WATER INFRASTRUCTURE FINANCE AUTHORITY OF ARIZONA

Clean Water State Revolving Fund

EPA United States Environmental Protection Agency

Supporting Wildfire Resiliency Using the CWSRF Program

An Arizona CWSRF Nonpoint Source Pilot

Photo: Brady Smith, USFS

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Addressing a Growing Problem

Arizona recently used the Clean Water State Revolving Fund, or CWSRF, to help its citizens better protect their communities from wildfire. The United States has averaged 70,000 wildfires per year since 1983. The wildfire season is lengthening in many areas due to warmer spring temperatures, decreases in precipitation and snowpack, longer dry spells and drier soils and vegetation. As global temperatures have increased, the size and severity of wildfires have increased. Although the entire United States is affected by wildfire, National Interagency Fire Center data show the western United States has been the most impacted region. Wildfire can be a significant source of water quality impairment because the loss of vegetation and subsequent erosion from barren slopes can lead to flash flooding, excessive sedimentation, degraded water supplies and diminished recreational opportunities.

Photo: Brady Smith, USFS

Smoke from the June 2010 Schultz Fire sweeps over the ridge of the Vulcan Mine in the Coconino National Forest, Arizona.

Arizona has a long history of devastating wildfires that have burned millions of acres, and these have become more frequent and devastating over the past 20 years. Communities have seen their homes and businesses destroyed, drinking water supply resources damaged and forests decimated. Arizona now experiences an average of 1,500 wildfires every year — more details are available in the 2023 Wildland Fire Annual Report. That trend seems likely to continue, as research indicates that the southwest United States is experiencing an ongoing megadrought.

The Water Infrastructure Finance Authority of Arizona, or WIFA, which administers the CWSRF in Arizona, has been promoting the CWSRF program for projects that address watershed health, green infrastructure and nonpoint source water quality challenges for many years. WIFA coordinates with its sister agency, the Arizona Department of Environmental Quality's Clean Water Act Section 319 Nonpoint Source Program, to identify critical needs and opportunities for project funding. In 2019, WIFA signed a $6 million CWSRF loan with the city of Flagstaff to help finance the activities of the Flagstaff Watershed Protection Project, which is a partnership effort between the city of Flagstaff, the State of Arizona and the Coconino National Forest to implement forest thinning, prescribed fire and other treatments aimed at reducing the risk of severe fire behavior and post-fire flood effects.

What Are the Negative Impacts of Wildfire?

- **Drinking water resources and treatment cost increases:** Impacts on drinking water supplies can persist for at least 5 – 10 years post-wildfire. Negative impacts include increased sedimentation and turbidity, spikes in nonorganic matter and changes in pH and alkalinity that may require changes in treatment methods, cause increased treatment costs and prompt a need to find new water sources, either temporary or permanent.
- **Utilities and infrastructure damage:** Wildfires can quickly destroy/disrupt critical communication and utility assets, such as communication towers and electrical transmission lines, which can be disastrous for firefighting efforts, emergency response, personal communications and business operations during and after the wildfire. Fully replacing or restoring the lost or damaged infrastructure can take years.
- **Property loss:** Wildfires can destroy homes in the wildland-urban interface, and the aftermath can significantly impact the value of the remaining homes left intact near the burned areas.
- **Recreational value and job losses:** Outdoor recreation is an $11 billion industry in Arizona. Wildfires have closed recreational facilities for months, sometimes years. Such closures can result in the loss of thousands of local jobs and millions of dollars in income and revenue.
- **Critical habitat loss:** The loss of forests and vegetation can destroy or damage wildlife habitat for important species, such as the endangered Mexican Spotted Owl.
- **Health and economic prosperity declines:** Many impacts that hit communities hardest come after the fire. Injuries, cardiovascular illness from smoke inhalation, emotional trauma and mental health treatment result in physical and financial costs to individuals.

In 2019 WIFA requested assistance through a U.S. Environmental Protection Agency CWSRF Nonpoint Source Pilot Program to identify tools and strategies for expanding CWSRF financing for wildfire resiliency and to create a CWSRF Forest Thinning and Restoration Program. WIFA sought advice on the following issues:

- What is the most effective way to finance wildfire resiliency projects with the CWSRF, particularly when much of the work will occur on federal or private land?
- How can WIFA make communities more aware of the availability of CWSRF financing for forest restoration projects to generate interest and demand?
- Can WIFA play a role in increasing investment in wildfire resiliency statewide to reduce the impacts of catastrophic wildfires?
- What is the potential demand for CWSRF financing, and what are the options for repayment?

Obtaining Critical Funding for Wildfire Resiliency

CWSRF federal eligibilities allow for the financing of nonpoint source projects if they implement the state's Section 319 Nonpoint Source Management Plan. Arizona's Section 319 plan specifically identifies wildfires as a source of water quality impairment. Although the federal CWSRF statutes allow nonpoint source financing to go to either public or private borrowers, Arizona's CWSRF program statutes only permit loans to public subdivisions of government, such as counties, cities, towns, special taxing districts and Tribal authorities (see Arizona Revised Statutes Title 49, Sections 1203(B)(1)(b) and 1201(14)). Notwithstanding this statutory limitation, WIFA recognized that public entities are not the only ones implementing forest treatments, so it had to plan for innovative options for financing forestry projects.

Many states, such as Arizona, face hurdles because lending is limited to municipal entities. Pass-through loans are commonly used by these CWSRF programs nationally to fund nonpoint source projects by taking advantage of existing relationships with public borrowers. This structure allows a municipality to act as a conduit through which CWSRF funding can pass through to watershed partners who can implement the project. These watershed partners are responsible for repaying the loan proceeds to the conduit municipality, which in turn repays the CWSRF program (Figure 1).

The pass-through loan mechanism allows state CWSRF programs to broaden the horizon of eligible projects and the types of borrowers to which they may offer loans. For WIFA, one of the most attractive features of this approach is that the loan forgiveness it planned to allocate to CWSRF loans for forest treatments could be passed along to the watershed partnership borrower(s). Due to these benefits, WIFA determined that pass-through would be the most likely way it would offer financing to future CWSRF Forest Thinning and Restoration Program projects.

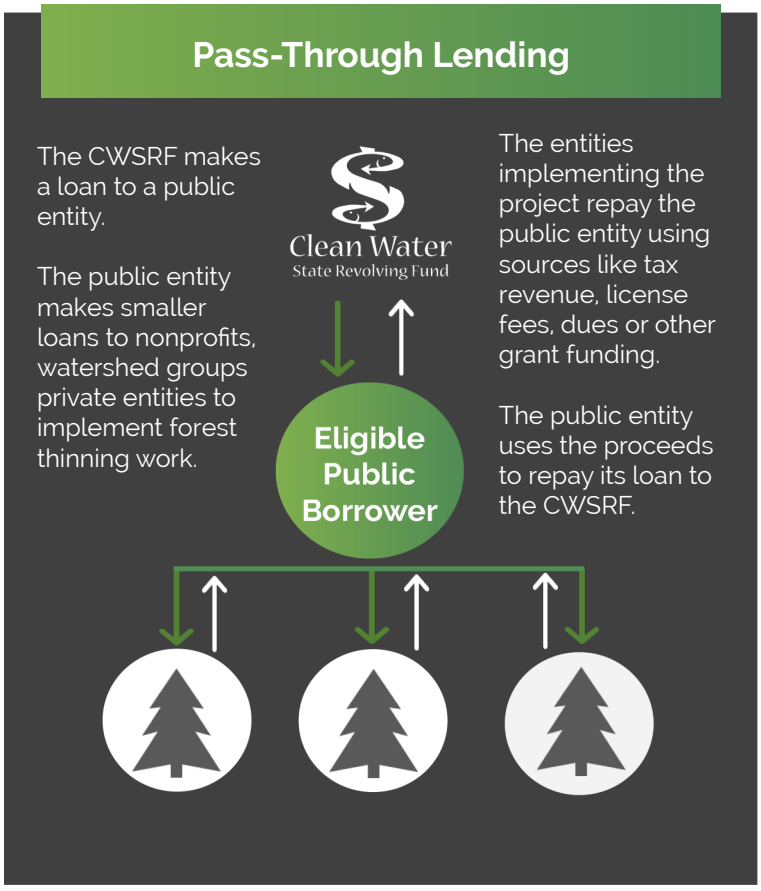

Figure 1. CWSRF's pass-through lending process.

Meeting the Funding Need

The CWSRF can play a key role in providing "gap" financing for forest treatments. The U.S. Forest Service's budgets for treatments such as thinning and prescribed burns to prevent or mitigate wildfire risk are insufficient to cover the full need. Although Forest Service budgets for fuel management activities have increased in recent years, the need greatly surpasses the appropriations, leaving the Forest Service and communities to pursue additional options to help finance the work. For instance, the Forest Service is paying for half of the $62 million in thinning activities around Arizona's C.C. Cragin Reservoir, which supplies drinking water to residents in Phoenix, Payson and other areas. The remaining funding is coming from utilities and ratepayers. There is an opportunity for the CWSRF to supplement Forest Service funding at a low cost to cover this gap. This situation is similar elsewhere in Arizona and thus represents a significant opportunity for WIFA to contribute to making communities and water resources safer.

To the extent that equipment is needed to implement a state's nonpoint source management program plan, the CWSRF can also finance needs such as environmentally friendly logging equipment. CWSRF could also potentially support technology like air curtain burners, which can transform biomass from excess fuel loads into biochar, a versatile product that can enhance pollutant removal when incorporated into green stormwater infrastructure practices.

Identifying Repayment Sources

The range of repayment options for a CWSRF loan is broad. CWSRF-funded forest restoration projects are no exception. Although forest treatment projects can be partially paid for by using timber and biomass revenues, the Flagstaff team acknowledged that these sources might offset the cost only a little. Borrowers have used a wide range of options to repay loans for nonpoint source projects. These options are discussed extensively in the EPA report, *Financing Options for Nontraditional Eligibilities in the Clean Water State Revolving Fund Programs*. A few repayment options are highlighted below:

- **Tax pledge** – A pledge of tax receipts, such as property taxes, flood control taxes and sales taxes. The CWSRF loan awarded to the Flagstaff Watershed Protection Project used a tax pledge.
- **Water utility revenue pledge** – Water treatment costs can increase substantially in the months and years following a wildfire. Water utilities in Denver, Santa Fe and Little Rock have used fees on water bills to fund forest restoration projects. Flagstaff has also approved a monthly fee on water bills to pay for ongoing maintenance and investments in forest restoration.
- **Timber revenues** – At least half of the material obtained in forest thinning is usable lumber. Although transportation costs can be high, there may be revenue potential for loan repayment.
- **Revenues from lower-value slash** – Entrepreneurs and government agencies are exploring potential uses for the lower-value biomass removed during forest thinning; biochar, for

example, can be used as a soil amendment to improve water and fertilizer retention, increase soil carbon and trap pollutants.

- **Electricity generation** – Biomass collected during forest thinning could provide fuel for electricity generation. In California, Phoenix Energy has co-located small biomass gasification plants at the sites of biomass collection, powering nearby facilities while also creating biochar.
- **Fees on park concessions** – Recreation activities and lodging generate significant revenues in national forests, mainly through concessions. A small percentage fee added to a bill could be a source of income for repaying loans that benefit the forest area.

Although the revenue potential for timber revenues, including from slash, and electricity generation is currently low, research and investments aim to expand these options. At this time, these potential revenue sources may not be sufficient to ensure full repayment of a CWSRF loan, so additional sources of security, such as taxes and utility revenues, may be needed to take on a loan. This list of repayment options is not exhaustive. The EPA report mentioned above describes other options, including foundation support, corporate sponsorship, nonprofit fees, development impact fees and nutrient and carbon trading.

Communicating Project Benefits

Obtaining public buy-in for forest treatments is essential in any state, and communication is key. In Arizona, law requires that communities larger than 150,000 people must obtain approval for a WIFA loan by a referendum (for more details, see Arizona Revised Statutes Title 9, Section 571(C)). Municipalities bound by this requirement include Phoenix and many of its surrounding communities, even as their locations in the Salt River and Upper Gila River watersheds put them at risk from wildfires in the surrounding national forests. A 2018 survey and a 2019 focus group of potential WIFA borrowers confirmed that the referendum requirement significantly impedes participation. Therefore, ensuring that communities learn and understand the project benefits will help bolster their support during elections to approve funds for forest treatment projects.

Some Arizona cities, faced with mounting wildfire threats and damage, are making progress on improving communication efforts. For example, during the two years after the city of Flagstaff was impacted by the effects of a catastrophic 2010 wildfire, the city conducted a coordinated campaign focusing on the avoided costs of investing in forest treatments (see box, next page). As a result, the city sought and obtained overwhelming approval for a $10 million bond measure in 2012.

Given Flagstaff's successful efforts to gain approval for forest thinning projects by demonstrating the avoided costs, WIFA focused its marketing efforts for the CWSRF Forest Thinning and Restoration Program on the measurable benefits of prospective projects. To identify specific, measurable benefits, WIFA created a Measurable Benefits Tool, which can be used to calculate the environmental,

Case Study: Flagstaff Watershed Protection Project

In 2010, the city of Flagstaff was ravaged by the Schultz Fire, which consumed more than 15,000 acres of forest outside the city and caused nearly $147 million in damage and the loss of one life in post-fire flooding. The city used the results of Northern Arizona University's **full cost accounting study** of the fire and the strong and vocal backing of the city's fire department to educate local and regional stakeholders on the importance of taking preventative measures through forest thinning and restoration. This led to a ballot initiative in 2012 for a $10 million bond election framed as a critical measure for protecting drinking water supplies and water infrastructure.

Photo: Brady Smith, USFS

A smoke plume from the Schultz Fire as seen from the east side of Flagstaff on June 20, 2010.

The educational campaign was a success, with an overwhelming 74% of the Flagstaff voting public approving the $10 million bond measure. The initiative, now known as the Flagstaff Watershed Protection Project, was the first time the city considered nonpoint source projects to be a part of their Capital Improvement Program and included them in their water infrastructure budget. It is also the only known project of its kind in the country where forest restoration work in a national forest has been funded by a municipality. The 2019 CWSRF loan is part of this bond measure.

economic and social costs and benefits of investments in fuel treatments that can help avoid catastrophic wildfires. The objective of the Measurable Benefits Tool was two-fold:

- Provide real, actionable data for potential municipal and Tribal borrowers on the investment and the potential benefits of borrowing through the CWSRF.
- Offer data and tools to prospective borrowers so they can gain approval from their leadership and voters, if necessary.

The Measurable Benefits Tool developed for Arizona under this pilot project uses quantifiable metrics designed to communicate values that everyday citizens can readily relate to. These data are important to help gain approval for projects from community leaders, as well as voters, if necessary. The metrics in the tool include:

- Lost revenues to local economies

- Impacts on real estate and property values
- Avoided drinking water treatment costs
- Impacts on recreation and tourism
- Public health and economic prosperity

Although these measures are not exhaustive, they provide a well-rounded picture of the potential benefits of forest restoration using available data sources. While a significant portion of the response and suppression costs is typically borne by the federal government, the remaining costs directly impact the local economy, employment and tax revenues.

The Measurable Benefits Tool is customizable by city, county or national forest entities. This customization allows WIFA to create marketing and education packages tailored to the location and characteristics of the community and stakeholders. EPA's contractor used the outputs from the Measurable Benefits Tool to develop a full suite of fact sheets to accompany each metric, which may be distributed electronically or printed for handing out at conferences, workshops and community meetings. They are suitable for use by WIFA and stakeholders interested in pursuing forest thinning and vegetative management efforts in their own communities and watersheds across Arizona (Figure 2).

To help launch the program, WIFA also developed a trifold brochure to highlight the Flagstaff loan, the cost savings that can be realized from investing in forest restoration and the importance and benefits of undertaking such projects. It also describes the Arizona CWSRF program, its financial offerings and its continued commitment to serving Arizona communities and their water quality needs (Figure 3).

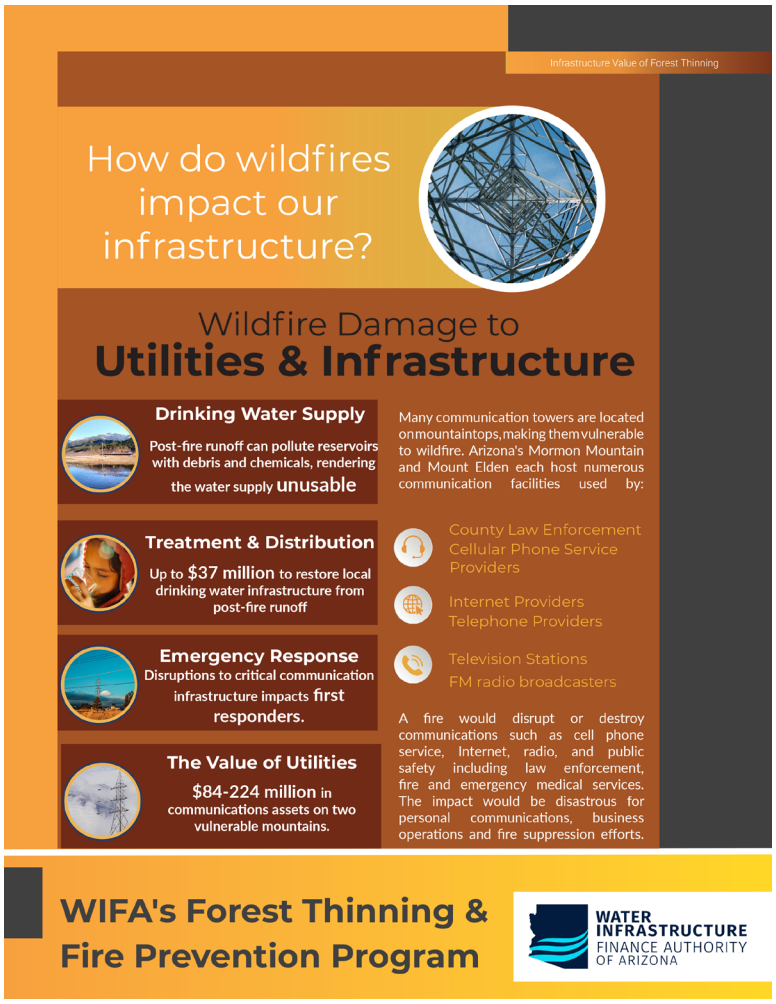

Figure 2. Example utilities fact sheet developed from the Measurable Benefits Tool's outputs.

Figure 3. WIFA's trifold brochure explains the program's economic and environmental benefits.

Sharing Lessons Learned

This pilot project is the first time a CWSRF program has worked to develop a program specifically aimed at forest treatment and wildfire resiliency. Lessons learned include:

- **Critical partnerships** – CWSRF financing typically requires collaboration between the program, the borrower and their contractors. In forest restoration, CWSRF participation may require working with a wider range of entities, including the Forest Service, local governments, Tribal entities and citizen groups. The city of Flagstaff's success can be attributed to its investments in developing partnerships, obtaining buy-in from citizens and committing to maximizing other funding sources, such as grants and in-kind support. The former Flagstaff Watershed Protection Project manager, who had been previously unaware of WIFA or the CWSRF, gives credit to "Team Flagstaff" for the loan, as other city staff helped the project team reach out beyond their typical contacts to identify more creative financing opportunities.
- **Strategic engagement and messaging** – Successful forest treatment programs have framed their work as an investment in avoided costs to prevent catastrophic wildfires. Several cost-avoidance studies, including the Flagstaff Watershed Protection Project's, have shown that the costs of recovering from wildfire significantly outweigh the costs of forest treatments to reduce the risks of catastrophic fire. Obtaining public support for the investments by clearly showing the costs avoided was a key factor to success in Flagstaff and other western cities, such as Santa Fe and Denver. The Measurable Benefits Tool created in this pilot project supports strategic engagement and messaging because it is designed to help calculate the potential avoided costs and convey the messages in a way that is approachable and easily understood by all citizens.
- **Replicability** – The likelihood of higher-intensity wildfires that burn larger areas has grown over the past two decades, with western states at increased risk. The Forest Service has been characterizing watersheds at higher risk to aid in prioritizing restoration efforts, using tools such as Forests to Faucets and Wildfire Risk to Communities. Third-party watershed organizations in states throughout the western U.S. play a significant role in securing financing and coordinating projects to implement forest restoration activities to limit catastrophic wildfires. With a need for funding in each of these at-risk watersheds, CWSRF programs can play an important role. As the nation's largest low-cost source of water quality financing, it can help ensure necessary projects are completed more quickly and on a larger scale. The use of the Measurable Benefits Tool or similar approaches in states prone to catastrophic wildfires can help communities and watershed groups make the case for investing in forest restoration efforts and the use of the CWSRF to help finance those investments.