Submission No 10

INQUIRY INTO INQUIRY INTO PFAS CONTAMINATION IN WATERWAYS AND DRINKING WATER SUPPLIES THROUGHOUT NEW SOUTH WALES

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Inquiry into PFAS contamination in waterways and drinking water supplies throughout New South Wales.
Parliament of New South Wales

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My submission addresses several aspects of the Inquiry's terms of reference.

Heightened community concern about PFAS emerged in 2024. This was triggered by (1) tightening of USEPA guidance on safe levels of PFAS in drinking water coupled with (2) media articles revealing that Australian water supplies have recorded elevated PFAS concentrations.

A Fairfax newspaper article by investigative journalist Carrie Fellner 'There's no safe level: Carcinogens-Found in Tap Water across Australia' was published on 11 June 2024. It reported that potentially unsafe levels of PFAS "forever chemicals" had been detected in drinking water supplies around Australia. These include human-made chemicals: perfluorooctane sulfonate (known as PFOS) and perflurooctanic acid (PFOA). Both are classed under the broader category of per- and polyfluoroalkyl substances or PFAS chemicals. Many of the water supply results in this article were uncovered by Carrie Fellner's investigation and were not widely known.

Over the following days and weeks this article itself released a chain reaction of several other media stories and widespread debate about the presence and health risks of PFAS chemicals in Australian drinking water supplies. Dr Kerry Chant, the NSW Chief Health Officer, declared on the ABC PM program on 11 June that Sydney's drinking water was safe (https://www.abc.net.au/listen/programs/pm/concerns-over-toxic-chemicals-in-tapwater/103965754). In my view, there was insufficient PFAS monitoring data to make a detailed assessment of PFAS in Sydney's water supply. As Carrie Fellner's article pointed, at that time Sydney Water only routinely monitored one location (North Richmond water treatment plant) across their drinking water network.

A number of weeks earlier (in April 2024) the US Environmental Protection Agency (USEPA) had sent shock waves through the global water industry when it announced much stricter advice on safe levels of PFAS in US drinking water. Their updated advice reduced limits considered safe in drinking water supplies

to zero and gave the water industry five years to meet legally enforceable limits of 4 parts per trillion (equivalent to 4 nanograms per litre). This new USEPA guideline reflected the analytical limits of detection.

Assurances that drinking water was safe were often made in the absence of PFAS tests

Assurances that drinking water was safe were often made in the absence of PFAS testing data that was available to the public. It is unclear how many water samples had been tested in Sydney's or other NSW drinking water supply systems. It is possible that assurances that PFAS levels were safe had been made in the absence of testing results.

Sydney Water made a statement to ABC Sydney Radio (broadcast 15 June 2024):

> ***"Sydney Water regularly consults with WaterNSW and NSW Health to assess any potential risk to Sydney's drinking water supply. There are no known PFAS hotspots in our drinking water catchments. All of Sydney's drinking water meets the strict Australian Drinking Water Guidelines."***
>
> ***https://www.abc.net.au/listen/programs/sydney-saturdaybreakfast/pfas-water-testing-wright/103982302***

I found this statement by Sydney Water to be alarming, as PFAS results from samples collected at their North Richmond water supply were already known to have elevated PFAS concentrations. This water supply extracts water from the Hawkesbury-Nepean River and is located within 5 km of the Richmond RAAF base which was known to be a PFAS-contaminated site.

In addition, my PhD research student Katherine Warwick's research (photo below) had recently published her research that documented elevated PFAS in the liver tissue collected from the body of a dead platypus collected from Wingecarribee River at Berrima, in Sydney's Warragamba drinking water catchment (https://www.abc.net.au/news/2024-08-20/australia-forever-chemicals-pfas-drinking-water-platypus/104244072). The Warragamba reservoir supplies Sydney with 80 to 90% of its drinking water supply.

Hazardous concentrations of PFAS force closure of Blue Mountain water supply

In August 2024 it was announced that samples collected by Sydney Water at the Cascade water filtration plant in Blue Mountains contained substantial concentrations of PFAS. This was based on samples collected 25 June 2024 (https://www.sydneywater.com.au/water-the-environment/how-we-manage-sydneys-water/safe-drinking-water/water-analysis/pfas-and-drinking-water/pfas-monitoring-results.html)

Samples taken 25 June 2024

Water filtration plant	PFOS (µg/L)	PFHxS (µg/L)	PFOA (µg/L)
Cascade – Blackheath	0.0155	0.0136	< 0.0001
Cascade – Katoomba	0.0164	0.0142	< 0.0001
North Richmond	0.0011	0.0014	< 0.0001

ADWG values: PFOS + PFHxS = 0.070 µg/L, PFOA = 0.56 µg/L

Further information was later released by WaterNSW, who supply bulk untreated water to Sydney Water, that the PFAS contamination was traced back to two water supply reservoirs (Medlow Dam and Greaves Creek Dam) located between Blackheath and Katoomba (https://www.abc.net.au/news/2024-08-28/blue-mountains-dam-medlow-shut-pfas-chemicals/104282482). WaterNSW explained that: 'Investigation of the Blue Mountains dams and catchment commenced in July….' (https://www.waternsw.com.au/water-services/water-quality/pfas/blue-mountains-investigations).

In September 2024 I was asked by Fairfax journalists to conduct catchment water sampling, and organise PFAS testing, in the vicinity of the Blue Mountains storages, to investigate the possible location of PFAS contamination. I accompanied Fairfax and collected samples on 4 September and sampled a tributary of Adams Creek, near Fairlop Road in Medlow Bath. The site is within the water catchment and several hundred meters downstream from the Great Western Highway. The PFAS results for the water sample collected from slowly flowing in a drainage line, near Fairlop Rd are provided below. The combined PFHxS and PFOS concentration in this sample was 3700 nanograms per litre (ng/L). In comparison to the current Australian Drinking Water Guidelines (under 70 ng/L), the concentration of these two forms of PFAS exceeded the guidelines by more than 50 times. However, just the PFOS alone would exceed the new (draft) Australian and US guidelines (under 4 ng/L) by more than 500 times.

PFAS results (in ng/L) for water samples collected on 4/9/24 from near Fairlop Rd.

Sample location			PFHxS	PFOS	PFHxS+PFOS	Exceedance (Aust.) Should be <70 ng/L	Exceedance (USA) PFOS <4 ng/L
Fairlop Rd (drainage)		Site 1	1400	2300	3700	X50 times	X575 times

A later SMH article revealed that the creek I collected the sample from was likely to be affected by fire-fighting foam used to control a 1992 truck crash involving a burning petrol tanker. This occurred on the

Great Western Highway, near Medlow Bath (https://www.smh.com.au/national/new-forever-chemical-tests-zero-in-on-contamination-source-20241022-p5kkdj.html)

In my opinion, the 2024 Blue Mountains PFAS case study exposed the many inadequacies in management of NSW drinking water supplies. A major shortcoming is the lack of routine monitoring of drinking water supply systems, including their catchments, storages, water treatment facilities and reticulated water supply systems. It also exposed hollow reassurances that the actual concentrations of PFAS are safe as they complied with the current Australian Drinking Water Guidelines. However, the Blue Mountains water results exceeded the USEPA guidelines, particularly for PFOS. It is unknown how long the Blue Mountains water has contained such elevated PFAS.

In October 2024 the Australian Drinking Water Guidelines PFAS guidelines were revised. This was in the form of Draft Guidelines. The draft guidelines recommend several changes. In general, the new (draft) guidelines have reduced the recommended PFAS concentrations to much lower concentrations. In several, but not all, aspects this is consistent with the USEPA recommended PFAS levels.

According to the new (draft) guidelines the concentration of PFOS reported in Sydney Water's Cascade water filtration plant drinking water would exceed the new guidelines. (https://www.nhmrc.gov.au/health-advice/environmental-health/water/PFAS-review/draft-fact-sheet)

PFAS in Belubula River

In winter 2024 landholders along the Belubula River were concerned about large accumulations of foam that were appearing. Samples of the foam and river water were collected and sent to a commercial testing laboratory. Analytical results revealed that the foam contained an extraordinarily large and hazardous amount of PFAS mixed with metals. (https://www.abc.net.au/news/2024-08-14/farmers-pull-pfos-chemical-from-belubula-river-nsw-pfas/104193746)

PFAS-enriched accumulation of foam on Belubula River (2 August 2028).

https://www.abc.net.au/news/2024-08-14/farmers-pull-pfos-chemical-from-belubula-river-nsw-pfas/104193746

The Belubula River landholders and wider community are understandably concerned about the risks posed by river foam containing a mixture of concentrated PFAS and metals. I have collected my own samples and have prepared and submitted a scientific research paper on this PFAS foam and it is currently under review for publication (https://www.abc.net.au/news/2024-10-22/pfos-found-at-campsite-belubula-river-by-nsw-epa/104468976).

I detected PFAS in the water, sediment and also in the foam accumulating on the Belubula River surface and edges. PFAS was hyper-concentrating in the foam, compared to the concentration measured in the river sediment and water column. This also appeared to be happening with hyper-accumulation of metals.

Such an accumulation of PFOS in floating water foam is not unique to the Belubula River. A USA study documented PFOS foam collected from the natural environment (Schwichtenberg et al. 2020). That study analysed foam samples for PFAS from different locations around the perimeter of a small freshwater lake in

Michigan USA. PFOS was an abundant form of PFAS with concentrations in foam ranging from 2,300 - 97,000 µg/L, while concentrations in lake water ranged from 0 to 52 ng/L (Schwichtenberg et al. 2020). The hyperaccumulation is apparent from the PFOS enrichment factor. It is the concentration of PFOS in the foam compared to the PFAS concentration in lake water. The Michigan foam had PFOS 2830 times more concentrated than the PFOS in the lake water. In the Belubula River investigation the median PFOS concentration in Belubula River foam samples was 375,000 ng/L. This was 18,750 times greater than in Belubula water column (median 20 ng/L). In addition, metals in Belubula River foam were more abundant than in river water. The median copper concentration recorded in Belubula River water was 3 µg/l and was nearly 1000 times greater in Belubula River foam (median 2900 µg/L).

The Belubula River is a high conservation-value river that is protected under NSW Fisheries Management Act (1994) as part of the Lachlan River 'Endangered Ecological Community' and is an important Murray Cod and Platypus habitat. Australian river water quality guidelines recommend PFOS less than 9.1 ng/L for protection of 99% of aquatic species in high ecological-value river (ANZG, 2023). This was exceeded by the Belubula River PFOS water concentration (median 20 ng/L) by 2.1 times and the PFOS foam concentration (median 375,000 ng/L) by more than 41,000 times. This has adverse implications for aquatic ecosystem health for the Belubula River and adjoining lands.

Belubula River

An additional concern for agriculture is the impact of elevated PFAS on the rural community. This includes grazing of livestock which has been reported to be susceptible to PFAS contamination of their meat if their drinking water exceeds 3 ng/L (Mikkonen et al. 2023). It has also known that platypus are also vulnerable to PFOS bioaccumulation (Warwick et al., 2024).

#1. Knowledge about the presence and concentration of PFAS in NSW drinking water supply systems remains poorly understood.

Given that the human-health hazards posed by PFAS in drinking water have been well known for at least two decades it defies logic that the Australian water industry, and their government regulators, have been reluctant to comprehensively monitor PFAS in drinking water catchments, storages, water treatment plants and across reticulated water supply systems including customers taps.

This was demonstrated by Sydney Water, Australia's largest drinking water utility, making the following statement to ABC in June 2024:

> ***"Sydney Water regularly consults with WaterNSW and NSW Health to assess any potential risk to Sydney's drinking water supply. There are no known PFAS hotspots in our drinking water catchments. All of Sydney's drinking water meets the strict Australian Drinking Water Guidelines."***

https://www.abc.net.au/listen/programs/sydney-saturdaybreakfast/pfas-water-testing-wright/103982302

At the time that Sydney Water issued this statement I suggest that they did not have rigorous data to substantiate their claim. But perhaps it also prompted Sydney Water to urgently test all of their many water supplies. This resulted in detection of the Blue Mountains water supply PFAS contamination.

In August 2024 Sydney Water's website uploaded PFAS results for their Blue Mountains supplies that revealed that their earlier June statement '…*no known PFAS hotspots*' was incorrect.

It took very little effort to locate the PFAS hotspot in the Blue Mountains (Medlow Bath) catchment. I collected water samples on two occasions (September and October 2024) from a tributary of Adams Creek in Medlow Bath. It contained PFAS at concentrations that were about 50 times greater than the current Australian Drinking Water Guidelines recommend. Without any doubt it is obvious that this contaminated waterway was a major PFAS catchment hotspot that Sydney Water or WaterNSW had failed to detect.

#2. All public drinking water supplies across NSW need to be thoroughly monitored for PFAS. This should be based on samples collected from water catchments, storages, water treatment plants (before and after treatment) as well as from reticulated water supply networks. It should include samples from customers taps. I recommend that this continue on a monthly basis for 12 months before determining the PFAS risk for individual water supply systems. The results need to be immediately reported to customers. I expect that many water supplies will not contain PFAS. But contaminated supplies, such as Blue Mountains, could be uncovered and be suitably managed to remove or reduce the PFAS to achieve safe concentrations.

#3. For the two largest water utilities in NSW (Sydney Water and Hunter Water) the need for more thorough PFAS monitoring and reporting should be addressed in their Operating Licences. Water utility Operating Licences are complex regulatory instruments that clearly and explicitly contain operating responsibilities, system standards, service standards and customer rights. They are issued by the NSW Governor, regulated by IPART and involve NSW EPA and NSW Health. Current Operating licences should be promptly revised to address improved testing of PFAS in all water supply systems. They should also outline measures that are required to be taken when PFAS levels above the concentration recommended in Australian Drinking Water Guidelines. This should involve supplying community with alternative safe drinking water.

#4. For the smaller town water supplies, often operated with the limited resources of local Government, further support from NSW Government will be needed to resource the PFAS testing of their water supply systems (catchment to tap).

#5. Communities that have been exposed to elevated PFAS in drinking water, such as the Blue Mountains community supplied with drinking water from the Sydney Water's Cascade treatment plant, the water utility should provide a clean and safe alternative drinking water supply. They should also offer to pay for PFAS blood testing for people in the community.

#6. All major rivers in NSW should be regularly monitored for PFAS. This should be a high priority at waterways of high conservation significance. It is also important for rivers used for agricultural industries.

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