CASE STUDY: Ann Arbor, MI

Building A Stormwater Utility

Project Snapshot

In 2006, the City of Ann Arbor updated the rate structure for its stormwater utility to charge property owners based on the amount of impervious surface on their property. The new, more equitable rate structure includes incentives to manage stormwater onsite. The utility, which generates over $5 million per year, funds operations and maintenance projects for the stormwater system, water quality improvement projects, stormwater education, implementation of environmental regulatory or remediation plans, and green infrastructure projects that reduce strain on the stormwater system.

Ann Arbor, MI
Population: 113,934
Governance: Council-Manager

What is a stormwater utility?

The Michigan Department of Environmental Quality defines a stormwater utility as:

"[a] source of funding the construction and maintenance of stormwater management facilities. User fees are typically charged based on the amount of runoff that may be anticipated from a property."

Nine Michigan communities have a stormwater utility: Adrian, Ann Arbor, Berkley, Chelsea, Harper Woods, Jackson, Marquette, New Baltimore, and Saint Clair Shores.

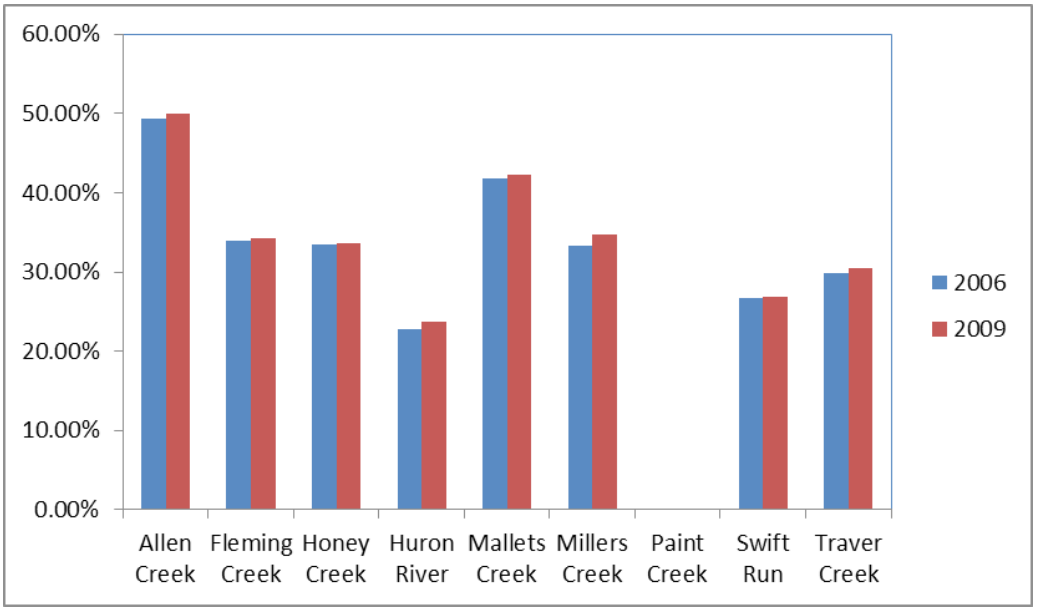
Utility Details

Until 2006, the City of Ann Arbor's stormwater utility, which began in 1984, charged residential property owners a flat rate. The City looked to update the utility in order to meet expanding service needs, employ new technologies to improve the system, and comply with evolving regulatory requirements. Specifically, in Bolt v City of Lansing (1998), the Michigan Supreme Court struck down Lansing's stormwater utility and established three utility rate design requirements:

- Fees must serve a regulatory and not revenue-generating purpose.
- Fees must be proportionate to the necessary cost of service.
- Property owners must be able to refuse or limit their use of the service.

Ann Arbor's utility and rate structures are designed to meet these criteria. First, all services are regulatory and fulfill National Pollutant Discharge Elimination System (NPDES) permit and National Flood Insurance Program (NFIP) obligations. Second, cost allocation and rate-setting processes ensure that costs are proportional to the fees charged. Third, residents and businesses can reduce their use of the service (and therefore their rates) by reducing the amount of impervious area on their properties. Properties that flow directly into the river are exempt because they do not use the City's stormwater system. In addition, the City offers a series of credits that reduce rates. Achieving "RiverSafe Home" certification or installing rain barrels, rain gardens, or detention basins lead to lower rates for property owners. Commercial credits include installing detention basins, following water quality best management practices, and achieving "Community Partners for Clean Streams" designation.

Percent Impervious Surface by Creek Watershed



Funding

Setting up the new rate structure carried significant cost because it required detailed information about each parcel and the City's overall impervious area. These measurements are based on flyover maps; Ann Arbor's most recent flyover map cost about $50,000. Although setting up a utility has high upfront costs, it brings in enough revenue to administer the program once it is operational. In 2010, Ann Arbor's utility generated nearly $5.3 million in revenue.

Utility Cost Per Parcel

Single-Family and Two-Family Residential	
Measured impervious area	Quarterly charge*
Up to 2,187 square feet	$13.68
> 2,187 to 4,175 square feet	$23.94
> 4,175 to 7,110 square feet	$41.04
> 7,110 square feet	$71.82

Left: Residential Impervious Surface In Red

** Plus a $6.77 customer service charge per quarter.*

Commercial and other properties (e.g., multi-family, office, institutional, and industrial land uses) are billed directly on the impervious areas at a rate of $342.00 per acre per quarter, plus a $6.77 customer charge per quarter.

Results

In addition to operations and maintenance of the stormwater pipes, the utility has provided funding for diverse projects that reduce strain on the system. Sample projects include installing a permeable concrete alley in a residential neighborhood, creating a wetland preserve in a public park, building underground detention basins, and operating the City's urban forestry management program. The City has granted over 5,000 credits to residents and businesses for actions that reduce strain on the stormwater system.

Left: Concrete alley in residential neighborhood

Right: Permeable material in Ann Arbor alley

Advice for Communities Considering a Similar Project

Start with education – Laying the education groundwork and making sure the community understands the connection between rainfall and water quality is a crucial first step before setting up a stormwater utility. Fostering a connection to the river or lake where the stormwater goes forms the basis for peoples' willingness to pay for stormwater system improvements because they understand the water quality benefits. Partnership opportunities can begin with the public schools for stormwater education. "Watershed" and "Runoff" are part of the Michigan Educational Assessment Program (MEAP) standards. Ann Arbor Public Schools has an urban hydrology program for 2nd through 6th grades.

Empower residents to make a difference – The rate structure gives residents an opportunity to use their property to improve water quality and get recognized for their efforts. These residents can then become ambassadors to their neighbors about the benefits of rain barrels, rain gardens, and other strategies to manage stormwater onsite.

Use high-quality data – Investing in technology to have accurate flyover data helps ensure that rates are fair and minimize disputes. GoogleEarth does not provide enough detail, in part because the flyover should happen during leafless conditions. Ann Arbor uses six-inch pixels and updates its maps every three years. The maps (and the cost for generating them) are shared with other City units.

Emphasize transparency – Through the City's website, residents can see an aerial photo of their parcel with impervious areas marked and the calculations the City used to determine their rate. The site outlines a process for property owners to dispute the City's calculations if they believe there are errors in the aerial photograph or interpretation. After visiting the property in question, field staff make corrections and adjust rates if necessary.

Leverage partnerships – The City of Ann Arbor, Washtenaw County, and the University of Michigan all own and operate portions of the stormwater system within city limits. Ann Arbor has kept program costs low and streamlined administration by partnering with the County Water Resources Commissioner's Office on stormwater improvement projects, education and outreach programs.

Raise the bar for municipal operations – Ann Arbor works to integrate best practices for stormwater management into its own operations as well. For instance, a newly constructed Municipal Center is an example to the community that includes a rain garden, cistern, infiltration beds, green roof, planter boxes, and permeable pavers in the parking lot to achieve a net zero runoff from the site.

For More Information

A copy of the flyover mapping RFP is available at MichEEN.org under the Michigan Green Communities group.

Visit a2gov.org/storm for more information on rate structure, available credits, and more.

Original case study developed by Laura Matson at Michigan Green Communities. For questions or information, visit greenchallenge.mml.org

Presentation on raingardens and understanding storm water: http://www.a2gov.org/government/publicservices/systems_planning/waterresources/Documents/systemsplanning_stormwater_raingardenguide_2008_05_05.pdf

Photo by: Dean Amhaus

CASE STUDY: MILWAUKEE, WISCONSIN

Building a Cluster of Water Innovation in Milwaukee

A Natural Asset Becomes the Driver for Economic Development

Background

Milwaukee is a Native American word meaning "Gathering Place by the Water." The Milwaukee region's location on the shores of Lake Michigan has both shaped its history and promises to build its future through an innovative multi-sectoral partnership that is making the city an internationally recognized "World Water Hub" for freshwater research, education, and economic development on an unprecedented scale.

21% of the world's fresh water lies in the Great Lakes, and almost 3% (nearly a million acres) of Wisconsin's area is made up of lakes. More than a third of Wisconsin's population lives in the 11 counties forming its Lake Michigan Coast. 24% live in the southeast coastal counties of Milwaukee, Racine and Kenosha. The lakes provide not only a source of fresh water, but also climate moderation, transportation alternatives, recreational opportunities, property value enhancement, and a source of fish.

> "Milwaukee exemplifies the hope that water may not only support growth, but catalyze it."
>
> – The Economist, May 20, 2010

Milwaukee's historical relationship to its water resources began with exploitation and development of this seemingly endless resource. Early Wisconsin settlers started water-intensive businesses including brewing, tanning, and food processing. Over time many other companies grew up to support these businesses with goods and services—meters, plumbing fixtures, valves, pumps, filters, controls, valves, heaters, coolers, tanks, dehumidifiers, leak detectors, software, etc. By the middle of the 20th century, the industry waste stream resulted in significant, regional water quality problems. A new generation of businesses filters, sensors, membranes, remediation technologies—grew up in response to a mandate from the Environmental Protection Agency (EPA) to clean up the lake and its tributaries, and to ensure a high quality supply of water to the industries that needed it. In more recent years the region has built on past experience and its wealth of knowledge and experience to develop a water-focused, asset-based marketing and business development approach that is based around the full water cycle: extraction, use, quality, and stewardship.

Process

Building on the "cluster development" theory of Harvard economist Michael Porter, a broad coalition of public and private partners have worked together to develop the region into an international "water hub."

Regional Partnership Fosters a Shared Vision. The Milwaukee 7 Regional Economic Development Advisory Council (M-7), launched in September 2005, was formed to create a cooperative economic development platform for the seven counties of southeastern Wisconsin: Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Waukesha and Washington. Its mission is to attract, retain and grow diverse businesses and talent. In its efforts to define regional strengths from which to build, the M-7 identified several possible themes, one of which was water. Around the same time, Rich Meeusen, the CEO of Badger Meter Company, and Paul Jones, CEO of A.O. Smith Company (the nation's largest independent meter and hot water heater manufacturers, respectively), met to discuss areas of possible collaboration and saw potential to expand their efforts among the many water-related companies in the area.

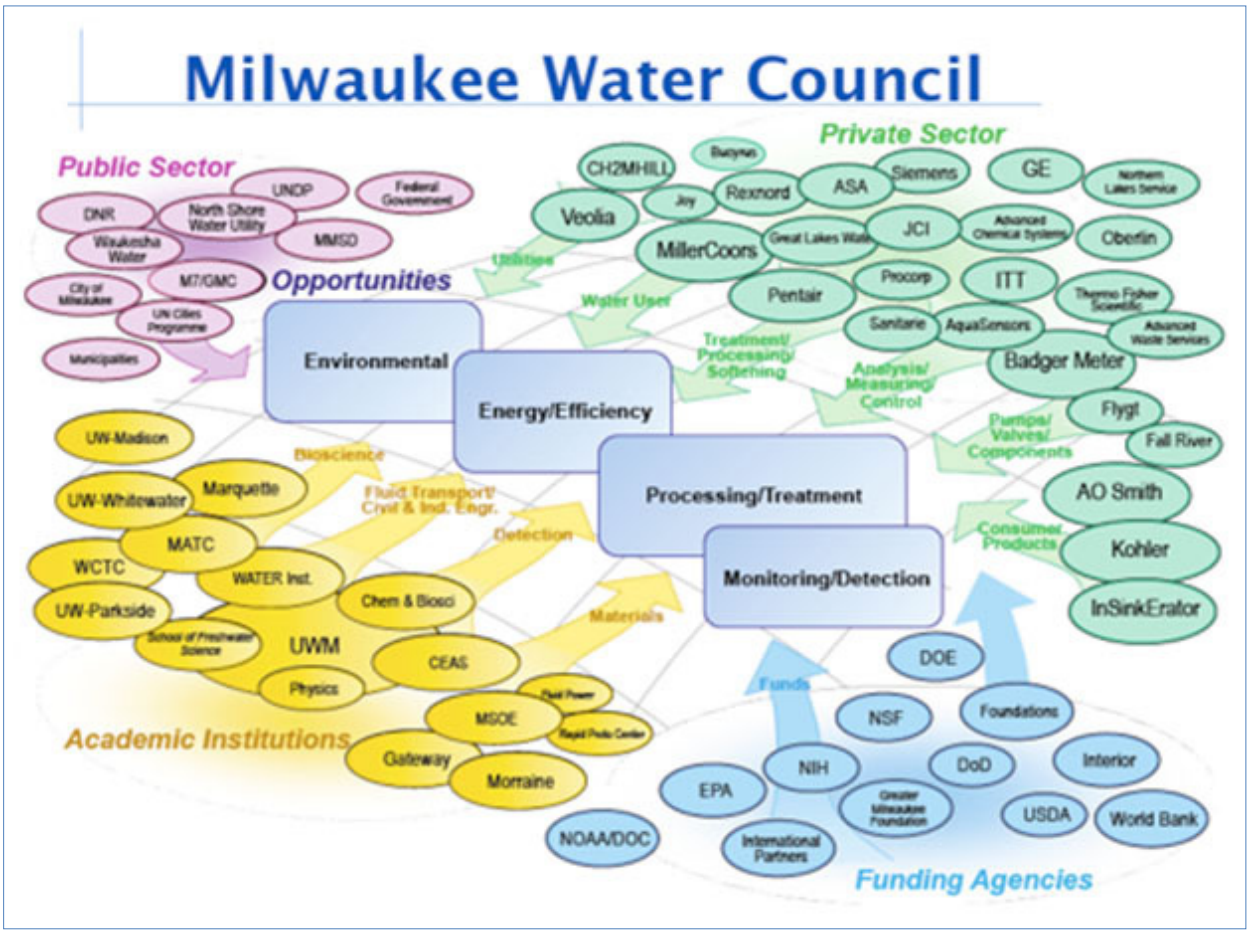
The idea of a water hub as a regional economic development strategy and flagship effort for the M-7 was initially greeted with some skepticism. Student researchers at the University of Wisconsin at Milwaukee (UWM) identified over 150 locally based water-related businesses (out of 218 statewide)—including offices of five of the world's 11 largest water technology companies, and the presence of dozens of water research specialists from engineering, science, legal, business, and other specialties—helping to advance the idea. Regular collaborative meetings among industry leaders, university researchers, and economic development advocates moved the process forward and eventually catalyzed the concept of a regional Water Council. A Water Summit in 2006 brought together various interested groups to discuss the region's potential as a water hub for the first time, and the Water Council was formed to harness the resulting interest and the "amazing momentum" that resulted, according to Meeusen. A second summit in 2008 helped to further advance the program.

Evolution of the Water Council. Initially hosted by the Greater Milwaukee Committee and staffed with hundreds of executive volunteers, today the Council is an independent 501(c)(3) nonprofit organization with over 300 members, whose dues—along with foundation grants—pay for its operations. Members include individual consultants and entrepreneurs, small start-up companies, nonprofit environmental and educational organizations, governmental units, higher education institutions, and large corporations. It has an annual budget of $700,000, a staff of four and a 15-member board, co-chaired by the CEOs of Badger Meter and A.O. Smith and including representatives from the business, university, environmental, and public sectors. Full-time CEO Dean Amhaus was hired to run the Council's operations in March of 2010.

The Milwaukee Water Council has three primary functions:

- Economic Development via message and marketing
- Talent Development through university-industry collaboration and student training
- Addressing the world's water problems through technology.

A fourth area—public policy development—is also being considered.
The Water Council has come a long way in five years. Successful concept development, program initiation, and messaging about water as a unique regional asset led to several federal grants—from the U.S. Department of Labor's WIRED program, U.S. Economic Development Administration (EDA), and National Science Foundation—and the designation of the greater Milwaukee area as the 14th United Nations Global Compact City. This international recognition and two major conferences in Milwaukee since 2006 have helped catalyze the development of partnerships and several research collaborations between industry, universities, and economic development interests.



By: Milwaukee Water Council

The Water Council has actively and successfully advocated at the state level for the establishment and funding of a new Freshwater Institute at UWM, and has initiated collaborative relationships with Engineering and Law Schools at Marquette University and the UW – Whitewater's Business School as well. State level support has also included $100,000 from the economic development office and the engagement of the Governor on trade missions for water company attraction.

There is also an important nonprofit component to the Water Council that helps to make the connection between Council work and broader environmental needs, and to bring in foundation interest and support. The International Alliance for Water Stewardship (AWS), based in Germany, has launched a North American Initiative in Milwaukee in a partnership between the Nature Conservancy and the Water Council. The AWS developed the first global water certification program for businesses, cities, and other major water users and managers, comparable to other voluntary certification systems that encourage sustainable forestry and energy efficient buildings. The Nature Conservancy and the Water Council have committed to secure $1.2 million in funding, with contributions pledged from companies including A. O. Smith Corp., Badger Meter, Bucyrus International, Diversy, MillerCoors, and Veolia Water North America. The state of Wisconsin has also agreed to support the effort in its initial year.

Creating Career Pathways. A final component of the university-industry collaboration is the talent pipeline, which builds on water resources training for science students from the UWM Freshwater Institute, law and engineering students from Marquette University, and business students from University of Wisconsin at Whitewater. The pipeline generates a locally grown, professional workforce with grounding in water issues to feed the needs of water-hub businesses. The Council places students in internships with member businesses—97 of them in 2011—which can lead to job offers or future career choices.

Lessons Learned

In retrospect, the opportunity for the Milwaukee region to build an economic asset out of its strengths in water industry and research capacity seems obvious, but its development required initial advocacy, strong leadership, persistent messaging, collaborative goal-setting and outreach.

Identify and Build on Existing Assets. The identification of a niche in water, building on regional strengths that previously were not perceived, gave the Milwaukee effort an edge. Until 2006 the existence of a predominance of water-based companies in SE Wisconsin had not been explicitly identified or understood as a strength—it was "hiding in plain sight." Understanding its local asset allowed the region to focus economic development efforts on building and enhancing it, rather than trying to attract entirely new types or categories of industry. The Water Council was not constrained by a prescribed way to develop this unique niche, but was free to experiment and learn as it went. One example of this, according to Council CEO Dean Amhaus, was the Milwaukee region's successful bid to become part of the United Nations Global Compact. While not immediately relevant to local economic development (and certainly not prescribed as typical practice), U.N. status conferred a level of visibility and international engagement that has proved extremely beneficial to the Water Council's work.

Provide a Forum for Collaboration and Partnership. Prior to the formation of the Water Council, there was little or no collaboration between local water industries and university research facilities. Early university-industry mixers brought people together in an informal way to explore areas of common interest and possible collaboration. The creation of the Water Council as the coordinating institution to foster and facilitate hub activity between business, the public sector, universities, and water users has been a success—it is the only one of its kind in the country.

Amhaus also identified strong cooperative relationships among partner groups as a key to the effort's success. "They get along well and collaborate on the broad, common vision," he said. The synergy among Council partner groups is such that "we almost forget who we work for" in their combined efforts to advance common goals, i.e., business partners attend university symposia, and water quality issues are of great interest to companies as well as environmental groups and public health agencies. Because they don't get too hung up on turf issues or who is in charge of what, they are able to foster the "catalytic collaboration" for which they have been recognized.

The 40-year-old Great Lakes Water Institute at the UWM became a communications and research partner for the nascent Council. Water Council partners identified a need for expanded local research capacity, eventually advocating successfully for the creation of UWM's new Freshwater Institute, with new facilities and operations funded by the state. The initially casual university-industry mixers eventually led to the University-Corporate Linkages group (the "Technology Committee") of the Council, which brings together Chief Technology Officers and university researchers in quarterly meetings to discuss and match company needs with research projects. In many cases businesses sponsor university research as a result. A $675,000 National Science Foundation Industry and University Cooperative Research Program grant was awarded to the Water Council in 2009 matching formal commitments from six area businesses to invest $1.5 million over a five-year period to support seven research projects per year with two universities (UWM and Marquette University). In May of 2010 the first seven research projects were announced, including work on chemical sensors, greywater assessment, hybrid nanomaterials, lead removal, and microbial fuel cell technology.

In August of 2010, UWM signed a memorandum of understanding with the EPA to collaborate on "innovative water technology development" both nationally and locally, adding another dimension to the water hub.

The Water Council also provides a forum to discuss and generate water quality and supply resources for other parts of the globe. The Council's Water Stewardship Committee is made up of major water-

using companies (such as breweries and food processors), interested in efficient manufacturing processes and high water quality, to partner with regional companies that can advance or support their efforts. In one example, Miller Brewing Company has developed the technology to reduce its water consumption from a historical average of 10 cans and a current industry average of 6 cans of water per can of beer, down to 3 cans of water per can of beer. Several local microbrewers are following suit.

Communicate the Message. Developing a clear message and marketing the combination of social benefits and business opportunities has been important. The "cluster" strategy, with a strong communications component, has paid off. An early emphasis on messaging and PR created a "buzz" for the program and a rallying point for regional interests.

Find the Right Indicators of Success. The Council is intentionally not tracking their success in terms of job creation or company attraction statistics, though the M-7 does some of this. Rather, they are focused on the idea of growing capacity and momentum from the bottom-up—building on existing strengths to encourage new entrepreneurial capacity in the region—more of a home-grown emphasis than traditional economic development activity. Under this scenario, the region will develop such a strong set of water-related resources, and a water business-friendly environment, that it would attract compatible activities as a result.

In recent years, Milwaukee has emerged as an international water leader in both research/ technology and business development, on par with other world water innovators such as Israel, Singapore and the Netherlands. The focus on helping to grow the 150+ water technology businesses already in the region and creating a collaborative university/industry relationship to foster new ideas, products and companies has sparked "a spirit and a drive not experienced here in almost a century." according to CEO Amhaus. Results to date include the recruitment of three new companies to the region, expansion of existing companies and facilities, and the transfer of positions in one company from other cities to Milwaukee and in 2011, the Milwaukee Water Center received an inaugural U.S. Water Prize in recognition of the success of this collaborative effort.

Thanks to Dean Amhaus, The Water Council; Rich Meeusen, Co-Chair Water Council, CEO, Badger Meter Co.; and Dr. Sam White, Associate Dean, Director of Workforce Development, UWM Freshwater.

Case study written by Beth Conover, Econover LLC.

For More Information

The Water Council website:
www.thewatercouncil.com

Greater Milwaukee Committee website:
www.gmconline.org

Milwaukee 7 Regional Economic Development Advisory Council website:
www.choosemilwaukee.com

Contact:
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Models for Mainstreaming Adaptation

For the first ISC Resource Guide on Adaptation & Resilience, staff prepared case studies documenting the experience of practitioners from various disciplines in Seattle and New Orleans in implementing strategies that bolster climate resilience within the context of water supply planning, public works, land use planning and redevelopment. The full case studies are available on ISC's Sustainable Communities Leadership Academy website. This synopsis captures in brief the lessons learned as previously documented.

Seattle Public Utilities – Water Supply Planning

Few people might suspect that Seattle's water supply is at risk. The city has long been known as a place of abundant water. For more than a century, it has met all its water supply needs with snow melt and rainfall from two mountain watersheds a short drive away. Despite this long history of ample water, Seattle Public Utilities (SPU), the city's publicly-owned water utility, turned its attention to the potential water supply risks from climate change more than a decade ago.

Hydrological Modeling. Since 2002, SPU has collaborated with the University of Washington's Climate Impacts Group on regional hydrological modeling—initial modeling suggested that under a moderate risk scenario, Seattle was projected to lose 13% of its water by 2050. SPU used the assessment as a basis for assembling a portfolio of adaptation strategies that could offset expected losses and make the city's water supply more resilient to climate change.

Looking for Effective Adaptation Options. Since climate impacts were not forecasted to be severe before 2050, SPU looked most closely at "no regrets" operational options that could be implemented by the utility itself in the near term and without significant cost to its rate payers, such as drawing down water levels in a reservoir below typical operating levels.

Seattle Public Utilities – Flood Risk Management

Seattle experienced two of the most damaging storms in its history in 2006 and 2007. The first storm, in December 2006, produced intense rainfall over a single hour. The city's natural and artificial drainage systems could not accommodate all the runoff that resulted, and water rapidly flooded streets and buildings.

Another record-breaking storm struck in December 2007, this time dumping nearly five inches of rain on Seattle in a 24-hour period. Again, severe flooding occurred throughout the city, with some properties having as much as four feet of stormwater in basements and on ground floors. Both incidents represented 100-year storm events (i.e. the rainfall released during each storm exceeded the amount the city would expect for a storm of its duration once every hundred years).

Assessing the Increased Risk of Flooding. SPU hired consultants to examine historic rain data collected at 17 rain gauges across the City and analyze whether the frequency of extreme precipitation events had increased. The analysis showed a "weak increasing trend...in the number of days on which 25-year or greater precipitation events are recorded by at least one gauge." The conclusion was that every 3.2 years, SPU could expect a storm to produce a volume of rainfall exceeding 100-year or greater precipitation events somewhere in the city.

Improving Data Collection. SPU's assessment of historic rain gauge data left no doubt that the utility should expand and improve the information it had available for analyzing localized precipitation trends. The utility added 11 new rain gauges to its network, locating them in places where robust

information about rainfall patterns was not yet available. It also improved procedures for gauge maintenance to increase the reliability of the record.

SPU also launched a new program to create better"eyes and ears"out on city streets when major storms strike. A new group of"storm observers"—utility planners and engineers who had no explicit emergency management responsibilities—were trained to go to specific sites during high intensity storms and prepare written notes and take photographs documenting what occurred.

Tuning Up Pre-Emergency Planning and Emergency Response. After the 2006 and 2007 storms, drainage managers at SPU decided the utility needed a more regularly-updated list of the locations in the city that were most vulnerable to flooding. Staff from across the utility—planners, engineers and field crews—now convene after every storm season to revise this so-called dynamic hot spot list, and continue improving their understanding of the types of storms that are of the greatest concern at each site (e.g. some spots flood during short, intense rain events; others during steadier, longer storms).

The updated hot spot list becomes a foundation for more strategic hazard mitigation and response planning. Sometimes, expensive retrofits of drainage infrastructure are needed, and little can be done in the short-term. In many cases, though, a simple increase in pre-storm maintenance, or a low-cost structural fix, such as building a redundant inlet, can significantly ameliorate the problem. Utility staff have also created a set of customized emergency procedures for each location. Each year, drainage managers brief SPU's director about the hot spot list and the work being done at each location, elevating the attention to flooding at the highest levels in the organization.

Regional Communications. In the fall before each storm season, SPU jointly launches a multi-media educational campaign with many other nearby jurisdictions. A"Take Winter By Storm"website disseminates coordinated messages about the specific steps property owners can take to protect themselves and increase the resilience of their properties. Public service announcements featuring elected officials, and tips delivered by weather reporters during television weather forecasts also help educate residents about what they should do before and during storms.
Remapping Flood Prone Areas. In addition to raising the awareness of all Seattle residents about how to prepare for flooding, SPU wanted to bring more intensive public education to those neighborhoods where the risk of flooding is highest. To target its public outreach efforts in this way, SPU first needed updated maps of flood prone areas that took account of more recent data on precipitation and stormwater flows.

I*ntegrating Climate Impacts into Capital Project Planning.* "How climate change will affect flooding is not specifically known enough yet for us to make significant changes to our design standards for drainage projects,"says Gary Schimek, SPU's Separate Systems Manager. In the meantime, though, SPU has made a push to increase consideration of flooding on a project-by-project basis."We are trying to anticipate how new infrastructure will be affected when flooding does occur,"explains Schimek."And we are looking at whether we can build individual projects for bigger storm events without substantially increasing our cost."

New Orleans Recovery and Redevelopment

Addressing the scale of damage in New Orleans after Katrina has been no small challenge, but today the city has a state-of-the-art comprehensive master plan that will shape growth and development for the next 20 years. The plan promotes compact, mixed-use, energy efficient, neighborhood-oriented development, improved transportation, and many other strategies to support its three pillars of livability, opportunity and sustainability. Most importantly, the plan squarely addresses the main adaptation challenge for the city: its vulnerability to climate change and sea level rise, and the need for better protection from storms and flooding.

The plan recommends preparing for climate change by adopting standards and techniques to increase resilience, and by engaging the community in dialogue about risk and mitigation options. It also adopts a strategy referred to as "multiple lines of defense"—an integrated approach to flood control that calls for restoration of Louisiana's coastal wetlands and other natural barriers, and structural strategies, such as levees. In a departure from the past, however, the plan also advocates learning to live with water, transforming it to an asset and integrating it in the urban landscape through canals and green infrastructure.

Community Based Adaptation and Mitigation in the Lower 9th Ward. In the wake of the storm, when the city's planning process and resources remained at best unclear, many individual neighborhoods proceeded to develop their own recovery plans with the encouragement of the mayor. The Holy Cross district in the devastated Lower 9th Ward was one of those neighborhoods. Less than a year after the storm, the Holy Cross Neighborhood Association (HCNA), in partnership with Tulane University and other neighborhood organizations produced a sustainable restoration plan for the entire Lower 9th Ward. The resident-led effort represented the type of new civic engagement that is creating neighborhoods that are on the forefront of sustainability. The plan addressed four areas: urban design and the built environment, the economy, the environment and quality of life.

Architectural Innovations to Create Safe Affordable Housing. Developers and nonprofit organizations are building sustainable and affordable architectural model homes throughout the city. The houses incorporate high design elements (which have gotten a somewhat mixed response from area residents), as well as features that will make them safe, affordable and sustainable for low–income residents. The homes are modern, colorful and compact, using existing narrow lots. Taking a practical approach, the houses were elevated and built with accessible roofs for easy escape and rescue in the case of extreme flooding. One is a floating house—the first in the U.S.

For More Information

ISC's 2010 Case Study on Tucson & Seattle Water Utility Planning:
http://sustainablecommunitiesleadershipacademy.org/resource_files/documents/Climate-Adaptation-Resource-Guide.pdf, page 8

ISC's 2010 Case Study on Seattle's Flood Risk Management:
http://sustainablecommunitiesleadershipacademy.org/resource_files/documents/Climate-Adaptation-Resource-Guide.pdf, page 21

ISC's 2010 Case Study on New Orleans Redevelopment:
http://sustainablecommunitiesleadershipacademy.org/resource_files/documents/Climate-Adaptation-Resource-Guide.pdf, page 30

Capturing the Rain: Different Approaches to Rainwater Harvesting in Four U.S. States

The capturing and use of rainwater for landscaping, in-home plumbing, and fire protection, known as rainwater harvesting, has become a popular alternative water supply strategy throughout the United States. Inherently, rainwater harvesting is a valuable strategy for reducing demand on existing water supply sources, but less recognized is its value in reducing run-off, erosion, and contamination of surface waters, as well as its value in reducing stormwater management demand and costs.[iii] Moreover, with the growing intensity and frequency of drought and water shortages throughout the U.S., rainwater harvesting has become an important climate adaptation strategy for many states throughout the country.

Interest in rainwater harvesting has grown notably in the last five years, with a number of state legislatures passing policies allowing, defining, and clarifying when rainwater harvesting can occur.[iii] While rainwater harvesting systems can range in size, complexity, and costs, all systems have basics components: a catchment surface, conveyance system, storage, distribution, and treatment.[iv] This snapshot looks at four states with differing rainwater harvesting policies and incentives.

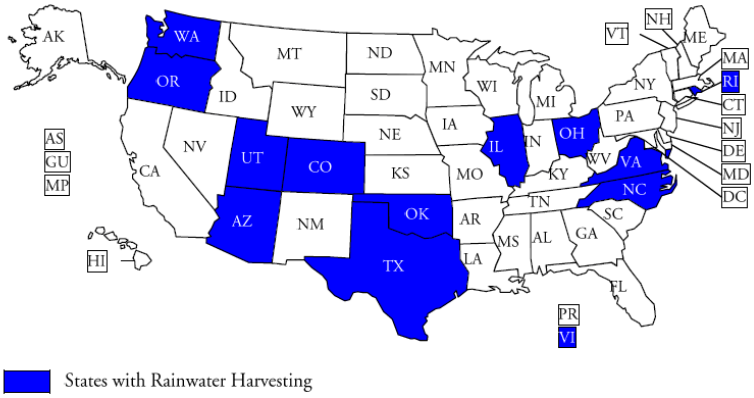

Figure 1: States with Rainwater Harvesting Policies or Legislation

Colorado

According to the National Conference of State Legislatures, "Colorado has "some of the nation's strictest rainwater harvest[ing] laws, essentially prohibiting the practice."[v] Historic water law in Colorado stated that all precipitation "belonged to existing water-rights owners, and that rain needed to flow to join its rightful water drainage."[vi] However, a study conducted by the Colorado Water Conservation Board and Douglas County found that only 3 percent of rain actually reached a stream or the ground and that, "with rainwater and snowmelt harvesting, outdoor water demand could be reduced by approximately 65% with moderate conservation and approximately 88% with water wise conservation…as defined in the study."[vii] The study's ultimate finding was that rainwater and snowmelt harvesting, combined with active water management techniques, could help the state reduce overall water demand without infringing on vested water rights.

Based on the findings from this study, state legislators came together to enact two pieces of legislation that loosened rainwater harvesting restrictions. The first, Senate Bill 09-80, allows certain types of well owners to collect and use rainwater. More specifically, the law allows precipitation to be collected from a roof up to 3,000 square feet of a home if the home ***is not*** connected to a domestic water system. Eligible homeowners must also have an exempt well permit or qualify for such a permit and water collected can only be used for the same purposes as stated on their exempt well permit[viii] (e.g. if a well permit is restricted to in-house use only, collected rainwater can only be used for in-house purposes and not for things such as irrigation). The second piece of legislation, House Bill 09-1129, authorizes a 10-year, 10-site pilot project for the collection

of rainwater on new residential or mix-use developments for non-potable uses.[ix] The purpose of the program is to ultimately understand how rainwater harvesting effects ground water flow, evaluate collection designs, and determine how to potentially scale-up rainwater harvesting while still protecting water rights.[x,xi] The 10 pilot sites are required to create a substitute water supply plan that must be approved annually by the State Engineer. These two pieces of legislation are ground-breaking for the state and represent initial steps in Colorado's effort to evaluate the value rainwater harvesting could have for reducing water demand throughout the state.

North Carolina

In 2007, the North Carolina legislature directed the State's Environmental Review Commission to "study the allocation of surface water resources and their availability and maintenance in the State."[xii] The results from this study found certain areas of the state did not have adequate water supply to handle expected population growth over the coming decades. With this finding, the study recommended that the state create an expedited regulatory review specifically for the construction of new water supply reservoirs.[xiii] These findings led the North Carolina legislature to pass House Bill 609 in 2011 which "directed the Department of Environment and Natural Resources to provide statewide outreach and technical assistance regarding water efficiency, which shall include the development of best management practices for community water efficiency and conservation."[xivxv]

Figure 2: Rain barrel (Treehugger.com)

One of the elements of HB 609 is the provision of education and outreach around water reuse practices that include both rainwater and grey water harvesting and use. Additionally, HB 609 includes language that promotes state and local collaboration on water supply development with a particular focus on "water sources [that] will provide for the long-term water supply needs documented in the local water supply plan and meet all of the following criteria…make maximum, practical beneficial use of reclaimed wastewater and stormwater."[xvi] A key part of this language is the mandating of local water supply plans. Further to this point, HB 609 specifies that local communities shall develop plans that provide explicit details on things such as future water conservation and water reuse programs, plans for a long-term per capita potable water demand reduction program, and details on how the community will respond to drought and other water shortage emergencies.[xvii]

Texas

The state of Texas may well be the nation's leader when it comes to rainwater harvesting. In 2011, the Texas legislature passed House Bill 3391, a "far-reaching and comprehensive piece of legislation regarding rainwater harvesting."[xviii] HB 3391 includes a number of cutting edge provisions, including[xix]:

- Allows rainwater that has been harvested to be used for potable purposes as long as all safe drinking water criteria are met
- Allows financial institutions to make loans to developments that solely rely on harvested

rainwater as their water supply

- Encourages each municipality and county to promote rainwater harvesting at residential, commercial, and industrial facilities through incentives such as the provision of discounts on rain barrels or rebates for water storage facilities
- Requires on-site reclaimed system technologies, including rainwater harvesting…for potable and nonpotable indoor use and landscape watering be incorporated into the design and construction of each new state building with a roof…at least 10,000 square feet, any other new state building for which the incorporation of such system is feasible, and at each new state building with a roof measuring at least 50,000 square feet and located in an area of the state in which the average annual rainfall is at least 20 inches
- Encourages each school district to implement rainwater harvesting at its facilities

In addition, Texas Health and Safety Code §341.042 states that homeowners associations cannot ban or restrict property owners from installing rain barrels or a rainwater harvesting system.[xx] This Code also outlines health and safety standards for the treatment and collection of harvested rainwater.[xxi] The state also offers a sales tax exemption on the purchase of rainwater harvesting equipment.[xxii]

Utah

The state of Utah, via Utah Code Annotated 73.3.1.5, allows for the "direct capture and storage of rainwater on land owned or leased by the person responsible for the collection."[xxiii] Individuals are allowed to collect and store precipitation, without registering, if they have two or less covered storage containers, as long as neither storage container has greater than 100-gallon capacity. Alternatively, individuals can register with the State and receive permission to have a single or multiple storage containers capable of holding, in total, less than or equal to 2,500 gallons. Registration with the state can all be done online and the Code mandates that captured rainwater must be used on the parcel on which the water was captured and stored.[xxiv]

Figure 3: Water Storage Container (from watercache.com)

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Conclusion

The four states analyzed in this snapshot all take slightly different approaches to rainwater harvesting. In Colorado, rainwater harvesting has long been an illegal activity, but new legislation is allowing the state to pilot different rainwater harvesting techniques in an attempt to further study their impact on groundwater and vested water rights. In contrast, Texas has one of the nation's most progressive approaches to rainwater harvesting, with strong legislation, an array of financial incentives, and policies mandating rainwater harvesting on certain government owned facilities. Utah's rainwater harvesting legislation provides a good deal of flexibility, allowing residential consumers the opportunity to find the rainwater harvesting technique that is most appropriate to their needs. In North Carolina, rainwater harvesting legislation is motivated primarily by population growth but includes laudable efforts to coordinate state and local government planning and action. The requirement of local water supply plans that include projected future water needs is forward looking and provides a great opportunity for North Carolinian communities to consider how issues

such as climate change could affect their supply and the quality of potable and non-potable water. Overall, these four states represent different approaches to how rainwater harvesting can be promoted, incentivized, and applied in states and local communities throughout the country.

For More Information

- Beaujon, David. 2009. Rainwater Harvesting in Colorado: An Issue Brief. Colorado Legislative Staff Council.
- General Assembly of North Carolina Session 2011: Session Law 2011-374-House Bill 609: http://www.ncleg.net/Sessions/2011/Bills/House/PDF/H609v6.pdf
- National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
- Texas House Bill 3391: http://www.capitol.state.tx.us/tlodocs/82R/billtext/html/HB03391F.htm
- Texas Health and Safety Code 341.042: http://codes.lp.findlaw.com/txstatutes/HS/5/A/341/C/341.042
- Utah Code Annotated 73-3-1.5: http://le.utah.gov/%7Ecode/TITLE73/htm/73_03_000105.htm

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[i] NSF International. Drinking Water Fact Sheet: Rainwater Collection Systems.
[ii] Texas A&M Rainwater Basics Factsheet: http://rainwaterharvesting.tamu.edu/rainwater-basics/
[iii] National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
[iv] Texas A&M Rainwater Basics Factsheet: http://rainwaterharvesting.tamu.edu/rainwater-basics/
[v] National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
[vi] ibid
[vii] Colorado Water Conservation Board. 2011. Authorization of Pilot Projects for the Beneficial Use of Captured Precipitation Use of Captured Precipitation in New Real Estate Developments: Criteria and Guidelines for the "Rainwater Harvesting" Pilot Project Program.
[viii] Beaujon, David. 2009. Rainwater Harvesting in Colorado: An Issue Brief. Colorado Legislative Staff Council.
[ix] Colorado Water Conservation Board. 2011. Authorization of Pilot Projects for the Beneficial Use of Captured Precipitation Use of Captured Precipitation in New Real Estate Developments: Criteria and Guidelines for the "Rainwater Harvesting" Pilot Project Program.
[x] ibid
[xi] Beaujon, David. 2009. Rainwater Harvesting in Colorado: An Issue Brief. Colorado Legislative Staff Council.
[xii] General Assembly of North Carolina Session 2011: Session Law 2011-374-House Bill 609: http://www.ncleg.net/Sessions/2011/Bills/House/PDF/H609v6.pdf
[xiii] ibid
[xiv] ibid
[xv] National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
[xvi] General Assembly of North Carolina Session 2011: Session Law 2011-374-House Bill 609: http://www.ncleg.net/Sessions/2011/Bills/House/PDF/H609v6.pdf
[xvii] ibid
[xviii] National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
[xix] Texas House Bill 3391: http://www.capitol.state.tx.us/tlodocs/82R/billtext/html/HB03391F.htm
[xx] Texas Health and Safety Code 341.042: http://codes.lp.findlaw.com/txstatutes/HS/5/A/341/C/341.042
[xxi] ibid
[xxii] Texas Tax Code 151.355: http://law.onecle.com/texas/tax/151.355.00.html

[xxiii] National Conference of State Legislatures. Issue Brief: State Rainwater Harvesting Statues, Programs, and Legislation. http://www.ncsl.org/issues-research/env-res/rainwater-harvesting.aspx
[xxiv] Utah Code Annotated 73-3-1.5: http://le.utah.gov/%7Ecode/TITLE73/htm/73_03_000105.htm

Climate Funding Opportunities[i]

NOTE: These opportunities represent a snapshot of what is currently available (as of January 9, 2013). Future grant opportunities are contingent upon funding appropriations.

National Scale Opportunities

National Science Foundation
Science, Engineering, and Education for Sustainability (NSF-wide investment area)
The National Science Foundation's Science, Engineering, and Education for Sustainability (SEES) program addresses the challenge of building a sustainable future through promoting research and education. SEES is expected to extend into FY15 with continuing research efforts to include global community sustainability; sustainable energy; modeling; vulnerability, resilience, and sensitivity to regional change; and public engagement. Since SEES is a NSF-wide investment area rather than an individual program, applicants are encouraged to check for updates to the collection of new and existing activities. Programs of interest include the Climate Change Education Partnership Program (CCEP), the Ocean Acidification (OA) program, the Coastal SEES program, and the Water Sustainability and Climate (WSC) program.
Eligibility: Unrestricted
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504707

National Science Foundation
Coastal Science, Engineering, and Education for Sustainability (Coastal SEES)
NSF's Coastal SEES program focuses on the sustainability of coastal systems, which include barrier islands, mudflats, beaches, estuaries, cities, towns, recreational areas, maritime facilities, continental seas and shelves, and the overlying atmosphere. The Coastal SEES program seeks proposals that create interdisciplinary teams of researchers to address two funding tracks: 1) incubator research proposals, which bring together new interdisciplinary teams of researchers to synthesize existing data sets; collect new data; conduct modeling experiments; test new integrative approaches; and test/identify gaps in knowledge and methods, and 2) research proposals, which support major new integrated coastal systems research, including theoretical, field, laboratory, and modeling activities. Project proposals should be in the range of $200K - $600K over two years for incubator research proposals (Funding Track 1), and up to $3 million over 5 years for research proposals (Funding Track 2). NSF anticipates awarding up to 10 Funding Track 1 proposals and up to 5 Funding Track 2 proposals.
Eligibility: U.S. academic institutions (with NSF supported research areas), non-profit (non-academic) organizations (such as independent museums, observatories, research laboratories, or professional societies).
Application deadline is **5pm proposer's local time on January 17, 2013**
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504816&WT.mc_id=USNSF_39&WT.mc_ev=click

Department of Commerce: National Oceanic and Atmospheric Administration (NOAA)
FY 2012-2013 Broad Agency Announcement (BAA)
Funding Opportunity Number: NOAA-NFA-NFAPO-2012-2003133
The purpose of this notice is to request applications for projects associated with NOAA's strategic plan and mission goals. The funded research, projects, or sponsorships must address one or more of the four mission

goals in NOAA's strategic plan (Climate adaptation and mitigation and responding to climate and its impacts; Weather-Ready nation – society is prepared for and responds to weather-related events; marine fisheries, habitats, and biodiversity sustained within healthy and productive ecosystems; and resilient coastal communities and economies – environmentally and economically sustainable). Funding appropriation is dependent on FY 2012, 2013, and 2014 appropriations.
Eligibility: Institutions of higher learning, non-profit organizations, commercial organizations, international or foreign organizations or governments, individuals, state, local and tribal governments. (Universities with a NOAA joint or Cooperative Institute (CI) should submit an application through the CI).
Application deadline is **11:59pm Eastern Daylight Time on September 30, 2013**
http://www07.grants.gov/search/search.do;jsessionid=YcKWQtLVs267vw0367J0lNST1SSb2dh31tsqc76SPpVGJhL0yvhz!-861966415?oppId=132454&mode=VIEW

Department of Commerce: National Oceanic and Atmospheric Administration (NOAA)
Environmental Literacy Grants Program
NOAA plans to release a new funding opportunity in January 2013 through the Environmental Literacy Grants (ELG) Program. The goal of the funding opportunity is to build the capacity of educators (formal and informal) to use NOAA data and tools in communicating information about global environmental change to K-12 students and the general public. Applicants may request up to $1 million for a 2 to 5 year project period.
Eligibility: Two main priority categories of eligibility: 1) collaborative teams of two or more U.S. institutions, or 2) collaborative teams exclusively composed of two or more non-profit U.S. aquariums.
Application deadline is **anticipated in early March 2013** with funding decisions made by September 30, 2013.
Since this funding opportunity has yet to be released, check the ELG website for more information. Through the website, you can also join the ELG mailing list to receive notification when the opportunity opens.
http://www.oesd.noaa.gov/grants/elg.html

Department of Commerce: National Oceanic and Atmospheric Administration (NOAA)
Climate Program Office (CPO)
NOAA's Climate Program Office manages the competitive research program in which NOAA funds high-priority climate science to advance understanding of Earth's climate system (including atmospheric, oceanic, land, snow, and ice components). Typically, the program annually supports region- and nation-wide research that contributes to knowledge about how climate variability affects our health, economy, and well-being. In FY13, the Climate Program Office accepted individual applications for seven (7) competitions through the following programs: 1) Earth System Science; 2) Modeling, Analysis, Predictions, and Projections; and 3) Climate and Societal Interactions. Projects ranged from $50K to $200K in awards per year.
Eligibility: In the past, institutions of higher education; other non-profits; commercial organizations; international organizations; and state, local, and Indian tribal governments have been eligible for these opportunities. Federal agencies are **not** eligible.
While the FY13 application deadlines have past, check with the Climate Program Office website for updates on future funding opportunities.
http://www.cpo.noaa.gov/opportunities/index.html

Department of Commerce: National Oceanic and Atmospheric Administration (NOAA)
Climate Program Office – Regional Integrated Sciences and Assessments Program
Funding Opportunity Number: NOAA-OAR-CPO-2013-2003599
The Climate Program Office's Regional Integrated Sciences and Assessments (RISA) program supports research teams conducting innovative, user-inspired, regionally relevant research that can inform resource management and policy decisions. The Climate Program office funds eleven (11) different RISA teams across the United States and Pacific Islands. In FY13, NOAA will accept applications for two competitions organized around RISA program components: 1) 5-year RISA awards, and 2) small grants for RISA teams and partners to encourage expansion of regional climate preparation capacity. Through competition 1, NOAA is soliciting proposals to fund one RISA team in the South Central US (portions of OK, TX, AR, LA, MS, and TN), and possibly another RISA team in the Midwest (portions of IA, MO, IL, IN, and OH). Through competition 2, NOAA is soliciting proposals to encourage expansion of regional climate preparation through initiating or enhancing research partnerships. The priorities for competition 2 include: 1) Preparing for floods in urban and coastal communities, 2) Scenario planning and management planning processes, 3) Drought monitoring and prediction products to support decision making, and 4) Climate impacts on marine and Great Lakes ecosystems. NOAA is anticipating awards for competition 1 to be at the funding level of approximately $700K per year (for 5 years). Anticipated awards for Competition 2 will range between $75K and $200K per year (for 1-2 year projects).
Eligibility: Competition 1: Institutions of higher learning, nonprofits; commercial organizations; international organizations; state, local, and tribal governments. Competition 2: The lead institution must be one of the institutions included in the existing eleven RISAs.
Letters of Intent for all competitions should be received by **February 5, 2013, at 5pm Eastern time**. The deadline for full applications is **April 8, 2013**.
http://www.grants.gov/search/search.do;jsessionid=LQ36QtQW3r326Jgw6ZSP8b2By7lpJszm8nR2GnqWJRhndSzNykQV!-1413871233?oppId=213994&mode=VIEW

U.S. Army Corps of Engineers
Estuary Habitat Restoration Program
Funding Opportunity Number: USACE-EHR-001
The U.S. Army Corps of Engineers is soliciting proposals for estuary habitat restoration projects. These restoration projects must provide ecosystem benefits, have scientific merit, be technically feasible, be cost-effective, and be able to adapt to the impacts associated with climate change. Eligible restoration activities include removing dams or berms; reintroduction of native species; improvement or reestablishment of fish passage; improvement of estuarine wetland tidal exchange; reestablishment of historic hydrology; appropriate reef, habitat, or substrate creation; and controlling invasive species by altering conditions or improving ecosystem resiliency. The Estuary Habitat Restoration Program anticipates $3.5 million will be available in FY13. Proposals must be between $200K and $1 million, and construction must be completed within 24 months of the start date (August 1, 2013 at the earliest). Applicant must provide the real estate interests necessary for implementation, long term operation, maintenance, repair, and replacement of the project. In some cases, an easement may be sufficient.
Eligibility: Institutions of higher learning; U.S. Territory, state, local, and tribal governments; non-governmental (specifically non-profit) organizations.
Application deadline **is 11:59pm EDT on February 8, 2013** via Grants.gov.
http://www07.grants.gov/search/search.do?&mode=VIEW&oppId=209633

U.S. Geological Survey

DOI Climate Science Centers – FY13 and FY14 Funding Opportunity

In FY13, six (6) of the eight USGS Climate Science Centers (CSCs) will be accepting statements of intent for project work initiated this year. These six CSCs include the Southeast CSC, the North Central CSC, the South Central CSC, the Southwest CSC, the Northeast CSC, and the Pacific Islands CSC. Each of the six CSCs outlines specific funding amounts, project durations, and priority scientific topics that they will be supporting through this funding opportunity. While these priorities are CSC specific, the eligibility and submission deadline information is uniform across all of the CSCs for this funding opportunity. The broad topic headings under which individual CSCs have crafted specific priorities include: 1) collaboration, communication, and translation of science to managers and the public; 2) assessment of the state of knowledge about climate and land use change impacts to DOI natural and cultural resources; 3) performance of vulnerability assessments; 4) understanding social-ecological impacts of climate and land use change; and 5) understanding the interactions between climate and the physical, biological, and chemical forces influencing ecosystem function and structure. In total, approximately $5.7 million - $6 million may be available for all of the CSCs in FY13 and FY14.

Eligibility: 1) Institutions that are DOI Climate Science Center host institutions or members of a CSC consortium; or 2) USGS centers, field stations, and laboratories. Each proposal must have a PI from one of the two eligible entities. Parties from other organizations are encouraged to partner with a PI from one of these two groups.

The deadline to submit a statement of interest is **February 1, 2013 at Midnight Mountain Standard Time**. Individual CSCs will be holding informational webinars throughout the next month (e.g. January 15th and 17th for the North Central CSC and January 16th for the Alaska CSC). The full funding opportunity document, which includes the science priorities and funding information for each CSC, is available below.

https://nccwsc.usgs.gov/ResearchFunds

U.S. Department of Transportation – Federal Highway Administration

Climate Change Vulnerability Assessment Pilots

The Federal Highway Administration (FHWA) is soliciting projects from State Departments of Transportation (DOTs), Metropolitan Planning Organizations (MPOs), Federal Land Management Agencies (FLMA), and Tribal Governments that would address two main focus areas. These focus areas include: 1) assessments of transportation vulnerability to climate change and extreme weather events, and 2) options for improving resiliency of transportation facilities or systems to climate change and/or extreme weather events. Upon approval, the pilot assessments must be completed within 18 months. Focus area one (1) includes analyses of climate change impacts, as well as extreme weather events, such as drought, heat waves, heavy precipitation, wildfires, hurricanes, and sea level rise. These analyses include conducting systems-level vulnerability assessments, expanding geographic scope of existing vulnerability assessments, or conducting more refined/detailed vulnerability assessments. The type of analyses included in focus area two (2) include evaluating options to reduce risk to specific assets (e.g. a specific bridge or roadway), converting vulnerability information into economic information (costs of inaction relative to costs of risk reduction strategies), and incorporating climate change and extreme event considerations into agency practices. The FHWA anticipates selecting 8 – 15 pilot projects for funding at approximately $75K to $300K each. A 100% non-federal match is required.

Eligibility: A MPO, State DOT, FLMA, or a Tribal Government is required to be the project lead. Partnerships are encouraged.

Project descriptions must be submitted to the FHWA Division Office by **January 22nd, 2013**.

http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/vulnerability_assessment_pilots/2013-2014_solicitation/solicitation/index.cfm

The Wildlife Conservation Society's Climate Adaptation Fund

In 2012, the Wildlife Conservation Society (WCS) provided 1-2 year grants ranging from $50K to $250K. The grants required a 1:1 match with a maximum of 50% of match funding from in-kind sources. WCS funds on-the-ground projects that focus on implementing conservation actions for climate adaptation at a landscape scale. WCS anticipates releasing the 2013 Request for Proposals by **mid-February**. Interested applicants should check with the program's website for future updates on grant opportunities. The link below offers information regarding the 2012 grant awards, and includes a link to the 2012 RFP.

Eligibility: U.S.-based (all 50 states and 6 territories) non-profit organizations with approved IRS 501(c)(3) status. Public agencies, tribal governments, and universities may partner with eligible non-profits to submit proposals

http://www.wcsnorthamerica.org/ClimateAdaptationFund/tabid/4813/Default.aspx

The Doris Duke Charitable Foundation

The foundation's Environmental Program strives to meet four main strategies through grant awards. These strategies include: 1) enabling strategic wildlife habitat conservation in an era of climate change; 2) reducing impacts on the landscape from increased energy development and energy demand; 3) encouraging land stewardship and sustainability in the Tri-state area; and 4) helping to build a clean-energy economy. Through this program, the foundation is anticipating funding awards in 2012 through a series of invited proposals. This foundation offers support through the Wildlife Conservation Society's Climate Adaptation Fund (described above).

Funding is limited to the U.S. Also, the foundation does not support green building projects (construction capital) or projects focusing on marine environments, toxics remediation, litigation, filmmaking, individual research, or scholarships

http://www.ddcf.org/Programs/Environment/Grant-making-Process/

The Rockefeller Foundation

One of the foundation's current initiatives is developing climate change resilience in the areas of Asian urban environments, African agriculture, and US policy. As the foundation is a "proactive grantmaker," it does not accept proposals without staff invitation. The grant seeker must first submit a "funding inquiry form."

Eligibility: The foundation partners with governments, foundations, donors, NGOs, and private sector groups

http://www.rockefellerfoundation.org/our-work/current-work/developing-climate-change-resilience/grants-grantees

The Rockefeller Family Foundation

This foundation focuses on public education of the risks of global warming, conservation of natural resources, protection of health as affected by the environment, meaning implementation of environmental laws, and public participation in national environmental policy debates. Grant applicants must submit a letter of inquiry online. If accepted, the applicant will be invited to submit a full proposal for evaluation. Grants are usually in the range of $25,000 – $30,000 and are normally made to the same organization for no more than two consecutive years.

Eligibility: United States non-profit organizations engaged in activities of national significance

Program information: http://www.rffund.org/grants/environment

The Kresge Foundation

This foundation's Environment program invests in projects within the U.S., as well as selects initiatives in Canada. Projects must revolve around the following strategies: (1) building the field of climate change adaptation, (2) fostering development of place-based adaptation strategies, and (3) informing and promoting climate-wise policies and practices. The foundation primarily accepts grants by invitation; however, preliminary applications can be submitted that includes background information about the proposal. If program staff determine that the project has potential for funding, the grant seeker will be asked to provide additional information.

Eligibility: U.S. based 501(c)(3) organizations (and Canadian equivalents), government entities

http://www.kresge.org/programs/environment/adaptation-climate-change

Surdna Foundation

This foundation invests in projects that support their program areas of Sustainable Environments, Strong Local Economies, Thriving Cultures, Community Revitalization, and Effective Citizenry. An example of a previous grant award is $200K to the American Planning Association in FY2008 to aid U.S. planners with initiatives to integrate energy sustainability and climate change into contemporary planning practices. Another example is $200K to the Coalition to Restore Coastal Louisiana in FY2010 to increase/strengthen local and national collaboration for the benefit of Louisiana coastal protection. Organizations are eligible for a max of three consecutive years of funding.

Eligibility: U.S. based non-profit organizations

There are no application deadlines. Grants are assessed three times a year (February, May, and September), and must be submitted three to four months prior to staff review.

http://www.surdna.org/grants/grants-overview.html

FAQ web page: http://www.surdna.org/grants/eligibility-a-faqs.html

Alfred P. Sloan Foundation

This foundation offers grant assistance in 6 major program areas. Two such areas are the "Public Understanding of Science," and the "Basic Research" areas. Through these programs, the foundation offers grants for high-quality, original STEM (science, technology, engineering, and math) research that benefits the scientific community, as well as increases the public understanding of relevant and complex scientific issues. The Public Understanding of Science program promotes using books, television, radio, film, theatre, and other media in order to engage the public in science and technology. A grant applicant must first submit a letter of inquiry that outlines the idea of the grant, since the foundation does not accept unsolicited grant proposals. If accepted, the applicant will receive notice to submit a full proposal for evaluation.

Eligibility: The foundation does **not** make grants to individuals, for-profit institutions, endowments, fundraising drives, political campaigns, or lobbying efforts for/against legislation. Institutions of higher learning and government entities have received project funding in the past.

There are no application deadlines. The foundation makes grants year-round.

Grant process information: http://www.sloan.org/apply-for-grants/

Regional Scale Opportunities

Department of the Interior – Landscape Conservation Cooperatives (LCCs)
LCCs are a network of partnerships working for the sustainability of America's land, water, wildlife, and cultural resources. Partnerships include federal, state, and local governments, tribes, universities, NGOs, landowners, as well as other stakeholders. These cooperatives (21 in total, representing different geographic areas of the country) build upon existing science and conservation efforts that preserve water and land resources, as well as cultural partnerships. Periodically, LCCs offer grants that support their core functions.
http://www.fws.gov/science/SHC/lcc.html

Department of the Interior: Bureau of Reclamation
WaterSMART: Water and Energy Efficiency Grants for 2013
Funding Opportunity Number: R13SF80003
This funding opportunity invites applicants to leverage resources through a cost-sharing program with the Bureau of Reclamation for large projects that will improve water/energy efficiency in Western states. Projects should address any of the following categories: 1) water and energy efficiency, 2) endangered species/habitats, 3) facilitation of water markets, 4) increased use of renewable energy, and 5) other activities addressing climate-related impacts on water. The award ceiling is $1.5M for 3yr, phased projects, and $300K for smaller, on-the-ground projects.
Eligibility: States, Indian tribes, irrigation districts, water districts, other organizations with water or power authority. Federal government entities, institutions of higher learning, and individuals are **NOT** eligible. Projects must serve western US. States (AZ, CA, CO, ID, KS, MT, NE, NV, NM, ND, OK, OR, SD, TX, UT, WA, WY, and U.S. territories)
http://www.grants.gov/search/search.do;jsessionid=S44CQtGJdKlkq1kkMkqhh7Mvt875HhlCjR2TBn2bvsNXfRvnpWhG!-1413871233?oppId=205114&mode=VIEW

Gaylord and Dorothy Donnelley Foundation
This foundation offers grant opportunities to advance work in land conservation and artistic vitality in the 13-county Chicago Region and the 9-county Lowcountry of South Carolina. Eligible counties are shown on the maps regional maps link below. Their land conservation efforts focus on 1) preserving, restoring, and protecting strategic lands that contribute to regional ecosystem health; 2) building and supporting constituencies that value land stewardship by sustaining appropriate land uses (e.g. limiting sprawl, fostering regional land use planning); and 3) engaging young people with the natural world. If applicants believe that their project fits the foundation's interests, they must submit an application (rather than a formal proposal or letter of inquiry). If unsure, contact the organization's Grant Manager
Eligibility: The foundation does not typically make grants to public entities (therefore, unsolicited proposals are not accepted). Public entities should contact the foundation to discuss a project. Also, non-profit "operating foundation" groups (Type III organization under 509(a)3) are not eligible.
Application deadline is **12am Eastern Time on August 3, 2012** (for review in November 2012).
Regional maps: http://gddf.org/about/
Grant information: http://gddf.org/grants/funding-guidelines

Sustain our Great Lakes
2013 Request for Proposals
Sustain our Great Lakes is a public/private partnership between Arcelor Mittal, the National Fish and Wildlife Foundation, and several US federal entities (such as the FWS, NOAA, EPA, NRCS, and the Forest Service). This organization offers grant programs to promote both in-the-water and on-the-ground restoration and enhancement projects. In 2013, funding will be awarded in three categories: habitat restoration, delisting of beneficial use impairments within Great Lakes Areas of Concern, and private landowner technical assistance. Proposals must address at least one of these categories; however, proposals do not need to address multiple categories to be competitive. Roughly $2-3.5 million will be available for the habitat restoration category, about $3-4.5 million will be available for the beneficial use impairment category, and about $500K-$700K will be available for the technical assistance category. Grant awards are expected to range from $25K to $1.5 million. Matching contributions are strongly encouraged.
Eligibility: Nonprofit 501(c) organizations; local, state, Tribal, and provincial governments; and education institutions. Federal agencies, individuals, and for-profit organizations are **not** eligible.
Application deadline is **February 14, 2013 for pre-proposals**. A webinar describing the funding opportunity and offering guidance on the application process will be held on **January 15, 2013 at 11am Eastern Time**. More information on the funding opportunity and informational webinar can be found below.
http://www.sustainourgreatlakes.org/MediaResources/Webinars.aspx

Lake Erie Protection Fund
The Lake Erie Protection Fund provides small grants, up to $15K, for projects which will provide a direct benefit to Lake Erie or its tributary watersheds in Ohio. This grant program requires at least a 25% match in funds. Projects must assist with the implementation of the Lake Erie Protection and Restoration Plan (2008), leading to better management decisions for environmental and economic development.
Eligibility: Nonprofit organizations (501(c)3); federal, states, and local governments; colleges and universities; local community groups
Applications are due by **January 18, 2013** for consideration at the March 20th commission meeting.
http://lakeerie.ohio.gov/LakeErieProtectionFund.aspx

Freshwater Future - Climate Grant Program
The grant program through Healing Our Waters (HOW) offers financial support to engage communities in preparing for and responding to the impacts of climate change. The Climate Grant Program provides awards ranging between $500 and $5,000. These awards are meant to encourage local communities to actively incorporate climate change into local decision-making. Projects must identify how they make communities more resilient to climate change impacts, as well as how the information will be communicated to local residents and incorporated into local decision-making. Applicants must also attend a webinar and Climate Symposium in order to receive funds. Information about the Climate Grant Program, as well as the webinar and symposium is available through the link below.
Eligibility: Any grassroots initiative (an organization with limited funds, which relies on volunteers for the majority of their work) working to protect Great Lakes waters. Applicants without a 501(c)(3) status must have a sponsoring organization with 501(c)(3) status or a sponsoring registered charity. Governmental entities are NOT eligible.
The application deadline is **June 3, 2013**. The full RFP will soon be posted on Freshwater Future's website, so interested applicants should check the site regularly.
http://www.freshwaterfuture.org/grant-programs/climate-grant-program.html

The Great Lakes Fishery Trust

The Great Lakes Fishery Trust offers grants in broad investment areas relating to Great Lakes fishery health and access. These investment areas include 1) Access to the Great Lakes Fishery; 2) Ecosystem Health and Sustainable Fish Populations; 3) Great Lakes Stewardship; and 4) Special Projects.

Eligibility: Organizations with a 501(c)(3) status, as well as educational and governmental (including tribal) organizations.

Important Dates: The Ecosystem Health and Sustainable Fish Populations ecology and biology research proposals are due **January 22, 2013**; and the Ecosystem Health and Sustainable Fish Populations Habitat protection and restoration proposals are due **March 6, 2013** (application will be available in January 2013)
http://www.glft.org/grants/apply-now

The Joyce Foundation

This foundation supports funding opportunities in Great Lakes protection and restoration. The foundation supports opportunities in the following areas: on-the-ground restoration work that can be monitored, documented, and replicated; efforts to drive policy change by connecting policy advocates with decision makers and nontraditional stakeholders; Efforts to advocate for collectively developed policies at the federal, state, and local levels. Submitted proposals must address one of four areas. 1) Reduce polluted, non-point source runoff from both agriculture and built areas. 2) Protect and restore critical habitats such as wetlands through improved hydrology and other means. 3) Improve coastal health through increased use of green infrastructure and financing conventional infrastructure. 4) Implement the Great Lakes-St. Lawrence River Basin Water Resources Compact. The foundation will also consider proposals relating to implementation of local, state, and regional climate and energy plans.

Eligibility: Non-profit organizations

Application process: http://www.joycefdn.org/content.cfm/application-process

Program information: http://www.joycefdn.org/content.cfm/guidelines-3

The Fred A. and Barbara M. Erb Family Foundation

This foundation supports funding opportunities in the Detroit, MI area (Wayne, Oakland, and Macomb counties) that work to improve water quality in the watersheds affecting Metro Detroit and Bayfield Ontario. The foundation supports efforts to restore ecological integrity in these watersheds, by emphasizing local implementation of regional Great Lakes strategies for reducing non-point source pollution and promoting water conservation and efficiency. The foundation considers multi-year projects where appropriate, but will not provide support for loans, grants to support religious activities, capital projects, research (unless solicited by the Foundation), fundraising events, or conferences.

Eligibility: a non-discriminatory 501(c)(3) organization with revenues exceeding $100K in the previous year. The foundation does NOT provide support to individuals or units of government

Application process: http://www.erbff.org/application-process

Gulf of Mexico Foundation – Community-based Restoration Partnership

This foundation offers a grants competition through its Community-based Restoration Partnership. This partnership, established in 2001 between the Gulf of Mexico Foundation, NOAA, and the EPA, has led to 76 restoration projects in the Gulf of Mexico and Caribbean Basin. In 2011, the foundation awarded approximately $500K to projects in the Gulf States and U.S. Caribbean Territories. Projects typically fell in the range of $50K - $100K. All participants are required to provide a 1:1 cash or in-kind match of the grant amount. Matching funds cannot be federal dollars. The Foundation also awarded approximately $250K in 2012. Interested applicants should check this website for future grant opportunities
http://www.gulfmex.org/conservation-restoration/gulf-conservation-restoration-and-preservation/

Bullitt Foundation

The mission of the Bullitt Foundation is to protect the natural environment through promotion of responsible human activities and sustainable development in the Pacific Northeast. The foundations program areas include Ecosystem Services; Energy, Industry, and Technology; Urban Ecology; and Leadership and Civic Engagement. The foundation currently focuses grant making on the following strategies: 1) Fostering environmental coalitions and furthering collaboration 2) Encouraging strong partnerships between grantees and local groups in the private, public, and tribal sectors to achieve broad consensus on issues of public interest 3) Supporting state and regional offices of national environmental organizations whose resources can lend valuable expertise to make sure that local efforts are coordinated with regional and national efforts 4) Supporting credible research, monitoring, and analysis to ensure advocacy campaigns are grounded in the best available science 5) Developing and promoting appropriate messages for public education. Previously funding projects include creation of a climate action plan for Montana (2006-2008). Grant applicants must submit a letter of inquiry online. If accepted, the applicant will be invited to submit a full proposal for evaluation.

Eligibility: Non-profit organizations in the Pacific Northwest (Washington, Oregon, Idaho, British Colombia, western Montana, and Coastal Alaska from the Cook Inlet to the Canadian border)

Grant making process: http://bullitt.org/grantmaking

The Russell Family Foundation

Environmental Sustainability Program

The Russell Family Foundation's Environmental Sustainability Program is aims to protect and restore Puget Sound by supporting three main focus areas: 1) Polluted Runoff and Green Infrastructure, 2) Environmental Education, and 3) Restoration and Protection of the Puyallup Watershed. Through these focus areas, the Foundation hopes to improve behaviors among Puget Sound residents to reduce polluted runoff; encourage and test green infrastructure innovations; improve local, state, and federal codes; increase environmental literacy; and promote effective management of land use and water quality of specific watersheds (such as the Puyallup). In 2011, the Environmental Sustainability Program supported 42 organizations, with awards averaging $48K each.

Eligibility: Non-profit organizations (501(c)(3)) organizations. Non-profit entities such as public schools and school districts may also apply.

A Letter of Inquiry (LOI) must first be submitted and approved before a full proposal will be accepted. The deadline to submit an LOI for this program is **January 28, 2013 at 11:59pm.**

http://trff.org/environmental_sustainability.aspx

International Opportunities

Centre for Indigenous Environmental Resources
Planning Adaptations to Climate Change
The Centre for Indigenous Environmental Resources (CIER) works with first nations to address threats to food security, fuel/essential goods security, health and property (from forest fires, flooding, and storm surges), and drinking water quality. CIER works with first nations involved in community planning to minimize their human health risks due to climate change. In the past, CIER has worked with Manitoba and Saskatchewan first nations to develop user-friendly climate change planning tools for Canadian First Nations. Other past projects have included climate adaptation workshops and other adaptation studies. Any interested Canadian First Nation should contact CIER through the link below.
http://www.cier.ca/taking-action-on-climate-change/partnership-opportunities.aspx?id=304

Environment Canada
Green Source Funding Database
Environment Canada hosts an online database of funding opportunities for organizations undertaking environmental projects. These opportunities include funding, in-kind donations, and labor costs contributions. Through this database, Canadian communities and organizations can identify funding opportunities, which are organized by keyword, issue, geography, as well as application deadline. The database contains opportunities for municipalities, academic institutions, non-profit organizations, Aboriginal organizations, community groups, and individuals.
http://www.ec.gc.ca/financement-funding/default.asp?lang=En&n=768DAFB1-1

Environment Canada
EcoAction Community Funding Program
The EcoAction Community Funding Program is supported by Environment Canada, and supports community groups that are completing projects that have measureable, positive impacts on the environment. The program supports project work addressing four main focus areas: 1) Clean air (reducing emissions), 2) clean water (improving water quality), 3) climate change (reducing emissions, as well as addressing impacts of climate change), and 4) nature (reducing biodiversity loss). Awards range up to $100K, but Environment Canada requires that 50% of the total project value must come from non-federal sources. The maximum project length is 36 months.
Eligibility: Environmental groups, community groups, community-based associations, service clubs, and Aboriginal organizations. Businesses, academic institutions, individuals, and governments are NOT eligible. The application deadline is **November 1, 2013**.
http://www.ec.gc.ca/ecoaction/

The Government of Manitoba
Water Stewardship Fund
Through the Water Stewardship Fund (WSF), the Government of Manitoba funds projects in six priority areas. These priority areas include 1) Watershed management planning and implementation, 2) Water related scientific research, 3) Education and capacity building, 4) Water conservation, 5) Water stewardship, 6) Economic development. Awards are limited to $25K per project, but may be considered for more. Projects are typically one year; however, multiple year projects will be considered.

Eligibility: local governments, conservation districts, private and non-profit organizations, industries, educational institutions, aboriginal organizations, communities, and youth groups
The application deadline to be considered for spring funding is **April 15, 2013**.
http://www.gov.mb.ca/waterstewardship/water_info/wsf/index.html

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