RURAL matters

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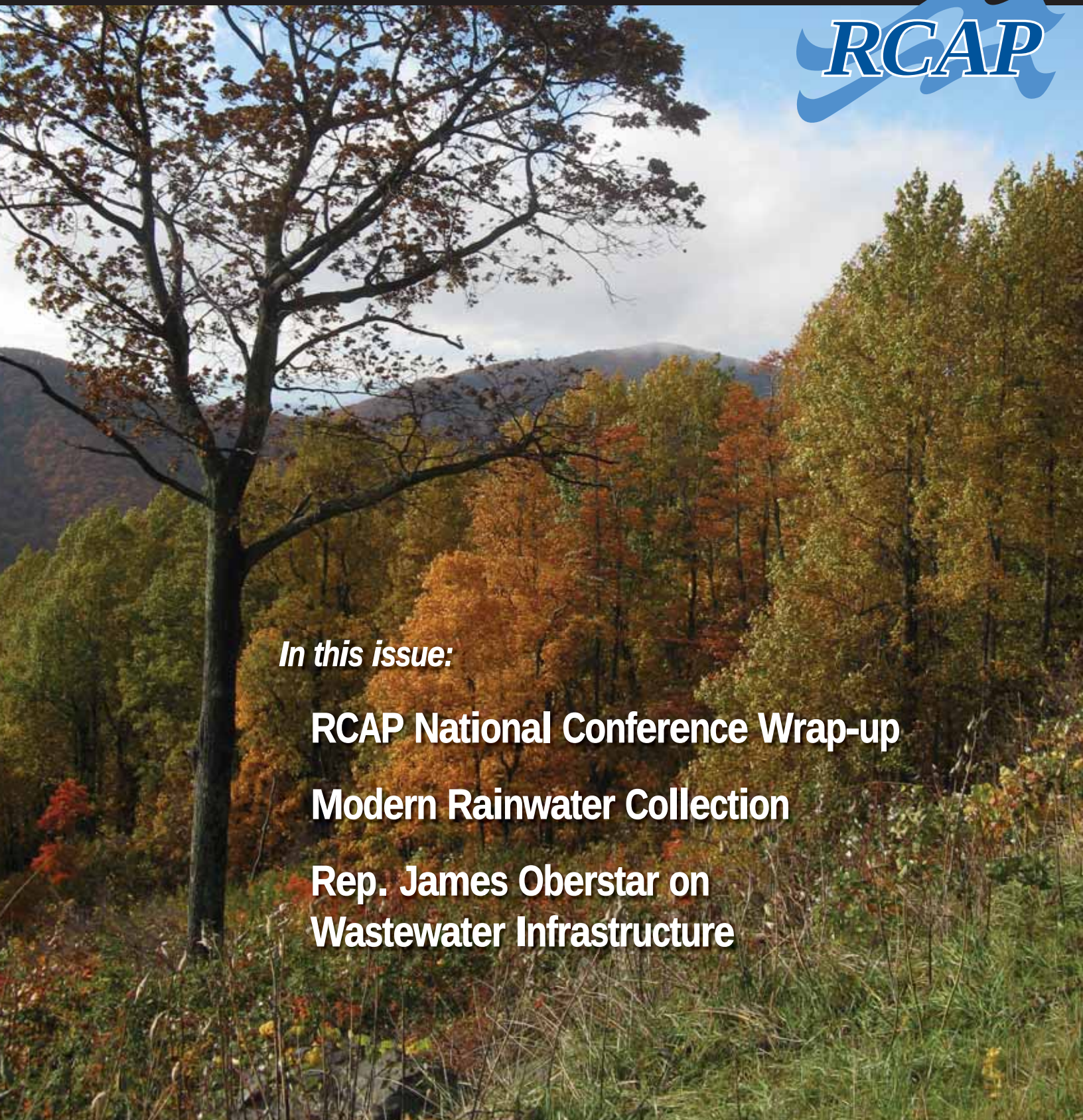
RCAP



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RCAP National Conference Wrap-up

Modern Rainwater Collection

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Southeast Rural Community Assistance Project, Inc.

Water Is Life

Modern rainwater collection provides potable water for a Virginia community

Douglas W. Phillips, Jr.

The Virginia community of Morton Lane had a problem. It needed another source of water to supplement an old community well as it was revamping its water and wastewater systems. The solution literally fell from the sky.

Photo by Rasmey MauRaymond

Southeast Rural Community Assistance Project began working in Morton Lane in 2002 to provide new housing to residents who lacked complete indoor plumbing and lived in substandard housing. This project eventually led to a joint effort among local and state governments, community action agencies and contractors in order to provide innovative solutions to the small community's water and wastewater needs.

Situated in the foothills of mountainous Greene County, about 30 miles north of Charlottesville and on the far eastern side of Appalachia, Morton Lane is a low-income minority community.

Maxine Morton and her relatives, who in total numbered 11 community residents, lived in a cluster of three mobile homes. Before the project, they shared a pit privy and had never had any sewage disposal system or running water in their substandard dwellings. The residents also shared a well that was drilled about 15 years prior to the start of the project. But the well could not meet the residents' demands and was not fully piped to the houses.

The project determined that the residents were eligible for a complete – demolish and rebuild – rehabilitation.

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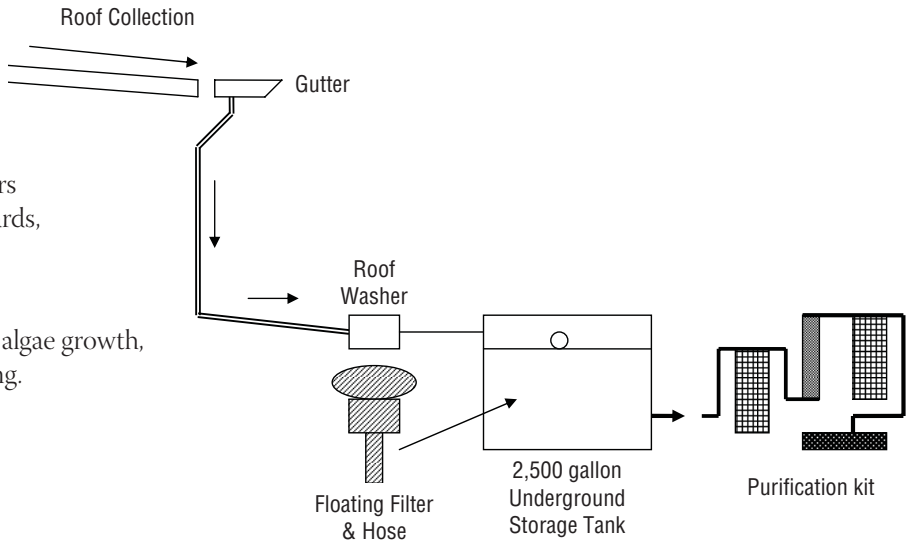
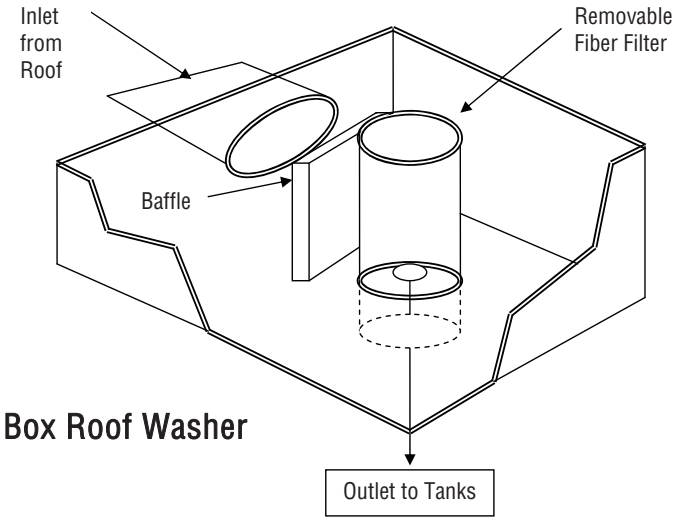
Technical Assistance Provider Douglas Phillips tests the soil in Morton Lane.

Basic components of a rainwater harvesting system

- Catchment surface (roofing material)
- Conveyance system – gutters and down-spouts – to channel water from the roof to the tank
- Leaf screens; roof washers; and first-flush diverters (standpipes): These can be in the form of leaf guards, funnel-type downspout filters, strainer baskets, cylinders of rolled screens, or filter socks.
- Storage tanks: They need to be opaque to inhibit algae growth, have screened vents, and be accessible for cleaning.
- Delivery system and pressure tanks
- Treatment/purification





All four tanks are polyethylene underground storage tanks.

The delivery system for Morton Lane consists of parallel SSHM-2 Berkeley booster pumps, one for the well side and one for the rainwater side of the pump house.

Following this is the disinfection train, which consists of parallel sets of sediment filters – a 5-micron fiber cartridge filter followed by a 3-micron activated charcoal cartridge filter. These are followed by an ultraviolet light.

There is a float switch in Tank 1 to protect the rainwater delivery pump. The float opens a solenoid. A similar float switch is in the well tank to protect the well-side delivery pump. A float there opens a solenoid to recharge the tank.

Operation and maintenance

Appropriately designed rainwater harvesting systems require very little maintenance. However, like any household component, they should be checked periodically to ensure an efficiently and appropriately operating system. The following comes from the *Virginia Rainwater Harvesting Manual*, compiled by The Cabell Brand Center.

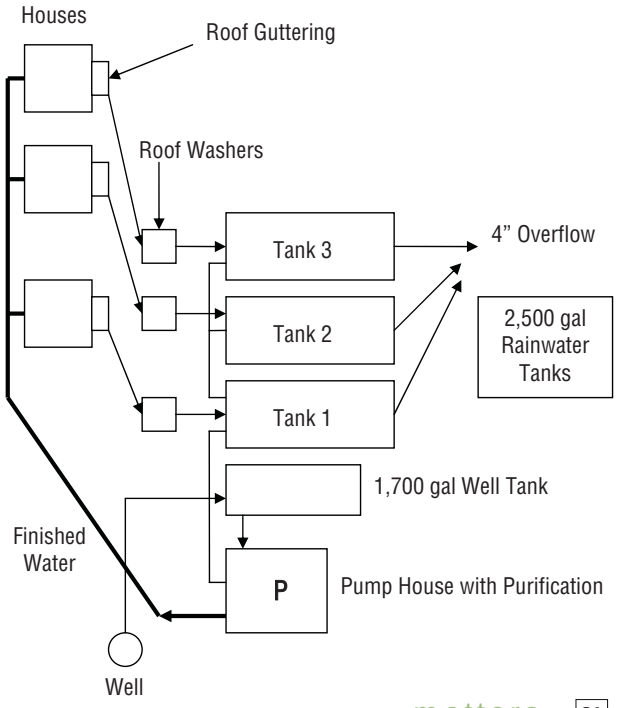
Gutters:
Periodically flush to clear organic matter and eliminate clogs.

Downspouts:
Check occasionally and remove debris, especially at connection to the gutter.

Roof washer filters:
Periodically clean. Replace cartridge yearly.

Tanks:
If a first flush filter is not used, clean annually to remove organic debris.

UV light:
Manually clean the quartz sleeve.



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Southeast RCAP became involved in the project at the request of the Skyline Community Action Program. This local community action agency asked that Southeast RCAP provide technical assistance, engineering and field construction help. Its involvement enabled Skyline to meet its family home rehabilitation funding requirements for water and wastewater services.

Three homes were constructed for the families, but poor soil conditions prevented individual onsite septic fields. Many alternative onsite schemes were evaluated, including mounds, drip disposal and constructed wetlands. A solution was found by obtaining a county easement approval on a neighboring lot where a conventional mass drain field with a pumping system could be built.

Douglas Phillips, the Technical Assistance Provider from Southeast RCAP working on the project, did the full engineering design for a dual septic tank, pumped effluent and treatment field and submitted it to the county health department.

Workers install the rainwater harvesting collection tanks and mixing mechanisms, which are buried underground (top). Installation of the roof washers (bottom). Photos courtesy of Douglas Phillips.

Solution from the sky

As for the problem of providing sufficient water for the new homes, a solution needed to be found to augment the existing well. Phillips helped procure funds to hire a company to design and install an innovative rainwater collection system using a modern roof washing, filtering and disinfection process.

The system consists of a roof wash collection and filtering component, underground storage tanks and valves for blending the system with water from the well. The system is further constructed so that it is sustainable. This means that with minimal homeowner maintenance, the system will operate indefinitely without a need to drain the tank to clean it or regularly replace its parts and filters. (See diagrams on previous page.)

Cabell Brand, a member of Southeast RCAP's board of directors, has been instrumental in promoting the use of rainwater harvesting as a responsible conservation method. He promotes this technology as one viable solution to the problem of eliminating homes that lack complete indoor plumbing.

According to the *Virginia Rainwater Harvesting Manual*, compiled by The Cabell Brand Center, "Rainwater harvesting offers an affordable, simple, sustainable, and reliable alternative water source. Not only does rainwater harvesting supply water for indoor and outdoor use, it protects the environment from detrimental nonpoint source pollution by reducing rooftop runoff."

As the project neared completion in 2008, Phillips and the contracted company established detailed standard operating and maintenance as well as emergency procedures. A list of spare components was included. Everything was posted in the pump house, and efforts were made to educate the residents on the basic operation of both the potable rainwater system and the onsite wastewater pump.

Skyline Community Action Program director Kim Smith said to Southeast RCAP: "We are so thankful that you all have worked on this project and that you have worked hard at the site as well." ■

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