ORANGE COUNTY, CA

MWDOC's Leak Detection Support Program: Boosting Regional Efficiency and Affordability

Many water utilities across the United States rely on reactive leak detection, repairing leaks only after they become apparent. This approach can lead to higher production costs, higher energy use, and costly emergency repairs, all of which can lead to higher customer bills. The Municipal Water District of Orange County (MWDOC) takes a different approach. Its coordinated, proactive leak detection program intercepts water losses early, preventing waste, safeguarding revenue, and supporting stable, fair rates for communities across Orange County. Through this resource-sharing model, MWDOC pools funding, standardizes data collection, and deploys skilled field staff to deliver high-impact leak detection services that are accessible to agencies of all sizes, from large urban systems to small cities with limited crews.

Utility Snapshot

Location: Orange County, CA

Utilities Served: 27 member agencies

Population Served: ~3.2 million residents

Utility Structure: MWDOC is a regional wholesale provider that supports the county's retail agencies with both water and technical services.

Water Sources: MWDOC imports water exclusively from the Metropolitan Water District of Southern California

Water Availability: Chronic drought risk

Background

For many years, leak detection was not widely viewed as a strategic utility practice in California. Instead, most agencies prioritized emergency response, relying on calls from customers or staff to identify and repair surfacing leaks. This approach left hidden leaks undetected, sometimes for years. The result was a steady drip of non-revenue water loss that increased wholesale water purchases and operating costs.

Recognizing the need for a more proactive approach to water loss control, MWDOC launched a technical assistance program in 2015. This effort was initiated in anticipation of a new state requirement for urban water suppliers to perform annual validated water audits. The goal was not only to help agencies meet state-issued compliance requirements, but also to strengthen the operational efficiency that underpins long-term rate stability. The program equipped member agencies with the tools and training needed to complete high-quality audits, supported by contracted specialists. The program offered a suite of technical assistance options to improve data accuracy and reliability—key inputs for managing costs and avoiding unnecessary expenditures.

Implementing a Leak Detection Program

It became clear over time that many agencies needed more support to meaningfully reduce water loss. While MWDOC's lending library made acoustic equipment available, many agencies lacked staff capacity or technical experience to use it effectively. Leak detection work is nuanced: it demands not only the right tools, but also field intuition, calibrated listening skills, and the discipline to revisit suspect locations multiple times with different instruments. For smaller agencies with limited crews, sustaining that level of focus in-house was impractical. Compounding these challenges was a lack of consistent data integration. Leak detection efforts, when undertaken, often went untracked or were recorded in inconsistent formats, undermining the ability to quantify savings or inform capital planning.

MWDOC recognized that unrepaired leaks meant higher wholesale purchases and operating costs, which are eventually passed on to customers. In response, MWDOC hired its first full-time field technicians in 2019, and they began offering direct leak detection surveys, shifting from a coordination role to hands-on service delivery. By taking on the technical heavy lifting, MWDOC enabled agencies of all sizes to address hidden leaks earlier, capture cost savings, and keep customer rates more stable.

As of 2026, the district employs three full-time leak detection technicians who collectively walk more than 1,500 miles of pipeline each year. These technicians use a combination of acoustic listening equipment, including correlating loggers and headsets, to identify hidden leaks in member agency systems.

Participation is voluntary and structured around agency-defined mileage requests. Agencies sign up for a specified number of miles, typically 30 to 150 per year, and provide GIS shapefiles of the segments they want surveyed. MWDOC technicians then conduct field surveys, verify suspected leaks, and compile findings in weekly reports.

Each leak is geotagged using Esri's Survey123 platform, allowing agencies to view results spatially and prioritize repairs. Technicians also quantify leak flow rates. These flow rates are combined with standard runtime estimates to calculate water savings, avoided production costs, and energy savings.

Photo courtesy of MWDOC: MWDOC Employee using acoustic listening equipment to identify leaks

The program is built on a cost-sharing model that keeps participation affordable. For FY 2025-2026, economies of scale bring the base cost to $315 per mile, then a subsidy from the Metropolitan Water District buys it down to $145 for member agencies. The fee covers technician time, equipment, and data reporting. This pricing model keeps high-skill leak detection accessible even to small agencies without requiring them to build their own programs.

How the Leak Detection Program Works

The operational flow of the program is designed for both scalability and precision:

1. **Agencies submit GIS shapefiles** for the pipeline segments they wish to survey.
2. **MWDOC technicians conduct acoustic surveys** by walking the identified areas.
3. **Suspected leaks are verified through re-visits** and cross-checks with multiple instruments.
4. **When feasible, leaks are measured** for flow rate.
5. **Weekly reports summarize findings** by location, type, and estimated flow rate. Agencies are responsible for completing repairs and reporting back, enabling final savings calculations.

This repeatable structure has allowed MWDOC to maintain a high leak confirmation rate—over 90 percent—while generating consistent savings year over year.

Innovative Strategies for Affordability and Performance

To build credibility and counter perceptions that leak detection is just routine maintenance, MWDOC delivers clear, verified savings data and showcases success stories at member meetings and public forums. Together, these efforts have helped shift leak detection from an occasional task to an embedded, trusted part of utility operations across the county.

Several elements have contributed to the program's strong uptake and sustained performance:

- **Full-time field staff for consistent quality**. Employing dedicated technicians ensures consistent, high-quality results across all participating agencies. Their expertise allows accurate leak identification and builds trust in the program's findings.
- **Workforce development.** Retaining skilled technicians has proven critical, as much of the program's success depends on field intuition and consistency. Acoustic leak detection is physically demanding and technically nuanced, and not all candidates are well-suited for the work. MWDOC addresses these workforce limitations through ongoing recruitment from Santiago Canyon College's water utility program and structured on-the-job training that pairs new hires with experienced technicians.
- **Affordability and flexibility**. With a per-mile cost well below market rates, even small cities like La Palma (with only 39 miles of pipe) have participated consistently. Large agencies such as Santa Margarita Water District have also opted in after successful pilots, underscoring the program's value across agency sizes.

- **Culture of shared learning.** Regular workshops, elected official briefings, and peer-to-peer exchanges have shifted leak detection from a routine operations task to a recognized strategic investment.
- **Integrated data tools.** GIS and Survey123 provide a clear, shared record of leak locations, repair status, and quantified benefits—helping agencies justify investments and inform long-term planning.
- **Making repairs and quantifying savings.** Technicians rely on agencies to report back on completed repairs to quantify savings. MWDOC has streamlined reporting and follow-up by delivering leak data in GIS formats compatible with agency systems, making it easier for members to schedule and document repairs.
- **Building trust with agencies.** Because most leaks detected through this program are not visible to the eye, verifying their location requires careful judgment and multiple visits using different instruments. This process demands high levels of communication and trust between MWDOC and its member agencies. Building that trust was critical to embedding leak detection as a core part of utility operations.

> As MWDOC's Water Loss Control Programs Supervisor explains: "We are pointing at a street that is perfectly dry and looks to be pristine, and we're saying there's a leak under there—dig here. And that does take a lot of trust and a good working relationship."

Another success factor is the program's visibility in the community. MWDOC's technicians are one of the few direct points of contact the regional agency has with the public because they are visible in the communities inspecting meters and walking distribution lines. Curious residents often stop to ask what the technicians are doing, creating organic opportunities to raise awareness about proactive water management. These encounters are strengthened by providing agency contact information or pre-approved handouts, turning everyday interactions into moments of community trust-building and education.

Project Outcomes

From FY 2019 through FY 2025, MWDOC's program has delivered measurable, cumulative impacts:

- **8,270 miles** of water mains surveyed
- **4,296 leaks** detected
- **1,145 acre-feet** of annual water savings

These savings translate into tangible operational and financial benefits:

- **Operational Efficiencies**: Reduced emergency repairs and overtime labor; fewer main breaks under high-risk areas like newly paved streets or coastal bluffs.
- **Capital Planning**: Early detection allows agencies to extend the life of aging mains and defer costly replacements, providing budgetary flexibility and long-term rate stability.

- **Affordability and Access**: The low per-mile cost and pay-as-you-go structure ensure that even the smallest agencies can participate.
- **Community-Level Impact**: Documented savings help agencies justify continued investment, stabilize operational budgets, and limit future rate increases.

Acknowledgements and Disclaimer

EPA's Water Finance Center developed this case study in collaboration with MWDOC as part of EPA's work to highlight innovative ways that utilities are addressing water affordability challenges. This document is intended to be solely informational. EPA is not endorsing any specific strategy presented. EPA's Water Finance Center would like to thank MWDOC for providing information and images for this case study.

Learn More

To explore the program further, visit MWDOC's Water Loss Control webpage.

To read more case studies and learn about EPA's water affordability work, visit Water Affordability | US EPA.