




PFAS and Public Awareness

A Closer Look at Orange County Drinking Water

Orange County Grand Jury 2025-2026

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SUMMARY

Per- and Polyfluoroalkyl Substances (PFAS) form a broad class of thousands of synthetic chemicals characterized by strong carbon–fluorine bonds and are among the most durable compounds in organic chemistry. This bond strength makes PFAS highly resistant to breaking down, allowing them to persist in the environment for decades or longer. Because of this persistence, PFAS are often called “forever chemicals.”

Various industries have used PFAS in consumer and commercial applications since the 1940s because their chemical properties provide water, oil, and stain resistance, as well as heat stability. These properties support applications across numerous sectors, including aerospace, automotive, textiles, firefighting foams, food packaging, electronics, and medical devices. As a result of their widespread use and persistence, PFAS now appear globally in water, air, soil, wildlife, and human blood.

Scientific studies continue to show associations between PFAS exposure and harmful health effects in humans and animals, although the degree of risk varies by compound. In response, federal and state agencies, including the United States Environmental Protection Agency (EPA) and the United States Food and Drug Administration (FDA), began accelerating regulatory actions in the 2010s to reduce PFAS exposure, enhance monitoring, and develop treatment and disposal methods.

This report identifies and describes PFAS levels detected by Orange County drinking water agencies. It evaluates how these agencies have responded to recent PFAS regulatory requirements. It also examines the progress of PFAS treatment facility planning and installation, along with implementation of public education programs related to PFAS in drinking water. This report’s findings and recommendations aim to strengthen PFAS reporting in annual Water Quality Reports (Consumer Confidence Reports) and expand public outreach by Orange County drinking water agencies.

BACKGROUND

PFAS are a large group of man-made "forever chemicals" produced since the 1940s, known for extreme persistence, environmental mobility, and bioaccumulation due to strong carbon-fluorine bonds.[1] Used in water/stain-resistant coatings, firefighting foams, industrial processes, PFAS have contaminated soil, water, and air globally.

[1] Elsie M. Sunderland, et al., “A review of the pathways of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects,” *Journal of Exposure Science & Environmental Epidemiology*, November 23, 2018, accessed March 16, 2026, https://sunderlandlab.org/assets/sunderland_jeseerev_2018wsi.pdf.

Contaminated drinking water has led to high levels of exposure to PFOA, PFOS, and other PFAS[2] for some populations residing near manufacturing facilities. Workers in facilities that make or use PFAS can be exposed to higher amounts of these chemicals and have higher levels in their blood.[3] Infants may be exposed to PFAS through breastfeeding.[4]

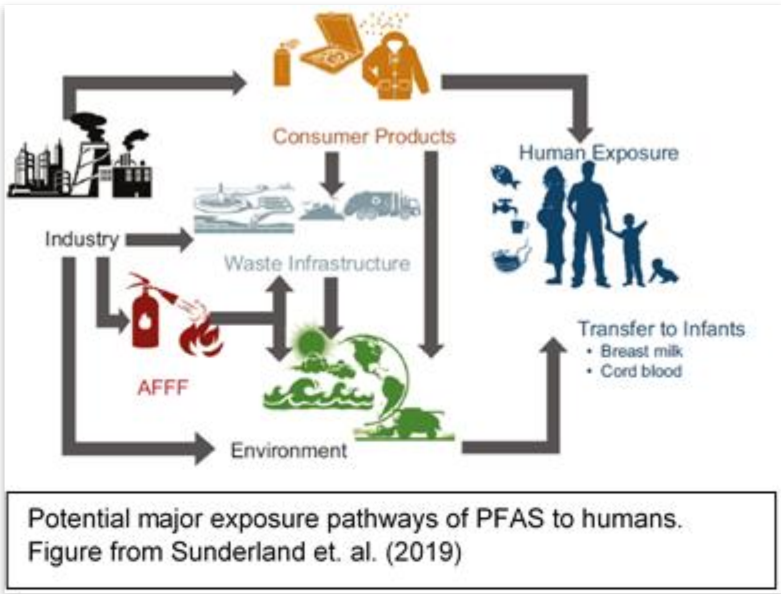

Figure 1 - Potential Major Exposure Pathways of PFAS to Humans[5]

PFAS, especially PFOA and PFOS, have been detected in air, water, and soil in and around manufacturing facilities. However, these releases have been declining since companies began phasing out the production and use of several PFAS in the early 2000s.[6] Due to their chemical structure, PFAS are very stable in the environment and are resistant to breaking down. Some PFAS are volatile and can be carried long distances through the air, which may lead to contamination of soils and groundwater far from the source of the PFAS emission.[7]

The four major sources of PFAS are: fire training/fire response sites, industrial sites, landfills, and wastewater treatment plants/biosolids. PFAS can get into drinking water when products containing them are used or spilled onto the ground or into lakes and rivers. Once in groundwater, PFAS are easily transported long distances and can

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[2] Kyle Steenland, Tony Fletcher, and David A. Savitz, "Epidemiologic Evidence on the Health Effects of Perfluorooctanoic Acid (PFOA)," *National Library of Medicine*, accessed May 12, 2026, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920088/.
[3] Sunderland, "A review of the pathways of human exposure."
[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] "Frequently Asked Questions (FAQs) PFAS General," California State Water Resources Control Board, March 4, 2019, https://www.waterboards.ca.gov/pfas/docs/pfas_general_faq.pdf.

contaminate drinking wells. PFAS in the air can also end up in rivers and lakes used for drinking water.[8]

PFAS have been used extensively in surface coating and protectant formulations due to their unique ability to repel oil, grease, and water. Major applications have included protectants for paper and cardboard packaging products, carpets, leather products, and textiles that enhance water, grease, and soil repellency, and in firefighting foams. PFAS have also been used as processing aids in the manufacture of nonstick coatings on cookware. Common consumer products containing PFAS include Teflon, Gore-Tex and Scotchgard.[9]

Background Summary of PFAS and Its Effects

Source and Exposure: Primary sources include industrial sites, firefighting training, landfills, and wastewater treatment plants. They enter drinking water, food, and indoor dust, resulting in widespread human exposure.

Health and Environmental Impact: PFAS are associated with adverse effects, including cancer (i.e. testicular, kidney), developmental delays, liver damage, and high cholesterol. They do not break down easily, leading to "background" contamination even in remote areas.[10]

Regulation and Action: While major US manufacturing of certain PFAS ended around 2015, they remain in products and in the environment. The EPA has established Maximum Contaminant Levels (MCLs) for drinking water.[11]

"Forever Chemicals" Definition: Their chemical structure, featuring one of the strongest bonds in organic chemistry, makes them resistant to heat, water, and oil, thus earning them the nickname "forever chemicals."[12]

In Orange County, PFAS have been detected in the **Orange County Groundwater Basin**, which provides 77% to 85% of the drinking water for north and central parts of the county. Local agencies have taken a proactive stance, shutting down dozens of impacted wells and building some of the nation's largest treatment facilities to ensure tap water meets safety standards.[13]

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[8] "PFAS background," California State Water Resources Control Board, January 14, 2025, https://www.waterboards.ca.gov/pfas/background.html
[9] Ibid.
[10] "PFAS Explained," EPA, accessed March 11, 2026, https://www.epa.gov/pfas/pfas-explained.
[11] "Per- and Polyfluoroalkyl Substances (PFAS), Final PFAS National Primary Drinking Water Regulation," Accessed May 12, 2026, https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.
[12] Ibid.
[13] University of California, Irvine, "UCI PFAS Health Study, Frequently Asked Questions," accessed May 12, 2026, https://sites.uci.edu/pfas/frequently-asked-questions/.

REASON FOR STUDY

Recent regulatory actions related to PFAS have created significant operational, financial, and communication challenges for drinking water agencies across California. Orange County agencies face an intensifying timeline due to the region's reliance on groundwater supplies, the presence of PFAS in local aquifers, and the need to comply with evolving state and federal standards. As regulatory and monitoring requirements expand, agencies must rapidly adapt their treatment strategies, capital planning, and public outreach efforts.

This study is necessary to provide a clear, up-to-date understanding of how Orange County drinking water agencies are responding to these new requirements. Evaluating the status of PFAS treatment planning and installation helps illustrate the extent of infrastructure readiness, the pace of implementation, and the challenges agencies encounter as they work to bring new systems online. At the same time, assessing the development and delivery of PFAS-related education programs offers insight into how effectively agencies are communicating risks, regulatory changes, and water quality information to the public.

By documenting current conditions and identifying gaps or emerging needs, the study supports informed decision-making among water providers, policymakers, and ratepayers. This work helps ensure that Orange County communities receive safe drinking water and that agencies are equipped to meet regulatory expectations while maintaining public trust.

METHOD OF STUDY

The Orange County Grand Jury investigated the PFAS in Orange County drinking water to provide a clear and accurate assessment. The Grand Jury based its study on a comprehensive review of multiple sources, including interviews, public records, field investigations, and relevant news articles. Multiple independent sources corroborated and validated all facts, findings, and recommendations presented in the report.

- Interviewed several Orange County governmental leaders and senior staff directly involved in managing drinking water quality
- Reviewed and analyzed key documents related to the investigation, including:
    - Published Water Quality reports from all Orange County water retailers
    - Records from all Orange County water agencies
- Examined news articles and publications relevant to the topic.
- Conducted extensive internet research.

- Performed field investigations in which Grand Jury members visited several water management agencies to directly observe and assess drinking water processes.

INVESTIGATION AND ANALYSIS

The 2025-2026 Orange County Grand Jury investigated the presence of PFAS in Orange County drinking water and the response of Orange County community water systems. Community water systems (CWS) are city, county, regulated utilities, regional water systems and even small water companies and districts where people live. Non-community water system.[14] Provide drinking water to the public at locations where people do not reside permanently. The investigation included evaluation of Orange County CWS compliance with federal and state PFAS monitoring and reporting requirements and the extent of the voluntary response to PFAS contamination. The Grand Jury also evaluated annual Consumer Confidence Reports, also called Annual Water Quality Reports, which are issued annually by CWS and distributed to their customers.

Orange County Drinking Water Systems

The Grand Jury investigation was limited to community water systems (CWS) operated by cities or special districts that are regulated under the Safe Drinking Water Act .[15] CWS are defined as public water systems that serve at least 15 service connections used by yearlong residents, or regularly serve at least 25 yearlong residents of the area served by the system.[16] In Orange County, there are 31 such CWS that are operated by cities or special districts and that sell drinking water directly to customers on a retail basis. In this report, these Orange County CWS may be referred to as retail water districts or water retailers.

Drinking Water Sources

North and Central Orange County

Orange County is divided into two distinct areas when it comes to drinking water sources. There are 2.5 million residents of north and central Orange County, who receive about 85% of their drinking water supplies from the Orange County Groundwater Basin, and the remaining 15% of their water supplies are imported from

[14] "California Code, Health and Safety Code - HSC § 116275," FindLaw, accessed May 21,2026, https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-116275/.
[15] "Summary of the Safe Drinking Water Act," EPA, describing statutory authority at 42 U.S.C. § 300f et seq., accessed My 21, 2026, https://www.epa.gov/laws-regulations/summary-safe-drinking-water-act.
[16] "California Code, Health and Safety Code - HSC § 116275," FindLaw.

the State Water Project and Colorado River delivered by Municipal Water District of Orange County (MWDOC).[17]

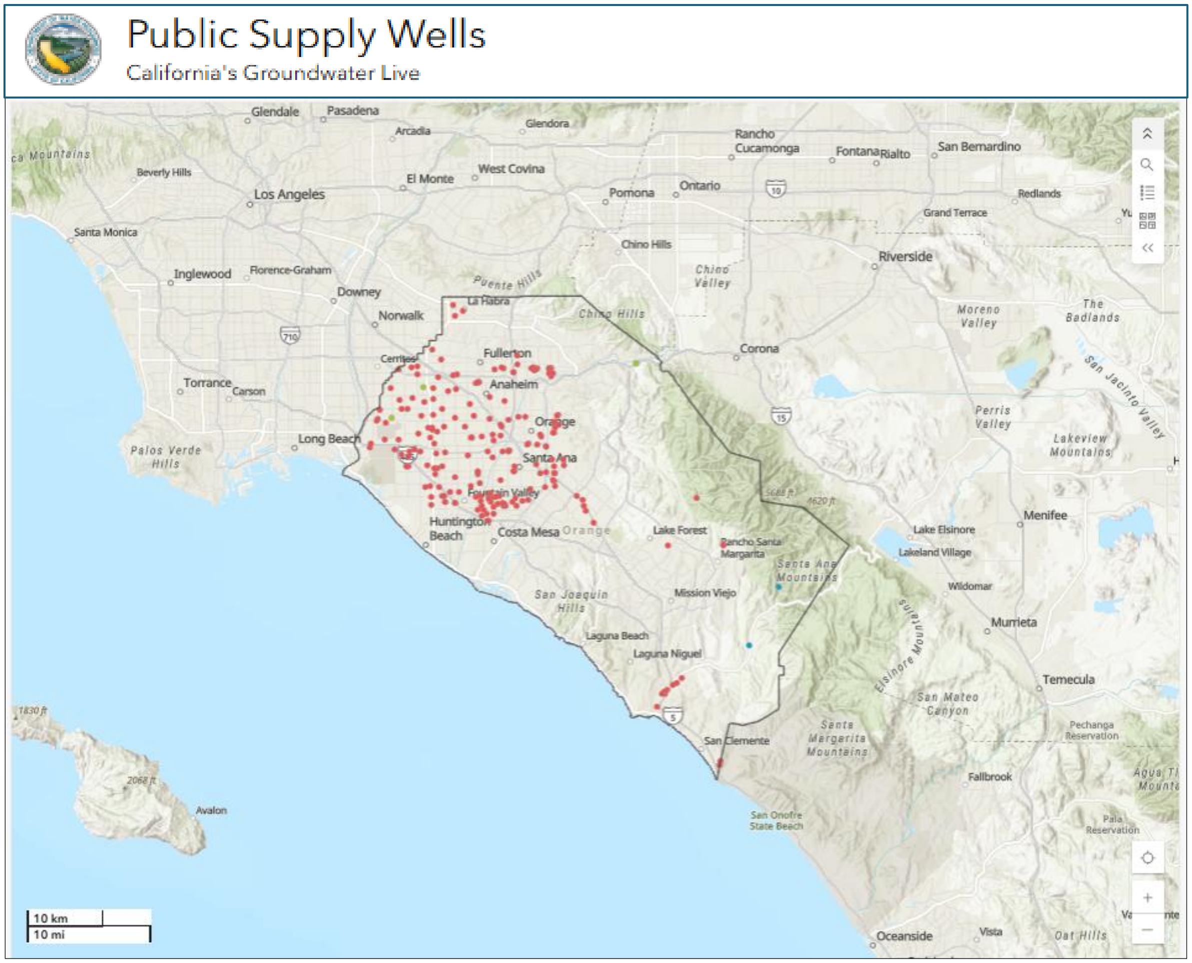
South Orange County

Approximately 600,000 residents of south Orange County rely primarily on imported water supplies delivered by MWDOC, and a few south County communities also have groundwater supplies from the San Juan Basin and surface water supplies from Irvine Lake (also referred to as the Santiago Reservoir).[18]

Public Supply Wells

According to the California Department of Water Resources (DWR) as of November 2024,[19] there were a total of 217 public supply wells for drinking water in Orange County. Of the 217 total wells, 211 were CWS wells and six were non-community water system wells. See Figure 2 for a Department of Water Resources map of Orange County groundwater public supply wells. This map illustrates the reliance of north and central Orange County on groundwater sources, and the reliance of south Orange County on imported water supplies.

[17] "How water works in Orange County," OCWD, accessed May 21, 2026, https://www.ocwd.com/learning-center/how-water-works-in-oc/.
[18] Ibid.
[19] "California's Groundwater Live: Well Infrastructure," California Department of Water Resources, accessed April 13, 2026, https://storymaps.arcgis.com/stories/f2b252d15a0d4e49887ba94ac17cc4bb.



Source: State of California, Department of Water Resources

Figure 2 - Orange County Groundwater Public Supply Wells

Orange County Water District

Orange County Water District (OCWD) manages the Orange County Groundwater Basin to ensure sustainable use through replenishment of groundwater and delivery of water supplies to its 19 member agencies. Some OCWD member agencies are also members of MWDOC.

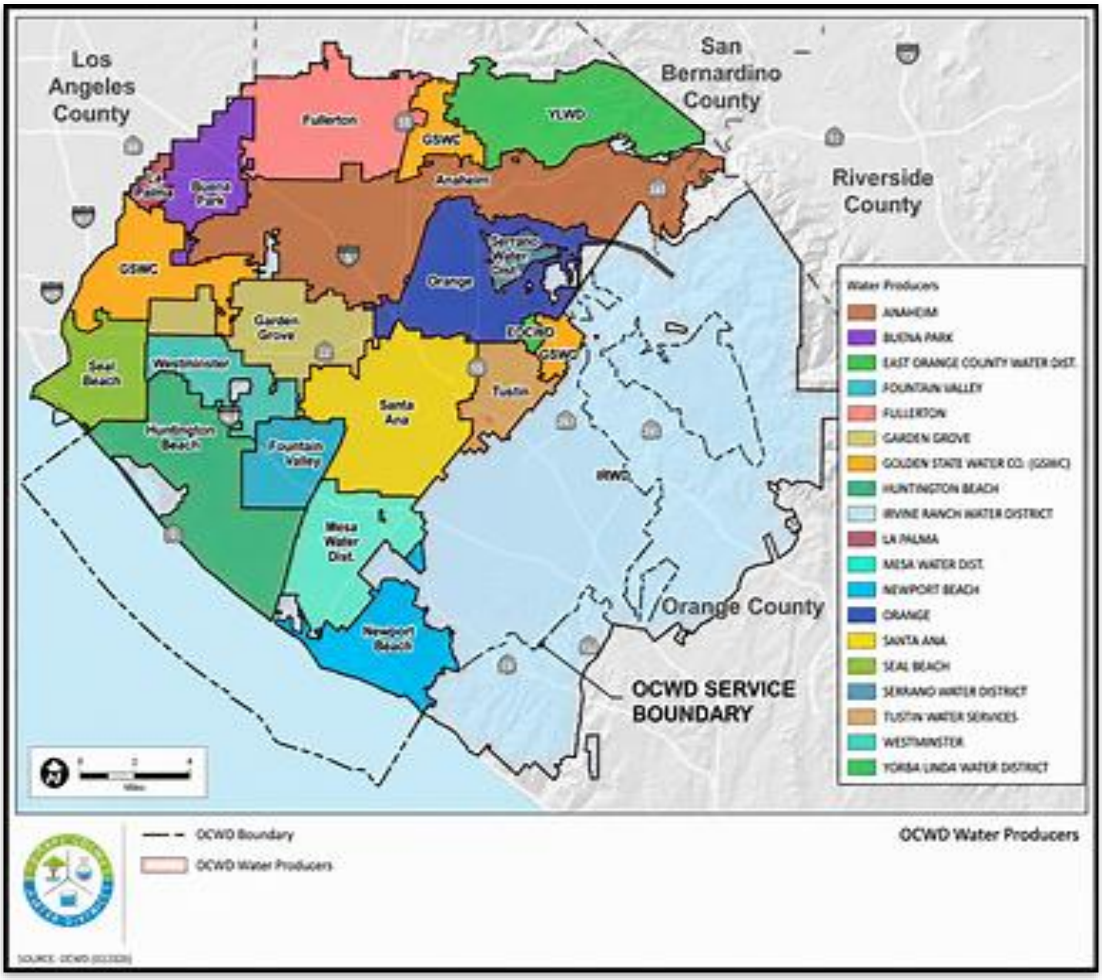
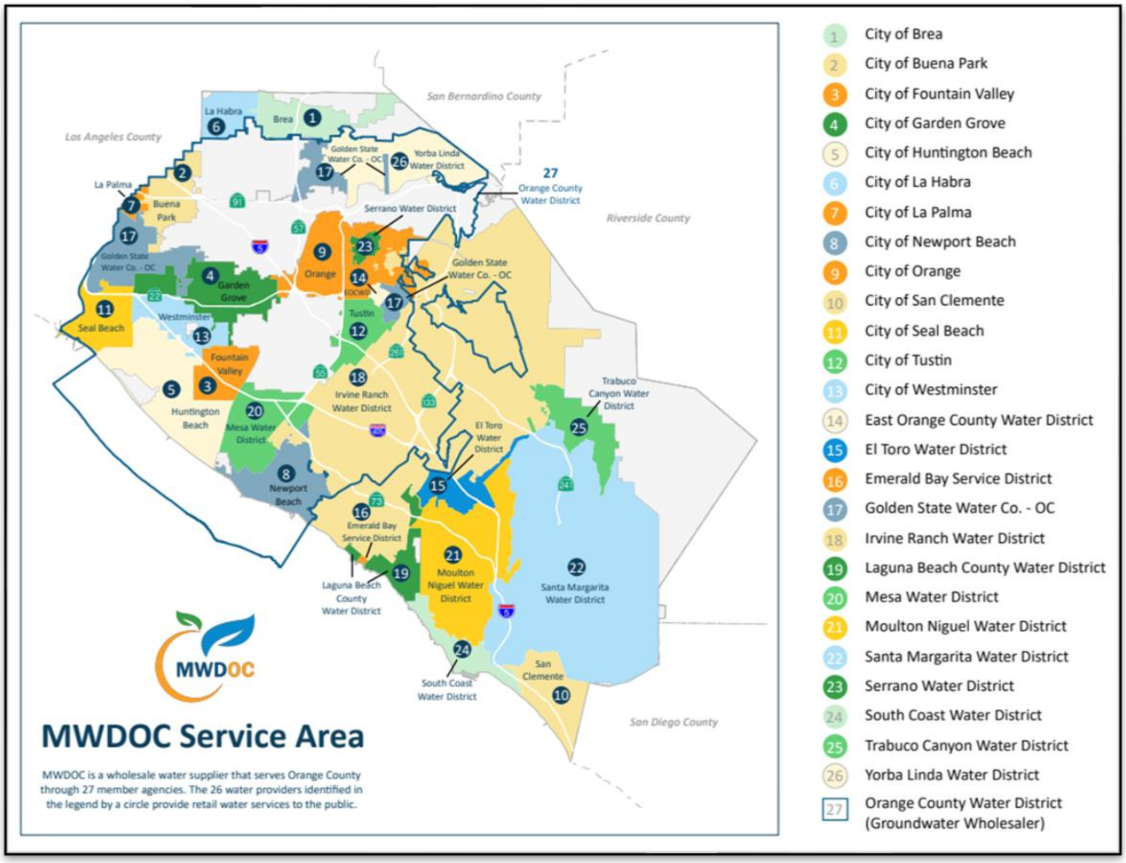


Figure 3 - Orange County Water District (OCWD) Service Area

Municipal Water District of Orange County

MWDOC is the wholesale water provider and resource planning agency that partners with the Metropolitan Water District of Southern California (MWD) to deliver imported water to its 27 member agencies.[20] Some MWDOC member agencies are also members of OCWD.

[20] "How water works in Orange County," OCWD.



Source: MWDOC

Figure 4 - Municipal Water District of Orange County (MWDOC) Service Area

PFAS and the Health Effects of Exposure

What are PFAS?

PFAS are a large group of many thousands of manufactured chemicals that are resistant to heat, oil, and water. Among the many thousands of different PFAS, some have been more widely used and studied than others.[21] PFAS have been used extensively in surface coating and protectant formulations due to their unique ability to reduce the surface tension of liquids, and their ability to repel oil, grease, water, and staining. Major applications have included use as processing aids in the manufacture of nonstick coatings on cookware, surface protectants for paper and cardboard such as disposable food packaging, microwave popcorn bags, pizza boxes, and candy wrappers. Other surface protectants include those used on furniture and carpets,

[21] "PFAS Explained," EPA.

leather products, outdoor gear, and textiles.[22] PFAS are also one of the main components of aqueous film forming foams (AFFF) used frequently at airports and military bases for firefighting and emergency response training activities.[23] It is important to note that PFAS-containing firefighting foams and other emergency response materials containing PFAS are no longer in use at Orange County airports and harbors.[24]

PFOA and PFOS are two types of PFAS of particular concern that are no longer manufactured or imported into the US. Trace amounts of PFOA and PFOS may still be contained in some imported goods and in other PFAS goods and materials that are still produced and used in the US.[25] Under the PFOA Stewardship Program with the EPA, eight major PFAS producers have phased out PFOA and other PFAS substances from their emissions and products; however, manufacturers are replacing substances in the PFAS family with others such as GenX and ADONA.[26]

Understanding the PFAS Cycle: How PFAS Moves Through the Environment

PFAS move through the environment in a repeating cycle through air, water, soil, products, animals, and humans. This is known as the PFAS cycle. This cycle can be described in four stages and is illustrated at Figure 5.[27]

Manufacturing and use. The PFAS cycle begins during manufacturing or everyday use of PFAS-containing consumer and industrial products. During manufacture and use, PFAS are released into the air, water, and soil. As more PFAS are manufactured and used, the more they accumulate because they are persistent and resistant to degradation.

Environmental spread. After PFAS are released to the environment, they move through wind, snowfall, rain, and runoff to soil and surface water, and infiltration to groundwater. Industrial sites and wastewater treatment plants are key entry points

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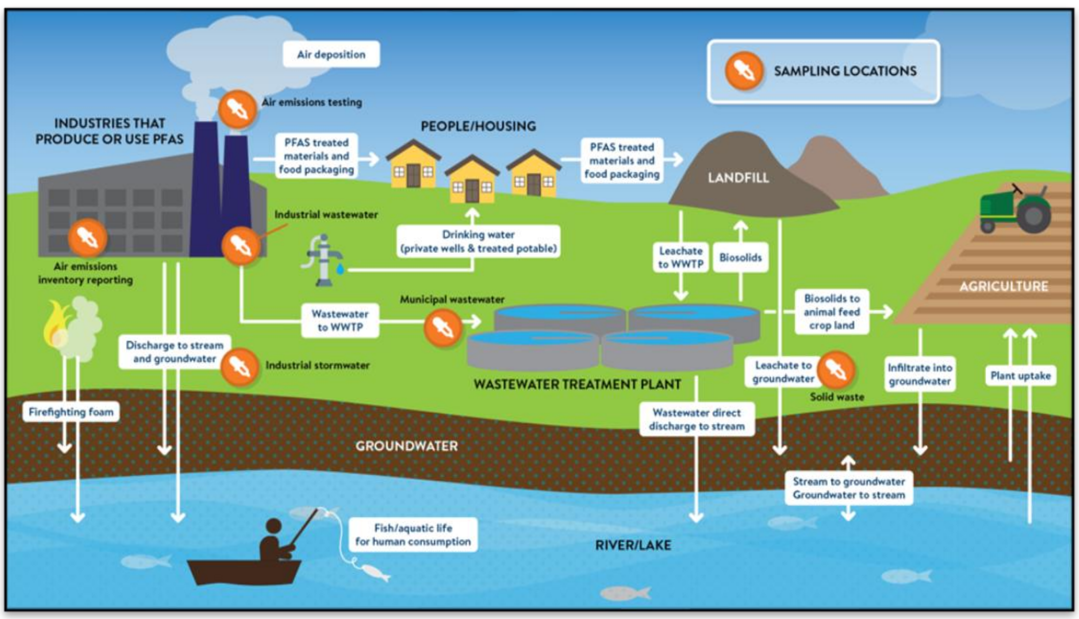
[22] "Our Current Understanding of the Human Health and Environmental Risks of PFAS," EPA, Accessed May 21, 2026, https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas.
[23] Sunderland. "A review of the pathways of human exposure."
[24] "SB-1044 Compliance: Phasing Out PFAS in Class B Firefighting Foam," CAL FIRE, accessed April 17, 2026, https://osfm.fire.ca.gov/what-we-do/pipeline-safety-and-cupa/fire-fighting-equipment-and-foam-pfas.
[25] "PFAS – Frequently Asked Questions," California State Water Resources Control Board Division of Water Quality (SWRCB), 5, [3] 3M Company, "Fluorochemical use, distribution and release overview.," AR226-0550, 1999, updated March 19, 2020, accessed March 25, 2026, https://www.waterboards.ca.gov/pfas/docs/master_pfas_faq_mar.pdf.
[26] "Risk Management for Per- and Polyfluoroalkyl Substances (PFAS) under TSCA," EPA, accessed May 21, 2026, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfas.
[27] "Understanding the PFAS Cycle," EcoPulse, accessed April 13, 2026, https://www.ecopulsenow.com/insights/understanding-the-pfas-cycle.

into the environment. PFAS are absorbed from the environment by plants and animals, and then move up the food chain.

Human exposure. Most people are exposed to PFAS through using PFAS-contaminated products, drinking contaminated water, and eating contaminated food such as fish caught from water contaminated by PFAS, and dairy products from livestock exposed to PFAS.[28] The US Centers for Disease Control (CDC) National Health and Nutrition Examination Survey (NHANES) estimated that in NHANES 2017–2018 data 98% of the US population had combined PFAS serum levels greater than 2 nanograms per milliliter.[29]

Re-entry. Even after disposal of PFAS products, PFAS can re-enter the environment through landfill leachate or runoff to soils, agricultural spreading of biosolids, and municipal wastewater treatment effluent discharges to surface water, resulting in PFAS cycling back into soil, animal feed crops, and water.



Source: Minnesota Pollution Control Agency

Figure 5 - The PFAS Cycle

What is the Source of PFAS in Orange County Groundwater?

Wastewater treatment plants located along the Santa Ana River that discharge effluent to the Santa Ana River upstream of managed aquifer recharge operations are sources

[28] “Risk Management for Per- and Polyfluoroalkyl Substances (PFAS) under TSCA,” EPA.
[29] “National Health and Nutrition Examination Survey. NHANES 2017-18 Overview,” Centers for Disease Control and Prevention (CDC), accessed April 16, 2026, https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/default.aspx?BeginYear=2017.

of PFAS contamination for public water systems downstream of these wastewater treatment plants.[30] The OCWD Groundwater Replenishment System (GWRS) actively manages and recharges the Orange County groundwater basin with surface water from the Santa Ana River, imported surface water, and purified recycled water from the GWRS. For much of the year, flow in the Santa Ana River consists predominantly of effluent from municipal wastewater treatment plants upstream from the Orange County groundwater basin.[31] Figure 6 illustrates these upstream wastewater discharges to the Santa Ana River.[32] PFAS has recently been measured in the Santa Ana River at concentrations consistent with wells surrounding the recharge facilities, suggesting that historic concentrations of PFAS in the Santa Ana River may be a primary input of PFAS in the Orange County groundwater basin.[33]

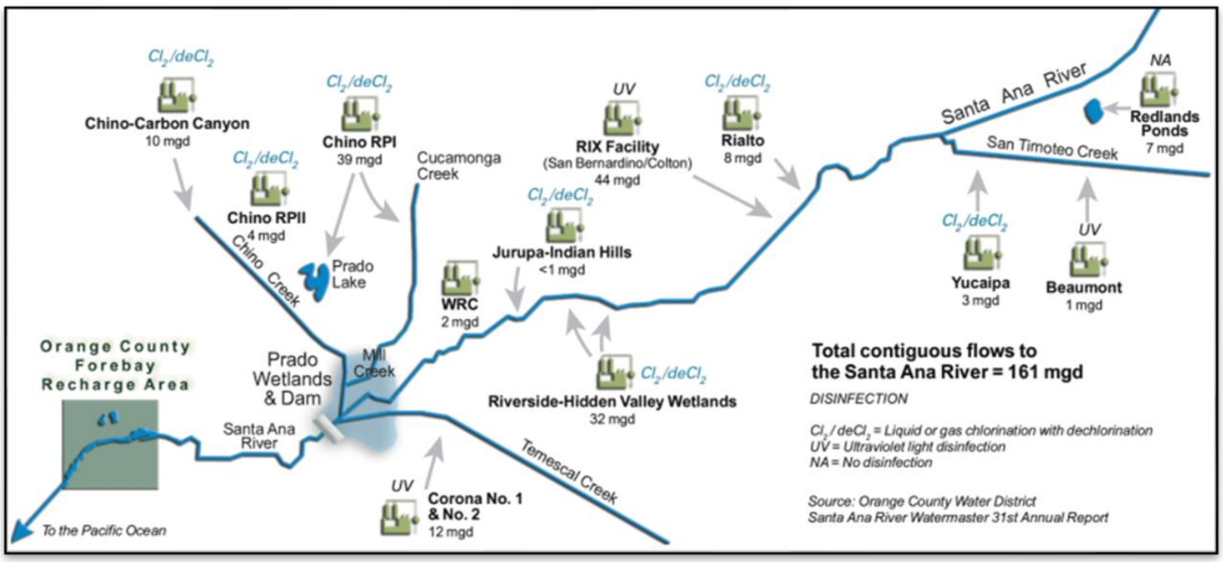


Figure 6 - Wastewater Treatment Discharges to the Santa Ana River

How Much PFAS is Found in the General Population?

Because of their widespread use and their persistence in the environment, many PFAS are found in the blood of people and animals all over the world.[34] CDC scientists have measured PFAS in the blood serum (the clear portion of blood) of 98% of participants

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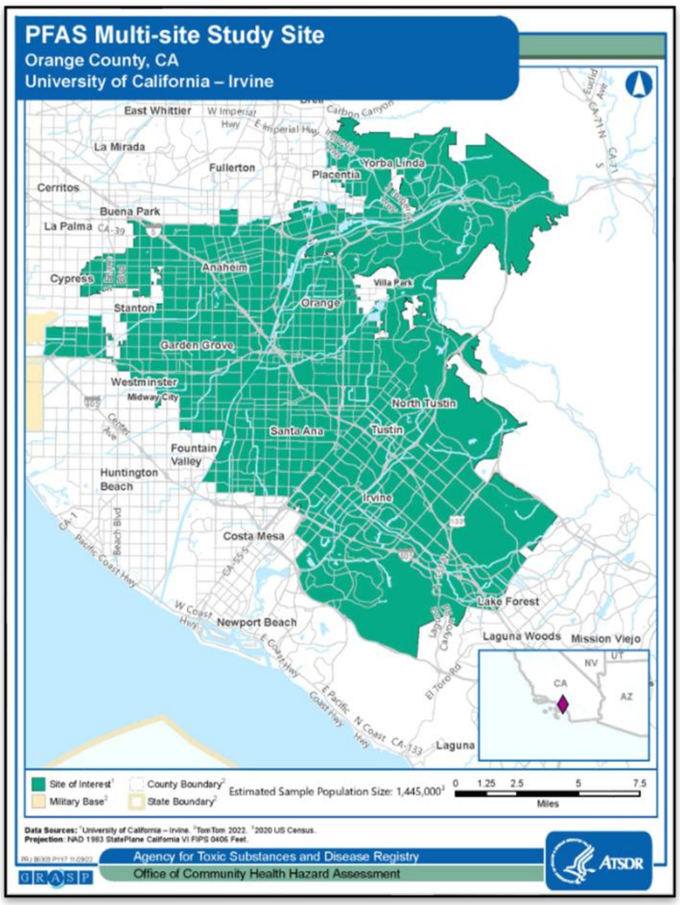
[30] "Per- and Polyfluoroalkyl Substances (PFAS), What are PFAS?" SWRCB, accessed May 21, 2026, https://www.waterboards.ca.gov/santaana/water_issues/programs/pfas/.
[31] "UCI PFAS Health Study," University of California, Irvine, accessed May 12, 2026, https://sites.uci.edu/pfas/.
[32] National Water Research Institute, *Report of the Scientific Advisory Panel: Orange County Water District's Santa Ana River Water Quality and Health Study*, Fountain Valley, CA, 2004, accessed April 14, 2026, https://www.ocwd.com/wp-content/uploads/sarwqh-final-nwri-panel-report-2004.pdf.
[33] Russ Detwiler, *Reconstructing historical PFAS concentrations in groundwater using a reduced-order modeling framework.* Alburquerque NM, InterPore2025, May 20, 2025, accessed April 16, 2026, https://events.interpore.org/event/56/contributions/7590/.
[34] "PFAS Explained," EPA.

aged 12 years and older since 1999, indicating widespread exposure to PFAS in the US population.[35]

Researchers at the University of California, Irvine (UCI) are participating in the CDC Multi-site Study (MSS).[36] The MSS provides information to communities about the health effects of exposure to PFAS. The UCI MSS site is the area in Orange County, shown at On the chart, the Orange County study site is labeled "CA." Orange County is the only California location included in the study.

~~Figure 7~~.



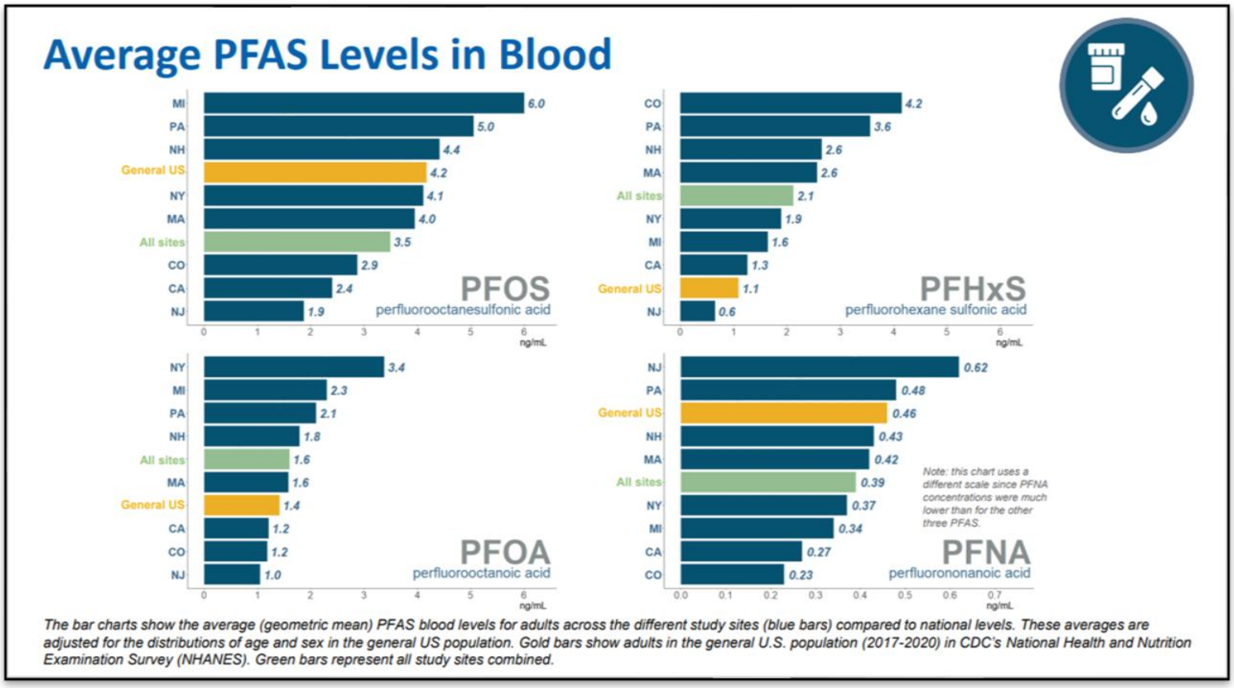
Source: CDC

Figure 7 - CDC Multi-site Study Site Orange County, CA

At the July 2025 MSS update, the UCI researchers shared results showing average levels of certain PFAS chemicals in the blood of adults who participated at the Orange County study site. They compared Orange County results with other study locations and with national averages. For adults at the Orange County site, the average blood levels were estimated to be 2.4 for PFOS, 1.2 for PFOA, 1.3 for PFHxS, and 0.27 for PFNA (measured in nanograms per milliliter, ng/L) These levels were lower than the averages seen across all study sites. In addition, all of these levels, except PFHxS, were lower than the average levels found in the general U.S. population. See Figure 8 for the UCI MSS chart of

[35] "PFAS Frequently Asked Questions," SWRCB, 5, [8] CDC, "National Report on Human Exposure to Environmental Chemicals," 2019, accessed April 23, 2026, https://www.waterboards.ca.gov/pfas/docs/master_pfas_faq_mar.pdf.
[36] "Multi-site Study," CDC, Agency for Toxic Substances and Disease Registry (ATSDR), Per- and Polyfluoralkyl Substances (PFAS) and Your Health, accessed April 16, 2026, https://www.atsdr.cdc.gov/pfas/health-studies/multi-site-study.html.

Average PFAS Levels in Blood.[37] On the chart, the Orange County study site is labeled "CA." Orange County is the only California location included in the study.



The bar charts show the average (geometric mean) PFAS blood levels for adults across the different study sites (blue bars) compared to national levels. These averages are adjusted for the distributions of age and sex in the general US population. Gold bars show adults in the general U.S. population (2017-2020) in CDC's National Health and Nutrition Examination Survey (NHANES). Green bars represent all study sites combined.

Source: CDC

Figure 8 - Average PFAS Levels in Blood, CDC Multi-site Study Virtual Open House, July 2025

Because of the phasing out of certain PFAS compounds, serum levels of PFOA and PFOS in the general population of the US have decreased dramatically in recent years. According to the CDC, blood levels of both PFOS and PFOA have steadily decreased in US residents since 1999-2000.[38]

The half-life of PFAS in the human body is defined as the time required for the PFAS concentrations in serum or plasma to fall by half from the starting concentration.[39] Thirteen studies conducted mainly in Europe and the US involving both general populations and exposed workers resulted in half-life estimates for PFOA of 2.73 years (range: 1.48 to 5.1 years), 4.70 years for PFOS (range: 1.69 to 5.7 years), and 5.31 years for PFHxS (range: 2.84 to 8.5 years).[40] Based on that information, with no

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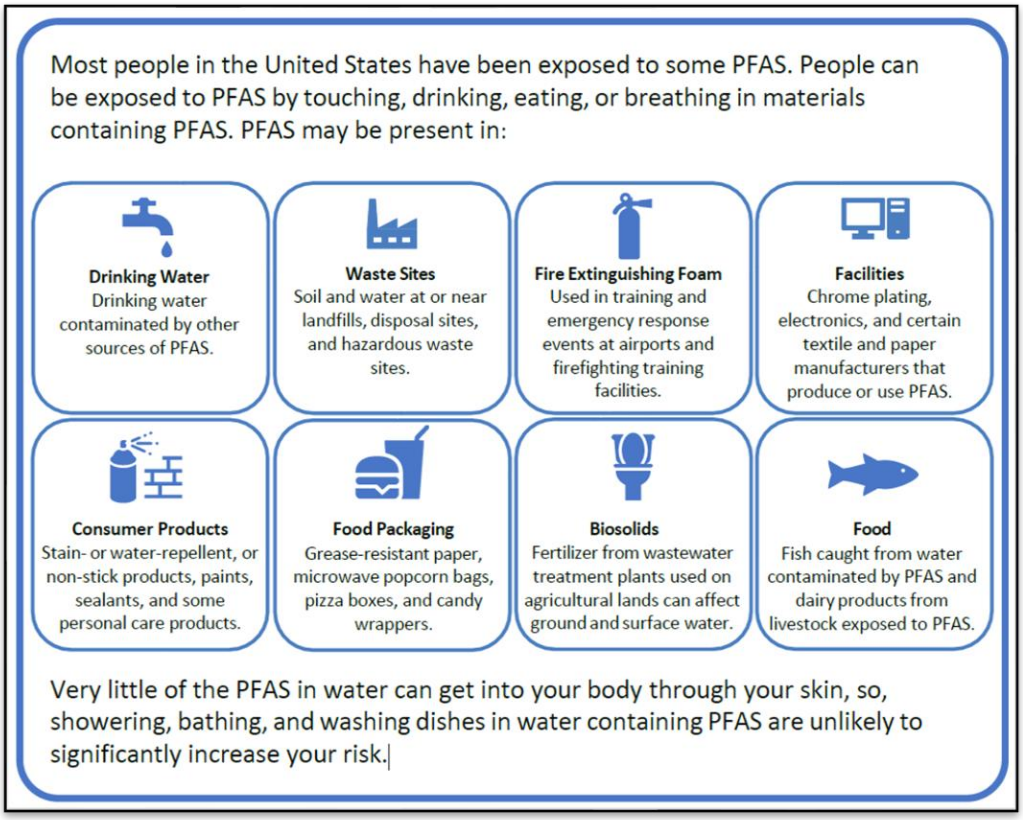
[37] "PFAS Multi-site Study (MSS), Virtual Open House," CDC, ATSDR, July 28, 2025, accessed April 16, 2026, https://www.atsdr.cdc.gov/media/pdfs/2025/08/Open-House-Slides-508.pdf.
[38] "Per- and Polyfluoralkyl Substances (PFAS) and Your Health, Fast Facts: PFAS in the U.S. Population," CDC, ATSDR, https://www.atsdr.cdc.gov/pfas/data-research/facts-stats/index.html.
[39] Isabella Rosato, et al. "Estimation of per- and polyfluoroalkyl substances (PFAS) half-lives in human studies: a systematic review and meta-analysis," *Environmental Research*, Volume 242, February 1, 2024, 117743, accessed April 13, 2026, https://www.sciencedirect.com/science/article/pii/S0013935123025471.
[40] Isabella Rosato, et al. "Estimation of per- and polyfluoroalkyl substances (PFAS) half-lives."

additional exposure, it could be anticipated that PFAS may be cleared from the body after an average of five years. However, PFAS exposures continue in general populations primarily through food and water despite production phase outs and regulatory interventions.

How Are People Exposed to PFAS?

There is general agreement that dietary intake is the largest source of PFAS exposure rather than inhalation or dermal contact.[41] Direct exposures due to use in products can be quickly phased out by production phaseouts but exposures driven by PFAS accumulation in the environment, food chains, and contamination of groundwater and drinking water persist because of the continuing PFAS cycle. Human exposures to PFOS and PFOA, the two PFAS that are of greatest regulatory concern, have been declining due to regulatory interventions while understanding of their adverse effects on human health has been rapidly advancing. At the same time, a proliferation of new PFASs has rapidly replaced PFOS and PFOA with shorter chain length PFASs and new chemicals that are difficult to detect using standard methods.[42] Emerging evidence from animal experiments suggests some of these alternative PFASs can be equally hazardous.[43]

[41] Sunderland, "A review of the pathways of human exposure," 136.
[42] Sunderland, "A review of the pathways of human exposure," 132.
[43] Ibid.



Source: EPA

Figure 9 - How are people exposed to PFAS?[44]

PFAS Exposure and Excretion

Exposure happens when a person breathes, eats, drinks, or touches a chemical and it enters their body. Excretion is the process whereby substances, like PFAS, leave the body. All PFAS can leave the body over time through urine, through menstrual blood or blood donation, or through breast milk. All of these factors could affect PFAS levels measured in blood.[45] While PFAS blood test results can tell you the amount of certain PFAS in your blood, the test results will not provide information to pinpoint a health problem and will not predict future health outcomes. You can talk with your healthcare provider about the benefits and limitations of PFAS blood testing.[46]

[44] "PFAS Explained," EPA, 2, March 11, 2026, https://www.epa.gov/system/files/documents/2023-10/final-virtual-pfas-explainer-508.pdf.
[45] "Per- and Polyfluoralkyl Substances (PFAS) and Your Health, Preventing PFAS Exposure," CDC, ATSDR, accessed April 16, 2026, https://www.atsdr.cdc.gov/pfas/prevent-exposure/your-body.html.
[46] "Per- and Polyfluoralkyl Substances (PFAS) and Your Health, Testing for PFAS," CDC, ATSDR, accessed April 17, 2026, https://www.atsdr.cdc.gov/pfas/blood-testing/index.html.

What are the Health Effects of Exposure?

Exposure to unsafe levels of PFOA/PFOS may result in adverse health effects including developmental effects to fetuses during pregnancy, cancer, liver effects, immune effects, thyroid effects, and other effects such as cholesterol changes.[47]

Laboratory studies in animals who were exposed to PFAS found links between the chemicals and increased cholesterol, changes in the body's hormones, alterations of the immunologic system, decreased fertility, increased risk of cancer (especially kidney and testicular), low birth weight, delayed puberty onset, and birth defects. Since humans and animals react differently to PFAS, not all effects observed in animals may occur in humans. Although many epidemiology studies have examined the potential of PFAS to result in adverse health effects, most of the studies are cross-sectional in design and do not establish causality. Based on several factors outlined in the report of PFAS by the CDC including the consistency of findings across studies, the available epidemiology studies suggest associations between PFAS exposure and several health outcomes in humans.[48]

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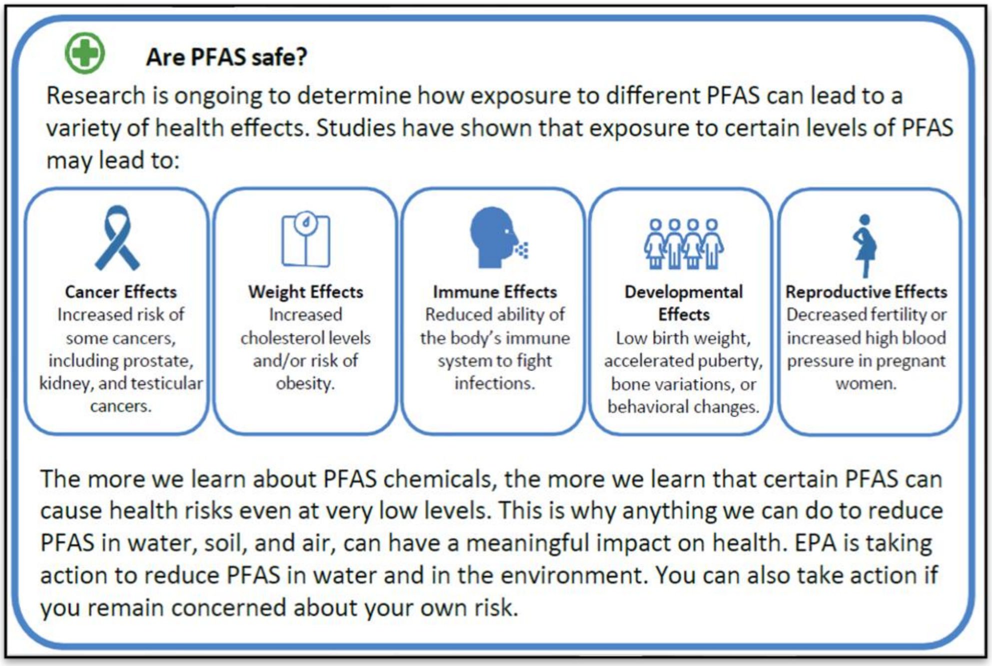
[47] "PFAS Frequently Asked Questions," SWRCB, 5, [6] A. M. Calafat, L.-Y. Wong, Z. Kuklenyik, J. A. Reidy, and L. L. Needham, "Polyfluoroalkyl Chemicals in the US Population: Data from the National Health and Nutrition Examination Survey (NHANES) 2003–2004 and Comparisons with NHANES 1999–2000," Environ. Health Perspect., vol. 115, no. 11, pp. 1596 - 1602, Nov. 2007, https://www.waterboards.ca.gov/pfas/docs/master_pfas_faq_mar.pdf.
[48] "PFAS Frequently Asked Questions," SWRCB, 8, [1] ATSDR, "Toxicological Profile for Perfluoroalkyls, Draft for Public Comment," 2018, https://www.waterboards.ca.gov/pfas/docs/master_pfas_faq_mar.pdf.



Source: EPA

Figure 10 - Are PFAS Safe?[49]

PFAS Regulatory Requirements

Public drinking water systems are required to follow certain regulations to ensure that the water they serve to their customers is safe to drink.[50]

In recent years, specific regulations have been issued to address PFAS contamination that require monitoring and taking actions when PFAS is detected in drinking water sources. The following sections present PFAS regulations in the order they were issued by the EPA and California State Water Resources Control Board (SWRCB).

PFAS Monitoring Requirements

Monitoring refers to the collection and evaluation of data for contaminants that are suspected of being present in water. Samples are collected and analyzed according to EPA-approved laboratory methods. Monitoring results are reported to either the EPA or SWRCB. This data serves as a primary source of occurrence and exposure information used to develop regulatory decisions.

OCWD conducts all sampling and analyses and reporting of monitoring results to regulatory agencies on behalf of its member agencies. OCWD owns and operates its

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49 "PFAS Explained," EPA, 1, accessed March 11, 2026, https://www.epa.gov/system/files/documents/2023-10/final-virtual-pfas-explainer-508.pdf.
50 "Drinking Water Standards and Regulations: An Overview," CDC, accessed May 21, 2026, https://www.cdc.gov/drinking-water/about/drinking-water-standards-and-regulations-an-overview.html.

own EPA-certified laboratory where it can use analytical methods approved by the EPA. MWDOC member agencies conduct monitoring activities using either their own staff or contractors to collect samples, which are delivered to EPA-certified laboratories for analyses. Laboratories report the results of their analyses to each MWDOC water retailer, who then reports the results to either the EPA or SWRCB.

EPA Unregulated Contaminant Monitoring Rule

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data every five years for no more than 30 priority contaminants that are suspected to be present in drinking water and do not have health-based standards set under the Safe Drinking Water Act (SDWA).[51] The UCMR applies to all large public water systems (PWSs) serving greater than 10,000 people, all small PWSs serving between 3,300 and 10,000 people, and a representative sample of small PWSs serving fewer than 3,300 people.

EPA establishes the list of contaminants for each five-year UCMR cycle, considering an initial list of contaminants that are not regulated by the National Primary Drinking Water Regulations, are known or anticipated to occur at PWSs, and may warrant regulation under the SDWA.[52]

The SDWA Public Notification Rule ensures that consumers will receive notice if there is a risk to public health from their drinking water. The Public Notification Rule requires that all PWSs notify their customers of the availability of UCMR results no later than 12-months after results are known. CWS are required to report UCMR results in their Consumer Confidence Report (CCR) when unregulated contaminants are detected. The annual drinking water quality report must include notice of availability of unregulated contaminant monitoring results, the average of the year’s results and the range of detections.[53]

The Grand Jury obtained UCMR monitoring data for all sampling and analyses conducted to fulfill UCMR requirements for its member agencies. The highest PFAS detections for all OCWD sources during the UCMR 3 and UCMR 5 monitoring cycles are shown at Figure 11.

[51] “Summary of the Safe Drinking Water Act,” EPA.
[52] “Learn About the Unregulated Contaminant Monitoring Rule,” EPA, accessed April 7, 2026, https://www.epa.gov/dwucmr/learn-about-unregulated-contaminant-monitoring-rule.
[53] “Public Notification Rule,” EPA, accessed April 7, 2026, https://www.epa.gov/dwreginfo/public-notification-rule#rule-summary.

EPA UCMR	Number of PFAS on UCMR Contaminants List	Maximum PFAS Detection Among all OCWD Sources
2012-2016 UCMR 3	6 PFAS Figure 20, Appendix A	70 ng/L
2022-2026 UCMR 5	29 PFAS Figure 21, Appendix A	29 ng/L

Source: Compiled from OCWD data

Figure 11 - Highest PFAS Detections Among All OCWD Sources During UCMR 3 and UCMR 5 Monitoring Cycles

California State Water Resources Control Board PFAS General Monitoring Orders

Beginning in 2020, the SWRCB Division of Drinking Water, based on review of monitoring results from its 2019 PFAS monitoring orders, determined that it was necessary to expand monitoring to groundwater sources located within the vicinity of the PFAS detections. Several PFAS general monitoring orders were issued to PWSs 2020, 2021, 2022, and 2025 that included Orange County groundwater well locations.[54]

Each of the SWRCB PFAS monitoring orders included requirements for sample collection and laboratory analysis by specific dates, to be followed by monitoring conducted every calendar quarter thereafter.[55] These PFAS monitoring orders established Consumer Confidence Report Detection Levels (CCRDL), and Notification and Response Levels for each PFAS chemical to be monitored. A list of the SWRCB PFAS monitoring orders and exhibits identifying groundwater sources required to be monitored are shown at Appendix A, as well as copies of the CCRDL for each monitoring order.

The Grand Jury obtained monitoring data for all sampling and analyses conducted to fulfill SWRCB monitoring order requirements for sources listed in the monitoring orders that are owned by their member agencies. The highest PFAS detections for all these OCWD sources are shown at Figure 12.

[54] "PFAS DDW General Orders," SWRCB, accessed May 21, 2026, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order/.
[55] Ibid.

SWRCB Order	Number of PFAS on Order CCRDL	Selected Monitoring Date Range	Maximum PFAS Detection Among All OCWD Sources Listed on Order Exihibit A
2020-0003-DDW	18 PFAS Figure 23, Appendix A	8/27/20 - 2/15/21	67.5 ng/L
2021-0003-DDW	18 PFAS Figure 24, Appendix A	2/16/21 - 10/30/22	470 ng/L[2]
2022-0001-DDW	25 PFAS Figure 25, Appendix A	10/31/22 - 4/24/24	169 ng/L[3]
2025-0002-DDW	25 PFAS Figure 26, Appendix A	4/25/24 - 3/19/26[1]	73.7 ng/L

[1]OCWD monitoring data as of March 19, 2026
[2]Outlier result. Next maximum PFAS result 88 ng/L
[3]Outlier result. Next maximum PFAS result 73.7 ng/L

Source: Compiled from OCWD data

Figure 12 - Highest PFAS Detections Among All OCWD Sources Listed on Each SWRCB Monitoring Order Exhibit A

2025 SWRCB General Order DW 2025-0002-DDW

The 2025 SWRCB General Order, issued on December 12, 2025, adopted the initial monitoring requirements in the federal PFAS Rule for each California CWS and non-transient, non-community water system. The 2025 SWRCB Order allows previously acquired data to count toward initial monitoring if collected on or after January 1, 2019, and reported concentrations no greater than the respective MCL.[56]

The 2025 SWRCB General Order also included a list of Orange County groundwater sources showing that 151 of the 198 listed sources had completed initial monitoring as required by the federal PFAS Rule.[57]

PFAS Notification and Response Requirements

Notification and response levels are health-based advisory levels established by the SWRCB Division of Drinking Water (DDW) for chemicals in drinking water that do not have established MCLs.

When chemicals are found in drinking water at concentrations greater than their notification levels, PWSs are required by law to make specific notifications. When

[56] "ORDER DW 2025-0002-DDW," SWRCB, accessed May 21, 2026, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order/docs/order-dw-2025-0002-ddw-pfas-initial-monitoring.pdf.

[57] "Exhibit A – List of Sources and Required Monitoring Frequency," SWRCB, accessed May 21, 2026, https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.waterboards.ca.gov%2Fdrinking_water%2Fcertlic%2Fdrinkingwater%2Fpfas_ddw_general_order%2Fdocs%2Forder-dw-2025-0002-ddw-exhibit-a.xlsx&wdOrigin=BROWSELINK.

chemicals are found in drinking water at concentrations greater than their response levels, DDW recommends removal of a drinking water source from service.[58]

PFAS notification and response levels specified in CCRDLs attached to SWRCB general monitoring orders remain in effect until MCLs are established and become effective. For example, MCLs for specific PFAS will become effective in 2029, and at that time will supersede notification and response levels specified the 2022 CCRDL.

PFAS National Primary Drinking Water Regulation

In April 2024 EPA announced the final National Primary Drinking Water Regulation for six PFAS (the federal PFAS Rule).[59] The PFAS Rule applies to all CWS. The EPA expects that over many years this rule will prevent PFAS exposure in drinking for approximately 100 million people, prevent thousands of deaths, and reduce tens of thousands of serious PFAs-attributable illnesses.[60]

The PFAS Rule establishes initial monitoring and compliance monitoring requirements, and enforceable maximum contaminant levels (MCL) for six PFAS in drinking water. Initial monitoring for six listed PFAS must be implemented beginning April 2024 and must be completed no later than April 26, 2027. Compliance monitoring requirements beginning April 26, 2027, will be either triennial, annual, or quarterly as determined by the SWRCB based on results of the initial monitoring.

Maximum Contaminant Level (MCL) is the highest level of a contaminant allowed in drinking water. EPA has established legally enforceable MCLs of 4.0 parts per trillion (ppt) for PFOA and PFOS, and 10.0 ppt for PFHxS, PFNA, and HFPO-DA (GenX chemicals). Figure 13 shows the MCLs and MCLG effective April 26, 2029.

Ensuring compliance with drinking water MCLs for the PFAS of most concern is the reason over $600 million (see Figure 17) is being spent to construct PFAS treatment facilities in Orange County.

58 "Drinking Water Notification Levels," SWRCB, accessed May 21, 2026, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html.
59 "Per- and Polyfluoroalkyl Substances (PFAS), Final PFAS National Primary Drinking Water Regulation," EPA, accessed May 21, 2026, https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.
60 Ibid.

Chemical	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFNA	10 ppt	10 ppt
PFHxS	10 ppt	10 ppt
HFPO-DA (GenX chemicals)	10 ppt	10 ppt
Mixture of two or more: PFNA, PFHxS, HFPO-DA, and PFBS	Hazard Index of 1	Hazard Index of 1

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
ppt: parts per trillion
Hazard Index (HI): The Hazard Index is a long-established approach that EPA regularly uses to understand health risk from a chemical mixture (i.e., exposure to multiple chemicals). The HI is made up of a sum of fractions. Each fraction compares the level of each PFAS measured in the water to the health-based water concentration.

Source: EPA

Figure 13 - PFAS Rule Enforceable Maximum Contaminant Levels and Maximum Contaminant Level Goals[61]

In addition to ongoing compliance monitoring and MCLs, the PFAS Rule also includes additional requirements with future effective dates. Between April 2027 and April 2029, if monitoring shows that drinking water levels exceed MCLs, CWS must implement solutions that reduce these PFAS; results of initial monitoring must be included in the CCR; results of compliance monitoring must be included in the CCR; and public notification is required for monitoring and testing violations. Starting April 2029, CWS that have MCL violations must take action to reduce levels of these PFAS in their drinking water, and public notification is required for MCL violations.

Compliance with Regulatory Requirements

Consumer Confidence Reports

The Grand Jury reviewed the 2025 Consumer Confidence Reports (Water Quality Reports) issued by 31 water retailers serving Orange County. The CCR is to be delivered to all billing customers by July 1 of each year and must include specified information. All 31 water retailers complied with the eight content requirements specified by the EPA, shown in Appendix B.[62] Seven of the 11 water retailers operating PFAS

[61] "PFAS National Primary Drinking Water Regulation, April 2024," EPA, accessed May 12, 2026, https://www.epa.gov/system/files/documents/2024-04/pfas-npdwr_fact-sheet_general_4.9.24v1.pdf.
[62] "Consumer Confidence Report Rule: A Quick Reference Guide," EPA, accessed April 18, 2026, https://www.epa.gov/sites/default/files/2014-05/documents/guide_qrg_ccr_2011.pdf.

treatment facilities in Orange County included a PFAS advisory section in their CCRs, while only 55 percent of the 31 water retailers included any PFAS advisory statement.

The Grand Jury found that the 31 Orange County water retailers reported either "not detected" results or concentrations below notification thresholds for the six PFAS listed in the EPA PFAS Rule on their 2025 CCRs. After PFAS treatment facilities became operational, OCWD member retailers operating these facilities consistently reported "not detected" results for the same six PFAS. The Grand Jury found that PFAS results from individual wells do not necessarily reflect the quality of water delivered to customers, as some tested wells were later placed into inactive status or destroyed. CCRs documented PFAS constituents exceeding notification levels as required and did not report "not detected" results for those constituents. Monitoring results and CCRs are available in the Safe Drinking Water Information System (SDWIS), California's official database for tracking public water systems, drinking water quality monitoring, regulatory compliance, and enforcement.[63]

Notification and Response

As of 2020, drinking water retailers with PFAS detections above notification and response levels at wells without PFAS treatment facilities began to rely on imported water, or groundwater blended with imported water to deliver drinking water with PFAS concentrations below notification and response levels. As of 2021, multiple water retailers in Orange County shut down groundwater wells after PFAS concentrations at those wells exceeded established response levels.[64]

PFAS Rule Initial Monitoring

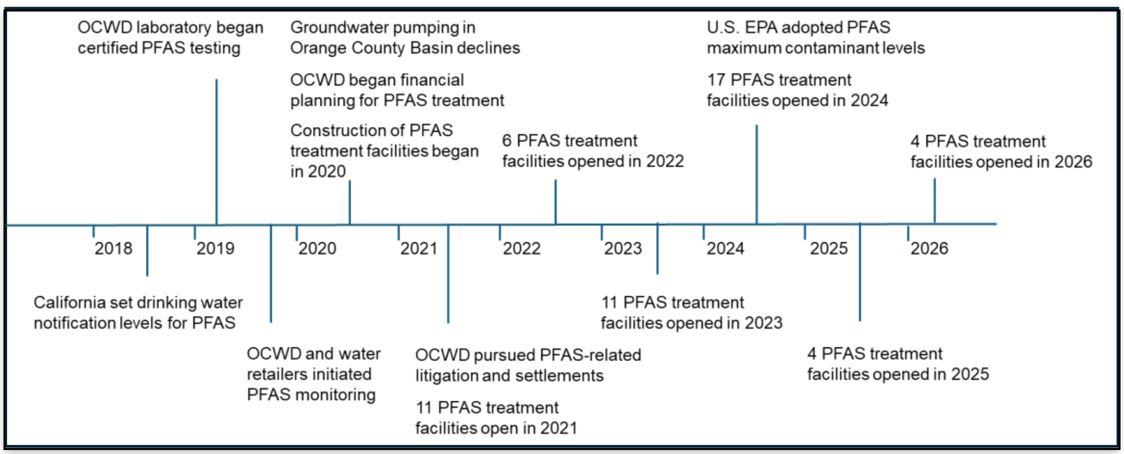
When the 2025 SWRCB General Order adopting the PFAS National Primary Drinking Water Regulation was issued in December 2025, 76% of listed Orange County groundwater sources had already completed initial monitoring required to be completed by April 2027. Most of the remaining Orange County sources received credit for previously acquired data, leaving only 6% with all requirements to be completed by April 2027.

[63] "Drinking Water Watch," SWRCB, Division of Drinking Water, Safe Drinking Water Information System (SDWIS), accessed April 26, 2026, https://sdwis.waterboards.ca.gov/PDWW/.
[64] "Orange County launches first water plant to remove PFAS toxins," Solano Public Health, accessed April 29, 2026, https://publichealth.networkofcare.org/solano/CommunityResources/News/Article?articleId=124536.

Proactive Response to PFAS Impacts

PFAS Impacts and OCWD Response

OCWD coordinated a regional response to PFAS contamination in partnership with its member agencies. These efforts focus on restoring the groundwater basin, which supplies up to 85 percent of the water used by approximately 2.5 million residents in north and central Orange County. A timeline of OCWD response to PFAS in the Orange County Groundwater Basin is shown in Figure 14. As PFAS-impacted groundwater wells began to be shut down in early 2020, public education became a critical component of community water systems' response. OCWD dedicated resources to public outreach, including the development of informational web pages to inform the public about PFAS impacts and the measures being implemented to address them.[65]



Source: Compiled from multiple OCWD sources

Figure 14 - Timeline of OCWD Response to PFAS in the Santa Ana River Basin

PFAS contamination has impacted more than 100 groundwater wells across 15 water retailers. As of this report, 53 wells have returned to service following construction of treatment facilities. Figure 15 Figure 15 - Map of Current and Future PFAS Treatment shows a map of current and future PFAS treatment locations in Orange County.

65 "PFAS education center," Orange County Water District, accessed April 8, 2026, https://www.ocwd.com/what-we-do/water-quality/pfas/.

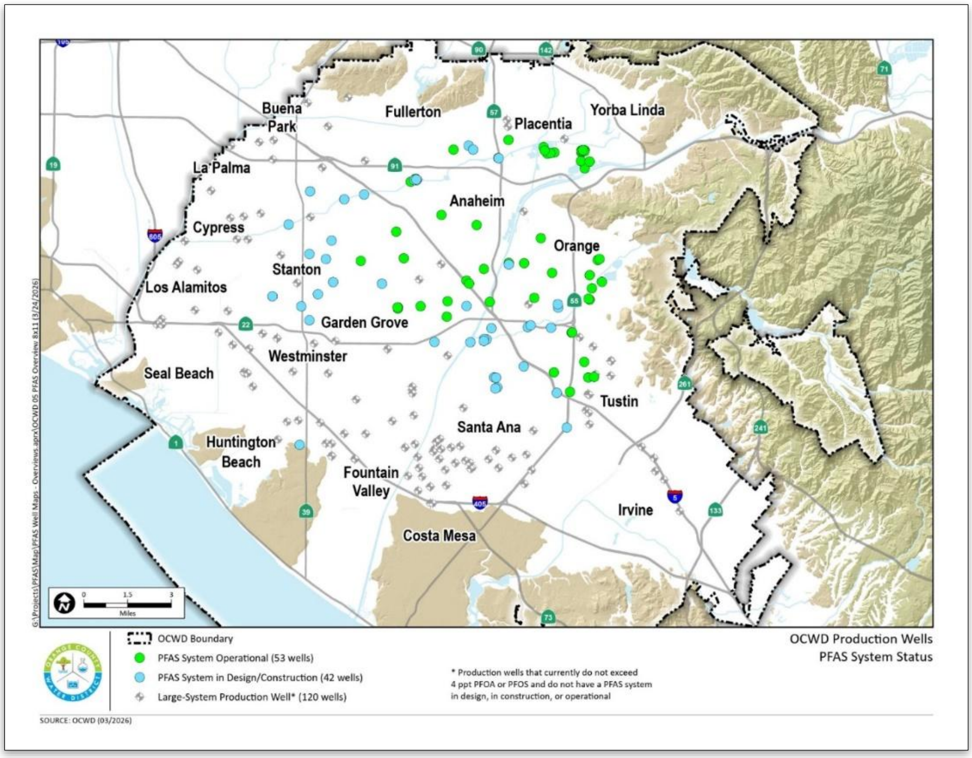
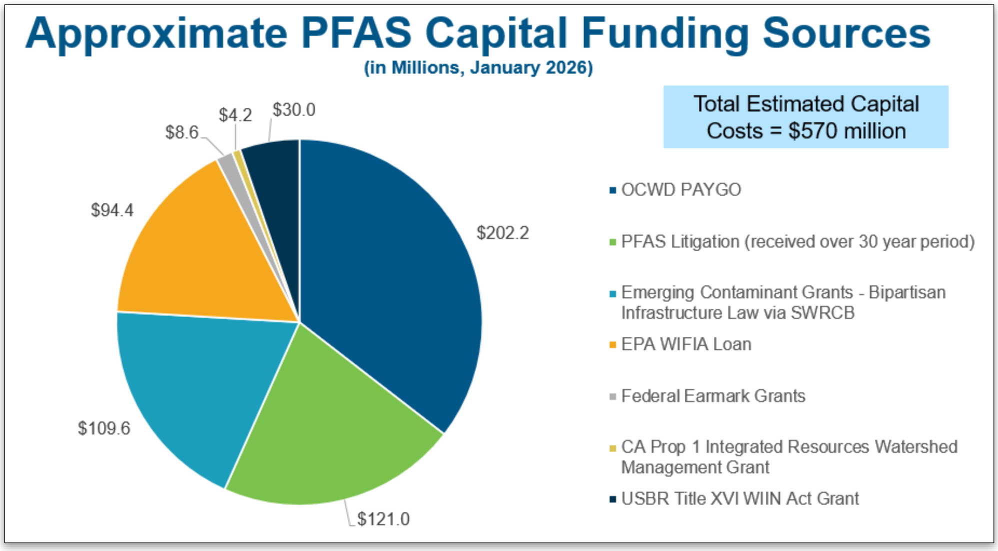


Figure 15 - Map of Current and Future PFAS Treatment Locations

PFAS Treatment Facilities and Capital Costs

Construction of PFAS treatment facilities began in 2020. OCWD executed the PFAS Treatment Facilities and Program Agreement, under which OCWD funds capital costs and shares operating and maintenance (O&M) costs with participating water retailers.

Figure 16 summarizes projected PFAS capital funding sources as of January 2026, including OCWD pay-as-you-go (PAYGO) revenue, state and federal grants, an EPA Water Infrastructure Finance and Innovation Act (WIFIA) loan, and litigation settlement proceeds. The Grand Jury commends OCWD for securing diversified funding sources to advance timely treatment facility construction.



Source: OCWD data

Figure 16 - Approximate PFAS Capital Funding Sources

Figure 17 - Summary of PFAS Treatment Facilities~~Figure 17 Summary of PFAS Treatment Facilities~~ summarizes PFAS treatment facilities by water retailer, opening date, treatment technology, capacity, location, connections, number of wells, and capital costs. Facilities began entering service in mid-2021, starting with a treatment plant in Fullerton, with additional facilities becoming operational over time. Most facilities use ion exchange technology. Capital costs vary based on the number of affected wells, conveyance pipeline requirements, and treatment facility configuration.

OCWD is funding the reasonable costs of designing and constructing PFAS treatment facilities for its member water retailers. Each retailer could either have OCWD design and build the treatment facility or receive reimbursement for designing and constructing the treatment system independently. As of this report, 38 wells with PFAS treatment were built by OCWD and fifteen wells with PFAS treatment were designed and built by the water retailers.

Eighteen wells with PFAS treatment construction projects by OCWD have been completed on schedule. Ten wells with PFAS treatment projects, which were built by OCWD, were completed on schedule; however, OCWD experienced cost overruns due to specialized design requirements or owner-requested improvements. An additional 10 wells with PFAS treatment projects that were done by OCWD were completed late and over budget, primarily due to pandemic-related material delays, design complexity, owner-requested improvements, and utility coordination challenges.

Community Water System	Opening Date	Type	Capacity	Location	Connections	Wells	Total Cost ($M)	Actual-to Date ($M)	Remaining Budget ($M)
City of Anaheim	Sep-2024	Ion Exchange	51,000 gal/min	Nine (9) PFAS treatment facilities at Linda Vista, Katella Ave., Santa Cruz, Energy Field, Brookhurst, Willow Park, Downtown, Boysen Park, and La Palma	64,000	14	$117.1	$117.1	$0.0
	Dec-2028	Ion Exchange	8,000 gal/min	Wells 48 & 53		2	$16.0	$0.8	$15.3
	Dec-2028	Ion Exchange	8,000 gal/min	Wells 39 & 47		2	$16.0	$0.9	$15.1
	Dec-2029	Ion Exchange	TBD	Well 51		1	$7.0	$0.0	$7.0
City of Buena Park	Jun-2026	Packer	2,200 gal/min	Linden Well - Install Packer to reduce flow from PFAS zone(s) in the well - not treatment.		1	$0.6	$0.1	$0.6
City of Fullerton	Jun-2021	Ion Exchange	2,400 gal/min	Kimberly Well 1A	32,000	1	$5.3	$4.1	$1.3
	Dec-2023	Granular Activated Carbon (GAC)	5,000 gal/min	Main Plant 3A		1	$13.7	$13.7	$0.0
	Dec-2026	Granular Activated Carbon (GAC)	4,000 gal/min	Main Plant Wells 5,6,7,8		4	$12.5	$2.6	$9.9
	Jun-2027	Ion Exchange	4,400 gal/min	Kimberly Well 2		1	$10.9	$4.3	$6.6
	Dec-2029	Ion Exchange	1,600 gal/min	Sunclipse Well 10 - Pipeline for Treatment at Kimberly 2 Plant Well 15 - New Well Site Needed		2	$15.3	$0.0	$15.3
City of Garden Grove	Jun-2023	Ion Exchange	17,600 gal/min	Wells 21, 23, 28, 29, 30, 31	34,300	6	$24.3	$24.3	$0.0
	Dec-2026	Ion Exchange	2,000 gal/min	Well 19		1	$6.5	$1.9	$4.7
	Dec-2028	Ion Exchange	13,590 gal/min	Wells 22, 26, and 27		3	$31.7	$1.6	$30.2
	Dec-2030	Ion Exchange	2,000 gal/min	Well 25		1	$7.0	$0.0	$7.0
City of Huntington Beach	Dec-2029	Ion Exchange	3,000 gal/min	Well 3A		1	$8.0	$0.0	$8.0
	Dec-2030	Ion Exchange	3,000 gal/min	Well 6		1	$8.0	$0.0	$8.0
City of Orange	Sep-2022	Ion Exchange	8,420 gal/min	Wells 9, 19, 23, 24	36,000	4	$10.0	$9.9	$0.1
	Apr-2026	Ion Exchange	7,940 gal/min	Wells 20, 21, 22		3	$14.7	$14.7	$0.0
	Apr-2026	Ion Exchange	3,200 gal/min	Well 28		1	$5.0	$4.0	$1.0
	Dec-2028	Ion Exchange	5,500 gal/min	Wells 25, 27		2	$13.0	$0.4	$12.7
	Dec-2029	Ion Exchange	3,200 gal/min	Well 26		1	$7.0	$0.1	$6.9
	Dec-2029	Ion Exchange	TBD	Well 29 - New Well Currently Being Drilled by City		1	$6.0	$1.0	$5.0
City of Santa Ana	May-2023	Ion Exchange	2,500 gal/min	Well 40	45,576	1	$5.8	$5.8	$0.0
	Sep-2026	Ion Exchange	2,500 gal/min	Well 38		1	$7.4	$7.4	$0.0
	Dec-2026	Ion Exchange	2,000 gal/min	Well 31		1	$8.5	$6.8	$1.7
	Apr-2027	Ion Exchange	3,600 gal/min	Well 27&28		2	$17.0	$8.7	$8.3
	May-2027	Ion Exchange	9,200 gal/min	Wells 27, 28, 31, 38, 40 at John Garthe Reservoir		5	$31.4	$0.0	$31.4
	Dec-2029	Ion Exchange	12,400 gal/min	Wells 16, 29, 33, 41, 43(fut) at Walnut Reservoir		5	$25.0	$0.1	$24.9
City of Tustin	May-2025	Ion Exchange	6,400 gal/min	Main Street and Prospect Avenue to remove PFAS from four (4) wells in Tustin	14,500	4	$32.7	$32.7	$0.0
	Dec-2029	Ion Exchange	2,000 gal/min	Edinger Well		1	$7.0	$0.0	$7.0
	Dec-2030	Ion Exchange	2,300 gal/min	17th St Wells (2 wells treated)		2	$7.0	$0.0	$7.0
City of Westminster	Dec-2030	Ion Exchange	2,500 gal/min	WM-3 (New Well)		1	$8.0	$0.0	$8.0
	Dec-2030	Ion Exchange	2,500 gal/min	WM-SC4 (New Well)		1	$8.0	$0.0	$8.0
East Orange County Water District	Jun-2024	Ion Exchange	3,200 gal/min	Treatment for East and VanderWerff Wells	19,000	2	$8.9	$8.9	$0.0
Golden State Water Company	Nov-2023	Ion Exchange	3,200 gal/min	Bradford and Fairhaven Plants	46,300	3	$4.4	$4.4	$0.0
	Jul-2027	Ion Exchange	940 gal/min	Sherrill Plant		1	$3.1	$0.8	$2.4
	Dec-2028	Ion Exchange	7,620 gal/min	La Jolla, Fern Plants		3	$8.3	$0.5	$7.8
	Dec-2028	Ion Exchange	7,620 gal/min	Clair, Beach, and Dale Plants		4	$12.8	$0.9	$11.9
	Dec-2030	Ion Exchange	2,500 gal/min	Lowden		1	$8.0	$0.0	$8.0
	Dec-2030	Ion Exchange	2,500 gal/min	Orangewood		1	$8.0	$0.0	$8.0
Irvine Ranch Water District	Oct-2024	Ion Exchange	3,200 gal/min	Orange Park Acres Well No. 1	125,000	1	$7.2	$7.2	$0.0
Serrano Water District	Feb-2022	Ion Exchange	3,200 gal/min	Wells 3 and 5	5,659	2	$6.0	$6.0	$0.0
Yorba Linda Water District	Dec-2021	Ion Exchange	13,200 gal/min	All ten (10) Yorba Linda wells	11,786	10	$27.7	$27.7	$0.0
Note: $M = Dollars in Millions						106	$607.8	$318.9	$288.9

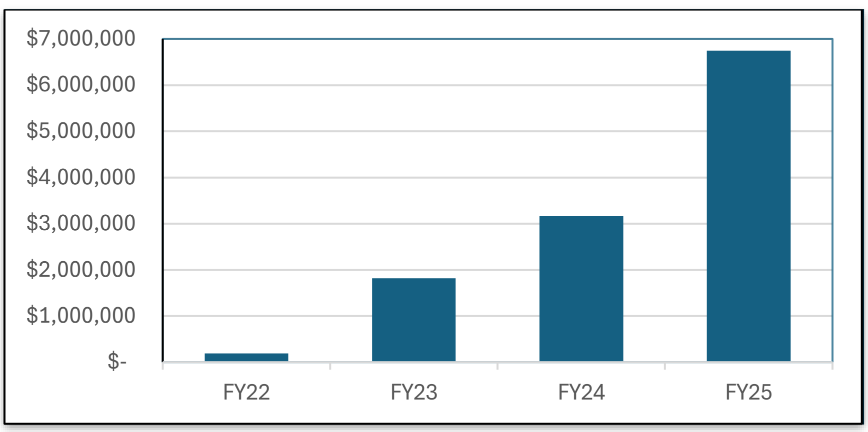
Source: Multiple OCWD and water retailer data

Figure 17 - Summary of PFAS Treatment Facilities

Operations and Maintenance Costs

Under the PFAS Treatment Facilities and Program Agreement, OCWD reimburses 50 percent of eligible operations and maintenance (O&M) costs incurred by participating water agencies. Eligible O&M costs include treatment media replacement, power and chemical costs, routine maintenance, repairs, staffing, compliance monitoring, regulatory compliance activities, additional pumping, waste disposal, sewer costs, and other necessary system maintenance expenses.

Actual PFAS treatment expenses (see Figure 18), which can be found in Annual Comprehensive Financial Reports (ACFRs),[66] varied primarily due to construction timing and the performance of ion exchange resin media. Specialized resins are a key element in PFAS treatment and help remove PFAS from water using electrostatics. Construction delays meant some treatment facilities were not operational as expected, resulting in lower O&M costs. In FY22 and FY23, initial resin media lasted longer than anticipated and reduced O&M costs. In contrast, FY25 experienced more resin changeouts than anticipated and higher O&M costs. Resin media life varies by treatment system and operating conditions, such as run time, cycling frequency, and production flow rates. OCWD is updating resin performance assumptions and changeout frequency estimates to improve future O&M forecasts.



Source: OCWD

Figure 18 – OCWD's Share of PFAS Treatment Facility Annual O&M Cost

Program Status and Future Plans

The overall OCWD PFAS Treatment Systems Project currently includes 11 water retailers, with construction planned or underway for four additional retailers, expanding the program to 15. Fifty-three treatment systems are operational. Construction

[66] "Sound financial management," Orange County Water District, accessed April 8, 2026, https://www.ocwd.com/what-we-do/sound-financial-management/.

continues on 20 additional systems, with design work underway for 24 more. Here is a list of PFAS projects in design or under construction as of May 2026:

- Golden State Water Company Wells SLON and SORG are still in planning. Well SSYC is in design and is anticipated to start construction in Fiscal Year 26/27.
- Tustin 17th Street Well is nearing the start of design.
- Huntington Beach Well 3A, Anaheim Wells 39 and 47, Tustin Edinger Well are all in the design phase and are anticipated to start construction in Fiscal Year 26/27.
- Buena Park Linden Well is currently in construction.

Figure 19 - PFAS Monthly Cost to OCWD Service Area Residents~~Figure 19 PFAS Monthly Cost to OCWD Service Area Residents~~ indicates the estimated average monthly cost of PFAS treatment to OCWD service area residents is $1.42 per person. OCWD anticipates continued design and construction activity over several years.

Average PFAS Impact to OCWD Service Area Residents
Over a 25 year period

Total Capital Costs	$570,000,000	
State & Fed Grants	$152,000,000	
Litigation Proceeds	$121,000,000	
Net Capital Costs	$297,000,000	
Amortized Debt Costs		
	4.50%	Interest Rate
	25	Years
	$297,000,000	Amount
Annual Debt Payment	$20,029,391	
Estimated Annual O&M Cost	$22,000,000	
Total Annual Cost	$42,029,391	
Total Monthly Cost	$3,502,449	
OCWD Population from 19 Member Agencies	2,469,000	persons
Monthly cost per person	$1.42	

Source: OCWD

Figure 19 - PFAS Monthly Cost to OCWD Service Area Residents

FINDINGS

In accordance with California Penal Code Sections 933 and 933.05, the 2025-2026 Orange County Grand Jury requires (or, as noted, requests) responses from each agency affected by the findings presented in this section. The responses are to be submitted to the Presiding Judge of the Superior Court.

Based on its investigation described herein, the 2025-2026 Orange County Grand Jury has arrived at the following six principal findings:

F1 Commercial and industrial chemical manufacturers are a major source of PFAS contamination. Settlement litigation funds are available for community water systems to make claims.

F2 PFAS is widespread, and contamination has been detected in Orange County groundwater sources. Community water systems are required to report PFAS monitoring results in their annual Consumer Confidence Reports.

F3 PFAS exposure is associated with potential adverse human health effects.

F4 OCWD has taken a proactive leadership role in addressing PFAS in the Orange County Groundwater Basin, though PFAS treatment implementation varies across local cities and water districts.

F5 Groundwater supplies must either be treated to remove PFAS or must be replaced with imported water supplies that are significantly more expensive than groundwater. Over $500 million is being spent on construction, operations, and maintenance of PFAS treatment facilities in Orange County.

F6 Orange County drinking water meets or exceeds state and federal standards and is safe for consumption without additional home filtration.

F7 Research on newer PFAS compounds and long-term exposure effects is ongoing.

F8 There are limited online PFAS education and outreach programs among Orange County water retailers. Most retailers rely on OCWD for PFAS education and outreach. PFAS advisories were included in approximately 55% of the Orange County water retailers’ annual water quality reports in 2025.

RECOMMENDATIONS

In accordance with California Penal Code Sections 933 and 933.05, the 2025-2026 Orange County Grand Jury requires (or, as noted, requests) responses from each agency affected by the recommendations presented in this section. The responses are to be submitted to the Presiding Judge of the Superior Court.

Based on its investigation described herein, the 2025-2026 Orange County Grand Jury makes the following recommendations:

R1 By September 30, 2026, Orange County Water District (OCWD), in coordination with state and federal agencies, should pursue cost recovery efforts against PFAS manufacturers to offset treatment, monitoring, and long-term remediation costs incurred by local water agencies and ratepayers. [F1, F5]

R2 By July 1, 2029, OCWD and its member agencies should monitor PFAS in groundwater and surface water sources and promptly implement PFAS treatment when response levels are exceeded. [F2, F4]

R3 By September 30, 2026, OCWD, in collaboration with the Orange County Health Care Agency, should update public education and guidance continually as scientific understanding and regulatory standards evolve. [F3]

R4 By July 1, 2029, all Orange County water retailers should consistently include a PFAS advisory, treatment facilities status, and compliance information in consumer confidence reports and on agency websites, using clear and understandable language for the public. [F2, F8]

R5 By September 30, 2026, OCWD and all Orange County water retailers should enhance coordinated public education efforts to reassure their customers about drinking water safety. [F6, F8]

R6 By September 30, 2026, OCWD should continuously monitor national and international PFAS research developments and incorporate new findings into future groundwater management, treatment planning, and regulatory compliance strategies. [F7]

COMMENDATIONS

Many Orange County water agencies have demonstrated exceptional leadership in addressing PFAS through large-scale treatment investments, rigorous monitoring, and public communication. Together, these agencies serve more than two million residents and have implemented some of the most advanced PFAS treatment systems in the nation. The following commendations recognize high-impact programs and measurable achievements across the region.

Orange County Water District (OCWD)

OCWD has implemented the largest PFAS treatment program in the United States, designing and constructing treatment systems for over 100 impacted wells across 15 cities and retail water districts, improving water quality for approximately 1.5 million people. OCWD secured a $94M EPA Water Infrastructure Finance and Innovation Act (WIFIA) loan, $152M in state and federal grant funding, and $131M in PFAS manufacturers litigation settlement funds to support this effort, which includes the build-out of more than 30 PFAS treatment facilities.

The Grand Jury offers additional commendations to OCWD and its member agencies for their collaborative cost-sharing agreement. Under this arrangement, OCWD fully funds all PFAS facility design and construction capital expenditures. Ongoing operations and maintenance costs are then shared equally, with OCWD covering 50% and each participating water retailer contributing the remaining 50% for the PFAS treatment facilities they operate. This approach reflects progressive public-sector planning, demonstrating how agencies can work together to address complex and costly challenges. It also serves as a strong model for future government/private-sector cost-sharing agreements, illustrating how thoughtful collaboration can enhance efficiency and long-term public benefit.

Anaheim Water Utility

Anaheim has launched one of the largest municipal PFAS treatment programs in the country, a multi-phase, $150M effort to construct treatment systems at nine groundwater sites. The utility serves 64,000 metered customers, historically relying on groundwater for 80% of its supply. PFAS treatment systems for Wells 39 and 47 are among the first in a series of facilities designed to restore local production while meeting stringent state and federal standards.

Yorba Linda Water District (YLWD)

YLWD operates the J. Wayne Miller, Ph.D. Water Treatment Plant, recognized as the nation's largest PFAS ion-exchange treatment facility. The plant serves approximately 80,000 customers and has delivered PFAS-free water for nearly three consecutive years. This facility allows YLWD to optimize its groundwater resources while proactively meeting evolving PFAS regulatory standards.

RESPONSES

The following excerpts from the California Penal Code provide the requirements for public agencies to respond to the Findings and Recommendations of this Grand Jury report:

§933

(c) No later than 90 days after the grand jury submits a final report on the operations of any public agency subject to its reviewing authority, the governing body of the public agency shall comment to the presiding judge of the superior court on the findings and recommendations pertaining to matters under the control of the governing body, and every elected county officer or agency head for which the grand jury has responsibility pursuant to Section 914.1 shall comment within 60 days to the presiding judge of the superior court, with an information copy sent to the board of supervisors, on the findings and recommendations pertaining to matters under the control of that county officer or agency head and any agency or agencies which that officer or agency head supervises or controls. In any city and county, the mayor shall also comment on the findings and recommendations. All of these comments and reports shall forthwith be submitted to the presiding judge of the superior court who impaneled the grand jury. A copy of all responses to grand jury reports shall be placed on file with the clerk of the public agency and the office of the county clerk, or the mayor when applicable, and shall remain on file in those offices. One copy shall be placed on file with the applicable grand jury final report by, and in the control of the currently impaneled grand jury, where it shall be maintained for a minimum of five years.

§933.05.

(a) For purposes of subdivision (b) of Section 933, as to each grand jury finding, the responding person or entity shall indicate one of the following:

(1) The respondent agrees with the finding.

(2) The respondent disagrees wholly or partially with the finding, in which case the response shall specify the portion of the finding that is disputed and shall include an explanation of the reasons, therefore.

(b) For purposes of subdivision (b) of Section 933, as to each grand jury recommendation, the responding person or entity shall report one of the following actions:

(1) The recommendation has been implemented, with a summary regarding the implemented action.

(2) The recommendation has not yet been implemented, but will be implemented in the future, with a timeframe for implementation.

(3) The recommendation requires further analysis, with an explanation and the scope and parameters of an analysis or study, and a timeframe for the matter to be prepared for discussion by the officer or head of the agency or department being investigated or reviewed, including the governing body of the public agency when applicable. This timeframe shall not exceed six months from the date of publication of the grand jury report.

(4) The recommendation will not be implemented because it is not warranted or is not reasonable, with an explanation, therefore.

(c) However, if a finding or recommendation of the grand jury addresses budgetary or personnel matters of a county agency or department headed by an elected officer, both the agency or department head and the board of supervisors shall respond if requested by the grand jury, but the response of the board of supervisors shall address only those budgetary or personnel matters over which it has some decision-making authority. The response of the elected agency or department head shall address all aspects of the findings or recommendations affecting his or her agency or department.

(d) A grand jury may request a subject person or entity to come before the grand jury for the purpose of reading and discussing the findings of the grand jury report that relates to that person or entity in order to verify the accuracy of the findings prior to their release.

(e) During an investigation, the grand jury shall meet with the subject of that investigation regarding the investigation, unless the court, either on its own determination or upon request of the foreperson of the grand jury, determines that such a meeting would be detrimental.

(f) A grand jury shall provide to the affected agency a copy of the portion of the grand jury report relating to that person or entity two working days prior to its public release and after the approval of the presiding judge. No officer, agency, department, or governing body of a public agency shall disclose any contents of the report prior to the public release of the final report.

(Amended by Stats. 1997, Ch. 443, Sec. 5. Effective January 1, 1998.)

Comments to the Presiding Judge of the Superior Court in compliance with Penal Code §933.05 are required from:

Orange County Board of Supervisors	90 Day Response Required
Findings:	F3
Recommendations:	R3
Orange County Water District Board of Directors	90 Day Response Required
Findings:	F1, F2, F3, F4, F5, F6, F7, F8
Recommendations:	R1, R2, R3, R5, R6
Orange County Health Care Agency	90 Day Response Requested
Findings:	F3
Recommendations:	R3
City of Anaheim	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Brea	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
City of Buena Park	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Fountain Valley	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5

City of Fullerton	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Garden Grove	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Huntington Beach	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of La Habra	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
City of La Palma	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Newport Beach	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Orange	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5

City of San Clemente	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
City of Santa Ana	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Seal Beach	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Tustin	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
City of Westminster	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
East Orange County Water District	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
El Toro Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5

Emerald Bay Service District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
Golden State Water Company	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
Irvine Ranch Water District	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
Laguna Beach County Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
Mesa Water District	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
Moulton Niguel Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
Santa Margarita Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5

Serrano Water District	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5
South Coast Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
Trabuco Canyon Water District	90 Day Response Required
Findings:	F2, F6, F8
Recommendations:	R4, R5
Yorba Linda Water District	90 Day Response Required
Findings:	F2, F4, F6, F8
Recommendations:	R2, R4, R5

Acronyms

ACFRS	Annual comprehensive financial reports
ADONA	Ammonium 4 8-dioxa-3h-perfluorononanoate
AFFF	Aqueous film forming foams used frequently at airports and military bases for firefighting and emergency response training activities
AL	Regulatory Action Level The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow
ATSDR	Agency for Toxic Substances and Disease Registry
CCR	Consumer Confidence Report
CCRDL	Consumer Confidence Report Detection Levels
CDC	United States Centers for Disease Control and Prevention
CWS	Community Water System
DDW	Division of Drinking Water
DWR	Department of Water Resources
Effluent	Liquid waste from industrial facilities
EPA	US Environmental Protection Agency
FDA	Food and Drug Administration
GenX	Is a Chemours trademark name for a synthetic, short chain organofluorine chemical compound, the ammonium salt of hexafluoropropylene oxide dimer acid (HFPO-DA). It can also be used more informally to refer to the group of related fluorochemicals that are used to produce GenX.
GWRS	Ground water replacement system
HALF LIFE	Time required for a quantity to reduce to half of its original value
HFPO-DA	Hexafluoropropylene oxide dimer acid
MSS	Multi site study
MCL	Glossary of Terms Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as

	close to the public health goals and maximum contaminant level goals as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
MCLG	Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. The United States Environmental Protection Agency (USEPA) sets maximum contaminant level goals.
MRDL	Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that the addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
MWD	Metropolitan Water District
MWDOC	Municipal Water District of Orange County
N/A	Not applicable
ND	Not detected
NHANES	National Health and Nutrition Examination Survey
NL	California Notification Level Non-regulatory, health-based advisory levels established by the State Board for contaminants in drinking water for which an MCL has not been established
NR	Not required to be tested; < = average is less than the detection limit for reporting purposes
NTU	Nephelometric turbidity units
OCWD	Orange County Water District
O & M	Operations and Management
PAYGO	“Pay as you go”
PDWS	Primary Drinking Water Standard MCLs, MRDLs and treatment techniques (TTs) for contaminants that affect health, along with their monitoring and reporting requirements
pCi/L	picoCuries per liter

PFAS RULE	Establishes enforceable drinking water standards for six PFAS chemicals
PFAS	Per- and polyfluoroalkyl substances
PFBA	Perfluoro Butanoic Acid
PFBS	Perfluoro Butane Sulfonic Acid
PFHpA	Perfluoro Heptanoic Acid
PFHxA	Perfluoro Hexanoic Acid
PFHxS	Perfluoro Hexane Sulfonic Acid
PFNA	Perfluorononanoic acid
PFOA	Perfluoro Octanoic Acid
PFOS	Perfluoro Octane Sulfonic Acid
PFPeA	Perfluoro Pentanoic Acid
PHG	Public Health Goal The level of a contaminant in drinking water below which there is no known or expected risk to health. The California Environmental Protection Agency (CalEPA) sets public health goals.
PPB	Parts per billion
PPM	Parts per million
PPT	Parts per trillion
PQL	Practical Quantitation Level
PWS	Public water supply
RAA	Highest Running Annual Average
SAR	Santa Ana River
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
SWRCB	State Water Resources Control Board
WIFIA	Water Infrastructure Finance and Innovation Act
TT	Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water
UCI	University of California, Irvine

UCMR	Unregulated Contaminant Monitoring Rule
US	United States
μmho/cm	Micromho per centimeter (equivalent to 1 microsiemens/cm)

Glossary

Cross Sectional Study	Examines prevalence of a condition or characteristic at a single point in time across a population to identify patterns, associations, and risk factors
Ion Exchange Technology	Process that removes/replaces dissolved ions in a solution using solid materials.
Non-Community Water Systems	Public water systems at locations where people do not reside
Non-Transient Water Systems	Public water systems that service at least 25 of the same people over six months of the year, but do not live there

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Appendix A

Unregulated Contaminated Monitoring Rule (UCMR) Contaminants Lists, PFAS Contaminants

Contaminant/CASRN[1]	MRL (µg/L)[2]	Use or Environmental Source[3]
Perfluorinated Compounds: EPA Method 537		
perfluorooctanesulfonic acid (PFOS) 1763-23-1	0.04	Surfactant or emulsifier; used in fire-fighting foam, circuit board etching acids, alkaline cleaners, floor polish, and as a pesticide active ingredient for insect bait traps; U.S. manufacture of PFOS phased out in 2002; however, PFOS still generated incidentally
perfluorooctanoic acid (PFOA) 335-67-1	0.02	Perfluorinated aliphatic carboxylic acid; used for its emulsifier and surfactant properties in or as fluoropolymers (such as Teflon), fire-fighting foams, cleaners, cosmetics, greases and lubricants, paints, polishes, adhesives and photographic films
perfluorononanoic acid (PFNA) 375-95-1	0.02	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluorohexanesulfonic acid (PFHxS) 355-46-4	0.03	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluoroheptanoic acid (PFHpA) 375-85-9	0.01	Manmade chemical; used in products to make them stain, grease, heat and water resistant
perfluorobutanesulfonic acid (PFBS) 375-73-5	0.09	Manmade chemical; used in products to make them stain, grease, heat and water resistant

1. CASRN - Chemical Abstracts Service Registry Number
2. MRL - Minimum Reporting Level
3. "Use or Environmental Source" further documented in UCMR 3 Contaminants – Information Compendium. EPA 815-B-11-001. January 2012

Figure 20 - UCMR 3 Contaminants List, PFAS Contaminants

Contaminant	CASRN[1]	MRL[2] (µg/L)	Additional Information
25 PFAS: EPA Method 533			
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	0.005	PFAS are a group of synthetic chemicals used in a wide range of consumer products and industrial applications including: non-stick cookware, water-repellent clothing, stain-resistant fabrics and carpets, cosmetics, firefighting foams, electroplating, and products that resist grease, water, and oil. PFAS are found in the blood of people and animals and in water, air, fish, and soil at locations across the United States and the world.
1*H*,1*H*, 2*H*, 2*H*-perfluorodecane sulfonic acid (8:2FTS)	39108-34-4	0.005	
1*H*,1*H*, 2*H*, 2*H*-perfluorohexane sulfonic acid (4:2FTS)	757124-72-4	0.003	
1*H*,1*H*, 2*H*, 2*H*-perfluorooctane sulfonic acid (6:2FTS)	27619-97-2	0.005	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	0.003	
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	0.002	
hexafluoropropylene oxide dimer acid (HFPO-DA)(GenX)	13252-13-6	0.005	
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	0.02	
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	113507-82-7	0.003	
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	0.004	
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	0.003	
perfluorobutanesulfonic acid (PFBS)	375-73-5	0.003	
perfluorobutanoic acid (PFBA)	375-22-4	0.005	
perfluorodecanoic acid (PFDA)	335-76-2	0.003	
perfluorododecanoic acid (PFDoA)	307-55-1	0.003	
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	0.003	
perfluoroheptanoic acid (PFHpA)	375-85-9	0.003	
perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.003	
perfluorohexanoic acid (PFHxA)	307-24-4	0.003	
perfluorononanoic acid (PFNA)	375-95-1	0.004	
perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.004	
perfluorooctanoic acid (PFOA)	335-67-1	0.004	
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	0.004	
perfluoropentanoic acid (PFPeA)	2706-90-3	0.003	
perfluoroundecanoic acid (PFUnA)	2058-94-8	0.002	
4 PFAS: EPA Method 537.1			
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	0.005	See above for PFAS information.
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	0.006	
perfluorotetradecanoic acid (PFTA)	376-06-7	0.008	
perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.007	

1. CASRN - Chemical Abstracts Service Registry Number
2. MRL - Minimum Reporting Level

Figure 21 - UCMR 5 Contaminants List, PFAS Contaminants

State Water Resources Control Board PFAS General Monitoring Orders, 2020-2025

SWRCB Order **Exhibit Title**	**Internet URL Web Address**
2020 SWRCB General Order DW 2020-0003-DDW	https://www.waterboards.ca.gov/board_decisions/adopted_orders/drinking_water/2020/pfas_go_2020_0003_ddw/pfas_go_2020_0003_ddw.pdf
Exhibit A – List of Sources Subject to General Order No. DW 2020-0003-DDW (for DDW Section 5),	https://wqts.com/wp-content/uploads/2020/09/go_exhibit_a_section5.pdf
2021 SWRCB General Order DW-2021-0001-DDW	https://www.waterboards.ca.gov/board_decisions/adopted_orders/drinking_water/2021/pfas_go_2021_0001_ddw/a5.pdf
Exhibit A – List of Sources Subject to General Order No. DW 2021-0001-DDW (For DDW Section 5)	https://www.waterboards.ca.gov/board_decisions/adopted_orders/drinking_water/2021/pfas_go_2021_0001_ddw/a5.pdf
2022 Amended General Order DW 2022-0001-DDW	https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order/docs/amended-pfas-general-order-2022-final.pdf
Exhibit A – List of Sources Subject to General Order No. DW 2022-0001-DDW (Amended)	https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order/docs/pfas_go_2022-0001-DDW_ExhibitA.pdf
2025 SWRCB General Order DW 2025-0002-DDW	https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas_ddw_general_order/docs/order-dw-2025-0002-ddw-pfas-initial-monitoring.pdf
Exhibit A – List of Sources Subject to General Order DW 2025-0002-DDW	https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.waterboards.ca.gov%2Fdrinking_water%2Fcertlic%2Fdrinkingwater%2Fpfas_ddw_general_order%2Fdocs%2Forder-dw-2025-0002-ddw-exhibit-a.xlsx&wdOrigin=BROWSELINK

Figure 22 - SWRCB PFAS General Monitoring Orders Issued 2020 through 2025

State Water Resources Control Board General Monitoring Orders PFAS Constituents Lists

General Order No. DW 2020-0003-DDW

EXHIBIT B

CONSUMER CONFIDENCE REPORT DETECTION LEVELS (CCRDL)

	Constituent	CCRDL, ng/L
1	PERFLUOROBUTANESULFONIC ACID (PFBS)	4
2	PERFLUORONONANOIC ACID (PFNA)	4
3	PERFLUORODECANOIC ACID (PFDA)	4
4	PERFLUOROTETRADECANOIC ACID (PFTA)	4
5	HEXAFLUOROPROPYLENE OXIDE DIMER ACID (HFPO-DA)	4
6	4,8-DIOXA-3H-PERFLUORONONANOIC ACID (ADONA)	2
7	PERFLUOROHEPTANOIC ACID (PFHpA)	4
8	N-ETHYL PERFLUOROOCTANESULFONAMIDOACETIC ACID	4
9	PERFLUORODODECANOIC ACID (PFDoA)	4
10	PERFLUOROTRIDECANOIC ACID (PFTrDA)	4
11	9-CHLOROHEXADECAFLUORO-3-OXANONE-1-SULFONIC ACID	2
12	PERFLUOROOCTANE SULFONIC ACID (PFOS)	4
13	PERFLUOROHEXANE SULFONIC ACID (PFHxS)	4
14	N-METHYL PERFLUOROOCTANESULFONAMIDOACETIC ACID	4
15	PERFLUOROHEXANOIC ACID (PFHxA)	4
16	PERFLUOROUNDECANOIC ACID (PFUnA)	4
17	11-CHLOROEICOSAFLUORO-3-OXAUNDECANE-1-SULFONIC ACID	2
18	PERFLUOROOCTANOIC ACID (PFOA)	4

NOTES:

1. The CCRDL is based on a review of the reporting levels reported for monitoring conducted between August and December 2019. Specifically, the SWB calculated the CCRDL as the reporting level that was achievable in 90 percent of all negative result reported during that period. Results were rounded to the nearest whole number.
2. For HFPO-DA, the rounded CCRDL is lower than the 90th percentile of conveyed reporting levels based on consultation with the laboratory reporting the highest volume of results, and their statement that a reporting level of 4 ng/L (4 ppt) could readily be achieved.

Figure 23 - SWRCB General Monitoring Order 2020-0003-DDW, PFAS Constituents

General Order No. DW 2021-0001-DDW

EXHIBIT B

CONSUMER CONFIDENCE REPORT DETECTION LEVELS (CCRDL) and ADVISORY LEVELS

	Constituent	CCRDL[1], ng/L	Notification Level, ng/L	Response Level, ng/L	Exceedance Methodology[3]
1	PERFLUOROBUTANESULFONIC ACID (PFBS)[4]	4	-	-	-
2	PERFLUORONONANOIC ACID (PFNA)	4			
3	PERFLUORODECANOIC ACID (PFDA)	4			
4	PERFLUOROTETRADECANOIC ACID (PFTA)	4			
5	HEXAFLUOROPROPYLENE OXIDE DIMER ACID (HFPO-DA)[2]	4			
6	4,8-DIOXA-3H-PERFLUORONONANOIC ACID (ADONA)	2			
7	PERFLUOROHEPTANOIC ACID (PFHpA)	4			
8	N-ETHYL PERFLUOROOCTANESULFONAMIDOACETIC ACID	4			
9	PERFLUORODODECANOIC ACID (PFDoA)	4			
10	PERFLUOROTRIDECANOIC ACID (PFTrDA)	4			
11	9-CHLOROHEXADECAFLUORO-3-OXANONE-1-SULFONIC ACID	2			
12	PERFLUOROOCTANE SULFONIC ACID (PFOS)	4	6.5	40	QRAA
13	PERFLUOROHEXANE SULFONIC ACID (PFHxS)	4			
14	N-METHYL PERFLUOROOCTANESULFONAMIDOACETIC ACID	4			
15	PERFLUOROHEXANOIC ACID (PFHxA)	4			
16	PERFLUOROUNDECANOIC ACID (PFUnA)	4			
17	11-CHLOROEICOSAFLUORO-3-OXAUNDECANE-1-SULFONIC ACID	2			
18	PERFLUOROOCTANOIC ACID (PFOA)	4	5.1	10	QRAA

Figure 24 - SWRCB General Monitoring Order 2021-0001-DDW, PFAS Constituents

Order DW-2022-0001-DDW (Amended)

Exhibit B - CONSUMER CONFIDENCE REPORT INFORMATION AND NOTIFICATION AND RESPONSE LEVELS

Table 1 - Consumer Confidence Report Detection Levels (CCRDL) – EPA Method 533

Constituent	CCRDL (ng/L)	U.S. EPA MCL (ng/L)
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorodecane sulfonic acid (8:2FTS)	5.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorohexane sulfonic acid (4:2FTS)	2.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorooctane sulfonic acid (6:2FTS)	5.0	--
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2.0	--
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	2.0	--
hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	2.0	10
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	2.0	--
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	2.0	--
perfluoro-3-methoxypropanoic acid (PFMPA)	2.0	--
perfluoro-4-methoxybutanoic acid (PFMBA)	2.0	--
perfluorobutanesulfonic acid (PFBS)	2.0	--
perfluorobutanoic acid (PFBA)	2.0	--
perfluorodecanoic acid (PFDA)	2.0	--
perfluorododecanoic acid (PFDoA)	2.0	--
perfluoroheptanesulfonic acid (PFHpS)	2.0	--
perfluoroheptanoic acid (PFHpA)	2.0	--
perfluorohexanesulfonic acid (PFHxS)	2.0	10
perfluorohexanoic acid (PFHxA)	2.0	--
perfluorononanoic acid (PFNA)	2.0	10
perfluorooctanesulfonic acid (PFOS)	2.0	4.0
perfluorooctanoic acid (PFOA)	2.0	4.0
perfluoropentanesulfonic acid (PFPeS)	2.0	--
perfluoropentanoic acid (PFPeA)	2.0	--
perfluoroundecanoic acid (PFUnA)	2.0	--

Figure 25 - SWRCB General Monitoring Order 2022-0001-DDW, PFAS Constituents

Order DW-2025-0002-DDW

Exhibit B - CONSUMER CONFIDENCE REPORT INFORMATION AND NOTIFICATION AND RESPONSE LEVELS

Table 1 - Consumer Confidence Report Detection Levels (CCRDL)

Constituent	CCRDL (ng/L)	U.S. EPA MCL (ng/L)
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorodecane sulfonic acid (8:2FTS)	5.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorohexane sulfonic acid (4:2FTS)	2.0	--
1*H*,1*H*, 2*H*, 2*H*-perfluorooctane sulfonic acid (6:2FTS)	5.0	--
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2.0	--
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	2.0	--
hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	2.0	10
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	2.0	--
perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	2.0	--
perfluoro-3-methoxypropanoic acid (PFMPA)	2.0	--
perfluoro-4-methoxybutanoic acid (PFMBA)	2.0	--
perfluorobutanesulfonic acid (PFBS)	2.0	--
perfluorobutanoic acid (PFBA)	2.0	--
perfluorodecanoic acid (PFDA)	2.0	--
perfluorododecanoic acid (PFDoA)	2.0	--
perfluoroheptanesulfonic acid (PFHpS)	2.0	--
perfluoroheptanoic acid (PFHpA)	2.0	--
perfluorohexanesulfonic acid (PFHxS)	2.0	10
perfluorohexanoic acid (PFHxA)	2.0	--
perfluorononanoic acid (PFNA)	2.0	10
perfluorooctanesulfonic acid (PFOS)	2.0	4.0
perfluorooctanoic acid (PFOA)	2.0	4.0
perfluoropentanesulfonic acid (PFPeS)	2.0	--
perfluoropentanoic acid (PFPeA)	2.0	--
perfluoroundecanoic acid (PFUnA)	2.0	--
n-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSSA)	5.0	--
n-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSSA)	5.0	--
perfluorotetradecanoic acid (PFTA)	2.0	--
perfluorotridecanoic acid (PFTrDA)	2.0	--

Figure 26 - SWRCB General Monitoring Order 2025-0002-DDW, PFAS Constituents

Appendix B

Eight Content Requirements of a CCR

- ***Item 1*: Water System Information** – Name/phone number of a contact person; information on public participation opportunities.
- ***Item 2*: Source(s) of Water**.
- ***Item 3*: Definitions** – Maximum Contaminant Level (MCL); MCL Goal (MCLG); Treatment Technique (TT); Action Level (AL); Maximum Residual Disinfectant Level (MRDL); MRDL Goal (MRDLG).
- ***Item 4*: Detected Contaminants** – A table summarizing reported concentrations and relevant MCLs and MCLGs or MRDLs and MRDLGs; known source of detected contaminants; health effects language.
- ***Item 5*: Information on Monitoring for *Cryptosporidium*, Radon, and Other Contaminants** (if detected).
- ***Item 6*: Compliance with Other Drinking Water Regulations** (any violations and Ground Water Rule [GWR] special notices).
- ***Item 7*: Variances and Exemptions** (if applicable).
- ***Item 8*: Required Educational Information** – Explanation of contaminants in drinking water and bottled water; information to vulnerable populations about *Cryptosporidium*; statements on nitrate, arsenic, and lead.

Optional Information

CWSs are not limited to providing only the required information in their CCR. CWSs may want to include:

- An explanation (or include a diagram of) the CWSs treatment processes.
- Source water protection efforts and/or water conservation tips.
- Costs of making the water safe to drink.
- A statement from the mayor or general manager.
- **Information to educate customers about**: Taste and odor issues, affiliations with programs such as the Partnership for Safe Water, opportunities for public participation, etc.

Communication Tips

- Provide a consistent message. Be as simple, truthful, and straightforward as possible. Avoid acronyms, initials, and jargon.
- Provide links to useful information resources.
- Limit wordiness – write short sentences and keep your paragraphs short.
- Assume that consumers will only read the top half of the notice or what can be read in 10 seconds.
- Display important elements in bold and/or large type in the top half of the notice.
- Do not make your text size too small.
- Give a draft of your CCR to relatives or friends who are not drinking water experts and ask them if it makes sense. Ask customers for their comments when you publish the CCR.
- Use graphics, photographs, maps, and drawings to illustrate your message. Do not distract from your main message with graphics and/or pictures that do not complement your message.
- Consider printing the CCR on recycled paper and taking other steps to make the CCR "environmentally friendly." If you hope to get your customers involved in protecting or conserving water, set a good example for them to follow.
- Use the CCR as an opportunity to tell your customers about all of the things that you are doing well.

Source: EPA

Figure 27 - EPA Eight Content Requirements of a Consumer Confidence Report