The Clean Water State Revolving Fund: Decentralized Systems – Developing Partnerships to Broaden Opportunities

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Decentralized wastewater treatment systems, such as onsite or cluster systems, can be an effective alternative to meeting clean water needs in suburban and rural areas compared to centralized treatment. These and other infrastructure projects that benefit water quality are eligible for funding through the Clean Water State Revolving Fund (CWSRF) programs. CWSRF loan funds provide low-interest financing for clean water infrastructure, including both point and nonpoint source projects, in all 50 states and Puerto Rico. Since the CWSRF was established in 1987, over $90 billion in funding has been provided to nonpoint source, estuary, and traditional and nontraditional wastewater treatment projects throughout the United States.

In February 2009, the American Recovery and Reinvestment Act (ARRA) was signed into law, with the primary intention of creating jobs and stimulating the economy by investing in vital infrastructure projects to ensure the long-term vitality of the nation. To contribute to this goal, $4 billion in ARRA funds was appropriated to the CWSRF program. The Act specified that 20 percent of the funds appropriated were to be used for projects that fell under one or more of four categories: water efficiency and conservation, energy efficiency improvements, environmentally innovative activities, and green infrastructure. This became to be known as the "Green Project Reserve" (GPR). The GPR presented a unique opportunity to direct CWSRF funding towards many types of innovative and sustainable projects that a number of state CWSRF programs had not previously pursued. States funded more than 50 projects addressing decentralized treatment systems with ARRA CWSRF funds.[1]

DECENTRALIZED TREATMENT AND THE ARRA GPR

Decentralized wastewater treatment systems offer a cost-effective alternative to traditional centralized treatment plants. These localized systems collect, treat, and disperse water from individual dwellings or small communities or service areas and can be an ideal solution for effective wastewater treatment in rural or suburban areas, where centralized collection and treatment may be impractical or inefficient.

There were two types of decentralized treatment systems funded under the ARRA Green Project Reserve: onsite systems and cluster systems. Onsite systems include any kind of individual system, from septic tanks with localized dispersal to advanced onsite treatment technologies, such as fixed film and suspended growth processes. Cluster systems, by contrast, provide treatment for anywhere from two homes to hundreds of homes.

Currently, as many as 50 percent of onsite sytems are located in suburban areas of the United States. More than half of existing onsite septic systems are greater than 30 years old,

[1] Data obtained from the EPA Clean Water Benefits Reporting System.

and studies show that these systems report the most problems and failures.[2] Failing septic systems are a type of nonpoint source pollution and one of the leading causes of water quality impairment in the nation. When onsite systems fail, it can allow untreated effluent to leach into groundwater, posing significant public health risks. For example, pathogens and other microorganisms in sewage-contaminated water supplies can lead to disease outbreaks, while increased nutrient content can lead to excess algal growth. Bacteria such as fecal coliform and *E. coli* can be found in untreated effluent, as well as other microorganisms that have been linked to illnesses such as *Giardia lamblia, Balantidium coli*, and viruses such as rotavirus and hepatitis A virus.

Decentralized treatment systems provide an alternative solution to these problems. In addition to addressing existing water quality issues from aging or failing systems, they can also have environmental benefits beyond those of centralized treatment plants as a result of a localized approach to collection, treatment, and dispersal. For example, localized treatment conserves water within the watershed through groundwater recharge. In addition, smaller volumes of discharge to waterbodies make it possible to disperse pollutants more effectively, reducing the potential for environmental damage. Localized treatment also decreases the energy needs and potential water losses involved in moving effluent large distances through wastewater collection systems. Because decentralized wastewater treatment solutions represent an alternative way of addressing a critical environmental concern, they were classified as categorically eligible for the ARRA GPR under the environmentally innovative category. Over $20 million of ARRA GPR assistance went to fund decentralized treatment projects.[3]

Choosing Decentralized Treatment Solutions

While centralized treatment may make the most sense for areas with high population density that produce a relatively high volume of wastewater, decentralized systems can have a number of distinct advantages for smaller communities. For example, operational costs are reduced by treating effluent close to its source. The risks associated with failure are also reduced as impacts are less widespread and easier to resolve.

Site conditions can also impact wastewater treatment decisions. Different treatment technologies are suited to different sites based on factors such as soil type and topography. Cost and level of treatment must also be considered. There is a broad range of options for both onsite and cluster systems. For example, the most basic form of an onsite system is a traditional septic tank and drainfield. However, there are also advanced treatment options that create a higher quality effluent and reduce pollutants entering the watershed. Following treatment, most decentralized systems disperse the treated effluent to the soil, where it undergoes further treatment, although some also directly discharge to waterbodies. The many options available in decentralized treatment make it possible for communities to choose a system that is most appropriate for their needs.

[2] Purdue University (2005). Septic System Failure. Available at http://www.extension.purdue.edu/extmedia/henv/henv-1-w.pdf.

[3] Data obtained from the EPA Clean Water Benefits Reporting System.

THE VALUE OF PARTNERSHIP BUILDING

One way that many states maximized the impact of their CWSRF ARRA grant was through the use of partnerships. Partnering with other state agencies, local governments, or nonprofit organizations is a way to identify new borrowers and increase the efficiency of the loan process, and ultimately the impact of the loan.

Many states, such as Ohio, have limitations on providing loans directly to individual homeowners due to the burden of administering large numbers of loans. However, the Ohio CWSRF program has formed partnerships with local government agencies and provided ARRA funds to these agencies that then passed funding along to individual homeowners with failing onsite systems. West Virginia used partnerships to help ensure that all of the water quality goals they set for their decentralized projects were met, which would have been difficult for resource-constrained communities to do on their own. As a result, the beneficial impact of these projects increased exponentially. Case studies from these two states demonstrate the importance and utility of partnerships.

Ohio

Through creative use of state and local partnerships, Ohio funded more decentralized wastewater treatment projects than any other state with ARRA funds as part of their Home Sewage Treatment System (HSTS) program. Through the HSTS program, repair or replacement of onsite treatment systems were eligible for ARRA CWSRF principal forgiveness loans equaling 75 percent of the total project cost. Funding agreements were made with local government agencies, which then passed the money on to homeowners, who were responsible for obtaining funding for the remaining 25 percent of the project costs.

The state also worked in partnership with local health districts to manage projects and ensure project compliance, both in terms of state rules and ARRA requirements. These health districts were responsible for review and approval of the individual projects before the CWSRF would reimburse communities for the costs. Through cooperative action at all levels – including state, county or municipality, health district, and homeowner – Ohio's HSTS program was able to fund repairs and replacements for a large number of aged or failing onsite treatment systems and ensure cleaner water for the state. Ohio plans to continue to fund projects under this program in future funding cycles.

West Virginia

A decentralized wastewater treatment demonstration project in Lincoln County, West Virginia provides another example of the benefits of partnerships. In 2005, the Lincoln County Commission and West Virginia Department of Environmental Protection began a project funded by the U.S. EPA to demonstrate the water quality benefits of installing innovative decentralized wastewater systems for homes where current septic systems were failing or nonexistent.[4] The success of the initial phase of this project led Lincoln County to apply for further funding under the ARRA GPR. The county was awarded a $719,000 principal forgiveness loan for 19 additional systems in the Left Fork Watershed.

[4] U.S. EPA (2005). Lincoln County – US EPA Cooperative Project: Final Report—Key Lessons Learned. Available at http://www.epa.gov/owm/septic/pubs/mudriverwv_finalreport.pdf

This demonstration project is an excellent example of a true community effort.

In addition to a large amount of community involvement, including dozens of meetings to ensure transparency, partnerships were formed that helped to maximize knowledge gained from the project. For example, ecology classes in Lincoln County schools participated in water quality testing. University partnerships also proved critical. The biotechnology department at Marshall University assisted the Lincoln County Commission in water quality testing, which determined that *E. coli* in the watershed was the result of human contamination. West Virginia University also was able to provide support to water testing efforts, as well as institutional knowledge related to water treatment. The results of the water quality tests performed by these university partners were used to measure the impact of the installation of new onsite systems for participating homes. This information contributed to fact sheets and other materials that will be used to showcase its benefits to the Left Fork community and beyond.

CONCLUSION

The environmental and public health risks associated with aging or failing onsite wastewater systems result from untreated sewage leaching into surface and groundwater. This often causes the eutrophication of waterbodies through excessive algal production resulting from high nutrient loads, creating a hypoxic environment where aquatic species cannot survive and humans may be exposed to harmful toxic microbes, protozoa, bacteria and viruses. The CWSRF, as demonstrated through the ARRA GPR, can provide attractive funding solutions that enable decentralized systems to retain the flexibility and affordability that makes them so valuable in rural and suburban areas while also protecting water quality through rehabilitation and replacement efforts. The use of partnerships and creative funding mechanisms can provide greater access to these funding opportunities, thus maximizing the long-term benefits and impact of decentralized wastewater projects.

For more information please see our website
http://www.epa.gov/cleanwatersrf