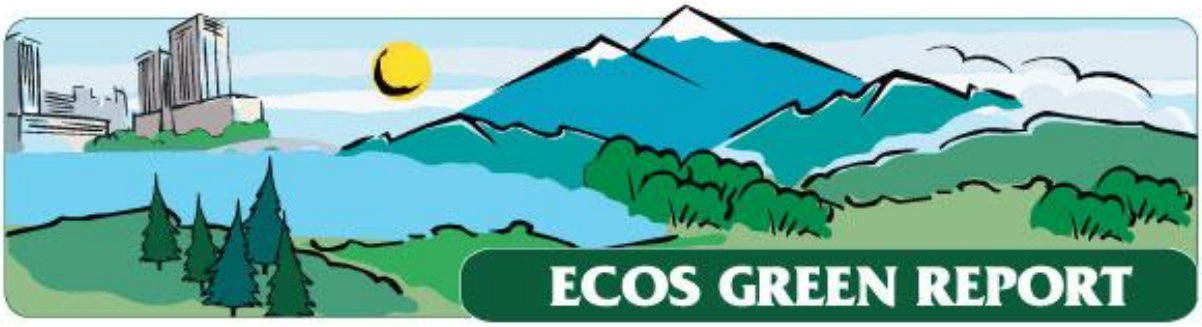


Innovations in the Clean Water SRF Grant Project

May 2016

By Carolyn Hanson, Deputy Executive Director, and Layne Piper, Project Associate, Environmental Council of the States

EXECUTIVE SUMMARY

The Clean Water State Revolving Fund (CWSRF) is an extremely successful federal-state-local partnership. Projects supported by the SRF deliver significant environmental, economic, and public health benefits nationwide. This report highlights innovative CWSRF projects in areas such as financing, green infrastructure, climate adaptation, and water and energy efficiency. The ten case studies below show that the CWSRF is flexible, effective, and able to meet the complex and diverse water quality needs of communities of all sizes and levels of sophistication.

Case Studies

- Bundling and Fast-Tracking High Priority Projects in West County Wastewater District – Western Contra Costa County, California
- Georgia's Toilet Rebate Program – Douglasville-Douglas County, Georgia
- Iowa's Linked Deposit Loans – Iowa
- Louisiana's Wastewater Reuse Project – West Monroe, Louisiana
- Maryland SRF Supports Wind Turbine at WWTP – City of Crisfield, Maryland
- Montana's Paradigm Shift: Re-Engineering WWTP Operations to Reduce Nutrients without Capital Expenditures – Montana
- New Jersey Green and Grey Infrastructure Project – Camden City, New Jersey
- New York's Green Innovation Grant Program and the Upper Susquehanna – Southern Tier, New York
- New York's Storm Mitigation Loan Program – Suffolk County, New York
- Oregon's Riparian Shade Pilot Program – Springfield, Oregon

PROJECT DESCRIPTION

This report is the result of a project by the Environmental Council of the States (ECOS) to document innovative projects funded by the CWSRF. In addition to this Green Report, the project included a national webinar to highlight CWSRF flexibilities, to show the variety of projects the CWSRF can be used to fund, and to offer case studies of completed or ongoing projects to build state capacity and knowledge. The February 10, 2016, ECOS webinar on Innovative Uses of the CWSRF is available for viewing at: https://ecos.adobeconnect.com/cwsrfwebinar-feb16/.

To find the case studies for this report, ECOS solicited information on innovative uses of the CWSRF from states directly and through associations including: the Association of Clean Water Administrators, the Council on Infrastructure Financing Authorities, the National Association of Clean Water Agencies and the Water Environment Federation. ECOS received over 30 submissions; ten were selected to be highlighted in this report. Those ten were sent to a selection committee to choose the three featured in the webinar. In addition to this report, the case studies are available as one-pagers that may be used individually.

ACKNOWLEDGMENTS

Thank you to all of those who submitted projects and to the EPA Office of Water for guidance and funding for this project.

Thank you to the selection committee for sharing their time and expertise:

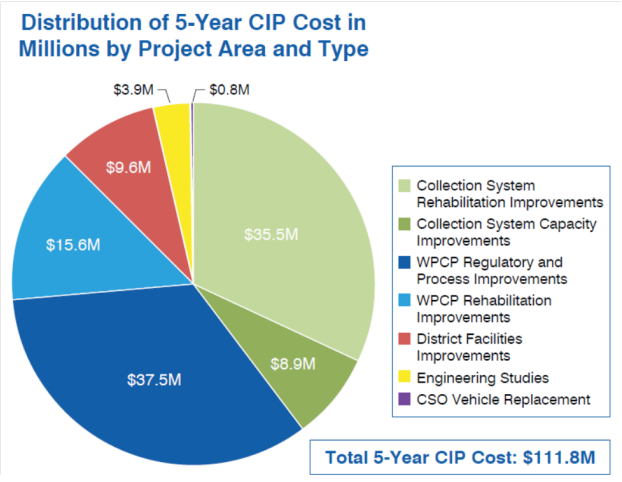
- Mark Bennett, Arkansas Natural Resources Commission, representing the Council of Infrastructure Financing Authorities
- Shellie Chard-McClary, Water Quality Division, Oklahoma DEQ, representing the Association of Clean Water Administrators
- Derek Gardels, U.S. Army Corps of Engineers Institute for Water Resources, representing the Water Environment Federation
- Logan Olds, California's Victor Valley Wastewater Reclamation Authority, representing the National Association of Clean Water Agencies
- Sheila Platt, CWSRF Implementation Team, U.S. EPA Office of Water

Bundling and Fast-Tracking High Priority Projects in West County Wastewater District, California

The West County Wastewater District obtained a low-interest, 20-year loan agreement in June 2014 with Clean Water State Revolving Fund (SRF) for approximately $18 million dollars at an interest rate of 1.9 percent. The loan will fund the completion of nine projects deemed essential in a district-wide Master Plan. These projects focus on rehabilitating and replacing aging assets to reduce the risk of sanitary sewer overflows and process failures at the water pollution control plant.

The Master Plan

The West County Wastewater District (District) serves a population of 93,000 in Western Contra Costa County in Northern California. The District owns, operates, and maintains 249 miles of gravity sewer pipelines, 17 lift stations, 6 miles of force mains, and a 12.5 million gallon per day (mgd) Water Pollution Control Plant (WPCP). The District recently completed a District-Wide Master Plan that assesses future needs for the District's assets. The Master Plan identified a 20 -year Capital Improvement Plan (CIP) that totals $330 million, with $111.8 million being in the first five years. For the first five years, a key area of focus in the CIP will be rehabilitating and replacing aging assets. Replacing these assets is very important to reduce the risk of sanitary sewer overflows, or to prevent a process failure at the WPCP. See image for an overview of projects in the first five years.



Five Year CIP Overview. *Image Credit: WWCD*

Fast Tracking High Priority Projects

To fast-track key projects, the District obtained a low-interest SRF loan for nine high priority projects that are Categorically Exempt with respect to the California Environmental Quality Act. Because the environmental documentation needed for these projects could be completed quickly, this approach allowed the District to bundle several projects into one application and fast-track their implementation. To establish which high priority projects could be included in this first package, a rigorous environmental screening analysis was completed to confirm they are Categorically Exempt. While most of the other projects in the 5-year CIP will also be funded through the SRF program, their implementation will take place after an environmental impact report is completed for the Master Plan. WCWD will generate revenue to pay back the loan through rate increases.

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

CWSRF: A Flexible Tool for Advancing Clean Water

Funding Mechanism

The District has executed a 20-year loan agreement in June 2014 with Clean Water State Revolving Fund (SRF) for approximately $18 million dollars at an interest rate of 1.9 percent. All of the project costs are being financed through this loan, with the exception of WCWD staff time and involvement.

This approach saved the ratepayers approximately $3.5 million compared to using traditional municipal bond financing.

Reducing Administrative Burdens

One unique aspect of this project is that multiple projects are being funded through one application. This has resulted in significant reduction in administrative effort for preparing application materials. In discussions with SRF staff, they have indicated this approach is being encouraged particularly with other larger agencies to streamline efforts.

Results

The District is in various stages of design and construction of the nine high priority projects (see chart). By utilizing this approach, the District has been able to fast-track high priority projects and implement them a few years before they could have been implemented with a traditional approach. This approach saved the ratepayers approximately $3.5 million compared to using traditional municipal bond financing. The CWSRF loan program will also be utilized by the District for upcoming CIP projects, including a Recycled Water Reliability Upgrade to improve the region's resiliency to the ongoing drought. The District is in the process of obtaining a loan for this project and will be applying for a third loan to fund the majority of the remaining projects in the 5-year CIP.

Description	Status
6,800 lf of sewer (12" or less)	Design
2,300 lf of sewer (greater than 12")	Design
Lift Station Wet Well Rehabilitation	Design
Hilltop Green Rehabilitation and Replacement	Design
Lift Station Pump and Controls Replacement	Design
WPCP Electrical Improvements	Design
WPCP Seismic Improvements	Construction
Miscellaneous Mechanical Improvements	Design
Primary Clarifier Improvements	Construction

More Information

For more information on this program contact:
EJ Shalaby at eshalaby@wcwd.org or 510-222-6700.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Georgia's Toilet Rebate Program

Douglasville-Douglas County Water and Sewer Authority (DDCWSA) received a $300,000 commitment to offer a rebate program to replace inefficient toilets that use more than 1.6 gallons per flush and exist in homes built in 1993 or earlier. It is estimated that toilets can account for one-third of water use in a home. Small funds here have a large impact: eliminating customer leaks not only reduces water demand, but can save the average family nearly $100 per year.

Program History

The Federal Energy Policy Act of 1992 mandated that low-flow fixtures using no more than 1.6 gallons per flush (gpf) be installed in all homes constructed during and after 1994. Unfortunately, according to the 2005 U.S. Census Bureau, approximately 59% of Douglas County's homes were built prior to 1993.

Those water-guzzling toilets which remain in Douglas County homes built prior to 1994 are the focus of the toilet rebate program offered by DDCWSA. Toilets are now available with as little as 1.28 gallons per flush, which can save the average household 20,000 gallons of water per year. The total project cost was $300,000, with the Clean Water State Revolving Fund providing the entire amount. A $50 rebate was offered for installing a replacement ultra low-flow toilet (1.6 gpf), and a $100 rebate was offered for installing a replacement high efficiency toilet (1.28 gpf). The rebates issued in this program were limited and were issued on a first-come, first-served basis, with a maximum of two issued per applicant.

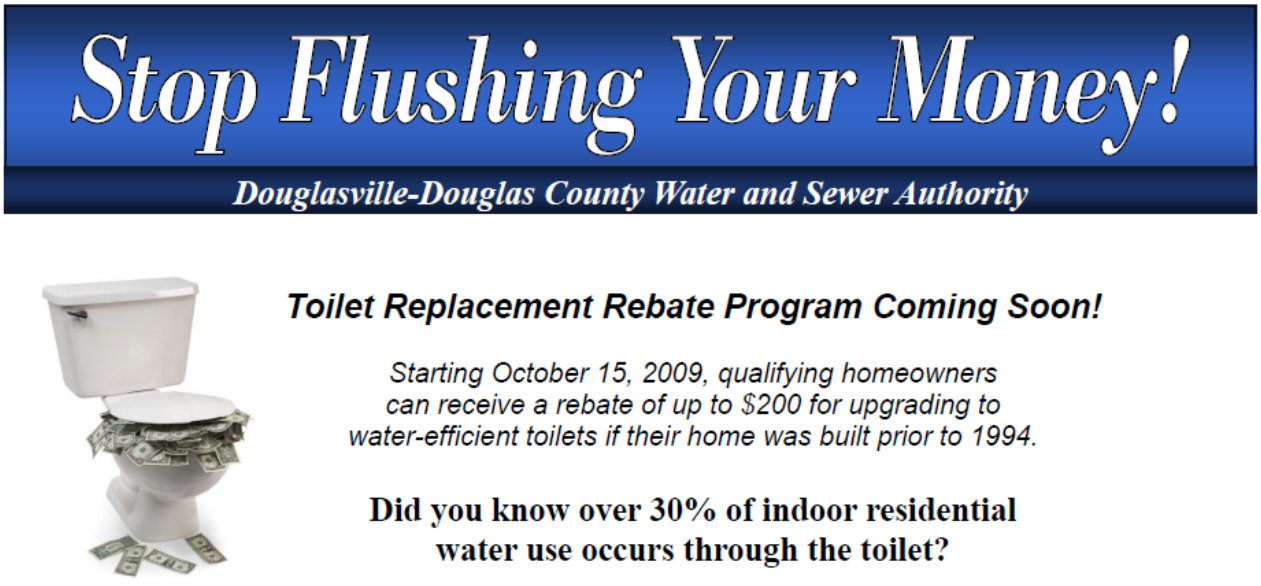


Image Credit: Douglasville-Doublas County Pamphlet

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

ECOS

CWSRF: A Flexible Tool for Advancing Clean Water

Funding Mechanism

The Georgia Clean Water State Revolving Fund provided Douglasville-Douglas County Water and Sewer Authority with a $300,000 commitment for this Toilet Rebate Program. The commitment consisted of a 40% loan at 3.0% interest along with a 60% principal forgiveness amount. This loan qualified for financing under the American Recovery and Reinvestment Act (ARRA) financing terms.

Replicability

Rebate programs can take a variety of forms and are not limited to toilets. Rebates programs can be developed for faucet replacement, showerhead replacement, service line replacement or any device where water can be saved.

Results

This project replaced approximately 2,507 toilets within the Douglasville-Douglas County Water and Sewer Authority water system. Approximately 2,278 toilets were replaced with high efficiency (1.28 gpf) toilets and approximately 229 toilets were replaced with ultra low-flow (1.6 gpf) toilets.

The toilets replaced could potentially reduce water and sewer distribution, treatment and collection by approximately 37 million gallons per year.

There were 10 times as many high efficiency toilets rebated versus ultra low-flow toilets rebated. The $50 increase in rebate was a sufficient incentive for most customers to invest the additional up front funds in the more efficient toilet. Customers clearly saw the additional benefit of reduced water and sewer usage and took the step to save additional water and sewer costs.

It is estimated that toilets can account for one-third of water use in a home, replacing a 3.5 gallons per flush toilet with a 1.6 gallons per flush can save a family of four from 11,000 to 15,000 gallons of water and sewer charges per year. The toilets replaced could potentially reduce water and sewer distribution, treatment and collection by approximately 37 million gallons per year for the Douglasville-Douglas County Water and Sewer Authority.

More Information

For more information on this program contact:

Jason Bodwell at Jason@gefa.ga.gov or 404-584-1129 or
Andrew Rose at arose@ddcwsa.com or 770-920-3841

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Iowa's Linked Deposit Loans

The Iowa Department of Natural Resources and the Iowa Finance Authority have developed clean water state revolving fund-linked deposit loan programs for manure management and soil erosion control. Working with the soil and water conservation districts in the state to identify farmers and others with eligible needs, the state uses its Clean Water State Revolving Loan Funds (SRF) to reduce interest rates for landowners that are making changes to address these nonpoint sources.

How the Programs Work

Farmers and other landowners work with their regular banks to acquire approval for a loan to pay for manure management or soil erosion control systems. The bank underwrites and signs the loan document with the borrower which eliminates default risk for the state SRF program as all risk is taken by the bank. To reduce the interest rate for the landowners, the state SRF deposits the principal amount of the loan into an account set up for this program at the bank. With the principal in hand, the bank is limited to charging no more than 3% to the borrower. As the loan is repaid by the borrower, the state SRF withdraws from the account the amount of principal repaid so that the SRF funds remaining at the bank equals the outstanding principal on the loan. The state deposit earns no interest, so the bank is provided with funds at no cost.

Partnerships Lead to Success

The SRF Linked Deposit Programs for Manure Management and Soil Erosion Control are successful due to the involvement of partners throughout the state. Iowa's 100 Soil and Water Conservation Districts are often the first point of contact for farmers and landowners who use these programs. U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) staff assist in designing best practices. Also, the programs are marketed by the Department of Agriculture and Land Stewardship's Division of Soil Conservation staff.

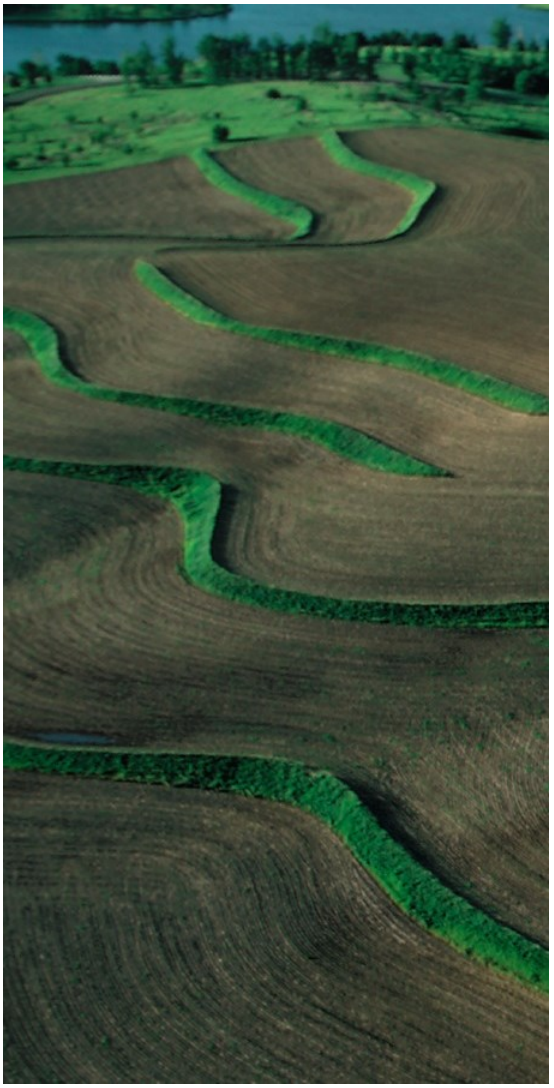


Photo by USDA NRCS

CWSRF: A Flexible Tool for Advancing Clean Water

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.

Published in March 2016

The program has over 400 lending institutions signed up as participation lenders. They use their own loan documents and underwriting criteria to approve loans for the projects. Also, the linked deposit loans can be used with other state and federal grant programs like NRCS' Environmental Quality Incentives Program (EQIP). Through these partnerships the linked deposit programs use existing organizations and existing relationships, both technical and financial, to implement an SRF program.

Multiple Benefits

- Assists landowners in addressing nonpoint source pollution.
- Helps landowners improve efficiency.
- Eliminates default risk for state SRF program.
- Caps the interest rate for borrowers at 3%.
- Reduces costs as state SRF does not have to file mortgages or other security instruments on the debt.

Since the first deposit in 2005, over $92 million has been deposited in banks throughout the state under these programs.

Size and Replicability

The state SRF program currently has almost $60 million deposited in financial institutions throughout the state for these programs. Since the first deposit in 2005, over $92 million has been deposited in banks throughout the state under these programs.

Linked deposit programs are used in other states and Iowa has worked with other states to create similar programs. Beyond SRFs, Iowa's State Treasurer has a linked deposit program for small businesses.

Success Stories

A certified organic dairy farmer with 665 acres of cropland, financed a new 1.5 million gallon manure pit to capture all cattle waste and store it until conditions are right to use it as fertilizer on his crops. He says this new system is much more efficient plus there is no run-off. So it makes running the dairy operation easier while also reducing the potential for nutrients to reach any waterways.

Near Fairfield, Iowa a farmer was able to cut his planting time in half by creating terraces on 85 acres where he had trouble holding grassed waterways. To afford this, he applied for an SRF linked deposit loan through the Local Water Protection Program. The funds were used to construct earthen ridges or terraces to hold water back, slow runoff and allow nutrients and pesticides to filter out before entering streams. It also creates more efficient pathways for his machinery to move in the field. He says it is "exceptional" and it makes the farm better for the environment and the next generation.

More Information

For more information on these programs visit:
www.iowasrf.com/program/other_water_quality_programs/
or contact Patti Cale-Finnegan at patti.cale-finnegan@dnr.iowa.gov or 515-725-0498.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Louisiana's Wastewater Reuse Project

The City of West Monroe used CWSRF funding to upgrade an existing wastewater treatment plant (WWTP). As a result of this water efficiency project, the facility now treats wastewater to drinking water standards using dissolved air floatation followed by pressurized granular activated carbon and chlorination. The treated effluent from the City's WWTP is pumped to Graphic Packaging International, Inc. (GPI) to meet the company's demand for process water in its food grade paper manufacturing process.

CWSRF: A Flexible Tool for Advancing Clean Water

Funding Mechanism

The City of West Monroe, LA obtained a $6,000,000 Louisiana Department of Environmental Quality CWSRF loan and various other funding totaling $20 million. Other funding included $11,900,000 of state capital outlay, and $700,000 from the City of West Monroe and West Ouachita Sewage District Number 5. The annual operation and maintenance costs amount to $2,137,000.

Project Description

The City of West Monroe used CWSRF funding to upgrade an existing 7 million gallons per day (MGD) wastewater treatment plant (WWTP). As a result of this innovative water efficiency project, the facility now treats wastewater to drinking water standards using dissolved air floatation followed by pressurized granular activated carbon and chlorination. The treated effluent from the City's WWTP is pumped to Graphic Packaging International, Inc. (GPI) to meet the company's demand for process water in its food grade paper manufacturing process. The City worked closely with GPI to identify, test, and implement this innovative solution to the company's industrial input needs.

Algae Removal Process by Dissolved Air Flotation Units. *Photo Credit: City of West Monroe*

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.

Published in March 2016

Solving the Problem

Prior to the implementation of this water efficiency project, the Sparta Aquifer was overdrawn by approximately 17 to 18 MGD. The Sparta Aquifer supplies drinking water to 14 parishes. The decline in water quantity had caused a decline in quality and occurrence of salt water intrusion in the aquifer. GPI's wells in the aquifer were becoming salty and corrosive; an alternate, reliable water source was needed in order to continue business in West Monroe. Since the properties of the treatment plant and GPI were adjacent, building a pipeline between the two to transfer the water was economically feasible. Before this solution was proposed, the primary solution identified by the Sparta Groundwater Conservation District Commission was a 10 MGD project using river water from the Ouachita River at West Monroe, which would cost nearly $83 million, compared to the $20 million required for this water reuse project.

This water reuse significantly reduces GPI's 10 MGD demand for water from the Sparta Aquifer, providing relief to the aquifer by reducing its estimated overdraw by approximately 30%.

Results

This water reuse project significantly reduces GPI's 10 MGD demand for process water from the Sparta Aquifer, providing relief to the aquifer by reducing its estimated overdraw by approximately 30%. For every gallon of reused water pumped to GPI, the company draws one gallon less from the aquifer. The aquifer water levels have seen significant recovery since the implementation of this project, and the quality of the water has also improved.

Local Partnership Creates Economic and Social Impact

The City worked closely with GPI to identify, test, and implement this innovative solution to the company's industrial input needs. In addition to the environmental benefits of this partnership, it has ensured the stability of the community's largest employer. GPI employs 1,200 people in West Monroe, with an additional 637 direct workers associated with harvesting timber and pulp wood and transporting it to GPI. It also raised community awareness of the issue, and promoted the acceptance of using recycled water.

More Information

For more information on this program contact:
Jonathan McFarland at jonathan.mcfarland@la.gov or 255-219-3956

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Maryland SRF Supports Wind Turbine at WWTP

Crisfield, Maryland, a small, economically-disadvantaged city on the Maryland's Eastern Shore, is combining CWSRF and other funding to design and construct a wind turbine at their wastewater treatment plant. The turbine will reduce the city's electric bill and its carbon footprint.

The Project

Using CWSRF funding received from Maryland's Water Quality State Revolving Fund, a 750 KW wind turbine and related equipment is being designed and built to provide electricity to the City of Crisfield Wastewater Treatment Plant. Crisfield's location at the lower end of Maryland's Eastern Shore, surrounded by water on three sides, will allow the 300-foot high wind turbine to use the strong, unobstructed winds off Chesapeake Bay's Tangier Sound to power the plant. Taking the local conditions into account, the wind turbine is sized to meet the wastewater treatment plant's peak demand. Energy produced off-peak in excess of the plant's need will be fed back into the commercial electric power grid.

Wind Turbine. *Photo credit: U.S. Department of Energy*

Financial and Other Benefits

For a small, economically disadvantaged city like Crisfield, where the wastewater treatment plant accounts for more than half of the city's electric bill, the wind power will mean big savings—between $140,000 and $165,000 a year—and a boon to the environment. The project, expected to be completed in the summer of 2016, will enable the city to apply the funds it usually spends on power toward other needed projects.

Based on an average wind speed of 18 miles per hour, the turbine is expected to produce 2,717 megawatt hours per year of electric power. This wind power is expected to reduce greenhouse gas emissions related to wastewater treatment in Crisfield by 765 metric tons per year.

CWSRF: A Flexible Tool for Advancing Clean Water

ECOS

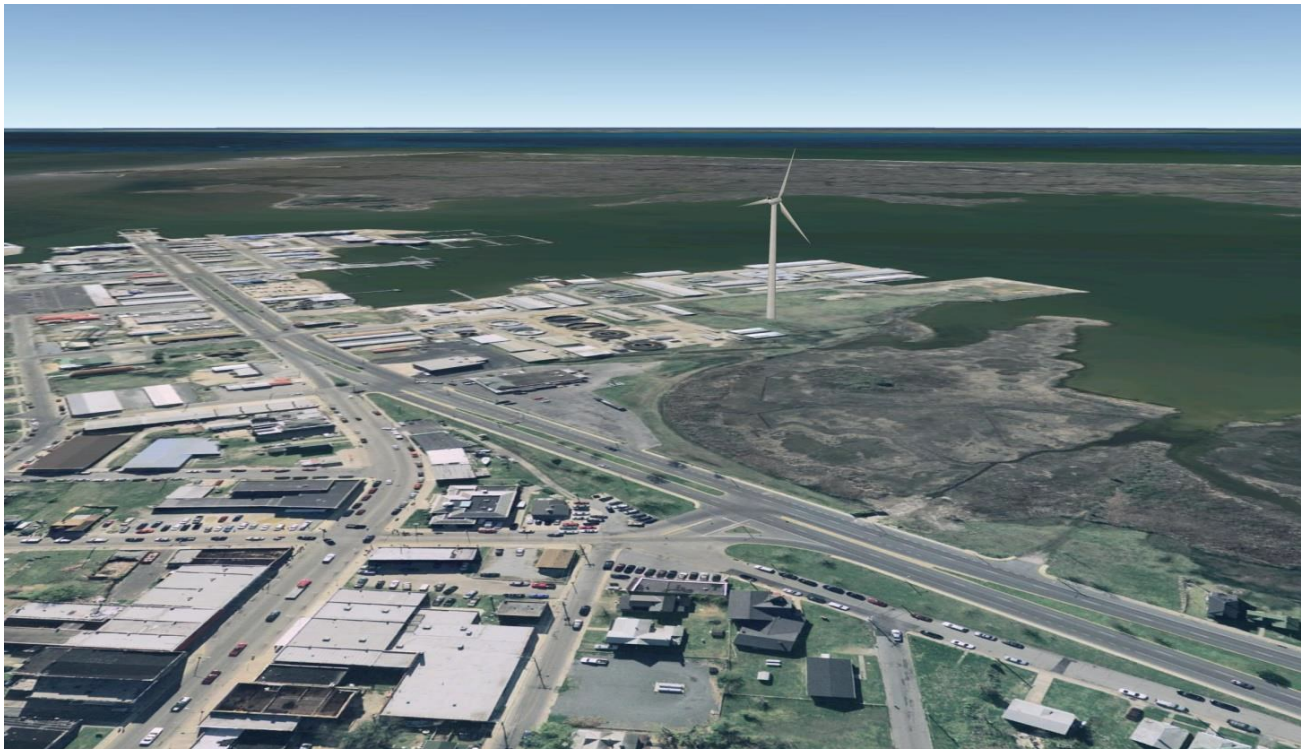
This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016.

Financing

This work is being financed through a combination of mechanisms. Maryland's Water Quality State Revolving Fund provided a $453,000 low-interest loan, as well as, $3.17 million in loan principal forgiveness. This funding is being combined with a $530,000 Community Development Block Grant from the U.S. Department of Housing and Urban Development. This financing is key to Crisfield's ability to pursue this project.

Timeline

CWSRF funding for this project was awarded by the state in 2013. While the city had hoped to have the turbine up and running by the summer of 2015, delays in equipment delivery have pushed that back a year. Now, in the summer of 2016, the city is looking forward to reducing its carbon footprint and saving money on its electricity bill that can then be spent on other critical projects.



Mock up of Crisfield with turbine at wastewater treatment plant. *Image courtesy of Maryland.*

More Information

For more information on this project contact:
Jag Khuman, Director of Maryland Water Quality Financing Administration, Maryland Deaprtment of the Environment at 410-537-3981 or jag.khuman@maryland.gov.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Montana's Paradigm Shift: Re-Engineering WWTP Operations to Reduce Nutrients without Capital Expenditures

Montana trains wastewater treatment plant operators to operate their facilities differently than originally designed, facilitating the removal of nutrients. Through this targeted education and some additional on-site, site-specific assistance, wastewater facilities are able to meet nutrient standards without incurring the significant capital costs that would be necessary to upgrade the existing treatment plants.

Funding Mechanism

This project is funded with CWSRF administrative fees only. With little federal funding for operator training available, and operations categorically ineligible for SRF funding, Montana DEQ charged an administration fee of .5% (now .25%) to each SRF loan. This is considered non-program income, and remaining funds can be used for Clean Water Act purposes other than administering the SRF program. Montana's annual budget for this work is only $35,000.

Solutions to the Nutrient Challenge

Montana Wastewater Treatment Plant Operators. *Photo Credit: Montana DEQ*

Biological nutrient removal, or BNR, is not new. Some states, including Montana, have BNR facilities that have been in place for over twenty years. A lot has been learned in that time, including the fact that the environmental niches necessary for BNR do exist in existing secondary mechanical plants to effectively remove nutrients. In many cases, properly trained operators can manipulate and optimize those niches to achieve a substantial reduction in nitrogen and/or phosphorous and may even save the utility money in energy savings and/or sludge disposal costs. The results can, in some cases, be so dramatic as to eliminate the need to upgrade the plant or, at the very least, minimize the extent and cost of an upgrade. The potential cost savings to communities and ratepayers are enormous, with the added benefit of the operators typically having much more control of their facilities.

Montana's Approach

In May 2012, the Montana WPCSRF program hired a contractor, Grant Weaver of The Water Planet Company, to provide free classroom training for the operators on BNR biochemistry, operational strategies and case studies. In subsequent years they expanded the training to also include on-site visits to help the operators implement process changes at their facilities. The on-site training is also at no cost to the communities. Some facilities were relatively old, run of the mill secondary activated sludge facilities…

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

CWSRF: A Flexible Tool for Advancing Clean Water

Montana's Approach Continued…

...and some were BNR-designed facilities. Because the BNR plants were already removing nutrients, the most dramatic improvements, mathematically, came from the secondary plants. In the summer of 2012, six weeks after the initial training, significant nutrient reductions were achieved.

Sustainable Success

One question often asked is "What happens after the trainer leaves?" Continued positive results are illustrated by discharge monitoring report data for the community of Chinook, MT. The data shows that, after training occurred in May 2012, nutrient reduction continued through June 2014. The operator, Eric Miller, has been able to achieve average total effluent nitrogen of 3.8 mg/l over the last Montana winter. To put Mr. Miller's accomplishments in perspective, some of their more advanced BNR facilities (that were not involved in the training) are producing closer to 8 mg/l total effluent nitrogen. The current limits of technology for total nitrogen removal are roughly around 3 mg/l.

This innovative, operations-based approach is by far the biggest bang for the buck in terms of pollution reduction.

Possibilities for Broad Application

Some states are considering adopting numeric nutrient standards in the range of 10 mg/l total nitrogen and 1 mg/l total phosphorous. That is about the same range that Montana believes this operations-based approach can achieve in the majority of secondary mechanical plants.

Costs and Benefits

This innovative, operations-based approach costs Montana DEQ less than $50,000 per year to implement and is, by far, the biggest bang for the buck in terms of pollution reduction. It has allowed them to build positive relationships with the communities while helping them improve water quality. DEQ believes that re-engineering operations is completely scalable, up or down, for suspended growth mechanical plants (the most common type of treatment facility in most regions) and the results can be observed in a relatively immediate timeframe.

More Information

For more information on this program contact:
Paul LaVigne at plavigne@mt.gov or 406-444-5321 or
Grant Weaver at gweaver@cleanwaterops.com or 860-444-0866

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

New Jersey Green and Grey Infrastructure Project

Camden City (population 80,000), one of the most economically distressed cities in the US, had a combined sewer system that was in a serious state of disrepair, creating serious human health issues due to flooding. This project implemented various green and grey infrastructure projects to address stormwater and combined sewer issues through a partnership between the Camden County Municipal Utilities Authority (MUA) and other governmental entities and non-profits.

CWSRF: A Flexible Tool for Advancing Clean Water

Funding Mechanism

The New Jersey Environmental Infrastructure Trust, New Jersey's State Revolving Loan Fund, awarded $5,657,000 for this project. The award consisted of a $2M grant and $3.6M in a low interest loan. The balance of the project funds were provided by the Camden County MUA itself.

Since the implementation of this project, the components listed below became the "phase 1" of a long term green and grey infrastructure program in Camden. This project's success led to the implementation of successive phases, also being funded through New Jersey's SRF.

Baldwin's Run Stream Daylighting Project Before and After, CCMUA

Project Components

1. Construction of 17 rain gardens to capture stormwater flow.
2. The daylighting of a stream that had previously been paved over in order to capture stormwater flow.
3. Conversion of an abandoned factory into a 5.5 acre riverfront park for the environmental justice community of Waterfront South in Camden. By depaving the impervious surface and removing contaminated soil and thereby eliminating contaminated runoff into the Delaware River, the project resulted in captured stormwater, water quality benefits and quality of life benefits.
4. Separating a portion of the City's combined sewer system to reduce the potential for flooding and overflows.
5. Replacing several failing portions of the city's combined sewer system in order to reduce the potential for flooding and overflows.

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

Innovation

The project is innovative for several reasons. First, green infrastructure is a relatively innovative way to deal with stormwater and combined sewer issues. Second, the CCMUA partnered with other governmental entities and non-profits in a completely voluntary manner to accomplish the project. Finally, this project resulted in the first New Jersey Environmental Infrastructure Trust green infrastructure grant, totaling $2,000,000.

Replicability

From an environmental standpoint, this project is extremely replicable in that the benefits of green infrastructure can be realized nearly everywhere. Economically, this project can be replicated assuming the community's SRF supports and funds green infrastructure projects. From a collaboration standpoint, most communities have similar potential partners, like a clean water utility, state regulatory agency, a state university, or local non-profits. This project can be scaled up or down depending on a community's need and budget. Projects can be significantly scaled up and used as a template to address a Combined Sewer Overflows consent decree.

The projects will result in the capture of 100,000,000 gallons of stormwater every year, significantly reducing the potential for combined sewage flooding in Camden.

Environmental Benefits

The projects will result in the capture of 100,000,000 gallons of stormwater every year, significantly reducing the potential for combined sewage flooding in Camden. Additionally, the receiving waterways of the Delaware and Cooper Rivers as well as Newton Creek will have significantly improved water quality as there will be less combined sewer overflows into the rivers and streams.

Community Benefits

These projects have a huge impact on Camden's neighborhoods. As previously mentioned, the Waterfront South community now has access to the waterfront for the first time in over 50 years. Children can now play in parks without fear they will be in contact with combined sewage. Many homes that were previously confronted with the health concerns of basement backups no longer face that challenge.

Economic Benefits

The most obvious economic impact is the $5,000,000 investment in Camden's infrastructure. In addition, the combined sewer flooding problem in Camden City is a serious deterrent to future investment in the City. Eliminating the flooding problem removes a significant barrier to economic development in the City of Camden. There is also an uncalculated economic impact that comes with wage earners not having to miss work because they cannot access a flooded street or the savings a family realizes when not confronting basement backups.

More Information

For more information on this program contact:
Andy Kricun at andy@ccmua.org or 856-583-1223

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

New York's Green Innovation Grant Program and the Upper Susquehanna

Under its CWSRF Program, the New York Environmental Facilities Corporation has created a Green Innovation Grant Program to encourage the use of green infrastructure. One project under this program has funded work to reconnect streams to their floodplains and constructing and restoring wetlands on the Upper Susquehanna Watershed.

CWSRF: A Flexible Tool for Advancing Clean Water

About the GIGP

The New York Environmental Facilities Corporation's (EFC) Green Innovation Grant Program (GIGP) provides funding to public green stormwater infrastructure projects. Serving as an incubator for new ideas and solutions, it supports projects that utilize unique stormwater infrastructure design and create cutting-edge green technologies. Through 2015, more than 150 innovative projects—ranging from rain-absorbing green roofs in Rochester, Syracuse and other cities to the unearthing of a river in downtown Yonkers—have been funded under this program. These projects provide multiple benefits including protecting and improving water quality; spurring innovation in stormwater management; increasing capacity to build and maintain green infrastructure; and facilitating the transfer of new technologies and practices. And in some cases, green stormwater projects funded by GIGP have been incorporated into larger, more-traditional gray infrastructure projects that EFC has financed through the SRF.

The EFC created GIGP using federal funds from the American Recovery and Reinvestment Act of 2009. With CWSRF funds, the state has awarded nearly $130 million in GIGP funding through 2015. Individual grants provide up to 90% of construction costs including eligible planning and design costs, with recipients providing a minimum 10% match.

Before and after berm removal. *Photo Credit: The Upper Susquehanna Coalition*

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

The Upper Susquehanna

In 2011 in response to Tropical Storm Lee, gravel streambank berms were created in New York's Southern Tier as a temporary emergency flood control. However, many were left in place, disconnecting streams from their floodplains. Using a $920,000 GIGP grant, the Upper Susquehanna Coalition's Wetland Program removed berms and built wetlands to reconnect streams to the floodplain and to restore a more natural flow, making streams more resilient to wet weather events.

These expanded wetlands help New York reduce its nutrient sediment loads to the Chesapeake Bay.

The Coalition restored approximately 120 acres of wetland complexes, selecting sites based on topography, soils, current land use, and the potential for habitat and stormwater management benefits. Each wetland complex was created with varying sizes of ephemeral wetlands, or vernal pools, mixed with larger permanent pools to maximize diversity. These expanded wetlands help New York to reduce its nutrient sediment loads to the Chesapeake Bay. The creation of significant headwaters wetlands acreage to capture runoff before rainfall enters the stream system is now considered an approach to managing larger and more frequent rain events related to climate change.

Photo Credit: The Upper Susquehanna Coalition

More Information

For more information on the Green Innovation Grant Program visit: http://www.efc.ny.gov/GIGP or contact GIGP@efc.ny.gov or 518-402-7461.
To learn more about the Upper Susquehanna Coalition's Wetlands Program visit: http://www.u-s-c.org/html/wetlandprogram.htm.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

New York's Storm Mitigation Loan Program

New York State's Storm Mitigation Loan Program (SMLP) was created in 2014 to assist local governments in strengthening long-term resilience for wastewater and drinking water treatment facilities in areas impacted by Hurricane Sandy. Elevating power systems, reducing infiltration and waterproofing electrical components are some of the projects being funded through the program.

Background

In the aftermath of Hurricane Sandy, the U.S. Congress appropriated $600 million in SRF funds for New York and New Jersey to "reduce flood damage risk and vulnerability or to enhance resilience to rapid hydrologic change or a natural disaster at treatment works…" New York used these funds to create the Storm Mitigation Loan Program (SMLP) for Clean Water and Drinking Water SRF projects. Between federal appropriations and state matching funds, the state made available $339.7 million in CWSRF funds for storm resilience and mitigation projects.

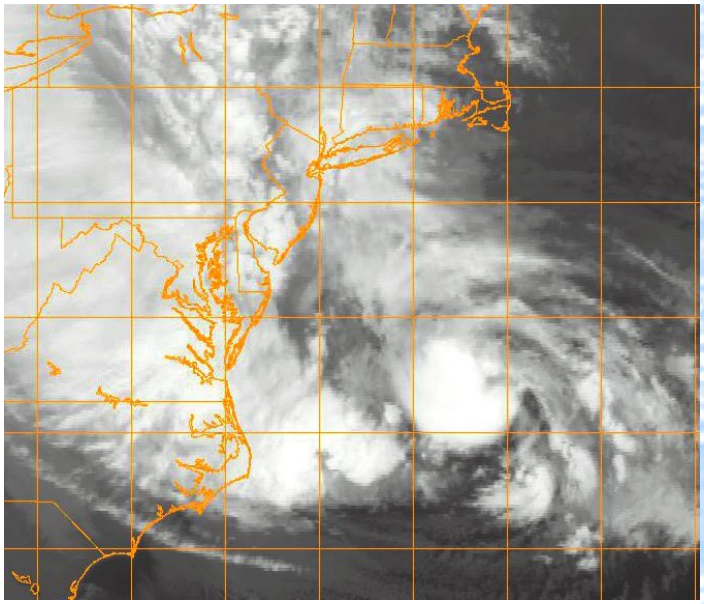


Photo Credit: US Navy

Program Overview

The goals of the program include promoting the use of sustainable practices in the design and construction of infrastructure, in order to reduce the risk from future storms and other natural disasters to water systems in the 14 counties affected by Hurricane Sandy, and to protect human health and the environment. To help achieve these goals, the SMLP provides financial assistance in the form of zero-interest loans and grants to help address rising sea levels and severe storms.

The need for this funding was apparent as the New York State Environmental Facilities Corporation, which administers the SRF program for New York, received 110 applications totaling more than $900 million for clean water projects under the SMLP. In 2014, based on the funding available, 36 projects were selected. These projects range from flood-proofing critical treatment systems to correcting significant I/I problems that reduce the likelihood of sewer backups or flooding of a treatment facility to upgrading and hardening pump stations to ensure peak flow capacity during a storm event. As an example, Nassau County is undertaking a project to reduce potential Sanitary Sewer Overflows that caused neighborhood basement backups during the storm. The County was approved to receive $25.4 million for the project, with $6.4 million in grant and the remainder in zero-interest loan.

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016

ECOS

CWSRF: A Flexible Tool for Advancing Clean Water

Setting New Standards

In order to help ensure resiliency, New York established new standards for the elevation of critical equipment and other storm-related measures funded under the SMLP. Critical equipment in an area subject to tidal change or sea-level rise is to be placed at the highest of the 100-year flood level plus five feet, the Sandy high-water mark plus four feet, or the 500-year flood level. Generally, any facility that has flooded or may flood due to sea level rise must be designed for the most protective of the 100-year flood level plus two feet, the Sandy high-water mark plus one foot or the 500-year flood level. These standards are being studied as a potential model by the New England Interstate Water Pollution Control Commission and others looking to identify best practices to protect water and wastewater infrastructure from the impacts of more intense storms and rising sea levels resulting from climate change.

The SMLP makes zero-interest loans and grants to help address rising sea levels and severe storms.

Suffolk County Example

To protect the existing ocean outfall from experiencing high operating pressures during storm conditions, pumping must be maintained to avoid submerging the plant processes and equipment and avoid sewer system backups. The final effluent pump station upgrades will allow the Bergen Point WWTP to more consistently convey wet weather flow and to discharge the effluent safely, protecting the plant and upstream areas from flooding.

Photo Credit: US Army

More Information

For more information on these programs visit:
http://www.efc.ny.gov/CWSRF
or contact Timothy Burns at timothy.burns@efc.ny.gov or 518-402-7396

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Oregon's Riparian Shade Pilot Program

To address future pollutant-discharge requirements and potential temperature exceedances, the Metropolitan Wastewater Management Commission—a regional wastewater entity in Eugene/Springfield, Oregon—launched a pilot program to demonstrate the viability and cost-effectiveness of a water quality trading program for thermal load compliance with its future NPDES permits.

CWSRF: A Flexible Tool for Advancing Clean Water

Background

The Metropolitan Wastewater Management Commission (MWMC) discharges to the upper Willamette River, part of the Willamette River Basin, which may be governed by a pending temperature TMDL with criterion to protect salmon spawning and rearing habitat. To address this, the MWMC looked beyond the wastewater treatment plant to other areas along the river for a solution.

The Pilot

To secure regulator-approved temperature credits, the MWMC contracted with the nonprofit The Freshwater Trust to restore streamside vegetation at two local priority side channels within its watershed trading area, thus reducing the solar load on the water via shade. Sites secured for restoration were cleared of invasive plant species and replanted with approximately 10,000 native trees and shrubs. These plantings created riparian shade on 4 acres/0.75 stream miles adjacent to the City of Springfield.

New native plants along Cedar Creek. *Photo credit: Freshwater Trust*

ECOS

This factsheet was developed by the Environmental Council of the States. It is one of ten factsheets on how states have used flexibility in the Clean Water State Revolving Loan Funds to pursue innovative projects. To view the other factsheets and information on other state projects visit www.ecos.org.
Published in March 2016.

This approach created a compliance solution that was integrated with the overall health of the watershed. Contracting with The Freshwater Trust to implement the project allowed the MWMC to transfer much of the risk and long-term operations and maintenance. Additionally, the MWMC specified these pilot projects would occur on local restoration priority systems, where the work would further leverage other conservation efforts on those streams.

Multiple Benefits

- Demonstrated feasibility of a riparian shade credit program.
- Helped MWMC prepare to meet potential temperature TMDL.
- Supported the overall health of the watershed.
- Pumped an estimated $180,000 into the local economy for supplies and services.
- Improved water quality through reductions in sediments and nutrients.

Cedar Creek Mile 2.5	**Before** (pre-project)	38,100,000
	After (post-project)	25,120,000
	Uplift	12,980,000
	Restoration Actions	**6,150** native trees and shrubs installed
Mill Race River Mile 2	**Before** (pre-project)	3,120,605
	After (post-project)	667,987
	Uplift	2,452,618
	Restoration Actions	**3,600** native trees and shrubs installed
Total Uplift		**15,432,618 kcal/day**

Financing

To fund this work, MWMC acquired a $48 million loan from the Oregon Clean Water SRF. As they combined a capital project with qualifying watershed project, they qualified for a reduced interest rate loan, or sponsorship. Using the sponsorship option, by spending $450,000 of the principal to the watershed project, the MWMC was able to borrow the CWSRF funds at 2.44% interest, a savings of 0.64% on the loan interest rate. This funding was complemented by $200,000 in non-CWSRF bond funds.

.

More Information

For more information on this project contact:
Danielle Dumont, The Freshwater Trust, 503-222-9091, danielle@thefreshwatertrust.org; or
Todd Miller, City of Springfield/MWMC, 541-736-7137, tmiller@springfield-or.gov.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement X5-83395401 to the Environmental Council of the States. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

APPENDIX – OTHER INNOVATIVE CWSRF PROJECTS

This appendix includes additional examples of the flexibility states have used within the CWSRF. Each brief description includes a contact that is available to provide more information.

Alternative Energy and Energy Efficiency

- Biofuel in Green Bay, WI – In need of a new solids handling facility, NEW Water opted for a forward-looking approach that harnesses resource recovery. The Resource Recovery and Electrical Energy Project (R2E2) addresses increased capacity needs, aging infrastructure, and new air quality regulations. The project features two anaerobic digesters that produce a methane gas which will be captured and processed into a biofuel. The biofuel will be used to recover heat and produce electricity.
  Contact: Tricia Garrison, TGarrison@newwater.us, 920-438-1064

- Net Zero Energy in Gloversville/Johnstown, NY – This net zero energy wastewater treatment facility treats municipal wastewater and high strength industrial food processing wastewater. In addition to preventing pollution, the combined heat and power (CHP) project increases generation of digester biogas (methane) which is used to generate up to 750kW of electricity on-site. Waste heat from the generators provides a heating source for the anaerobic digester. The Zero Net Energy facility creates and uses renewable, clean power on-site, meeting or exceeding 100% of the facility's electric energy needs.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

- Using Yellow Grease as Fuel in Glen Falls, NY – A wastewater treatment plant upgrade allows the City of Glen Falls to receive, concentrate, store, and use "yellow grease" (grease discarded from commercial kitchens) as an auxiliary fuel in its existing, permitted fluidized bed incinerator for sewage sludge disposal.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

Flexible Financing

- Addressing Inflow and Infiltration in Duluth, MN – After decades of problems with excessive inflow and infiltration (I&I) that resulted in releases of untreated wastewater into Lake Superior from even small storm events, the City of Duluth was placed under a U.S. EPA consent decree to fix the problem. Due to an innovative funding package that included SRF funds, the project was completed over a period of ten years. It included a number of sewer rehab and I&I projects along with a series of overflow tanks that provide over 16 million gallons of storage so that releases no longer occur.
  Contact: Rebecca Flood, rebecca.flood@state.mn.us, 651-757-2022

- Community Loan Program in Clackamas County, OR – The County used a loan to develop a community loan program to fund local nonpoint source projects. The community option provides flexibility with internal funds.
  Contact: Jennifer Wigal, wigal.jennifer@deq.state.or.us, 503-229-5323

- Reduced Interest Rates for Nonpoint Source Additions in Portland, OR – The CWSRF offers a sponsorship option in a program with reduced interest rates for borrowers who add nonpoint source components to wastewater treatment facility projects. The City of Portland has taken advantage of this sponsorship option many times on both wastewater treatment plant projects and a variety of others.
  Contact: Jennifer Wigal, wigal.jennifer@deq.state.or.us, 503-229-5323

- Zero and Low-Interest Loan in Mancos, CO – This small town received a 20-year loan at 0% interest, then 1% after that in order to build a new wastewater treatment plant.
  Contact: Erick Worker, Erick.worker@state.co.us

- Zero Interest Loan Program in Rhode Island – This program was created to provide additional subsidization to borrowers. The program was started with a loan from the Rhode Island Clean Water Finance Agency.
  Contact: Michael Larocque, 401-453-4430 x113

Flow Restoration

- Dam Removal and Wetland Construction in Lake Placid, NY – In conjunction with the Village's replacement of an aged trunk sewer system, the Village of Lake Placid removed an existing dam, restored approximately 1,200 linear feet of natural stream bed and riparian buffers, and constructed close to an acre of additional wetlands. This was a net-addition, not mitigation, for lost wetland.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

Green Infrastructure

- Green Space in Alexandria, VA – Alexandria Renew Enterprises designed a Nutrient Management Facility (NMF) that will better manage biological treatment processes to remove harmful nitrogen from used water. The facility will also transform an industrial tract into available green space. Renew partnered with a developer to build a turf field above the NMF tanks.
  Contact: Lisa VanRiper, lisa.vanriper@ alexrenew.com, 804-928-8431

- Green Roof and Green Infrastructure in Troy, NY – The Urban Grow Center, a non-profit organization in the City of Troy, is retrofitting a former industrial building near the Hudson River with a green roof and other green infrastructure practices. A parking lot has become a green space with porous walkways, bioretention systems, and a cistern to collect rainwater, which will be used to irrigate a community garden where residents can come to garden and learn about the green practices.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

- Stormwater Control and Green Infrastructure in Bellingham, WA – Bellingham received a low-interest loan that was a partially forgivable principal loan. In combination with a Section 313 grant, this money was used to implement stormwater control, nonpoint

source control, and green infrastructure to decrease Squalicum Creek's water temperature, and to improve dissolved oxygen and biotic integrity.
Contact: Renee LaCroix, rlacroix@cob.org, 360-778-7966

Land Acquisition

- Designated Funds in Suffolk County, NY – The Suffolk County Drinking Water Protection Program was designed to allow Suffolk County to use 0.25% of 1% of the sales tax generated in Suffolk County for water quality protection programs until the year 2013. These water quality protection programs include the protection of undeveloped and environmentally significant land from development.
Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

Nonpoint Source Control

- Controlling and Treating Wet Weather Flows in Washington, IN – The City of Washington used a unique and cost-effective solution to comply with state regulations for the control and treatment of wet weather flows by constructing a wetland system. It is the second of kind in the US.
Contact: Bill Harkins, wharkins@ifa.in.gov, 317-324-4862

- Supporting Direct Seed and No-Till Agriculture in Spokane, WA – The Spokane Conservation District used a CWSRF loan to provide loans to agricultural producers in a 14-county area of eastern Washington. The low interest loans allow producers to purchase direct seed and no-till equipment, facilitating the transition to direct seed and no-till agriculture.
Contact: Ty Meyer, ty-meyer@sccd.org, 509-535-7274

- UV Treatment of Stormwater at Easton's Beach, RI – UV treatment is used to disinfect moat stormwater prior to discharge at the beach. This is the largest UV stormwater treatment system in U.S.
Contact: William Sequino, wsequino@ricwfa.com, 401-453-4430 x114

- Wetlands Capture Urban Runoff in Cheyenne, WY – The City of Cheyenne used a CWSRF award to reduce excess sediment flowing to a creek through construction of a stormwater wetlands complex to capture and treat urban runoff.
Contact: Bob Bradshaw, bbradshaw@cheyennecity.org, 307-637-6331

Remediation and Cleanup

- Dissolved Oxygen Injection in Central OK – Lake Thunderbird is a public water supply source for Norman, Oklahoma and surrounding communities. It is also a 303(b) listed priority watershed impaired for color, turbidity, and dissolved oxygen. The anoxic lake bottom was managed with a supersaturated dissolved oxygen injection system.
Contact: Jennifer Wasinger, Jennifer.wasinger@owrb.ok.gov, 405-530-8800

Water Efficiency

- Captured Rainwater and Snowmelt in Syracuse, NY – Onondaga County installed a rainwater collection system at the War Memorial Arena to capture rainwater and snow melt runoff from its roof. The county now reuses the harvested runoff for ice production for events at the facility, a popular hockey venue.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924

- Effluent for Golf Course Irrigation in Stockton, KS – Stockton has a lagoon wastewater treatment facility with effluent reuse for irrigation of a municipal golf course. It requires zero energy input besides pumping wastewater to the lagoon.
  Contact: Rodney Geisler, Rgeisler@kdheks.gov, 785.296.5527

- Stormwater for Public Restrooms in Syracuse, NY – Syracuse University installed a large-scale stormwater harvesting system at the Carrier Dome, a large sports arena in downtown Syracuse. To offset the quantity of municipal water used to serve the plumbing systems within the facility, stormwater is collected from the roof and used to supply water for public restrooms at the facility.
  Contact: Linda Foglia, linda.foglia@efc.ny.gov, 518-402-6924