the 1980s, Jonathan’s love for the ocean brought him to Rhode Island in 1989 where he promptly joined Save the Bay (STB) as a member and swimmer. Those early experiences with STB convinced him he had something significant to offer the organization, planting the seeds for the role he would later play as Executive Director.

In 1988, Jonathan served as National Budget Director for Michael Dukakis’ presidential campaign, before returning to the private sector and starting a career in the investment field. He conducted investment research on public companies in a variety of industries, including renewable energy and oil and gas exploration and production. In 2000, he co-founded a premier investment management company, Lee Munder Capital Group, which managed pension, endowment, and private wealth assets.

Throughout these years, he fished, kayaked, and swam in Narragansett Bay and was an active STB member. In 2008, he retired from the investment business and began teaching at Providence College. One year later, he took up the mantle as Save the Bay’s fourth Executive Director, fulfilling a personal mission to dedicate his time and expertise to protecting the Bay full time.

Jonathan earned an undergraduate degree from Brown University and completed his graduate work at Harvard University. He holds the CFA designation for investment research. Jonathan is also an avid mountaineer, having climbed major summits in the lower 48 states, Alaska, and East Africa – and trekked extensively in Nepal. He is married with two children and lives in Providence.

John Torgan, Director of Ocean and Coastal Conservation, Rhode Island Chapter, The Nature Conservancy

John Torgan began as Director of Ocean and Coastal Conservation at the Rhode Island chapter of the Nature Conservancy in 2011, after 18 years at Save the Bay serving as Baykeeper for Narragansett Bay. A leading environmental advocate and trusted voice for Rhode Island’s waters, John is a native Rhode Islander who grew up spending summers on the South County coast, working on charter fishing boats and on Block Island.

He earned an undergraduate degree in environmental studies/biology at Union College in New York. Before returning to Rhode Island, John worked for a consulting firm working on rivers in Upstate New York and Michigan. John joined Save the Bay in 1993 and became Narragansett Baykeeper in 1994, becoming one of the nation’s first and longest-serving Waterkeepers in what is now a global organization of more than 200 programs. As Baykeeper, John advocated for clean water and communicated the
importance of Rhode Island’s waters to broad audiences and policy makers. During his tenure, an oil-barge tragedy spurred Save the Bay to lead a successful drive to toughen state oil-shipping laws. John also waged a campaign to force the Brayton Point Power Station to minimize its impact on Mount Hope Bay. He advocated for combined sewer-overflow improvements to reduce raw sewage from being dumped into the bay during heavy rains. And he fought efforts to create a deep-water port at Quonset Point and a liquefied natural gas terminal in Fall River.

Beyond his role as Baykeeper, John sought to broaden the agency’s focus to include inland rivers, the ocean, and coastal waters. At the Nature Conservancy, he continues to work to protect and restore the ecological health of the state’s waters and to integrate these efforts across the regional ecosystem.

Peter Wellenberger, Great Bay–Piscataqua Waterkeeper, Conservation Law Foundation

Peter Wellenberger is the Great Bay–Piscataqua Waterkeeper with Conservation Law Foundation New Hampshire. For 22 years, Peter managed the Great Bay National Estuarine Research Reserve, where he worked within New Hampshire state government, and with federal agency and NGO partners, to advance estuarine research and monitoring, habitat restoration, public education and outreach, and training of coastal decision makers.

During his tenure at the Reserve, Peter grew the program from a staff of one to ten; helped secure more than $62 million in federal funds for land acquisition; established a watershed-wide friends group (the Great Bay Stewards); and increased the size of the Reserve from 7,000 to 20,000 acres. Peter has served as president of the National Estuarine Research Reserve Association, worked with the U.S. Commission on Ocean Policy to develop recommendations in support of the National Estuarine Research Reserve System, and been a longstanding member of the Piscataqua Region Estuaries Partnership’s management committee. Peter was named Conservationist of the Year by the New Hampshire Chapter of The Nature Conservancy (2010) and is the recipient of similar service awards from the National Estuarine Research Reserve Association (2010), the New Hampshire Chapter of The Nature Conservancy (2009), and the NOAA Fisheries Service (2008).

Peter graduated from the University of New Hampshire. He also holds a Master of Science degree in Resource Management from Antioch New England Graduate School. He lives in Newmarket with his wife and has two children.

Robert (Bob) Zimmerman, Jr., Executive Director, Charles River Watershed Association

Bob Zimmerman is Executive Director of the Charles River Watershed Association. Founded in 1965, the CRWA is a private nonprofit environmental advocacy, research, and education organization. During his tenure, the CRWA has become an authority on the science of water in urban watersheds and the catalyst for addressing water pollution, stormwater discharge, low in-stream flow, nutrient loading, habitat protection and restoration, community zoning, suburban sprawl, and sustainable development on the Charles River. Bob has been appointed by four governors to the Massachusetts Water Resources Commission, and also serves on the Massachusetts Water Infrastructure Finance Commission and the River Network Board of Directors. The Charles River, and the Charles River Watershed Association, are the 2011 winners of the International River Foundation’s Thiess International Riverprize.

Charting New Waters Team

Lynn Broaddus, Director, Environment Program, The Johnson Foundation at Wingspread

Dr. Lynn Broaddus joined The Johnson Foundation at Wingspread in December 2008 and is responsible for shaping the Foundation’s Environmental Program with an emphasis on the freshwater crisis facing the United States. Since that time, Lynn has convened national leaders in government, business, and nongovernmental organizations to examine our freshwater challenges, specifically as they relate to climate change, infrastructure, agriculture, energy, and public health. That work resulted in the release of
a national report, *Charting New Waters: A Call to Action on U.S. Freshwater Challenges*, issued by a diverse group of stakeholders convened by The Johnson Foundation at Wingspread focused on changing U.S. freshwater policy.

Prior to joining The Johnson Foundation, Lynn served for six years as executive director of Milwaukee Riverkeeper®, a water advocacy organization. Before joining Riverkeeper, she spent 12 years working for The Nature Conservancy and a related organization, NatureServe, where her role as director of U.S. Network Partnerships focused on negotiating data-sharing agreements among the nation’s Natural Heritage Programs.

Lynn holds a bachelor’s degree in environmental sciences from the University of Virginia, a master’s in business administration from the University of Wisconsin–Milwaukee, and a doctorate in botany and genetics from Duke University. She serves on the boards of River Network, River Alliance of Wisconsin, and the Nelson Institute for Environmental Studies (University of Wisconsin–Madison).

**Wendy S. Butler, Special Initiatives Coordinator, The Johnson Foundation at Wingspread**

Wendy Butler has been with The Johnson Foundation for a number of years beginning as a Conference Support Specialist, handling logistics for all conferences, events, and local meetings. Later she became a Program Assistant, supporting all aspects of the environmental conferences, including agenda planning and development, follow-up, and research projects. In 2008, as the Special Initiatives Coordinator, Wendy began work on the Foundation’s Convening for Impact project to review and assess the Foundation’s approach and practices in regard to conferences to ensure that these programs are generating impact. Currently, she is also working with the Environment Program, focusing on freshwater and other related initiatives. Wendy has a degree in Liberal Arts with an emphasis in Organizational Behavior from the University of Wisconsin, Green Bay, and is currently pursuing a Master’s Degree in Leadership Studies at Marquette University. She lives in Franklin, Wisconsin, with her husband, Dennis, daughter Maggie, and adopted puppy, Murphy. Her son, Brenden, just completed his first year of college and Maggie is beginning college this fall, neither of which has anything to do with the puppy adoption.

**Roger C. Dower, President, The Johnson Foundation at Wingspread**

Roger Dower, President of The Johnson Foundation at Wingspread, is responsible for leading the organization’s strategic efforts in its mission as a catalyst for innovative solutions to complex environmental and community challenges.

Roger’s career spans more than 30 years and has included senior management roles in the public, private, and nonprofit sectors, with a major focus on environmental and energy matters. An economist by training, he began his career directing research for the Environmental Law Institute before entering the public policy arena, first as an Economic Consultant to the White House during the Carter Administration and then Chief of the Energy and Environmental Unit in the Congressional Budget Office during the Reagan Administration.

In 1990, Roger joined the World Resources Institute (WRI), where he led the Climate, Energy, and Pollution Program and was a senior advisor to WRI’s president in his capacity as Co-Chairman of President Clinton’s landmark President’s Council on Sustainable Development. In 1996, Roger joined Sycom Enterprises (now eNERGYSolve Corporation), which provides internet-based energy management solutions to large commercial and industrial energy users; he was named President in 2000. During his tenure, he directed the company’s strategic business planning and oversaw all aspects of its operations and marketing efforts.

In 2002, Roger was named President of the U.S. Forest Stewardship Council (FSC) where he conceived and led programs that almost doubled the expanse of certified forestry acreage in the U.S. and transformed the FSC into a major brand in the domestic and global paper markets. In 2007, he was named President of The Johnson Foundation, becoming the fifth leader of the highly esteemed private family foundation.
Roger holds a B.S. in Agricultural Economics and a Masters in Resource Economics, both from the University of Maryland, and is the author of numerous books, articles, and publications relating to energy and environmental policy. He currently serves as Chairman of the Board of the nonprofit Clean Air, Cool Planet, is a member of the Board of the Wisconsin Climate Change Action Initiative, and serves on the Board of the Rechargeable Battery Recycling Corporation.

John Ehrmann, Founder and Senior Partner, Meridian Institute

Dr. John Ehrmann is a founder and Senior Partner of Meridian Institute. John has pioneered the use of collaborative decision-making processes for more than two decades at the local, national, and international levels. He has designed and implemented projects in national and international forums; in public policy arenas involving legislation, negotiated regulations, and Federal Advisory Committees; in organizational management and strategic planning settings; in communities and site-specific disputes; and with stakeholder groups advising NGOs and companies. His work has focused on environmental and natural resources issues, energy and climate change, health policy, science and technology, and the economic and social challenges associated with developing sustainable practices for communities and industries.

In addition to his extensive involvement in convening and facilitating collaborative processes, John also works to promote the use of collaborative decision making. He lectures and has published numerous articles on collaborative decisions in public policy issues. He serves as an adjunct faculty member for the University of Wyoming and provides advice to the Ruckelshaus Institute and School of Environment and Natural Resources on the use of collaborative problem solving in natural resource decision making.

John received his undergraduate degree from Macalester College and his Ph.D. in Natural Resource Policy and Environmental Dispute Resolution from the University of Michigan’s School of Natural Resources. His doctoral dissertation involved developing a practice-based model of the policy dialogue that can be applied to both practice and research. Between 1983 and 1997, John was executive vice president at The Keystone Center. In September 1997, he became one of the founders of Meridian Institute.

Tad Segal, President, Outreach Strategies, LLC

Tad Segal is President of Outreach Strategies, LLC. He is an accomplished public affairs expert specializing in complex communications campaigns that impact public policy. He has served at some of the highest levels of government and corporate America and has played a leading role in shaping numerous successful public affairs campaigns.

Tad previously led the public affairs practice at Widmeyer Communications, where he managed a series of engagements on behalf of clients in the climate, environment, energy, and transportation fields.

He served as Senior Vice President at Venn Strategies, a boutique lobbying firm focused on tax, health care, and nonprofit issues, and is the founder of WinCampaign, a political campaign and grassroots management firm serving national, state, and local campaigns.

Tad led the Washington, D.C., communications operation for United Parcel Service (UPS), where he served as the company’s main spokesperson and communications counselor on all domestic and international government relations, crisis communication, and corporate reputation management issues. While at UPS, he designed and executed an international communications strategy that helped the company win a highly competitive aviation route authority to fly directly into China.

In Congress, Tad served as Communications Director to U.S. Senator Alan Simpson. Tad is a former producer for the McLaughlin Group and McLaughlin One on One television programs, and was a State Capital Bureau reporter in Cheyenne.
Tad holds a B.A. in Journalism from the University of Rhode Island and an M.A. in Public Communication from American University in Washington, D.C., where he also served as adjunct faculty, teaching a master's-level course in political communication.

**Susie Seidelman, Environment Program Associate, The Johnson Foundation at Wingspread**

Susie Seidelman is the Environment Program Associate at The Johnson Foundation at Wingspread, where she works with co-sponsoring organizations to develop and convene solutions-driven conferences. Prior to her time at The Johnson Foundation, Susie worked with Wisconsin Public Radio, the City of Milwaukee Election Commission, and the University of Wisconsin-Milwaukee. Susie holds an M.A. from the University of Wisconsin-Milwaukee and a B.A. from Oberlin College. In her spare time, she likes to cook, eat, learn about cooking, talk about eating, and generally spend as much time as possible doing fun things outside. She's fortunate to live three blocks from the Milwaukee River, where she takes daily hikes with her wife, Laura, and their dog, Maury. (She also has a cat, but he is not allowed to visit the river.) She plans to one day live on a farm.

**Brad Spangler, Mediator and Program Manager, Meridian Institute**

A Mediator and Program Manager based out of Meridian Institute’s Dillon, Colorado, office, Brad Spangler has eight years of experience convening and facilitating multi-party collaborative processes. He has worked on a variety of issues in the environmental and public health policy arenas, including freshwater quality and quantity, renewable energy, carbon sequestration, forest management, endocrine-disrupting chemicals, children’s health protection, food safety, and community resilience to natural disasters.

Prior to joining the Meridian team in April 2008, Brad was a Senior Associate at RESOLVE, where he was responsible for a range of duties including process design, agenda development, facilitation, project management, stakeholder communications, issues research, meeting summary and report writing, and meeting logistics. He began working in the field of conflict resolution in 2000 at the Conflict Research Consortium in Boulder, Colorado, where he helped build CRInfo and Beyond Intractability, two Web-based resources for the field. Brad has also completed two facilitation training courses with the Interaction Institute for Social Change.

Born and raised in Summit, New Jersey, Brad finished high school in Burlington, North Carolina, and received his B.A. in Anthropology from the University of North Carolina-Chapel Hill in 1997. He earned an M.A. in Cultural Anthropology and an Interdisciplinary Graduate Certificate in Environmental Policy from the University of Colorado-Boulder in December 2002. During the summer of 2002, he interned with the National Parks Conservation Association’s Southeast Regional Office as a participant in the University of Tennessee’s Southern Appalachian Man and Biosphere internship program.

**Barbara Suprak, Executive Assistant to the President, The Johnson Foundation at Wingspread**

Barbara Suprak has been with The Johnson Foundation for five years and serves as the first contact with many who interact with the president of the Foundation, including members of the board of trustees and heads of philanthropic and industrial organizations. She handles a wide range of challenging responsibilities and is the link between the president and Foundation staff. She promotes volunteerism and community involvement among the Foundation staff and, at times, assists with providing logistical support for conferences, local meetings, and briefings. Barb serves on several local community Boards. She and her husband, John, happily reside in Racine, Wisconsin, where they were born and raised.
## APPENDIX C

### Participant List

**New England Regional Freshwater Forum:**
*Moving Toward Integrated Water Planning and Management*

**May 30–31, 2012**

### List of Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Organization</th>
</tr>
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<tbody>
<tr>
<td>Katherine Baer</td>
<td>Senior Director</td>
<td>Clean Water &amp; Water Supply Program, American Rivers</td>
</tr>
<tr>
<td>Geoff Brosseau</td>
<td>Executive Director</td>
<td>California Stormwater Quality Association</td>
</tr>
<tr>
<td>David Cedarholm</td>
<td>Town Engineer</td>
<td>Town of Durham, New Hampshire</td>
</tr>
<tr>
<td>Jeffrey (Jeff) Chapman</td>
<td>Senior Technical Leader</td>
<td>IBM</td>
</tr>
<tr>
<td>Nancy Cole</td>
<td>Outreach Director</td>
<td>Climate and Energy Program, Union of Concerned Scientists</td>
</tr>
<tr>
<td>Alexandra (Alex) Davis</td>
<td>Counsel</td>
<td>Vranesh and Raisch</td>
</tr>
<tr>
<td>Carl Deloi</td>
<td>Chief, Wetlands &amp; Information Branch</td>
<td>U.S. EPA Region 1</td>
</tr>
<tr>
<td>Shawn Dent</td>
<td>Principal Water Resources Engineer</td>
<td>CDM Smith</td>
</tr>
<tr>
<td>Bruce Douglas</td>
<td>Vice President</td>
<td>Natural Systems Utilities, LLC</td>
</tr>
<tr>
<td>John Gilbert</td>
<td>President</td>
<td>Synchrony Advisors, LLC</td>
</tr>
<tr>
<td>Wendi Goldsmith</td>
<td>CEO &amp; Founder</td>
<td>Bioengineering Group</td>
</tr>
<tr>
<td>Andrew Gottlieb</td>
<td>Executive Director</td>
<td>Cape Cod Water Protection Collaborative</td>
</tr>
</tbody>
</table>
Ben Grumbles  
President  
Clean Water America Alliance

George Hawkins  
General Manager  
DC Water

William (Bill) Hinchey  
Town Administrator  
Town of Yarmouth

Anthony Iarrapino  
Staff Attorney, Clean Water Advocate  
Conservation Law Foundation

Curtis (Curt) Johnson  
Senior Attorney and Program Director  
Connecticut Fund for the Environment and Save the Sound

EkOngKar (E.K.) Singh Khalsa  
Executive Director  
Mystic River Watershed Association

Chris Kilian  
Senior Attorney & Director  
Vermont Advocacy Center and Clean Water and Healthy Forests Program  
Conservation Law Foundation

Susannah (Susy) King  
Director of Water Quality Programs  
New England Interstate Water Pollution Control Commission

MaryLynn Lodor  
Environmental Program Manager  
Metropolitan Sewer District of Greater Cincinnati

David Mears  
Commissioner  
Vermont Department of Environmental Conservation

Ken Moraff  
Deputy Director  
Office of Ecosystem Protection  
U.S. EPA Region 1

Valerie I. Nelson  
Director  
Water Alliance

Mark Newton  
Vice President  
Corporate Social Responsibility  
Timberland, LLC

Paul Niedzviecki  
Executive Director  
Cape Cod Commission

Arleen O’Donnell  
Vice President  
Eastern Research Group, Inc.

Dave Paris  
Water Supply Administrator  
Manchester Water Works

Cameron Ross  
Senior City Planner  
City of Cincinnati, Ohio

Joel Sisolak  
Advocacy and Outreach Director  
Cascadia Green Building Council

Sarah Slaughter  
President  
Built Environment Coalition

H. Curtis (Curt) Spalding  
Regional Administrator  
U.S. EPA Region 1

Jonathan Stone  
Executive Director  
Save the Bay
John Torgan
Director of Ocean and Coastal Conservation
Rhode Island Chapter
The Nature Conservancy

Peter Wellenberger
Great Bay–Piscataqua Waterkeeper
Conservation Law Foundation

Robert (Bob) Zimmerman, Jr.
Executive Director
Charles River Watershed Association

Charting New Waters Team

Lynn Broaddus
Director, Environment Program
The Johnson Foundation at Wingspread

Wendy Butler
Special Initiatives Coordinator
The Johnson Foundation at Wingspread

Roger Dower
President
The Johnson Foundation at Wingspread

John Ehrmann
Founder and Senior Partner
Meridian Institute

Tad Segal
President
Outreach Strategies, LLC

Susie Seidelman
Environmental Program Manager
The Johnson Foundation at Wingspread

Brad Spangler
Mediator and Program Manager
Meridian Institute

Barbara Suprak
Executive Assistant to the President
The Johnson Foundation at Wingspread
APPENDIX D
Participant Survey

New England Regional Freshwater Forum: Moving Toward Integrated Water Planning and Management

Participant Survey

1) As a water leader, what do you see as the most promising strategies being developed in the New England region for making the transition to a holistic or “one-water” management framework? Similarly, what do you see as the most promising strategies being developed to stimulate the transition from old infrastructure to new infrastructure?

2) What do you see as the most promising strategies New England stakeholders are devising or implementing to proactively address freshwater challenges arising from climate change?

3) How did the Charting New Waters New England Regional Freshwater Forum add value to ongoing efforts to solve New England’s freshwater challenges? What novel or innovative ideas did you hear that you think will advance solutions to the challenges discussed during the Forum?

4) In your view, what are the most important lessons or messages from New England’s experience confronting freshwater challenges that Charting New Waters should carry forward to other regions of the nation? To federal decision makers in Washington, DC?

5) If you were to request one legislative, regulatory, or policy change of federal decision makers to facilitate solving New England’s freshwater challenges, what would it be?

6) Please state 1-3 actions you will take as a result of an idea you heard, an idea sparked by the discussion, or a relationship built at the Forum.

7) What funders in the region should be involved in this effort and conversation?

8) What role do you see for The Johnson Foundation (if any) in furthering the work from this Forum? And if you do see a role, please try to be specific as to why The Johnson Foundation is best qualified to play this role as opposed to others.
Watershed Characteristics

- 1,023 square miles, all or part of 52 communities (42 in NH and 10 in ME)
- Great Bay is a rare inland estuary of National Significance, it is a National Estuary Research Reserve and National Estuary Program.
- It is fed by tidal waters of the Piscataqua River that forms the boundary between ME and NH.
- The watershed includes 22% of New Hampshire's population and is a high growth area.
- Seven rivers drain the Great Bay Watershed.
- It includes diverse habitats and 23 threatened or endangered species.
- There are numerous stakeholder groups and river advisory committees, and university research is ongoing.

Current State

- Eel grass biomass in the estuary declined by 64% between 1990 and 2008.
- Dissolved inorganic nitrogen is up 42% over the past 5 years.
- Adult oyster populations have decreased from 125,000 in 1997 to 10,044 in 2009.
- Dissolved oxygen standards are not being met in the tidal rivers.
- NH DES has listed the Bellamy River, Cochecho River, Lamprey River, Salmon River, Oyster River, Piscataqua River, and Great Bay as impaired or threatened by water pollution.
- Nutrient loads come from various sources (70% nonpoint, 27% WWTPs, 2% atmospheric, 1% groundwater).
- Nitrogen loads need to be reduced by 30–45%.
- The percent of impervious cover in increasing, with 1,500 acres added each year.
- 18 sewage treatment plants discharge 20 million gallons of wastewater.
- Approximately half of the towns in the Great Bay watershed are partial or full MS4 communities.
- Several major rivers in the watershed serve as sources of drinking water (Bellemery Reservoir, Salmon Falls River, Lamprey River, Exeter River, and Oyster River) for municipalities.
- 55% of the population is on private septic systems, 45% on public sewer.
- The USDA has ranked the Piscataqua–Salmon Falls watershed as the most threatened watershed in the U.S. due to impacts of increased housing development on private forests.
- The Piscataqua River Estuary Partnership has developed a 10-year comprehensive protection and management plan.
- The Great Bay Dialogue is bringing together all stakeholders to engage in dialogue; numerous committees and workgroups have formed.
- Research is being conducted to identify “hot spots” and sources of nitrogen.
- The Great Bay Resource Protection Partnership has been active doing strategic land protection and has protected 5,500 acres in a 24-town area of the watershed since 1995.

Issues of Concern

- 11 of 12 indicators of the health of Great Bay are showing negative or cautionary trends.
- Managing nitrogen is a very complex problem, and all forms of nitrogen are not equal.
- Not all nonpoint sources are manageable.
- There are multiple federal regulations, and multiple jurisdictions involved.
- There is not enough information about pollutant sources and loading yet.
The cost of compliance and being able to meet water-quality standards is high.
There are competing municipal priorities for limited funding.
Two paths are emerging – one of resistance by municipalities and one of engagement.

<table>
<thead>
<tr>
<th>The Path of Resistance</th>
<th>The Path of Engagement</th>
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<tbody>
<tr>
<td>Great Bay Municipal Coalition (Rochester, Dover, Exeter, Portsmouth, and Newmarket, NH) are suing NH DES over water-quality standards.</td>
<td>Durham, NH, and UNH have submitted a draft integrated plan to look at wastewater and stormwater, wanting to be a model community,</td>
</tr>
<tr>
<td>The Coalition recently wrote the EPA Administrator and the Inspector General alleging scientific misconduct by the Region and called for the Great Bay permit work be taken away from Region 1.</td>
<td>Newmarket, NH, has moved ahead with improvements and some innovations,</td>
</tr>
<tr>
<td>NPDES permits are appealed.</td>
<td>Portsmouth, NH, is doing low-impact development practices.</td>
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<tr>
<td>The science is challenged.</td>
<td>The Dover, NH, WWTP is making plans to get to 8 mg/l of nitrogen.</td>
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<tr>
<td>The process is challenged.</td>
<td>The Great Bay Dialogue has begun – multiple stakeholders engaged.</td>
</tr>
<tr>
<td>Municipalities are digging in against the EPA and DES.</td>
<td>The EPA and DES have identified Great Bay as a joint Area for Collaboration.</td>
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<tr>
<td>The Piscataqua River Estuary Program Comprehensive Conservation and Management Plan was revised in 2010.</td>
<td>The Southeast Watershed Alliance is a legislatively established organization in the Great Bay region whose mission is to help communities collaborate on regional water-quality issues.</td>
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APPENDIX F
Background on Cape Cod

Developed by Andrew Gottlieb, Cape Cod Water Protection Collaborative

Introduction

Coastal embayments on Cape Cod are becoming nutrient enriched and are rapidly experiencing declines in ecological health. The primary cause of these eutrophication problems is an overabundance of nitrogen discharged within the watersheds of these water bodies. On Cape Cod, 85% of the controllable nitrogen comes from onsite wastewater disposal systems (i.e., Title V septic systems. Storm water, leaching lawn fertilizers, and discharges from agricultural land uses also contribute varying quantities of nitrogen, but the dominant source of excess nitrogen is wastewater).

These declines in ecological health can, in advanced states, result in loss of eel grass, fisheries habitat and spawning grounds, shell fish beds and all related recreational uses, causing negative impacts on tourism, offshore marine ecology, local fishing and shell fishing interests, and local tax bases.

Background

Cape Cod has 15 towns. Four towns (Barnstable, Falmouth, Chatham, and Provincetown) have publicly owned treatment works. There are perhaps 45 privately owned treatment systems over 10,000 gallons per day throughout the Cape servicing golf courses, shopping centers, schools, and condominiums.

- Only 6% of properties on the Cape, accounting for 15% of the sewage flow, are connected to treatment facilities of any kind.
- There are 133,000 developed parcels and about 121,000 onsite disposal systems.
- 1,500 nitrogen-reducing systems are in use on Cape Cod. Testing by the Barnstable County Health Department shows that these systems remove about 50% of the nitrogen 60% of the time.
- Cape Cod covers some 412 square miles of land or 263,000 acres.
- The Cape has 794 miles of coastline, 32% of the total coastline in Massachusetts.
- There are 46 embayments on Cape Cod included in the Massachusetts Estuaries Project. 35 of these embayments are designated as nitrogen sensitive. More than 70% of the parcels in these watersheds are already developed.
- Nitrogen enrichment has caused widespread degradation of embayment water quality. Most scallop populations have disappeared. Eelgrass is in serious decline and most shellfish are farmed.
- The Cape is below the state average in per capital income and has higher-than-average property taxes.
APPENDIX G
Background on the Charles River

Developed by Ken Moraff, U.S. EPA Region 1; Arleen O'Donnell, Eastern Research Group, Inc., and Bob Zimmerman, Charles River Watershed Association

Background

The rebirth of the Charles would not have been possible without the engagement and participation of the CRWA, the EPA, the U.S. Army Corps of Engineers, the U.S. Geological Survey (USGS), the Massachusetts Department of Environmental Protection (DEP), the Department of Fish & Game (DFG), the City of Boston, the Massachusetts Water Resources Authority (MWRA), universities, and local boards and conservation commissions. Add the CRWA’s dedicated members and volunteers, engaged citizens, river users, businesses, land trusts, conservancies, and the close working relationship between the CRWA and the Conservation Law Foundation (CLF), a regional legal/environmental nonprofit, and the picture is nearly complete.

The first significant reversal from the Charles’ status as a “lost river” began in the late 1960’s, when the CRWA promoted the use of wetlands for flood control to the Corps. On a CRWA canoe trip through the extensive wetlands in the river’s upper and middle reaches, the Corps’ Colonel recognized their value as natural storage reservoirs. Thereafter, the Corps, with help from the CRWA, pursued a strategy of acquiring and protecting those wetlands at a cost of $10 million. The 13-square mile Natural Valley Storage Area (NVSA), remains the largest wetland protection project undertaken by the Corps.

Twenty years later, in 1994, the CRWA launched a comprehensive monitoring and computer modeling program to understand how the Charles actually works. The CRWA’s monitoring work made it clear that point source sewage discharges plagued the river. The EPA’s Regional Administrator, John DeVillars, decided to exercise the agency’s regulatory authority aggressively, issuing Consent Orders to 10 watershed communities and fining academic institutions and businesses with point source discharges. Through its Clean Charles Initiative and the creation of the Clean Charles Coalition, which brought diverse stakeholders in the Lower Basin together, the EPA played a leading role in restoring the Charles. The MWRA, which is responsible for metropolitan Boston’s sewage and was created as a consequence of the CLF Boston Harbor cleanup lawsuit, developed a Combined Sewer Overflow (CSO) Control Plan that will reduce the MWRA’s activations to the Charles from 1.7 billion gallons annually to 8 million gallons in a “typical” rainfall year.

With sewage and bacteria pollution dramatically reduced, the CRWA and partner agencies began tackling eutrophication and habitat degradation. With the DEP and EPA, the CRWA helped develop nutrient “total maximum daily load” (TMDL) analyses documenting excessive phosphorus loading to the river. The studies, and conversations among the two agencies, the CRWA and CLF, led the EPA to exercise its “residual designation” authority (RDA) to issue stormwater permits to owners of industrial, commercial, and high-density residential properties with two acres or greater impervious surfaces in the upper watershed. Although just underway, this novel program will require stormwater retrofits of existing properties to address the remaining major source of pollution to the river.

The CRWA may have been the catalyst in most of the efforts addressing the river’s problems over the past 50 years, but most of the “heavy lifting” has been accomplished by federal, state, and local governments and authorities. In each and every effort, a significant number of nay-sayers have attempted to block the change, claiming unfunded mandates and lack of “bang for the buck” would break the bank for little return. Measure those concerns against the vitality of development around the Charles and Boston Harbor as a direct consequence of environmental restoration.
Watershed Characteristics

- The river is 80 miles long and the watershed is 308 square miles
- River runs through 23 cities and towns; 35 cities and towns in watershed
- Only river with a Class C state water quality designation (changed 1990)

Accomplishments

- Protection of 13 square miles of wetlands and construction of New Charles River Dam (1976, flood control)
- Acquisition of “lost half mile” parkland (1980)
- Reclassification of Charles from Class C water to Class B (1990)
- Implementation of MWRA Long-Term CSO Control Plan (1994–present) (Reference C)
- Identification and repair of illegal cross-connections and failed sewage infrastructure (1995–present)
- Development of a stronger regulatory climate for rainwater retention and recycling (2002)
- Fish ladder repair and replacement and Bleachery Dam Fish Passage Improvement Project (2005)
- American shad restoration program (2006–present)
- Blue Cities® Initiative for water-sensitive urban development demonstration projects: German International School, Harvard University, Allston (2010, 2009), Watch Factory, Waltham (2009), Peabody Square, Dorchester (2010), Chester Avenue, Clinton Court, Chelsea (2010, 2012), Town Hall, Blackstone (2012)
- Issuance of 13 Charles watershed conservation-oriented public water supply permits with mitigation offset feasibility requirements (2010)
- New draft municipal stormwater permits and EPA’s pilot exercise of RDA to control private property runoff in three upstream towns (2010, 2008)
- Boston’s Complete Streets Guidelines with goals for “greening” City streets and achieving stormwater targets (2011)
- Tenfold increase in recreational activity on and around the Charles since 1995

Remaining Challenges

- Stormwater management including implementation of MS4 and RDA permits
- Low in-stream flow caused by human demand, wastewater infrastructure
- Resilience to drought
- Flash flooding
- Increase in CSO activations due to climate change
- Eutrophication
- Contaminated sediments

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<thead>
<tr>
<th>The Path of Resistance</th>
<th>The Path of Engagement</th>
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<tr>
<td>Communities and private facilities question the science, challenge the process, appeal permits.</td>
<td>Work with communities on schedules, adaptive management approach that allows flexibility</td>
</tr>
<tr>
<td>Cost concerns motivate resistance, make it politically difficult for municipalities to work with regulators.</td>
<td>Provide municipalities with analytical support re: governance and financing options</td>
</tr>
<tr>
<td>Lack of public awareness makes it hard to build support; much easier to rally opposition based on cost.</td>
<td>Look for opportunities to demonstrate early success, build public support</td>
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</table>