

## FROM NSFC TO NOWIC AND BEYOND

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### ABSTRACT

The National Small Flows Clearinghouse (NSFC) was originally established by the 1977 Clean Water Act and funded by the U.S. Environmental Protection Agency (EPA) to protect the public health and environment of the nation's small communities. The NSFC provided objective information about innovative and alternative technologies to address wastewater issues characteristic of small communities and rural areas across the country. Some of us fondly remember NSFC and the services it provided in terms of information exchange and technical assistance to all groups of people interacting with onsite systems, from users to practitioners to decision-makers. For almost a decade, most of NSFC's activities have been discontinued due to a lack of funding. What remains is access to past issues of NSFC's publications, *Small Flows* and *Pipeline*, and reference materials related to wastewater and drinking water. The toll-free hotline is no longer available; however, a regular number will reach an employee of West Virginia University's Energy Institute.

At Texas A&M University (TAMU), we believe it's time to renew efforts to fund a new generation information center devoted to supporting education, training, research, and demonstration activities related to onsite water issues, through the **National Onsite Water Information Center**, or NOWIC (pronounced as "Now I see"). Just like the initial funding for NSFC from the Clean Water Act (CWA), we have an opportunity to fund NOWIC through the recently enacted America's Water Infrastructure Act of 2018 (AWIA). This paper and the presentation to follow, provides a brief history of the NSFC and its current status, details about TAMU's ongoing activities related to onsite water, and a collaborative plan to address today's water issues continuing to plague our nation's small communities and those living outside the reaches of centralized systems. With the support of NOWRA and its membership, we must continue to advocate for our fellow citizens and bring attention to the fact there is still an overwhelming population of our country not being provided basic water (i.e., wastewater and drinking water) treatment services. NOWIC (*or the NOW Center*) will consist of a collaborative effort between various land grant institutions with the purpose to provide assistance to small communities, rural and suburban areas, and individuals concerning current water issues. The land grant institutions, or Regional Centers working in conjunction with NOWIC, will be appropriate to address region-specific challenges that play a hinderance to adequate water services.

### INTRODUCTION

Managed onsite water and wastewater systems play, and will continue to play, an important role in our nation's water infrastructure (US EPA Report to Congress, 1997). Advances in water and wastewater treatment technologies are allowing available water to be kept in a localized, hydrological cycle closer to facilities where water is needed and reducing adverse impacts of

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climate change on water availability. Texas, along with many other states, needs to increase reliable water supplies and make their water infrastructure resilient (climate-proof) through better management of surface / groundwater sources, inclusion of alternative water sources (i.e., rain, atmospheric, and desalinated water), and improvement of overall water-use efficiency through wastewater reuse.

The **One Water** concept (Figure 1) allows for integration of stormwater management, wastewater treatment, and potable water supply into a single system. Managing water onsite is an integral part of the **One Water** concept; hence, we are referring to it as the Onsite, One Water ( $O_2W$ ) concept to include Innovation, Information, and Training ( $I_2T$ ). Despite the importance and funding given to water infrastructure for our nation, the American Society of Civil Engineers (ASCE) infrastructure report card assigned a grade of “D” for water and “D+” for wastewater infrastructure. (Report Card for America’s Infrastructure, ASCE, 2017). Trillions of dollars are expected to be spent (invested) refurbishing our aging 19<sup>th</sup> and 20<sup>th</sup> century water infrastructure; however, very little of these funds, if any, will be considered for more efficient and cost-effective decentralized approaches. The time is **now** to implement the  $O_2W$  concept to existing and planned water infrastructure projects, an important and vital step for communities to become sustainable and resilient. We believe NOWIC could go beyond to become  $NO_2WI_2TC$ .

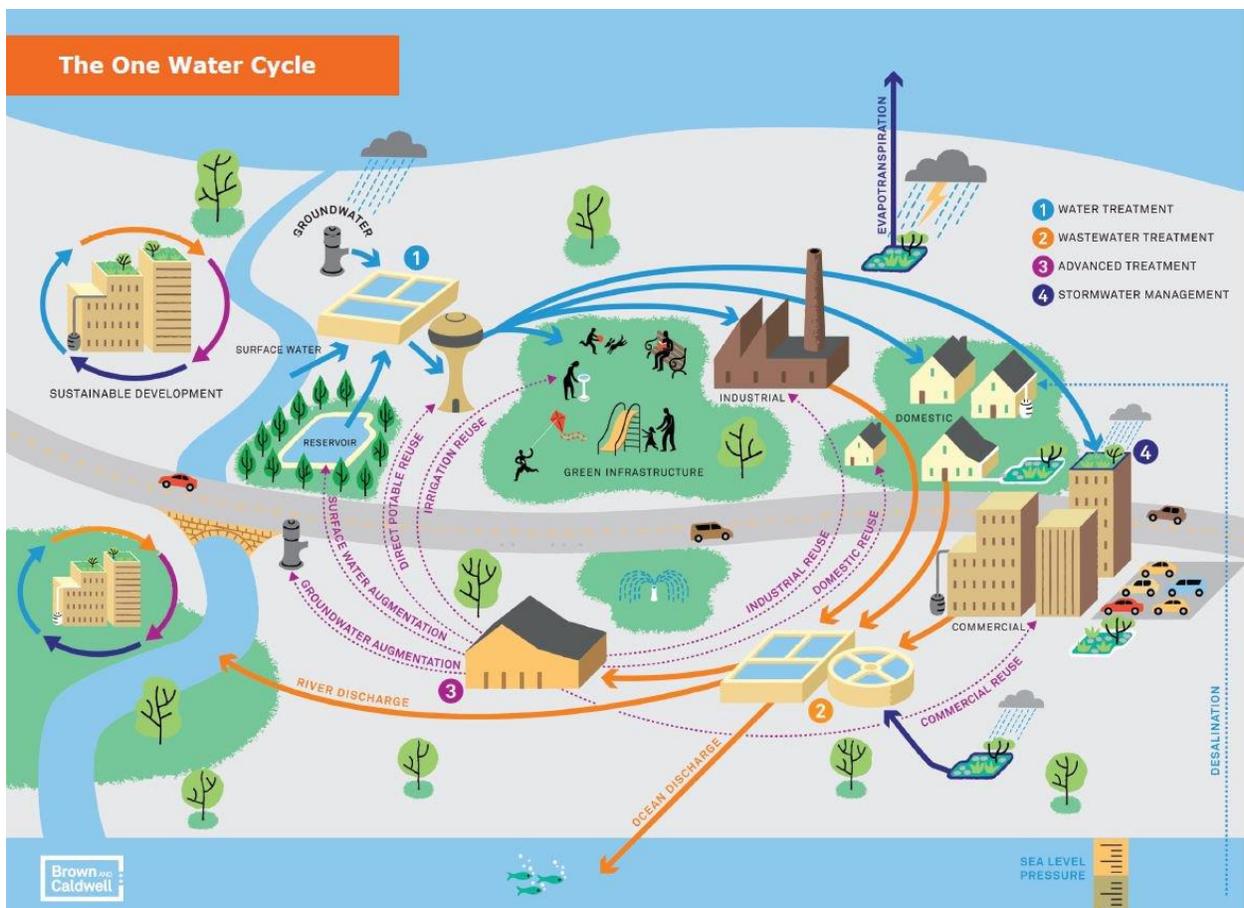


Fig. 1. The One Water Concept as developed by Brown and Caldwell for the Water Research Foundation (Image: © by Brown and Caldwell).

Over the next few years, billions of dollars will be spent on centralized approaches to upgrade water infrastructure resulting in costly per customer rates. Little consideration, if any, will be given to decentralized or onsite solutions. A systematic approach for applied research, information dissemination, education, workforce development, and training related to **One Water** does not exist; but, its existence would impact water infrastructure outcome by providing alternative options for communities to consider potentially leading to reduced project costs or additional customers served (i.e., more bang for the buck). We are making a case to establish a National Onsite One Water Innovation, Information, and Training Center (**NO<sub>2</sub>WI<sub>2</sub>TC**) with several regional centers to systematically promote integration of managed onsite water systems in both centralized and decentralized water infrastructure with the goal of making water infrastructure more resilient to climate change, supportive of economic development, and improve quality of life.

## NSFC

The National Small Flows Clearinghouse (NSFC) is known to many in the onsite industry, its contributions during 1980s and 1990s are well known. As a matter of fact, NSFC hosted one of the planning meetings to form NOWRA on the WVU Campus in Morgantown, WV. Both the authors of this paper started their career in the onsite industry at the NSFC and are still working in the field of onsite water. A few years ago, the National Environmental Services Center (NESC) published the history to celebrate its 30 years of helping small communities (NESC Media Room, 2011) As the article indicates, NSFC was established 40 years ago in 1979 by Professors Willem Van Eck and Raul Zaltzman with a goal for “*protecting the public health and environment of the nation’s small communities by providing wastewater information and assistance.*” The need for such a center was recognized in the Clean Water Act of 1977. With the funding from the U.S. Environmental Protection Agency (EPA), NSFC was set up at WVU with the help of West Virginia Senator Jennings Randolph and Professors van Eck and Zaltzman. Other faculty and students from WVU supported NSFC’s activities related to information dissemination. NSFC operated a toll-free phone line to offer technical assistance to small communities facing wastewater challenges. In 1980, the first issue of *Small Flows* was published, and its publication continued through the 2000s. In mid-1990, NSFC started a second publication, The *Small Flows* Journal, that contained a collection of professional papers on the studies of onsite and small community wastewater issues. Both the publications (Photo 1) were circulated among onsite industry professionals at no cost. In 1991 two new programs were added, the National Drinking Water Clearinghouse (NDWC) and the National Environmental Training Center (NETC) for small communities Also, in 1993 the first of the National Onsite Demonstration Projects began in Gloucester, MA. This eventually grew to become the National Onsite Demonstration Program (NODP) under which alternative wastewater treatment technologies were showcased at numerous sites across the country.

In 2016, NESC transformed into the Appalachian Community Technical Assistance and Training (ACTAT) Program, in partnership with the University of Kentucky’s Water Resources Research Institute and the University of Tennessee-Knoxville’s Water Resources Research Center. The partnership between the three universities WVU, UKY, and UTK offers a model for providing face-to-face training and technical assistance for improving conditions of water infrastructure and services in small, rural communities.

**Georgia High School Students Initiate Creek Cleanup**

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Small Flows

By Nondie Eddy  
NSFC Staff Writer

A group of high school students from Ellijay, Georgia, recently learned an important lesson in how a small group can make a big difference by raising a community's consciousness.

Three students from Gilmer High School, along with teacher Mark Stallings, called attention to a point source wastewater management problem in a local stream and undertook solving the problem by contributing it with the solution to another pollution problem.

During a routine stream investigation, the students discovered that fecal coliform levels in Cox Creek were extremely high, the result of raw sewage being dumped from 22 homes into the two-mile tributary into the Ellijay River, one of the major sources of recreation for Gilmer County.

Throughout the process, the students learned about environmental issues, won a national scholarship award contest, and got an opportunity to study water-wastewater issues.

Small Flows Journal

Stallings, who teaches 10th and 12th grade biology, "It was an incredible life experience," said Stallings. "It taught the kids how much effort it takes to find solutions to problems and not just talk about it. The kids are far more proactive now, and they understand what it takes to solve problems. It made a huge difference in the student body, giving them an improved attitude and community spirit, and it has made the community feel better about the school."

**Project Beginning**

The project began during the fall semester of 1992 when Stallings decided to put together a team of students to do stream investigations, including one senior, one junior, and two freshmen. The students conducted the investigations as part of a national environmental contest, called the Saha Youth Challenge.

The students had been studying water-wastewater issues in biology class. Stallings used a lot of information from Small Flows to help teach the students about environmental issues and how other communities are resolving their problems.

"Frankly, we were just doing things at random," said Stallings.

Ellijay High School students (left to right, standing) Jennifer Stallings, David Smith, and Rebecca Smith worked closely with local and county agencies to solve the Cox Creek pollution problem. They are shown here working with Jay Brown, Ph.D., member of the health division (far left) and one of the chairmen of the Gilmer County Board of Health. Photo courtesy of the Times Courier, Ellijay, Georgia.

"I asked around looking for resources, and the local sewage treatment plant said they would run 10 fecal coliform tests for us free if we brought in samples."

When the students tested Cox Creek, they found the fecal coliform organism levels to be extremely concentrated. After consulting with Peasey of the Gilmer County Environmental Health Department, the students learned that Peasey had been trying to address the same problem for 18 years.

Additional fecal coliform tests showed that the rate of organisms increased as the creek progressed to its final destination, the Ellijay River.

"The bacteria along the creek were both 50 or 60 years old, and they were built there because it was easy to dispose of their sewage into the creek."

Continued on page 2

**Small Flows Special Issue Looks at Pollution Prevention**

By Nancy Greer  
Small Flows Editor

Benjamin Franklin said it first, and perhaps best—our sense of prevention is worth a pound of cure. That's the basic idea behind pollution prevention, a strategy that concentrates on reducing pollutants at the source, rather than waiting until expensive methods are required to control or eliminate them.

Once the waste has entered the environment, removing it is often an expensive and time-consuming task. In addition, cleaning up pollution after it has occurred is often less than effective, and it may also simply transfer pollution from one medium to another.

**Changing Perceptions**

Because pollution prevention encourages participation on the part of those doing the polluting, implementing it often requires changing the way people perceive pollution. Traditional thinking about pollution puts the blame on those in charge of treating it. The new emphasis is on becoming aware of the environmental repercussions of the actions—both immediate and long-term—and looking to change that behavior.

Background

Pollution prevention became a national objective with the passage of the Pollution Prevention Act of 1990. That act established a hierarchy of environmental protection measures, declaring that pollution should be prevented at its source whenever feasible.

That is precisely the goal of the act.

As the act points out, "The opportunities for source reduction are often not realized because existing regulations, and the industrial processes they require for compliance, focus upon treatment and disposal, rather than source reduction."

Helping America's small communities meet their wastewater needs

CELEBRATE EARTH DAY 1995 with big savings from the NSFC

In the spirit of Earth Day 1995, the National Small Flows Clearinghouse would like to help you celebrate the season by offering a special discount on our entire line of environmental information products.

We are offering 50 percent off all products for orders placed by phone or fax between Wednesday, May 31 and Wednesday, May 31.

Phone (800) 624-8301 between 9 a.m. and 5 p.m. EST to place

or fax your order to the National Small Flows Clearinghouse, 301 291-3161. Fax orders are accepted 24 hours a day.

Please note that shipping and handling charges for a minimum of \$25 will apply. Please allow four to six weeks for delivery.

Don't forget that the NSFC now accepts payment by VISA and MasterCard!

As the act points out, "The opportunities for source reduction are often not realized because existing regulations, and the industrial processes they require for compliance, focus upon treatment and disposal, rather than source reduction."

Continued on page 9

The Small Flows Journal

A collection of professional papers on the study of onsite and small community wastewater issues.

NATIONAL SMALL FLOWS CLEARINGHOUSE

Photo 1. Two publications many in the onsite industry are familiar with were developed by the NSFC.

ACTAT team members from all three universities are using the *Rural and Small Systems Guidebook to Sustainable System Management* (USEPA, 2017) and the companion *Workshop in a Box: Sustainable Management of Rural and Small Systems Workshop* (USEPA, 2016) both documents developed as a joint effort between US EPA and the United States Department of Agriculture (USDA) as the basis for a step-by-step process leading to outreach, technical assistance, training, and community water system improvement activities. Communities in West Virginia, Kentucky, and Tennessee are serving as "trailblazer" sites to validate the model. Subject matter experts and community outreach capabilities available through land-grant institutions are leveraged to improve community water infrastructure, provide water services that meet state and federal regulations, and promote economic development. Having a resilient and sustainable water infrastructure is important for rural communities' economic and social development.

The question now is should the project like ACTAT be expanded to serve rural communities all over the country using a partnership among the water resources institutes? We believe it should be done, and the focus should be on **One Water** that encourages communities to manage their drinking water, storm water, agricultural water, and wastewater incorporating onsite/decentralized technologies for treatment and reuse. During the late 1990s, numerous technologies were developed for onsite and decentralized water and wastewater management, with similar progress made for stormwater management technologies. Familiarity with more than one water service yields many cases of same technologies being utilized for different purposes. However, innovation for integrating these technologies for applications in One Water infrastructure is greatly needed. Moreover, training of the new generation of designers, installers, and operators and service providers is also needed for successful long-term implementation of **One Water** in small

communities. Thus, we believe now is the time for establishing a National Onsite One Water Innovation, Information, and Training Center (NO<sub>2</sub>WI<sub>2</sub>TC) with several regional centers to systematically promote integration of managed onsite water systems.

## **NOWIC and NO<sub>2</sub>WI<sub>2</sub>TC**

In September 2018, the 115<sup>th</sup> United State Congress passed the “*America’s Water Infrastructure Act of 2018*” (AWIA) in which NOWRA successfully introduced the following three provisions (NOWRA Act, 2018):

- **Information Clearinghouse.** EPA is directed to set up a technology clearinghouse on the cost-effectiveness of alternative wastewater technologies, especially onsite/decentralized wastewater treatment.
- **Disseminate Information to Local Governments.** EPA must share information about the cost-effectiveness of onsite/decentralized wastewater treatment with local governments and non-profits seeking federal funding.
- **Report to Congress.** One year from now (and every three years thereafter), EPA must tell Congress how well it has met the first two objectives and describe what other actions it has taken to increase deployment of onsite/decentralized treatment.

In late October 2018, President Trump signed AWIA making it into the Public Law 115-270 (Law), that provides funds for water infrastructure improvement throughout the country as well for technical assistance to small communities. Just like any other public laws, AWIA is long and complicated. It is difficult to understand how it could offer funds for setting up center(s) to offer technical assistance to small communities related to information, innovation, and training for One Water. We found a few sections in **Title 2 of the Law** that are applicable specific to drinking water:

1. Section 2007: INNOVATIVE WATER TECHNOLOGY GRANT PROGRAM,
2. Section 2017: REVIEW OF TECHNOLOGIES, and

One additional section in **Title 4 of the Law** that is applicable:

3. Section 4304: WATER INFRASTRUCTURE AND WORKFORCE INVESTMENT.

The Law gives “*Authorization of Appropriation*” for just the above three sections, combined it is \$32,000,000. There may be more sections giving similar authorization. However, it is not clear if funds authorized were appropriated in the EPA’s budget or how those funds would be used to fulfill obligations. Support from the NOWRA member groups (*educators, regulators, engineers, contractors, manufacturers, suppliers, service providers, and other interested parties*) would build momentum in securing funding for establishing **One Water** to support technology innovation and research, information dissemination, training, and workforce development.

NOWRA’s success in raising the awareness related to the onsite/decentralized wastewater treatment in the AWIA is commendable; however, it is time for the NOWRA membership to embrace a **One Water** concept that includes all water resources (e.g., rainwater harvesting,

drinking water treatment, and wastewater reuse) moving from the current model of a single-source, single-use onsite water concept to a multi-source, multi-use onsite water concept that sustains the fresh water resource.

Rainwater harvesting is gaining momentum in Texas with many new homes being built where rainwater is the only source of water. Excess rainwater is stored in storage tanks for future use. The Texas A&M AgriLife Extension Service offers an education and training program for homeowners to design a rainwater harvesting system (Texas A&M AgriLife Rainwater Harvesting Website). Jantrania, et. al, (2017) presented a hypothetical case study of an individual home in Texas where the average annual rainfall is not enough to meet the daily water demand. The On-Site Sewage Facility (OSSF) program at the Texas A&M AgriLife Extension is currently assessing the feasibility of developing a water treatment train that would purify highly treated wastewater to drinking water quality. Onsite One Water technologies are not too futuristic, and with the support of both wastewater (septic/decentralized) and drinking water (well) industries, it is possible to bring a prototype **One Water** technology into the marketplace within a couple of years. Figure 2 illustrates the concept of integrating rainwater harvesting and wastewater reuse into a decentralized, **One Water** infrastructure concept.

The Texas A&M University RELLIS Campus offers a great opportunity to establish the National Onsite One Water Innovation Information and Training Center. Already home to one of the oldest and still operating onsite wastewater treatment training centers in the country (Texas A&M AgriLife OSSF Website), the RELLIS Campus is undergoing a multi-million-dollar renovation project that will bring several new academic and research facilities requiring a brand-new water, wastewater, and stormwater infrastructure.

*Single-Use Water Infrastructure (Decentralized): Depleting Fresh Water Sources ...*



*Re-Use Integrated Water Infrastructure (Decentralized): Sustained Fresh Water Sources ...*

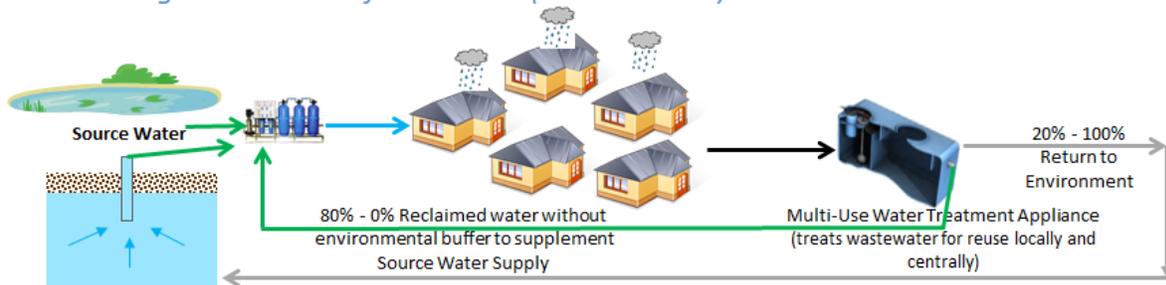


Fig. 2. Managing all water onsite as One Water to sustain freshwater resources.

If the onsite water and wastewater industries are looking for an opportunity to demonstrate the application of the **Onsite One Water** infrastructure concept in real world, then establishing a permanent national center to focus on research, innovation, training, and information

dissemination while using the RELLIS Campus as a “*living laboratory*” is the way to do it. Texas Water Resources Institute (TWRI) is ready to lead and offer to house the center if/when funding becomes available. Texas Commission on Environmental Quality (TCEQ), the state regulatory agency has rejuvenated research funding for onsite systems and the onsite team at TAMU has successfully secured the first round of funding to support three research projects, one of which will focus on reuse of treated wastewater. A five-year, federally funded program started this year gives fellowship to eight undergraduate students to learn about onsite reuse water quality and get hands-on experience in research and extension programs (Texas A&M REEU Program Website).

With the focus on research, education, extension, and training projects, Texas A&M University’s onsite wastewater team is ready to embrace the onsite **One Water** infrastructure concept and to serve as the national center with other land grant institutions to serve as regional centers such that together, all small communities nationwide can be served efficiently and effectively. Funding from the AWIA for an initial five-year start-up would provide the seed money to initiate **One Water** and leverage other federal, regional, industry, and private funding with the goal to become self-supporting by the fifth year.

## REFERENCES

American Society of Civil Engineers (ASCE). 2017. 2017 Infrastructure Report Card. <https://www.infrastructurereportcard.org>.

Jantrania, A., Karimov, A., Bonaiti G., and Gerlich, R., 2017. Reusing Water Onsite – Opportunities and Challenges (ASABE Paper Number: 1700085).

National Environmental Service Center (NESC) Media Room, 2011. NESC Celebrates 30 Years of Helping Small Communities (<http://www.nesc.wvu.edu/>).

National Onsite Wastewater Association (NOWRA) 2018. President Trump Signs NOWRA Act Legislation (<http://www.nowra.org/>)

Texas A&M AgriLife Rainwater Harvesting, On-Site Sewage Facility, and REEU Programs Websites: <https://rainwaterharvesting.tamu.edu/>, <https://ossf.tamu.edu/>,

USEPA (United States Environmental Protection Agency). 1997. Response to Congress on use of decentralized wastewater treatment systems. (Report 832-97-001b). Washington, DC.

United States Department of Agriculture (USDA) and United States Environmental Protection Agency (USEPA). 2017. Rural and Small Systems Guidebook to Sustainable Utility Management.

United States Department of Agriculture (USDA) and United States Environmental Protection Agency (USEPA). 2016. Workshop in a Box: Sustainable Management of Rural and Small Systems Workshops.