Prioritizing New Drinking Water Infrastructure Funding in Texas

White Paper Prepared by the Texas Groundwater Protection Committee (TGPC)

Groundwater Issues (GWI) Subcommittee

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EXECUTIVE SUMMARY

The Bipartisan Infrastructure Law (BIL) of 2021, also known as the Infrastructure Investment and Jobs Act (IIJA), will provide ~$50 billion in financing to states through the U.S. Environmental Protection Agency (EPA) to improve the nation's drinking water and wastewater systems. This white paper focuses on Drinking Water State Revolving Funds (DWSRF), which account for $31 billion of the BIL financing. Texas is scheduled to receive $422 million of the BIL financing for the 2022 distribution: $141 million for DWSRF supplementation, $222 million for lead service line replacement, and $59 million for mitigating emerging contaminants. However, DWSRF base funding was reduced by 36% across all states to account for earmarks. On balance, 2022 DWSRF funding for Texas more than doubled from the prior period. The BIL emphasizes disadvantaged communities (DACs), requiring 49% of DWSRF general supplementation funding be applied to these communities. Existing environmental justice (EJ) tools produced by the White House and the EPA that could be used to evaluate DACs are limited in their ability to direct DWSRF financing as they assess proximity to point sources of contamination, such as Superfund sites, and only include economic aspects of social vulnerability.

Texas is unique among all states within the United States in having the largest number of Community Water Systems (CWSs) (4,649), ~60% more than California, which ranks second in number of CWSs. The majority (72%) of Texas CWSs are groundwater-sourced, but surface water supplies the majority (81%) of the Texas population served by CWSs. This suggests that the bulk of Texas CWSs are "small" (500–3,300 people served) or "very small" (<500 people served) groundwater dependent systems.

About 1 in 10 people in Texas were exposed to a health-based Safe Drinking Water Act (SDWA) violation between 2018 and 2020. Violations were dominated by disinfectants and disinfection byproducts (DBPs) resulting from treatment (37% of violations), followed by arsenic (11%), radionuclides (10%), lead and copper (10%), revised total coliform (8%), nitrate (6%), and others (17%). Relative to all other states in the United States, Texas ranked first in terms of CWSs with any health-based, DBPs, nitrates, radionuclides, and lead and copper violations, and ranked second in terms of arsenic and revised total coliform rule violations. This ranking is partly a reflection of the large number of CWSs in Texas and highlights the great need to bring CWSs into compliance. Most violations (65%) were in groundwater sourced CWSs, predominantly in very small and small systems. Addressing vulnerability of CWSs to risk, such as drought and flood, is also an important aspect of the BIL.

The Texas Water Development Board (TWDB) manages the Texas DWSRF program and contracts with the Texas Commission on Environmental Quality (TCEQ), which is the DWSRF primacy agency. Application for DWSRF funds requires CWSs to submit a Project Information Form, which is ranked by TWDB and TCEQ and feeds into the annual Priority Project List and the Intended Use Plan that are submitted to the EPA. The point system used to rank the applications emphasizes SDWA noncompliance and physical deficiencies, paying only limited attention to other aspects, including social vulnerability.

One of the main challenges of the DWSRF program is to ensure that very small and small systems apply for the funding. The DWSRF program is continually improving, as shown by the recent development of an Asset Management Program for Small Systems directed primarily to small rural systems. One approach to improving access for these types of CWSs would be to develop a dashboard to show whether CWSs are eligible for DAC status and other attributions. The DWSRF program could also consider lower percentages of annual median household income below the current level of 75% to try to address more extremely disadvantaged communities. Recurring noncompliant systems could be given additional project ranking points in an effort to resolve these persistently noncompliant systems. A more comprehensive approach to regionalization could be adopted to reflect the full spectrum of options, including physical and nonphysical (virtual) approaches. Increased efforts could be applied to system resilience, considering that the state is frequently subjected to droughts and floods. While the current DWSRF point system addresses depopulating systems, points could be differently allocated to CWSs to account for rising populations that may be driven by the increasing prevalence of telework and other factors.

A variety of tasks have been identified to support optimal deployment of new drinking water infrastructure funding, including the following:

1. Determine the drivers of non-compliance of community water systems, including geogenic and anthropogenic sources particularly relevant to groundwater systems;
2. Evaluate vulnerability of CWSs to droughts and floods and potential solutions;
3. Examine various approaches to defining disadvantaged communities and the impact on number of systems and populations served;
4. Conduct a reconnaissance study to assess the potential for regionalization and consolidation of CWSs, including physical and virtual approaches;
5. Provide technical assistance to various groups in need, including NGOs such as Communities Unlimited and the Texas Rural Water Association; and,
6. Compare performance for CWSs that have received DWSRF funding with those that have not.

BIL funding and relevant guidance provides an opportunity to further improve the DWSRF program to increase access to funding, particularly for very small and small CWSs serving disadvantaged communities in rural areas.

LIST OF ACRONYMS

AC5YE – American Community Survey Five-Year Estimates
AMHI – Annual median household income
AMPSS – Asset Management Program for Small Systems
BIL – Bipartisan Infrastructure Law
CWA – Clean Water Act
CWS – Community Water System
CWSRF – Clean Water State Revolving Fund
DAC – Disadvantaged community
DBP – Disinfectants and disinfection byproducts
DBPR – Disinfectants and Disinfection Byproducts Rule
DFC – Desired future conditions
DTW – Depth-to-water
DWSRF – Drinking Water State Revolving Fund
EJ – Environmental justice
EPA – U.S. Environmental Protection Agency
GU – Groundwater under the direct influence of surface water
GW – Groundwater
GWI – Groundwater Issues
GWR – Groundwater Rule
HB – Health-based
IIJA – Infrastructure Investment and Jobs Act
IUP – Intended Use Plan
LCR – Lead and Copper Rule
MCL – Maximum contaminant level
M&R – Monitoring and reporting
NCWS – Non-Community Water System
PFAS – Per- and polyfluoroalkyl substances
PIF – Project Information Form
PPL – Priority Project List
PSI – Pounds per square inch
PWS – Public Water System
RTCR – Revised Total Coliform Rule
SDWA – Safe Drinking Water Act
SDWIS – Safe Drinking Water Information System
SNAP-WIC – Supplemental Nutrition Assistance Program; WIC – Women, infants, and children
SW – Surface water
SRF – State Revolving Fund
SWP – State Water Plan
SWTR – Surface Water Treatment Rule
TCEQ – Texas Commission on Environmental Quality
TGPC – Texas Groundwater Protection Committee
TWDB – Texas Water Development Board
UTBEG – The University of Texas at Austin Bureau of Economic Geology (the State Geological Survey)

1. INTRODUCTION AND BACKGROUND

The Bipartisan Infrastructure Law (BIL) of 2021, also known as the Infrastructure Investment and Jobs Act (IIJA) of 2021, will provide ~$50 billion in financing through the U.S. Environmental Protection Agency (EPA) for states to strengthen the nation's drinking water and wastewater systems. The BIL represents the largest investment in water infrastructure that the Federal Government has ever made and makes key amendments to the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). However, Congress has reduced the capitalization grants for CWA and SDWA base programs by 36% to use those funds for earmarks (CIFA, 2022). This reduction applies equally to all states and reduced the total funding from ~$2.6 billion in 2021 to ~1.8 billion in 2022 (CIFA, 2022).

A total of $43 billion of the BIL financing will be administered by the states through the Clean Water State Revolving Funds (CWSRF) and Drinking Water State Revolving Funds (DWSRF) from Federal fiscal years 2022 through 2026 (EPA, 2022b). The DWSRF, which is the focus of this white paper, will receive ~$31 billion in BIL financing, $11.7 billion for general DWSRF supplementation, $15.0 billion for lead service line replacement, and $4.0 billion for emerging contaminants, such as per- and polyfluoroalkyl substances (PFAS) (EPA, 2022b). For the 2022 fiscal year BIL distribution, which will remain available to states through the 2023 fiscal year, Texas is scheduled to receive $422.4 million or 7.4% of all fiscal year 2022 BIL DWSRF distributions: $141 million for general DWSRF supplementation, $222 million for lead service line replacement, and $59 million for emerging contaminants (EPA, 2022b). By comparison, the Texas DWSRF received a total of $86.3 million in Federal grants in fiscal year 2021 (EPA, 2022a) which was reduced by 36% in fiscal year 2022 to $54.9 million. Therefore, the net increase in the Texas DWSRF equates to more than doubling the available funds from $86 million (2021) to $196 million (2022). Future BIL distributions to the Texas DWSRF may vary and will be based on a new EPA needs survey.

The BIL also includes new authorities and priorities that states are required or encouraged to utilize in their State Revolving Fund (SRF) programs. Notably, these include the following:

Refining SRF Programs—Throughout the five-year implementation of the BIL, states are expected to evaluate and revise DWSRF point systems used to rank the priority of projects to be financed. States are encouraged to reduce the burden of the application process and other program requirements, as these barriers may be particularly challenging for small and disadvantaged communities that may lack the capacity to navigate the DWSRF process and manage projects. Regionalization, partnerships, and physical or nonphysical integration are also encouraged.

Supporting Resilience—The DWSRFs are encouraged to use BIL financing to support infrastructure projects that are resilient to all forms of threats. These include climatic extremes, such as droughts and floods, and emerging threats, such as power outages, bioterrorism, and cyber-attacks. States are encouraged to incorporate resilience considerations in their prioritization of projects financed by the BIL.

Investment in Disadvantaged Communities—The BIL mandates that at least 49% of DWSRF general supplementation financing and 25% of emerging contaminants financing must be provided to Disadvantaged Communities (DACs) in the form of grants and forgivable loans. In Texas, this equates to $69 million and $15 million, respectively, for the 2022 fiscal year distribution. States establish definitions of DACs for DWSRF participation and are expected to evaluate and revise these definitions

throughout the five-year BIL implementation. The EPA recently published a review of state DAC definitions showing that 49 out of 50 states use median household income to define DACs, 27 states use affordability, and 16 states use water system size (EPA, 2022c). Only two states use "environmental justice community" or similar designations in their DAC designations.

At a broader scale, the White House requires that many Federal programs apply 40% of their funding to disadvantaged communities, termed the "Justice40 Initiative" (https://www.whitehouse.gov/environmentaljustice/justice40/). The EPA has developed an EJ screening and mapping tool that combines environmental and socioeconomic information (https://www.epa.gov/ejscreen). Four out of twelve of these indexes consider factors relevant to drinking water quality, but most of these indexes emphasize point sources of contamination, including proximity to hazardous waste sites, Superfund sites, underground storage tanks, and wastewater discharges. Recent studies of drinking water quality in the United States show that nonpoint sources of contamination are dominant, including naturally occurring contaminants related to geologic sources (geogenic contaminants), such as arsenic and radionuclides, and nonpoint anthropogenic sources, including nitrate (Belitz et al., 2022; Scanlon et al., 2022). Disinfectants and disinfection byproducts (DBPs) are also widespread from treatment issues (Scanlon et al., 2022). Therefore, future studies will need to determine relevant social vulnerability parameters for defining disadvantaged communities when focusing on drinking water quality issues.

1a. Texas Community Water Systems

A Public Water System (PWS) is considered a Community Water System (CWS) if it supplies water to at least 15 residential service connections year-round or serves an average of at least 25 residents year-round (TCEQ, 2021). Public Water Systems that do not serve the same community year-round, such as office buildings, are classified as Non-Community Water Systems (NCWSs). This white paper focuses primarily on CWSs and, given that this white paper is authored by the Texas Groundwater Protection Committee (TGPC), predominantly focuses on CWSs sourced by groundwater.

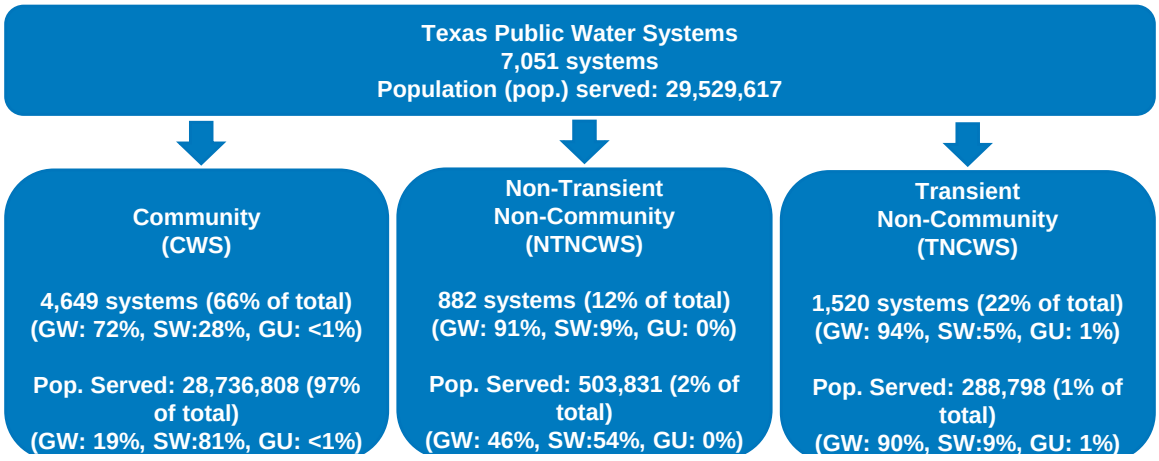

Figure 1. Numbers of PWSs and populations served in Texas, including CWSs and NCWSs, both transient and nontransient. The source of water to these systems is also included: groundwater (GW), surface water (SW), and groundwater under the direct influence of surface water (GU). Values are based on a download of Safe Drinking Water Information System (SDWIS) data on April 15, 2021.

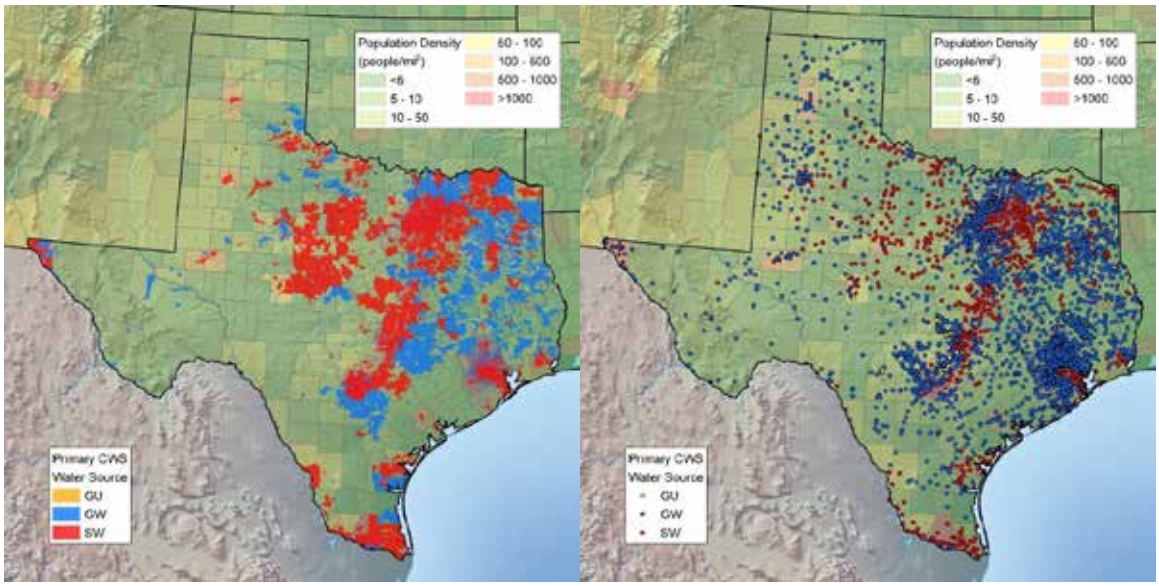

Figure 2. Distribution of CWSs in Texas based on water source (surface water, SW; groundwater, GW; and groundwater under the direct influence of surface water, GU). The map on the left shows CWS service areas, whereas that on the right uses points to denote CWSs to show all of the CWSs. The background is county population density and topography.

Texas has the largest number of CWSs in the nation, 4,649 systems serving almost the entire state population (~28.7 million people) via ~12.5 million connections (based on download of SDWIS data on Apr. 15, 2021 and Scanlon et al. [2022]) (Fig. 1). The next highest state in terms of number of CWSs is California, with 60% fewer CWSs than Texas. The dominant water source for CWSs in Texas is groundwater, serving 72% of CWSs (3,331) (Figs. 1, 2). However, groundwater-sourced CWSs service only 19% of the total population served by all CWSs in Texas. Therefore, the majority of GW systems service small populations. In contrast, the number of surface water systems is much less (28% of total CWSs) than groundwater systems, but they serve 81% of the total CWS population. Groundwater under the direct influence of surface water (GU) accounts for <1% of CWSs.

1b. Noncompliant Community Water Systems

The SDWA requires that CWSs comply with a number of regulations. These regulations can be broadly classified as (a) monitoring and reporting (M&R) regulations (Fig. 3) and (b) health-based (HB) regulations (Fig. 4). Health-based standards are generally grouped under the following categories: inorganic contaminants (including arsenic and nitrate), organic contaminants, radionuclides, microbial contaminants, disinfectants and disinfection byproducts, lead and copper, the Surface Water Treatment Rule, and the Groundwater Rule.

Analysis of CWS data from 2020 shows that about one in every two CWSs in Texas, 54% of CWS (2,518/4,649), had an M&R violation (Fig. 3). CWSs with M&R violations served almost 2 in every 10 people (5.7 million/29.5 million) in 2020. The number of people served by CWSs with HB violations was 10% of those served by CWSs with M&R violations in 2020 (0.5 million versus 5 million). Considering any HB

violations over a longer time period (2018–2020), 12% of CWSs (556/4,649), serving almost 1 in every 10 people (2.7 million/29.5 million), had any HB violation (Fig. 4).

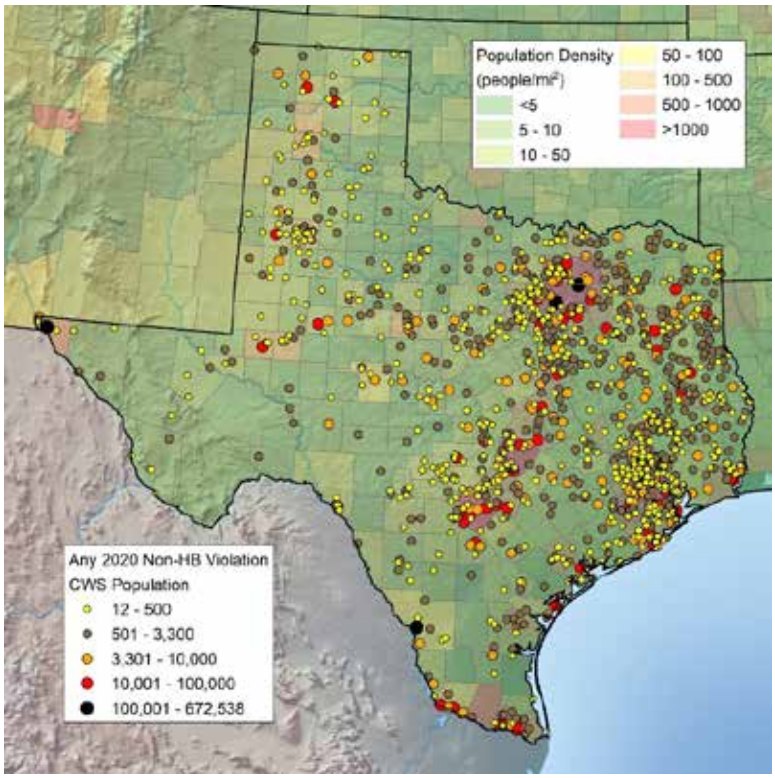

Figure 3. Distribution of CWSs with non-HB violations (M&R) based on SDWIS data from 2020. The population categories include subdivisions defined by the EPA (<500, very small; 501–3,300, small; 3,301–10,000, medium; 10,001–100,000, large; and ≥10,001, very large). The background is the population density by county.

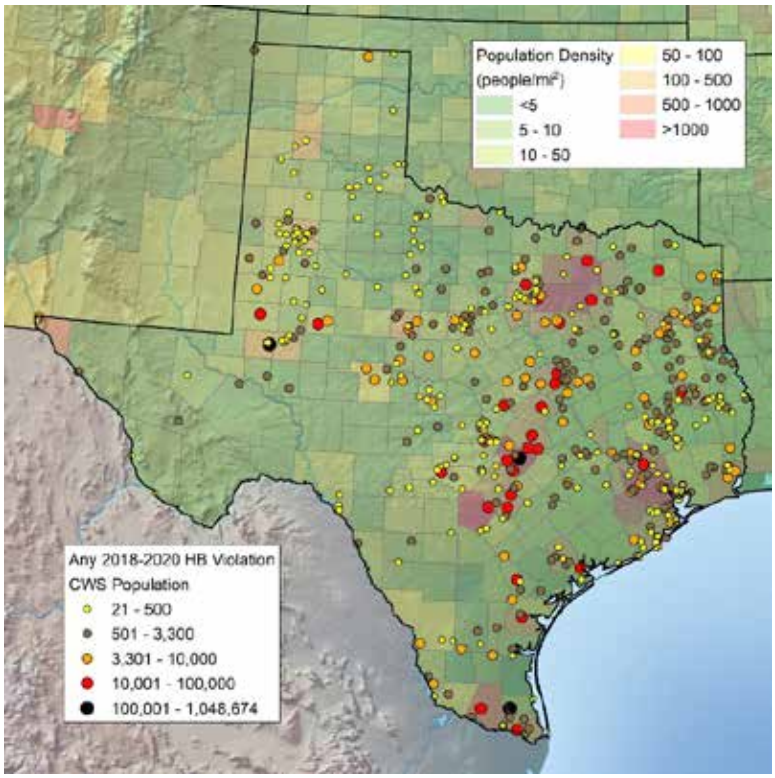

Figure 4. CWSs with any health-based violation in 2018–2020 color coded according to population served. Data include 260 very small CWSs, 192 small CWSs, 71 medium CWSs, 30 large CWSs, and 3 very large CWSs. The background is the population density by county.

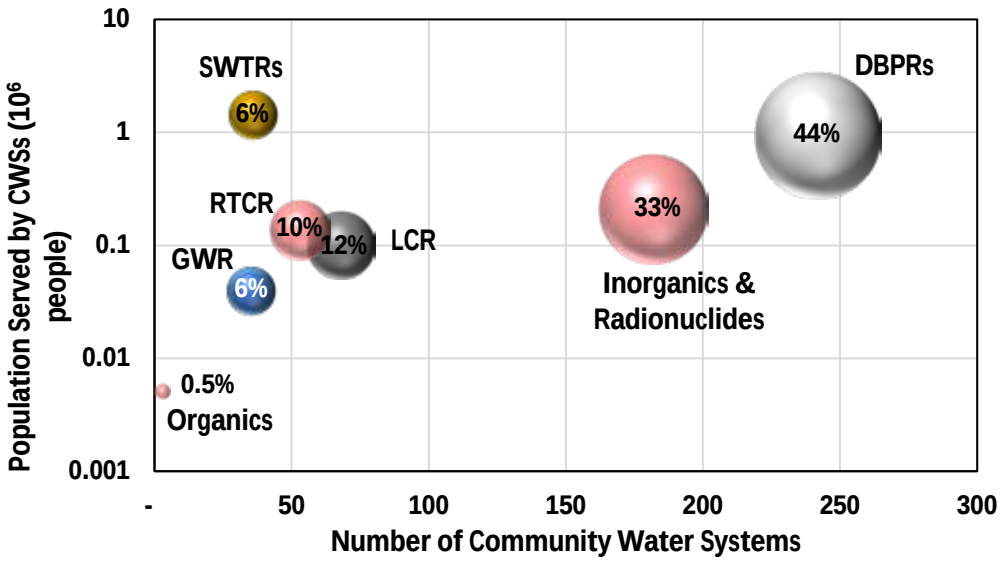

Figure 5. Health-based violations in terms of number of violating CWSs and population served. Percentages of CWSs are shown in the spheres. Data are based on 2018–2020 SDWIS database (downloaded April 15, 2021).

Texas CWSs violation of HB regulations are dominated by Disinfectants and Disinfection Byproducts Rule (DBPR) violations (44% of CWSs with HB violations) followed by inorganic (e.g., arsenic and nitrate) and radionuclide violations (33% of CWSs) (Fig. 5, Table 1). The DBPR violations reflect water treatment issues and are found primarily in the South-Central United States, extending into the Northeast (EPA, 2019). Inorganic and radionuclide violations include arsenic, fluoride, selenium, and radionuclides related to naturally occurring contaminants, primarily in the High Plains, Llano Uplift, and Gulf Coast regions (Scanlon et al., 2009; Gates et al., 2011; Reedy et al., 2011; Reedy and Scanlon, 2018; Hudak, 2021). Nitrate violations are widespread and linked to agricultural fertilizers (Scanlon et al., 2008; Chaudhuri et al., 2012). The remaining HB violations represent <12% of HB violations each, including Lead and Copper Rule (LCR) and Revised Total Coliform Rule (RTCR) violations, followed by Surface Water Treatment Rule (SWTR) and Groundwater Rule (GWR) violations, with organic violations affecting the lowest percentage of CWSs (~0.5%). The low percentage of organic violations is surprising, as many studies suggest HB violations are linked primarily to pollution from point sources, such as Superfund sites and chemical storage facilities.

Comparison of the number of violating CWSs in Texas with those in other states shows that Texas ranked first for violations of any HB regulation, nitrate rule, radionuclides rule, LCR, and DBPR and ranked second for violations of arsenic and revised total coliform rules (Scanlon et al., 2022). These data indicate that Texas has great needs in terms of managing CWSs to bring them into compliance with HB regulations. CWSs violating any HB rule (2018–2020) were dominated by very small systems (serving ≤500 people, 47%) and small systems (serving 501–3,300 people, 35%) (Fig. 6).

A total of 65% of the violating CWSs are sourced from groundwater (359/556 CWSs). Groundwater violations were dominated by arsenic (16%), nitrates (9%), inorganics (9%), radionuclides (15%), LCR (12%), RTCR (8%), GWR (8%), DBPRs (23%), and organics (0.5%). All SWTR violations are, by definition, surface water systems or groundwater systems under the influence of surface water.

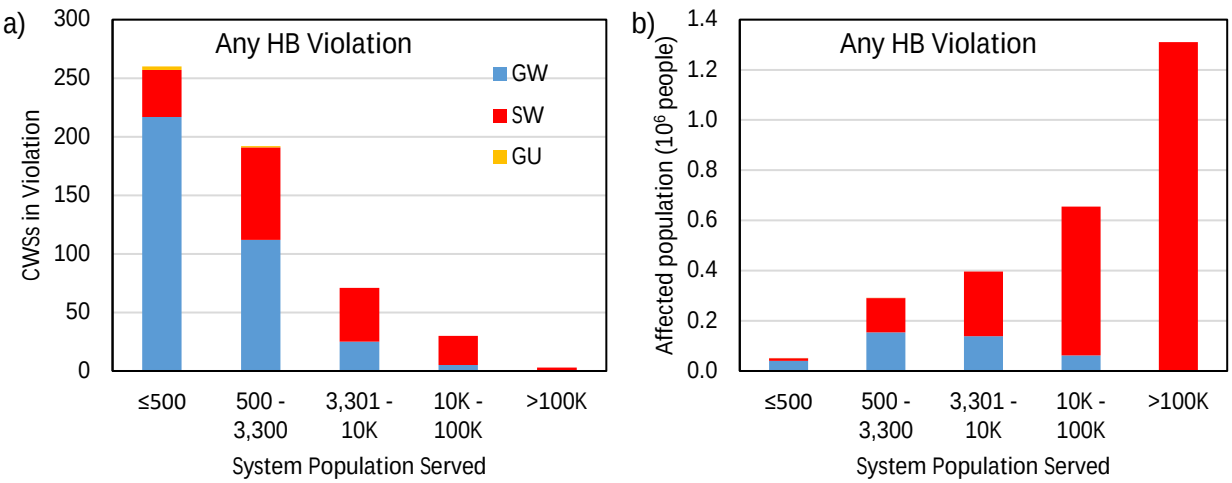

Figure 6. (a) Community Water Systems with any HB violation (2018–2020 data) relative to water source (SW: surface water; GW, groundwater; and GU, groundwater under the influence of surface water). (b) Affected population impacted by any health-based violation relative to water source. The CWSs are categorized by size in number of people served (≤500, very small; 500–3,300, small; 3,300–10,000, medium; 10,000–100,000, large; and ≥10,000, very large). Under current Texas DWSRF definitions, 62% of groundwater-sourced CWSs (~2,886 systems) qualify as a "very small to small community" (each servicing ≤3,300 people), with 8% as medium CWSs (3,301–10,000 people) and 1.5% as large CWSs (10,000–100,000 people).

Table 1. Characterization of CWSs with EPA HB violations related to number of CWSs and populations served. Note that sums across all of the rules do not equal the Any HB category because some systems have violations under multiple rules.

Rule	*Systems in Violation*				*Populations in Violation*			
	All	*GW*	*SW*	*GU*	*Total*	*GW*	*SW*	*GU*
Any HB violation	556	359	193	3	2,703,508	395,117	2,307,274	1,117
Arsenic	72	68	4	-	110,363	97,290	13,073	-
Nitrates	45	37	7	1	24,667	9,006	15,555	106
Inorganics	37	37	-	-	46,659	46,659	-	-
Radionuclides	65	62	3	-	57,267	45,414	11,853	-
Lead and Copper	68	52	15	1	100,283	35,424	64,753	106
Revised Total Coliform	53	34	19	-	137,166	30,400	106,766	-
Ground Water Rule	35	34	1	-	39,621	28,091	11,530	-
Surface Water Treatment Rules	36	1	31	8	1,419,947	-	1,418,590	2234
Disinfection Byproducts	242	98	143	-	940,415	147,162	792,541	712
Organics	3	2	1	-	5,089	2,315	2,774	-

1c. Additional Factors Impacting Community Water Systems

The SDWA also covers vulnerability of CWSs to climate extremes (droughts and floods), cyber-attacks, and other risks. All CWSs under current (August 2022) drought restrictions are shown in Fig. 7.

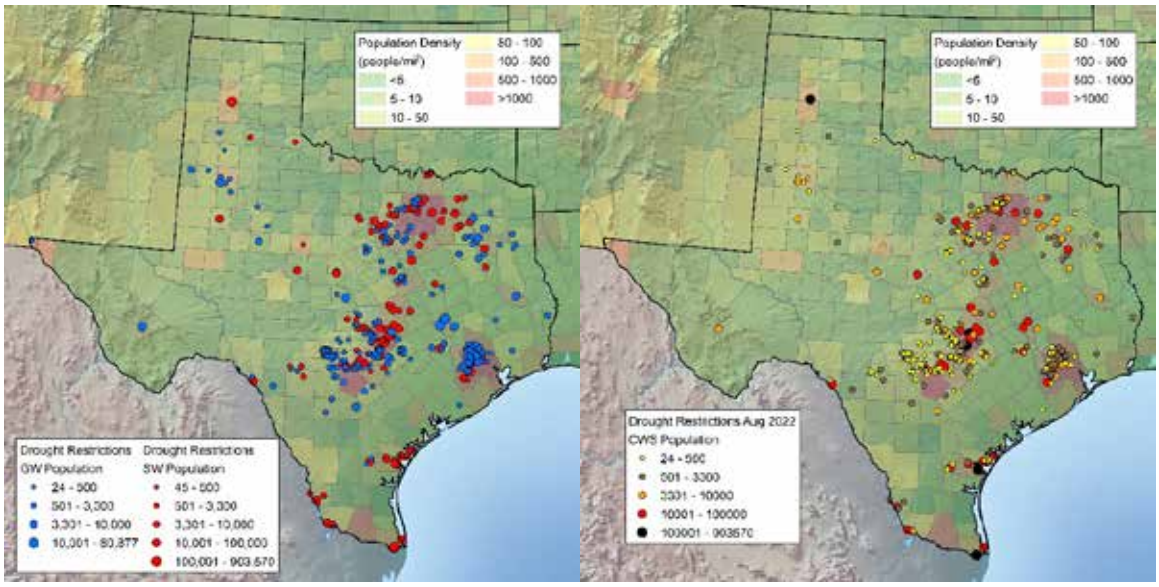

Figure 7. Community Water Systems under drought restrictions based on data downloaded on August 8, 2022. Map on left shows both groundwater- and surface water-sourced systems and map on right shows all CWSs classified according to population served.

1d. Texas Drinking Water State Revolving Fund

The Texas Water Development Board (TWDB) has a contractual relationship with the primacy DWSRF agency for Texas, the Texas Commission on Environmental Quality (TCEQ), to administer the DWSRF. TCEQ DWSRF duties include but are not limited to: rating proposed projects, providing technical assistance to small systems, and enforcing the regulations related to the requirements of the SDWA. The TCEQ retains primary enforcement authority (primacy) over Texas Public Water Systems' compliance with the SDWA and its amendments under the Public Water System Supervision (PWSS) program. The TCEQ ensures that the PWSS program is operated through technical assistance, preventive efforts, and customer service as well as through regulatory and enforcement actions. Preventive efforts are aimed at notifying and educating an operator about requirements and can prevent critical issues. The TWDB annually prepares an Intended Use Plan (IUP) describing the particulars of the DWSRF and submits it to the EPA.

To be considered for DWSRF financing, CWSs must submit to the TWDB a Project Information Form (PIF) describing the proposed infrastructure project and other information. PIFs are then assessed by the TWDB and TCEQ to determine whether or not they are eligible for DWSRF financing and to assign them a priority rating. The ranked order list of projects selected for DWSRF financing is then assembled into a Priority Project List (PPL) that is included in the annual IUP submission to the EPA.

The 2023 IUP and PPL are available from the TWDB at the following web address: https://www.twdb.texas.gov/financial/programs/DWSRF/index.asp.

The rating system used to rank PIFs contained within the 2023 IUP is attached hereto in its entirety as **Appendix A**. The rating system is composed of two principal elements: (1) TCEQ ratings that address issues such as SDWA noncompliance, physical system deficiencies, and consolidation, and (2) TWDB ratings that address CWS managerial capacity, DAC eligibility, and prior funding allocations.

The current PIF rating system numerically prioritizes SDWA noncompliance and physical system deficiencies over other factors. For example, the maximum contaminant level violation for the presence of nitrates or nitrites generates a minimum of 30 PIF rating points, a lack of filtration for a surface water source or a lack of required 4-log viral inactivation for a groundwater source each generate 120 PIF rating points, and a system presenting pressure of 20 psi or less generates 10 PIF rating points. By comparison, a maximum of 13.5 points are generated from managerial capacity factors, 20 points from DAC qualification, and 10 points from receipt of prior funding from the TWDB for planning, acquisition, or design.

The regionalization of systems, or consolidation as it is known in the IUP, is factored into the PIF rating system by combining all TCEQ rating factors for all systems to be consolidated. Potential financial or managerial efficiencies gained from consolidation earn a maximum of two points in the PIF rating system.

The resilience of CWSs to threats is principally addressed by the requirement that projects be consistent with the current State Water Plan (SWP). The PIF rating system also grants points (1 or 2) for projects consistent with a water conservation, protection, or management plan. A set-aside of funding has also been established to support the preparation of emergency evaluation and audit plans assessing the capacity to continue operations when faced with an extended power outage driven by severe weather.

1e. Disadvantaged Communities

The SDWA defines a DAC to mean "the service area of a Public Water System that meets affordability criteria established after public review and comment by the State in which the Public Water System is located." Thus, states have the latitude to define DAC criteria while EPA provides guidance to assist states in establishing such criteria. The CWA requires CWSRFs to establish DAC criteria that include considerations of income, unemployment, and population trends, but no such requirement is stated by the SDWA for DWSRF DAC criteria.

Under the currently implemented Texas DWSRF definitions, a PWS qualifies as a DAC if it has *both* (1) a service area wherein the average median household income (AMHI) is ≤75% of the statewide AMHI *and* (2) a household cost factor ≥1% if only water or sewer service is provided or ≥2% if water and sewer services are both provided. The household cost factor is calculated as follows:

$$Household\ Cost\ Factor = \left(\frac{(K+V+Y)}{AMHI}\right) + Z + AA \qquad \text{Eq. 1}$$

where K is the average annual water bill for an average household within the PWS service area, V is the average annual sewer bill for an average household within the PWS service area, Y is the annual amortized cost of the project on a per household basis being considered for DWSRF financing, Z is an unemployment rate adjustment only applied if it is greater than zero but limited to a maximum of 0.75, AA is a population adjustment only applied if it is greater than zero but limited to a maximum of 0.5, and

$$Z = \left(\frac{(U - U_{TX})}{U_{TX}}\right) \times 2 \quad \text{Eq. 2}$$

$$AA = \left(\frac{(P_P - P_C)}{P_P}\right) \times 6.7 \quad \text{Eq. 3}$$

where U is the unemployment rate within the PWS service area sourced from the most recently available American Community Survey Five-Year Estimates (ACS5YE), U_{TX} is the unemployment rate in Texas sourced from the most recently available ACS5YE, P_P is the population of the PWS sourced from the prior ACS5YE, and P_C is the population of the PWS sourced from the most recently available ACS5YE.

The first part of the household cost factor, $(K + V) / AMHI$, conforms with longstanding methods established by the EPA for assessing the affordability of water and wastewater services. The amortized cost of the proposed project, Y, is included to capture the cost of the project in terms of affordability considerations, but it could incentivize prospective DWSRF participants to design projects to be as expensive as possible to increase the household cost factor score. Similarly, the population adjustment, AA, is included to address potentially increasing per household costs as CWS populations decline but does not address the significance of growing populations.

2. OPPORTUNITIES

The new authorities and priorities established by the BIL afford Texas the opportunity to revisit and enhance its DWSRF. The DWSRF program is continually improving, as shown by the Asset Management Program for Small Systems (AMPSS) that is directed primarily to small, rural utilities (https://www.twdb.texas.gov/financial/programs/ampss/index.asp).

2a. Refining the Drinking Water State Revolving Fund Point System

The TCEQ and TWDB may wish to revise and streamline the current PIF ranking system and resulting PPLs to address evolving state needs and the priorities of the BIL.

Disaggregated Ranking—PIFs could be further divided for priority ranking into groups with interconnections that correlate to DWSRF funding structures. For example, given that 49% of BIL DWSRF general supplementation financing must be devoted to DACs, PIFs could be initially separated on the basis of whether or not they qualify as DACs. DAC-qualifying PIFs could then be priority rank ordered to compete specifically for BIL DWSRF DAC financing. In the event that BIL DWSRF DAC financing is insufficient to fully fund all DAC-qualified PIFs, those projects that do not receive BIL DWSRF DAC financing could then flow into a master PIF group to compete on a priority rank basis with non-DAC PIFs for standard DWSRF financing. A similar grouping and flow structure could be utilized to address other DWSRF priorities and set asides, such as financing for small and very small systems or green infrastructure.

Recurring Noncompliance—Repeated noncompliance violations with SDWA requirements could be allocated additional PIF ranking points to prioritize remediating persistent drivers of noncompliance. For example, the same points allocated for a current noncompliance could be allocated to the CWS for each prior year with the same noncompliance on a scale that diminishes exponentially with time. The current PIF ranking system gives equal weight to random, one-off noncompliance as it does to a recurring noncompliance. Such a readjustment could substantially benefit Texas groundwater-sourced CWSs, as they are frequently subject to recurring geogenic noncompliance drivers, including arsenic and radionuclides.

Regionalization—Regionalization and consolidation could be further incentivized by reworking the PIF priority ranking points awarded for these approaches. The current PIF ranking system awards points for either physically consolidating CWSs or where one CWS agrees to supply wholesale water to another CWS. However, wholesale water suppliers require "take or pay" contracts, forcing CWSs to pay for water when they may not need it. A CWS consolidating another CWS is awarded the sum of all TCEQ PIF rating points that address SDWA noncompliance and physical system deficiencies for the CWS to be consolidated. A CWS that agrees to supply wholesale water to another CWS receives one-half of the same sum of points for the CWS to which it supplies water. This current point allocation does not capture the full spectrum of regionalization approaches nor all of the potential benefits to be garnered therefrom. For example, nonphysical integration, where one or more smaller CWSs agree to have a larger CWS provide services (such as financial management or operational maintenance) may yield substantial economies of scale or improve long-term performance of the DWSRF-financed projects. These benefits are unaccounted for in the current PIF ranking system.

Streamlining—The PIF ranking and DAC qualification processes could be substantially streamlined to reduce the burden upon CWSs seeking DWSRF financing by creating an online **dashboard** that establishes preliminary CWS ranking points and DAC eligibility for all Texas CWSs. The TCEQ and TWDB have sufficient data available to them to calculate preliminary ranking points and DAC qualification in most, if not all, circumstances. Additional data needed for final rankings and DAC assessments, such as project cost assessments or income surveys, could still be supplied via PIF submission. This dashboard could inform CWSs considering seeking DWSRF financing without the need for lengthy and complex analyses on their part and could reduce the burden on the TCEQ and the TWDB in reviewing PIFs to assign ranking points. Reducing barriers to entry is particularly relevant to small systems and DAC CWSs that may not have sufficient resources to overcome them otherwise and is recommended by BIL implementation.

2b. Supporting Community Water System Resilience

BIL implementation guidance strongly recommends that states incorporate resilience considerations, which may address many potential stressors, ranging from **climatic extremes** (such as droughts and floods) to cyber-attacks, in their prioritization of projects. In this white paper, we focus on two such stressors we suggest may be particularly relevant to groundwater-sourced CWSs.

Shifting Populations—Understanding how populations served by CWSs are projected to change in the future is critical to the long-term success of these systems; ideally DWSRF-financed projects should be appropriately sized to meet the needs of communities projected to grow or contract over the next 50 years. Currently, population changes are addressed by the DWSRF in two forms:

a. An adjustment to the household cost factor used in making DAC determinations that considers recent historical population changes (evidenced by the most recent two ACS5YEs); and;
b. The requirement that DWSRF-financed projects comply with the SWP.

The population adjustment to the household cost factor, *AA* (see Eq. 3), increases the likelihood that a CWS will qualify as a DAC if it has experienced a contraction in the population served given that a declining population may have a direct impact upon the affordability of water and sewer services. Beyond the household cost factor, which looks at past data, prospective changes in **population** are not considered in the PIF priority ranking system. The SWP explicitly considers projected population change, but those projections use a cohort component projection technique that integrates birth rates, death rates, migration rates, and currently recorded populations. These techniques may or may not capture recent shifts in population change drivers, such as the increasing prominence of telework and, therefore, may fail to capture potentially increasing demand in small and rural (often groundwater-sourced) CWSs. A more comprehensive study of population changes and integrating those results with DWSRF metrics could improve CWS resilience and the efficiency of DWSRF allocations.

Groundwater Recoverability—Changes in groundwater storage conditions, such as depth-to-water (DTW), have direct impacts on the operation of groundwater-sourced CWSs. Texas groundwater resources are managed on the basis of desired future conditions (DFCs), which most frequently take the form of a change in DTW (Thompson et al., 2020), but the impacts to pumping driven by DTW changes are currently largely unknown and unquantified. New methods (Thompson and Young, 2023) recently developed at The University of Texas at Austin Bureau of Economic Geology (UTBEG, the State geological survey) can quantify these impacts; determining at what DTW a CWS supply well experiences a capacity failure (i.e.,

"goes dry"), whether or not capacity failures can be remediated, and what the economic impacts of changes in DTW and related remediations may be. Understanding these impacts, driven either by DFC-based groundwater management regimes or exogenous drivers, such as drought, could enhance CWS resilience and improve the efficiency of DWSRF allocations.

2c. Addressing Disadvantaged Communities

The BIL provides both the opportunity and the impetus for Texas to reevaluate how it prioritizes DACs for DWSRF financing. States are encouraged to reevaluate and revise DAC definitions and affordability criteria. The 2022 fiscal year BIL distribution to the Texas DWSRF general supplementation fund allocates $69 million for DACs.

A preliminary analysis by UTBEG found that 567 groundwater-sourced CWSs, 17% of all groundwater-sourced CWSs in Texas, would qualify as DACs if the household cost factor were disregarded and only the requirement that the entire CWS service area represent an AMHI of ≤75% of the state AMHI were considered (Fig. 8). The number of groundwater-sourced CWSs so qualifying would be even higher if partial service areas were considered.

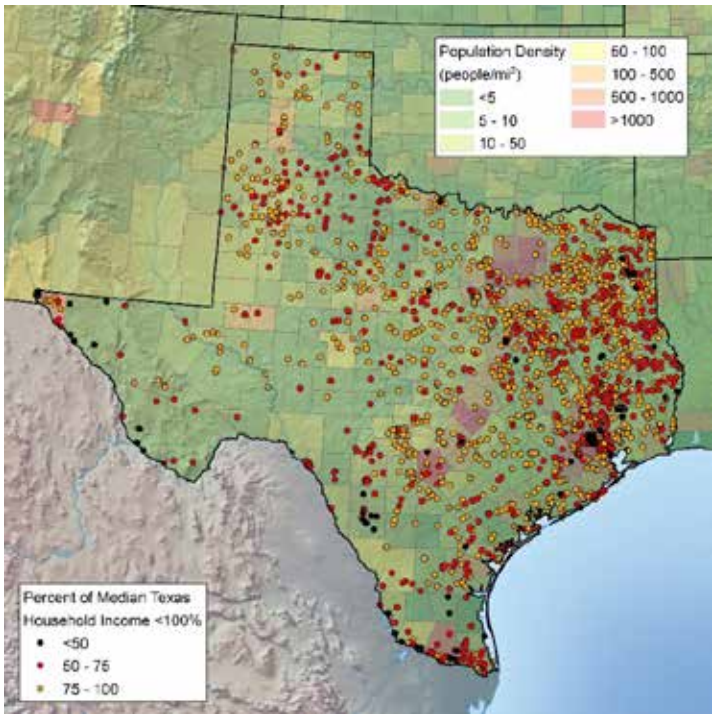

Figure 8. Community Water Systems based on percent of average median household income (AMHI) in Texas.

DAC criteria recommended by the EPA or in use by other states that Texas may wish to consider in revising its DAC qualifications include but are not limited to (in no particular order):

- Establishing a category for "severely disadvantaged community" and relevant thresholds, e.g., CWS AMHI ≤ 50%, 60%, or 70% of state AMHI

- Evaluating affordability to the 20th percentile of household income, e.g., household costs ≥2% of the lowest quintile income in the CWS service area
- Prevalence of poverty, e.g., X% of the CWS service area population at or below the official poverty measure
- Prevalence of government assistance programs, e.g., X% of the CWS service area population receiving Supplemental Nutrition Assistance Program (SNAP) for Women, Infants and Children (WIC), etc.
- Shutoffs for nonpayment, e.g., X% of the CWS service area population disconnected due to nonpayment within the last Z years

If TWDB decides to retain the household cost factor (Eq. 1) in making DAC qualification determinations, it may wish to modify it to avoid incentivizing CWSs to oversize projects to qualify as a DAC. The annual amortized cost of the proposed project being considered for DWSRF financing on a per household basis, or *Y*, certainly may impact affordability of CWS services. However, the current formulation of DAC qualification (Eq. 1) could incentivize CWSs to oversize proposed projects to qualify as DACs, and this incentive could be amplified as BIL DAC funds are deployed. One potential solution would be to limit the maximum impact of *Y* in the calculation, as is currently done for *Z* (Eq. 2) and *AA* (Eq. 3).

Additionally, if the TCEQ and TWDB do not pursue a disaggregation of PIF rankings (as discussed above), they may wish to adjust the number of ranking points yielded for qualifying as a DAC so as to make DAC projects more competitive and to fully leverage BIL DAC financing. Indeed, the TWDB increased the number of PIF points awarded for qualifying as a DAC from 10 points in the 2022 IUP to 20 points in the 2023 IUP. However, even with this increase, the PIF points awarded for DAC qualification are significantly outweighed by other PIF factors. For example, a CWS serving 100,000 or more people receives 40 PIF ranking points, double the points yielded for DAC status (see Appendix A).

2d. Providing Technical Assistance to Agencies

A variety of different groups are working with CWSs on the implementation of the BIL in Texas, including the TCEQ, the TWDB, Communities Unlimited, and the Texas chapter of the American Water Works Association. Other organizations, such as UTBEG, Texas 2036, and the Texas Alliance of Groundwater Districts, are generating or contributing to relevant scientific and policy analyses. Coordinating these efforts, optimizing their outputs, and ensuring they are actionable could significantly enhance the impact of the BIL DWSRF financing.

The TWDB has extensive data on general groundwater quality for a large number of parameters relevant to the SRF program that can be used to assess the potential of different treatment options in various regions. Combining the TWBD water quality data with the TCEQ PWS data will be very valuable in understanding the regional groundwater systems in the vicinity of the CWSs. Geogenic contaminants, including arsenic and radionuclides, are strongly linked to the geology of the different aquifers, and we can use many previous studies on these contaminants to address the CWS issues. DBPR violations reflect issues with treatment systems. The EPA conducted a detailed analysis of DBPR violations within the United States, and this can provide reconnaissance-level data to address these issues (EPA, 2019). Nitrate

problems can also benefit from many previous studies assessing the general distribution of groundwater nitrate contamination in the state (Reedy and Scanlon, 2017).

The TWDB, the TCEQ, and the EPA also have extensive data describing the well infrastructure supplying groundwater-sourced CWSs and aquifer parameters (such as geometries, potentiometric surface, and pumping estimates). These data could be integrated and applied to models recently developed at UTBEG to assess which CWSs might be threatened by declining water levels driven by local management practices or drought.

2e. Communicate with Other States and National Agencies

Each state will be implementing BIL funding to address CWS issues in their states. It will be important to learn optimal approaches from other states to address CWS issues, particularly for disadvantaged communities.

2f. Continuing Task Needs

A variety of tasks have been identified to support optimal deployment of new drinking water infrastructure funding:

1. Determine the drivers of non-compliance of community water systems, including geogenic and anthropogenic sources particularly relevant to groundwater systems;
2. Evaluate vulnerability of CWSs to droughts and floods and potential solutions;
3. Examine various approaches to defining disadvantaged communities and the impact of approaches on number of systems and populations served;
4. Conduct reconnaissance study to assess the potential for regionalization and consolidation of CWSs, including physical and virtual regionalization;
5. Provide technical assistance to various groups in need, including NGOs such as Communities Unlimited and Texas Rural Water Association;
6. Compare performance of CWSs that have received SRF funding with those that have not;
7. Examine output from the Asset Management Program for Small Systems;
8. Compile data on success stories for CWSs that have achieved compliance, relative to different types of CWSs and types of contaminants; and,
9. Communicate results from Texas' program with those in other states through the EPA and the Association for State Drinking Water Administrators.

Because each of the states works essentially independently on SDWA regulations, interstate communication may help advance solutions in different regions.

TGPC GWI Subcommittee

TGPC GWI Subcommittee members include but are not limited to the following entities:

- Texas Commission of Environmental Quality (TCEQ)
- Texas Water Development Board (TWDB)
- Railroad Commission of Texas (RRC)
- Texas Department of State Health Services (DSHS)
- Texas Department of Agriculture (TDA)
- Texas State Soil and Water Conservation Board (TSSWCB)
- Texas Alliance of Groundwater Districts (TAGD)
- Texas A&M AgriLife Research (AgriLife Research)
- The University of Texas at Austin Bureau of Economic Geology (UTBEG)
- Texas Department of Licensing and Regulation (TDLR)
- Texas Parks and Wildlife Department (TPWD)
- Texas Tech University (TTU)
- Texas A&M AgriLife Extension Service (AgriLife Extension)
- United States Geological Survey (USGS)

The primary goals of the TGPC GWI Subcommittee are as follows:

- Facilitate interagency communication for assessment programs addressing groundwater contamination
- Coordinate and assist member agencies with three types of monitoring programs:
    - Ambient groundwater conditions
    - Pesticides
    - Emerging contaminants or constituents of concern
- Support the intent of the *Texas Groundwater Protection Strategy* (https://www.tceq.texas.gov/downloads/groundwater/publications/as-188-texas-groundwater-protection-strategy.pdf) with the following actions:
    - Reviewing published data reports and evaluating data independent of published reports to assist in the determination of the effectiveness of existing regulatory programs and to identify potential groundwater contaminants not addressed by existing regulatory programs.
    - Developing recommendations for consideration by the TGPC to address potential groundwater contamination identified through monitoring and data review.
    - Developing white papers on the groundwater issues listed in their biannual *Activity Plan* which summarize the best available scientific data on a specific groundwater issue, identify areas where there is insufficient scientific data to thoroughly assess the issue, evaluate the effectiveness of existing regulatory programs to address the issue, and provide recommendations or policy options to the TGPC regarding the issue.

The above recommendations or policy options represent the opinion of the TGPC GWI Subcommittee and do not necessarily reflect the views and policies of each participating organization. The United States Geological Survey (USGS) may have contributed scientific information only.

For more information about this white paper, please contact the TGPC (https://tgpc.texas.gov/contact-us/).

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APPENDIX A

Community Water System Rating Criteria for the Texas Drinking Water State Revolving Fund
from the
2023 Intended Use Plan by the Texas Water Development Board

TCEQ Ratings

All TCEQ ratings will be summed then multiplied by 10 before adding effective management and affordability points.

Combined Rating, Health and Compliance, and Primary Compliance Factors

Microbiological Factors	**Points**
The sum of the total coliform MCL violations, total acute coliform MCL violations, and the treatment technique violations (including all exceedances of the 0.5 Nephelometric Turbidity Units standard), disregarding one violation.	(TCV=s)+(ACV=s)+(TT)-1
Chronic Chemical	
The compliance result above the MCL for any chronic exposure chemical, divided by the MCL level.	Result/MCL
Acute Chemical	
Three times the compliance result above the MCL for Nitrate or Nitrite, divided by the MCL level.	(Result/MCL) X 3
Carcinogen	
Two times the compliance result above the MCL for any carcinogenic chemical, divided by the MCL level.	(Result/MCL) X 2
Lead/Copper	
Two times the greater of the 90th percentile lead level divided by the lead action level or the 90th percentile copper level divided by the copper action level.	[Greater of (Pb90/0.015) or (Cu90/1.3)] X 2
Filtration	
Awarded to any system with one or more sources identified as surface water or groundwater under the direct influence of surface water for which no filtration is provided.	12.00
Groundwater Rule Factor	
Awarded to any system with one or more sources of water identified as groundwater requiring 4-log viral inactivation for which 4-log inactivation is not provided.	12.00

Population Factor

Added to the sum of the other Primary compliance factors to determine the overall compliance rating.

Population Range	
0-100	0.00
101-1,000	1.00
1,001-10,000	2.00
10,001-100,000	3.00
100,001+	4.00

Secondary Compliance Factors

Secondary Chemical

One half the compliance result above the MCL for any secondary chemical violation for sulfate, chloride, and total dissolved solids, divided by the MCL level. (Maximum of 1 pt.)	(Result/MCL) X 0.5

Physical Deficiency Factor

A rating based on the confirmed existence of physical deficiencies within the water system. This rating will be used to prioritize systems with no other Health and Compliance Factors or Affordability Factors.

Deficiency:

Pressure <20 psi	1.00	Water Loss >25%	0.25
No disinfection	1.00	Pressure ≥20 & ≤35 psi	0.25
Production ≥85% total capacity	0.25	Other Secondary MCLs	0.25
Storage >85% total capacity	0.25		

Consolidation Factor

The sum of all factors for each system which will be consolidated. One half the sums of all factors for each system which will be provided wholesale water.

TWDB Ratings

Effective Management

An adopted asset management plan that contains an inventory of assets, an assessment of the criticality and condition of assets, a prioritization of capital projects, and a budget.	2.50
Entity has adopted an Asset Management / Financial Planning tools within the past 5 years that contains the product deliverables under the AMPSS initiative as described in Section XII.	5
Entity plans to prepare an asset management plan with completion of proposed project	0.50
Providing asset management training for the entities governing body and employees	0.50
Project addresses a specific goal in a water conservation plan	1.00
Project involves the use of reclaimed water	1.00
Project addresses a specific goal in an energy assessment, audit, or optimization study conducted within the past three years	1.00
Project is consistent with a municipal and/or state watershed protection plan, water efficiency plan, integrated water resource management plan, a regional facility plan, regionalization or consolidation plan, or an approved Total Maximum Daily Load implementation plan	2.00

Disadvantaged Eligibility

Awarded to any entity that qualifies as a disadvantaged community (see Appendix D for eligibility criteria) — 20.00

Previously Received TWDB Planning, Acquisition or Design Funds

The project is requesting construction financing and previously received a TWDB commitment for Planning, Acquisition, and/or Design (PAD) financing within the prior five years (60 months) of the PIF due date under the DWSRF program or the TWDB's Economically Distressed Areas Program, the entity has completed and received TWDB completion approval for all of the PAD activities and is ready to proceed to the construction phase, TWDB has released from escrow at least eighty percent of the PAD funds, and the project has not received any TWDB funding for construction. — 10.00

Tie Breaker

Equal combined rating factors will be ranked in descending order with priority given to the least population first.