

Arizona Department of Environmental Quality Water Quality Protection Responsibilities

Department has not developed all required aquifer water quality standards, conducted key ongoing groundwater monitoring of the State's aquifers, monitored for agricultural pesticides in groundwater and surrounding soil, or reduced the number of impaired surface waters in the State, limiting its ability to keep these waters safe from pollution

Performance Audit

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A Report to the Arizona Legislature

Lindsey A. Perry
Auditor General





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September 28, 2021

Members of the Arizona Legislature

The Honorable Doug Ducey, Governor

Mr. Misael Cabrera, Director
Arizona Department of Environmental Quality

Transmitted herewith is the Auditor General's report, *A Performance Audit of the Arizona Department of Environmental Quality—Water Quality Protection Responsibilities*. This report is in response to a September 19, 2018, resolution of the Joint Legislative Audit Committee. The performance audit was conducted as part of the sunset review process prescribed in Arizona Revised Statutes §41-2951 et seq. I am also transmitting within this report a copy of the Report Highlights to provide a quick summary for your convenience.

As outlined in its response, the Arizona Department of Environmental Quality agrees with all the findings and plans to implement all the recommendations.

My staff and I will be pleased to discuss or clarify items in the report.

Sincerely,

Lindsey A. Perry

Lindsey A. Perry, CPA, CFE
Auditor General

Arizona Department of Environmental Quality Water Quality Protection Responsibilities

Department has not developed all required aquifer water quality standards, conducted key ongoing groundwater monitoring of the State's aquifers, monitored for agricultural pesticides in groundwater and surrounding soil, or reduced the number of impaired surface waters in the State, limiting its ability to keep these waters safe from pollution

Audit purpose

To determine whether the Department met its responsibilities to develop aquifer water quality standards (AWQS), conduct ambient groundwater monitoring, monitor agricultural pesticides in groundwater and the surrounding soil, and reduce impaired surface waters in the State; and provide information on recent developments related to per- and polyfluoroalkyl substances (PFAS) and water quality contamination in the State.

Key findings

- The Department's Water Quality Division is responsible for administering the Department's water protection and improvement programs, including developing AWQS to help protect the State's groundwater.
- The Department has not developed required AWQS for 8 contaminants, including arsenic and uranium, to help ensure that the water in aquifers is safe and protected, potentially putting private well users at risk of having unsafe water. The Department has been out of compliance for 7 to 29 years in developing AWQS for these 8 contaminants.
- The Department has not conducted key ambient groundwater monitoring responsibilities since 2017, such as detecting the presence and evaluating the effect of contaminants in groundwater.
- The Department has not conducted required monitoring of agricultural pesticides in groundwater and surrounding soil since 2013, as required by statute.
- Although it has established a goal to do so, the Department has not reduced the total number of impaired surface waters in the State that do not meet federal surface water quality standards to address pollutants that affect the safe use of these waters and potentially negatively impact the environment. From 2014 to 2020, the number of impaired surface waters in Arizona has increased from 136 to 155 impaired surface waters.
- Contamination from PFAS is an ongoing threat to the State's water. The Department reported it has worked with affected public water systems and private well users to address PFAS contamination, including taking various steps to monitor, investigate, and remediate PFAS found in Arizona's water.

Key recommendations

The Department should:

- Adopt AWQS in rule to match federal drinking water standards or a State alternative AWQS for the 8 contaminants that do not have AWQS, as required by statute.
- Conduct statutorily required ambient groundwater monitoring and agricultural pesticide monitoring in groundwater and soil.
- Perform a workload analysis to assess its costs for developing AWQS and conduct ambient groundwater and agricultural pesticide monitoring and then work with the Legislature to obtain the needed resources.
- Reduce the number of impaired surface waters in the State by developing and reviewing implementation plans for reducing impaired surface waters in a timely manner.



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The Arizona Auditor General has completed the first of 2 performance audits of the Arizona Department of Environmental Quality (Department). This performance audit determined whether the Department met its responsibilities to develop aquifer water quality standards (AWQS), conduct ambient groundwater monitoring, monitor agricultural pesticides in groundwater and the surrounding soil, and reduce impaired surface waters in the State (see textbox for key terms). This report also includes information on recent scientific, regulatory, and legal developments related to per- and polyfluoroalkyl substances (PFAS) and water quality contamination in the State. The second audit will assess the Department's compliance with conflict-of-interest statutory requirements and provide responses to the statutory sunset factors.

Mission and oversight

The Department is responsible for administering the State's environmental laws and federal programs for which the State has the primary enforcement responsibility to prevent pollution of the State's air, land, and water and ensure cleanup in Arizona. As one of the Department's 3 environmental divisions, the Water Quality Division (Division) is responsible for administering the Department's water protection and improvement programs, including developing AWQS to protect the State's groundwater (see Finding 1, pages 7 through 10). The Division's mission is to protect and enhance public health and the environment by ensuring healthy drinking water is provided by public water systems and by controlling current and future sources of ground and surface water pollution. The Department's water quality programs also help protect the State's groundwater for the approximately 350,000 Arizona residents who rely on drinking water from private wells instead of public water systems. Arizonans in rural parts of the State are particularly dependent on drawing groundwater from private wells, as it is often the only option for providing water (see Findings 1 and 2, pages 7 through 13, for more information).

The Department, through the Division, has 2 federally approved programs that it is responsible for implementing in Arizona: the Federal Safe Drinking Water Act and Federal Clean Water Act. The Federal Safe Drinking Water Act establishes standards to help protect the nation's drinking water supply, such as requiring certification for water system operators and an assessment of drinking water sources to identify potential sources of contamination. The Federal Clean Water Act establishes the regulatory structure for discharges of pollutants into the Waters of the United States and water quality standards to protect these waters.¹

Key terms

Aquifer water quality standards—Standards that establish the highest level of specific contaminants allowed in the State's aquifers to help regulate the quality of groundwater.

Ambient groundwater monitoring—Detecting the presence and evaluating the effects of contaminants in groundwater.

Agricultural pesticides monitoring—Testing for pesticides and assessing actions needed to protect groundwater and soil.

Impaired surface waters—Surface waters that do not meet federal surface water quality standards for their designated purpose.

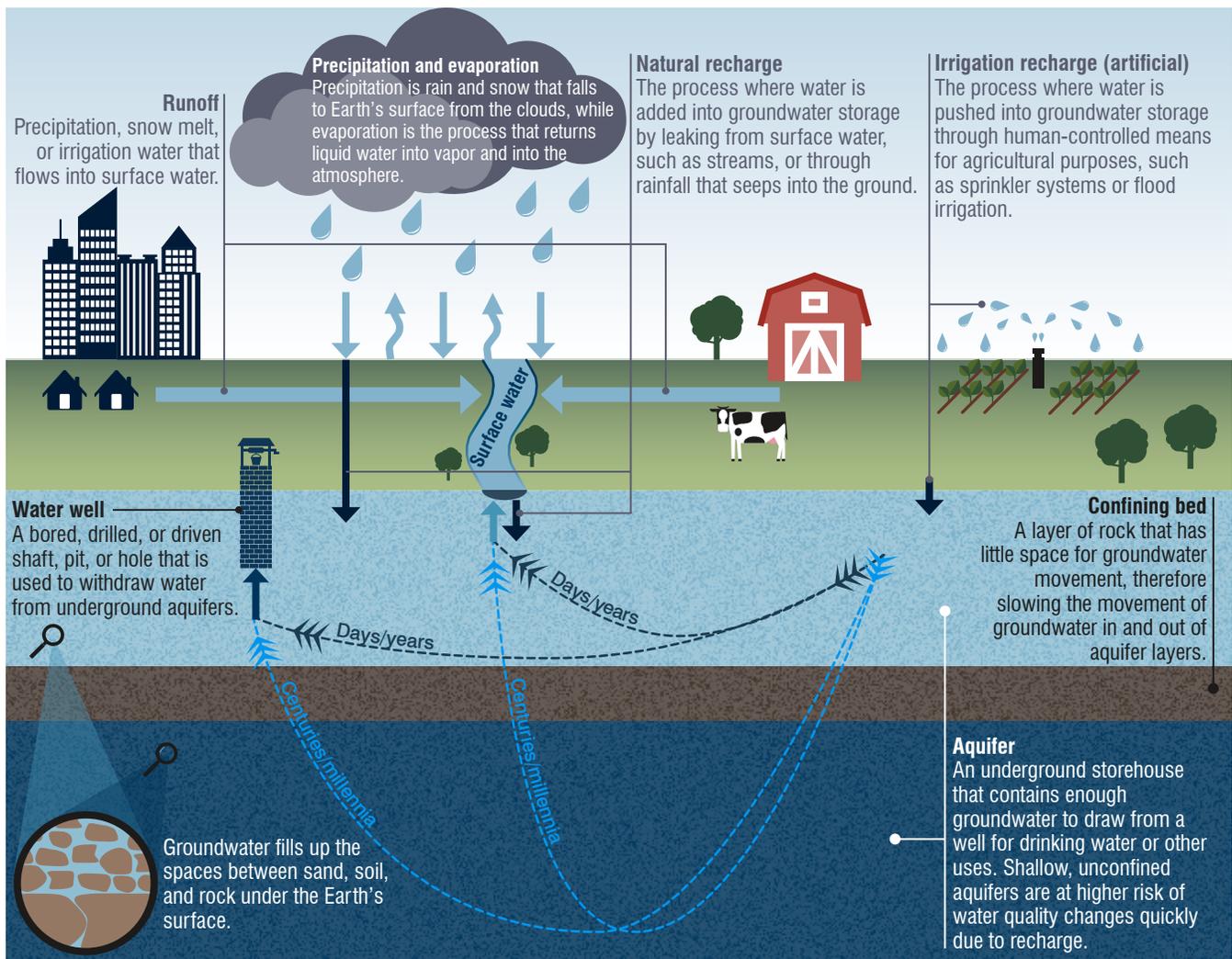
Source: Auditor General staff summary of Findings 1 through 4 (see pages 7 through 21) and various sources, such as statute, the Environmental Protection Agency (EPA), federal law, and Department-provided information.

¹ "Waters of the United States" is a term used in the Federal Clean Water Act to establish the scope of federal jurisdiction, such as for lakes, ponds, and tributaries. However, the definition of "Waters of the United States" has been the subject of recent rulemaking and legal action that could impact the regulation of these waters.

The interaction between water above and below ground affects water quality

The constant exchange of water above and below the earth's surface as well as the contaminants in water affect water quality (see Figure 1). For example, precipitation and runoff travel directly from the air or over the ground into surface water, such as lakes and rivers. Water seeps into the ground from natural sources, such as rainfall or through surface water, and artificial sources, such as irrigation, and recharges the underlying aquifer, where groundwater can remain underground for days or many years. Groundwater constantly and slowly flows through aquifers and eventually discharges back into surface water. Depending on how much time water spends underground and the conditions within the aquifer, the quality of groundwater can change before it discharges at the surface or is pumped out from a well.

Figure 1
Key components of the water cycle, including the interaction between ground and surface water



Source: Auditor General staff review of water quality definitions in statute and United States Geological Survey (USGS) website.

Arizona's water quality is a key factor in preserving the State's water supply. Although the Department is not responsible for maintaining or increasing the State's water supply, its water quality responsibilities are critical for the State's water supply conditions. Groundwater and the Colorado River each constitute about 40 percent of Arizona's annual water supply. Because Colorado River water is shared by Arizona, 6 other states, and Mexico, shortages could result in the State increasing its reliance on groundwater.

Organization, responsibilities, and staffing

As of July 2021, the Division reported having 103 filled full-time equivalent (FTE) positions and 4 vacancies. The Division included 2 positions, the Division's Director and Deputy Director, and allocated the remaining FTE positions to the following 4 subdivisions:

- **Groundwater Protection and Water Reuse (30 FTEs, 0 vacancies)**—These 2 subdivisions are responsible for safeguarding Arizona's groundwater from pollution by issuing permits to facilities that discharge to groundwater or reuse wastewater, such as facilities with aquifer protection permits (APPs), which regulate facilities that discharge contaminants into aquifers, and for enforcing compliance. The Groundwater Protection subdivision is also responsible for groundwater monitoring, including ambient groundwater monitoring, which is an assessment of water quality in the State's aquifers (see Finding 2, pages 11 through 13, for more information on ambient groundwater monitoring). Further, the Groundwater Protection subdivision is responsible for agricultural pesticide monitoring, including working with other State agencies to monitor the amount of pesticides found in groundwater and surrounding soil (see Finding 3, pages 14 through 17, for more information on agricultural pesticide monitoring).
- **Safe Drinking Water (30 FTEs, 2 vacancies)**—This subdivision is responsible for applying and enforcing federal and State regulations that govern public water systems in Arizona, including overseeing compliance with the Federal Safe Drinking Water Act.
- **Surface Water Protection (21 FTEs, 0 vacancies)**—This subdivision is responsible for protecting the water quality in Arizona's streams, rivers, lakes, and wetlands from pollution through permitting and enforcement of the Federal Clean Water Act programs (see textbox for 2 permits issued by this subdivision).
- **Surface Water Quality Improvement Planning (20 FTEs, 2 vacancies)**—This subdivision is responsible for developing surface water quality standards, assessing surface water quality, and working with stakeholders, including permitted facilities, to develop implementation plans to help ensure waters meet established standards. As part of these responsibilities, the subdivision is authorized by the Federal Clean Water Act to develop a plan to reduce impaired waters in the State, which includes identifying, monitoring,

The Division's permits and registrations

The Division is responsible for permitting, registering, and certification. It administers 70 different types of permits, registrations, and certificates, and issued approximately 9,600 permits, registrations, and certificates in calendar year 2020, including the 3 most common:

1. Arizona pollutant discharge elimination system (AZPDES) construction activity general permit (3,255 permits issued in calendar year 2020)—This permit is for construction activities that cause rainwater runoff discharges to enter Arizona surface waters or a municipal separate storm sewer system leading to Arizona surface waters.
2. AZPDES industrial multi-sector general permit (895 permits issued in calendar year 2020)—This permit is for mining activities and other types of facilities with industrial activities that discharge rainwater runoff to some surface waters.
3. Drywell registration (507 registrations issued in calendar year 2020)—This registration is for any person who owns an existing or proposed drywell, which is a well where rainwater runoff is collected, most commonly gas stations and other places with parking lots that have drainage from storm events.

Source: Auditor General staff review of the Department's website and information provided by the Department regarding its permit and registration actions in calendar year 2020.

and implementing plans to address contamination in the State's surface waters (see Finding 4, pages 18 through 21).

Revenues and Expenditures

Table 1 (see pages 5 and 6) provides information on the Division's revenues and expenditures. Although the Division receives funding from several sources, most of its funding consists of licensing and permitting fees, as well as federal grants. The Division's fiscal year 2021 revenues are estimated to total approximately \$24.8 million, with more than half of this amount coming from federal grants. The Division's total expenditures increased from approximately \$14.5 million in fiscal year 2019 to an estimated \$20.9 million in fiscal year 2021. Expenditures primarily comprised payroll and related benefits and professional and outside services, such as environmental consultants, legal services, and temporary staffing.² The Division also transferred an estimated \$4.4 million to the Department's Indirect Cost Recovery Fund in fiscal year 2021 to help pay for Department-wide administrative personnel and overhead costs that are not directly allocated to the Department's 3 divisions and the Director's office.

The Division's fund balances remained about the same in fiscal years 2019 and 2020, at about \$5.1 million, but are estimated to decrease to approximately \$2.8 million for fiscal year 2021. The Department attributed this decrease to Monitoring Assistance Program credits that were issued to public water systems.³ Specifically, public water systems with outstanding balances for fiscal year 2021 were given credits for payment because there was a surplus in the previous year's Monitoring Assistance Program Fund's fund balance that reduced the outstanding balances and monies these systems needed to pay in fiscal year 2021.

² According to the Department, the majority of these expenditures were used for water remediation projects.

³ The Monitoring Assistance Program helps small drinking water systems comply with the Safe Drinking Water act by assisting with the collection, transportation, analysis, and monitoring of contaminants. Participating water systems are required to pay annual fees.

Table 1
Schedule of revenues, expenditures, and changes in fund balances
Fiscal years 2019 through 2021
(Unaudited)

	2019 (Actual)	2020 (Actual)	2021 (Estimate)
Revenues			
Licensing, permitting, and other fees ¹	\$7,951,950	\$8,156,094	\$6,722,996
Department funds and revenues ²			
Federal grants	8,521,543	7,964,761	13,861,932
Water Quality Assurance Revolving Fund (WQARF)	778,107	1,912,888	1,503,910
Underground Storage Tank Revolving Fund	647,096	1,354,256	891,908
Air Quality Fee Fund		1,300,000	
Emissions Inspection Fund		1,269,300	
Natural Resources Damage Claim Fund		29,776	
Taxes ³	1,800,000	1,800,000	1,800,000
Charges for services	11,404	24,955	7,840
Interest income	118,251	72,969	18,927
Total revenues	19,828,351	23,884,999	24,807,513
Expenditures and transfers			
Payroll and related benefits	9,524,496	10,167,558	9,744,152
Professional and outside services ⁴	3,506,291	3,634,944	9,378,148
Travel	212,479	159,753	111,476
Aid to organizations ⁵	683,067	3,446,386	805,209
Other operating ⁶	352,103	856,400	732,267
Capital and noncapital purchases	226,511	71,765	103,194
Total expenditures	14,504,947	18,336,806	20,874,446
Expenditures in other divisions ⁷	2,070,879	1,732,302	1,823,384
Transfers to the Department's Indirect Cost Recovery Fund ⁸	4,228,065	3,672,586	4,384,867
Transfers to other State agencies ⁹	80,000	133,218	5,000
Total expenditures and transfers out	20,883,891	23,874,912	27,087,697
Net change in fund balances	(1,055,540)	10,087	(2,280,184)
Fund balances, beginning of year	6,177,815	5,122,275	5,132,362
Fund balances, end of year¹⁰	\$5,122,275	\$5,132,362	\$2,852,178

¹ The Division received licensing, permitting, and other fees from several water quality protection programs, such as the Aquifer Protection Permit Program established in A.R.S. §49-241, and a fee charged to public water systems serving up to 10,000 persons as part of the Monitoring Assistance Program established in A.R.S. §49-360(F). These fees vary between fiscal years depending on the number of license and permit applications received and, according to the Department, the fiscal year 2021 revenues decreased because the Department provided Monitoring Assistance Program credits to public water systems in accordance with A.R.S. §49-360(G) that reduced outstanding balances due and the amount of revenues these systems needed to pay in fiscal year 2021.

² Department funds and revenues were the portions of Department funds or revenue sources that were used to pay Division expenditures, including federal grant monies for several programs during fiscal years 2019 through 2021. The amount of Department funds and revenues used varies from year to year depending on the State appropriation process, federal monies received for water quality purposes, the needs of the Water Quality Division, and available resources. For example:

- a. The Department received multi-year funding from federal grants for one-time Division projects that had expenditures paid in multiple fiscal years. The federal grant revenues are estimated to increase nearly \$6 million in fiscal year 2021 because the Division used available monies from these multi-year grants to pay for projects during this fiscal year. Approximately \$900,000 and an estimated \$4.1 million in fiscal years 2020 and 2021, respectively, of these federal monies was from an EPA Nonpoint Source Implementation Grants program. According to the Department, it expects to use a lower level of federal grant revenues in fiscal year 2022 because these one-time projects have ended.
- b. The Division received WQARF monies in fiscal years 2019 through 2021. According to A.R.S. §49-282, the WQARF consists of monies from various sources, such as appropriated monies and licensing and registration fees. WQARF monies can be used for various purposes, such as compliance monitoring, investigation and enforcement activities pertaining to generating, transporting, treating, storing, and disposing of hazardous waste, as well as water quality monitoring.

Table 1 continued

- c. In fiscal year 2020, the Division received approximately \$2.6 million from the Air Quality Fee Fund and Emissions Inspection Fund monies to pay State expenditures for the repairs to the Nogales Wash and International Outfall Interceptor pipeline.
 - d. The Department reported that Natural Resources Damage Claim Fund monies are available and spent on a 5-year cycle for restoration project monitoring.
- ³ Taxes consisted of the first \$1.8 million of taxes levied on businesses operating a municipal water delivery system as part of the Safe Drinking Water Program and as required by A.R.S. §42-5304.
- ⁴ Professional and outside services expenditures consisted of various services acquired, including legal, temporary staffing, and program-related services. For example, in fiscal years 2019 through 2021, the Division spent or estimated spending between \$700,000 and \$830,000 annually for the collecting, transporting, analyzing, and reporting of the water quality of Arizona public water systems. According to the Department, the fiscal year 2021 professional and outside services estimated expenditures increased primarily because the Department received additional monies for federal programs. For example, the Department estimates that approximately \$2.7 million of the increase is related to expenditures from a Nonpoint Source Implementation Grants program, an EPA grant that focuses on watersheds with water quality impairment caused when rainfall or snowmelt moving over and through the ground picks up natural and human-made pollutants.
- ⁵ Aid to organizations consisted of monies provided to local governments and businesses for various purposes. Specifically, in fiscal years 2019, 2020, and 2021, the Division provided financial assistance from the Department's various federal grant programs, primarily to various organizations from the Nonpoint Source Implementation Grants program (see footnote 4 for additional information). In addition, in fiscal year 2020, approximately \$2.6 million was provided to the International Boundary and Water Commission for the repairs to the Nogales Wash and International Outfall Interceptor pipeline (see footnote 2 for the source of revenues for this project).
- ⁶ Other operating expenditures consisted of various expenditures such as printing costs, supplies, and software support and maintenance costs. In addition, in fiscal years 2020 and 2021, the Department paid or estimates it paid approximately \$533,000 and \$548,000, respectively, for building rent costs.
- ⁷ Expenditures in other divisions consisted of expenditures from the Division funds (see footnote 10) that were expended by other divisions, primarily the Director's office.
- ⁸ Transfers to the Indirect Cost Recovery Fund were assessments to the Division's funds to pay Department-wide administrative personnel and overhead costs that are not directly allocated to the Department's 3 divisions and the Director's office.
- ⁹ Transfers to other State agencies were for various purposes, but primarily for the distribution of federal financial assistance. Specifically, transfers in fiscal years 2019 and 2020 were to the Arizona Game and Fish Department from the Nonpoint Source Implementation Grants program (see footnote 5 for additional information).
- ¹⁰ The fiscal year ending fund balances primarily consisted of Water Quality Fee Fund, Safe Drinking Water Program Fund, and Monitoring Assistance Program Fund ending balances, of which the Division was the primary funds' user. The Water Quality Fee Fund and Safe Drinking Water Program Fund are subject to the State's appropriation process. The Monitoring Assistance Program Fund revenues are required to be used for the Monitoring Assistance Program contractors and the environmental laboratories in accordance with A.R.S. §49-360.

Source: Auditor General staff analysis of the Arizona Financial Information System *Accounting Event Transaction File* and the State of Arizona *Annual Financial Report* for fiscal years 2019 and 2020; and Department-provided financial information for fiscal year 2021.



Department has not developed all required aquifer water quality standards, potentially putting private well users at risk of having unsafe water

Department statutorily required to develop aquifer water quality standards (AWQS), which help protect groundwater and private wells

The Department is statutorily required to develop AWQS, which are used to help regulate the quality of groundwater in the State (see textbox for key terms).⁴ Specifically, AWQS establish the highest level of specific contaminants, such as arsenic and uranium, allowed in the State's aquifers. Statute requires the Department to adopt AWQS in rule that match the federal drinking water standard for each contaminant.^{5,6} However, if there is substantial opposition from stakeholders when developing an AWQS to match a new or updated federal drinking water standard, statute indicates that the Department can develop an alternative AWQS.^{7,8}

Aquifers are underground storehouses that contain enough groundwater to draw from a well for drinking water or other uses.

Groundwater is water beneath the Earth's surface that fills up the spaces between sand, soil, and rock.

Sources: Auditor General staff review of United States Geological Survey (USGS) website obtained 6/7/21 from <https://www.usgs.gov/> and Groundwater Foundation "What is a well?" webpage obtained 6/7/21 from <https://www.groundwater.org/get-informed/basics/wells.html>.

Developing or updating AWQS helps to ensure that the water in aquifers is safe and protected. For example, the Department's Water Quality Assurance Revolving Fund (WQARF) Program is responsible for remediating contaminated groundwater across the State, and it considers remediation efforts successful when testing results meet AWQS. In addition, the Department uses AWQS as the compliance standard for permittees that discharge pollution into groundwater. If a permittee's pollutant discharge exceeds AWQS, the Department can take enforcement action to bring them back into compliance so that they do not contaminate the State's aquifers and make water unsafe to drink. Remediating or limiting contamination in aquifers is particularly critical for the approximately 350,000 Arizona residents who rely on groundwater from private wells for drinking water instead of from a public water system. Although most Arizonans drink water from regulated public water systems that must comply with federal drinking water standards through regular water testing and treatment, private wells are unregulated and therefore not subject to federal drinking water standards. Arizonans in rural parts of the State are particularly dependent on drawing groundwater from private wells, as it is often the only option for water consumption.

⁴ A.R.S. §49-221(A).

⁵ Federal drinking water standards establish the highest level of a contaminant allowed in all public water systems, according to the Federal Safe Drinking Water Act. For example, arsenic cannot be present in water at any amount larger than 0.01 milligrams per liter. The EPA evaluates each federal drinking water standard every 6 years to determine if revisions are needed.

⁶ A.R.S. §§49-223(A) and 49-201(1). The Department is required to initiate a rulemaking to create or update AWQS within 1 year from when the EPA creates or changes the federal drinking water standard.

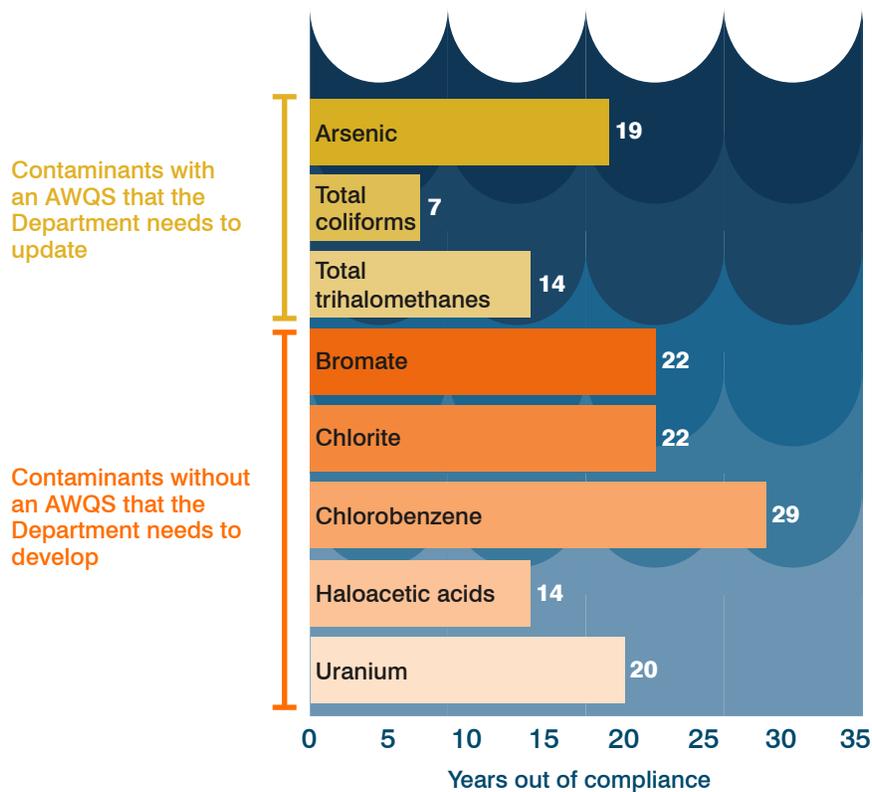
⁷ A.R.S. §49-223(A)&(B).

⁸ According to statute, the Department must determine an alternative AWQS appropriate for the State based on technologies, costs, sampling and analytical methodologies, and health risks.

Department has not developed AWQS for 8 contaminants, as required by statute

Although there are AWQS for 75 contaminants in rule, the Department has not developed or updated the required AWQS for 8 contaminants that present a threat to human health (see Figure 2). The Department's noncompliance in developing an AWQS for the 8 contaminants ranges from 7 to 29 years. For example, the Department has not updated the AWQS for arsenic to match the federal drinking water standard for 19 years. Arsenic is a contaminant that can cause skin damage, circulatory system problems, and may increase the risk of cancer. Additionally, the Department has failed to develop an AWQS for 5 contaminants altogether. For example, although the federal drinking water standard for uranium was established in 2000, the Department has yet to develop an AWQS for it. Uranium is a contaminant that can cause an increased risk of cancer or kidney toxicity.

Figure 2
Department has been out of compliance for 7 to 29 years in developing AWQS for 8 contaminants¹



¹ With long-term exposure at levels above the federal drinking water standards, these contaminants can have varying health impacts, ranging from an increased risk of cancer, kidney problems, or other detrimental health impacts for infants and young children.

Source: Auditor General staff comparison of the EPA's federal drinking water standards to the Department's administrative rule containing AWQS and review of the EPA's National Primary Drinking Water Regulations webpage obtained 8/17/21 from <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>.

Department reported opposition from stakeholders and lack of funding for not developing AWQS

Department stopped development of AWQS for 2 contaminants in response to stakeholder opposition—According to the Department, it has not developed AWQS for 2 of the 8 contaminants because, in part, it had received opposition from stakeholders to its efforts to establish AWQS for these contaminants. Specifically, in 2006, the Department was in the process of updating AWQS for arsenic and uranium to match the federal standards, but stopped when it received opposition from the Arizona Chamber of Commerce and Industry even though statute allows it to create an alternative standard after substantial opposition.^{9,10} The Department also reported that it has not initiated any attempts since 2006 to develop AWQS for any of the 8 contaminants because it has prioritized other water quality rulemakings. For example, according to the Department, it is in the process of developing rules to address statutory changes that require the Department to assume the primary enforcement responsibility for some Safe Drinking Water Act regulations.

Department has not identified funding source to use to develop AWQS—As of July 2021, the Department reported that it does not have an authorized funding source to develop AWQS and plans to seek a statutory change to expand the allowable uses of the Department's Water Quality Fee Fund (WQFF) for developing AWQS.¹¹ The WQFF consists of monies that the Department receives from various water quality permitting, registration, and certification fees. Statute restricts the use of the WQFF for specific purposes, which do not include the development of AWQS.¹² Thus, a statutory change authorizing the Department to use WQFF monies to develop AWQS would be needed.

Even with statutory authority to use WQFF monies to pay for the costs of developing AWQS, there may be inadequate monies in the WQFF to do so. The Department uses WQFF monies to fund several of its water quality protection responsibilities. However, as shown in Table 2 on page 10, the WQFF fund balances have decreased annually, from more than \$6.1 million at the end of fiscal year 2016 to an estimated \$1 million at the end of fiscal year 2021. These reduced fund balances result from WQFF revenues that have not kept pace with increasing expenditures. Specifically, from fiscal years 2016 through 2021, revenues or estimated revenues for the WQFF have averaged nearly \$6.8 million annually, while expenditures have increased from more than \$6.4 million in fiscal year 2016 to an estimated \$8.6 million in fiscal year 2021. According to the Department, the fee amounts that provide WQFF revenues, last set by the Department in 2011, have been insufficient to fund the Division's water quality protection responsibilities that are paid for with WQFF monies and that various factors have contributed to expenditure increases, including the need for additional staffing resources to accelerate cleanups of polluted groundwater.

Although the Department has taken some steps to try to address the declining monies in the WQFF—such as a 2018 budget request to the Governor's office proposing that some fee revenues from the Department's Water Quality Assurance Revolving Fund be transferred to the WQFF and a 2019 legislative proposal to increase the fee amounts for some permits that provide revenues to the WQFF—these efforts were not successful.¹³ In addition, the Department did not perform a workload analysis to support its request to increase some permit fees in 2019 and has not previously performed a workload analysis to determine how much funding it needs to develop AWQS. However, the Department reported that it is in the process of performing a workload analysis to assess the cost of developing AWQS.

⁹ The Arizona Chamber of Commerce and Industry argued that, because arsenic and uranium naturally occur in Arizona aquifers, the federal drinking water standards are not appropriate as AWQS.

¹⁰ A.R.S. §49-223(A)&(B).

¹¹ The Department reported that it does not know what funding source was previously used to develop AWQS in 2006.

¹² A.R.S. §49-210.

¹³ Although the Department's fees for its water quality programs are established in rule, statute requires the Department to obtain statutory authority to increase these fees.

Table 2
WQFF revenues, expenditures, and changes in fund balances
Fiscal years 2016 through 2021

	Actual 2016	Actual 2017	Actual 2018	Actual 2019	Actual 2020	Estimate 2021
Total revenues	\$6,783,212	\$6,553,357	\$6,552,361	\$7,230,449	\$7,169,922	\$6,435,595
Total expenditures	6,451,238	6,904,508	7,040,338	8,950,063	7,506,707	8,609,512
Fund balances, end of year	\$6,107,874	\$5,756,723	\$5,268,746	\$3,549,132	\$3,212,346	\$1,038,429

Source: Auditor General staff analysis of the State of Arizona *Annual Financial Report* for fiscal years 2016 through 2020 and the Department's WQFF information for fiscal year 2021.

Department has established time frames for developing AWQS—According to the Department's 2020 5-year rule review report, the Department plans to develop AWQS for all contaminants by the end of fiscal year 2023 for the stated purpose of protecting public health and preserving Arizona's groundwater as a valuable source of drinking water. To accomplish this plan, the Department reported it would need to identify and establish an authorized funding source and initiate the rulemaking process by the beginning of fiscal year 2023, which means any needed legislation would have to be passed by the 2022 legislative session.

Recommendations

The Department should:

1. Adopt AWQS in rule to match federal drinking water standards by the end of fiscal year 2023, consistent with its plans, or a State alternative AWQS, for the 8 contaminants that do not have a developed or updated AWQS, as required by statute.
2. Perform a workload analysis to assess the cost of developing AWQS. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to develop AWQS.
3. Based on the assessment performed in Recommendation 2, the Department should then work with the Legislature to seek a statutory change by the 2022 legislative session to authorize funding from the WQFF and obtain the needed resources from the WQFF to develop AWQS, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: As outlined in its [response](#), the Department agrees with the finding and will implement the recommendations.



Department has not conducted key groundwater monitoring responsibilities, limiting its ability to keep groundwater safe

Department has not conducted statutorily required ambient groundwater monitoring since 2017

As required by statute and indicated in the textbox, the Department is responsible for ambient groundwater monitoring, including detecting the presence and evaluating the effects of contaminants in groundwater (see textbox for more information).¹⁴ However, the Department has not fulfilled key statutory requirements for ambient groundwater monitoring in the State since June 2017. Prior to June 2017, the Department's ambient groundwater monitoring efforts included sampling groundwater State-wide and publishing individual aquifer basin reports and overview reports of its sampling results and analyses State-wide.

Department's ambient groundwater monitoring responsibilities:

- Detecting the presence of new and existing contaminants, such as arsenic and uranium.
- Determining whether water in aquifers meets water quality standards, such as AWQS and federal drinking water standards.
- Assessing water quality trends.
- Determining the effectiveness of its guidance for permittees in preventing or reducing pollution discharge.
- Evaluating the effects of contaminants in groundwater on public health or the environment, such as private well owners.

Source: Auditor General staff review of A.R.S. §49-225(A) and information provided by the Department.

Not monitoring ambient groundwater limits Department's ability to identify and address groundwater quality concerns and provide up-to-date water quality data to the Arizona Department of Health Services

By not conducting ambient groundwater monitoring, the Department cannot identify groundwater contamination, use the information to work with its remediation programs to investigate and clean up contamination, or provide the information to other agencies to help protect the State's private well users from drinking contaminated water. Specifically, the Department:

- **Is not identifying groundwater contamination to help determine when to address groundwater quality concerns**—For example, when the Department was monitoring ambient groundwater, it identified several contaminants that exceeded federal drinking water standards in the State's aquifers, such as arsenic and uranium. Specifically, from 1995 to 2015, 22 percent of sites sampled by the Department had arsenic

¹⁴ Although the term "ambient groundwater monitoring" is not mentioned in statute, we use the term to refer to the Department's statutory responsibilities in A.R.S. §49-225(A) to conduct ongoing monitoring of the State's aquifers. From 1995 through 2017, the Department used its "Ambient Groundwater Monitoring Program" to fulfill these statutory responsibilities and defined this monitoring as characterizing groundwater quality conditions by sampling and testing the State's aquifers.

levels that exceeded federal drinking water standards and 16 percent had uranium levels that exceeded federal drinking water standards.¹⁵ Because these contaminants can impact human health (see Finding 1 on pages 7 through 10), a Department official stated that ambient groundwater monitoring can help the Department determine when to take action to address the contamination. According to the Department, data gathered from conducting ambient groundwater monitoring could also be shared with other Department programs that investigate and help ensure that groundwater contamination concerns are addressed, such as the Voluntary Remediation Program, which works with property owners and other interested parties to remediate contaminated groundwater across the State.

- **Is not providing up-to-date groundwater quality data to the Arizona Department of Health Services (ADHS)**—In addition, the Department not conducting ambient groundwater monitoring impacts the ADHS' ability to protect Arizonans. Specifically, the ADHS uses the Department's ambient groundwater monitoring data to provide guidance to private well owners regarding water quality on its website. This guidance includes a groundwater quality data dashboard and well water testing recommendations, and indicates that the monitoring data is from 2017. However, because the Department has not conducted ambient groundwater monitoring since 2017, its monitoring data is outdated and may not effectively inform ADHS' guidance. According to an ADHS official, having updated groundwater monitoring data would help to successfully prioritize public health hazards in a timely manner.

Department reported staff retirement stopped its ambient groundwater monitoring and lack of funding impedes its ability to restart it

According to the Department, it stopped conducting ambient groundwater monitoring when the sole employee responsible for doing so retired in 2017. However, the Department did not have an explanation for why these responsibilities were not continued at that time, such as by hiring a new employee or transferring the responsibilities to other Department staff.

In addition, the Department reported that it does not have adequate funding to restart its ambient groundwater monitoring efforts. The available funding sources for ambient groundwater monitoring are the Department's WQFF and WQARF (see Finding 1, pages 9 and 10, for more information on the WQFF and Table 1, footnote 2, on page 5, for more information on the WQARF). As previously discussed, the Department uses WQFF monies to fund several of its water quality protection responsibilities; however, as shown in Table 2 on page 10, the WQFF fund balance has decreased to an estimated \$1 million at the end of fiscal year 2021 and there may be insufficient monies in the WQFF to pay for all the Division's water quality protection responsibilities, including ambient groundwater monitoring and the additional responsibilities discussed in Findings 1 and 3 of this report (see pages 7 through 10, and 14 through 17, respectively). Similarly, WQARF monies can be used for various purposes, such as enforcement activities related to hazardous waste and water quality monitoring, but the Department reported that WQARF monies are also not sufficient to support all the responsibilities that can be funded with these monies. Finally, although necessary to determine the level of funding needed for its ambient groundwater monitoring responsibilities, the Department has not performed a workload analysis to determine how much funding it needs to fulfill these responsibilities.

Recommendations

The Department should:

4. Conduct statutorily required ambient groundwater monitoring, including:
 - Detecting the presence of new and existing contaminants.
 - Determining whether water in aquifers meets water quality standards.

¹⁵ When the Department was conducting monitoring prior to June 2017, it used federal drinking water standards because these were the most stringent standards available for arsenic and uranium (see Finding 1, pages 7 through 10, for more information).

- Assessing water quality trends.
 - Determining how effectively the Department's guidance for permittees prevents or reduces pollution discharge.
 - Evaluating the effects of contaminants in groundwater on public health or the environment.
 - Developing and implementing policies and procedures for conducting ambient groundwater monitoring.
5. In conjunction with performing workload analyses for developing AWQS and agricultural pesticide monitoring (see Findings 1 and 3, pages 7 through 10 and 14 through 17, respectively), perform a workload analysis to assess its costs for conducting ambient groundwater monitoring. This assessment should include a documented analysis of its ambient groundwater monitoring workload, and any available staff resources, and then identify the resources it needs to conduct ambient groundwater monitoring.
 6. Based on the assessment performed in Recommendation 5, the Department should then work with the Legislature to obtain any needed resources, such as modifying fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: As outlined in its [response](#), the Department agrees with the finding and will implement the recommendations.



Department has not conducted required monitoring of agricultural pesticides in groundwater and surrounding soil, limiting its ability to identify and address potential pollution in groundwater

Department required to work with other State agencies to monitor groundwater and soil for agricultural pesticides

Statute requires the Department to work with other State agencies to monitor agricultural pesticides in groundwater and surrounding soil to help prevent or address contamination from agricultural pesticide use.¹⁶ For example, the Department is responsible for identifying pesticides with the potential to pollute groundwater by reviewing all new pesticides, monitoring for these pesticides in areas of the State where they are primarily used or may migrate into groundwater, determining whether

Pesticide with the potential to pollute groundwater—A pesticide introduced to groundwater at a level that may adversely affect human health and safety.

Pesticide that threatens to pollute groundwater—A pesticide found in groundwater or soil that poses a threat to human health.

Source: Auditor General staff review of A.R.S. §§49-301, 49-302, 49-308, 49-309, and information provided by Department.

any of these pesticides threaten to pollute groundwater, and notifying the Arizona Department of Agriculture (AZDA) to cancel the pesticide's registration, if necessary (see Figure 3 on page 15 for more information on the Department's key agricultural pesticide monitoring responsibilities and the textbox for definitions).¹⁷ These agricultural pesticides include those used for weed control in Arizona, such as atrazine and diuron, which can cause adverse human health impacts when present in drinking water at dangerous levels.

Department has not conducted required groundwater and soil monitoring of agricultural pesticides since 2013, limiting its ability to identify and address potential pollution in groundwater

The Department has not conducted groundwater and soil monitoring for agricultural pesticides since 2013, as required by statute. Although the Department identifies pesticides with the potential to pollute groundwater before new pesticides are registered with AZDA (see Figure 3, Step 1), the Department has not met other key agricultural pesticide monitoring requirements outlined in the figure as follows:¹⁸

- In consultation with ADHS developing testing and analytical procedures to determine how to monitor identified pesticides with the potential to pollute groundwater, (see Figure 3, Step 2).

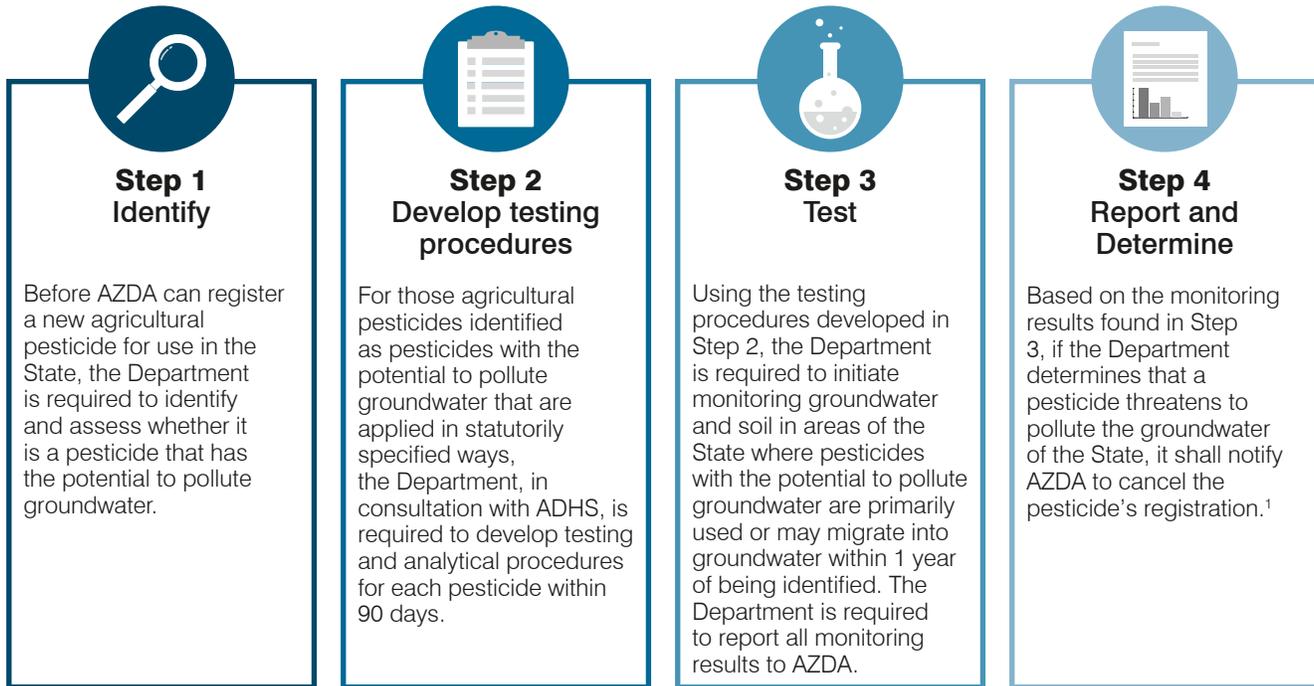
¹⁶ A.R.S. §49-301 et seq.

¹⁷ AZDA is responsible for pesticide registrations, cancellations, and enforcement.

¹⁸ From January 1, 2019 through December 31, 2020, the Department reviewed 290 new pesticides before they were registered with AZDA.

- Conducting groundwater and soil monitoring of identified pesticides with the potential to pollute groundwater in areas of the State where they are likely to contaminate groundwater to detect whether they are present and likely to harm human health and the environment and reporting all monitoring results to AZDA (see Figure 3, Step 3).
- Making determinations based on monitoring results whether any pesticides threaten to pollute the groundwater of the State and notifying AZDA to cancel the pesticide’s registration (see Figure 3, Step 4).

Figure 3
Key agricultural pesticide monitoring responsibilities



¹ A.R.S. §49-309 provides some exceptions to cancellation, such as modifying the pesticide’s label to change its approved use and application so that it no longer threatens to pollute groundwater.

Source: Auditor General staff review of A.R.S. §§3-351, 49-302, 49-305, 49-307, 49-309, and AZDA’s website obtained on 8/4/21 from <https://agriculture.az.gov/pestspest-control/pesticide-registration>.

As explained in the Introduction, pesticides can reach shallow groundwater due to agricultural runoff into streams and irrigation recharge to groundwater in areas where pesticides are used (see Figure 1 in the Introduction, page 2). Once in groundwater, pesticides can contaminate aquifers and present a threat to human health and the environment. By not conducting agricultural pesticide monitoring, the Department cannot identify and take action to address potential new pesticides that threaten to pollute groundwater or protect against previously detected contaminants that may now be pesticides that threaten to pollute groundwater, putting human health and the environment at risk. When the Department was monitoring for agricultural pesticides from 2009 through 2013, it detected 10 pesticides with the potential to pollute groundwater in agricultural areas, including Buckeye and Yuma. Although these pesticides were not found at concentrations that threatened to pollute groundwater, the Department reported to the Legislature in its 2010 through 2014 pesticide annual reports that it would continue to closely monitor these pesticides because of the effects they can have on human health and their potential to become pesticides that threaten to pollute groundwater in the future. For example, the Department detected diuron, a pesticide used for weed control, which has carcinogenic potential for humans and poses risks to other mammals, aquatic life, and plants.

Department reported staff turnover stopped pesticide monitoring and lack of funding as reason it has not resumed pesticide monitoring

According to the Department, staff turnover that occurred around 2013 is the primary reason why it stopped performing 3 of the 4 key required pesticide monitoring activities. However, the Department did not have an explanation for why these responsibilities were not continued at that time, such as by transferring the responsibilities to other Department staff.

The Department also reported that it does not have an authorized funding source for agricultural pesticide monitoring and that it plans to seek a statutory change to expand the allowable uses of the Department's WQFF to include agricultural pesticide monitoring (see Findings 1 and 2, pages 7 through 13) for more information on the WQFF).¹⁹ Additionally, as of July 2021, the Department has not performed a workload analysis to determine its funding needs for performing pesticide monitoring.

Finally, the Department has not developed policies and procedures for some of its pesticide monitoring duties, such as developing testing and analytical procedures to determine how to monitor identified pesticides with the potential to pollute groundwater and reporting monitoring results to AZDA. As it resumes pesticide monitoring, the Department should develop and implement policies and procedures that address all aspects of its pesticide monitoring responsibilities as a way of ensuring it performs them and does so correctly and consistently. According to best practices developed by the United States Government Accountability Office (GAO), policies and procedures are important to help ensure that agencies perform their program responsibilities correctly and consistently.²⁰

Recommendations

The Department should:

7. Monitor for agricultural pesticides in groundwater and soil throughout the State, as required by statute, by developing and implementing policies and procedures for:
 - Determining how to analyze identified pesticides with the potential to pollute groundwater, in consultation with ADHS.
 - Monitoring groundwater and soil in areas of the State where identified pesticides with the potential to pollute groundwater are primarily used or may migrate into groundwater.
 - Reporting all monitoring results to AZDA.
 - Determining if a pesticide threatens to pollute groundwater and, if necessary, notifying AZDA to cancel the pesticide's registration.
8. In conjunction with performing workload analyses for developing AWQS and conducting ambient groundwater monitoring (see Findings 1 and 2, pages 7 through 13), perform a workload analysis to assess its costs for monitoring agricultural pesticides in groundwater and soil throughout the State. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to monitor agricultural pesticides in groundwater and soil throughout the State.
9. Based on the assessment performed in Recommendation 8 and in conjunction with associated recommendations in Findings 1 and 2 (see pages 7 through 13), the Department should then work with the Legislature to seek a statutory change to authorize funding and obtain the needed resources from the WQFF

¹⁹ The Department reported that it does not know what funding source was previously used to perform agricultural pesticide monitoring.

²⁰ U.S. Government Accountability Office (GAO). (2014). *Standards for internal control in the federal government*. Washington, DC. Retrieved 7/21/21 from <https://www.gao.gov/assets/gao-14-704g.pdf>.

to monitor agricultural pesticides in groundwater and soil throughout the State, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: As outlined in its [response](#), the Department agrees with the finding and will implement the recommendations.



Department has not reduced total number of impaired surface waters in State to address pollutants that affect the safe use of these waters and potentially negatively impact the environment

Department required to remediate Arizona's impaired surface waters

As part of the Department's responsibilities under the Federal Clean Water Act, the Department assesses surface waters, such as lakes and rivers, to determine whether they meet federal surface water quality standards.²¹ Surface waters that do not meet these standards for at least 1 of their designated purposes, such as recreational swimming or fish consumption, are considered impaired.

The Department has established a goal to reduce the number of impaired surface waters in Arizona, and federal and State laws require the Department to develop and implement plans to remediate impaired surface waters. Specifically, within 15 years from when the Department designates a surface water as impaired, it is required by State law to complete a total maximum daily load (TMDL)(see textbox for definitions).^{22,23} Statute also requires the Department to develop a TMDL implementation plan to explain how reductions in pollutants will be achieved and a time frame in which compliance with applicable surface water quality standards is expected to be achieved.²⁴

Total maximum daily load (TMDL)—An estimation of the total amount of a pollutant from all sources that may be added to a water while still allowing the water to achieve and maintain applicable water quality standards. Each TMDL shall include allocations for sources that contribute the pollutant to the water.

TMDL implementation plan—A written strategy to implement a TMDL that is developed for an impaired water.

Source: Auditor General staff summary of A.R.S. §49-231.

As an example, the Department designated a segment of the San Pedro River as impaired in 2004 due to E. coli contamination, and in 2013 it completed the required TMDL. The Department determined that agriculture and grazing were the primary causes of the E. coli contamination and calculated the amount of contaminant reduction needed for this segment of the river to meet federal surface water quality standards. The Department's TMDL also included an implementation plan to work with other State agencies to help prevent and reduce E. coli contamination, such as constructing fencing to keep cattle away from the river. Further, the TMDL indicated that it would take the Department 3 to 5 years after improvement measures were implemented to see significant improvements in the water quality.

²¹ 33 USC 26 §1315.

²² A.R.S. §49-233(B).

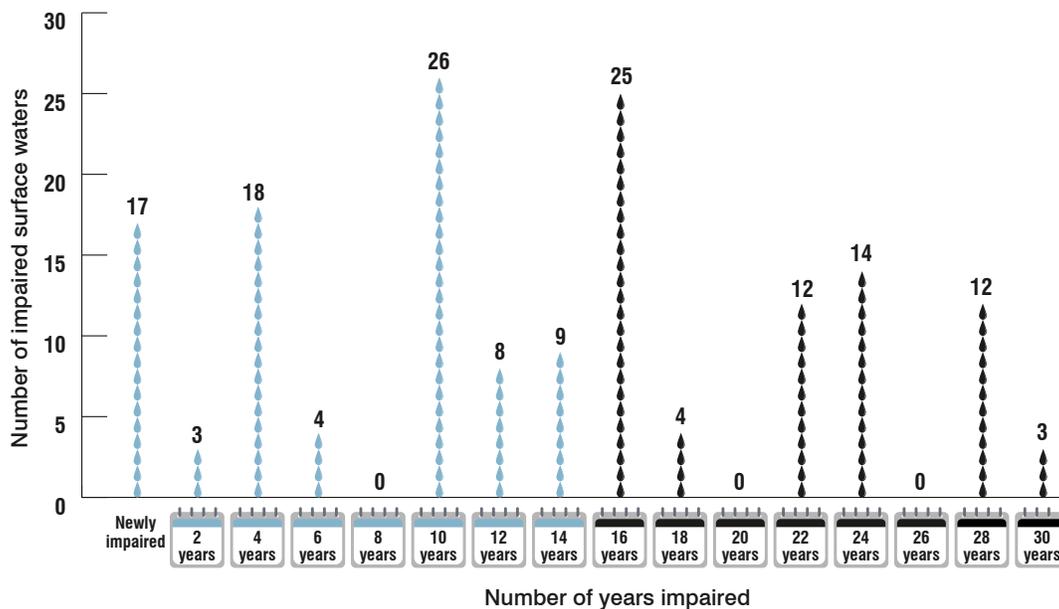
²³ The EPA must approve the Department's determination of impaired surface waters.

²⁴ A.R.S. §49-234.

Department has not reduced Arizona’s impaired surface waters to help ensure these waters can be safely used and do not negatively impact the environment

Department has not reduced State’s impaired surface waters between 2014 and 2020 but rather the number has increased—The Department has not met its goal to reduce the total number of impaired surface waters in the State between 2014 and 2020. Specifically, although the number of impaired surface waters in Arizona decreased from 142 in 2010 to 136 in 2014, the number of impaired surface waters has increased since that time.²⁵ As of 2020, Arizona had 155 impaired surface waters, with 70 of them having been impaired for more than 15 years (see Figure 4).

Figure 4
155 impaired surface waters by number of years impaired, as of 2020¹



¹ The Department assesses surface water impairments on a biennial basis.

Source: Auditor General staff analysis of the Department’s draft assessment report of impaired waters for 2020, and Department-provided information.

Although the Department has not met its goal to reduce the total number of impaired surface waters in the State, some impaired waters have been remediated. For example, 2 segments of the Santa Cruz River were designated as impaired in 2010 due to outdated wastewater reclamation facilities that were not effectively treating and disposing of wastewater.²⁶ In coordination with the Department, the wastewater reclamation facilities were replaced in 2013, which resulted in these 2 waters meeting surface water quality standards in 2016.²⁷

Additionally, the Department reported that it has recently prioritized the remediation of impaired surface waters with the largest environmental impact. Specifically, as of June 2021, the Department reported focusing its remediation efforts on 13 surface waters that were impaired due to various metals from historic mine sites. To help remediate these waters, the Department tracks these remediation projects from the project planning stage

²⁵ We reviewed the Department’s final assessment of impaired waters in 2010 through its draft assessment in 2020 to determine the total number of impaired waters in the State.

²⁶ Rivers are divided into segments for assessment analysis. Therefore, a single river can have multiple impaired segments.

²⁷ As of 2020, 4 other segments of the Santa Cruz River were impaired due to E.coli contamination.

through project completion, including whether an impaired surface water needs additional remediation. The Department's tracking also includes estimated time frames and progress toward completion to help ensure remediation efforts have occurred and are reducing surface water impairments.

Impaired surface waters pose risks to human health and environment—By not reducing the number of impaired surface waters in the State, the Department has not adequately addressed pollutants that present risks to human health and the environment in these surface waters. E. coli and metals, such as mercury and copper, are the most common pollutants contributing to impaired surface waters in the State between 2014 and 2020. These pollutants can have a wide range of health and environmental impacts. For example, swimmers or waders in surface waters impaired due to high levels of E. coli can contract gastrointestinal illnesses.²⁸ In addition, eating fish from a surface water impaired by mercury may cause harm to the nervous system. Further, additional impacts can be associated with impaired surface waters. For example, according to a Slide Rock State Park official, high levels of E. coli have caused Slide Rock State Park near Sedona to periodically close its recreation waters to swimmers in Oak Creek.²⁹

Department has not developed some TMDLs or tracked due dates, or reviewed existing TMDLs to identify needed changes

We identified 2 key factors for why the Department has not reduced the number of impaired surface waters in the State:

- **Department has not developed some TMDLs by due date nor track when TMDLs are due**—Although the Department is required to develop a TMDL for each pollutant that is contributing to an impaired surface water within 15 years from when it designated the surface water as impaired, it has not done so.³⁰ Specifically, as of 2020, we found that the Department had not developed required TMDLs for 23 of 70 impaired surface waters that had been impaired for 16 years or longer. Further, the Department does not track or schedule the date by which it needs to develop the required TMDL to address an impaired surface water.
- **Department does not perform required evaluation of TMDL plans for still-impaired surface waters nor track when evaluations are due**—At least once every 5 years the Department is statutorily required to evaluate whether it needs to modify its TMDL or implementation plan for surface waters that are still impaired.³¹ However, we found that the Department has not done so, nor has it tracked or scheduled when evaluations are due to help ensure that it meets this statutory requirement. Reviewing TMDLs and implementation plans is important for several reasons, such as identifying the need to develop a different implementation plan if the source(s) of a pollutant has changed over time or if the implementation plan has not improved the surface water quality.

Recommendations

The Department should:

10. Reduce the number of impaired surface waters in the State.
11. Develop TMDLs for pollutants contributing to surface waters that have been impaired for 15 years or more.
12. Develop and implement policies and procedures to:
 - a. Track and schedule when TMDLs need to be developed, and develop a TMDL for each impaired surface water pollutant within 15 years from when the water was listed as impaired.

²⁸ Contaminated water can enter a swimmer's or wader's body through the mouth, nose, ears, or cuts.

²⁹ According to a Slide Rock State Park official, since 2015, the Park no longer closes due to high levels of E. coli, but rather notifies the visiting public of the elevated levels.

³⁰ A.R.S. §49-233.

³¹ A.R.S. §49-234.

- b. Track and schedule when TMDLs need to be reviewed, and review developed TMDLs and implementation plans for surface waters still impaired at least once every 5 years.

Department response: As outlined in its [response](#), the Department agrees with the finding and will implement the recommendations.

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Question 1: What are PFAS and their risks?

Per- and polyfluoroalkyl substances (PFAS) are a group of over 4,700 man-made chemicals used in a variety of industries and consumer products, such as cookware and stain repellants. PFAS are known as “forever chemicals,” which means they accumulate over time and do not break down. While 2 commonly used PFAS chemicals—perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA)—are no longer manufactured in the United States due to voluntary phase-out programs, there are many other PFAS chemicals still in use.³² The federal Centers for Disease Control and Prevention (CDC) reports that PFAS can adversely impact human health, such as causing an increased risk of cancer, health risks to pregnant women, and impacts to infant development.³³ According to the Department, one of the most significant PFAS human exposure pathways is drinking contaminated water from public water systems or private wells in communities near military bases, airfields, or locations where fire-fighting foams containing PFAS, including PFOS and PFOA, were used.³⁴ Once released to the environment, these foams can seep into soil and infiltrate groundwater. Contaminated groundwater could then be used by public water systems and private well users in the area to provide drinking water to consumers.

Question 2: What drinking water regulations exist for PFAS?

As of July 2021, there were no federal drinking water standards or associated requirements for monitoring PFAS in drinking water. Additionally, there were no State-level drinking water standards in Arizona for PFAS. However, the EPA is in the process of developing federal drinking water standards for PFAS chemicals entering drinking water supplies (see Figure 5 on page 23).³⁵ Specifically, in March 2021, the EPA determined that it would develop

³² PFOS and PFOA were phased out by 2002 and 2015, respectively. PFOS and PFOA are the 2 PFAS chemicals that had been produced in the largest amounts within the United States.

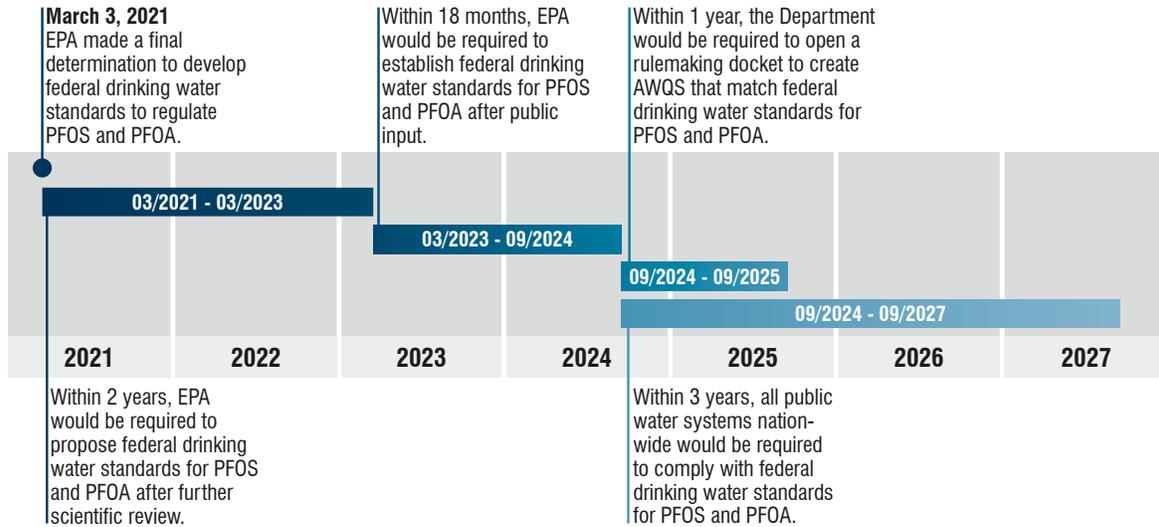
³³ Agency for Toxic Substance and Disease Registry (ATSDR). (2020). *What are the health effects of PFAS?* Atlanta, GA: Centers for Disease Control and Prevention. Retrieved 8/11/21 from <https://www.atsdr.cdc.gov/pfas/health-effects/index.html>.

³⁴ The Department of Defense (DOD) stopped regular usage of PFAS fire-fighting foams in January 2016, but still uses these foams in life-threatening emergencies and reports that it conducts remediation efforts to ensure PFAS is not added to groundwater. Additionally, A.R.S. §36-1696 prohibits the use of these foams for training or testing purposes unless required by law or done in a facility with proper mitigation and disposal measures.

³⁵ The EPA could designate PFAS as hazardous waste through the Federal Resource Conservation and Recovery Act (RCRA) in the future, which could provide a federal framework for the Department to address PFAS contamination before the creation of a federal drinking water standard and allow State officials to manage cleanup of PFAS contamination under existing State programs authorized by the EPA.

federal drinking water standards to regulate PFOS and PFOA. As required by the Safe Drinking Water Act, the EPA has 2 years from March 2021 to propose federal drinking water standards after further scientific review. The EPA would then be required to establish these standards within 18 months following their proposal after allowing for public input.³⁶ After the EPA creates federal drinking water standards, public water systems would be required to comply with the new standards within 3 years.³⁷ As a result, states would be required to regulate public water systems for these 2 PFAS chemicals by 2027, but as late as 2030 with additional extensions.³⁸ The Department would also be responsible for developing AWQS that match federal standards for these chemicals within 1 year of EPA’s creation of federal drinking water standards (see Finding 1, pages 7 through 10, more information on AWQS).

Figure 5
Estimated timeline to create federal and State PFAS drinking water standards, as of July 2021



Source: Auditor General staff review of regulations and websites on the EPA’s Safe Drinking Water Act, A.R.S. §49-223(A), and information provided by the EPA and the Department.

Although there are no federal drinking water standards for PFAS, the EPA began monitoring for some PFAS chemicals in public water systems nation-wide beginning in 2013. The EPA also established nonregulatory health advisory levels for public water systems in 2016 to monitor for PFOS and PFOA (see textbox). Additionally, in 2016 the EPA awarded the Department a grant to screen for PFAS contamination in at-risk public water systems State-wide using the EPA’s health advisory level. Further, because PFAS fire-fighting foams have been used on military bases nation-wide, the U.S. DOD uses the EPA health advisory levels to conduct investigations where there is known or suspected PFAS contamination in drinking water.

EPA health advisory levels—Nonenforceable and nonregulatory concentrations of contaminants in drinking water above which adverse health effects can occur. They also serve as informal technical guidance to assist federal, state, and local officials, and water system managers, by providing information on the health effects of and methods to sample and treat PFAS chemicals in drinking water.

Source: Auditor General staff review of the EPA’s *PFAS laws and regulations* website, obtained 6/9/21 from <https://www.epa.gov/pfas/pfas-laws-and-regulations>.

³⁶ The EPA may extend that deadline by up to an additional 9 months by notice in the Federal Register.

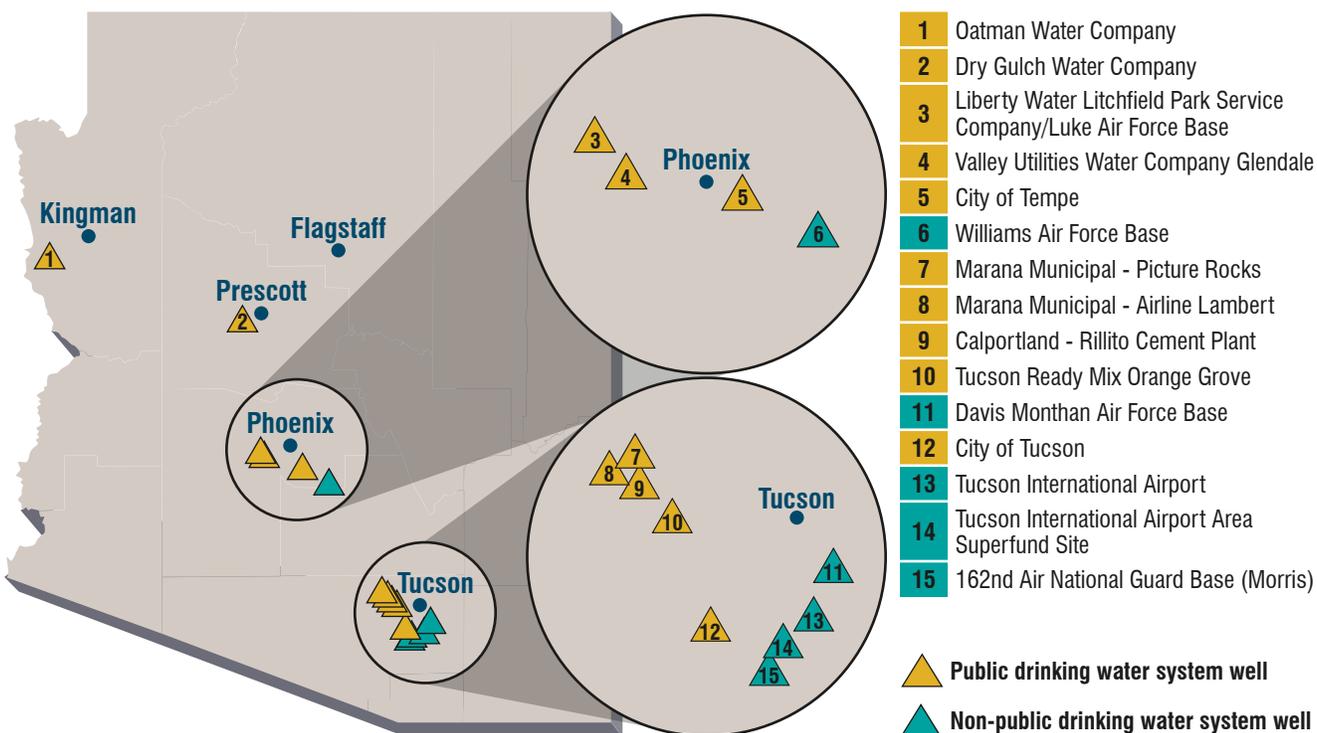
³⁷ If capital improvements are required, the EPA or a state may allow this period to be extended up to 2 additional years.

³⁸ Figure 5 provides required end dates for the development of drinking water standards, but the EPA could complete requirements before each end date. In addition, the time frames could change based on legislation. For example, the U.S. House of Representatives passed the PFAS Action Act in July 2021, which would expedite the process to create federal drinking water standards for PFAS. The U.S. Senate had not yet voted on the Act.

Question 3: How have PFAS affected Arizona’s water?

According to the Department, as a result of the monitoring efforts explained in Question 2 (see pages 22 through 23), the Department, EPA, DOD, or public water systems have identified 15 sites across the State with PFAS contamination above the EPA health advisory level, as of July 2021 (see Figure 6). Of these 15 sites with PFAS contamination, 10 were public water systems and, according to the Department, all but 1 of the 10 sites are now serving safe drinking water to consumers either by mitigating the contamination in the water or providing an alternate water source. The remaining 5 sites with PFAS contamination contain wells that are not part of public drinking water systems. Although these 5 wells are only used to sample for contamination, contaminated groundwater from these sites can migrate to areas where drinking water is consumed by both private well users and public water system users.³⁹

Figure 6
Sites with PFAS contamination detected above the EPA’s health advisory level, as of July 2021



Source: Auditor General staff review of PFAS information provided by the Department.

According to the Department, although the source of PFAS contamination is unclear or unproven for all locations, PFAS fire-fighting foams have been a major source of PFAS groundwater contamination at airports and military bases in Arizona. For example, in 2018, the City of Tucson’s public water system (Tucson Water) detected PFAS groundwater contamination in wells used to draw drinking water just north of Davis-Monthan Air Force Base, one of the bases that used these foams, and shut the wells down. However, additional Tucson Water wells are at risk of PFAS contamination as contaminated groundwater moves from the base toward Tucson Water’s groundwater drinking water supply, which surrounds the base and lies under the central part of the city. According to the Department, this groundwater serves as the primary drinking water supply for over 65,000 people and is periodically used as the sole drinking water supply for 600,000 people. Additionally, in February 2021, Luke Air

³⁹ Some of the nondrinking water PFAS contamination sites were found on military bases. DOD reported that, as of March 2020, no one was drinking water with PFAS above health advisory levels where DOD identified its own actions as the source of PFAS contamination.

Force Base notified Valley Utilities Water Company and its customers that the wells used to draw drinking water for the utility had levels of PFAS contamination higher than the EPA health advisory level. The Department has identified multiple public water systems that serve more than 50,000 people within a 4-mile radius of the base that may be impacted by this PFAS contamination, which primarily came from fire-fighting foams.

Question 4: What actions has the Department taken to address PFAS contamination in the State's water?

Although the Department is not required to take specific action to address PFAS contamination, it reported that it has taken various steps to monitor, investigate, and remediate PFAS found in Arizona's water. Specifically, the Department has:

- **Worked with public water systems to ensure consumers are drinking safe water**—The Department has worked with public water systems with PFAS contamination to discontinue using affected supply wells and implement treatment or other measures to bring the PFAS concentrations below the EPA health advisory level. For example, in March 2021, the Department sent letters to the 10 public water systems within a 4-mile radius of Luke Air Force Base to inform them of potential PFAS contamination and encouraged them to allow the Department to conduct additional sampling and testing for PFAS at no cost to the systems. According to the Department, this additional sampling and testing, which it plans to conduct by the end of calendar year 2021 with State monies and EPA grant funding, will allow it to determine if PFAS contamination is present in other public water systems in addition to Liberty Water Litchfield Park Service Company and Valley Utilities Water Company Glendale (see Figure 6 on page 24).
- **Worked with private well users to ensure consumers are drinking safe water**—The Department has also worked with private well users in areas with PFAS contamination by sampling wells and providing safe drinking water to consumers. For example, the Department notified private well owners north of Tucson International Airport about the potential for PFAS affecting their drinking water. At the owners' requests, the Department tested 13 privately owned wells for PFAS and worked with the Air National Guard to provide an alternate source of drinking water to residents that used 3 wells found with PFAS contamination above the EPA health advisory level.⁴⁰
- **Begun working to reduce groundwater contamination through a pilot PFAS treatment system**—As of July 2021, the Department was in the process of constructing a demonstration treatment system in Tucson to contain the contaminated groundwater near Davis-Monthan Air Force Base and prevent it from spreading to the city's groundwater. The treatment system is designed to stop PFAS from reaching additional water wells in the Tucson area, both public and private. While Tucson's public water system does not intend to serve the system's treated water to its customers, the treated water is intended to be discharged or reinjected back into the aquifer to gradually reduce the amount of contaminated groundwater in the area. The Department plans to start the demonstration system in November 2021.
- **Worked with other entities throughout the State to provide information about PFAS contamination**—The Department has worked with various entities throughout the State to provide information about PFAS contamination from fire-fighting foams. Specifically, the Department advises fire departments, local emergency planning committees, and industries State-wide about potential adverse impacts associated with PFAS fire-fighting foams. As part of this effort, the Department created a website to help these entities better understand potential health and environmental risks associated with using PFAS fire-fighting foams.

⁴⁰ The Department reported in August 2021 that the private well users that drew water from 2 of these 3 wells were being served by a public water system.



SUMMARY OF RECOMMENDATIONS

Auditor General makes 12 recommendations to the Department

The Department should:

1. Adopt AWQS in rule to match federal drinking water standards by the end of fiscal year 2023, consistent with its plans, or a State alternative AWQS, for the 8 contaminants that do not have a developed or updated AWQS, as required by statute (see Finding 1, pages 7 through 10, for more information).
2. Perform a workload analysis to assess the cost of developing AWQS. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to develop AWQS (see Finding 1, pages 7 through 10, for more information).
3. Based on the assessment performed in Recommendation 2, the Department should then work with the Legislature to seek a statutory change by the 2022 legislative session to authorize funding from the WQFF and obtain the needed resources from the WQFF to develop AWQS, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund (see Finding 1, pages 7 through 10, for more information).
4. Conduct statutorily required ambient groundwater monitoring, including:
 - Detecting the presence of new and existing contaminants.
 - Determining whether water in aquifers meets water quality standards.
 - Assessing water quality trends.
 - Determining how effectively the Department's guidance for permittees prevents or reduces pollution discharge.
 - Evaluating the effects of contaminants in groundwater on public health or the environment.
 - Developing and implementing policies and procedures for conducting ambient groundwater monitoring (see Finding 2, pages 11 through 13, for more information).
5. In conjunction with performing workload analyses for developing AWQS and agricultural pesticide monitoring (see Findings 1 and 3, pages 7 through 10 and 14 through 17, respectively), perform a workload analysis to assess its costs for conducting ambient groundwater monitoring. This assessment should include a documented analysis of its ambient groundwater monitoring workload, and any available staff resources, and then identify the resources it needs to conduct ambient groundwater monitoring (see Finding 2, pages 11 through 13, for more information).
6. Based on the assessment performed in Recommendation 5, the Department should then work with the Legislature to obtain any needed resources, such as modifying fees that contribute to the WQFF to increase the amount of revenues generated for this Fund (see Finding 2, pages 11 through 13, for more information).
7. Monitor for agricultural pesticides in groundwater and soil throughout the State, as required by statute, by developing and implementing policies and procedures for:

- Determining how to analyze identified pesticides with the potential to pollute groundwater, in consultation with ADHS.
 - Monitoring groundwater and soil in areas of the State where identified pesticides with the potential to pollute groundwater are primarily used or may migrate into groundwater.
 - Reporting all monitoring results to AZDA.
 - Determining if a pesticide threatens to pollute groundwater and, if necessary, notifying AZDA to cancel the pesticide's registration (see Finding 3, pages 14 through 17, for more information).
8. In conjunction with performing workload analyses for developing AWQS and conducting ambient groundwater monitoring (see Findings 1 and 2, pages 7 through 13), perform a workload analysis to assess its costs for monitoring agricultural pesticides in groundwater and soil throughout the State. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to monitor agricultural pesticides in groundwater and soil throughout the State (see Finding 3, pages 14 through 17, for more information).
 9. Based on the assessment performed in Recommendation 8 and in conjunction with associated recommendations in Findings 1 and 2 (see pages 7 through 13), the Department should then work with the Legislature to seek a statutory change to authorize funding and obtain the needed resources from the WQFF to monitor agricultural pesticides in groundwater and soil throughout the State, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund (see Finding 3, pages 14 through 17, for more information).
 10. Reduce the number of impaired surface waters in the State (see Finding 4, pages 18 through 21, for more information).
 11. Develop TMDLs for pollutants contributing to surface waters that have been impaired for 15 years or more (see Finding 4, pages 18 through 21, for more information).
 12. Develop and implement policies and procedures to:
 - a. Track and schedule when TMDLs need to be developed, and develop a TMDL for each impaired surface water pollutant within 15 years from when the water was listed as impaired.
 - b. Track and schedule when TMDLs need to be reviewed, and review developed TMDLs and implementation plans for surface waters still impaired at least once every 5 years (see Finding 4, pages 18 through 21, for more information).



Scope and methodology

The Auditor General's Office has conducted a performance audit regarding various Department water quality protection responsibilities pursuant to a September 19, 2018, resolution of the Joint Legislative Audit Committee. The audit was conducted as part of the sunset review process prescribed in A.R.S. §41-2951 et seq.

We used various methods to meet the report's objectives. These methods included reviewing statutes, rules, applicable session laws, and the Federal Clean Water Act and the Federal Safe Drinking Water Act; reviewing the Department's website and federal environmental websites; reviewing Department-provided documents, including policies and procedures, annual reports, and financial information; and interviewing Department management and staff. In addition, we used the following specific methods to meet the audit objectives:

- To determine whether the Department developed all required AWQS, we reviewed the EPA's federal water quality standards, including when they were established and information regarding the effects of regulated contaminants on human health, and the AWQS developed in rule. Additionally, we reviewed documentation and comments submitted to the Department by stakeholders in 2006 expressing opposition to the development of some AWQS. Finally, we compiled and analyzed the revenues, expenditures, and changes in fund balances for the Department's Water Quality Fee Fund using the State of Arizona *Annual Financial Report* and information from the Department for fiscal years 2016 through 2021.
- To determine whether the Department has conducted key groundwater monitoring responsibilities, we reviewed the Department's ambient groundwater monitoring reports from 1995 to 2017 and reviewed State and federal documentation explaining the effects of detected contaminants from when the Department was conducting monitoring.⁴¹ In addition, we interviewed ADHS officials to understand its use of past monitoring reports and information to inform private well owners about common contaminants in the State's groundwater.
- To determine whether the Department conducted agricultural pesticide monitoring in groundwater and surrounding soil, we interviewed ADHS and AZDA to determine whether the Department coordinated required pesticide monitoring responsibilities with these agencies. We also reviewed the Department's pesticide monitoring annual reports and EPA documentation explaining the effects of detected pesticides from when the Department was conducting agricultural pesticide monitoring.⁴²
- To determine whether the Department has reduced the number of impaired surface waters in the State, we reviewed the Department's internal goals for remediating impaired waters from 2010 through 2020; its 2010, 2012/2014, and 2016/2018 impaired water final assessment reports; and its 2020 impaired water draft

⁴¹ Arizona Department of Health Services. (n.d.) *What you should know about arsenic in Arizona groundwater*. Phoenix, AZ. Retrieved 6/14/2021 from <https://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/environmental-toxicology/well-water/arsenic.pdf>; U.S. Environmental Protection Agency (EPA). (2009). *National primary drinking water regulations*. Washington, DC. Retrieved 6/12/2021 from https://www.epa.gov/sites/default/files/2016-06/documents/npwdr_complete_table.pdf; EPA. (2001). *Radionuclides rule: A quick reference guide*. Washington, DC. Retrieved 6/14/2021 from <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=30006644.txt>.

⁴² EPA. (2020). *Chemicals evaluated for carcinogenic potential annual cancer report 2020*. Washington, DC. Retrieved 6/14/2021 from http://npic.orst.edu/chemicals_evaluated.pdf; National Pesticide Information Center. (2019). *Pesticide fact sheets*. Corvallis, OR: Oregon State University. Retrieved 6/14/2021 from <http://npic.orst.edu/npicfact.htm>.

assessment report.⁴³ To understand the impacts of impaired surface waters, we interviewed a Slide Rock State Park official and reviewed literature.⁴⁴

- To develop information for the PFAS Questions and Answers, we reviewed information on PFAS contamination from the EPA and U.S. Department of Defense, reviewed documentation from the Department regarding PFAS sites in the State, and interviewed Department staff regarding the Department's actions and goals for addressing PFAS contamination in the State's groundwater.
- To obtain information for the Introduction, we reviewed Department-provided information regarding its responsibilities and staff member vacancies as of July 2021 and the number of permits and registrations issued in calendar year 2020. In addition, we compiled and analyzed unaudited financial information from the AFIS Accounting Event Transaction File and the State of Arizona *Annual Financial Report* for fiscal years 2019 and 2020, and Department-provided financial information for fiscal year 2021.
- Our work on internal controls included reviewing the Department's policies and procedures for ensuring compliance with Department statutes, rules, and a goal, and where applicable, testing compliance. Our work included reviewing the following components of internal controls: control environment; control activities; information and communication; and monitoring. We reported our conclusions on these internal controls in Findings 1 through 4.

We selected the previously indicated audit samples to provide sufficient evidence to support our findings, conclusions, and recommendations. Unless otherwise noted, the results of our testing using these samples were not intended to be projected to the entire population.

We conducted this performance audit of the Department in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We express our appreciation to the Department Director and staff for their cooperation and assistance throughout the audit.

⁴³ We used the Department's 2020 draft assessment report, which was revised in November 2019. The Department reported that the 2020 assessment will be finalized once it is combined with the Department's 2022 assessment report.

⁴⁴ Rock, C. & Rivera B. (2014). *Water quality, E. coli and your health*. Tucson, AZ: The University of Arizona, College of Agriculture and Life Sciences, Cooperative Extension. Retrieved 2/2/21 from <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1624.pdf>; Tchounwou, P.B., Yedjou, C.G., Patlolla, A.K., & Sutton, D.J. (2012). Heavy metals toxicity and the environment. In A. Luch (ed.), *Molecular, clinical, and environmental toxicology* (pp. 133-164). Basel, Switzerland: Springer Basel. Retrieved 2/2/21 from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4144270>.

DEPARTMENT RESPONSE



Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

September 24, 2021

Lindsey A. Perry
Auditor General
2910 N. 44th Street, Suite 410
Phoenix, AZ 85018-7271

Dear Ms. Perry:

This letter provides the Arizona Department of Environmental Quality's (ADEQ) response to the September 17, 2021 revised preliminary draft of the department's Water Quality Performance Audit report. We appreciate the diligence and hard work of the Auditor General's staff in completing this report and their consideration of our feedback on the previous draft.

The auditors identified 12 recommendations for improvement the department should address. Specifically:

Finding 1: Department has not developed all required aquifer water quality standards, potentially putting private well users at risk of having unsafe water

Recommendation 1: The Department should adopt AWQS in rule to match federal drinking water standards by the end of fiscal year 2023, consistent with its plans, or a State alternative AWQS, for the 8 contaminants that do not have a developed or updated AWQS, as required by statute.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: The implementation is dependent on obtaining a funding source and the appropriate funding levels being provided pursuant to recommendations 2 and 3.

Recommendation 2: The Department should perform a workload analysis to assess the cost of developing AWQS. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to develop AWQS.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ is developing an estimate of the cost of rulemakings, including expenditures associated with setting standards such as AWQS.

Recommendation 3: Based on the assessment performed in Recommendation 2, the Department should then work with the Legislature to seek a statutory change by the 2022 legislative session to authorize funding from the WQFF and obtain the needed resources from the WQFF to develop AWQS, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ acknowledges that a revision to state statute is required to use WQFF for developing AWQS. ADEQ also notes that the WQFF currently has a structural deficit creating a lack of sufficient funding for WQD programs. The agency is actively working with state leadership to implement this recommendation.

Finding 2: Department has not conducted key groundwater monitoring responsibilities, limiting its ability to keep groundwater safe

Recommendation 4: The Department should conduct statutorily required ambient groundwater monitoring, including:

- Detecting the presence of new and existing contaminants.
- Determining whether water in aquifers meets water quality standards.
- Assessing water quality trends.
- Determining how effectively the Department's guidance for permittees prevents or reduces pollution discharge.
- Evaluating the effects of contaminants in groundwater on public health or the environment.
- Developing and implementing policies and procedures for conducting ambient groundwater monitoring.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: In early January 2020, ADEQ began a project to compile data from multiple databases and sources to identify the priority locations where monitoring needs to occur. ADEQ receives significant amounts of groundwater data from regulated facilities under the Aquifer Protection Program, the Safe Drinking Water program, state and federal Superfund programs, Underground Storage Tanks program, and Hazardous Waste programs. Other state agencies and water providers (such as Salt River Project) also collect and share groundwater data with ADEQ.

In addition, ADEQ has allocated initial funding of \$200,000 to conduct ambient groundwater monitoring in FY22. This funding will cover the cost of contract resources to monitor 67 locations across the state. Initial funding of \$200,000 is from a one-time transfer into the WQFF in FY22 and federal grants.

Recommendation 5: The Department should, in conjunction with performing workload analyses for developing AWQS and agricultural pesticide monitoring (see Findings 1 and 3, pages 7 through 10 and 14 through 17, respectively), perform a workload analysis to assess its costs for conducting ambient groundwater monitoring. This assessment should include a documented analysis of its ambient groundwater monitoring workload, and any available staff resources, and then identify the resources it needs to conduct ambient groundwater monitoring.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ is currently gathering existing data to understand the scope of ambient monitoring that needs to occur. Once the scope is determined, ADEQ will estimate the cost of the program.

Recommendation 6: Based on the assessment performed in Recommendation 5, the Department should then work with the Legislature to obtain any needed resources, such as modifying fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ acknowledges that the WQFF currently has a structural deficit creating a lack of sufficient funding for WQD programs. As statute requires ADEQ to seek legislative approval to revise fees for the Aquifer Protection Program, the program charged with conducting ambient groundwater monitoring, the agency is actively working with state leadership to implement this recommendation. Initial funding of \$200,000 is from a one-time transfer into the WQFF in FY22 and federal grants.

Finding 3: Department has not conducted required monitoring of agricultural pesticides in groundwater and surrounding soil.

Recommendation 7: The Department should monitor for agricultural pesticides in groundwater and soil throughout the State, as required by statute, by developing and implementing policies and procedures for:

- Determining how to analyze identified pesticides with the potential to pollute groundwater, in consultation with ADHS.
- Monitoring groundwater and soil in areas of the State where identified pesticides with the potential to pollute groundwater are primarily used or may migrate into groundwater.
- Reporting all monitoring results to AZDA.
- Determining if a pesticide threatens to pollute groundwater and, if necessary, notifying AZDA to cancel the pesticide's registration.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: In FY22, ADEQ has allocated initial funding of \$200,000 to monitor pesticides in groundwater. This funding will cover the cost of contract resources to monitor 13 wells for all 101 pesticides on the Groundwater Protection list.

Recommendation 8: The Department should, in conjunction with performing workload analyses for developing AWQS and conducting ambient groundwater monitoring (see Findings 1 and 2, pages 7 through 13), perform a workload analysis to assess its costs for monitoring agricultural pesticides in groundwater and soil throughout the State. This assessment should include a documented analysis of its workload, and any available staff resources, and then identify the resources it needs to monitor agricultural pesticides in groundwater and soil throughout the State.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ will begin to determine the scope of monitoring needed and will document the resources required.

Recommendation 9: Based on the assessment performed in Recommendation 8 and in conjunction with associated recommendations in Findings 1 and 2 (see pages 7 through 13), the Department should then work with the Legislature to seek a statutory change to authorize funding and obtain the needed resources from the WQFF to monitor agricultural pesticides in groundwater and soil throughout the State, such as modifying the fees that contribute to the WQFF to increase the amount of revenues generated for this Fund.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ acknowledges that the WQFF currently has a structural deficit creating a lack of sufficient funding for WQD programs. The agency is actively working with state leadership to implement this recommendation.

Finding 4: Department has not reduced total number of impaired surface waters in the State, putting human and environmental health at risk.

Recommendation 10: The Department should reduce the number of impaired surface waters in the State.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: Since ADEQ's last sunset review, the Agency has funded more than 45 surface water improvement projects for a total cost of approximately \$5.5 million. These efforts have reduced the top three contaminants reported to EPA, for these projects, by an estimated 94,000 tons, have reduced the number of impaired waters by 31 and have reduced concentrations of pollutants in other waterways.

In the past 2 years, ADEQ has remediated or supported remediation of surface waters at 4 legacy mine sites and is currently scheduled to remediate seven more. Improvements due to work at these sites are already apparent with six pollutants now meeting water quality standards in associated waters, and a reduction of pollutants by up to 90 percent in one water. See <https://www.youtube.com/watch?v=OFJlbJLY-EI> for an example of ADEQ's work around Boulder Creek.

Recommendation 11: The Department should develop TMDLs for pollutants contributing to surface waters that have been impaired for 15 years or more.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ acknowledges that TMDL development has not kept pace with statutorily mandated timeframes. ADEQ notes that there is no state funding for developing TMDLs. ADEQ relies on federal grants to provide resources to develop TMDLs and does not receive sufficient funding to complete all the required work. ADEQ receives approximately \$1.8 million each year from EPA and those funds are balanced across several required activities, including monitoring, assessment, permitting, and inspection of surface waters, leaving insufficient funds to develop TMDLs, which are estimated to cost on average \$300,000 each.

Recommendation 12: The Department should develop and implement policies and procedures to:

- a. Track and schedule when TMDLs need to be developed, and develop a TMDL for each impaired surface water pollutant within 15 years from when the water was listed as impaired.

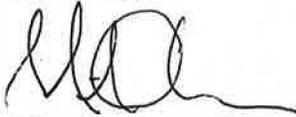
- b. Track and schedule when TMDLs need to be reviewed, and review developed TMDLs and implementation plans for surface waters still impaired at least once every five years.

Department response: The finding of the Auditor General is agreed to and the audit recommendation will be implemented.

Response explanation: ADEQ is developing a tracking board to document the backlog of TMDLs and make visual the TMDL development workflow. ADEQ is also drafting standard work associated with the development and tracking of TMDLs.

On behalf of ADEQ, we appreciate having had this opportunity to respond to the above recommendations. Moreover, we appreciate the professionalism and cooperation your audit team demonstrated in working with us throughout the performance audit process. We found the process and the results to be both constructive and informative, and we look forward to timely implementation of all the recommendations identified in your audit report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Misael Cabrera', with a long horizontal flourish extending to the right.

Misael Cabrera, P.E.
Director

