The recent axing of five of the six senior scientists charged with protecting the health and safety of Sydney's drinking water has understandably created concerns.

This follows last year's merger of the New South Wales State Water Corporation and the Sydney Catchment Authority, creating a single body called WaterNSW to oversee water for the entire state. Later in the year the newly created agency suffered around 80 job cuts.

Domestic water supply systems are generally managed in ways that eliminate or reduce any possible risk to water quality. It appears to be problematic that the new agency loses its specific focus on Sydney's water supply at the same time that it loses its most knowledgeable and experienced staff.

Water big deal

Sydney has Australia's biggest and most complex domestic water supply network. In 2013-14 the city's 4.5 million inhabitants used 536,607 million litres of water – roughly equivalent to an Olympic swimming pool of water every hour.

The challenge of supplying the greater Sydney population with clean, safe and reliable water has not always been met. In 1998, Sydneysiders were forced to boil their drinking water when the network was infected with Cryptosporidium and Giardia , after heavy rains washed these chlorine-resistant parasites into the water supply.

The pathogens were detected and nobody became seriously ill. Nevertheless the incident was a great embarrassment for the state government and tarnished Sydney Water's coveted reputation for water cleanliness and safety.

The subsequent inquiry recommended that the catchments and water supply infrastructure become the responsibility of a separate agency, leading to the creation of the

Sydney Catchment Authority (SCA)
in 1999.

Science plan

The inquiry also pointed to a lack of scientific certainty about the sources of water supply contaminants, and how they should be dealt with. So the SCA developed an in-house team of scientists, and commissioned others from CSIRO and universities, to gather the expertise needed to provide safe and reliable water in the face of factors such as droughts, deluges, pollution and pathogens.

This scientific effort was no mean feat, given the size of Sydney's water infrastructure and the SCA's modest workforce of fewer than 300 staff. Sydney's catchments collect water from an area covering 16,000 square km of land west and south of the city. The water is stored in 21 dams, including the massive Warragamba Dam . These are linked to consumers by a complex array of pipelines, tunnels and other infrastructure.

What's more, the catchments themselves are extensively developed. More than 100,000 people (and many domesticated animals) live in the region. Towns such as Katoomba, Lithgow, Goulburn, Moss Vale, Bowral and Berrima all discharge their treated sewage waste into catchment waterways.

As a result, Sydney's water catchments have many potential sources of pathogens, including those from human and animal waste. A crucial part of the SCA's research was to determine which of these contaminants poses a serious threat to humans.

The scientific research improved routine operational monitoring of the effectiveness of the multiple barriers that protect the quality of the water from the headwaters of the catchment through various storages, filtration and treatment systems, to the reticulated network of pipes to the consumer.

The SCA science team has undertaken and published some of the world's most thorough research on the effects of subsidence from coal mining and its impacts on surface waters, such as Waratah Rivulet , an important waterway that feeds the Woranora Dam .

The research thoroughly documents the changes in surface water flows and chemistry as the mine subsidence fractures the sandstone strata. The freshly fractured sandstone “captures” some or all of the stream flow and a complex array of chemical reactions occur, resulting in increased salinity and concentrations of metals zinc, nickel and cobalt. It is less clear how mining was able to inflict such environmental damage in such well-protected catchments.

Other sources of catchment water pollution received less attention from the SCA scientists even though coal mining in Sydney’s water catchments continues to generate considerable community concern. One example is Springvale Colliery in the Warragamba catchment near Lithgow. The mine has just been extended despite having been identified as the largest source of salinity in the Coxs River catchment, the second-biggest waterway that flows into Warragamba Dam.

Financial flows

Although the SCA was a government agency, it earned revenues of just over A$200 million in 2013-14 by selling water to its customers, principally Sydney Water. Rather than costing the NSW government money, it paid the state a dividend of A$27.9 million in 2013-14.

It remains to be seen whether WaterNSW, with its significantly smaller scientific team, can continue this vital research to protect Sydney’s catchments and infrastructure. I expect that its biggest customer, Sydney Water, and NSW Health will demand that rigorous scientific standards continue to be upheld.

In its previous incarnation, the Sydney Catchment Authority had as its motto “Healthy catchments, quality water – always”. It’s an important principle to uphold, and regional areas could benefit if this guiding principle pervades WaterNSW’s operations across the state. It needs to ensure that the high standards that protected Sydneysiders' water are not sacrificed.

Ian Wright has previously worked as a scientist with Sydney Water and the Sydney Catchment Authority.

Read more http://theconversation.com/cuts-to-waternsws-science-staff-will-put-sydneys-water

-quality-at-risk-55313