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CALIFORNIA

SAFE Drinking Water Plan

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Report to the Legislature in Compliance
with the Health and Safety Code Section 116355

State Water Resources Control Board

UPDATE 2025

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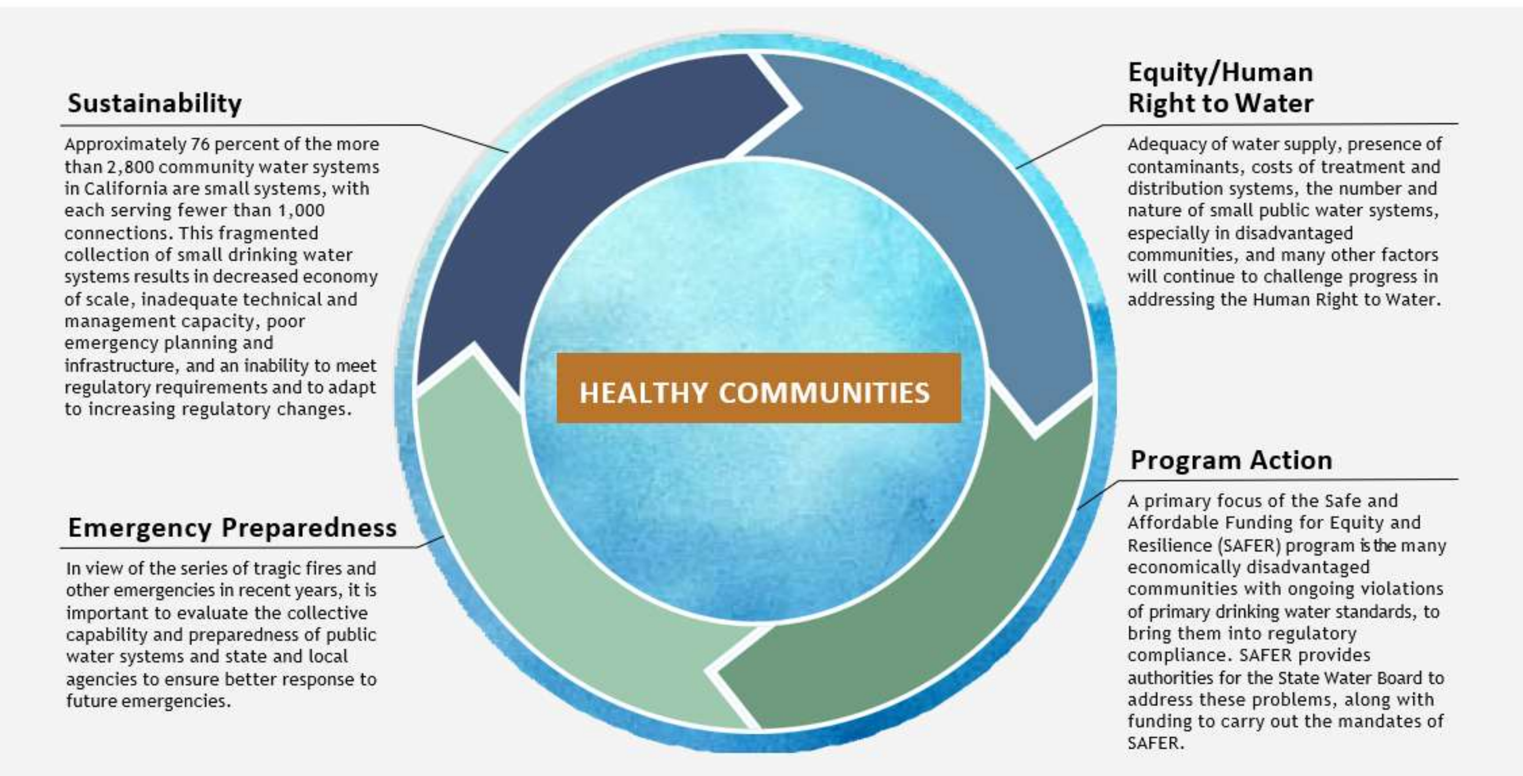
EXECUTIVE SUMMARY

BACKGROUND

The 2025 Safe Drinking Water Plan (Plan) provides a comprehensive analysis of California's drinking water from the perspective of the State Water Resources Control Board's (State Water Board) Division of Drinking Water (DDW) with support from the Division of Financial Assistance (DFA), and the Office of Chief Counsel (OCC). The 2025 Plan reviews drinking water regulations, the quality of drinking water, and water quality issues affecting water systems. It also assesses treatment technologies, considers funding aspects and financial assistance, and focuses on the challenges faced by small drinking water systems. Additionally, the Plan discusses tools such as technical assistance, the use of administrators for public water systems (PWS) serving economically disadvantaged communities, and consolidation of drinking water systems.

Throughout the Plan there is an emphasis on equity and the human right to water, sustainability, emergency preparedness and actions that water systems and the State Water Board are taking to provide safe drinking water. Central to these themes (Figure 1) is the reality that safe, clean, and affordable water is essential for healthy communities.

Figure 1: Safe Drinking Water Plan Themes



In 2012, California became the first state to enact a Human Right to Water (HR2W) policy, AB 685 (Chapter 524, Statutes of 2012). Public policy continues to focus on the right of every human to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitation. In 2019, California Legislature provided 10 years of financing which the State Water Board utilized to create The Safe and Affordable Funding for Equity and Resilience (SAFER) program. The SAFER program is a set of tools, funding sources, dedicated staff, and regulatory authorities designed to secure sustainable access to safe, clean, affordable, and accessible drinking water for California's disadvantaged communities. Although the SAFER program has been critical to the success of addressing HR2W, many challenges remain. These include the need for an adequate supply of water suitable for drinking, the removal of various contaminants, the costs of constructing, operating, and maintaining treatment and distribution systems, affordable water rates, and the ever-evolving sustainability challenges of managing a small PWS (especially those in economically disadvantaged communities). Consistent with the HR2W policy, the State Water Board is committed to ensuring that all Californians have access to safe, clean, and affordable drinking water.

California relies on a mixture of surface water and groundwater for drinking water. The balance of supplies used each year depends upon the region of the state, water needs, water resource availability, changing source water quality, emerging regulatory concerns, and fluctuating weather conditions within the state. During periods of normal to high rainfall, surface water sources make up a higher percentage of the overall drinking water supplies across the state. During periods of lower-than-average rainfall, surface water supplies are strained and the use of groundwater increases. Since the 1993 Plan (first version of the Safe Drinking Water Plan) was first published, the demand and challenges impacting the State's limited water resources have increased in part due to California's population growth. To meet these challenges the State Water Board promulgated conservation regulations effective July 1, 2023, and January 1, 2025, and many PWS have promoted conservation measures and looked to other potential sources such as recycled water and desalination. On October 1, 2024, the State's first direct potable reuse regulations became effective, which set forth the regulatory requirements for what may be a significant source of potable use in the future.

REGULATION OF DRINKING WATER

The regulation of the state's drinking water is primarily the responsibility of the State Water Board. Several agencies at both state and local levels have a role in regulating PWS, including formation, design, construction, operations, and the rates they can charge customers (Chapter 2). Similarly, the regulation of water supply and water quality is spread across various state agencies.

Along with the regulation of drinking water, the State Water Board and the Regional Water Quality Control Boards (Regional Water Boards), (collectively the "Water Boards") are responsible for protecting the waters of the state. This includes drinking water sources – surface water and groundwater.

The Office of Environmental Health Hazard Assessment (OEHHA) is responsible for preparing health-based risk assessments for contaminants which the State Water Board proposes a primary drinking water standard. Also, the California Public Utilities Commission (CPUC) shares regulatory responsibility with the State Water Board in ensuring the quality of water supplied by investor-owned water utilities subject to its jurisdiction and is also responsible for overseeing their rate structures and related management.

The principal federal agency involved in drinking water regulation is the United States Environmental Protection Agency (USEPA). USEPA is responsible for establishing and implementing the federal Safe Drinking Water Act including national drinking water standards and overseeing the State Water Board's exercise of primary enforcement responsibility of the Act.

Local agencies also have a role in drinking water regulation of certain PWS and through activities that affect a PWS service area. The State Water Board may designate county health departments as the local primacy agency (LPA) to regulate small PWS serving fewer than 200 service connections. In addition to other functions, local county health departments also regulate domestic wells and state small water systems, which are non-PWS that serve between 5 and 14 connections. Local Agency Formation Commissions (LAFCOs) oversee the expansion of service areas of PWS that are public agencies and can review them to determine if an agency is operating acceptably including the delivery of safe drinking water.

Mirroring the regulatory scope of the State Water Board, the scope of this Plan focuses on the state's PWSs, as defined in Health and Safety Code section 116275(h). These are systems that either have 15 or more service connections or serve an average of at least 25 individuals daily at least 60 days out of the year. There were 7,265 PWS in the state as of November 2024. This is a significant decrease from the more than 10,000 systems that existed in 1993, and approximately 100 less than reported in the 2020 Plan. Additionally, California's population has grown from approximately 29 million at that time to around 42 million.

Table 2, 3 and 4 show the breakdown of California water systems as discussed throughout this report, including the number of systems per type, population, and the corresponding percentage. Figure 2 indicates that 8 percent of community water systems (CWS), those that serve the same people continuously, serve communities with more than 10,000 service connections (approximately 33,000 or more people per PWS). Collectively, these 228 CWS serve 79% of California's population. Figures 3 and 4 indicate that the 2,355 smaller community water systems that serve 3,000 or less connections represent 32% of PWS and serve only 6% of the state's population. Yet these systems represent 84% of systems most at risk of serving non-compliant water according to the DDW's 2024 Needs Assessment. Domestic wells are not regulated by the State Water Board but serve around 4% of the population. Noncommunity systems, which are those that do not regularly serve the same people annually, represent 61% of the PWS regulated in California.

Many of the small PWS are challenged by lack of technical, managerial, and financial (TMF) capacity and do not charge sufficient rates necessary to sustainably provide safe, clean, affordable, and accessible drinking water.

Figure 2: Estimated Percentage of Population Served by System Size (November 2024)

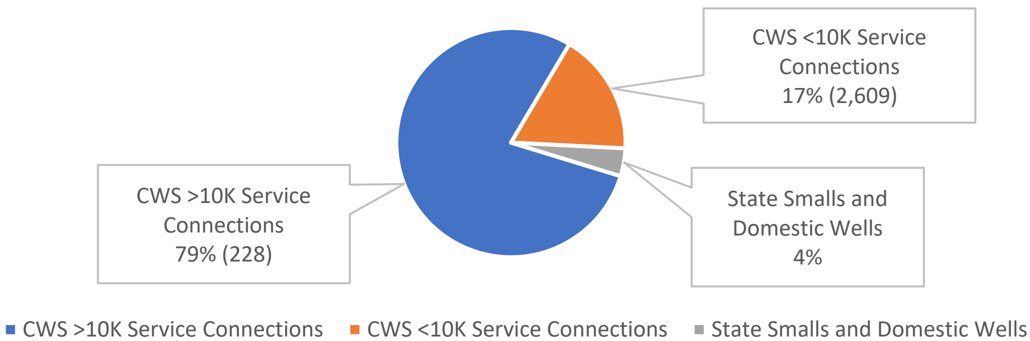


Figure 3: Number of Public Water Systems by Type and Size (November 2024)

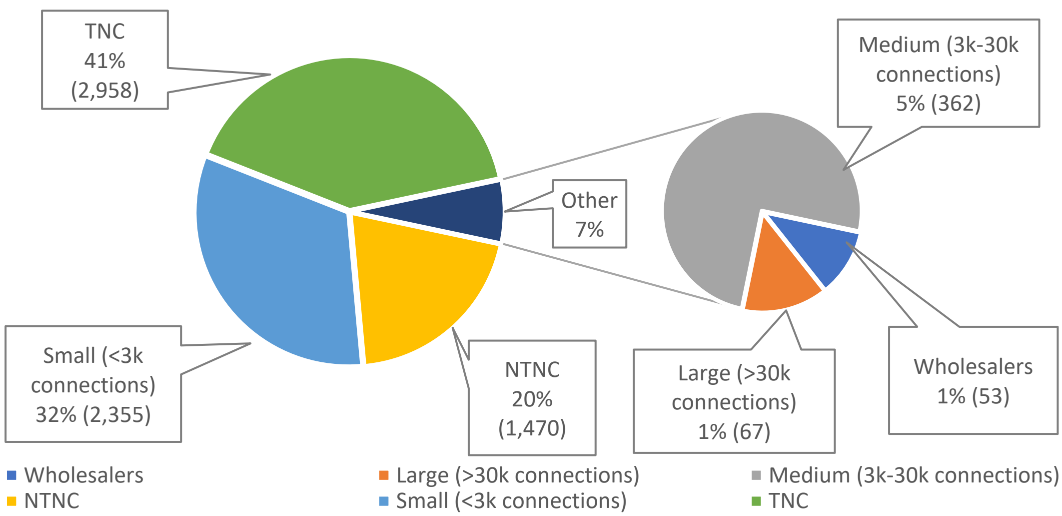
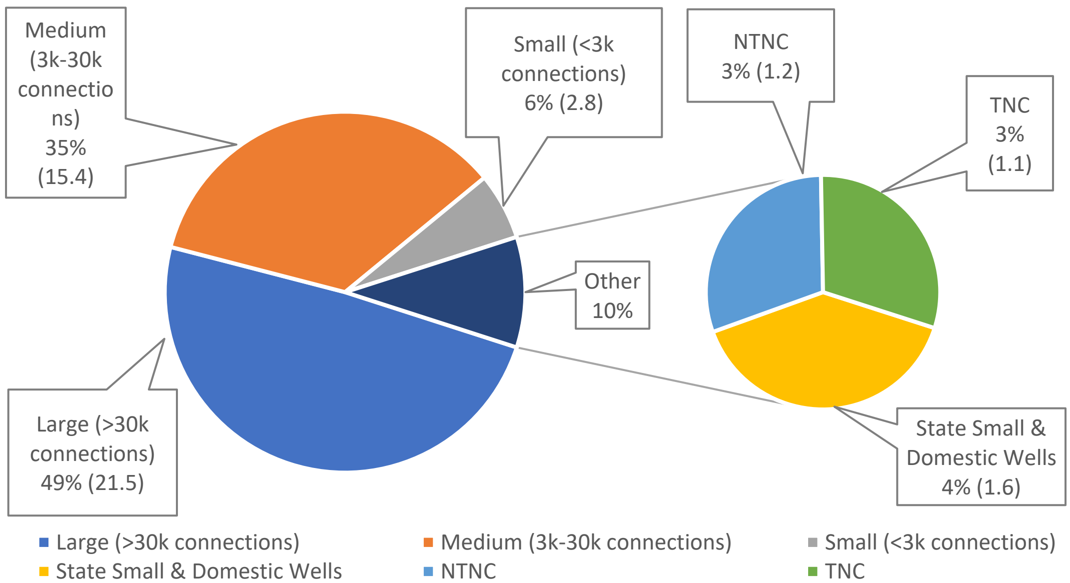


Figure 4: California Population Served by Water System Type and Size in Millions (November 2024)



WATER QUALITY AND REGULATORY COMPLIANCE

The State Water Board has successfully ensured that over 98 percent of California's drinking water consumers served by PWS receive drinking water that meets federal and state drinking water standards, with 79% of the water systems in continual compliance with drinking water standards since 2017. However, some Californians continue to receive water that does not meet federal and state drinking water standards, such as those served by domestic wells or by water systems outside the scope of the State Water Board's regulatory authority. The State Water Board evaluates the needs of these communities and partners with local agencies to address the drinking water needs of those residents who are not served by PWS. Due to data limitations, water quality for the domestic wells and other unregulated water systems are not fully addressed in this Plan.

Various water quality contaminants identified in previous years remain a concern in California and are discussed in this Plan. In addition, new maximum contaminant levels (MCL) continue to be developed to address specific emerging contaminants.

Contamination issues discussed in this Plan include:

- Naturally occurring contaminants, industrial chemicals, pesticides, and water-treatment byproducts.
- Per-fluoroalkyl and Poly-fluoroalkyl substances (PFAS) and related fluoridated substances are undergoing statewide data collection and characterization

studies.

- Hexavalent chromium MCL which was effective October 1, 2024.
- Emerging contaminants such as 1,4-dioxane and N-nitrosodimethylamine (NDMA).
- Lead in schools and preschools, for which monitoring requirements have been established or have become more stringent.
- Constituents of Emerging Concern (CEC), such as microplastics, manganese, pharmaceuticals, and personal health care products. These materials and chemicals represent concerns, not only for drinking water systems using groundwater and surface water, but also for systems that use recycled, highly treated wastewater to supplement their drinking water supplies.
- Updates to the federal lead and copper rule requiring water systems to survey their service lines for lead components and submit these inventory plans to the state.

For smaller water systems that use groundwater, arsenic, nitrate, and uranium are commonly detected and result in significant primary drinking water standard violations. Many of these same systems need to address contamination of their drinking water sources by the newly regulated 1,2,3-trichloropropane (1,2,3 TCP), hexavalent chromium (Cr6), and eventually by PFAS. It is common for these small systems that use groundwater to violate secondary drinking water standards for manganese and iron. For small water systems that use surface water sources, compliance with the Surface Water Treatment Rule and the standards for disinfection byproducts pose the greatest challenge.

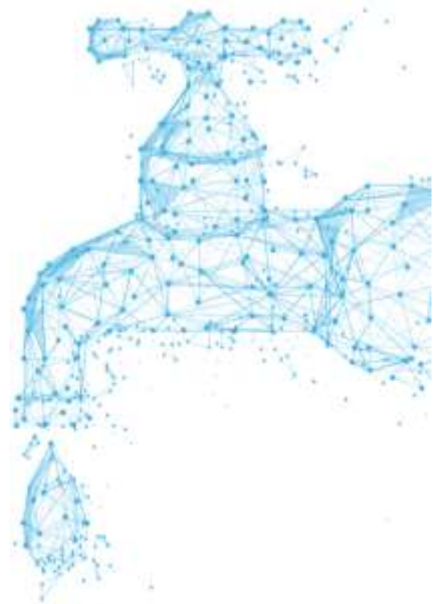
Treatment technologies are available to address these water quality issues. Although some financing may be available to build or upgrade treatment facilities, the cost to operate and maintain these facilities is generally beyond the capabilities of small systems, particularly those that serve economically disadvantaged communities. The endeavor to meet the legislative mandates to ensure every Californian has a right to pure and wholesome drinking water is compromised by the limitations of affordability and adequate technical, managerial and financial capacity of the small water systems (Chapters 3 and 4).

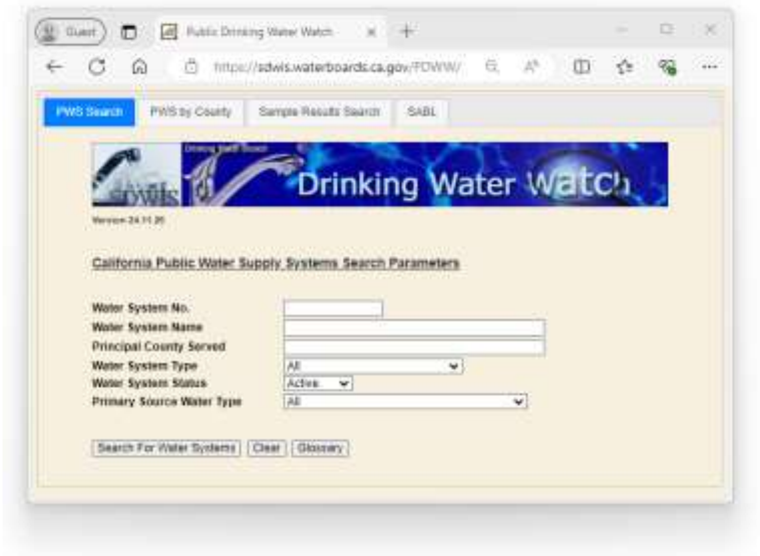
DRINKING WATER INFORMATION SYSTEMS

Compliance determination is based on data; therefore, it is critical to have strong data systems to carry out the mandates of the Safe Drinking Water Act. Since the 1993 Plan, the State Water Board has developed a comprehensive database on drinking water quality. This includes electronic data reporting of analytical results by environmental laboratories, which has allowed for the improved review of PWS compliance monitoring results and better public health protection. Since the 2020 Plan, the State Water Board has continued to make improvements to its data systems. State agencies have made great progress in sharing water quality data. PWS's water quality data are used by several agencies, including the Department of Water Resources, the Department of

Pesticide Regulation, and USEPA. While improvements have been made, the State Water Board has identified improvement projects related to data tools and specific data gaps, such as having limited information on state small water systems and domestic wells.

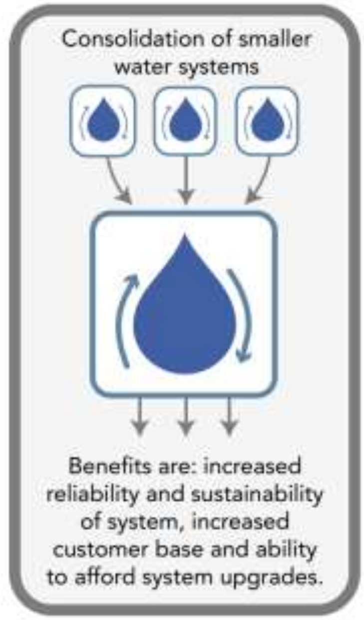
In addition to database improvements, the State Water Board has improved public access to water quality data. Water quality data is available online at the Drinking Water Watch website, as well as several other State Water Board websites. The State Water Board is committed to making drinking water data available to the public (Chapter 5).





CONSOLIDATIONS OF WATER SYSTEMS AND THE USE OF ADMINISTRATORS

Before 2017, an average of four consolidations were completed each year. Due to subsequent legislative amendments to the State Water Board's consolidation authority under the Safe Drinking Water Act, over 250 consolidations have been completed since 2017 and another 260 are currently at the funding, planning, or construction stage. Most consolidations addressed bacteriological, chemical or radiological contamination. Some consolidations addressed water outages and reliability issues associated with a single source of supply, while other consolidations addressed lead and copper violations, lack of TMF capacity, failing infrastructure, or systems destroyed by wildfire.



As a result of the new consolidation authority, the State Water Board has initiated 17 mandatory consolidations of small systems serving disadvantaged communities. In 2018, using new statutory authority and with funding provided by the Legislature, the State Water Board appointed the first administrator to manage a failing small water system. Since 2019, additional funding provided by the Legislature has allowed the State Water Board to begin covering the costs associated with the appointment of 16 PWS administrators and other tools and resources needed to support water partnerships and consolidations via the SAFER program (Chapter 8).

SUSTAINABILITY OF WATER SYSTEMS

Sustainability of a water system refers to the ability to meet all statutory and regulatory requirements across the range of operating conditions. Sustainability has become a serious issue for many water systems because of inadequate water supplies, contamination of water supplies, or inadequate TMF capacity. To prevent the formation of new unsustainable water systems, the Safe Drinking Water Act was amended in 2017 to require proposed water systems to submit a preliminary technical report to the State Water Board before applying for a permit for the new water system. Although the 2017 amendment was a step in the right direction towards preventing the formation of new unsustainable water systems, further legislation and local governmental oversight is needed to ensure that systems with a high potential for failure are not permitted. As a result, SB 1188 was enacted in 2024, requiring the State Water Board to adopt minimum TMF capacity requirements for smaller and most at-risk water systems.

As required by 2018 legislation, the State Water Board developed the first statewide Needs Assessment to identify water systems that are failing and those that are at-risk of failure to provide safe and affordable drinking water. The results of the assessment also show possible interim and long-term solution pathways to address identified challenges. The Needs Assessment is updated annually and helps the State Water Board identify and prioritize various resources needed to help water systems return to or maintain compliance. The Needs Assessment demonstrates size as a key predictor of failure for PWS; in 2024, 84% of the water systems determined to be at risk of failing had 3,000 connections or less. Despite these challenges, since 2019, the number of Californians without access to safe drinking water has been reduced from 1.6 million to 750,000. Chapters 8 and Chapter 9 highlight SAFER program goals that have led to success around addressing unsustainable water systems.

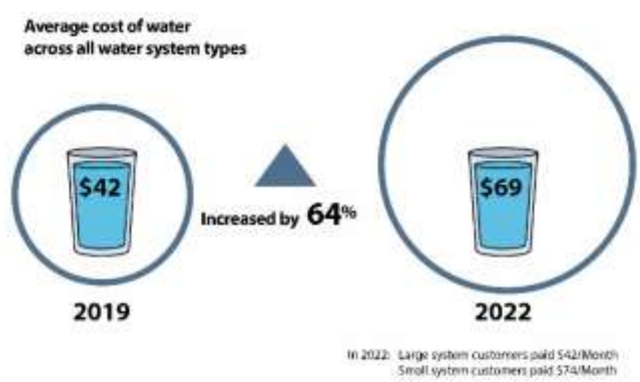
THE COST OF WATER

Between 2019 and 2022 the average cost of drinking water increased by over 60 percent across water systems of all sizes. In 2022, the average statewide monthly customer charge for 6 hundred cubic feet (HCF) is $69. Based on this average volume of usage, small drinking water systems charge on average $74 a month compared to large water systems averaging $42 per month. Many economically disadvantaged communities are served by small water systems. As a result, water affordability has become a significant issue among residents in these communities. According to the 2024 SAFER Affordability Assessment, approximately 3% (94) of community water systems face high drinking water affordability burden, 10% (311) may be experiencing medium affordability burden, and 50% (1,588) are likely facing low affordability burden. High, medium, and low affordability burden in the Affordability Assessment is defined as having three, two, or one of the affordability indicators respectively, such as income level, high water bill, and household socioeconomic burden, such as prevalence of poverty levels and housing costs (Chapter 9).

Small water systems have several barriers to funding operations and often lack TMF capacity to sustainably run a PWS. Their customer base is often too small to generate sufficient revenue for operational costs or to qualify for wholesale pricing of materials available to larger systems. Reluctance to raise rates reduces their ability to cover costs of operations and maintenance. Inadequate revenues compound funding shortfalls and costs mount as maintenance is further deferred.

Regardless of whether rates are sufficient to support a PWS, customers in small economically disadvantaged communities may have difficulty paying water bills. The inability for customers to pay their water bills further contributes to inadequate TMF capacity for these water systems.

Over the past decades, the cost of drinking water, adjusted for inflation, has been on the rise and this trend is expected to continue. To address the issue of affordability, there is a need for a statewide rate assistance program, increased funding availability, and an increase in water partnerships to address these TMF challenges in the short and long term (Chapter 9).



DRINKING WATER SYSTEM FINANCING

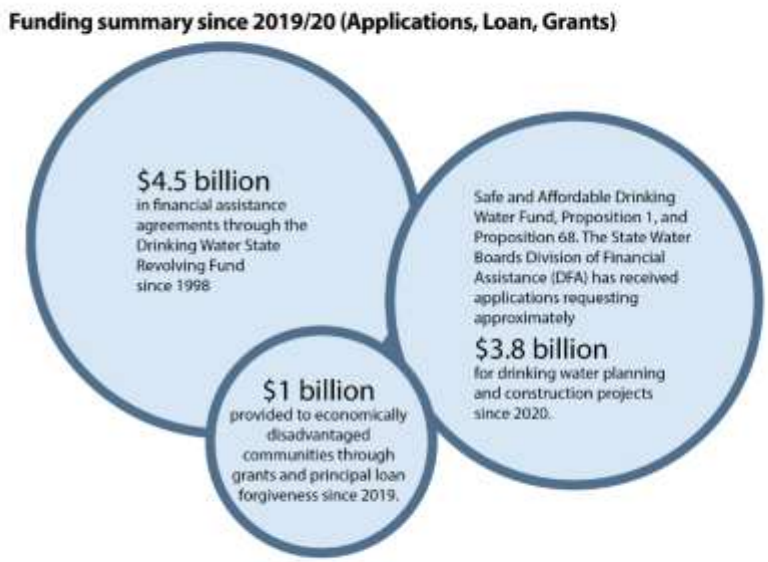
Many industry reports including the American Society of Civil Engineers' 2021 Infrastructure Report Card, the USEPA's 2023 Drinking Water Infrastructure Needs Survey and Assessment, and American Water Works Association's 2024 State of the Industry indicate that capital improvement reserves and other funding sources during the past decades have not kept up with the need for major infrastructure improvements. Even large water systems with significant economies of scale can struggle with the rising costs required to replace aging distribution systems, install new treatment systems as necessary to remove new contaminants or deliver drinking water that meets all drinking water standards. In many cases, especially with smaller more economically challenged water systems, this funding inadequacy results in subpar asset replacement and may lead to leaks or water outages with associated water quality and availability risks. As such replacement programs struggle to meet the need, there is an increasing risk of failure and costs. When a preventable failure occurs, urgent repairs are required, and costs are exacerbated, especially due to inflation.

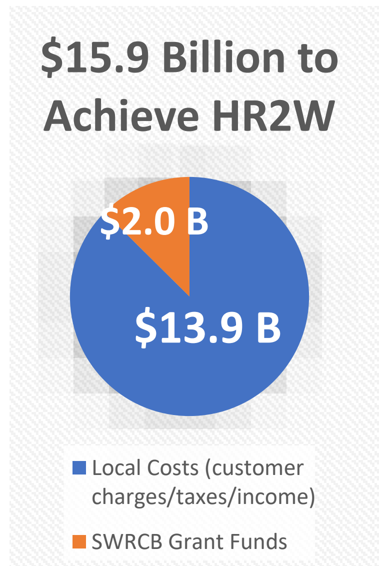
Since 1998, a significant investment has been made at the federal and state level to provide funding for water system infrastructure that would help to achieve regulatory compliance via the Drinking Water State Revolving Fund (DWSRF). Since that time the State Water Board has executed more than $4.5 billion in financial assistance agreements.

In addition to the DWSRF, other funds have been available to assist water systems achieve and maintain compliance with drinking water standards. These other funds include the Safe and Affordable Drinking Water Fund (SADW), Proposition 4, Proposition 1, and Proposition 68. Thanks to these State funding mechanisms, between 2019 and 2023 the State Water Board provided $73 million in technical assistance for 673 failing or at-risk systems and 251 water systems serving 2 million people have come back into compliance with drinking water standards.

Notwithstanding the significant investment in capital and technical assistance already provided, USEPA 2023 Infrastructure Needs Survey estimates a 20-year need of $83.5 billion for water systems improvements statewide ($625 billion nationally). In addition, the 2024 DDW Needs Assessment estimates a 5-year funding need of $15.9 billion in interim and long-term capital solutions to uphold the HR2W policy for California's most vulnerable at-risk or failing systems. Over the next five years, the State Water Board's projected grant funding is estimated to meet $2 billion of this cost, and local communities would need to fund $13.9 billion through other agency grants, loans, or sources of income.

Many small water systems serving economically disadvantaged communities lack the TMF capacity to manage ongoing operations and maintenance. This, in many cases, prevents them from accessing financial assistance for capital improvement projects. Most government funds require water systems to demonstrate the ability to self-fund the ongoing operations and maintenance (O&M) cost to ensure that the investment is sustainable. In recent years, DFA initiated a program to fund limited O&M related projects. Over the last five years the State Water Board has funded over $1 billion in grants for drinking water assistance and projects to 750 small, disadvantaged communities serving 13.8 million Californians. This represents over 2.5 times more grants than the previous five years (Chapter 10).





DRINKING WATER SYSTEM EMERGENCY MANAGEMENT, SECURITY, AND RESILIENCY

The recent droughts, wildfires, climate change effects, September 11, 2001, events, and concerns related to data security and cyberattacks, demonstrate the importance of ensuring the reliability of high-quality drinking water sources. These challenges highlight the need for PWS resilience and their ability to maintain and/or restore service, should it be stressed or interrupted for any reason. It is also important to prevent deliberate or accidental contamination of drinking water supplies from wildfires or other environmental releases.

Emergency management aims to reduce or avoid potential loss from hazards by addressing elements in the four phases of the emergency management cycle: (1) Prevention/Mitigation, (2) Preparedness, (3) Response, and (4) Recovery. The emergency management cycle, shown below, illustrates the ongoing process by which all organizations can plan for and reduce the impacts of disasters, respond during and immediately following a disaster, and take steps to recover after a disaster has occurred. Over the past decade, state and federal agencies, and water systems, have continuously collaborated in developing strategies and implementing programs to secure drinking water supplies from interruption due to deliberate and accidental causes.

DDW enlists a suite of strategies to ensure safe drinking water is always available within PWS. Some of these strategies include the creation of program manager positions to coordinate and disseminate relevant drought and emergency preparedness related communications and requirements as well as ongoing coordination and planning of continuity of operations at the local, and federal levels. Other initiatives described in Chapter 11 include cybersecurity and bioterrorism preparedness, water loss reduction, testing after wildfires, emergency and expedited funding, mutual aid networks, and day to day ongoing coordination. Additionally, climate change responses such as drought planning, are discussed in Section 8.1. The State Water Board and its partners will continue to evaluate the collective capability and preparedness of PWS and state and local agencies for better response to future emergencies.

PROBLEMS AND SOLUTIONS

Small water systems continue to have the largest percentage of water quality issues and the highest rate of noncompliance with drinking water standards. Community water systems serving less than 500 service connections and non-transient non-community water systems have the greatest noncompliance rates, especially those that serve disadvantaged communities. Many of these water systems lack the resources to comply with drinking water regulations or develop strategies to ensure their own sustainability. State small water systems and domestic wells also tend to be problematic. There are more than 1,200 state small water systems servicing about 18,000 people and though the number of domestic wells is unknown it is estimated that domestic wells serve about 1.6 million Californians; these systems are similarly vulnerable to the problems that small PWS confront. However, state small water system and domestic well requirements are much less strict than those placed on PWS, and those systems are not subject to addressing water quality problems unless they become PWS. State small water systems and domestic well owners often lack TMF capacity to operate and maintain treatment facilities.

The 2025 Safe Drinking Water Plan recognizes that land use planning is important in controlling the expansion of new unsustainable water systems, as well as addressing those areas with poor water quality not served by a PWS. The Plan also provides recommendations for creation of viable systems through forming water partnerships and the consolidation of water systems, regionalization of water systems that serve economically disadvantaged communities, and other means.

The recent extended drought highlights the fact that water resource availability has a direct impact on the supply of safe drinking water. The state needs to ensure that the quality of drinking water supplies is protected, that new sources are identified to replace aging infrastructure, and that water supply meets the demands of California’s increasing population. Small water systems, particularly those serving disadvantaged communities, will continue to be stressed, as will its customers who may be challenged with the affordability of drinking water.

The State Water Board is committed to actively pursuing initiatives to address HR2W, beginning with the state’s residents who are currently served by PWS that are failing to deliver water that meets the state and federal drinking water standards. The State Water Board recognizes that to fulfill HR2W in California, every resident should have access to affordable, safe drinking water regardless of the size of their water system. Meeting the safe drinking water needs of all Californians will require a multi-agency effort at the state and local levels. The SAFER program initiatives have begun addressing these issues, but more work is needed and with the assistance of stakeholders, legislature and voters, the needed resources can be allocated to ensure these systematic solutions continue.

The Plan contains over 70 practical recommendations in four thematic areas (Figure 1) that highlight the State Water Board’s efforts to bring a greater number of systems into compliance and uphold the HR2W in California. Each chapter provides a detailed discussion covering the areas mandated by the Legislature, including a description of challenges and a set of conclusions and recommendations with the basis and justification for them. Chapter 12 summarizes the recommendations from Chapters 2 through 11.

CHAPTER 1 INTRODUCTION

1.1 PURPOSE OF THE SAFE DRINKING WATER PLAN

The Legislative requirements for this plan are outlined in Health and Safety Code (HSC) section (§) 116355, which identifies the topics to be addressed and requires the State Water Board to submit the plan every five years. This plan covers the calendar years 2021 through 2024.

The legislative intent of the Safe Drinking Water Plan (Plan) is to provide an analysis of the overall quality of California's drinking water and to identify specific water quality problems. Accordingly, this plan provides an overview of the State Water Board's Division of Drinking Water (DDW) initiatives, programs, goals and successes, and identifies challenges, as well as recommendations, to provide Californians with safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.

1.2 FEDERAL AND STATE SAFE DRINKING WATER ACTS

Since establishment of the federal Safe Drinking Water Act (SDWA) on December 16, 1974, the SDWA has been the cornerstone of national efforts to regulate contaminants, establish drinking water standards, and protect water sources (42 U.S.C.A. § 300f et seq.) The SDWA authorizes the United States Environmental Protection Agency (USEPA) to establish minimum standards to protect tap water and requires owners or operators of public water systems to comply with these primary (health-related) standards. In the last 50 years, there have been major improvements in the quality of drinking water with over 98 percent of the population served by public water systems receiving water that meets federal and state drinking water standards. However, additional challenges, such as climate change and the establishment of new drinking water standards, are continually arising, and for some communities the promise of safe drinking water has not been met. In many of these cases, safe drinking water is out of reach due to customers' inability to fund the costs of treatment or maintenance of aging infrastructure.

California has primary enforcement authority of the federal SDWA through its implementation of the California SDWA (HSC § 116270 et seq.) The requirements of the California SDWA must be at least as stringent as the requirements of the federal SDWA. To support the implementation of the SDWA, in 2019, Governor Newsom signed Senate Bill (SB) 200)[1] establishing the Safe and Affordable Drinking Water Fund to help disadvantaged communities secure an adequate and affordable supply of safe drinking water. The State Water Board launched the Safe and Affordable Funding for Equity and Resilience (SAFER) program that established a set of tools, funding sources, and regulatory authorities designed to secure access to safe, affordable, and sustainable drinking water for California's disadvantaged communities. Five years into the SAFER program, underprivileged communities have received over $1 billion in grants for drinking water technical assistance, planning, and construction projects, and

[1] SB 200: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB200

the number of Californians without access to safe drinking water has been reduced from 1.6 million to 750,000.

Looking forward, the State Water Board remains focused on continuing to develop drinking water standards for the protection of public health and ensuring public water systems are meeting those standards. To do that, the State Water Board will continue addressing challenges related to public water system technological, managerial and financial capacity, including strengthening operational resilience, modernizing infrastructure, and consolidating at-risk and failing water systems with larger, more sustainable systems.

The SDWA 50th anniversary in 2024 marked a moment to celebrate past achievements and renew the State Water Board's commitment to safeguarding drinking water in California. To commemorate the 50th anniversary of the Safe Drinking Water Act, a Board presentation on December 4, 2024, showcased California's leadership in drinking water protection, which predated the federal SDWA. Additionally, a commemorative webpage featuring historical milestones and industry leader statements is available on the State Water Board's website.[2]

1.3 CHALLENGES OF PROVIDING SAFE DRINKING WATER

Implementing treatment to meet drinking water standards, lack of resources for capital improvements, public outreach, and ongoing maintenance, aging infrastructure and operational challenges make it difficult for public water systems to meet statutory and regulatory requirements. These challenges are significantly amplified for public water systems serving small and disadvantaged communities, which lack the economies of scale of larger systems.

Historically, larger community public water systems consistently provide drinking water that meets all drinking water standards. Overall, progress has been slow to bring all community water systems (CWS) into compliance, as smaller, disadvantaged communities struggle to find solutions to their drinking water problems. Over the previous three decades this disparity has received increased focus by the Legislature, culminating in major reforms including the adoption of SB 200 in 2019 establishing the Safe and Affordable Drinking Water Fund.

This Plan provides an update to the overall progress toward providing safe drinking water to all California communities, including a mid-point update on the successes resulting from SB 200.

1.4 BACKGROUND ON THE SAFE DRINKING WATER PLAN

In 1989, the California Legislature enacted Assembly Bill (AB) 21 (Chapter 823, Statutes of 1989) which directed the California Department of Health Services (CDHS) to undertake a comprehensive assessment of drinking water in California: its quality and safety, types of problems, overall health risks, current and projected costs, and current regulatory programs. From this assessment, CDHS was directed to develop a plan, containing specific recommendations to resolve any problems and improve the overall

[2] Honoring 50 Years of Safe Drinking Water: https://www.waterboards.ca.gov/campaigns/sdwa50.html

quality and safety of California's drinking water.

In 1993, CDHS (now the California Department of Public Health (CDPH)) completed and submitted to the Legislature the report entitled, "Drinking Water into the 21st Century: Safe Drinking Water Plan for California (1993 Plan)." In 1996, the California Legislature enacted SB 1307 (Chapter 755, Statutes of 1996) amending HSC §116355 to require a periodic update of the 1993 Plan and to include at least the first ten topics listed below (Section 1.6). The subsequent Plan was initiated by CDPH and was completed by the State Water Board in 2015 following transfer of the Drinking Water Program to the State Water Board in the prior year.[3]

In 2018, AB 2501 amended HSC §116355 to specify two additional topics for the Safe Drinking Water Plan. These new topics are numbers 11 and 12 in Section 1.6 below. The additional topics are related to the implementation of new authorities for the appointment of public water system administrators and consolidations (Section 1.8). The 2025 Plan represents a 10-year update of drinking water regulation under the State Water Board; however, the information presented is primarily focused on the last five years since the 2020 Plan.

1.5 DATA PRESENTED IN THE SAFE DRINKING WATER PLAN

This plan relies on documents and analysis prepared for other purposes, and which are incorporated here to address the topics described in Section 1.6. As a result, the dates, definitions, totals, and data formatting (such as range or number of system sizes) may not be consistent throughout the Plan. For instance, Chapters 3 and 4 rely on DDW's Annual Compliance Report, which is prepared annually for US EPA, while Chapters 8 and 9 rely on data from DDW's Needs Assessment and related SAFER documents, including information submitted by PWS via the electronic Annual Report. Chapter 10 relies on information from the Division of Financial Assistance, including the funding implementation and expenditure plans. Each of these sources of information are prepared at different times, within different contexts, and incorporate various stakeholder processes.

1.6 TOPICS OF THE SAFE DRINKING WATER PLAN

Pursuant to the requirements set out in HSC § 116355, the 2025 Safe Drinking Water Plan includes updates on the following information related to the regulation of public water systems as defined in HSC § 116275(h)-(k) (see Appendix 2).:

1. Analysis of the overall quality of California's drinking water and identification of specific water quality problems (Chapters 3 and 4).
2. Types and levels of contaminants found in public water systems that have less than 10,000 service connections (Chapter 4). Discussion of these water systems includes:
    a. Estimated costs to meet primary drinking water standards and public health goals (Sections 4.5 and 7.6, and Chapter 10).

[3] Safe Drinking Water Plans for 2015 and 2020: https://www.waterboards.ca.gov/drinking_water/safedrinkingwaterplan/

   b. Recommendations for actions that could be taken by the Legislature, the State Water Board, and these systems to improve water quality (Chapter 12).
3. Discussion and analysis of known, and potential, health risks associated with contamination of drinking water (Chapter 3).
4. Evaluation of how water quality data systems can be more effectively used to protect drinking water (Chapter 5).
5. Research necessary to develop inexpensive methods used by small utilities to detect chemicals and microbial agents in drinking water (Chapter 6).
6. Analysis of technical and economic viability and health benefits of treatment techniques used to reduce levels of trihalomethanes, lead, nitrates, synthetic organic chemicals, micro-organisms, and other contaminants in drinking water (Chapter 7).
7. Alternative methods of financing construction, installation, and operation of new treatment technologies (Chapters 9 and 10).
8. Discussion of revenue sources available to public water systems to meet current and future expenses (Chapter 9).
9. PWS and customer cost analysis for large, medium, and small public water systems (Chapter 9 and 10).
10. Recommendations to improve the quality of drinking water in California with a five-year implementation program (Chapter 12).
11. Review the effectiveness of administrators in ensuring communities achieved access to safe drinking water, the costs of an administrator, whether communities served by administrators have higher rates and if those rates are affordable, and whether the administrator program should be modified (Chapters 8 and 9).
12. Review consolidations in the state including, number of communities that achieved access to safe drinking water through consolidation, whether rate structures are affordable following consolidation, barriers to consolidation, and whether the consolidation program should be modified (Chapters 8 and Chapter 9).

The 2025 Plan also discusses:

13. The regulation of public water systems (Chapter 2)
14. Challenges and the resources needed to provide sustainable and safe drinking water in disadvantaged communities, including those communities not served by public water systems regulated by the State Water Board, but rather served by state small water systems or domestic wells, and the potential for these communities to form water partnerships or consolidate with neighboring public water systems (Chapter 8 and 9).

15. Emergency preparedness, response, and recovery (Chapter 11).

1.7 UPHOLDING THE HUMAN RIGHT TO WATER

The 2025 Plan includes a focus on the progress made in carrying out the 2012 legislation, which set out the state policy “that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes,” also known as “Human Right to Water (HR2W). (Water Code, § 106.3.) Related initiatives include evaluation of consumer affordability, drinking water access, small drinking water system sustainability (and prevention of future unsustainable small water systems), and the adequacy of small water systems funding. In support of HR2W, the Legislature created the SAFER program, described in the next section, which has provided the State Water Board with resources and tools to assess and support HR2W. The legislative appropriation for the SAFER program is set to end in time for the 2030 Safe Drinking Water Plan, and a new source of funding will need to be established to continue to carry out the work of ensuring the HR2W.

1.8 SAFE AND AFFORDABLE FINANCING FOR EQUITY AND RESILIENCE

In 2018, the Legislature established the Safe and Affordable Financing for Equity and Resilience (SAFER) program with up to $130 million in funding from the Greenhouse Gas Reduction Fund through 2030.[4] Thanks to the SAFER program resources, the HR2W policy permeates all the work DDW performs. The immense volume of work to uphold the HR2W is described in Chapters 8, 9 and 10.

The SAFER program provides a framework and resources to resolve drinking water issues facing disadvantaged communities, including those not served by public water systems (i.e. small water systems and individual well owners).

Community and stakeholder involvement is a foundational element of the development and implementation of SAFER. The statutes require the State Water Board to consult with an Advisory Group on the development of the Fund Expenditure Plan (FEP). (HSC § 116768.5.) For communities served by water systems that the State Water Board is seeking to consolidate under HSC 116682, or appoint an Administrator for under HSC 116686, the statutes mandate a high level of input from the community throughout the processes. In addition, DDW staff from the SAFER program have ongoing, frequent interaction with the diverse communities that benefit from and are impacted by the SAFER program.

For communities that struggle to provide an adequate supply of affordable, safe drinking water to their communities, SAFER utilizes its authority to address such problems by providing technical support and funding. The SAFER program includes the following elements as discussed in Chapters 8 (sustainability), 9 (affordability) and 10 (funding):

1. Oversee administrator activities in accordance with the Administrator Policy Handbook
2. Manage consolidations and water partnerships, including outreach to the communities being impacted
3. Provide support and the organizational structure within the State Water Board to administer the SAFER and funding programs
4. Develop, update, and execute the Fund Expenditure Plan for the SAFER program;
5. Conduct Risk, Affordability and Needs Assessments
6. Characterize drinking water quality issues of communities not regulated by the State Water Board, including households on individual wells and those served by one of the approximately 1,200 state small water systems
7. Conduct ongoing public outreach and program improvement

[4] See AB 2501 (Chapter 871, Statutes of 2018) and SB 200 (Chapter 120, Statutes of 2019).

The SAFER program website contains many success stories and tools for tracking program progress.[5]

1.9 LEGISLATIVE UPDATES

The State Water Board's authority to uphold the SDWA along with the resources needed to carry out related legislative mandates comes primarily from laws enacted by the California Legislature. Without legislative support, including the appropriation of needed funding, DDW could not meet all of its legal requirements, let alone make any progress on improving the number of public water systems in compliance with the SDWA. Appendix 9 includes the comprehensive list of key drinking water legislation between 2021-2024. Select legislation related to the state's drinking water program since the 2020 Plan is listed below:

- Expansion of consolidation authority for at risk disadvantaged communities (DACs), requiring State outreach and stakeholder feedback. (SB 403, 2021)
- Expansion of technical assistance providers to include Investor-Owned Utilities (IOUs), prohibition on CWS water shutoffs. Stabilization of water extraction/diversion reporting requirements. (SB 155, 2021)
- Requirements for small and non-transitory non-community systems (NTNC) to develop drought related planning and notification measures. (SB 552, 2021)
- Improvements to SB 200 and State Water Board funding programs. Applying certain measures to state smalls and strengthen fraud protective action. (SB 776, 2021)
- Liability protection for administrators. Expands administrator appointment authority to systems at risk of failure. (SB 1254, 2022)
- Expansion of financing eligibility, including 0% loans and grants. (SB 1188, 2022)
- Clarification of authority to require sampling by public water systems post wildfire. (AB 541, 2023)
- Requirement for State Water Board to adopt minimum technical, managerial, and financial (TMF) capacity standards for CWS with less than 3,300 service connections and public water systems (PWS) that serve schools. (SB 1188, 2024).

Other key legislative changes that took place prior to 2021, but are contributing to significant impacts to the program, as described in this Plan, are listed below:

- Mandatory Consolidation Authority (SB 88, 2015)
- Water System Administrators Authority (SB 552, 2016)
- Prevention of Proliferation of New, Unsustainable Water Systems (SB 1236, 2016)

[5] SAFER: https://www.waterboards.ca.gov/safer/

- Expansion of Mandatory Consolidation and Administrator Services (AB 2501, 2018)
- Needs Assessment Funding (Budget Act of 2018)

1.10 EXISTING UNSUSTAINABLE WATER SYSTEMS

This 2025 Plan includes a detailed discussion of current SAFER program initiatives to improve water system sustainability along with recommendations for additional improvement to the program. (Chapter 8). Efforts to improve water system sustainability is a major theme of the 2025 Plan, as it is these unsustainable systems that are most likely failing to comply with the SDWA and the HR2W.

California's drinking water infrastructure is significantly fragmented compared to other utilities. For example, there are approximately eight (8) times less wastewater treatment providers (900) and 100 times less electrical service providers (75) in California than there are public water systems (approx. 7,265).[6] The existence of multiple water systems in a community often leads to confusion as to who is responsible for providing drinking water to the community and decreases the economy of scale available to any one given water system in a community. In addition, this extensive patchwork of water providers adds to the drinking water regulatory challenges and is a primary cause of many of the failing or at-risk small water systems. The small water systems account for most compliance challenges statewide.

Of the 2,837 CWS in California, approximately 76 percent serve less than 1,000 connections, but serve less than 4% of the population served by CWS's. These small systems accounted for approximately half of the total annual violations of the federal and state SDWAs. Approximately 85 percent of CWS's serve less than 3,300 connections, representing about 9% of the population served by CWSs. Systems with between 1,000 and 3,300 connections accounted for approximately 6% of the total annual violations. Most violations occur in systems with less than 500 connections. The county regulated PWSs, which serve less than 200 connections, accounted for approximately 43% of compliance violations statewide. Communities served by smaller systems are less likely to be provided drinking water that meets all water quality standards. Statewide violations are presented in more detail in Chapter 4.

These smaller providers of drinking water experience decreased economies of scale, and too frequently demonstrate inadequate TMF capacity, poor emergency planning, insufficient infrastructure maintenance, and inability to adapt to increasing regulatory changes.

Though 94% of water systems can meet primary SDWA requirements, the proliferation of thousands of public water systems in the state has resulted in numerous public water systems that are failing or at risk of failing to comply with the SDWA. The reason for the proliferation of numerous small systems in California includes:

- Easy access to groundwater sources and limited regulatory requirements when many water systems were formed in the pre-1970's era.

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[6] As set out in Appendix 2, public water systems include community water systems; non-transient, non-community water systems, such as schools; and transient, non-community water systems, such as campgrounds.

- Small public water systems are not typically desirable for annexation into municipalities based on low potential tax revenues, and a high likelihood of need improvements. In addition, small public water systems often are unable to pay their fair share of needed infrastructure improvements and connection fees. Other economic or political factors may also play a factor.
- Preference by developers to create new communities (and their associated water systems) outside the edges of cities due to lower land costs, an ability to avoid paying city development fees, and to avoid meeting more stringent zoning and infrastructure requirements.
- Pressure on county planning departments to develop new housing based on increased population growth and low-income housing needs.
- Business development practices that have not historically considered the sustainability challenges of providing continuous safe and affordable drinking water across all operating conditions.

There are many other concerns that contribute to unsustainability. Chief among them is the number of CWS that only have one source of drinking water, making them highly susceptible to water quality issues or loss of water. Other examples of challenges to sustainability include the inability to respond to drought impacts, pumping equipment failure, and communities that have rate structures insufficient to maintain infrastructure or install treatment to address contamination.

SAFER “Risk and Needs Assessments” identified that 84% of At-Risk water systems are systems with 3,000 of less service connections. The following elements contribute to unsustainable, failing, or at-risk of failing water systems:

1) Poor water quality (35%),
2) Lack of access to water (34%)
3) Lack of affordable water rates (19%)
4) Lack of Technical, Managerial, and Financial (TMF) capacity (12%).

1.11 PROGRESS ON 2020 IMPLEMENTATION PLAN

The 2020 Safe Drinking Water Plan contained an extensive implementation plan with a range of recommendations. Appendix 1 highlights a list of milestones and accomplishments since the 2020 Plan. Appendix 7 of this Plan contains a review of progress made on implementation of the 2020 Plan recommendations. While many recommendations in the 2020 plans have been completed, some have not been achieved because they require resources that are beyond those of the State Water Board to complete; some are highly complex and will take additional time to complete. For others, the sheer volume of challenges impedes progress. And then there are some that present challenges because of conflicting goals state-wide goals. For example, California’s need for new housing accelerates the rush to add new small unsustainable water systems instead of requiring connection to a nearby municipality, adding to the number of small, potentially unsustainable public water systems. Many of the recommendations in the 2020 Plan, and within this current Plan, take time to implement, requiring coordination with various stakeholders and often large amounts of public financing. Therefore, statewide progress is often slow and may not be completed in a 5-year or even 10-year timespan.

1.12 2025 IMPLEMENTATION PLAN

Each chapter contains related recommendations to the Legislature and stakeholders as well as programmatic updates needed to address key issues and challenges that impact drinking water and communities served by public water systems. Chapter 12 contains a summary of the 2025 Plan recommendations.

CHAPTER 2 CURRENT REGULATION OF DRINKING WATER SYSTEMS

2.1 INTRODUCTION

The federal Safe Drinking Water Act (SDWA) sets the minimum standards that each state's drinking water program must meet to have primary enforcement authority of the SDWA for public water systems[7] (PWS) within their boundaries. California has carried out a drinking water program since before the inception of the federal SDWA, and its standards are at least as stringent as those adopted at the federal level. (See Health and Safety Code (HSC) section (§) 116270(f) (stating the intent of Legislature to improve upon minimum requirements of federal SDWA, to establish primary drinking water standards at least as those in the federal SDWA and establish a program that is more protective of public health than the minimum federal requirements.)

The regulation of California's drinking water was established May 24, 1915, when the Bureau of Sanitary Engineering was established by the State Board of Health and has further developed over the last almost 50 years under the SDWA. A major milestone in this development was the transfer of the Drinking Water Program to the State Water Board in 2014. Since that transfer, the drinking water program within the State Water Board has grown and improved. resulting in more effective regulation of drinking water and public water systems. See Appendix 6 for additional details regarding current regulations.

2.2 GOVERNMENT AGENCIES INVOLVED IN DRINKING WATER

The regulation of water supply, water quality, and types of water systems is shared among several agencies, including local agencies.

2.2.1 State Agencies

The State Water Board is the agency with the primary responsibility for regulating California's public water systems' (PWS) compliance with water quality requirements. (For definition of PWS and description of the types of PWS, see section 2.3, below.) A PWS may also be regulated for other reasons by other state agencies including:

1. The California Public Utilities Commission (CPUC) for investor-owned systems
2. The Division of Corporations and Financial Institutions (DOC) and Secretary of State (SOS) for mutual water companies
3. The Department of Housing and Community Development (DHCD) for mobile home parks

Additionally, the Department of Water Resources (DWR), the Office of Environmental Health Hazard Assessment (OEHHA), and the Department of Real Estate are also involved in activities impacting PWSs.

A brief description is provided below for the regulatory agencies, including their authority and responsibilities related to the regulation of PWSs.

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[7] See Appendix 2 for definition of a public water system per HSC § 116275(h) - (k)

2.2.1.1 State Water Resources Control Board

The State Water Board is overseen by a five-member board, whose members are appointed by the Governor. The State Water Board's Executive Director and the two Chief Deputy Directors oversee the day-to-day management of the five divisions within the State Water Board, including the Division of Drinking Water (DDW); the Division of Financial Assistance (DFA); Division of Water Quality (DWQ) and the Regional Water Quality Control Boards; the Division of Water Rights; and the Division of Administrative Services (DAS), which provides administrative support and services to the State Water Board and its various Divisions. These divisions work closely together to implement the Water Board's priorities[8] and are described below.

2.2.1.1.1 Division of Drinking Water

The State Water Board is designated by the U.S. Environmental Protection Agency (USEPA) as the agency with primary enforcement of the federal Safe Drinking Water Act (SDWA) in California. Additionally, the State Water Board implements and enforces the requirements of California's SDWA. These responsibilities are set forth in California HSC § 116270 *et seq*., and in the implementing regulations (California Code of Regulations (CCR), tit., 22, § 64801 et seq.).

2.2.1.1.1.1 Field Operations Branches

The Field Operations Branches (FOB) of DDW regulate approximately 7,300 public water systems out of 28 district offices. They issue permits, conduct sanitary surveys of the public water systems to assess compliance, review monitoring reports submitted by the systems, issue compliance orders and take other enforcement, as required; and are the State Water Board's direct contact with the public water systems. See discussion below in section 2.4.1.1.

2.2.1.1.1.2 Program Management Branch

The Program Management Branch (PMB) includes the Environmental Laboratory Accreditation Program (ELAP), which is responsible for accreditation of laboratories that analyze environmental samples for regulatory purposes, including drinking water laboratories performing analyses pursuant to the California SDWA. ELAP is of critical importance to a range of programs within the State Water Board, such as the Division of Water Quality's implementation of the Clean Water Act, and other partner agencies, such as the Department of Toxic Substances Control.

PMB also includes the Technical Operations Section (TOS), which includes the Regulatory Development Unit, which develops new drinking water standards; and the Recycled Water Unit, which develops uniform criteria for the use of recycled water, which is then incorporated into water reclamation permits issued by the Regional Water Quality Control Boards (Regional Water Boards). See Appendix 6: Recent Regulations.

Regional Water Boards work cooperatively with DDW FOB on regulating water recycling projects including those that are designed to augment drinking water supplies, including

[8] The State Water Board develops annual strategic work plans to highlight actions planned to further current priorities and goals: https://www.waterboards.ca.gov/board_info/priorities/

recharging groundwater or augmenting surface water sources, such as reservoirs. DDW completed the development of the Direct Potable Reuse regulations which became effective on October 1, 2024. See Chapter 3.

The Treatment Technology Unit reviews and evaluates new treatment technologies or enhancements of existing treatment technologies for the treatment of regulated and emerging contaminants of concern in drinking water and recycled water applications. The Treatment Technology Unit supports DDW in regulation development by identifying the best available technology for treatment, and FOB staff in assessing and permitting proposed treatment facilities.

See further discussion below regarding the Program Management Branch programs in section 2.4.1.8.

2.2.1.1.1.3 Resiliency and Data Branch

The Resiliency and Data Branch (RAD) is composed of the Quality Assurance Section (QAS) and the SAFER Drinking Water (SAFER) Section. QAS is composed of several units that manage, support and use data collected by the DDW to better direct and implement the State Water Board's efforts to ensure access to safe and affordable drinking water. These units include the Data Management and Support Units; the Needs Analysis Unit; and the Water Resiliency Unit.

The SAFER section includes several units that are engaged in finding solutions for small, disadvantaged systems that do not have access to safe and affordable drinking water. They work with the Safe and Affordable Financing for Equity and Resiliency (SAFER) Program, which is a coordinated effort across several divisions within the State Water Board, whose goal is to resolve drinking water issues facing disadvantaged communities, while also addressing broader drinking water issues faced by households and communities that are not served by public water systems, specifically individual wells and state small water systems. Several Divisions besides the DDW's SAFER Section are involved in the SAFER program including the DFA, Division of Administrative Service (DAS), Office of Public Engagement, Equity, and Tribal Affairs, and the Office of Chief Counsel (OCC). As of November 2024, there are approximately 1,200 state small water systems and an estimated 1,600,000 people served by individual private wells, which are not directly regulated by DDW. See sections 2.4.1.6 and 2.4.1.7 for more information regarding Consolidations and Administrators. Refer to Chapters 8, 9, and 10 for details related to how the SAFER program and recent program changes, such as the Needs and Affordability Assessments, are being utilized to address the needs of California's most vulnerable water systems, including private well users and other non-regulated drinking water sources.

2.2.1.1.2 Division of Financial Assistance

The Division of Financial Assistance (DFA) is responsible for the administration of the Drinking Water State Revolving Fund (DWSRF) Program, including processing of applications from water systems for funding under the DWSRF. It also administers and processes applications for funding from programs funded by state propositions, and the Legislature, including funding to address drought and other emergencies, such as serious water quality contamination and water outages.

DFA also administers the Drinking Water Operator Certification program, which certifies water treatment plant operators and water distribution system operators, including providing testing of operators and renewing of their certificates. The Office of Operator Certification presently certifies approximately 35,000 water treatment and water distribution operators.

Staff within DFA provide technical and financial assistance for small, disadvantaged communities and seek to promote permanent and sustainable drinking water and wastewater treatment solutions and to ensure that safe, clean, affordable, and accessible drinking water and wastewater treatment services are provided effectively and efficiently. See Chapter 10 for details on DFA’s funding programs.

2.2.1.1.3 Division of Water Quality and Regional Water Quality Control Boards

The Division of Water Quality (DWQ) and the Regional Water Boards are responsible for monitoring and protecting the quality of surface and groundwater (namely lakes, rivers, and groundwater basins) for all beneficial uses, including protection of municipal and domestic drinking water supplies. DWQ and the Regional Water Boards adopt statewide and regional water quality control plans and policies that establish beneficial uses of surface and groundwaters, water quality objectives for a variety of constituents to protect those uses, and a program of implementation to achieve water quality objectives.

The program of implementation typically includes monitoring and surveillance, permitting discharges of waste, and enforcement. DWQ and the Regional Water Boards have the authority to issue waste discharge permits to the following:

- any entity that discharges wastes to surface or groundwaters including municipal or industrial wastewater treatment plants
- municipalities or facilities that discharge stormwater
- agricultural operations
- food processing facilities
- mining facilities
- timber harvest operations.

As a part of these permitting programs, the Regional Water Boards also issue orders to clean up and abate spills and leaks.

DWQ administers the state’s Groundwater Ambient Monitoring and Assessment Program (GAMA program), which collects data from private wells and groundwater basins and makes it available through GeoTracker, GAMA’s online data system. The GAMA program coordinates and shares statewide monitoring data to improve public accessibility of groundwater quality data. DWQ and the Regional Water Boards coordinate closely with many local stakeholders in the protection of regional waters impacted by water quality concerns. Non-DDWregulated water systems, such as state small water systems and domestic wells may be impacted by such regional concerns. Chapter 3 provides resources to help these users better access the water quality of their local supplies to prevent the consumption of water that does not meet state or federal standards.

2.2.1.1.4 Division of Water Rights

The Division of Water Rights issues water rights for the use of surface water. Although water rights can be an important issue for some public water systems, most public water systems, especially the smaller ones, generally rely on groundwater for the drinking water they provide. In part this is because use of surface water requires compliance with the surface water treatment rule, which can be too expensive for small systems, as it requires the costs of the construction, and operation and maintenance of a treatment plant. However, as discussed further in Section 2.2.1.11, below, implementation of the Sustainable Groundwater Management Act (SGMA), which is intended to help protect groundwater resources, could affect public water systems, small water systems, and individual wells that rely on over-drafted aquifers.

2.2.1.2 California Public Utilities Commission

The California Public Utilities Commission (CPUC) is responsible for ensuring California's investor-owned water utilities deliver clean, safe, and reliable water to customers at reasonable rates. As of October 2023, CPUC Water Division regulates 134 investor-owned water systems, which provide water service to about 16 percent of California's residents. Approximately 97 percent of these water customers are served by nine companies. Six companies own approximately 42 individual service areas that serve more than 10,000 connections each. Annual water and wastewater revenues under CPUC's regulation total $1.4 billion.[9]

CPUC ensures that customers of regulated water utilities receive safe and reliable water service while allowing the utility to earn a reasonable return on its investment. The CPUC's functions include authorizing utility service within defined service areas, setting rates, and regulating the quality of service.

As a result of shared responsibility for the regulation of investor-owned utilities with respect to water quality, CPUC and the State Water Board maintain a formal memorandum of understanding (MOU) to ensure consistency and coordination between the two agencies' programs. The MOU defines common objectives, principles, agency responsibilities, and project coordination. Staff of the two agencies routinely meet to ensure the goals of the MOU are complied with, and to coordinate the activities between the two agencies. The large (Class A) investor-owned utilities have acknowledged the coordination between the two organizations and may participate in joint meetings with the staff of both agencies. The CPUC imposes some stricter water quality requirements than the State Water Board; for example, the CPUC requirement that Class A utilities implement the distribution system operations plan of the California Water Works Standards is a more stringent requirement than that which DDW mandates.

Compliance issues related to the small investor-owned utilities continue to be difficult to resolve because these systems often lack the technical, managerial and financial (TMF) capacity to effectively operate and maintain a public water system, and often have an

[9] CPUC Water Division: https://www.cpuc.ca.gov/about-cpuc/divisions/water-division

insufficient number of customers to properly fund infrastructure improvements.[10] Many of the small, investor-owned utilities experience significant infrastructure problems, such as leaking water pipes, undersized water storage facilities, inadequate fire service, and their revenue from water sales are insufficient to address these problems. For additional information regarding water system sustainability refer to Chapter 8.

The previous Safe Drinking Water Plan identified that state infrastructure funding was underutilized by investor-owned utilities because of the taxability of grants under the Tax Cuts and Jobs Act of 2017, but that issue has been at least partially resolved in the 2021 Infrastructure Investment and Jobs Act, which allowed tax-free contributions/government grants to water utilities to fund construction of drinking water facilities. Because of this, there is now a lot of interest from investor-owned utilities to receive grant funding. There are several parallel initiatives to promote and streamline grant funding for failing systems that are either already owned or being consolidated by the investor-owned utilities, especially the Class A utilities. California Water Association is actively working with DFA on this issue, and sent comments on the 2024-2025 Intended Use Plan for the State Revolving Fund, outlining their proposals. Also, the CPUC Water Acquisitions rulemaking (R.22.04-003) is focusing on consolidations and grant funding for small failing systems, including investor-owned and publicly owned systems to be acquired by larger investor-owned utilities. See also Appendix 9 for additional details regarding recent legislation including Assembly Bill (AB) 1250 (2021) regarding consolidation urgency and Senate Bill (SB) 1188 (2022) regarding CPUC regulated water system grant eligibility.

2.2.1.3 Division of Corporations and Financial Institutions

The Division of Corporations and Financial Institutions (DOC)) within the Department of Financial Protection and Innovation has responsibility under the Corporate Securities Law of 1968 (Corporations Code Section 25000 et seq.) to approve and register the security offerings of mutual water companies (MWCs). MWCs are privately-owned water companies in which each lot owner is entitled to some portion of share(s) of water per lot that they own. They are managed and operated in accordance with Articles of Incorporation and bylaws approved by the DOC and filed with the Secretary of State. Title 10, CCR, Subarticle 7.1 of Article 4 of Subchapter 2 of Chapter 3 sets forth the standards governing the regulation of MWCs. These regulations do not deal with the quality of the drinking water served. DOC's regulations for incorporated MWCs require compliance with DOC standards and financial responsibility requirements before DOC will approve the security offering.

DOC regulations require MWC to contact the State Water Board when it is being formed since DDW is the permitting agency for the establishment of public water systems. Without DDW permitting approval, MWC cannot legally operate as a public water system.

AB 54, Chapter 512, Statutes of 2011[11] requires MWCs that operate as public water

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[10] Over the last twenty years, there has been a reduction in the number of CPUC regulated water utilities by one-third.

[11] Chapter 512, Statutes of 2011 (AB 54): http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0051-0100/ab_54_bill_20111007_chaptered.html

systems meet California Waterworks Standards and maintain a financial reserve fund for repairs and replacement of their water production, transmission, and distribution facilities. In addition, AB 54 requires MWC board members to complete a two-hour training course on their fiduciary duties, duties of public water systems, and long-term management of a public water system within six months of taking office.

The Mutual Water Company Open Meeting Act , (AB 240, Chapter 633, Statutes of 2013) permits eligible persons to attend MWC meetings and to speak during the meeting; requires MWC boards to adopt, in an open meeting, an annual budget on or before the start of each fiscal year; requires a contract with a certified public accountant or public accountant to conduct an annual review of the MWC's financial records and reports; and requires the board of directors to make specified documents available to eligible persons upon payment of fees covering the direct costs of duplication.

2.2.1.4 Department of Education

The Department of Education oversees over 10,000 schools including over 420 that are regulated as public water systems. Schools that operate as PWS are designated as non-transient non-community systems (NTNC) and have lower regulatory requirements than community water systems. These PWS often lack the resources to adequately address the challenges of providing compliant drinking water to this sensitive portion of the population, leading to special concern for water quality compliance. In 2019, requirements were added to identify and address heavy metals in service lines at schools.[12]

The ownership of schools that operate as PWS is usually delegated to local public-school districts, which results in a decentralized approach to operating and maintaining the school's PWS infrastructure. The 2024 Needs Assessment determined that 10% of schools that are public water systems are at-risk or failing to comply with the SDWA. Additional resources are needed to address the operational needs of schools that operate as PWS. See Chapters 2 and 7 for additional discussion and related recommendations.

2.2.1.5 Department of General Services - Division of the State Architect

Division of the State Architect (DSA) provides design and construction oversight for K–12 schools, community colleges, and various other state-owned and leased facilities. When a school that operates as a PWS is making upgrades to their water system DSA must review and approve the plans before the project can proceed. DSA may also be involved in plumbing upgrades at schools to address concerns about toxic metals in plumbing and drinking fountains at schools not regulated as PWS.

2.2.1.6 Department of Social Services - Child Care Licensing

The California Department of Social Services (CDSS) oversees over 35,000 child care providers, 70% of which are home based centers. Though it is not typical that these child care centers operate as PWS, like schools, the population they serve are of

[12] Lead Sampling of Drinking Water in California Schools: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/leadsamplinginschools.html

special concern for water quality compliance. In 2018, AB 2370[13], set water quality sampling and remediation requirements at child care centers to identify and address heavy metals in service lines and plumbing fixtures that may be impacting children served at these facilities. See Chapter 3 regarding these sampling initiatives.

2.2.1.7 Secretary of State

The Secretary of State (SOS) interacts with water suppliers who are also considered business entities. As a business entity, a water supplier needs to submit the required documents, including Articles of Incorporation and periodic statements of information to the Business Programs Division. All non-profit, non-stock corporations organized under the Non-Profit Corporation Law are required to have Articles of Incorporation certified by, and on file with SOS. This includes all MWCs, as well as homeowners' associations, religious, charitable, social, educational, and recreational associations. When the water supplier is considered a public entity and not required to register with other public agencies, the water supplier submits a "Statement of Facts" to the Special Filings Unit, within the Business Programs Division. Noncompliance with SOS requirements can result in delays in State financing until such issues are resolved.

2.2.1.8 Department of Housing and Community Development (DHCD)

The DHCD is responsible for the regulation of the construction and maintenance of mobile home parks, private campgrounds, recreational vehicle parks, and employee housing facilities, such as labor camps, many of which have independent public water systems. The authorizing statutes for DHCD's regulations are the Mobile Home Parks Act (HSC §§ 18200 – 18700), the Special Occupancy Parks Act (HSC, §§ 18860 – 18874), and the Employee Housing Act (HSC, §§ 17000 – 17062.5), with regulations adopted under these statutes included in CCR Title 25.

DDW and DHCD have discussed how their respective programs can better work together to address problems at PWS that serve mobile home parks, special occupancy parks, and employee housing. Additionally, many water systems that serve facilities regulated by DHCD are engaged with the SAFER program via emergency funding, technical assistance, funding for capital projects, or are involved in a water partnership or consolidation to address their short- and long-term needs. DHCD has communicated a process for DDW staff to identify water systems under their jurisdiction that do not meet drinking water standards. DHCD can suspend a mobile home park's operating permit where there is imminent health and safety hazard, which DDW believes should include contamination that could have acute impacts on health, such as nitrate and bacteria. Suspending a park's operating permit is a powerful incentive for owners to bring the public water system into compliance because it is unlawful for a mobile home park or special occupancy parks to collect rent without a valid permit to operate.

There are, however, several inconsistencies between DHCD and DDW's requirements that need to be addressed by changes to statute or regulations to help address safe and affordable drinking water issues at mobile home parks, special occupancy parks and employee housing. First, DHCD's construction standards require mobile home parks to comply with the state's uniform building codes when developing its water distribution

[13] Childcare Center Lead Sampling: https://www.waterboards.ca.gov/drinking_water/programs/lsicc/

system, and those requirements are less stringent than DDW's Waterworks Standards. This is a problem because the State Water Board is unable to permit any public water system that does not comply with the California Waterworks Standards. Not meeting Waterworks Standards may also hinder consolidation opportunities between mobile home parks and special occupancy parks with other public water systems, which could enable mobile home parks and special occupancy parks to provide drinking water that meets standards.

Another problem is that while the Employee Housing Act requires that potable drinking water be maintained for all employees, the term “potable” is not defined. (CCR tit. 25, § 772.) In addition, it is unclear whether the local environmental health departments, who are charged with annually sampling and approving the potability of the water before initial operation each year, have sufficient resources to properly inventory and permit these facilities. As a result, many water systems for such facilities may be unregulated even if they meet public water system criteria. See discussion on “found” systems in the Permits Section 2.4.1.2.

Lastly, the Mobile Home Parks Act, the Special Occupancy Parks Act and Employee Housing Act do not require a facility with its own water system demonstrate that it has received a permit for operation of a public water system from the State Water Board.

To assist in helping mobile home parks, special occupancy parks, or employee housing that are public water systems to understand the requirements of owning a public water system, DHCD can share the “What is a Public Water System?” document referenced in Section 2.3 with owners of mobile home parks, special occupancy parks, or employee housing, notifying them of their responsibilities as a public water system with the expectation that this outreach will encourage some of the mobile home parks, special occupancy parks, and employee housing owners that have their own water systems to contact DDW about their responsibilities and to obtain a permit.

2.2.1.9 Department of Real Estate

The Department of Real Estate, operating under the authority of the Subdivided Lands Law (Bus. & Prof. Code, § 11000 et seq.), is involved in the regulation of water systems through its approval process for the sale of subdivided lands. Subdivision laws were enacted to ensure that subdividers deliver to buyers what was agreed to at the time of sale. Before real property that has been subdivided can be marketed in California, a public report from the Department of Real Estate must be obtained by the subdivider disclosing pertinent information about a particular subdivision, including the details of the water system serving the area. Prior to the issuance of a public report, the subdivider must file an application along with supporting documents.

The State Water Board has developed a number of online resources and dashboards such as the Aquifer Risk Map (see Chapter 3) to help non-DDW regulated water systems, such as state small water systems and domestic wells, assess the quality of their water prior to drilling a well, building residences, or completing acquisition of a property that is currently served by a water source not permitted by a public water system. To prevent the use of water for domestic purposes that does not meet drinking water standards, local agencies and/or property buyers could require water quality testing for compliance with state primary drinking water standards.

2.2.1.10 Department of Public Health

DDW interacts with several entities within CDPH including the Oral Health Unit, which oversees the Community Water Fluoridation Program, and the Food and Drug Branch, which is responsible for the regulation of bottled water and water sold through vending machines, as well as the licensing of water haulers that transport drinking water.[14] DDW also collaborates with CDPH's Division of Communicable Disease Control in the investigation of suspected drinking water-related infectious disease outbreaks.

2.2.1.11 Department of Water Resources (DWR)

The Natural Resources Agency's DWR manages California's water resources, systems, and infrastructure, including the State Water Project[15] (SWP), which many public water systems and other non-DDW regulated entities rely on as a water supply source. DWR is responsible for the development of the California Water Plan[16], which serves as a guide to the development and management of the State's water resources. The California Water Plan is required to be updated every five years. DWR has directly funded drinking water-related projects under State Propositions, primarily through Integrated Regional Water Management grant programs.

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge.

DWR has several responsibilities related to implementation of SGMA including: (1) adoption of emergency regulations for the evaluation of groundwater sustainability plans (GSP) and alternative plans (completed in 2016), (2) evaluation of submitted GSP, alternative plans, and annual reports, (3) support to local agencies through facilitation and technical support services, and (4) administration of the Sustainable Groundwater Planning Grant Program.

The statute required the formation of new local agencies, called Groundwater Sustainability Agencies (GSA), by June 30, 2017, to implement SGMA in medium and high priority basins. These GSAs are required to develop, adopt, and implement Groundwater Sustainability Plans (GSP). Under SGMA, these basins are required to reach sustainability within 20 years of implementing their sustainability plans. For critically overdrafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline to reach sustainability.

Through the Sustainable Groundwater Planning Grant Program, DWR provides ongoing support to GSAs through guidance and financial and technical assistance. In addition, the State Water Board has specific authorities to intervene when basins do not meet the requirements and time schedules established by SGMA.

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[14] California Department of Public Health, Food and Drug Branch: https://www.cdph.ca.gov/Programs/CEH/DFDCS/pages/fdbprograms/foodsafetyprogram/water.aspx

[15] State Water Project: https://water.ca.gov/Programs/State-Water-Project

[16] California Water Plan: https://water.ca.gov/programs/california-water-plan

DWR also oversees requirements related to Urban Water Management Plans (UWMPs). These plans support water suppliers' long-term resource planning to ensure that adequate water supplies are available to meet existing and future water needs. Public water systems must coordinate closely with DWR to meet these regulatory requirements in addition to DDW's regulatory oversite. In addition, DFA and DWR coordinate closely on funding prioritization for public water systems. Chapter 8 provides additional details on how SGMA supports water system sustainability.

2.2.1.12 Office of Environmental Health Hazard Assessment

OEHHA is responsible for providing to state and local government agencies toxicological and medical information relevant to decisions involving public health. OEHHA has the statutory responsibility for assessing the public health risks of chemical and radiologic contaminants in drinking water. That responsibility includes establishing Public Health Goals (PHG), which are the health-based levels that the State Water Board uses in the development of state primary drinking water standards (maximum contaminant levels (MCLs)). OEHHA also assists DDW in recommending drinking water notification levels, which are advisory in nature, and helps maintain Cal Enviroscreen, a mapping tool which identifies California communities that are most affected by many sources of pollution and are especially vulnerable to the pollution's effects.[17]

2.2.1.13 Department of Food and Agriculture (CDFA)

The State Water Board entered into an interagency agreement with CDFA Center for Analytical Chemistry (CAC) for consulting services on analytical methods, research, and special studies from July 2022 – March 2025. Due to insufficient funding and recent budget cuts, DDW is not able to renew or maintain a contract for analytical method development, research or related special studies and consultation. See Chapter 6 for additional discussion on the need for resource allocation to allow DDW's to maintain a principal laboratory.

2.2.1.14 Department of Pesticide Regulation (DPR)

DPR is responsible for identifying agricultural pesticides with the potential to pollute groundwater. DPR obtains reports and analyzes the results of water quality sampling for pesticides conducted by public agencies and, if a pesticide is detected, reviews the detected pesticide to determine if its continued use can be allowed. DPR adopts pesticide-use-modifications to protect groundwater from pollution if the formal review indicates that continued use can be allowed. The State Water Board provides public drinking water quality monitoring data to DPR for its groundwater protection program.

2.2.1.15 Coastal Commission

The Coastal Commission has the responsibility to use a balanced approach to the conservation and use of coastal resources, to the rights and responsibilities of individuals and the public in the protection and use of these resources, and the need to limit human use of some resources to avoid degradation or destruction. For desalination/brackish water supply projects, Coastal Commission approval of the intake

[17] Cal Enviroscreen: https://oehha.ca.gov/calenviroscreen

and outlet structures, treatment facilities, and transmission pipelines is required.

2.2.2 Federal Agencies

2.2.2.1 United States Environmental Protection Agency

USEPA administers the nationwide drinking water program as authorized under the 1974 federal SDWA and its amendments. The federal program consists of the establishment of drinking water standards, monitoring and reporting requirements, and public notification, which are applicable to all public water systems. USEPA can directly enforce compliance of these standards or authorize primary enforcement of the federal SDWA to any state that has an authorizing state statute at least as stringent as the federal SDWA, and a state regulatory program for public water systems that meets various enforcement, planning, and record-keeping requirements.

Authorization of primary enforcement of the federal SDWA to a state is known as "primacy." As part of the delegation of primacy to a state, USEPA provides oversight and partial grant funding of the state program as well as annual capitalization grants under the DWSRF and administers other drinking water related federal grant programs. The oversight by USEPA requires states to develop an annual work plan, an annual DWSRF Intended Use Plan, and specific reporting requirements including an annual PWS compliance report. Data used in the annual compliance report is incorporated into Chapter 4.

2.2.3 Tribes

DDW coordinates efforts with USEPA, who regulate tribes, when working with Tribal agencies to ensure public health protection of drinking water supplies. According to the 2024 Needs Assessment and data managed by USEPA of federally recognized tribes in California, there are approximately 148 tribal water systems, comprised of 112 tribal community water systems, 23 non-transient non-community water systems, and 13 transient water systems that are regulated by USEPA. These water systems may be owned and operated by the tribe or managed by non-tribal members or the federal government. (e.g., Bureau of Indians Affairs and U.S. Customs and Border Protection). There are 49 federally recognized tribes in California that do not have water systems regulated by USEPA because they do not meet the federal definition of a public water system. For these 49 tribal communities, drinking water may be accessed through 1) domestic wells that serve fewer than 15 service connections or 25 people, 2) decentralized surface water diversions, or 3) through public water systems that are not located on tribal land and that are regulated by the State Water Board. The SAFER program has included efforts to expand awareness and availability of technical assistance and funding to tribes in California including evaluation as part of the Needs Assessment and recent legislation, AB 2877, Chapter 481, Statutes of 2022 which requires SAFER funding liaison and promotion of State funding opportunity to tribes.

2.2.4 Local Agencies

Several local agencies directly or indirectly oversee or regulate the activities of public water systems, including cities and counties and their departments. The respective roles, responsibilities, and areas of concern for each of these units of government are described below.

2.2.4.1 Local Primacy Agency Counties

HSC § 116330 allows the State Water Board to delegate the authority for regulating public water systems with fewer than 200 service connections to a local county health officer.

As of November 2024, 26 local primacy agency counties (identified in Table 2-2) have been delegated authority to regulate small water systems. Although the delegation agreement is with the local county health officer, the regulatory program is typically operated by the Local Environmental Health Jurisdictions (LEHJs). For this report the primacy agency will be referred to as the Local Primacy Agency (LPA).

2.2.4.2 Local Agency Formation Commissions (LAFCOs)

Among the purposes of a LAFCO are “discouraging urban sprawl, preserving open-space and prime agricultural lands, encouraging the efficient provision of government services, and encouraging the orderly formation and development of local agencies based upon local conditions and circumstances.” (Gov. Code, § 56301.) LAFCOs have authority to approve, deny, or modify boundary changes requested by public agencies or individuals. LAFCOs provide input to public water systems during the formation of new communities, special districts, and "spheres of influence" for all public agencies. In 2011, LAFCOs were provided authority through AB 54 to approve the annexation of a MWC that operates as a public water system into the jurisdiction of a city, a public utility or a special district, with the consent of the respective public agency or public utility and MWC. LAFCOs have authority to conduct municipal service reviews to ascertain whether the entity is providing municipal services in a satisfactory manner.

While this authority to approve annexation can provide a mechanism for consolidation of public water systems, the timeline of LAFCO annexations and political nature of their proceedings often make this challenging to implement. To an extent, LAFCO’s policy of “discouraging urban sprawl” conflicts with annexation of an area of new development into an existing neighboring municipal public water system. Local opposition and the timeline on which LAFCOs operate can further result in delays in annexation. This can result in the State Water Board being pressured to permit a new public water system, when consolidation would typically be a superior alternative. The State Water Board’s policy is to deter development of new, unsustainable public water systems, but when a new development does not have an efficient alternative consolidation option for water services, a new system may need to be permitted.

2.2.4.3 Planning Departments

Planning departments are responsible for managing land use within their communities. This is done by reviewing development applications, enforcing zoning regulations, creating comprehensive plans for future growth, and engaging with the public to guide the development of a city or county according to established policies and ordinances. DDW works with planning departments when new developments are proposed that would include the development of a new water system. In 2018, a new section was added to the Health and Safety Code to require submittal of a preliminary technical report (PTR) for a proposed new water system (HSC § 116527). The PTR must include a discussion of the feasibility of the proposed development to be served by an existing community water system.

2.2.4.4 Local Building Departments

Local building departments have a responsibility to enforce the California Building Standards Code (CCR Title 24) and ensure compliance with the state's regulations banning the use of lead, including the use of low-lead solders and prevention of the use of lead plumbing materials.

2.3 PUBLIC WATER SYSTEMS

A PWS is defined as “a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.” (HSC, § 116275, subd. (h). See Appendix 2) “Public” water systems serve the public but can be either publicly-owned or privately-owned. The handout titled “What is a Public Water System?” provides additional clarification.[18]

Public water systems can be broken down into community and non-community systems; and non-community systems can either be transient or non-transient, resulting in three types of water systems (community, transient non-community and non-transient non-community) (see Figure 2-1)

Figure 2-1: Types of Public Water Systems

[18] What is a Public Water System: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/waterpartnerships/what_is_a_public_water_sys.pdf

A flowchart showing the differences between community water systems and non-community water systems can be found on the State Water Board's website.[19]

2.3.1 Organizational Structures

All types of public water systems in California, regardless of organizational type, are regulated by the State Water Board or LPA for compliance with SDWA requirements. As described above, there may be additional State or local agencies with oversight authority depending on the governance structure. Depending on the nature of an individual water system and their compliance violations, the additional oversight authority can augment actions being performed by the State Water Board for the purpose of providing safe drinking water or the additional oversight can be at odds with these actions due to another agency's competing mandates.

2.3.1.1 Publicly-owned Public Water Systems

Publicly-owned Public Water System examples include:

- Municipal
- County
- Special District, Community Services District, Public Utilities District, County Water District, Metropolitan Water District, Irrigation District, etc.

Publicly-owned public water systems are subject to oversight from both the State Water Board and the LAFCO of the county where the water system resides. The State Water Board, or LPA, regulates compliance with the SDWA, while the LAFCO controls the water system's boundary and has authority to perform municipal service reviews. The LAFCO also has a mandate to preserve agricultural land resources, discourage urban sprawl and ensure organized growth, and does not easily allow the expansion of the urban service area. In addition, even where expansion is supported by LAFCO, the process can be lengthy and difficult. The State Water Board's goal is to avoid the formation of small water systems in areas adjacent to cities and other LAFCO-regulated entities, and instead have these new developments served by existing public water systems, even if the new development is located outside of the existing water systems' urban service areas. For example, in Santa Clara County there have been three PTRs submitted to the State Water Board related to new developments adjacent to the City of Morgan Hill.[20] Due to an existing settlement agreement between the Santa Clara County LAFCO and the City, the City's urban service boundary cannot be expanded until environmental analysis of growth within the City's urban growth boundary is

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[19] Decision Tree for Classification of Water Systems https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/class_dec_tree.pdf

[20] There are 38 new developments proposed in Santa Clara county pursuant to SB 330, also known as the Housing Accountability Act. (Gov. Code, § 65589.5.) For the additional six or more located adjacent to Morgan Hill, it is anticipated that PTRs would be filed with the State Water Board, proposing new public water systems.

completed. In the past, such historical challenges have resulted in the formation of small, privately-owned, unsustainable water systems existing outside the boundaries of larger more sustainable water systems, as explained in Chapter 1.

Publicly-owned public water systems also have special rate setting requirements under Proposition 218 (Prop 218). Under Prop 218, the residents of the publicly-owned water systems may protest new rate structures, even if the water system is proposing a rate increase as a necessary step in correcting public health violations or to make necessary infrastructure upgrades. Publicly-owned public water systems also have requirements regarding the public notification of their board meetings in accordance with the Brown Act. It is important to understand that Prop 218, LAFCO jurisdiction and the Brown Act are not applicable to most other types of privately-owned public water systems. For example, LAFCO has no jurisdiction over mobile home parks, investor-owned utilities, etc.

Publicly-Owned Non-Community Water Systems examples include:

- Public schools (owned by Local Education Agencies)
- Publicly-owned prisons and correctional facilities
- Publicly-owned campgrounds with transient populations, such as State Parks
- Publicly-owned marinas with transient populations

Public schools that are served by their own water supply are required to have system changes and modifications approved by both the State Water Board and DSA. LAFCO review of the service area of schools, prisons, campgrounds and marinas are not applicable unless there is a consolidation with a LAFCO-regulated public water system.

2.3.1.2 Privately-owned Public Water Systems

Privately-owned Community Water System examples:

- Mutual Water Companies, as described in Corporations Code Sections 14300 through 14307[21]
- Investor-Owned Utilities, regulated by the CPUC as described under the Public Utilities Code Sections 2701 through 2715[22]
- Other Privately owned public water systems (not actively regulated by the CPUC)
- Mobile Home Parks
- Farmworker housing / Labor camps
- Apartments (with their own water supply facilities)
- Condominium and townhouse developments (with their own water supply)

[21] Corporations Code Sections 14300 through 14307 https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=CORP&division=3.&title=1.&part=7.&chapter=1.&article=

[22] Public Utilities Code Sections 2701 through 2715: http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=1.&title=&part=2.&chapter=2.&article=

- Other community water systems owned by individuals or partnerships but not actively regulated by the CPUC, such as County Water Companies or individual owners.

Privately-owned public water systems fall generally into two types: those regulated by the State Water Board/LPA and CPUC, and those regulated only by the State Water Board/LPA. Of the privately owned public water systems, investor-owned utilities serve the largest population, while other privately-owned public water systems represent a larger number of water systems, each serving fewer customers. Investor-owned utilities are regulated both by the State Water Board/LPA for compliance with the SDWA and the CPUC for water rates, boundaries, water quality, and other matters. As investor-owned utilities have rate structures that are subject to different requirements than publicly-owned public water systems, many large investor-owned utilities are able to have low income assistance programs[23] that publicly-owned public water systems cannot have due to Prop 218 constraints.

MWCs do not fall under CPUC oversight, but have their own financial budgeting, training and public noticing requirements under Sections 14300-14307 of the Corporations Code. These sections require financial reserve funds for repairs, annual budget audits by a certified public accountant, educational training requirements for board members, and specific public meeting notice requirements. However, only “eligible persons,” which include MWC shareholders, customers that receive drinking water from the mutual, and city or county officials that represent people who receive drinking water directly from the MWC on a retail basis, may request review of financial records. (Corp. Code, §§ 14305, subds. (e) and (o)(1).) Since the passage of AB 54 in 2012, LAFCOs have increased jurisdiction over MWCs. Section 14301.1 of the Corporations Code requires MWCs to submit information for the purpose of municipal service reviews and sphere of influence changes at the request of its local LAFCO agency. However, limited staffing of LAFCO agencies results in municipal service reviews not being completed for MWCs in many areas. Historically, no other state authority, including the State Water Board, has jurisdiction to require submittal of financial information or training records from MWCs. Therefore, it has been difficult to verify the financial capacity of these water systems. However, the passage of SB 200 (Chapter 120, Sec. 6, Statutes of 2019) provided the State Water Board with increased authority to require on-going technical, managerial and financial reporting via HSC § 116530.

Approval of the location of new MWCs is under the jurisdiction of city or county planning offices. MWCs have been created by developers that do not want the expense of paying city development fees or building pipelines to connect to existing municipal water systems. In these cases, the MWC board members must come from the future residents, who may not understand all the requirements of being a public water system or their legal responsibilities of being a stockholding owner of a water system upon buying a home. Public water systems cannot be granted a permit unless the public

[23] Low Income Assistance Programs: https://www.cpuc.ca.gov/consumer-support/financial-assistance-savings-and-discounts/water-company-assistance

water system demonstrates that it "possesses adequate financial, managerial and technical capability to ensure the delivery of pure, wholesome, and potable water." (HSC § 116540, subd. (a)(1).) Additionally, changes to HSC § 116540 have provided the State Water Board additional tools to limit these types of unsustainable systems. First, the State Water Board, in considering whether to approve a proposed new public water system, must consider "the sustainability of the proposed new water system and its water supply in the reasonably foreseeable future, in view of global climate change, potential migration of groundwater contamination and other potential treatment needs, and other factors that can significantly erode a system's capacity." (*Id*. at subd. (c).) In addition, if the State Water Board determines that it is feasible for the service area of the public water system to be served by one or more permitted public water systems identified in the PTR, the State Water Board may deny the permit of a proposed new public water system. (*Id*. at subd. (d).) What is considered feasible has yet to be challenged in the courts.

Mobile home parks that have their own water supply source and related facilities may be classified as public water systems regulated by both the State Water Board/LPA and the DHCD. However, if 10 percent of the mobile home residents file a complaint with the CPUC in a 12-month period claiming rates are unreasonable or service is inadequate then the CPUC may review the merits of the complaints and take certain actions, in accordance with Section 2705.6 of the Public Utilities Code. The State Water Board's information is that four such complaints were filed in the years 2021-2024. Other privately-owned public water systems such as apartments and condominiums are not regulated by DHCD; their water systems are only under the jurisdiction of the State Water Board or LPA.

Privately-owned Non-community Water Systems examples:

- Private schools
- Privately-owned campgrounds, RV parks, resorts, etc.
- Privately-owned marinas
- Businesses such as restaurants, gas stations, manufacturing plants, etc.

Non-community water systems are typically private businesses that do not have residents that spend more than six (6) months per year at their facility. These privately-owned non-community water systems typically only have oversight by the State Water Board or LPA, except for restaurants, which have additional local environmental health requirements.

2.4 STATE DRINKING WATER REGULATORY PROGRAM

2.4.1 Division of Drinking Water

Over the last fifty years, DDW has been given increasing responsibilities and powers over the regulation of public water systems. Along with the ability to issue permits, citations and compliance orders to public water systems to ensure compliance with drinking water statutes and regulations, DDW has obtained the ability to revoke permits, consolidate water systems, and contract with, or provide a grant to, an administrator to provide administrative, technical, operational, or managerial services, or any combination of those services, to designated water systems (per HSC § 116686(r)(2)) to ensure the provision of adequate supplies of water that are pure, wholesome and potable.

Maintaining drinking water quality and reliability have become more challenging as demands for the state's limited supply of high-quality water intensify. Although DDW's emphasis continues to be placed on compliance and enforcement activities related to state and federal SDWA, there is also now a greater degree of importance placed on the district offices to proactively monitor and report various regulatory requirements and activities with PWSs and stakeholders. Maintaining compliance, especially among smaller water systems, is increasingly challenging due to TMF capacity issues.

Legislation continues to give additional responsibilities to DDW, as presented in Appendix 9. For example, DDW is now involved in activities related to lead exposure from drinking water in schools and childcare centers, and customer-side lead service line inventory requirements. In addition, DDW has increased responsibility in the areas of direct potable reuse, including inspections and permitting advanced water treatment systems, and development and adoption of regulations for onsite treatment and reuse of nonpotable water. DDW's consolidation authority has also been expanded to include single-family residences on consolidation projects. DDW is also involved in oversight of regulations related to drought and conservation; enforcement of the Water Shutoff Protection Act, including responding to water waste and shut-off complaints; development of drinking water methods; fire response, including requiring testing for benzene in the distribution system after a wildfire; and investigation of microplastics and PFAS in drinking water.

Table 2-1 shows the total number and types of permitted public water systems in California. Ninety-two percent of Californians that are provided drinking water by CWSs are served by a system with over 3,300 service connections; however, CWS with over 3,300 service connections account for only about 14% of the total number of CWS. Over half of CWS serve fewer than 100 homes (service connections).

Table 2-1: Number of California Public Water Systems by Type as of November 2024

Public Water Systems by Type	Number
Community Water System	2,837
Non-transient Non-community Water System	1,470
Transient Non-community Water System	2,958
Total	**7,265**

As described previously, DDW is comprised of five branches: the Northern, Central, and Southern Field Operation Branches; the Resiliency and Data Branch; and the Program Management Branch. The following sections describe in more detail the various branches and their functions within DDW.

2.4.1.1 Field Operations Branches

The Field Operations Branches ensure water systems comply with the California Code of Regulations and with the SDWA using the following primary tools:

1. Issuance of permits to public water systems for sources, treatment, critical facilities, management, and operations,
2. Sanitary survey inspections of water systems,
3. Compliance tracking of required monitoring data, and
4. Timely and appropriate enforcement actions.

DDW field activities also include training, technical assistance, plan review, and prompt responses to water system personnel with questions about water system issues that may impact public health and customer complaints regarding water quality problems.

As noted above, DDW's responsibilities have not historically included ongoing and direct involvement with the regulation or oversight of private domestic wells or water systems that are not public water systems. These categories of drinking water are under the oversight of local agencies. However, with the establishment of the SAFER program, DDW has a more direct and active role in addressing problems in these facilities. The SAFER program, including details regarding status of non-DDW regulated state smalls and domestic wells, is discussed further in Chapter 8.

There is a total of 7,265 public water systems in California as of November 2024. For regulatory purposes, there are three categories of public water systems (see section 2.3, above and Appendix 2 for the definition of public water system):

1. Community water systems (CWS) – These systems serve residential areas.
2. Non-transient non-community water systems (NTNCWS) – These systems serve the same people daily for at least six months per year (for example schools and businesses with 25 or more employees).
3. Transient non-community water systems (TNCWS) - These systems serve a varying population in nonresidential settings for a minimum of 60 days per year. These include facilities such as restaurants, gas stations, highway rest stops and campgrounds where different people visit throughout the year.

2.4.1.2 Permits

All public water systems must have a permit to operate issued by the State Water Board. These permits and their accompanying engineering reports may place specific conditions on various aspects of individual water systems such as operation, monitoring, and management. System-specific permit conditions are an important and powerful tool to address system-specific issues in a proactive way.

Permits typically include provisions established specifically for the individual water system, setting forth operating requirements dictated by the water system during the permitting process that, if not met, could result in a formal enforcement action. Permits do not have expiration dates. The public water system must comply with the permit conditions and apply for an amendment per CCR, tit. 22, § 64556, HSC § 116550, or § 116525 whenever any of the following events occur:

1. A water system proposes using a new water source
2. A change is proposed to the types of water treatment provided
3. A change in ownership

4. Modifications of facilities are proposed that differ from a specific element of a DDW standard (such as an alternative pipe material for a specific reason).
5. Use of new storage tanks and reservoirs with capacities greater than 100,000 gallons.

One of the more significant permitting problems for DDW is permitting “found” public water systems. These are unpermitted systems that often started out as providing water to less than the threshold 15 connections or 25 people (the limit that defines a public water system). Once these systems are found, it may be impossible for the State Water Board to permit them because they do not meet minimum requirements, such as having sufficient treatment, compliance with Waterworks Standards, or having the technological, managerial, and financial capacity to be a public water system. For example, legislation has reduced the barriers for homeowners to add accessory dwelling units (ADUs) to their existing homes. When new ADUs are added, the minimum threshold of service connections or people served are met and a new water system is created and must be permitted. In Santa Clara County alone, this has resulted in the creation of 19 new water systems. Because the permitting process is not automatic, these newly created “found” systems may be operating without a permit. With the most recent adoption of SB 1211 in 2024, which makes it easier for ADUs to be added to existing homes, it is likely that the number of “found” water systems will continue to rise and therefore add to the existing permitting issues DDW currently faces.

2.4.1.3 Inspections

DDW performs routine inspections of public water system facilities, which often include a review of operational records. These inspections are known as sanitary surveys under the SDWA and are foundational to the regulatory program as they provide detailed evaluations of the status of facilities and identification of potential deficiencies. Water quality sampling required for public water systems also provides documentation of the quality of water being served. However, sampling alone does not prevent problems from occurring; therefore, the sanitary survey process evaluates potential problems and flags them for elimination before they can result in problems, such as violations of drinking water standards. In fiscal year 2023/24, approximately 740 inspections of CWS were completed statewide, representing 26% of CWS. Approximately 80% of CWS have been inspected in the last 3 years.[24]

HSC § 116735, subdivision (b) requires that public water systems be inspected according to the following schedule:

1. Annually for systems with a treated surface water source.
2. Biennially for systems with groundwater subject to treatment.
3. Every three years for systems with groundwater not subject to treatment.

2.4.1.4 Compliance Tracking

Water quality monitoring requirements for each water system are electronically tracked

[24] Annual Performance Report - Fiscal Year 2023-24 https://www.waterboards.ca.gov/about_us/performance_report_2324/regulate/251_drinking_water.html

in a DDW database and used to determine compliance with all drinking water standards. USEPA requires the State Water Board to submit an annual compliance report containing information of noncompliance with drinking water standards by public water systems (see Chapters 3, 4, and 5).

2.4.1.5 Enforcement

DDW has several mechanisms available to obtain compliance with drinking water standards, including:

1. Specifying corrective action provisions in permits,
2. Issuing citations and/or compliance orders,
3. Revoking or suspending permits,
4. Initiating a court action, including the petition for a court-appointed receivership.

DDW can issue citations and monetary penalties of up to $1,000 a day for violations of the SDWA, drinking water regulations, permits, drinking water standards, or previously issued citations or compliance orders. DDW may also issue compliance orders directing water systems to take corrective actions. If a water system fails to remedy a violation, DDW can revoke the public water system's operating permit. Any person operating a public water system without having an unrevoked permit to do so, may be enjoined from so doing by any court of competent jurisdiction (HSC § 116669, subd. (a).) DDW's recent enforcement actions are available for individual public water systems via Drinking Water Watch.[25]

DDW can also work with the Attorney General's Office to seek judicial remedies, including injunctive relief and the imposition of civil penalties. The State Water Board worked with the Attorney General's Office in 2024 on several cases, including obtaining an injunction against a farm operating an unpermitted drinking water system for workers onsite, and another obtaining restitution to customers and an injunction for violations of the Water Shutoff Protection Act and the Water Arrearages Act. A court may also appoint a receiver to assume possession of the water system and its operation. Currently, there are four receiverships the State Water Board is working on with the Attorney General's Office.[26]

[25] Drinking Water Watch: https://sdwis.waterboards.ca.gov/PDWW/

[26] As described in section 2.4.1.7, SB 552 allowed the State Water Board to contract with an administrator for many of the services that would have been assigned to a receiver in the past. Administrators are preferred over appointment of a receiver for several reasons. First, appointment of an administrator does not need to go through the courts and is a much simpler process. Second, the State Board can provide funding to administrators for their work; whereas a receiver is only able to pay themselves out of the water system's existing funding, which often barely can cover existing expenses. Before the 2022 passage of SB 1254, the ability to appoint an administrator was limited to PWS that serve disadvantaged communities, and therefore the State Water Board worked with the AG's office to get receivers appointed for systems, such as Twin Valley, Inc in Santa Clara County and Big Basin Water Company, Inc. in Santa Cruz County, both of which are small, privately-owned public water systems that do not serve disadvantaged communities.

2.4.1.6 Consolidation

The State Water Board has authority to order mandatory consolidations under Water Code section 116882 (SB 88, Ch. 27, 2015). Subsequent bills, SB 552, AB 2501, AB 1250, SB 403 and AB 664 added additional consolidation related authorities, clarifying language and expanding the scope of the initial legislation to include state small water systems (serving 5 to 14 connections and fewer than 25 individuals for more than 6 months a year) and domestic well owners that petition the State Water Board to be consolidated. Mandatory consolidation can only be completed for water systems that include *all* the following conditions: (1) the public water system serves disadvantaged communities (with a median income less than 80 percent of the state median), (2) the water system consistently fails to provide an adequate supply of safe drinking water (a primary or secondary MCL standard failure), or are at-risk of failing and (3) another water system is close enough for the consolidation to be cost effective. As presently written, mandatory consolidations must also meet several criteria prior to the State Water Board issuing an order, including: a voluntary negotiation period (typically 6 months), public meetings, a finding that no LAFCO action will address the water supply issue, and that water rights and contracts have been addressed. Recent requirements (per AB 664, Ch. 810, 2023) also apply to landlords and dissemination of water quality information as it relates to potential state funded consolidations initiatives. Progress on consolidation is discussed in Chapter 8.

2.4.1.7 Administrators

SB 552, approved in September 2016, gave the State Water Board authority to contract with an administrator to provide administrative and managerial services to disadvantaged public water systems and state small systems, which is particularly useful where it is not feasible to do physical consolidation (SB 552, Ch. 773, 2016.) The legislation specifically stated that systems would not be responsible for the costs associated with the administrator. Since no State or Federal funds were available for this purpose, no administrators were appointed until the passage of AB 1577 and SB 862, which appointed and funded an administrator for the Sativa-Los Angeles County Water District. However, with the passage of SB 200, more funding for the appointment of administrators has become available. Investor-owned utilities are now also eligible to have an administrator appointed. As a result of SB 1254 in 2022, additional liability protection for administrators has been included in statute, as well as the authority for the State Water Board to appoint administrators for at risk systems (SB 1254, Ch. 681, 2022.) The State Water Board has developed and adopted an administrator policy in accordance with HSC § 116686. See Chapter 8 for additional details regarding the administrator's role in the SAFER program and PWS sustainability.

2.4.1.8 Technical Programs

DDW carries out several other program elements in support of the overall regulatory program. These elements are important to the effectiveness of drinking water regulatory programs and the protection of public health.

Among these activities are the certification of drinking water laboratories through DDW's Environmental Laboratory Accreditation Program, and ensuring, through DDW's quality assurance program, the integrity and validity of drinking water analytical data that is received from certified environmental laboratories. Furthermore, DDW aids water systems in building their resilience to natural disasters, emergencies, and attacks on security systems and equipment.

DDW reviews potential water recycling projects, such as indirect potable reuse, such as using groundwater recharge or surface water augmentation; those using recycled water for landscape or other irrigation; and develops criteria for different types of recycled water uses, including direct potable reuse.

In addition, DDW provides technical support to DFA, oversees the state's drinking water fluoridation program and maintains a registry of residential point-of-entry (POE) and point-of-use (POU) water treatment devices, as part of its Residential Water Treatment Device registration program.[27] That program provides oversight and a registry of water treatment devices that make contamination-reduction claims for residential use.

Finally, DDW develops regulations related to drinking water, including primary and secondary drinking water standards, issues advisory Notification and Response Levels, and provides information to other state agencies regarding activities that might impact drinking water sources. Over the past few decades, California has adopted drinking water standards for 25 MCLs that are more health-protective than federal standards, setting a precedent for rigorous water quality protection. Furthermore, 14 of California's MCLs are for drinking water contaminants not regulated by federal standards, reflecting the state's commitment to being on the front lines of safeguarding public health. These and other regulated contaminants are presented in Chapter 3 and Appendices 3 and 6.

The state has also adopted regulations that identify unregulated contaminants for required monitoring to determine the extent of their presence in drinking water, beginning with several dozen chemicals in the 1980s, many of which have subsequently become regulated. The most recent unregulated contaminant monitoring requirements were established in 2001 for unregulated organic and inorganic chemical contaminants; these resulted in MCLs for perchlorate and 1,2,3-trichloropropane, as well as for hexavalent chromium. These MCLs are discussed further in Chapter 3.

More recently, DDW has issued general orders to specific public water system for sampling of perfluoroalkyl and polyfluoroalkyl (PFAS) substances, pursuant to HSC 116378. DDW intends to use the information that comes out of the sampling and analysis to help set an MCL for PFAS substances in the next several years.

The federal SDWA sets minimum drinking water standards. States may adopt more stringent requirements. The following bullets highlight how California has gone above and beyond federal requirements of the SDWA:

- Secondary Standards: USEPA developed secondary standards for drinking water to

[27] In 2011 and again in 2016, emergency regulations were adopted for the use of POE and POU treatment devices. The POE/POU regulations became permanent in 2019. (Cal. Code Regs., tit. §§ 64417-64418.8 (POU); §§ 64419-64420.8 (POE).) The use of these devices by a public water system for compliance with the Safe Drinking Water Act is limited to PWS serving less than 200 service connections. State law further limits the use of POU/POE devices for compliance purposes to only three years or less if centralized treatment can be installed before that time.

prevent non-health-based impacts, such as undesirable tastes, odors, and colors and damage to water equipment, but their secondary MCLs are not enforceable. California's are. California regulates 16 contaminants via secondary standards.

- California Waterworks Standards: In addition to regulating contaminants either found in source waters or created through the disinfection process, California has established regulations requiring proactive prevention of direct and indirect addition of contaminants in the treatment process or through materials contacting water during the treatment and distribution processes.
- Cross-connection Control: California recently overhauled its cross-connection control requirements, which were developed to protect "public health through the establishment of standards intended to ensure a PWS's drinking water distribution system will not be subject to the backflow of liquids, gases, or other substances". See Chapter 3.

Regulations adopted since the 2020 Plan publication are included in Appendix 6.

2.4.2 Local Primacy Agencies

The State Water Board may, pursuant to state law, delegate to the local county health officer the responsibility for enforcement of the California SDWA and regulations for small public water systems (public water systems with less than 200 service connections) in their jurisdiction. (HSC § 116330.) These counties are known as LEHJ or LPA counties. The LPAs are given primacy enforcement authority to carry out the duties of the Safe Drinking Water Act, including permitting and enforcement, in lieu of the State Water Board. Table 2-2 provides information on the number of public water systems within each of the 58 counties, as well as denoting the counties with delegated authority. As of November 2024, DDW had delegation agreements with 26 LPA counties.[28] The LPAs oversee approximately 43 percent of PWSs statewide, which commutatively serve less than 3 percent of the statewide population.[29] Additionally, LPA's may also regulate state small water systems (5-14 connections and not more than 25 people) and local state small systems (2-4 connections), which are estimated to account for about 4 percent of the statewide population. In the years 2019, 2022 and 2023, the LPA regulated PWSs accounted for approximately 43% of compliance violations statewide (see Chapters 5 and 8 for discussion on LPA compliance).

LPAs and the State Water Board enter into delegation agreements, setting out requirements and expectations. LPAs must meet the requirements of their delegation agreement. DDW conducts an annual performance review for each LPA and makes recommendations for improvements. The LPA has a reasonable amount of time to make program improvements required by DDW. Should an LPA fail to make the necessary improvements to their program, DDW has the authority to revoke the LPA's delegation agreement.

LPAs face several challenges to meet the requirements of their delegation agreements,

[28] LPA County Map: https://waterboards.ca.gov/drinking_water/programs/documents/ddw-lpa-not-lpa-map-exp.pdf
[29] The portion of the population served by LPA regulated community water systems is less than 1 percent.

including:

1. Increasing number, and complexity, of drinking water standards and regulations.
2. Small size of LPAs and staff turnover, which makes it difficult to develop the expertise needed. Extensive system familiarity and technical expertise are often required to oversee water distribution and treatment facilities. Thus, LPAs rely heavily on DDW for technical training and support of complex technical issues.
3. Insufficient time and resources to carry out enforcement actions and resolve compliance issues with smaller systems. Counties may not allocate the resources required, particularly given the volume of workload. The LPA delegation agreements specify the number of personnel required to ensure adequate staffing; however, as previously noted, drinking water regulations have become more complex and numerous over the last 10 years.
4. Complex compliance issues, such as regional nitrate and arsenic problems, which disproportionately impact small water systems unable to afford expensive treatment solutions.

Since 2014, several LPA programs have returned primacy enforcement of the SDWA for small systems to DDW. There are three less LPAs now than were reported in the 2020 Plan. This has created an additional workload for DDW to hire and train staff to familiarize themselves with these systems, attempt to collect relevant information for compliance review, and to coordinate with public water systems that may not be up to speed with the most recent regulatory requirements. DDW reports to the USEPA, and makes available annually to the public, information on the effectiveness of the LPA programs in the Water Boards Annual Compliance Report. Tracking the LPAs' programs more closely allows DDW to prioritize technical assistance and training for LPAs or to take other appropriate actions, if necessary.[30]

DDW needs to update the LPA delegation agreements to reflect current regulatory, database and enforcement expectations, including enforcement tracking, return to compliance milestones, and the associated LPA minimum staffing requirements. The delegation agreements will require LPAs to have a DDW approved enforcement policy and/or a process for enforcement escalation. DDW does not have control over LPA resources; however, additional support is needed at the state or county level to adopt and implement these updated delegation agreements.

Table 2-2: California Public Water Systems by County (November 2024)[31]

COUNTY	LPA	CWS	TNCWS	NTNCWS	Total
Alameda	No	15	9	4	28

[30] HSC § 116330, sub. (a) requires that the delegation agreements with the LPAs provide that the DDW retains jurisdiction to administer and enforce the SDWA "to the extent determined necessary" by DDW.

[31] CWS - Community Water System, TNCWS - Transient Non-community Water System, NTNCWS - Non-transient, Non-community Water System California Water Systems: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/california_water_systems.html

COUNTY	LPA	CWS	TNCWS	NTNCWS	Total
Alpine	Yes	5	32	3	40
Amador	No	21	46	5	72
Butte	Yes	42	25	22	89
Calaveras	Yes	19	27	6	52
Colusa	No	9	15	5	29
Contra Costa	Yes	39	41	7	87
Del Norte	No	15	13	3	31
El Dorado	Yes	18	99	9	126
Fresno	No	103	155	82	340
Glenn	No	14	11	12	37
Humboldt	No	45	35	11	91
Imperial	Yes	29	24	25	78
Inyo	No	46	52	12	110
Kern	No	172	88	83	343
Kings	Yes	13	8	12	33
Lake	No	44	36	2	82
Lassen	No	15	17	13	45
Los Angeles	No	204	57	25	286
Madera	Yes	67	92	45	204
Marin	No	15	28	6	49
Mariposa	No	13	47	9	69
Mendocino	No	43	79	26	148
Merced	No	22	43	54	119
Modoc	No	5	6	3	14
Mono	Yes	18	72	3	93
Monterey	Yes	159	70	91	320
Napa	Yes	28	91	66	185
Nevada	Yes	21	47	15	83
Orange	No	40	2	4	46
Placer	Yes	54	56	13	123
Plumas	Yes	27	78	5	110
Riverside	Yes	98	82	24	204
Sacramento	Yes	62	74	33	169
San Benito	No	32	14	17	63
San Bernardino	Yes	148	138	39	325
San Diego	No	80	92	23	195
San Francisco	No	5	2	1	8
San Joaquin	Yes	96	115	100	311
San Luis Obispo	Yes	74	43	51	168
San Mateo	No	35	12	3	50

COUNTY	LPA	CWS	TNCWS	NTNCWS	Total
Santa Barbara	Yes	63	64	24	151
Santa Clara	No	66	27	23	116
Santa Cruz	Yes	52	29	15	96
Shasta	Yes	62	81	33	176
Sierra	No	8	25	0	33
Siskiyou	No	33	30	9	72
Solano	No	26	22	16	64
Sonoma	No	130	200	109	439
Stanislaus	Yes	62	72	65	199
Sutter	No	8	11	16	35
Tehama	Yes	49	33	31	113
Trinity	No	17	23	5	45
Tulare	No	94	129	74	297
Tuolumne	No	49	57	11	117
Ventura	No	68	9	21	98
Yolo	Yes	18	38	32	88
Yuba	Yes	22	35	14	71
Total	**26**	**2,837**	**2,958**	**1,470**	**7,265**

2.5 FUNDING ASSOCIATED WITH STATE DRINKING WATER PROGRAM

The funding for state drinking water regulatory program activities is derived from several sources, including the state General Fund, cost recovery and fees from public water systems for regulatory program activities (Safe Drinking Water Account), federal funds in support of regulatory oversight of public water systems, the Safe & Affordable Drinking Water Fund, fees for the administration of the operator certification program, and fees generated from laboratories by the environmental lab accreditation program.

Chapter 10 provides additional details on funding of PWS including financial assistance programs administered by DFA.

2.6 CONCLUSIONS AND RECOMMENDATIONS

2.6.1 Conclusions

There are numerous state and local agencies regulating water systems and coordination among the agencies continues to improve and become more consistent. This improvement has been the result of more defined regulatory authority thanks to ongoing collaboration and better understanding of the challenges PWS face in navigating the regulatory landscape. In addition, close cooperation and coordination among agencies has resulted in improvements in areas such as source water quality protection, water supply reliability, enforcement, and financial responsibility.

Further collaboration with other state agencies is needed to address differences between the regulatory requirements of the respective agencies that affect the provision of drinking water that meets quality standards. Similarly, more collaboration is needed with local agencies to find solutions for communities that are not served by a sustainable public water system, as well as to prevent the creation of small, unsustainable water systems. Some challenges discussed in this Chapter are included in Chapter 8 recommendations.

2.6.2 Recommendations

2-1 Encourage DHCD to adopt requirements addressing water quality and water quantity concerns in mobile home parks, special occupancy parks, and employee housing.

2-2 Support the update of LPA delegation agreements to reflect current regulatory, database and enforcement expectations, including enforcement tracking, return to compliance milestones, and the associated LPA minimum staffing requirements. The delegation agreements should require LPAs to have a DDW approved enforcement policy and/or a process for enforcement escalation. LPA programs require additional sources of funding to support the necessary staff levels for comprehensive regulatory oversight.

2-3 Support legislation to remove obstacles, including LAFCO requirements, to new development being served by an existing water system, instead of proposing the formation of a new water system.

2-4 Require local agency approvals for accessory dwelling units (ADU), as set forth in Gov. Code §§ 66314-66332, be amended to require, when relevant:

- Ensure the water system serving the new ADU is not subject to a building moratorium or has a restrictive permit provision per CCR, title 22, §64556.
- Where ADUs will be located outside of areas served by an existing public water system, and the additional service connections or people served will create a new public water system, the local agency should reach out to the State Water Board to determine whether the existing state small system has adequate source and storage capacity before issuing a building permit, use permit, or other permitting activities that would result in an increase in the water usage onsite.
- For ADU's or new construction outside of the service area of an existing public water system, if the existing water provider is a state small water system, require that if the addition of the new construction will create a new public water system that the existing water provider contact the State Water Board to either obtain a permit or to consider consolidation with an existing public water system.

CHAPTER 3 CALIFORNIA'S DRINKING WATER SUPPLY AND THREATS TO SAFE DRINKING WATER

3.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses the overall quality of California's drinking water and identification of specific water quality problems and discussion of known, and potential, health risks associated with contamination of drinking water.

Ensuring adequate and safe water supplies for Californians requires vigilance by water system operators and managers, a strong regulatory structure, and financial stability adequate to meet operational needs and long-term infrastructure replacement. Each component must focus on continuously meeting industry standards while developing proactive approaches to prevent future problems. There are a variety of challenges to sustainable drinking water supplies both on a local level and across regions of the state. These challenges come in many forms including local incidents such as contamination from main water breaks to local and regional groundwater contamination issues. Groundwater contamination can be caused by human actions, both historic and current, and by naturally occurring processes. For example, arsenic is primarily a naturally occurring contaminant but in some rare cases it is a result of improper disposal practices.

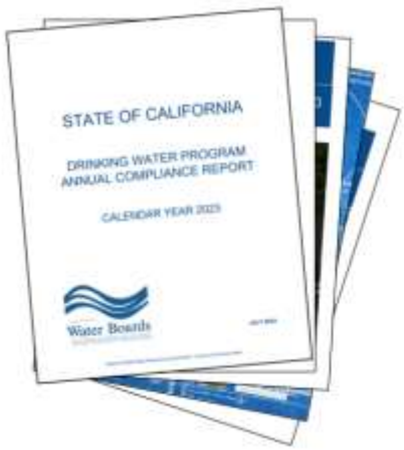
Public water systems (PWSs) monitor their sources to ensure that the drinking water delivered to customers meets water quality standards. If a drinking water source is found to be contaminated and out of compliance with drinking water standards, the public water system typically provides treatment or another source of water that is not contaminated.

Under the Safe Drinking Water Act (SDWA), public water systems are required to provide drinking water quality information to their customers. These requirements include:

- Consumer Confidence Report - Community water systems and non-transient non-community water systems are required to provide their customers with an annual report on the quality of water delivered to customers. This report must also include information on any violations of primary drinking water standards that occurred during the prior calendar year (HSC § 116470).

- All public water systems are subject to requirements for notifying their customers in the event of violations of primary drinking water standards or water quality monitoring requirements (HSC § 116540).

The State Water Board prepares an annual report summarizing compliance status of public water systems with the state and federal Safe Drinking Water Acts, and posts the report, known as the "Annual Compliance Report" (ACR), on the Division of Drinking Water website.[32]



The annual compliance report indicates over 98 percent of the population served by public water systems receive drinking water that meets federal and state drinking water standards. As will be discussed in Chapter 4, public water systems that do not meet drinking water standards generally serve smaller communities, particularly those communities that are disadvantaged. In support of the Human Right to Water Act (Chapter 524, Statutes of 2012), the State Water Board pursues initiatives to ensure all Californians receive safe, clean, affordable, and accessible drinking water.

This Plan primarily focuses on public water systems but many of the same contaminants that impact PWSs also impact non-PWSs such as private wells. The Safe and Affordable Funding for Equity and Resilience (SAFER) program partners with local communities to address drinking water needs of residents not served by PWS.

The State Water Board provides additional information about drinking water quality to the public through the following websites:

- Human Right to Water Portal: https://www.waterboards.ca.gov/water_issues/programs/hr2w/index.html
- Drinking Water Watch: https://sdwis.waterboards.ca.gov/PDWW/

For non-PWSs not subject to the State or Federal Safe Drinking Water Acts, including state small water systems, private domestic well owners, and other self-supplied communities, less information is available on the extent and prevalence of their water quality concerns. Additional measures could be taken to improve monitoring and reporting of the water quality within these communities. The State Water Board has developed a number of online resources and dashboards such as the Aquifer Risk Map to help non-DDW regulated water systems, such as state small water systems and domestic wells, assess the quality of their water prior to drilling a well, building residences, or completing acquisition of a property that is currently served by a water source not permitted by a public water system. To prevent the use of water for domestic purposes that does not meet drinking water standards, local agencies and/or property buyers could require water quality testing for compliance with state primary drinking water standards. The following websites provide information on how these communities can protect their health:

[32] State Water Board Annual Compliance Reports: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Publications.html

- Private Drinking Water Wells: https://www.epa.gov/privatewells
- SAFER Strategy for State Small Water Systems, Domestic Wells and Other Self-Supplied Communities: https://www.waterboards.ca.gov/safer/ssws_dw.html
- Other related online resources: https://www.waterboards.ca.gov/gama/well_owners.html https://www.waterboards.ca.gov/gama/domestic_well.html https://www.waterboards.ca.gov/water_issues/programs/grants_loans/drinking_water_well.html
- When siting a new well, existing data such as the Aquifer Risk Map may be useful as a screening tool in addition to initial and ongoing water quality monitoring: https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=18c7d253f0a44fd2a5c7bcfb42cc158d

3.2 SOURCES OF DRINKING WATER

3.2.1 Surface and Groundwater Sources

The state's water supplies are from surface water sources such as rivers, streams, and lakes and from groundwater sources which are present in groundwater basins throughout the state. The amount of drinking water derived from surface water sources and groundwater sources can vary annually depending on rainfall and snowpack conditions. In general, surface water sources provide a larger portion of the drinking water supply than groundwater sources. Based on the 2023 Annual Compliance Report, public water systems using surface water or a combination of surface water and groundwater supply approximately 80% of the state's population. However, the wider availability and easier access to groundwater basins means that about 80 percent of public water systems only use groundwater sources (Figure 3-2).

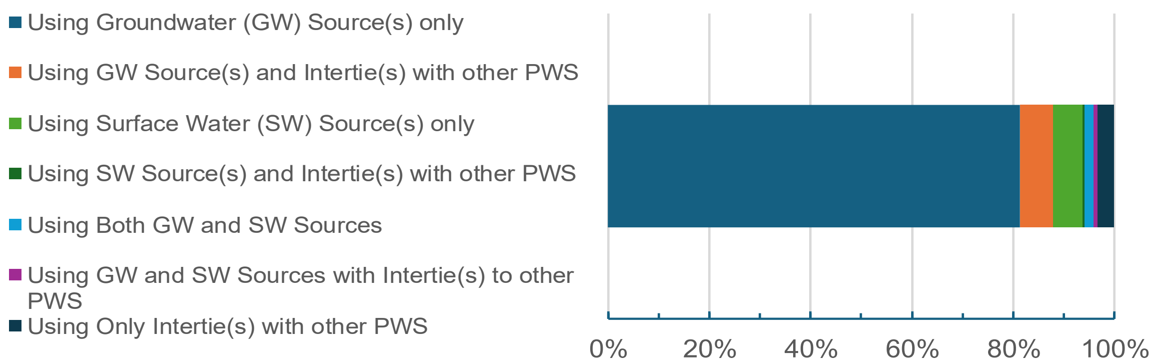
Figure 3-1: Chino Creek in Riverside County showing the surface water intake pipeline to the water treatment plant

Table 3-1 shows that the number of groundwater wells far outnumber the number of surface water sources, even though the surface water sources contribute a larger quantity of water to the state's drinking water supply. Figure 3-3 shows that a higher percentage of noncommunity water systems use groundwater as their only source of supply, while community water systems typically have more varied water sources available.

Table 3-1: Number of Water System Facilities as of October 2024

Water Source	Number of Sources
Surface Water	887
Groundwater under direct influence of surface water[33]	275
Groundwater	14,153

Figure 3-2: Percent of public water systems using each kind of source



[33] Cal. Code Regs., tit. 22, § 64651.50: "Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large diameter pathogens such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions.

There are several conditions that have altered and will continue to affect the adequacy of the state's drinking water sources. These include increasing requirements for water due to population growth; uncertainty in water supplies because of drought conditions and climate change; demands for water by agriculture and industry, as well as for environmental purposes; contaminating activities that threaten surface water and groundwater quality (therefore affecting available quantity); Tribal needs, and reductions in access to and use of the Colorado River.

As demand for groundwater continues to increase, effective management is needed to protect the future availability and quality of the supply. The Sustainable Groundwater Management Act (SGMA), as described in Chapter 2, requires local agencies to develop and adapt groundwater sustainability plans to meet their regional, economic, and environmental needs. If local efforts fail to adequately manage groundwater, the State Water Board has authority to step in and collect data, develop management plans, and collect fees for these activities. SGMA coordination is discussed further in Chapter 8.

Figure 3-4: Miramar Reservoir in San Diego County showing the top of the intake tower

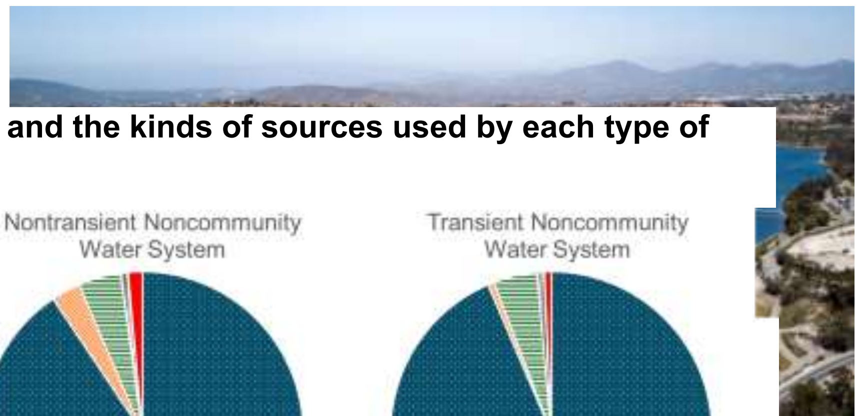
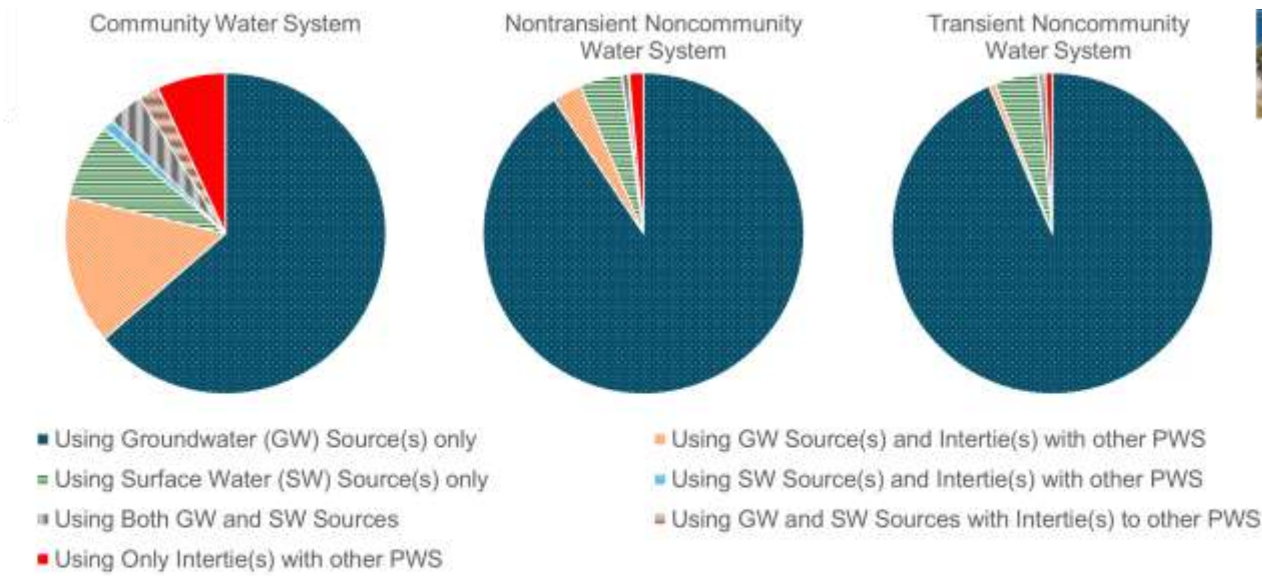


Figure 3-3: Public water systems and the kinds of sources used by each type of public water system



As discussed in Chapter 8, many small water systems depend on a single source of supply (only one well or a single surface water intake), rendering them highly vulnerable to system outages, contamination plumes, drought depletion, and other challenges. There are approximately 1,000 community water systems without a backup source or intertie. Accordingly, the Waterworks Standards require new community systems using groundwater to have access to multiple sources. The lack of backup supplies has resulted in numerous instances where water systems faced dire emergency situations when their single source of water supply failed or was curtailed. Given the impacts of climate change, these situations will become more common.

Figure 3-5: Groundwater Well

While larger water suppliers have been required to develop contingency plans to ensure reliable and safe drinking water, small water suppliers have historically not been required to develop such plans. In 2021, the state enacted Senate Bill (SB) 552[34], which requires public water systems serving fewer than 3,000 service connections and schools (which are typically categorized as noncommunity water systems) to conduct drought planning, including a requirement to develop water shortage contingency plans for those serving more than 1,000 service connections. SB 552 also established drought resiliency measures to increase resiliency during a drought, such as a backup source of supply or an intertie with another water system, a backup power supply, and water storage, that these water systems must implement by certain deadlines if funding is available. It also requires counties to develop drought and water shortage planning that would address non-public water systems, such as water systems serving fewer than 14 service connections and those served by individual domestic wells. More information on climate change impact and response is discussed in Chapter 11.

3.2.1.1 Groundwater Overdraft, Water Loss, Land Subsidence, and Intrusion

Over-extraction of groundwater to meet community and agricultural needs, particularly during times of drought, can cause land subsidence and potentially lead to a permanent loss in the ability for the groundwater aquifer to store water in the future, thus reducing the availability of this important source of drinking water. Areas of land subsidence in the state are monitored by the United Stated Geological Survey (USGS), which has studied subsidence in the San Joachin Valley, Coachella Valley, Sacramento-San Joaquin Delta, and other areas[35]. The California Water Plan highlights the significance of land subsidence and provides recommendations to reduce land subsidence.

In addition, land subsidence can damage water infrastructure such as pipelines, aqueducts, and other infrastructure such as roads and bridges. The subsidence of the California Aqueduct, which delivers surface water statewide, has resulted in reduction in flow capacity in certain areas. The Department of Water Resources (DWR) is addressing impacts of land subsidence in its California Aqueduct Subsidence

[34] Chapter 245, Statutes of 2021, (SB 552): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB552

[35] DWR California Water Plan: https://water.ca.gov/Programs/California-Water-Plan

Program.[36]

Groundwater extraction can also result in movement of contaminated groundwater plumes and in the case of aquifers adjacent to the ocean intrusion of the seawater into the drinking water aquifers. Special remedies such as engineered extraction or injection wells must be coordinated to monitor and prevent the contamination of groundwater in these cases.

3.2.2 Alternative or Supplemental Sources of Water

In addition to the usual surface and groundwater sources of drinking water, there are alternative or supplemental sources of water, which may be used to augment drinking water supplies. These include recycled water and desalination, which may be used to treat seawater or brackish groundwater.

3.2.2.1 Recycled Water

There has been considerable development in the use of recycled water to supplement drinking water supplies. Recycled water is municipal wastewater (sewage) that is further treated prior to its reuse. Recycled water has become a significant supplemental source of water in some areas of California.

3.2.2.1.1 Recycled water for nonpotable uses

Recycled water may be used for nonpotable uses such as landscape irrigation or industrial use, in lieu of using drinking water supplies, which would in effect preserve the drinking water supplies for potable (drinking water) uses. According to the State Water Board's tracking of recycled water production, more than 300,000 AFY (acre-feet per year) of recycled water was produced in 2022 for these nonpotable uses. An additional 175,000 AFY of recycled water was produced for agricultural irrigation.

3.2.2.1.2 Recycled water for indirect potable uses

Recycled water may also be used as an indirect source of drinking water (called indirect potable reuse), wherein recycled water is used to augment groundwater basins or surface water reservoirs. Recycled water receives additional treatment before being introduced into the groundwater basin and surface water reservoir environments where it eventually replenishes those sources. Public water systems then extract water from these sources and distribute the drinking water to its customers in accordance with applicable regulations.

Most of the indirect potable reuse projects to date have been in Los Angeles County, Orange County, and San Bernardino County, where recycled water is introduced to groundwater basins by percolation into underground aquifers using recharge basins, or additionally treated and injected into underground aquifers using injection wells. While recycled water reuse in these counties continue to increase, new projects have been recently approved or are under review in Monterey, Santa Barbara, Ventura, Riverside, and San Diego counties. Groundwater replenishment regulations were updated in 2014, which has increased the number of proposals for groundwater recharge. In addition,

[36] California Aqueduct Subsidence Program:
https://water.ca.gov/Programs/Engineering-And-Construction/Subsidence

surface water augmentation regulations adopted in 2018 enabled two water systems in San Diego County to propose surface water augmentation projects. These projects are expected to begin producing water for surface water augmentation as early as 2026.

Indirect potable reuse projects operate under permits issued by the Regional Water Boards, who consult with the Division of Drinking Water (DDW) to establish conditions necessary to protect drinking water supplies. In addition, surface water augmentation projects also require public water systems that are extracting from augmented reservoirs to comply with certain requirements, and thus surface water augmentation projects also require a drinking water permit issued by DDW.

3.2.2.1.3 Direct Potable Reuse of Wastewater

Recycled water has also been evaluated as a direct source of drinking water, which would be introduced directly into a public water system's distribution system for customer use (direct potable reuse or DPR). The State Water Board submitted a report to the legislature on the feasibility of developing uniform water recycling criteria for direct potable reuse in December 2016, pursuant to SB 918[37] and SB 322[38]. The feasibility report, as well as the work of the expert panel and advisory panel, are available from DDW's website.[39] In 2017, the legislature mandated that the State Water Board adopt regulations for direct potable reuse by December 2023 (Assembly Bill (AB) 574[40]). The State Water Board adopted regulations for direct potable reuse in December 2023, and the regulation became effective in October 2024.[41] Public water systems are not currently using direct potable reuse, but several systems in Los Angeles, Santa Clara, and San Diego counties are considering these types of projects.

Development of alternative water supplies requires considerable treatment to provide adequate public health protection. For direct potable reuse projects, where the connection between treated wastewater and treated drinking water is closer in proximity than in indirect potable reuse projects, public water systems must take extra precautions to ensure that the drinking water receives the necessary level of treatment so that customers receive drinking water that meets drinking water standards. Extra precautions to ensure the delivery of water that meets drinking water standards include, for example, higher levels of treatment, considerable treatment and water quality monitoring, a higher level of operator vigilance, and a higher degree of oversight.

3.2.2.2 Desalination

Desalination of water that is otherwise not fit for consumption may provide another

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[37] Chapter 700, Statutes of 2010 (SB 918): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB918

[38] Chapter 637, Statutes of 2013 (SB 322): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB322

[39] Direct Potable Reuse: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/rw_dpr_criteria.html

[40] Chapter 528, Statutes of 2017 (AB 574), California Water Code section 13561.2, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB574

[41] Regulating Direct Potable Reuse in California: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/direct_potable_reuse.html

source of supplemental water supply. Typically, desalination is either categorized as seawater or brackish water desalination. Seawater desalination treats ocean water obtained from either an open water intake or a subsurface intake to a treatment plant located near the coast. Brackish water desalination treats groundwater with elevated salt levels and can occur in both inland and coastal areas. In addition to reduction of salinity and water hardness, these groundwater desalination plants also reduce contaminants such as nitrate and arsenic.

There are seven seawater desalination facilities in California that produce drinking water (Table 3-2). Other coastal counties, including Orange County, have proposed facilities but have not yet begun construction. The State Water Board recently spearheaded an effort by six state agencies, plus all regional water boards, to develop agreed criteria that would allow for more efficient and timely permitting and approval of coastal desalination projects.[42]

Table 3-2: Permitted Seawater Desalination Facilities

Desalination Project	Production (acre-feet/yr)	County Served
Claude "Bud" Lewis Carlsbad Desalination Plant	56,000 (50 MGD)	San Diego
Charles E. Meyer Desalination Plant	3,360 (3 MGD)	Santa Barbara
Santa Catalina Island Desalination Plant	364 (0.33 MGD)	Los Angeles
Sand City Coastal Desalination Plant	336 (0.30 MGD)	Monterey
Diablo Canyon Desalination Plant	756 (0.675 MGD)	San Luis Obispo
San Nicolas Island Desalination Plant	47 (0.042 MGD)	Santa Barbara
Gaviota Oil Heating Facility	448 (0.4 MGD)	Santa Barbara

Brackish groundwater may also be desalinated for human consumption after treatment. The 2013 Update to the California Water Plan reported that the desalinated brackish groundwater production capacity doubled between 2009 and 2013, with 23 brackish water desalination plants operating in 2013, primarily in Southern California. In 2024, DWR reported that 35 brackish groundwater desalination plants were operating in 2020, producing about 106,000 acre-feet of drinking water, with approximately 14 brackish water desalination projects expected to be online by 2040 that will increase the groundwater and seawater production capacity by 40,000 acre-feet and 28,000 acre-feet, respectively.[43] To further brackish desalination projects, the board also authored a

[42] Ocean Plan Requirements for Seawater Desalination Facilities: https://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/

[43] DWR Projected Brackish Water Desalination Projects in California, February 2024: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/Desalination/Files/Water-Supply-Strategy-Brackish-Desalination-Projects_02-16-24_v2.pdf and Desalination (Brackish and Seawater) Resource Management Strategy: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/RMS/2025/Desalination-RMS---2025.pdf

report identifying the groundwater basins with the highest potential for brackish desalination.[44]

As an example, the Chino Basin Desalter Authority operates two brackish water desalination treatment facilities that treat contaminated groundwater in the southern portion of the Chino Basin. The facilities have a combined capacity of 34.7 million gallons per day (MGD). The treated water is used to supplement the drinking water supplies of several communities in San Bernardino and Riverside counties.

3.3 THREATS TO THE SAFETY OF DRINKING WATER SUPPLIES

Drinking water sources have inherent vulnerabilities to contamination. Threats can be short-term, for example a minor spill, or can have long-term impacts, for example a contaminated aquifer. Although there are different vulnerabilities for surface water and groundwater sources, either can pose a risk to a water systems' ability to supply safe, clean and affordable water.

Threats to a safe drinking water supply include:

- microbiological organisms, such as viruses, bacteria, *Giardia*, and *Cryptosporidium*
- inorganic chemical contaminants, many of which may be naturally occurring
- radiological contaminants, from natural radioactivity or from human activities that may release radionuclides into the environment, and
- organic chemical contaminants, many of which are of industrial, agricultural, or household origin.

3.3.1 Microbiological Contaminants

Microbiological contamination is a public health concern and is the basis for water treatment and disinfection for the prevention of infections. Because of the acute health risk posed by microbial contamination, DDW focuses on ensuring pathogen free water from source to tap. To ensure microbial contamination is mitigated, DDW requires a source to be adequately protected, sufficiently sampled, and properly treated (if necessary) and the distribution system is routinely sampled for bacteria. If treatment is applied, a minimum disinfectant residual must also be maintained and monitored. Competent management, operations and timely reporting are fundamental to minimizing microbial risks.

In 2024, the State Water Board received authority to designate and appoint administrators for certain sewer systems that are unable to sustainably operate their systems which may contribute to microbiological, nitrate, or other related contaminating releases.[45]

Microbiological contamination is a greater concern for surface water than for

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[44] Water Supply Strategy Implementation: Water Available for Brackish Groundwater Desalination: https://www.waterboards.ca.gov/water_issues/programs/recycled_water/docs/2024/brackish-GW-write-up.pdf

[45] Sewer System Administrators: https://www.waterboards.ca.gov/water_issues/programs/sewer_system_administrators

groundwater, therefore, the requirements for microbiological treatment are generally more focused on surface water. Inadequately treated wastewater from wastewater treatment plants or stormwater from municipalities that discharge into rivers and streams may result in elevated levels of pathogens (for example viruses, bacteria, *Giardia*, and *Cryptosporidium*) and pose unacceptable health risks to those who use the surface water for supply of drinking water. The discharge of wastewater into rivers, streams, and other surface water bodies is regulated by the Regional Water Quality Control Boards to prevent discharges of wastewater that would degrade groundwater aquifers and surface waters that are designated for municipal supply, including those that are used for a public water supply. DDW provides consultation to the Regional Water Boards on public health protection criteria for recycled water projects and provides public health engineering perspectives on Water Board actions and initiatives to improve the microbial water quality of surface water sources, including stormwater and other waters, for infiltrations into groundwater basins.

Groundwater contamination by microbiological contaminants may be a concern when water wells are improperly constructed or maintained, when there is release of sewage or percolation of untreated or partially treated sewage leaking through poorly maintained wastewater collection systems, from infiltration of stormwater runoff or agricultural drainage such as those from liquid waste lagoons from confined animal feeding operations or septic systems (septage) into aquifers, or when surface water is introduced into groundwater aquifers without appropriate treatment. Groundwater under the influence of surface water (for example, shallow groundwater near a stream) is at an increased risk of microbial contamination like a surface water source. PWSs are required to conduct source water assessments of their sources for potentially contaminating activities and locate their wells away from these potential sources of contamination if possible.

Groundwater under the influence of surface water may be susceptible to surface waterborne pathogens. There are state and federal regulatory requirements to treat groundwater under the influence of surface water as a surface water supply and to filter and disinfect the water accordingly.

The use of municipal wastewater to produce recycled water for nonpotable use, for indirect potable reuse, and for direct potable reuse requires increasingly robust pathogen control measures to protect public health. Regulations for nonpotable use include requirements to provide reliable treatment appropriate for the type of nonpotable reuse as well as management controls to reduce human contact with the recycled water. Higher levels of pathogen reduction are required for indirect potable reuse to ensure the augmented groundwater aquifer or surface water reservoir is protected from contamination by pathogens from the municipal wastewater. A risk-based approach was used to determine the required level of pathogen reductions required for viruses, *Giardia*, and *Cryptosporidium*. Multiple safety barriers must be provided, including two treatment barriers and an environmental barrier, to ensure a consistent and reliable production of source water before the water is ultimately extracted for use by a water system.

Microbiological pathogens (viruses, bacteria, parasites) in raw wastewater pose a significant public health risk in direct potable reuse projects. These pathogens must be greatly reduced continuously by removal or inactivation in the environment and/or engineered treatment barriers to yield safe drinking water. The direct potable reuse regulations contain the requirements necessary to produce safe drinking water from municipal wastewater and would be applied in conjunction with other drinking water regulations adopted under the SDWA.[46] Multiple treatment barriers must be provided, with rigorous testing and validation requirements for each treatment barrier. Additionally, robust continuous monitoring of the treatment train and automatic control and diversion must be provided to ensure that no drop of inadequately treated water is able to reach the consumer. With the direct potable reuse regulations recently adopted, no public water system has yet been approved for direct potable reuse.

3.3.2 Chemical and Radiological Contaminants

Water systems may use water from sources that have detectable levels of chemical contaminants, provided the water served to customers meet the health protective standards, called maximum contaminant levels (MCL) in accordance with state or federal SDWA requirements. If the chemicals are present in concentrations greater than the MCL, the water systems must treat the source, blend it with a clean source to a concentration less than or equal to the MCL, or remove the source from use. Water systems are also required to notify their customers any time water is delivered that exceeds an MCL. This chapter includes information on constituents detected at public water system sources above the detection limit and above the MCL. A detection greater than the MCL at the source does not necessarily indicate non-compliance with the drinking water standard, since the source might not have been used or might be treated to reduce or remove the contaminant prior to delivery to customers. Additionally, MCLs of many contaminants are based on chronic health effects, and thus compliance with those MCLs is determined by calculating a running annual average and not based on a single measurement or sampling. Violations of MCLs are discussed in Chapter 4.

Monitoring for 2019 through 2023 as reported in the ACRs shows the following:

Regulated inorganic chemicals most detected were nitrate, arsenic, lead, and total chromium (fluoride and aluminum were excluded since they are used in treatment). Lead is associated with lead solder, brass fixtures, or lead service lines within distribution systems and is not a source water concern.

The most detected industrial organic contaminants (excluding disinfection byproducts) were tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1,1-trichloroethane, 1,1-dichloroethylene, cis-1,2-dichloroethylene, carbon tetrachloride, and 1,2-dichloroethane.

The most detected pesticides were 1,2- dibromo-3-chloropropane (DBCP), ethylene dibromide (EDB), and 1,2-dichloropropane. The newly regulated pesticide-related contaminant 1,2,3-trichloropropane (1,2,3-TCP) is also commonly detected and, where detected, it is greater than its respective MCL. For pesticides, most detections above

[46] State Water Board Direct Potable Reuse Regulations: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/dpr-regs.html

the MCL occurred in Fresno, Kern, Stanislaus, San Bernardino, and Tulare counties.

Radioactivity analyses included gross alpha activity, which may be used to trigger further analyses for uranium and radium-226 and radium-228, which reflect natural soil radioactivity. Relatively few detections of tritium and strontium-90 (radionuclides of human origin) have been reported.

A 2013 report to the Legislature pursuant to AB 2222 (Chapter 670, Statutes of 2008) utilized public water system analytical data to provide information on communities whose primary source of drinking water is contaminated groundwater.[47] Similar to the more recent reporting period 2019 - 2023, the most prevalent drinking water contaminants between 2002 and 2010 were arsenic, nitrates, gross alpha particle activity, perchlorate, PCE, TCE, uranium, DBCP, fluoride, and carbon tetrachloride. The counties with the most numerous contaminant results in the 2013 report were Los Angeles, Kern, San Bernardino, Tulare, Riverside, Fresno, and Madera. Again, which is like the more recent county results 2019 through 2023.

Natural elements such as arsenic, perchlorate, mercury, cadmium, and hexavalent chromium in drinking water sources, and lead and copper and disinfection byproducts in drinking water distribution systems continue to be the focus of regulatory activity. Regulated contaminants are listed on the State Water Board website.[48] The State Water Board's notification levels for other contaminants that have been found in drinking water are presented in Appendix 5.

Arsenic, nitrates, and perchlorate are currently the regulated inorganic contaminants most often detected at levels greater than their primary MCL. Manganese, which is regulated as a secondary standard relative to aesthetics but has emerging health concerns, is also a common contaminant. A new MCL for hexavalent chromium was effective October 1, 2024. Before that, hexavalent chromium was addressed by the MCL for total chromium. Because of its widespread natural occurrence, hexavalent chromium is expected to join those that are detected most often. Among inorganic chemicals often detected are chlorite and bromate, which can be present as byproducts from water disinfection.

Of the radiological contaminants, uranium and radium are common naturally occurring radionuclides. Gross alpha activity and gross beta activity are used as screening measurements; exceeding standards for these constituents can prompt additional monitoring for the causes of the excess radioactivity.

The most detected organic contaminants are TCE and PCE, and the banned nematicide DBCP, as well as disinfection byproducts such as the trihalomethanes and haloacetic acids. Other contaminants of more recent concern are 1,2,3-TCP, which in 2017 became a regulated contaminant, and the unregulated 1,4-dioxane and N-

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[47] 2013 Report pursuant to Assembly Bill 2222: https://www.waterboards.ca.gov/gama/ab2222/docs/ab2222.pdf

[48] MCLs, DLRs, and PHGs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/mclreview/mcls_dlrs_phgs.pdf

nitrosodimethylamine (NDMA).

There are approximately 90 contaminants that are currently regulated for drinking water by the State Water Board and another 33 with notification levels. Technical support documents associated with a contaminant's public health goal (PHG) are developed by the Office of Environmental Health Hazard Assessment (OEHHA).[49] Another 30 chemicals that have been found in or may pose a risk to drinking water have advisory levels that require notification under certain circumstances but are not formally regulated. Information on these chemicals and their respective levels is available on the State Water Board website.[50]

Additional information is available from the State Water Board's Groundwater Ambient Monitoring and Assessment (GAMA) program, which has published fact sheets on many of these chemicals that include statewide maps showing the locations of contaminated wells, based on its water quality database.[51]

On occasion, drinking water contaminants appear in previously undocumented patterns. For example, because of the damage sustained during recent devastating fires, benzene in Santa Rosa (2017) and benzene and other volatile organic chemicals (VOC) in Paradise (2018) were found to have entered the communities' distribution systems. For more, see subsection 3.3.7.3, Distribution Systems.

3.3.2.1 Inorganic Contaminants

Specific contaminants of concern are discussed below.

3.3.2.1.1 Arsenic

Due to concerns about the potential for cancer-related health risks and non-cancer effects associated with exposures to this naturally occurring element (which also has some industrial uses), the federal MCL was reduced from 50 parts per billion (ppb) to 10 ppb in 2006 and the state MCL to 10 ppb in 2008. Because arsenic is present in groundwater supplies throughout the state, reducing the MCL greatly increased the number of water systems that have exceeded the state and federal MCL. Around the time the lower MCL went into effect, an estimated 2,200 drinking water sources were reported to have arsenic present at levels greater than the 2-ppb detection limit for purposes of reporting (DLR) for arsenic.[52] From 2019 through 2023, 4,523 active drinking water sources were reported to have arsenic detected above the DLR. The doubling of the number of wells with detected arsenic levels can be attributed to the increased number of groundwater wells constructed between 2008 and 2023. From 2019 through 2023, detections greater than 10 ppb were reported for 913 sources. In 2022, DDW proposed lowering the arsenic DLR closer to the corresponding PHGs to make more sensitive arsenic data available to evaluate health risk and technological

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[49] OEHHA Public Health Goals: https://oehha.ca.gov/water/public-health-goals-phgs

[50] Drinking Water Notification Levels: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html

[51] GAMA: https://www.waterboards.ca.gov/water_issues/programs/gama/resources.html#coc

[52] Metal DLRs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/swrcbddw21-001-metal.html

feasibility in considering a revised MCL.

3.3.2.1.2 Nitrate/Nitrite

Nitrates historically have been considered significant contaminants of drinking water. They generally result from human activities, for example, in rural areas from septage and fertilizer application in agriculture, or from waste in confined animal facilities such as dairies or feedlots. Focus has been on controlling the release of nitrates to the environment from such activities. The MCL for nitrate is 10 ppm as nitrogen; the MCL for nitrite is 1 ppm as nitrogen; and the MCL for nitrate and nitrite combined is 10 ppm as nitrogen. Results from 2019 through 2023 show 832 sources reporting detections of forms of nitrate that exceeded their MCL. Counties with the greatest number of sources reporting nitrate detections were Tulare, Los Angeles, Riverside, San Bernardino, and Monterey. For more information, see the State Water Board's website on nitrate[53] and recommendations on nitrate in groundwater.[54]

The State Water Board's Irrigated Lands Regulatory Program (ILRP) assesses threats to water quality resulting from agricultural practices and helps prevent agricultural discharges from further impairing waters. The program regulates agricultural irrigated lands throughout the state by issuing waste discharge requirements (WDRs) or conditional waivers of WDRs to growers. Reports (2012 and 2017) from researchers at the University of California, Davis, pursuant to Chapter 1, Statutes of 2008 (SB X2 1) presented extensive information on nitrates in the Tulare Lake Basin and Salinas Valley.[55] In October 2024, ILRP staff initiated the process to form an Agricultural Expert Panel to evaluate program data, consider regulatory approaches, and make recommendations to the program's recent initiatives. The panel is anticipated to begin work in Spring 2025.[56]

The issue of nitrate contamination continues to be coordinated extensively throughout California at both state and regional levels. The State Water Board is working with local agencies such as Groundwater Sustainability Agencies[57] or other local agencies to study and address the needs of potential and active management zones with impacted water sources that serve small water systems and domestical wells, however further coordination is needed to help address the long-term and interim solutions, such as funding and administration of bottled water or point of use devices, needed to support

[53] Nitrates and Nitrites in Drinking Water: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html

[54] Recommendations addressing Nitrate in Groundwater: http://www.waterboards.ca.gov/water_issues/programs/nitrate_project/docs/nitrate_rpt.pdf

[55] Addressing Nitrate in California's Drinking Water: https://watershed.ucdavis.edu/project/addressing-nitrate-california%27s-drinking-water

[56] Irrigated Lands (Agriculture) Regulatory Program: https://www.waterboards.ca.gov/water_issues/programs/agriculture/

[57] Department of Water Resources – Groundwater Sustainability Agencies: https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Groundwater-Sustainable-Agencies

these impacted communities.[58] For more discussion on point of use treatment devices see Chapter 7.

3.3.2.1.3 Manganese

Manganese is a naturally occurring element and is regulated via a secondary MCL of 50 ppb. Secondary MCLs address taste, odor, and appearance, and unlike federal secondary standards, California secondary standards are enforceable. Manganese can cause aesthetic problems including affecting taste and color. Taste and odor issues associated with secondary contaminants are a significant concern, as they reduce trust in PWSs, and the acceptability of the water delivered.

Manganese has historically not been considered to pose a health risk at low levels and is an essential nutrient. However, recent studies have raised concerns about manganese for its potential to cause neurotoxicological effects, especially in infants and children. In 2003 a notification level of 500 ppb was established, ten times the secondary MCL to address health concerns that may be associated with high levels of manganese exposure. Since non-transient non-community water systems such as schools are not required to monitor for or comply with state secondary MCLs, these systems may not collect samples that would trigger recommended public notice associated with established notification levels. Water systems that serve water above the notification level are required to notify their county boards of supervisors or city councils that their customers are receiving this water. Results from 2019 through 2023 show that 389 sources reported a detection above the 500-ppb notification level. Sonoma, Monterey, San Diego, and Napa Counties, with between 20 and 35 sources each, had the greatest number of sources exceeding 500 ppb notification level.

Due to the possible neurotoxicological effects of manganese, it is appropriate to consider additional advisory or regulatory actions, particularly as they might relate to the protection of young children in the home and school environment. In 2022, DDW proposed setting an initial DLR of 20 ppb for manganese to ensure that methods used in performing the required analyses are sufficiently sensitive for the proposed use of the data. In 2023, DDW proposed lowering the notification and response levels and is evaluating lowering the secondary MCL and requesting a PHG as the first step toward pursuing a primary MCL.[59] Manganese can also accumulate within distribution systems and release elevated concentrations into customer taps. In 2024, DDW hired staff to

[58] Example Report/Resources: Preliminary Management Zone Proposal for Priority 2 Management Zones:
https://cvsalinity-my.sharepoint.com/personal/cv-salts_cvsalinity_org/Documents/Website_Resources/Management%20Zone%20Development/P2%20EAP_PMZP/Valley%20Water%20Collaborative%20P2/VWC%20PMZP%20Final%20DraftwEAP%20-%2012.30.24.pdf?ga=1 https://www.cvsalinity.org/resources/management-zone-development/ https://www.cvsalinity.org//safe-drinking-water/ https://cvsalts.mljenv.com/ https://www.cvsalinity.org//wp-content/uploads/2022/01/WIC-Nitrate-Drinking-Water-Testing-Final-Report.pdf

[59] Manganese in Drinking Water:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Manganese.html

investigate potential health risks and establish drinking water standards for manganese at customer taps as well as at the source of supply.

3.3.2.1.4 Hexavalent Chromium

The hexavalent form of chromium is the toxic, carcinogenic form (trivalent chromium is a required nutrient). Total chromium has been regulated in drinking water supplies since the 1970s to protect against adverse health effects associated with the hexavalent form. Hexavalent chromium has been known to be carcinogenic in people when inhaled, but its potential for carcinogenicity when ingested was not supported scientifically until 2007 when the National Toxicology Program reported the results of long-term animal laboratory studies that showed ingested hexavalent chromium can result in cancer.

A primary drinking water standard of 10 ppb was adopted in July 2014 for hexavalent chromium. This standard was withdrawn in 2017 due to legal challenges. In June 2023, the State Water Board undertook a new rulemaking effort to establish an MCL for hexavalent chromium, as required by statute. As a result, a primary drinking water standard for hexavalent chromium was adopted by the State Water Board in April 2024 and the MCL became effective on October 1, 2024. The new hexavalent chromium MCL is 10 ppb with a DLR of 0.1 ppb. Public water systems serving greater than 10,000 service connections must complete initial monitoring by April 2025, with smaller water systems to initiate monitoring on a staggered schedule.

Hexavalent chromium has been found in drinking water supplies, both as a naturally occurring contaminant and as an industrial contaminant. From 2015 through 2018[60], 2,930 sources were reported to have detections greater than the 1.0 ppb DLR, with the greatest number in the counties of Fresno, Los Angeles, Riverside, Sacramento, and San Bernardino. From the same time, 2,070 sources reported a detection greater than 10 ppb. The greatest number of detections above 10 ppb were reported in the counties of Los Angeles, Monterey, Riverside, San Bernardino, and Tulare. During the rulemaking process, an assessment of the average hexavalent chromium source concentration during the ten-year period 2012-2022 showed 7,780 sources had an average concentration above the detection level, while 327 sources had an average concentration exceeding MCL. This larger dataset indicated that Riverside, Los Angeles, and San Bernardino Counties would have the greatest number of sources exceeding the new hexavalent chromium MCL.[61] Chapter 7 contains a summary of some of the economic analysis from the MCL rulemaking process.

3.3.2.1.5 Perchlorate

About three decades ago (in 1997), perchlorate, which is used in solid rocket fuel, fireworks and munitions, was found to have contaminated groundwater supplies near several aerospace facilities. At around the same time, perchlorate was also found to be

[60] Since the MCL was withdrawn, compliance information is not available for the subsequent reporting periods.

[61] Hexavalent Chromium website: http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chromium6.shtml

present in surface water supplies from the Colorado River, a major source of drinking water in Southern California, due to contamination by industrial operations in Nevada. At high concentrations, perchlorate can interfere with the thyroid gland's ability to take up iodine and to make thyroid hormones, which are required for normal growth and development and for normal metabolism. Inadequate thyroid hormones are a particular concern for developing fetuses and infants.

Perchlorate is an example of a contaminant that has historically been present in groundwater and surface water, but due to limitations of laboratory analytical methods, the State Water Board was not sure to what extent. Previously, laboratories were not able to detect perchlorate at very low concentrations. With laboratory analytical improvements, perchlorate can now be detected at much lower concentrations. Through this improvement in analytical methods, perchlorate was discovered to be more widespread in groundwater than previously thought.

There have been ongoing efforts to address the widespread contamination of perchlorate in groundwater. Monitoring for perchlorate was first required in the late 1990s, and in 2007, a perchlorate MCL of 6 ppb was adopted with a DLR of 4 ppb. As a result of DDW's periodic reviews of MCLs, DDW proposed establishing a lower DLR for perchlorate in 2020 which would enable the collection of additional occurrence data that would be needed to revise the current MCL, if appropriate. In October 2020, the State Water Board approved lowering the DLR to 2 ppb effective May 5, 2021, with a subsequent reduction of the DLR to 1 ppb effective January 1, 2024.

From May 2021 to December 2023, 496 active sources were reported to have detected perchlorate above the 2 ppm DLR. From January 2019 through April 2021, 209 active sources were reported to have detected perchlorate above 4 ppb. These results were found primarily in the counties of Los Angeles, Riverside, and San Bernardino. 123 sources had a detection greater than 6 ppb MCL between 2019 to 2023.[62]

3.3.2.2 Radiological Contaminants

Uranium

Uranium is naturally occurring radionuclide in soil and can be found in groundwater. Like other radioactive materials and radiation in general, high enough exposures can result in an elevated lifetime cancer risk. In 2006, regulations were updated for uranium, radium-226 and -228, gross alpha and gross beta particle activity, strontium-90, and tritium. Uranium and radium isotopes are the predominant radionuclides in drinking water and reflect the natural radioactivity that occurs in the soil. Uranium is mostly detected in groundwater in the foothill areas of the state where geology is associated with granitic formations. From 2019 through 2023, 3,119 active sources have been found to have uranium levels above the DLR.

[62] Perchlorate in Drinking Water:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Perchlorate.html

3.3.3 Organic Contaminants

1,2-Dibromo-3-Chloropropane (DBCP)

Though the agricultural use of the nematicide DBCP has not been allowed since the late 1970s, groundwater continues to be contaminated with DBCP, and water continues to need to be treated to remove this widespread contaminant. The concern about DBCP initially was sterilization of male workers, both in its manufacture and in its agricultural use, and it was subsequently found to pose a cancer risk. DBCP was detected from 2019 through 2023 at a level greater than the DLR in 435 sources primarily in counties of the Fresno, Kern, Madera, Merced, San Bernardino, San Joaquin, Stanislaus, Riverside and Tulare; it was detected at greater than the MCL in 57 of those sources.

Ethylene dibromide (EDB)

Ethylene dibromide (also known as 1,2-dibromoethane) is no longer in use as a pesticide. From 2019 through 2023, EDB was detected at concentrations above its DLR in 18 sources, and at concentrations greater than its MCL in six sources.

1,2,3-Trichloropropane (1,2,3-TCP)

In 1999, a 0.005-ppb notification level was established for 1,2,3-trichloropropane, based on cancer risks derived from laboratory animal studies. 1,2,3-TCP has had various industrial uses, and has been found to be present at hazardous waste sites. It is also associated with historic pesticide uses. The notification level for 1,2,3-TCP was established to address its presence at the Burbank Operable Unit, a Southern California Superfund hazardous waste site, and concerns that it might find its way into drinking water supplies. 1,2,3-TCP was also found in several drinking water wells at the same time, primarily in the San Joaquin Valley, reflecting its agricultural linkage.

Subsequently, in early 2000 water systems were required to monitor for 1,2,3-TCP and several hundred sources reported 1,2,3-TCP detections; the greatest number of sources were in the counties of Fresno, Kern, Los Angeles, Merced, Riverside, San Bernardino and Tulare. The State Water Board adopted a 0.005 ppb MCL for 1,2,3-TCP, effective December 2017.[63]

Monitoring results from 2019 through 2023 showed that 528 sources had two or more detections above 0.005 ppb, mostly in the counties of Fresno, Kern, and Tulare and 590 sources had at least a single detection above that concentration.

Trichloroethylene (TCE)

An industrial solvent, trichloroethylene (TCE) is a cancer risk. From 2019 through 2023, it was detected above its DLR in 382 sources, with nearly two-thirds of those detections occurring in sources in Los Angeles County. It was detected at levels above its MCL in 138 sources. TCE contamination is widely distributed throughout the state, often present in groundwater associated with hazardous waste sites. Where cleanup has not

[63] 1,2,3-Trichloropropane website:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/123TCP.html

been completed, it can spread laterally and vertically in contaminated groundwater basins. This is likely to continue because the cleanup of the groundwater contamination is very expensive, time-consuming, and technically challenging.

Tetrachloroethylene (PCE)

An industrial solvent, tetrachloroethylene is another contaminant that can pose a cancer risk. From 2019 through 2023, it was detected above its DLR in 490 sources, with over 50 percent of those detections occurring in Los Angeles County. It was detected above its MCL in 131 sources. PCE, like TCE, is often present in groundwater associated with hazardous waste sites. Because of its historic use in dry cleaners, there has been urban contamination of groundwater supplies by this contaminant.

Methyl tertiary butyl ether (MTBE)

In the 1990s, Methyl tertiary butyl ether was found to have contaminated groundwater and certain surface water sources that allow gasoline-powered watercraft. MTBE was used as a gasoline oxygenate. Leaks from underground gasoline storage tanks caused dozens of drinking water supplies to become contaminated; its use as a gasoline additive was eventually prohibited. California established a 5 ppb secondary MCL in 1999 to address its taste and odor, and a 13 ppb primary MCL was established in 2000 to address its potential carcinogenicity. To address MTBE contamination from leaking underground gasoline storage tanks, the Drinking Water Treatment and Research Fund was established (Health and Safety Code (HSC) section (§) 116367, Chapter 997, Statutes of 1998 (SB 2198)) to help affected water systems. This fund was accessible to effected water systems through 2006. Detections of MTBE have decreased significantly over the past decades, reflecting its cessation of use as a gasoline additive, as well as cleanup activities. From 2019 through 2023, 14 sources reported MTBE detections greater than the DLR, and five sources that exceeded the MCL.[64]

1,4-Dioxane

1,4-Dioxane has been used as a solvent and as a stabilizer for solvents like 1,1,1-trichloroethane (TCA), and in several industrial and commercial applications. In 1998, a drinking water notification level was established for 1,4-dioxane of 3 ppb, and in 2010 revised it downwards to 1 ppb to take into account revisions by USEPA of the cancer risk estimate, based on laboratory animal studies. From 2019-2023, 1,4-dioxane was detected at levels greater than its 1 ppb in 119 sources, mostly in Los Angeles County (94 sources) and Orange County (23). In early 2019, DDW requested a public health goal (PHG) from OEHHA. A PHG for 1,4-dioxane is needed before DDW can develop a proposal for a primary MCL.[65]

N-Nitrosodimethylamine (NDMA)

[64] MTBE: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MTBE.html

[65] 1, 4-Dioxane PHG (pending): https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/14-Dioxane.html

In 1998, N-Nitrosodimethylamine was found to be present in several drinking water wells due to industrial contamination. The discovery of NDMA in these drinking water wells prompted the establishment of a notification level of 0.01 ppb for NDMA as there were concerns regarding the contaminant's carcinogenic risk. In 2000, NDMA was discovered in monitoring wells associated with a groundwater recharge project in Orange County. NDMA was additionally discovered to be produced in water treatment which means the contaminant is a potential disinfection byproduct in certain water treatment situations. NDMA and other nitrosamines have been shown to cause cancer in laboratory animal testing (1956), therefore, it is important to limit exposure to NDMA in drinking water. In 2006, OEHHA published a final PHG for NDMA of 0.003 ppb. DDW will begin collecting data to assist in prioritizing a NDMA MCL in 2025. From 2019-2023, NDMA has been reported to be present at greater than 0.01 ppb in nine sources, all in Los Angeles and San Benito Counties.[66]

Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonic acid (PFOS)

Perfluorooctanoic acid and perfluorooctane sulfonic acid, also referred to as Per- and polyfluoroalkyl substances (PFAS) have been found to be drinking water contaminants. PFAS have been used extensively in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, and other materials (for example non-stick cookware) designed to be waterproof, stain-resistant or non-stick. In addition, they have been used in fire-retarding foam and various industrial processes. Six perfluorinated compounds, including PFOA and PFOS, were identified in 2012 by USEPA as unregulated contaminants requiring monitoring. In 2016, USEPA issued a 70-parts per trillion (ppt) lifetime health advisory for PFOA and PFOS in drinking water and advised water systems to notify their customers when the advisory level is exceeded, including information on increased health risks to susceptible populations.

Subsequently, in 2018, DDW established notification levels at concentrations of 14 ppt for PFOA (based on its liver toxicity, as well as cancer risk) and 13 ppt for PFOS (based on its immunotoxicity), on recommendations from OEHHA. In August 2019, DDW revised the notification levels to 6.5 ppt for PFOS and 5.1 ppt for PFOA. The single health advisory response level (for the combined values of PFOS and PFOA) remained at 70 ppt. On February 6, 2020, DDW issued updated drinking water response levels of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average.

Before PFOA and PFOS became regulated contaminants, DDW issued monitoring orders to investigate the prevalence in drinking water sources. Monitoring orders were first issued in 2019 for groundwater sources near airports which used aqueous film forming foam (AFFF) to extinguish fires, near landfills, and near Unregulated Contaminant Monitoring Rule (UCMR) detections. DDW issued additional monitoring orders with expanded requirements in 2020 and 2022 to water systems near sources with previous PFAS detections. The Budget Act of 2022 appropriated funds to test PFAS in water systems serving disadvantaged and severely disadvantaged communities. In March 2024, DDW initiated sample collection at no cost to these affected communities. On April 10, 2024, the USEPA announced the final National

[66] Nitrosamines: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NDMA.html

Primary Drinking Water Regulation (NPDWR) for six PFAS, establishing legally enforceable MCLs.[67] DDW will prioritize rulemaking for a PFAS MCL starting in 2025.

Based on the results of the 2019-2023 monitoring orders, PFOA has been detected at greater than 5.1 ppt in 572 sources and PFOS detected at greater than 6.5 ppt in 631 sources.

3.3.4 Constituents of Emerging Concern

Constituents of Emerging Concern (CECs) are substances that may be present in water supplies. Often, they occur in wastewater from industry or households and may reach surface water or groundwater supplies. These constituents include pharmaceuticals, personal care products, household products, hormones and others, as well as their breakdown products. Some are endocrine disrupting constituents, that may mimic the action of hormones, particularly female and male sex hormones. CECs have received considerable attention in the past decade owing to possible health concerns related to their presence in wastewater and in drinking water supplies.

As the state's population grows, the volume of treated wastewater from municipal sewage treatment plants can be expected to increase. Since no increase is anticipated in the volume of natural water supply from rainfall, the percentage of treated wastewater in the receiving water bodies (discharge-receiving water bodies) will likely increase. A point may be reached when the percentage of wastewater is high enough that the approval of the recipient stream as a source of drinking water will be questioned, especially if CECs are detected at higher concentrations. DDW, the Regional Water Boards and DWQ will continue to coordinate efforts to ensure that no losses of drinking water supplies occur as a result.

DWQ manages the State Water Boards CEC program including addressing the requirements of SB 230 (Chapter 676, Statutes of 2022).[68] Subject to funding availability, this bill requires that the State Water Board improve its knowledge of CECs in drinking water, with provisions for an expanded program, advisory panel, and special fund.

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[67] PFAS: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas.html

[68] Constituents of Emerging Concern (CECs): https://www.waterboards.ca.gov/water_issues/programs/cec/index.html

Microplastics, microbeads, and microfibers

In addition to concerns about the impact of plastics on the environment at large, very small particles of plastics and fibers are also being recognized as potential concerns in wastewater and subsequently in drinking water. As required by HSC § 116376 (SB 1422, Chapter 902, Statutes of 2018) the State Water Board defined microplastics in drinking water in 2020. The law required the State Water Board to adopt analytical methods for microplastics and accredit qualified laboratories in California by 2021. In compliance with this requirement, an analytical method for microplastics in drinking water was developed, and two laboratories are accredited to run the analyses. However, actual sampling techniques are onerous and relatively expensive resulting in delays to the four-year monitoring requirements. Once a reasonable sample collection protocol is developed, DDW will move forward with required monitoring from a select number of PWSs, and the establishment of advisory health levels (e.g., notification level), if appropriate. Analytical methods have been developed but monitoring from a select number of public water systems has not been initiated. Although microplastics raise potential concerns, there is a lack of information regarding related health effects and the nature of these effects, if any. More resources are needed to establish a reasonable sample protocol to assist systems with monitoring.

As a means of source water protection, it is appropriate to consider microplastics in the environment, particularly regarding their potential impact on water reuse projects, which will likely lead to increased attention to industrial source control activities. Since microplastics also result from domestic sources, a public education program focused on waste reduction would be appropriate to encourage the minimization of these materials into the domestic waste stream.[69]

3.3.5 Potential Contaminating Activities

3.3.5.1 Wastewater and Reuse Projects

Most wastewater treatment plants discharge treated wastewater into surface water bodies, such as rivers, or into groundwater. Wastewater treatment technologies and regulatory requirements have been developed to address health concerns regarding the use of drinking water supplies that receive such discharges and adequately protect public health. The Regional Water Boards limit such discharges for the protection of public health and the environment, through permits on wastewater treatment plants and through industrial source control limits on chemicals that are released into sewers for subsequent wastewater treatment.

Commensurate with population growth are increases in the volume of waste discharges from industries and municipal sewage. In the past, those discharges have been minor contributors to the drinking water supply (generally less than five percent in most supplies); however, the increase in population has increased the percentage of treated wastewater in drinking water supplies. With the advancement of potable reuse projects following recent adoption of the indirect and direct potable reuse regulations this

[69] Microplastics Drinking Water: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/microplastics.html

important alternative water supply will need to be coordinated at both the local and state levels.

Wastewater must be highly treated for use in direct or indirect potable reuse projects that supplement groundwater and surface water drinking water supplies. To assist in ensuring the availability of such wastewater, Regional Water Boards' industrial source control programs have a crucial role in protecting public health. By making sure that industrial and commercial operations comply with their allowable permitted releases and that they do not inadvertently or intentionally introduce new contaminants into their waste streams, the Regional Water Boards' regulatory activities can help reduce the uncertainties associated with the chemical inventory of wastewater.

When water supplies are not affected by wastewater or other human activities, the possibility for contamination is diminished. The water supply from Hetch Hetchy that San Francisco uses is an example of a relatively pristine surface water supply that is not required to be filtered. Pristine sources like Hetch Hetchy, however, are rare.

3.3.5.2 Water Security

Recent attention has been directed toward addressing threats to drinking water supplies, from the environment and from criminal or anti-government (terrorist) purposes. Chapter 11 (Emergency Management, Security, and Resiliency) addresses the unintentional and intentional disruption of water supplies, and the potential release of chemicals and other agents into public water supplies.

3.3.5.3 Other Threats to Surface Water Supplies

Algae and algal toxins: Some surface water sources are affected by algae and algal toxins that affect the quality of drinking water supplies and can also pose health risks. Poor mixing and circulation, high temperatures, and nutrients from runoff contribute to algal growth.

The public health concern about algal toxins, particularly cyanobacteria (blue-green algae) has been generally related to recreational exposures (swimming), although some cyanotoxin exposures have caused fish kills and deaths of pets and livestock. In coastal environments, marine algal toxins can affect the suitability of shellfish for harvest and consumption. In 2023, OEHHA provided DDW with an evaluation of health concerns about recreational exposures to such toxins and DDW is in the process of establishing notification and response levels for the four cyanotoxins cylindrospermopsin, anatoxin, saxitoxin and microcystin and completing the laboratory method development for saxitoxin.

For drinking water supplies, the likelihood of exposure to algal toxins is low, since most public water systems strive to minimize algal growth to meet drinking water standards that address taste and odor, and to avoid problems of consumers finding their water unacceptable for use. Nonetheless, drought and the effects of climate change increase the likelihood of cyanobacteria blooms and the threat of their toxins to surface water bodies used to supply drinking water.

In 2011, USEPA added cyanotoxins (anatoxin-a, microcystin-LR, and cylindrospermopsin were specifically mentioned) to its Candidate Contaminants List 3

(CCL3).[70] Their presence on CCL3 indicates a need for additional information on occurrence in drinking water supplies and their potential to cause adverse health effects. USEPA listed cyanotoxins in CCL4 in 2016, adding that the group includes, but is not limited to, the three mentioned above plus saxitoxin.[71] In 2015, USEPA developed advisory levels for certain cyanotoxins to address their potential neurotoxic and other adverse health effects.[72]

In 2016, ten cyanotoxins were added the Fourth Unregulated Contaminant Monitoring Rule.[73] In 2021, DDW initiated the process to establish notification and response levels for four cyanotoxins. DDW has continued to validate related analytical methods and plans to propose the revised levels in 2025. More information is available on the following websites:

- State Water Board's website on cyanobacteria and cyanotoxins in drinking water: https://www.waterboards.ca.gov/drinking_water/programs/habs/
- California's My Water Quality website on Harmful Algal Blooms: https://mywaterquality.ca.gov/habs/

Invasive Fish Eradication Projects: In 2007, the Department of Fish and Game (now the Department of Fish and Wildlife) Northern Pike Eradication Program for Lake Davis used the pesticide rotenone in a drinking water supply to kill the invasive species. The local community was concerned about the potential health effects that the poison would have, as Lake Davis was a source of drinking water supply for them. Subsequent extensive monitoring of the pesticide and its degradation products in water and sediment samples was required until levels were below detectability. Legislation to amend HSC §11675 was also adopted, which prohibited the Department of Fish and Wildlife from introducing poison to a drinking water supply for purposes of fisheries management unless the State Water Board determines that the activity will not have a permanent adverse impact on the quality of the drinking water supply or wells connected to the drinking water supply.

Accidental Releases: Surface water sources can also be subject to accidents involving chemical releases. An example is the 1991 railroad accident at the Cantara Loop on the Sacramento River that resulted in the release of thousands of gallons of the fumigant pesticide metam sodium from a tank car into the Sacramento River and the contamination of the river and Shasta Lake. This spill not only threatened drinking water supplies but resulted in concerns about the public health and ecological effects of chemical exposures. These types of accidental releases typically involve emergency response management with reporting as described in Chapter 11, and when a drinking

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[70] Contaminant Candidate List 3 - CCL 3: https://www.epa.gov/ccl/contaminant-candidate-list-3-ccl-3

[71] CCL 4 Chemical Contaminants | US EPA: https://www.epa.gov/ccl/ccl-4-chemical-contaminants

[72] Drinking Water Health Advisory Documents for Cyanobacterial Toxins | US EPA: https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisory-documents-cyanobacterial-toxins

[73] Fourth Unregulated Contaminant Monitoring Rule: https://www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule

water supply may be affected, the PWS and DDW are contacted to ensure a public health protective response.

Industrial Releases: Groundwater contamination by industrial and agricultural activities is well known. In addition to examples discussed above, surface water contamination of the Colorado River by perchlorate was discovered in 1997, the result of groundwater contamination at a perchlorate manufacturing facility in Nevada, which came to the surface via the Las Vegas Wash to the Colorado River. This contamination was significant to California not only because the Colorado River provides drinking water to many Southern Californians, but also because Colorado River water is used to recharge groundwater supplies.

3.3.5.4 Other Threats to Groundwater Supplies

Natural Geologic Formations: The geology of the state contributes to several contaminants in drinking water supplies. Chemicals such as arsenic, manganese, chromium (particularly hexavalent chromium), cadmium, and radionuclides like uranium are examples of regulated chemicals that have natural origins. Unregulated contaminants of natural origin, for which the State Water Board has established notification levels include boron and vanadium.

Industrial and Agricultural Activities: Groundwater contamination has occurred historically in industrial and agricultural areas throughout the state and has resulted in widespread groundwater contamination, as has been described previously.

Hydraulic Fracturing: Various oil and natural gas well stimulation techniques including hydraulic fracturing (or "fracking") are used in California to increase oil and natural gas production from "tight" (low permeability) geological formations such as diatomite or shale. Hydraulic fracturing permits have not been issued in California since 2021. Governor Newsom directed the Geologic Energy Management Division (CalGEM) to phase out issuance of new fracking permits effective October 2024, which should help reduce the potential impact on drinking water supplies from new fracking operations.[74]

Concerns have been raised at both the state and national level regarding the potential for groundwater contamination from hydraulic fracturing and other well stimulation activities. These concerns relate to the quantities of water and chemicals used to fracture the geologic formations that release oil and natural gas and the potential for this activity to contaminate groundwater resources. Although most oil and gas production zones are in deep geological formations, injected fluids could impact groundwater resources that have beneficial use, such as drinking water supply, because of improperly constructed wells or fractures that create a conduit to the groundwater. As a result, source water assessments and protection programs should include the possible impacts related to fracking or other well stimulating activities.

In 2015, to assess the potential effects of well stimulation treatments such as hydraulic fracturing pursuant to Chapter 313, Statutes of 2013 (SB 4), the State Water Board adopted model groundwater monitoring criteria to prioritize monitoring of groundwater in

[74] CalGEM: https://www.conservation.ca.gov/calgem/Pages/Well-Stim-National-Lab-Scientific-Review.aspx

areas of oil and gas well stimulation that is or has the potential to be a source of drinking water or otherwise designated for any beneficial use.[75] The State Water Board has also collaborated with the USGS to implement the Regional Groundwater Monitoring Program. Since 2015, the USGS has collected data from oilfields located in Kern, Santa Barbara, Ventura, and Los Angeles Counties. More information is available on the State Water Board Oil and Gas Monitoring Program website[76] and USGS California Oil, Gas, and Groundwater (COGG) website.[77]

3.3.6 Addressing Threats to Drinking Water Supplies

3.3.6.1 Source Water Assessment and Protection Programs

The 1996 reauthorization of the federal SDWA included a requirement for states to assess all groundwater and surface water sources, and DDW has carried out a Drinking Water Source Assessment and Protection (DWSAP) Program since 2000. A source water assessment is an inventory of possible contaminating activities that may threaten the quality of the source. If possible contaminating activities present a threat to the source, water systems are encouraged to protect their water sources from contamination through the establishment and implementation of a source water protection program. The results of the source water assessment must be included in the water system's annual Consumer Confidence Report. Any new drinking water sources must include an assessment as part of DDW's permit process. DWSAP is also discussed in Chapter 5. For more information, see the State Water Board's website on DWSAP.[78]

Since the transfer of DDW to the State Water Board in 2014, the ongoing integration of surface water and groundwater protection efforts to protect drinking water supplies have included:

1. Regional Water Boards' greater emphasis on drinking water source water protection through salt and nutrient management planning and regulation and enforcement of nitrate discharges from agriculture and dairies.
2. State Water Board's GAMA Program and online mapping tools and databases.
3. Regional Water Boards' Irrigated Lands Regulatory Programs to monitor groundwater to characterize potential impacts to drinking water supplies.
4. State Water Board integration of DDW's drinking water monitoring data to improve source water protection efforts. For example, DDW has used public water system well location information to identify wells that are vulnerable to contamination from wastewater injection wells used by the oil and gas exploration industry.

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[75] Chapter 313, Statutes of 2013, (SB 4): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB4 (California Water Code section 10783)

[76] Oil & Gas Monitoring (SB 4): https://www.waterboards.ca.gov/water_issues/programs/groundwater/sb4/

[77] California Water Science Center COGG: https://webapps.usgs.gov/cogg/

[78] Drinking Water Source Assessment and Protection (DWSAP) Program: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/DWSAP.html

3.3.6.2 Limits on Industrial Releases and Restoration of Drinking Water Supplies

Due to the widespread contamination of several groundwater basins, the State Water Boards have been diligent in controlling discharges of waste to prevent further contamination of groundwater basins. The regulation of wastewater discharges from larger facilities into surface water supplies includes requirements for industrial source control, whereby industries must limit chemical releases into wastewater collection systems. Additionally, many State Water Board programs are actively identifying and addressing historic industrial and illegal discharges that have contributed to groundwater basin contamination.[79] Identification and cleanup of these illegal discharges will contribute to groundwater restoration in the long term.

The State Water Boards' Division of Financial Assistance (DFA) cleanup programs serve to restore beneficial groundwater uses and prevent further impacts on groundwater basins used for drinking water. DFA's cleanup programs include the Site Cleanup, Department of Defense, and Underground Storage Tank Cleanup Programs, and other funding programs, which fund, regulate, and oversee the investigation and cleanup of sites where recent or historical unauthorized releases of pollutants to the environment, including soil, groundwater, surface water, and sediment, have occurred. These sites have already impacted drinking water supplies or have the potential to. Sites in the programs are varied and include, but are not limited to, pesticide and fertilizer facilities, railyards, ports, equipment supply facilities, metals facilities, industrial manufacturing and maintenance sites, dry cleaners, gasoline stations, bulk transfer facilities, refineries, and brownfields. Numerous pollutants are encountered at the sites including solvents, pesticides, heavy metals, and fuel constituents.

3.3.6.3 Limits on Household Chemical Releases into Drinking Water Supplies

Household hazardous substances, personal care products, sanitary and laundry releases, and prescription pharmaceuticals are examples of materials that can be discharged into wastewater collection systems and subsequently discharged into surface water bodies and includes CECs and microplastics discussed above.

Regional Water Boards cannot feasibly require or enforce source control or household discharges. However, some progress has been made in limiting the presence of pharmaceuticals released from households into wastewater and subsequently into water used for drinking. Several communities have instituted public education programs or other programs to collect unused drugs and keep them from being flushed down the toilet. For example, Alameda County passed an ordinance in July 2012 requiring drug manufacturers and producers that sell, offer for sale, or distribute certain prescription drugs in the county to participate in a program that includes a process for the collection and disposal of unwanted products from residential prescription drug consumers. Similar public education initiatives will be required to improve user awareness and practice.

[79] Groundwater - Protecting Groundwater: https://www.waterboards.ca.gov/water_issues/programs/groundwater/protecting_gw.html

3.3.6.4 Requirements for Reducing Nitrate Contamination in Groundwater and Surface Water

In February 2018, the State Water Board adopted Order WQ 2018-0002 revising agricultural requirements for the Eastern San Joaquin River Watershed to reduce nitrate contamination of groundwater and surface water. The order protects communities that rely on groundwater for drinking water supply. It establishes a model for all nine Regional Water Boards to follow in their subsequent orders to reduce pollutants for irrigated agriculture around the state. The order directs the Regional Water Boards to revise their agricultural orders to incorporate testing of drinking water quality for on-farm wells, and to address the long-term goal of improving groundwater and surface water quality through monitoring and controlling agricultural practices, specifically nitrogen management. It requires reporting of nitrogen application to crops from fertilizers, organic soil amendments and in irrigation water as well as data on nitrogen removed when crops are harvested and taken from the fields. The State Water Board 2013 report contains additional information and recommendations regarding nitrate related initiatives.[80]

3.3.7 Threats Related to Drinking Water System Operations

Below is a discussion on specific threats to drinking water system operations. As discussed in Chapter 11 on emergency preparedness and response it remains a critical duty and challenge for water systems to actively prepare to respond to disruptions in normal system operations both from a technical standpoint but also to do so while communicating with customers in ways that are as actionable and transparent as possible. Data collection, websites, and online dashboards have been developed to provide updated information to customers as both planned and unplanned water system operation outages are addressed. Communications through these types of methods support customers' trust and confidence in deciding how to respond to operational challenges at a household level.

3.3.7.1 Lead and Copper

Lead exposure can result in neurological, reproductive, and developmental effects. Copper is an essential nutrient, but at elevated levels can result in gastrointestinal distress. The source of most lead and copper in water supplies tends to be pipes, fixtures, and associated hardware from which lead can leach that are part of the premise plumbing. Premise plumbing is defined as the portion of a water system, including both hot and cold water, various devices (e.g., hot water heater, HVAC humidifier), fixtures (e.g., showers, faucets), and drains (e.g., sinks, toilets) connected to the water system's main distribution system via service lines or laterals (most typically a connection to residences, schools, or businesses). In 1991, USEPA adopted the Lead and Copper Rule (LCR). The LCR changed the approach to regulating lead and copper in drinking water to regulatory action levels, for which compliance is measured at the water taps of customers and determined by statistical measures. Because the most likely sources of lead and copper exposure are associated with water distribution systems or premise plumbing, this approach is reasonable for the protection of public

[80] Nitrate Project: https://www.waterboards.ca.gov/water_issues/programs/nitrate_project

health. In addition, there have been other changes in the production of plumbing fixtures to reduce the presence of lead and to minimize its leaching into water (for example, from changes in the Building Code and from enforcement actions resulting from the Safe Drinking Water and Toxic Enforcement Act of 1986, Proposition 65, and the 2010 California law (HSC §116875) that further reduced the maximum allowed lead content in “lead free” pipes and pipe fittings, plumbing fittings, or fixtures).

Since the 2015 Safe Drinking Water Plan, there has been considerable attention given to lead in drinking water. Much of the concern resulted from the experience of Flint, Michigan—in which a change in water supply in 2014, without attention to the change in the new water supply’s corrosiveness, and inadequate water treatment—resulted in considerable release of lead from the lead pipes in the community, and high level of lead exposures to water consumers.

Although current law prohibits the use of any pipe, pipe fittings, or other related plumbing materials that are not lead-free in the installation or repair of public water system or a facility providing drinking water, there may nonetheless be instances when lead materials exist in pipes and associated materials, particularly in older systems. California has taken several actions, prompted by the Flint, Michigan experience:

- Chapter 746, Statutes of 2017, (AB 746), (HSC § 116277) required testing to be done at all K-12 public schools that were constructed before January 1, 2010. Testing via this program was completed in 2020.[81]
- Chapter 676, Statutes of 2018, (AB 2370), (HSC § 1596.7996, et seq.) required drinking water testing by each licensed child care center that is in a building constructed prior to January 1, 2010. Testing was to be completed no later than January 1, 2023, and every five years after the initial sampling date. AB 2370 also includes posting and notification requirements, as well as steps to be taken if lead levels are elevated (specifically cease use and obtain potable water). The bill required that the State Water Board make all test results readily available via public web portal, which is updated monthly.[82]
- Community water systems were required to provide an inventory of known partial or total lead user service lines in their distribution system, as well as those with unidentified materials used in construction (Chapter 731, Statutes of 2016 (SB 1398) and Chapter 238, Statutes of 2017 (SB 427)). The inventory was to be completed by July 1, 2018.[83]
- Community water systems were required to compile an inventory of known service line materials and provide a timeline for replacement of known lead user service lines, as well as those with unidentified materials as part of their

[81] Lead Sampling of Drinking Water in California Schools: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/leadsamplinginschools.html

[82] Childcare Center Lead Sampling Program: https://www.waterboards.ca.gov/drinking_water/programs/lsicc/

[83] Health and Safety Code section 116885 User Service Line Inventory: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/lead_service_line_inventory_pws.html

Electronic Annual Report (eAR) between 2017 and 2020. The timeline had a completion date of July 1, 2020. The State Water Board tracks this program[84] and collects data on lead service line inventories.[85]

- In 2021, the USEPA revised the LCR via the LCR Revisions and LCR Improvements (LCRR and LCRI, respectively). DDW created a new unit to address the new requirements and has begun coordinating the submissions needed from PWSs. Required testing at schools and childcare will start in 2027. For more details including timelines see the State Water Board's website on the LCR[86] and the EPA's factsheet on the LCR.[87]
- In 2022, DDW proposed lowering the DLR for lead and other metals[88] to collect more sensitive data to improve understanding of occurrence, health risk, and technological feasibility in consideration of revised standards.

3.3.7.2 Disinfection and Disinfection Byproducts (DBPs)

With very few exceptions, all surface waters must be filtered and disinfected to address the microorganisms present in surface waters to make it safe for drinking. Water treatment processes are discussed further in Chapter 7. For surface water supplies, microorganisms and disinfection byproducts (DBPs) have been and continue to be contaminants that must be dealt with by public water systems.

Disinfection is the most important barrier to the spread of the acute threat of infectious disease from waterborne pathogens. Historically chlorine was the disinfectant of choice for surface water sources. However, in the 1970s it was discovered that chlorine reacts with natural organic matter to form DBPs that have potential long-term health effects. Surface water contains natural organic compounds from vegetation present in water supplies or from algae that may grow in sun-lit water. To prevent the formation of DBPs, water systems must take steps to reduce organic material in surface water sources, control water age, and/or adjust the method or chemicals used for disinfection.

Since 1989, USEPA promulgated several regulations that apply to certain public water systems that use surface water. These regulations were all subsequently adopted by the state and include the Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term (LT) 1 Surface Water Treatment Rule (LT1SWTR), LT 2 Surface Water Treatment Rule (LT2SWTR), and the Filter Backwash Recycling Rule. In 1995, the *Cryptosporidium* Plan was released to address risks associated with this parasite. Subsequently, regulations for *Cryptosporidium* and

[84] Health and Safety Code section 116885 User Service Line Inventory: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/lead_service_line_inventory_pws.html

[85] Initial Lead Service Line Inventory: https://lslinventory.waterboards.ca.gov/

[86] Lead and Copper Rule (LCR) for Drinking Water: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/lead-copper-rule/

[87] EPA's Final Lead and Copper Rule Improvements Technical Fact Sheet: https://www.epa.gov/system/files/documents/2024-10/final_lcri_fact-sheet_schools-and-child-care.pdf

[88] Metal DLRs: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/swrcbddw21-001-metal.html

Giardia were included in the surface water treatment rules mentioned above. Additional requirements and regulations to minimize the presence of DBP have been put into place, including the Stage 1 Disinfection and Disinfection Byproducts Rule in 1998 and the Stage 2 Disinfection and Disinfection Byproducts Rule in 2006.

NDMA is currently unregulated, though it and other nitrosamines have notification levels. It has been found to result from water chlorination and can be present in drinking water and in wastewater. Accordingly, NDMA can be considered a disinfection byproduct and can be of concern for drinking water and for wastewater that is destined for use in a recycled water project involving the augmentation of drinking water supplies.

3.3.7.3 Distribution Systems

Public water system distribution systems consist of pipes, pumps, storage facilities, and other appurtenances to distribute drinking water to customer homes and businesses. Operation and maintenance of the distribution system is critical to meet a community's regular demands for water, including during natural disasters such as earthquakes, floods, or fires.

Adequate storage facilities and standby power helps water systems prepare and respond to disasters and planned outages.[89] Some water systems have made efforts to prepare for such disasters, but most water systems, especially small water systems, do not. Recently, mutual aid organizations have been formed by some small water systems that need access to an inventory of standby equipment.

Based on the USEPA's 2023 Infrastructure Needs Survey and Assessment, the estimated cost to replace aging distribution systems is over $55.7 billion.[90]

In the 2020 Plan, it was noted some water systems had uncovered distribution reservoirs, which are susceptible to contamination of treated water from DBP formation, runoff and airborne contaminants, and vandalism. These sources were not acceptable according to the 2008 regulations or the "California Waterworks Standards." Nor did they meet subsequent USEPA requirements for open distribution reservoirs. Of the three reservoirs that were uncovered as of late 2020 and still in use, one completed installation of ultraviolet and chlorine disinfection treatment at the reservoir outlet in 2024, one was removed from service in 2024 and the last is pending removal after consolidation with another system in the next several years.

Most water systems use storage reservoirs to handle short-term emergencies, as well as hourly, daily, and seasonal fluctuations in water demands. During periods of low water demand, especially during the winter months or due to increased conservation, water can be stored in the reservoirs for several days and, in some cases, weeks. This can cause the water to become stale. If the water system uses chloramines for disinfection, the stale water could result in the breakdown of chloramines, through nitrification. This loss of disinfectant residual leads to bacteriological problems in water

[89] Public Safety Power Shutoff and Wildfire Information: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pspswildfire.html
[90] Infrastructure Needs Survey and Assessment: https://www.epa.gov/system/files/documents/2023-09/Seventh%20DWINSA_September2023_Final.pdf

quality and may increase the opportunity for DBP formation if subsequent disinfection is required.

Water pipes are subject to contamination if the pipes develop leaks, such as through deterioration or damage during construction related activities. Depending on the water pressure, the openings in the pipe may allow contaminants in the surrounding soil to seep in and contaminate water inside the pipe. In addition, during repairs water could become contaminated if proper procedures are not carefully followed. Adequate disinfection is necessary after repairs to ensure water in the pipe is safe for drinking.

Although much is known about disinfection techniques necessary to mitigate microbial contamination, additional research on the potential health impacts of microbes, such as Legionella, within the distribution system and premise plumbing is needed.

Water pipes in the distribution systems are also subject to contamination from source water quality deposits over time. For example, sources with elevated levels of manganese will deposit manganese in the distribution pipes, which can be released when hydraulic or chemical changes occur. Elevated levels of manganese cause the water to appear brown and as mentioned above, recent studies have indicated there are also potential health concerns associated with manganese. Most monitoring occurs at the source and the full extent of water quality in the distribution system is unknown. DDW will investigate this phenomenon and develop monitoring strategies to mitigate potential health risks.

Besides the potential for contaminants entering the distribution through leaking pipes, the loss of water from leaking pipes is also of concern. Water system operators must be aware of water losses and address them to ensure an adequate supply for their customers. The State Water Board's Water Loss Control Portal[91] has access to information about the development of water loss performance standards and other related information.

Water loss can be more easily determined when meters exist at the service connections. Annually public water systems submit a report that quantifies the number of metered and unmetered service connections; however, there are still several systems that have not reported meter data to DDW. Currently only systems with greater than 10,000 service connections are required to install meters at service connections. Based on the information from the DDW database, on average, large systems are more likely to have meters at service connections. Based on 2024 eAR data, approximately 99 percent of systems serving more than 10,000 service connections are metered. Most of these systems are fully metered, while approximately six percent have at least one unmetered connection remaining in their service area. Forty percent of systems serving fewer than 200 service connections are metered, with roughly half of those systems between 1-5 metered connections. Meters allow water systems to gather information to improve system management.

It is essential to maintain a disinfectant residual in the distribution system to control microbial growth inside distribution system piping and reservoirs. As normal disinfection

[91] Water Loss Control Portal: https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/water_loss_control.html

processes do not sterilize water, there will still be some microbiological organisms present in the water supply that can be controlled by the disinfectant residual. In addition, a disinfectant residual will prevent contamination that may occur if microbiological organisms are introduced into the distribution system via improper connections, leaks, vents, or other openings.

Connections can be made that expose the distribution system to contaminants or pollutants that may cause the water supply to be unsafe for drinking. These “cross-connection” occur when a connection is made between the drinking water and another source of water that is not safe. An example of a cross-connection is when a container of a chemical is connected to drinking water through a pipe or a hose. If the drinking water system loses pressure or a vacuum occurs, the chemical can be sucked into the drinking water system. Another example is when the homeowner leaves a garden hose flowing and submerged in a pond or pool of water. If the drinking water system experiences a loss of pressure or a vacuum is created (as during a main break or excessive demand such as firefighting scenarios), the water in the pond or pool can be sucked into the drinking water system. To prevent such events, California requires every water system to have a cross-connection control program, including an ordinance or rules of service. DDW adopted the Cross-Connection Control Policy Handbook effective July 1, 2024.[92]

Water system owners and operators must be diligent in inspecting and monitoring their facilities on a frequent basis. At any time, the facilities may be targets of vandals or terrorists. Several acts of vandalism and/or terrorism have occurred in California. Several water systems inspect their facilities more than once a day. Many systems have installed cameras and intrusion alarm systems.

3.3.7.4 Wildfires and Resulting Distribution System and Source Water Contamination

Wildfires can cause large-scale physical damage and deplete water supplies when buildings and distribution system infrastructure are damaged. They also create opportunities for contamination to enter drinking water pipelines. In 2017, a new type of contamination was discovered following wildfire in Santa Rosa, where benzene and other volatile organic compounds (VOCs) were found in water distribution pipelines. While VOC contamination is a rare event, it has since been identified in multiple water systems across California. The primary pathways for VOC contamination include combustion byproducts entering low-pressure or depressurized drinking water pipelines, and the release of VOCs from heated plastic and synthetic materials.

As wildfires grow in intensity and frequency, the risk of contamination in drinking water systems is expected to increase, posing a growing concern for public health and water safety. In January 2025, major wildfires caused significant damage in Los Angeles, prompting water systems to implement remediation efforts, including testing for VOC contamination.

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[92] Cross-Connection Control Policy Handbook:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/cccph.html

While VOC contamination does not occur after every wildfire, specific conditions must align for it to happen. Previous wildfire events have shown that most VOC detections were found in small-diameter service laterals, with only a small percentage of small water mains showing low-level detections. Most detections occur in service laterals and have ranged from barely detectable to tens of times greater than the California MCL for benzene (the California MCL for benzene is 1 microgram per liter (µg/L), while the federal MCL is 5 µg/L). In a few extreme cases, benzene has been detected at levels hundreds to thousands of times the MCL. While other VOCs have been detected, benzene has served as an indicator for this type of contamination because of its relative abundance and comparatively low MCL. Other VOCs appear present either with benzene or below their respective MCL. Remediation measures involve extensive flushing and replacement of affected infrastructure. Remediation can take anywhere from weeks to several months to remediate in full, depending on the extent of damage. As wildland-urban interfacing wildfires continue to increase in severity and size, this type of distribution system contamination is expected to occur routinely.

Wildfires can also significantly impact water quality for both surface and groundwater. Loss of vegetation leaves soil exposed and increases erosion and runoff. Runoff can then carry soil, sediment, and pollutants into waterways, creating challenges for water treatment. Debris flow and flash floods become more common after wildfires due to the increased erosion. This is typically more common in areas with steep slopes. In the long term, loss of vegetation can reduce the infiltration of water into soil, potentially decreasing groundwater replenishment and the availability of water supply. Wildfires may alter hydrological processes, changing streamflow patterns and baseflow. The effects of wildfire on water quality can persist well beyond the fire itself, sometimes lasting for years.

DDW provides technical assistance to guide impacted water systems during wildfire recovery processes. DDW has created guidance for water systems that have been impacted by large wildfires. Additionally, public notice templates have been developed to be used when needed. The State Water Board actively researches VOC contamination and continues to implement its findings. Recently, the passing of AB 541 (Chapter 530, Statutes of 2023) includes certain monitoring requirements for water systems following wildfires (see Appendix 9). A 2021 University of California Wildfire and Water Supply[93] report and Chapter 11 can be referenced for additional discussion regarding wildfire and emergency response.

3.3.7.5 Operation and Maintenance

Good operation and ongoing maintenance of water systems are critical components of providing drinking water that meets primary and secondary drinking water standards. Some shortfalls in operations and maintenance can be attributed to a scarcity of funds. Other problems that occur in water systems result from operator errors. These are caused by poor or no training, improper standard operating procedures and policies, inadequate staffing, or lack of proper guidance from supervisors.

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[93] Wildfire and Water Supply: https://innovation.luskin.ucla.edu/wp-content/uploads/2021/12/Wildfire-and-Water-Supply-in-California.pdf

To address these issues, in 2001 USEPA required states to establish certification programs for operators of water treatment and water distribution facilities. While California has long had a water treatment certification program, it did not previously certify or require certified distribution operators. The State Water Board now has a comprehensive program, funded by application and renewal fees, to certify treatment and distribution operators.[94] Over the past decade the number of operators has grown significantly from about 23,000 to 35,000 active certified operators.

Small economically disadvantaged water systems have greater difficulty in obtaining and keeping certified operators because larger water systems can afford dedicated full-time staff with higher salaries, and many small water systems are in isolated rural areas where the availability of certified operators is limited. In the past, USEPA provided one-time federal funds through the Expense Reimbursement Grant Fund to pay for classes and certification for small water systems operators; however, these funds have been exhausted. Methods were investigated to continue this program with set-aside funds from DWSRF, but that approach was hampered by the state's contracting and fiscal requirements.

Historically, the availability of classes also depends on location. In rural areas, especially in Northern California, there is generally a lack of classes that an operator can attend in person. However, the recent increase in virtual training should help address this issue. Nonetheless, many small water systems will continue to be challenged to cover such training and certification costs.

3.4 CONCLUSIONS AND RECOMMENDATIONS

3.4.1 Conclusions

More than 98 percent of the population served by public water systems receives drinking water that meets federal and state drinking water standards. Chemical, radiological, and microbiological contaminants are effectively removed through treatment.

Small water systems, as discussed in Chapter 4, are more likely than larger systems to be out of compliance with drinking water standards. They are also more likely to be out of compliance with reporting requirements and with their permit provisions. This is generally due to their inability to meet minimum technical, managerial, or financial (TMF) capacity requirements and is closely linked to economies of scale (Chapters 8 and 9).

In addition, consumers of drinking water from state small water systems, transient non-community systems or individual well owners do not receive the public health benefits associated with extensive monitoring and compliance requirements. Further, state small water systems and private well owners often rely on shallow aquifers which are prone to poorer water quality than deeper aquifers accessed by larger more economically sustainable systems.

With the SAFER program, the State Water Board has begun addressing the needs of

[94] Drinking Water Treatment and Distribution System Operators: https://www.waterboards.ca.gov/drinking_water/certlic/occupations/DWopcert.html

residents who are not served by public water systems. The State Water Board is committed to pursuing solutions to ensure that all Californian's receive affordable, safe, and reliable drinking water and will continue to partner with local agencies to ensure this goal is achieved.

In the past several decades, many new contaminants have been identified, the majority of which have been effectively regulated or are in the process of being regulated. Monitoring certain unregulated contaminants (Appendix 4) has provided information on the extent of their presence in drinking water supplies. Some CECs will continue to be considered for regulatory action; although, because of their low concentrations in drinking water sources, it is unclear whether these pose a health risk. Water quality monitoring for the many emerging and regulated contaminants has become costly, which has resulted in an economic burden on many small water systems, which impacts their ability to sustainably comply with the SDWA.

California depends on a combination of surface water and groundwater to meet its drinking water needs. Pollution threats such as wastewater discharges and agricultural practices can impact the quality of these sources. Fortunately, strong regulatory efforts along with greater emphasis on drinking water source protection activities have lessened the impact from these threats. However, with California’s increasing population and the effects of climate change on water resource reliability, new sources of drinking water will be needed. Sources derived from high-quality recycled wastewater and desalination will likely become prevalent and present new challenges and benefits.

The operation and maintenance of water systems has a significant impact on the quality of drinking water delivered to the public. Larger water systems have the TMF capacity to operate sophisticated treatment facilities and to provide for a well-trained and technically competent workforce of system operators. Small water systems, however, particularly those that require treatment facilities, have a difficult time paying the operating costs, acquiring, retaining and properly training certified operators with the expertise to operate such facilities.

3.4.2 Recommendations

3-1 Improve the means for large water systems to assist small systems with technical, managerial and financial expertise to operate and maintain the small water systems.

3-2 Support operator education opportunities, particularly for small water system operators, including increased outreach to recruit new operators through high schools, veterans’ affairs groups, by providing internships, and other training initiatives.

3-3 Ensure vulnerable water systems, particularly those that rely on a single groundwater source, move toward sustainability through consolidation or enhanced management and financial capacity to maintain adequate rate structures for redundant source capacity development.

3-4 Require county health agencies to conduct initial sanitary surveys of state small water systems with repeat inspections every five years. Require state small water systems to provide annual Consumer Confidence Reports to systems’ consumers.

3-5 Require state small water systems to follow bacteriological standards, like title 22 of the California Code of Regulations (CCR), beginning at section 64423.

3-6 Require state small water systems and transient non-community water systems to monitor for nitrate/nitrite, perchlorate and other inorganic chemicals, radionuclides and organic chemical contaminants, like title 22 of the CCR, including sections 64432, 64442, and 64444.

3-7 Require all public water systems, including state small water systems, to install water meters on all service connections.

3-8 Require at least quarterly monitoring and reporting of static and pumping water levels and flow rates by public water systems and state small water systems. The monitoring should be submitted to the State Water Board on a schedule developed that is proportionate to the (drought) risk level.

3-9 Support State Water Board's continued investigation into prevalence, and the development of related analytical methods, data collection efforts, and treatment requirements for CECs including PFAS, manganese, microplastics, and other unregulated contaminates, as well as regulatory improvement of currently regulated contaminates.

3-10 Support continued improvements to the source water assessment and protection programs to address CECs and other contamination described herein as well as opportunities to improve public education regarding source protection at the customer level.

3-11 For property not served by public water systems, such as those reliant upon domestic well or state small public water system, require testing and disclosure of water quality compliance with state primary drinking water standards prior to the sale of real property or issuing of a building permit.

CHAPTER 4 QUALITY OF CALIFORNIA'S DRINKING WATER SUPPLY AND WATER QUALITY ISSUES AFFECTING PWS SERVING FEWER THAN 10,000 SERVICE CONNECTIONS

4.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses water quality issues affecting all public water systems but focuses on systems serving fewer than 10,000 service connections. Table 4-1 below shows total populations served by various types of public and non-public water systems and separates community water systems into different size categories. The table also includes communities served by non-regulated water systems to represent all Californians.

Ninety-seven percent of California public water systems (PWSs) serve less than 10,000 service connections (non-community systems typically have few connections). An estimated four percent of the State's population is served by state small water systems or domestic wells, which are not regulated PWSs and are not discussed in this chapter.

Table 4-1: Number and Population of Water Systems (November 2024)

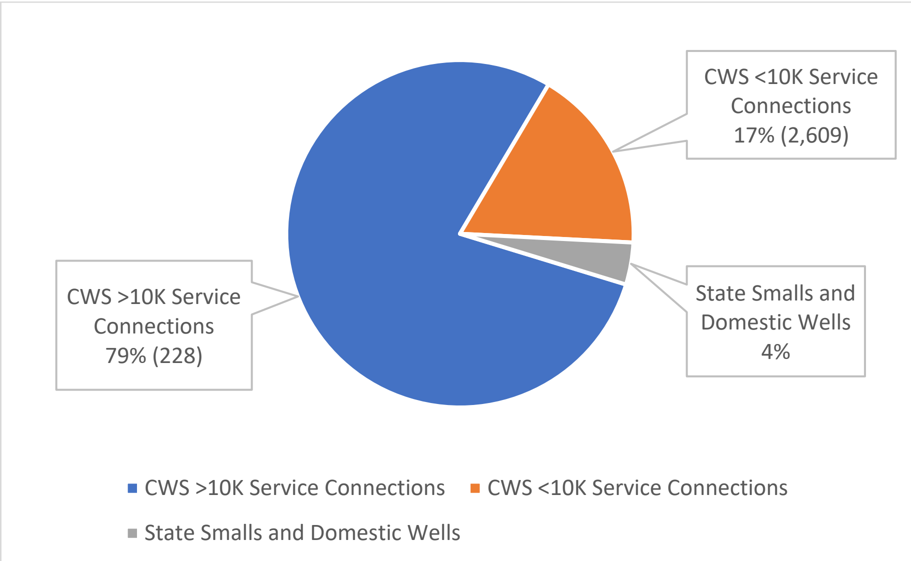
System Type / Size	Number of Systems	Estimated Population Served
Community Water Systems (CWS) with 10,000 or more service connections (SC)	228	32,553,461
CWS with 3,300 to 9,999 SC	183	4,092,788
CWS with 1,000 to 3,299 SC	261	1,772,048
CWS with 500 to 999 SC	140	334,064
CWS with 100 to 499 SC	596	534,059
CWS with 25 to 99 SC	924	198,095
CWS with fewer than 25 SC	505	208,656
Non-Transient Non-Community (NTNC)	1,470	1,163,864
Transient Non-Community (TNC)	2,958	1,121,210
PWS Total[95]	**7,265**	**41,978,245**
Community Water Systems	*2,837*	*39,693,171*
State Small Water Systems (SSWS)	*1,200*	*18,000*
Domestic Wells (DW)	*~300,000*	*1,600,000*
CA Total Population[96] *(CWS+SSWS+DW)*	-	*41,311,171*

[95] PWS Total does not include the estimated 1.6 million Californians served by state small water systems and domestic wells which are not regulated as PWSs; thus, the total number of these systems is unknown.

[96] The CA Population Total excludes NTNC and TNC systems as those types of PWS generally do not have a permanent population and their inclusion would result in double counting.

Figure 4-1 shows that though there are more community water systems (CWSs) with fewer than 10,000 service connections, cumulatively they serve only seventeen percent (17%) of the state population.

Figure 4-1: Estimated Percentage of Population Served by System Size (November 2024)[97]



PWSs are required to monitor their source water for a range of constituents in accordance with regulations developed under the Safe Drinking Water Act (SDWA). As a result, PWSs are required to respond to violations and potential violations of drinking water standards in accordance with regulatory requirements. The required response may include follow-up sampling, investigation, corrective action and notification of the public of drinking water quality violations.

Public water systems must comply with primary drinking water standards that are applicable to their category of system. Community and non-transient non-community systems are required to meet all primary drinking water standards, and transient non-community water systems need to comply with microbiological and nitrate standards and surface water treatment requirements if appropriate. The basis for less extensive source monitoring requirements for transient non-community systems is the low risk of chronic exposure to the public since most of the population may visit the location a limited number of days per year.

Almost every violation the State Water Board issues is to water systems with less than 10,000 connections. Of these, systems with less than 500 connections receive most of the violations. Furthermore, though most violations occur in the very small systems, these water systems serve less than 2% of the state's total population.

[97] Percentage shown is the estimated percentage of CA population served by the size of system listed. Number in parentheses is the number of community water systems (CWSs) represented. State small water systems and domestic wells serve less than 10,000 connections and are not regulated as CWSs.

Information in this chapter is drawn largely from the 2023 Annual Compliance Report (ACR) with added summaries and discussion based on data sets that were used in the 2019-2022 ACRs. The ACR is a detailed annual report summarizing the violations incurred by PWSs statewide in each calendar year and provides a snapshot of the water quality issues affecting PWS. This chapter describes water quality issues based on violations of primary drinking water standards from the reporting years since the 2020 Plan, which includes data from 2019 through 2023. There are five important factors to keep in mind:

1. Most Californians receive drinking water that complies with drinking water quality standards. On average over 94% of public water systems complied with water quality standards.
2. A source that is contaminated is not necessarily served to the public but may receive treatment to maintain compliance with standards. Furthermore, source quality and quantity can change over time and add to the complexity of a PWS to manage its sources and maintain regulatory compliance.
3. The Safe and Affordable Funding for Equity and Resilience (SAFER) program has made important progress in assessing the needs of PWS that have challenges complying with the SDWA and related requirements (see Chapters 8 and 9).
4. Many large systems, including wholesalers, rely on surface water and thus have alternatives to local and regional groundwater quality issues faced by smaller systems which tend to rely only on groundwater. Surface water sources require extensive treatment, and systems must pay special attention to the challenge of meeting drinking water standards within the distribution system, including compliance with Disinfectant Byproduct Standards. Though wholesale water is often more costly than groundwater sources, larger systems have an economy of scale to afford these costs and avoid contaminated groundwater sources.
5. The state has about 50 wholesale water agencies, and the Division of Drinking Water (DDW) databases input their direct connections (98% have less than 500 connections and 77% have less than 25 connections). DDW databases do not include the number of connections or population of the water systems who purchase their water. Compliance of the source water is the responsibility of the wholesaler. The wholesalers had no primary standard violations.

4.2 SURFACE WATER

4.2.1 Microbiological

Over the last three decades, greater emphasis has been placed on improving treatment of surface waters to provide effective removal and inactivation of bacterial, parasitic, and viral pathogens. The United States Environmental Protection Agency (USEPA) adopted several regulations to target removal and inactivation of *Giardia lamblia* (cycts), viruses, heterotrophic bacteria, *Cryptosporidium* and *Legionella*. These rules include the

Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), and the Filter Backwash Recycling Rule.

The Surface Water Treatment Rule and the LT2ESWTR apply to all PWS using surface water or groundwater under the influence of surface water. The IESWTR is directed at PWS that serve 10,000 or more people, while the LT1ESWTR, enacted four years later, is directed at PWS serving fewer than 10,000 people. The effect of these rules has been to significantly reduce the risk of waterborne infectious disease transmission associated with surface water sources of supply. California adopted all five surface water treatment regulations that hereinafter will simply be referred to as SWTR.

Table 4-2 shows the number of SWTR violations incurred by community, transient non-community, and non-transient non-community water systems between 2019 and 2023. Community water systems with fewer than 500 service connections and non-community water systems had over 99% of the SWTR violations. These violations were for failure to comply with various treatment techniques required by the SWTR.

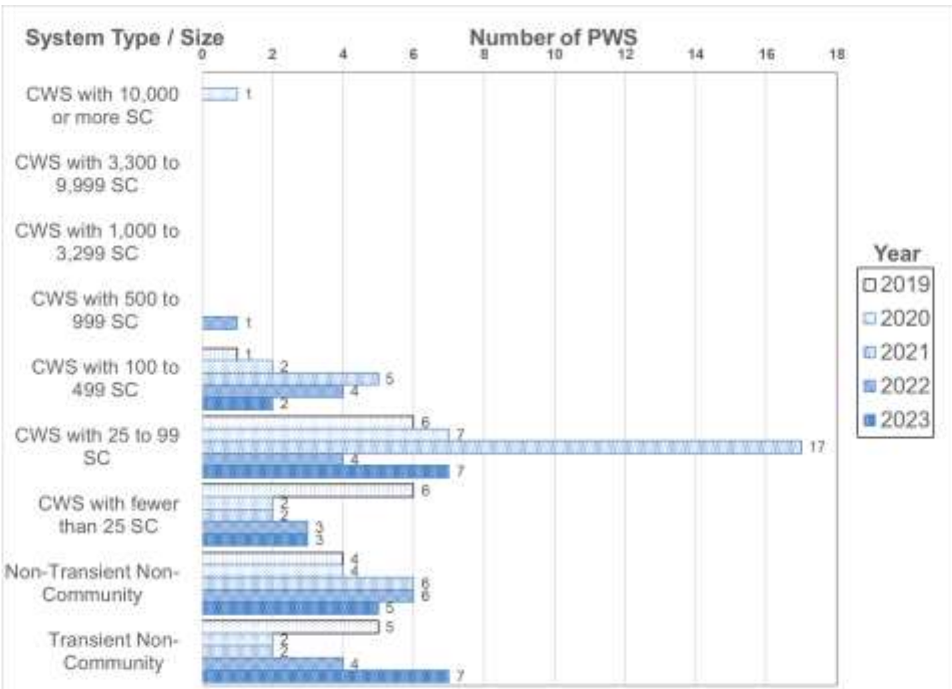
Table 4-2: Number of SWTR Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	1	0	0	0	**1**
CWS with 3,300 to 9,999 SC	0	0	0	0	0	**0**
CWS with 1,000 to 3,299 SC	0	0	0	0	0	**0**
CWS with 500 to 999 SC	0	0	0	1	0	**1**
CWS with 100 to 499 SC	2	3	5	9	9	**28**
CWS with 25 to 99 SC	15	16	17	4	18	**70**
CWS with fewer than 25 SC	97	82	2	3	3	**187**
Non-Transient Non-Community	6	4	6	11	10	**37**
Transient Non-Community	5	2	2	4	18	**31**
Total Number of Violations	**125**	**108**	**32**	**32**	**58**	**355**

Since it is possible for PWS to have multiple violations Figure 4-2 shows the number of PWS with violations. About 20 public water systems incur a SWTR violation each year. Most of these systems incurred more than one violation during the five-year period.

Since it is possible for PWS to have multiple violations Figure 4-3 shows the number of PWS with violations. About 20 public water systems incur a SWTR violation each year. Most of these systems incurred more than one violation during the five-year period.

Figure 4-2: Number of PWSs with SWTR Violations



DDW takes enforcement action when a water system violates a SWTR treatment technique requirement. Due to the potential for acute public health risk, this action may be immediate and require a boil water advisory public notification. Enforcement orders detail the actions PWS must complete to return to compliance. Additionally, DDW provides oversight helping the PWS obtain resources such as funding, to correct the issue(s) that caused the violation to occur.

CASE STUDY

Sonoma County Mutual Water Company

Sonoma County Mutual Water Company (MWC) is a small community (serving fewer than 25 service connections) that has violated the SWTR since 2012 when the water system failed to provide the necessary surface water treatment after it was determined that their groundwater well is or under the direct influence of surface water.[98] As a result, Sonoma County MWC has been under a boil water order since 2012. After several enforcement actions issued by DDW including an administrative penalty (fine) in 2020 to compel continued progress, Sonoma County MWC submitted a water supply permit application in 2019 to operate a surface water treatment plant that includes a prefilter, a cartridge filter, an ultraviolet light disinfection system, and chlorine disinfection. Sonoma County MWC returned to compliance with the SWTR in late 2020, and in 2022 the boil water order was lifted after Sonoma County MWC demonstrated it could reliably operate the surface water treatment plant.

4.2.2 Chemicals

Due to strong pollution prevention efforts by the Regional Boards, surface waters in California continue to be principally free from organic and inorganic chemicals that exceed their respective maximum contaminant level (MCL). The principal chemicals that affect surface waters are naturally occurring organic chemicals and, in some situations, bromide, that are precursor materials in the formation of disinfection by-products.

However, Colorado River contamination by perchlorate from industrial facilities in Nevada (Chapter 3) shows that chemical contaminants may be problematic for surface water supplies of drinking water in some situations. Chemicals used in industry, though limited in their release because of industrial source control measures and wastewater treatment, may nonetheless be present at low levels in receiving surface waters. At the same time, knowledge about chemicals and their toxicity is continually developed and new chemicals are routinely required to be monitored by PWSs to gather data about the occurrence and concentration of a chemical. This data is used to develop drinking water notification levels and drinking water standards to ensure adequate public health information is provided to consumers and protection of public health. In addition, constituents of emerging concern (CEC), such as microplastics, pharmaceuticals and personal health care products, are being detected at low levels in surface waters that receive wastewater discharges. The public health significance of the low levels of these many chemicals is unclear, but their presence demonstrates the vulnerability of drinking water supplies to contamination.

4.3 GROUNDWATER

4.3.1 Inorganic Chemicals

Inorganic chemicals (IOCs) are often naturally occurring in groundwater as minerals in the soil and rock dissolve. In general, naturally occurring contaminants are detected statewide, while anthropogenic (caused by human activities) contaminants tend to be detected regionally. For example, arsenic (naturally occurring) is detected in community

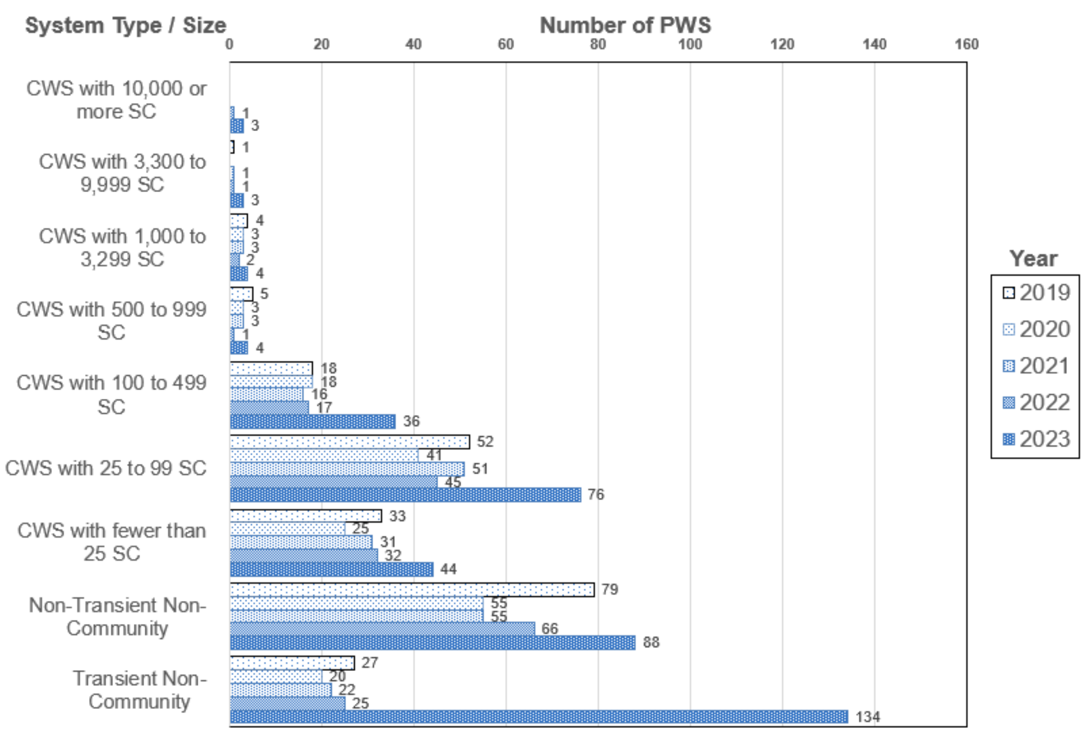
[98] Cal. Code Regs. Tit. 22, § 64651.50: "Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large diameter pathogens such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions.

water system wells broadly distributed across the state (Figure 4-4). In contrast, nitrate at concentrations above the MCL is anthropogenic and is predominantly detected above the MCL in areas of the state with current or historical agricultural activity (Figure 4-5). Table 4-3 and Figure 4-3 show the inorganic chemical MCL violations for different sized community water systems, non-transient non-community systems and the transient non-community water systems from 2019 to 2023. Like surface water treatment violations, most of the IOC MCL violations occur in community water systems with fewer than 500 connections and the two categories of non-community water systems.

Table 4-3: Number of Inorganic MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	0	0	1	1	**2**
CWS with 3,300 to 9,999 SC	2	0	1	1	0	**4**
CWS with 1,000 to 3,299 SC	10	9	9	8	6	**42**
CWS with 500 to 999 SC	10	8	7	1	6	**32**
CWS with 100 to 499 SC	77	51	48	62	78	**316**
CWS with 25 to 99 SC	175	122	170	182	193	**842**
CWS with fewer than 25 SC	100	74	91	95	91	**451**
Non-Transient Non-Community	228	181	166	200	168	**943**
Transient Non-Community[99]	83	50	42	54	57	**286**
Total Number of Violations	**685**	**495**	**534**	**604**	**600**	**2918**

Figure 4-3: Number of PWS with Inorganic MCL Violations



[99] Transient non-community water systems only need to comply with the nitrate and nitrite MCL's.

Arsenic: Around one-third of the IOC MCL violations between 2019 to 2023 are exceedances of the arsenic MCL. In 1993, the MCL for arsenic was 50 micrograms per liter (ug/L) but in 2001 USEPA lowered the MCL to 10 µg/L and the state subsequently adopted the same 10 µg/L MCL. The reduction in the standard resulted in a large increase in MCL violations for arsenic.

Arsenic continues to be a primary groundwater quality issue, affecting small community water systems, that account for over half the violations, and non-transient non-community water systems, with about 30% of the violations. Table 4-4 shows arsenic violations for different sized community water systems and non-transient non-community systems from 2019 to 2023. Transient non-community water systems are not required to sample or treat for arsenic. Again, it is the small water systems with less than 500 connections that have the majority of arsenic MCL violations (95%). Figure 4-4 displays affected water systems across the state that exceed the arsenic MCL grouped by county. As Figure 4-4 indicates, there are 29 counties with water systems over the MCL, with most of those counties being located in the Central Valley. The public health goal (PHG) for arsenic is 0.004 ug/L and the Water Board has included arsenic as a priority contaminant to undergo an MCL review and if appropriate revision.

Table 4-4: Number of Arsenic MCL Violations

System Type / Size	2019	2020	2021	2022	2023	**Total Violations**
CWS with 10,000 or more SC	0	0	0	0	0	**0**
CWS with 3,300 to 9,999 SC	2	0	0	0	0	**2**
CWS with 1,000 to 3,299 SC	10	5	4	4	4	**27**
CWS with 500 to 999 SC	8	6	6	1	4	**25**
CWS with 100 to 499 SC	22	23	27	22	26	**120**
CWS with 25 to 99 SC	95	59	95	86	67	**402**
CWS with fewer than 25 SC	51	48	52	49	45	**245**
Non-Transient Non-Community	92	67	64	64	65	**352**
Total Number of Violations	**280**	**208**	**248**	**226**	**211**	**1173**

Figure 4-4: Number of PWSs with Arsenic Violations by County (2019-2023)

Nitrate is the second most significant groundwater quality issue affecting PWSs serving fewer than 10,000 service connections. Nitrates have historically been a major groundwater contaminant. The use of nitrogen fertilizers, the presence of large dairy operations and cattle feeding facilities, and to a lesser extent sewage disposal practices, such as communities that rely on septic systems, have been the principal sources of nitrate contamination.

Table 4-5 summarizes the MCL violations for nitrate for 2019-2023 for different sized community water systems, transient non-community water systems, and for non-transient non-community water systems. Almost 99% of the water systems with nitrate violations have less than 500 services connections. These findings are consistent with the February 2013 Report to the Legislature by the State Water Board, "Recommendations Addressing Nitrate in Groundwater," available on the State Water Board's website.[100]

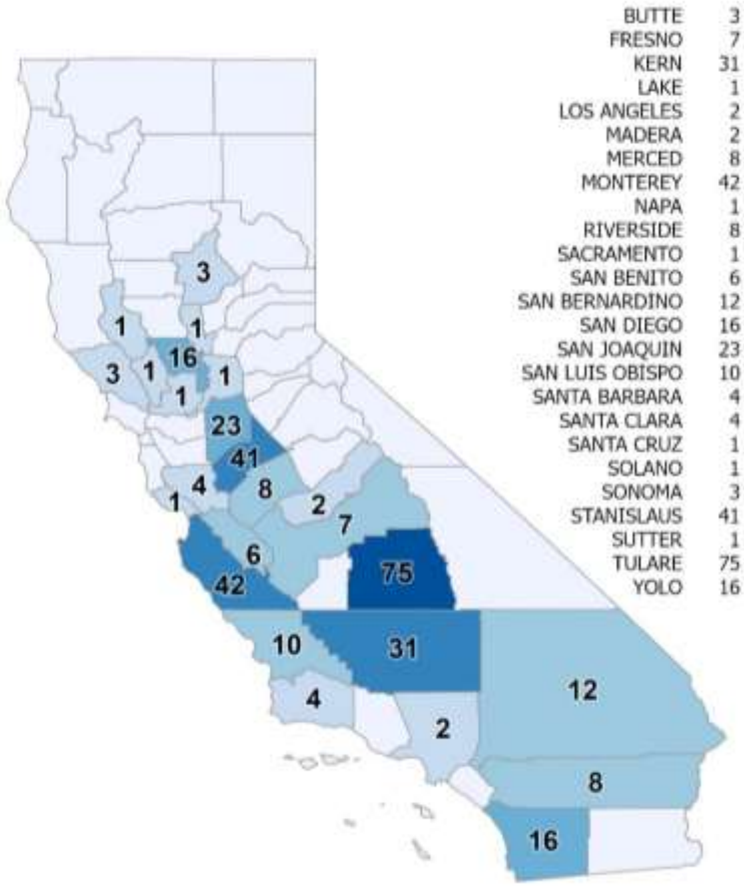
[100] Nitrate Project: https://www.waterboards.ca.gov/water_issues/programs/nitrate_project/index.html

Table 4-5 : Number of Nitrate MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	0	0	1	1	**2**
CWS with 3,300 to 9,999 SC	0	0	1	1	0	**2**
CWS with 1,000 to 3,299 SC	0	0	1	0	2	**3**
CWS with 500 to 999 SC	2	2	1	0	2	**7**
CWS with 100 to 499 SC	22	16	11	13	27	**89**
CWS with 25 to 99 SC	57	50	55	39	52	**253**
CWS with fewer than 25 SC	42	24	37	40	38	**181**
Non-Transient Non-Community	113	98	87	122	92	**512**
Transient Non-Community	83	50	42	54	57	**286**
Total Number of Violations	**319**	**240**	**235**	**270**	**271**	**1335**

Figure 4-5 shows the location, and number of water systems, with nitrate and/or nitrite MCL violations. Nitrate violations are predominantly in the Central Valley (mainly Tulare, Stanislaus, Kern, and San Joaquin Counties), and the Salinas Valley in Monterey County.

Figure 4-5: Number of PWSs with Nitrate Violations by County (2019-2023)



Perchlorate is an inorganic contaminant regulated in California since 2007. Principally a groundwater contaminant associated with munitions, rocket fuel, and fireworks, it was also found to be present in the Colorado River, a source of drinking water for many Californians, because of releases from a facility in Nevada. It may also be naturally present in low concentrations in groundwater. Perchlorate MCL violations are relatively uncommon; for example, violations occurred in only 11 PWS from 2019 to 2023 (1 PWS with more than 10,000 connections, 4 PWS with fewer than 500 service connections, and 6 non-transient non-community PWS).

Hexavalent chromium occurs in groundwater as a natural constituent, as well as a contaminant from industrial disposal practices. It was previously regulated under California's total chromium MCL of 50 parts per billion (ppb), as well as the less stringent federal MCL of 100 ppb. It was also regulated with a California-specific MCL of 10 ppb for a relatively short period of time from July 1, 2014, to September 11, 2017. The MCL was rescinded by the State Water Board following a court order to revisit the standard after a better evaluation of the costs for small water systems. A new California-specific MCL for hexavalent chromium of 10 ug/L was established by the State Water Board in October 2024.

4.3.2 Organic Chemicals

Agricultural pesticides like dibromochloropropane (DBCP) and volatile organic chemicals such as the chlorinated solvents trichloroethylene (TCE) and tetrachloroethylene (PCE) have been the most common organic chemicals found to exceed their MCLs. Another organic chemical, 1,2,3-trichloropropane (1,2,3-TCP), a byproduct of an agricultural pesticide and an industrial solvent, has been found to exceed its MCL, which was adopted in late 2017.

In the past two decades tremendous strides have been made to mitigate problems associated with organic contamination. Between 2015 and 2018, three small community water systems and one non-transient non-community water system exceeded a volatile organic chemical (VOC) MCL. In the years 2019 through 2023, no public water systems exceeded any VOC MCLs. From 2019 through 2023, PWS have exceeded the synthetic organic chemical (SOC) MCL only for DBCP and 1,2,3-TCP. Table 4-6 shows the number of community and non-transient non-community water systems that were in violation of the DBCP MCL for each year from 2019 to 2023. Transient non-community water systems are not required to monitor or treat organic compounds. Nearly 60 percent of the DBCP MCL violations occurred in non-transient non-community systems.

Table 4-6: Number of DBCP MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	0	0	0	1	**1**
CWS with 3,300 to 9,999 SC	0	0	0	0	0	**0**
CWS with 1,000 to 3,299 SC	0	0	0	0	0	**0**
CWS with 500 to 999 SC	0	0	0	0	0	**0**
CWS with 100 to 499 SC	0	0	0	0	1	**1**
CWS with 25 to 99 SC	0	0	0	0	0	**0**
CWS with fewer than 25 SC	0	4	4	4	1	**13**
Non-Transient Non-Community	5	5	1	5	6	**22**
Total Number of Violations	**5**	**9**	**5**	**9**	**9**	**37**

PWS serving fewer than 10,000 service connections have experienced higher violations of 1,2,3-TCP, a contaminant regulated in California since December 2017. Table 4-7 shows the number of community water systems per size category and the number of non-transient non-community water systems that were in violation of the 1,2,3-TCP MCL for 2019 through 2023. Transient non-community water systems are not required to monitor or treat for 1,2,3-TCP.

Table 4-7: Number of 1,2,3-TCP MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	12	12	13	12	12	**61**
CWS with 3,300 to 9,999 SC	28	52	47	16	2	**145**
CWS with 1,000 to 3,299 SC	24	18	28	20	20	**110**
CWS with 500 to 999 SC	10	0	1	5	1	**17**
CWS with 100 to 499 SC	45	18	17	13	11	**104**
CWS with 25 to 99 SC	52	28	33	18	12	**143**
CWS with fewer than 25 SC	37	12	8	25	23	**105**
Non-Transient Non-Community	244	170	174	113	88	**789**
Total Number of Violations	**452**	**310**	**321**	**222**	**169**	**1474**

Figure 4-6 shows the number of water systems grouped by county that had 1,2,3-TCP MCL violations from 2019 through 2023. Counties with the most prevalent MCL violations are in the Central Valley and include Kern, Fresno, Tulare, Merced, Stanislaus, and San Joaquin counties. This contamination is most likely due to agricultural pesticide use. Violations by smaller numbers in other counties may either be from agricultural pesticide use or the use and disposal of certain industrial solvents. The findings of these chemicals in parts of Los Angeles County are generally attributed to industrial sources. About 17 percent of violations occurred in community water systems with fewer than 100 connections, and 53% of violations occurred in non-transient non-community systems.

Figure 4-6: Number of PWSs with 1,2,3-TCP Violations by County (2019-2023)

CASE STUDY

Athal Mutual Water Company

A system that has repeatedly violated the 1,2,3-TCP MCL is the Athal Mutual Water Company (MWC). Athal MWC is a small community water system with a single groundwater well located in Kern County approximately five miles southeast of Bakersfield. Athal MWC considered three possible solutions to mitigate the 1,2,3-TCP issue including drilling a new groundwater well, treating the existing well with granular activated carbon, or consolidating with a nearby medium-sized community water system (Lamont Public Utility District). The challenge with drilling a new well is the fact that most of the sources in the area are impacted by 1,2,3-TCP and/ or arsenic and treatment requires additional financial and technical resources. The most sustainable solution is to consolidate with the Lamont Public Utility District as the larger customer base will result in a more financially and technically resilient water system, better able to meet current and future challenges. Currently, the SAFER program is assisting Athal MWC through all the steps needed to complete consolidation (see Chapter 8 for a detailed discussion).

4.3.3 Radionuclides

Regulations adopted for radionuclides over the last two decades include MCLs for uranium, radium 226 and 228, and gross alpha particles. Uranium was initially adopted in California and subsequently by USEPA. Other radionuclides are required only if the water system is vulnerable to contamination by a nuclear facility. Table 4-8 summarizes the radionuclide MCL violations for 2019-2023. All violations were associated with combined uranium and gross alpha particle exceedances and 99 percent were from water systems serving fewer than 500 service connections.

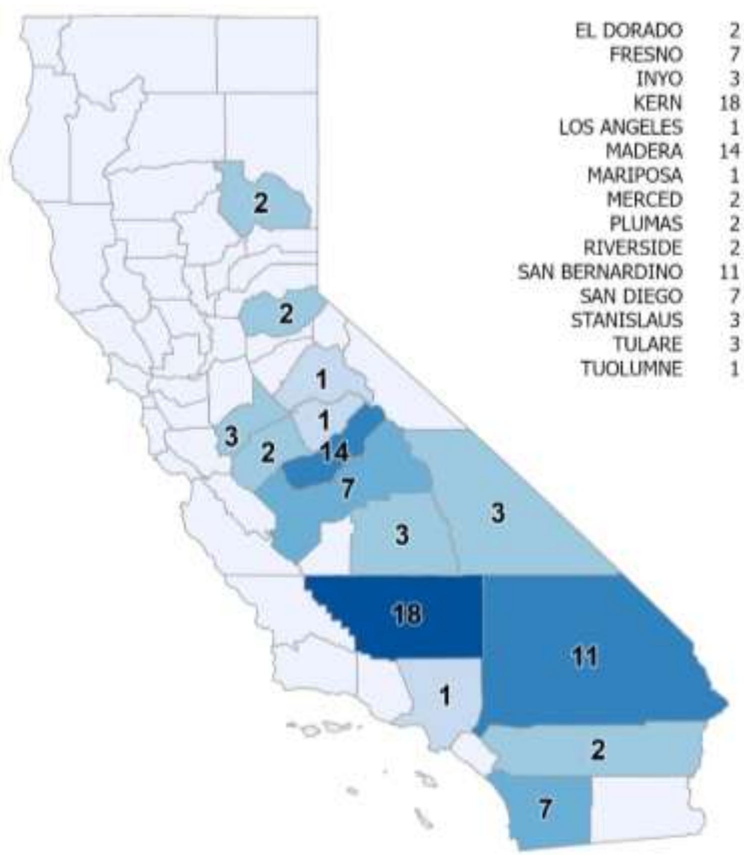
Table 4-8: Number of Radionuclide MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	0	0	0	0	**0**
CWS with 3,300 to 9,999 SC	0	0	0	0	0	**0**
CWS with 1,000 to 3,299 SC	1	1	0	2	0	**4**
CWS with 500 to 999 SC	0	0	0	0	0	**0**
CWS with 100 to 499 SC	14	16	17	14	14	**75**
CWS with 25 to 99 SC	55	35	27	18	37	**172**

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with fewer than 25 SC	17	7	4	10	22	**60**
Non-Transient Non-Community	30	11	18	13	4	**76**
Total Number of Violations	**117**	**70**	**66**	**57**	**77**	**387**

Figure 4-7 shows the counties and number of public water systems that exceeded a radionuclide MCL between 2019 and 2023. The majority of these PWS are in the foothills of the Central Valley where the geology (granitic formations) is consistent with the presence of radionuclides in groundwater.

Figure 4-7: Number of PWSs with Radionuclide Violations by County (2019-2023)



4.3.4 Microbiological

PWS that use groundwater, such as wells or springs, must comply with the Groundwater Rule (GWR) to reduce the occurrence of disease associated with microorganisms commonly found in groundwater. The GWR established a risk-based approach to target groundwater systems that are vulnerable to fecal contamination.

Groundwater systems that are identified as being at risk of fecal contamination must take corrective action to reduce potential illness from exposure to microbial pathogens.

Special monitoring of the groundwater source for a fecal indicator microorganism must be conducted whenever a sample collected in the water distribution system pursuant to the total coliform rule or revised total coliform rule is positive for total coliform (triggered source monitoring). California has chosen to use *E. coli* monitoring as the indicator of fecal contamination. This monitoring is discussed further in 4.4 Distribution Systems.

Between 2019 and 2023, eight PWS (7 with fewer than 500 connections) failed to provide the required level of virus inactivation treatment resulting in 12 violations of the GWR.

4.4 DISTRIBUTION SYSTEMS

4.4.1 Compliance with Microbial Standards

Microbial contaminants continue to be the primary concern for PWS and health officials because of the potential for acute illness. Furthermore, conditions in the distribution system can quickly change, for example, a water main break may allow pathogens to be introduced into the water supply. Regular microbial monitoring helps identify problems that arise. PWSs are required to routinely collect bacteriological samples from distribution systems on a schedule based on their size. Coliform bacteria are used as the indicator to determine if drinking water is free of contamination from human waste. The coliform group is accepted as the indicator organism because they are the most prevalent bacteria in the environment. The analytical methods used to determine the presence or absence of these organisms are the easiest and least expensive to use.

There are two types of violations of drinking water standards associated with coliform organisms, also known as the Total Coliform Rule (TCR): acute violation, which indicates a PWS has detected fecal coliform or *E. coli* bacteria in the drinking water being delivered to customers; and nonacute violations which indicate a PWS detected total coliform bacteria in a specific number of samples of drinking water being delivered to customers within a specific timeframe (most commonly a month). An acute violation will result in immediate action including a notice to consumers to boil the water before drinking or use of an alternative supply. Nonacute violations generally result from the introduction of non-fecal coliform organisms and are reflective of microbial activity in the distribution system and the need for better operation and maintenance of the water system's infrastructure. Fortunately, the nonacute violations can generally be addressed quickly, although some may require infrastructure improvements that can be costly. If a transient non-community or non-transient non-community water system cannot quickly resolve the problem (for example, make infrastructure improvements), they can temporarily shut down until the problem is solved. Community water systems cannot be shut down in the same way.

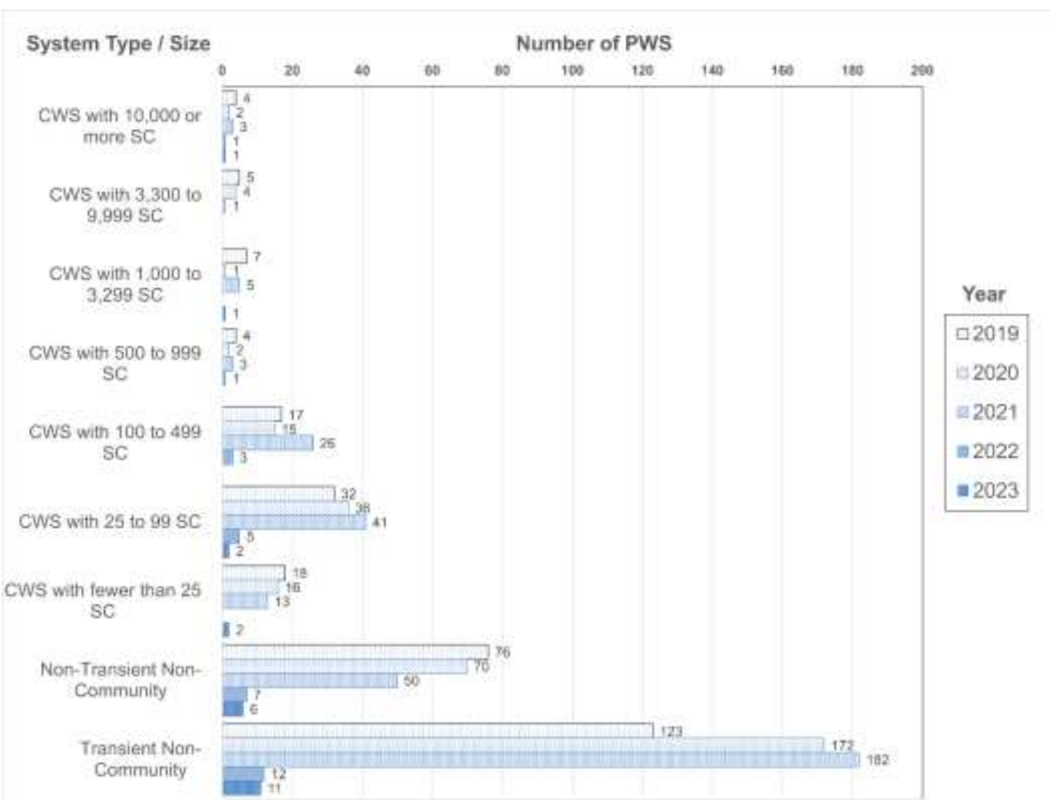
The USEPA revised the total coliform rule (rTCR), which became effective on April 1, 2016. The rTCR replaced the TCR Monthly Total Coliform MCL with a new total coliform treatment technique requirement. The rTCR also establishes a "find and fix" approach for investigating and correcting causes of coliform problems within water distribution systems. California adopted the rTCR regulations July 1, 2021. For simplicity, TCR is used to refer to both TCR and rTCR. Table 4-9 summarizes TCR violations from 2019 to 2023.

Although most of the violations were nonacute violations and did not represent a public health risk, TCR violations are often reflective of problems with aging infrastructure and inadequate maintenance and operation of the water system. Over 95 percent of the violations were from small community (<500 service connections), non-transient non-community, or transient non-community water systems.

Table 4-9: Number of TCR MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	5	5	3	1	1	**15**
CWS with 3,300 to 9,999 SC	5	5	1	0	0	**11**
CWS with 1,000 to 3,299 SC	9	1	5	0	1	**16**
CWS with 500 to 999 SC	5	5	3	1	0	**14**
CWS with 100 to 499 SC	19	15	40	6	0	**80**
CWS with 25 to 99 SC	37	40	52	6	2	**137**
CWS with fewer than 25 SC	21	34	19	0	2	**76**
Non-Transient Non-Community	93	93	68	7	6	**267**
Transient Non-Community	144	243	264	13	11	**675**
Total Number of Violations	**338**	**441**	**455**	**34**	**23**	**1291**

Figure 4-8: Number of PWS with TCR Violations



4.4.2 Disinfection Byproducts

All community and non-transient non-community water systems are required to meet standards for disinfection byproducts (DBP) to reduce the potential for long-term health effects. There are MCLs for total trihalomethanes (TTHM) (bromodichloromethane, bromoform, chloroform, and dibromochloromethane), chlorite, bromate, and five haloacetic acids (HAA5) (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid). There are also requirements for disinfectant residuals including chlorine, chloramine, and chlorine dioxide.

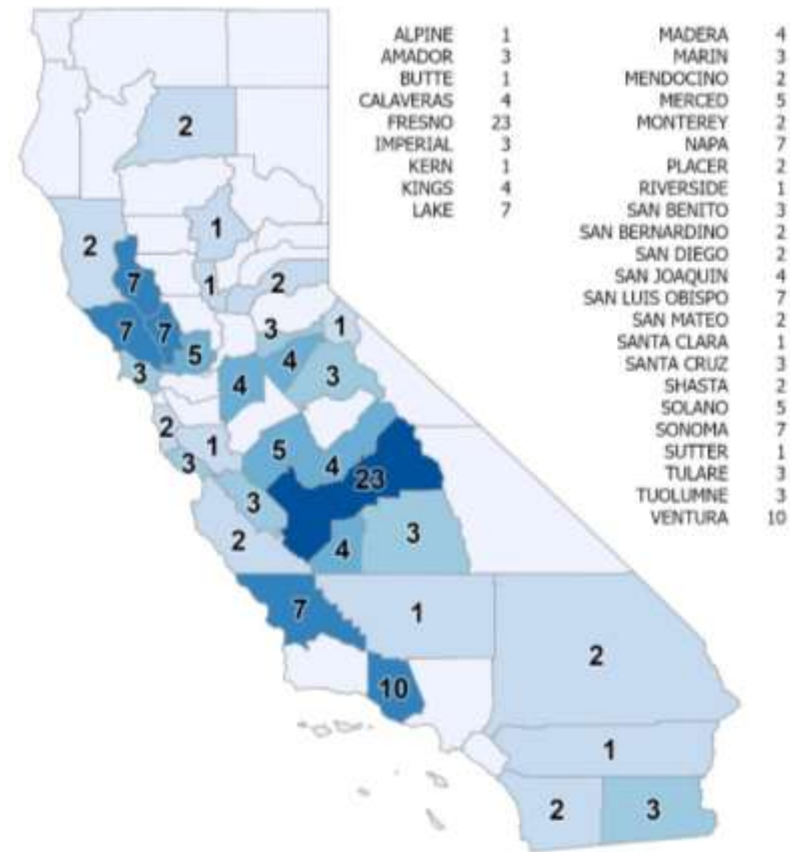
All community and non-transient non-community water systems that provide disinfected drinking water are required to comply with the Stage 1 and Stage 2 Disinfectants and Disinfection By-Products Rules (DBPR). Additionally, transient non-community water systems that use chlorine dioxide are required to comply with the requirements for chlorine dioxide. The DBPR established MCLs for disinfection by-products, maximum disinfectant residual levels, treatment technique (TT) requirements for the control of total organic carbon (TOC), and TT requirements for certified treatment operators.

Exceedance violations of the MCL for DBPR for 2019-2023 are shown in Table 4-10. About 45 percent of these violations were due to an exceedance of TTHM MCL. Almost all DBPR violations occurred in community water systems with less than 10,000 service connections. Figure 4-9 shows the number of public water systems within each county that violated the DPBR, with the greatest number of violations in Fresno County.

Table 4-10: Number of DBPR MCL Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	2	1	0	2	**5**
CWS with 3,300 to 9,999 SC	3	5	3	2	6	**19**
CWS with 1,000 to 3,299 SC	21	36	16	33	17	**123**
CWS with 500 to 999 SC	8	5	4	4	5	**26**
CWS with 100 to 499 SC	22	13	18	14	5	**72**
CWS with 25 to 99 SC	43	37	33	23	20	**156**
CWS with fewer than 25 SC	25	13	11	2	13	**64**
Non-Transient Non-Community	18	6	7	13	10	**54**
Total Number of Violations	**140**	**117**	**93**	**91**	**78**	**519**

Figure 4-9: Number of PWS with DBPR MCL Violations by County (2019-2023)



CASE STUDY

Panoche Water District

Ten water systems in Fresno County account for 23 of the DBPR MCL violations shown in Figure 4-9. This is due to several factors including the use of surface water, and elevated water temperature. Compounding the issue, some Fresno County PWSs serve disadvantaged communities (median household income is less than 80 percent of the statewide median household income) which limits their ability to afford treatment. One example of a PWS that struggled with the DBP MCL is the Panoche Water District (PWD). PWD has prior TTHM violations which were addressed by installation of spray aeration treatment system at each storage tank. However, aeration has not been effective. Subsequently, PWD started having HAA5 and TTHM MCL violations. PWD has been working with the State

Water Board for funding of a proposed compliance project but has been struggling due to the high capital cost of the project and funding limitations. Currently, PWD is seeking technical assistance from the State Water Board to keep the project moving forward.

4.4.3 Lead and Copper

In 1991, USEPA adopted the Lead and Copper Rule (LCR), which was the most extensive regulation involving water quality associated with materials used in the water distribution system. The LCR applies to community and non-transient non-community water systems and established Action Levels for lead of 15 µg/L and for copper of 1.3 mg/L. Compliance is statistically determined by water samples taken from a minimum number of household faucets served by the system. If an Action Level is exceeded pursuant to certain monitoring criteria for either or both chemicals, remediation methods must be implemented. In addition, water systems are required to install corrosion control treatment if the water sources have the potential to become corrosive.

Table 4-11 shows the LCR violations for exceedance of an action level, failure to replace a lead service line, failure to complete a corrosion control study, or failure to perform public education from 2019-2023. Of the 15 LCR violations, 67 percent were by small community water systems (<500 service connections).

Chapter 3 discusses recent improvements to the LCR which are being initiated and do not have data to report in this chapter.

Table 4-11: Number of LCR Violations

System Type / Size	2019	2020	2021	2022	2023	Total Violations
CWS with 10,000 or more SC	0	0	0	0	0	**0**
CWS with 3,300 to 9,999 SC	0	0	0	0	0	**0**
CWS with 1,000 to 3,299 SC	2	0	1	0	0	**3**
CWS with 500 to 999 SC	0	0	0	0	0	**0**
CWS with 100 to 499 SC	2	1	2	1	1	**7**
CWS with 25 to 99 SC	1	1	0	0	0	**2**
CWS with fewer than 25 SC	1	0	0	0	0	**1**
Non-Transient Non-Community	1	0	0	0	1	**2**
Total Number of Violations	**7**	**2**	**3**	**1**	**2**	**15**

4.5 COST OF COMPLIANCE

As required by HSC §116355, this chapter discusses water quality issues affecting PWSs focusing on the challenges facing those serving fewer than 10,000 service connections, including the estimated cost required to meet primary drinking water standards and public health goals (PHG). Chapters 8, 9, and 10 discuss the SAFER program initiatives related to engaging and assessing failing systems, quantifying needed financing, and allocating such financing through technical assistance and funding agreements for planning, select operations, and construction. These sections describe how PWSs serving smaller customer bases are generally more costly to operate and maintain due to the lack of economies of scale. As a result, they tend to have artificially low water rates which result in nonexistent maintenance and an increased likelihood of being at-risk or failing to meet water quality objectives.

Chapter 7 discusses challenges associated with different treatment technologies and includes a summary of the statewide cost estimate used for the adoption of the hexavalent chromium MCL, California's most recent primary drinking water standard.

Chapter 8 discusses challenges related to sustainability and results of the Needs Assessment. Chapter 9 discusses the challenges related to water system costs and issues related to affordability including details from Needs Assessment which quantify the funding gap needed to address uphold the Human Right to Water policy. Chapter 10 discusses additional state funding program details related to those topics in Chapter 8 and 9.

4.5.1 Estimated Cost to Meet Primary Drinking Water Standards

The costs of requiring PWSs serving fewer than 10,000 service connections to meet all primary drinking water standards cannot be accurately estimated given the variables involved in such an estimate. While large PWSs are likely to have reasonable estimates for treatment costs, often because they have technical staff and consultants with experience designing and operating treatment systems, in many cases, the treatment processes used by large PWSs are not equally as affordable for small systems to plan, design, and construct such infrastructure or it may not be suitable for use by small PWSs due to the scale or complexity required. A larger system may be able to avoid treatment by blending with another source or affording to use an alternative source such as purchasing imported water or drilling a new or deeper well on new or existing property.

For example, it may be difficult for a small PWS to meet the primary standard for nitrate. The best available treatment technology and related infrastructure maybe too costly and technical to operate and maintain for many smaller PWSs, especially those with limited rate base and technical and managerial expertise. Many small PWSs, rather than installing treatment, have looked to consolidate with one or more neighboring PWSs to meet drinking water standards at a lower cost gained through economies of scale. To address the many barriers to consolidation, the State Water Board provides financial incentives to larger systems to construct the infrastructure necessary to subsume smaller systems and is committed to further pursuing solutions to address the barriers to consolidation.

4.5.2 Estimated Cost to Meet Public Health Goals

PHGs are the health-based levels that the State Water Board uses in the development of MCLs. As discussed in Chapter 7 the State Water Board must set MCLs “at a level that is as close as feasible to the corresponding public health goal placing primary emphasis on the protection of public health that is technologically and economically feasible.” Accordingly, the PHG is generally lower than an MCL. A MCL that is too low may result in an excessive or impossible threshold to meet. For this reason, estimating the cost of requiring PWSs serving fewer than 10,000 services connections to meet PHGs is even more difficult. Since there is no requirement for PWSs to meet PHGs, most PWSs do not have real experience with such costs. Large PWS (those serving more than 10,000 service connections) are only required to prepare a report that estimates the cost to meet PHGs and to hold a public hearing to receive comments on the report.

In addition, the cost to PWSs serving fewer than 10,000 service connections to meet PHGs would far exceed the water systems ability to afford water. Thus, the focus should be on compliance with drinking water standards.

For example, the PHG for arsenic is 0.004 µg/L; the lowest level arsenic can be reliably detected for compliance purposes in water is 2 µg/L. When adopting the MCL for arsenic of 10 µg/L in 2008, the annual cost to different sizes of PWS was estimated to meet the proposed MCL at the lowest measurable level. For PWS serving fewer than 10,000 service connections, the estimated cost to meet an MCL of 10 µg/L was approximately $77 million, while the estimated cost to meet an MCL of 2 µg/L was approximately $417 million. Such a cost burden would be unmanageable, particularly among the smaller PWS that, as indicated in this chapter, are having extreme difficulty complying with the existing arsenic MCL.

4.6 REGULATORY COMPLIANCE ISSUES

Regulations have been adopted resulting in increased monitoring requirements, more MCLs, such as the MCL for hexavalent chromium, the notification level (NL) for Per- and polyfluoroalkyl substances (PFAS), new LCR, DBPR and SWTR rules, and source water protection programs. Compliance with regulations has been high among large water systems. However, some small water systems, particularly community water systems serving fewer than 500 service connections and smaller non-transient non-community water systems, have had considerably more difficulty complying with the regulations.

4.6.1 Human Right to Water

In 2012, California became the first state to enact legislation recognizing a Human Right to Water (HR2W), which declared that it is “the established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.” However, the HR2W can be threatened by many factors, including water supply availability, contaminants, high costs of treatment and distribution systems, the number and nature of small water systems, and the geographical location of individual homeowners. As discussed throughout this plan, the State Water Board is actively pursuing initiatives to address HR2W, beginning with the state's residents who are served by public water systems but who do not receive safe drinking water. While this chapter focuses on PWS, the HR2W also applies to other drinking water systems such as state small water systems and domestic wells.

4.6.2 Violations Incurred by Public Water Systems

While many drinking water quality issues have been addressed over the past two decades, arsenic and nitrate continue to remain the principal contaminants that affect PWS with fewer than 10,000 connections. There are also numerous violations with the MCL's for 1,2,3 TCP, DBPs, and TCR.

The distribution of violations discussed in this chapter for 2019-2023 within the different sized community, transient non-community, and non-transient non-community water systems are summarized in the tables below. Almost all violations are in systems with less than 10,000 connections, and most violations are in systems serving less than 500 connections.

Table 4-12: Distribution of Violations

System Type / Size	2019	2020	2021	2022	2023
CWS with 10,000 or more SC	1%	1%	1%	2%	1%
CWS with 3,300 to 9,999 SC	2%	4%	2%	1%	3%
CWS with 1,000 to 3,299 SC	4%	4%	4%	4%	3%
CWS with 500 to 999 SC	2%	1%	1%	2%	1%
CWS with 100 to 499 SC	9%	7%	10%	12%	11%
CWS with 25 to 99 SC	21%	19%	25%	23%	23%
CWS with fewer than 25 SC	17%	16%	15%	16%	12%
Non-Transient Non-Community	36%	40%	38%	32%	41%
Transient Non-Community	8%	8%	4%	8%	6%

Table 4-13 summarizes the percentage of PWS that incurred violations for the various regulations included in Table 4-2 to Table 4-12. Among community water systems, those with fewer than 100 service connections incurred most of the violations. Between 2019-2023, on average 22 percent of the PWS with violations were incurred by community water systems with 25 to 99 service connections, 37 percent were incurred by non-transient non-community water systems and 7 percent were incurred by transient non-community water systems.

Table 4-13: Distribution of Violations in Community Water Systems with 10,000 or More Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 10,000 or more SC	Percent of Violations by CWS with 10,000 or more SC
Arsenic MCL	1173	0	0 %
Nitrate MCL	1335	2	< 1 %
Uranium MCL	387	0	0 %
DBCP MCL	37	1	2.7 %
1,2,3-TCP MCL	1454	61	4.2 %
TCR MCL	1291	15	1.2 %
DBPR MCL	519	5	< 1 %
SWTR	355	1	< 1 %
LCR	2257	14	<1 %

Tables 4-14 through 4-21 summarize the percentage of systems that incurred violations for the various regulations based on water system size (less than 10,000 connections) or water system classification between 2019 and 2023. Systems with less than 500 service connections had most of the violations.

Table 4-14: Distribution of Violations in Community Water Systems with 3,300 to 9,999 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 10,000 or more SC	Percent of Violations by CWS with 3,300 to 9,999 SC
Arsenic MCL	1173	2	< 1 %
Nitrate MCL	1335	2	< 1%
Uranium MCL	387	0	0 %
DBCP MCL	37	0	0 %
1,2,3-TCP MCL	1454	145	10 %
TCR MCL	1291	11	< 1 %
DBPR MCL	519	19	3.7 %
SWTR	355	0	0 %
LCR	2257	32	1.4 %

Table 4-15: Distribution of Violations in Community Water Systems with 1,000 to 3,299 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 1,000 to 3,299 SC	Percent of Violations by CWS with 1,000 to 3,299 SC
Arsenic MCL	1173	27	2.3 %
Nitrate MCL	1335	3	< 1 %
Uranium MCL	387	4	1.0 %
DBCP MCL	37	0	0 %

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 1,000 to 3,299 SC	Percent of Violations by CWS with 1,000 to 3,299 SC
1,2,3-TCP MCL	1454	100	6.9 %
TCR MCL	1291	16	1.2 %
DBPR MCL	519	123	24 %
SWTR	355	0	0 %
LCR	2257	61	3.0 %

Table 4-16: Distribution of Violations in Community Water Systems with 500 to 999 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 500 to 999 SC	Percent of Violations by CWS with 500 to 999 SC
Arsenic MCL	1173	25	2.1 %
Nitrate MCL	1335	7	< 1 %
Uranium MCL	387	0	0 %
DBCP MCL	37	0	0 %
1,2,3-TCP MCL	1454	17	1.2 %
TCR MCL	1291	14	1.1 %
DBPR MCL	519	26	5.1 %
SWTR	355	1	< 1 %
LCR	2257	28	1.2 %

Table 4-17: Distribution of Violations in Community Water Systems with 100 to 499 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 100 to 499 SC	Percent of Violations by CWS with 100 to 499 SC
Arsenic MCL	1173	120	10 %
Nitrate MCL	1335	89	6.7 %
Uranium MCL	387	75	19 %
DBCP MCL	37	1	2.7 %
1,2,3-TCP MCL	1454	103	7.1 %
TCR MCL	1291	80	6.2 %
DBPR MCL	519	72	13.9 %
SWTR	355	28	7.9 %
LCR	2257	280	12 %

Table 4-18: Distribution of Violations in Community Water Systems with 25 to 99 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with 25 to 99 SC	Percent of Violations by CWS with 25 to 99 SC
Arsenic MCL	1173	402	34 %
Nitrate MCL	1335	253	19 %
Uranium MCL	387	172	44 %
DBCP MCL	37	13	35 %
1,2,3-TCP MCL	1454	139	9.6 %
TCR MCL	1291	137	11 %
DBPR MCL	519	156	30 %
SWTR	355	70	20 %
LCR	2257	603	27 %

Table 4-19: Distribution of Violations in Community Water Systems with Fewer than 25 Service Connections (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by CWS with Fewer than 25 SC	Percent of Violations by CWS with Fewer than 25 SC
Arsenic MCL	1173	245	21 %
Nitrate MCL	1335	181	14 %
Uranium MCL	387	60	16 %
DBCP MCL	37	0	0 %
1,2,3-TCP MCL	1454	105	7.2 %
TCR MCL	1291	76	5.9 %
DBPR MCL	519	64	12 %
SWTR	355	187	53 %
LCR	2257	412	18 %

Table 4-17: Distribution of Violations in Non-Transient Non-Community Water Systems (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by NTNCWS	Percent of Violations by NTNCWS
Arsenic MCL	1173	352	30 %
Nitrate MCL	1335	512	38 %
Uranium MCL	387	76	19 %
DBCP MCL	37	22	59 %
1,2,3-TCP MCL	1454	784	54 %
TCR MCL	1291	675	52 %
DBPR MCL	519	54	10 %
SWTR	355	37	10 %
LCR	2257	808	36 %

Table 4-18: Distribution of Violations in Transient Non-Community Water Systems (2019-2023)

Contaminant or Treatment Technique	Total Violations for all PWS	Number of Violations by TNCWS	Percent of Violations by TNCWS
Nitrate MCL	1335	286	21 %
TCR MCL	1291	267	21 %
SWTR	355	31	8.7 %
LCR	2257	19	< 1 %

Table 4-12 through Table 4-21 summarize the total number of violations and corresponding percentages for each type of PWS for the regulations included in Table 4-2 to Table 4-11 above. Based on Table 4-12 most violations are by community water systems with fewer than 500 service connections, non-transient non-community and transient non-community water systems. Non-transient non-community water systems accounted for the most IOC MCL and SOC MCL (DBCP and 1,2,3-TCP), and TCR violations. In contrast, CWSs with 25 to 99 service connections accounted for the most DBPR MCL (TTHM and HAA5) violations. Both CWS with 25 to 99 service connections, and non-transient non-community water systems accounted for 60 percent of the LCR violations.

For regulations protecting against microbiological contaminants, CWSs with less than 25 service connections had the most violations.

Contaminants such as uranium, 1,2,3-TCP and DBP, and treatment technique rules such as the SWTR and the IESWTR have also added compliance challenges for PWS, particularly the smallest ones. The new MCL for hexavalent chromium will likely have a similar effect on small community water systems.

The TCR also continues to present challenges to small community, transient non-community and non-transient non-community water systems. Violations of the TCR may reflect infrastructure problems for the smaller systems, and/or they may reflect inadequate technical, managerial, or financial shortcomings that may be associated with such systems.

4.7 CONCLUSIONS AND RECOMMENDATION

4.7.1 Conclusions

The compliance information presented in this chapter indicates that most water quality violations affect PWS that serve fewer than 10,000 service connections. Among CWSs that were not in compliance with chemical primary drinking water standards, an average of 94 percent served fewer than 10,000 service connections.

More importantly, non-transient non-community water systems accounted for the largest percentage of violations for all regulated contaminants and treatment technique requirements for which there were violations. Most troubling are the violations of the requirements for the treatment of surface waters, which increase the risk of waterborne infectious disease transmission.

These findings highlight the ongoing problems faced by water systems that either serve small communities or are small facilities that serve the same non-resident populations during much or all the year such as rural schools, small farming operations, and churches. The findings are consistent with those contained in the January 2013 legislative report, "Communities that Rely on a Contaminated Groundwater Source for Drinking Water,"[101] indicating this issue for which the SAFER program was created is ongoing and mirrors the findings of the Needs Assessment discussed in Chapter 8.

The January 2013 legislative report found that between 2002 and 2010, a total of 265 community water systems that rely on contaminated groundwater had at least one MCL violation. The report found that the largest number of MCL violations involved three contaminants: arsenic, nitrate, and uranium; and the violations were overwhelmingly associated with small community water systems of which about 81 percent served fewer than 1,000 service connections.

The inability of small community and non-transient non-community water systems to meet most of the primary MCLs exemplifies the difficulties small systems have with maintaining the technical, managerial and financial (TMF) capacity needed to operate a public water system. More information on TMF requirements for the sustainable operation of water systems is presented in Chapter 8.

For many small community water systems, the financial and technical challenge to continue operating as a stand-alone system is too great. Where feasible, the best solution to ensure the sustainable provision of drinking water to system users is by consolidation with a larger water system. At the same time, the creation of new small community water systems should be discouraged.

Similarly, for transient and non-transient non-community water systems that have difficulties complying with regulatory requirements to ensure safe drinking water, consolidation is a good solution when feasible. Where a larger community water system

[101] Communities Reliant on Contaminated Groundwater, AB 2222: https://www.waterboards.ca.gov/gama/ab2222/docs/ab2222.pdf

can provide safe drinking water to a new proposed transient and non-transient non-community water systems—for example, to a gas station, restaurant, or a school—use of water from the community water system is preferred to creation of a new unsustainable water system.

4.7.2 Recommendation

4-1 Support State Water Board's goal of sustainable water systems by limiting the creation of new small and unsustainable public water systems, in addition to support of the ongoing consolidation and administrator programs to help address compliance issues with not only community water systems, but also transient non-community and non-transient non-community water systems, wherever feasible and appropriate. Consolidation does not have to be limited to full or physical consolidation of drinking water treatment and delivery systems, and could also include technical, managerial, financial or physical arrangements between water systems.

CHAPTER 5 DRINKING WATER INFORMATION MANAGEMENT

5.1 INTRODUCTION

The Division of Drinking Water (DDW) uses several data management systems to intake, manage, track, and report data and information relevant to operations of its various programs. As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses DDW's current water quality data systems, identifies limitations of the data systems that impact decision-making, regulatory determinations and provision of accurate and timely dissemination of information, and provides recommendations on development of priority data projects to more effectively protect drinking water.

DDW relies on high-quality datasets and compliance determination tools to facilitate accurate and timely regulatory determination to protect public health. These datasets and tools are based on data, reports, and other information received. Due to the direct impact drinking water quality has on public health, the data needs of DDW have a heightened importance and urgency. DDW continually receives a variety of data and reports from public water systems (PWSs), water quality data from analytical laboratories, and information from other entities regarding compliance with the Safe Drinking Water Act (SDWA), drinking water regulations, and water supply permits. For water quality alone, DDW receives data on source water quality, treatment plant process data, finished water data, and distribution system data. A robust drinking water information management system is critical to ensuring the data received is checked and made available for regulatory determination and a variety of other information needs of the drinking water program. Timely and accurate information is critical in protecting public health and providing assurance to the public.

To improve receipt of high-quality data, DDW prioritized the replacement of its legacy data intake system. To streamline data processes, DDW takes advantage of data tools developed by the U.S. Environmental Protection Agency (USEPA) for states in carrying out the drinking water program. Since these tools are mostly designed to meet the reporting needs of USEPA, DDW also uses a variety of other stand-alone data tools to address the business needs of the drinking water program. DDW is working to integrate stand-alone data tools to improve overall business practices, improve accessibility and transparency, increase usability of data, and facilitate transformation of data into usable information.

DDW also provides public access to the data it gathers and transparency with the information it derives from evaluation of the data. While there are numerous benefits for providing increased accessibility of data to the public, there have been occasions where incorrect assumptions were made by external data users in the evaluation of the datasets published by DDW, resulting in confusion and conflicting information about drinking water quality. For example, although most PWSs submit data representing water quality delivered for public consumption, the data submitted by PWSs providing treatment also include data that represents the raw water prior to treatment; in such cases it may be difficult for external data users to differentiate the data associated with water delivered to the public for consumption, without researching the details of each PWS or analyzing other datasets. To address the issue, DDW includes language on its website to describe the published data and to urge external data users to contact DDW for more information. As DDW continues to improve accessibility and transparency of data, DDW is also working to improve understanding and usability of the data by providing additional data context, increasing public awareness of drinking water regulation and compliance determination, and educating the public about safe drinking water.

DDW makes information accessible, discoverable, and usable to PWSs, the general public, other state agencies, academia, policymakers, and others, in part due to participation in the California Water Quality Monitoring Council (SB 1070, Chapter 750, Statutes of 2006)[102] and subsequently as part State Water Board's role in carrying out AB 1755, the Open and Transparent Water Data Act (Chapter 506, Statutes of 2016).[103] DDW continues to improve availability and usability of open-source tools and make information more accessible to enhance public understanding and policy decision making.

The rapid pace of technological improvements in data management systems presents an ongoing need to update legacy systems to improve data intake, support compliance decisions, and increase business function through streamlined connectivity with other data systems. Additionally, technological improvements in data and information systems provide a great opportunity to improve timely and accurate communication of information to the public and PWSs. DDW continues to prioritize, develop, and implement data projects with existing resources. However, due to the long list of priority projects that have been identified, additional resources are needed to support the increasing demands on DDW's drinking water data and information systems.

5.2 DATA GOVERNANCE

To improve data integrity and information management, DDW has established business processes and data governance to guide DDW's data-related needs. Implementation of DDW's data governance is described in the sections below.

5.2.1 Quality Assurance Section

DDW established the Quality Assurance Section (QAS) in 2017 to ensure that water quality data and water system information used for decision making was of known and documented quality through the development of processes and data systems to improve data quality and accessibility. QAS's main responsibilities are to ensure the accuracy, quality, and reliability of information that DDW intakes and to ensure that the information is accessible and meaningful to the public. To carry out its responsibilities

[102] SB 1070: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060SB1070
[103] AB 1755, The Open and Transparent Water Data Act: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1755

and implement DDW's data governance, QAS includes the following units:

Data Management Unit (DMU) Since 2016, DMU has increased from two full time positions to eight full time positions. The expansion was needed to significantly improve DDW's maintenance of data and information management systems, increase progress toward fully transitioning to and implementing the Safe Drinking Water Information System (SDWIS) for state drinking water regulatory programs (see SDWIS/STATE, Section 5.3.1) and to conduct advanced planning work.

Data Support Unit (DSU) In 2022, DDW created DSU to support stand-alone data tools developed by DDW, increase data availability and usability, prepare the reports required by USEPA for primacy, and improve the sharing of important information within DDW, external stakeholders, and the public.

Needs Analysis Unit (NAU) To integrate efforts regarding safe and affordable drinking water, NAU was recently moved under QAS to ensure data intake and data management systems regarding at-risk non-PWSs are developed and managed cohesively under DDW's data governance, as well as enhancing data transparency and usability by providing meaningful information to the public regarding the safety of the drinking water.

Water Resiliency Unit (WRU) The WRU maintains DDW's Continuity of Operations Plan (COOP), which looks at threats to DDW's operations and creates a plan to address the threat. Since DDW's operations are reliant upon access to much of the information managed by QAS, the WRU works with a team to evaluate DDW's essential functions and develop plans to continue operations after an incident. The team includes a representative from the State Board's Division of Information Technology (DIT), for coordination with DIT's Technology Recovery Plan.

Efforts continue to be made to streamline data and improve publication of datasets. QAS is assisting with efforts among numerous state agencies, including the Department of Water Resources, Department of Public Health, Department of Social Services, Local Primacy Agencies (counties), and with internal partners such as the Division of Water Quality, the Office of Information Management and Analysis (OIMA), Office of Research, Planning, and Performance (ORPP), the Office of Public Engagement, Equity, and Tribal Affairs, the Operator Certification Unit, and the Fee Unit, to share water system inventory and water quality data and streamline intake and reporting of similar information needed by multiple agencies. The increased collaboration among these state agencies ensures the quality of the state's water resources and benefits the public by facilitating access to knowledge about water quality. Additional public portals and dashboards have been developed and continue to be improved, to allow public access information regarding water systems and to drinking water quality data.

QAS is focused on improving the availability and quality of the data being made available to the public. For example, to demonstrate the data and information that is received is of known and documented quality requires knowledge of data quality from beginning to end. For water quality results, this would be from sample collection to data reporting. This process includes many parties: the sampler, the person(s) transporting the samples to the laboratory, the laboratory, Environmental Laboratory Accreditation Program (ELAP) for accrediting the laboratories, QAS, and DDW staff. With the launch of the California Laboratory Intake Portal (CLIP, Section 5.3.2.3), QAS continues to work to electronically intake information that documents data quality. The intake and analysis of additional quality control data will result in improved data quality.

5.2.2 Data Integration Execution Team (DIET)

The Data Integration Execution Team (DIET) was formed in 2017 to assist the Quality Assurance Section to better understand past issues and develop a vision to address existing and future data needs. DIET was tasked with establishing standard business processes and assisting with their implementation, with a goal of integrating existing data collection and use into a single point of access system. Its mission is to provide technical expertise and support to continuously improve DDW operational efficiency and enhance services to stakeholders by leveraging information technology. The current focus of DIET is the development of DDW's centralized data system, Water Technical Access Portal (WaterTAP), discussed in Section 5.3.11.

5.2.3 Data Executive Steering Committee (DESC)

The Data Executive Steering Committee (DESC) was formed shortly after DIET as part of the data governance structure. DESC provides direction to DIET, prioritizes workload and resources, facilitates implementation of data-related business process changes, reviews data project proposals for merit, business need, and alignment with DDW goals, adopts business rules, and makes recommendations to executive management.

5.2.4 Data Strategic Plan

The Data Strategic Plan was created to support data governance and guide data-related needs as well as unify efforts to make information accessible, discoverable, and usable to the public, other state agencies, academia, and others. The Data Strategic Plan guides DDW's data management goals to focus on strategies for enhancing data collection, transparency, accessibility, consistency, and quality. Data of known and documented quality is integral for DDW and other stakeholders to make knowledgeable decisions. The overall mission of the Data Strategic Plan is to continuously improve DDW operational efficiency and enhance services to stakeholders by leveraging information technology. The Data Strategic Plan seeks to provide accessible data of known and documented quality to enhance the knowledge and understanding of California's water resources to promote elevated decision-making for all stakeholders. The goals of the Data Strategic Plan include understanding data, data quality, prioritizing information development, data accessibility, data consistency, and streamlining data.

5.3 DRINKING WATER DATA SYSTEMS

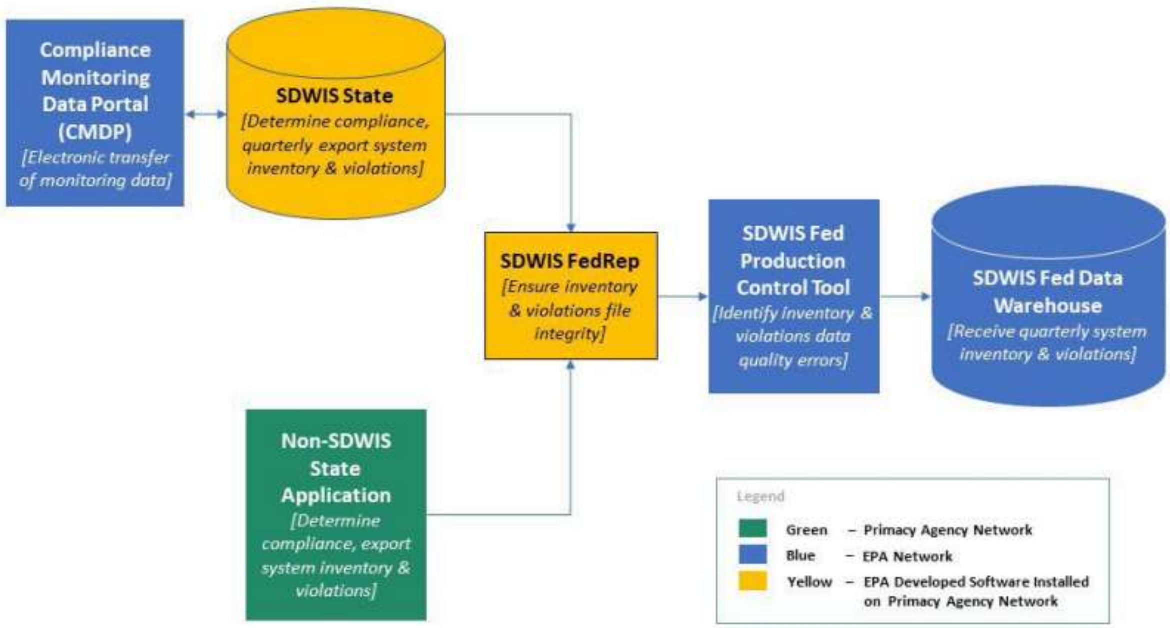
DDW uses several data management systems to intake, manage, track, and report data and information relevant to operations of its various programs. Each system is described as it currently operates.

5.3.1 SDWIS

The Safe Drinking Water Information System (SDWIS) contains PWS inventory information maintained by drinking water regulatory programs to meet the reporting requirements established by the SDWA and related regulations and guidance.

SDWIS has two components, SDWIS/STATE and SDWIS/FED. SDWIS/STATE was developed to provide state drinking water regulatory programs with a uniform and consistent means to track and report data to USEPA as required. States can elect to use SDWIS/STATE or other data management systems to transfer data in the required format to USEPA. SDWIS/FED is a system that intakes data reported by states and regions and is the federal version of SDWIS/STATE as illustrated in Figure 5-1 below:

Figure 5-1: SDWIS State data flow into SDWIS Fed



USEPA is responsible for providing updates to SDWIS/STATE to track compliance with new rules and new reporting requirements established under the federal Safe Drinking Water Act. Installations of SDWIS/STATE are maintained by individual drinking water regulatory programs. USEPA has been undertaking SDWIS modernization efforts since 2012, to provide new system capabilities that improve the reporting by primacy states and provide an enhanced and more efficient way to manage data flows into and out of SDWIS. One of the key objectives for modernization was to transfer the burden of maintaining SDWIS/STATE to USEPA by developing a cloud-based application while also allowing states to customize application based on state-specific needs. The current iteration of the SDWIS modernization effort was initiated in 2020 with a SDWIS Modernization Board with members from states and the USEPA involved in drinking water data and information technology. The new SDWIS/STATE replacement is called the Drinking Water State-Federal-Tribal Information Exchange System (DW SFTIES) and is currently undergoing user acceptance testing. With the history of delays with the SDWIS modernization effort, USEPA will continue to provide technical support for SDWIS/STATE in the foreseeable future.

It should be noted that use of any USEPA developed compliance reporting tool is an option for states, not a requirement. The basic requirement is for each state that has been granted primacy under the federal SDWA to provide reporting of specific compliance elements to USEPA's SDWIS/FED. The use of USEPA-developed tools can lessen the burden on states to develop their own tools that meet this requirement. Additionally, there is the benefit that USEPA would upgrade SDWIS as new regulations are adopted to ensure appropriate and adequate reporting of PWS compliance. USEPA does not develop SDWIS to implement state-only rules, such as the operator certification regulations, California-specific maximum contaminant levels, or provide other management tools necessary to carry out a drinking water program, such as the ability to track domestic water supply permits required to be issued to each PWS.

SDWIS/STATE Implementation

DDW began transitioning from the legacy Permits, Inspections, Compliance, Monitoring and Enforcement (PICME) database into SDWIS/STATE starting in 2009 but has not fully implemented some key features of SDWIS/STATE, such as its monitoring schedules management modules and the compliance decision support modules. DDW currently uses SDWIS/STATE to allow DDW field offices to maintain PWS inventory information, including basic water system information, site visits (inspections and sanitary surveys), lead and copper rule monitoring schedules, and violations and enforcement action records. This information stored in SDWIS/STATE is reported to SDWIS/FED on a quarterly basis. DDW has taken additional steps since the completion of CLIP, to begin phasing in additional use of SDWIS/STATE. The transition to SDWIS/STATE is implemented in three phases:

Phase 1 (completed) brought SDWIS/STATE into production for entering and maintaining PWS inventory information. The inventory migration phase included extensive data cleanup before migrating data from PICME to SDWIS/STATE and extensive staff training for ongoing entry and maintenance. This phase also included collecting 90th percentile data from the various lead and copper databases and spreadsheets located in each field office, migrating the data into SDWIS/STATE, and decommissioning local data repositories for lead and copper.

Phase 2 (completed) brought SDWIS/STATE into production for receiving and storing incoming water quality data from CLIP, becoming the new database of record for water quality results from PWSs. The recent historical water quality data (2011 to 2021) was also migrated from the legacy Water Quality Management (WQM) system to SDWIS/STATE to ensure that SDWIS/State contains data covering at least one 9-year compliance cycle (see Section 5.3.2.1). This dataset, which uses an updated user-friendly format with additional data elements and includes data collected from years 2011 to the present, is published on DDW's water quality data and download website, where data users can directly download the files. DDW continues to offer access to PWS water quality data via the public Drinking Water Watch (see Section 5.3.3).

Phase 3 (in progress) is to maintain SDWIS/STATE with the newest updates from USEPA to maintain federal reporting requirements, including SDWIS software updates to handle Lead and Copper Rule Revision data entries, compliance tracking, and federal reporting requirements. Additional software updates will allow SDWIS/STATE to store additional water quality data, such as Harmful Algal Bloom data and PFAS data, and to allow DDW to provide federal reporting of PFAS data. To improve the quality of the SDWIS/STATE inventory, including the data described in Sections 5.3.6 (GIS) and 5.4 (LPA), DMU will continue to manage the data cleanup program, which identifies and prioritizes inventory data that requires cleanup, provides training and tools to help update the data, and tracks that status of data cleanup. This includes training staff to use the SDWIS/STATE compliance decision support tools for the Lead and Copper Rule, which will help streamline identification of potential violations and compliance tracking as well as clean up the dataset submitted to USEPA. Aside from the many benefits of an accurate inventory, continued focus on data quality will facilitate DDW's long-term plan to upgrade from SDWIS/STATE to WaterTAP (see Section 5.3.11) and/or DW-SFTIES for monitoring and compliance decision support for all rules.

Because SDWIS/STATE does not have a permit inventory component, the development of a permit inventory and tracking system has been an identified need that is currently included, among other identified data needs, in DDW's WaterTAP effort.

5.3.2 Water Quality Data Management

Gathering accurate and timely PWS water quality data is critical to protect public health and is one of DDW's core functions. DDW uses several data applications and tools to intake water quality data, store water quality data, provide user application tools for staff to access and analyze the data to meet their regulatory oversight needs, and provide public and stakeholder accessibility tools to view and download water quality data.

5.3.2.1 WQM

Water Quality Management (WQM) was developed by DDW and was put into production in 1988 as the repository of drinking water quality monitoring results and the database of record for water quality data submitted by analytical laboratories on behalf of PWSs. In 2021, after years of careful planning, testing, and phased transitions to new data systems and data workflows, DDW decommissioned WQM as the database of record for water quality data for PWSs since the drinking water program transitioned to using CLIP (see Section 5.3.2.3). As part of the planning effort, DDW repurposed WQM to intake lead sample data exclusively for the Childcare Center Lead Sampling Program (see Section 5.3.8). The current repository of drinking water quality monitoring results and the database of record for PWSs is SDWIS/STATE (see Section 5.3.1). The PWS water quality datasets covering data collected from 1974 to 2010 that were originally populated from WQM continue to be published on DDW's water quality data and download website, where data users can directly download the files.[104]

5.3.2.2 Qir

Water Quality Inquiry Revised (WQIr) is the information management system developed by DDW in 1988 that allows DDW staff to maintain and manage monitoring schedules, assess compliance with monitoring requirements, and access and create reports. WQIr is one of the legacy systems that has been modernized and further developed to add useful tools and features. Monitoring schedules, water quality data, and reports from

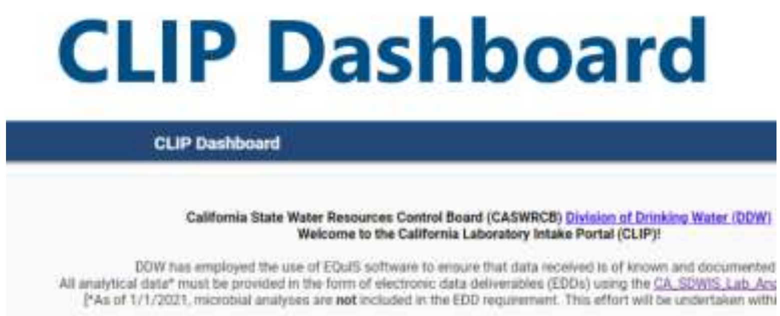
[104] Water Quality Data and Download Page: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.html

WQIr are displayed in Drinking Water Watch, which is accessible to PWSs and the public. DDW is planning to continue to add features to WQIr for eventual integration as a module in WaterTAP (see Section 5.3.11). Additionally, a large effort will need to be made to review, prioritize, and clean up the monitoring schedules in WQIr to verify compliance with regulations and improve accuracy of monitoring schedules as part of the WaterTAP integration.

5.3.2.3 CLIP

DDW launched the California Laboratory Intake Portal (CLIP) in September 2021.[105] DDW's legacy water quality intake applications, Write-On and WQM, were retired after CLIP became operational.

CLIP is the new single point of access for laboratories to report drinking water quality data, replacing WQM and Write-On. A third-party vendor, EarthSoft, Inc., provides the data intake platform, which includes user credentialing, data submission templates, and data error check tools. Data submission by laboratories is via Excel, text, or comma separated value templates (replacing the Electronic Deliverable Format [EDF] v1.2i used by Write-On) as the data reporting format required for drinking water quality data per regulation.



As part of the CLIP development effort, DDW updated several data workflows, including how the datasets published on DDW's water quality data download page is generated and revisions in water quality data migrations to other applications used by DDW (such as SDWIS/STATE) and others. DDW also added data workflows to manage new quality control processes and trained laboratories on how to submit water quality data using the new intake system. As a result of these efforts and a focus on customer support, the transition to CLIP, while a big change for laboratories, minimized disruption as much as possible. The successful completion of CLIP implementation by DMU was a significant achievement for DDW. DDW is implementing a phased approach to adding data quality elements to CLIP, such as more robust data error checks and more sample data quality control information. DDW also plans to implement the intake of bacteriological water quality data directly from laboratories to replace the existing process of submitting electronic copies of laboratory reports to field offices.

5.3.3 Drinking Water Watch

Drinking Water Watch (DWW) is a tool that displays information directly from SDWIS/STATE on both internal and external facing platforms. DDW has modified DWW

[105] California Laboratory Intake Portal (CLIP):
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/clip.html

(mew) to better display SDWIS/STATE inventory data and information from WQI such as monitoring schedules, as well as other aggregated information for DDW staff to streamline reviews and facilitate regulatory oversight. DDW has also developed a public Drinking Water Watch (pDWW)[106] that provides useful information to PWSs and the public, such as monitoring schedules and water quality data.

Both platforms are critical interfaces for information access, with mDWW providing needed tools for use by DWW staff to assist in the implementation of SDWA, and pDWW providing a meaningful point of information access to the public in an easy-to-understand format. Currently, pDWW allows the public to view information such as water system locations, contact information, facility and sampling point inventory, water quality results, and violation and enforcement information. DDW continues to develop applications that facilitate a single point of access to data and information, to streamline access of important information for staff and the public alike.

5.3.4 Electronic Annual Reporting System

The "Annual Report to the Drinking Water Program" was started in the mid-1980's to gather updated information from PWSs that supports the requirement for maintaining inventory information under the primacy agreement with USEPA. In 2009, DDW put an electronic Annual Report (eAR) system into production to replace the paper format Annual Report forms. The eAR form is updated every year, with the types of information requested in the eAR growing and changing as data collection needs change over time. In 2018, DDW initiated a stakeholder process on eAR data collection, which includes a public input forum process with meetings scheduled two times a year as part of the annual eAR form update review. The purpose of the eAR input forums is to provide information regarding proposed changes to the upcoming eAR, gather feedback from stakeholders on proposed changes, provide updates to the technical reporting order that requires the eAR reporting, and provide an overview of previous reporting year statistics and data uses. In 2020, DDW completed the redesign of the eAR system to address quality control issues and problems with the eAR data structure and moved the eAR to a new portal. The redesign allowed additional improvements to automate the eAR review process. The new eAR Portal was put into production in 2021.

In addition to the eAR forms, the eAR Portal hosts the electronic submittal of the annual Consumer Confidence Report and certification, as well as the submittal of disadvantaged community certification forms. It also provides a customizable platform from which to gather information on emerging issues such as information on lead

[106] Drinking Water Watch: https://sdwis.waterboards.ca.gov/PDWW/

service lines pursuant to Senate Bill (SB) 1398 (2016) and SB 427 (2017), as well as financial information to support implementation of SB 200 (Safe and Affordable Drinking Water Act, 2019). Information about eAR Portal updates is posted on the eAR website[107].

Increasingly, other State Water Board units and partners have discovered that the eAR is a valuable platform for them as well. The information gathered through the eAR is used not only by DDW staff, but also by the public, policymakers, academia, non-governmental organizations (NGO), and others, to assist in evaluations and decision-making. The eAR provides a platform for the following agencies to gather data:

- DWR has long used the eAR to collect monthly water production data for their PWS statistics surveys used to update Bulletin 160 (California Water Plan) and Bulletin 166 (Urban Water Use in California).
- State Water Board's ORPP has partnered with DDW to use the eAR to collect information on water loss, water rates, water conservation, and climate change adaptation/resiliency. This data is used by ORPP to craft guidance on a variety of issues related to water; it is also being used to inform analyses required for the rulemaking process.
- The State Water Board's Fee Billing Unit uses data from the eAR to determine the annual fees to collect from each PWS to support the operation of DDW, as well as verify disadvantaged community status for application of fee reductions.

DDW staff review the eAR forms submitted by PWS and update DDW's SDWIS inventory accordingly. Because reporting is not always accurate and inaccuracy in critical information such as inventory and contact information can lead to undesirable outcomes, some eAR revisions must be carefully reviewed to ensure that the SDWIS inventory remains accurate. This means that DDW's annual eAR reviews are a resource intensive task. DDW continues to leverage technology, automation, and user interface design to help streamline the review and inventory update process. DDW has developed tools to help DDW staff compare submitted eAR data to the current SDWIS inventory, which helps staff identify if a change/update needs to be made in SDWIS.

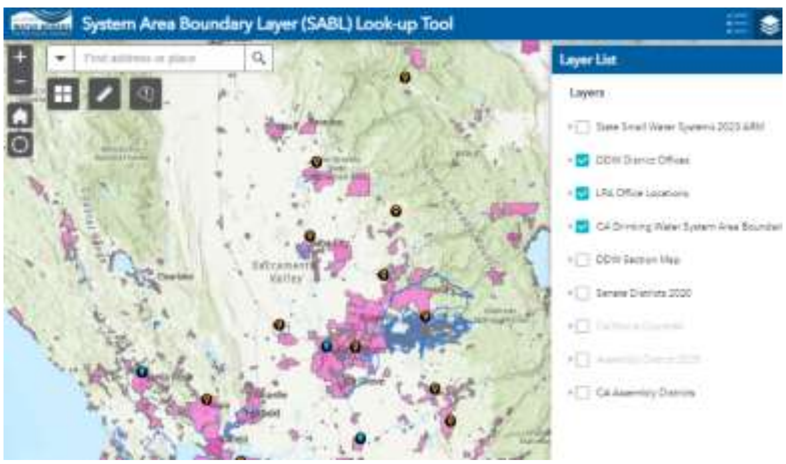
DDW publishes the eAR dataset on an annual basis for use by data users and other stakeholders. The dataset from reporting year 2023 are available on the Data

[107] Electronic Annual Report: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html

Downloads section on the eAR website, and DDW is working to improve the usability of the datasets for reporting years 2013-2022 with the target to republish them in 2025.

5.3.5 System Area Boundary Lookup

The Water Boundary Tool (WBT) was launched in 2012 by the California Environmental Health Tracking Program (now Tracking California) per SB 702 (Chapter 538, Statutes of 2001) using a geographic information system (GIS) application.[108] The WBT facilitated the creation and collection of customer service area boundaries for PWSs in California, which were published online as high-resolution GIS maps for use by internal and external stakeholders. The California Department of Public Health (CDPH) Drinking Water Program (now DDW) verified the service area boundary information submitted by PWSs and initially developed GIS tools to link customers to their drinking water and for emergency preparedness and response, such as quickly identifying water systems impacted by a fire or other emergency event. The WBT was a useful tool to better allow stakeholders to research and enhance the understanding of the relationship between drinking water, health, and the environment.



The State Water Board subsequently started using the WBT in the planning and prioritization of funding drinking water system improvements, regionalization, consolidation, and technical assistance in support of the Human Right to Water Act.

In 2019, the State Water Board took ownership of WBT and its further development and maintenance. DDW now hosts these verified boundaries in the newly created System Area Boundary Layer (SABL) application, which includes the SABL Look-up Tool.[109]

DDW completed the development of the SABL application administrative tools, which streamlined the verification of water system boundaries by District Offices, Local Primacy Agencies and PWSs, and created a process to update existing boundaries, create new boundaries, and upload revised boundaries. DDW also completed revising the SABL Look-up Tool, which displays the SABL GIS layer together with other reference GIS layers and SDWIS data.

5.3.6 Geographical Information Systems

Recognizing the importance of GIS in implementing DDW’s data governance, a GIS Workgroup was formed in 2016 which is comprised of DDW staff. The GIS Workgroup

[108] Tracking California: https://trackingcalifornia.org/topics/water-systems#gsc.tab=0
[109] System Area Boundary Layer (SABL) Look-up Application: https://gispublic.waterboards.ca.gov/portal/home/item.html?id=272351aa7db14435989647a86e6d3ad8

was instrumental in demonstrating the benefits of using GIS to streamline key work areas such as emergency response, and to enhance data visualization of water quality data from PWSs. Since much of the data DDW uses has a geographic or spatial component, such as PWS boundaries, source location data, and distribution system water quality sampling data, use of GIS can assist and improve data assessment and public health impact evaluations. GIS technology can help the State Water Boards, its stakeholders, policymakers, and others collaborate, manage, and integrate public health water quality data, perform statistical analysis, data visualization, and reporting.

The GIS Workgroup developed the PWS GIS base map which includes wells, treatment facilities, storage tanks, and pump stations to make locational information accessible. This base map can be overlaid on other GIS map layers (such as the SABL layer) to enhance data visualization.

The GIS Workgroup has developed GIS layers such as:

- Emergency response GIS map which includes dynamic feeds for earthquakes, fires, and floods to identify at-risk water systems or facilities
- Public Safety Power Shutoff (PSPS) map to identify utilities affected by power shutoffs caused by threatening weather events
- Lead service line inventory replacement plan status maps
- Contaminant-specific maps displaying geographically located detections, such as the recent per- and polyfluoroalkyl substances (PFAS) maps, which were used to further determine PFAS monitoring needs
- Groundwater cleanup maps, in conjunction with the Regional Water Boards and USEPA

To ensure the PWS GIS base map is accurate, the GIS Workgroup in coordination with DMU and DDW field office staff assessed the data quality of existing locational datasets for completeness and accuracy, including locational data associated with wells, treatment plants, storage tanks, pump stations and PWS service area boundaries. The GIS Workgroup developed an internal portal and process to gather additional locational data and revise existing locational data to improve data quality.

Although the GIS Workgroup continues to assist in filling GIS needs, QAS has increased its GIS capability with the creation of the DSU to support DDW's growing GIS mapping needs. Additional resources will be necessary to continue supporting GIS interfaces to provide meaningful and useful data visualizations to meet routine and emergency needs.

5.3.7 Drinking Water Source Assessment and Protection (DWSAP) Program

The drinking water source assessment is the first step in the development of a complete DWSAP program. DDW's source water assessment process consists of a delineation of the area around a drinking water source through which contaminants might move and reach the drinking water supply; an inventory of possible contaminating activities (PCAs) that might lead to the release of microbiological or chemical contaminants within the delineated area; a prioritization of PCAs, and a determination of the PCAs to which the drinking water source is most vulnerable. In 2001, the Drinking Water Program provided a software application called TurboSWAP as a tool for PWSs to facilitate completion and submittal of drinking water source assessments. PWSs without access to computers were able to use paper copies of assessment forms available in TurboSWAP.

TurboSWAP was developed by the University of California, Davis – Information Center for the Environment (UCD-ICE) specifically for the California DWSAP program, which also included tools to manage the submittal of source water assessment reports. However, the contract with UCD-ICE to maintain TurboSWAP expired in 2015 and was not renewed by the State Water Board. Since then, the State Water Board has been working on developing a replacement tool to help PWSs complete and submit source water assessment reports.[110] Because TurboSWAP is no longer available as a computer software tool, PWSs are only able to use paper assessment forms, without benefit of automation that a tool like TurboSWAP provides. Without additional resources the State Water Board must reevaluate its ability to develop a TurboSWAP replacement tool in house and develop a schedule for implementation of a TurboSWAP replacement tool.

5.3.8 School and Child Care Center Lead Monitoring and Reporting

In 2017, DDW required approximately 1,200 community water systems to facilitate water sampling for lead for California's K-12 schools per AB 746 (Chapter 746, Statutes of 2017), which required community water systems serving school sites of local education agencies not independently permitted as water systems to test lead levels in drinking water at all facilities located on public school property which were constructed before January 1, 2010. This sampling was to be completed by July 1, 2019. These sample results were submitted electronically to DDW and published on the "Lead Sampling of Drinking Water in California Schools" website.[111]

Subsequently, AB 2370 (Chapter 676, Statutes of 2018) required licensed childcare centers located in buildings constructed before January 1, 2010, to test their drinking water for lead between January 1, 2020, and January 1, 2023, and every five years after the initial date of testing. It also required that these samples be electronically submitted to DDW, and if the test results show elevated lead levels, DDW must in a timely manner report the results for the affected licensed childcare center to the California Department of Social Services (CDSS). DDW must also publish all lead test results received on an internet website that is accessible

[110] Source water assessment resources for PWS: https://waterboards.ca.gov/drinking_water/certlic/drinkingwater/DWSAP.html

[111] Lead Sampling of Drinking Water in California Schools: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/leadsamplinginschools.html

to the public in a timely manner. DDW redeveloped WQM as the data intake system and database for the childcare center lead results and continues to collaborate with CDSS to ensure complete implementation of requirements under AB 2370. The initial sampling was completed, and monthly updates are published on the website.[112]

5.3.9 Lead and Copper Rule Revisions (LCRR)

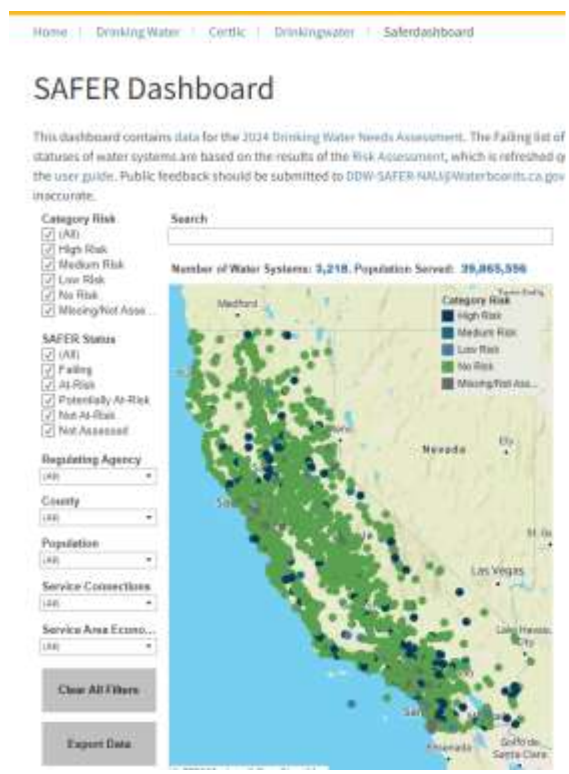
DDW completed the development of the Lead Service Line Inventory Reporting Portal[113] in 2023 to facilitate PWS submittal of the initial lead service line inventory (LSLI) pursuant to DDW pursuant to the LCRR. The portal includes a user guidance document as well as resources from DDW, the Association of State Drinking Water Administrators (ASDWA), and USEPA to assist PWSs with the development of LSLI's and support PWS compliance with the LCRR. DDW also developed a tool for DDW staff to help track the status of inventory submittals by PWSs.

5.3.10 Safe and Affordable Drinking Water

Several data tools related to the SAFER program are summarized below. The SAFER program and related tools are discussed in more detail in Chapters 8 and 9.

5.3.10.1 Drinking Water Needs Assessment

The Drinking Water Needs Assessment is the annual State Water Board report that provides a comprehensive identification of California drinking water challenges in achieving the Human Right to Water. The report analyzes and identifies drinking water infrastructure, managerial capacity, technical, and financial needs for communities served by public water systems, state small water systems, and domestic wells. The Needs Assessment consists of four core components: Failing Water Systems, Risk Assessment, Cost Assessment, and Affordability Assessment. The Needs Assessment informs the annual Fund Expenditure Plan for the Safe and Affordable Drinking Water Fund and broader SAFER program activities. (Health & Saf. Code, § 116769.). Details of the Drinking Water Needs Assessment are discussed further in Chapters 8 and 9.



[112] Childcare Center Lead Sampling Program: https://www.waterboards.ca.gov/drinking_water/programs/lsicc/

[113] Lead and Copper Rule Revisions Lead Service Line Inventory Reporting Portal: https://lslinventory.waterboards.ca.gov/

Related data tools include:

1) The SAFER Dashboard[114]

2) Risk Assessment for State Small Water Systems and Domestic Wells Dashboard[115]

3) Water System Financial Capacity & Community Affordability Dashboard[116]

4) Aquifer Risk Map[117]

5) SAFER Dashboard data publication on the California Open Data Portal[118]

5.3.10.2 *Water System Partnerships and Consolidations (SAFER Clearinghouse)*

The SAFER Clearinghouse is an information management system to collect, manage, and analyze data from a variety of disparate data systems and sources, SDWIS, the Loan and Grants Tracking System (LGTS), Local Primary Agencies (LPAs), and city and county regulators of domestic/private wells. The State Water Board completed the first stage of development of the SAFER Clearinghouse in 2021, and it is currently used by the SAFER Program to manage the tasks specified under SB 200 (Safe and Affordable Drinking Water Act, 2019)[119]. The SAFER Clearinghouse enables DDW SAFER staff to oversee and manage the identification and prioritization of water systems; the provision of technical assistance; assigned Administrators; provision of interim water supplies; status of violations and compliance with issued enforcement orders; as well as tracking the funding of planning and construction projects to address drinking water issues. It is also used by State Water Board management to demonstrate progress toward achieving the Human Right to Water and to provide information to the Board and stakeholders on SAFER implementation.

5.3.11 Other Non-Integrated Data Systems (at DDW Field Offices)

DDW field offices, comprised of 28 Districts, as well as the 26 LPAs have long utilized a variety of disparate, non-integrated spreadsheets and data systems to track, store, and manage data collected from over 7,200 PWSs for compliance determination. Over time, the Districts and LPAs developed these individualized, non-integrated data systems out of necessity since there was no platform to encompass the data tracking needs in a

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[114] SAFER Dashboard: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html

[115] Risk Assessment for State Small Water Systems and Domestic Wells: https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=ece2b3ca1f66401d9ae4bfce2e6a0403&page=Homepage

[116] Water System Financial Capacity & Community Affordability Dashboard: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/afforddashboard.html

[117] Aquifer Risk Map: https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=18c7d253f0a44fd2a5c7bcfb42cc158d

[118] SAFER Dashboard data publication on the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

[119] Chapter 120, Statutes of 2019 (SB 200): https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB200

unified manner. Over 40 types of unique data systems and data tools have been developed to meet local data management needs. None of these tracking systems are maintained by dedicated information technology support staff or third-party contracts; rather they are supported and maintained by various knowledgeable district office staff, committees, and workgroups. While some of these local data systems and data tools are shared with other District offices, and useful local tools are often redeveloped by DDW for use statewide on an ad hoc basis, DDW's Data Strategic Plan calls for integration of local datasets to work with division-wide data systems to improve data accessibility.

The data that the Districts and LPAs collect, review, and manage is vital to ensuring safe water is provided, such as through the review and assessment of water treatment effectiveness. The development of non-integrated data systems came out of necessity to enable individual Districts and LPAs to perform their duties more efficiently. However, it limits the availability of data to the local level and is not available at the state level for consolidated evaluations and decision making and decreases data quality and uniformity.

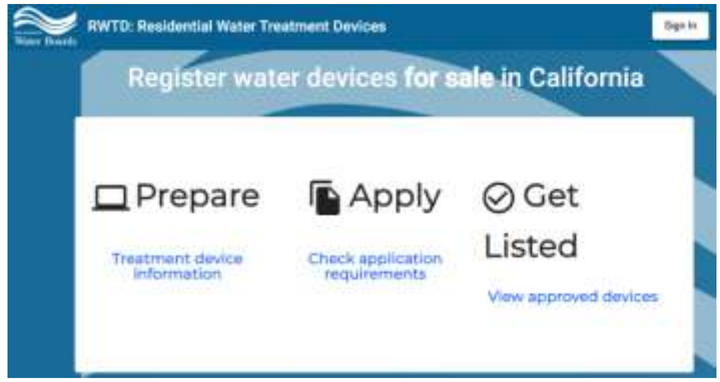
The State Water Board plans to integrate these disparate data systems into a single point of access system, known as WaterTAP, to create a more efficient, transparent, and consolidated system. The purpose of Water TAP is to centralize these disparate data systems and make consistent business rules to centralize all these data systems to meet state regulations, DDW business needs and practices, and to implement USEPA business rules and federal regulations. To meet the USEPA reporting requirements, the State Water Board intends to develop WaterTAP to support DDW and LPA staff, manage USEPA reporting requirements and automate data management efforts. WaterTap will reduce standalone databases and provide centralized data for increased accessibility for all users that is comprehensive, reliable, and defensible.

WaterTAP will expand usership and information accessibility by creating a role-based web interface. External users will have the ability to submit, update, and maintain the data that they are required to report to DDW. This will provide additional control over the quality of information submitted to DDW. DDW staff will have the ability to review and accept user submissions. This will increase staff productivity and reduce errors as external users will be entering and managing their own data into WaterTAP as opposed to DDW staff manually entering and managing data into various disparate systems. Additional savings will be realized by automating and streamlining business rules, processes, and compliance determinations. The data in WaterTAP will be of higher quality, more easily accessible, and allow users such as policymakers, NGOs, and academia to directly access the information.

DDW completed the business analysis for WaterTAP in 2021 after which an internal workgroup began developing requirements for WaterTAP, including performing an alternative analysis to identify what options are available to meet these needs. DDW continues to refine requirements including plans to integrate stakeholders into the development process.

5.3.12 Residential Water Treatment Device Registration Portal

Water treatment devices (WTD) sold or otherwise distributed in California which make a claim of health or safety benefit must be registered by the State Water Board. The State Water Board must make available to the public a list of the registered residential water treatment devices. California Health and Safety Code section 116825 defines a WTD as "any point of use or point of entry instrument or contrivance sold or offered for rental or lease for residential use, and designed to be added to the plumbing system, or used without being connected to the plumbing of a water supply intended for human consumption in order to improve the water supply by any means." It also defines a "health and safety claim" as a claim that a WTD will remove or reduce a contaminant that is regulated (has a primary drinking water standard) in California. The State Water Board's WTD registration program lists only registered WTDs for which health and safety benefit claims are made.



To facilitate tracking of WTD registration, DDW and DIT developed a new WTD registration portal for use by device manufacturers to submit required device registration information to the State Water Board. This new registration portal was released for use by device manufacturers in February 2024.

The last phase of DDW's WTD registration portal project is to improve how the WTD listing is displayed to the public. Currently, registered WTD are published on a manually updated spreadsheet on the Residential Water Treatment Device website.[120]

Once complete, the residential water treatment device public website will offer an improved user experience with added search capabilities so that users can more easily look up registered water treatment devices sold in California that make a health and safety claim.

5.3.13 Data Publishing

DDW publishes a variety of information about PWSs and the safety of drinking water supplies that ensures data transparency, accessibility, and usability, and to satisfy various legislative mandates. DDW continues to improve historically published datasets to meet current data publication needs and manage changes to publish datasets as legacy data management systems are modernized.

As DDW integrates existing tools to enhance data visualization, the program also explores new tools to improve data publishing in the future, like Snowflake, a cloud-based data warehouse that stores, analyzes, and shares data, as part of Data Strategic Plan initiatives to leverage information technology. DDW has established a Snowflake Workgroup to enhance the program's collective understanding and use of Snowflake's capabilities. The workgroup provides a space for both new and experienced users to

120 Residential Water Treatment Device website: https://www.waterboards.ca.gov/drinking_water/certlic/device/watertreatmentdevices.html

explore Snowflake concepts, share insights, and explore the tool through real projects.

5.4 LOCAL PRIMACY AGENCIES (LPA)

With the enactment of Chapter 1248, Statutes of 1992 (AB 2995)[121], there was a significant change to the responsibility for oversight of small PWSs serving less than 200 service connections. The State Water Board was authorized to delegate its regulatory powers over these systems within a county to LPAs through Local Primacy Delegation Agreements (LPDAs) specifying the activities required to maintain primacy delegation. As of November 2024, there are 26 LPAs, a reduction from 36 LPAs in 1992 (see Table 2-2 in Chapter 2).

Although individual LPAs used a variety of data management systems to track and report data for small water systems, upon implementation of AB 2995, each contracting LPA had to meet specific reporting requirements for data. Each LPA either established its own data management system or switched to EnvisionConnect, a privately developed data management system, to meet the requirements.

In Fiscal Year 2012-13, the Drinking Water Program identified issues with LPA data quality and issued new LPDAs requiring LPAs to use SDWIS/STATE for data management and reporting by the end of 2014. To support LPAs in their LPDA compliance, the USEPA provided one-time grant funds which were to be used for data reporting, training, staffing, equipment, and other costs related to the drinking water program. Due to complications related to the switch to SDWIS/STATE, LPAs could not meet the original deadline. As a result, the Drinking Water Program issued amendments to the LPDAs requiring use of SDWIS/STATE for all elements implemented by DDW. As of September 2024, all LPAs have at least one user with a SDWIS/STATE account and are evaluated quarterly for compliance with data reporting requirements established in the LPDAs.

Since the issuance of the LPDA amendments, the State Water Board has continued to observe issues with LPA data reporting. For example, many LPAs do not maintain contact information in SDWIS/STATE and instead use third-party software to maintain contact information shared with other local programs. There are also issues with maintaining accurate records of violations and enforcement, which often lead to difficulty in assessing and prioritizing failing or at-risk systems.

These issues have become especially apparent as several LPAs have terminated their delegation agreements, returning oversight of their small PWSs to the State Water Board. The lack of accurate water system inventory and contact information often makes it difficult to establish timely communications with small water systems following the change in regulatory jurisdiction. Inaccurate violation and enforcement records further complicate the prioritization of core work and can significantly delay and/or increase enforcement workload for ongoing violations not previously identified by the LPAs.

LPAs face several obstacles in accurate reporting via SDWIS/STATE and other data

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[121] AB 2995:
http://leginfo.ca.gov/pub/95-96/bill/asm/ab_2701-2750/ab_2727_cfa_960808_174242_sen_floor.html

management tools used by DDW, the most significant being financial sustainability of their regulatory program. Many LPA staff dedicate a significant amount of time to fieldwork due to issues stemming from complex water quality issues or the limited technical, managerial, and financial capacity of smaller water systems. This limits the time available for other administrative or reporting activities, and to attend training related to data management tools. The introduction of new data management tools has further exacerbated these challenges, as LPAs have been unable to utilize them effectively. LPAs are also having trouble with recruitment and retention, making it hard to maintain a consistent level of knowledge and experience to rely on for accurate data reporting.

The State Water Board continues to assist and train LPAs with data issues and in the long term is developing WaterTAP (Section 5.3.11) that will address some of the LPAs' data issues, while also facilitating workflows and improving the quality of the data managed by both LPA and DDW staff.

5.5 CITY AND COUNTY REGULATORS OF STATE SMALL WATER SYSTEM (SSWS) AND DOMESTIC/PRIVATE WELLS

State small water systems (SSWS) are non-PWSs that are overseen by their respective counties and serve at least five, but not more than 14 service connections and do not serve more than an average of 25 individuals daily for more than 60 days out of the year. Domestic and private well systems serve fewer people than SSWS. There is an increased effort to ensure the Human Right to Water to each of the customers or users of SSWS and domestic and private wells. Pursuant to SB 200, the State Water Board is tasked with gathering information related to SSWS including locations, contacts, and water quality. To meet this data collection need, a new data intake portal was developed to enable cities and counties to upload SSWS and domestic/private well inventory to the SAFER Clearinghouse (Section 5.3.10.2) that can interface with DDW's existing data management systems for ease of reporting by the respective counties, and ease of data use by the respective stakeholders.[122] Resources are needed to further enhance displaying representative information of these non-PWSs to stakeholders.

5.6 ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

The ELAP application and accreditation management system (ELATED) is an internally facing Microsoft Access database system that manages the information of accreditation for ELAP. The system consists of a front-end 2010 Microsoft Access database and a back-end structured query language (SQL) database. The front-end Access database contains forms, tables, queries, and reports while data is stored on the back-end SQL database. The ELAP database maintains the information for laboratory applications, Fields of Testing/Accreditation, on-site assessment data, payment amount, and certificate timelines.

ELAP uses the database to accredit laboratories located in the state of California and throughout the nation. The database has been used since the program transitioned from the California Department of Public Health to the State Water Board in 2014 and

[122] State Small Water System and Domestic Well Water Quality Data: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/small_water_system_quality_data.html

continuously by ELAP since 1995. The database is a critical software platform that is used daily by all ELAP staff statewide.

However, the current database does not meet the program needs. ELAP staff manually enter information for accrediting laboratories which is time intensive and may result in keystroke entry errors. Information for laboratory applications, proficiency testing results, on-site assessment evaluations, and dates for accreditation are also manually entered by staff into the database. This labor-intensive effort has exacerbated the shortage of staff resources and increased the time to complete laboratory accreditation. An additional shortcoming of the existing database is that it does not store historical information for laboratories nor enable auditable tracking of staff data input.

ELAP needs software tools to help meet workload demands and to ensure consistency when accrediting laboratories. The current database meets some of the needs of the program but does not provide all the features and functionalities needed for the program to achieve its mission. Acquisition of new software is needed to improve the processing efficiency of information being evaluated for laboratory accreditation. With new accreditation software, automated processes will enhance management of the overall accreditation process. Acquisition of accreditation software is critical for ELAP to fully achieve its legislative mandates and establish credibility both state- and nation-wide as an effective environmental laboratory accreditation program.

5.7 COLLABORATION WITH OTHER AGENCIES

DDW collaborates with several other state agencies. Collaborating with other organizations and data systems enhances publicly accessible open data by integrating water data into open-access platforms to assist users in making more informed data-driven decisions. Updates to DDW data systems will require involvement and communications with these other organizations.

5.7.1 CDPH Environmental Health Investigations Branch (EHIB)

EHIB is under the CDPH, Division of Environmental and Occupational Disease Control and has been investigating possible adverse health outcomes due to exposure to drinking water contaminants. EHIB uses water quality data from SDWIS and SABL to carry out their investigations and surveillance.

5.7.2 Office of Environmental Health Hazard Assessment (OEHHA)

DDW shares information with OEHHA from data sources, such as SDWIS, eAR and water system boundaries to support several efforts by OEHHA. CalEnviroScreen uses DDW water system information to update and improve the scoring hosted on the tool.

In July 2017, DDW entered into an inter-agency agreement with the Office of Environmental Health Hazard Assessment (OEHHA) to provide the State Water Board with statewide metrics related to the adequacy of California’s drinking water with respect to its safety (via water quality indicators), affordability, and accessibility, for consideration in DDW’s own efforts in documenting the Human Right to Water. Under this contract, OEHHA developed the metrics and created an interactive online tool that visualizes the HR2W indicators that are defined in the report. In 2021, OEHHA launched the Human Right to Water Framework and Data Tool, becoming the first state to develop a tool to measure the progress of achieving the Human Right to Water.[123]

5.7.3 Department of Water Resources (DWR)

DDW collaborates with DWR in several efforts related to data. Information on monthly and annual water production and deliveries has been gathered annually in a format to meet DWR's data needs since about 2013. As a result of the data efforts completed under DDW's Data Strategic Plan, DWR can download data from the SAFER Clearinghouse directly as needed. DDW has also provided information to DWR to assist in the implementation of Chapter 14, Statutes of 2018 (SB 606) and Chapter 15, Statutes of 2018 (AB 1668) related to drought risks for smaller water systems (less than 3,000 service connections). As part of this effort, significant amounts of SDWIS and eAR data were used to develop the Drought Risk Tool. Most recently, DDW and DWR have been collaborating on water system boundaries, and the possibility of hosting urban water supplier boundaries on the SABL tool.

As part of the implementation of AB 1755, the Open and Transparent Water Data Act (Chapter 506, Statutes of 2016), DDW and State Water Board divisions and offices are continuing to collaborate with DWR, the California Data Consortium, and other PWS stakeholders to address how various datasets are published online on the California Open Data Portal. Furthermore, 2018 conservation legislation (SB 606 and AB 1668), directed DWR and the State Water Board to streamline water data reporting. Water Code section 10609.15 outlines these directives, which include analyzing opportunities for more efficient publication of urban water reporting requirements and for integrating various datasets into a publicly accessible location.

5.7.4 Governor's Office of Emergency Services

The Governor's Office of Emergency Services (CalOES) and other emergency response partners have used SDWIS information such as water system size through public Drinking Water Watch, and water system boundaries hosted on the State Water Board website during disaster and emergency response to assist in identifying potentially affected water system utilities and addressing repopulation of impacted areas. During an incident like a wildfire or an earthquake, DDW uses a GIS application containing the facility location to run a query of the facilities in and around the impacted area and provides it to CalOES and other local groups, to support incident response and recovery efforts.

5.7.5 Department of Pesticide Regulation

The Department of Pesticide Regulation uses PWS source water locations and drinking water quality source data within its own programs to monitor pesticide contamination of surface water and groundwater.

5.7.6 California Water Quality Monitoring Council

The California Water Quality Monitoring Council (Monitoring Council), established by a 2007 Memorandum of Understanding between California Environmental Protection Agency (CalEPA) and the California Natural Resources Agency, is required to integrate

[123] Human Right to Water in California: https://oehha.ca.gov/water/report/human-right-water-california

and coordinate the water quality and related ecosystem monitoring, assessment and reporting of the agencies. The Monitoring Council seeks to provide multiple perspectives on water quality information and to highlight existing data gaps and inconsistencies in data collection and interpretation, thereby identifying areas for needed improvement to better address the public's questions. DDW is a member of the Monitoring Council workgroup to ensure the information provided is clear and pertinent for the public.

5.8 CONCLUSION AND RECOMMENDATIONS

5.8.1 Conclusion

Following the 2014 transition from the California Department of Public Health to the State Water Board, greater expectations were placed on DDW to:

1) Make water system information useful and transparent,
2) Reduce the number of PWSs through targeted consolidations efforts,
3) Further develop drinking water standards,
4) Promote expanded uses of recycled water,
5) Launch and track the progress of the Human Right to Water initiative,
6) Expand the tracking of LPA regulated PWSs and non-PWSs water quality data and related information, and
7) Concentrate on ensuring the sustainability of PWSs.

Obtaining meaningful data from water systems, processing that data, and making it useful as well as accessible to the public is fundamental for DDW to meet these new expectations. In addition, there are increased demands for greater public access to water quality information used by DDW. To meet these greater demands, and at the same time ensure the integrity of water quality data, QAS was created, of which the main task is to ensure the intake of accurate, quality, and defensible data and information, and to ensure that same data and information is accessible and meaningful to the public.

As noted in the 1993 Plan, "A strong regulatory program requires an effective and efficient information management program to collect, organize, and make accessible the information necessary to carry out that program." Additionally, as part of the Open and Transparent Water Data Act, DDW has improved access to water data to foster collaboration, improve transparency and accountability, integrate existing datasets, and move toward increased data-driven decision-making. DDW is committed to improving its data management and has begun implementing significant improvements such as the creation of DSU under QAS to support the applications developed by DDW, provide data analysis and visualization, and improve communications within DDW and sharing of important information with the public and stakeholders. With additional resources provided to DMU, DDW implemented CLIP and completed training and transitioning all laboratories to the new water quality data intake portal, streamlined the workflow for water quality data, continued to implement SDWIS/STATE, and initiated planning of numerous data management projects to improve tracking, management, and data accessibility such as WaterTAP.

This is only the beginning of a better data management system. As the number of emerging contaminants continues to increase, and analytical techniques detect and report constituents at lower concentrations, the need to ensure and maintain quality systems within DDW has never been more apparent. Making complex information accessible to the public requires extensive technical programming and understanding of engineering practices of drinking water systems, resulting in the creation of the QAS as the logical conclusion to the vast array of technical requests being made on DDW. However, the needs and technology continue to grow faster than the funding is being made available for DDW to meet those needs. Obsolescence of existing systems and additional new data needs continue to be issues of concern. To ensure accurate data systems are in place, long-term planning for data system enhancements and replacements is important to include time for development and selection of the optimal alternative and to ensure that data systems can transition in a timely manner. Currently, there are still many improvements to be made while incorporating new regulations and new reporting requirements. Therefore, it is important to fund data management system resources needed to implement new regulations.

In addition, there is now a significant effort among state agencies to share water quality data and to streamline reporting of similar information needed by multiple agencies. The public benefits when they have access to knowledge about the quality of their water. This effort has been supported by legislative mandates and greater collaboration among state agencies have a role in ensuring that the quality of the state's water resources is maintained. State agencies that collect water quality data are also making this data available to the public in ways that are accessible and useful. The State Water Board has responded to public interest in drinking water quality by developing public portals that not only allow the public to access drinking water quality data, but to obtain information about the water systems that serve them.

5.8.2 Recommendations

5-1 Support the State Water Board's strategy to ensure future data system transitions occur in a systemic, optimized manner, allowing time for the selection and development of the preferred alternative, including the resources needed to engage and train those responsible for data submission.

5-2 Support the State Water Board's intention to pursue regulations to update the data format for electronic water quality submissions.

5-3 Support the State Water Board's intention to pursue electronic reporting and intake of microbiological analyses pursuant to the Revised Total Coliform Rule by requiring the intake of all water quality via CLIP.

5-4 Support the addition of improved data quality elements to CLIP, such as more robust error checks and more quality control information to facilitate transparency and consistency of sample data collection.

5-5 Support the State Water Board's efforts to bring DDW's compliance data intake tools such as CLIP into compliance with USEPA requirements for electronic submittal known as the Cross-Media Electronic Reporting Rule (CROMERR).

5-6 Support the strategic development of dashboards and other similar tools to provide meaningful information to the public in an organized and easy-to-understand format to enhance transparent and publicly accessible data.

5-7 Support the State Water Board's collaboration with internal and external stakeholders to enhance reporting formats and framework to improve data quality and usability of data collected in the eAR and other similar intake interfaces.

5-8 To meet growing GIS needs of external and internal users, increase the State Water Board's GIS resources, including resources to collect additional water system service area locational data and to check the accuracy of existing locational data. Additional GIS resources are needed to improve information provided to the public interfacing with service areas for such purposes as PWS consolidations, PWS sustainability, and emergency preparedness/response.

5-9 Enable public water systems to comply with DWSAP Program requirements to conduct and update drinking water source assessments by supporting redevelopment and implementation of a TurboSWAP replacement.

5-10 Support the State Water Board's implementation of WaterTAP to integrate disparate data systems into a single point of access system. Centralize disparate, non-integrated data systems for ease of data tracking, storage, and management and incorporate role-based access to facilitate open access to data to improve transparency and accountability.

5-11 To meet workload demands, fully achieve legislative mandates, and ensure consistency, support ELAP's efforts to pursue automating processes for the program, laboratories, and proficiency testing providers which will enhance the overall accreditation program. These efforts include the need to procure a modern database to enable ELAP to meet evolving regulatory requirements, and ensure defensible, reliable data that supports the DDW's mission to protect public health.

5-12 Support the continued improvement to the quality of SDWIS/STATE reporting by LPAs by providing resources for SDWIS training and tools for identifying data that need to be cleaned up, and in the long term, and support the development of tools through WaterTAP to facilitate dataflows between LPAs and DDW.

CHAPTER 6 METHODS AND INSTRUMENTS FOR SCREENING AND DETECTING CHEMICALS AND MICROBIAL CONTAMINANTS

6.1 INTRODUCTION

Analytical methods used to monitor contaminants in drinking water have become more sophisticated and the scope and type of contaminants monitored have broadened. Additionally, advances in technology have simplified some analytical methods, improved their accuracy, reduced costs, and increased the speed at which sample results can be generated. As required by Health and Safety Code (HSC) Section (§) 116355(b)(5), this chapter discusses methods used to monitor chemical and microbiological contaminants, including research needed to develop inexpensive methods and instruments to ensure better screening and detection of waterborne chemicals, and inexpensive detection methods that could be used by small utilities and consumers to detect harmful microbial agents in drinking water.

6.2 WATER QUALITY MONITORING AND ANALYTICAL METHODS

There are generally two types of monitoring undertaken by public water systems (PWSs) to screen and detect chemical, radionuclides, and microbiological contaminants in drinking water: compliance monitoring and occurrence monitoring.[124] Although not discussed in this chapter, but not to be minimized, is the importance of proper sample collection techniques that clearly identify sample times and locations to ensure laboratory results provide meaningful data to regulating agencies. Knowledgeable and highly trained staff are necessary to ensure quality control is maintained throughout the preparation, execution, and review of the sampling and analysis.

6.2.1 Compliance Monitoring

Compliance monitoring is used to determine compliance with federal and state drinking water standards. All compliance testing by PWSs must be carried out at a laboratory accredited by the State Water Board's Environmental Laboratory Accreditation Program (ELAP). If an analysis is not done by an accredited laboratory using methods approved by the State Water Board's Division of Drinking Water (DDW) for a particular contaminant, PWS is deemed noncompliant with its monitoring requirements. Laboratory results are transmitted directly by electronic means to the State Water Board as discussed in Chapter 5. The use of accredited laboratories and approved methods provide a measure of quality assurance of the data submitted by laboratories.

6.2.2 Occurrence Monitoring

Occurrence monitoring is used to determine the extent to which unregulated contaminants are present in drinking water sources. Historically, California has had a vigorous program to monitor contaminants, particularly chemicals that have not been or are currently not regulated at the federal or state level. These unregulated contaminants

[124] See Section 6.6 for discussion on operational monitoring (or process monitoring) which is not directly required by regulation but is useful for systems to verify treatment efficacy needed to maintain compliance and may be required as a permit condition. DDW has authority to include permit provisions that ensure adequate protection of public health. HSC § 116525 and § 116540.

may be first detected as part of routine compliance monitoring for a closely related contaminant or a chemical that may be in wide use and has the potential to enter and contaminate drinking water sources. It is important to know whether certain forms of a chemical are present because of the significance of the potential public health risk. See Section 6.5.7.

6.2.3 Analytical Methods Required for Monitoring

Prior to implementation of compliance or occurrence monitoring, the analytical method(s) to be used must be standardized. For federal drinking water standards or federal occurrence monitoring, this is done by the U.S. Environmental Protection Agency (USEPA), who develops analytical methods for testing these chemicals, radionuclides, and microbes and specifies which method(s) may be used in the federal regulations. For state-developed drinking water standards and state occurrence monitoring, DDW in conjunction with the California Department of Public Health's Drinking Water and Radiation Laboratory (DWRL) and ELAP, have historically worked closely with testing laboratories to develop and standardize the appropriate drinking water analytical methods to assure reliability, ruggedness, and quality of the data produced. In 2022, DDW transferred this task from DWRL to the California Department of Food and Agriculture's Center for Analytical Chemistry (CAC).

It is important that the methods used for compliance monitoring ensure that a contaminant can be detected and reliably reported at a level at or below the applicable drinking water standard (maximum contaminant level, action level, or treatment technique). The reporting level for regulated contaminants, that is, the level at which there is confidence that the chemical is present at the levels being reported for compliance purposes, is called the Detection Level for Purposes of Reporting (DLR). The DLR is established in the regulations when a maximum contaminant level (MCL) is adopted but may be updated subsequently as technology and use of the method changes over time. The DLR is always set at least, or preferably below, the MCL. See Chapter 3 for additional discussion on DDW's ongoing evaluation of DLRs to improve understanding of occurrence, health risk, and technological feasibility in consideration of revised standards.

Methods used for occurrence monitoring must be sensitive enough to identify the presence of contaminants in drinking water sources at very low concentrations to ensure protection of public health at current regulatory levels as well as those that may be adopted in the future. Approved methods and reporting levels for state-developed occurrence monitoring are specified in regulations, monitoring orders, and permits. For emerging contaminants, method development may be conducted concurrently with prevalence or occurrence monitoring. Understanding prevalence and the limitations of method development are just two factors considered when developing MCLs for the protection of public health.

PWSs are required to annually provide customers with monitoring results through their Consumer Confidence Reports. In addition, PWSs are required to notify their customers whenever they do not comply with an MCL or a microbial standard. The results of drinking water monitoring are also available to the public through DDW's data publication webpage and water quality data portals described in Chapters 3 and 5.

6.3 DRINKING WATER PROGRAM PRINCIPAL LABORATORY

To receive and retain primacy, states must have available facilities capable of performing analytical measurements for all the federally mandated contaminants specified in the State Primary Drinking Water regulations (40 CFR § 142.10, subd. (b)(4).) The laboratory or laboratories are considered the Principal State Laboratory System and must be certified by USEPA. (Manual for the Certification of Laboratories Analyzing Drinking Water, 5th Ed., USEPA 2005.) Traditionally, the drinking water program's principal laboratory also provided analytical technical and scientific expertise to the drinking water program on the techniques and methodologies used to analyze water samples for chemicals, radionuclides, and microbiological contaminants, hold a critical role in the development of MCLs, and act as the public health reference laboratory for the drinking water program. Public health laboratories serve an essential function in public health protection, to monitor and detect chemical, biological, and radiological health threats in water, air, food, and the environment, ranging from contaminated drinking water from natural hazards, chemical spills, or malevolent acts, to contaminated environmental water, to infectious disease and foodborne outbreak monitoring and tracing.

The California Department of Public Health's (CDPH) Drinking Water and Radiation Laboratory (DWRL) was DDW's principal laboratory until 2021. During this time, DWRL provided expertise on analytical methods to be used for contaminants proposed to be regulated by the state (that were not regulated by the federal SDWA), such as perchlorate, MTBE, 1,2,3- trichloropropane (1,2,3-TCP), and hexavalent chromium. For example, DWRL developed a low detection level analytical method for 1,2,3-TCP which allowed DDW to set a health protective State-specific MCL for 1,2,3-TCP. DWRL also advised DDW on the adequacy of previously approved federal and state methods when updates to regulations are considered to lower the MCL or DLR of an existing regulated chemical.

Additionally, DWRL advised DDW on appropriate analytical methods to be used to analyze unregulated chemicals that may pose a health risk in California drinking water sources, such as those that have been added to DDW's notification level list. DWRL was also instrumental in allowing DDW to consider permitting proposals to use extremely impaired sources for drinking water, by developing health protective analytical means to characterize the water quality of impaired sources using non-target analysis and elemental analysis. DWRL was also instrumental in providing types of laboratory analyses to assure communities of the safety of water in other unusual circumstances, such as after the controversial addition of a fish pesticide by the state into Lake Davis (a source of drinking water in Plumas County) in 1997 to eradicate the Northern Pike, an invasive predatory species of fish. The formulation of the fish pesticide included pesticides such as piperonyl butoxide (PBO) and hydrocarbon solvents that were largely unknown. The sampling and non-target analytical methods developed by DWRL identified regulated and unregulated organics with such as TCE, benzene, toluene, and naphthalene in the lake, and their independent analysis of the samples collected over many months generated data showing a decrease in the chemicals over time until they were no longer detected. Review of the sampling results during this period allowed public health officials (CDPH, now DDW) to determine when the water had become safe to drink.[125]

A principal laboratory can also play an important role as an independent public health laboratory that can analyze confirmation samples in situations when compliance monitoring results from a PWS are in doubt and provide technical assistance to DDW in investigations where discrepancies in laboratory sample analysis submitted by PWSs and accredited laboratories must be reviewed to determine compliance. In its capacity as DDW's principal laboratory, DWRL was also engaged in emergency water sampling activities to evaluate the quality of drinking water impacted by natural disasters or intentional contamination events, and participated in laboratory mutual aid organizations such as CAMAL Net (California Mutual Aid Laboratory Network) and LRN-C (CDC's Chemical Laboratory Response Network) to address laboratory capacity issues and laboratory coordination to facilitate water quality testing during drinking water contamination events.

As discussed in Chapter 2, through an interagency contract process in 2022, the California Department of Food and Agriculture's Center for Analytical Chemistry (CAC) replaced DWRL as DDW's principal laboratory, with a contract scope and budget that included analytical method development and technical assistance. In 2025, DDW's contract with CAC lapsed due to budget restrictions, however, DDW currently has several laboratories that can perform analytical assessments for all the federally mandated drinking water contaminants, including a contract with Babcock Laboratories. DDW would like to reestablish a principal laboratory that can not only run the required assessments but also provide the expertise on analytical methods and help support public health. .

6.4 ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

To obtain primacy, states must establish and maintain a program for the certification of laboratories conducting analytical measurements of drinking water contaminants. (40 CFR § 142.10, subd. (b)(3).) For California, ELAP is the program for the certification of laboratories, providing evaluation and accreditation of environmental testing laboratories to ensure they generate environmental and public health data of known, consistent, and documented quality. An environmental laboratory that is accredited by ELAP for an approved method has demonstrated the capability to provide analytical data for regulatory purposes to meet the requirements of the State Water Board's drinking water program. In addition to drinking water, ELAP accredits laboratories for testing to meet the regulatory requirements of the state's wastewater, food, and hazardous waste programs.

Since ELAP's transfer in 2014 from CDPH to the State Water Board (along with the drinking water program), ELAP has transformed its oversight activities related to laboratory accreditation, modified its program operations, and reconvened ELAP's Environmental Laboratory Technical Advisory Committee (ELTAC), which provides support and guidance on matters of importance to the environmental and public health

[125] Northern Pike Eradication Program: Evaluation of Lake Davis Water Quality: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/LakeDavis.html

laboratory community. In May 2020, the State Water Board adopted regulations amending the requirements and standards for accreditation of environmental testing laboratories in California, eliminating outdated requirements and replacing state-created accreditation standards with the national consensus-based 2016 TNI (the NELAC Institute) Standard, Volume 1: Management and Technical Requirements for Laboratories Performing Environmental Analysis (2016 TNI Standard), with two California-specific exceptions. For more information, see ELAP's website.[126]

6.5 BACKGROUND ON EXISTING METHODS AND INSTRUMENTATION

The following provides an overview of the contaminants for which PWSs must monitor along with a discussion of the complexity of the methods used. The most current and reliable source of information on specific methods can be found at USEPA's approved methods for drinking water website.[127] While a large number of approved methods are listed on USEPA's website, DDW coordinates with ELAP to maintain a shorter list of methods offered for accreditation by ELAP (in ELAP's Fields of Accreditation tables[128]). Some methods are not being used by laboratories doing business in California due to factors such as the obsolescence of laboratory instrumentation specified by the method, and the inability of some methods to meet data objectives due to California's lower MCLs (and corresponding DLRs) for some contaminants. DDW continues to coordinate with ELAP and laboratories doing business in California to update the list of methods offered by ELAP for accreditation.

The USEPA website also provides information on methods used to evaluate the occurrence of unregulated contaminants in drinking water sources that are of public health interest. These methods for unregulated contaminants include methods used to detect organic chemicals such as hormones, pharmaceuticals, personal care products, and per- and polyfluorinated alkyl substances (PFAS), which are different classes of chemicals typically referred to by the State Water Board and others as "constituents of emerging concern" (CEC). DDW lists some of these methods for chemicals with notification levels, so that laboratories can seek accreditation for these methods. Methods developed by DDW are posted on its Contaminants in Drinking Water website.[129]

The various chemicals listed in this chapter and their respective regulatory levels are updated on the State Water Board website in Appendix 3.

6.5.1 Inorganic Chemicals

The sampling procedures for inorganic chemicals require sophisticated instrumentation such as inductively coupled plasma/mass spectrometry (ICP/MS) and, in the case of asbestos, electron microscopy. Although the analysis of inorganic chemicals is generally conducted in the laboratory, online analyzers have also been developed to

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126 ELAP's Regulations: https://www.waterboards.ca.gov/drinking_water/certlic/labs/elap_regulations.html
127 USEPA Approved Methods for Drinking Water Compliance: https://www.epa.gov/dwanalyticalmethods
128 ELAP's website on Forms and Checklists, which includes the Field of Accreditation Tables: https://www.waterboards.ca.gov/drinking_water/certlic/labs/elap_forms.html
129 DDW's Contaminants in Drinking Water, Sampling and Analysis section: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html

continuously measure the level of certain inorganic chemicals in water, as described in Section 6.6.

Of the regulated inorganic chemicals, the level of nitrate continues to be a public health concern, as described in Chapters 2 and 3, and all PWSs are required to sample for nitrate at least once a year. The cost of sample analysis for nitrate using approved methods was relatively inexpensive when the USEPA adopted the nitrate MCL, analytical methods, and monitoring requirements in 1991. Today, a nitrate sample analysis can cost typically between $10 and $35 per sample, depending on the laboratory, and some PWSs are able to reduce analytical costs with negotiated contracts or bulk orders. Some county public health laboratories offer nitrate analysis services to private well owners and small water systems.

6.5.2 Organic Chemicals

All organic chemicals require testing using standard laboratory chemical methods including gas chromatography (GC), gas chromatography/mass spectrometry (GC/MS), liquid chromatography (LC), and immunoassay. GC methods are the least expensive while GC/MS methods generally provide the most reliable data. However, for VOC related methods the prices of instruments for GC and GC/MS methods are comparable, and GC/MS is the preferred option for most ELAP accredited labs due to the method's flexibility and sensitivity. While the analysis of organic chemicals is generally conducted in the laboratory, GC and CG/MS based instruments are now portable to allow measurements to be made in the field. However, the costs for both portable systems and laboratory analysis for either GC or GC/MS analysis are comparable, principally because the maintenance costs are quite high for portable systems. In addition, miniaturizing GC and GC/MS instruments has been proposed to allow for direct measurements of organic chemicals in water; however, general application of such instrumentation is well into the future. These portable GC and GC/MS instruments can be used as a screen, while compliance samples are taken to an accredited laboratory. LC methods are used to test certain polar, water-soluble chemicals such as the pesticide oxamyl.

Immunoassay analysis is relatively new for chemicals in the water environment. It is a biochemical technique performed in a laboratory setting where an antibody (a protein) is used to quantitatively measure a chemical such as drug, hormone, or pesticide. Currently, there are no immunoassay kits with validated and USEPA approved methods for regulated contaminants.

6.5.3 Disinfectant and Disinfection Byproducts

The analysis of disinfectant residuals and disinfection byproducts (DBPs) in water varies depending on the chemical and location throughout the distribution system. For example, the DBPs known as total trihalomethanes (TTHMs) are categorized as volatile organic compounds (VOCs) and the methods of analysis are like other regulated VOCs. In contrast, DBPs like haloacetic acids (HAA5), bromate and chlorite are considered non-volatile chemicals and therefore are subject to a different analysis.

Disinfectant residuals can vary dramatically across the distribution system and will vary based on time. The most common approach is to analyze the disinfectant residual at a treatment facility or within the distribution system using handheld field test kits or an online analyzer that continuously measures the residual level. The accuracy of such equipment is periodically checked against water samples analyzed in the laboratory. In locations where a disinfection residual analyzer is not installed, a field kit can be used to measure disinfection residual levels. These field kits and online analyzers are used as screening tools, while compliance samples are taken to an accredited laboratory to provide more accurate data. Some of these kits are like those used to measure disinfectant residuals in swimming pools.

6.5.4 Radionuclides

Radionuclides that are regulated in drinking water include the naturally-occurring uranium, radium-226 (a decay product of uranium-238), radium-228 (a decay product of thorium-232), tritium (hydrogen-3, which can also be produced by human activities), and strontium-90, a product of human activities related to nuclear fission. There are also two additional regulated constituents, gross alpha particle activity and gross beta particle activity, that measure the level of total radioactivity of water supplies from particles emitting alpha and beta radiation and serve as screening standards to determine whether additional measurements of radioactivity are required.

Radioactivity is expressed in terms of picocuries per liter (pCi/L), for gross alpha particle activity, radium, and uranium. For gross beta activity, tritium, and strontium, the standard is based on the levels of radioactivity that will deliver a certain annual exposure or dose, in millirems per year, to tissues or organs.

The current analytical methods consist typically of a sample preparation component and a radioactivity counting component (the concentration of radioactivity is determined by “counting” the emissions emanating from the radionuclide). Sample preparation is time-consuming and can only be performed in an accredited laboratory. After the initial sample preparation, counting requires sophisticated instruments that are costly to purchase and maintain.

Gamma-ray counters can be used effectively in the field for gamma (photon) emitters. Prolonged counting periods allow for achieving the desired detection limits for certain radionuclides. USEPA and other emergency responders for radionuclide emergencies rely on gamma counting for initial screening.

Strontium-90 and tritium are pure beta emitters that do not lend themselves to gamma counting.

6.5.5 Microbial Analysis

Historically, drinking water has been analyzed for the coliform group of bacteria as an indicator of water quality degradation. Coliform bacteria are present throughout the environment while a specific subgroup, fecal coliform bacteria, is found in the intestinal tract of warm-blooded animals. Therefore, the presence of total coliform bacteria may indicate contamination that would allow other potentially harmful waterborne pathogens to enter the drinking water supply, and the presence of fecal coliform bacteria indicates the water is potentially contaminated by human or animal wastes and that pathogenic microbes may also be present. Heterotrophic bacteria is another useful measure for distribution system monitoring that indicates how well the bacteriological water quality is being maintained by measuring the overall quantity of bacteria.

Federal regulations adopted in 2006 (Groundwater Rule) specified that the fecal indicators for groundwater contamination would be *Escherichia coli* (*E. coli*), coliphage, and enterococci. In the 2013 Revised Total Coliform Rule, USEPA adopted a MCL for *E.coli*, where water distribution systems would continue to be sampled regularly for total coliform bacteria, but with all total coliform positive samples also required to be analyzed for *E.coli*.

The use of indicator organisms is a valuable tool in the assessment of drinking water quality and the protection of public health. Their use provides timely information about the bacterial quality of water at a reasonable cost, with wide analytical capability across the state. For sampling submitted to DDW for regulatory compliance, the laboratories performing these methods must be accredited by ELAP. Although the most common coliform methods used are tests measuring presence or absence, most of the methods can also provide bacterial counts or enumeration of the sample, when quantification is necessary.

While the long-established standard methods using multi-tube fermentation (MTF) or membrane filtration (MF) are still utilized, newer analytical methods using "enzyme substrate" such as Colilert®, Colisure®, Coliblue®, E*Colite®, Readycult®, Colitag®, and Enterolert® have become more widely used to test for coliforms, *E.coli* or *enterococci*. These testing methods require lower laboratory technician time per sample, generate less waste, and are usually available at lower cost than the conventional laboratory methods.

The presence/absence tests are the lowest cost tests among the approved coliform tests and offer a tangible and immediate benefit to small water systems. A comprehensive evaluation of monitoring costs was completed for the Revised Total Coliform Rule in 2020[130] which indicated that the cost of sample collection and sample delivery could be as much as, or more than, the cost of sample analysis. For PWSs that are not located within reasonable driving distance to laboratories, these samples must be sent by courier service or expedited mail to get the samples to the lab within the short sample holding times. To address the cost of sample delivery to laboratories, some large PWSs establish their own local ELAP-accredited laboratories (typically called municipal laboratories). Some county public health laboratories offer water analysis services for total coliform and E.coli to private well owners and small water systems. The State Water Board will continue to help ensure analytical capability across the state for analysis of water samples for indicator organisms.

Research on coliform methods continue to evolve, with methods developed that shorten the time for analysis (e.g., Colilert-18®), methods that can provide simultaneous detection of total coliforms and E.coli (e.g, Colitag®), and those that automate procedures (e.g., Tecta). As funding is available, the State Water Board will continue to

[130] Revised Total Coliform Rule, Complete Rulemaking File - Cost Estimating Methodology: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/3b_rtcr_cost_estimating_methodology_to_oal.pdf

evaluate research needed to develop inexpensive detection methods that could be used by small utilities and consumers to reduce the cost of monitoring and provide useful information about the microbial safety of drinking water. When the use of indicator organisms is inadequate or when more information is needed, specific testing for pathogens may be beneficial and some are required. The parasitic protozoans *Cryptosporidium* and *Giardia* are regulated pathogens and have requirements for testing that apply to some new PWSs that use surface water sources.[131]

More extensive, pathogen-specific testing is time consuming and expensive, owing to the required specialized equipment and laboratory expertise, and is impractical for routine monitoring of water supplies by PWSs and their commercial laboratories. Therefore, testing for pathogens associated with water-borne disease, such as viruses (including adenovirus, rotavirus, norovirus), bacteria (including the specific *E. coli* strain *O157:H7*, *Legionella*, *Campylobacter*), or parasitic organisms beyond *Cryptosporidium* and *Giardia* is limited. Generally, such specific testing occurs in academic research, or by public health officials in follow-up studies related to waterborne disease outbreaks.[132]

Recently the State Water Board, as part of its development of regulations for direct potable reuse, funded research into monitoring and determining levels of pathogens in wastewater, as well as the feasibility of collecting pathogen data in wastewater during disease outbreaks. Because raw wastewater will serve as the source of drinking water in direct potable reuse projects, such research on pathogen monitoring will contribute to the protection of public health. Information on this and other related research is available at the State Water Board's "Regulating Direct Potable Reuse" website.[133]

6.5.6 Lead and Copper Monitoring

The inorganic chemicals lead and copper are regulated differently than other contaminants in that they have action levels, which are based on monitoring taken from a sampling of several household taps and a statistical analysis of the results, instead of monitoring at the source or within the PWS distribution system. The different regulatory approach reflects concerns about lead and copper that may be associated with their release from pipes, fixtures, and plumbing connections, as opposed to being within the source water.

The methods used to analyze lead and copper levels are the same as those applied to other inorganic chemicals as previously described in Section 6.5.1. As indicated there, these methods require sophisticated instrumentation, such as inductively coupled plasma/mass spectrometry (ICP/MS) and atomic adsorption spectrophotometry, and the analyses are carried out by ELAP accredited laboratories. A detailed discussion of lead and copper issues can be found in Chapter 3.

6.5.7 Unregulated Chemical Monitoring

The monitoring of unregulated chemicals is important to gather information on the

[131] Required for new surface water systems/sources with over 10,000 connections which has not already been tested. The Long Term 2 Surface Water Treatment Rule required testing of systems until 2019.

[132] About Waterborne Disease Surveillance: https://www.cdc.gov/healthy-water-data/about/index.html

[133] Regulating Direct Potable Reuse in California: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/direct_potable_reuse.html

occurrence of chemicals that may pose a public health risk. The monitoring is used to determine the extent to which unregulated contaminants are present in drinking water sources and the concentrations of chemicals where they are found. Once this data are gathered, the data are evaluated to assess the public health risk of a chemical and whether a chemical should be regulated.

6.5.7.1 Federal Unregulated Contaminant Monitoring Rule (UCMR)

As part of the federal SDWA, USEPA periodically identifies chemicals and other contaminants that will be subject to monitoring to collect national occurrence data and to determine whether setting a national drinking water standard for those contaminants may be appropriate. A representative number of PWSs across the nation are identified by USEPA to monitor for the UCMR analytes in water entering the water distribution system, which would be representative of the water delivered to their water system customers. PWSs are given a specific period to complete the collection and analysis of the samples at one of a limited number of laboratories approved by USEPA to conduct the UCMR analysis. Testing for UCMR chemicals by these laboratories is done using published analytical methods identified by USEPA. Data from this monitoring is submitted to USEPA.

California PWSs that are selected for the federal UCMR monitoring also submit their findings to the State Water Board. With this data, DDW reviews the occurrence of these contaminants in California and determines whether further action is necessary to expand the occurrence sampling or establish drinking water standards or notification levels (NLs). Often, a few of the UCMR chemicals in each round of UCMR are already being addressed in California, with DDW having already adopted MCL or established NLs. There have been several federal UCMR testing periods (see Appendix 4), as described below.

UCMR 1 required occurrence monitoring for 25 contaminants, including those classified as pesticides, fuel additives, solid rocket propellants, industrial chemicals, and explosives, with samples collected from 2001 through 2003. Included in the UCMR 1 contaminants were molinate and methyl tert-butyl ether (MTBE), for which the CDPH drinking water program (now DDW) had previously established MCLs. The primary MCL for molinate (a pesticide) was adopted in 1989, and the primary MCL for MTBE (a fuel additive and solvent) was adopted in 2000, while a secondary MCL was previously established in 1999 to address taste and odor concerns (Chapter 3). Also included in the UCMR 1 contaminants list was perchlorate (found in solid rocket propellants, munitions, fireworks, and similar uses), for which DDW subsequently adopted a MCL in 2007. USEPA has not established federal MCLs for any contaminants from UCMR 1.

UCMR 2 required occurrence monitoring for 25 contaminants, including those classified as flame retardants, pesticides, nitrosamines, and explosive-related compounds, with samples collected from 2008 through 2010. Included in UCMR 2 are the nitrosamines NDMA, NDEA, and NDPA, which are types of disinfection byproducts. DDW had previously established notification levels for NDMA in 2006 based on the PHG established by OEHHA (Chapter 3). Notification levels were established for NDEA and NDPA in 2004 and 2005 respectively. No federal MCL has yet been established for any contaminants from UCMR 2.

UCMR 3 required occurrence monitoring for 30 contaminants, including those classified as metals, hormones, PFAS, solvents, refrigerants and other industrial chemicals, with samples collected from 2013 through 2015. Notable among the UCMR 3 chemicals are hexavalent chromium and 1,2,3-trichloropropane (1,2,3-TCP). Responding to a legislative mandate[134], DDW established a state MCL for hexavalent chromium in 2014, which was repealed in 2017 by court order, and reestablished through another rulemaking process that was completed in 2024. After UCMR 3, DDW adopted a state MCL for 1,2,3-TCP in 2017. Other UCMR 3 contaminants included 1,4-dioxane, for which DDW initially established a notification level in 1998, and four PFAS compounds PFOS, PFOA, PFBS, and PFHxS, for which DDW has established notification levels in 2019, 2019, 2021, and 2022, respectively. For more information, these chemicals are discussed further in Chapter 3. No federal MCL has yet been established or revised (one UCMR 3 chemical, total chromium, already had a federal MCL during UCMR 3 sampling period) for any contaminants from UCMR 3.

UCMR 4 required occurrence monitoring for 30 contaminants, focusing on cyanotoxins, pesticides, disinfection byproducts, and metals, with samples collected from 2018 through 2020. Of the cyanotoxin contaminants in UCMR 4, DDW requested that OEHHA provide recommendations for notification levels in 2021 for three of them: total microcystins, cylindrospermopsin, and anatoxin-a. Although saxitoxin was not a UCMR 4 contaminant, DDW additionally requested that OEHHA provide recommendations for saxitoxin based on other data reviewed by DDW. However, because saxitoxin is not a UCMR 4 contaminant, no published EPA method is available. DDW directed CAC to develop an analytical method for saxitoxin using the same methodology as the EPA method for total microcystins, EPA 546, based on Enzyme-Linked Immunosorbent Assay (ELISA). Additional information on cyanotoxins related to harmful algal blooms can be found in Chapter 3.

UCMR 5 required occurrence monitoring for 30 contaminants that are all PFAS compounds, except for lithium, which is a metal/pharmaceutical compound, with samples required to be collected from 2023 through 2025. UCMR 5 uses two methods developed by USEPA, method EPA 533 and EPA 537.1 based HPLC-MS/MS, to quantify concentrations of the 29 short and long chain PFAS compounds. The availability of these methods allowed DDW to include them in ELAP's fields of accreditation table so that additional laboratories can get accredited for the methods, and facilitated DDW's monitoring initiatives for PFAS, as described in Chapter 3. These UCMR 5 methods will also be used to comply with the requirements of the federal SDWA's national primary drinking water standards for five PFAS compounds and a Hazard Index MCL for mixtures of PFHxS, PFNA, HFPO-DA, and PFBS.

The State Water Board is also investigating other types of monitoring to characterize PFAS contamination, such as the total oxidizable precursor (TOP) assay, which converts poorly characterized unknown quantities of PFAS precursor compounds into a form of PFAS (PFAA) that can be measured. More information is needed on what is

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[134] Health and Safety Code Section 116365.5, Chapter 602, Statutes of 2001 (SB 351 (2001)): https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=116365.5&lawCode=HSC

measured by the TOP assay, its utility in addressing the risk of PFAS, and its potential applications in drinking water regulation. DDW continues to follow and initiate research on method developments for PFAS and will continue to evaluate how these methods can meet the needs of future state drinking water regulations to monitor and reduce the public health risk of PFAS through drinking water.

Prior to UCMRs 1 through 5, unregulated contaminants testing was done by the states, and this was referred to by USEPA as UCM-States Rounds 1&2, which included 76 unregulated contaminants with the monitoring period spanning from 1988-1997. Several thousand California PWSs participated in these earlier sampling studies. Many of the chemicals from Rounds 1&2 and the earlier state sampling programs have become regulated through the adoption of MCLs by USEPA or by the state, as presented in sections 6.4.1-6.4.6.

For more information, see USEPA's UCMR Program website.[135]

6.5.7.2 Unregulated Chemical Monitoring in California

The drinking water program has had a robust monitoring program to gather information on the occurrence of chemicals in California drinking water supplies that may pose a public health risk. Independently of the federal UCMR effort, DDW identifies unregulated chemicals for monitoring in the state sometimes years before the chemical is included in a federal UCMR list for national occurrence monitoring. This unregulated chemical monitoring program was also used to supplement the occurrence data collected under the federal UCMR.

In the early 1980's when drinking water regulations included just six regulated organic chemicals, the Department of Health Services (DHS, predecessor of DDW) established action levels[136] for eight additional unregulated organic chemicals and required occurrence monitoring by PWSs. All eight unregulated organic chemicals have since become regulated with MCLs.

The Safe Drinking Water Act of 1989[137] added HSC section 4023.3 (now HSC section 116375) which required DHS to establish regulations it deems necessary, including regulations for the monitoring of unregulated chemicals for which drinking water standards had not been established. The unregulated chemical monitoring regulations subsequently adopted in 1990[138] included 47 organic chemicals. In 1996, ten organic chemicals were removed from the list because they had become regulated chemicals with MCLs, and 12 organic chemicals, mostly pesticides, were added to the list. In 1998, gasoline additive MTBE was added to the list to gather occurrence data in preparation for meeting a legislative mandate[139] to develop a drinking water standard for MTBE. In

[135] US EPA's Monitoring Unregulated Contaminants in Drinking Water: https://www.epa.gov/dwucmr
[136] The use of the term "action levels" for unregulated chemicals was changed to "notification levels" (NLs) to avoid confusion after the adoption of the federal Lead and Copper Rule in the 1990's, which used the term "action level" for another purposes.
[137] Chapter 823, Statutes of 1989, AB 21 (Sher)
[138] Barclays California Code of Regulations, Title 22 sections 64449.1 et seq. (1990), 4-1-90, pages 612-613.
[139] Chapter 814, Statutes of 1997, AB 592 (Kuehl)

2000, two additional gasoline additives, ETBE and TAME, and perchlorate were added to the list. In 2001, the regulations were revised to remove the initial list of 49 organic chemicals, except for five organic chemicals (MTBE, ETBE, TAME, 1,2,3-TCP and dichlorodifluoromethane) and perchlorate, while the inorganics boron, hexavalent chromium, vanadium, and another gasoline additive, TBA, were added.

The typical monitoring requirements were for PWSs with surface water sources to sample quarterly for one year and PWSs with groundwater sources to sample twice in one year. Testing for unregulated chemicals was done using published analytical methods, often those developed by USEPA, identified for use by USEPA for the federal UCMR program, or developed by the State Water Board as described in Section 6.2.

In 2007, the unregulated chemical monitoring regulations were repealed, after a sufficient set of occurrence data was collected. Of the 67 chemicals monitored during the occurrence monitoring period, 18 chemicals subsequently became regulated with MCLs, and 26 chemicals were established with NLs (11 of the NLs are now archived). The results of the occurrence monitoring eventually resulted in an MCL established for perchlorate in 2007, hexavalent chromium in 2014 (repealed but reinstated in 2024) and 1,2,3-TCP in 2017. For more information see Appendix 4. The current information on unregulated chemicals is available on the "Contaminants in Drinking Water" website.[140] The State Water Board may develop regulations in the future to obtain additional data on the occurrence of new or previously studied chemicals as needed. In addition, the State Water Board can issue individual and general orders for information, including water quality information. (See HSC §§ 116400, 116530 and Gov. Code § 11352, subds. (d) and (f).)

DDW continues to develop NLs through the existing NL setting process. In 2022, new requirements in the HSC[141] regarding NLs went into effect, requiring DDW to take several steps before establishing a NL or response level, including notifying the public of any proposed new or revised NLs, providing information to the public about the studies or recommendations from OEHHA that were used to derive the NLs, providing information about the quality of the information used, including whether only one study was used and whether the studies were peer reviewed, and requiring the proposed NL or response level to be brought before the State Water Board in a regularly noticed meeting. Information about proposed NLs is posted on the State Water Board's Drinking Water Notification Levels website.[142]

Requirements for PWSs to monitor chemicals with NLs are through DDW general monitoring orders, such as those issued for PFAS monitoring,[143] or through individual PWS permits or other correspondence, such as permits for extremely impaired

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[140] Contaminants in Drinking Water: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html

[141] Health and Safety Code section 116456: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=116456

[142] Drinking Water Notification Levels: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html

[143] PFAS DDW General Orders: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order

sources.[144] When an unregulated chemical has an associated NL, PWSs with sources have been found to be contaminated by a specific chemical will routinely monitor for the chemical to ensure the NL is not exceeded. Exceeding a NL carries certain notification requirements, which are defined in law (HSC § 116455).

For projects that involve providing supplemental sources of drinking water through indirect potable reuse, there are monitoring requirements that ensure that all drinking water standards and applicable NLs are met. Monitoring requirements for certain chemicals with NLs also ensures that various treatment processes are functioning as they should. Because these types of projects are required to broadly remove organics in the wastewater, including unknown chemicals and CECs, monitoring for indicator constituents that are representative of families or groups of chemicals enable determinations to be made relative to the effectiveness of chemical removal. Some of these indicator constituents are also chemicals associated with health risks, such as 1,4-dioxane and NDMA, for which NLs have been established.

6.5.8 Analytical Method Development

The State Water Board is responsible for conducting research and studies relating to the provision of a dependable, safe supply of drinking water, which includes research to develop or improve methods that identify and measure the occurrence of contaminants in drinking water (HSC § 116350, subd. (b)(1)(A).) DDW continues to develop analytical methods to conduct occurrence monitoring. Methods developed are published on the State Water Board's Drinking Water Analytical Methods website.[145]

Starting in 2022, DDW and California Department of Food and Agriculture (CDFA) Center for Analytical Chemistry (CAC) entered into an interagency agreement (contract) to develop new or modified sampling methods and provide technical assistance to DDW on sampling and analysis questions, replacing DWRL as the drinking water program's principal lab, as described in Section 6.2.

CAC's technical assistance included method development for chemicals being reviewed for potential regulation, reviewing analytical method capability for methods proposed for ELAP laboratory accreditation or proposed by water agencies for compliance monitoring, investigating water quality interferences from various water matrices being analyzed by water agencies, and evaluating laboratory records associated with individual sampling events. CAC also works with accredited laboratories to provide technical assistance and facilitate knowledge transfer. For example, CAC has recently worked with commercial laboratories regarding analysis of trifluoroacetic acid (TFA) and other short chain polyfluoroalkyl substances (PFAS).

CAC is engaged in method development for several chemicals of interest to DDW. Method development requires a substantial technical effort, including a literature review of methods used in the environmental research fields, determination of methodologies

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144 Permits for Extremely Impaired Sources:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/process_memo_97-005-r2020_v7.pdf

145 State Water Board Drinking Water Analytical Methods:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/methods.html

that are feasible and adequately robust, method optimization, evaluation of quality control, and conducting multi-validation studies, to ensure that the method is adequately robust to generate findings for use in regulatory compliance determination. CAC has been charged with developing analytical methods for the following chemicals to facilitate potential future prevalence/occurrence monitoring for these chemicals:

- Quantification of total extracellular and intracellular saxitoxin by Enzyme-Linked Immunosorbent Assay (ELISA). Saxitoxins are associated with harmful algal blooms (HAB) and for which OEHHA recently proposed an interim Notification Level.
- Determination of trifluoroacetate by liquid chromatography/tandem mass spectrometry (LC-MS/MS). This method will allow analysis of water samples for TFA, a short chain PFAS.
- Determination of benzotriazole in drinking water by LC-MS/MS.

Due to state budget reduction plan imposed in 2024, DDW was unable to extend the contract with CAC and the contract lapsed in March 2025. DDW plans to work on a new contract as soon as budget restrictions are lifted. The progress in developing methods and availability of technical assistance from CAC will be impacted until a new contract can be executed.

As described in Chapter 3, microplastics are an emerging concern in drinking water with legislation passed in 2018 requiring the State Water Board to adopt a definition of microplastics in drinking water, adopt a standard method of testing for microplastics in drinking water, and require microplastics monitoring for four years with public notification of the results of monitoring. The State Water Board adopted a definition of microplastics in 2020 and is collaborating with the Southern California Coastal Water Research Project (SCCWRP) to develop and evaluate analytical methods. For more information about the status of the microplastics effort, please visit the State Water Board Microplastics website.[146] Additional information about the most recent workshop on microplastics is available on the SCCWRP website.[147]

To address other concerns related to monitoring recycled water used for drinking water, the State Water Board, in collaboration with the Water Research Foundation, completed a research study in 2021 to address monitoring methods and capabilities for pathogen monitoring in raw wastewater. Standard operating procedures (SOPs) were developed for processing and enumerating several viruses (enterovirus, adenovirus, norovirus, coliphage) in raw wastewater, adapting the procedures from sections of EPA Method 1615 and 1602; and for processing and enumerating *Giardia* and *Cryptosporidium* in raw wastewater, adapting the procedure from EPA Method 1693. These SOPs describe how the EPA methods can be optimized for analysis of raw wastewater, which is a more

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[146] State Water Board Microplastics:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/microplastics.html
[147] SCCWRP Workshop on Sample Collection Method for Microplastics in Drinking Water:
https://microplastics.sccwrp.org/pages/mp-workshop-drinking-water

difficult matrix to work with than the matrices described in the EPA methods. For more information, visit the Water Research Foundation website for the research study.[148]

6.6 MONITORING IN REAL-TIME: ONLINE ANALYZERS, FIELD TEST KITS, AND OTHER PORTABLE TESTING

While most analytical methods are complex and require a trained and knowledgeable chemist, biologist or laboratory technician in a sanitary laboratory setting with advanced laboratory instruments, some methods have been developed to allow testing to be completed in the field. This is especially helpful for operational or process monitoring and capturing real-time information on water quality parameters that may change rapidly, such as disinfectant residuals like total or free chlorine, ozone, or chlorine dioxide, or that cannot be otherwise preserved, such as pH or temperature. These methods are implemented as continuous online analyzers, which are robust enough to be installed outdoors, or as field test kits, which are portable and simpler to use than conventional laboratory instruments and methods.

Continuous monitoring, or online monitoring, has been a key element of compliance monitoring in water treatment plants. Continuous monitoring of water quality indicators within the treatment process, including turbidity (an indicator of the cloudiness of the water, which indirectly quantifies the amount of particulate material in the water), particle counts, specific conductance, pH, temperature, and chlorine residual, indicate how well the treatment process is treating the water. As the design of online analyzers has improved over the years, these instruments have become more robust, can detect to lower levels, or complete sampling and analysis at more frequent intervals.

Instruments used for monitoring and regulatory compliance determination for the surface water treatment rules, such as turbidity and chlorine residual, must utilize USEPA approved methods.[149]When online monitoring is not feasible at a surface water treatment plant (which is common for small PWSs) or when the online monitoring instrument is out of service, regular grab samples must be collected and analyzed using field test kits that utilize approved USEPA approved methods. Portable devices such as turbidimeters and chlorine residual test kits have been used for decades and are typically an acceptable alternative for small water systems.

For groundwater treatment, where the treatment is designed to remove specific contaminants like nitrate, perchlorate, arsenic, or organic chemicals like TCE or DBCP, the options for online monitoring and field testing are presently limited. Online nitrate analyzers and field test kits have been used for decades to verify that the treatment is operating as intended, especially for large scale blending treatment facilities or at desalination plants, and to provide information about the quality of the water being produced. Online fluoride analyzers and field test kits are widely available and are used by some PWSs in treatment process control to ensure fluoride is maintained in the compliant range. More recent developments in online analyzers include analyzers for

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[148] Water Research Foundation, Project 4989, Pathogen Monitoring in Untreated Wastewater: https://www.waterrf.org/research/projects/pathogen-monitoring-untreated-wastewater

[149] USEPA Approved Drinking Water Analytical Methods for the Surface Water Treatment Rules: https://www.epa.gov/system/files/documents/2024-02/swtr-methods-table.pdf and https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100TCKZ.txt

arsenic and hexavalent chromium. These online analyzers must be routinely calibrated and are occasionally verified by split samples collected for laboratory analysis.

Field test kits available for turbidity, chlorine residual, nitrate, nitrite, ammonia, iron, manganese, hardness, alkalinity, and orthophosphate are often used by PWSs to track the quality of the water within the treatment process and distribution system. This type of monitoring is typically conducted proactively by well operated PWSs to optimize the water quality in the distribution system.

For treatment plants that treat wastewater for potable reuse, the treatment processes must be continuously monitored using indicators or surrogates that have been demonstrated to track the performance of the treatment process to reduce pathogens (viruses, *Giardia* and *Cryptosporidium*) and unknown chemicals in the wastewater. For these projects, advanced monitoring techniques include the use of online total organic carbon (TOC) analyzers and instruments measuring specific ultraviolet absorbance, which have been proposed as indicators of the concentration of certain organic material. Although these instruments are becoming more cost-effective over time, they continue to require attendant telemetry systems to view and store the data and they must be maintained and periodically calibrated to ensure the data generated are accurate.

DDW continues to review novel methods proposed for use by potable reuse projects, to ensure that the methods are robust, reliable, and capable of generating data to meet regulatory requirements for the method. A recent example of this is the proposed use of an on-line instrument that would quantify the concentration of elemental strontium, which could be used as an indicator of treatment performance and reverse osmosis membrane integrity.

Figure 6-1: Analytical Method Used to Analyze a Water Quality Sample

Several manufacturers have developed field test kits that allow for analyses of specific chemicals and groups of chemicals. The tests kits are principally designed to be used in response to emergencies, including contamination events and terrorism. These analyses can provide results within a short period of time. There has been continued progress in making sophisticated portable instrumentation such as GC and GC/MS systems. The portability of these devices has allowed for mobility of sophisticated laboratory analysis, particularly for organic chemicals. In general, both portable GC and GC/MS instruments serve as screening devices to detect the presence and concentration of organic chemicals with more detailed analyses being carried out in a fixed laboratory setting, as necessary. It is expected that developments will continue to expand the functionality and availability of these types of equipment.

6.7 EMERGENCY DRINKING WATER TESTING

Natural disasters such as earthquakes, wildfires, levee breaks, and other flood-related events can occur at any time in California. Water systems supplying water to communities are highly susceptible to these events. Generally, the biggest threat to water systems is bacterial contamination; however, chemical contaminants have presented threats on some occasions. As described in Chapter 11, section 11.4.4, VOC contamination of drinking water systems can occur after wildfires. Recovery efforts typically include PWSs flushing out contaminated water and conducting repeated water quality testing to measure the contaminants of concern. It is critical that the analysis results generated during this time meet all quality standards and therefore can be reliably used to make a public health determination that water is safe to drink. It is also critical that the laboratory responding to the emergency is capable and can provide analysis results quickly with short notice. DDW continues to advise PWSs affected by contamination events on the appropriate contaminants to sample for and the appropriate analytical methods to use. DDW also continues to ensure the availability of laboratory capacity of accredited laboratories capable of conducting the needed analyses during emergency events to help facilitate PWS recovery after contamination events. Testing can be significant as the recovery processes can range from weeks to months depending on the size of the system, the extent of damage, and the amount of contamination present. See Chapter 11 for additional discussion on drinking water emergency preparedness and response.

6.8 CONCLUSIONS AND RECOMMENDATIONS

6.8.1 Conclusions

Analytical methods used to monitor contaminants in drinking water continue to evolve with new methods continuing to be developed. Although efforts have been made to reduce the cost of analyzing most contaminants that may be present in drinking water, to date, there has been limited success in developing less expensive methods. The successes that have occurred are in testing for chemicals that have been regulated over a long period of time at higher levels. An example of a major advancement in monitoring abilities is the development of inexpensive techniques to continuously monitor surrogates such as total organic carbon, total fluorescence, as well as individual chemicals such as nitrate.

Unregulated chemicals or CECs, as described in Chapters 3, 4 and section 6.5 above, are detected or measured by sophisticated methods/instrumentation. Most of these chemicals are highly water soluble and are generally found at low levels (parts per trillion) in drinking water sources that may directly or indirectly be impacted by wastewater discharges. Although health effects of these chemicals are not known to occur at the low levels currently found in drinking water supplies, analytical methods should be sufficiently sensitive to detect and quantify their presence in drinking water sources. The availability of sensitive analytical methods for unregulated chemicals and CECs is necessary to determine if their concentrations are changing over time and to enable regulators to identify and prioritize those of greater public health concern, so that effective measures can be taken, such as watershed source control programs, wastewater industrial or domestic source control programs, public education, or other treatment techniques.

Efforts to determine the presence of waterborne microbial pathogenic agents in drinking water sources will continue to require more sophisticated analytical methods. As a result, there will be continued reliance on monitoring for indicator organisms including coliform bacteria and enterococci that require less expensive and easy to use methods.

The development of methods for monitoring microbes, CEC, and regulated chemicals will continue to be of importance for recycled water projects, both for indirect potable reuse of groundwater and surface water sources, as well as for possible direct potable reuse projects. Focus will likely be on real-time monitoring and results.

There is little indication that the development of less expensive and easy to use analytical methods or field test kits that could be used for compliance purposes by small water systems or consumers is forthcoming. Given the nature of most contaminants that are present in drinking water sources, and the complexity required to maintain quality assurance and regulatory requirements, research toward developing such methods seems unlikely. Accordingly, laboratory accreditation by ELAP remains an important part of ensuring that appropriate analytical methods are being utilized and that data produced are of high quality.

6.8.2 Recommendations[150]

6-1 Allocate resources for DDW to reestablish a contract with a public health laboratory to not only comply with the federal SDWA's state primacy requirements for a primary laboratory, but also to assist with method development.

6-2 Allocate resources for analyses of indicator organisms and allocate resources to conduct research needed to develop inexpensive and easy to use detection methods that could be used by small utilities and consumers to reduce the cost of monitoring and provide useful information about the microbial and chemical safety of drinking water per HSC § 116355(b)(5).

6-3 Support DDW's review of online monitoring methods and other field-testing methods to ensure that the methods are robust, reliable, and capable of generating data to meet regulatory requirements for PWSs and direct potable reuse projects.

6-4 Support adoption of a statewide UCMR monitoring regulation for chemicals and microbiological constituents of public health concern, to evaluate the extent of their presence in drinking water supplies.

[150] See Chapter 3 for related recommendations

CHAPTER 7 TREATMENT TECHNOLOGY AND HEALTH RISK REDUCTION

7.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, subdivision (b)(6), this chapter discusses analysis of technical and economic viability and health benefits of treatment techniques used to reduce levels of trihalomethanes, lead, nitrates, synthetic organic chemicals, micro-organisms, and other contaminants in drinking water.

Public water systems (PWS) use treatment technologies to ensure compliance with primary drinking water standards; these treatment technologies vary widely in complexity and cost. The most common is a disinfection process used to help ensure the microbiological safety of the drinking water delivered to customers. Beyond simple disinfection treatment, more advanced treatment technologies are used to comply with primary drinking water standards and to address secondary drinking water standards, including reduction of constituents such as iron and manganese, as well as improve taste and odor compounds.

About half (54 percent) of PWSs treat their own sources and the other half do not need to treat their water or receive water from a wholesaler that is responsible for source water treatment. The number of surface water and groundwater PWS treatment facilities, including disinfection, are listed in Table 7-1 below. Approximately half of the treatment facilities use precautionary disinfection that can be operated by either a minimum Treatment 1 or Distribution 1 certified operator.[151]

PWSs of various sizes rely on treatment for their groundwater and/or surface water sources. The larger systems often utilize multiple sources and therefore have more than one treatment facility (note the 206 PWS with over 10,000 service connections have about 1,800 treatment facilities.)

Table 7-1: PWS with Existing Treatment Facilities (November 2024)

System Size (service connections)	Number of Systems	Number of Groundwater Treatment Facilities	Number of Surface Water Treatment Facilities
<200	2,969	1,442	215
200 to 999	336	314	61
1,000 to 10,000	389	916	77
>10,000	206	1,687	112

This chapter discusses current treatment technologies used by PWS to meet drinking water standards, affordability of operation and maintenance of treatment systems, and estimated cost of compliance with a recently adopted MCL. Appendix 8 provides a summary of treatment technologies used by California water systems.

[151] Operator Certification: https://www.waterboards.ca.gov/drinking_water/certlic/occupations/DWopcert.html

The California Safe Drinking Water Act (SDWA) prescribes enforceable primary standards for five major categories of drinking water contaminants: Inorganic Chemicals, Organic Chemicals, Radionuclides, Microorganisms, Disinfectants and Disinfection Byproducts. A complete listing of these contaminants regulated by the State Water Board's Division of Drinking Water (DDW) is presented in Appendix 3 with their corresponding applicable MCL or Treatment Techniques (TT).

The regulations identify the best available treatment technologies applicable to these regulated contaminants. (Cal. Code Regs. (CCR), tit. 22, 64447 (microbial contaminants); 64447.2 (inorganic chemicals); 64447.3 (radionuclides); 64447.4 (organic chemicals).) Individual treatment technologies are designed to be effective in removing or reducing specific contaminants to meet drinking water standards. Depending on the type of contaminants present in the source water, one or a combination of treatment technologies may be applied. Relative to surface water sources, groundwater sources are more likely to contain chemical contaminants at levels of concern or above an MCL. Surface water sources are more prone to biological contaminants, such as viruses and bacteria, and most are filtered to remove particulate matter and microbes. All surface water sources require disinfection treatment to make the water microbiologically safe for human consumption. Some groundwater sources require disinfection to ensure the microbiological quality of the water.

The following sections describe the major technologies used to address contaminants. Technologies used for reducing and/or removing biological contaminants include disinfection and filtration treatment processes. Technologies used for particulate or turbidity removal include filtration treatment processes. A variety of treatment technologies are used to reduce chemical contaminants. See Appendix 8 for a summary of treatment technologies used by PWS.

7.2 BIOLOGICAL CONTAMINANT REDUCTION/REMOVAL TECHNOLOGIES: DISINFECTION

Disinfection is a treatment process that reduces pathogenic microorganisms in water through inactivation. The Surface Water Treatment Rule (SWTR) requires disinfection for all PWS that utilize surface water or groundwater under the direct influence of surface water (GWUDI).[152] (CCR, tit. 22, § 64650 et. seq.) In addition, these PWS must maintain a residual amount of disinfectant within the distribution system to ensure the safety of the water as it is distributed to customers. Disinfection is also required by the Groundwater Rule (GWR) for some biologically contaminated water sources. (Cal. Code Regs., tit. 22, § 64430.) Disinfection is provided by chlorination, chloramination, chlorine dioxide, ultraviolet (UV) light, or ozonation.

[152] Cal. Code Regs. Tit. 22, § 64651.50: "Groundwater under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae or large diameter pathogens such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions.

7.2.1 Chlorination

Chlorination is the most common method used for disinfection. There are several methods of delivery and chemical reactions utilized for chlorination. These include sodium hypochlorite solution, calcium hypochlorite tablets/pellets, or chlorine gas. Most of these chemicals are made offsite at factories, but sodium hypochlorite solution can also be produced onsite at the PWS. The goal of all these methods is to produce a hypochlorite solution that is an effective disinfectant.

7.2.2 Chloramination

Chloramines are commonly used for disinfection for water supply sources, such as surface water, that are prone to produce higher levels of disinfection byproducts (DBPs), such as trihalomethanes or haloacetic acids. Due to chloramine's greater stability over time, it may also be used for very large distribution systems in which hypochlorite is prone to dissipation. Chlorine and ammonia are combined to produce chloramines (monochloramine or dichloramine), which do not produce as many DBPs.

7.2.3 Chlorine Dioxide

Chlorine dioxide, made by reacting sodium chlorite with sodium hypochlorite or with hydrochloric acid, is a gas that disinfects through its reaction with the source water. Chlorite is a byproduct of this process and is regulated as a DBP. In California, there is minimal use of this treatment process.

7.2.4 Ultraviolet Light

UV light penetrates the cell walls of a microorganism, which disrupts its genetic material causing inactivation of the microorganism. A special lamp generates the radiation that creates UV light by striking an electric arc through a lamp filled with mercury vapor. Drinking water applications generally use low pressure and medium pressure mercury vapor lamps. These lamps emit a broad spectrum of radiation. Low pressure UV lamps emit radiation with intense peaks at UV wavelengths of 253.7 nanometers (nm) and a lesser peak at 184.9 nm. Research has shown that the optimum UV wavelength range to destroy pathogens is between 250 and 270 nm. However, at shorter wavelengths (for example 185 nm), UV light is powerful enough to produce ozone, hydroxyl, and other free radicals that destroy pathogens.

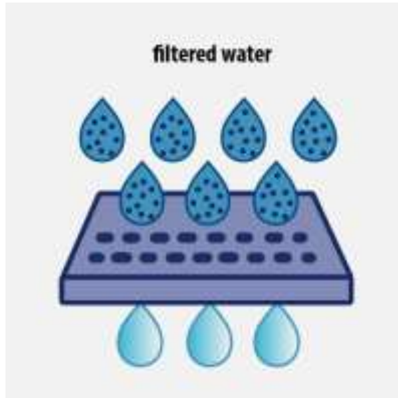
7.2.5 Ozonation

Ozone is a colorless, very unstable gas that is effective as an oxidizing agent and disinfectant. With a relatively short exposure time, it is effective in killing pathogens and oxidizing taste and odor and DBP precursor compounds. Since the gas is unstable and has a very short life, ozone generators must be used to produce ozone gas onsite. Bromate, a regulated DBP, may be formed during ozonation if bromide is present in the source water.

7.3 FILTRATION

Filtration is used as the primary treatment for the reduction and removal of particulate matter, chemical contaminates, and microbes in surface water or of groundwater under the direct influence of surface water (GWUDI). With few exceptions, filtration is required by the SWTR for all public water systems that obtain their water from surface water or from GWUDI.

Figure 7-1: Water Filter Concept Diagram



7.3.1 Conventional Filtration

This process consists of the addition of coagulant chemicals (which helps clump suspended and other particulates into larger more filterable sizes), mixing, coagulation-flocculation (where the clumps are formed and stabilized), sedimentation and clarification (clumps settle and suspended solids are removed), and filtration. The media used in the filtration process can be single media (for example sand) or dual media (for example anthracite and silica sand), or multimedia (for example anthracite, silica sand and garnet).

7.3.2 Direct Filtration

This process is like conventional filtration but without the sedimentation and clarification step. It is suitable only for consistently low turbidity waters.

7.3.3 Slow Sand Filtration

In this process, untreated water percolates slowly down through a layer of fine sand, then through a layer of gravel, and ultimately collects in a system of underdrains. A biological layer of “schmutzdecke” forms on the surface of the sand, trapping small particles and microbes. The schmutzdecke also helps degrade organic material in the water. Slow sand filtration requires a large surface area to accommodate the slow percolation rate and, thus, is suitable only for settings where lower volumes of treated water are needed.

7.3.4 Diatomaceous Earth

The diatomaceous earth (DE) process, also known as pre-coat or diatomite filtration, can be used for low turbidity raw water supplies or chemically coagulated, more turbid water sources. DE filters consist of a pre-coat layer of DE, approximately 1/8 inch-thick, supported by a porous surface.

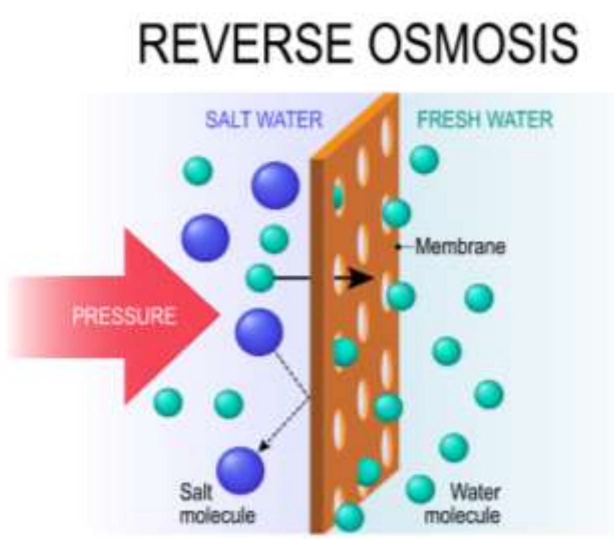
7.3.5 Advanced Filtration: Membrane Filtration

Membrane filtration is a pressure-driven and energy intensive separation process in which particulate matter larger than 1-micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has measurable removal efficiency for a target organism that can be verified through the application of a predetermined physical check to directly test the membrane integrity. The membranes can be spiral wound (made of flat permeable sheets wrapped around and connected to a central tube in a spiral) or made of hollow fibers (tube shaped filter elements that are aligned in parallel).

Some common types of membrane filtration are microfiltration, which employs membranes with a pore size range of approximately 0.1-0.2 micrometers (nominally 0.1 micrometers); ultrafiltration, which employs membranes with a pore size range of approximately 0.01 – 0.05 micrometer (nominally 0.01 micrometer); and nanofiltration, which employs membranes with a pore size of approximately one nanometer.

Reverse Osmosis (RO) is another membrane filtration process. RO uses hydraulic pressure to oppose the liquid’s osmotic pressure across a semi-permeable membrane, forcing the water from the concentrated solution side to the dilute solution side. The RO membrane allows the passage of the solvent (water) but not particulate matter. RO can effectively remove virtually all particulates from water, arsenic, barium, cadmium, chromium, radionuclides like radium and uranium, pesticides, microbiological contaminants, and natural organic minerals, salts, and substances. As a result, RO produces demineralized water as well as a brine residual, for example in sea water desalination as shown in Figure 7-2, for which ongoing proper disposal is required. In addition to the production of considerable waste streams, RO is also energy intensive and thus presents a challenge for widespread use.

Figure 7-2: Reverse Osmosis Concept Diagram



7.3.6 Oxidation Filtration

Oxidation filtration consists of first oxidizing the water, then filtering out the precipitate.

This treatment method is commonly used for groundwater for the removal of arsenic, iron and manganese. Oxidation is commonly done with the addition of chlorine, although other oxidizing chemicals can be used. The filtration media may be selective like greensand or manganese dioxide, which are chosen due chemical properties which make them preferential for filtration removal of arsenic, manganese and iron.

7.4 CHEMICAL CONTAMINANT REDUCTION/REMOVAL TECHNOLOGIES

Chemical contaminants, including both inorganic and organic chemicals, and radionuclides, are commonly removed using ion exchange, sorption technologies and membranes. This section provides a brief overview of these technologies along with other treatment technologies that are used to remove chemical contaminants in drinking water. Each of these technologies have their own waste creation and disposal considerations to factor into the selection of a preferred and sustainable treatment solution.

7.4.1 Ion Exchange

Ion exchange (IX) involves the selective removal of charged inorganic species from water using an ion-specific resin. The surface of the ion exchange resin contains charged functional groups that hold ionic substances by electrostatic attraction. As water containing undesired ions passes through a column of resin beds, charged ions on the resin surface are exchanged for the undesired species in the water. The resin, when saturated with the undesired species, is regenerated with a solution of the exchangeable ion (USEPA, 1998b). Generally, resins can be categorized as either anion exchange or cation exchange resins. Anion exchange resins selectively remove anionic species such as nitrate (NO_3^-), sulfate (SO_4^{2-}), or fluoride (F^-) and exchange them for hydroxyl (OH^-) or chloride (Cl^-) ions. Cation exchange resins are used to remove undesired cations such as cadmium (Cd^{2+}) or barium (Ba^{2+}) from water and exchange them for hydrogen ions (H^+), sodium ions (Na^+) or potassium ions (K^+).

The pH of the source water is important when employing IX resins. For example, uranium, a radionuclide, exists in water at pH levels of 6.0 and higher as a carbonate complex, which is an anion, and has a strong affinity for anion resin in the chloride form. The ion exchange treatment process is effective on water with a pH of up to 8.2. A pH higher than 8.2 could result in uranium precipitation, or a pH lower than 6.0 changes the nature of uranium to non-ionic and/or cationic species, either of which would prevent the exchange reaction from operating efficiently. It is advisable to control the pH of the water into the treatment plant to above 6.0. Sudden pH changes to below 5.6 can cause the resin to release previously removed uranium off the resin.

7.4.2 Sorption Technologies

Adsorption involves the removal of ions and molecules from solution and concentrating them on the surface of adsorbents. Adsorption is driven by the interfacial forces of the ions and the adsorbent. Adsorption media employed at drinking water plants include granular activated carbon (GAC), activated alumina, and iron media. Sorption technologies are used for the removal of organics including disinfection byproduct precursor compounds, compounds contributing to objectionable taste and odor, and inorganic contaminants such as arsenic.

7.4.3 Reverse Osmosis

In addition to removing particulate matter, RO is used to remove dissolved contaminants (solutes) from water, effectively removing nearly all contaminants, including arsenic, barium, cadmium, chromium, radionuclides radium and uranium, natural organic substances, and pesticides. RO produces demineralized water as well as a brine residual for which proper disposal is required.

7.5 OTHER TECHNOLOGIES

7.5.1 Aeration Technologies

Aeration technologies are typically used for removal of volatile organic compounds or radon and for removal of excess carbon dioxide. Aeration involves the contacting of the water with air wherein the target chemical is transferred from the water to the air stream. There are several methods used for the mixing of air and water including packed aeration towers, shallow tray air strippers, mechanical aeration, and spray aeration.

7.5.2 Softening

Softening is used to remove calcium and magnesium ions from water. Types of technologies used include ion exchange, chemical flocculation (formation of clumps via chemical addition), and precipitation (settling/filtration of clumps formed in via flocculation).

7.5.3 Electrodialysis

Electrodialysis is less commonly used for chemical removal by PWS. It is a process in which ions are transferred through ion-selective membranes by means of an electromotive force from a less concentrated solution to a more concentrated solution. Electrodialysis is very effective in removing fluoride and nitrate, and can also remove barium, cadmium, and selenium.

7.5.4 Sequestration

Sequestration is the addition of a chelating agent to form a soluble complex with the targeted metal ions. Sequestering does not remove the metal ion from the water, it binds tightly to the metal ion to prevent it from oxidizing and will keep it in solution temporarily. Commonly this treatment is used for iron, manganese and corrosion control.

7.5.5 Biological Treatment

Biological treatment relies on bacteria or other small organisms to break down disinfection by-product precursors, organic, or inorganic drinking water contaminants, through normal biological processes. It is a complex process and the biological mechanisms at work are not completely understood. Following or concurrently with biological treatment, filtration and subsequent disinfection treatment are needed to remove and inactivate the biomass.

In some conventional surface water filtration treatment plants, to reduce organic matter, GAC filter media are sometimes used in place of traditional sand or anthracite media.

GAC media provides high surface areas that can be used to promote biological activity in the filter bed that can effectively reduce disinfection by-product precursors prior to the disinfection process.

In recent years, a few groundwater biological treatment plants have come on-line for the removal of inorganic and organic chemicals (such as nitrate, perchlorate and some organic chemicals). At these treatment plants, biological reactors are used to create an anoxic environment (depleted of dissolved oxygen) with fixed or fluidized media beds, along with an electron donor (acetic acid is the most used) and nutrients, that are necessary to facilitate the biological breakdown of contaminants to harmless constituents. For example, bacteria that convert ammonia to nitrite (*Nitrosomonas*) can convert nitrate (NO_3^-) in drinking water to nitrite (NO_2^-) with nitrogen gas (N_2) as the final product that can be released into the atmosphere. The same group of bacteria is also effective in converting perchlorate (ClO_4^-) to chlorate (ClO_3^-), then to chlorite (ClO_2^-) and finally to chloride (Cl^-) and oxygen (O_2) as the final products.

In general, the complexity involved with biological treatment makes it unsuitable for many small PWS that lack the necessary technical, managerial, and financial capabilities to procure and operate this type of treatment. However, for large PWS that need to treat multiple contaminants, biological treatment has the potential of becoming a cost-effective treatment technique due to its capability of addressing multiple contaminants at once and the cost savings related to the lack of a treatment residual that requires disposal.

7.5.6 POU/POE Treatment

In some cases, drinking water treatment methods such as point-of-use (POU) devices or point-of-entry (POE) devices may be appropriate for small water systems (including state small water systems or domestic wells that are not regulated by the State Water Board) to provide safe drinking water at individual homes, businesses, or apartment buildings. Such water systems may not have the financial resources, technical ability, or physical space to own and operate centralized treatment plants.

POU devices are utilized at specific plumbing fixtures in a building or residence (for example at the kitchen faucet), treating only the water flowing from that fixture, and POE devices are installed in the water supply line just outside a building/residence, treating all water before entry. POU treatment is applied to reduce levels of certain groups of organic and inorganic chemicals, and many other contaminants. However, POU treatment cannot be applied to microbial contaminants, volatile organic chemicals or radon. POE treatment is applied to reduce levels of organic and inorganic contaminants, turbidity, microorganisms including cysts, and many other contaminants. The same technologies used in treatment plants for community water systems can be used in POU/POE treatment.

The State Water Board adopted regulations for the use of POU/POE treatment in articles 2.5 and 2.7 of chapter 15 of division 4 of title 22 of the CCR.[153] The regulations impose specific conditions on the use of POU and POE devices to achieve compliance

[153] POU/POE Regulations: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/regulations

with drinking water standards. [154] Only PWS with less than 200 service connections can use POU and POE devices for regulatory compliance in lieu of centralized treatment, and only if the PWS demonstrates to the State Water Board that centralized treatment would be economically infeasible and the PWS has applied for financial assistance. An eligible PWS must submit to the State Water Board for approval a treatment strategy, operations and maintenance program, and monitoring program. Not unlike centralized treatment, POU/POE treatment requires ongoing maintenance, inspection, and both source water and effluent monitoring after installation. A community water system wanting to use POU/POE treatment must first hold a public hearing to determine whether there is substantial community opposition to the use of POU or POE treatment. To be deemed in compliance with SDWA requirements, the system must ensure that each building and dwelling unit has a POU or POE treatment device installed.

POU and POE treatment may be an attractive option for some small water systems to return to compliance with the SDWA; however, customer participation can be a major obstacle to water systems using POU devices to come into compliance. The water system must be able to access the household or place of business of each customer to install, test, and routinely maintain the POU device.

An offshoot of POU/POE treatment is the dual distribution system (DDS) concept, where a small community may only treat a portion of its water for domestic use to reduce the cost of treatment when it is too expensive to treat water for all non-drinking water consumption needs. The concept needs more regulatory or policy development for use in rural areas where consolidation is not an option. This concept is particularly for contaminants that do not have dermal or inhalation hazards so that untreated water could still be used for bathing for instance.

In 2023, DDW created a report regarding use of POU/POE and reported that there were 122 PWSs currently permitted to use or proposing to use POU/POE treatment and estimated many state small water systems and domestic wells may benefit from POU/POE treatment. The report also included case studies, estimated cost details, guidelines,and a series of recommendations to improve the successful implementation of POU/POE treatment.[155]

7.6 COST OF COMPLIANCE

The federal and state SDWA both require an analysis of the economic impacts of establishing or updating primary drinking water standards. While USEPA uses a cost-benefit analysis[156], looking at health risk reduction and cost analysis under which quantifiable and non-quantifiable benefits of a proposed rule are measured against its cost, the State employs a feasibility analysis. (HSC § 116365; *California Manufacturers*

[154] Any home, school, or business may install POU/POE, but only if all the regulatory requirements are met will it count toward compliance with the SDWA. The State Water Board maintains a list of Residential Water Treatment Devices registered for sale in California to treat for specific contaminants. https://www.waterboards.ca.gov/drinking_water/certlic/device/watertreatmentdevices.html

[155] POU/POE Report: https://www.waterboards.ca.gov/safer/docs/2023/2023-POU-POE-report.pdf

[156] Information on USEPA's approach to economic and cost analysis when developing standards for drinking water contaminants is available at https://www.epa.gov/sdwa/sdwa-economic-analysis.

& Technology Assn. v. State Water Res. Control Bd., 64 Cal. App. 5th 266, 285-286.)

California cannot set an MCL less stringent that the national primary drinking water standard adopted by the USEPA; it must be set “at a level that is as close as feasible to the corresponding public health goal placing primary emphasis on the protection of public health that is technologically and economically feasible,” and avoids any significant risk to public health (HSC § 116365, subd. (a)(2) (standard for setting standard for carcinogens). The State Water Board must consider “the technological and economic feasibility of compliance with the proposed primary drinking water standard,” and for the purposes of determining economic feasibility, must consider “the costs of compliance to public water systems, customers, and other affected parties with the proposed primary drinking water standard, including the cost per customer and aggregate cost of compliance, using best available technology” (HSC § 116365, subd. (b)(3)). This analysis is documented within each rulemaking package.

Historical drinking water rulemaking records are transmitted to the California State Archives (https://www.sos.ca.gov/archives). The State Water Board retains recent rulemaking records. When the rulemaking records are available, they are digitized and are accessible online.[157]

One of the ongoing concerns regarding the cost of compliance is how small water systems can afford to charge rates necessary to sustainably meet compliance requirements. For smaller systems, the capital costs to install treatment and the on-going operation and maintenance (O&M) costs have a smaller rate-base through which to spread those costs. Affordability of operation and maintenance is discussed in subsection 7.6.1. Subsection 7.6.2 provides a summary of hexavalent chromium rulemaking effort, including a reference to the full economic analysis. Analysis of water system affordability and costs of compliance are also discussed in Chapters 8 and 9.

7.6.1 Operation and Maintenance Affordability

Disadvantaged communities served by small water systems often struggle due to the lack of an adequate rate base through which to spread their costs, and the lack of economies of scale. Some systems serving economically disadvantaged communities require treatment in addition to the usual O&M costs of running a water system. For many of these systems, the need to install, operate, and maintain a sophisticated treatment system requires a high degree of management oversight, financial capability, and technical capacity. Many small systems do not have these resources. One solution may be consolidation with another water system, since that approach broadens the rate base and optimizes economies of scale; however, consolidation is not always feasible or without challenges (see Chapter 8).

All treatment systems require upfront capital costs. Grant funding for capital costs is often available to a system serving an economically disadvantaged community if it can

[157] Adopted Drinking Water-Related Regulations and Policy Handbooks: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Recentregs.html

demonstrate an ability to afford ongoing O&M costs. The most common contaminants affecting groundwater sources of drinking water are arsenic and nitrate. The most common treatment systems for nitrate removal are IX and RO (biological and chemical reduction methods may also be used for nitrate but are not commonly used in California, especially by small water systems). The most common treatment systems for arsenic removal are adsorptive media, manganese dioxide media with the addition of ferric salts for oxidation and filtration, and RO.

Ongoing O&M costs for arsenic and nitrate treatment are especially high for several reasons. First, costs for certified operators are high because these treatments require advanced levels of operator certification and proficiency, and costly sampling may also be required to ensure effectiveness of treatment. In addition, many treatment technologies use significant amounts of energy, generating large utility bills. Furthermore, many treatment technologies generate significant volumes of contaminated resins/media or brine waste (residuals) that are often not suitable for disposal via local wastewater treatment infrastructure and must be hauled off for disposal at a hazardous waste disposal facility or via a long pipeline constructed to an adequate waste disposal or treatment facility and maintained at significant costs. Finally, the on-going costs to purchase treatment system materials (chemicals, media, or resins) tend to be particularly high, especially for systems without the ability to take advantage of economies of scale who can purchase large quantities of material in bulk. Taken together, these treatment-related costs can surpass the community's ability to pay, precluding the PWS from providing safe drinking water to their residents.[158] Although there are readily available and affordable POU/POE water treatment devices on the consumer market, such as under the counter RO and IX units that are effective in removing arsenic and nitrates, the responsibility for providing safe drinking water still resides with the PWS and POU/POE solutions are not always viable as discussed in 7.5.6, above.

An example of how O&M costs for treatment of chemical and radiological contaminants can affect PWS of different sizes is the cost to comply with the 1,2,3-TCP MCL. As a part of its 2017 rulemaking efforts, the State Water Board conducted a cost estimate to address economic impact of the regulations, which includes cost of compliance with the regulations. The State Water Board noted a great disparity in its estimation that, on average, the estimated annual cost of compliance per service connection for water systems with less than 200 service connections is $609 while the average annual cost per service connection for water systems with greater than 200 service connections is $25. For the hexavalent chromium MCL economic analysis, described in the next section, the average annual cost per service connection for community water systems ranges from $91 (systems with more than 10,000 service connections) to $808 (for systems with between 100 and 200 service connections). Many smaller water systems do not have economies of scale to keep cost per service connection affordable.

[158] Per DDW's 2023 Annual Compliance Report (p. 20) 149 of 172 community water systems with violations of the federal drinking water standards and treatment technique requirements serve less than 500 connections: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/annual-compliance-report-2023.pdf

Affordability is described in more detail in Chapter 9.

7.6.2 Hexavalent chromium

A hexavalent chromium MCL and monitoring requirements became effective on October 1, 2024. There is no federal MCL for this constituent. Hexavalent chromium is a heavy metal that has been used in industrial applications and found naturally occurring throughout the environment. While chromium can exist in a nontoxic, trivalent form, the hexavalent form has been shown to be carcinogenic and toxic to the liver. Hexavalent chromium is among the chemicals known to the state to cause cancer, pursuant to California's Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65").[159]

As a part of its rulemaking efforts, the State Water Board prepared a programmatic-level environmental impact report to comply with the requirements of the California Environmental Quality Act and conducted an analysis of the estimated costs of the regulations to comply with the requirements of the Administrative Procedure Act and section 116365 of the Health and Safety Code. That section requires the State Water Board to demonstrate that the proposed regulation is "as close as feasible to the public health goal" set by the Office of Environmental Health Hazard Assessment, with a primary emphasis on the protection of public health, and that is technologically and economically feasible, and avoids significant risk to public health.

The costs of compliance with the hexavalent chromium MCL were primarily associated with monitoring and treatment.[160] Based on available data, a total of 501 water sources were determined to be out of compliance, affecting 233 water systems. Total estimated annualized cost of compliance, including monitoring and treatment, was $179.6 million. Approximately 325 of the sources (65% of total) belonged to systems with less than 10,000 connections and represent an annual cost of $72.2 million. A complete discussion of the regulations and associated economic impacts are available on the rulemaking file posted online.[161]

7.7 CONCLUSIONS AND RECOMMENDATIONS

7.7.1 Conclusions

For all contaminants that have an MCL, there are methods of treatment to achieve compliance. Almost all large- and medium-sized water systems that need treatment to meet an MCL have installed or are in the process of installing the necessary treatment systems. However, small water systems, including schools that operate as PWSs, state small water systems, and domestic well owners still face challenges in funding the

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159 Proposition 65: https://oehha.ca.gov/proposition-65

160 Initial Statement Of Reasons for The Hexavalent Chromium MCL Regulation: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/chromium6/2023/3-0_Cr6-MCL-ISOR.pdf

161 Hexavalent Chromium MCL (SWRCB-DDW-21-003): https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/SWRCBDDW-21-003_hexavalent_chromium.html

installation and on-going operation and maintenance of necessary treatment facilities.

Because operational costs are traditionally paid by the ratepayers of PWSs, funding for continued operations and maintenance of treatment can be problematic for small water systems. With their small rate base, and often disadvantaged community status, small water systems find it difficult to establish rates that their ratepayers can afford, and which adequately cover operational costs. Many federal and state financial assistance sources are not available for operations and maintenance costs. Under these federal and state funding programs, water systems must demonstrate sufficient financial capacity to afford the operations and maintenance costs before they receive funding for capital costs of new treatment facilities. The lack of a sustainable revenue source to fund operations has been a major impediment to the construction of treatment facilities for small water systems, and particularly small disadvantaged systems, and the resulting incidence of continued noncompliance with drinking water standards among small water systems. Legislation signed by the Governor in 2019 (Chapter 120, Statutes of 2019, (SB 200)) created the Safe and Affordable Drinking Water Fund, which makes funding available for operation and maintenance support for small water systems that are unable to meet safe drinking water standards. SB 200 appropriates up to $130,000,000 annually from the Greenhouse Gas Reduction Fund and the General Fund through June 30, 2030. The Safe and Affordable Drinking Water Fund enables the State Water Board to aggressively address the lack of access to safe and affordable drinking water for small water systems. While the funding allows the State Water Board to help many struggling small water systems, the need exceeds the available resources, and these systems will continue to face risk of failure to comply with requirements of the SDWA due to ongoing factors – such as lack of capacity to treat emerging contaminants, aging infrastructure, and poor financial health. A consistent and more sustainable source of funding and solutions are needed to permanently address these issues to ensure that every Californian has access to safe and affordable drinking water. Chapter 8 and 9 include discussions on the SAFER program activities to help failing and at-risk systems comply with SDWA requirements. Chapter 10 includes details of the state funding, including O&M support.

7.7.2 Recommendations

7-1 High operation and maintenance costs of treatment facilities are unsustainable for many small water systems, particularly those serving disadvantaged communities. The SAFER program funding and engagement activities has provided substantial assistance to help alleviate these financial hurdles for small water systems, including by mandating and encouraging consolidations. However, where consolidation is not feasible or is not going to happen quickly, there is a need for a consistent and more sustainable or permanent source of O&M funding, including staff oversight for implementation of such a program.

7-2 With increasing challenges to treat multiple contaminants, the State Water Board recommends specialized operator training programs to ensure a sufficient number of operators are available to industry to operate treatment facilities and that resources are made available for operators willing and able to work with the small disadvantaged communities incapable of establishing sustainable water rate structures.

7-3 Amend Water Code Section 106.4(b) to prohibit residential development in locations where water sources are not provided necessary treatment by an existing public water system.

7-4 Require local ordinances to establish more rigorous drinking water standards for state small water systems and domestic well owners, including regulations related to use of POU/POE to improve water supplies and requirements for a sustainable source of supply.

7-5 Support the development of a framework, including permitting and monitoring policies for implementation of dual distribution systems, for long-term solutions for systems unable to afford full scale centralized treatment.

7-6 Encourage local agencies (such as agencies overseeing management zones, Groundwater Sustainability Agencies, etc.) managing impacted water supplies to coordinate with affected state small water systems and domestic well owners to consider POU/POE devices as an interim solution to supplement or replace bottled water where appropriate.

CHAPTER 8 SUSTAINABILITY OF CALIFORNIA'S DRINKING WATER SYSTEMS

8.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses how administrators and consolidations are ensuring communities have access to safe drinking water, the costs of administrators, barriers to consolidation, and other related initiatives related to sustainable water systems in California.

In 2012, California made history by adopting the Human Right to Water (HR2W), recognizing that every person has the right to safe, clean, affordable, and accessible drinking water. Building on this, the State Water Resources Control Board (State Water Board) embraced HR2W as a core value, shaping policy and decision-making. The passage of Senate Bill (SB) 200 in 2019 further advanced these efforts by establishing the Safe and Affordable Funding for Equity and Resilience (SAFER) program, aimed at helping water systems achieve long-term sustainability. Critical legislation has supported this framework, including SB 88, which in November 2020 granted the State Water Board mandatory consolidation authority to merge failing water systems with more stable ones. Additionally, SB 1263, passed in September 2016, prevents the formation of unsustainable water systems, and Assembly Bill (AB) 2501, passed in September 2018, granted the State Water Board authority to appoint administrators to oversee and manage struggling systems. In 2021, SB 552 was passed to enhance drought resilience, requiring small water suppliers and rural communities to plan for drought emergencies. Alongside these efforts, the Sustainable Groundwater Management Act (SGMA) was enacted in 2014 to protect groundwater resources and ensure responsible management. Governor Gavin Newsom's 2020 Executive Order called for the development of a Water Resilience Portfolio, setting a comprehensive vision for securing California's water resources in the face of climate change and population growth. Together, these initiatives create a robust framework to enhance the sustainability of California's water systems.

Sustainability refers to the ability of a water system to consistently provide safe, clean, affordable, and accessible drinking water while maintaining financial, technical, and managerial capacity over the long term. It requires balancing environmental, economic, and social factors to ensure the system can adapt and be resilient to changing conditions, such as population growth, climate variability, and regulatory requirements, while protecting water resources and responding to emergencies or financial challenges without compromising service.

This chapter introduces characteristics and factors that hinder water system sustainability. It then focuses on the State Water Board's initiatives implemented through the SAFER Program, such as SAFER engagement activities, needs assessment, technical assistance/administrators, and water partnerships, to uphold the mandates of HR2W. While this chapter focuses largely on public water systems, other drinking water systems not regulated by DDW, such as state small water systems (SSWS) and self-supplied individuals (through domestic wells, etc.) experience similar, if not exacerbated challenges in achieving sustainability.

8.2 SAFER PROGRAM DATA, ASSESSMENT, AND ANALYSIS

In 2019, to advance the goals of the HR2W, California passed SB 200 which enabled the State Water Board to establish the SAFER program. SB 200 established a set of tools, funding sources, and regulatory authorities the State Water Board can harness through the SAFER program to help struggling water systems sustainably and affordably provide safe drinking water to their customers. Among the tools created under SB 200 is the Safe and Affordable Drinking Water Fund (SADWF) that provides up to $130 million per year through 2030 that enables the State Water Board to develop and implement sustainable solutions for underperforming drinking water systems.

SAFER harnesses SADWF to implement interim and long-term solutions for communities across the state. The State Water Board prioritizes SAFER program funding annually through the SADWF's Fund Expenditure Plan (FEP). The annual FEP is informed by data and analysis from the drinking water Needs Assessment, as required by HSC § 116769.

8.2.1 Drinking Water Needs Assessment

The Drinking Water Needs Assessment[162] (Needs Assessment) is a comprehensive, data-driven analysis that:

1. Identifies communities served by Failing public water systems (PWS);
2. Predicts which PWS, state small water systems, and domestic wells are At-Risk of failing;
3. Estimates how much it may cost to achieve the HR2W for Failing and At-Risk systems and the communities they serve;
4. Estimates the potential five-year funding gap between estimated funding needs and state funding availability; and
5. Identifies disadvantaged communities (DAC) that may be facing affordability challenges, which may limit their ability to address existing and future drinking water challenges.

The results of the annual Needs Assessment are used by the State Water Board's SAFER program and the SAFER Advisory Group[163] to inform the prioritization of available state funding in the SADWFFEP.[164]

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[162] Drinking Water Quality: Needs Assessment | California State Water Resources Control Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html
[163] SAFER Advisory Group https://www.waterboards.ca.gov/safer/advisory_group.html
[164] Safe and Affordable Drinking Water Fund https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html

Figure 8-1: How the Needs Assessment is Utilized by the SAFER Program

Since its first iteration in 2021, the annual Needs Assessment serves to highlight and track progress in achieving safe drinking water in communities that have historically lacked access. It also serves to document the pace of implementing drinking water solutions, measure water system performance to encourage resiliency, explore sustainable long-term solutions like consolidation, and estimate the cost of implementing these solutions.

By incorporating the Needs Assessment into the SAFER program and implementation of SADWF, the State Water Board continues to lead long-term drinking water solutions. At the same time, the Needs Assessment brings clarity to the amount and type of work that must be done by state, federal, local and stakeholder partners collectively to realize the HR2W for all Californians.

Figure 8-2: Needs Assessment Results

2024 NEEDS ASSESSMENT RESULTS

384
FAILING
Public Water Systems

Population Served
730,416

45% Receiving $352 M in State Funding & Technical Assistance

KEY FINDINGS:

1. 98% of California's population receives water from systems that meet drinking water standards. 79% of water systems have continually been in compliance with drinking water standards since 2017.
2. Approximately 56% of Failing public water systems serve DACs and 67% serve majority communities of color.

613
AT-RISK
Public Water Systems

Population Served
1,535,220

16% Receiving
$136 M in State Funding & Technical Assistance

727
HIGH-RISK
State Small Water Systems[165]

143,663
HIGH-RISK
Domestic Wells[166]

3. The Risk Assessment was able to predict risk of failure for 91% of water systems on the Failing list in 2023.
4. Estimated 5-year funding needs for modeled long-term and interim solutions for Failing and At-Risk public water systems is approximately $6.6 billion and $4.9 billion for high-risk state small water systems and domestic wells.
5. The State Water Board projects $3.5 billion in 5-year funding availability, $2 billion for grants and $1.5 billion for loans. The estimated 5-year funding gap is $5.5 billion for grant eligible needs. All estimated 5-year loan eligible needs are met by projected available loan capacity.
6. In the long-run, local communities and private well owners may need to cover $13.9 billion to achieve HR2W.
7. Small drinking water systems charge on average $32 more a month for the same volume of water compared to larger water systems.
8. Approximately 94 (3%) of community water systems face a high drinking water affordability burden and 311 (10%) may be experiencing a medium affordability burden.

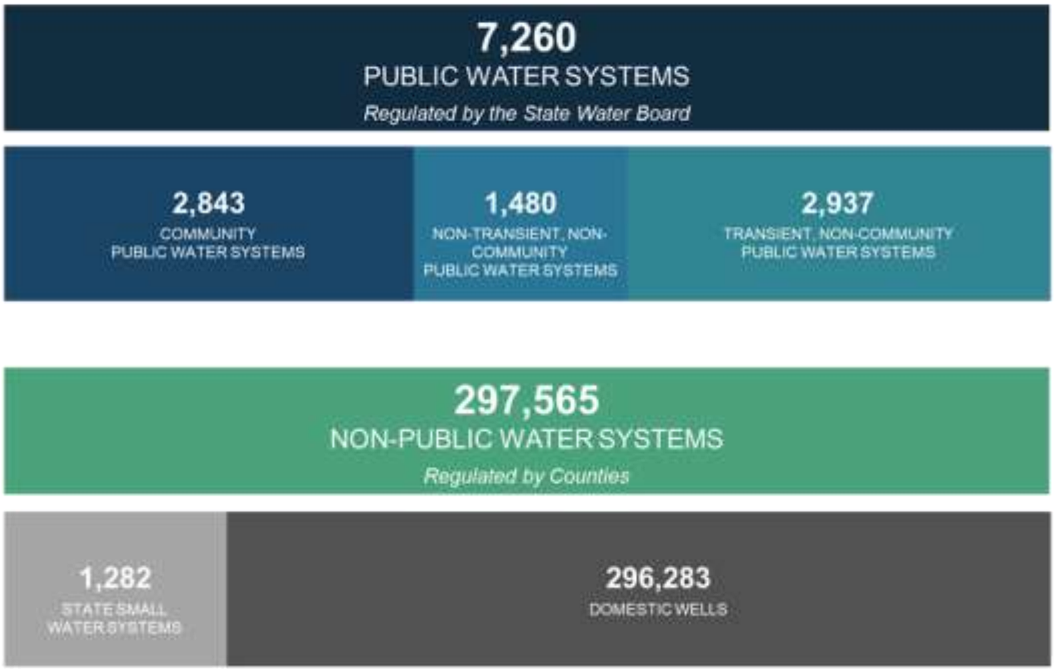
8.2.1.1 Water Systems Classifications Analyzed

California has over 7,200 active public water systems, 1,280 state small water systems (SSWS), and around 300,000 known domestic wells (estimates are as high as 485,000, but data for locations and activity status are missing). The State Water Board and Local Primacy Agencies (LPAs) regulate public water systems while SSWS and domestic wells are permitted and regulated by county agencies, which may include LPAs. Data on SSWS and domestic wells is limited. Appendix: County State Small Water System & Domestic Well Data Reporting[167] summarizes the data received from counties since

[165] This count represents State Small Water Systems that are: High Water Quality Risk only (464), High Water Shortage only (130), and both High Water Quality & Water Shortage (133).
[166] This count represents Domestic Wells that are: High Water Quality Risk only (39,709), High Water Shortage only (63,146), and both High Water Quality & Water Shortage (40,808).
[167] 2024 Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024county-ssws-dw-rpt.pdf

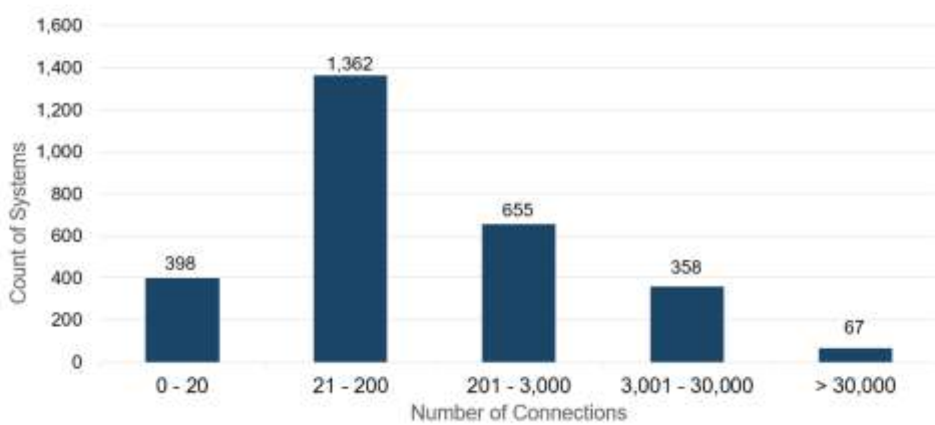
2021 for these systems.

Figure 8-3: California Water System Classifications[168]



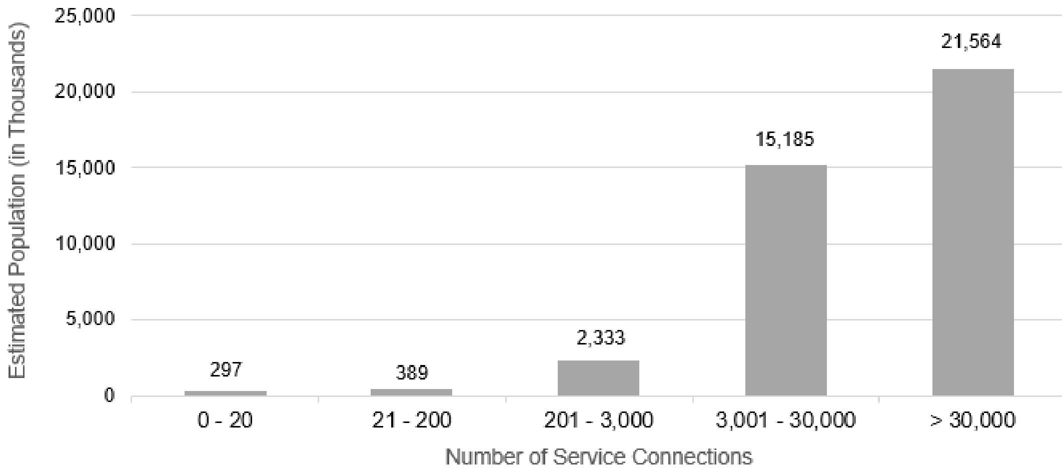
Notably, 85% of community water systems are considered “small,” serving less than 3,000 service connections (Figure 8-4). However, these small water systems serve approximately 8% of the population (Figure 8-5).

Figure 8-4: Number of Community Systems by Service Connections



[168] The counts of public water systems reflect the current active inventory of public water systems on 03.14.2024. The number of state small water systems included represents systems with known locations included in the Needs Assessment. The count of domestic wells is based on the number of domestic well records identified using the Department of Water Resources (DWR) Online System for Well Completion Reports (OSWCR). The actual count and location of active domestic wells is currently unknown.

Figure 8-5: Total Estimated Population (in Thousands) Served by Water Systems of Different Sizes (by Service Connections)



8.2.1.2 Systems Included in the Needs Assessment

The 2024 Needs Assessment's components analyze different types of water system as summarized in Table 8-1 below.

Table 8-1: Systems Included in 2024 Needs Assessment Components

Needs Assessment Component	Water Systems Included	# Systems
Failing List and Affordability Assessment	• All community water systems.	2,837
	• Non-transient non-community K-12 schools.	365
Risk Assessment for Public Water Systems	• Community water systems up to 30,000 service connections and up to 100,000 population served. ◦ Wholesalers are excluded.	2,695
	• Non-transient non-community K-12 schools.	360
Risk Assessment for State Small Water Systems and Domestic Wells	• All state small water systems where location data is available.	1,282
	• All domestic wells with "domestic" well completion reports in the Department of Water Resources Online System for Well Completion Reports.	296,283

8.2.1.3 Failing Public Water Systems

The State Water Board assesses public water systems that fail to meet the goals of the

HR2W and maintains a list and map of these systems on its website.[169] The Failing list is updated and refreshed daily as violations and enforcement actions are issued, updated, or resolved. Systems on the Failing list are out of compliance with or consistently fail to meet drinking water standards.

The original Failing criteria developed in 2017 only identified water systems with water-quality based violations and active/open enforcement actions. The Failing list criteria were expanded in April 2021 to better align with statutory definitions of what it means for a water system to "consistently fail" to meet primary drinking water standards.[170] At that time, *E. coli* violations, treatment technique violations, and multiple monitoring and reporting violations were also added.

In April 2024, considering lessons learned from the 2021-2022 drought, the State Water Board expanded the Failing criteria to capture water systems that are unable to consistently provide safe drinking water to their customers due to water shortage. In particular, the State Water Board added source capacity and water outage violations to the Failing criteria. By including systems experiencing water shortages on the Failing list, the State Water Board ensures that these systems are duly prioritized for funding and support.

Table 8-2 summarizes how the Failing criteria have changed over time. Additional details regarding the history of the Failing list and criteria methodology can be found on the State Water Board's Failing water system webpage.[171]

Table 8-2: Expanded Criteria for Failing Water Systems

Criteria	Jan. 2017 – April 2021	April 2021 – April 2024	After April 2024
Primary MCL[172] Violation with an open Enforcement Action	Yes	Yes	Yes
Secondary MCL Violation with an open Enforcement Action	Yes	Yes	Yes
***E. coli* Violation with an open Enforcement Action**	No	Yes	Yes
Treatment Technique Violations: • One or more Treatment Technique violations (in lieu of an MCL), related to a	Partially	Expanded	Yes

[169] SAFER Dashboard | California State Water Resources Control Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html
[170] California Health and Safety Code § 116275(c)
[171] Human Right to Water | California State Water Resources Control Board https://www.waterboards.ca.gov/water_issues/programs/hr2w/
[172] Maximum Contaminant Level

Criteria	Jan. 2017 – April 2021	April 2021 – April 2024	After April 2024
primary contaminant, with an open enforcement action; and/or • Three or more Treatment Technique violations (in lieu of an MCL), related to a primary contaminant, within the last three years.			
Monitoring and Reporting Violations: • Three Monitoring and Reporting violations (related to an MCL) within the last three years where at least one violation has been open for 15 months or greater.	No	Yes	Yes
Source Capacity & Water Outage Violations with an open Enforcement Action	No	No	Yes

8.2.1.4 2023 Failing Systems

In 2023, there were 457 unique water systems on the Failing list at one point throughout the year. This includes systems that were on the Failing list prior to 2023 but had yet to come off the list as shown in Table 8-3.

Table 8-3: 2023 Failing List Systems

Water System Size	Unique Systems	Population Served	Average Connections	On List > 3-yrs
Small[173]	379 (83%)	324,442 (15%)	233	188 (79%)
Medium[174]	20 (4%)	648,660 (30%)	8,631	10 (4%)
Large[175]	2 (.5%)	1,193,253	136,535	0
K-12 School[176]	56 (12%)	17,739 (0.8%)	6	40 (15%)

[173] Small water system: a community water system serving 3,000 or less service connections.
[174] Medium water system: a community water system that serves between 3,001 and 30,000 service connections; and up to 100,000 population.
[175] Large water system: a community water system that serves at least 30,001 service connections, or a population of 100,001.
[176] Non-transient non-community water systems that serve K-12 schools.

Water System Size	Unique Systems	Population Served	Average Connections	On List > 3-yrs
TOTAL:	**457**	**2,184,094**	**1,169**	**238 (52%)**

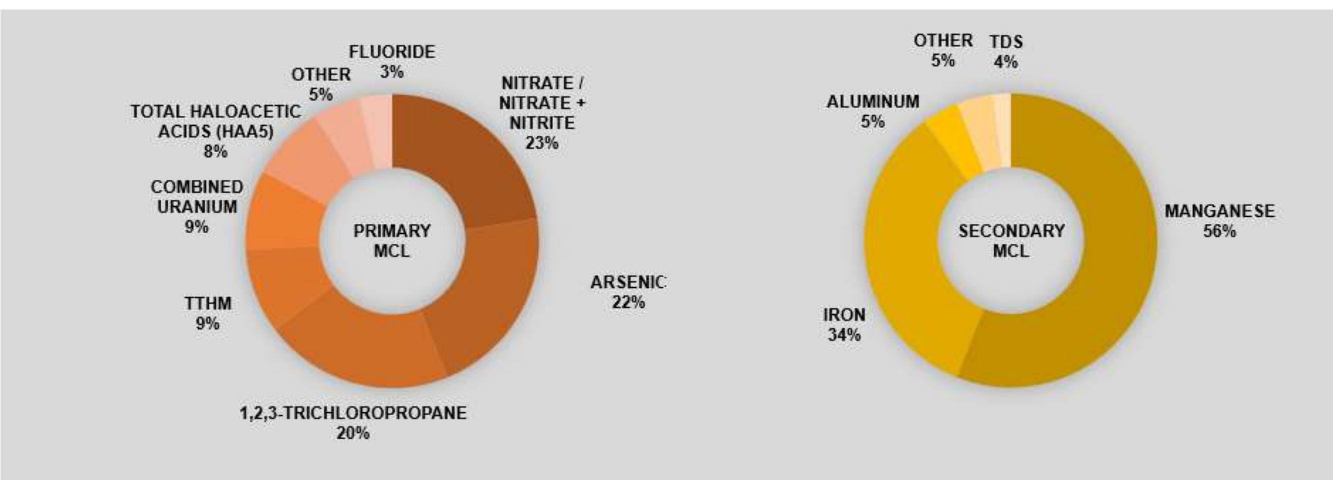
In 2023, 67 unique water systems were added, and 59 water systems were removed from the Failing List. Table 8-4 breaks down the criteria that caused systems to be added to or remain on the 2023 List. Approximately 50 water systems met more than one criterion.

Table 8-4: Number of Instances of Failing List Criteria Met in 2023

Water System Size	Primary MCL Violation	Secondary MCL Violation	*E. coli* Violation	Treatment Technique Violation	Monitoring & Reporting Violations
Small	262	47	8	29	62
Medium	18	0	0	5	0
Large	1	0	0	1	0
K-12 School	47	1	3	4	6
TOTAL:	**328**	**48**	**11**	**39**	**68**

Statewide, the top contaminants that contributed to higher proportions of systems on the 2023 Failing list were unchanged from 2022 and were: arsenic, 1,2,3-trichloropropane, and nitrate / nitrate + nitrite for primary MCL violations and manganese and iron for secondary MCL violations.

Figure 8-6: Primary and Secondary MCL Violation Contaminants



8.2.1.5 Failing List Used in the 2024 Needs Assessment

Multiple components of the Needs Assessment rely on the Failing list of systems. For the purposes of the Risk Assessment, Failing systems are excluded from the results, except for comparison purposes. If a water system meets one or more of the Failing criteria, then that system is considered a Failing water system and cannot be considered “at-risk” of failing. However, once a water system is removed from the Failing list, it may be added to the At-Risk list if it meets the Risk Assessment criteria. Failing systems are included in the Cost Assessment and Affordability Assessment results.

The Needs Assessment analyzes data at a point in time. For the purposes of the 2024 Needs Assessment, the State Water Board utilized the Failing list as of January 1, 2024.[177] The Failing list on this date had 385 water systems, serving 913,462 people.

Table 8-5: Failing List from January 1, 2024[178]

System Size/Type		Number
Small		317
Medium		16
Large		1
K-12 School		51
	TOTAL:	**385**

8.2.2 Risk Assessment

The purpose of the Risk Assessment for public water systems is to identify systems at-risk or potentially at-risk of failing to meet one or more key HR2W goals: (1) providing safe drinking water; (2) accessible drinking water; (3) affordable drinking water; and/or (4) maintaining a sustainable water system. Data on performance and risk is most readily available for PWS and thus the Risk Assessment methodology for PWS allows for a multi-faceted examination across four risk indicator categories: Water Quality, Accessibility, Affordability; and TMF (technical, managerial, and financial) Capacity.

The Risk Assessment is conducted for community water systems up to 30,000 service connections or 100,000 population and water systems that serve K-12 schools. 91 large community water systems are excluded from the Risk Assessment, 4 of which were on the Failing list as of January 1, 2024. The inventory of systems included in the Risk Assessment align with State Water Board’s expanded funding eligibilities in the 2021-22

[177] This list of Failing public water systems on January 1, 2024 was queried from the State Water Board’s databases on 01.23.2024

[178] In this analysis, non-transient non-community systems that are day care centers were excluded.

Intended Use Plan[19] to medium DAC water systems. The 2024 Risk Assessment excluded 54 wholesalers because they do not provide direct service to residential customers. Some water system types have also been excluded from certain risk categories or specific risk indicators (Table 8-6).

Table 8-6: Public Water Systems Analyzed in the 2024 Risk Assessment

Water System Type[179]	Number	Water Quality	Accessibility	Affordability	TMF Capacity
Community Water Systems[180]	2,695	Yes	Yes	Yes	Military bases are excluded
K-12 Schools[181]	360	Yes	Yes	Yes	Yes
TOTAL ANALYZED:	**3,055**				

8.2.2.1.1

8.2.2.2 Risk Assessment Methodology

The first Risk Assessment, published in the 2021 Needs Assessment, was developed by the State Water Board in partnership with the University of California, Los Angeles (UCLA) through a phased public process from January 2019 through January 2021. Since the initial Risk Assessment, many enhancements have been made to the methodology to accommodate new or missing data, respond to stakeholder feedback and improve the predictive power of the analysis. Appendix: Risk Assessment Public Water System Methodology[182] contains an in-depth overview of the Risk Assessment methodology that relies on three core elements to calculate an aggregated risk score of a public water system as shown in Figure 8-7.

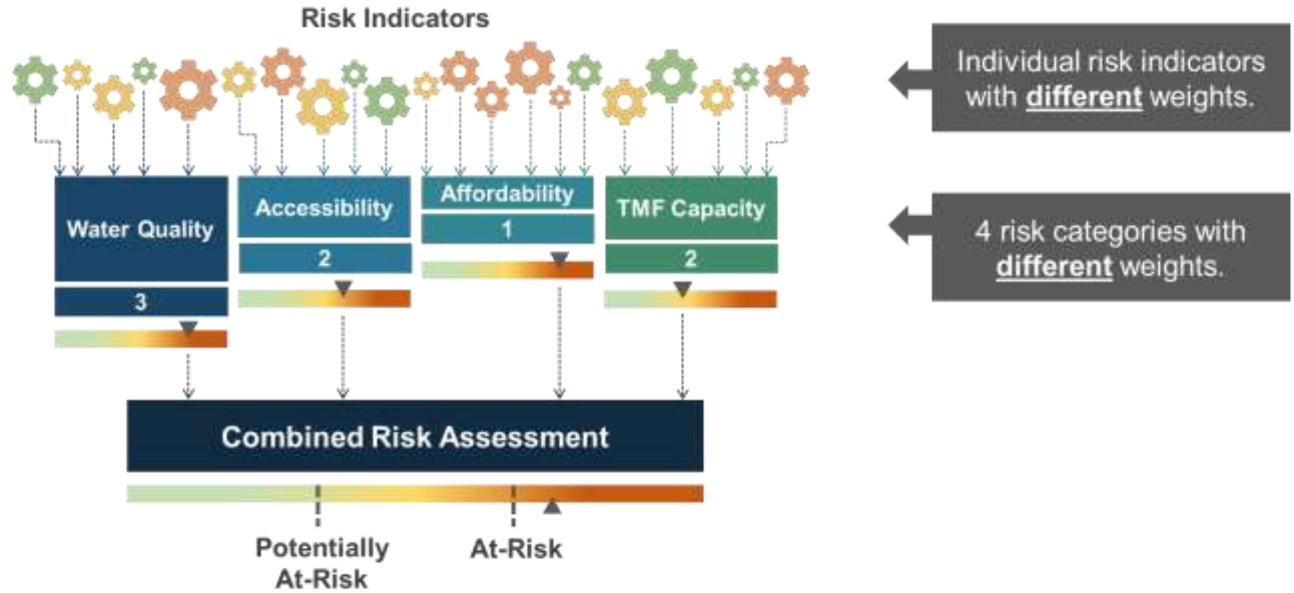
[179] Systems on the Failing list were included in the Risk Assessment analysis; however, they were excluded from the final Risk Assessment results.

[180] Wholesalers were excluded.

[181] These systems were manually identified by the State Water Board.

[182] Appendix: Risk Assessment Public Water System Methodology https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024risk-assessment-pws-methodolgy.pdf

Figure 8-7: Illustration of the Risk Assessment Methodology



Risk Indicators	Quantifiable measurements of key data points that assess the potential for a water system to fail to sustainably provide an adequate supply of safe drinking water due to water quality, water quantity, infrastructure and/or institutional issues.
Risk Indicator Thresholds	The levels, points, or values associated with an individual risk indicator that delineates when a water system is more at-risk of failing, typically based on regulatory requirements or industry standards.
Scores & Weights	The application of a multiplying value or weight to each risk indicator and risk category, as certain risk indicators and categories may be deemed more critical than others and/or some may be out of control of the water system.

8.2.2.3 Risk Indicator Categories

The Risk Assessment analyzes risk in the following categories:

Water Quality	Water Quality risk indicators measure current water quality and trends to identify compliance with regulatory requirements, as well as frequency of exposure to drinking water contaminants.
Accessibility	Accessibility risk indicators measure a system's ability to deliver safe, sufficient, and continuous drinking water to meet public health needs.

Affordability

Affordability risk indicators measure the capacity of households and the community to supply the revenue necessary for a water system to pay for necessary capital, operations, and maintenance expenses.

TMF Capacity

Technical, Managerial, & Financial (TMF) Capacity risk indicators measure a system's capacity to plan for, achieve, and maintain long term compliance with drinking water standards.

8.2.2.4 Risk Indicators

The initial 2021 Risk Assessment utilized 19 risk indicators identified and developed between 2019-2021 by the State Water Board and UCLA, with public feedback.[183] Risk indicators that measure water quality, accessibility, affordability, and TMF capacity were selected based on their direct relationship to a water system's ability to remain in compliance with drinking water standards. In 2021, the State Water Board made significant changes to the indicators used in the 2022 Risk Assessment. To keep the Risk Assessment methodology static, minimal changes were made to the 2023 risk indicators, and no changes have been made for the 2024 Risk Assessment (Table 8-7). Information on each risk indicator calculation methodology, thresholds, scores, and weights can be found in Appendix: Risk Assessment Public Water System Methodology.[184]

Table 8-7: Risk Indicators

Category	2024 Risk Indicators
Water Quality	History of *E. coli* Presence
	Increasing Presence of Water Quality Trends Toward MCL
	Treatment Technique Violations
	Past Presence on the Failing List
	Percentage of Sources Exceeding a MCL
	Constituents of Emerging Concern

[183] Information on how the initial 19 risk indicators used in 2021 were selected from a list of 129 potential risk indicators is detailed in an October 7, 2020, white paper:
Evaluation of Potential Indicators and Recommendations for Risk Assessment 2.0 for Public Water Systems
https://www.waterboards.ca.gov/safer/docs/e_p_i_recommendations_risk_assessment_2_public_water_systems.pdf

[184] Appendix: Risk Assessment Public Water System Methodology
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024risk-assessment-pws-methodolgy.pdf

Category	2024 Risk Indicators
Accessibility	Number of Sources
	Absence of Interties
	DWR – Drought & Water Shortage Risk Assessment Results
	Critically Over drafted Groundwater Basin
	Bottled or Hauled Water Reliance
	Source Capacity Violations
Affordability	Percent of Median Household Income (%MHI)
	Extreme Water Bill
	Household Socioeconomic Burden
TMF Capacity	Operator Certification Violations
	Monitoring and Reporting Violations
	Significant Deficiencies
	Days Cash on Hand
	Operating Ratio
	Net Annual Income

8.2.2.5 Risk Assessment Results

The results of the Risk Assessment are presented as a water system's "SAFER Status." The SAFER Status can be one of four options as defined in Table 8-8. If a water system's SAFER Status is currently Failing, its Risk Assessment result (At-Risk, Potentially At-Risk, Not At-Risk, or Not Assessed) will replace its SAFER Status once the system comes off the Failing list.

Table 8-8: SAFER and Risk Assessment Status

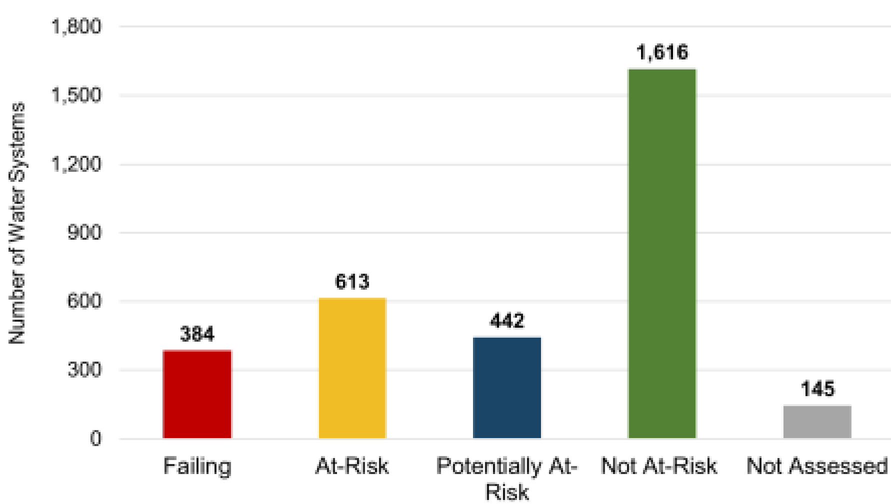
Status	About
Failing	Failing water systems are those that meet current Failing criteria as defined by the State Water Board.[185]

[185] Failing Criteria https://www.waterboards.ca.gov/water_issues/programs/hr2w/docs/hr2w_expanded_criteria.pdf

Status	About
At-Risk	Water systems at-risk of failing. The system's risk scores meet the threshold to be designated as At-Risk in the results of the Risk Assessment.
Potentially At-Risk	Water systems potentially at-risk of failing. The system has accrued risk points within the Risk Assessment, but not enough to be designated as At-Risk.
Not At-Risk	Water systems not at-risk of failing. The system has accrued zero or very little risk points within the Risk Assessment.
Not Assessed	Water systems that are currently not Failing and excluded[186] from the Risk Assessment analysis.

The 2024 Risk Assessment was conducted for 3,055 public water systems and identified 384 Faling systems[187] The results indicate most assessed water systems (1,616 or 53%) are Not At-Risk. After removing the 384 Failing systems, the analysis identified 613 (23%) At-Risk water systems, 442 (17%) Potentially At-Risk water systems, and 1,616 (61%) Not At-Risk water systems.[188]

Figure 8-8: 2024 Risk Assessment Results



[186] Large community water system with greater than 30,000 service connection or more than 100,000 population served are not included in the Risk Assessment and will not have a Risk Assessment result.
[187] There were 385 Failing systems on January 1, 2024. The Risk Assessment analysis excludes 1 large Failing water system due to its size.
[188] Attachment: Risk Assessment Results Spreadsheet https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024risk.xlsx

8.2.2.6 Results by System Size

The analysis of the Risk Assessment results indicates the majority (84%) of At-Risk water systems are small water systems with 3,000 service connections or less (Table 8-9).

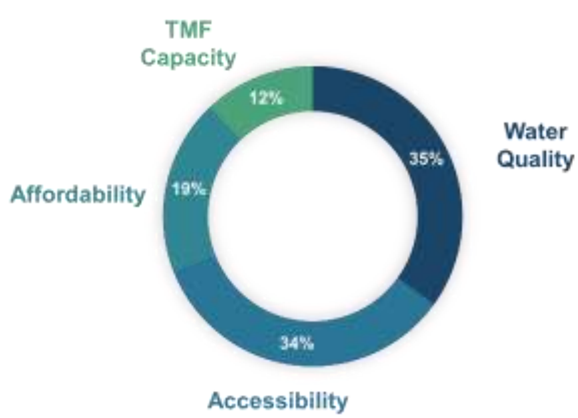
Table 8-9: 2024 Risk Assessment Results by Systems Size and Type

Assessment Result	Small	Medium	Large	K-12 Schools
Failing	317 (13.4%)	16 (4.8%)	1	51(14.2%)
At-Risk	512 (21.7%)	31 (9.3%)	N/A	70 (19.4%)
Potentially At-Risk	377 (16%)	36 (10.8%)	N/A	29 (8.1%)
Not At-Risk	1,155 (48.9%)	251 (75.1%)	N/A	210 (58.3%)
Not Assessed	0 (0%)	0 (0%)	90	0 (0%)
TOTAL:	**2,361**	**334**	**91**[189]	**360**

8.2.2.7 Risk Drivers

The performance of At-Risk water systems across all individual risk indicators shows that the Water Quality category contributes the most weighted risk points to At-Risk scoring (35%), with Accessibility coming second (34%) and the Affordability (19%) and TMF Capacity (12%) categories contributing distant third and fourth highest shares of risk points.

Figure 8-9: Share of Each Risk Indicator Category in Calculating the Total Risk Score for Systems Meeting At-Risk Threshold (n=918)[190]



[189] One large community system, which is a wholesaler, is not included in this total count.

[190] This analysis includes the 613 At-Risk systems and 305 Failing systems that meet the At-Risk threshold in the 2024 Risk Assessment.

8.3 FACTORS IMPACTING SUSTAINABILITY

Water system sustainability is shaped by several critical factors, all of which influence a system's ability to provide safe, clean, affordable, and accessible drinking water to its customers. The Risk Assessment Results (as of October 1, 2024)[191] have four key categories—Water Quality, Accessibility, Affordability, and TMF Capacity—as essential measures of system sustainability. These categories, coupled with the data reported in the 2023 electronic Annual Report (eAR), provide a comprehensive overview of the challenges water systems face. By examining these factors, it becomes clear where vulnerabilities exist and what improvements are needed to ensure that water systems can meet the long-term needs of their communities, particularly considering increasing regulatory pressures and climate-related impacts.

8.3.1 Water Quality

Water quality is a critical factor in determining the sustainability of drinking water systems, impacting both public health and the system's operational resilience. Contamination may be naturally occurring or from unauthorized discharges by responsible parties. The need to treat source water causes long-term financial burdens on water systems. Several key indicators were used to assess water quality risk, including the presence of *E. coli*, violations of treatment techniques, and instances of sources exceeding MCLs. Table 8-10 outlines the risk indicators used to assess the water quality risks for public water systems, followed by Table 8-11, which provides a breakdown of water quality risks by system size. This analysis was conducted using the Risk Assessment results retrieved on October 1, 2024, from the California Open Data Portal[192].

Table 8-10: Water Quality Risk Indicators

Category	2024 Risk Indicators
Water Quality	History of *E. coli* Presence
	Increasing Presence of Water Quality Trends Toward MCL
	Treatment Technique Violations
	Past Presence on the Failing List
	Percentage of Sources Exceeding an MCL
	Constituents of Emerging Concern

[191] The Risk Assessment is refreshed quarterly incorporating updated data. The Risk Assessment result was retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems.

[192] California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems.

Table 8-11: Water Quality Risk Level by System Size and Type[193]

Risk Level	Small	Medium	Large	K-12 Schools
High Risk	403 (17.1%)	46 (13.6%)	N/A	72 (20.2%)
Medium Risk	174 (7.4%)	48 (14.2%)	N/A	24 (6.7%)
Low Risk	562 (23.9%)	77 (22.8%)	N/A	37 (10.4%)
No Risk	1,214 (51.6%)	167 (49.4%)	N/A	223 (62.6%)
Not Assessed	0 (0%)	0 (0%)	91	0
TOTAL:	**2,353**	**338**	**91**[194]	**356**

The data indicates that among small systems, which make up the largest portion of those evaluated, 403 systems were assessed as having high risk water quality, which is equivalent to 17.1% of the total small systems assessed. In comparison, medium systems and K-12 schools exhibit 46 and 72 systems, respectively, which represent 13.6% and 20.2% of their total system size. Large systems were excluded from the Risk Assessment.

The data shows that small systems are particularly vulnerable, with a significant percentage falling into the high-risk category. Medium systems and K-12 schools also face notable water quality risks, though many of these systems report low or no risk. Moving forward, the state must continue to focus on water quality improvements, especially in smaller and vulnerable systems, to ensure long-term sustainability and public health protection. Water quality remains a primary driver for water systems that are classified as Failing.

Groundwater water quality hazard GIS mapping tools can be found on the Groundwater Ambient Monitoring and Assessment (GAMA) Program website[195].

8.3.2 Accessibility

Accessibility risks, particularly those related to source capacity, are vital in determining the resilience and long-term sustainability of California's water systems. Indicators such as the number of sources, absence of interties, reliance on hauled or bottled water, and source capacity violations are key factors in assessing a system's accessibility risk. As of October 1, 2024,[196] water systems are classified as Failing due to source capacity

[193] The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

[194] One large community system, which is a wholesaler, is not included in this total count.

[195] Groundwater Ambient Monitoring and Assessment Program website: https://www.waterboards.ca.gov/water_issues/programs/gama/online_tools.html

[196] Some of these systems also meet other Failing criteria as well, such as primary MCL violation, secondary MCL violation, treatment technique violation, and monitoring and reporting violations.

violations, emphasizing the urgency to address these issues. Table 8-12 outlines the risk indicators used to assess the accessibility risks for public water systems, followed by Table 8-13, which provides a breakdown of accessibility risks by system size. This analysis was conducted using the Risk Assessment results retrieved on October 1, 2024, from the California Open Data Portal[197].

Table 8-12: Accessibility Risk Indicators

Category	2024 Risk Indicators
Accessibility	Number of Water Sources
	Absence of Interties
	DWR – Drought & Water Shortage Risk Assessment Results
	Critically Over drafted Groundwater Basin
	Bottled or Hauled Water Reliance
	Source Capacity Violations

Table 8-13: Accessibility Risk Level by System Size and Type[198]

Risk Level	Small	Medium	Large	K-12 Schools
High Risk	929 (39.5%)	13 (3.8%)	N/A	301 (84.6%)
Medium Risk	333 (14.2%)	31 (9.2%)	N/A	13 (3.7%)
Low Risk	848 (36%)	67 (19.8%)	N/A	38 (10.7%)
No Risk	243 (10.3%)	227 (67.2%)	N/A	4 (1.1%)
Not Assessed	0 (0%)	0 (0%)	91	0
TOTAL:	**2,353**	**338**	**91[199]**	**356**

Data shows small systems are most affected by accessibility issues, with 39.5% assessed having high risk and 14.2% having medium risk. These figures suggest that small systems tend to face more challenges in maintaining reliable access to water resources, which could undermine their sustainability.

197 California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

198 The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems.

199 One large community system, which is a wholesaler, is not included in this total count.

In contrast, medium systems demonstrate a more favorable risk profile, with 67.2% falling into the "No Risk" category. However, 9.2% of medium systems still experience medium risk, while a smaller portion (3.8%) are at high risk.

K-12 schools display some of the highest accessibility risks, with 84.6% classified as high risk. Only 1.1% of K-12 schools were assessed as having no accessibility risk, pointing to a critical need for improved infrastructure and water resource management in educational settings.

Accessibility challenges, particularly among small water systems and K-12 schools, are significant barriers to the sustainability of California's water systems. Small systems show the highest percentage of high-risk classifications, indicating that targeted interventions are necessary to ensure reliable access. K-12 schools are also disproportionately impacted, with the vast majority classified as high risk. Addressing these accessibility risks, especially the 27 water systems classified as failing due to source capacity violations, is critical to ensuring water sustainability across the state.

8.3.2.1 Climate Change

State Water Board's Resolution No. 2017-0012[200] required a comprehensive response to climate change. Climate change is currently affecting various regions across California in different ways and will most likely continue to do so in the future. According to the California Department of Water Resource's Climate Change website[201], climate change will result in more extreme weather events and changes in seasonal timing of precipitation. Enhanced droughts, more frequent and intense fires, intense rainfall events and flooding, and harmful algal blooms, due to a combination of warmer waters and erosion, are anticipated to directly affect water quality and, therefore also impact drinking water supplies.

The Office of Research, Planning and Performance (ORPP) Climate Team presented a general climate update to the State Water Board on June 4, 2024, outlining a plan to develop a new Board Climate Resolution by early 2025 (see recording here[202]). The new resolution will be aligned with the Board's racial equity efforts including Climate and Racial Equity Strategy (CARES), a State Water Board Racial Equity Action Plan[203] commitment. The ORPP Climate team have been working with State Water Board Office of Information Management and Analysis (OIMA) to update the website visualization for the climate change related responses to the eAR from 2018-2023.

Externally, Board staff have a public engagement process. Internally, staff keep the

[200] STATE WATER RESOURCES CONTROL BOARD RESOLUTION NO. 2017-0012
https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2017/rs2017_0012.pdf
[201] Climate Change Basics
https://water.ca.gov/Water-Basics/Climate-Change-Basics
[202] State Water Resources Control Board Meeting - June 4, 2024
youtube.com/live/BaaG7daIlpA?si=6dXKTn2-LipMfTBL&t=4013
[203] Racial Equity | California State Water Resources Control Board
https://www.waterboards.ca.gov/racial_equity/

necessary committees, including the Water Boards Climate Roundtable updated. For more information see the State Water Boards Climate webpage[204].

8.3.2.2 Drought Planning

8.3.2.2.1 Senate Bill 552[205] - Drought Planning for Small Water Suppliers and Rural Communities

Under SB 552, passed and signed by Governor Gavin Newsom in September 2021, State and local governments will share the responsibility in preparing and acting in the case of a water shortage event. These new requirements are expected to improve the ability of Californians to manage future droughts and help prevent catastrophic impacts on drinking water for communities vulnerable to impacts of climate change. The bill outlines the new requirements for small water suppliers, county governments, DWR, and the State Water Board to implement more proactive drought planning and be better prepared for future water shortage events or dry years.

SB 552 defines a small water supplier as a community water system serving 15 to 2,999 service connections, and that provides less than 3,000 acre-feet of water per year (Water Code § 10609.51, subd. (k)). It considers several categories of small water suppliers: those suppliers with under 1,000 connections, those with 1,000 to 2,999 connections inclusive, and non-transient non-community (NTNC) water systems that are schools. Water suppliers providing water to over 3,000 connections are considered “urban water suppliers” and are subject to the Urban Water Management Planning Act (Water Code § 10610 et seq.) and other requirements. All small water suppliers and NTNC water systems that are schools must implement the following drought resilience measures, subject to funding availability:

a) No later than January 1, 2023, implement monitoring systems sufficient to detect production well groundwater levels.

b) Beginning no later than January 1, 2023, maintain membership in the California Water/Wastewater Agency Response Network (CalWARN) or similar mutual aid organization.

c) No later than January 1, 2024, to ensure continuous operations during power failures, provide adequate backup electrical supply.

d) No later than January 1, 2027, have at least one backup source of water supply, or a water system intertie, that meets current water quality requirements and is sufficient to meet average daily demand.

e) No later than January 1, 2032, meter each service connection and monitor for water loss due to leakages.

f) No later than January 1, 2032, have source system capacity, treatment system capacity if necessary, and distribution system capacity to meet fire flow

[204] State Water Boards Climate webpage https://waterboards.ca.gov/climate/

[205] Drought Planning for Small Water Suppliers and Rural Communities (SB 552) https://water.ca.gov/Programs/Water-Use-And-Efficiency/SB-552

requirements (Water Code § 10609.62)

8.3.2.2.2 Water System Production Reporting

On January 1, 2024, DDW issued Technical Reporting Order DDW_HQ_2024_001[206] requiring public water systems to submit annual and quarterly reports on water inventory, supply, and demand via the SAFER Clearinghouse, with additional monthly reports required for those at risk of or experiencing water outages. Urban water suppliers must report monthly on drought and conservation, while systems facing outages must submit weekly updates on shortages and mitigation efforts. Additional information regarding the required drought reporting is available at: Drought and Conservation Reporting | California State Water Resources Control Board[207].

8.3.2.3 Mutual Aid Organization Membership

As required by SB 522, by January 1, 2023, small water systems and K-12 schools are required to maintain membership in the California Water/Wastewater Agency Response Network (CalWARN) or similar mutual aid organization. According to the 2023 electronic Annual Report, approximately 76% small water systems and 93% K-12 schools lack formalized mutual aid agreements (table below). Participation in a mutual aid organization is another example of a TMF challenge for a small water system or K-12 schools.

Table 8-14: Number of Small Community Water Systems and K-12 Schools with a Mutual Aid Agreement (2023 eAR Data)[208]

Mutual Aid Agreement	Small Systems	K-12 Schools
Yes	508 (24.2%)	28 (7.3%)
No	1,593 (75.8%)	355 (92.7%)
TOTAL:	**2,101**	**383**

Additional TMF capacity is needed for small water systems and K-12 schools to achieve the SB 552 requirement. Data collection around water systems' ability to comply with SB 552 has improved but there is a large gap in implementing all elements.

8.3.2.4 Backup Power Supply

As required by SB 522, by January 1, 2024, subject to funding availability, small water systems and K-12 schools must provide adequate backup electrical supply to ensure

[206] State Water Board Drought Reporting Order https://www.waterboards.ca.gov/drought/resources-for-drinking-water-systems/docs/ddw-technical-order.pdf

[207] Drought and Conservation Reporting | California State Water Resources Control Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/clearinghouse_drought_conservation_reporting.html

[208] Numbers in Table 8-14 are from eAR and differ from Risk Assessment counts accordingly.

continuous operations during power failures. According to the 2023 eAR, approximately 56% of small water systems and 34% of K-12 schools reported to have backup power supply that can maintain water system operations during a power outage. Additionally, approximately 84% of small water systems and 93% of schools indicated that they do not have funding to achieve this. The incongruent responses indicate that the water systems likely did not clearly understand the questions of the eAR, but it appears evident that funding for needed backup power is inadequate. Revisions should be made regarding data collection to better understand the ability of water systems to comply with SB 552 requirements.

Table 8-15: Number of Small Community Water System and K-12 Schools with Backup Power (2023 eAR Data)

Backup Power	Small Systems	K-12 Schools
Yes	1,183 (56.3%)	130 (33.9%)
In Progress	150 (7.1%)	73 (19.1%)
No	598 (28.5%)	180 (47.0%)
No Response	170 (8.1%)	0 (0%)
TOTAL:	**2,101**	**383**

Table 8-16: Number of Small Community Water System and K-12 Schools with Funding for Backup Power (2023 eAR Data)

Funding	Small Systems	K-12 Schools
Yes	171 (8.1%)	27 (7.0%)
No	1,760 (83.8%)	356 (93.0%)
No Response	170 (8.1%)	0 (0%)
TOTAL:	**2,101**	**383**

8.3.2.4.1

8.3.2.5 Reliance on a Single Groundwater Source and Interties:

As required by SB 522, by January 1, 2027, subject to funding availability, small water systems and K-12 schools must have at least one backup source of water supply, or a water system intertie, that meets current water quality requirements and is sufficient to meet average daily demand. Approximately 36% of the assessed small and medium community water systems and 82% of assessed K-12 schools (Table 8-17) rely on only one or less sources. A small water system relying on a single source can experience both short-term and long-term water outages for several reasons. For example, a water system that relies on a single groundwater well could experience short term mechanical failures such as pump breakdowns, electrical issues, or well equipment malfunctions which can halt water production. Surface water sources could be impacted upstream and conveyance maintenance can also impact raw water availability. Additionally, events like contamination, natural disasters, or infrastructure damage could disrupt water supply. Over the long term, sustained droughts can lower groundwater levels, causing the well to run dry, or reduce surface water capacity. Without redundancy or backup systems, these issues can be difficult, costly, and time-consuming to resolve, leading to inadequate resolutions, and repeated or prolonged outages.

Table 8-17: Number of Water Sources Risk Level by System Size and Type[209]

Risk level	Small	Medium	Large	K-12 Schools
Very High[210]	3 (0.1%)	0 (0%)	N/A	3 (0.8%)
High[211]	941 (40%)	20 (5.9%)	N/A	290 (81.5%)
No Risk [212]	1,409 (59.9%)	318 (94.1%)	N/A	63 (17.7%)
Not Assessed	0 (0%)	0 (0%)	91	0
TOTAL:	**2,353**	**338**	**91[213]**	**356**

According to the 2023 eAR, 1,005 small water systems and 281 K-12 schools reported they do not have a backup water supply or an intertie with another water system capable of meeting average daily demand (Table 8-18). According to October 1, 2024, Needs Assessment data, 842 small water systems and 292 K-12 schools do not have a backup water supply or an intertie with another water system (Table 8-19). There is a gap between the total number of reporters per system type in the 2023 eAR compared to the water systems provided in the Needs Assessment data. The data gap could be related to the quality of the self-reporting of the eAR and the methodology of the Needs Assessment. Continued refinement of data collection and analysis methodology could reduce the gap between the two datasets and give the State Water Board better information on the drought risks of small water systems.

209 The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

210 Zero sources

211 One Source

212 Two or more sources

213 One large community system, which is a wholesaler, is not included in this total count.

Table 8-18: Number of Small Community Water System and K-12 Schools with Backup Supply or Interties (2023 eAR Data)

Backup Supply or Intertie	Small Systems	K-12 Schools
Yes	1,093 (52.1%)	102 (26.6%)
No	1,005 (47.8%)	281 (73.4%)
No Response	3 (0.1%)	0 (0.0%)
TOTAL:	**2,101**	**383**

Table 8-19: Number of Water Sources without an intertie by System Size and Type[214]

Number of Sources	Small Systems	K-12 Schools
One or Less Source	839	291
Two or More Sources	1,114	56

8.3.2.6 Water Loss and Meters

As required by SB 522, by January 1, 2032, subject to funding availability, small water systems and K-12 schools must meter each service connection and monitor for water loss due to leakages. Additionally, California Code of Regulations (CCR), title 22, § 64561 requires meters on all water sources, and urban water suppliers (those that have more than 3,000 service connections) are required to install municipal and industrial meters by 2025 (Water Code § 527).

Data from the 2023 eAR, presented in Table 8-20 and Table 8-21 below, highlights the disparities in water loss monitoring and metered service connections among different system sizes and types. While a majority of medium and large systems (over 85%) monitor water loss, small systems and K-12 schools lag significantly, with nearly 26% and 43%, respectively, not engaging in monitoring. Additionally, the presence of unmetered connections is particularly concerning small systems (63%) and K-12 schools (96%), limiting the ability to detect and reduce water loss. To improve water sustainability and efficiency, it is critical for all systems to adopt both water loss monitoring and full metering and for funding to be made available to support small systems and K-12 schools in implementing these essential measures to prevent waste

[214] The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems.

and ensure accurate tracking of water usage.

Table 8-20: Number of Community Water System and K-12 Schools monitoring water loss (2023 eAR Data)

Monitoring Water Loss	Small	Medium	Large	K-12 Schools
Yes	1,548 (73.7%)	308 (85.8%)	62 (93.9%)	219 (57.2%)
No	551 (26.2%)	50 (13.9%)	3 (4.5%)	164 (42.8%)
No Response	2 (0.1%)	1 (0.3%)	1 (1.5%)	0 (0%)
TOTAL:	**2,101**	**359**	**66**	**383**

Table 8-21: Number of Small Community Water System and K-12 Schools with unmetered service connections (2023 eAR Data)

Unmetered Service Connections	Small	Medium	Large	K-12 Schools
Yes	780 (37.7%)	22 (6.1%)	6 (6.1%)	17 (4.4%)
No	1,321 (62.9%)	337 (93.9%)	60 (90.9%)	366 (95.6%)
No Response	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0%)
TOTAL:	**2,101**	**359**	**66**	**383**

8.3.2.7 Pipelines and Storage Designed for Fire Flow:

As required by SB 522, by January 1, 2032, subject to funding availability, small water systems and K-12 schools must ensure that their source, treatment (if applicable), and distribution systems have the capacity to meet fire flow requirements (Water Code § 10609.62). In addition, CCR, title 22, § 64573 mandates a minimum 4-inch nominal diameter for newly installed pipelines. Table 8-22 highlights the ability of water systems to meet fire flow demands, which are essential for fire protection and community safety.

Table 8-22: Number of Community Water System and K-12 Schools ability to meet fire flow requirements (2023 eAR Data)

Can Meet Fire Flow	Small	Medium	Large	K-12 Schools
Yes	1,553 (73.9%)	350 (97.5%)	65 (98.5%)	274 (71.5%)
No	544 (25.9%)	7 (1.9%)	1 (1.5%)	109 (28.5%)
No Response	4 (0.2%)	2 (0.6%)	0 (0%)	0 (0.0%)

Can Meet Fire Flow	Small	Medium	Large	K-12 Schools
Yes	1,553 (73.9%)	350 (97.5%)	65 (98.5%)	274 (71.5%)
TOTAL:	**2,101**	**359**	**66**	**383**

As Table 8-22 indicates, 73.9% of small water systems and 71.5% of K-12 schools report capacity to meet fire flow demands. Many small water systems were built prior to the common design standards of today (e.g. individual water meters) and they struggle with TMF capacity to upgrade their source, treatment, and distribution systems to meet fire flow requirements and monitor water loss. In contrast, medium and large systems self-report they can meet fire flow demands, at 97.5% and 98.5%, respectively.

Historically, smaller pipeline sizes were common in public water systems, especially in small systems. A 4-inch pipeline at low pressures has an estimated maximum capacity of about 240 gallons per minute, which is generally insufficient for fire flow. Although current water storage regulations under CCR, title 22, § 64554, subdivision (a) require that all systems maintain enough water storage to meet their maximum daily demand, there is no requirement to incorporate fire suppression or align storage designs with local fire codes. While the State Water Board collaborates with local fire professionals on these requirements, it is crucial that fire demand be integrated into storage and pipeline capacity to address growing fire risks driven by climate change.

Moreover, existing drinking water funding restrictions typically prevent grant funds from being used solely to expand distribution and storage capacity for fire flow. As a result, the newly installed infrastructure may still fail to meet proper fire flow standards. With the rise in wildfire across California, legislation addressing this funding limitation is urgently needed to ensure that both safe drinking water and adequate fire suppression can be achieved simultaneously.

Disaster planning information for fire response is provided in Chapter 11.

8.3.2.8 Water Rights and Allocations Complexity

Water rights and allocations in California are legally complex, creating challenges in understanding water availability and can hinder consolidations and water partnerships. Water systems may fear that any changes to their service area or a review of their existing water rights could result in reductions to their current allocations, or wells previously considered groundwater could be reclassified as surface water influenced. While larger systems often have legal staff to navigate these issues, smaller systems typically lack the resources to manage such complexities. With the passage of the Sustainable Groundwater Management Act (SGMA), passed in 2014, Groundwater Sustainability Agencies (GSAs) are required to manage groundwater resources in their area. This creates an additional layer of complexity around ground water rights and allocations. Section 8.4.7 discusses SGMA in more detail.

As droughts become more frequent due to climate change, clarity about available water and prioritization of rights will be crucial. More flexibility in adjusting areas of use will be needed to facilitate water partnerships, particularly during droughts, when such partnerships are often developed permanently.

8.3.2.9 Local Hazard Mitigation Plans

Many CWS do not have an approved Local Hazard Mitigation Plan (LHMP)[215], and the Federal Disaster Mitigation Act of 2000 requires an eligible entity to have an approved LHMP or be named in another entity's LHMP to be eligible for hazard mitigation funding. Hazard mitigation funding can be used for improvements such as an emergency intertie, a backup generator, seismic retrofits, or even plans to implement such items. Hazard mitigation funding is a 75 percent grant with a 25 percent match when the public water system is not economically disadvantaged; economically disadvantaged water systems may be eligible for up to 90 percent grants. A public water system can either participate in the development of the county LHMP or develop their own. Additional outreach and coordination are recommended; see Chapter 11 for discussion on water system emergency preparedness and response.

8.3.3 Affordability

Affordability is a key factor affecting the sustainability of water systems, particularly for small and rural communities. Water systems with high affordability risk are often unable to generate sufficient revenue to support operational and infrastructure needs, leading to deferred maintenance, limited-service improvements, and a heightened vulnerability to failure. Table 8-23, below, presents the affordability risk indicators used for public water systems, which includes percentage of Median Household Income (%MHI) spent on water, extreme water bills, and overall household socioeconomic burden. These indicators are broken down by system size and type, providing insight into the disparities faced by small systems and schools compared to larger, more resilient water systems (Table 8-24).

Table 8-23: Affordability Risk Indicators

Category	2024 Risk Indicators
Affordability	Percent of Median Household Income (%MHI)
	Extreme Water Bill
	Household Socioeconomic Burden

[215] Local Hazard Mitigation Plans | California Governor's Office of Emergency Services https://www.caloes.ca.gov/office-of-the-director/operations/recovery-directorate/hazard-mitigation/local-mitigation-planning/local-hazard-mitigation-plans/

Table 8-24: Affordability Risk by System Size and Type[216]

Risk Level	Small	Medium	Large	K-12 Schools
High Risk	697 (29.6%)	24 (7.1%)	N/A	0 (0%)
Medium Risk	355 (15.1%)	67 (19.8%)	N/A	90 (25.3%)
Low Risk	461 (19.6%)	90 (26.6%)	N/A	106 (29.8%)
No Risk	835 (35.5%)	157 (46.4%)	N/A	160 (44.9%)
Not Assessed	0 (0%)	0 (0%)	64	0 (0%)
Unknown	5 (0.2%)	0 (0%)	N/A	0 (0%)
TOTAL:	**2,353**	**338**	**91**[217]	**356**

The data shows that small water systems are disproportionately affected by high affordability risks, with 29.6% of small systems assessed as high risk, compared to just 7.1% of medium systems. Large systems, while not assessed in this analysis, are generally presumed to have lower affordability risks due to greater economies of scale. The affordability risk for K-12 schools is relatively low, with 44.9% assessed as no risk, but 25.3% face medium risk, likely to reflect socioeconomic challenges in certain school districts. This topic is discussed further in Chapter 9 with recent data indicating that on average smaller systems pay higher water rates than larger systems (see Section 9.7).

As of October 1, 2024, the affordability risk for water systems remains a pressing issue, with affordability concerns closely linked to system sustainability. The data highlights the need for targeted support to small systems, which face the greatest financial pressures to maintain affordable and reliable water services. Addressing these affordability challenges is crucial for long-term operational viability and ensuring equitable access to safe drinking water for all communities.

8.3.4 Technical, Managerial, and Financial (TMF) Capacity

Table 8-25 below presents TMF Capacity risk indicators assessed as part of the Needs Assessment for public water systems as of October 1, 2024. These indicators assess current vulnerabilities within water systems based on operator certification, financial stability, and system management. The data also highlights gaps in reporting that are considered a limitation in the current Risk Assessment methodology and approach. The State Water Board will develop new strategies to collect data related to TMF capacity

[216] The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

[217] One large community system, which is a wholesaler, is not included in this total count.

for future iterations of the Needs Assessment. Also, the State Water Board will establish TMF regulations in response to SB 1188 (discussed below). Incomplete or missing data for certain indicators can lead to redistributed risk weights within the overall TMF risk category and distorts a comprehensive understanding of a system's operational health. Table 8-26 compares TMF capacity risk indicators for K-12 schools, small and medium-sized water systems.

Table 8-25: TMF Capacity Risk Indicators

Category	2024 Risk Indicators
TMF Capacity	Operator Certification Violations
	Monitoring and Reporting Violations
	Significant Deficiencies
	Days Cash on Hand
	Operating Ratio
	Net Annual Income

Table 8-26: TMF Capacity Risk by System Size and Type[218]

Risk Level	Small	Medium	Large	K-12 Schools
High Risk	179 (7.6%)	11 (3.25%)	N/A	1 (0.3%)
Medium Risk	4 (0.2%)	0 (0%)	N/A	5 (1.4%)
Low Risk	1 (0.04%)	0 (0%)	N/A	15 (4.2%)
No Risk	2,169 (92.2%)	327 (96.75%)	N/A	335 (93.6%)
Not Assessed	0 (0%)	0 (0%)	91	0 (0%)
TOTAL:	**2,353**	**338**	**91[219]**	**356**

As of October 1, 2024, TMF capacity risk assessment reveals most small and medium sized water systems fall into the "No Risk" category, with 92.2% of small systems and 96.75% of medium systems showing no significant operational or financial issues. A substantial portion of small systems (7.6%) and some medium systems (3.25%) still face high risk, indicating significant operational challenges, such as operator certification violations or financial deficiencies. Additionally, one critical issue identified in the TMF assessment was the absence of complete TMF data for key financial

[218] The Risk Assessment is refreshed quarterly incorporating updated data. The analysis in this table was conducted utilizing the Risk Assessment result retrieved on October 1, 2024, from the California Open Data Portal: https://data.ca.gov/dataset/safer-failing-and-at-risk-drinking-water-systems

[219] One large community system, which is a wholesaler, is not included in this total count.

indicators like "Days Cash on Hand," "Operating Ratio," and "Net Annual Income." [220] A water system missing data necessary to conduct an adequate risk indicator analysis will have the indicator weights within the risk category redistributed.

After the State Water Board establishes TMF regulations, it is anticipated that the number of systems in the medium and high-risk categories will increase significantly. For example, K-12 schools indicate very little TMF risks, but as stated earlier, school water systems have some of the highest accessibility needs in the state (8.2.2.2).

8.3.4.1 TMF Constraints

Technical, Managerial, and Financial capacity are deeply interconnected elements that determine the overall health and sustainability of a water system. Financial constraints are a significant challenge for small water systems, impacting their ability to respond to emergencies and sustain day-to-day operations. Limited revenue from inadequate water rates, billing practices, and collections exacerbates these issues, hindering critical infrastructure improvements and perpetuating deferred maintenance. Without sufficient funding, small systems struggle to hire the necessary staff and technical experts, further complicating project execution and regulatory compliance. These financial limitations are often compounded by the complexity of securing funding, since application and reimbursement processes can be overwhelming for systems with limited resources. Moreover, governance structures play a pivotal role in financial capacity; for example, while investor-owned utilities may undergo extensive fiscal reviews, mutual water companies and mobile home parks lack fiscal oversight, leaving many such small systems vulnerable to financial mismanagement.

Managerial capacity, while harder to define, is equally critical and closely linked to financial capacity. It encompasses a water system's ability to effectively run its operations, set and manage budgets, hire and retain staff, and ensure regulatory compliance. Smaller systems, particularly those governed by volunteer boards, often struggle to attract and retain qualified leadership, leading to governance challenges that cripple operations. Without a full board, small systems cannot function legally or efficiently, which further undermines their ability to manage finances and operations effectively. Sufficient funding is also key to managerial capacity, as it allows systems to hire professional water system managers, who can oversee critical functions such as asset management, budgeting, and emergency planning. However, unlike the requirement for certified water operators, there is no mandate for the qualifications of those managing a water system, leaving a gap in oversight. Legislative measures like AB 54 and AB 240, which mandate 2-hour ethics and legal training for mutual water company board members, aim to enhance the managerial capacity of water systems but are largely insufficient to address the boarder challenges they face.

Technical capacity, in turn, depends on both financial and managerial capacity. Small water systems often lack the expertise to meet increasingly complex regulatory and operational demands, which impacts their ability to implement necessary projects and

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[220] 2021 NEEDS ASSESSMENT: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024risk-assessment-pws-methodolgy.pdf

comply with legal requirements. Technical shortcomings, like insufficient operator certifications, make it difficult to secure legal agreements, address compliance issues, and navigate regulatory frameworks. Additionally, a shortage of qualified operators—exacerbated by retirements and few replacements—puts further strain on these systems. Therefore, improving financial and managerial capacity directly strengthens technical capacity, highlighting the need for workforce development programs and the creation of regulatory standards to ensure small systems can meet the demands of modern water management.

8.3.4.2 Governance Limitations

Volunteer boards, integral to the governance of small water systems, frequently encounter limitations that impede effective operations. Many boards struggle to maintain full membership, leading to gaps in leadership and decision-making capacity. Aging staff and volunteers, without successors in sight, struggle to grasp evolving regulatory and technical demands. As a result, crucial decisions related to infrastructure upgrades, compliance issues, and emergency response can be delayed or inadequately addressed. This knowledge gap necessitates reliance on third-party expertise, adding coordination challenges, costs, and extending project timelines.

The different water system governance structures have important implications for sustainability (organization structures are described in Chapter 2). Postdoctoral researchers Kristin Dobbin and Amanda Fencl have been reviewing water system data and the correlations between governance types, ownership, size, and health-based violations. Their work identified 26 distinct governance types. More information about their research is available on the California WaterBlog.[221]

8.3.4.3 Public Communication and Transparency Gaps

Public trust and perception also play a key role in project acceptance and stakeholder engagement. Public skepticism towards water system organizations, fueled by past incidents or lack of transparency, can hinder community buy-in for necessary projects and initiatives. Additionally, DDW staff have received feedback directly from water system customers expressing their frustration regarding lack of adequate communication from their water system including access to meetings and decision making processes. Public meetings can be irregular and other forms of communication, such as webpages, emails and mailers may not exist.

8.3.4.4 Regulatory Changes

As previously discussed in Chapter 4, small water systems account for most water system violations. The adoption of new MCLs creates additional hardships on small water systems already struggling to meet normal operational needs. Since the 2020 Safe Drinking Water Plan, the Revised Total Coliform Rule (RTCR) became effective in 2021, a new hexavalent chromium MCL in 2024, federal PFAS MCLs in 2024, the Lead

[221] Who governs California's drinking water systems? | California WaterBlog https://californiawaterblog.com/2022/01/23/who-governs-californias-drinking-water-systems/

and Copper Rule Revisions (LCRR) and Lead and Copper Rule Improvements (LCRI) in 2024, and the Cross-Connection Control Policy Handbook in July 2024. Other constituents of emerging concern discussed in Chapter 3, like PFAS, 1,4-Dioxane, manganese, and microplastics could potentially result in new MCLs that could impact small water systems by requiring expensive treatment installation, and costs associated with on-going operations, monitoring, and reporting. To permanently decrease the number of water quality violations rather than piecemeal, system by system each time that there is a violation, significant effort is needed to focus on addressing regional planning and consolidation, in areas where contamination or limited source capacity is known or anticipated to be present.

8.3.5 Project Challenges

Infrastructure projects for small water systems, while essential for improving sustainability and reliability, often face significant challenges. Legal complexities, divergent stakeholder interests, governance issues, and operational and infrastructure barriers can impede progress. For small water systems, these projects may also involve a perceived loss of autonomy and control. Challenges associated with the funding process add additional layers of complexity. Common concerns communicated to DDW staff include:

- The funding process can be long and complex.
- The reimbursement process may not be timely enough to pay contractors, requiring the large water system to float construction costs.
- Project components for the consolidation may not follow established local ordinances or water master plans.
- Standalone project alternatives, such as water treatment, are complicated and costly to operate.
- Legal requirements in the State Water Board’s funding agreements may create additional liability and may not follow the system’s normal business processes.

DDW staff work with water systems to navigate project challenges. They host regular stakeholder meetings to secure buy-in, coordinate and participate in public meetings to gain project momentum and liaise with DFA to ensure crucial support reaches small water systems through the state Water Board’s TA program. However, the scale and complexity of these challenges underscore the ongoing need for sustained support and advocacy to safeguard community health and ensure the resilience of our water systems. Each hurdle presents a unique set of challenges that require strategic solutions and collaborative efforts to overcome. Project examples throughout this chapter illustrate the types of challenges communities encounter and how State Water Board staff work with communities and their water systems to overcome them.

8.3.5.1 TMF Standards (SB 1188)

On September 24, 2024, SB 1188 – Drinking Water: Technical, Managerial, and Financial Standards, was signed into law. SB 1188 added Article 7.2 (commencing with § 116600) to Chapter 4 of Part 12 of Division 104 of the HSC and requires the State

Water Board to adopt minimum standards related to the technical, managerial, and financial capacity of the community water systems serving fewer than 10,000 people or 3,300 service connections and non-transient non-community water systems that serve K-12 schools.[222]

8.3.6 State Small Water Systems and Domestic Wells

In California, state small water systems (SSWS), defined in HSC § 116275, subdivision (n) as serving 5 to 14 service connections and less than 25 people daily on average for more than 60 days of the year, are under the jurisdiction of the local health officer of each county. Permit and water quality requirements for SSWS are not as stringent as regulations for public water systems and are found in sections 64211 through 64217 of title 22 of the CCR.

Residences supplied by domestic wells fall under the jurisdiction of county environmental health programs. Water quality requirements, if any, originate from local ordinances because there are no statewide requirements for SSWS. There are also individual homes where residents rely directly on surface water such as lakes, streams, or irrigation ditches. Residents supplied by domestic wells may not regularly test their sources and thus may be unaware of contaminant levels such as arsenic and uranium, which are naturally occurring and present in many regions of California. Homes supplied by surface water sources are particularly vulnerable to acute pathogenic organisms and the filtration process to make surface water safe for consumption is particularly challenging.

SB 200 (HSC § 116772) requires county health officers and other relevant local agencies to electronically submit state small water system and domestic well inventories and water quality testing results (performed by accredited laboratories) to the State Water Board. Collection and submission of water quality testing data for SSWS and domestic wells has, historically, been performed at the county level with little to no oversight or support from the State Water Board. In 2021, the State Water Board developed and provided counties guidance on how to comply with SB 200 reporting requirements.[223]

Additional information for SSWS and domestic wells can be found in the 2024 Needs Assessment. Specifically, the Risk Assessment for SSWS and domestic wells is focused on identifying areas where groundwater is at high risk of containing contaminants that exceed drinking water standards, is at high risk of water shortages, and where there is high socioeconomic risk. This information is presented as an online dashboard.[224] Water quality risk data is from the State Water Board's Aquifer Risk

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[222] Bill Text – SB 1188 Drinking water: technical, managerial, and financial standards. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB1188

[223] State Small Water System and Domestic Well Water Quality Data Submission Guidance for Counties https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/ssws_dw_data_submittal_guidance.pdf

[224] State Small Water System and Domestic Well Risk Assessment Dashboard https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=ece2b3ca1f66401d9ae4bfce2e6a0403

Map,[225] water shortage risk data is from the Department of Water Resources (DWR) Water Shortage Vulnerability Tool for Self-Supplied Communities,[226] and socioeconomic risk data was developed by the Office of Environmental Health Hazard Assessment. Lastly, Appendix: County State Small Water System & Domestic Well Data Reporting[227] of the 2024 Needs Assessment summarizes the data received from counties since 2021 for small water systems and domestic wells.

While neither SSWS nor domestic wells are under the regulatory jurisdiction of the State Water Board, they still represent approximately 1.6 million people[228], roughly 4 percent of California's population. Moreover, HR2W recognizes all California's as having the right to safe, clean, affordable, and accessible drinking water without limitation. SSWS and domestic wells were included in the mandatory consolidation order authority in Chapter 871, Statutes of 2018, (AB 2501). The State Water Board has funded consolidation projects that include SSWS and/or domestic wells. Examples of two of these projects in Tulare County, East Porterville and Monson Water System, can be found on the State Water Board's Water Partnership Success Stories website[229].

The State Water Board will continue to work toward improving inventory of and solutions for SSWS and domestic wells, particularly those impacted by contamination or water supply issues where there is need and funding is available. The State Water Board will make every effort to include SSWS and domestic wells into existing consolidation projects for public water systems; however, it should be noted that these consolidation efforts face similar challenges to consolidation projects discussed previously. Furthermore, the addition of SSWS and domestic wells to public water system consolidation projects have the potential to add complication to projects because each owner or resident must be individually willing to participate in the consolidation project.

Additional resources are presented in the introduction to Chapter 3 to aid SSWS and domestic wells in assessing the quality of their water prior to drilling a well, building residences, or completing acquisition of a property that is currently served by a water source not permitted by a public water system. To prevent the use of water for domestic purposes that does not meet drinking water standards, local agencies and/or property

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[225] Aquifer Risk Map Webtool https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=18c7d253f0a44fd2a5c7bcfb42cc158d

[226] Drought and Water Shortage Risk for Self-Supplied Communities https://tableau.cnra.ca.gov/t/DWR_IntegratedDataAnalysisBranch/views/DWRDroughtRiskExplorer-RuralCommunitesMarch2021/Dashboard?%3AshowAppBanner=false&%3Adisplay_count=n&%3AshowVizHome=n&%3Aorigin=viz_share_link&%3AisGuestRedirectFromVizportal=y&%3Aembed=y

[227] Appendix: County State Small Water System & Domestic Well Data Reporting https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024county-ssws-dw-rpt.pdf

[228] State small water systems estimated population is 18,200. The 1.6 million figure is taken from other studies that estimate the available well completion reports represents only 60% of domestic wells. Community Water Center: https://drinkingwatertool.communitywatercenter.org/wp-content/uploads/2023/09/DWA_v2_plss_020824_Metadata.pdf

[229] Water Partnership Success Stories | California State Water Resources Control Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/partnershipsuccess.html

buyers could require water quality testing for compliance with state primary drinking water standards.

8.4 SAFER INITIATIVES

8.4.1 SAFER Engagement Units

DDW's SAFER Section includes four Engagement Units[230] located across the state.[231] SAFER Engagement Units provide direct assistance to water systems, the communities they serve, and key partners to help navigate and address drinking water challenges.

SAFER Engagement Units focus on community water systems and schools (defined as non-transient non-community water systems) that are on the Failing list. Many Failing water systems struggle to implement solutions on their own. The staff of the SAFER Engagement Units are experienced and trained to help navigate obstacles and assist systems achieve the Human Right to Water goal of delivering safe, clean, affordable, and accessible drinking water. The SAFER Engagement Units are staffed by engineers, scientists and analysts who provide guidance, analysis, and support to water systems and communities. SAFER Engagement Unit staff help manage projects, facilitate communication, overcome obstacles, and inform local decision-making.

Many of the water systems the SAFER Engagement Units work with are experiencing long-term challenges, often pre-dating the Risk Assessment (2021) and Failing list criteria (2017). Because these systems are combatting antiquated and failing infrastructure, inadequate economic resources, historic disinvestment and customer affordability challenges, it can take many years to determine sustainable solutions, foster necessary agreement, and deliver new or upgraded drinking water infrastructure. Furthermore, implementing project solutions to deliver safe drinking water to these systems is extremely sophisticated and logistically challenging, while TMF capacity within the system is often far too limited to shepherd these projects to a successful outcome. This mismatch of limited TMF capacity and complicated sustainable solutions necessitates project leadership from SAFER Engagement Unit staff to guide water systems and stakeholders to successful project outcomes. Figure 8-10 illustrates the steps the Engagement Units often take to guide water systems through successful planning and implementation of drinking water projects.

Figure 8-10: SAFER Engagement Unit Project Facilitation Process

6 STEPS: WHAT SAFER ENGAGEMENT UNITS DO

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[230] SAFER Engagement Units I State Water Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/engagement_unit.html

[231] The four SAFER Engagement Units are: the Northern Engagement Unit, Southern Engagement, Rural Solutions Engagement Unit, and County Engagement Unit. Currently the SAFER Section is comprised of 27 staff.

STEP 1: PROBLEM IDENTIFICATION

Coordinate with water systems, communities, and regulators to gather accurate information on water quality, quantity, and challenges to understand the community's drinking water needs.

STEP 2: EVALUATE ALTERNATIVES

Evaluate interim and long-term drinking water solutions to identify alternatives. Engage water systems, communities, and stakeholders to address each community's unique needs.

STEP 3: SCOPE THE PROJECT

Develop an appropriate project schedule and deliverables with stakeholders.

STEP 4: COMPLETE PLANNING ACTIVITIES & FINALIZE DESIGN

Guide systems and project teams to ensure all applicable project planning items are completed on project specific timelines. Ensure the engineered solution meets project goals and timelines.

STEP 5: CONSTRUCT PROJECT

Manage projects and work with stakeholders to ensure infrastructure projects are constructed in alignment with project concepts, planning activities, and engineered design.

STEP 6: DELIVER SAFE & ACCESSIBLE WATER

Work closely with communities and project stakeholders to implement projects that provide communities with safe and affordable drinking water.

Since their establishment in 2019-2020, SAFER Engagement Units have worked with 755 water systems. As summarized in Table 8-27, the number of systems supported was highest when the units were first formed. Since 2020, between 27 – 115 new Failing systems were added to the Failing list each year. Therefore, the number of systems receiving newly initiated Engagement Unit support has declined and will vary in the future based on trends with the Failing list. On January 1, 2024, SAFER Engagement Units were actively supporting 524 unique public water systems. Unit staff provide a wide range of support to public water systems and the communities they serve.

Table 8-27: Number of Public Water Systems with New Engagement Initiated per Year

	2019	2020	2021	2022	2023
Northern California	N/A	111	73	89	34
Southern California	N/A	243	139	29	37
TOTAL:	**N/A**	**354**	**212**	**118**	**71**

SAFER Engagement Units utilize funding tools and build collaboration with water systems and project stakeholders. These tools include voluntary and mandatory consolidations, the Water System Outreach Map,[232] partnership events, third-party administrators, Point of Use/Point of Entry household treatment[233] and SAFER funding. By engaging, training, and supporting communities and stakeholders, SAFER Engagement Units lead complex projects to success— securing access to safe and affordable drinking water. Table 8-28 summarizes the services the Engagement Units provided to water systems over the last five years.

Table 8-28: Current Active Engagement Services Rendered (January 2024)[234]

Engagement Service	Description	# of Systems
Consolidation Assistance	Provide support to water systems navigating a consolidation project. Services may include review of consolidation agreements, assisting funding acquisition and/or technical assistance, community outreach and education, liaising with the receiving water system, and review of project scope, design, and timeline.	298
Administrator Support	Work with DFA to appoint an administrator and support that administrator to advance long-term solutions for the water system. This support includes but is not limited to designating public water systems for	22

232 Water System Outreach Map https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=70d27423735e45d6b037b7fbaea9a6a6

233 Point-of-Use (POU) and Point-of-Entry (POE) Treatment - Permanent Regulations https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/regulations/

234 Some water systems many have more than one service rendered while working with Engagement Unit staff.

Engagement Service	Description	# of Systems
	administrators, holding public meetings, working with proposed administrators on their respective workplans for administrator assignments, working with DFA on funding eligibility, issuance of administrator orders, and ongoing performance review of appointed administrators.	
Interim Solutions	Provide support to a water system to access interim or emergency assistance. This may include support in acquisition of funding and technical assistance, community outreach and education, and technical review of proposed interim solutions.	10
General Assistance	Provide expertise in navigating funding options for engineering, community engagement, funding acquisition for projects, legal assistance, water system staff training, regulatory compliance and reporting, and performing rate studies and rate setting.	73
Tracking	Some Failing and At-Risk water systems do not require assistance to identify and implement long-term solutions. Or some systems have received SAFER support and are on a path towards compliance. These systems are tracked to ensure progress is being made.	209

PROJECT EXAMPLE

Anderson Valley Regional Consolidation Project

The Anderson Valley Community Services District is a new entity that plans to construct a new public water system to serve the community of Boonville in Mendocino County. The project was awarded nearly $1 million in State Water Board funds in 2016 to complete planning for the new water system but experienced delays in completing a Water Rate Study to establish appropriate water rates and ensure the water system is financially sustainable. Much of the public outreach prior to SAFER engagement was conducted door-to-door by the District’s board president and vice-president. The SAFER Northern Engagement Unit identified the need for larger scale public outreach and collaborated with DFA to fund a technical assistance provider to complete an interest survey. The responses from the interest survey provided the necessary data for the District’s contract engineering company to establish preliminary water rates for the Water Rate Study. The completed Water Rate Study is a significant step for the Community Services District as it endeavors to regionalize several small water systems. The draft Water Rate Study proposes rates for single family residence in range with that of the statewide average according to the affordability dashboard.

8.4.1.1 Northern and Southern Engagement Units

The Northern and Southern Engagement Units primarily assist Failing water systems to consolidate with neighboring, higher-capacity systems. Navigating the landscape of small water system compliance and project implementation is a complex endeavor marked by numerous formidable challenges that underscore the critical need for strategic interventions and dedicated resources from the SAFER Engagement Units. Engagement Unit staff work closely with project stakeholders, such as potential receiving water systems, and coordinate with other board staff in the DFA or Office of Public Participation, to help drive consolidations to completion.

PROJECT EXAMPLE

Fuller Acres & Athal Mutual Water Company Consolidation Project

The Fuller Acres and Athal Mutual Water Companies are small Failing water systems that are struggling through the consolidation process. Both water systems exceed the maximum contaminant level for 1,2,3-trichloropropane and have not met the compliance deadline specified in their respective compliance orders. Additionally, both water systems serve severely disadvantaged communities. The most cost effective and sustainable solution for these water systems is to consolidate with the Lamont Public Utilities District, a large public water system approximately one mile away that is currently undergoing its own major upgrade project with SAFER funding.

The SAFER Southern Engagement Unit has spent many hours meeting with key stakeholders from the small water systems to share the benefits of consolidation and address concerns about relinquishing their water systems. Additionally, SAFER staff have reviewed and commented on several iterations of engineering reports that analyzed various project alternatives, which required many meetings with the SAFER funded third-party technical assistance provider and their contract engineer. SAFER staff coordinated three public meetings for these small water systems that focused on community outreach and education regarding the benefits of consolidation, and the mandatory consolidation and administrator appointment processes. At each meeting, members of the public expressed their support for the project and their frustrations and lack of trust with their current water system boards and staff.

Work toward consolidation continues and SAFER Engagement Unit staff are actively engaged with all aspects of the project. Tasks yet to be completed include project design, finalized consolidation agreements, environmental review, funding acquisition, project bidding, and project construction.

8.4.1.2 Rural Solutions Unit

In 2022, the SAFER program established the Rural Solutions Unit (RSU) with the primary objective of assisting Failing water systems that are too removed from others to be physically consolidated. Strategies supported by the RSU for these communities include administrator appointments, development of new or additional water sources, centralized treatment, point-of-entry (POE) treatment, point-of-use (POU) treatment, and other innovative solutions throughout the State. The RSU works with DFA, public water systems, domestic well owners, technical assistance providers, engineering firms, device manufacturers, and stakeholders to develop and implement drinking water solutions.

The RSU led the State Water Board's effort to develop a report[235] that identifies and addresses the potential successes and shortcomings of POU/POE treatment equipment as interim solutions to contamination in public drinking water systems and domestic wells. Finalized and published in 2023, the report addresses equity, technical, social, regulatory, and financial aspects of POU/POE treatment, and provides recommendations and identifies areas for further study for successful implementation of POU/POE treatment. The RSU is now starting the process of implementing these recommendations, which are also discussed in Chapter 7.

8.4.1.3 County Engagement Unit

In 2023, the SAFER program established the County Engagement Unit (CEU)[236] to oversee county LPA programs and work with counties to implement SB 552[237]

[235] 2023 State Water Board POU POE Report https://www.waterboards.ca.gov/safer/docs/2023/2023-POU-POE-report.pdf
[236] County Engagement Unit https://www.waterboards.ca.gov/drinking_water/programs/documents/ddwcountyengagementunit-map-20230717.pdf
[237] Senate Bill No. 552, § 10609.62, Chapter 245 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB552

requirements. Statewide, 26 out of 58 counties elect to operate an LPA program through which they carry out provisions of the California Safe Drinking Water Act and California Health and Safety Code. The CEU works with LPAs to ensure that the regulatory requirements delegated to them through Local Primacy Delegation Agreements are consistently met. This includes developing annual workplans, conducting annual evaluations and providing guidance, often in coordination with other branches of DDW. The CEU also works with counties and other stakeholders to facilitate drought preparedness for domestic wells and state small water systems, as required by SB 552.

In 2023, the CEU worked closely with counties to evaluate their performance during the 2022-2023 fiscal year. The evaluations established that LPAs successfully:

- Completed 271 of 367 (74%) of their permit goals, with an additional 191 permits in progress.
- Completed 771 of 761 (101%) of their sanitary survey goal.
- Issued 666 enforcement actions.
- Returned 343 systems to compliance (Failing, At-Risk, and other public water systems have resolved violations and are now delivering safe, clean, affordable, and accessible drinking water).
- Achieved a 96% completion rate for their required electronic Annual Report (eAR) submission.

In addition to these successes, staff identified areas for improvement for LPA programs and provided recommendations and directives for short-term changes in program implementation. Information gathered during the evaluations will guide long-term LPA program development at the State Water Board.

For developing water shortage contingency plans as required by SB 552, the CEU also supports small community water systems and non-transient non-community schools by providing templates, best practice examples, and training.[238] These were collaboratively developed with the Department of Water Resources and the California State University, Sacramento in 2022, with feedback solicited from small water systems to ensure the resources met their needs and complied with SB 552 requirements. To date, 504 of 2,680 (19%) systems required to develop a water shortage contingency plan have done

[238] Water Shortage Contingency Plan Templates:
Small Water Supplier Template (community water systems w/ 1,000 - 2,999 service connections)
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/templateblankwscp1000-2999connections.docx
Small Water Supplier Best Practice Example
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/smalltowncsdsamplewscp1000-2999connections.docx
Non-Transient Non-Community School Template
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/templateblankwscpschools.docx
Non-Transient Non-Community School Best Practice Example
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/sampletemplatewscpschools.docx

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8.4.1.4 DDW Needs Analysis Unit

DDW's Needs Analysis Unit (NAU) leads the development of the annual Needs Assessment in coordination with the Division of Water Quality (DWQ), Division of Financial Assistance (DFA), and Division of Information Technology (DIT). They manage resources such as the SAFER Dashboard[239] to identify Failing and At-Risk water systems and promote transparency and accountability. The NAU will also be responsible for the development of TMF regulation standards as required by SB 1188.

8.4.2 Project Management

SAFER's project management framework plays a critical role in addressing water systems on the failing list, which have been designated based on the failing criteria. To restore systems to compliance, SAFER tracks the progress of construction projects through ten defined phases (Table 8-29), starting with Water System Engagement and the development of a Corrective Action Plan (CAP), and concluding with the completion of the necessary infrastructure improvements. Effective project management in this process includes establishing clear tasks, setting timelines, and assigning responsible parties to ensure accountability at each phase. Best practices involve detailed planning, continuous monitoring, and risk management to address challenges that may arise throughout the project. By following a structured approach, SAFER ensures that each project moves forward efficiently from initial engagement to final construction, and therefore able to better resolve the critical issues that placed these systems on the failing list.

Table 8-29: SAFER Project Management - Project Phases

Project Phase	Phase Description	Final Task of Phase
P01 – System Engagement & Corrective Action Plan	The water system is responsible for developing a CAP. The CAP must meet District-issued enforcement action deadlines and is subject to District or LPA Office review and approval.	District or Local Primacy Agency approval of a CAP.
P02 – Technical Assistance	The water system acquires TA from a third-party provider to help implement the project. This includes submitting a TA request, developing a work plan, and obtaining DFA approval for the TA work plan.	Approved TA Workplan
P03 – Project Evaluation	An engineering evaluation is conducted to complete a feasibility study or engineering report, which assesses project alternatives and	Approved Feasibility Study or Engineering Report

[239] SAFER Dashboard | California State Water Resources Control Board https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html

Project Phase	Phase Description	Final Task of Phase
	associated costs. The evaluation concludes by recommending a preferred project alternative for construction.	
P04 – Technical Studies	Technical studies, such as a test well, treatment pilot study, or hydrogeological assessments, etc. to further evaluate and refine the project alternatives identified in Phase 3. These studies provide essential data to inform and support the final project recommendations.	Completed Technical Studies
P05 – Legal and Environmental Documents	Completion of necessary environmental documents, such as CEQA, along with any relevant legal documents or resolutions required for the project. This includes addressing consolidation agreements, service agreements, property rights, land easements, water rights, LAFCO agreements and water system governance issues, etc.	Completed CEQA
P06 – Project Design	Project design involves the creation of detailed plans and specifications required for the construction project. This phase ensures that all design elements meet regulatory standards and project goals.	Approved 90% Plans and Specifications
P07 – Construction Funding Application	Funding application centers on completing all the necessary documentation to secure construction funding, including the four sub-packages (General, Technical, Financial, and Environmental) for DFA-funded projects. For projects not funded by DFA, this phase involves meeting application requirements specific to their chosen funding institution, whether from another state or federal agency or a private entity like a bank.	Funding Application Deemed Complete and DFA Master File Routed or being processed by funding institution
P08 – Secure Funding	Securing funding involves finalizing and executing the funding agreement for DFA-funded projects or similar agreements with other state or	Execution of Construction Funding Agreement or Loan Funds Received

Project Phase	Phase Description	Final Task of Phase
	federal agencies or obtaining funds from private entities like banks. This phase confirms that funds are officially available for project construction.	(non DFA funded projects)
P09 – Pre-Construction	Pre-construction involves finalizing the project plans and specifications, preparing and advertising the bid package, and awarding the contract. This phase concludes with issuing the Notice to Proceed, signaling the start of construction.	Notice to Proceed with Construction
P10 – Project Construction	Project construction involves the physical building of the project as designed, with the goal of addressing the water system's compliance issues. This phase concludes with the water system's return to compliance or its deactivation through consolation.	Project Complete & Water System Returned to Compliance

8.4.3 Technical Assistance

Technical Assistance (TA) is direct support to communities provided by third parties contracted with the State Water Board. These parties identify challenges, develop plans, support outreach efforts, build capacity and develop application materials to access water infrastructure funding. In many cases TA does not eliminate the need for other capital improvements, but it should increase the technical, managerial, and financial capacity of water systems. TA is to assist water systems in developing the financial and managerial structures necessary to maintain a sustainable water system, including asset management plans, water rate studies, fiscal policies, drought plans, etc. A combination of upgraded infrastructure and proactive long-term managerial and fiscal policies can help address affordability issues and preventatively meet the needs of these water systems before expensive emergency responses are necessary.

The State Water Board prioritizes water systems serving small DACs or low-income households for TA support. TA providers utilize the results for the Needs Assessment as a starting point to better assess entrenched challenges and work with the water systems to better understand their needs. TA providers often support project scoping, including development of an engineering report, cost estimate, plans and specifications, and necessary environmental documentation for the most feasible long-term solution.

In addition, the State Water Board may use a regional approach to pool services to multiple systems within an area to reduce costs.[240] In all cases, DFA staff are assigned to oversee and manage the scope, cost and progress of all TA work, with increased attention given to new types of services that have been approved under the SAFER program.

The State Water Board continues to expand investments in the TA program, with a focus on small, DACs and consolidations. Legislation enacted in 2021 added qualified TA providers as a new eligible funding recipient for monies from the Safe and Affordable Drinking Water Fund.[241] The State Water Board developed a Request for Qualifications (RFQ) process to identify qualified TA providers,[242] including for-profit entities. In 2022, DFA approved $64 million to be awarded to five new drinking TA providers (with funding encumbered in 2022 and 2023). The expanded list of qualified TA providers enables new types and a greater volume of services to be available to communities and public water systems, as well as the expansion of services to other areas of the state. DFA has qualified 18 drinking water TA providers in total via the RFQ process, though 4 have since completed their work as show in the table below.

Table 8-30: Technical Assistance Providers in 2023

Technical Assistance Providers	
California Rural Water Association	Provost & Pritchard Consulting Group
California Urban Water Agencies	Pueblo Unido Community Development Corporation
Coleman Engineering	Rural Community Assistance Corporation
Community Water Center	Self-Help Enterprises
GHD, Inc.	Stantec Consulting Services, Inc.
Leadership Counsel for Justice and Accountability	University Enterprises Inc. at California State University, Sacramento
NV5, Inc.	University of California at Davis, School of Law

From 2019 through 2023, the State Water Board funded nearly $73 million in TA for 673 water systems through agreements with several TA providers.[243] Of this funding,

[240] Policy for Developing the Fund Expenditure Plan https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/docs/2023/final_policy_for_dev_fep_sadwf_0130.pdf
[241] Safe and Affordable Funding for Equity and Resilience https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html
[242] Drinking Water Technical Assistance Provider Request for Qualifications Guidelines https://www.waterboards.ca.gov/water_issues/programs/grants_loans/docs/2022/rfq-guidelines.pdf
[243] Four water systems had a TA request approved in 2022 that were ultimately cancelled, with little to no TA provided.

approximately $42 million has been committed towards 116 projects for full planning via TA (which guides systems towards a construction funding agreement). This information is summarized in Chapter 10 (Table 10-3 and 10-4).

PROJECT EXAMPLE

Rio Bravo-Greeley School Water Treatment O&M Project

Approximately five miles west of Bakersfield, the Rio Bravo-Greeley School water system serves a rural campus that includes an elementary school, middle school, district office, and employee housing, serving a total of 1,190 people. The campus is dependent on a water system that, in 2015 and 2018, was cited for violating maximum contaminant levels for nitrate and 1,2,3-TCP. The school received a $5 million grant for planning and construction of a new treatment plant in March 2018 from the Department of Water Resources and received over $731,000 in State Water Board funding for interim bottled water. The plant will be in service soon and the SAFER program is providing grant funding for three years of operation and maintenance (O&M).[244] In addition to addressing serious public health threats, the project provides the State Water Board with current data about the costs of nitrate treatment in small DACs.

"The Rio Bravo-Greeley Union School District is thrilled that our water treatment facility is nearly complete," said Jennifer Hedge, district superintendent. "Since 2015, we've worked to find solutions to address nitrate and then 1,2,3-TCP contaminants in our water. This journey has been long but greatly supported by the State Water Board. Our school community will soon have access to safe drinking water and no longer depend on bottled water support on campuses. With guaranteed safe water and a more efficient system in place, we can confidently move forward knowing that everyone in our school community has access to clean and safe drinking water."

8.4.4 Consolidations

Consolidation is the joining of two or more water systems, which commonly includes a smaller system being subsumed into a larger, receiving water system. The State Water Board aims to achieve consolidation projects on a voluntary basis, where the systems involved reach an agreement and the project proceeds collaboratively. However, when an agreement cannot be reached between the subsumed and receiving systems, the State Water Board may initiate a mandatory consolidation, as discussed later in this section.

[244] The operation and maintenance (O&M) agreement with the State Water Board is from September 1, 2023, through September 30, 2026.

When a physical consolidation occurs, one water system is dissolved, and its customers are provided service by the receiving water system. If the project can be expanded to include multiple water systems in the area, the State Water Board may support a regionalization project that benefits a broader customer base. Managerial consolidation occurs when a small water system becomes part of a larger water system for all managerial purposes but continues to use its original water supply and distribution system. Increased organization and connectivity in the water system landscape creates a more sustainable and resilient water supply. Some hypothetical examples include:

- **Managerial Consolidation**: “Water System A” is a mutual water system with an aging, all-volunteer staff. The staff no longer want to be responsible for the water system and there are no community members willing to take over. The water system is too far from the nearest large water system to make it cost-effective to physically consolidate, but the larger water system is willing to assume legal responsibility for the system and take over regulatory reporting, billing, operations, etc. The smaller water system dissolves and is no longer legally responsible for water service.
- **Physical Consolidation**: “Water System B” is a senior mobile home park with its own water system and the owner decides it no longer wishes to be responsible for providing drinking water. The nearest city can provide water to the mobile home park through a physical pipe interconnection. By connecting with the nearest city’s water system, the mobile home park will dissolve its water system and no longer be responsible for providing water. In this case, the city’s water system is considered the "receiving" water system and the mobile home park the "subsumed" water system.
- **Regionalization**: The neighbors of “Water System C” include other mobile home parks, some neighborhoods with their own small water systems, and a K-12 school with an unreliable well. Community organizations and local elected officials work with the State Water Board to develop a regionalization project that will leverage economies of scale to create a regional sustainable drinking water solution.

SAFER program funds help small water systems pay for consolidations and may incentivize the larger water systems to assume additional responsibility where feasible. Consolidations typically require community engagement, water system governance changes, complex planning and engineering, and multiple agreements between numerous parties. DDW’s SAFER Engagement Unit staff and engineers assist with initiating partnership discussions, outreach to other agencies and stakeholders, and facilitate possible consolidation alternatives.

PROJECT EXAMPLE

Porterville Regional Consolidation Project

Consolidating multiple smaller water systems with larger, regional water systems expands the resilience and resources of all concerned. Just outside of Porterville in Tulare County, two small DACs, located approximately one mile apart, were served by Failing drinking water systems for some time. Akin Water Company served 26 homes and approximately 90 people, while Central Mutual Water Company served 40 homes, a preschool, and an estimated 120 individuals. In 2017, Akin began having total coliform and E. coli bacteriological contamination. Concurrently, Central Mutual Water began experiencing water outages due to an aging well and a decreasing water table caused by the severe drought. Fortunately, Porterville agreed to consolidation, which enabled the State Water Board to support the advancement of a consolidation project, leveraging the proximity and resources of the three communities. Joining the two struggling water systems with Porterville is an example of a regional consolidation that benefits all. Since 2017, Porterville has successfully consolidated seven small community water systems and the East Porterville area of private domestic wells. The city continues to collaborate with the State Water Board to pursue additional consolidation projects in the region.

"The funding, support and assistance provided by the State Water Board and the staff of the Division of Financial Assistance were critical for the success of these consolidations," said Michael L. Knight, Porterville Assistant City Manager. "We—the residents of Porterville and surrounding communities were partners with the State for the consolidation projects, leveraging the proximity and resources of the three communities to the benefit of all."

PROJECT EXAMPLE

El Adobo – Lamont Public Utility District Consolidation Project

The towns of Lamont and El Adobe in Kern County are examples of communities that will benefit from one of these ongoing consolidations. In February 2023, the State Water Board provided the Lamont Public Utility District in Kern County a $25.4 million grant[245] from the SAFER program to finance the consolidation of the water systems serving Lamont and the neighboring El Adobe Property Owners' Association, both failing due to elevated levels of arsenic. Once complete in 2025, the new, single, and upgraded system will supply safe and affordable water to over 20,000 residents.

245 Lamont – El Adobo Consolidation Press Release https://www.waterboards.ca.gov/press_room/press_releases/2023/pr021323-lamont.pdf

> "For us, this is monumental. We have never received assistance of this magnitude in our 80-year existence," said Scott Taylor, general manager of Lamont PUD. "The grant helps us make critical repairs and upgrades to our system to reliably provide safe and affordable drinking water for our customers and El Adobe. Lamont and El Adobe are severely disadvantaged communities; our customers are mostly agricultural workers. This never would have been possible without the board's funding and technical support through the SAFER program."

Since 2019, 142 public water systems have been consolidated, serving nearly 100,000 Californians (Table 8-31)[246]. One of these consolidation projects utilized the State Water Board's mandatory consolidation authority. In addition, the SAFER program is actively facilitating or tracking roughly 261 ongoing water system consolidations. Approximately 51% of currently Failing water systems are considering or are moving forward with full physical consolidation, including 21 schools. SAFER Engagement Unit staff actively manage consolidation projects for Failing water systems, which includes engagement with other State Water Board staff, LPA staff, the various water systems involved in the project, the communities served, and additional key partners. The State Water Board maintains an online map of complete consolidation projects.

Table 8-31: Consolidated Public Water Systems [247]

SAFER Status	2019	2020	2021	2022	2023	TOTAL	Total Population Served
Failing	12	5	3	5	6	**31**	6,779
At-Risk	N/A	N/A	0	2	2	**4**	1,138
Potentially At-Risk	N/A	N/A	1	6	1	**8**	4,105
Not At-Risk / Not Assessed	27	18	24	18	12	**99**	86,473
TOTAL:	**39**	**23**	**28**	**31**	**21**	**142**	**98,495**

8.4.4.1.1

8.4.4.1.2 Voluntary Consolidation

Voluntary consolidation occurs when both the receiving and subsumed water systems work collaboratively on a construction project that integrates the subsumed system into

[246] 2024 NEEDS ASSESSMENT https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024-needs-assessment.pdf

[247] In 2024, an estimated 16 consolidations are to be completed. The State Water Board Consolidation Dashboard contains an annual list of consolidated systems with additional details: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/dashboard.html

the larger receiving system. The project typically follows phases outlined in Table 8-29, with the legal agreements critical to the project's timelines. Among these, the consolidation agreement is particularly critical, addressing key elements such as governance integration, service area boundaries, and asset transfers, all of which require consensus to move forward smoothly.

8.4.4.1.3 Mandatory Consolidations

Mandatory consolidation is a State Water Board mandated consolidation requiring two or more water systems to merge with, or receive an extension of service from another, public water system as specified in HSC § 116682[248]. Mandatory consolidation can only be used when all the following criteria are met:

a. The water system is a DAC[249]
b. There is documented water quality or quantity issue or the system is deemed at-risk of failing
c. There is a functional water system nearby that can serve the subsumed system

Therefore, water systems on the Failing list that do not serve DACs cannot be issued mandatory consolidation orders.

Issuing a mandatory consolidation order requires additional procedural steps under HSC § 116682. Prior to issuing a mandatory consolidation order, the State Water Board must take actions and make specific findings. Key actions specified in HSC § 116682, subdivision (b) are sending a six-month voluntary consolidation letter, allowing systems time to negotiate a voluntary consolidation or find other means to secure an adequate supply of safe drinking water and the State Water Board must also hold at least one public meeting to inform the community about the water system issues and the mandatory consolidation process as well as address any questions or comments.

If voluntary consolidation is not reached after the six-month period, the State Water Board must make findings in accordance with HSC § 116682, subdivision (d) which are summarized as follows:

1) The potentially subsumed water system is a Failing or At-Risk water system.
2) Reasonable efforts to negotiate consolidation or extension of server were made.
3) Consolidation is technically and economically feasible.
4) No LAFCO process can resolve the problem in a reasonable timeframe.
5) Water rights or water contracts have been adequately addressed.

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[248] Health and Safety Code § 116682 https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=104.&title=&part=12.&chapter=4.&article=9.

[249] A disadvantaged community (DAC) is defined in Health and Safety Code, § 116275, subd. (aa) as those communities "with an annual median household income that is less than 80 percent of the statewide annual median household income."

6) Consolidation is an effective and cost-effective means to provide safe and reliable drinking water.
7) The water supply capacity is limited-service connections and parcels in the effected project area(s) and fire flow.

After findings have been made, the State Water Board must host the second public meeting in accordance with HSC 116682, subdivision (c). Finally, after the State Water Board has complied with HSC 116682, a mandatory consolidation order can be issued.

The process of completing a consolidation project between two or more water systems is largely the same for voluntary and mandatory consolidation projects, the difference being the mandatory consolidation order compels both systems to participate in the project, meaning it is no longer optional or voluntary. Table 8-32[250], below, displays the water systems that are in the mandatory consolidation process.

Table 8-32: Mandatory Consolidations in Process

Joining System	Receiving System	Population	County	Year Initiated
Cutler PUD	Orosi PUD	6,200	Tulare	2023
Athal MWC	Lamont PUD	150	Kern	2022
Fuller Acres MWC	Lamont PUD	545	Kern	2022
East Wilson Road WC	East Niles CSD	35	Kern	2022
Oasis Property Owners Assoc.	East Niles CSD	100	Kern	2022
San Joaquin Estates MWC	East Niles CSD	165	Kern	2022
Wilson Road WC	East Niles CSD	66	Kern	2022
Wini Mutual Water Company	East Niles CSD	29	Kern	2022
Del Oro WC – Country Estates District	East Niles CSD	297	Kern	2022
Victory MWC	East Niles CSD	849	Kern	2022
NorCal Water Works	Del Oro Water Company	45	Tehama	2021
Tooleville Mutual Non-Profit Association	City of Exeter	340	Tulare	2021
Six Acres Water Company	City of Cloverdale	66	Sonoma	2020
West Water Company	CSA 41-Fitch	40	Sonoma	2020

[250] Mandatory Consolidation
https://www.waterboards.ca.gov/drinking_water/programs/compliance/

Joining System	Receiving System	Population	County	Year Initiated
East Orosi CSD	Orosi PUD	423	Tulare	2018
TOTAL:	**16**	**9,350**		

The mandatory consolidation process does not always result in a mandatory consolidation order. Before an order is issued, the process provides an opportunity for the water systems to reach a voluntary agreement and collaborate on a consolidation project without mandatory action from the State Water Board. When a mandatory consolidation is issued, the water systems are still required to work together to complete project tasks, such as finalizing legal agreements, defining the project scope, and securing funding. The order may include specific, legally enforceable tasks and deadlines essential for the project's completion.

8.4.4.1.4 Barriers to Consolidation and Regionalization Efforts

Despite the State Water Board's focus on consolidations and regionalization efforts, several barriers persist. A major concern for small water systems is the potential for higher rates following consolidation. Many small systems, particularly those serving DACs, often maintain artificially low rates that fail to account for essential expenses such as infrastructure replacement, operations and maintenance, and emergency preparedness, resulting in unsustainable and non-compliant operations and skyrocketing replacement costs due to deferred maintenance requiring prohibitive replacement costs that could have been reduced with timely maintenance. Larger systems benefit from economies of scale, making them more compliant and sustainable. Thus, the comparison of the rates between large and small systems is sometimes not directly equivalent, which requires additional analysis and potentially rate studies.

TMF challenges can also present barriers to consolidation. Many small water systems lack the TMF capacity required to manage the complexities of consolidation, such as securing funding, overseeing infrastructure upgrades, navigating the LAFCO annexation process, etc. While providing TA to support these systems can help them overcome some of these TMF challenges it cannot overcome all the TMF challenges, especially those related to governance (e.g. lack of quorum) and poor financial management practice.

LAFCO boundaries also pose a significant barrier to consolidation. When a small water system falls outside the service area of a larger system, an annexation process is needed to incorporate the small system into the larger system's boundaries. This can be a lengthy and complex process. LAFCO plays a critical role in overseeing these boundary changes, and the annexation process requires multiple levels of review and approval, including feasibility studies, public hearings, California Environmental Quality Act (CEQA) clearance, and coordination with various local agencies. This process, while necessary to ensure compliance with local governance and service obligations, can take up to two years or more to accomplish. The administrative and financial burdens of navigating LAFCO regulations can be overwhelming for small systems, delaying much-needed improvements in infrastructure and service.

The high cost of large infrastructure upgrades, pipeline connections, and service connection fees can also be major barriers. Many projects are grant-eligible through the State Water Board Drinking Water State Revolving Fund (DWSRF), though lengthy and complex legal requirements can increase reluctancy on the part of receiving water systems. The 2024/25 DWSRF Intended Use Plan (IUP)[251] offers grants or principal forgiveness up to 100 percent of costs at a rate of $80,000 per service connection to address public health related issues and/or consolidations of small DACs (and eligible NTNCs that serve small DACs; Expanded Small DACs; or Small Non-DAC with MHI < 150% of Statewide MHI). It is important to note that the IUP is updated every fiscal year and therefore, funding eligibility is subject to change.

Water rights can pose another barrier to consolidation when systems lack the appropriate rights or allocations to meet community needs. For example, if a larger system does not have sufficient water rights or the smaller system's allocation is insufficient to meet increased demand, transferring allocations or obtaining the necessary rights becomes essential to completing the project.

Litigation can significantly impact consolidation efforts. Water systems involved in active litigation, whether directly or indirectly, may face challenges that affect their eligibility for funding or reduce the willingness of receiving systems to participate due to potential liability risks. If a small water system is found financially liable in a lawsuit, this could create a barrier to obtaining funding. Conversely, water systems awarded litigation settlements may be required to allocate a portion of the funds for specific purposes, such as infrastructure improvements, remediation, or treatment. The terms and conditions of such funds, their designated use, and implications for future funding eligibility can influence the consolidation process and its timeline.

Additional barriers to consolidation may include the lack of responsiveness or willingness from individual property owners (for project participation, including needed easement or land purchase) or water systems, whether they are the subsuming or receiving party. Resistance to consolidation often arises from concerns about losing control, potential rate increases, staffing or capacity constraints, or project costs. SAFER staff and TA providers typically engage in outreach efforts to address these concerns and facilitate communication. If the system remains unresponsive, the State Water Board may consider pursuing mandatory consolidation if the appropriate criteria are met.

When applicable, obtaining approval from the California Public Utilities Commission (CPUC) may be a barrier to consolidation due to the coordination and approval needed to move the project forward and adds several months to the process depending on procedural requirements. Approval may be required prior to the issuance of a DWSRF funding agreement.

The California Environmental Quality Act (CEQA) generally requires state and local

[251] Drinking Water State Revolving Fund (DWSRF) (see Appendix E) https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/2024/2024-25-dwsrf-iup.pdf

government agencies to inform decision-makers and the public about the potential environmental impacts of proposed projects and to mitigate those impacts wherever feasible. For water systems seeking funding through the State Water Board, the environmental assessment must be completed or deemed CEQA-exempt.

Mitigating barriers to consolidations and regionalization efforts is crucial to ensuring the long-term sustainability and reliability of water systems, particularly for DACs. Overcoming these challenges requires a coordinated effort among state agencies, local governments, water systems, and communities. Continued technical assistance, streamlined regulatory processes, and targeted financial support will be essential in removing obstacles and advancing consolidation and regionalization efforts. The State Water Board remains committed to finding innovative solutions and partnerships to achieve these goals and improve access to safe, reliable drinking water for all Californians.

8.4.5 Administrators

A water system administrator is a qualified specialist that provides technical, managerial, and/or financial expertise to struggling water systems. Since September 2016, the State Water Board has had the authority to contract administrators for DAC water systems. The State Water board did not appoint any administrators until the passage of AB 1577 and SB 862 in 2018, which provided funding and allowed Los Angeles County to be appointed as the administrator for Sativa Water District. Sativa faced severe issues, including water quality violations, maintenance failures, and brown water caused by elevated manganese levels. Despite the $200,000 allocated by SB 862, Sativa's financial mismanagement, including negative cash flow and lack of reserves, in part due to water rates remaining fixed at $75 per month, led to a monthly budget deficit.. Los Angeles County eventually approved a $1.4 million line of credit to stabilize the system and estimated to have spent over $8 million by the time the system completed acquisition by a successor. Due to such outside financial support, including other agency grants, and proactive management of the system, the current owner, Suburban Water Systems, reported via the 2023 eAR average water rates of $62 a month. Lessons from this process emphasized that the administrator process is time intensive, may be uncertain in scope of challenges, requires various expertise and resources, and highlighted the benefits of maintaining Sativa as a separate public agency to limit liability and allow for administrative flexibility for the administrator.

SB 200 provided additional funding for administrators and HSC § 116686 required the creation of an Administrator Policy Handbook[252] to outline the process of appointing an administrator. The first version of the handbook was adopted in September 2019, establishing standards, terms, and procedures that apply to the selection and duties of appointed administrators for designated water systems. It has since been updated to incorporate revisions, including those associated with SB 1254 (2022), with the latest version adopted September 2023.

DACs served by a Failing or At-risk water system are eligible for an administrator

[252] Administrator Policy Handbook https://www.waterboards.ca.gov/safer/docs/2023/administrator-policy-handbook-2023-revision.pdf

funded through SAFER program. Administrators may be individual people, businesses, non-profit organizations, local agencies like counties or nearby larger utilities, and other entities. Administrators act on behalf of a designated water system as a general manager or may be assigned limited specific duties, such as supervising an infrastructure improvement project. Administrators are often appointed for a limited term to help a water system through the consolidation process or to come into compliance.

The appointment of an administrator is an authority given to the State Water Board to act when a water system, based on the Needs Assessment and the direct knowledge and expertise of DDW/LPA staff, is identified as in need but does not have the resources itself to secure one. The State Water Board does recognize the significant and, in some cases, potentially disruptive effect of ordering acceptance of an administrator and therefore uses this authority prudently; only doing so after careful consideration and seeking and incorporating significant community engagement, as stipulated in the Administrator Policy Handbook.

At present, qualified administrators include:

- non-profit TA providers (e.g., California Rural Water Association)
- counties (e.g., Sonoma and Tulare)
- for-profit water systems (e.g., Russian River Utility), and
- engineering services providers (e.g., Provost and Prichard, Stantec Consulting)

Since obtaining a list of qualified administrators in 2020, the State Water Board has designated 16 public water systems[253] as in need of an administrator and held public meetings for the impacted communities, representing approximately 4,876 people and 1,443 service connections in seven counties.[254]

Currently, there are twelve administrator projects with appointments and funding approved by the State Water Board (Table 8-33). Two additional water systems have identified administrators and await executed funding agreements and/or are working through liability concerns before the administrator is ordered (Table 8-34). The administrator process has been started for one other water system, which does not yet have an identified administrator. As of the end of 2024, one administrator appointment has been completed with the North Edwards Water District (Table 8-35).

[253] Ten systems were initiated in 2020, three in 2021, one in 2022, one in 2023, and one in 2024.
[254] Water System Administrators
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/administrator.html

Table 8-33: Administrator Projects – Currently Active (2020 – 2024[255])

System Name	Population	County	Funding Approved by State Water Board	Administrator Appointed	Year Appointed
East Orosi CSD	932	Tulare	**$585,923**	County of Tulare	2022
Six Acres Water Company	66	Sonoma	**$214,472**	Marlene Demery & Associates	2022
Keeler CSD	66	Inyo	**$1,166,197**	Provost and Pritchard	2023
Cazadero Water Company	250	Sonoma	**$512,765**	Russian River Utility	2023
Teviston Community Services District	343	Tulare	**$872,216**	Stantec Consulting	2023
NorCal Water Works	45	Tehama	**$1,166,558**	Provost and Pritchard	2023
Sierra Vista Water Association	44	Tulare	**$1,166,558**	Provost and Pritchard	2023
South Kern Mutual Water Company	32	Kern	**$688,882**	Provost and Pritchard	2024
Old River Mutual Water Company	126	Kern	**$688,882**	Provost and Pritchard	2024
Lake Morena Views Mutual Water Company	360	San Diego	**$1,060,009**	Stantec Consulting	2024
Las Deltas Mutual Water System	375	Fresno	**$773,937**	Provost and Pritchard	2024
Allensworth Community Services District	521	Tulare	**$965,787**	Stantec Consulting	2024
TOTAL:	**3,160**		**$9,862,186**		

[255] Through September 2024.

Table 8-34: Administrator Projects - In Development

System Name	Population	County	Administrator Identified
Valley Ford Water Association	61	Sonoma	Russian River Utility
West Water Company	40	Sonoma	County of Sonoma
TOTAL:	**101**		

Table 8-35: State Water Board Administrator Projects - Completed

System Name	Population	County	Funding	Administrator Appointed	Year Appointed	Year Completed
North Edwards Water District[256]	944	Kern	**$309,457**	California Rural Water Association	2020	2023
Sativa Count Water District[257]	4,339	Los Angeles	**$200,000**	Los Angeles County	2018	2021

The State Water Board is currently working with administrators that are likely to have multiple administrator projects spanning multiple years. This has led to the development of administrator master agreements to simplify the process and expedite future administrator appointments for multiple water systems. The State Water Board continues to accept Statements of Qualifications from potential administrators. More information about the administrator program is found on the State Water Board's Administrator web page.[258] One of the most significant challenges seen to the administrator process is the lack of liability protection for municipal water systems and others that may be willing to act in an administrator capacity but are hesitant to do so because of liability concerns. Although HSC § 116686 provides liability protection for administrators, many remain concerned about potential risks due to the failing condition of the water systems they oversee and the disorganized state in which these systems were previously operated. While the liability protections exist, they do not prevent

[256] The administrator appointment resulted in a new water source for the water district, and the consolidation of two small water systems which were also failing to comply with the arsenic MCL. Based on eAR data provided by the water district the administrator and related projects did not result in an increase in the water district water rates. The rate remains in the "low burden" range according to the Affordability Dashboard.

[257] The administrator appointment predated SB 200 and the SAFER administrator program. Water rates have been reduced as a result of the administrator and subsequent change of ownership.

[258] State Water Board Administrators – Information for Potential Administrators https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/future-administrator.html

lawsuits from being filed, and the lack of extensive case law leaves the scope of administrators' risk exposure uncertain. This is particularly pronounced when the water system is unwilling to assist a potential administrator in the water system assessment prior to being appointed.

8.4.6 TMF Capacity Development

In 2022, the State Water Board updated the Drinking Water Capacity Development Strategy to improve the performance of public water systems in consistently providing safe drinking water. This effort was undertaken pursuant to Federal initiatives and incentives developed by the United States Environmental Protection Agency (USEPA). The Capacity Development Strategy was developed systematically with input from stakeholders and the public collected through two public workshops. More information on TMF capacity development is available on the State Water Board's website.[259]

8.4.7 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) provides an opportunity to encourage water partnerships and increase stakeholder involvement in groundwater planning and management. SGMA is a law that empowers local agencies to form Groundwater Sustainability Agencies (GSA) to manage basins sustainably. GSAs are required to adopt Groundwater Sustainability Plans (GSP) for crucial groundwater basins, which must include strategies to achieve sustainability goals and avoid undesirable outcomes such as water level declines or water quality degradation.

The State Water Board strongly recommends that GSAs engage with domestic well users and public water systems when analyzing and discussing what constitutes an undesirable result. If a GSA evaluation indicates that proposed groundwater level declines or water quality degradation would have significant and unreasonable impacts, the GSA has several options beyond enhancing supply or reducing demand. For example, the GSA can consider developing mitigation plans to replace or repair domestic or drinking water system wells, installing treatment systems to address water quality impacts, or facilitating the consolidation of smaller, at-risk systems with larger public water systems. GSAs can also support the expansion of public water system boundaries to include communities served by private wells.

Water partnership efforts can help achieve these goals and may involve providing financial assistance for low-cost intertie projects near larger systems, collaborating with county planning agencies to annex communities served by at-risk wells into larger systems, and fostering connections between small water systems, domestic wells owners, and larger water systems to develop long-term partnerships. These strategies not only help address sustainability but also remove barriers to consideration, enhancing the resilience of water systems.

8.4.8 Water Partnerships

Many small water systems can provide safe and affordable water in the short term, but often struggle to ensure long-term sustainability due to challenges of drought, regulatory

[259] TMF - Capacity Development: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/TMF.html

changes, funding infrastructure maintenance, wildfires, etc. To support small communities and ensure safe, sustainable, and affordable water for all Californians, the State Water Board encourages partnerships and consolidation whenever feasible. Water partnerships strengthen resilience of small systems and benefit communities by enhancing the collective ability to manage resources and infrastructure.[260]

Water partnerships can take many forms, ranging from informal agreements such as local resource sharing to formal contracts between water systems. Informal agreements can be thought of as handshake agreements with no contractual obligations to share resources or to help each other during emergency situations. They can be as simple as sharing contact information to discuss their understanding of a new regulatory requirement. Water systems can also share equipment, share the cost of purchasing chemicals in bulk, or have a mutual aid agreement in case of emergencies.

Formal agreements may include contractual assistance, Joint Powers Authority, physical consolidation, managerial consolidation, and regionalization. Contractual assistance includes parties obliged to fulfil a mutually agreeable contract, such as a water purchase agreement or emergency intertie. Joint Powers Authority includes the creation of a new entity by several water systems that continue to exist as independent entities but benefit from shared management, operators, facilities, or even source water. Managerial consolidation, physical consolidation, and regionalization all include an ownership transfer and connection of one or several public water systems to another, either physically or managerially, as described below. Water partnership success stories can be found on the State Water Board's Water Partnership Success Stories website[261]

8.4.9 Prevention of New Unsustainable Water Systems (SB 1263)

Chapter 843, Statutes of 2016 (SB 1263) went into effect on January 1, 2017, which amended the HSC to prevent the formation of new unsustainable water systems (HSC § 116527). One of the requirements of the regulation was the creation of a preliminary technical report as part of the permitting process. This step requires new domestic water supply applicants to explore and assess the feasibility of being annexed, connected to, or otherwise supplied domestic water by an existing adjacent community water system. Once the preliminary technical report has been completed, an application for a permit to operate a public water system must demonstrate TMF and source capacity. (HSC § 116540; CCR, title 22 § 64554.) HSC § 116540, subdivision (c) also requires that impacts such as climate change, contaminant migration and other potential impacts to water system sustainability be considered in the permit review process. SB 200 further modified that section to authorize the State Water Board to deny the permit of a proposed new public water system if it determines that consolidation is a feasible alternative.

SB 200 also requires that local primacy agencies consult with the State Water Board prior to permitting new public water systems and prevents the use of hauled water as a

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[260] Water Partnerships Overview
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/waterpartnership.html

[261] Water Partnership Success Stories
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/partnershipsuccess.html

water source for new residential development.

The State Water Board updated external guidance for new domestic water supply applicants provided on its Permits for Water Systems website[262], as well as provided training for staff on this issue. The State Water Board now reviews all preliminary technical reports that are received prior to a new domestic water supply permit application. When proposed public water systems are near existing systems, DDW often tries to facilitate negotiations between adjacent water systems and potential new water systems for service.

However, there continues to be challenges related to preventing new unnecessary water systems from forming. Because development in many counties is an important source of revenue, and housing is a recognized need in California, there is a strong incentive to allow the creation of new water systems even where new development cannot connect to existing services. In some instances, connecting to existing services may not be technically feasible. However, even where a pipeline to hook up to a city's water system is nearby, if the property is located outside the city's service area, a city can decline to serve the development. For example, a city's pipeline was located across the street from a proposed non-community water system that planned to serve industrial uses and had historical arsenic and nitrate groundwater issues. The industrial facility also had a history of non-compliance with other various County regulations, including providing water without a water supply permit and was shut down due to the many violations. When the proposed water system requested connection to the City via a pipeline that was across the street, the City denied access to the water on the grounds that it was technically outside its sphere of influence. However, the City also noted that they historically disagreed with the County's land use decision in permitting an industrial facility so close to the City. Because the proposed water system was legally denied water service by the City because it was outside of the City's LAFCO designated sphere of influence, the State Water Board had to conclude that water service by the City was not "feasible," even though it was across the street. Further legislative definition of what is deemed "feasible" would provide clarity for these types of situations. For example, California's Plumbing Code § 713 requires a public sewer connection to be installed whenever it is available within 200 feet; there is no such requirement for drinking water.

Another unintended consequence of SB 1263 has been an increase in the number of state small water systems that are being created to side-step public water system regulations. By limiting the number of service connections and people being served, a water system falls outside of State Water Board jurisdiction, which is 15 service connections, or an average of 25 or more people served six or more months of the year. For example, in 2018, a new mobile home park development in San Joaquin County split its distribution system in two and provided two separate well sources (one to each distribution system), so that the mobile home parks would not technically fall into the public water system category. Although this type of situation is clearly not the intent of the legislation, there is currently no statute that prevents these actions.. The State Water Board documents issues that arise with the implementation of this legislation to

[262] Permits for Water Systems website
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Permits.html

support future legislative updates.

Other challenges to the prevention of unsustainable small public water systems include LAFCO's mandate to protect agricultural land from being encroached upon. While this is a laudable goal in California, one of the unintended consequences is the creation of badly needed farm labor housing being denied water service from nearby cities due to LAFCO policies. Instead, some County LAFCOs propose that new public water systems be formed because they are concerned about uncontrolled growth if a pipeline to an existing system is created. The result is that growth continues to happen to serve farm labor housing, but results in the formation of small, fragmented water systems that lack economies of scale for sustainable operation and compliance and often have inadequate fire protection. Regions where community members are opposed to growth, but development pressures are high, such as Monterey, Sonoma and San Luis Obispo counties, should negotiate this through enforcement of the General Plan process, not via the formation of fragmented water supply.

The State Water Board believes that more engagement with County and State land-use planners is necessary to develop regional or county-wide drinking water plans that eliminate the formation of new, small public water systems and state small water systems that will most likely not have adequate TMF capacity to comply with the SDWA. The State Water Board recognizes, however, that the formation of new, small public water systems and state small water systems might be necessary to develop more affordable housing, in which case, a larger, well-funded entity should be responsible for the water system to ensure the system will have adequate TMF capacity and comply with the SDWA, such as through managerial consolidation. Additionally, drinking water supplies should be a mandatory part of the County General Plans and require an assessment of all water supplies, not just the large municipal supplies that are typically the focus of any water section. The State Water Board also supports more authority for LAFCO to deny any type of new public water system, including mutual water companies, mobile home parks and neighborhood associations within City boundaries or within the sphere of influence of any municipality serving drinking water.

8.4.10 SAFER Goals

The following goals have been established for the SAFER Program:

1. Ensure people served by Failing community and non-transient non-community K-12 school water systems have safe water.
2. Expedite effective solutions for Failing communities and non-transient non-community K-12 school water systems that serve unsafe drinking water.
3. Ensure California's most vulnerable communities and non-transient non-community K-12 school water systems are resilient to cycles of failure.

8.5 CONCLUSIONS AND RECOMMENDATIONS

8.5.1 Conclusions

Significant progress has been made in the past five years to promote sustainable public water systems through tools provided in the Safe and Affordable Drinking Water Fund. However, much remains to be done, and the State Water Board provides the following recommendations to move the State toward sustainable HR2W goals.

Most drinking water violations come from water systems serving less than 500 service connections, and approximately 72 percent of the community water systems have less than 500 service connections (approximately 2,500). These systems are limited by economies of scale resulting in limited technical, managerial, and financial capacity. To ensure long-term sustainability and decrease hurdles to consolidation and implementation of regional projects, public water systems must ensure that rates address ongoing infrastructure maintenance and replacement based on industry's best practices. Furthermore, financial capacity metrics of each water system should be comparable to other water systems, even those with different governance structures, through universal financial capacity metrics. These universal financial capacity metrics must be publicly available to ensure transparency.

The State Water Board recommends increasing financial capacity through setting regulatory requirements, implementing additional inspection procedures, and by creating publicly available financial capacity metrics. The State Water Board plans to utilize the Needs Analysis Unit to initiate financial review of community water systems that show marginal technical, managerial and financial capacity, and to coordinate infrastructure replacement planning needs into future developments of the Fund Expenditure Plan. It is anticipated that when infrastructure costs are included in small water system rates, the water rates may be unaffordable for some portion of the population. Therefore, consolidation, regionalization, and other affordability tools (see Chapter 9) may be necessary to bring water rates down for these residents.

The State Water Board recommends that all existing community water systems with one well source be required to have an additional well source, or an intertie to another public water system, to mitigate the challenges of climate change such as future droughts and as redundancy for well outage due to mechanical failure or water quality concerns. Additionally, it is recommended that individual meters be required on all public water systems, not just urban water suppliers, and that minimum fire flow requirements for pipelines and storage capacity be incorporated on a statewide basis to deal with the increase in fires and that drinking water funding criteria be expanded to include funding for pipeline capacity necessary to provide fire protection. It is also recommended that domestic well owners, SSWS, and small public water systems participate in the SGMA processes.

With respect to consolidations, the State Water Board plans to continue to actively pursue voluntary consolidations and mandatory consolidation orders when necessary. This is a primary mechanism to achieve sustainability for those water systems that may otherwise be at risk due to future changes such as climate change, new regulations, loss of volunteer board members and general technical, managerial and financial capacity limitations. Given the large number of violations affecting water systems with less than 500 service connections, it is also recommended that mandatory consolidation authority be expanded to non-DACs that are less than 500 service connections that have been in violation of a primary maximum contaminant level for more than three years. It is also recommended that a state funding source, after 2030, be dedicated to public water system consolidations and third-party administrators that can oversee consolidation projects so that many of the limitations of federal funding sources, which can slow and limit funding projects, are alleviated.

While pursuing consolidations and water system sustainability, it is important to curtail the creation of new small water systems that are likely to have TMF problems in the future. Looking forward, the State Water Board recommends that changes be made to SB 1263 to clarify its intent with respect to SSWS and require clear technical, managerial and financial capacity for all new water systems. Other states, and other California programs such as landfills, have specific requirements for long-term financial capacity and stewardship such as proof of credit worthiness and use of escrow accounts. PWS should be required to meet long-term financial standards to ensure sustainability and responsible stewardship long after its creation.

The State Water Board also believes that more engagement with County and State land-use planners is necessary to develop County-wide drinking water plans that eliminate the formation of new small public water systems and State small water systems unless a larger, well-funded entity will be responsible for the water system for the long-term, thus ensuring the ability for any small system to provide safe and affordable drinking water. The State Water Board supports more authority for LAFCO to deny any type of new public water system, including mutual water companies, mobile home parks and neighborhood associations within City boundaries and within the sphere of influence of any municipality serving drinking water.

In summary, the sustainability and safety of California's public water systems will be determined by our ability to create partnerships and to physically or managerially consolidate or regionalize water systems to create greater economies of scale. This must be done through greater clarity of expectations and transparency of the financial capacity of existing public water systems and through dedicated funding sources to help water systems overcome the multitude of barriers in achieving these goals. Shifting focus away from short-term fixes to long-term regional partnerships, the long-term solutions will also require a comprehensive plan for preventing the formation of new unsustainable water systems through collaboration between local and state-wide planning agencies, agencies with authority over public water systems, and stringent technical, managerial and financial capacity requirements and review of consolidation potential.

8.5.2 Recommendations

8-1 Support TMF capacity development, targeting small water systems and non-transient non-community systems that are K-12 schools, to support the sustainability of water system preparation for drought and water shortages.

8-2 Enhance data collection efforts around compliance with SB 552.

8-3 Address and enable the provision of a sustainable water supply that meets fire flow requirements through legislative support and increased funding for the installation of water infrastructure.

8-4 Provide resources that address regional planning and consolidation in areas where contamination or limited source capacity is known or anticipated to be present.

8-5 State small water system information should be publicly available on a single website location for increased understanding and transparency of any issues regarding these water systems and to aid in their inclusion in regional planning efforts.

8-6 Increase access to additional funding for the inclusion of SSWS and domestic well owners in consolidation projects.

8-7 Investigate ways to expedite funding for consolidation projects, such as through technical service providers, administrators, and/or direct payment of connection fees to a receiving water system.

8-8 Provide liability protection for municipal water systems and others willing to act in an administrator capacity.

8-9 Support legislation to address the attempt by new water systems to avoid State Water Board regulations by limiting the number of service connections and populations served to avoid meeting the definition of a state small water system.

8-10 Support the amendment of HSC § 116527 requirements of a preliminary technical report to extend the submittal time prior to permitting application to align with land use permitting by local agencies and enable local and state agencies to more quickly identify proposed public water systems that would not be sustainable or feasible to permit.

8-11 Support LAFCO policies and requirements to address existing, and prevent the formation of, unsustainable, small, and fragmented water systems that lack TMF capacity, especially when the water system is within city boundaries or within the sphere of influence of other DDW regulated municipalities. The LAFCO process must be improved to expedite consolidations of DAC and Failing water systems.

8-12 Increase engagement with County and State land use planners to promote a mandatory assessment of all water suppliers in County General Plans and develop regional drinking water plans to reduce the formation of small public water systems. Regional drinking water plans could be prepared through required water sections of existing documents such as County General Plans, or other more specific drinking water plans.

8-13 Support increased financial capacity through the development of TMF regulations in alignment with SB 1188 to ensure public water systems have adequate TMF capacity, including implementing additional inspection procedures, and by creating publicly available financial capacity metrics.

8-14 Expand mandatory consolidation authority to address all public water systems under 500 service connections that exceed a primary MCL for longer than three years, inclusive of those that serve non-disadvantaged communities.

8-15 Support the allocation of a state funding source after 2030 and the sunsetting of current SAFER funding, to continue the efforts of the SAFER program, including tools such as assistance to public water system for consolidations and third-party technical assistance providers and administrators.

8-16 Allocate a funding source for K-12 schools that are public water systems to ensure sustainable water systems that are not at-risk for failure.

CHAPTER 9 DRINKING WATER COST AND AFFORDABILITY

9.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, subdivision (b)(7), (8), and (9), this chapter discusses how water systems typically fund their operations including:

- Alternative methods of financing construction, installation, and operation of new treatment technologies
- Revenue sources available to public water systems to meet current and future expenses
- Cost analysis for large, medium, and small public water systems
- Affordability of water rates

Public policy has focused on the right of Californians to have access to high quality drinking water. This chapter pertains only to community water systems and does not discuss costs for other types of water systems such as transient and non-transient non-community systems, state small water systems or individual well owners, as these types of water systems do not typically bill customers for usage. Affordability of water is directly related to access to water and is an essential component of the Human Right to Water263 (HR2W).

9.1.1 Human Right to Water

As discussed throughout this plan, Chapter 524, Statutes of 2012 (AB 685) established as state policy that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking and sanitary purposes. Furthermore, Health and Safety Code Section 116270, subdivision (a) states: "Every resident of California has the right to pure and safe drinking water." To advance the goals of the HR2W, Chapter 120, Statutes of 2019 (SB 200) enabled the State Water Board to create the SAFER Program and establish the Safe and Affordable Drinking Water (SADW) Fund to help struggling water systems sustainably and affordably provide safe drinking water.

The SAFER Program utilizes a set of tools, funding sources, and regulatory authorities to assist California communities as they develop local capacity to ensure reliable access to safe drinking water. The SADW Fund requires the annual adoption of a Fund Expenditure Plan (FEP), informed by the SAFER Advisory Group[264] and the annual Drinking Water Needs Assessment which includes four core components: the Failing Water System List, a Risk Assessment, Cost Assessment, and Affordability Assessment. The SAFER Program and the Needs Assessment[265] are described in

[263] State Water Board Resolution No. 2016-0010
https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2016/rs2016_0010.pdf
[264] SAFER Advisory Group: https://www.waterboards.ca.gov/safer/advisory_group.html
[265] Drinking Water Needs Assessment:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html

Chapter 8.

9.1.2 Overview of Water System Revenues and Affordability Assessment

For community water systems, the overall budget depends on revenue generated from billings. The customer's bill is determined by the water system's rate structure, which may account for water used, depending in part on whether service connections are metered.[266] Water systems may experience some uncertainty with projecting revenues under various rate increase scenarios, such as drought restrictions that substantially reduce water usage. Conservation is also known to impact water system rates and revenue in that as water usage is reduced, rates must increase to cover baseline costs regardless of water savings resulting from customer conservation efforts.

Water affordability is extremely difficult to determine and must be considered at both the household and community level. The economic impact of increased water rates for households depends on cost factors that include basic needs such as housing, food, and utilities, as well as personal expenses like entertainment, modes of transportation, and individual preferences. Personal spending habits are much more difficult to quantify but must be considered in any discussion on affordability. On a community level, expenses for water compete with other basic services such as sanitation, public safety, street and facilities maintenance, and parks and recreation. The monthly cost of water is significant not only to directly billed customers such as homeowners and businesses, but also to tenants who indirectly pay for water costs through rent. High water rates are unaffordable to certain segments of California's population and disproportionately affect disadvantaged communities or low-income households regardless of overall community status. To meet the costs of basic needs such as water, consumers face difficult decisions that compromise their quality of life.

As part of the SAFER Program's Needs Assessment, the Affordability Assessment evaluates several indicators to identify communities that may experience drinking water affordability challenges. Measuring affordability includes an analysis of the ability of households and communities to pay for current and future water service charges. The 2024 Affordability Assessment indicates 94 (3%) community water systems face a high drinking water affordability burden and 311 (10%) face a medium drinking water affordability burden (Table 9-6). The affordability burden designation is based on the number of affordability indicator thresholds exceeded by each water system. If a community does not exceed a threshold indicator, that community's affordability level may not be a concern all together. However, that does not mean some households within that community do not struggle to pay for water services. The State Water Board recognizes the importance of considering household and community affordability, but statewide data that includes household affordability indicators is not currently available.

Chapter 662, Statutes of 2015 (AB 401), required the State Water Board to develop a

[266] Water Code section 525 requires every water purveyor to require, as a condition of new water service on and after January 1, 1992, that a water meter be installed on the water service facilities. Urban Water Suppliers, which is defined in Water Code section 10617 as a supplier providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, are required to install water meters on all municipal and industrial service connections within its service area by January 1, 2025. (Water Code, § 527.)

plan for funding and implementing a Low-Income Water Rate Assistance Program. The statewide plan is called: Recommendations for Implementation of a Statewide Low-Income Water Rate Assistance Program (AB 401 Report[267]) and it was submitted to the California Legislature on February 2020.

9.2 SOURCES OF REVENUE

9.2.1 Rates and Other Charges

Water rates make up most of a community water system's available revenue. The customer pays fixed costs or charges for being provided with a potable water supply through a water system in addition to the price of water served if the connection is metered. The fixed costs and charges can include connection fees, assessments, standby fees, and property taxes from which revenues are used by the utility to pay for annual operations, maintenance, and to repay debt.

9.2.2 Non-Rate Revenue

Some water systems have additional revenue collected via special assessments, surcharges, and taxes paid separately (e.g. property tax bill). Some systems derive revenues from income other than rates or assessments. For example, some systems can rent space on their water towers to cell phone companies. Some systems may be able to lease unutilized water rights to neighboring water systems. Although generally limited, these revenues are flexible and can be used for a variety of expenditures.

9.2.3 Sustainability of Revenue

A fundamental concern for all community water systems is whether current rate structures, along with any existing system reserves, are adequate to sustainably maintain the water system. In general, community water systems in California do not fund infrastructure replacement at a sufficient rate. This results in a growing gap between infrastructure needs and the revenues and reserves needed to pay for these needs.

While water rates generally provide a stable source of ongoing revenues for water systems, economically disadvantaged households may struggle to pay bills including water bills (directly, or via rent increases). Most large or medium-sized systems have a large customer base that includes many non-disadvantaged households, such that revenues are generally sustainable. In contrast, sustainability of revenue is often challenging for small systems serving disadvantaged communities. The affordability of water and water service shut-off for nonpayment are addressed later in this chapter.

9.2.4 Uses of Revenue

9.2.4.1 Ongoing Operational Costs

Water systems must continually spend their revenue to operate the system and provide

[267] Recommendations for Implementation of a Statewide Low-Income Water Rate Assistance Program https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/ab401_report.pdf

customers with safe and clean drinking water. These expenditures include operational costs, maintenance costs, capital costs, water quality monitoring costs, and cost of treatment of contaminated sources. In addition, some water systems must purchase water from wholesalers to meet their supply needs or pay fees associated with the provision of future water resources planning.

9.2.5 Replacement Costs

The physical infrastructure of water systems can be extensive and may include pipes, valves, treatment systems, wells, pumping plants, storage facilities, and other components. As the infrastructure deteriorates over time, it must be periodically replaced. Most system infrastructure components remain in service considerably past their expected life expectancy. Often, they are replaced only upon failure or unacceptable water quality or service, which tends to increase the total cost compared to when aging infrastructure is maintained and replaced proactively.

9.2.5.1 Debt Services

Systems often fund their capital improvements – such as for the replacement of aging infrastructure – through borrowing. In these cases, some larger systems may issue bonds, and many systems borrow from sources such as the Drinking Water State Revolving Fund. As a result, repayment of debt can be a significant source of expenditure for water systems.

Eligible water systems not regulated by the California Public Utilities Commission, which serve a severely disadvantaged community (SDAC), and have fewer than 200 service connections are deemed to have no ability to repay any financing for a project serving the SDAC (Chapter 680, Statutes of 2022 (SB 1188)). For these systems, the State Water Board may provide up to 100 percent grant funding, and principal forgiveness on loans, from the Safe Drinking Water State Revolving Fund. More information on financing available to water systems is detailed in Chapter 10.

9.2.5.2 Low-Income Rate Assistance Programs

Publicly-owned systems are subject to Proposition 218, which requires that property related fees for water services do not exceed the proportional cost of service attributable to the property and that the revenues derived from such fees not exceed the funds required to provide the property related service. Publicly-owned water systems struggle to reconcile the funding of Low-Income Rate Assistance (LIRA) programs by water rate revenues with these constitutional cost-of-service requirements and, as a result, instead fund LIRA programs from non-rate revenues. In practice, these limitations mean that only large publicly-owned systems with access to non-rate revenues, such as lease revenues or voluntary donations, and privately-owned systems, which are not subject to Propositions 218 or 26 (see Section 9.4.3), are able to provide some type of affordability assistance. The State Water Board recognizes the importance of such assistance programs to assure accessible water as part of the mandate of HR2W.

9.3 WATER SYSTEM COST FACTORS

Water costs vary significantly from system to system based on a variety of factors such as governance type, size, source of water, complexity and age of infrastructure, and local and geographical conditions.

9.3.1 Governance Types

As described in Chapter 2, community water systems (CWSs) can be either publicly- or privately-owned. Publicly-owned CWSs include cities, counties, and special districts. Privately-owned systems include investor-owned utilities regulated by the California Public Utilities Commission (CPUC), as well as other privately-owned systems. This group includes mutual water companies, mobile home parks, employee housing such as farmworker housing, apartments, condominium developments, and other facilities owned by individuals or partnerships, but not subject to most of the CPUC’s rate setting requirements.

System governance type is significant for several reasons, including the fact that publicly-owned systems are subject to constitutional requirements limiting their use of revenues, such as Proposition 218. As previously discussed, privately-owned systems’ rate structures are not subject to Proposition 218, so some use rate revenues to fund LIRA programs. Privately-owned systems regulated by the CPUC must go through the CPUC when setting water rates. Accordingly, the setting and approval of water rates will impact the ability for water systems to make needed and timely improvements.

9.3.2 System Size, Complexity and Age of Infrastructure

All systems incur costs for operators, energy, maintenance, monitoring and testing, etc. Large systems spread these costs over a greater number of customers while small systems have the same types of expenses but fewer customers. Therefore, small systems inherently lack economies of scale, as discussed further below and throughout this plan, which greatly impacts their sustainability. Large water systems need sources that provide higher capacities (typically surface water) and require large treatment and delivery systems consisting of miles and miles of pipelines to provide customer demands. Although these facilities have been designed and built to last for decades, they often are maintained past their useful life to defer large capital costs.

9.3.3 Source of Water

Variation in the water quality of a source and the type of treatment required impacts cost. Surface water sources typically require extensive treatment or can entail significant costs to purchase water from wholesalers. Groundwater sources may or may not require treatment, but they usually entail ongoing expenditure for electricity to operate and maintain pumps, as well as monitor water quality.

9.3.4 Geographic Location and Local and Regional Conditions

Geographic setting can have an outsized effect on water costs. Much of Southern California is classified as desert, whereas much of Northern California receives abundant rain and snowfall. Large aqueducts import surface water supplies from Northern California and the Eastern Sierras to the Central Valley and Southern California. Conveyance results in additional varying costs for these supplies.

Other geographic impacts include water quality variations, extreme weather conditions that must be accounted for in constructing and operating facilities, emergency response preparation, population densities, or subsurface geological obstructions. Anthropogenic and naturally occurring contaminants such as 1,2,3-trichloropropane and hexavalent chromium tend to be detected in specific regions of the state and require treatment that increases the cost of water in those areas (see Chapter 4).

9.4 RATE DESIGN

Establishing appropriate rates involves determining an equitable structure and obtaining approval, which varies between private entities and public agencies. Deferred maintenance results in higher water rates as maintenance work is delayed due to offsets in other areas of the budget, such as reserves. This leads to unplanned infrastructure or capital equipment failure and further exacerbates inadequate reserves (if there are such funds). The result can be significant rate increases over a short period of time that will probably be rejected by ratepayers not wanting to adopt such increases. To compensate for insufficient rates, water systems may need to rely on external financing to maintain their system.

9.4.1 Elements of Rate Design

Water systems need to factor in the requirements to meet fixed and variable costs of water in their rates. Variable costs are expenses that fluctuate based on the amount of water produced, such as energy and chemicals. Fixed costs are expenses incurred regardless of the production volume, such as employee salaries, and the costs to maintain, replace, or construct infrastructure, treatment facilities, and sources.

Water systems that use only variable rates can see the revenue from their rates fluctuate significantly due to factors such as conservation, rainfall or drought. Systems that set their rates to a combination of Flat Base Rate and Variable Usage Rates are better able to handle changes in consumption that impact revenues. The Flat Base Rate can address the fixed costs while the usage rates can address the variable costs.

Water systems have continued to develop a variety of rate structures to best meet their needs. The most common of these rate structures include the following:

1. Flat base rates: a flat rate usually based on pipe or meter size.
2. Variable base rates: a rate based on certain features and fees.
3. Uniform usage rate: a metered rate based on a uniform quantity charge for water.
4. Variable usage rate: a metered rate where the water rate charges are based on a “tiered rate,” with different rates for different ranges of consumption during a billing period.
5. Flat base rate and variable usage rate combination.

Some rate structures include other factors, such as additional charges for the energy required to lift water to homes in higher elevations or for larger lot sizes, which tend to have higher usage.

Note that most rate designs encourage conservation (numbers 2 through 5 above) and require customers to have meters. A lack of water meters prevents the water system from sending significant price signals to customers, resulting in less customer incentive to conserve water during droughts. As conservation becomes more prevalent, rates will have to increase to make up for the lower consumption.

9.4.2 Rate-Setting Process

There are two steps to the establishment of appropriate water rates. The first step involves determining a rate structure that will provide the necessary revenue in an equitable way. The second step involves gaining approval of the rate structure. The process for approving rate increases is different for private entities than for public agencies. Private entities may need to obtain approval from the California Public Utilities Commission. Public agencies must follow a public review and input process under Proposition 218. Gaining ratepayer acceptance through the public review process can be a challenge. Good communication, transparency, credibility, and trust are essential elements of the process.

9.4.3 Rate-Setting Process - Proposition 218

Both Proposition 218, which was approved by voters in 1996, and Proposition 26, approved by voters in 2010, impact the ways in which water systems may collect funds from ratepayers. Proposition 218 imposes substantive procedural restrictions on taxes, assessments, fees, and charges “assessed by any agency upon any parcel of property or upon any person as an incident of property ownership.” (Cal. Const., art. XIII D, § 3(a).) Under article XIII D of the California Constitution, the “fee or charge imposed upon any parcel or person as an incident of property ownership” must not “exceed the proportional cost of the service attributable to the parcel.” (Cal. Const., art. XIII D, § 4(a).) Proposition 218 also added article XIII C, which restricts the authority of local governments to impose taxes by requiring voter approval of all taxes.

In 2010, voters passed Proposition 26, which expanded the reach of article XIII C’s voter approval requirements by broadening the definition of “tax” to include “any levy, charge, or exaction of any kind imposed by a local government.” (Cal. Const., art. XIII C, § 1(e).) The definition contains numerous exceptions for charges or assessments, which generally implement pre-Proposition 26 case law that distinguishes between taxes and regulatory fees. (*City of San Buenaventura v. United Water Conservation District* (2017) 3 Cal.5th 1191, 1210, (quoting *Sinclair Paint Co. v. State Bd. Of Equalization* (1997) 15 Cal.4th 886, 874 that in general “taxes are imposed for revenue purposes, rather than in return for a specific benefit conferred or privilege granted.”)) In addition to falling into one of the exceptions to be exempt from the voter approval requirements, the government must also show that the amount of the charge is “no more than necessary to cover the reasonable costs of the governmental activity,” and “the manner in which those costs are allocated to a payor bear a fair or reasonable relationship to the payor’s burdens on, or benefits received from the governmental activity.” (Cal. Const., art. XIII C, §1(e).) Charges subject to Proposition 26 are not limited to those fees or charges imposed on parcels or persons “as an incident of property ownership.” (*City of San Buenaventura*, *supra,* 3 Cal.5th at p. 1208 [“not all fees associated with obtaining water are property-related fees within the meaning of article XIIID”].)

Under Proposition 218, “no local government may impose, extend, or increase any general tax unless and until that tax is submitted to the electorate and approved by a majority vote." (Cal. Const. art. XIII C, § 2(b).) Similarly, a two-thirds voter approval is required before a local government may "impose, extend, or increase any special tax." (Cal. Const. art. XIII C, §2 (d).) There are also voter approval requirements for property-related fees and charges; however, these voter approval requirements are not applicable to levying fees for water service. Section 6 of Article XIII expressly exempts water service charges from the voter-approval requirement for other property-related fees and charges. (Cal. Const., art. XIII D, § 6(c) ["Except for fees or charges for sewer, water, and refuse collection services, no property-related fee or charge shall be imposed or increased unless and until that fee or charge is submitted and approved by a majority vote of the property owners of the property subject to the fee or charge or, at the option of the agency, by a two-thirds vote of the electorate residing in the affected area"].) Instead, fees or charges for water service can be challenged by a majority protest procedure under Proposition 218, and by the initiative process (*Bighorn-Desert View Water Agency v. Verjil*, (2006) 39 Cal.4th 205; *Howard Jarvis Taxpayer Assoc. v. Amador Water Agency*, (2019) 36 Cal.App.5th 279 (as modified on denial of hearing); *Morgan v. Imperial Irrigation Dist.* (2014) 223 Cal.App.4th 892, 910 (holding that protest procedure required by Section 6 of Article XIII does not require each rate tier to have its own separate protest procedure).)

Passage of Proposition 218 has affected the steps the State Water Board takes to provide financial assistance to water systems for capital projects. Before the State Water Board enters into an agreement to fund a new treatment system, it ensures that the water system can pay for the ongoing operation and maintenance of the system, and when a loan is provided instead of a grant, that it has a sufficient source of income to pay back the loan. This could require that the system raise its fees. If a fee increase is needed, the State Water Board conditions funding on a water system's adoption of such fee increase. The court, in *Paradise Irrigation District v. Commission on State Mandates* (2019) 33 Cal.App.5th 174, noted a presumption that local voters give appropriate consideration and deference to a government board's judgments about the rate structure needed to ensure a public water agency's financial solvency, and that board members will give appropriate consideration and deference to the voters expressed wishes for affordable water service. There the court found that such an arrangement does not revoke water systems' legal authority to levy fees necessary to comport with state water laws but instead is a "power-sharing arrangement." (*Id.* at pp. 194-195.) Nonetheless, there have been situations where the fees have successfully been raised, only to later be rolled back by the initiative process.

In addition to challenges to rate increases by majority protest procedure, challenges to rates have also been based on the rate structure, arguing either that the rate exceeded what was necessary to fund the government activity or the costs were not proportional to the payor's burden on, or benefit from, the governmental activity. (See *Plantier v. Ramona Mun. Water Dist.* (2019) 7 Cal.5th 372 [finding that challenges based on proportionality requirement do not have to comply with administrative remedy in subdivision (a)(2) of section 6 for protest over imposition of increase in rates prior to filing suit].) For example, in *City of San Buenaventura*, *supra*, the California Supreme Court found that groundwater pumping charges imposed to fund a local agency's groundwater conservation and management services, such as replenishing groundwater stores and preventing the degradation of the groundwater supply, had to be both “no more than necessary to cover the reasonable costs of the governmental activity,” and “bear a fair or reasonable relationship to the payor’s burden on or benefit received from the governmental activity.” (3 Cal.5th at p. 1214; see also *City of Palmdale v. Palmdale Water District* (2011) 198 Cal.App.4th 926 [finding that Water District failed to demonstrate that its water rate structure met proportionality requirement because it charges few irrigation users vastly disproportionate share of Water District’s costs].)

These constraints on ratemaking impact water systems’ ability to create tiered rate structures that support conservation efforts or timely fund programs to assist low-income rate payers. The holding in *Capistrano Taxpayers Assn., Inc. v. City of San Juan Capistrano* (2015) 235 Cal.App.4th 1493 prohibits charging rates that do not reflect the actual cost of service. In that case, the court noted that although tiered rates that go up in relation to usage are consonant with Proposition 218, the tiers must correspond to actual costs of providing service at a given level of usage. (*Id*. at p. 1498.) Therefore, efforts to create low-income rate programs that charge some rate payers a higher amount for their water service to support other low-income rate payers that are low-income would be vulnerable to similar legal challenges. The court in *Capistrano Taxpayers Assn., Inc. v. City of San Juan Capistrano* (2015) 235 Cal.App.4th 1493, noted, however, that rates unrelated to the actual cost of service could be imposed, but they would have to be submitted to the electorate and approved by the people in a vote. “There is no reason, for example, why a water district or local government cannot, be consistent with Proposition 218, seek the approval of the voters to impose a tax on water over a given level of usage…” (*Id.* at p. 1515.)

In response to the challenges raised by these cases, the Legislature passed a series of bills in 2024 that attempt to reduce the vulnerability of public agencies setting water rates. For example, in response to the challenges raised by *Capistrano Taxpayers Assn.*, *supra,* 235 Cal.App.4th at p. 1498, the Legislature passed AB 1827 (Chapter 359, Statutes of 2024), which modified the Government Code to clarify that fees or charges for property-related water service may include the incrementally higher costs of water service due to specified factors. These factors include higher water usage demands, maximum potential water use, or projected peak water usage (or any combination of those factors), and allows the incrementally higher cost associated with those factors to be allocated using any method that reasonably assesses the water service provider’s cost of serving those parcels that are increasing potential water usage demand, maximum potential water use, or projected peak water usage.

In response to Howard Jarvis Taxpayers Assn. v. Coachella Valley Water District (2025) 108 Cal. App. 5th 485, 517-518 and Coziahr v. Otay Water Dist. (2024) 103 Cal. App. 5th 785, 823-825, which both held that refunds are available for water rates imposed in violation of Proposition 218, the Legislature passed SB 1072 (Chapter 323, Statutes of 2024) to address the difficulties imposed on water systems when having to provide refunds to ratepayers when their rates are found to not comply with the requirements of Proposition 218. The addition of Article 4.6.5 to the Government Code would relieve agencies from having to provide refunds for violations of Proposition 218 and allow a local agency to credit the amount of the fee or charge found to be in violation of

Proposition 218 against the amount of the revenues required to provide the property-related service, set in the next procedure to impost or increase the fee or change. In adopting SB 1072, the Legislature stated that the legislation furthers the purposes and intent of Proposition 218 by recognizing, in part, that “lawsuits seeking refunds for property-related service rate determinations threaten to compromise the financial stability of water and sewer and agencies and local governments providing property-related services and critical public services they provide.” (SB 1072, Chapter 323, Statutes of 2024.)

In response to the challenges posed by Plantier v. Ramona Mutual Water Dist., supra, 7 Cal.5th at p. 383, which allowed challenges based on proportionality without having to comply with protest requirements in section 6(a)(2) of article XIII C, prior to filing suit discussed above, the Legislature passed AB 2257 (Chapter 561, Statutes of 2024), which created an exhaustion of administrative remedies procedure. If a local agency chooses to implement the procedure, ratepayers would be required to bring objections regarding a proposed property-related water or sewer fee or charge to the local public agency’s attention as part of the rate or assessment consideration process, allowing the local agency to address or resolve objections before its governing body makes a final decision on whether to establish a new or amend a current property-related fee or special assessment pursuant to Proposition 218. If the local agency complies with the procedures, the court’s review in any judicial action to challenge the fee or assessment for failure to comply with Proposition 218 is limited to a record of proceedings containing specified documents.

9.5 INFRASTRUCTURE NEEDS/ASSET MANAGEMENT PLAN

Rates collected by water systems include any revenues to be set aside for future infrastructure and capital replacement reserves. The difference between current and projected reserves is one factor in determining funding gaps that may exist for infrastructure replacement. The second major factor in evaluating the adequacy of reserves is having accurate information on the current inventory of a system’s physical facilities and their expected lifespan. These two factors provide the basis for an asset management plan.

California does not currently have a regulatory requirement for public water systems to develop asset management plans while other states require such plans. Ohio adopted a requirement, effective 2018, that all public water systems have asset management plans. However, in 2024, the Legislature passed SB 1188 (Stats. 2024, Ch. 507, Sec. 1), requiring the State Water Board to develop minimum standards related to the technical, managerial, and financial (TMF) capacity of community water systems serving fewer than 10,000 people or 3,300 service connections and non-transient non-community water systems that serve K-12 schools, including “revenue sufficiency, including adequate financial reserves to plan, operate, maintain, and restore or replace the system’s water infrastructure as it reaches the end of its useful life.” (HSC § 116600, subd. (a)(6).)

9.5.1 National Infrastructure Needs Survey

To estimate national infrastructure needs, the United States Environmental Protection

Agency (USEPA) conducts the Drinking Water Infrastructure Needs Survey and Assessment (DWINSA) every four years. The USEPA DWINSA provides the best available information on the national needs of community water systems to meet the requirements of the Safe Drinking Water Act. This survey is not designed to include other infrastructure needs such as system expansion and upgrades that are not directly related to meeting Safe Drinking Water Act requirements.

The 20-year national infrastructure need for states (including territories, Puerto Rico, and the District of Columbia) estimated by the 7th DWINSA is $625 billion. This is a 32% increase over the 6th DWINSA ($472.6 billion, in January 2015 dollars). Accounting for inflation, this is a 14% increase in need over the adjusted 6th DWINSA ($546.6 billion, in January 2021 dollars). California's statewide 20-Year need is shown in Table 9-1 by project category. During the last 30 years of the survey the need of California water systems has increased 4.4 times, and the national need has increased 2.5 times, illustrating the ever-increasing cost of replacing aging infrastructure needed for ongoing water system operations and maintenance.

Table 9-1: California 20-Year Need by Project Category in Billions (January 2021 dollars)

Project Category	Total Need
Distribution/Transmission	$55.7
Treatment	$13.6
Storage	$9.2
Source	$3.6
Other	$1.4
TOTAL:	**$83.5**

9.5.2 State Water Board Cost Assessment of Failing/At-Risk Systems

The State Water Board conducted three Cost Assessments, in 2021, 2022 and lastly in 2024. Compared to the statewide need evaluated by the Division of Financial Assistance (DFA) and the EPA in DWINSA, summarized above, Division of Drinking Water's (DDW) Cost Assessment estimates the needs for the subsection of communities served by only the Failing and At-Risk water systems. The 2024 Cost Assessment estimated the 5-year funding needs for modeled long-term and interim solutions for Failing and At-Risk public water systems is approximately $6.6 billion and $4.9 billion for high-risk state small water systems and domestic wells. The 2024 Drinking Water Needs and Cost Assessment is discussed in Chapter 8[268].

Given aging infrastructure and the increase in the number of regulated contaminants, water systems must ensure their water rates reflect the true cost of water, and they

[268] 2024 Drinking Water Needs Assessment https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024-needs-assessment.pdf

clearly communicate this information to their communities. Financial planning should include asset management plans and the ability to increase rates to replace those assets as required, as well as provide adequate reserves. If the needed rate structures are unaffordable for some portion of the population, then finding ways to expand rate bases or decreasing overhead through water partnerships or low-income assistance may be necessary. Good water system governance decisions can only occur when water system governing entities and management have a full understanding of the financial status of the water system and are actively addressing such needs of their water system.

9.6 WATER RATES / RATE SURVEYS

The State Water Board began requiring the submission of average monthly residential customer charges for 6 HCF[269] in the 2019 electronic Annual Report (eAR).[270] Figure 9-1 illustrates the trends in customer charges since this requirement went into effect. It is important to note that many water systems struggled to submit data of customer charges for the 2020 reporting year, which may have contributed to the difference between average charges data from 2019 to 2020.

Table 9-2 summarizes 2022 average residential customer charges by system size. On average, smaller community water systems charge more for the same volume of water when compared to medium and large community water systems, and when compared to the statewide average (Figure 9-1). In general, there was a steady increase in drinking water customer charges for all system sizes between 2020 and 2022. Small community water system drinking water charges have been increasing at an average rate of $2.08 per year. Medium community water system drinking water charges decreased $0.47 between 2020 and 2021 and increased by $5.32 between 2021 and 2022. Large system drinking water customer charges increased by $4.09 between 2020 and 2021, then increased again by $0.17 in 2022. Statewide average drinking water customer charges have been steadily increasing at an average rate of $2.39 per year since 2020.

Table 9-2: 2022 Average Monthly Residential Customer Charges for 6 HCF by Community Water System Size

System Size	Total Systems	Average Customer Charges for 6 HCF
Large[271]	91	$41.85
Medium[272]	334	$50.60

[269] Hundred cubic feet (HCF). 6 HCF is the average monthly customer volumetric usage estimated from this data. Six HCF indoor water usage per month is roughly equivalent to 50 gallons per person per day for a three-person household for 30 days.

[270] Electronic Annual Report: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html

[271] serves: at least 30,001 service connections, or a population of 100,001.

[272] serves: between 3,001 and 300,000 service connections; and up to 100,000 population.

System Size	Total Systems	Average Customer Charges for 6 HCF
Small[273]	2,412	$74.23
STATEWIDE:	**3,202**	**$69.09**
K-12 schools and systems that do not charge for water or missing charge data	*1,268*	

Figure 9-1: Average Monthly Residential Customer Charges

Table 9-3 and Table 9-4 summarize the 2022 average customer charges collected from water systems by disadvantaged community and SAFER status, respectively.[274] Since 2020, when the State Water Board began requiring the annual reporting of this data, drinking water customer charges have been increasing annually (Figure 9-2). On average non-disadvantaged community systems have higher drinking water customer charges than disadvantaged community (DAC) or SDAC systems, as well as the statewide average. Non-DAC systems have been increasing their drinking water customer charges for 6 HCF by $4.04 per year since 2020. DAC/SDAC water systems' drinking water charges for 6 HCF have been increasing by $1.14 per year since 2020. The statewide average has also seen an increase from 2020 to 2022 of approximately $2.39 per year.

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273 serves: 3,000 or less service connections.

274 Collected in the 2022 reporting year eAR.

Table 9-3: 2022 Average Monthly Residential Customer Charges by DAC/SDAC Status

Community Status	Total Systems	Average Customer Charges for 6 HCF
DAC/SDAC	1,635	$60.36
Non-DAC	1,505	$76.65
Missing DAC Status[275]	62	$70.08
STATEWIDE:	**3,202**	**$69.09**
Community water systems & K-12 schools that do not charge for water or missing charge data	*1,268*	--

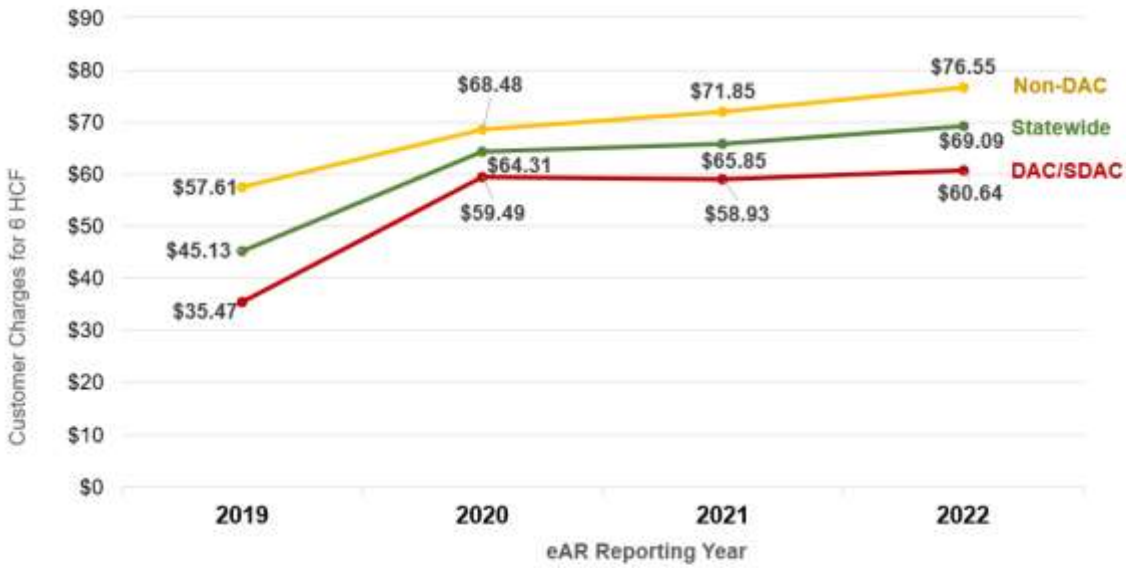
Table 9-4: 2022 Average Monthly Residential Customer Charges by SAFER Status

SAFER Program Status[276]	Total Systems	Average Customer Charges for 6 HCF
Failing Systems	**384**	**$75.09**
Failing DAC/SDAC	234	$68.71
At-Risk Systems	**612**	**$89.66**
At-Risk DAC/SDAC	421	$77.70
Potentially At-Risk Systems	**440**	**$76.97**
Potentially At-Risk DAC/SDAC	264	$59.48
Not At-Risk System	**1,615**	**$62.36**
Not At-Risk System DAC/SDAC	678	$51.18
Not Assessed	**151**	**$45.54**
Not Assessed System DAC/SDAC	38	$44.81
STATEWIDE:	**3,202**	**$69.09**
Community water systems & K-12 schools that Do Not Charge for Water or Missing Charge Data	*1,268*	--

[275] Missing DAC Status refers to the list of systems that were included in the Affordability Assessment but lacked data necessary to calculate their MHI to determine their DAC status.

[276] Water systems that are not DAC/SDAC or are missing DAC status designations are excluded from sub-categories within this table.

Figure 9-2: Average Monthly Residential Customer Charges for 6 HCF Over Time by DAC Status



9.6.1 Average Rates and Current Trends

There are many factors for the variance in water rates locally, regionally and across the state. In addition, there are factors that contribute to the overall increasing cost of water. Some of the major factors include:

- Increases in cost associated with producing water such as electricity, chemicals, etc.
- Court action regarding water allocations of Colorado River waters resulting in a decrease in California's allotment has required utilities throughout Southern California to switch to more costly sources of water and to promote water conservation measures.
- Costs associated with replacing infrastructure brought into service 25 to 75 years ago (distribution pipes, storage tanks, treatment plants, wells, etc.), and now reaching the end of their useful life.
- Improved drinking water standards have caused many water systems to add treatment facilities, increase treatment chemical use, or improve their existing treatment facilities. Many also incur costs related to handling treatment residuals.
- Local water shortages and cyclical drought conditions trigger the need to develop additional sources of supply.
- Increases in demand and infrastructure replacement reserve needs associated with population growth and expanded service areas such as to serve new housing.
- Personnel costs from salary adjustments and increases in costs related to health benefits.

Regulations established at both the state and federal level have required increased monitoring of chemical and microbial contaminants. Improved analytical methodologies have allowed for the detection of chemicals at much lower concentrations and identified new microorganisms of health concern. These improved methods require more sophisticated instrumentation and result in increased monitoring cost.

9.6.2 Water Rates - External Factors

9.6.2.1 Wholesale Prices

As California's water supplies are increasingly strained, the wholesale price of water increases and systems pass this added expense along to their customers.

9.6.2.2 Drought/Climate Change

Climate change is causing an increased frequency of droughts in California. Water conservation and drought affect water rates, particularly under variable water rate structures. There are both direct and indirect costs associated with water conservation and drought. While water conservation conserves a scarce resource -- whether in response to state mandates, drought, or climate change -- it also reduces water sales and revenues in systems with metered rates, usually at a level that is not directly proportional to a corresponding reduction to the costs of providing service. The tiered/inclined rate structures increasingly used by water systems (lower rates for less consumption) tend to reduce revenues. Conservation can result in a utility's need to raise metered rates to cover fixed costs that are not directly related to the volume of water used by customers.

9.6.2.3 Other Impacts

The COVID-19 pandemic had numerous impacts, including financially affecting water systems. Historically, water systems may stop providing water services for non-payment; however, on April 2, 2020, the Governor issued Executive Order N-42-20 prohibiting shut-offs of water service to residences and critical infrastructure sector small businesses for non-payment. Due to the pandemic, some customers were not able to pay their water bill, thereby reducing the amount of revenues water systems received to cover expenses. In 2021, the State Water Board begin collecting data on water system finances and household water bill debt accumulation as part of the Executive Order related the California Extended Water and Wastewater Arrearage Payment Program.[277] The Arrearages Program provided relief to community water and wastewater systems for unpaid bills related to the COVID-19 pandemic funded thorough $985 in federal funding allocated by the Legislature. However, the information was from a limited sample size and time range as well as suffered from limited data submission rates, so analysis was not conducted. Subsequently however, the collection of this data was incorporated into the water system's Electronic Annual Reports (eAR) to better understand the financial status of water systems statewide. Water system financial data submission has been incomplete and will be coordinated with the Needs Assessment

[277] California Extended Water and Wastewater Arrearage Payment Program https://www.waterboards.ca.gov/arrearage_payment_program/

efforts as well as future TMF capacity regulations required under SB 1188. The regulations will set the frame work for DDW to assess SAFER system status (i.e. Failing or At-risk of Failing, etc.) based on these pending TMF requirements.

9.6.3 Infrastructure Replacement and Improvement

In many systems, water rates have been kept low by deferring expenditures for needed maintenance and replacement of water treatment facilities and distribution systems. This has resulted in systems facing the outsized replacement needs of outdated or severely deteriorated infrastructure such as leaking mains and deficient storage capacity. As growth related demands and associated costs increase so does the need to fund additional source capacity and the planned replacement of newly installed infrastructure needed to serve new development or consolidated service areas.

9.6.4 Small Water System Considerations

Smaller water systems currently have some of the highest water rates in the state, yet their rate structures are often inadequate to maintain the system and meet new drinking water standards. Although the current cost of water is higher in smaller water systems than in larger water systems, this does not equate to better quality water or service. In most cases, small systems are in poor physical condition, which results in a higher rate of noncompliance. Consequently, customers of smaller water systems are paying higher per-customer costs for systems lacking in quality and sustainability.

If small- to medium-sized systems continue to charge insufficient water rates, noncompliance will rise due to a failure to plan for and implement rate structure changes to replace deteriorating infrastructure without significant outside financial help. Without a rapid reassessment of the adequacy of existing water rates, almost all water systems in California will be faced with source, quality, storage, and distribution issues that impact the ability to provide safe water.

9.6.5 Project Financing, Consolidation, and Water Rates

Consolidation is discussed extensively in Chapter 8 as the combining of two systems. Each consolidation project is as complex as the multiple systems that are involved. Nevertheless, consolidation is typically selected as the most economical long-term solution to address many small water systems needs because the water rates that have historically been charged by the smaller subsumed water system have been artificially and thus unsustainably low. In many circumstances, such low rates have resulted in years or decades of deferred maintenance. This precarious economic situation has led to many Failing systems or being determined to be At-Risk of failing as discussed in Chapter 8. As discussed throughout this plan, smaller water systems lack the economies of scale to charge sufficient rates needed to operate and maintain their systems when compared to larger systems. The data presented in Section 9.6 indicates that on average small systems have higher rates than larger systems, yet these smaller systems are at a higher risk of failing than a larger system that is more likely to have the TMF capacity needed to address compliance issues, access needed project financing, or to consolidate a smaller failing system.

Water rate affordability and sustainability is part of the alternative analysis for any State Water Board DFA funded project. As part of providing funding assistance for any improvement project, including consolidation, DFA analyzes each funding applicants water rates to confirm ability to operate and maintain the improvements over the life of the project, typically 20 years. Barring special circumstances, DFA will not prioritize grant funds for non-consolidation project alternatives if such financial analysis is incomplete, shows that the water system charges insufficient rates, or shows that consolidation is economically viable and the most sustainable long-term solution for the subsumed water system. Furthermore, in many instances consolidation may require improvements within the subsumed systems service area that the subsumed system needs anyway and would be unable to afford on their own regardless of consolidation being the selected project alternative to address an acute compliance problem.

A frequent barrier to consolidation (and many improvement projects) is consumer concern that following consolidation (or project implementation), the subsumed system's customers may face higher water rates than the previously unsustainable rates the subsumed system had been charging. In some instances, this result is the unavoidable price of compliant water. Conversely, the subsumed system customers may pay lower rates due to the new economies of scale afforded by consolidating with a larger water system that has a larger and sustainable rate base capable of delivering reliable and compliant water. Ultimately, a low water rate at a small water system may signal an unsustainable financial situation and risk of pending failure. The State Water Board has identified consolidation as a critical tool to uphold the mandate of HR2W.

9.6.6 Future Trends in Water Rates

The water industry has experience with the challenges of accurately forecasting revenue as water rates are adjusted. During the drought years of 2014 through 2016, many water systems in California adopted water rate increases and surcharges designed in part to encourage conservation. In some cases, these higher rates resulted in lower overall revenue than projected, due to decreased demand. Water systems have learned that adjusting water rates can have unanticipated impacts on actual revenues.

Based on factors such as more stringent regulations, increased costs of treatment, climate change, water conservation, location of water sources, and deteriorating infrastructure, the future cost of providing drinking water can be expected to increase beyond the general inflation rate. Water utilities are primarily governed on a local level; therefore, rates are based on factors specific to each water system, such as water availability, size, water quality issues, and local source conditions.

In general, large water systems and most medium water systems will be able to deal with these cost increases given their economies of scale. However, for small water systems, particularly those that serve disadvantaged communities, the increasing costs may be insurmountable. Although eligible small water systems may receive financial assistance for capital improvements through grants and loans, and potentially for operations and maintenance from the Direct Operation and Maintenance Funding Program, these are not long-term solutions, as funding may not be available long-term. Systems need to develop and maintain the TMF capacity to design, operate and maintain the system, particularly sophisticated treatment facilities. In general, many small water systems are not viable in California and consolidation and regionalization may be the only sustainable solution.

9.7 AFFORDABILITY OF WATER

9.7.1 Human Right to Water Considerations

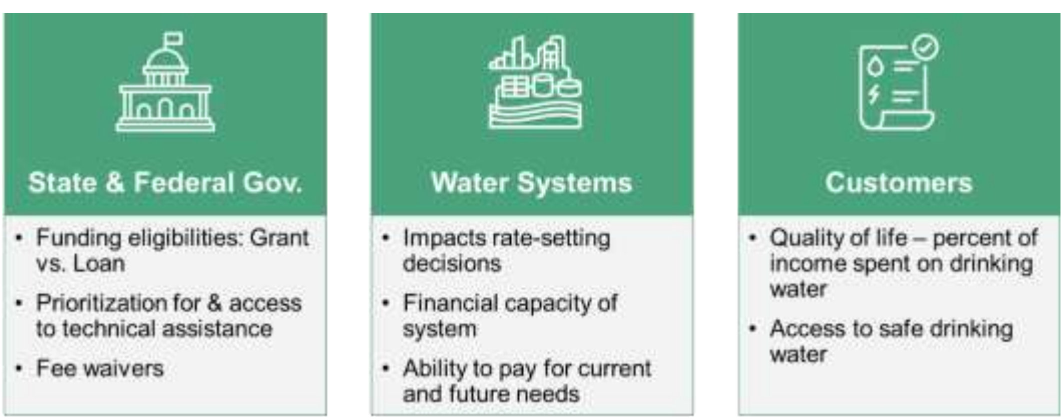
Ensuring that drinking water is affordable is crucial to meeting California's Human Right to Water mandate. The COVID-related economic crisis magnified the need to address drinking water affordability for households as well as drinking water systems that require financial viability to provide a safe and reliable drinking water supply.[278]

Since 2021 as part of the legislative requirement for the SAFER FEP, the State Water Board has conducted annual Affordability Assessments, as part of the Drinking Water Needs Assessment, to identify disadvantaged community water systems and non-transient non-community water systems that serve K-12 schools that have customer charges that exceed the affordability threshold established by the State Water Board in order to meet state and federal drinking water standards.[279] Nothing in section 116769 defines what the Affordability Threshold should be. Nor is there specific guidance on how the State Water Board should be assessing the Affordability Threshold. Accordingly, this section describes the affordability assessment criteria developed by the State Water Board in the Needs Assessment.

9.7.2 Why Measuring Affordability Matters

Drinking water affordability is difficult to measure. Different terms and metrics have been used to describe and measure affordability in the water sector and have been used to influence important decisions. For instance, affordability metrics are used to determine which water systems are eligible for state and federal assistance. Water systems meeting certain affordability thresholds qualify for grants (as opposed to loan funding) for infrastructure projects and may be prioritized for state and federal technical assistance.

Figure 9-3: Why Measuring Affordability Matters



Affordability metrics are often used by water systems when exploring possible rate changes. Systems serving communities with affordability challenges often struggle to

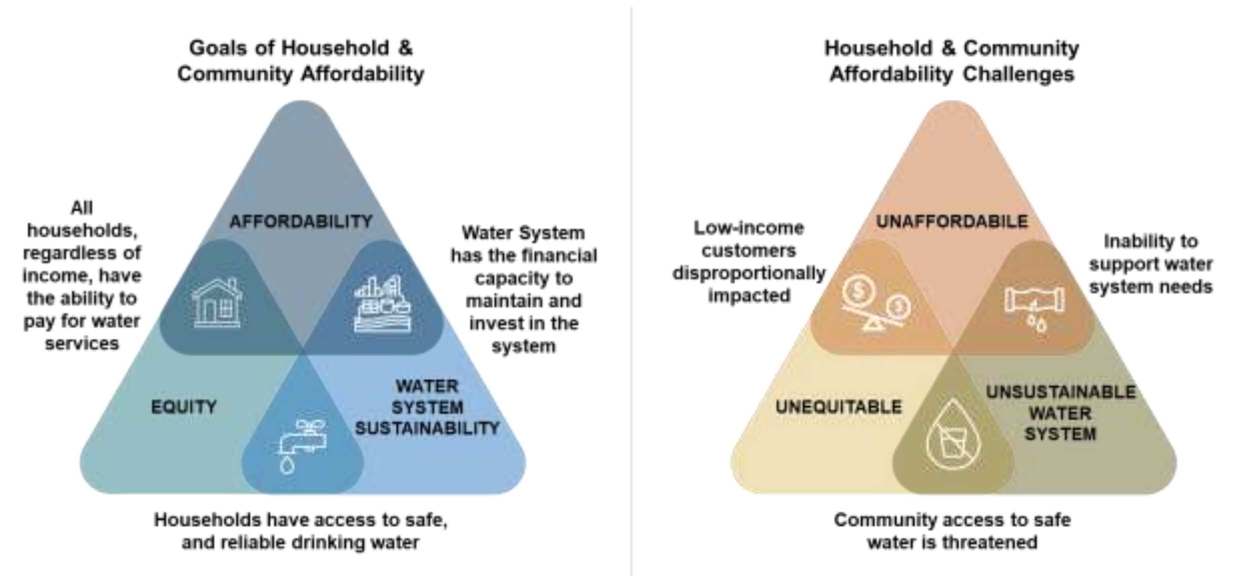
[278] Drinking Water COVID-19 Financial Impacts Survey https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/covid-19watersystemsurvey.html

[279] California Health and Safety Code, § 116769, subd. (a)(2)(B)

raise their rates, affecting their long-term financial capacity. Customers unable to pay for water services may experience challenges in accessing a reliable source of safe drinking water.

It is important to assess the affordability of drinking water services because issues surrounding equity and water system sustainability overlap various aspects of addressing affordability challenges to ensure that all Californians have access to safe drinking water. Figure 9-4 illustrates this relationship and the potential consequences of inaction.

Figure 9-4: The Relationship Between Affordability, Equity and Water System Sustainability



9.7.3 Defining Affordability

To better navigate the different metrics and approaches used to measure affordability, Figure 9-5 illustrates the nexus between types of affordability.

Figure 9-5: Nexus of Affordability Definitions

Household Affordability: The ability of individual households to pay for an adequate supply of water. Metrics to measure household affordability are not included in either the Affordability Assessment or Risk Assessment due to limited data availability.

(1) Community Affordability: The ability of households within a community to pay for water services with the effect of financially supporting a resilient water system. Metrics used to measure community affordability are included in both the Affordability Assessment and Risk Assessment.

(2) & (4) Water System Financial Capacity: The ability of a water system to financially meet current and future operational and infrastructure needs to deliver safe drinking water. The financial capacity of water systems affects future rate increases, impacting households. A water system's inability to provide adequate services may require households served by the system to rely on expensive alternatives such as bottled water for drinking water, even while still paying their monthly bills. Metrics measuring the financial capacity of water systems are included in the Risk Assessment only.

9.7.4 Disadvantaged Communities & the Affordability Assessment

The purpose of the Affordability Assessment is to identify disadvantaged community water systems that have instituted customer charges that exceed the Affordability Threshold. The State Water Board distinguishes two types of disadvantaged communities based on American Community Survey (ACS) income data:

Disadvantaged Community (DAC): the entire service area of a community water system, or a community therein, in which the median household income is less than 80% ($73,524) of the statewide annual median household income level.[280]

Severely Disadvantaged Community (SDAC): the entire service area of a community water system, or a community therein, in which the median household income is less than 60% ($55,143) of the statewide median household income.[281]

DAC status is determined by comparing a system's median household income (MHI) to California's statewide median income.[282] The methodology for deriving a system's MHI is described in Appendix: Affordability Assessment Methodology, an appendix to the 2024 Needs Assessment discussed in section 9.7.5, below.[283] In general, MHI is calculated by intersecting California block group[284] boundaries joined with ACS derived

[280] Health & Saf. Code, § 116275, subd. (aa).

[281] Water Code § 13476, subd. (j)

[282] $91,905, based on 2018-2022 ACS data, U.S. Census Bureau Quick Facts: California https://www.census.gov/quickfacts/fact/table/CA/INC110222

[283] Appendix: Affordability Assessment Methodology https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024affordabilityassessment-metodology.pdf

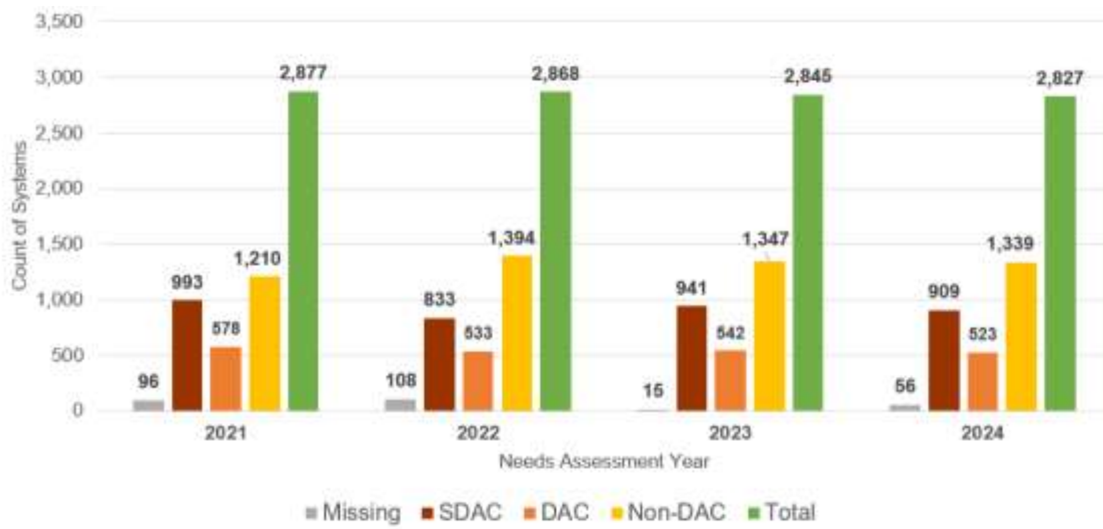
[284] A block group is the smallest unit for which the U.S. Census Bureau reports a full range of demographic statistics.

MHI data, with the service area boundaries[285] of water systems across the state.

Through previous iterations of the Needs Assessment (2019, 2020, 2021, 2022), the total number of DAC and SDAC systems has fluctuated, but overall decreased on average by 34 systems per year.

For the purposes of discussing the Affordability Assessment, this section highlights and compares affordability challenges for DAC/SDAC water systems as well as non-DAC systems.

Figure 9-6: Count of Community Water System by DAC Status[286]



9.7.5 Affordability Indicators

The following are brief descriptions of the affordability indicators utilized in the 2024 Affordability Assessment. Additional details on data sources, calculation methodologies, and thresholds are detailed in Appendix: Affordability Assessment Methodology.[287]

%MHI: This indicator measures annual system-wide average residential customer charges for six Hundred Cubic Feet (HCF) per month relative to the annual MHI within a water system's service area. Six HCF indoor water usage per month is roughly equivalent to 50 gallons per person per day for a three-person household for 30 days.

%MHI has been commonly used by state and federal regulatory agencies and by water industry stakeholders for assessing community-wide water charges affordability for

[285] Geographic area that a water system physically delivers drinking water and provides drinking water services to.

[286] DAC status is based on MHI from the ACS; Each year of the Needs Assessment utilized the most recent 5 Year Estimate MHI ACS data set at the time: 2021 DAC determinations were based on 2019 ACS data, 2022 based on 2020 ACS data, 2023 based on 2021 ACS data, and 2024 is based on 2022 ACS data.

[287] Appendix: Affordability Assessment Methodology https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024affordabilityassessment-metodology.pdf

decades. The State Water Board uses MHI to determine DAC status[288] and in the past used the 1.5% MHI threshold in the Drinking Water State Revolving Fund (DWSRF) program as a metric for evaluating eligibility of a small DAC receiving repayable (loan) or non-repayable (e.g., grant or non-repayable) funding. Annual water bills based on the baseline of six HCF per month that are 1.5% of community MHI or greater is the threshold for %MHI indicator.

Extreme Water Bill: This indicator measures drinking water customer charges that meet or exceed 150% ($103.64) and 200% ($138.18) of statewide average drinking water customer charges at the six HCF level of consumption ($69.09). The affordability thresholds utilized for this indicator are 150% and 200% of the state average drinking water bill for six HCF.

Household Socioeconomic Burden: The purpose of this risk indicator is to identify water systems that serve communities that have both high levels of poverty and high housing costs for low-income households. These communities may be struggling to pay their current water bill and may have a difficult time shouldering future customer charge increases when their limited disposable income is constrained by high housing costs. This indicator is a composite indicator of two data points: Poverty Prevalence and Housing Burden.

- **Poverty Prevalence** measures the percent of the population living below two times the federal poverty level and can be represented reliably at the census block group, tract, and county level.
- **Housing Burden Indicator** measures the percent of households in a census tract that are both low income (making less than 80% of the Housing and Urban Development (HUD) Area Median Family Income) and severely burdened by housing costs (paying greater than 50% of their income to housing costs).

9.8 AFFORDABILITY ASSESSMENT RESULTS

9.8.1 Affordability Results by Community Economic Status

For the 2024 Affordability Assessment, State Water Board staff analyzed 2,837 community water systems and 365 non-transient non-community K-12 schools (3,202 total), of which approximately five water systems lacked the data necessary to calculate any of the three affordability indicators.[289] Water systems that had partial data for some, but not all, of the affordability indicators were included in the analysis and are summarized in

Table .

Overall, comparing the three affordability indicators in cases where data was available,

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[288] It is important to note that the estimated designation of community economic status is for the purposes of the Affordability Assessment only and will not be used by the State Water Board's Division of Financial Assistance (DFA) to make funding decisions. MHI analysis on a per system basis is conducted by DFA when a system seeks financial assistance.

[289] Attachment: Affordability Assessment Results Spreadsheet https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024affordability.xlsx

more communities exceed the affordability threshold for ‘Household Socioeconomic Burden’ (56%) than the affordability threshold for ‘%MHI’ (13%). For instance, a community has a high poverty level, and a high portion of low-income community income is used for housing (exceeds Household Socioeconomic Burden threshold), but average annual community water bills may be less than 1.5 times the communitywide MHI (does not exceed %MHI threshold.) Nonetheless, the water bill of these communities may be unaffordable at a household level. Of those that exceeded the affordability threshold for ‘Household Socioeconomic Burden, most of them are DAC/SDAC water systems (79%). Table 9-5 summarizes the number of water systems, by their community economic status, that exceeded the minimum affordability threshold for each indicator assessed.

Table 9-5: Number of Systems Exceeding Affordability Thresholds

Community Status	Total Systems	%MHI	Extreme Water Bill	Household Socioeconomic Burden
DAC/SDAC	1,635	325 (20%)	84 (5%)	1,295 (79%)
Non-DAC	1,505	98 (7%)	197 (13%)	448 (30%)
Missing DAC Status[290]	62	0 (0%)	3 (5%)	42 (68%)
TOTAL:	**3,202**	**423 (13%)**	**284 (9%)**	**1,785 (56%)**
Missing Data[291]		*593 (19%)*	567 (18%)	6 (1%)
Not Applicable[292]		702 (22%)	702 (22%)	0 (0%)

To assess which systems may be facing the greatest affordability burden, the State Water Board further analyzed how many water systems exceeded thresholds for multiple affordability indicators. Affordability burden is ranked from low (only one affordability indicator threshold exceeded), medium (two affordability indicator thresholds exceeded), or high (three affordability indicator thresholds exceeded) (Table 9-6). Of the 3,202 water systems analyzed, 63% exceed affordability thresholds, 50% have a low affordability burden, 10% a medium affordability burden, 3% have a high affordability burden, and 22% did not exceed any of the thresholds. The remaining ~16% of systems were not able to be evaluated for at least one indicator due to not charging water rates or due to missing information. Overall, there is a higher proportion of DAC/SDAC systems that have a high or medium affordability burden compared to non-DAC and missing DAC status systems.

290 Missing DAC Status refers to the list of systems that were included in the affordability assessment but lacked data necessary to calculate their MHI to determine their DAC status.

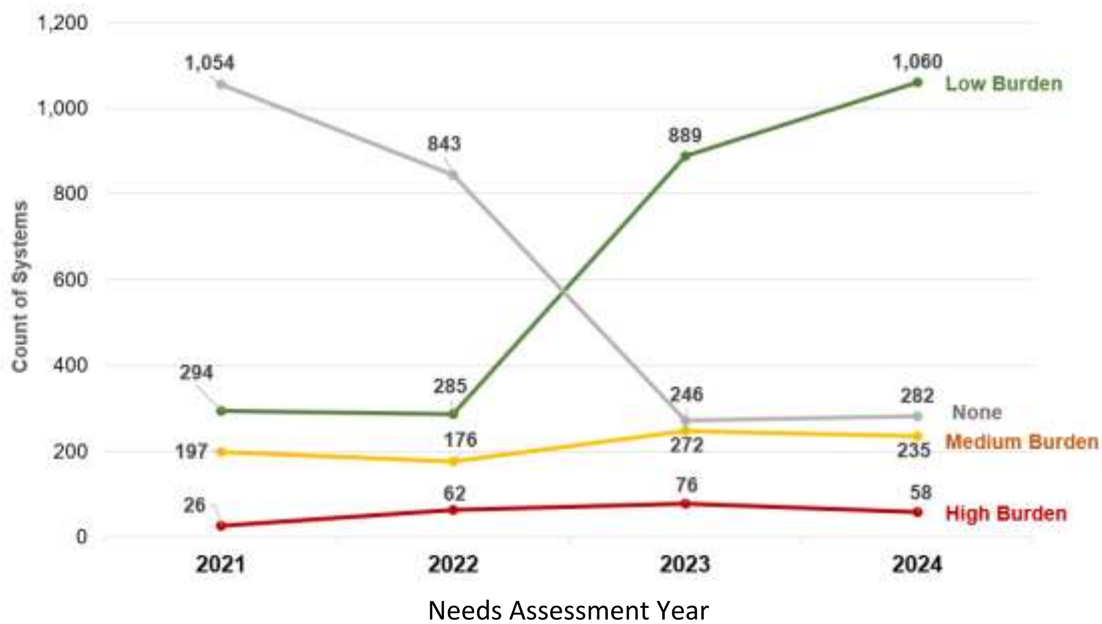
291 Missing data: %MHI; lacked water rates data, lacked data to calculate MHI; Extreme Water Rates, lacked data on water rate charges, water rate was outside of $5-$500 range.

292 Not applicable refers to systems who did not qualify to meet an indicator threshold: % MHI, systems who did not charge for water; Extreme Water Bill, systems that did not charge for water.

Table 9-6: 2024 Affordability Assessment Results

Community Status	Systems Assessed	High Burden[293]	Medium Burden[294]	Low Burden[295]	None
DAC/SDAC	1,635	58 (4%)	235 (14%)	1,060 (65%)	282 (17%)
Non-DAC	1,505	36 (2%)	73 (5%)	489 (32%)	907 (60%)
Missing DAC Status	62	0 (0%)	3 (5%)	39 (63%)	20 (32%)
TOTAL:	**3,202**	**94 (3%)**	**311 (10%)**	**1,588 (50%)**	**1,209 (38%)**

Figure 9-7: Affordability Assessment Results for DAC Systems[296]



[293] Community water system met or exceeded the minimum threshold for 3 of the affordability indicators.

[294] Community water system met or exceeded the minimum threshold for 2 of the affordability indicators.

[295] Community water system met or exceeded the minimum threshold for 1 of the affordability indicators.

[296] In 2023, the State Water Board added Household Socioeconomic Burden to the Affordability Assessment. The inclusion of this new affordability indicator helped measure affordability for systems in previous years that had no data because they do not charge customers directly for water. Therefore, more systems went from "None" to "Low Burden."

Figure 9-8: Top Eleven Counties with the Most "High Affordability Burden" DAC/SDAC Systems

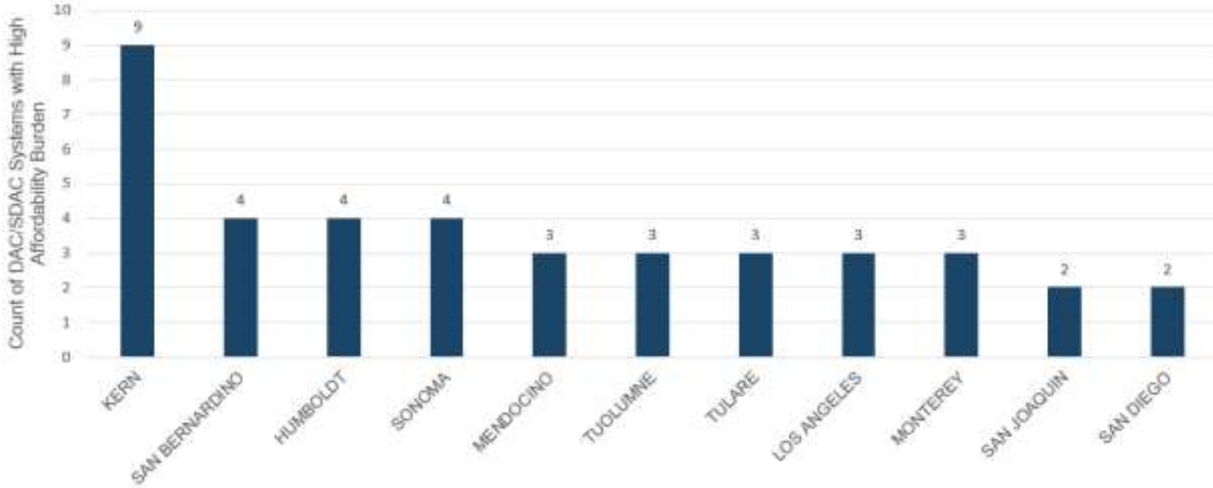


Table 9-7: Affordability Assessment Results for Top Eleven Counties with Most "High Affordability Burden" DAC/SDAC Systems

County	Total DAC Systems Assessed	High Affordability Burden[297]	Medium Affordability Burden[298]	Low Affordability Burden[299]	None
Kern	125	9	47	57	12
San Bernardino	103	4	18	70	11
Humboldt	44	4	10	21	9
Sonoma	38	4	5	22	7
Mendocino	46	3	8	27	8
Tuolumne	37	3	5	15	14
Tulare	96	3	17	71	5
Los Angeles	84	3	7	69	5
Monterey	45	3	3	30	9
San Joaquin	54	2	4	38	10
San Diego	32	2	4	22	4
TOTAL:	**704**	**40**	**128**	**442**	**94**

[297] Community water system met the minimum threshold for 3 of the affordability indicators.

[298] Community water system met the minimum threshold for 2 of the affordability indicators.

[299] Community water system met the minimum threshold for 1 of the affordability indicators.

9.8.2 Affordability Results by Water System SAFER Program Status

While SB 200 only mandates the identification of DAC/SDAC water systems that have customer charges that exceed affordability thresholds, the 2024 Affordability Assessment also identified the total number of Failing and At-Risk public water systems exceeding affordability thresholds. Table 9-8 and the section below summarizes the number of Failing and At-Risk water systems, by their community economic status, that exceeded the minimum affordability threshold for each affordability indicator assessed.

According to the analysis, At-Risk DAC/SDAC systems had the highest percentage of systems exceeding %MHI affordability threshold compared to any other category at 27%. For Extreme Water Bill, At-Risk systems were the highest at 13%. Finally, for Household Socioeconomic Burden, At-Risk DAC/SDAC systems had the highest again at 86%.

Table 9-8: SAFER Program Status for Water Systems that Exceeded Aggregated Affordability Assessment

SAFER Program Status[300]	Total Systems	%MHI	Extreme Water Bill	Household Socioeconomic Burden
Failing Systems	**384**	**68 (18%)**	**37 (10%)**	**236 (61%)**
DAC/SDAC	234	60 (26%)	16 (7%)	191 (82%)
At-Risk Systems	**612**	**148 (24%)**	**80 (13%)**	**455 (74%)**
DAC/SDAC	421	113 (27%)	35 (8%)	364 (86%)
Potentially At-Risk Systems	**440**	**90 (20%)**	**42 (10%)**	**293 (67%)**
DAC/SDAC	264	67 (25%)	13 (5%)	225 (85%)
Not At-Risk System	**1,615**	**114 (7%)**	**122 (8%)**	**716 (44%)**
DAC/SDAC	678	83 (12%)	19 (3%)	485 (71%)
Not Assessed	**151**	**3 (2%)**	**3 (2%)**	**85 (56%)**
DAC/SDAC	39	2 (5%)	1 (3%)	30 (79%)
TOTAL:	**3,202**	**423 (13%)**	**284 (9%)**	**1,785 (57%)**
Missing Data		*593 (19%)*	*567 (18%)*	*6 (1%)*
Not Applicable		*702 (22%)*	*702 (22%)*	*0 (0%)*

To assess which systems may be facing the greatest affordability burden, the State Water Board further analyzed how water systems, by SAFER status, exceeded thresholds for multiple affordability indicators. Affordability burden is ranked from low (one indicator exceeded), medium, (two indicators exceeded), or high (three indicators exceeded). As summarized in Table 9-9, At-Risk systems had the largest percentage of

[300] Water systems that are not DAC/SDAC or are missing DAC status designations are excluded from sub-categories within this table.

High Affordability Burden systems at 7%, At-Risk DAC/SDAC and Potentially At-Risk DAC/SDAC had the same percentage of systems with Medium Affordability Burden at 20%. Not Assessed DAC/SDAC systems had the highest proportion of Low Affordability Burden at 74%.

Table 9-9: Affordability Assessment Results by SAFER Program Status

SAFER Program Status	Total Systems Assessed	High Affordability Burden[301]	Medium Affordability Burden[302]	Low Affordability Burden[303]	None
Failing Systems	**384**	**12 (3%)**	**50 (13%)**	**205 (53%)**	**117 (30%)**
DAC/SDAC	234	8 (3%)	45 (19%)	153 (65%)	28 (12%)
At-Risk Systems	**612**	**41 (7%)**	**103 (17%)**	**354 (58%)**	**114 (19%)**
DAC/SDAC	421	25 (6%)	83 (20%)	271 (64%)	42 (10%)
Potentially At-Risk Systems	**440**	**21 (5%)**	**63 (14%)**	**236 (54%)**	**120 (27%)**
DAC/SDAC	264	10 (4%)	52 (20%)	171 (65%)	31 (12%)
Not At-Risk System	**1,615**	**18 (1%)**	**94 (2%)**	**710 (44%)**	**793 (49%)**
DAC/SDAC	678	14 (2%)	54 (8%)	437 (64%)	173 (26%)
Not Assessed System	**151**	**2 (1%)**	**1 (1%)**	**83 (55%)**	**65 (43%)**
DAC/SDAC	38	1 (3%)	1 (3%)	28 (74%)	8 (21%)
TOTAL:	**3,202**	**94 (3%)**	**311 (10%)**	**1,588 (50%)**	**1,209 (38%)**

9.8.3 Water System Shutoffs

Discontinuing water service for lack of payment is an important tool for water systems to ensure financial stability and to provide continuous operations to customers. However, shutting off a person's water creates significant hardship and is in juxtaposition with California's Human Right to Water. To provide fair and equitable protection to water system customers, as well as public water systems needing to maintain services, the Legislature adopted two Senate Bills designed to protect customers from undue shutoffs, allow water systems to collect money for services rendered, and provide customers sufficient warning of a pending shutoff. The Water Shutoff Protection Act, Senate Bill 998 (Dodd, 2018) in Chapter 891, statutes of 2018, and Senate Bill 3 (Dodd, 2023) in Chapter 855, statutes of 2023 require a public water system to have a written policy on discontinuation of residential water service and impose procedural limits on discontinuations of service, including minimum delinquency times, notice requirements,

[301] Community water system met or exceeded the affordability threshold for 3 affordability indicators.
[302] Community water system met or exceeded the affordability threshold for 2 of the affordability indicators.
[303] Community water system met or exceeded the affordability threshold for 1 of the affordability indicators.

and restrictions on shutoffs to customers that cannot afford to pay their bills, or for whom a shutoff would pose a threat to life or health and safety and who agree to pay delinquent bills. The legislative bills require a public water system to work with a customer delinquent on their payment to create a mutual repayment agreement to prevent water shutoffs. The statutes also allow authorized tenants the opportunity to put the water service in their name if landlords do not keep up with water payments. Despite these protections, water service may still be turned off if customers fail to meet the terms of the mutual repayment agreements. Accordingly, some customers are still losing water service.

In 2022, Los Angeles Department of Water and Power became the first utility to place a permanent moratorium on service shutoffs for low-income households enrolled in its discount programs, and recognized the relatively low financial burden such a moratorium imposes on the utility.[304]

Based on water shut-off data collected by the State Water Board via the eAR for 2018-2021 reporting years, there was an annual average of 237 community water systems reporting water shut-offs. An annual average of 76,934 occupied single-family residential accounts were reported to have a water shut-off. Data was not collected during 2022-2023 because there was a water shut-off mortarium due to the COVID-19 epidemic. For comparison, 250,000 annual shutoffs were estimated by roughly 500 of the state's largest CWSs in the 2020 Safe Drinking Water Plan update. With the passage of Senate Bill 3 (2023), the State Board will begin collecting water shut-off data again via the 2024 reporting year eAR. Outside the protections of the Water Shutoff Protection Act, and financial assistance like low-income rate assistance programs, water system customers may be vulnerable to water system shutoffs and the health effects they cause.

9.9 CONCLUSIONS AND RECOMMENDATIONS

9.9.1 Conclusions

Several factors affect costs incurred by water systems. To cover these cost, most community water systems charge rates for providing water services. These rates need to cover both current expenses for operating and maintaining the water system and planned future projects, such as pipeline and other infrastructure replacements. Water systems will be better prepared to set adequate rates when asset management plans are developed.

Water system costs will continue to increase due to a variety of factors including inflation, new regulatory requirements, deferred infrastructure maintenance and upgrades, treatment of contaminated sources or new water source development needed to address climate change, drought, and population growth induced demands such as the expansion of service area or population through consolidation or new development. Smaller water systems do not typically have the economies of scale

[304] Los Angeles DWP to end water and power shutoffs for low-income customers who can't pay: https://www.latimes.com/california/story/2022-11-16/l-a-to-end-water-and-power-shutoffs-for-low-income-customers-who-cant-pay

needed to absorb these cost increases. On average, customers of smaller water systems pay approximately 77 percent more for water than customers served by larger water systems. Even though customers of small water systems pay more for water service, the water is less often in compliance of regulatory requirements and rates are often insufficient to fully fund basic operation and maintenance, reserves, and capital investments needs. This results in the need for even higher water rates to address the failing status for non-compliant water.

Water rates are not affordable by some customers of disadvantaged community water systems; and many water systems serving disadvantaged communities do not consider future infrastructure costs. Research has shown there are customers served by public water systems in both urban/suburban areas and rural areas who pay more of their annual income for water service than is considered affordable, based on commonly used affordability criteria. The State Water Board continues pursuit of solutions that ensure all Californians have safe, clean, affordable, and accessible drinking water.

9.9.2 Recommendations

9-1 Many small water systems have water rates that are inadequate to sustainably maintain their system. Support requirements for all public water systems to develop asset management plans and analyze the adequacy of their rate structure to meet existing operation and maintenance costs, while also planning for future capital replacement. Subject to funding availability, technical assistance can be provided to assist small systems with this work.

9-2 Support the development of funding tools that make drinking water affordable for low-income households, including the potential to establish appropriate water service subsidization programs. As a guiding human right to water principle, the cost of water should not pose a barrier to access. Assistance to low-income households that face discontinuation of water service should be provided to protect human health impacts from shutoffs of water service due to payments in arrears.

9-3 Continue to support the mandatory consolidation of water systems that cannot meet minimum TMF requirements.

9-4 Reduce the cost burden to public water systems by ensuring housing costs in California do not exceed a maximum percentage of a person’s income.

CHAPTER 10 FINANCIAL AND TECHNICAL ASSISTANCE FOR PUBLIC WATER SYSTEMS

10.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses how water systems typically fund their operations including:

- Alternative methods of financing construction, installation, and operation of new treatment technologies
- Cost analysis for large, medium, and small public water systems
- Estimated costs to meet primary drinking water standards (as part of the Needs Assessment)
- Affordability of water rates

To meet regulatory requirements, water systems must identify, address, and plan for all necessary capital improvements and replace infrastructure nearing or beyond the end of its useful life. In addition to capital costs, water systems need to consider costs associated with operations and maintenance of the infrastructure for the project to be successful. For example, a water system may secure funds necessary to install a water treatment facility; however, without covering the operation and maintenance costs, the facility will unlikely continue to provide safe drinking water.

10.2 METHODS OF FINANCING

10.2.1 Self-Financing

Self-financing, commonly termed "pay-as-you-go," is a form of non-debt financing where a water system contributes revenues to a capital improvement reserve fund and the system uses accumulated revenues and other income to pay for system improvements. Very few water systems can generate this reserve based on accumulated revenues. This is particularly true for small systems. Reserves, if any, held by small systems are generally insignificant in comparison to capital improvement funding requirements. Self-financing may only be viable for capital expenditure under certain circumstances and if the project may be broken into several phases constructed over time. However, this can delay compliance with regulatory requirements. In addition, constitutional constraints on rate-making and other sources of revenue may pose obstacles to publicly owned systems wishing to self-fund future capital improvements.

10.2.2 Debt Financing

Capital improvements, as opposed to ongoing operations and maintenance costs, may be financed through long-term debt so that the cost of the project is spread out over its useful life. Loans are generally appropriate for smaller amounts and less routine borrowing and bonds become more cost effective as the size of the debt goes up and as the financing becomes more regular.

Publicly owned systems typically finance capital improvements using revenue bonds or loans. Other financing options include general obligation (GO) bonds and assessment-or tax-secured financing. Municipal bonds may be issued by public entities as either taxable or tax-exempt, depending on the uses of the bond proceeds (such as project, project beneficiaries, timing of expenditures, etc.). Many publicly owned water systems issue tax-exempt bonds, which result in lower overall debt service obligations on the part of the system than taxable bonds. The costs associated with bond issuance, including future water rate structures, must be considered in determining the feasibility of these mechanisms for financing.

Privately owned systems may finance capital improvements through secured or unsecured loans or bonds.

Debt financing terms may vary. Repayment terms for capital financing typically require repayment over a 20 to 30-year term, not to exceed the useful life of the improvements. Short-term bridge financing may be available to certain systems to cover planning costs and initial construction costs incurred by a system while it structures long-term financing.

10.2.3 Public-Private Partnerships

Public-private partnerships (P3) are sometimes formed to design, build, own, operate, and finance significant capital projects. Whether a true P3 or through an informal arrangement, partnership with a private entity can be a way for local government to work with the private sector in obtaining financing and/or construction for needed facilities. Several city water departments are now being leased to California Public Utilities Commission (CPUC)-regulated, investor-owned, water utilities. For example, California Water Service Company operates two leased water systems for the City of Hawthorne and the City of Commerce.

Use of a P3 should be carefully considered due to their cost, scope and difficulty of amendment. They should be pursued only where true efficiencies can be realized and only with trusted partners. Participation of a private entity may negatively affect the ability of a public entity to issue tax-exempt revenue bonds. The authorizing statute for P3 may also prohibit the use of state funds on a P3 project.

10.3 FEASIBILITY OF FINANCING OPTIONS

The type of ownership and size of a water system will determine whether a particular financing mechanism is feasible. Specific benefits or limitations associated with ownership and size are discussed below. Note that many of these financing mechanisms are generally limited to addressing capital infrastructure.

10.3.1 Publicly-Owned Water System Financing

Water systems that are publicly owned (governmental agencies), including cities and special districts, may take advantage of tax-exempt bond financing, as discussed above. This federal tax subsidy results in a lower interest rate than they would pay if they issued taxable bonds. Tax-exempt financing requires compliance with federal tax and securities laws, so publicly owned systems issuing tax-exempt bonds must have the resources and expertise to ensure compliance at the time of issuance and during the life of the bonds. Even with lower interest rates, tax-exempt bonds may be more costly than State Water Board’s Drinking Water State Revolving Fund financing, discussed below.

Bond financing may be difficult for small publicly owned water systems for both financial and administrative reasons. A small publicly owned water system may be unable to secure financing because of its credit rating, a lack of resources or expertise, or an inability to generate sufficient revenues or other collateral to repay the bonds. Once issued bonds must also be administered for their lifetimes, including reporting and compliance, which may represent an operating burden for smaller system. For this reason many systems look to state and federal financial assistance programs.

Publicly owned systems needing capital upgrades may struggle with capital improvement budgeting within their organizations, due in part to rate stress experienced by ratepayers and organizational budgeting priorities. Cities, counties, and districts are restricted in their ability to raise rates (see Section 9.5) which would be used to support the long-term debt obligation of the municipality.

10.3.2 Investor-Owned Water System Financing

Investor-owned (private) water utilities can issue equity stock (common and preferred stock) and sell taxable bonds. The CPUC must give authorization prior to the issuance of any stocks or bonds of an investor-owned water company. This method of financing capital improvement projects is limited primarily to the large CPUC-regulated investor-owned water systems. The smaller investor-owned systems, which are generally owned by families or individuals, do not issue stock and, like smaller publicly-owned systems, lack the rate base to utilize some of the other financing options discussed in this chapter. CPUC-regulated investor-owned water systems are not able to accumulate reserves, so infrastructure replacement must be financed by incurring debt and recovering costs through obtaining CPUC approval of necessary rate adjustments. Investor-owned utilities may use both short- and long-term financial instruments such as taxable notes and bonds or Contributions in Aid of Construction (CIAC) per 26 CFR § 1.118-2.

Very small investor-owned water systems typically are owned by individuals as sole proprietors or small partnerships. These systems have very few options for funding other than water rates, private loans, subsidies from other income sources, or select grants and loans.

10.3.3 Mutual Water Company Financing

Mutual water companies can assess members to raise capital. Depending on the governing bylaws of the mutual water company, this may not require the approval of members, nor by any outside agency. The amount of the assessment may be limited; however, by the ability of the members to pay, such as in disadvantaged communities. As a requirement to form a mutual water company by the Department of Financial Protection and Innovation (which includes the former Department of Business Oversight, and Department of Corporations), a sinking fund must be established that provides for capital replacement of water facilities at the end of their useful life. This sinking fund, or reserve, is a means to maintain the integrity of the system's existing infrastructure but may not be available or adequate to fund the costs of future upgrades to address source contamination or other needs that arise after formation. Most existing mutual water companies have failed to meet this requirement. Mutual water companies of sufficient size may also use short- and long-term financing instruments such as taxable bonds and notes. Mutual water company bylaws may also prescribe debt or contract limitations, another potential hurdle to project financing.

10.4 FINANCIAL ASSISTANCE PROGRAMS

There are numerous state and federal financial assistance programs available to eligible public water systems.

10.4.1 State Water Board Funding and Assistance Programs

The State Water Board's Division of Financial Assistance (DFA) administers multiple funding programs to assist water systems with achieving and maintaining compliance with safe drinking water standards. These programs seek to streamline the use federal funds and state funds to address the highest priorities of the state's water infrastructure needs. To ensure that government funds are well-spent and do not result in stranded assets, and to comply with funding source rules, the water system must demonstrate its technical, managerial, and financial (TMF) capacity to take on and maintain a project and to maintain long-term sustainability and compliance with national safe drinking water regulations. The State Water Board's funding programs can be utilized for any size of water system, provide technical assistance (TA) to communities, and implement programs that would benefit households served by state small water systems and/or domestic wells. The State Water Board's Safe and Affordable Funding for Equity and Resilience (SAFER) Drinking Water Program specifically focuses on small, disadvantaged communities served by water systems on the Failing list, as discussed in Chapter 9, as well as low-income households.

10.4.2 Drinking Water Project Funding Sources

10.4.2.1 Drinking Water State Revolving Fund

The State Water Board administers the Drinking Water State Revolving Fund (DWSRF) program[305] with complementary funding, including state general obligation (GO) bond proceeds from Proposition 4, Proposition 1[306] and Proposition 68[307], General Fund appropriations), the Safe and Affordable Drinking Water (SADW) Fund. Additional federal appropriations for the DWSRF have included federal disaster-related funds from the Additional Supplemental Appropriations for Disaster Relief Act of 2019 (ASADRA) and other drinking water related infrastructure funding from the federal Infrastructure Investment and Jobs Act (IIJA), which included general project funding as well as funding specifically allocated to projects addressing emerging contaminants (see

[305] Drinking Water State Revolving Fund Program | California State Water Quality Control Board https://www.waterboards.ca.gov/drinking_water/services/funding/SRF.html

[306] Proposition 1: Drinking Water Projects https://www.waterboards.ca.gov/water_issues/programs/grants_loans/proposition1/drinking_water_proj_locations.shtml

[307] Proposition 68 https://www.waterboards.ca.gov/water_issues/programs/grants_loans/propositions/prop68.html

Section 10.4.3.6) and lead service lines (LSLs)[308].

The DWSRF has included annual federal capitalization grants, local match amounts contributed by certain borrowers, repaid principal and interest on loans made to water systems, proceeds from state revenue bonds, and interest earned on all the foregoing amounts held in the fund. To receive a federal DWSRF Capitalization Grant, a state must have statutory authority for the program and must provide a state match. California's current share of the federal DWSRF appropriation (not including lead service lines funding) is the highest allocation of all states (about 11%), reflecting its large population and resulting infrastructure needs. However, this allocation could change, and there is no guarantee that the federal government will continue to provide capitalization grants in the future. Past sources of funding cannot be assumed to be available going forward. Federal rules do require the DWSRF to be operated in perpetuity, and the Water Board expects loan repayments to continue.

California has implemented the DWSRF program since 1998. The standard interest rate on a DWSRF loan or other financing is one-half the state's GO bond rate. The standard repayment term is 20 or 30 years (for eligible systems), not to exceed the project's useful life. General eligibility criteria are set forth in the DWSRF Policy (amended May 2025)[309] and in each year's Intended Use Plan (IUP), including principal forgiveness (additional subsidy like a grant) allocations and criteria, requirements, and incentives. The standard financial review and loan security terms are set forth in the Credit/Financial Guidelines and Application Appendices of the DWSRF Policy. Typically, loans are secured by enterprise revenues (namely user water rates, charges, and/or surcharges). Total DWSRF funding since 1998 provided to water systems in executed loans and principal forgiveness funds to date is over $4.5 billion.

10.4.2.2 *Safe and Affordable Drinking Water Fund*

The SADW Fund, established by Chapter 120, Statutes of 2019 (SB 200), provides up to $130 million per year until June 30, 2030, to develop and implement sustainable solutions (including consolidations) for small systems in disadvantaged communities with a focus on those on the Failing list. The SADW Fund can be used for capital planning and construction projects that complement the DWSRF, and TA, but was also intended as a more flexible drinking water project funding source which can be used for interim water supplies, emergency assistance, administrators, and operations and maintenance (O&M). The SADW Fund can also be used to fund countywide or regional programs that would benefit communities and households served by state small water systems and/or domestic wells.

Each year's planned expenditure for the SADW Fund is set forth in an annual Fund Expenditure Plan (FEP). The policy for developing the FEP for the SADW Fund (SAFER Policy) was adopted by the State Water Board in May 2020 and amended in December

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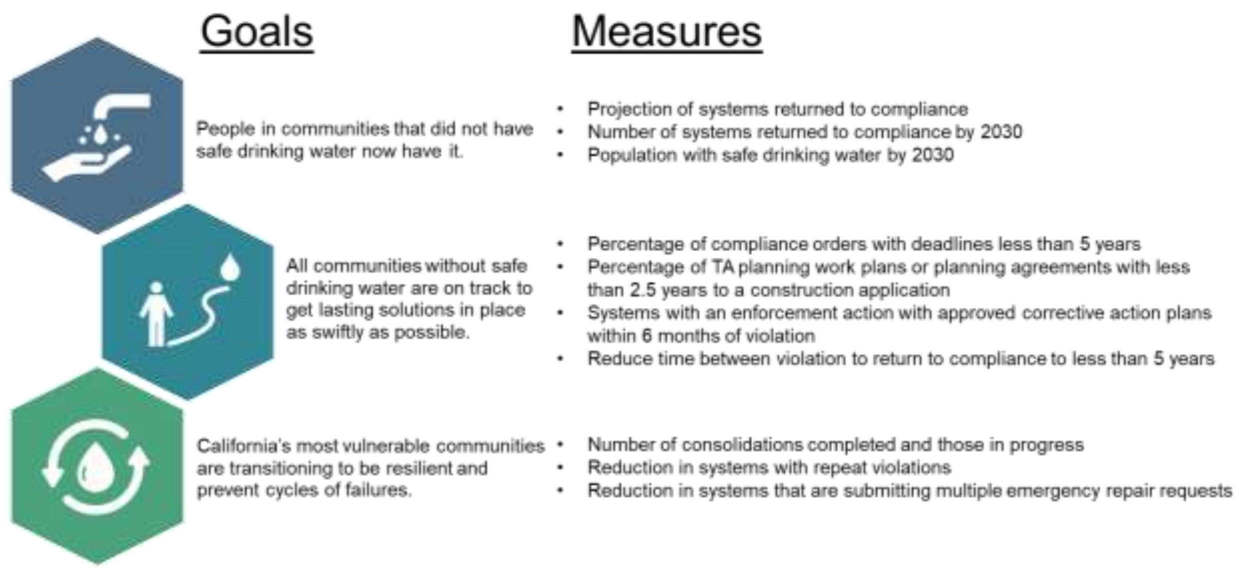
[308] Lead Service Line Replacement Funding Program: https://www.waterboards.ca.gov/drinking_water/services/funding/lead-service-line-funding.html

[309] Policy for Implementing the DWSRF: https://www.waterboards.ca.gov/drinking_water/services/funding/documents/srf/dwsrf_policy/dwsrf-policy-final.pdf

2021. The SAFER Policy establishes and documents the State Water Board's direction on how the FEP will be developed. The SAFER Policy defines key terms; discusses eligible entities and projects; provides an overall funding strategy; includes funding terms, conditions, and how to appeal a funding determination; discusses the required elements of the FEP (including how proposed solutions will be identified, evaluated, and prioritized); establishes a petition process for consideration of consolidation orders; and identifies SAFER Program resources.[310]

The annual FEP utilizes the results of the latest annual Needs Assessment[311] to inform the prioritization of available state funding and TA through the SAFER Program. The Fiscal Year (FY) 2024-25 FEP[312] includes refined SAFER Program goals, entering the last five years of the original SADW Fund appropriation. The refined water system goals and measures are in Figure 10-1 below.

Figure 10-1: SAFER Program Key Goals and Measures



SAFER Program

In consideration of the complementary funding sources available to fund drinking water projects such as state General Fund appropriations, GO bond funds, and funding available through annual DWSRF capitalization grants, in FY 2024-25, $843 million, all of which may fund capital projects, is anticipated to be available for projects from the

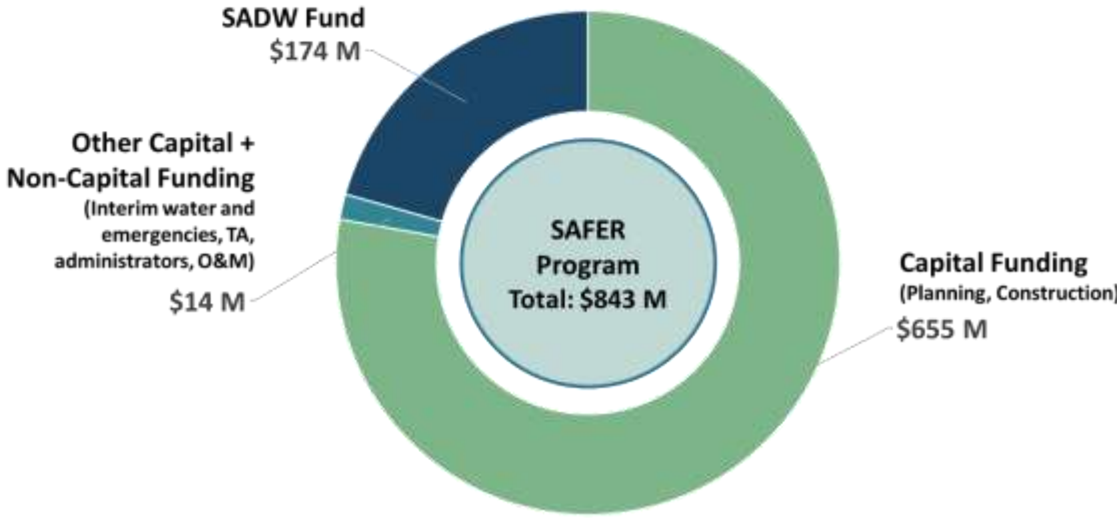
[310] Safe and Affordable Funding for Equity and Resilience | California State Water Resources Control Board
https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html

[311] 2024 NEEDS ASSESSMENT
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024-needs-assessment.pdf

[312] FY 2024-25 Fund Expenditure Plan
https://waterboards.ca.gov/water_issues/programs/grants_loans/docs/2024/draft-final-fy2024-25-fep-clean-version.pdf

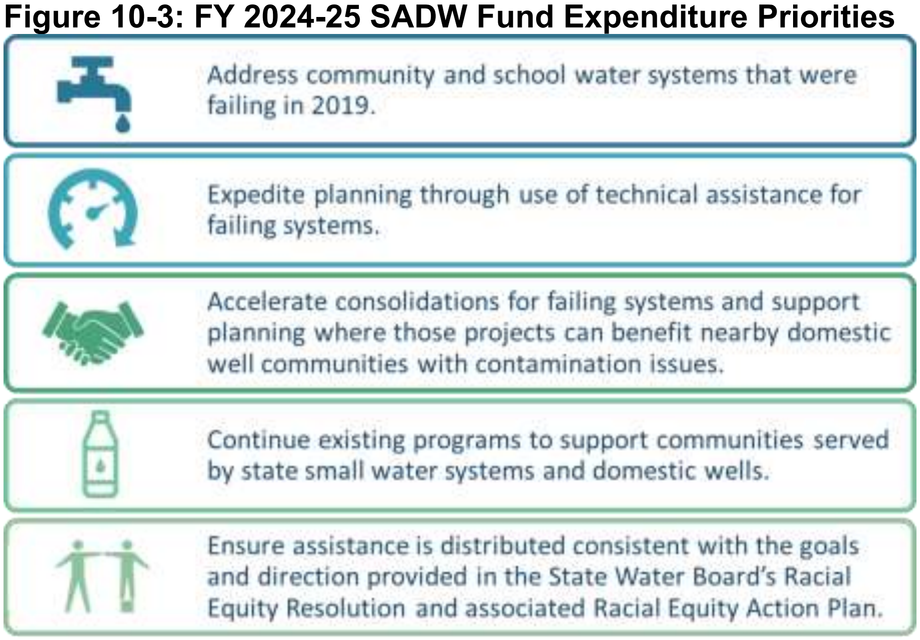
SADW Fund and complementary funding sources that make up the broader DWSRF / SAFER Program (Figure 10-2). For the projected $655 million solely available for capital projects, it is important to note that $368 million is for projects that address contaminants of emerging concern only and may have additional eligibility requirements.

Figure 10-2: FY 2024-25 SAFER Program Anticipated Funding Availability for Projects (SADW Fund plus DWSRF and complementary funding)



Consistent with the refined SAFER Program goals, the FY 2024-25 funding priorities were modified compared to past FEPs. SADW Fund expenditures will continue to focus on solutions for small, disadvantaged communities (DACs), and low-income households, and will prioritize the following, as shown in Figure 10-3.

Figure 10-3: FY 2024-25 SADW Fund Expenditure Priorities



10.4.2.3 *Other State Water Board Complementary Drinking Water Project Funding Sources*

Proposition 4, the Safe Drinking Water Wildfire Prevention, Drought Preparedness, and Clean Air Bond Act of 2024 (Senate Bill 867, Allen)[313] authorized $10 billion in general obligation bonds for projects related to safe drinking water, wildfire prevention, drought preparedness, and clean air. Section 91011 of Prop 4 allocated $610 million in grants or loans to improve water quality or help provide clean, safe, and reliable drinking water.

In addition to the Proposition 1 and Proposition 68 funds discussed above as complementary to the DWSRF program, the State Water Board received allocations from these two GO bond acts for the purposes of groundwater activities. Under Proposition 1, the State Water Board received an $800 million allocation in 2014 to make grants to prevent and clean up contamination of groundwater that serves (or has served) as a source of drinking water. Under Proposition 68, the State Water Board received a $74 million allocation to make grants for treatment and remediation activities that prevent or reduce the contamination of groundwater that serves as a source of drinking water. The funds from Proposition 1 and Proposition 68 have been allocated and are not expected to be available for future projects.

With the Budget Act of 2021, the State Water Board received $1.3 billion from the General Fund for drinking water and wastewater infrastructure projects in disadvantaged communities. In the Budget Act of 2024, the remaining amounts of the 2021 appropriation were reverted to the General Fund but the State Water Board also received $224.9 million from the Greenhouse Gas Reduction Fund for drinking water and wastewater infrastructure projects. On November 19, 2024, the State Water Board adopted a resolution delegating authority to the Deputy Director of DFA to direct these funds to eligible projects at a split of $151 million towards drinking water and $62.7 million towards wastewater, with the remainder reserved for administrative costs. These funds will be utilized in accordance with the established DWSRF and Clean Water SRF Policies and IUPs, as well as the SADW FEP (drinking water only).

The Drinking Water For Schools Grant Program initially allocated and awarded $9.5 million in grants funds to school districts to improve access to, and the quality of, drinking water in public schools. Funds were awarded pursuant to Chapter 29, Statutes of 2016, SB 828, consistent with the Drinking Water For Schools Guidelines adopted by the State Water Board on May 16, 2017. An additional $6.8 million was authorized for the Drinking Water For Schools Grant Program with guidelines approved in June of 2019. Grant funds were awarded to two nonprofit organizations (Self-Help Enterprises (SHE) and Rural Community Assistance Corporation (RCAC)) to act as Program Administrators (Table 10-2). These Program Administrators work directly with eligible school districts to develop and fund projects for disadvantaged community schools. The priority for funding was based on assisting schools with impaired water quality. Schools may also receive funding through DFA's other funding sources including the interim and emergency assistance options described in Section 10.4.3.1.

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[313] Proposition 4: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB867

10.4.3 Eligible Project Types

The following sections include information on types of projects that are eligible for funding under the SAFER Program. The types included indirect O&M assistance (such as interim and emergency assistance and technical assistance), direct O&M assistance (such as direct payments for ongoing costs), planning assistance, and capital assistance. Generally, most funding described is in the form of grant or principal forgiveness, though planning and capital assistance is also available in the form of loan.

10.4.3.1 Interim and Emergency Assistance[314]

Although the goal of the SAFER Program is to ensure long-term, sustainable supplies of safe drinking water, it may be necessary to fund interim solutions in certain communities as they progress towards a long-term solution. Interim solutions help provide community members access to safe drinking water while long-term solutions are planned and constructed. Emergency improvements or repairs to existing water systems may also be necessary to ensure safe drinking water.

Interim water solutions target Failing or At-Risk public water systems. Interim solutions continued to be prioritized for community water systems, state small water systems, and domestic wells, serving small DACs or low-income households, with contamination or water outage. Interim solutions include point-of-use or point-of-entry (POU/POE) systems, hauled water, bottled water, vending machines/filling stations, or temporary connections to other approved alternative sources. In some cases, interim solutions may take a phased approach, e.g., immediate short-term provision of bottled water while POU/POE treatment is piloted and implemented. In other cases, an interim solution may be the only feasible long-term solution for a community.

Interim solutions are also available to support state small water systems and domestic wells via the provision of bottled water, well testing, and/or POU/POE programs with counties (or other local partners) with the highest numbers of state small water systems and/or domestic wells either in high-risk aquifers or with high-risk of a water shortage. These programs can include interim measures to address both drought and contamination.

Emergency funding will be prioritized for systems that serve small DACs or low-income communities where there is the greatest threat to public health and safety. As opposed to funding for interim solutions, emergency funding generally refers to system-level emergency improvements or repairs (e.g., well/pump replacement or emergency interties that fall outside of the provision of bottled or hauled water, which may also be provided as interim solutions) to address unforeseen needs experienced by individual water systems (see current year's Fund Expenditure Plan[315]). Emergency funding requests are accepted on a continuous basis to address needs as they arise. An eligible applicant may apply for emergency funding directly with DFA. If the affected water

[314] CAA Urgent Drinking Water Need Projects | California State Water Resources Control Board https://www.waterboards.ca.gov/water_issues/programs/grants_loans/urgent_water_needs.html
[315] Safe and Affordable Funding for Equity and Resilience: https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html

system is in the Central Valley or Coachella Valley, emergency funding may be available through Self-Help Enterprises' (SHE) or Pueblo Unido's emergency programs, respectively.

In some cases, assistance with interim water supplies (i.e., interconnections/purchased water, bottled, vended, or hauled water) may also be provided to ensure safe water is available while emergency improvements or repairs are implemented.[316] Longer-term TA or planning needs can be subsequently evaluated and addressed, as needed. Since the long-term goal is for all systems to become sustainable, emergency funding may be conditioned on the system working to improve asset management and financial planning or taking other actions as directed by the State Water Board to improve the water system's TMF capacity. In addition, systems that do not have an adequate emergency response plan or reserves to address "routine" emergencies (e.g., well pump failure or ruptured distribution lines) may be evaluated as candidates for TA, appointment of an administrator, or potential consolidation.

Emergency funding is not intended to serve as an expedited path to funding for non-emergency projects. Emergency requests submitted to circumvent the regular funding process for long-term solutions are not approved.

Funding may be provided for interim or emergency projects by either system-specific agreements or regional (including county-wide) programs with third parties that administer funding to eligible systems or households served by state small water systems or domestic wells. Table 10-1 summarizes system-specific interim solution and emergency funding for the last four fiscal years by funding program and lists the estimated number of people that benefited from this assistance. Table 10-2 summarizes active regional and county-wide programs.

Table 10-1: System-specific Interim Solutions & Emergency Funding by Funding Program

Fiscal Year	SAFER Program Funding	No. of People Benefiting	No. of Systems Assisted
2019-20	$1.27 M	5,348	9
2020-21	$707,218	358	5
2021-22	$1.64 M	19,964	21
2022-23	$5 M	24,614	19
TOTAL:	**$8,696,419**	**50,284**	**54**

[316] Note that bottled, vended, and hauled water is regulated by the California Department of Public Health, Food and Drug Branch, while PWS drinking water supplies are regulated by the State Water Board, Division of Drinking Water: https://www.cdph.ca.gov/Programs/CEH/DFDCS/pages/fdbprograms/foodsafetyprogram/water.aspx

Table 10-2: Regional Programs for Interim Solutions & Emergency Funding Approved (2019 – 2023)[317]

Recipient and Program	County or Region Covered	Funding Approved by State Water Board	Funding Remaining	Active Enrollees[318]
Self-Help Enterprises (SHE) Bottled Water	San Joaquin Valley[319]	$6,892,264	$3,218,748	3,600
SHE Point of Use/Point of Entry	San Joaquin Valley	$14,698,375	$12,748,218	245
SHE Tanks and Hauled Water	San Joaquin Valley	$86,376,502	$11,569,804	1,490
SHE Regional Private Domestic Water Well Abandonment, Repair, Replacement & Connection Program	San Joaquin Valley	$ 50,153,253	$36,579,415	256
Rural Community Assistance Corporation (SB 108 Drinking Water Well Replacement Program)	Statewide except in SHE Service Area	$7,050,002	$172,680	108
SHE Emergency Funding	San Joaquin Valley	$5,500,000	$3,385,028	35[320]

317 Information presented on amount of funding remaining and active enrollees for the programs is as of April 2024.

318 These programs include enrollees served by private wells, state smalls and eligible public water systems. Total enrollment over the life of the programs is higher.

319 SHE's service area includes nine counties: Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, and Tulare.

320 Active enrollees represent services provided to 35 eligible state small water systems and public water systems within SHE's service area, representing 16,102 households.

Recipient and Program	County or Region Covered	Funding Approved by State Water Board	Funding Remaining	Active Enrollees[318]
Community Water Center Bottled Water	Regional[321]	$3,976,612	$3,147,311	348
Pueblo Unido Community Development Corporation – Interim Drinking Water Program	Riverside County	$2,265,437	$1,773,525	320
Santa Cruz County Regional Program	Santa Cruz County	$601,000	$601,000	0[322]
Shasta County Drinking Water Drought Assistance Program	Shasta County	$2,474,998	$955,083	113
Imperial County Regional Point of Entry Installation and Urgent Drinking Water Needs Program	Imperial County	$3,184,725	$3,184,725	0[15]
Valley Water Collaborative	Modesto and Turlock Groundwater Basins	$5,540,725	$4,796,316	391
Tule Basin Water Foundation	Tule Groundwater Basin	$4,528,882	$4,528,882	0
Drinking Water for	Statewide	$6,435,000	$983,139	100

[321] Santa Cruz, San Benito, San Luis Obispo, Santa Barbara, and portions of Santa Clara, Monterey, and Ventura Counties.

[322] Programs for Santa Cruz and Imperial County recently executed and are in early stages of implementation.

Recipient and Program	County or Region Covered	Funding Approved by State Water Board	Funding Remaining	Active Enrollees[318]
Schools Program[323]				
Bottled Water for Schools	Statewide	$4,547,038	$3,020,470	66[324]

10.4.3.2 Technical Assistance

The State Water Board provides grant funding to TA providers to provide a variety of services geared toward accelerating the implementation of drinking water solutions. Some examples include, but are not limited to, application preliminary planning, engineering and environmental studies; funding application assistance; TMF capacity assessments; system inventories and asset management plans; rate studies; income surveys; financial audits and accounting services; negotiating consolidation agreements; and resolving entity formation or ownership issues. Funding is also provided to community outreach organizations to engage with the community for input into the assessment and determination of solutions.

The State Water Board prioritizes TA to small DACs and water systems serving small DACs and may continue to expand these efforts under the SAFER Program using the SADW Fund. Systems serving small non-DACs may also receive TA, with a focus on consolidations and addressing Failing and At-Risk systems. TA provided to small non-DACs will be for long-term solutions that when implemented will reduce Green House Gas (GHG) emissions directly or indirectly through water system improvements that reduce water and energy demand and increase sustainability to mitigate potential for emergency response needs.

From 2019 through 2023, the State Water Board funded nearly $73 million in TA for 673 water systems through agreements with several TA providers.[325] Of this funding, approximately $42 million has been committed towards 116 projects for full planning via TA (which guides systems towards a construction funding agreement). This information is summarized in Table 10-3. Additional description of the TA program, including provider details is available in Chapter 8.

Table 10-4 summarizes the amount of funding committed by funding source to support TA via master funding agreements with qualified TA providers (master agreements). As of April 2024, the amount of funding remaining for multi-year TA master agreements is approximately $136 million.

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[323] Includes 2 separate funding agreements – one implemented by RCAC statewide, and another implemented by SHE within their existing service area.

[324] This number represents 66 schools actively enrolled in the BWFS program.

[325] Four water systems had a TA request approved in 2022 that were ultimately cancelled, with little to no TA provided.

Table 10-3: Number of SAFER Systems that Received Technical Assistance[326]

SAFER Status	2019	2020	2021	2022	2023
Failing	46	38	164	111	82
At-Risk	N/A	N/A	94	58	35
Potentially At-Risk	N/A	N/A	65	39	18
Not At-Risk	125	122	231	149	41
TOTAL:	**171**	**160**	**554**	**357**	**176**

Table 10-4: Technical Assistance Funding Committed to Master Agreements

Year	DWSRF Set-Aside	Prop 1[327]	SADW Fund	General Fund
2023	$0	$0	$102,886,465	$19,062,035
2022	$0	$2,557,304	$6,447,552	$0
2021	$0	$0	$41,531,833	$87,844
2020	$0	$6,000,000[328]	$14,752,339	$0
2019	$0	$9,226,343	$0	$0
TOTAL:	**$0**	**$17,783,647**	**$165,618,189**	**$19,149,879**

10.4.3.3 Administrators

A water system administrator is a qualified specialist that provides technical, managerial, and/or financial expertise to struggling water systems. Administrators may be individuals, businesses, nonprofit organizations, local agencies including counties or nearby larger utilities, and other entities. Administrators may be assigned broad duties such as acting as general manager for the designated water system, or specific duties, such as managing an infrastructure improvement project on behalf of a designated

[326] These are the number of SAFER systems, as evaluated in the Needs Assessment, which received TA each year. A total of 673 different water systems received TA across these years combined.

[327] For 2020 – 2023, this represents the amount of Prop 1 funding disencumbered due to either funding swap or unused funding at the end of a funding agreement. A total amount of $23,875,601 Prop 1 funds was encumbered for TA between 2016 and 2019.

[328] In 2020, Prop 1 funds on five TA agreements were swapped for SADW funding.

water system. Non-administrator funding can be awarded to an administrator on behalf of a designated water system (e.g., O&M or bottled water). Appointed administrators must be an eligible entity qualified to be an administrator through the Division of Drinking Water's (DDW) Administrator Request for Qualifications process[329].

Administrators can be funded via the SADW Fund either through a single system-specific funding agreement or through a master agreement that will assist multiple designated water systems. For administrators funded through a master agreement, system-specific administrator work plans are executed to outline the scope, budget, and schedule for administrator work in each community (like the TA work plan process).

Currently, there are twelve Administrator appointments and 9.9 million in funding approved by the State Water Board. Thus far, one Administrator appointment has been completed with the North Edwards Water District. See Chapter 8, Tables 8-36 and 8-37 for a summary of the Administrator projects details.

10.4.3.4 Operations and Maintenance

The goal of the Direct Operations and Maintenance (O&M) Program is to assist in cases where there is a direct correlation to supporting the affordability of water (as part of the mandate of Human Right to Water) while also improving system sustainability. O&M funding has also continued to be utilized to facilitate voluntary consolidations and provide interim O&M funding for water systems that will be or have been appointed an administrator.

Since FY 2023-24 there are two groups of systems under consideration for Direct O&M funding. This approach is subject to re-evaluation each fiscal year.

Group 1 – Statewide Prioritization: Small DAC water systems that have water rates that are above 2.5% of the community's median household income (MHI)[330] meeting criteria established in the Direct O&M Program Guidelines[331] are considered for a streamlined solicitation and approval process with template funding agreements.

To maximize available resources, a prioritization scheme is utilized to ensure O&M funding is distributed to communities most in need, which may consider a system's affordability burden and risk assessment according to recent Needs Assessment results. The purpose of the funding provided to qualifying Group 1 systems will be to lower the water rates down to 2.5% of the community's MHI. Specific system requirements to receive funding (e.g., lowering water rates, TMF assessment, conducting a feasibility study on how to improve system sustainability, etc.) are included in the Direct O&M Program Guidelines and as special conditions in each funding

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[329] Administrator Request For Qualifications Guidelines https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/rfq_admin-(002).pdf

[330] The community's MHI ratio of 2.5% is the calculated system-wide annual average residential water bill relative to the annual MHI within a water system's service area.

[331] Direct Operation And Maintenance Funding Program https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/direct-operation-maintenance.html

agreement[332]. TA may be considered to assist systems in meeting these requirements.

Group 2 – Case-by-Case: Projects may also be considered for O&M funding on a case-by-case basis for circumstances including, but not limited to:

- Small DAC water systems with existing debt burdens.
- Non-transient non-community (NTNC) K-12 public schools.
- Small DAC water systems owned by California Native American Tribes that can demonstrate an O&M assistance need.
- Small DAC water systems on the Failing List or otherwise not part of the initial Group 1 prioritization.

The Deputy Director of DFA has discretion to approve projects that do not fall into the scenarios outlined above on a case-by-case basis. The next round of Group 1 agreements is expected to be executed during FY 2024-25. Per Section V.D.1 of the FY 2024-25 FEP, the uncommitted $18.7 million from the previous FY FEP is targeted to go towards direct O&M projects in either Group 1 or 2.

As the Direct O&M Program continues to develop, it remains focused on water system level affordability data, but funding awards may also incorporate requirements for water systems to set up household level assistance programs when O&M funding is awarded.

Notwithstanding the eligibility criteria described above, direct O&M funding that facilitates voluntary consolidations or provides interim O&M funding for water systems that will be or have been appointed an administrator will continue to be eligible.

10.4.3.5 Planning & Construction

Between 2019 and 2023, financial assistance for long-term solutions, such as drinking water infrastructure construction and consolidation, was provided to 188 water systems serving approximately 12.5 million individuals. Planning assistance (towards construction of long-term solutions) was provided to 61 water systems serving approximately 413,000 individuals.[333] Since 2019, the percentage of Failing and At-Risk systems receiving assistance from the State Water Board and the amount of funding received each fiscal year has increased, with most of the funding going towards capital projects. Table 10-5 summarizes the amount of funding provided via agreements for planning and construction projects during this period. Table 10-6 and 10-7 summarize the funding programs that supported these projects.

In 2023, the State Water Board adopted the Guidelines for the Expedited Drinking Water Grant (EDWG). The EDWG Program utilizes a variety of state funding sources for drinking water infrastructure projects, including Proposition 1, Proposition 68, the Safe

[332] O&M funding for California Public Utilities Commission (CPUC)-regulated utilities is subject to all applicable CPUC regulations and is contingent on the ability of the utility to meet funding conditions in compliance with applicable CPUC rules.

[333] Funding contracts are typically made with a single water system; however, some projects often benefit multiple systems, especially in the case of consolidation projects. Additional planning resources are available via the TA program.

and Affordable Drinking Water Fund, and the Budget Act of 2021. These funds are administered as grants to help expedite construction ready projects subject to the eligibility guidelines.[334]

Table 10-5: Planning and Construction Funding

Funding Provided	# of Systems	# of Projects	Planning Funding	Construction Funding
2023	82	64	$5.8 M	$448.2 M
2022	55	48	$6.2 M	$749.0 M
2021	73	60	$8.3 M	$511.4 M
2020	55	40	$5.2 M	$209.5 M
2019	37	33	$7.3 M	$188.0 M
TOTAL:	**302**	**245**	**$32.8 M**	**$2,106.1 M**

Table 10-6: Planning Funding by Funding Program

Funding Provided	Drinking Water State Revolving Fund	Drinking Water Bonds	General Fund	Safe and Affordable Drinking Water Fund
2023	$4.3 M	$0.4 M	$0.8 M	$0.3 M
2022	$2.0 M	$2.1 M	$2.1 M	$0
2021	$2.0 M	$6.2 M	$0	$0.1 M
2020	$1.2 M	$2.8 M	$0	$1.2 M
2019	$6.6 M	$0.7 M	$0	$0
TOTAL:	**$16.1 M**	**$12.2 M**	**$2.9 M**	**$1.6 M**

[334] Expedited Drinking Water Grant Program: https://www.waterboards.ca.gov/drinking_water/services/funding/expedited-grant-funding.html

Table 10-7: Construction Funding by Funding Program

Funding Provided	Drinking Water State Revolving Fund	Drinking Water Bonds	General Fund	Safe and Affordable Drinking Water Fund
2023	$222.0 M	$11.2 M	$192.5 M	$22.5 M
2022	$689.0 M	$13.1 M	$42.5 M	$7.2 M
2021	$394.3 M	$83.2 M	$4.8 M	$29.4 M
2020	$131.1 M	$22.5 M	$4.4 M	$45.8 M
2019	$166.1 M	$21.8 M	$0	$0
TOTAL:	**$1,602.5 M**	**$151.8 M**	**$244.2 M**	**$104.9 M**

10.4.3.6 PFAS and other Emerging Contaminants

Recent budget acts included approximately $125 million for technical and financial assistance to drinking water systems to address PFAS or per- and polyfluoroalkyl substances. After funding reductions, there was $24 million remaining which has been fully committed. In SFY 2024-2025, an estimated $407 million in federal funding, such as the Emerging Contaminants and Emerging Contaminants in Small or Disadvantaged Communities Grant Programs, is also available to address emerging contaminants, including PFAS, manganese, and 1,2,3-trichloropropane (1,2,3-TCP).[335] IIJA also provided $206 million in FY 2022 and 2023, and future allotments are expected in future years available to community water systems and nonprofit noncommunity systems to complete LSL inventory and replacement. A portion of funds may be utilized consistently with the 2024-2025 FEP to meet the needs of small DACs, to an extent consistent with the funding source requirements, and aligned with SAFER Program priorities. These may include:

- Support of statewide testing for small or DAC CWSs for PFAS. This work is anticipated to be implemented via an agreement with an eligible third-party TA provider.
- Discussions with consultants, non-governmental organizations and subject matter experts to identify potentially interested parties to conduct treatment pilots and/or demonstration projects for small DACs. The scope could include development of design templates for small and medium systems.
- Support of development and planning for projects benefiting small DACs where regional-scale consolidation approaches may be the most cost-effective

[335] 2024-2025 Emerging Contaminants Supplemental IUP: https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/2024/2024-25-supp-iup-ec.pdf

approach to addressing PFAS contamination.

- Support of planning for projects benefiting small DACs to treat PFAS and other emerging contaminants.

The Deputy Director of DFA has authority to approve funding of eligible needs consistent with the FEP. Most of the funding is expected to be utilized for eligible PFAS construction projects, which will be implemented and funded consistent with the process outlined in the DWSRF application process and IUP, including the Supplemental IUP for Emerging Contaminants.[336]

10.4.4 Other Governmental Financial Assistance Programs

The State Water Board's Citizen Monitoring Program[337] keeps listings of California-based funding sources of all types, including private foundations and corporations, along with contact information, grant project examples, and other pertinent information for funding volunteer (citizen) monitoring projects and related California watershed restoration efforts.

The Department of Water Resources (DWR) administers grant and loan funding associated with legislation and several general obligation bond laws. In recent years, the State Water Board has coordinated closely with DWR on addressing drought impacts and other regional programs via both agencies' respective funding programs to maximize benefits to small communities.

The US Department of Agriculture's Rural Development's Rural Utilities Service, a Water and Environmental Program (WEP), provides loans, grants and loan guarantees for drinking water, sanitary sewer, solid waste and storm drainage facilities in rural areas, cities, and towns of 10,000 or less. Public bodies, non-profit organizations and recognized Indian tribes may qualify for assistance. WEP also makes grants to nonprofit organizations to provide TA and training to assist rural communities with their water, wastewater, and solid waste problems.

The US Department of Agriculture's Rural Development Financial Programs support such essential public facilities and services as water and sewer systems, housing, health clinics, emergency service facilities and electric and telephone services. The US Department of Agriculture promotes economic development by supporting loans to businesses through banks and community-managed lending pools. It offers TA and information to help agricultural and other cooperatives get started and improve the effectiveness of their member services and provides TA to help communities undertake community empowerment programs.

The US Fish and Wildlife Service offers grants for states and territories, through the Cooperative Endangered Species Conservation Fund (authorized under section 6 of the Endangered Species Act) in a wide array of voluntary conservation projects for candidate, proposed and listed species. These funds may in turn be awarded to private

[336] DWSRF Intended Use Plan (IUP) and Supplemental IUPs: https://www.waterboards.ca.gov/drinking_water/services/funding/DWSRFIUP.html

[337] Citizen and Community Monitoring Programs and Groups https://www.waterboards.ca.gov/water_issues/programs/swamp/clean_water_team/watershed_rel.html

landowners and groups for conservation projects.

The Environmental Grantmaking Foundations directory is a comprehensive list of foundations that support environmental activities and programs. These foundations primarily give grants to nonprofit 501(c)(3) organizations.

Watershed Action Grants are conservation funds that aid nonprofit organizations in implementing conservation plans to protect watersheds, improve water quality and promote watershed stewardship.

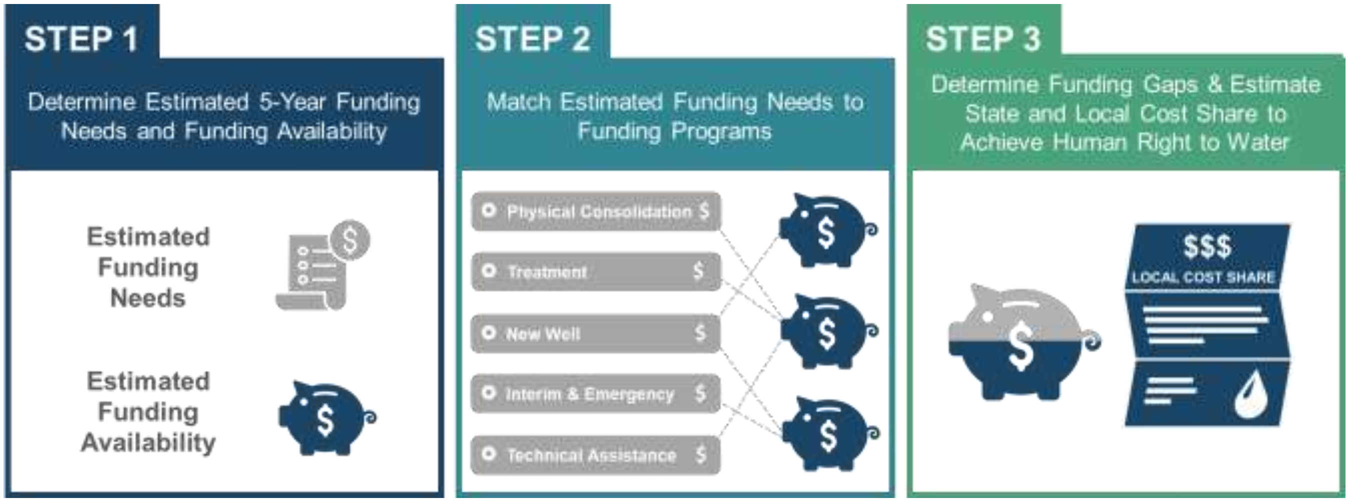
USEPA Water Infrastructure Finance and Innovation Act (WIFIA) provides long-term, low-cost supplemental loans for regionally and nationally significant water infrastructure projects. USEPA also implements a Drinking Water Infrastructure Grant Tribal Set-Aside program. WIFIA has been gaining speed and utility over the years. In the next 5 years, WIFIA is likely to continue to grow or replace DWSRF federal support based on recent USEPA funding priorities.

The Infrastructure State Revolving Fund (ISRF) Program is authorized to directly provide low-cost public financing to state and local government entities. ISRF financing is available in amounts ranging from $1 million to $65 million with loan terms for the useful life of the project up to a maximum of 30 years. Eligible applicants must be in California and include any subdivision of a local government, including cities, counties, special districts, assessment districts, joint powers authorities and nonprofit organizations sponsored by a government entity.

10.5 FUNDING GAP ANALYSIS

The 2024 Needs Assessment Cost Assessment and resulting Funding Gap Analysis informs the broader demands of the SAFER Program, including annual funding needs for the SADW Fund. The Cost Assessment modeling process helps determine the estimated costs related to implementation of new interim and long-term solutions for Failing and At-Risk public water systems, high-risk state small water systems, and high-risk domestic wells. The Funding Gap Analysis is the final step within the Cost Assessment process. The results of the Funding Gap Analysis estimate projected funding needs over the next five years within the 10-year appropriation of SADW funds. It estimates the gap between potentially available funding and the estimated amount needed. The results of this analysis help the State Water Board determine the potential long-term cost share responsibilities between the State Water Board and local communities in achieving the Human Right to Water. This information helps the State Water Board budget and prioritize how best to utilize the amount of SAFER program funding that is available. The funding gap analysis methodology is outlined in Figure 10-4 below.

Figure 10-4: Funding Gap Analysis Methodology



10.5.1 Estimated 5-Year Funding Needs

The estimated funding needs in the analysis assume that a portion of the total cost burden of modeled needs is borne by water systems, their ratepayers, and/or domestic well owners. Additionally, the State Water Board's funding sources are not the only external funding sources available to water systems. Therefore, estimated funding needs for interim and long-term solutions were separated into three categories: costs that are State Water Board grant eligible, costs that are loan eligible, and capital costs that are not State Water Board loan or grant eligible. The criteria used to determine grant-eligible funding needs were generally adapted from the DWSRF IUP from FY 2023-24 in Appendix E.[338] The results of this analysis are summarized below in Figure 10-5, Table 10-8, and Table 10-9. Learn more in Appendix: Funding Gap Analysis Methodology (June 2024).[339]

Note: Estimated financing costs (public and private interest payments) and estimated new modeled treatment O&M costs are excluded from the Funding Gap Analysis but included in the estimated Local Cost Share for communities. Additionally, the model does not fully analyze a water system's ability to pass DFA financial review.

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[338] FY 2023-24 Drinking Water State Revolving Fund Intended Use Plan https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/2023/2023-24-dwsrf-iup.pdf

[339] Appendix: Funding Gap Analysis Methodology https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024funding-gap-analysis-methodolgy.pdf

Figure 10-5: Estimated 5-year Funding Needs (Capital and Managerial Assistance Only based on 2024 Needs Assessment)

Grant Eligible Needs: portion of modeled long-term and interim estimated needs that are State Water Board grant eligible. Grant eligibility is based on system size, system type, DAC status, and affordability.
Loan Eligible Needs: portion of modeled interim and long-term estimated needs that are State Water Board loan eligible. Loan eligibility is based on system size, system type, DAC status, and affordability.
Non-State Water Board Funding Eligible Needs: portion of modeled interim and long-term capital needs that are neither State Water Board grant nor loan eligible.

Table 10-8: 5-Year Estimated Capital and Managerial Assistance Funding Needs for Failing & At-Risk Public Water Systems ($ in Millions)

System Type	Projected # of Systems with Need	Total Grant Eligible Need	Total Loan Eligible Need	Total Needs Not Funding Eligible	Total Estimated 5-Year Need[340]
Failing Public Water Systems	624	$3,425	$435	$0	**$3,860**
At-Risk Public Water Systems	569	$2,476	$307	$0	**$2,783**
TOTAL:	**1,193**	**$5,901**	**$742**	**$0**	**$6,643**

[340] Excludes estimated financing costs (interest payments) and long-term O&M for new modeled treatment.

Table 10-9: 5-Year Estimated Capital and Managerial Assistance Funding Needs for High-Risk State Small Water Systems & Domestic Wells ($ in Millions)

System Type	Projected # of Systems with Need	Total Grant Eligible Need	Total Loan Eligible Need	Total Needs Not Funding Eligible	Total Estimated 5-Year Need[341]
High-Risk State Small Water Systems	727	$95	Not Eligible	$235	**$330**
High-Risk Domestic Wells	143,663	$1,479	Not Eligible	$3,103	**$4,582**
TOTAL:	**144,390**	**$1,574**	**$0**	**$3,338**	**$4,912**

10.5.2 Estimated 5-Year Funding Availability

Table 10-10 provides a complete list of all State Water Board funds that are anticipated to be available to help meet SAFER program funding objectives in the next year and projected out five years.[342] The majority of projected funding availability is based on federal appropriations and priorities which may shift over time.

Table 10-10: State Water Board Grant and Loan Estimated Availability ($ in Millions)

State Water Board Administered Funds	Yr. 1 Est. Fund Size	Projected Total 5-Yr. Fund Size
Safe and Affordable Drinking Water Fund (SADWF) (Grant State Funding)	$214[343]	**$670**
Drinking Water State Revolving Fund (DWSRF) (PF Federal Funding)	$146	**$540**
DWSRF (Loan Federal Funding)	$300	**$1,500**
Emerging Contaminant Funding Program (e.g. 1,2,3-TCP, manganese, etc.) (PF/Grant Federal Funding)	$523	**$770**

[341] Excludes estimated financing costs (interest payments) and long-term O&M for new modeled treatment.

[342] Note that anticipated funding available per state and federal source are estimates. These estimates are subject to various external factors such as state and federal budgeting and are also influenced by potential shifts in priorities year-to-year.

[343] The Funding Gap Analysis assumes approximately $114 million in grant funding availability through 2030, which includes $130 million from SADWF appropriations, reduced by $16 million for State Water Board staff costs. The estimated amount available for year 1 (FY 2024-25) includes an amount of $100 million carried over from prior FYs.

State Water Board Administered Funds	Yr. 1 Est. Fund Size	Projected Total 5-Yr. Fund Size
TOTAL:	$1,183	$3,480

10.5.3 Funding Gap Analysis Results

The purpose of the Funding Gap Analysis is to provide an opportunity for the State Water Board and the public to view the refined 5-year estimated funding and financing capital and managerial assistance needs from different perspectives. The results of the analysis will be utilized to inform the annual funding plan for the SADWF as well as the broader demands on the State Water Board's drinking water funding programs. The following is a summary of the results:

- **Refined Statewide 5-Year Cost Estimate**: The total State Water Board estimated 5-year capital and managerial assistance needs is approximately $11.5 billion for Failing public water systems, At-Risk public water systems, high-risk state small water systems, and domestic wells. This estimate is $1.3 billion (13%) higher than the total estimated needs in the 2021 Funding Gap Analysis ($10.2 billion).
- **Grant Funding Gap**: The Funding Gap Analysis estimates a cumulative 5-year grant funding gap of $5.5 billion for estimated capital and managerial assistance needs.[344] This estimated 5-year grant funding gap is $3.45 billion (168%) greater than the results from the 2021 Funding Gap Analysis ($2.05 billion). This significant increase is attributed to project eligibility changes as defined in the annual DWSRF IUPs, meaning that more modeled needs are State Water Board grant eligible in 2024 compared to what was considered grant eligible in 2021.
- **Loan Funding Gap**: The Funding Gap Analysis indicates no projected loan/financing funding gap. All estimated 5-year loan eligible estimated capital needs are met by projected available loan capacity.[345] The analysis estimates $758 million in unused loan capacity. This result differs greatly from the 2021 Funding Gap Analysis that estimated a $2.55 billion loan gap. Changes in grant eligibilities since 2021 have expanded, resulting in more modeled needs being grant eligible rather than loan eligible. It is important to note that in many cases grant eligible projects may also be loan eligible. A shortfall in grant would not necessarily preclude a recipient from applying for loan.
- **The Growing Grant Gap**: Estimated additional new grant-eligible needs are expected to exceed the amount of grant funds available, in perpetuity. Therefore, without additional funds, the future grant funding and financing gaps are expected to grow. Other state, federal, and private funding and financing (including loans) may be available to meet some of these needs.
- **Local Cost Share:** The Funding Gap Analysis estimates that the projected needs of local cost share required are $13.9 billion. This is $11.4 billion (456%)

[344] Grant Funding Gap is based on an analysis of applicable State Water Board grant programs only.
[345] Financing Gap is based on an analysis of the State Water Board's DWSRF only.

higher than the results from the 2021 Funding Gap Analysis ($2.5 billion). This difference is attributed to the following:

- The 2021 local cost share calculations did not include estimated State Water Board funding eligible needs that were projected to be unmet by estimated available funding.
- The 2024 analysis includes a much larger estimate of non-DAC high-risk state small water systems and domestic wells that would not be eligible for State Water Board funding. Refer to the Cost Assessment section of this report for more information.

This analysis is for modeling purposes only. The projected 5-year funding needs do not reflect typical funding demand for the State Water Board's programs. Many water systems can self-finance their interim and/or long-term capital needs.

10.5.3.1 Funding Gap Analysis of All State Water Board Funds

Anticipated available near-term funding sources across all State Water Board funding programs relevant to drinking water were analyzed and compared to the estimated total funding need in the second quarter of 2024. Anticipated available funding was distributed based on general funding priorities identified in the FY 2023-24 FEP's "General Funding Approach and Prioritization" and accordingly are subject to change each fiscal year.

The total State Water Board estimated 5-year funding eligible need is $8.2 billion for Failing public water systems, At-Risk public water systems, high-risk state small water systems, and domestic wells. Of this total estimated 5-year funding need, $7.5 billion is modeled grant eligible and $742 million is modeled as loan eligible. The State Water Board has a projected $3.5 billion in 5-year funding availability: $2 billion for grants and $1.5 billion for loans. Therefore, the estimated 5-year funding gap is $5.5 billion for grant eligible needs (Figure 10-6). All estimated 5-year loan eligible needs are met by projected available loan capacity.[346] The State Water Board estimates $758 million in loan capacity that could be utilized for projects serving larger, potentially non-DAC systems.[347]

[346] The evaluation of loan eligible need does not factor each individual system's ability to take on a State Water Board administered repayable loan. This is evaluated by State Water Board staff based on several items including revenue to debt service ratio, available reserves, and TMF capacity.
[347] Funding totals described in Section 10.4 differ because the funding gap analysis discussed in this section was completed in Spring 2024 prior to the FY 2024-25 FEP referenced in Section 10.4

ACTUAL FUNDING DEMAND

In the five years since 2019, the State Water Board has received approximately 100 applications annually, from water systems requesting an average annual total of approximately $766 million. About 87% of these applications are submitted by small and medium sized water systems for planning and construction projects requesting an average annual total of $460 million (60% of total funding demand). This indicates that while the modeled average annual State Water Board eligible funding demand projected by the Funding Gap Analysis is $1.6 billion, the actual demand in recent years is less. This could be due to several reasons, such as projects not being developed to a point where funding can be requested, a lack water system awareness about funding availability, or lack of interest in receiving funding from or working with State government. State Water Board staff continue to engage with public water systems, particularly those on the Failing list, to ensure that they are aware of the funding resources available to address their compliance issues.

Figure 10-6: 5-Year Funding Gap Analysis Results for Estimated Capital & Managerial Assistance Needs

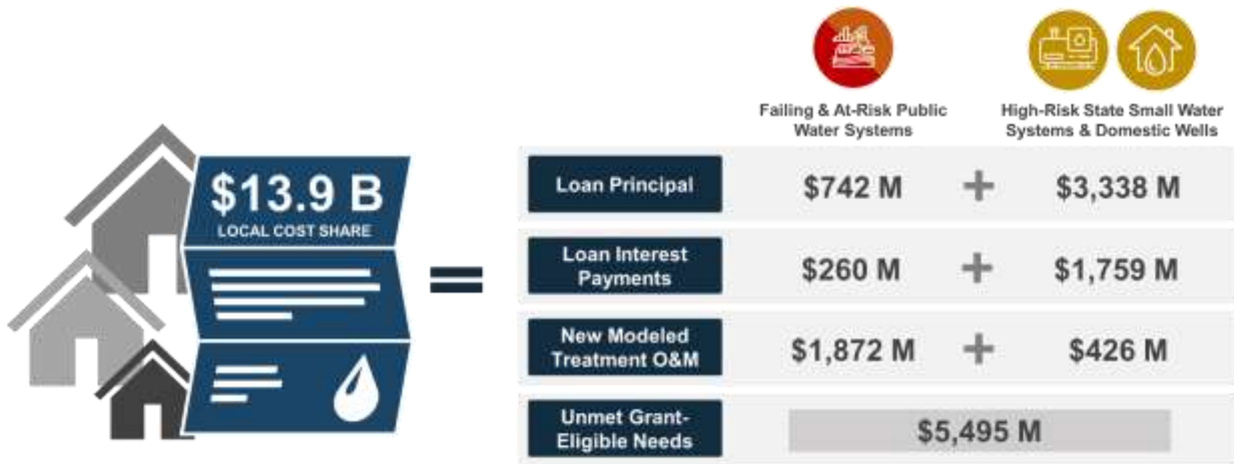
10.5.3.2 Local Cost Share

The responsibility of paying for the interim and long-term drinking water solutions to achieve the Human Right to Water can be borne by federal, state, local funding, and/or private funding sources. For the purposes of this analysis, only State Water Board funding was included as mentioned above.[348] Any costs not covered by grant dollars would ultimately be covered by local communities and homeowners through rates, fees, savings, reserves, etc. (see Figure 10-7). These costs are referred to as “Local Cost Share.”

[348] APPENDIX: FUNDING GAP ANALYSIS METHODOLOGY Refer to “*Unaccounted Funding Sources*.” https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024funding-gap-analysis-methodolgy.pdf

Local cost share includes the principal of private/State Water Board loans, long-term financing costs (interest payments), long-term O&M costs associated with new modeled treatment, and estimated grant eligible needs not covered by available 5-year State Water Board grant funding.

Figure 10-7: Local Cost Share Components



Local Cost Share ($13,892 M) = Private Loan Principal ($3,338 M) + State Water Board Loan Principal ($742 M) + Financing Costs ($2,019 M) + Long-Term O&M for New Modeled Treatment ($2,298 M) + Unmet Grant-Eligible Needs ($5,495 M)

10.5.3.3 Achieving the Human Right to Water

The total estimated cost of achieving the Human Right to Water is $15.9 billion for communities currently served by Failing public water systems, At-Risk public water systems, high-risk state small water systems and domestic wells, and projected new Failing public water systems (Figure 10-8). The State Water Board's available grant funding can meet $2 billion of this cost, and local communities would need to fund $13.9 billion.

Figure 10-8: Human Right to Water Cost Share

10.6 CONCLUSIONS AND RECOMMENDATIONS

10.6.1 Conclusions

Over the past several decades, federal and state programs have significantly invested in funding water system infrastructure improvements to help systems comply with regulatory standards. Hundreds of millions of dollars have been directed to eligible water systems through these financial assistance programs, with an emphasis on addressing the needs of small, disadvantaged communities. However, many small systems serving these communities still face ongoing challenges in affording capital improvements, as well as managing ongoing operations and maintenance (O&M) costs. Failure to charge sufficient rates to be able to cover O&M costs can prevent these small systems from being able to access financial assistance for capital projects. Even when treatment facilities are installed, water systems must have technical expertise and financial capacity to manage and maintain these facilities. To address these issues, the SAFER program offers financial assistance to support both physical and managerial consolidations, ensuring that these systems have access to long-term sustainable solutions for safe drinking water.

The State Water Board will continue to track, prioritize, optimize, and streamline the available funding and estimated need to address the State's most drinking water needs. These initiatives include continued support of changing DWSRF appropriations, continued improvements of the EDWG Program, rollout of the IIJA appropriations (including emerging contaminate research and program funding, and lead service line inventory and replacement related initiatives), establishment of Proposition 4 guidelines and funding programs, and continued improvements to the planning, construction, and Technical Assistance programs (including O&M, administrator, and consolidation support). Continuation or replacement of the SAFER Program funding will be critical to success in these areas.

10.6.2 Recommendations

10-1 Advocate to increase the State Water Board's funding to meet the funding gap and support public water systems' sustainability.

10-2 Continue to inform water systems, stakeholders, and legislators about the State Water Board's funding shortfall affecting support for water systems.

10-3 In anticipation of the development of TMF regulations in alignment with SB 1188 (2024), support the continued education of water systems regarding the importance of assessing, developing, and implementing TMF capacity to create sustainable water systems.

10-4 Support the continued development of interagency coordination to facilitate funding access to the public water systems most in need.

10-5 To increase the speed and efficiency of completing funding projects, develop a state accounting mechanism to provide electronic payments for approved reimbursement requests.

CHAPTER 11 EMERGENCY MANAGEMENT, SECURITY, AND RESILIENCY

11.1 INTRODUCTION

Emergency management aims to reduce or avoid potential losses by addressing the four elements in the emergency management cycle (Figure 11-1): Prevention/Mitigation, Preparedness, Response, and Recovery. The emergency management cycle illustrates the ongoing process by which all organizations can plan for and reduce the impacts of disasters, respond during and immediately following a disaster, and take steps to recover after a disaster has occurred. The Division of Drinking Water (DDW) has taken steps to improve its ability to respond to an incident by updating emergency response plans and its continuity of operations plan, so DDW can best support the water systems it regulates.

Figure 11-1: Emergency Management Cycle

11.2 INITIATIVES

The federal government, State of California, and the State Water Resources Control Board (State Water Board) are continuing efforts to improve water system security, emergency preparedness, emergency response, and water system resiliency, including the need to bolster and expand existing levels of preparedness, while addressing concerns related to climate change. Over the last five years, the following initiatives have advanced these efforts. Other older initiatives are being revisited due to increased threats and new research, and desires at the state and federal levels to address these threats.

11.2.1 Public Health Security and Bioterrorism Response Act

Terrorism is a water security concern across the nation. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (PL107-188), known as the Bioterrorism Act, was enacted to improve overall national security. Title 4 of the Bioterrorism Act was directed at Drinking Water Security and required the US Environmental Protection Agency (USEPA) to modify the Safe Drinking Water Act (SDWA) to require public water systems (PWSs) to improve security. Water system facilities were identified as critical infrastructure in the 2003 Homeland Security Presidential Directive 7.

11.2.2 America's Water Infrastructure Act

In 2018, America's Water Infrastructure Act (AWIA) was signed into law. Section 1433 of AWIA requires community water systems serving more than 3,300 people to certify every five years that they completed or updated a risk and resilience assessment (RRA) and an emergency response plan (ERP). The law specifies the components that ERPs must address. All certifications submitted by water systems are submitted directly to USEPA. The State Water Board does not have any authority to enforce this requirement, but water system ERPs are reviewed during a sanitary survey.

11.2.3 Water Conservation and Drought Planning

Senate Bill (SB) 606 (Hertzberg) and Assembly Bill (AB) 1668 (Friedman) of 2018 combined require the Department of Water Resources (DWR) and the State Water Board to establish new requirements for water conservation, water use efficiency standards, and drought planning. These laws also recognize the vulnerability of small water systems and rural communities to drought or other stressed water supply conditions due to limited resources and solutions to water shortage conditions. To address this, the law required DWR, in consultation with the State Water Board, to develop recommendations and guidance on how county-wide drought and water shortage contingency plans can be implemented to address planning needs of small systems and rural communities. The report, *Small Water Systems and Rural Communities Drought and Water Shortage Contingency Planning and Risk Assessment*, was published in March 2021 and is posted on DWR's website.[349]

Executive Order N-10-19 issued by Governor Newsom directs the California Natural Resources Agency, California Environmental Protection Agency, and the California Department of Food and Agriculture to prepare the Water Resilience Portfolio for California.[350] The first portfolio was released in July 2020. Since then, two progress reports were released in 2021 and 2023. The 2023 progress report contains 142 distinct actions to be taken by state agencies, as resources allow. Together, the actions are intended to support California's diverse regions as they work to improve their ability to withstand drought and flood and safeguard reliable water supplies for communities and

[349] Department of Water Resources, Small Water Systems and Rural Communities Drought and Water Shortage Contingency Planning and Risk Assessment. Countywide Drought Planning, https://water.ca.gov/Programs/Water-Use-And-Efficiency/2018-Water-Conservation-Legislation/County-Drought-Planning

[350] Water Resilience Portfolio: https://resources.ca.gov/Initiatives/Building-Water-Resilience/portfolio

natural systems. The portfolio actions are organized into four broad approaches:

1. Maintaining and Diversifying Water Supplies
2. Protect and Enhance Natural Systems
3. Build Connections
4. Be Prepared

This initiative builds on the work completed under the California Water Action Plan, developed at the direction of Governor Brown in 2014 and updated in 2016. That plan identified the risks to California’s water resources due to climate change, water scarcity and drought, poor water quality, floods, and supply disruptions. It identified the need for more reliable water supplies and more resilient, sustainably managed water systems that can better withstand inevitable pressures on the system in the coming decades.

11.2.4 Drought Planning: Small Water Suppliers

State and local governments share the responsibility in preparing and acting in the case of a water shortage event by ensuring that small water suppliers plan for a water shortage before it occurs. As discussed throughout this plan, SB 552 (Hertzberg 2021) included requirements aimed at improving the ability of Californians to manage future droughts and help minimize catastrophic impacts on drinking water for communities vulnerable to impacts of climate change. The bill outlines the new requirements for small water suppliers, county governments, DWR, and the State Water Board to implement more proactive drought resiliency planning and be better prepared for future water shortage events or dry years.

11.2.5 Cybersecurity Preparedness

SB 892 (Hurtado 2022) required California Governor’s Office of Emergency Services (Cal OES) to direct the California Cybersecurity Integration Center (Cal-CSIC) to prepare, and Cal OES to submit to the Legislature on or before January 1, 2024, a strategic, multiyear outreach plan to assist the food and agriculture sector and the water and wastewater sector in their efforts to improve cybersecurity and an evaluation of options for providing grants or alternative forms of funding to, and potential voluntary actions that do not require funding and that assist those sectors in their efforts to improve cybersecurity preparedness. DDW collaborated with Cal-CSIC to provide information specific to the water sector and share sector-specific challenges that are included in the plan. Cal-CSIC submitted the report to the Legislature, and DDW continues to collaborate with Cal-CSIC and other cyber entities at Cal OES.

11.2.6 Water Loss Performance Standards Regulation

Modified in 2023, Water Code section 10608.34 requires the State Water Board to develop and adopt performance standards for water loss for urban retail water suppliers (URWS), while considering lifecycle cost accounting. The Water Loss Performance Standards will achieve more efficient water use in California by reducing water loss, and energy and greenhouse gas emissions associated with supplying and treating water that is lost to leakage. The regulation is designed to bring water losses to levels that are cost-effective and feasible for each URWS, and the regulation will support each URWS in planning and implementing water loss control in a cost-effective manner. The intent of the regulation is to identify and require each supplier to reduce leakage to the level of a specific volumetric standard that is based on its own unique characteristics and is cost-effective, while providing each supplier with the flexibility to choose any effective approach best suited for its system and budget to meet its standard.

11.2.7 Benzene Testing After a Wildfire

AB 541 (Wood 2023) directs the State Water Board pursuant to the SDWA to require a PWS that has experienced a wildfire incident meeting specified criteria to perform sample collection and analysis of its source waters, treatment facilities, conveyance facilities, distribution systems, or a combination thereof, for the presence of benzene as soon as it is safe to do so. AB 541 also authorizes the State Water Board to require a PWS response that includes specified measures if a PWS conducts sampling and finds detectable concentrations of benzene.

11.2.8 Guidelines for the Expedited Drinking Water Grant Funding Program

Resolution No. 2023-0006 authorizes the Deputy Director of the Division of Financial Assistance (DFA) or designee to award grants and execute grant agreements and amendments for routine, non-controversial projects consistent with these guidelines. Expediting funding after an incident has been used to help an impacted system recover more quickly.

11.2.9 Direct Potable Reuse Regulations

Adopted in 2024, Direct Potable Reuse (DPR) regulations (SBDDW-23-001) enable participating PWSs to augment their system's drinking water source(s) thereby reducing reliance on surface and groundwater sources by establishing minimum uniform water recycling criteria. The regulations adequately protect public health with respect to the planned reuse of municipal wastewater to produce water that is placed into a water distribution system of a PWS or into a water supply immediately upstream of a PWS's water treatment plant.

11.2.10 Resiliency Resolutions

Over the last five years (2020-2024), the State Water Board adopted several resolutions to improve water resiliency. Some of the resolutions include adopting regulations to reduce water use for non-functional turf, adopting emergency regulations to address severe water shortages, and authorizing grants to conduct water resource studies. There have also been several drought and climate change related initiatives.

11.3 DRINKING WATER EMERGENCY PREPAREDNESS AND RESILIENCY

11.3.1 Emergency Preparedness

Under the America's Water Infrastructure Act (AWIA) of 2018, community water systems (CWSs) serving more than 3,300 people are required to conduct risk and resilience assessments (RRAs) and develop emergency response plans (ERPs). Training to conduct thorough RRAs and develop ERPs is vitally important to the successful development and effectiveness of each document. DFA maintains a contract with Rural Community Assistance Corporation (RCAC) to deliver training to rural water systems, and DDW coordinates with RCAC to review the presentations to provide insight into relevant state and federal emergency planning principles and to ensure water system personnel are trained in accordance with guidance from state and federal emergency managers. Currently, there is no requirement for systems serving 3,300 people or less to conduct a vulnerability assessment and develop an ERP. Requiring all community water systems to conduct risk and resilience assessments and develop emergency response plans would enhance the resiliency and preparedness of all systems.

Once the COVID-19 pandemic began in 2020, it halted in-person exercise and training events. The role of such exercises is to train personnel, test systems, and evaluate plans so organizations can increase the effectiveness of their plans. These exercises need to be performed by water systems with the participation of external stakeholders to test assumptions and enhance familiarity with planned actions. Over the last couple of years, consistent with the termination of the state's COVID-19 State of Emergency in 2023, DDW has seen a resurgence of in-person exercise and training events, and as such has been participating in exercise and training events across the state to assist with local response planning. DDW has also been involved in providing training to county environmental health professionals, mutual aid organizations, and water systems professionals to improve their planning and response capabilities. To provide training to environmental health professionals, DDW partners with the California Department of Public Health (CDPH) by providing speakers at CDPH hosted Environmental Health Training in Emergency Response (EHTER) training events to provide training in drinking water emergency response.

11.3.2 Resiliency

11.3.2.1 Drought

Long-term megadroughts stress groundwater aquifers and diminish surface water supplies, contributing to water scarcity. SB 552 (Hertzberg 2021) was signed into law to improve California's resilience against drought by establishing a Drought Response Program Manager position within DDW. This new role will enhance DDW's ability to monitor and address the impacts of drought on water systems throughout the state, particularly smaller, non-urban systems that often face greater challenges. In addition to providing dedicated oversight and follow-up, SB 552 (Hertzberg 2021) also includes provisions to require water shortage contingency plans or drought planning elements to be constructed, and for several drought resiliency measures to be implemented. These measures collectively aim to strengthen the state's drought preparedness and ensure a more equitable distribution of resources to vulnerable water systems.

11.3.2.2 Harmful Cyanobacteria

One impact believed to be attributable to the changing climate is the increasing occurrence of harmful cyanobacteria. DDW maintains an ad hoc, informal workgroup to share information on harmful algal blooms, cyanotoxins, and related matters. The members participate in the California Cyanobacteria and Harmful Algal bloom Network (CCHAB), a part of the California Water Quality Monitoring Council. The CCHAB developed guidance for local environmental health directors to address cyanobacteria in inland recreational waters to help public health managers respond to inland harmful algal blooms (HABs).[351]

When a surface water source is identified as containing harmful cyanobacteria and a PWS relies on that water body as a source, workgroup members from the State Board may provide recommendations. Around 77% of the volume of water withdrawn statewide for public supply and domestic use is taken from surface water sources.[352] Allocating resources to create a program that identifies at risk surface water sources will be key to addressing the impacts of a changing climate and will help the state to be more proactive in addressing harmful cyanobacteria.

To understand which sources are at risk, an assessment system needs to be set up to identify higher risk water bodies. Sampling determines which sources are at risk or contain harmful cyanobacteria and is an initial step to identify at risk sources. The next step involves assessing treatment plant vulnerabilities to toxins identified in the initial step. Once identification is complete and DDW better understands the vulnerabilities associated with each surface water treatment plant, conducting ongoing monitoring of at-risk and prioritized PWSs can be done to reduce the impacts of harmful cyanobacteria. Creating a table of California water bodies with a documented presence of cyanotoxins will benefit PWSs to better assess their vulnerabilities to toxins. It is likely too that the data collected from monitoring can help inform other climate-related studies as they impact water sources and subsequently drinking water in California.

While harmful cyanotoxins can be identified in a water body, their drivers to emergence and sustainment are still being researched. Understanding potential drivers could lead to early identification of at-risk water bodies. Funding studies at universities that look at more regional and local impacts at a biological level will help provide a better understanding whether there could be potential impacts to drinking water treatment on the horizon. Comprehending drivers that contribute to elevated cyanotoxins in a water body will better inform PWSs when they treat source waters into drinking water and will support prioritizing programmatic efforts.

11.3.2.3 External Partnering

DDW also coordinates with the United States Department of Agriculture Rural Development (USDA-RD) to connect eligible systems to grant and loan opportunities. USDA-RD makes grants and loans available to eligible systems through its Water and Environmental Programs and its Community Facilities Programs. Through these funding opportunities, eligible water systems can apply for emergency funding, technical assistance funding, and funding to improve facilities. USDA-RD occasionally receives funding from Congress after disasters to help eligible systems with impacts from the disasters that occurred in certain fiscal years, so DDW coordinates with USDA-RD to connect them with eligible systems after disaster.

Like USDA-RD, DDW helps systems become more resilient through its Safe and Affordable Funding for Equity and Resilience (SAFER) program. More can be found in

[351] Freshwater and Estuarine Harmful Algal Bloom (FHAB) Program:
https://www.waterboards.ca.gov/water_issues/programs/swamp/freshwater_cyanobacteria.html
CCHAB Network: https://mywaterquality.ca.gov/cyanohab
[352]Estimated Use of Water in the United States in 2005: https://pubs.usgs.gov/circ/1344/

Chapter 8 about the SAFER Program and how it helps PWSs improve resiliency.

11.4 EMERGENCY RESPONSE

11.4.1 Day-to-Day Emergency Response

Local drinking water emergencies happen every day across the state but are often so small that they do not make the news. If a water system experiences a water main break DDW coordinates with system personnel to issue unsafe water notifications as necessary. After the notices are issued, DDW coordinates with the water system to ensure drinking water is safe by reviewing lab test results taken from the affected distribution system and assuring that appropriate follow-up actions are taken. Once DDW confirms lab results meet regulatory standards, DDW will approve canceling any unsafe water notice. DDW maintains Unsafe Water Notification Guidance[353] on its website in the event an incident occurs, and operators and/or local health officials need guidance about the different notices and who to contact if help is needed.

DDW receives daily incident reports from Cal OES. To ensure Cal OES has a point of contact 24/7, DDW continues to maintain its duty officer program, which assures a DDW manager is constantly available to triage incoming urgent communications. Duty officers receive notifications from the California State Warning Center and forward them to the appropriate DDW field staff for review and action.

11.4.2 Drinking Water Cybersecurity

Since 2020, the national focus on cybersecurity has increased. In 2022, Governor Newsom signed SB 892 (Hurtado 2022) into law, requiring the California Cybersecurity Integration Center (Cal-CSIC) to prepare a report to the California Legislature outlining a plan to improve cybersecurity in the water and wastewater and food and agriculture sectors. The State Water Board coordinated with the Cal-CSIC to provide input into the plan. As Cal-CSIC continues with its plan, DDW will coordinate with Cal-CSIC personnel to relay sector-specific challenges encountered and provide critical information to public water systems.

DDW has also been involved in workgroups with other state primacy administrators, hosted by the Association of State Drinking Water Administrators (ASDWA) and American Waterworks Association (AWWA) to collaborate with USEPA, the Cybersecurity & Infrastructure Security Agency (CISA), and the White House, to improve cybersecurity maturity. DDW has submitted feedback to USEPA and CISA (via ASDWA and AWWA) on several circulating documents under review. DDW is also involved in various workgroups led by ASDWA and AWWA that include representatives from other state primacy agencies.

One of the challenges identified in discussions with state and federal partners is protecting critical infrastructure security measures and practices from “Sunshine” Laws. The term “Sunshine” may have originated from the Government in the Sunshine Act, that was signed into law in 1976. It requires meetings of some federal agencies to be

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[353] DDW Unsafe Water Notification Guidance https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Notices.html

open to the public but identifies ten exemptions to allow portions of meetings to be closed (one of those exemptions is to protect national security interests). Prior to that, in 1966, President Johnson signed the Freedom of Information Act into law. It has nine exemptions where information may be protected (the first of which also includes protecting national security interests). Given that water system information is not properly classified, it is releasable to the public, unless another reason can be identified to protect it.

The challenge for regulators of water systems is that any deficiencies identified during an inspection must be reported to the public, and it is very difficult to obscure a cybersecurity deficiency and still be able to release it to the public. For example, USEPA recently posted on its website that many water systems fail to change the factory default passwords on their operational technology and industrial control system equipment. If a water system inspector were to highlight this as a deficiency, the deficiency would, in accordance with the law, be made public, and the security vulnerability would be available for viewing. Even publicly posting information about entities not changing default passwords can be argued as an alert to cybercriminals of easy targets.

Several federal documents highlight how important critical infrastructure is to the United States. The opening sentence of the National Infrastructure Protection Plan states, “Our national well-being relies upon secure and resilient critical infrastructure—those assets, systems, and networks that underpin American society.” On April 30, 2024, President Biden issued National Security Memorandum 22. The opening statement in the memorandum reads, “Critical infrastructure comprises the physical and virtual assets and systems so vital to the Nation that their incapacity or destruction would have a debilitating impact on national security, national economic security, or national public health or safety.” While these are only a couple of citations, one could likely find many more stating something to the same effect.

Despite the stated importance of water systems (one of the 16 critical infrastructure sectors), there are no laws that clearly delineate protecting water system information that contributes to the security of the system. CISA and others recognize the importance of doing so, and as such created the Traffic Light Protocol (TLP) to alert readers to the sensitivity of the information as it relates to security. TLP designations resemble federal classification schemas by identifying categories that promote limiting information to a need-to-know basis and determine the severity of releasing the information. Currently, water system information is distributed via email, and viewers of the information operate on the honor system, but adoption of TLP remains mostly if not entirely at the federal level.

DDW works to ensure water systems are informed in a timely manner promptly when the federal government identifies and shares threats it is concerned about. For example, following Russia’s 2022 invasion of Ukraine, CISA warned of threats from Russian hackers. DDW uses its GovDelivery platform to disseminate information about cybersecurity threats to water systems. DDW also uses the platform to inform water systems about relevant training and resources as they become available.

At the field level, DDW coordinates with water systems that report cyber incidents to their local field office by ensuring operators know to whom to make reports. DDW has also participated in cybersecurity exercises hosted by local agencies and water systems to provide a state-level perspective, as well as to better understand local agency needs and the challenges they face when representing them at the state and federal levels. DDW also participates in regular calls with the Federal Bureau of Investigation (FBI) that serves as an opportunity to hear about the latest threats and tactics of cybercriminals, as well as a place where local agencies can share any information or ask questions about cybersecurity.

As regulatory discussions on cybersecurity continue to evolve, DDW will participate in these conversations at the local, state, and federal levels.

11.4.3 Public Safety Power Shutoff Events

Under a Public Safety Power Shutoff (PSPS), electric power utilities may proactively turn off power in high-fire-risk areas to reduce the chances of fire. DDW receives notifications from the California State Warning Center and coordinates internally to identify potentially impacted systems. After the systems are identified, District Engineers at the local DDW field offices and their staff review the lists and conduct outreach to the systems to determine if a system has a need for support. If a need arises, DDW coordinates with Cal OES's Emergency Services Coordinators, local emergency managers, and mutual aid network to connect them with the water system in need to help fulfill any requests to meet the need. DFA has piloted funding of backup power infrastructure based on availability of funds.

11.4.4 Disaster-Related Emergency Response

During the initial response to an incident, DDW coordinates with state partners to improve awareness of water system needs. For example, DDW provides locations of regulated drinking water facilities to emergency personnel fighting wildfires so they have awareness of critical infrastructure locations and can develop tactics to protect water system infrastructure that not only protects facilities but enables water systems to continue operating and continue providing water to the pipes so firefighters can better fight the fire. In the case of an earthquake, DDW determines the area where water systems' facilities may most likely be impacted by using available geographic information system (GIS) data. If impacted facilities are identified in the area, district office personnel conduct outreach to determine if there have been any impacts and if any assistance is needed. Whatever the incident, the State Water Board participates in coordination efforts to support response by connecting with PWSs to identify any needs, briefing emergency responders, coordinating with mutual aid organizations and local and state agencies to support the PWS's needs, and working with the PWSs to protect public health. If necessary, DDW will send personnel to the local emergency operations center to act as subject matter experts for drinking water response.

Throughout the response, DDW conducts regular outreach to gather any requests for assistance and provide consultation to PWSs and counties that have a local primacy agreement (LPA). For LPA counties, assistance may be to hear a second opinion or to discuss recently passed legislation. Whatever the case, DDW collaborates closely with the local jurisdictions having primacy to help locals regulate their systems. For any requests for assistance from PWSs, DDW will coordinate with state and local emergency managers and mutual aid organizations to fill those requests.

After an incident, DDW staff may conduct field visits to assist water systems in surveying the damage and effects of the disaster, provide support, and potentially coordinate the collection of samples for analysis. Visting PWSs after an incident is an opportunity to see the effects of the disaster and connect with water system personnel. Disasters can be hectic times if operators are working to stabilize operations, and DDW can answer questions on the spot as they arise and provide additional support to the system. If needed, DDW will coordinate with other state agencies to identify PWSs that might be impacted by future threats. For example, DDW provides California Geological Survey a list of drinking water facilities inside and downstream of a burn scar so the locations of the facilities can be included in debris flow risk evaluations. If any facilities are identified, PWS will be notified of the risk and any mitigation recommendations included in the assessment.

As a result of DDW's focus on post-fire impacts, DDW has observed over the last several years some water systems detecting volatile organic compounds (VOCs) in their distribution systems after wildfires. DDW began efforts to understand fire-induced VOC contamination following the Tubbs Fire in 2017 and after the Camp Fire in 2018 when VOCs were detected in water systems impacted by the fires. After the Camp Fire, DDW collected samples from the Paradise water system, as well as from systems impacted by fires in subsequent years, to analyze the samples and work to understand the causes of post-fire VOC contamination. This continued effort to learn more about VOC contamination after a fire and developing steps to mitigate contamination after a fire has led to DDW being a respected authority on the subject, providing support after the fires in Maui and in neighboring states. Over those years, DDW has learned more about those detections by partnering with USEPA Office of Research and Development and other states to assist with assessments by reviewing sampling and testing data and participating in discussions with experts in the field.

In 2023, AB 541 (Wood 2023) was signed into law, clarifying DDW's authority to require sampling for the VOC, benzene, after a fire. The State Water Board has coordinated with other state agencies to identify whether structures have been damaged or destroyed within a water system's service area so DDW can readily inform the water system if it needs to begin assessing whether sampling and testing is warranted.

11.4.5 Drought Response and Financing

During the most recent drought cycle (2020-2023), the State Water Board collaborated closely with colleagues across Divisions (DDW and DFA), and with other state agencies such as Cal OES, and DWR to identify and fund drought resiliency projects using various funding tools:

1. Funding for Urgent Drinking Water Needs
2. Funding through Technical Assistance providers (such as Self-Help Enterprises)
3. DWR Small Community Drought Relief Funding
4. DWR Urban Community Drought Relief Funding

Coordination was needed to ensure no duplication of effort between funding programs, funding for an appropriate engineering solution, and to prioritize funding for water systems with documented water supply problems. DWR was allotted over a billion dollars by Legislature between 2021 and 2022 and the money for that fund has already been allocated to projects that will help large, small, and tribal water suppliers better endure the next inevitable drought.

When a barrage of atmospheric rivers and a giant Sierra Nevada snowpack ended the drought in early 2023, state agencies invested in projects and streamlined permitting to expand groundwater recharge. As a result, state experts estimate that 3.8 million acre-feet of water was intentionally recharged from December 2022 through May 2023.

11.4.6 Mutual Aid

As mentioned above, DDW conducts outreach to drinking water systems impacted by a disaster. If a need is identified, DDW directs the impacted water system(s) to follow California's Standardized Emergency Management System (SEMS) to make requests for mutual aid. DDW also contacts Cal OES's regional emergency services coordinators to inform them of issues and potential impacts so they can work within the counties' emergency operations centers to ensure the counties have visibility of the issues and can prioritize them.

DDW will also contact California Water/Wastewater Agency Response Network (CalWARN) to garner mutual aid/assistance as it has done for recent earthquakes and fires to provide support to water systems. CalWARN regional contacts can connect impacted systems with another system that could help respond to the emergency and re-establish potable water service to customers.

One organization briefly mentioned above that DDW coordinates with frequently during droughts and any outages impacting water systems in eight counties in the San Joaquin Valley and various surrounding areas is Self-Help Enterprises (SHE). Through multi-year grant contracts with SHE, the State Water Board provides funds to address the needs of private homeowners with domestic wells and PWSs serving disadvantaged communities in eight counties in Central California. Through these grants, SHE, on behalf of the State Water Board, can respond quickly to deliver bottled water, rehabilitate or drill new wells, supply tanks to residents, and fund hauled water deliveries. This partnership with SHE has been vital to ensuring the delivery of water in Central California. Every year, regardless of whether there is a drought, SHE has been called upon to provide technical assistance and deliver water as systems respond to and recover from an outage.

While the State Water Board's data shows the greatest need is within SHE's service area, there are still other areas of need where the State Water Board does not yet have a partner. As such, additional funds would be needed to accommodate assistance providers like SHE in other parts of California.

DDW recently worked with Water Emergency Response Organization of Orange County (WEROC) to build response capabilities by providing a Safety Assessment Evaluator Training to engineers of its member organizations. Building this capacity at the local organization level reduces the number of potential requests sent to WEROC after an earthquake and enables PWSs to respond much quickly after an incident where structures need to be evaluated.

Near the beginning of this chapter SB 552 (Hertzberg 2021) was presented. In it is a requirement for community water systems serving 15 to 2,999 connections and schools that are non-transient non-community systems to be a member of a mutual aid organization. It is important to note that mutual aid organizations benefit all the systems involved not just the neediest. Broader participation by water systems in mutual aid networks is necessary to enhance support during an incident. In other words, more systems in a mutual aid network increases the likelihood of a water system receiving mutual aid support faster. Small systems without resources requesting from other small systems without resources increases the potential for an unmet need during or after an incident. If medium and large water systems are also required to be members of a mutual aid network, they would be alerted to the needs of smaller systems and potentially increase the amount of support that could be provided. Furthermore, participation in mutual aid organizations would benefit medium and small systems too. Medium and larger sized systems would be enlisted to support other systems in emergencies and gain critical emergency response experience in the process, building resiliency, and the needed communication protocols and experience to respond when emergencies within their community or elsewhere in the state occur.

11.4.7 State Water Board Emergency Operations

The State Water Board falls under Emergency Support Function 10 (ESF-10). The lead agency for ESF-10 is the California Environmental Protection Agency (CalEPA). The State Water Board coordinates regularly with CalEPA and other boards, divisions, and offices under the Cal EPA umbrella to enhance responses to incidents. With CalEPA as the lead, DDW provides technical expertise around drinking water issues during an incident and works with CalEPA to ensure other state partners are informed. DDW also participates in the Public Health Assessment Unit (PHAU) along with representatives from the California Air Resources Board (CARB) and the Office of Environmental Health Hazard Assessment (OEHHA) to provide subject matter expertise and consultation services during an incident regarding things that may impact public health through drinking water.

The State Water Board's Office of Research Planning and Performance has an emergency management unit, the Emergency Management Program (EMP). To assist with drinking water response, the unit reviews all incident reports that come out of the State Warning Center for any potential impacts to drinking water systems. If any are identified and have not been sent to the DDW duty officer, they are forwarded to DDW for review. Additionally, DDW may request assistance from members within the EMP to build out projects to enhance DDW's ability to meet its mission.

11.5 DRINKING WATER EMERGENCY RECOVERY

11.5.1 Recovery Assistance

During the recovery phase, DDW coordinates with Cal OES to ensure impacted systems that are potentially eligible for California Disaster Assistance Act and Stafford Act Public Assistance funding are included in any initial outreach conducted by Cal

OES. DDW also coordinates with DFA, DWR, USDA – Rural Development, Self-Help Enterprises, and other agencies that could potentially aid during or after a disaster to connect them with PWSs who have been impacted and are need of aid.

11.5.2 Costs, Funding, and Reimbursement

Water systems that incur costs because of an emergency may be eligible for reimbursement from the Federal Emergency Management Agency's (FEMA) and/or Cal OES's Public Assistance grants. To be eligible, there are specific requirements that must be verified to receive reimbursement for expenses incurred due to a disaster. Complying with the documentation and reporting requirements associated with FEMA's and Cal OES's Public Assistance programs increases the likelihood of reimbursement, therefore, DDW contacts the appropriate personnel in Cal OES's Recovery Directorate to connect water system personnel early to help give them the greatest chances of success.

DFA has emergency funding available to help water systems respond to and recover from certain emergency incidents on a case-by-case basis. Emergency funding might include providing money for interim remedies such as emergency bottled water or hauled water, or for urgent repairs such as drilling or repairing groundwater wells.

11.6 CONCLUSIONS AND RECOMMENDATIONS

11.6.1 Conclusions

In the next five years, the State Water Board will continue to enhance its ability to respond to disasters and assist water systems, as well as ways it can address climate impacts. DDW will continue to create and improve internal plans to ensure effective response and coordination after a disaster. As disasters occur, DDW will partner with other state agencies to enhance response and help support water systems as they address challenges that arise during response and recovery.

The next five years will likely provide more clarity surrounding cybersecurity as state and federal elected officials and their respective administrations decide how to enhance cybersecurity for the sixteen critical infrastructure sectors. DDW will work with ASDWA and AWWA to represent water systems in the process by coordinating with cybersecurity professionals, legislatures, and state and federal partners to ensure the unique challenges water systems face regarding cybersecurity and existing regulations are recognized.

To help smaller water systems address preparedness needs, DDW will review existing technical assistance training agreements to determine the best path toward providing smaller water systems with the resources and knowledge to create plans that will help them during disasters. DDW will also continue to partner with CDPH and other state and local entities to enhance the capabilities of local jurisdictions by participating in EHTER trainings and tabletop exercises that promote training toward emergency management goals.

The State Water Board desires to collect and report information to ensure water systems are proactively identified before they experience a severe water shortage due to increasing drought impacts to reduce the impact on Californians by proactively allocating resources to address needs. Water system sustainably related to fire suppression capacity is discussed further in Chapter 8.

11.6.2 Recommendations

11-1 Provide resources to support continued state, local and federal collaboration to enhance cybersecurity. DDW looks forward to collaborating with the agency (or agencies) responsible for cybersecurity to improve the cyber maturity of water systems, as well as obtain and disseminate useful information to inform water systems how to best protect themselves against cyber threats.

11-2 Protect critical infrastructure security measures and practices from having to be released in accordance with public accessibility or “Sunshine” laws to reduce exposing vulnerabilities and security practices to the public for potential bad actors to see.

11-3 Support efforts to build and utilize new and innovative data tools to inform the State Water Board’s ability to anticipate and proactively safeguard water systems from experiencing severe water shortages due to drought and other climate impacts.

11-4 Conduct sampling and analysis of water bodies to determine which are at risk or contain harmful cyanobacteria.

11-5 Create a table of California water bodies with a documented presence of a cyanotoxin.

11-6 Develop resources for public water systems to assess water treatment vulnerabilities by sharing treatment considerations when cyanotoxins are present.

11-7 Provide funding to promote longitudinal studies at academic institutions on the top 10% of water bodies identified as high risk for cyanotoxins in California to better understand the ecological drivers and potentially model the emergence and sustainment of harmful cyanobacteria.

11-8 Support DDW’s efforts to evaluate emergency preparedness in its future technical, managerial, and financial (TMF) regulations. Systems that struggle with TMF capacities tend to lack the resiliency to respond and recover from emergency incidents like a fire when it impacts their system. Consolidating a system with another system with effective TMF capacity can address emergency preparedness and resiliency concerns.

11-9 Support the expansion of the Senate Bill 552 requirement that small water suppliers and schools join a mutual aid organization by adding language to legislation to include all community water systems.

11-10 Establish State Water Board authority to require all community water systems to conduct risk and resilience assessments and develop emergency response plans to improve preparedness.

11-11 Allocate new personnel to enable DDW to conduct and review risk and resilience assessments and emergency response plans.

11-12 Enlist Cal OES and/or FEMA to conduct outreach and provide workshops to small and medium-sized PWSs about Hazard Mitigation grants.

11-13 Support the routine submission by public water systems of accurate and updated water system service area and legal boundaries to the State Water Board.

11-14 Identify ways to ensure drinking water is addressed in local emergency operations centers (EOCs) such as having a dedicated position at an EOC or developing a standard operating procedure (SOP) that includes drinking water concerns as part of incident planning and response.

11-15 Continue to increase awareness of cyber threats and use of guidelines and assistance from organizations such as AWWA, CISA, and the Water Information Sharing and Analysis Center (WaterISAC) to help water systems improve their cyber security.

CHAPTER 12 IMPLEMENTATION

12.1 INTRODUCTION

As required by Health and Safety Code (HSC) section (§) 116355, this chapter discusses recommendations to improve the quality of drinking water in California with a five-year implementation timeline.

This fourth edition of the Safe Drinking Water Plan provides an update to the State's progress in achieving the promise of safe drinking water for all communities in California. As noted in Chapter 1, although most Californians receive drinking water that meets all standards, the promise of safe drinking water has not been met in some communities. In too many cases, achieving solutions to drinking water quality standard violations have been delayed for years.

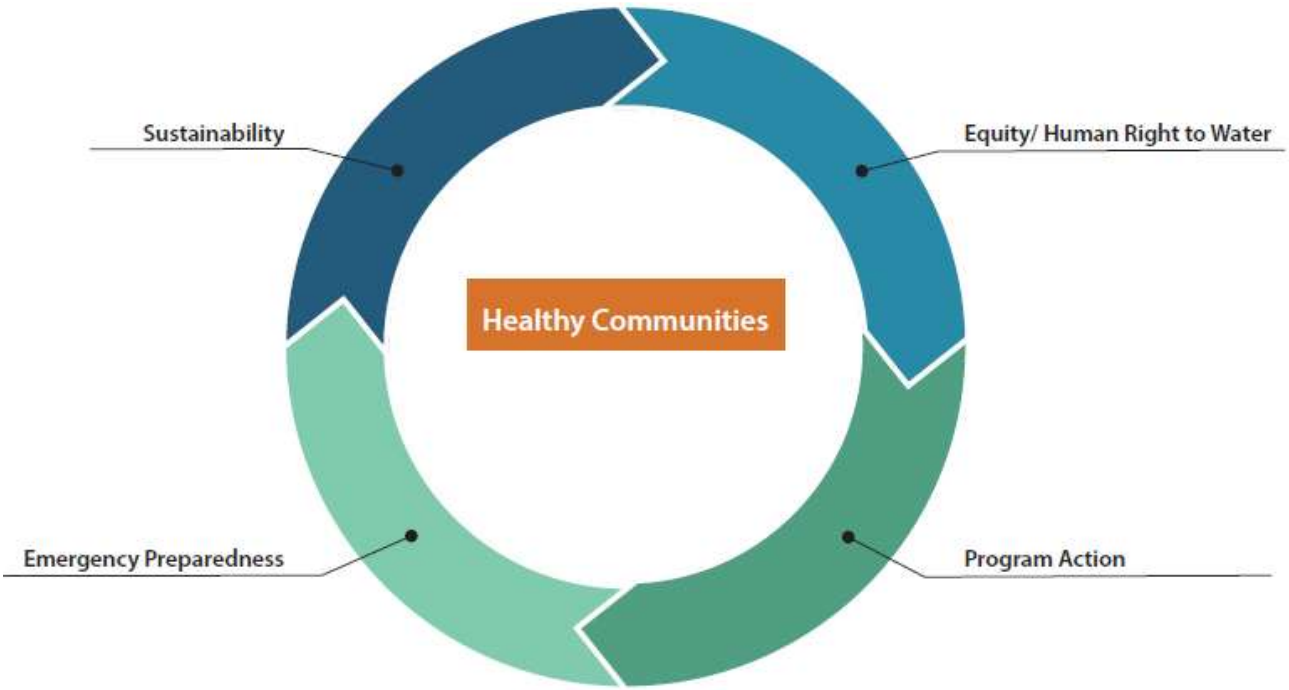
The 2020 Safe Drinking Water Plan (2020 Plan) outlined 66 recommendations in four areas designed to expand efforts to bring a greater number of public water systems and individuals served by state small water systems or domestic wells into compliance and contribute to realizing the Human Right to Water (HR2W) in California. As outlined in Appendix 7, many of the recommendations contained in the 2020 Plan have been acted upon by legislative action and/or program action by the State Water Board and stakeholders. DDW and its stakeholders face ongoing resource challenges to ensure such objectives continue to be met.

The 2025 Safe Drinking Water Plan (Plan) focuses on recommendations necessary to achieve goals of the Safe Drinking Water Act for all communities in California. The recommendations of the Plan are aimed primarily at public water systems regulated by DDW. However, consistent with the statutory mandate of the SAFER program, there has been a broadening of the focus to include public health aspects of state small water systems along with homes and communities served by private domestic wells, which are not currently regulated by DDW

12.2 IMPLEMENTATION STRATEGY OF THE 2025 SAFE DRINKING WATER PLAN

The Plan contains recommendations grouped in the four thematic areas of Emergency Preparedness, Sustainability, Equity/Human Right to Water, and Program Action. These thematic areas are interrelated as shown below. For instance, Sustainability relates closely to technical, managerial, and financial (TMF) capacity in the long term, as well as Emergency Preparedness in the short term. Furthermore, Equity/Human Right to Water is impacted by lack of Sustainability and Emergency Preparedness. All factors are influenced by stakeholder Program Action, such as education, collaboration, funding and enforcement authority. Safe drinking water is now fully recognized as fundamental to healthy communities as the focal point of the overall initiative.

Figure 12-1: Implementation Thematic Areas



Implementation of the Plan builds on the following program initiatives that have been prioritized since the development of previous plan:

12.2.1 Safe and Affordable Financing for Equity and Resiliency (SAFER)

The SAFER program provides both funding and staffing resources aimed at developing and implementing projects to resolve drinking water standards violations impacting small, disadvantaged water systems. The SAFER program has achieved important milestones and objectives with the adoption, development and implementation of plans, tools and approaches consistent with SAFER's statutory mandates. The SAFER program is funded through 2030 and will need replacement funding to continue its work assuring the HR2W is met for all Californians.

12.2.2 Sustainability and Consolidation Initiatives Pursuant to Statutory Authority

Senate Bills (SB) 1263 and 88 provided the State Water Board with important authorities. SB 1263 established the authority to promote sustainability in the consideration of the formation of new public water systems, and stop the proliferation of new, small water systems when feasible for an existing system to serve the proposed service area. SB 88 provided the State Water Board the authority to require mandatory consolidation for disadvantaged communities with water quality or quantity issues with a nearby compliant public water system. To date, most consolidations have been achieved through a voluntary approach, SB 88 provides an important incentive for these solutions. Legislative support for these initiatives included authority to appoint administrators (SB 773) and is discussed throughout this report and highlighted in Appendix 9. Administrators and other forms of technical assistance are key to consolidations when the subsuming water system is unwilling or unable to do the preliminary work necessary to complete the consolidation on behalf of the subsumed system.

These authorities have proven useful, but not entirely sufficient, to fully address the issue of sustainability. Providing adequate technical assistance and funding for all the remaining consolidation projects is a significant barrier to ensuring safe drinking water to all Californians.

12.2.3 Increased Focus on the Issue of Affordability

Consistent with the Human Right to Water and the SAFER program, the State Water Board continues its focus on affordability. The Needs Assessment details cost of solutions needed to address the needs of systems failing to comply or at risk of failing to comply with the Safe Drinking Water Act, and includes an Affordability Assessment, detailing the trends and factors related to water rates and affordability for customers of public water systems. In addition, the SAFER program has developed additional tools, methodologies and approaches to evaluate and consider affordability in the development of sustainable solutions.

12.2.4 Public Information and Transparency

The requirement for timely and thorough public information is foundational to the Safe Drinking Water Act and related regulations. Each public water system has specific obligations to provide information to customers, especially in the event of a problem. The State Water Board has a policy to promote transparency across all data and information systems. To ensure that this program element is met, additional data systems and enhancements are continually being developed, as discussed in this Chapter 5. These improvements include dashboards to promote the timely and transparent availability of information to the public.

12.3 2025 SAFE DRINKING WATER PLAN RECOMMENDATIONS

The grouping of recommendations of this Plan around four key program elements are based on recent authorities and initiatives developed since the 2020 Plan. These program elements are strongly interrelated. For example, a public water system without adequate technical, managerial, and financial capability is likely not able to meet all statutory and regulatory requirements across the range of operating conditions, is less likely to be able to return to compliance after a violation and is less likely to be prepared to deal with and recover from an emergency, requiring program assistance. Many of the Plan’s recommendations are relevant to more than one of the program elements.

Success in carrying out the Plan’s recommendations rely on the efforts of the State Water Board and continued Legislative support. Collaboration with public water systems, stakeholders and the regulatory community is necessary to identify and prioritize desired outcomes and common goals surrounding the recommendations. This must be coupled with an increased level of public involvement and education. The following four thematic approaches are founded on a collaborative approach and recognizes obligations and authorities of the Safe Drinking Water Act are foundational to success. The four thematic areas, and their respective recommendations follow along with chapter references.[354]

12.3.1 Emergency Preparedness

Recent regional emergencies and disasters have brought this thematic area to the forefront. The list of tragic events includes wildfires, droughts, earthquakes, and flooding. Necessity dictates DDW increase overall level of awareness, preparation and resiliency to protect communities and public health in California's emergency response agencies and drinking water communities with the following recommendations pulled from Chapter 11:

- Address and enable the provision of a sustainable water supply that meets fire flow requirements through legislative support and increased funding for the installation of water infrastructure. (8-3)
- Provide resources to support continued state, local and federal collaboration to enhance cybersecurity. DDW looks forward to collaborating with the agency (or agencies) responsible for cybersecurity to improve the cyber maturity of water systems, as well as obtain and disseminate useful information to inform water systems how to best protect themselves against cyber threats. (11-1)
- Protect critical infrastructure security measures and practices from having to be released in accordance with public accessibility or "Sunshine" laws to reduce exposing vulnerabilities and security practices to the public for potential bad actors to see. (11-2)
- Support efforts to build and utilize new and innovative data tools to inform the State Water Board's ability to anticipate and proactively safeguard water systems from experiencing severe water shortages due to drought and other climate impacts. (11-3)
- Conduct sampling and analysis of water bodies to determine which are at risk or contain harmful cyanobacteria. (11-4)
- Create a table of California water bodies with a documented presence of a cyanotoxin. (11-5)
- Develop resources for public water systems to assess water treatment vulnerabilities by sharing treatment considerations when cyanotoxins are present. (11-6)
- Provide funding to promote longitudinal studies at academic institutions on the top 10% of water bodies identified as high risk for cyanotoxins in California to better understand the ecological drivers and potentially model the emergence and sustainment of harmful cyanobacteria. (11-7)
- Support DDW's efforts to evaluate emergency preparedness in its future technical, managerial, and financial (TMF) regulations. Systems that struggle with TMF

[354] The Chapter reference for each recommendation follows the recommendation in the form of (Chapter number – Recommendation number). Such as, (11-1) is for Chapter 11, recommendation 1.

capacities tend to lack the resiliency to respond and recover from emergency incidents like a fire when it impacts their system. Consolidating a system with another system with effective TMF capacity can address emergency preparedness and resiliency concerns. (11-8)

- Support the expansion of the Senate Bill 552 requirement that small water suppliers and schools join a mutual aid organization by adding language to legislation to include all community water systems. (11-9)
- Establish State Water Board authority to require all community water systems to conduct risk and resilience assessments and develop emergency response plans to improve preparedness. (11-10)
- Allocate new personnel to enable DDW to conduct and review risk and resilience assessments and emergency response plans. (11-11)
- Enlist Cal OES and/or FEMA to conduct outreach and provide workshops to small and medium-sized PWSs about Hazard Mitigation grants. (11-12)
- Support the routine submission by public water systems of accurate and updated water system service area and legal boundaries to the State Water Board. (11-13)
- Identify ways to ensure drinking water is addressed in local emergency operations centers (EOCs) such as having a dedicated position at an EOC or developing a standard operating procedure (SOP) that includes drinking water concerns as part of incident planning and response. (11-14)
- Continue to increase awareness of cyber threats and use of guidelines and assistance from organizations such as AWWA, CISA, and the Water Information Sharing and Analysis Center (WaterISAC) to help water systems improve their cyber security. (11-15)

12.3.2 Sustainability

For public water systems, the term sustainability refers to both general concepts and some specific elements including technical, managerial and financial (TMF) capacity. In the coming years DDW is tasked with developing TMF regulations to help address TMF capacity issues that lead to unsustainable and failing systems. Chapter 8 explores this topic in detail. Key elements of these recommendations include an ever-increasing emphasis on opportunities for consolidation, development of asset management plans, ensuring sufficient revenues and the need for water systems to further evaluate the adequacy of their sources (both quantity and quality). Specific recommendations include:

- Improve the means for large water systems to assist small systems with technical, managerial and financial expertise to operate and maintain the small water systems. (3-1)

- Support operator education opportunities, particularly for small water system operators, including increased outreach to recruit new operators through high schools, veterans' affairs groups, by providing internships, and other training initiatives. (3-2)
- Require all public water systems, including state small water systems, to install water meters on all service connections. (3-7)
- Require at least quarterly monitoring and reporting of static and pumping water levels and flow rates by public water systems and state small water systems. The monitoring should be submitted to the State Water Board on a schedule developed that is proportionate to the (drought) risk level. (3-8)
- Support State Water Board's goal of sustainable water systems by limiting the creation of new small and unsustainable public water systems, in addition to support of the ongoing consolidation and administrator programs to help address compliance issues with not only community water systems, but also transient non-community and non-transient non-community water systems, wherever feasible and appropriate. Consolidation does not have to be limited to full or physical consolidation of drinking water treatment and delivery systems, and could also include technical, managerial, financial or physical arrangements between water systems. (4-1)
- With increasing challenges to treat multiple contaminants, the State Water Board recommends specialized operator training programs to ensure a sufficient number of operators are available to industry to operate treatment facilities and that resources are made available for operators willing and able to work with the small disadvantaged communities incapable of establishing sustainable water rate structures. (7-2)
- Amend Water Code Section 106.4(b) to prohibit residential development in locations where water sources are not provided necessary treatment by an existing public water system. (7-3)
- Require local ordinances to establish more rigorous drinking water standards for state small water systems and domestic well owners, including regulations related to use of POU/POE to improve water supplies and requirements for a sustainable source of supply. (7-4)
- Support the development of a framework, including permitting and monitoring policies for implementation of dual distribution systems, for long-term solutions for systems unable to afford full scale centralized treatment. (7-5)
- Encourage local agencies (such as agencies overseeing management zones, Groundwater Sustainability Agencies, etc.) managing impacted water supplies to coordinate with affected state small water systems and domestic well owners to consider POU/POE devices as an interim solution to supplement or replace bottled water where appropriate. (7-6)

- Support TMF capacity development, targeting small water systems and non-transient non-community systems that are K-12 schools, to support the sustainability of water system preparation for drought and water shortages. (8-1)
- Enhance data collection efforts around compliance with SB 552. (8-2)
- Support legislation to address the attempt by new water systems to avoid State Water Board regulations by limiting the number of service connections and populations served to avoid meeting the definition of a state small water system. (8-9)
- Support the amendment of HSC § 116527 requirements of a preliminary technical report to extend the submittal time prior to permitting application to align with land use permitting by cities and counties and enable local and state agencies to more quickly identify proposed public water systems that would not be sustainable or feasible to permit. (8-10)
- Expand mandatory consolidation authority to address all public water systems under 500 service connections that exceed a primary MCL for longer than three years, inclusive of those that serve non-disadvantaged communities. (8-14)
- Many small water systems have water rates that are inadequate to sustainably maintain their system. Support requirements for all public water systems to develop asset management plans and analyze the adequacy of their rate structure to meet existing operation and maintenance costs, while also planning for future capital replacement. Subject to funding availability, technical assistance can be provided to assist small systems with this work. (9-1)
- Continue to support the mandatory consolidation of water systems that cannot meet minimum TMF requirements. (9-3)

12.3.3 Equity/Human Right to Water

The Plan includes recommendations designed to address the issue of equity and the State's commitment to the HR2W. The work currently underway within the SAFER program reflects this commitment by specifically targeting disadvantaged communities with ongoing water quality violations and problems. The SAFER program includes robust reporting and transparency that provides a foundation for achieving these recommendations. Within this thematic area, there are recommendations related to the ongoing initiatives to explore, analyze and develop action related to the issue of affordability.

- Support State Water Board's continued investigation into prevalence, and the development of related analytical methods, data collection efforts, and treatment requirements for CECs including PFAS, manganese, microplastics, and other unregulated contaminates, as well as regulatory improvement of currently regulated contaminates. (3-9)

- Support continued improvements to the source water assessment and protection programs to address CECs and other contamination described herein as well as opportunities to improve public education regarding source protection at the customer level. (3-10)
- For property not served by public water systems, such as those reliant upon domestic well or state small public water system, require testing and disclosure of water quality compliance with state primary drinking water standards prior to the sale of real property or issuing of a building permit. (3-11)
- Allocate resources for analyses of indicator organisms and allocate resources to conduct research needed to develop inexpensive and easy to use detection methods that could be used by small utilities and consumers to reduce the cost of monitoring and provide useful information about the microbial and chemical safety of drinking water per HSC § 116355(b)(5). (6-2)
- Support DDW's review of online monitoring methods and other field-testing methods to ensure that the methods are robust, reliable, and capable of generating data to meet regulatory requirements for PWSs and direct potable reuse projects. (6-3)
- Support adoption of a statewide UCMR monitoring regulation for chemicals and microbiological constituents of public health concern, to evaluate the extent of their presence in drinking water supplies. (6-4)
- High operation and maintenance costs of treatment facilities are unsustainable for many small water systems, particularly those serving disadvantaged communities. The SAFER program funding and engagement activities has provided substantial assistance to help alleviate these financial hurdles for small water systems, including by mandating and encouraging consolidations. However, where consolidation is not feasible or is not going to happen quickly, there is a need for a consistent and more sustainable or permanent source of O&M funding, including staff oversight for implementation of such a program. (7-1)
- Provide resources that address regional planning and consolidation in areas where contamination or limited source capacity is known or anticipated to be present. (8-4)
- State small water system information should be publicly available on a single website location for increased understanding and transparency of any issues regarding these water systems and to aid in their inclusion in regional planning efforts. (8-5)
- Increase access to additional funding for the inclusion of SSWS and domestic well owners in consolidation projects. (8-6)
- Investigate ways to expedite funding for consolidation projects, such as through technical service providers, administrators, and/or direct payment of connection fees to a receiving water system. (8-7)

- Allocate a funding source for K-12 schools that are public water systems to ensure sustainable water systems that are not at-risk for failure. (8-16)

- Support the development of funding tools that make drinking water affordable for low-income households, including the potential to establish appropriate water service subsidization programs. As a guiding human right to water principle, the cost of water should not pose a barrier to access. Assistance to low-income households that face discontinuation of water service should be provided to protect human health impacts from shutoffs of water service due to payments in arrears. (9-2)

- Reduce the cost burden to public water systems by ensuring housing costs in California do not exceed a maximum percentage of a person's income. (9-4)

- In anticipation of the development of TMF regulations in alignment with SB 1188 (2024), support the continued education of water systems regarding the importance of assessing, developing, and implementing TMF capacity to create sustainable water systems. (10-3)

- Support the continued development of interagency coordination to facilitate funding access to the public water systems most in need. (10-4)

12.3.4 Program Action

The recommendations within this thematic area focus on the State Water Board's continued collaboration with public water systems, stakeholders, academia, interested parties, and the public to identify desired outcomes and achieve common goals including those highlighted above noted thematic areas of emergency preparedness, equity/Human Right to Water, and sustainability. Recognizing that the obligations and authorities of the Safe Drinking Water Act continue to be foundational to success.

- Encourage DHCD to adopt requirements addressing water quality and water quantity concerns in mobile home parks, special occupancy parks, and employee housing. (2-1)

- Support the update of LPA delegation agreements to reflect current regulatory, database and enforcement expectations, including enforcement tracking, return to compliance milestones, and the associated LPA minimum staffing requirements. The delegation agreements should require LPAs to have a DDW approved enforcement policy and/or a process for enforcement escalation. LPA programs require additional sources of funding to support the necessary staff levels for comprehensive regulatory oversight. (2-2)

- Support legislation to remove obstacles, including LAFCO requirements, to new development being served by an existing water system, instead of proposing the formation of a new water system. (2-3)

- Require local agency approvals for accessory dwelling units (ADU), as set forth in Gov. Code §§ 66314-66332, be amended to require, when relevant (2-4):

  - Ensure the water system serving the new ADU is not subject to a building moratorium or has a restrictive permit provision per CCR, title 22, §64556.
  - Where ADUs will be located outside of areas served by an existing public water system, and the additional service connections or people served will create a new public water system, the local agency should reach out to the State Water Board to determine whether the existing state small system has adequate source and storage capacity before issuing a building permit, use permit, or other permitting activities that would result in an increase in the water usage onsite.
  - For ADU's or new construction outside of the service area of an existing public water system, if the existing water provider is a state small water system, require that if the addition of the new construction will create a new public water system that the existing water provider contact the State Water Board to either obtain a permit or to consider consolidation with an existing public water system.
- Require county health agencies to conduct initial sanitary surveys of state small water systems with repeat inspections every five years. Require state small water systems to provide annual Consumer Confidence Reports to systems' consumers. (3-4)
- Require state small water systems to follow with bacteriological standards, like title 22 of the California Code of Regulations (CCR), beginning at section 64423. (3-5)
- Require state small water systems and transient non-community water systems to monitor for nitrate/nitrite, perchlorate and other inorganic chemicals, radionuclides and organic chemical contaminants, like title 22 of the CCR, including sections 64432, 64442, and 64444. (3-6)
- Support the State Water Board's strategy to ensure future data system transitions occur in a systemic, optimized manner, allowing time for the selection and development of the preferred alternative, including the resources needed to engage and train those responsible for data submission. (5-1)
- Support the State Water Board's intention to pursue regulations to update the data format for electronic water quality submissions. (5-2)
- Support the State Water Board's intention to pursue electronic reporting and intake of microbiological analyses pursuant to the Revised Total Coliform Rule by requiring the intake of all water quality via CLIP. (5-3)
- Support the addition of improved data quality elements to CLIP, such as more robust error checks and more quality control information to facilitate transparency and consistency of sample data collection. (5-4)
- Support the State Water Board's efforts to bring DDW's compliance data intake tools such as CLIP into compliance with USEPA requirements for electronic submittal known as the Cross-Media Electronic Reporting Rule (CROMERR). (5-5)

- Support the strategic development of dashboards and other similar tools to provide meaningful information to the public in an organized and easy-to-understand format to enhance transparent and publicly accessible data. (5-6)
- Support the State Water Board's collaboration with internal and external stakeholders to enhance reporting formats and framework to improve data quality and usability of data collected in the eAR and other similar intake interfaces. (5-7)
- To meet growing GIS needs of external and internal users, increase the State Water Board's GIS resources, including resources to collect additional water system service area locational data and to check the accuracy of existing locational data. Additional GIS resources are needed to improve information provided to the public interfacing with service areas for such purposes as PWS consolidations, PWS sustainability, and emergency preparedness/response. (5-8)
- Enable public water systems to comply with DWSAP Program requirements to conduct and update drinking water source assessments by supporting redevelopment and implementation of a TurboSWAP replacement. (5-9)
- Support the State Water Board's implementation of WaterTAP to integrate disparate data systems into a single point of access system. Centralize disparate, non-integrated data systems for ease of data tracking, storage, and management and incorporate role-based access to facilitate open access to data to improve transparency and accountability. (5-10)
- To meet workload demands, fully achieve legislative mandates, and ensure consistency, support ELAP's efforts to pursue automating processes for the program, laboratories, and proficiency testing providers which will enhance the overall accreditation program. These efforts include the need to procure a modern database to enable ELAP to meet evolving regulatory requirements, and ensure defensible, reliable data that supports the DDW's mission to protect public health. (5-11)
- Support the continued improvement to the quality of SDWIS/STATE reporting by LPAs by providing resources for SDWIS training and tools for identifying data that need to be cleaned up, and in the long term, and support the development of tools through WaterTAP to facilitate dataflows between LPAs and DDW. (5-12)
- Allocate resources for DDW to reestablish a contract with a public health laboratory to not only comply with the federal SDWA's state primacy requirements for a primary laboratory, but also to assist with method development. (6-1)
- Provide liability protection for municipal water systems and others willing to act in an administrator capacity. (8-8)
- Support LAFCO policies and requirements to address existing, and prevent the formation of, unsustainable, small, and fragmented water systems that lack TMF capacity, especially when the water system is within city boundaries or within the sphere of influence of other DDW regulated municipalities. The LAFCO process must be improved to expedite consolidations of DAC and Failing water systems. (8-

11)

- Increase engagement with County and State land use planners to promote a mandatory assessment of all water suppliers in County General Plans and develop regional drinking water plans to reduce the formation of small public water systems. Regional drinking water plans could be prepared through required water sections of existing documents such as County General Plans, or other more specific drinking water plans. (8-12)
- Support increased financial capacity through the development of TMF regulations in alignment with SB 1188 to ensure public water systems have adequate TMF capacity, including implementing additional inspection procedures, and by creating publicly available financial capacity metrics. (8-13)
- Support the allocation of a state funding source after 2030 and the sunsetting of current SAFER funding, to continue the efforts of the SAFER program, including tools such as assistance to public water system for consolidations and third-party technical assistance providers and administrators. (8-15)
- Advocate to increase the State Water Board's funding to meet the funding gap and support public water systems' sustainability. (10-1)
- Continue to inform water systems, stakeholders, and legislators about the State Water Board's funding shortfall affecting support for water systems. (10-2)
- To increase the speed and efficiency of completing funding projects, develop a state accounting mechanism to provide electronic payments for approved reimbursement requests. (10-5)

APPENDIX 1. ACCOMPLISHMENTS SINCE THE 2020 PLAN (2021-2024)

This appendix lists key metrics and accomplishments described throughout the 2025 Safe Drinking Water Plan. See also Appendix 6: Recent Regulations and Appendix 9: Recent Key Legislation.

2025 Celebrated:

- **50-years** of the **Safe Drinking Water Act**
- **10-years** of the **Drinking Water** Program at **State Water Board**
- **5-years** of the **SAFER Program**
    - Consolidation & Administrator **support** to assist **Failing** & **At-Risk** water systems
    - **$1B** funding & **$73M** technical assistance for water system improvements
    - Established various **SAFER program units**, such as the **County** and **Rural Engagement** and **Needs Assessment** Units

Milestones:

- Adoption:
    - Federal **PFAS MCL**, including **monitoring** orders w/ state funds for disadvantaged communities
    - **Hexavalent Chromium MCL** Regulation
    - **Direct Potable Reuse** Regulations
- Advanced **microplastic** analytical method development
- **Ongoing review** of MCLS, DLRs, NLs/RLs and other relevant **health protective regulations** (see Appendix 6)
- Advancing Human Right to Water through development of:
    - **Climate and Racial Equity Strategy** (CARES)
    - **Racial Equity Action Plan** (REAP)
- New **sewer system administrator** authority (SB 805, 2024)
- Drinking Water **Needs and Affordability Assessments**
- **POU/POE Report**
- **Conservation** Regulations
- Water **Shutoff Protection** Act
- **$985M Arrearages** Payment Program

- **Expedited** Drinking Water **Grant** Funding Program
- **Lead** service line **inventories** portal and related regulatory **improvements**
- **Childcare lead testing** (ongoing) and data **dashboard**
- **Cross-Connection Control Policy Handbook**
- Increased emphasis and coordination on **drought resiliency planning** and emergency preparedness and response (in response to SB 552, 2021)
- Initiate development of minimum **TMF capacity requirements** (SB 1188, 2024)

Tools and activities that have been completed which **increase data transparency** and **accessibility** such as:

- Launched:
    - **CLIP** data portal
    - **System Area Boundary Lookup** tool
    - **Residential Water Treatment Device** Registration portal
    - **Affordability Dashboard**
    - State Small Water Systems and Domestic Wells **Risk Assessment Map**
- Redeveloped:
    - **Electronic Annual Report**
    - Water rights source/capacity data into **SAFER Clearinghouse**
- Various **Legislative actions** completed (see Appendix 9 & summary Chapter 2)
- Various **interagency and stakeholder coordination** efforts ongoing
- Various initiatives to **expedite consolidation** projects
- Publication of various **water partnership success**
- Completed **Low-Income Rate Assistance** Program Plan and Legislative Report

Compliance:

- **98%** of CA drinking water consumers served by PWS receive water that meets standards
    - On average, **94%** of PWSs **complied** with water quality standards annually **over the last 5 years**
    - **79%** of water systems have **maintained continual compliance** with drinking water standards **since 2017**
- Number of:

- **Permits** and permit **amendments** issued: **1,701**
- **Sanitary surveys** completed: **7,270**
- **Enforcement actions** issued: **4,740** (8,950 violations)
- **ELAP** laboratory **application accreditations: 2,287**
- **ELAP** laboratory **assessments: 816**
- **ELAP** lab **enforcement actions**: **308**
- Analytical **water quality samples**: ~2 million/year (3-4 samples/minute)

Consolidations - Key Achievements: In the 2025 Plan, we are reporting **100 less** systems overall since the 2020 plan which accounts for over **170 consolidations**, but also the creation of new systems.

- **>250** consolidations completed since 2017
- **260** consolidations currently in funding, planning, or construction phase

- **Strategic Interventions:**
  - **17** mandatory consolidations initiated
  - **16** administrators appointed for small systems serving disadvantaged communities
- **Impact on Safe Drinking Water Access:**
  - Californians lacking access to safe drinking water reduced from **1.6 million** to **750,000**

Drinking Water Financing:

- **Infrastructure Financing:**
  - **$4.5B** in financial assistance agreements since 1998
- **Recent Funding Impact:**
  - Over **$1B** in grants since 2019
  - **$73M** in technical assistance provided
  - Assistance provided to **750** small disadvantaged communities
  - Support for **13.8M** Californians
  - **>2.5x** increase in grant funding compared to 2015–2020

APPENDIX 2. DEFINITION OF A PUBLIC WATER SYSTEM

(Health & Safety Code Section 116275(h) - (k), (*o*), (z))[355,356]

(h) "Public water system" means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A public water system includes the following:

> (1) Any collection, treatment, storage, and distribution facilities under control of the operator of the system that are used primarily in connection with the system.
>
> (2) Any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system.
>
> (3) Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

(i) "Community water system" means a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system.

(j) "Noncommunity water system" means a public water system that is not a community water system.

(k) "Nontransient noncommunity water system" means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

(*o*) "Transient noncommunity water system" means a noncommunity water system that does not regularly serve at least 25 of the same persons over six months per year.

(z) "Small community water system" means a community water system that serves no more than 3,300 service connections or a yearlong population of no more than 10,000 persons.[357]

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[355] https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-116275

[356] Not regulated as public water systems: (n) "State small water system" means a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year.

[357] Nomenclature of small water system may vary throughout the document. However, this is the definition per statute.

APPENDIX 3. DRINKING WATER STANDARDS FOR CONTAMINANTS

This appendix provides a link to a list of Federal and California maximum contaminant levels for inorganic contaminants, radiological contaminants, organic contaminants and disinfection byproducts; action levels for lead and copper; and treatment techniques for two chemicals. This document is maintained by the State Water Board Division of Drinking Water:

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/mclreview/mcls_dlrs_phgs.pdf

APPENDIX 4. UNREGULATED CHEMICALS FOR WHICH MONITORING IS REQUIRED (UCMR)

California State Water Board and USEPA have requirements for monitoring unregulated chemicals to determine the extent of contamination by certain contaminants, as well as their concentration in drinking water supplies. The data collected under these monitoring requirements enable state and federal authorities to identify contaminants that are candidates for regulation under the Safe Drinking Water Act, generally by the adoption of maximum contaminant levels (MCL).

Federal UCMR

The federal UCMR program involves monitoring primarily by large PWS, although certain smaller systems may be required to participate. USEPA develops the UCMR lists of chemicals, which are sampled over several years. USEPA identifies the systems that will participate, as well as sampling points and analytical methods to be used. For more Information, see the USEPA's website on UCMR program (https://www.epa.gov/dwucmr).

The federal UCMR sampling programs over the past several decades have focused on the following chemicals.

UCMR 5 (2023-2025)

Assessment Monitoring

- Twenty-nine perfluorinated compounds (the 6 from UCMR 3)
- One metal/pharmaceutical (lithium)

For more information, see USEPA's website on UCMR5 (https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule)

UCMR 4 (2017-2021)

Assessment Monitoring

- Ten cyanotoxin chemical contaminants (total microcystins, microcystin-LA, -LF, -LR, -LV, -RR, and –YR, nodularin, anatoxin-a, and cylindrospermin)
- Two metals (germanium, manganese)
- Eight pesticides and one pesticide manufacturing byproduct (alpha-hexachlorocyclohexane, chlorpyrifos, dimethipin, ethoprop, oxyfluorfen, profenofos, tebucoazole, total permethrin (cis- & trans), and tribufos)
- Three brominated Haloacetic Acid (HAA5) Groups (HAA5, HAA6Br, and HAA9)
- Three alcohols (1-butanol, 2-methoxyethanol, and 2-propen-I-ol)
- Three other semivolatile chemicals (butylated hydroxyanisole, o-toluidine, and quinoline)
- Two indicators (total organic carbon (TOC), and bromide)

For more information, see USEPA's website on UCMR 4
(https://www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule)

UCMR 3 (2012-2016)

Included the following:

Assessment Monitoring

- Seven VOCs (1,2,3-TCP, 1,3-butadiene, chloromete, 1,1-dichloroethane, bromomethane, chlorodifluoromethane, and bromochloromethane)
- One synthetic organic compound (1,4-dioxane)
- Six metals (vanadium, molybdenum, cobalt, strontium, chromium and chromium-6)
- One oxyhalide anion (chlorate)
- Six perfluorinated compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, PFBS)

Screening survey

- Seven hormones (17-β-estradiol, 17-α-ethynylestradiol, 16-α-hydroxyestradiol (estriol), equilin, estrone, testosterone, and 4-androstene-3,17-dione)

Pre-screen Testing

- Two viruses (enteroviruses and noroviruses)

For more information, see USEPA's website on UCMR 3
(https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule)

UCMR 2 (2007-2011)

Included the following:

Assessment Monitoring

- Two Insecticides (dimethoate and terbufos sulfone)
- Five Flame Retardants (BDE-47, BDE-99, HBB, BDE-153, and BDE-100)
- Three explosives (1,3-dinitrobenzene, TNT, and RDX)

Screening Survey

- Three parent acetanitides (Acetochlor, Alachlor, Metolachlor)
- Six acetamilide degradates (Acetochlor Ethane Ssulfonic Acid (ESA), Acetochlor Oxalonic acid (OA), Alachlor ESA, Alachlor OA, Metolachlor ESA, and Metolachlor OA)
- Six nitrosamines (NDEA, NDMA, NDBA, NDPA, NMEA, NPYR)

For more information, see USEPA's website on UCMR 2
(https://www.epa.gov/dwucmr/second-unregulated-contaminant-monitoring-rule)

UCMR 1 (2001-2005)

Included the following:

- 2,4-dinitrotoluene
- 2,6-dinitrotoluene
- Acetochlor
- DCPA mono-acid degradate
- DCPA di-acid degradate
- 4,4'-DDE
- EPTC
- Molinate
- MTBE
- Nitrobenzene
- Perchlorate
- Terbacil

For more information, see USEPA's website on UCMR 1 (https://www.epa.gov/dwucmr/first-unregulated-contaminant-monitoring-rule)

Monitoring Unregulated Contaminates State Round 1 (1988-1992) & 2 (1993-1997)

The original UCMR program applied to PWS serving more than 500 people and was managed by state drinking water programs. Round 1 addressed 62 at that time unregulated contaminants (resulting in data from 40 states and primacy entities), while Round 2 addressed 48 unregulated contaminants (35 states and primacy entities).

For more information, see USEPA's website on Monitoring Unregulated Drinking Water Contaminants Rounds 1 and 2 (https://www.epa.gov/dwucmr/rounds-1-and-2-datasets-unregulated-contaminant-monitoring-program-managed-state-drinking)

California UCMR

The list of California UCMR chemicals since 1990 are shown below. Although the requirement for monitoring was repealed in 2007, the list remains a helpful tool that may be used to identify the presence of drinking water contaminants that may be appropriate for future regulatory action.

PARAMETER	1990	1996	1998	2000	2001	Currently has a Notification Level	Currently is a Regulated Chemical
Boron					X	Yes	
Perchlorate				X	X	*	Yes
Vanadium					X	Yes	
Chromium-6					X		Yes

PARAMETER	1990	1996	1998	2000	2001	Currently has a Notification Level	Currently is a Regulated Chemical
1,1,1,2-Tetrachloroethane	X	X	X	X			
1,1-Dichloroethane	X						Yes
1,1-Dichloropropene	X	X	X	X			
1,2,3-Trichlorobenzene	X	X	X	X			
1,2,3-Trichloropropane	X	X	X	X	X	*	Yes
1,2,4-Trichlorobenzene	X						Yes
1,2,4-Trimethylbenzene	X	X	X	X		Yes	
1,2-Dichlorobenzene	X					*	Yes
1,2-Dichloropropane	X						Yes
1,3,5-Trimethylbenzene	X	X	X	X		Yes	
1,3-Dichlorobenzene	X	X	X	X		*	
1,3-Dichloropropane	X	X	X	X			
1-Phenylpropane (N-Propylbenzene)	X	X	X	X		Yes	
2,2-Dichloropropane	X	X	X	X			
2-Chlorotoluene	X	X	X	X		Yes	
3-Hydroxycarbofuran		X	X	X			
4-Chlorotoluene	X	X	X	X		Yes	
Alachlor	X						Yes
Aldicarb	X	X	X	X		*	
Aldicarb Sulfone		X	X	X			
Aldicarb Sulfoxide		X	X	X			
Aldrin		X	X	X		*	
Bromacil	X	X	X	X			
Bromobenzene	X	X	X	X			
Bromochloromethane (HALON 1011)	X	X	X	X			
Bromodichloromethane (THM)	X	X	X	X			Yes
Bromoform (THM)	X	X	X	X			Yes
Chloroform (THM)	X	X	X	X			Yes
Dibromochloromethane (THM)	X	X	X	X			Yes
Bromomethane	X	X	X	X			
Butachlor		X	X	X			
Carbaryl (SEVIN)		X	X	X		*	
Carbofuran	X						Yes
Chloroethane	X	X	X	X			
Chloromethane	X	X	X	X			

PARAMETER	1990	1996	1998	2000	2001	Currently has a Notification Level	Currently is a Regulated Chemical
Chlorothalonil	X	X	X	X			
Diazinon	X	X				Yes	
Dibromomethane	X	X	X	X			
Dicamba		X	X	X			
Dichlorodifluoromethane	X	X	X	X	X	Yes	
Dichloromethane	X						Yes
Dieldrin		X	X	X		*	
Dimethoate (CYGON)	X	X	X	X		*	
Diuron	X	X	X	X			
Ethylbenzene	X						Yes
Ethyl-tert-butyl ether (ETBE)				X	X		
Hexachlorobutadiene	X	X	X	X			
Isopropylbenzene	X	X	X	X		Yes	
Methomyl		X	X	X			
Methyl-tert-butyl ether (MTBE)			X	X		*	Yes
Metolachlor		X	X	X			
Metribuzin		X	X	X			
Naphthalene	X	X	X	X		Yes	
N-Butylbenzene (1-Butylpropane)	X	X	X	X		Yes	
P-Isopropyltoluene	X	X	X	X			
Prometryn	X	X	X	X			
Propachlor		X	X	X		Yes	
Sec-Butylbenzene	X	X	X	X		Yes	
Styrene	X						Yes
Tert-amyl-methyl ether (TAME)				X	X		
Tert-Butyl Alcohol (TBA)					X	Yes	
Tert-Butylbenzene	X	X	X	X		Yes	
Toluene	X						Yes

*Action Level has been archived. Please see the Notification Level website for more information: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html

APPENDIX 5. CHEMICALS WITH STATE WATER BOARD NOTIFICATION LEVELS

Notification Levels are advisory levels. Health and Safety Code §116455[358], among its requirements, states that if water is served at concentrations greater than the notification level, the water system is to notify the local governing body, *e.g.*, the county board of supervisors and/or the city council, about the exceedance. The notification is required to include information about the contaminant, its concentration in drinking water, the operational status of the source, and a brief and plainly worded statement of health concerns.

There are additional notification requirements specific for per- and polyfluoroalkyl substance with notification levels (currently PFOA and PFOS). These are in Health and Safety Code §116378.[359]

For more information, see the State Water Board's website on notification levels https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html

Chemical	Notification Level (milligrams per liter)
Boron	1
n-Butylbenzene	0.26
sec-Butylbenzene	0.26
tert-Butylbenzene	0.26
Carbon disulfide	0.16
Chlorate	0.8
2-Chlorotoluene	0.14
4-Chlorotoluene	0.14
Diazinon	0.0012
Dichlorodifluoromethane (Freon 12)	1
1,4-Dioxane	0.001
Ethylene glycol	14
Formaldehyde	0.1
HMX (Octahydro-1,3,5,7-tetranitro-1-3-5-7-tetrazocine)	0.35
Isopropylbenzene	0.77
Manganese	0.5
Methyl isobutyl ketone (MIBK)	0.12
Naphthalene	0.017
N-Nitrosodiethylamine (NDEA)	0.00001
N-Nitrosodimethylamine (NDMA)	0.00001

[358] http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=116455.&lawCode=HSC

[359] https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=116378

Chemical	Notification Level (milligrams per liter)
N-Nitrosodi-n-propylamine (NDPA)	0.00001
Perfluorobutanesulfonic acid (PFBS)	0.0005
Perfluorohexanesulfonic acid (PFHxS)	0.000003
Perfluorooactanoic acid (PFOA)	0.0000051
Perfluorooctane sulfonic acid (PFOS)	0.0000065
Propachlor	0.09
n-Propylbenzene	0.26
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	0.0003
Tertiary butyl alcohol (TBA)	0.012
1,2,4-Trimethylbenzene	0.33
1,3,5-Trimethylbenzene	0.33
2,4,6-Trinitrotoluene (TNT)	0.001
Vanadium	0.05

Table updated as of November 1, 2022

APPENDIX 6. RECENT DRINKING WATER-RELATED REGULATIONS

This appendix provides a list of drinking water-related regulations and policy handbooks that have been adopted by the State Water Board since the 2020 Safe Drinking Water Plan publication. The list does not include State Water Board annual adoption of drinking water fee regulations pursuant to Health and Safety Code section 116565 and "Changes Without Regulatory Effect" filings pursuant to California Code of Regulations Title 1, section 100.

- Revised Total Coliform Rule (SBDDW-20-002) – effective July 1, 2021
- Perchlorate DLR (SBDDW-20-001) – effective July 1, 2021
- Standard Method of Testing and Reporting of Microplastics in Drinking Water (Policy Handbook) — effective September 7, 2022
- Water Loss Performance Standards— effective April 1, 2023
- Cross-Connection Control (Policy Handbook) — effective July 1, 2024
- Direct Potable Reuse (SBDDW-23-001) — effective October 1, 2024
- Hexavalent Chromium MCL (SWRCB-DDW-21-003) — effective October 1, 2024

Associated rulemaking files for drinking-water related regulations and policy handbooks listed above are available on the State Water Board webpage for "Adopted Drinking Water-Related Regulations and Policy Handbook": https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Recentregs.html

State Water Board staff also maintains an unofficial compilation of drinking water and recycled water-related statutes and regulations. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Lawbook.html

The published codes are the only official representation of the law and should be referenced whenever specific citations are required. Codes (statutes) can be accessed via the California Legislative Information website (https://leginfo.legislature.ca.gov/faces/home.xhtml), and the Office of Administrative Law's website (https://oal.ca.gov/publications/ccr) has information on how to obtain the official California Code of Regulations (CCR).

Annually, the State Water Board adopts various regulatory priorities. 2025 Division of Drinking Water Regulatory Priorities Adopted: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2025/rs2025-0006.pdf

Annually, the State Water Board adopts various documents related to the expenditure of drinking water project financing. See Chapter 10 for more details on these documents and funds administered by the Division of Financial Assistance. https://www.waterboards.ca.gov/water_issues/programs/grants_loans

APPENDIX 7. STATUS UPDATE ON RECOMMENDATIONS FROM THE 2020 PLAN

The recommendations in the 2020 Plan are presented below, along with the status of those recommendations. Many of the 2020 Plan recommendations have been updated and integrated into the 2025 Plan's respective chapters.

CHAPTER 2. CURRENT REGULATION OF DRINKING WATER (2020 PLAN)

2-1 State Water Board will continue to work closely with DHCD to develop a coordinated strategy to address water quality and water quantity in mobile home parks, special occupancy parks, and employee housing.

Status: Efforts are ongoing. Many water systems regulated by DHCD are included in the SAFER engagement pipeline, via emergency funding, technical assistance, funding for capital projects, or are involved in a water partnership or consolidation to address their short- and long-term needs.

2-2 The State Water Board will continue to work closely with LAFCO to help address technical, managerial, and financial issues with small agencies under their purview that operate a public water system.

Status: State Water Board staff have worked on developing an effective working relationship with LAFCO and other local agencies. This work will continue at both the local and regional levels. Furthermore, DDW will develop TMF capacity requirements in response to SB 1188, 2024 and coordinate accordingly.

2-3 The State Water Board will coordinate with local county and city planning departments, LAFCO, and LEHJ, to coordinate elements of the SAFER program and to identify: 1) areas that may be at a higher risk of contamination 2) areas currently developed without safe drinking water to determine where Community Services Districts or County Service Area could be created or where other actions could be taken, and 3) areas where new development or issuance of new building permits should be postponed until safe water is demonstrated. See Chapter 8 recommendations.

Status: State Water Board staff have worked on developing an effective working relationship with LAFCO and other local agencies. This work will continue at both the local and regional levels. The SAFER County Engagement Unit was developed to provide special attention in this area.

2-4 Provide authorities for LAFCO and/or the State Water Board to deny any type of new public water system, including mutual water companies, mobile home parks, and neighborhood associations within City boundaries or within the sphere of influence of any municipality serving drinking water.

Status: SB 1263, Chapter 843, Statutes of 2016 provides the State Water Board certain permitting authorities but limitations on those authorities for such denials of permits exist. Provide additional authority that expedites connection of new housing within a defined proximity to an existing public water system or otherwise account for the sustainable provision of water that meets all drinking water standards. See Chapter 2 and Chapter 8 recommendations.

2-5 The State Water Board will report on the effectiveness of the LPA programs annually in the State Water Board's performance report and will use this information to track progress and prioritize activities related to LPAs.

Status: Additional work is needed to ensure LPA program performance. The 2025 Plan (Chapter 2) contains recommendations to support the effectiveness of LPAs, including needed resources and updating of the LPA primacy delegation agreements to help account for needed improvements. Refer to Chapter 4 containing results of the 2023 Annual Compliance Report as well as Chapters 8 and 9 for more information.

CHAPTER 3. QUALITY OF CALIFORNIA'S DRINKING WATER (2020 PLAN)

3-1 The State Water Board will continue to encourage large water systems to assist small systems with technical knowledge and implementation, for example optimizing water treatment systems.

Status: State Water Board recognizes the value of such local resources and experts, accordingly, facilitating such resources and knowledge sharing is a constant goal of the SAFER engagement pipeline via ongoing water partnerships to address small systems short- and long-term needs.

3-2 The State Water Board will continue to explore ways to facilitate operator education opportunities particularly for small water system operators and will increase outreach to recruit new operators through high schools and veterans' affairs groups by providing internships and other training initiatives.

Status: Having well-educated and well-trained small water treatment system operators and water distribution system operators is a priority. The State Water Board continues to explore possible funding opportunities for training and educating small water system operators, and to encourage ongoing training and education for drinking water system operators. To this end the State Water Board and its partners provide financing and technical assistance, including operator training at low or no costs to operators statewide.

3-3 The State Water Board will continue to encourage vulnerable water systems, particularly those that rely on only a single groundwater source, to study and improve their reliability. Increase existing community water systems source capacity requirements to include a minimum of two sources, either through an intertie to another water system or an additional well source and ensure backup power supply.

Status: Subject to funding availability, SB 552 requires small systems and non-transient non-community systems to develop a Water Storage Contingency Plan and other drought related planning and notification measures. DFA has incorporated these requirements which include addressing reliability issues such as source and storage capacity and climate change responsiveness be included as part of technical assistance work plans and construction applications. This work is also incorporated into the SAFER engagement activities discussed in Chapters 8 and 9.

3-4 To ensure the health and safety of consumers of drinking water from state small water systems, the State Water Board recommends an initial sanitary survey followed by repeat sanitary surveys every five years. In addition, an annual Consumer

Confidence Reports should be issued by state small water systems.

Status: The SAFER program has incorporated state smalls into its overall engagement process including the Needs Assessment, which is described in Chapters 8, 9, and 10. However, since state small water systems are regulated by county agencies such a requirement would be enforced by the respective counties and not DDW. Due to regulatory priorities this recommendation is still pending.

3-5 To ensure the health and safety of customers of state small water systems and consumers of their drinking water, the State Water Board intends to explore amending the existing bacteriological quality regulations for such systems to require them to collect and analyze water samples for compliance with bacteriological standards, consistent with CCR, title 22, section 64423, et seq.

Status: This recommendation is still pending.

3-6 The State Water Board will explore amending its regulations to require both state small water systems and transient non-community water systems to monitoring and comply with the same monitoring requirements for non-transient non-community water systems. Specifically, nitrate/nitrite, perchlorate and other inorganic chemicals, radionuclides and organic chemical contaminants, consistent with Title 22 CCR section 64432, et seq., section 64442, et seq., and section 64444, et seq., respectively.

Status: This recommendation is still pending.

3-7 To address the potential after-effects of large fires on public water systems' distribution systems with regard to benzene and other VOC contamination, the State Water Board support research on the origins of such contamination, including the effects of fire on pipes and other associated materials, and on ways to prevent an affected distribution system from losing pressure during a fire and being subsequently contaminated.

Status: The State Water Board has conducted outreach and research and continues to implement its findings along with the passing of AB 541, Chapter 530, Statutes of 2023 which includes certain monitoring requirements following wildfires (Appendix 9 and Chapters 3, 6, and 11).

3-8 To address and to enable conservation of treated drinking water, to provide information to drinking water consumers, and to improve the management of water systems, the State Water Board recommends legislation that requires all drinking water systems including state small water systems to install water meters on all service connections in their service area.

Status: Legislation requiring unregulated systems such as state smalls to install meters is still pending.

3-9 To further address conservation of treated drinking water, the State Water Board will require all drinking water systems, including state small water systems, to document at least quarterly the quantity of drinking water they produce or otherwise delivered to customers, the quantity received by customers (based on customers' water meters), and the quantity estimated to be lost by broken or leaky conveyance and distribution systems. Such documentation shall be provided to the State Water Board annually.

Status: This information is now required to be collected monthly and reported to the State Water Board either monthly or quarterly. Additionally, validated water loss audits are reported to the Department of Water Resources on an annual basis (Drought and Conservation Reporting[360] for Clearinghouse reporting). Urban Water Loss audits are sent to DWR and are used to calculate standards and compliance

3-10 To provide information that will address drought-related and over-drafting stresses on groundwater sources used as drinking water, at least monthly monitoring of both static and pumping water levels by public water systems, including state small water systems, should be conducted. The results of water level monitoring should be submitted to the State Water Board on a schedule developed that is proportionate to the risk level.

Status: This effort was completed; however monthly monitoring has not been required of water systems, only voluntary reporting. Work is still needed to require water systems to collect and report this information on a minimum quarterly frequency.

CHAPTER 4. WATER QUALITY ISSUES AFFECTING PSW SERVING FEWER THAN 10,000 SERVICE CONNECTIONS (2020 PLAN)

4-1 The State Water Board will continue to promote consolidation and utilize administrator programs, including transient non-community and non-transient non-community water systems, wherever feasible and appropriate. Consolidation is not limited to full or physical consolidation of drinking water treatment and delivery systems, and may include technical, managerial, financial or physical arrangements between water systems.

Status: This is an ongoing priority and is addressed throughout the report, specifically Chapters 8 and 9. See Appendix 9 for related recent legislation in support of these initiatives.

CHAPTER 5. DRINKING WATER-RELATED INFORMATION SYSTEMS (2020 PLAN)

5-1 As the existing information systems are modernized, the State Water Board should develop a strategy and work with those responsible for data submission to ensure future data system transitions occur in a systemic, optimized manner, allowing time for the selection and development of the preferred alternative.

Status: Ongoing. Refer to Chapter 5 which contains relevant updates.

5-2 To facilitate the intake of all water quality via CLIP, the State Water Board intends to pursue revised regulations that will allow it to specify a data format for water quality submission by laboratories. This new format will include additional quality control elements, resulting in higher quality data that will be of known and documented quality.

Status: CLIP was launched in September 2021 and is now operational (Chapter 5). Due to regulatory priorities, the proposed regulations described is still

[360] Drought and Conservation Reporting: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/clearinghouse_drought_conservation_reporting.html

pending.

5-3 To enhance timely and accurate determination of PWS compliance with drinking water standards, the State Water Board intends complete Phase 3 of the SDWIS/STATE transition plan to implement SDWIS/STATE's extensive compliance decision support tools.

Status: Ongoing. Refer to Chapter 5 which contains relevant updates.

5-4 To enhance public access and ensure transparent, accessible data, public Drinking Water Watch (DWW) should be further developed in a strategic, planned effort in order to provide meaningful information to the public in an easy-to-understand format.

Status: Ongoing. Refer to Chapter 5 which contains relevant updates.

5-5 To improve the quality and usability of data collected from the Electronic Annual Report (eAR), the State Water Board intends to redevelop the eAR in a new format for improved data collection, quality control, and usability. Some of the changes will include a single format for all PWS, auto calculated fields, and prepopulated fields from DDW databases.

Status: Completed. The eAR is available: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/ear.html.

5-6 To assist in emergency response and enhance access to water data, the State Water Board will use the System Area Boundary Lookup (SABL) to allow continued information accessibility and facilitate easier identification of water system service areas and legal boundaries.

Status: Completed. SABL is available: https://gispublic.waterboards.ca.gov/portal/home/item.html?id=fbba842bf134497c9d611ad506ec48cc

5-7 To meet the growing GIS needs of external and internal users, the State Water Board recommends increasing its GIS resources. This is particularly important for emergency preparedness and response, as well as sustainability.

Status: Refer to Chapter 5 which contains relevant updates.

5-8 To comply with AB 2370, which added Section 1596.7996 to the Health and Safety Code, the State Water Board intends to develop a new data intake system and database to receive and post lead water sample results for monitoring conducted from child daycare facilities on an internet website that is publicly accessible.

Status: Completed. The data is available: https://www.waterboards.ca.gov/drinking_water/programs/lsicc/

5-9 The State Water Board is planning to implement a DDW Data Enterprise System over the next few years to integrate disparate data systems into a single point of access system. This will centralize disparate, non-integrated data systems for ease of data tracking, storage, and management by DDW while incorporating role-based access to facilitate open access to data to improve transparency and accountability.

Status: Refer to Chapter 5 which contains relevant updates.

5-10 A new residential water treatment device registration portal is under development to ensure accurate information is conveyed to the public and other stakeholders regarding these devices which are making health and safety claims. This portal will better facilitate registration, including both new and updates of residential water treatment devices.

Status: Completed. The Portal is available: https://www.waterboards.ca.gov/drinking_water/certlic/device/wtd_manufacturers.html

5-11 To be able to identify state small water systems that consistently fail or are at risk of failing to provide an adequate supply of safe drinking water, as required by SB 200, a new data intake portal needs to be developed. The new intake portal will be integrated into DDW's existing data systems to streamline data collection while promoting data transparency.

Status: The new data intake portal has been built, and enhancements continue to ensure full implementation occurs smoothly.

5-12 To meet workload demands, fully achieve legislative mandates, and ensure consistency, ELAP intends to automate processes for the program, laboratories, and proficiency testing providers which will enhance the overall accreditation program.

Status: Due to funding priorities this recommendation has been delayed.

5-13 Continue to improve SDWIS/STATE reporting by LPA by developing tools to allow reporting through the use of portals and platforms accessible outside of State Water Board firewalls to intake the information for subsequent uploading to SDWIS/STATE.

Status: Refer to Chapter 5 which contains relevant updates.

CHAPTER 6. METHODS AND INSTRUMENTS FOR SCREENING AND DETECTING CHEMICALS AND MICROBIAL CONTAMINATES (2020 PLAN)

6-1 Research should continue to be focused on analytical methods used by laboratories for testing of emerging pathogens and CEC, as well as field testing methods for regulated contaminants.

Status: Ongoing. Refer to Chapter 6 which contains relevant updates. Work is also ongoing in the field of microplastics analysis, but additional work is needed.

6-2 The State Water Board will consider adopting a regulation for statewide UCMR monitoring for chemicals of public health concern, including NDMA and certain other CEC discussed in Chapter 3, to evaluate the extent of their presence in drinking water supplies. The results of UCMR monitoring will be used in determining whether a drinking water standard (MCL) is appropriate for a particular drinking water contaminant.

Status: Due to regulatory priorities this recommendation is pending. DDW continues to work on elements necessary to support adoption of a statewide UCMR regulation.

CHAPTER 7. TREATMENT TECHNOLOGY AND HEALTH RISK REDUCTION (2020 PLAN)

7-1 Given that the high O&M costs of treatment for chemical and radiologic contaminants are unsustainable for many small water systems particularly those serving disadvantaged communities, the State Water Board will seek to implement different solutions to providing safe drinking water such as consolidation with larger water systems.

Status: The progress on this ongoing goal is addressed throughout the report, specifically Chapters 8 and 9.

7-2 With the increase challenges in operating facilities that treat multiple contaminants, the State Water Board recommends special training programs to ensure operators are equipped to operate such facilities.

Status: Having well-educated and well-trained treatment operators and distribution system operators is of high priority. The State Water Board continues to explore possible funding opportunities for training and educating small water system operators, and to encourage ongoing training and education for drinking water system operators. To this end the State Water Board and its partners provide financing and technical assistance, including operator training at low or no costs to operators statewide. Additional initiatives such as state-led operators and operator coaches should be considered.

CHAPTER 8. SUSTAINABILITY OF CALIFORNIA'S DRINKING WATER SYSTEMS (2020 PLAN)

8-1 Require easily accessible and publicly available information regarding technical, managerial, and financial (TMF) status for all public water systems, regardless of governance types.

Status: This recommendation will be incorporated as part of the State Water Board's development of TMF regulations in response to SB 1188 and is included as part of the 2025 Plan recommendations.

8-2 Increase financial capacity requirements, potentially including asset management plans (or similar documents) and requirements to increase rates to meet those asset management plan requirements, as well as provide for adequate reserves, accounting policies, and insurances.

Status: Such requirements exist for systems related to receiving state funding and may be included as part of technical assistance provided to certain water systems. Recent legislation such as SB 552 and SB 1188 require the State Water Board to adopt and oversee certain TMF capacity requirements in the near term; however, this work is still pending.

8-3 Expand the financial capacity dashboards to include all public water systems to increase transparency and accessibility of infrastructure needs and water rates.

Status: Dashboard is limited to community water systems. Noncommunity water systems are excluded from the dashboard because there typically are no water rates associated with users of noncommunity water systems. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/afforddashboard.html

8-4 Limit the number of water systems a contract operator can maintain per license, similar to North Carolina's requirements to ensure that minimum levels of service are maintained.

Status: Due to regulatory priorities this recommendation is still pending. Another approach would be to track related system's operational needs with reference to the available and completed hours of operator time. State Water Board will evaluate this recommendation as part of its development of TMF regulations in response to SB 1188.

8-5 Requirements for minimum pipeline size and storage tanks requirements to meet fire demand, and/or collaborate with local fire authorities, in drinking water regulations, in order to deal with the demands of the changing climate.

Status: Additional resource allocation is needed to support such fire suppression related infrastructure. Subject to funding availability SB 552 requires small systems and NTNC to develop Water Storage Contingency Plan and other drought related planning and notification measures. DFA has incorporated these requirements, which include addressing fire flow capacity and climate change response be included as part of technical assistance work plans and construction applications. See: https://water.ca.gov/Programs/Water-Use-And-Efficiency/SB-552.

8-6 Water systems to be part of a mutual aid agreement, and all Counties to prepare a Local Hazard Mitigation Plans that address water system needs, including but not limited to identifying feasible water system interties and PWSs vulnerable to fire due to inadequately sized pipes.

Status: Efforts are an ongoing priority of the SAFER program engagement pipeline via emergency funding, technical assistance, funding for capital projects, or involvement in water partnerships or consolidations to address short-term and long-term needs.

8-7 Create a comprehensive and publicly available website that summarizes the source capacity and water rights for each public water system.

Status: Due to regulatory priorities this recommendation is still pending, though the SAFER Clearinghouse currently collects water rights identifying information from water systems on a source level basis. It is currently optional to submit and there is no data quality verification currently to ensure the information accurately identifies the water right. Source capacity data is also collected optionally but is not used to determine official source capacity (see also response 8-5).

8-8 In collaboration with the Division of Water Rights, identify barriers and consider whether greater flexibility is needed to modify existing water rights to ensure continued operations during or after emergency events.

Status: This initiative is ongoing. Such coordination is included as Phase 5 of SAFER Project Management described in Chapter 8.

8-9 Widely publicize the successes of large water systems or counties that actively support voluntary water system consolidations and regionalization partnership, ensuring safe drinking water for their current communities and their community at large. Perform outreach to notify large systems of smaller water systems that are in their immediate service area.

Status: The progress on this goal is addressed throughout the report, specifically Chapters 8 and 9 and published on State Water Board website consolidation pages.

8-10 Investigate ways to expedite funding for consolidation projects, through technical service providers, administrators, and/or direct payment of connection fees to a receiving water system for a subsumed water system immediately adjacent that may not currently be in violation of drinking water standards but have TMF failures.

Status: The progress on this ongoing initiative is addressed throughout the report, specifically Chapters 8, 9, 10. See recent legislation (Appendix 9), including AB 1250, Chapter 713, Statutes of 2021; SB 403, Chapter 242, Statutes of 2021; SB 776, Chapter 1; SB 1254, Chapter 676, Statutes of 2022; AB 805, Chapter 505, Statutes of 2024; and SB 1188, Chapter 881, Statutes of 2024.

8-11 Expand mandatory consolidation authority to address all public water systems under 500 service connections that have exceeded a primary MCL for longer than three years, not just those that serve disadvantaged communities.

Status: The progress on this ongoing initiative is addressed throughout the report, specifically Chapters 8, 9, 10. See recent legislation (Appendix 9).

8-12 Provide liability protection for municipal water systems and others that may be willing to act in an administrator capacity but are hesitant to do so because of liability concerns.

Status: See recent legislation (Appendix 9), including SB 1254, Chapter 676, Statutes of 2022.

8-13 Clarify the intent of SB 1263 on what is considered feasible to deny a public water system permit. The State Water Board recommends that feasible be defined as within 200 feet of another public water system’s distribution pipeline or if it is greater than 200 feet but is cost-effective based on an evaluation of 30-year operation and maintenance costs, and regardless of whether the system is within the public water system’s sphere of influence.

Status: Due to regulatory priorities this recommendation is still pending. DDW continues to facilitate consolidations instead of new PWS or domestic wells and recommends consultation on defining the scope of what distance constitutes feasibility or not. Additional clarity and authority would support DDW and counties decision process. DFA has worked with Technical Assistance providers and applicants to clarify the need to analyze feasibility as a necessary part of applying for grant funding.

8-14 Increase engagement with County and State land-use planners to develop County-wide drinking water plans. Plans could be done through required water sections of existing documents such as County General Plans, or other more specific drinking water plans.

Status: Progress on this initiative is ongoing. Though additional legislative support may be needed. The SAFER County Engagement Unit was developed to provide such coordination efforts.

8-15 Information regarding State Small Water Systems, including water quality data and boundaries, should be publicly available on a single website location for better understanding and greater transparency of any issues regarding these water systems and so they can be included in regional planning efforts.

Status: SSWS are regulated by county LPA's. Progress on this initiative is ongoing and a part of the SAFER engagement activities. See Safer Dashboards: https://www.waterboards.ca.gov/safer/safer_data.html

Risk Assessment - State Small Water Systems and Domestic Wells: https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=ece2b3ca1f66401d9ae4bfce2e6a0403

CHAPTER 9. DRINKING WATER COST AND AFFORDABILITY (2020 PLAN)

9-1 Many small water systems have water rates that are too low and some still have flat rates. Each public water system should be required to analyze the adequacy of their rate structure and asset-management plan. For small systems, technical assistance can be provided to assist with this work.

Status: For systems to receive technical assistance or funding for capital improvements this type of analysis is included in the scope of work or as a condition of funding. SB 1188 (See Appendix 9) has directed State Water Board to develop and implement minimum standards related to TMF capacity of CWS serving fewer than 10,000 people or 3,300 service connections and non-transient non-community water systems serving K-12 schools. Systems must comply within no less than 2 years after adoption of standards.

9-2 Options should be developed and evaluated for making drinking water affordable for all low income households, including evaluating the potential for establishing an appropriate water service subsidization program to low-income families and individuals served by a PWS that charges unaffordable rates. As a guiding human right principle, the cost of water should not pose a barrier to access. Assistance should be provided by some means to low-income households that face discontinuation of water service in order to protect human health impacts from shutoffs of water service due to payments in arrears.

Status: Progress on this initiative is still pending. SB 222, Vetoed on 09/28/2022: This bill would have, upon appropriation, established the Water Rate Assistance Fund and the Water Rate Assistance Program, to be administered by the State Water Board. The program would provide water and wastewater bill assistance to low-income residential ratepayers.

State Water Board completed Low-Income Rate Assistance Program Plan and Legislative Report. CPUC and State Water Board held Joint Workshop on Water Affordability Impacts During COVID-19 in October 2020. https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance

Low Income Household Water Assistance Program (LIHWAP) was a limited-term, federally funded program that offered assistance to help low-income households pay residential water and sewer bills and manage their residential water utility costs. LIHWAP was established by Congress in December 2020, and the program sunset on March 31, 2024. The Department of Community Services and Development (CSD) was the designated administering agency for LIHWAP in California. https://www.csd.ca.gov/lihwap

State Water Board administered California Water and Wastewater Arrearages Payment Program and California Extended Water and Wastewater Arrearage Payment Program via $985 million in federal funding allocated by the state legislature between March 2020 and January 2024. https://www.waterboards.ca.gov/arrearage_payment_program/

CHAPTER 10. FINANCING PUBLIC WATER SYSTEM INFRASTRUCTURE (2020 PLAN)

10-1 Proposition 218 has made it difficult for water systems of all sizes to increase their rates to address critical infrastructure issues. Consumers may not understand the costs associated with new treatment systems and otherwise supplying safe drinking water. The State Water Board will collaborate with the water utility industry, public interest groups, local non-profit organizations and other organizations to develop strategies to educate consumers on the factors that affect the cost of operating a water system.

Status: This continues to be a challenge for water systems subject to Prop 218. State Water Board continues to collaborate solutions with stakeholders as a constant goal of the SAFER program engagement activities to shorten the time it takes to address system's short- and long-term needs.

10-2 As part of its Capacity Development Program, the State Water Board will continue to encourage community water systems to adopt an asset management plan for infrastructure replacement.

Status: Considering SB 1188 requirements, the State Water Board will continue to collaborate on asset management plans related to infrastructure replacement as a constant goal of the SAFER program engagement activities with stakeholders to reduce unsustainable water systems, encourage water partnerships, and shorten the time it takes to address systems short- and long-term needs.

CHAPTER 11. DRINKING WATER SECURITY, EMERGENCY PREPAREDNESS, EMERGENCY RESPONSE, AND RESILIENCY (2020 PLAN)

11-1 All community water systems (CWSs) should be required to participate via membership in a mutual aid organization with other water utilities.

Status: SB 552 (2021) requires CWSs serving 15 to 2,999 service connections to join a mutual aid organization. This accounts for approximately 79% of the CWSs in California. DDW will continue to recommend that all CWSs maintain a membership in a mutual aid organization.

11-2 A requirement to join a mutual aid organization should be a condition of any state funding contracts.

Status: DDW will continue to collaborate with DFA and other State funding agencies to incorporate this recommendation.

11-3 Establish statutory requirements for all CWSs to develop, maintain and exercise an emergency response plan (ERP).

Status: This requirement is pending. Under AWIA, CWSs serving more than 3,300 people are required to develop ERPs based on vulnerability assessments they conduct. This only accounts for approximately 23% of the CWSs in California. While the low-end of 3,300 does capture some systems in hazard prone areas, there are many more CWSs in these areas that would benefit from conducting vulnerability assessments and drafting ERPs if the state or federal government had a requirement.

Threats that are common to all water systems regardless of size are cyber threats. There is a tendency to think about threats from natural disasters or human-caused incidents related to physical security, but it has been ever so important to include cyber threats in vulnerability assessments and ERPs. Requiring all water systems to review their cyber vulnerabilities and develop a response plan would improve system response to a cyber incident and possibly improve cyber maturity.

DDW works with DFA's TA provider, RCAC to provide ERP training presentations to rural water systems by reviewing the presentations to ensure they are in line with Cal OES and FEMA emergency management principles and guidelines. As time and resources allow, DDW also participates in tabletop exercise events hosted by water systems to provide a state perspective.

11-4 As part of Sanitary Surveys, the State Water Board encourages and will verify that PWSs serving greater than 3,300 people update their risk and resilience assessment and their ERP and review and update these documents every five years, per the AWIA.

Status: DDW will continue to discuss ERP requirements during sanitary surveys and recommend system personnel conduct vulnerability assessments and draft or update their ERPs.

11-5 Build a culture of preparedness. Every segment of water supply, from individual water systems to governance and support associations, must be encouraged and empowered with the information needed to prepare for the inevitable impacts of future disasters.

Status: DDW is working internally to update its emergency preparedness plans. By strengthening the preparedness knowledge within, DDW can create greater familiarity and comfort with emergency management concepts that will enhance the knowledge at the unit level, increasing the comfort level of staff to address emergency preparedness.

11-6 PWSs should be encouraged to subscribe to and review the intelligence alerts from organizations.

Status: DDW will continue to make such recommendations. As noted below, DDW coordinates with CISA, EPA, and Cal OES's Cal-CSIC to distribute information to PWSs. When doing so, DDW encourages water systems to sign up for the same alerts so PWSs can receive the alerts firsthand.

11-7 Ensure water systems are positioned to be able to seek FEMA reimbursement following any disaster that has caused damage to their water facilities by having a Local Hazard Mitigation Plan or being included in a County Local Hazard Mitigation Plan (LHMP).

Status: DDW continues to collaborate with water systems and Cal OES to ensure they are aware of potential Public Assistance (PA) funding. Regarding LHMPs, DDW recognizes that such plans are not the limiting eligibility factor for PA funding. Constraints outside of DDW's scope of influence include the type of entity that owns the water system, ownership of the facility, and proving damage occurred due to the disaster/incident. Due to the inability of DDW to ensure PWSs are positioned to access such public assistance grant funding this is a low priority.

11-8 Inclusion of Water Sector Specific positions at local EOCs. This will provide the necessary support and coordination with other emergencies managers to ensure there are targeted efforts to repair our critical sectors so water can be used for fire suppression tactics and populations can return to safe drinking water when evacuations are lifted.

Status: Additional resources are needed to fully realize this recommendation. DDW will continue to recommend to local emergency managers that they consider how they will best consider response to drinking water emergencies after a disaster. Given that there are currently 58 county EOCs and approximately 400 city EOCs, DDW will coordinate within its limited capabilities with Cal OES regional staff to provide presentations to local emergency managers about drinking water response during and after an incident.

11-9 Develop focused programs to ensure California water systems are planning and preparing for the impacts of climate change. This may include, but is not limited to, technical assistance providers to develop regionalized training focusing on climate vulnerabilities, funding programs to assist water systems to develop climate change vulnerability assessments and mitigation plans, ensure funding is available for water systems to implement mitigations to develop resiliency to changing climate.

Status: This initiative is ongoing. Additional resources are needed to further develop this initiative. Subject to funding availability, SB 552 requires small systems and NTNC to develop Water Storage Contingency Plan and other drought related planning and notification measures. DFA has incorporated these requirements, which include addressing reliability issues such as source and storage capacity and climate change responsiveness be included as part of technical assistance work plans and construction applications. DFA's technical assistance providers have provided emergency management presentations as part of disseminating this information. This work is also incorporated into the SAFER engagement activities discussed in Chapters 8 and 9.

11-10 The water and wastewater systems sector should be consolidated into a single

Emergency Support Function under the National Response Framework to improve the efficiency and prioritization of water sector needs during an emergency.

Status: California handles water and wastewater under the state's ESF 10. While this is different than where water and wastewater are placed in the federal ESF (ESF 3), US EPA coordinates with DDW effectively to address any concerns. Each state handles water and wastewater differently, so it would be difficult to force a one-size-fits-all model. Accordingly, this is a low priority.

11-11 Establish requirements for water systems to routinely provide accurate and updated water system service areas and legal boundaries to the State Water Board.

Status: This recommendation is ongoing and coordinated as part of DDW's eAR and data review processes.

11-12 Increase awareness of cyber threats and use of guidelines and assistance from organizations such as AWWA, the CISA and Water ISAC to help PWS improve their cyber security.

Status: This recommendation is ongoing. DDW coordinates with CISA, EPA, and Cal OES's Cal-CSIC to distribute information to PWSs. When doing so, DDW encourages water systems to sign up for the same alerts so PWSs can receive the alerts firsthand.

11-13 Adoption of cyber security practices by PWSs when implementing SCADA systems. Provide ongoing security maintenance and updates to the SCADA system.

Status: This recommendation is ongoing. Drinking water system operators are approved to receive contact hours for cybersecurity courses. DFA's Operations Certification Unit has seen an increase in operators submitting contact hours for cybersecurity training. Additionally, local organizations host regular cybersecurity planning and exercise events incorporating water system operators and information technology (IT) professionals.

11-14 Advance financial planning and investments in water system infrastructure to replace facilities that have exceeded their useful life to make them better prepared for emergencies and disaster recovery.

Status: This recommendation is ongoing. DFA provides technical and financial assistance to help water systems prioritize and address such capital improvement needs, including those needed to address the impacts of climate change, resiliency, redundancy, and overall sustainability.

APPENDIX 8. LIST OF TREATMENT TECHNOLOGIES USED BY PUBLIC WATER SYSTEMS

This appendix contains a summary of treatment technologies used by public water systems as of October 2024.

Table 1 – Treatment Method, Purpose, and Total Number of Facilities within each Treatment Category

Most Common Treatment Method	Corrosion Control	Disinfection Byproduct Control	Inorganic Removal	Organic Removal	Radionuclide Removal
Aeration	15	33	1	46	1
Biological	0	0	4	1	0
Blending	0	0	102	26	4
Chlorine Dioxide	0	7	0	0	0
Granular Activated Carbon	0	31	41	462	0
Ion Exchange	0	0	310	51	49
Media Filtration	0	3	123	4	1
Membrane Filtration	0	4	179	15	10
pH Adjustment	267	5	41	3	0
Point of Use & Point of Entry	0	0	275	1	0
Ultraviolet	0	8	0	1	0

Table 2 – Treatment Purpose and Number of Water Systems within each Category

Treatment Purpose	Water Systems	Target Contaminants
Corrosion Control	307	lead and copper
Disinfection	3429	microbial, virus
Disinfection Byproduct Control	99	total organic carbon, disinfection byproducts
Inorganic Removal	1,264	arsenic, nitrate, hexavalent chromium, fluoride, chloride, perchlorate, barium
Organics Removal	229	tetrachloroethylene, 1,2,3-Trichloropropane, 1,2-dibromo-3-chloropropane, ethylene dibromide, PFAS, trichloroethylene, methyl tert butyl ether
Particulate Removal	832	suspended particles typically associated with surface water treatment
Radionuclide Removal	48	gross alpha, uranium
Softening (hardness removal)	166	calcium, magnesium

Treatment Purpose	Water Systems	Target Contaminants
Taste and Odor Control	94	hydrogen sulfide

Table 3 – Percent of Public Water Systems with Treatment by System Classification

System Classification	Percent With Treatment	Percent Without Treatment
Community	68%	32%
Transient Non-Community	35%	65%
Non-Transient, Non-Community	59%	41%
Total	54%	46%

Table 4 – Percent of Community Water Systems with Treatment by Size Category

Community	Percent With Treatment	Percent Without Treatment
100 Connections or Fewer	56%	44%
More than 100	81%	19%
Total	69%	31%

APPENDIX 9: KEY DRINKING WATER LEGISLATION 2021-2024 (SINCE 2020 PLAN)

This appendix includes a summary of key drinking water legislative bills that were (1) enacted into law between 2021 and 2024 and (2) for various reasons, were not enacted into law between 2021 and 2024.

(1) **BILLS THAT WERE ENACTED INTO LAW**

2021

AB 1250, Chapter 713, Statutes of 2021

This bill requires the California Public Utilities Commission (CPUC) to approve or deny an application for consolidation involving a CPUC regulated water system within 12 months, where a water system is failing to provide an adequate supply of safe drinking water, or is at-risk of failing, as determined by the State Water Resources Control Board (State Water Board). For consolidations valued at less than $5 million and where a water system is failing or at-risk of failing, the bill requires the CPUC to approve or deny an advice letter requesting consolidation within 180 days. For transactions valued at more than $5 million, a water system is required to pay a $10,000 fee when filing an application for consolidation.

AB 1428, Chapter 64, Statutes of 2021

This bill preserves the state’s primary authority to implement the federal Safe Drinking Water Act (SDWA) in California. Existing state law authorized certain agricultural water districts to self-certify that the water they are incidentally providing for residential drinking water purposes provides an equivalent level of public health protection as state drinking water standards. The U.S. EPA identified this self-certification provision in state law as being inconsistent with federal law and indicated that this provision for self-certification must be removed for California to maintain primacy. Consistent with U.S. EPA’s direction, this bill removed the self-certification provision. Now, the State Water Board must make the determination that the drinking water incidentally provided by agricultural water districts is the equivalent level of protection provided by the applicable primary drinking water regulations.

SB 403, Chapter 242, Statutes of 2021

This bill expands the State Water Board’s existing authority to order consolidations of failing drinking water systems serving a disadvantaged community by authorizing the State Water Board to order consolidation where a water system serving a disadvantaged community is at-risk of failing to provide an adequate supply of safe drinking water, or where a disadvantaged community is substantially reliant on domestic wells that are at-risk of failing to provide an adequate supply of safe drinking water. Before ordering consolidation or extension of service, the State Water Board must consult with any groundwater sustainability agency that provides groundwater supply to the affected area, the State Water Board must also conduct outreach to ratepayers and residents served by an at-risk water system and to consider any specified petitions submitted by members of a disadvantaged community served by the at-risk water system. This bill also authorizes the State Water Board to prioritize consolidation of an at-risk water system that has historically been overburdened by pollution and industrial development or faced other environmental justice hurdles.

SB 155, Chapter 258, Statutes of 2021

This bill is an omnibus budget resources trailer bill and contains provisions necessary to implement the 2021 Budget Act. Among the various administrative provisions, this bill expands the list of eligible funding recipients, under the Safe and Affordable Drinking Water Fund, to include technical assistance providers, as defined, and community water systems, and provides that a privately-owned public utility may serve as a technical assistance provider. Until December 31, 2021, all community water systems were prohibited from discontinuing water service to customers due to nonpayment. This bill also establishes specific reporting requirements for water extractions and diversions by standardizing all water right reporting based on the water year (October-September), rather than the calendar year, and by establishing a due date of February 1 for water use reports submitted to the State Water Board.

SB 552, Chapter 245, Statutes of 2021

This bill requires small water suppliers that serve 1,000 to 2,999 service connections, and non-transient non-community water systems that are schools, to develop and maintain an abridged Water Shortage Contingency Plan that includes specified drought planning elements. The bill requires small water suppliers that serve fewer than 1,000 service connections to include specified drought planning elements in their Emergency Notification or Emergency Response Plans. The bill also requires small water suppliers and non-transient non-community water systems that are schools to implement specified drought resiliency measures by specified dates, subject to funding availability. Small water suppliers, or small water suppliers integrated into larger water systems, that voluntarily choose to instead comply with specified existing law relating to urban water management plans are exempt from the statutes adopted under this bill.

SB 776, Chapter 187, Statutes of 2021

This bill makes several statutory changes to improve implementation of the SDWA. Through this bill, several provisions of the SDWA extend to state small water systems, including authorizing the State Water Board to adopt emergency regulations to quickly address drinking water emergencies and to make limited advance payments and funding for projects without a written agreement. Additionally, this bill consolidates and strengthens the State Water Board's authority to enforce the terms, conditions, and requirements of its financial assistance programs and to take enforcement against fraud. This authority applies to all funding programs administered by the State Water Board, including the Safe and Affordable Drinking Water Fund. The State Water Board is authorized to recover misused funds, recover staff costs associated with investigation and prosecution of fraud or misuse of funds, and prohibits entities or individuals found to have misused funds from being able to obtain future grants or loans from the State Water Board.

2022

AB 1642, Chapter 859, Statutes of 2022

This bill provides an exemption to the California Environmental Quality Act for projects designed to mitigate or prevent the failure of a domestic water well or water system. For the exemption to apply, the well or water system to which the well is connected must be designated by the State Water Board in its drinking water needs assessment as high or medium risk. Additionally, the lead agency must determine that several conditions exist, including that the well project is not designed primarily to serve irrigation for future growth and does not affect wetlands or sensitive habitats. The lead agency must contact the State Water Board to determine whether claiming the exemption will affect the ability of the project to receive federal financial assistance or federally capitalized financial assistance. The exemption sunsets on January 1, 2028.

AB 2877, Chapter 481, Statutes of 2022

This bill requires the State Water Board to make diligent efforts to ensure that California Native American tribes and specified non-federally recognized Native American tribes receive Safe and Affordable Drinking Water (SADW) Fund monies. For example, the State Water Board must identify potential solutions to funding barriers in its annual SADW Fund Expenditure Plan and publicly post data about tribal funding. This bill also requires the State Water Board's tribal liaison or specific designees to participate in all discussions with tribes about SADW funding, including negotiations over limited waivers of sovereign immunity. The waiver must be narrowly drafted to serve both the individual needs of the tribe and make the funding agreement enforceable.

SB 230, Chapter 676, Statutes of 2022

This bill requires that the State Water Board build upon its existing work related to Constituents of Emerging Concern (CECs) in water and improve its knowledge of CECs in drinking water. The State Water Board must also create a dedicated program and science advisory panel for CECs in drinking water, provide opportunities for public participation, and create a "CEC Action Fund" to fund these activities, once funding is appropriated to do so. Subject to funding availability, this bill authorizes the State Water Board to provide financial assistance for monitoring CECs to certain community water systems both directly and through technical assistance providers.

SB 1254, Chapter 676, Statutes of 2022

This bill expands the definition of "designated water system" in Health and Safety Code 116686 to include any at-risk water system, as defined in section 116681 of the Health and Safety Code. This bill also provides liability protection to water system administrators who are appointed by the State Water Board to improve a failing drinking water system. To receive liability protection, the appointed administrator must make good faith, reasonable efforts and exercise ordinary care while fulfilling its obligations under the statute. The bill does not create any new liability for the State Water Board, nor does it remove liability from the State Water Board in any other context.

SB 1188, Chapter 680, Statutes of 2022

This bill allows the State Water Board to provide grants, principal forgiveness funding, and zero percent financing from the state's Drinking Water State Revolving Fund to the full extent that such funding is authorized by federal law. These changes will allow the State Water Board to provide funding to small, non-disadvantaged communities for consolidation projects, drinking water projects benefiting public health, and for larger non-disadvantaged communities to encourage consolidation with smaller water systems.

2023

AB 541, Chapter 530, Statutes of 2023

This bill directs the State Water Board to require a public water system that has experienced a wildfire event, as specified, to perform sample collection and analysis of its source waters, treatment facilities, conveyance facilities, distribution systems, or a combination thereof, for the presence of benzene, as soon as it is safe to do so. This bill also clarifies the State Water Board's authority to direct a public water system's post-wildfire response if benzene contamination is detected.

AB 664, Chapter 530, Statutes of 2023

This bill requires the owner of any domestic well that serves a rental property and is located within a consolidation or extended service area, if the owner does not provide written consent to the consolidation or extension of service, to ensure that tenants of rental properties served solely by that domestic well have access to an adequate supply of safe drinking water. Until consent is provided, the domestic well owner must ensure that their tenants have access to safe drinking water by, among other provisions, testing their domestic wells for drinking water contaminants, providing uninterrupted replacement water service, and prohibiting associated costs from being passed to tenants. Additionally, this bill expands the application and scope of a crime under the SDWA. Enforcement of the requirements under this bill is contingent upon legislative appropriation.

AB 1627, Chapter 173, Statutes of 2023

AB 1627 preserves the State's authority to implement the federal SDWA in California by (1) repealing a provision in the California SDWA that might have been construed as exempting food facilities that operate public water systems from regulation under the California SDWA and (2) making a technical clarification to the California SDWA's definition of “public water system.” By aligning the California SDWA with the federal SDWA, this bill ensures that state law is no less stringent than federal law. This protects the state’s primary authority to enforce the federal SDWA in California.

SB 3, Chapter 855, Statutes of 2023

This bill requires community water systems with 200 or fewer service connections to comply with the Water Shutoff Protection Act (Act). The State Water Board, subject to the availability of funding, is required to provide statewide training for water systems to assist in compliance with the Act. Additionally, the State Water Board is authorized to use the Safe Drinking Water Account to administer the Act’s provisions, including the requirement to provide training to water systems to assist with compliance.

2024

AB 805, Chapter 505, Statutes of 2024

This bill was adopted with urgency and therefore took effect immediately upon the date of adoption, September 24, 2024. The bill authorizes the State Water Board, after it makes specific findings by resolution, to require a designated sewer system to contract with an administrator designated or approved by the State Water Board to provide technical, operational, legal, or managerial services for disadvantaged communities whose sewer service is deemed inadequate. This State Water Board is required to undergo a public process prior to determining that an administrator is required, define the authorities of an administrator, outline expectations of State Water Board assistance and required processes, and detail grant funding sources that may be made available to the administrator and receiving sewer service provider. The State Water Board is authorized to grant specified authority over the designated sewer system to the administrator, including the authority to expend money for various purposes and to set and collect sewer rates and fees. Some of the authorities granted to the State Water Board through the adoption of this bill have sunset provisions. For example, beginning January 1, 2029, the State Water Board no longer has the authority to require a sewer service provider to contract with an administrator.

AB 2454, Chapter 506, Statutes of 2024

This bill requires owners of domestic wells that serve rental properties and are within the boundaries of a testing program to participate in a free domestic well testing program. The owner must provide the test results to tenants within 10 days of receiving them. If the test results demonstrate an exceedance of any primary drinking water standard, and the owner of the domestic well or a resident served by the domestic well is eligible for a program that is offered by the State Water Board, a Regional Board or other state agency to access safe drinking water, then the domestic well owner must provide safe drinking water under that program to the residents. Owners of domestic wells are prohibited from imposing any charge, or increasing any fee, rent or other charge imposed on any resident solely because of the mandatory well testing associated with this section.

AB 2962, Chapter 203, Statutes of 2024

The Wholesale Regional Water System Security and Reliability Act requires the City and County of San Francisco to adopt a specified program of capital improvement projects designed to restore and improve the bay area regional water system. Current law makes the act inoperative and repeals these provisions on January 1, 2026. This bill extends the repeal date of the act to January 1, 2036.

SB 1147, Chapter 902, Statutes of 2024

This bill requires the Office of Environmental Health Hazard Assessment (OEHHA) to study the health effects of microplastics in drinking water and bottled water. After OEHHA's study is complete, the State Water Board is authorized to request that OEHHA develop a public health goal for microplastics in drinking water.

SB 1188, Chapter 881, Statutes of 2024

This bill requires the State Water Board to develop and adopt minimum standards related to the technical, managerial, and financial (TMF) capacity of community water systems with fewer than 10,000 people or 3,300 service connections and systems that serve K-12 schools. The State Water Board must adopt timelines for the community water systems to come into compliance with the standards adopted in accordance with the provisions adopted under this bill; the timelines may not require compliance sooner than two years after the State Water Board's adoption of the standards. The State Water Board is authorized to require such a community water system to show proof that it has the TMF to meet the standards, through, but not limited to, annual reporting requirements.

(2) BILLS THAT WERE NOT ENACTED INTO LAW

<u>2021</u>

N/A.

<u>2022</u>

AB 1931, Held in Senate Appropriations Committee in August 2022

This bill would have required the State Water Board to provide federal Bipartisan Infrastructure Law funding to community water systems to fund the replacement or removal of lead service lines, among other related uses. Community water systems that serve disadvantaged communities would have been prioritized for funding. The bill would have mandated that community water systems take certain measures before they replace a lead service line or a service line of unknown materials-- such as determining the materials on the private side of the line—and certain measures after they replace a lead service line—such as providing customers with educational materials, instructions on flushing, and pitcher filters. The bill would have provided for certain exemptions in the case of emergency repairs. Finally, this bill would have sunset on the earlier of two dates: (1) January 1, 2025, or (2) when the State Water Board issues regulations conforming with the federal Lead and Copper Rule revisions.

AB 2041, Held in Assembly Appropriations Committee in May 2022

This bill would have required that the State Water Board do the following once it adopted a primary drinking water standard with a compliance schedule: (1) Identify public water systems that may not be able to comply without receiving financial assistance and (2) Work with the identified water systems to create a compliance plan and financial plan to comply with the primary drinking water standard.

SB 222, Vetoed in September 2022

Upon appropriation, this bill would have established the Water Rate Assistance Fund and the Water Rate Assistance Program, to be administered by the State Water Board. The program would have provided water and wastewater bill assistance to low-income residential ratepayers. Within 270 days of appropriation, the State Water Board would have been required to consult with relevant agencies and an advisory group to adopt program guidelines. This bill would have also required, within 365 days of appropriation, the Public Utilities Commission (CPUC) to establish a mechanism for electrical corporations and gas corporations to regularly share data for the program. All community water systems and wastewater systems would have been required to participate in the program but would have been optional for tribal water and wastewater systems.

SB 1124, Held in Assembly Appropriations Committee in August 2022

This bill would have required OEHHA to prepare, on or before July 1, 2023, a PHG for manganese. This bill would have also required the State Water Board to adopt a primary drinking water standard for manganese by January 31, 2024. This State Water Board would have been required to consider establishing a new manganese Notification Level and Response Level for manganese that would remain in place until the primary drinking water standard is adopted. This bill would have authorized the State Water Board to continue ordering community water systems to monitor manganese in their distribution systems and to continue providing funding for manganese-related remediation measures.

SB 1144, Vetoed in September 2022

This bill would have required the State Water Board to adopt regulations for water efficiency and quality programs to be implemented at all public schools and state buildings as provided. This bill would have required state agencies and public schools to complete an assessment report for each covered building that contains: (1) An inventory of noncompliant plumbing fixtures and appliances; (2) Testing for lead in a building's drinking water, identification of lead pipes or pipes of unknown materials, and replacement of those pipes if necessary; and (3) Development of a Legionella Management Program for each covered building, which the State Water Board would have had the authority to periodically monitor for compliance.

2023

AB 249, Vetoed in October 2023

This bill would have required community water systems that serve school sites with buildings constructed before January 1, 2010, to test for lead at each of those school sites' potable water system outlets, on or before January 1, 2027. Testing would have been limited to school sites that receive funding pursuant to Title I of the federal Elementary and Secondary Education Act of 1965. Local educational agencies and schools would have been required to take certain action if lead levels exceed five parts per billion, such as notifying parents and guardians, shutting down affected faucets and outlets, and ensuring the availability of a potable source of drinking water. The State Water Board would have been required to collect and publicly post the data that this program generated.

2024

N/A.

CALIFORNIA

SAFE Drinking Water Plan

UPDATE 2025

CALIFORNIA Water Boards