

# Tracking groundwater pollution to its source

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Computer algorithms might be useful in identifying sources of groundwater pollution, according to researchers in Australia and India. Writing in the *International Journal of Environment and Waste Management* they explain how notoriously difficult it is to trace such pollution.

Groundwater is a major and economical source of drinking water for both urban and rural areas. Although groundwater represents a small percentage of the total water distribution across the globe, it is the largest available reservoir of freshwater. Available fresh water amounts to less than one half of 1% of all the water on earth. However, the subsurface is also the principal receptacle for increasing volumes of human and industrial waste. As [global consumption](#) of water is doubling every 20 years, more than twice the rate of human population growth, the issue of pollution of groundwater is a growing problem.

[Groundwater pollution](#) occurs from different anthropogenic sources such as leakage from underground storage tanks and chemical and waste depositories, leakage from hazardous waste dump sites, sewers, liquid effluent and process lagoons, soak pits and accidental discharge, explain Ravi Naidu of the Centre for [Environmental Risk Assessment](#) and Remediation, at the University of South Australia and colleagues. "Remediation of these contaminated sites requires the optimal decision-making system so that the remediation is done in a cost-effective and efficient manner," the researchers say. "Identification of unknown pollution sources plays an important role in remediation and containment of contaminant plume in a hazardous site."

They point out that reliable and accurate estimation of unknown groundwater [pollution sources](#) remains a challenge because of the uncertainties involved and the lack of adequate observation data in most cases. The non-unique nature of the identification results is also an issue in finding the original source of a pollutant. They have tested the validity of different optimization algorithms including a genetic algorithm, an artificial neural network and simulated annealing and hybrid methods. All of these methods essentially process available data including pollutant concentrations and how these change over time and any monitoring data to home in on a potential source. The benefit of using such algorithms is that as more information becomes available another iteration will take investigators closer to the source.

**More information:** "Optimisation approach for pollution source identification in groundwater: an overview" in *Int. J. Environment and Waste Management*, 2011, 8, 40-61

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