PATHWAYS TO ONE WATER

A GUIDE FOR INSTITUTIONAL INNOVATION

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Design by MarketSpace Communications

Pathways to One Water
A Guide for Institutional Innovation

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This guide is part of a suite of documents that also includes:

- A detailed research report "Institutional Issues for Integrated One Water Management"
- A collection of two-page, case study *snapshots*

For more detailed analysis and discussion of the issues and/or specific case studies, go to WERF at www.werf.org/c/KnowledgeAreas/IntegratedInstitutionsinfo.aspx.

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Pg. 2 Central Park Sydney green building. Image courtesy of Pierre Mukheibir, UTS-ISF

Pg. 7 Clean Water Services (CWS) Board Chair, Andy Duyck, testifying before Congress. Image courtesy of CWS

Pg. 8 Pinellas County - 2014 Economic and Leadership Symposium. Image courtesy of Pinellas County

Pg. 9 Civic center portion of Lick Run bio-engineered conveyance system. Rendering courtesy of Metropolitan Sewer District of Greater Cincinnati

Pg. 11 (top) Philadelphia Water Department Commissioner Howard Neukrug with local youths

Pg. 11 (bottom) Sustainable Urban Drainage System pond at turnover stage from developer to Scottish Water. Image courtesy of Alison Duffy, Abertay University

Pg. 12 Arcadia Creek linear park and festival site. Image courtesy of OCBA Landscape Architects – Kalamazoo, Michigan

Pg. 13 (top) Albuquerque Customer Conversations workshop. Image courtesy of Albuquerque Bernalillo County Water Utility Authority

Pg. 13 (bottom) Green infrastructure charette in Pittsburgh. Image courtesy of Pittsburgh Water and Sewer Authority

Pg. 14 Central Texas Hill Country - Flash Flood Alley. Copyright 2005 Marshall Frech (image adapted for layout)

Pg. 15 Seattle's rainfall/runoff map. Map courtesy of Seattle Public Utilities (image adapted for layout)

Pg. 16 The Solaire Building green roof. Image courtesy of American Hydrotech, Inc.

Pg. 17 San Francisco East Bay Transit building. Image courtesy of the Transbay Joint Powers Authority [TJPA] and Project Architects: Pelli Clarke Pelli

Pg. 19 Recreation on Pittsburgh's Allegheny River. Image courtesy of Jennifer Marlow via Wired

Pg. 20 Sydney Park stormwater biofiltration pond. Image courtesy of City of Sydney

Pg. 21 Clean Water Services GM touring Fernhill wetlands natural treatment system. Image courtesy of CWS

What's in the guide?

The primary audiences for this guide are urban water professionals and local government leaders. However, this guide is also targeted at urban planners, academics, developers, architects, regulators, funding agencies and non-governmental organizations, as well as the building and infrastructure trades. All of these groups will need to be engaged to truly achieve a One Water outcome.

The guide includes:

- A description of how cities are moving into a new generation of infrastructure
- An introduction to One Water and a summary of the key institutional challenges in moving to this approach
- Key elements of institutions that have embraced a One Water approach
- Case study *snapshots* of innovative initiatives taken by organizations
- Examples of institutional change at the regional, city and utility level
- Finally, how an individual, an organization or an association might take action or influence change toward a One Water approach

Introduction

Urban water planners and policymakers around the world are wrestling with the challenge of moving to an integrated water management approach. Common to all of these approaches is the concept of integration across the water cycle and with other aspects of urban management. People and organizations describe this approach by many names including:

- Regenerative infrastructure
- Integrated water resource management
- Water sensitive urban design
- Integrated resource planning
- Integrated regional water management
- Total water cycle management
- Integrated urban water management
- Whole water

In this report, we have chosen to use the term 'One Water.' Challenges to a One Water approach are many including the inertia associated with the dominant paradigm of centralized systems and siloed institutions. This dominant paradigm results in a lack of industry and community understanding of the benefits of integrated systems, such as lower costs, higher resilience to extreme events and more localized availability of water for domestic, recreational and environmental use or as an urban amenity.

This guide presents potential actions that organizations might take to move forward on the *Path to One Water.* It is primarily based on a literature review of the major challenges encountered to date and examples of how organizations have taken action. This is a rapidly evolving area of research. There is no right or wrong way to move forward, and each organization will chart its own path based on suggestions in this guide or by building upon its existing initiatives.

A New Generation of Infrastructure

An emerging vision for our cities

Communities are creating a growing demand for water systems that add value to the urban landscape. A vision is emerging for livable cities with resilient, adaptable, affordable and environmentally sensitive water infrastructure that continues to provide basic services, but also enhanced recreational, aesthetic and environmental value.

The challenges for water services

Utilities and local government institutions, in cities around the world, are facing looming capital investments to refurbish aging infrastructure, upsize and upgrade existing infrastructure and build new infrastructure to meet growing demands of both urban sprawl and densification. These challenges, coupled with the impacts of climate change on water resource availability and more stringent environmental regulations, mean that planners and decision makers must adopt a new way of thinking about water systems. The challenge for water institutions and professionals is to shift our view of water services as solving a problem, to one where water services systematically add value to the urban landscape.

The opportunities from a One Water approach

New opportunities are emerging for integrated water designs, where all sources of water and water by-products are viewed as resources. A new type of regenerative infrastructure, that includes a portfolio of systems from centralized to decentralized, a mix of grey and green infrastructure, increased recycling of water and nutrients and resource recovery, is being implemented at a variety of levels from building to city scale. These new systems offer economic opportunities for both the public and private sectors and increased social and environmental value for the community.

"By collaborating on innovation, the water sector will help create urban environments only imagined in the past – turning possibilities into realities."

– Eileen J. O'Neill, Ph.D., Executive Director, Water Environment Federation

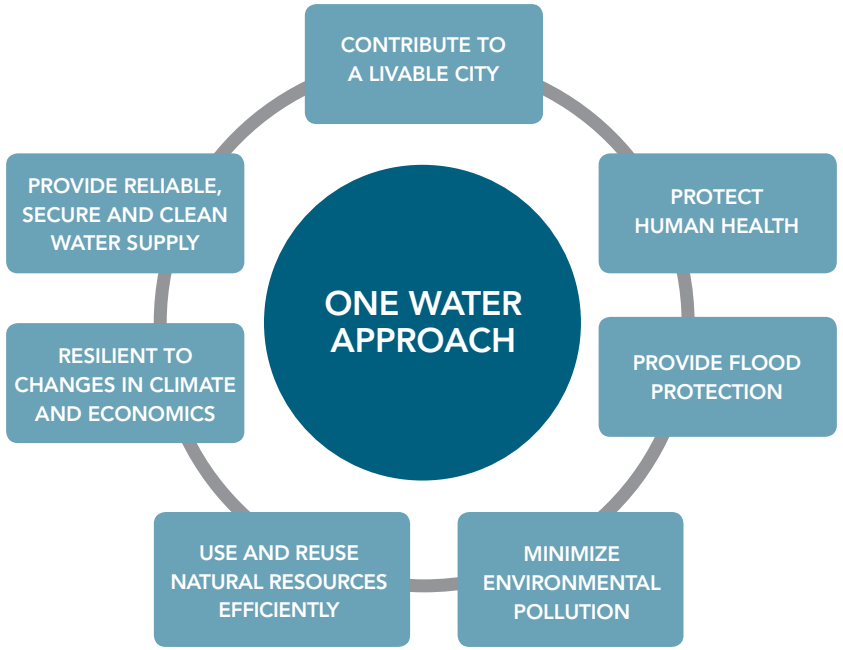
What is One Water?

The One Water approach considers the urban water cycle as a single integrated system, in which all urban water flows are recognized as potential resources, and the interconnectedness of water supply, groundwater, stormwater and wastewater is optimized, and their combined impact on flooding, water quality, wetlands, watercourses, estuaries and coastal waters is recognized.

One Water

Beyond service provision

This One Water approach provides the potential to enhance the urban, social and environmental landscape. It strives for greater coordination among diverse interests, stakeholders and decision makers, recognizing that water quantity and quality, whether above or below ground, depend on multi-faceted collaborations. It recognizes that water is more than just service provision – it is a key component of livable cities.



CHANGING OUR APPROACH

One Water requires transitioning water management from a linear and disaggregated approach to an integrated, whole of water and society approach. Changing our approach requires moving to productive, net-positive infrastructure where the aim is not to just "do less harm" but to create "regenerative systems."

Traits of a One Water Approach

COLLABORATION	with a wide variety of stakeholders, and engagement with the community
INTEGRATION	of the entire urban water cycle with urban planning and other services
ECONOMICS AND FINANCES	that recognize the true cost of water and price it accordingly
GREEN INFRASTRUCTURE	that works with and mimics nature
CLOSED LOOP SYSTEMS	that enhance nutrients and energy recovery
BUILT ENVIRONMENT	that supplements the function of the natural environment
ENABLING CONDITIONS	that foster innovative institutional and management arrangements
FLEXIBLE AND ADAPTIVE	to allow for innovation and change

The need for innovative institutions

For the One Water concept to be integrated into mainstream infrastructure planning, a conducive institutional environment needs to be in place, one that encourages innovation and supports alternative and decentralized approaches to integrated water management.

Decisions made by various institutions affect the management of water at the different governance scales:

- In general, state and federal agencies set the policy environment, while local governments and regional agencies are concerned with the regulatory and planning environments.
- At the operational level, utilities and local councils develop practices that will influence the uptake of the One Water approach.

Currently, across institutions there is a lack of:

- Drivers for change or a sense of urgency
- Data sharing
- Systems thinking

Transitioning to a One Water Approach

Six key elements have been identified that contribute positively to a One Water paradigm:

- Strong leadership and vision from senior positions, at both political and executive levels
- Partnerships between departments and collaborating organizations
- Organizational culture that embraces the One Water approach
- Transparent engagement with the community and stakeholders
- A conducive economic environment for private investment
- A conducive regulatory and legislative environment for encouraging public and private participation

Leaders on the path to One Water

Moving toward One Water requires a vision of what cities and water systems could look like and a re-evaluation of stakeholders and their roles and responsibilities. While institutional efforts to progress the concept of One Water across all aspects of the urban water cycle have been very limited, many organizations are creatively leading the way in overcoming specific institutional challenges, as shown in the snapshots that follow.

Further details on these case studies can be found at:
www.werf.org/c/KnowledgeAreas/IntegratedInstitutionsinfo.aspx

CASE STUDY *SNAPSHOTS*

"The emergence of the One Water approach to urban water management will shift America away from mere avoidance of pollution to a broader focus on the enhancement, beautification and livability of our cities and urban landscapes."

– G. Tracy Mehan, III, Interim President, U.S. Water Alliance

CREATE A VISION

Bold Leadership

CREATE A UNIFIED VISION

ONE WATER | LOS ANGELES

The City of Los Angeles recognized the need to create a common vision for water management across water, energy and sanitation institutions. A citywide One Water vision allowed them to develop and implement a plan that integrates water supply, water conservation, water recycling, runoff management and wastewater facilities planning using a regional watershed approach. This approach of putting more recycled water to use, managing more runoff for beneficial uses, and continuing to conserve drinking water has resulted in citywide benefits including overall cost savings and a reduction of the city's dependence on imported water supplies.

POLITICAL LEADERSHIP

LIVING VICTORIA | MELBOURNE

The key catalyst for driving a One Water transition has been cited as strong political leadership and a clearly articulated vision at all scales of government. The Victorian state government appointed the Independent Living Victoria Ministerial Advisory Council in 2011 to provide independent advice on the changes needed to achieve the government's vision for Melbourne's water system as a smart and resilient water system for a livable, sustainable and productive Melbourne. This vision was developed in response to the shift in community values as they pertained to water and the urban environment.

LESSONS: Establish mutually beneficial goals and actions, create a regional leadership committee, encourage community support and participation.

LESSONS: Establish a state-based institution to support the new water system approach, then define the problem and reach a common understanding with all stakeholders of the proposed way forward.

CHANGING OUR APPROACH

Political leadership is needed to develop an inclusive vision of an urban water environment. Changing our approach requires identifying champions, creating new state and regional One Water institutions and leadership committees, and providing funding for facilitators to share knowledge and bring people together.

Planning and Collaboration

IDENTIFY THE STAKEHOLDERS

THORTON CREEK | SEATTLE

The Thorton Creek watershed is Seattle's largest at 680 acres. Historically, the creek has been buried to allow development. To find a balance between urbanization and environmental sustainability, the city convened a group of business, community and environmental interest groups to propose a facility that would improve creek water quality, while also promoting open space, livability and economic development. Consensus was reached on a natural biofiltration swale that is an anchor for private development, bringing millions of dollars to the Northgate neighborhood.

LESSONS: Facilitate an open communication platform, use triple bottom line to satisfy community and environmental needs.

COLLABORATE ACROSS GOVERNMENT

PINELLAS COUNTY UTILITIES | FLORIDA

Collaboration across scales of government is often difficult and requires trust to be built up between the institutions and their staff. In Pinellas County, the scarcity of water resources acted as a catalyst for all of its member governments to enter into a Regional System Water Supply Contract. They adopted several laws and regulations to ensure equal water distribution to all beneficiaries. Pinellas County eventually included an Intergovernmental Coordination Element in its Comprehensive Plan to identify and respond to the need for coordination among Pinellas County and other local governments.

LESSONS: Establish working agreements and collaborative systems between and across different levels of government.

PARTNER, PARTNER, PARTNER

SHARE DATA

PROJECT GROUNDWORK | CINCINNATI

Sharing data and compatible formats can cut costs and enhance integrated planning. The Cincinnati Metropolitan Sewer District needed to find a more sustainable and less expensive option for Combined Sewer Overflows (CSOs). Collaboration between the county, EPA and local universities allowed more data to be collected for evaluation of the performance of green infrastructure in meeting overflow reductions. The watershed approach resulted in savings to taxpayers of approximately $200 million and the creation of an urban amenity with the waterway as the focus of a local town.

LESSONS: Collaborate on data collection and assessment, engage with universities to conduct research on integrated system effectiveness.

PLAN REGIONALLY, ACT LOCALLY

SEWERSHED-BASED PLANNING | PITTSBURGH

3 Rivers Wet Weather (3RWW) was created to coordinate wet weather solutions across 83 municipalities and the City of Pittsburgh. After gaining a solid understanding of the system, 3 RWW focused on facilitating a regional solution including consensus building and standardization of approaches. Initially, EPA funding supported individual demonstrations, including sewer separation, as a model for others. Over time 3RWW shifted focus to multi-municipal projects, particularly those that involve studies and activities that lead to integrated sewer system solutions. This collaborative approach has led to more than $60 million in savings for ratepayers.

LESSONS: Standardize approaches across regions, develop projects and tools that support regional solutions, including funding for regional facilitators.

CHANGING OUR APPROACH

Integrated planning requires flexible, adaptive approaches and collaboration with a wide range of players including urban planners, other service providers and the community. Changing our approach requires tackling silos and politics, short-term thinking, inflexible processes, unclear roles and responsibilities and access and sharing of data.

CLEAN RELIABLE NEW WATER ENVIRONMENT

Culture, Knowledge and Capacity

UNDERSTANDING YOUR ORGANIZATION

SOCIAL NETWORK ANALYSIS | MELBOURNE

Understanding an organization's complex social network, where people operate and make decisions at various scales, is critical to One Water success. Melbourne Water undertook social analysis to understand who staff believed had influence within the organization, who were seen as advocates for One Water and who were highly visible and listened to. The study identified vulnerabilities within the organization and enabled targeted engagement, communication by influential people and quantitative metrics to measure how well One Water was embedded in their organization.

LESSONS: Social analysis can be a valuable internal tool, a dedicated team can be effective for driving initial change, building cross-organizational capacity and embedding knowledge across an organization.

A NAME THAT REFLECTS A NEW ROLE

REBRANDING

Organizations are rebranding themselves through name changes and mission statements. They are moving from a negative perception as pollution control or sanitation facilities, to a positive emerging role as value added, watershed wide, resource recovery and water security facilities. The final form and emphasis of the brand will depend on the utility's regional roles, industry leadership and cultural strengths. Common terms used in rebranding include water, clean or clean river, reliable, environment, service and new. Those who have rebranded have found a positive shift in public perception and public interest in the organization.

LESSONS: Rebranding can help staff to understand important organizational value issues, create pride and motivate staff, and help in recruiting talent.

CHANGE MINDSETS

ENABLING CHAMPIONS

ATTRIBUTES OF ONE WATER ORGANIZATIONS

The Water Research Foundation (WRF) found organizations operating in a sustainable manner share the following traits: acceptance of flexible operating systems and uncertainty as "normal," recognition that initiatives are "experimental" and results are not predictable, willingness to integrate operations and share information and appreciation for the need to collaborate with outside partners. Case studies show how the Philadelphia Water Commissioner started at a lower-level position as a champion for water sustainability and cultivated a group of staff referred to as "passionistas" and how in Kentucky, Sanitation District 1's organizational attributes enabled sustainable operations.

LESSONS: Investigate attributes that need change and provide the appropriate tools, understand balance between your organization's ability to change and its planned One Water activities.

RESKILLING THE WORKFORCE

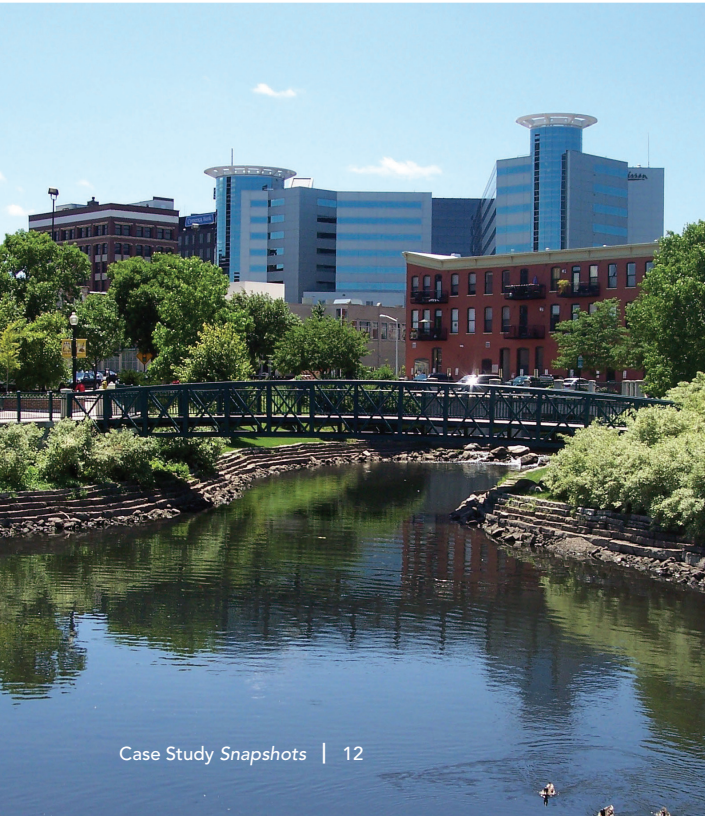
IMPROVING CAPACITY | SCOTTISH WATER

Scottish Water was required by law to incorporate existing and new sustainable urban drainage systems (SUDS) into their existing processes and procedures. This meant addressing a lack of professional knowledge and technical skills in design, construction and long-term management of these new systems. They overcame this gap in capacity through two Knowledge Transfer Partnerships in collaboration with Abertay University. These partnerships address knowledge gaps, training, auditing, data acquisition, benchmarks and risk analysis. Interactive workshops with managerial, technical, operative, and financial staff improved skillsets and reduced resistance to change.

LESSONS: Identify what 'success' looks like and work backwards to target capacity-building programs, spend time identifying, understanding and addressing staff concerns.

CHANGING OUR APPROACH

Achieving culture change within organizations can be challenging and time-consuming. It requires changing mindsets at all levels. Changing our approach requires tackling issues of technical capacity, staff motivation, organizational receptivity and learning mechanisms, as well as freeing up staff time to collaborate across organizational boundaries.



BUILD TRUST

Citizen and Stakeholder Engagement

EMBED ENGAGEMENT IN PLANNING

DAYLIGHTING | KALAMAZOO

Arcadia Creek was buried beneath the downtown business area. Five city blocks of the stream were daylighted and restored for ecological and human purposes including a festival site and a large detention basin area. Initially there was concern, but a portfolio of actions including engagement of the Downtown Development Association, public outreach and education to schools, informational resources about flooding impacts and green infrastructure, charettes and meetings helped to change public opinion. Private development mixed with public investment was very important to the success of these projects.

LESSONS: Innovative and creative public outreach should be an integral part of project planning, development associations can act as a vehicle for funding opportunities.

EMPOWER CUSTOMERS

WATER CONSERVATION | ALBUQUERQUE

The arid Albuquerque aquifer was being withdrawn at more than twice its sustainable rate. Citizens had become complacent with high outdoor water use and urban sprawl. The city was looking for a means to empower, rather than punish, residents and businesses to decrease water use. They engaged the pubic in meetings and focus groups, and developed a strategy that included education but also ordinances, rebates and supply side auditing. Residential customers have reduced use by 46% and commercial customers by 35%, surpassing every water usage goal set.

LESSONS: Rollout multiple initiatives to give customers choice, streamline planning and tackle demand and supply, use incentives like rebate-supported ordinances, engage the public in water conservation strategies.

BUILD TRUST

GAIN COMMUNITY SUPPORT

GREEN INFRASTRUCTURE | PHILADELPHIA

The Philadelphia Water Department (PWD) set out to establish one of the most ambitious hybrid grey/green infrastructure projects in the U.S. PWD's water jurisdiction is complex across seven watersheds and with combined and separate stormwater systems. An appropriate ratio of grey to green infrastructure and a standard unit of measure to quantify benefits was needed. By entering into agreements and partnerships with the State Department of Environmental Resources and the EPA, they were able to assure community partners, including businesses and citizens, that their *Green City, Clean Waters* program was serious with legal strength behind it.

LESSONS: Be open and adaptable to public feedback, adopt standardized, measurable units, emphasize multiple benefits, create watershed partnerships.

MULTI-DISCIPLINARY ENGAGEMENT

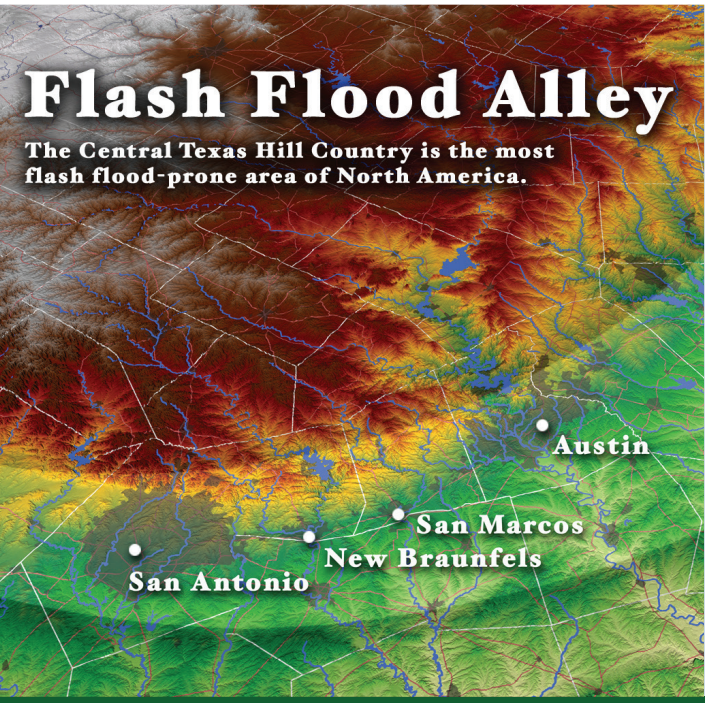
CHARRETTE PROCESS | PITTSBURGH

The City of Pittsburgh and Pittsburgh Water and Sewer Authority (PWSA) recognized green infrastructure as part of the solution to Pittsburgh's stormwater and wastewater issues, but lacked expertise to make this a reality. They turned outward to researchers, architects, engineers and environmental non-profits for help. A series of three charettes were used to understand legal, institutional and financial issues. Recommendations included creation of a stormwater utility, PWSA leading green infrastructure and a comprehensive education and engagement campaign targeted at residents and the development community. PWSA has moved forward with a Green Infrastructure Technical Advisory Committee and demonstration partnerships.

LESSONS: Look outside your organization for expertise, use interactive design workshops to understand different perspectives, empower the community and developers to take action.

CHANGING OUR APPROACH

Engagement is about more than just providing information. Gaining community support requires trust, a long-term commitment and a willingness to be open minded. Changing our approach requires meaningful processes at the right scale, better use of social media and learning to speak in ways that resonate with the public.



Economics and Finance

SEEK DEDICATED FUNDING

FLASH FLOODING | AUSTIN

Austin lies in an area dubbed "Flash Flood Alley." The Watershed Protection Department (WPD) was formed to protect lives, property and the environment by reducing the impact of flood, erosion and water pollution. WPD works in collaboration with Austin Water, the Office of Sustainability, Austin Resource Recovery and the Planning Department. A drainage fee was created to ensure a stable revenue stream. Residential customers pay based on the number of storeys in their dwellings and commercial properties based on impervious surface, with offsets for on-site actions.

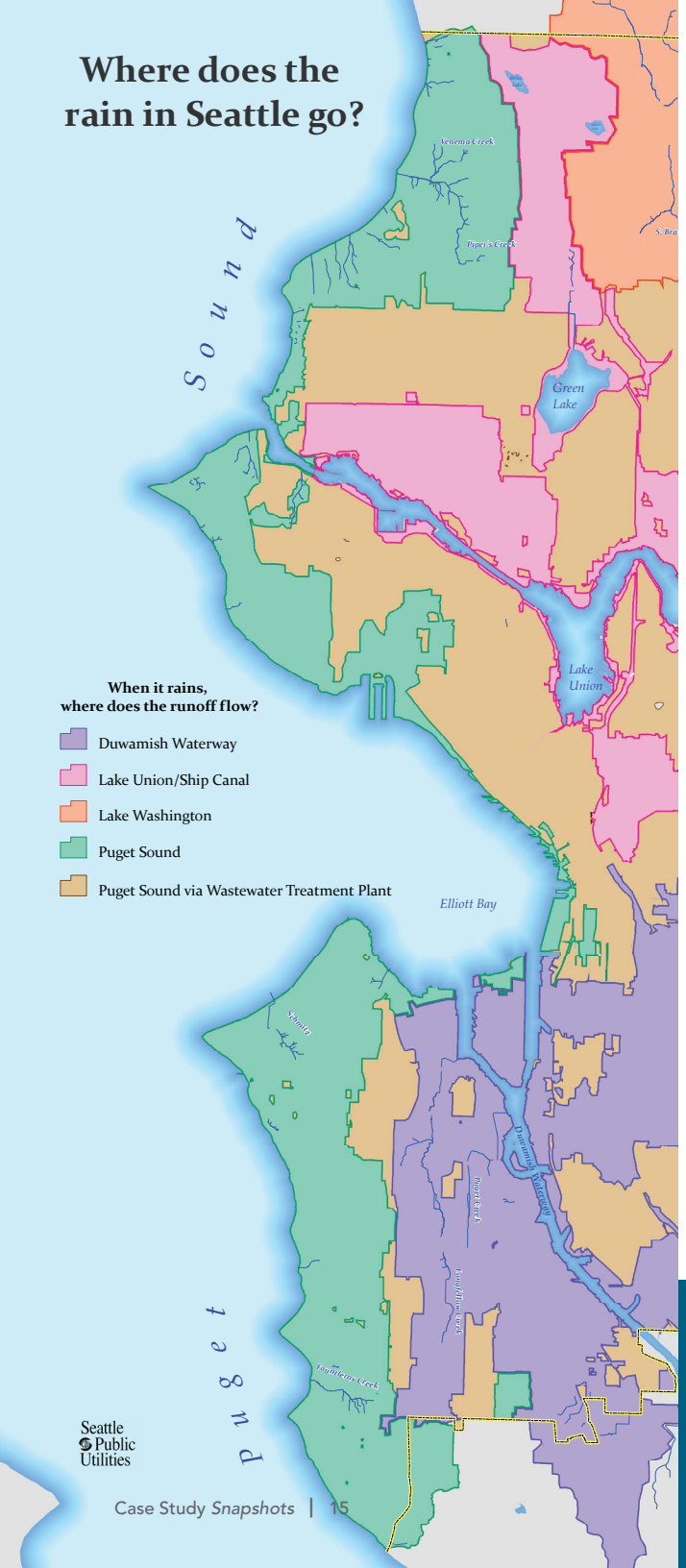
LESSONS: Changing a department's name can enhance public support and understanding, dedicated and consistent funding ensures successful programs.

LOOK FOR SYNERGIES

RESOURCE RECOVERY AND ENERGY GENERATION | OAKLAND

East Bay Municipal Utility District (EBMUD) was looking for ways to reduce its energy use. It had 12 digesters, but not enough organic matter. It partnered with Recology to add food waste to its digesters and received revenue from accepting this food waste. Research, funded by EPA, found that food waste was three times as powerful as sludge for producing energy. In 2012, EBMUD became the first treatment plant to be a net producer of energy – producing 120% of its own needs. Annual sales are about half a million dollars.

LESSONS: Establish strong public-private partnerships, seek out investors that can benefit, understand interdependencies in regulations and drivers, look beyond your own industry for synergies and opportunities.



UTILIZE THE MARKETPLACE

ENSURE EQUITABLE REVENUE STREAMS

STORMWATER PROPERTY TAXES | SANTA MONICA

The city has two stormwater parcel fees that are paid annually by all property owners. These fees are assessed through property taxes and generate approximately four million dollars per year. While the Stormwater User Fee is a flat fee each year, the Clean Beaches & Ocean Parcel Tax is tied to the Consumer Price Index and adjusted accordingly. Revenues from these fees support the city's watershed management program and the city's obligation to comply with federal and state Clean Water Act regulations.

LESSONS: Include water quality in plans to gain community support, consider available land use, open space and project life funding, wide community consultation can help gain support for taxes.

SEE THE BIGGER PICTURE

TRIPLE BOTTOM LINE ACCOUNTING | SEATTLE

Seattle Public Utilities (SPU) had to demonstrate to regulators how an integrated plan, that included implementing stormwater projects and delaying some combined sewer overflow projects, would significantly benefit water quality. SPU used a 'Triple Bottom Line' approach to analyze, allowing them to consider financial, social and environmental benefits and costs. Dollar values were assigned to non-market social and environmental impacts. The method used MODA (multi-objective decision analysis) to allow them to clearly communicate with stakeholders that not only cost and water quality were considered, but also social and environmental issues.

LESSONS: Triple bottom line accounting combined with innovative modeling can result in better project prioritization and overall results.

CHANGING OUR APPROACH

An integrated approach requires new economic methods that go beyond traditional cost-benefit analysis to more holistic evaluations. Changing our approach requires recognition of social and environmental costs, access to new forms of funding, different allocations of costs and new methods of cost recovery.

Regulation and Legislation

USE REDEVELOPMENT AS A CATALYST

SOLAIRE BUILDING | NEW YORK

The greening of Battery Park City started in 1999, when the Battery Park City Authority, a New York State public-benefit corporation, drafted its own green building guidelines, requiring every residence and commercial property in the area to meet strict sustainability criteria. Over the years, the Authority has tightened its guidelines. Buildings were first required to recycle grey water, from the laundry or shower for irrigation. Now all water, including toilet (or *black water)*, must be recycled for toilet flushing, air-conditioning, irrigation and central laundry. Developers must file annual reports that account for their energy and water savings.

LESSONS: Redevelopment agencies can play a big role in unregulated systems, subsidies help catalyze pilots, staff continuity is important.

QUANTIFY WIDER BENEFITS

2030 DISTRICT | SEATTLE

Seattle took a *District* approach to urban development with a goal to create a high-performance and sustainable building district in downtown Seattle. They chose the largest water-consuming and greenhouse gas-emitting sector in the region. Permitting was extremely time-consuming with state regulations prohibiting the use of energy/water efficient innovation due to the lack of knowledge on long-term effectiveness. To overcome this, the city implemented a *Streamlined Permitting Process* to cut times by 25%. Metrics were developed to measure improvements in water and energy use. Seattle 2030 continues to add programs and services including efficiency finance workshops for building managers.

LESSONS: Understanding of new technology effectiveness in the long-term is critical, planning at a district scale for water, energy and transport can yield big benefits.

ALLY WITH REGULATORS

HARMONIZE ACROSS SCALES

OPTIMIZING CONSENT DECREES | NORTHERN KENTUCKY

Regionally, Northern Kentucky Sanitation District 1 (SD1) worked with planning agencies to take an integrated approach to stormwater and wastewater management, including overcoming barriers in local ordinances. Statewide, SD1's partnerships led to passage of a Kentucky House Bill (504) requiring regulators to consider affordability, green infrastructure and effectiveness when enforcing the Clean Water Act. At the Federal level, SD1 is collaborating with the US Conference of Mayors to address policy concerns with the US Environmental Protection Agency.

STREAMLINE THE PERMITTING PROCESS

RECYCLED WATER | SAN FRANCISCO

In 2012, San Francisco (SF) developed a program to streamline the permitting process for the installation of non-potable water systems. This process overcomes a gap in the CA Plumbing Code and lack of guidelines at a state level, and ensures appropriate health and construction guidelines for safe and reliable use of these systems. Codifying the roles and actions of SF Public Utilities Commission, Public Health and Building Inspection led to quick development of the guidelines. To encourage uptake, developers can access a non-potable water calculator, a developer's guidebook, technical assistance and funding assistance in the form of grants.

LESSONS: Establish working relationships across jurisdictions, coordinate groups with inter-local agreements, foster a regulatory system that recognizes opportunity cost.

LESSONS: Pursue cross-city departmental buy-in, provide technical and regulatory guidance to developers, provide grant funding as a catalyst.

CHANGING OUR APPROACH

Legislation and regulations have been designed for centralized water systems, not the current movement to multi-scale, hybrid (grey/green) systems. Changing our approach requires tackling inconsistent and overlapping regulations, a lack of regulatory frameworks, prescriptive versus performance-based regulations, the assessment of risk and the role of private and public operators.

Action at different scales

Change generally occurs through the cumulative results of many actions by many people at many levels. Actions that occur depend on the particular drivers in an area, the 'champions' involved at different points in time, and the local capacity to implement change.

The examples that follow show how multiple collaborative actions are occurring at a:

- Regional scale in Pittsburgh, Pennsylvania
- City scale in the City of Sydney, New South Wales
- Utility scale by Clean Water Services, Oregon

PATHS TO CHANGE

"The organizational culture has transformed from one that was obsessed with quality to one obsessed with delivering unparalleled value."

– Bill Gaffi, General Manager, Clean Water Services

Challenges

The Pittsburgh region has an abundance of water and an institutional structure that is highly fragmented (82 municipalities and the City of Pittsburgh). There are numerous water challenges including:

- Sewer overflows
- River water quality
- Flash flooding
- Fracking impacts on water quality

DRIVERS FOR ACTION are coming from multiple directions including regulatory mandates requiring action for Combined Sewer Overflows and Total Maximum Daily Loads (TMDLs) into the waterways; the Green Building movement; and citizen and NGO demands for a cleaner environment.

Pittsburgh: A Region with Many Challenges

Evolving institutional landscape

Over time, the institutional challenges in the Pittsburgh region are changing. Groups, like Allegheny County, ALCOSAN and 3 Rivers Wet Weather, are providing the leadership and capacity to enable systems 'sewershed' thinking and institutional consolidation of infrastructure. Regulatory requirements for green infrastructure are evolving from the national to local and building level. Emerging is the need for increased capacity and knowledge for water and local government professionals in relation to One Water and green infrastructure.

Multiple One Water initiatives

A variety of One Water initiatives are under way but overall coordination is still needed. Examples include:

- **Vision:** 9 Mile Run – a collaborative vision for an urban watershed
- **Engagement:** Pittsburgh Water and Sewer Authority multi-agency – charettes
- **Leadership:** Etna Borough – green infrastructure
- **Innovative Financing:** Mt. Lebanon Township – dedicated funding for stormwater infrastructure
- **Capacity Building:** Phipps Conservatory Living Building – showcasing sustainable water architecture and landscape design

LESSONS: Partnering is the foundation of change, regulatory action can be a powerful catalyst for innovation, local action can create a domino effect, strong facilitation and regional databases are key enablers, One Water initiatives can create new markets and revenue generation.

Challenges

Sydney is a rapidly growing city with a high rate of urban consolidation. It has concerns about:

- Water supply security under climate change
- River and harbor water quality
- The high percentage of aging network infrastructure

DRIVERS FOR ACTION include a commitment by the city to environmental leadership, recognition that climate change is likely to increase both water scarcity and flooding and concerns about the city's livability and economic vitality.

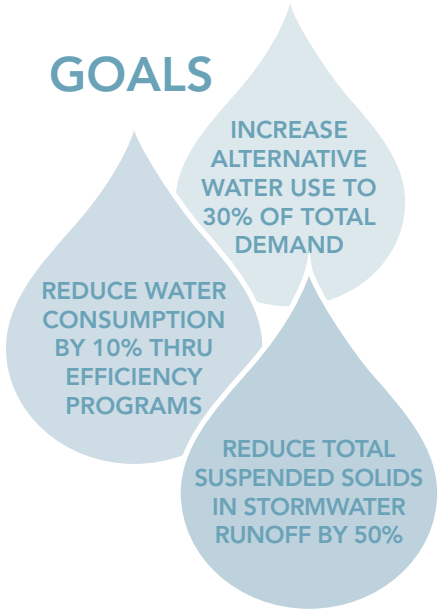
Sydney: Rethinking Water in the City

Leadership – consultation – vision – action

- Political leadership at federal and state levels to create an enabling environment through regulation, targets and incentives
- Strong political and executive leadership at the city council level to drive the process
- Extensive community consultation to develop the Sustainable Sydney Vision 2030
- Consultative process to agree on the strategy and prepare the Decentralized Water Master Plan
- Collaborative partnerships with utilities and the private sector

Multiple One Water initiatives

- Water Industry Competition Act 2006 was passed to regulate a competitive environment for the recycled water infrastructure
- Australian Water Recycling Guidelines changed from prescriptive to treatment systems based risk assessment
- NABERS (National Australian Built Environment Rating Scheme) encourages private sector involvement in water efficiency
- BASIX (Building Sustainability Index at the state level) drives mandatory water efficiency in new and redeveloped residential buildings



LESSONS: Champions at political and institutional levels are required, community and stakeholder consultation is key to implementation, building staff capacity through dedicated teams is important, partnership with the private sector (developers) and the public sector is needed to leverage capital finance.

Challenges

The Tualatin River Watershed is located in Washington County, Oregon. Significant water pollution in the 1970s led to citizen action that created a regional service provider, Unified Sewerage Agency, now known as Clean Water Services. Many challenges have been addressed and the Tualatin River is cleaner than it has been in generations. Still, challenges remain:

- Planning and regulatory coordination
- Funding limitations
- Regulations that confound innovation

DRIVERS FOR ACTION included a building moratorium, the need to consolidate permitting, and the high cost of meeting regulatory requirements.

Clean Water Services: Changing an Organization's Culture

An evolving organizational culture

As Clean Water Services overcame challenges, its mission expanded from pumps, pipes and the protection of public health to include a broader focus on resource recovery, ecological health, watershed restoration and quality of life. By empowering its workforce, embracing innovation, building partnerships and engaging the community, the public utility sets an example for positive cultural change.

Multiple organizational initiatives

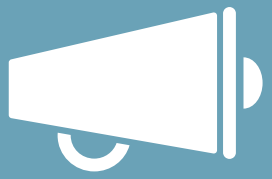
CWS is working to break down barriers to One Water, including:

- Internal regulatory affairs department
- Fully integrated NPDES permit
- Tree planting to reduce thermal loads
- Integration with water supply project
- Coordinated planning on capital investments
- Nutrient recovery
- Utility rebranding
- Natural treatment systems
- Pay for performance goal sharing
- College of Clean Water

LESSONS: Visionary leadership can provide the driving force for innovation and culture change, communication begins with the utility or organization's name, regulatory actions, such as a building moratorium, can be a huge catalyst for change, staff that values customers is critical to a sustainable utility, new revenue generation pathways should be explored.

Moving Forward

Action can take the form of new initiatives or build upon existing work, approaches, projects and capabilities. This section is divided into three areas of recommendations that can be directly taken by individuals or organizations, that involve influencing others and finally, a specific set of actions that water associations could take to support their memberships.



TAKING ACTION

"Planners typically are not educated about water. We plan for development and expect the water industry to meet the demand for water, wastewater and stormwater service... preferably out of sight. This needs to change."

– Vicki Elmer, Ph.D., Director Emerita,
Oregon Leadership in Sustainability (OLIS) graduate program, University of Oregon

Individuals and groups within utilities and government institutions (from local to federal level) can be catalysts for their institution's transition to One Water. These actions are some possible steps that can be taken in that direction.

"Taking one step in your own way toward One Water – be it big or small – will lead to amazing results."

– Paula Kehoe, Director of Water Resources, San Francisco PUC

Initiating Your Own Transition

BOLD LEADERSHIP	▪ Create and champion your organization's One Water vision ▪ Provide leadership to drive planning and implementation of One Water initiatives
PLANNING AND PARTNERSHIPS	▪ Establish collaborative agreements and improve data sharing with other institutions ▪ Initiate discussions with urban planners and other government agencies
CULTURE, KNOWLEDGE AND CAPACITY	▪ Change your organizational culture to one that embraces the One Water approach ▪ Improve the understanding, knowledge and capability of staff to mainstream One Water initiatives
CITIZEN AND STAKEHOLDER ENGAGEMENT	▪ Ensure engagement is transparent, appropriately staffed and sufficiently funded ▪ Use clear language and branding reflecting your organization's positive role in community
ECONOMICS AND FINANCE	▪ Adopt a transparent, triple bottom line, economic framework ▪ Create an economic environment conducive to public/private partnerships
REGULATIONS AND LEGISLATIONS	▪ Lobby and engage with regulators to streamline the approval process ▪ Set guidelines and monitoring protocols in collaboration with other institutions

Your organization can foster a One Water approach by championing collaboration and influencing other individuals or organizations to take action. These actions are some possible steps that can be taken in that direction.

"The key to successful local water supply development is partnerships. Open and transparent dialogue creates successful projects."

– Shivaji Deshmukh, P.E. Assistant Manager, West Basin Municipal Water District

Influencing Others to Transition

BOLD LEADERSHIP	▪ Champion your One Water vision across government agencies and with the public
PLANNING AND PARTNERSHIPS	▪ Support establishment of cross-industry committees to share information and ideas ▪ Ensure water issues are integrated with urban planning
CULTURE, KNOWLEDGE AND CAPACITY	▪ Create and distribute One Water guidance materials to inform and empower officials ▪ Conduct research on effectiveness of integrated systems and develop benefit-oriented performance metrics
CITIZEN AND STAKEHOLDER ENGAGEMENT	▪ Support a strong facilitating organization to create a common vision ▪ Engage politicians and customers with rebranding strategies
ECONOMICS AND FINANCE	▪ Develop and apply investment frameworks that recognize opportunity costs and TBL benefits in both water and urban planning ▪ Attract investors and private developers through grant financing, incentives and key bulk infrastructure
REGULATIONS AND LEGISLATION	▪ Enact local ordinances and guidelines that encourage a One Water approach ▪ Encourage utilities and communities to have regulatory flexibility that enables a One Water approach

Industry associations can harness the collective force of their memberships, knowledge and capacity to transform the water industry. These actions are some possible steps that can be taken in that direction.

"WERF is dedicated to working collaboratively with other organizations to make the Utility of the Future a reality now. Integrated Water Management is a critical element in the future success of this program."

– Lawrence P. Jaworski, P.E., BCEE
Interim Executive Director, WERF

Supporting the Transition of Others

BOLD LEADERSHIP	▪ Facilitate regional and city visioning processes around the One Water approach
PLANNING AND PARTNERSHIPS	▪ Advocate centralized management of data at the city and regional scale ▪ Facilitate the bridge between water and urban planning professionals
CULTURE, KNOWLEDGE AND CAPACITY	▪ Provide professional development courses on the One Water approach ▪ Develop university or online courses on One Water approach ▪ Develop awards program for One Water initiatives
CITIZEN AND STAKEHOLDER ENGAGEMENT	▪ Develop One Water informational materials
ECONOMICS AND FINANCE	▪ Encourage triple bottom line accounting including livability metrics ▪ Evaluate different cost and pricing frameworks including ones that attract investment from the private sector
REGULATION AND LEGISLATION	▪ Develop a best practice manual for ordinances and legislation that promote a One Water approach ▪ Lobby for regulations that recognize opportunity costs, capital offsets, benefits and triple bottom line outcomes

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