USDA Source Water Protection Funding: Successes and Opportunities

John D. Murphy and Adam T. Carpenter

Key Takeaways

Source water protection (SWP) programs funded in the 2018 Farm Bill require highly motivated partners for implementation in priority watersheds.

Three categories of past and current SWP projects are discussed: conservation partnership projects, conservation programs for farmers and ranchers, and forestry programs.

There are several examples of utilities and US Department of Agriculture partnering to implement SWP programs.

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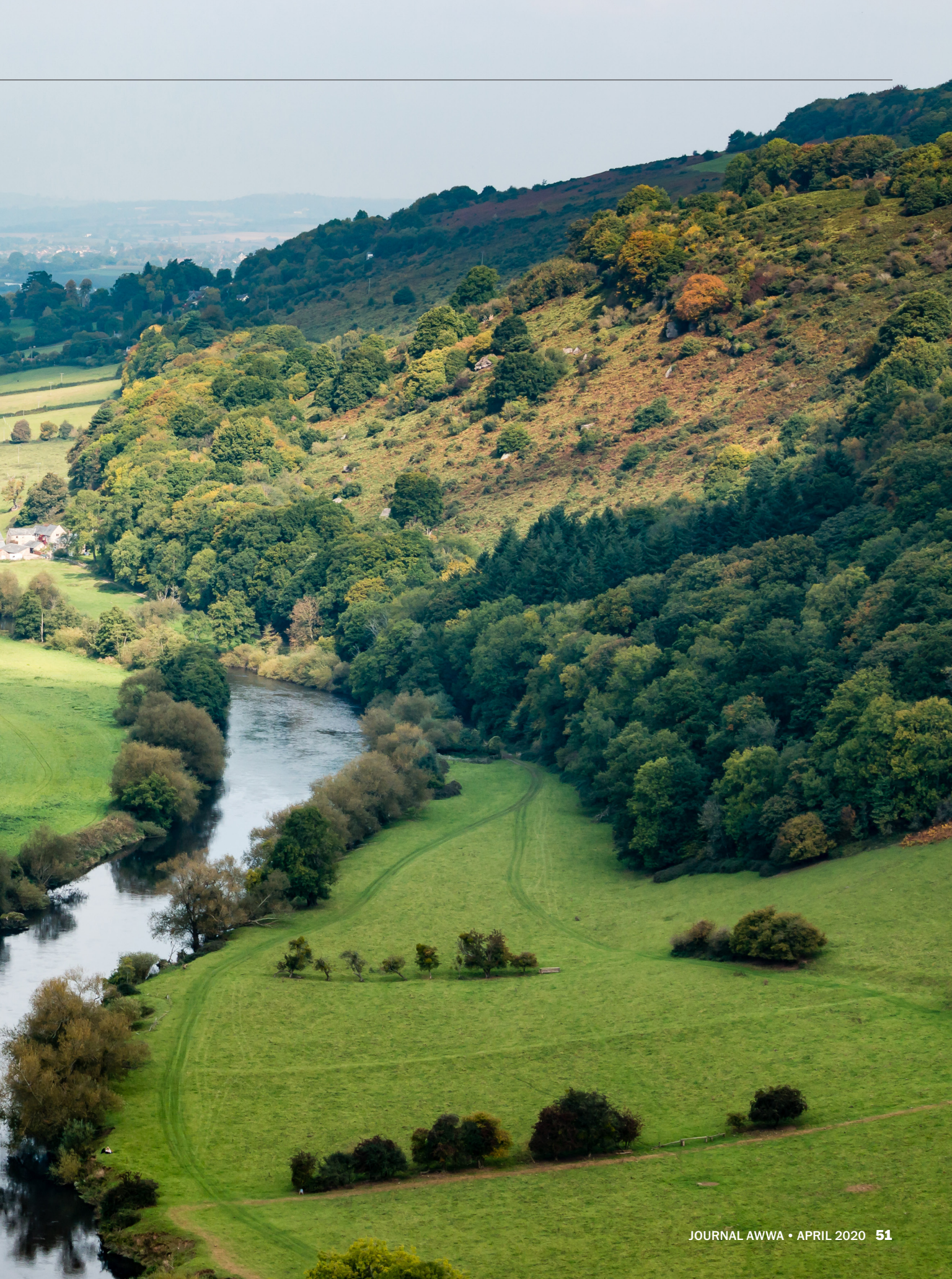

The Agricultural Improvement Act of 2018 (also known as the Farm Bill) gives water utilities the opportunity to build mutually beneficial relationships with agricultural producers in their watersheds. The Farm Bill provides guaranteed funding for source water protection (SWP) projects and requires the Natural Resources Conservation Service (NRCS) to consult with utilities to identify SWP areas (Mehan & Carpenter 2019). SWP proactively reduces pollutant and sediment flows into watersheds, moderating pressures on utilities and providing recreational, economic, and public health benefits to adjacent communities.

The US Department of Agriculture (USDA) administers SWP financial assistance through NRCS, the Farm Service Agency, and the US Forest Service (USFS), with activities spanning several types of projects. This article explores the expanded SWP provisions of the 2018 Farm Bill and past applications of SWP in the NRCS assistance programs.

SWP: Significance and History

The health consequences associated with nutrient and sediment runoff pose serious threats to drinking water utilities and their customers. Overabundant nutrient runoff can lead to harmful algal blooms that require public health advisories and additional water treatment and monitoring. For example, algal blooms polluted the Detroit Lake reservoir—the drinking water supply of Salem, Ore.—with cyanotoxins, leading to two drinking water advisories in summer 2018.

When there are risks, utilities should have plans for cyanotoxin outbreaks, but they can also preemptively mitigate potential contamination problems. In particular, agricultural SWP projects allow utilities to work with producers to minimize pollutant flows and limit nutrient overloads. The Farm Bill's statutory requirement to protect source water also includes actions to ensure that healthy watersheds remain healthy.

SWP is a proactive approach to safeguard, maintain, or improve the quality and/or quantity of drinking water sources and their contributing areas. To address nonpoint sources, which make up 85% of all water pollution in the United States (Ruckelshaus 2010), SWP plans can include variable treatments such as buffers, cover crops, water management, and nutrient management (including manure).

The USDA maintains technical and financial support for conservation initiatives, including SWP through NRCS, and it works with private landowners, farmers, and ranchers to implement environmentally beneficial projects. State technical committees and local working groups make program and policy recommendations to prioritize projects on the basis of size, scope, and required resources.

Within NRCS, 14 individual assistance programs respond to natural resource conservation concerns. In the 2018 Farm Bill, funding for SWP was included and statutorily set at a minimum of 10% of all conservation funds administered by NRCS—the first such provision in Farm Bill history. These programs require highly motivated partners to help implement SWP in priority watersheds. Water utilities can interact directly as participants and informally as informational sources supporting SWP practices.

USDA Data

Information included in this article does not represent a complete historical analysis of USDA assistance, but examples and information were gathered from publicly available databases found on NRCS webpages. The

Hugh Hammond Bennett (second from left), first chief of the Soil Conservation Service (SCS), poses with others at the site of the United States' first watershed project in Coon Valley, Wis. The SCS is the predecessor of the US Department of Agriculture's Natural Resources Conservation Service. *Photo: USDA NRCS*

majority of webpages for producer contracts did not include previous recipients or catalogued past initiatives. SWP assistance mentioned in this article reflects only the publicly accessible data from NRCS and may understate the number of projects benefiting SWP.

Projects mentioning drinking water quality and/or SWP were separated from other conservation topics. Using the "USDA Tools to Support Source Water Protection" on AWWA's website (AWWA 2018), source water topics were separated into conservation partnership projects, conservation programs for farmers and ranchers, and forestry programs. These categories, which represent differences in administration of the assistance options within NRCS and the USFS, are described more in the following sections.

Conservation Partnership Programs

The types of financial assistance included in conservation partnership programs allow utilities to work directly with NRCS to implement SWP projects. A majority of NRCS funding goes to conservation implemented by agricultural producers, but partnership programs allow utilities to increase their involvement in the decision-making process. While not all projects included in this category directly involve utilities, these programs can still benefit them if SWP is a primary or secondary objective. Partnership programs include the Regional Conservation Partnership Program (RCPP), the Conservation Innovation Grant (CIG) program, and the National Water Quality Initiative (NWQI).

Regional Conservation Partnership Program

The RCPP mentions water utilities as eligible partners in the 2018 Farm Bill. Assistance funding for RCPP is determined in both state and national competitions (Farm Bill 2018). Partners must provide a significant portion of the funding for projects approved under the RCPP.

AWWA has assisted in the development of three previous RCPP projects and has promoted several others as examples that utilities can look to for inspiration. The RCPP database is well organized, allowing for a complete analysis of all water-related projects. Of the 365 projects found in the RCPP category from 2014 to 2018, 173 were organized around water quality, with around 40 describing activities that could be classified as SWP.

Conservation Innovation Grants

CIGs are administered through Environmental Quality Incentives Program (EQIP) funds. NRCS uses these grants to partner with public and private entities to accelerate adoption of innovative technologies and approaches in the conservation field. Producers benefit by meeting their resource goals through cost-effective techniques; utilities benefit by adopting innovative conservation practices in their watershed. The CIG database documents entries from the start of the grant program in 2003 until 2018. Of the 1,299 listings in the CIG database, 105 mentioned water quality assistance directly or as a secondary goal, and four of those were directly related to SWP.

National Water Quality Initiative

The NWQI provides targeted EQIP funding to implement voluntary conservation practices that improve water quality in priority watersheds. NWQI funding goes directly to producers and does not include partnership agreements—unlike other included partnerships. Previous NWQI funding likely benefited drinking water sources, but these outcomes are not specifically documented.

Although most of NWQI has focused on addressing Clean Water Act concerns, in 2018 this program launched 16 pilot projects for fiscal year 2019 specifically designed to address SWP. Because these projects are still in early stages, detailed descriptions of their implementation and success are not available. Additionally, publicly accessible information on current and past recipients is not available on the NWQI website.

Using the Environmental Working Group's (EWG) conservation database, funding for the NWQI between 2012 and 2018 was determined to be US$166,098,972. The NWQI is a highly effective tool in helping determine where NRCS focuses water protection funding. With cooperation among local NRCS offices and utilities, future SWP projects can be developed; the program has been extended through fiscal year 2023.

The health consequences associated with nutrient and sediment runoff pose serious threats to drinking water utilities and their customers.

Conservation Programs for Farmers and Ranchers

Most NRCS programs work directly with agricultural producers. While these programs ultimately benefit utilities, most water quality projects are not specifically intended to protect drinking water sources. The practices used in these programs are also used commonly in

RCPP. The three programs included under this category are the PL-566 Watershed Protection and Flood Prevention Program (PL-566), EQIP, and the Conservation Stewardship Program (CSP).

Of the three general categories for NRCS assistance programs, the activities within this category have the least publicly available information, with only PL-566 containing a partial list of completed projects. The EQIP and CSP databases contain approved NRCS practices. These databases contain the watershed protection activities permitted under both EQIP and CSP. Therefore, water quality practices were catalogued in place of real-world proposals.

PL-566

PL-566 allows NRCS to help local organizations and governments implement watershed projects. These projects primarily help protect and preserve watershed infrastructure and reduce watershed degradation from flood waters. While typically not implemented directly with agricultural producers, these projects use agricultural land to achieve flood protection. This program helps participants solve both economic and natural resource problems on a watershed-specific basis.

PL-566 projects from 2017 receiving financial assistance were found in the publicly available information. Of the 48 available projects, 15 were found to be directly related to water quality protection, with nine mentioning some form of SWP.

Environmental Quality Incentives Program

Much of the funding for other conservation practices comes from or is combined with EQIP, the largest NRCS program. According to EWG's conservation database, between 1997 and 2015, EQIP provided $7.9 billion in funding to install conservation practices on more than one million on-farm contracts. Of the 170 NRCS conservation practices, 84 were found to directly or indirectly relate to water quality and SWP. These 84 practices provide an outline for how utilities could approach project proposals in the EQIP system.

Table 1 shows example practices that can benefit SWP. Types include a wide variety of cropland, grassland, and forestland practices; however, without more specific information on past projects, the number of these contracts related to SWP remains unknown.

Conservation Stewardship Program

CSP encourages producers to improve conservation practices by installing and adopting higher-level

Examples of EQIP Source Water Protection Practices

Practice	Definition	Purpose
Saturated buffer	A subsurface, perforated distribution pipe used to divert and spread drainage system discharge to a vegetated area to increase soil saturation	Install to reduce nitrate loading from subsurface drain outlets.
Nutrient management	Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments	Minimize agricultural nonpoint source pollution of surface and groundwater resources.
Streambank and shoreline protection	Treatment(s) used to stabilize and protect banks of streams or constructed channels and shorelines of lakes, reservoirs, or estuaries	Prevent the loss of land or damage to land uses or facilities adjacent to the banks of streams or constructed channels, shoreline of lakes, reservoirs, or estuaries (including the protection of known historical, archeological, and traditional cultural properties). Maintain the flow capacity of streams or channels. Reduce the offsite or downstream effects of sediment resulting from bank erosion.

EQIP—Environmental Quality Incentives Program

Table 1

management activities. Under CSP, the higher the participants' operational performance, the higher their payment. Using conservation performance tracking over a five-year contract, CSP assists producers who succeed in implementing advanced conservation on their properties.

The 2018 CSP activity sheet is the most up-to-date list of approved practices in this program. Included in this sheet are 40 unique activities and 24 bundled activities that mention water quality. The activity sheet describes each enhancement/activity by listing the resource concern, the concern's cause, the eligible land use, and a description of the enhancement. The water resource concerns are typically sedimentation, nutrient and pesticide application, and water management.

As with EQIP, CSP does not have a comprehensive database of previous recipients. The EWG database shows that from 2011 to 2014, CSP distributed $2.1 billion to more than 127,000 projects, which represents the second-largest source of NRCS program funding.

Forestry Programs

Forestry programs are managed by the NRCS and the USFS (most NRCS forestry work occurs under EQIP and CSP). Forestry programs address issues associated with development in forest areas, invasive plant control, forest stand improvement, early successional habitat establishment, and sedimentation control—especially when resulting from forest fire. Findings presented here were limited to the Joint Chiefs' Landscape Restoration Partnership and the USFS' Forest Legacy Program, both of which include detailed databases of projects with brief descriptions.

Joint Chiefs' Landscape Restoration Partnership

Delivered jointly by NRCS and the USFS, the joint chiefs' partnership targets conservation activities with the support of partner organizations. Funding for the partnership typically originates from NRCS, with the USFS providing guidance and funding for public lands restoration activities that advance the goals of these projects. A key feature of the initiative is the implementation of practices on private and public lands adjacent to the source water location.

The partnership began in 2014, with the first projects completed in 2016. From 2014 to 2018, the joint chiefs' partnership distributed $168 million to 56 projects; of these, 32 were partially related to water quality and promoted SWP practices. Many ongoing initiatives do not have up-to-date information pertaining to current implementation or successes. These projects use mitigation tools to achieve land restoration primarily in forests and woodlands as well as prairie habitats. Mitigation of wildfire, a prominent issue for many projects, plays a role in watershed pollution as well, with many secondary goals including watershed restoration after the primary goal of fire prevention.

Forest Legacy Program

This program, which is administered through the USFS, has dedicated funding originating from the Land and Water Conservation Fund, which invests a percentage of federal offshore drilling fees for conservation of land and water. Landowners participate through the sale of development rights to state and federal partners involved in legacy projects. These permanent easements conserve environmentally important forests threatened by nonforest uses. Twenty-three projects explicitly mention drinking water, with 130 others mentioning water quality initiatives. Table 2 shows an overall summary of these programs.

Well-organized, multi-industry partnerships may help in obtaining Regional Conservation Partnership Program funding.

USDA SWP Projects

The following examples demonstrate how utilities have partnered with USDA to implement SWP.

RCPP With Illinois River, Arkansas

A $1.2 million state RCPP began in 2014 in the Illinois River watershed. Led by the Illinois River Watershed Partnership, the main goal of this RCPP is to improve drinking water quality in the Illinois River watershed, which was impaired by bacteria, sediment, and excess nutrients. While SWP practices were executed on agricultural and forest lands, the partnership led the initiative to employ RCPP funds where they could be of greatest value. The Illinois River Watershed Partnership is a group of diverse stakeholders from different sectors within the watershed, and this RCPP is one example of nonagricultural users partnering with NRCS. Well-organized, multi-industry partnerships may help in obtaining RCPP funding.

Overall Program Summary

Program	Number of Water-Related Projects: Water (Source Water)	Contribution Totals From NRCS and/or US Forest Service—*US$*	Total Projects (Not All Water Related)	Year(s) Included
RCPP	173 (40)	1,012,369,000	365	2014–2018
CIG	105 (4)	286,000,000[a]	1,299	2004–2018
NWQI	All related to water protection; unknown number related to source water protection directly	166,098,872	3,877	2012–2018
PL-566	15 (9)	Unknown	48	2017
EQIP	Unknown	7,956,149,351	1,027,124	1997–2015
CSP	Unknown	2,176,537,487	127,315	2011–2014
Joint Chiefs	32 (8)	168,563,407	56	2014–2018
Forest Legacy Program	130 (23)	838,229,305	415	1992–2018

CIG—Conservation Innovation Grant, CSP—Conservation Stewardship Program, EQIP—Environmental Quality Incentives Program, Joint Chiefs—Joint Chiefs' Landscape Restoration Partnership, NRCS—Natural Resources Conservation Service, NWQI—National Water Quality Initiative, PL-566—Watershed Protection and Flood Prevention Program, RCPP—Regional Conservation Partnership Program

[a]CIG funding total includes 2004–2011 national grants (2012–2018 grant funding not included).

Note: Information is based on publicly accessible data from NRCS websites.

Table 2

RCPP With Kansas

Kansas State University obtained $13 million in assistance funding for a national RCPP to manage surface water reservoirs. Threats from algal blooms as well as stream bank erosion caused a 40% decrease in storage capacity for watersheds across the state. This project used forestry best management practices (BMPs) to improve drinking water and recreational opportunities within the watershed. This RCPP is led by a large nonagricultural partner with the assistance of agricultural producers and nine other partners, including the Kansas Forest Service, which administered the NRCS funds. Similar to the RCPP implemented in the Illinois River watershed, Kansas State University led the initiative to implement EQIP practices.

CIG With Tributary Watersheds: Indiana, Iowa, and Minnesota

In 2013, the Environmental Defense Fund received $654,837 in national grant funds for an SWP initiative. The goal of this project was to reduce hypoxic conditions in HUC-12, or tributary, watersheds by reducing agricultural runoff to create more stable conditions. This is a collective effort by multiple producers in different watersheds to reduce the amount of water they consume and to instill BMPs to reduce effluent flows to the estuary.

An additional goal of this project is to demonstrate how NRCS and partners can design systems to achieve water quality improvements. This project outlines the need for watershed-scale approaches to addressing localized pollution. Without thinking about the overall health of the watershed, conservationists may be missing significant sources of pollution. However, utilities are acutely aware of increases in watershed pollution, so they can serve as an effective resource for NRCS and assist in the design of watershed-scale projects.

CIG With Arizona

Universal Entech, a waste materials business, received $250,500 in 2005 in a national grant to manage concentrated animal feeding operations where water conservation was described in detail. This project uses BMPs, natural nutrient mitigation methods, and artificial filtration systems to limit nitrogen and phosphorus

loading. Applications include wetland construction, aeration, and anaerobic digesters. In this case, a nonagricultural user received funding to implement a CIG to improve the implementation methods and BMPs, not directly for implementation. CIGs lend themselves to research initiatives that can improve the way producers interact with their watersheds.

PL-566 With Wolf River, Kansas

The Nine Dam Project, on Kansas' Wolf River, is one of the few projects specifically designed to assist drinking water utilities. The watershed's degradation issues are emblematic of pollution problems typically found in the projects receiving funding through the Watershed Protection and Flood Prevention Program. This project seeks to combat erosion issues that led to flooding in the watershed. Benefits to utilities include watershed protection, flood prevention, sedimentation reduction, and erosion prevention. PL-566 database entries do not list recipients or partners, which hinders a complete analysis of this project, but the stated benefits have a strong potential to assist water utilities.

PL-566 With West Virginia

Five projects in the 2017 data describe their watershed protection projects as "seeking an authorized watershed plan that would result in flood prevention and watershed protection." These proposals originated from separate watersheds in West Virginia but were part of a greater statewide initiative to restore watersheds through the West Virginia Watershed Assessment Program, which is funded by the US Environmental Protection Agency (USEPA). These projects use state involvement and are funded through multiple federal and state agencies; their implementation is also coordinated through state and federal agencies. Utility involvement in these projects is unclear, but comments and formal feedback would be likely outlets in projects such as these.

Joint Chiefs' Partnership With New Hampshire

The New Hampshire Drinking Water Improvement project exemplifies drinking water–related programs funded through a Joint Chiefs' Landscape Restoration Partnership. Watersheds in the state were projected to experience degradation from increases in urbanization and land use related to forestry, agriculture, and waste management. The USFS and NRCS allocated funding through this program for protection of wells and watershed health. Local partners implemented the project through following BMPs to support drinking water improvements, primarily through the creation of buffer zones and infrastructure to minimize runoff. Similar to other projects within this category, secondary goals include habitat restoration and wildlife protection.

Joint Chiefs' Partnership With Kinkaid Lake, Illinois

Kinkaid Lake in Jackson County, Ill., serves as a drinking water source for roughly 30,000 people. This joint chiefs' project's goals included restoration of the watershed to protect drinking water and to bolster recreational activities at the lake. This project also received matching funds from local partners to reach $1 million over three years.

With multiple government agencies involved, each tackled different goals under the same umbrella project.

A watershed dam and upland terraces in a small watershed project in western Iowa. *Photo: Lynn Betts, US Department of Agriculture's Natural Resources Conservation Service*

- The USFS focused on reducing sedimentation and wildfire risks.
- NRCS partnered with local landowners to improve on-farm conservation using EQIP practices.
- USEPA funded studies on pollutant sources in the watershed.

These activities combined for major reductions in sediment and nutrient loading. Joint chiefs' partnership funds collaborative work between agencies, partners, and producers, and utilities can partner to inform decisions regarding how SWP is implemented.

Forest Legacy With Central Arkansas Water

The Maumelle Water Excellence project is a drinking water–specific Forest Legacy project that protects forests along four miles of the Big Maumelle River, which supplies drinking water to more than 450,000 residents in Arkansas through the Lake Maumelle reservoir. The project and watershed are managed by Central Arkansas Water (CAW).

Given the likely increase in available funds for SWP, now is the time to fully analyze the successes and challenges of previous SWP projects.

While NRCS serves as a partner on this project, Forest Legacy projects protect forest buffers through land easements that preserve areas proposed for development. The CAW project is unique in that it includes restoration efforts on a highly impacted former sod farm that was slated for residential development.

Recommendations for restoration, preservation, and development of the site were based on in-depth mapping and analysis of natural and cultural resources. Project partners established an objective to protect and restore water quality while enhancing the ecological integrity of the site.

The project also supports public education and research for topics such as CAW's water supply, low-impact and environmentally sensitive design, stormwater BMPs, and ecological restoration. Project outcomes include the following:

- Reforestation
- Forest enhancement
- Shrubland restoration
- Stream restoration and enhancement
- Wetland restoration
- Enhanced recreation opportunity
- Public education

Forest Legacy With South Boulder Creek, Colorado

The South Boulder Creek is a source of water for Denver Water, a water utility serving more than 1.4 million people. This 2013 project, executed through land easements, expanded the buffer zone on the largest contiguous property in the South Boulder Creek watershed.

Development at nearby ski resorts and other anthropogenic activities threatened the watershed; however, with protection of the current forest, land use is now limited to low-impact recreational activity. Like many projects within the Forest Legacy category, secondary goals for the program include recreational pursuits on the preserved forest land.

Recommendations for NRCS

Because of limited publicly available information online for the majority of programs, this analysis of current and past SWP projects does not represent a full range of project frameworks. To better understand the types of opportunities to work with NRCS on SWP, a more complete picture of applicable methods is needed.

Summary information or incomplete data is available for many of the programs not included in this analysis, but greater access to data would assist the development of SWP projects. More complete cataloguing of SWP in NRCS databases could increase utility engagement, specifically in RCPP proposals. Utility engagement would provide greater insight into where SWP can provide the most value. Given the likely increase in available funds for SWP, now is the time to fully analyze the successes and challenges of previous SWP projects.

Utility Engagement with NRCS

Working with NRCS to improve the health of utility watersheds is important. The 2018 Farm Bill grants US water utilities the opportunity and the means to work with NRCS to improve their watersheds directly; the first step is to contact your local NRCS field office. Important stakeholders include your state conservationist, the assistant state conservationist for programs, the area conservationist, and the district conservationist.

AWWA recommends that interested utilities ask to be members of their state technical committees and local work groups or on tribal advisory committees; once onboard, utilities can recommend conservation practices, cost–share rates, and program policies that advance SWP. Promoting these actions remains an important challenge for securing source protection funding, and

utilities need to advocate preserving their most important resource. With the inclusion of guaranteed funding for SWP in the 2018 Farm Bill, the time is right to expand SWP.

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Supporting Information

Additional information may be found online in the Supporting Information section at the end of the article.

About the Authors

John D. Murphy is a public policy master's degree candidate at the University of Maryland (College Park, Md.) studying intersections of water and agricultural policy in the environmental sector; johndmurphy3rd@gmail.com. He was an intern at AWWA's Washington, D.C., office (www.awwa.org) at the time the analysis was completed.

Adam T. Carpenter is manager of energy and environmental policy at the AWWA Government Affairs Office in Washington, D.C.

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