How SAWS is working to fix its 21 billion-gallon water loss problem

As it pushes its customers to conserve, the utility's water loss has jumped in recent years, in part due to drought and aging infrastructure.

By Liz Teitz, Staff writer July 13, 2024

When the San Antonio Water System pitched the Vista Ridge pipeline, the utility called it a “game-changing water project.”

SAWS officials promoted the $2.8 billion project as a crucial step to diversify and expand San Antonio’s water supply, and they hail it as a success. The 142-mile pipeline, which runs from Burleson County, brings more than 16 billion gallons of water per year into the SAWS’ system.

But as SAWS imports that immense amount of water, the city-owned utility is losing even more — 21 billion gallons per year — by way of leaks, breaks and other issues.

As the region remains locked in drought and San Antonio's population continues to grow, it has become increasingly crucial for SAWS to maximize the water it does have and reduce its need to find water from other sources.

Some critics and SAWS' own board say the utility has to do a better job of ensuring that less of its water pours onto the pavement or seeps into the ground from the system’s aging infrastructure — especially as SAWS is pushing its customers to cut back on outdoor watering and cracking down on violators of water use rules.

SAWS and City Council recently approved restrictions aimed at reducing water usage by 10% during droughts — but that comes as SAWS is losing more than 20% of its water intake.

"You've got double that in our own leaks in our system," SAWS trustee David McGee said at a June board meeting. "We do need to hold ourselves to the same high standard of not wasting water that our own ratepayers are dealing with as well. It's right there in front of us."

SAWS officials say they have already made reducing water loss a priority, with plans to spend more than $500 million over the next five years to replace mains and increase staffing to repair pipes, among other efforts.

“Reducing losses from the SAWS system has risen in priority with new initiatives reaching across departments and staff,” the utility’s recently approved conservation plan says.

How San Antonio stacks up

A 2022 report from the Texas Living Waters Project and the National Wildlife Foundation found that across the state, water systems lose at least 572,000 acre-feet per year — enough to meet the total annual water needs of Austin, Fort Worth, El Paso, Laredo and Lubbock combined. One acre-foot is enough water to cover 1 acre in 1 foot of water.

Texas utilities lose an average of 51 gallons of water per service connection each day, the report found. Large utilities like SAWS that serve more than 100,000 people tend to lose even more, with an average loss of 55 gallons per connection per day, the report said.

Of the 91 billion gallons that entered the SAWS distribution system last year, more than 20% was not sold to customers, something that is referred to in the industry as “nonrevenue water.” While some of that is accounted for by firefighting, mandatory line flushing and other factors, most of it — 19 billion gallons — is the result of “real losses” from breaks and leaks in the system.

Dallas Water Utilities reported real losses of 17.6 billion gallons, while Austin Water lost about 7 billion and Fort Worth 5.9 billion. Those numbers were reported in water loss audits, which utilities are required to submit annually to the Texas Water Development Board. The 2023 reports have not yet been reviewed by the board, so they could be subject to corrections.

Sorting out how SAWS' water loss stacks up against those systems is complicated because utilities can vary widely in how they are constructed and how they operate.

San Antonio and Dallas, for example, have similar populations within their city limits — about 1.5 million residents in San Antonio and 1.3 million in Dallas, according to the Census Bureau — but their water utilities operate very differently.

According to its audit, SAWS serves a retail population of more than 2 million people and about 22,000 people by wholesale — meaning that SAWS provides water to another system for it to distribute. Dallas Water serves a population of about 2.6 million, but half are served through wholesale water sales to more than 20 nearby cities. That setup means the water losses in those smaller cities are tallied by those municipalities, not by Dallas, while nearly all water loss in San Antonio is attributed to SAWS.

That adds up to big differences in the number of service connections, which are individual connections to water main lines. SAWS served about 875,000 service connections in 2023, which was 22,000 more than the year before. Dallas had about 340,000 connections last year, a number that increased by only 1,000 year over year. Austin Water, which serves the state's fourth-largest city, has about 252,000 connections.

Every connection is a potential spot where leaks and loss could occur. Each connection is also opportunity for meter error, although SAWS officials say they expect that the number of meter errors will be improved by its new electronic meters, which are currently being deployed.

Last year, SAWS lost about 61 gallons per connection per day, according to its water loss audit. Fort Worth Water lost just under 51 gallons, while El Paso Water, which serves about 222,000 connections, lost 59 gallons. The city of Houston reported losing 73 gallons per connection per day and Austin 77 gallons, while Dallas topped the list at 142 gallons, according to their audits.

SAWS typically discusses water usage in terms of gallons per capita per day, or GPCD, which describes how much water is used daily per person within its service area. In 2023, SAWS lost 28 gallons per person per day, which was the highest since at least 2014, according to the conservation plan. Dallas and Houston both reported losing 37 gallons per person day.

The increase came as SAWS' overall water consumption also spiked over the past two years, though it still reported the lowest GPCD of the state's six largest cities.

'A very complicated situation for SAWS'

While SAWS' water loss issues are not unique, some of the issues the system faces are very different from those in other large Texas cities.

SAWS differs from its counterparts in the structure of its system, the variety of its water sources and the challenges presented by San Antonio's geography.

SAWS has almost 7,800 miles of water main lines, enough that if they were laid out end to end, they'd stretch from San Antonio to New Zealand. That's more than Houston, which reported about 7,200 miles. More miles of pipe mean more potential chances for leaks, along with increased maintenance and replacement work demands.

Some of that infrastructure is approaching the end of its lifespan, including cast-iron and cement pipes that are 50 to 60 years old, said Carlos Mendoza, SAWS' vice president of distribution and collection operations.

SAWS also brings in water from 13 water supply projects from seven sources, making the system more complex. While more than half of SAWS water comes from the Edwards Aquifer, supply is also brought in from parts of the Trinity Aquifer, the Carrizo Aquifer and the Simsboro Aquifer, by way of the Vista Ridge pipeline. The utility also has a desalination plant to treat and distribute brackish water, has an aquifer storage and recovery facility that provides water and supplies a small amount of surface water from Canyon Lake.

About 90% of SAWS' water supply is groundwater, which is drawn by almost 200 wells, each creating an opportunity for leaks, data errors or other issues.

The system isn't centralized — so water from multiple sources doesn't come together in one location. Instead, different parts of the city receive water from different sources.

The diverse water sources are a strength for the system, Vice President of Conservation Karen Guz said, because it makes SAWS more resilient to issues with one particular water source. But it also makes water loss analysis more complicated, she said.

Other large Texas utilities have fewer sources: Austin Water has three treatment plants pulling water from the Colorado River, while Dallas Water Utility gets drinking water from six lakes.

With dozens of intake points, SAWS has more opportunities for leaks. Each well also has its own meter, which is a place for potential error, said Jeff Haby, senior vice president for production.

"Measuring water can be done very accurately, but there is some error in every meter," he said. "The more meters there are, the more potential errors."

San Antonio's geography and topography also can play a role in water loss.

Within SAWS' service area, the elevation varies by about 1,400 feet from the lowest to highest points. While utilities in flatter cities can run at similar pressure throughout the system, SAWS has about four dozen different pressure zones, Haby said, where water is moving through the system with different amounts of force. Moving water from a lower elevation to a higher elevation requires more water pressure at the bottom of the hill — and more water pressure means more potential for leakage, because it stresses pipes.

And then there's the ground itself, which presents its own problems. Parts of the city have heavy clay soil, which dries and contracts during drought. That shifts the pipes that sit in underground trenches and causes breaks. That's why some areas seem more susceptible to breaks than others, such as the Northeast Side, with its clay soils, as well as the far South Side, which has sandy ground.

Other areas, such as the Northwest Side, sit on rock, which isn't free from issues. Water leaks might not show up on the surface there, instead seeping into the porous stone, making it harder to detect them, Haby said.

"All of that," he said, "creates a very complicated situation for SAWS."

Questions from customers, council

SAWS' water loss has increased over the past decade, according to records from the Texas Water Development Board. In 2013, it reported losing 43.4 gallons per connection per day, 18 gallons less than it reported a decade later. It has surged over the past two years, which the utility attributes to the record-breaking heat and prolonged drought, because of dry, shifting ground and increased demand for water.

About one-third of the increase in SAWS' daily per capita usage in recent years is related to nonrevenue water, conservation manager Chelsea Hawkins recently told the SAWS board.

As the utility tries to drive down overall usage and calls on residents to use less water, that's increasingly come under scrutiny.

"Reducing use from individual account holders as part of these plans is important, but the real issue that needs immediate attention is nonrevenue water," said Joe Yakubik, a former member of the utility's Rate Advisory

Committee. Speaking during the public comment portion of the utility's May 7 board meeting, he urged trustees to prioritize addressing leaks.

"Leaks are SAWS' largest growing customer class and have been rising steadily and uninterrupted for over 20 years," he told the board of trustees. "I wonder if SAWS has overemphasized production at the detriment of conservation."

While City Council was supportive of SAWS' recent proposed changes, two council members questioned the utility about water loss and proactive plans to prevent leaks at a meeting in June before voting to approve them.

Council Member Melissa Cabello Havrda asked for more information about the utility's plans to replace aging infrastructure, while Council Member Marina Alderete Gavito asked about how SAWS responds to leaks.

"We see a lot of (breaks) in District 7. Last summer, there was a huge one next to Jefferson High School and Wilson (Boulevard) was flooded for blocks," Alderete Gavito said. She asked if current and future investments by the utility would help cut response times from weeks to days.

Donovan Burton, senior vice president for water resources and governmental relations, said SAWS has an asset management team tasked with looking at the conditions of water mains to help prioritize replacements and that the utility tries to align its work with city construction projects when possible.

Replacing those pipes will help prevent breaks in the future, said CEO and President Robert Puente, and the utility also changed working hours this summer to speed up crews' responses.

'A top priority for SAWS'

Puente says the utility has been working to address water loss for years, well before members of the public starting paying attention.

"The question for me is, really, why now is the public interested in this?" he said. Puente said some of the additional focus has come from the SAWS board and City Council, which have spoken up about water loss and supported adding resources and staffing to reduce it.

"I thank the public for getting on board with this and helping us move it forward," he said.

But the utility's own conservation plan, a document required by state law, highlights how it has placed a spotlight on water loss, listing "make reduction of SAWS water losses a top priority for SAWS" as a conservation strategy.

The document outlines several steps SAWS is taking to do that, including increasing staffing and spending.

Over the next five years, SAWS plans to spend at least $549 million on replacing water mains, the conservation plan said, and staff members are looking for ways to increase that number. That's a major increase: From 2019 to 2023, the utility was spending about $68 million per year on main replacements, Burton said. That jumped to $99 million in 2024, and the 2025 draft budget calls for $129 million, he said.

"That's how serious we are about this particular problem," Burton said. Some of that money will come from growth to the system, he said. As the city's population grows, so does SAWS' customer base and its revenue.

Other funds are being freed up as SAWS nears completion of projects required under the Environmental Protection Agency's consent decree, a decadelong, $1.2 billion effort to reduce sewer spills.

In 2013, the utility reached an agreement with the federal government to make upgrades and repairs to its sewage system and to pay a $2.6 million penalty for Clean Water Act violations. SAWS had more than 2,000 illegal sewer overflows from 2006 to 2012, according to the Justice Department, discharging about 23 million gallons of raw sewage into waterways.

The consent decree required SAWS to increase capacity, conduct systemwide cleaning and implement a maintenance program to reduce those overflows, and it required work to be completed by 2025. Houston is under a similar consent decree, which was approved in 2021 after years of negotiation and expected to cost $2 billion.

Haby led the consent decree work and will now lead the water loss initiative.

In 2022 and 2023, the utility added 50 employees to improve response time to breaks, and contractors have been hired to supplement SAWS staff. Those numbers will continue to rise: "Approval was given to increase crews more in both 2024 and 2025," the plan said.

SAWS is also trying to improve retention among those employees, in part through safety measures for high heat, and creating "more growth opportunities for these roles."

The utility already has a team tasked with proactive leak detection, using technology to identify and repair leaks before they surface as large breaks. In 2026, that team is expected to double from seven to 15, according to the plan.

Those are starting points for SAWS, the plan said.

"SAWS leadership recognizes that water losses experienced during the past two years are not acceptable. With this in mind the SAWS Water Loss
Plan will be updated to determine what investments will be needed to avoid a similar challenge during future drought periods."

Puente said it's not feasible to eliminate water loss completely, the same way the city will never be able to eliminate potholes. It will be a years-long effort to reduce it, then more work to maintain that, he said.

"We're going to play catch-up for a while," Puente said. "But once we get there, you will see the numbers driven down."

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