



Environmental sampling

Makowhai Stream, Ōhakea

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Prepared for:

Mike Patterson
Science Manager

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Prepared by:

James Conway
Pattle Delamore Partners Ltd

CONTACT		24 hr Freephone 0508 800 800	help@horizons.govt.nz	www.horizons.govt.nz
SERVICE CENTRES	Kairanga Cnr Rongotea and Kairanga-Bunnythorpe Roads Palmerston North	REGIONAL HOUSES	Palmerston North 11-15 Victoria Avenue	DEPOTS
	Marton Hammond Street		Whanganui 181 Guyton Street	
	Taumarunui 34 Maata Street			
POSTAL ADDRESS		Horizons Regional Council, Private Bag 11025, Manawatū Mail Centre, Palmerston North 4442		
		F 06 9522 929		



25 September 2026

Mike Patterson
Science Manager
Horizons Regional Council
PALMERSTON NORTH

Dear Mike

ENVIRONMENTAL SAMPLING - MAKOWHAI STREAM, ŌHAKEA

1.0 Introduction and Background

Pattle Delamore Partners Limited (PDP) was engaged by Horizons Regional Council (HRC) to undertake environmental sampling in Makowhai Stream, Ōhakea. Due to historic activities at RNZAF Base Ōhakea, per- and polyfluoroalkyl substances (PFAS) have entered the surface water and groundwater surrounding Ōhakea. Regular monitoring of surface water and groundwater has occurred to track the concentrations of PFAS. Limited sampling of freshwater biota (eel/tuna), plants (watercress) and sediment has also been completed at select locations within Makowhai Stream. The results of these investigations have confirmed that PFAS are present in a range of environmental media.

A recent Massey University research project investigated the concentrations of PFAS in freshwater fish (including eel/tuna) from a range of locations within the central and southern North Island, including within the Ōhakea region (Marulli de Barletta, 2026). The study found concentrations of PFOS in the livers of short-fin eel within the Ōhakea region ranging from 878 – 3,867 µg/kg (Marulli de Barletta, 2026).

As a result of this recent finding, and recognising the importance of mahinga kai¹, Horizons Regional Council wanted to understand the concentrations of PFAS in surface water, sediment and biota within Makowhai Stream. Tuna and watercress were chosen for sampling as these are important mahinga kai species which are known to be present in Makowhai Stream.

2.0 Scope and Objective

The objective was to assess the human health and environmental risk from PFAS concentrations in sampled biota within Makowhai Stream. Surface water and sediment samples were collected contemporaneously to assist in determining the risks.

The scope of work that was completed to achieve the objective included:

- ✧ The collection of surface water, sediment and biota (eel/tuna and watercress) samples from five locations along Makowhai Stream.
- ✧ Laboratory analysis of the samples for PFAS.

¹ Mahinga kai is specific to iwi, hapū and whānau throughout Aotearoa New Zealand, and is used here to describe traditional food and the places where those resources are obtained.

- Tabulation of the results and comparison to relevant human health and ecological guidelines for the purposes of a risk assessment.
- Preparation of this report detailing the sampling methodology, the sample results and guideline comparisons and the findings from the risk assessment.

3.0 Methodology and Field Work

3.1 Sample Collection

Surface water, sediment, tuna (eel) and watercress samples were collected from five existing monitoring locations along Makowhai Stream (refer to Figure 1). At each location one surface water, one sediment and up to two biota samples were collected.

Further detail on the number and type of samples collected at each location is provided in Table 1.

Table 1: Sample Details		
Surface Water Sample ID	Site Description	Samples Collected (sample ID in brackets)
SW4	Upstream site. Upstream of Base Ōhakea.	Surface water (SW4), sediment (SD12), tuna/eel x2 (FS10a, FS10b).
SW20	Adjacent to bridge where Speedy Road crosses Makowhai Stream. Immediately downstream of Base Ōhakea.	Surface water (SW20), sediment (SD7), watercress (WC4).
SW33	Adjacent to bridge where Taylor Road crosses Makowhai Stream.	Surface water (SW33), sediment (SD11), watercress (WC3), tuna/eel (FS9).
SW44	Adjacent to bridge where Tangimoana Road crosses Makowhai Stream.	Surface water (SW44), sediment (SD6), watercress (WC2), tuna/eel x2 (FS2a, FS2b).
SW36	Downstream Makowhai Stream, near to the point where the stream discharges into Rangitikei River.	Surface water (SW36), sediment (SD10), watercress (WC1).

3.1.1 Surface Water and Sediment

All surface water and sediment samples were collected in accordance with the procedures in the draft guidance document Sampling and Analysis of Per- and Poly-fluorinated Substances (Ministry for the Environment (MfE), 2018). Sampling was conducted working from downstream locations to upstream locations, and surface water and sediment samples were collected prior to biota samples. Surface water and sediment samples were sent to RJ Hill Laboratories in Hamilton for PFAS analysis under standard PDP chain of custody documentation.

Water quality parameters were recorded at the time of sampling using a YSI proDSS water quality meter.

3.1.2 Biota Samples

Tuna/eel samples were collected using baited Fyke nets. These were set on day 1 and left over night for collection on day 2. Only tuna/eel of approximately 30-40 cm in length were selected for sampling. All other tuna (either larger or smaller), and non-target native fish species were released. Tuna were euthanised by placing them in a container with a mixture of water and clove oil. Once euthanised, the tuna were immediately placed into a clean zip lock bag and stored in a chilly bin with ice. Samples were sent to the analysing laboratory who undertook the preparation for analysis. The tuna were filleted and the whole fillets, with skin on, were analysed for PFAS. In addition, three tuna (FS2a, FS9 and FS10a) had their liver removed and analysed for PFAS.

Watercress samples were collected using a gloved hand directly into clean zip lock bags. These were placed in a chilly bin with ice for transport to the analysing laboratory. Biota samples (tuna and watercress) were sent to ALS Laboratories for PFAS analysis under standard PDP chain of custody documentation.

3.2 Data Quality Objectives

The project data quality objectives (DQOs) were:

1. To collect representative biota samples from Makowhai Stream to determine the presence or absence (less than 0.5 µg/kg) of PFAS in finfish and watercress tissue, and whether concentrations exceed the assessment criteria (Section 5).
2. To collect representative surface water samples from Makowhai Stream to determine the concentrations of PFAS in surface waters associated with biota samples and whether concentrations exceed the assessment criteria (Section 5).
3. To collect representative sediment samples from Makowhai Stream to determine the presence or absence of PFAS in sediment co-located with biota and surface water samples.

3.3 Quality Assurance Sampling

As part of the sampling programme, the following Quality Assurance/Quality Control (QA/QC) samples were collected:

- ✧ One duplicate water sample (primary sample SW33).
- ✧ One trip blank.
- ✧ One field blank sample.
- ✧ One duplicate sediment sample (primary sample SD12).

All QA/QC samples were collected in accordance with the draft methodology outlined in MfE (2018). All analysis of the QA/QC samples was undertaken by Hill Labs in Hamilton. The results of the QA/QC sampling are reported in Appendix A and further discussed in Section 5.

3.4 Antecedent Weather Conditions and Flow Conditions

The preceding two weeks before the 23 and 24 June 2026 had a cumulative rainfall of 29.2 mm, with 11.6 mm of rain occurring on 21 June, two days before sampling. A total of 1.6 mm of rain fell during the sampling period, this was on the second day of sampling (24/06/2026).

The surface water samples collected during the sampling round were reported to be clear, except for the samples from SW4 and SW44 which were noted to be slightly discoloured/turbid.

4.0 Assessment Criteria

To facilitate the human health and ecological risk assessment, the results have been compared to the assessment criteria outlined below.

4.1 Surface Water Guidelines

Table 2 below shows the reference guideline values against which the results have been compared. Makowhai Stream is not used as a source of drinking water or stock water.

Table 2: Environmental and Human Health Guidelines – Water

Media	PFOA	Total PFOS	Sum of PFOS + PFHxS	Source
Ecological freshwater guideline – 95% ecosystem protection	220 µg/L ¹	0.9 µg/L ²	-	Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG)
Ecological Freshwater guideline – 99% ecosystem protection	19 µg/L ¹	0.02 µg/L ²	-	ANZG
Recreational water quality guidelines ³	10 µg/L		2 µg/L	PFAS NEMP 3.1 (HEPA, 2026).
Notes: 1. Australian and New Zealand Guidelines for Fresh and Marine Water Quality – interim default guideline values as reproduced in PFAS National Environmental Management Plan Version 3.1 – Table 8. The Heads of EPAs Australia and New Zealand (HEPA), January 2026. 2. ANZG 2026, Toxicant default guideline values for aquatic ecosystem protection: Perfluorooctane sulfonate (PFOS) in freshwater. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. CC BY 4.0. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia. 3. The guidelines address natural fresh, estuarine and marine recreational water bodies but specifically exclude swimming pools, spas and hydrotherapy pools.				

The Technical Brief (ANZG, 2026) also introduces a new ‘biota screening threshold’ for PFOS in freshwater of 0.0005 µg/L. This screening threshold is based on a number of studies from Australia and North America that reported aquatic biota sample results alongside corresponding water concentrations. These studies found that concentrations of PFOS in freshwater that are below the 99% DGV can be associated with PFOS bioaccumulation in freshwater aquatic fauna (e.g. fish and macroinvertebrates) to concentrations that exceed the PFAS NEMP 3.1 (HEPA 2026) biota guideline values². One Australian study found that PFOS at 0.0005 µg/L could lead to concentrations of PFOS in aquatic biota which exceed the PFAS NEMP 3.0 biota guideline values for mammals if only aquatic fauna were considered as food sources (i.e. not also plants).

Exceedance of the biota screening threshold is a trigger to assess the concentration of PFOS in aquatic biota that may be consumed by mammalian and avian predators (e.g. via sampling and analysis of fish and macroinvertebrates). With regard to potential risks to birds that consume these aquatic organisms (e.g. ducks), it is currently unknown to what extent such aquatic organisms make up their diet. Further, due to the relatively small size of Makowhai Stream and the distance before it joins Rangitikei River, it is considered unlikely they would only source their food from this water body. Therefore, the risk to avian predators from the consumption of aquatic biota has not been considered in this investigation.

² Ecological direct exposure for wildlife diet Sum of PFOS and PFHxS: 3.1 µg/kg for mammals and 8.2 µg/kg for birds.

With respect to mammalian predators in an Aotearoa New Zealand context, mammals that would have the potential to consume aquatic biota are limited and if present are likely to be invasive species. Therefore, these have also not been considered in this investigation.

4.2 Aquatic Biota Guidelines

Tuna samples were compared to the Food Standards Australia New Zealand's (FSANZ) trigger points (for further investigation); these are provided in Table 3. The trigger points are the "maximum concentration level of these chemicals that could be present in individual foods or food groups so that even high consumers of these foods would not exceed the relevant TDI [tolerable daily intake]" (FSANZ, p.2, 2017). For finfish (all), the trigger points are based on consumption, by a child 2 – 6 years old, of 73 g per day of fish. For fish liver, the trigger points are based on the Australian population aged 2 years and above, with a median consumption assumed to be 5 g (weight of one liver). However, it is noted in the report that there was no food consumption data available for this food type.

FSANZ derived trigger points for a range of vegetables (e.g. root vegetables, leafy vegetables etc.) and then used the values for the vegetables with the highest consumption rates as its trigger point for the overall category of 'all vegetables'. In the case of watercress, the category of leafy vegetable is considered more appropriate, and this has been used for the comparison of the watercress sample results.

Table 3: Human Health Trigger Points for Investigation – Plant and Finfish

Media	Sum of Total PFOS + PFHxS	PFOA	Total PFOS	Source
Finfish (all)	5.2 µg/kg	41 µg/kg	5.2 µg/kg	FSANZ ¹
Fish liver ²	280 µg/kg	2,240 µg/kg	280 µg/kg	
Watercress (leafy vegetables)	15 µg/kg	119 µg/kg	15 µg/kg	
Notes: 1. Assessment of potential dietary exposure to perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) occurring in foods sampled from contaminated sites, Supporting Document 2 - Table 8. Food Standards Australia New Zealand (FSANZ), April 2017. 2. Assumed to be occasionally consumed food (FSANZ, 2017)				

Tuna samples were additionally compared to the consumption guidelines for recreational catch freshwater finfish produced by the Ministry for Primary Industries (MPI, 2018). These guidelines were developed to minimise the food safety risk associated with recreational catch freshwater finfish. The guideline is based on the average of PFOS concentration found in fish. MPI state that, on average, adults consume freshwater fish less than twice a month (MPI, 2018). The guidelines are provided in Table 4.

Tuna sample results were compared to the lowest average PFOS concentration guideline of 30 – 45 µg/kg as the MPI guidance states that "Risk Managers should take action when the concentration in finfish is above 30 µg/kg (micrograms per kilogram). For example, Risk Managers should consider warning signs in affected areas, possibly for different species and for specific stretches of waterways, to limit consumption of finfish" (MPI, 2018).

Table 4: Consumption Guidelines for Recreational Catch Freshwater Finfish¹

Average PFOS concentration (µg/kg)	Child (2-10 years) (1 serving = 100g)	Adult (1 serving = 150g)
30-45	Limit of 3 servings/month	No advice necessary
45-60	Limit of 2 servings/month	
60-90	Limit of 1 serving/month	Limit of 3 servings/month
90-125	Limit of 1 serving/month	Limit of 2 servings/month
125-250	Do not consume	Limit of 1 serving/month
>250		Do not consume

Notes:

1. Ministry for Primary Industries. Accessed on 08/09/2026 from <http://www.mfe.govt.nz/sites/default/files/media/Land/marine-freshwater-fin-fish-PFOS-thresholds.pdf>

In 2024 the US EPA published final recommended aquatic life criteria for PFOA and PFOS (US EPA 2024a; US EPA 2024b). The US EPA derived both 'chronic water column criteria' (i.e. surface water criteria) as well as chronic criteria expressed as tissue-based concentrations. The chronic water criteria were derived using water-based toxicity data from a range of aquatic organisms and a sensitivity distribution approach. They are intended to be protective of 95% of freshwater genera (US EPA, 2024a).

Because there was insufficient data to derive chronic tissue criteria using tissue-based toxicity data and a sensitivity distribution approach, the tissue criteria were derived by translating the chronic water column criteria into tissue criteria using accepted bioaccumulation factors (BAF) and the formula:

$$\text{Tissue Criteria} = \text{Chronic Water Column Criteria} \times \text{BAF}$$

By using different BAFs for different tissue types, it was possible to calculate tissue criteria for three tissue types, fish whole-body, fish muscle (fillet) and invertebrate whole-body tissue. The chronic tissue-based criteria are expected to be protective of 95% of freshwater genera potentially exposed to PFOS or PFOA.

It is important to note that because of how the tissue criteria have been calculated (i.e. using water quality criteria for a range of species and a statistical BAF derived from field measured BAFs from a range of fish species), there is some uncertainty in their level of protection, especially when applied to Aotearoa's native tuna/eel. Nevertheless, for reference, tuna samples from Makowhai Stream have been compared to the chronic fish muscle (fillet) criteria (Table 5).

Table 5: US EPA Final Recommended Freshwater Aquatic Life Water Quality Criteria for PFOA and PFOS¹

Compound	Fish Muscle (µg/kg ww ²)
PFOA	133
PFOS	87

Notes:

1. <https://www.epa.gov/system/files/documents/2024-09/pfoa-pfos-pfas-final-factsheet-2024.pdf>
2. Wet weight.

4.3 Sediment Guidelines

As noted in the PFAS NEMP 3.1 (HEPA, 2026), there is currently insufficient ecotoxicity data available to derive high confidence guideline values for PFAS in freshwater sediments under the ANZG framework. Some international sediment guidelines do exist; however, these have been derived for marine environments, and it is unclear how these may translate to a freshwater setting. Consequently, the sediment results have not been compared to ecological guidelines. Given the current investigation has also sampled water and biota, and this allows a direct assessment of the PFAS concentration in these media, the approach taken with sediment is considered appropriate.

5.0 Quality Assurance/ Quality Control Programme

QA/QC samples collected and analysed as part of this investigation comprised one duplicate water sample, one duplicate sediment sample, a field blank and a trip blank. The duplicate surface water sample was collected at SW33, and the duplicate sediment sample was collected at SD12. Refer to Table A-1, Appendix A for the QA/QC sample results.

QA/QC procedures included confirmation that blank samples did not contain detectable levels of PFAS, and comparison of duplicate samples to determine relative percentage differences (RPD) and checking to ensure the RPDs meet the data quality objectives (DQO) for the testing (i.e. are within an acceptable margin of natural variation or error).

No PFAS were detected above the laboratory limit of reporting (LOR) in either the field blank or the trip blank.

No PFAS were detected above the LOR in either the primary or the duplicate sediment sample.

For aqueous samples, an RPD of 30% is generally considered acceptable provided the result is five times the LOR³. As the results approach the LOR, the acceptable RPD increases. For the primary and duplicate water sample, PFAS were detected at levels generally five times the LOR and there is good agreement between the samples with RPDs ranging from 2% to 24%.

Based on the above, the QA/QC samples meet the DQOs, and the results are considered acceptable.

6.0 Results and Comparison to Assessment Criteria

The following were collected during this investigation:

- ✧ Five tuna (eel) samples (*Anguilla sp*);
- ✧ Five watercress samples (*Nasturtium officinale*);
- ✧ Five surface water samples; and
- ✧ Five sediment sample.

The location of the samples is shown on Figure 1. Summary tables for sediment, surface water, fish and watercress results are provided in Appendix B, and the laboratory reports for all samples are provided in Appendix C. Field sheets are provided in Appendix D and select site photographs are provided in Appendix E.

³ Interstate Technology Regulatory Council – Data Comparison Methods – <https://psu-1.itrcweb.org/4-data-comparison-methods/>, Accessed 3/7/2025.

6.1 Tuna/Eel

Five individual tuna were sampled. All five individuals had their muscle tissue (with skin attached) analysed and three of these individuals also had their liver analysed. A summary of the results of select PFAS compared to the relevant guidelines is provided in Table B-1, Appendix B. The complete suite of PFAS compounds reported in the tuna samples is provided in Table B-2.

A range of PFAS were detected above the LOR; these were almost exclusively perfluorocarboxylic acids and perfluorosulfonic acids, the majority of which were detected at relatively low concentrations. The exception to this was PFOS which consistently reported the greatest concentrations, often several orders of magnitude higher than the other compounds.

All five muscle samples reported total PFOS concentrations above the FSANZ trigger points for further investigation. Three of those samples (FS9, FS2a and FS2b) also exceeded the 'do not consume' level derived by MPI. Given these exceedances, tuna (eel) from Makowhai Stream should not be consumed. If not already in place, it is recommended that signage is installed warning people that fish from the stream are unsafe to eat.

The same three samples (FS9, FS2a and FS2b) also reported PFOS concentrations in muscle that exceeded the freshwater aquatic life criteria derived by the US EPA. This suggests that the tuna in this stretch of water may accumulate sufficient PFOS to adversely affect the health of those fish.

6.1.1 Comparison of Liver and Muscle Samples

Three individual tuna had both their muscle tissue and liver analysed. A comparison of the muscle and liver results for each individual clearly shows that PFAS accumulate at greater concentrations in the liver relative to the muscle. This is in line with other studies which have demonstrated that PFAS preferentially accumulate in the liver due to their affinity for liver proteins (e.g. Barhoumi et al., 2026; Khan, et al., 2024). Sampling of the liver therefore likely provides a worst-case scenario of the concentrations of PFAS.

6.2 Watercress

All four watercress samples reported detectable levels of PFAS, however concentrations of PFOS in all samples were below the FSANZ trigger points for further investigation for leafy vegetables (refer to Table B-3, Appendix B).

6.3 Surface Water

Surface water results have been compared to the non-potable/recreation guideline, and the ecological freshwater guidelines.

Of the five surface water samples collected:

- ✧ PFAS were detected in all five samples, however sample SW4 reported only a single PFAS compound (FOSA = 0.0012 µg/L) at a level that was marginally above the laboratory limit of reporting (LOR).
- ✧ Of the remaining four samples (SW20, SW33, SW44 and SW36), a range of PFAS were detected above the LOR and all samples reported total PFOS concentrations exceeding the ANZG 99% species protection DGV.

A summary of the surface water results compared to the ANZG 99% species protection DGV is provided in Table B-4, Appendix B.

The results were also compared to previous monitoring rounds. Timeseries plots showing the concentrations of select PFAS at each location over time are provided in Appendix F (note that some locations have not been regularly monitored and as such there are some gaps in the monitoring records for some sites). In summary, the results are comparable to previous monitoring rounds.

6.4 Sediment

Sediment results are provided in Table B-5. There were minor detections of PFOS in sediment samples from two locations. No other PFAS were reported above the LOR.

- ∴ Sediment sample SD7 (water sample location SW20) reported total PFOS of 0.0026 mg/kg.
- ∴ Sediment sample SD7 SD6 (water sample location SW44) reported total PFOS of 0.0033 mg/kg.

7.0 Risk Assessment

7.1 Conceptual Site Model

A risk to human health can only exist if there is a hazard (e.g. a source such as contaminated soil/sediment, dust or water), a receptor (e.g. people, waterbody, biota) and an exposure pathway between the hazard and the receptor. An absence of any one of these components means no risk can exist. A Conceptual Site Model (CSM) is designed to identify the hazards, receptors and possible links between these.

A CSM for the investigation area is provided in Table 6.

Table 6: Conceptual Site Model

Source	Potential Contaminants	Exposure Pathway	Potential Receptor	Pathway Linkage
Historic use of AFFF Firefighting and training. Secondary sources: Leaching from contaminated soil, sediment and concrete (e.g. stormwater pipes). Discharge of contaminated groundwater to surface water.	PFAS	Dermal contact with sediment	Humans (recreational users of Makowhai Stream)	Potentially complete, but low risk – very minor concentrations of PFAS were detected in some sediments. However, although there are no sediment applicable guidelines, the reported concentrations are well below the human health guidelines for contaminated soil and as such the risk to human health from exposure to these sediments is considered to be low.
		Ingestion of sediment		
		Surface water	Humans (contact recreational)	Potentially complete, but low risk – PFAS concentrations do not exceed the recreational water quality guideline values and as such the risk to human health from exposure via this pathway is considered to be low.
			Aquatic ecological receptors	Complete – PFAS concentrations exceed ANZG (2018) ecological water quality guidelines and the US EPA tissue criteria for the protection of freshwater fish.
		Consumption of freshwater fish	Human consumers of freshwater fish	Potentially Complete – concentrations of PFAS in tuna exceed the safe levels for human consumption recommended by MPI. However, it is currently unknown if people are catching and consuming tuna/eel from Makowhai Stream; if they are, then this pathway is complete.

Based on the CSM, the contaminants of concern are PFAS compounds associated with the historic use of AFFF. Soils, sediment, groundwater and stormwater infrastructure that are contaminated with PFAS act as secondary sources. Shallow groundwater is contaminated with PFAS, however this is currently being monitored as part of a long term monitoring programme in partnership between HRC and NZDF, it is therefore not assessed further here other than as a potential secondary source via discharge to surface water.

The potential receptors identified in the CSM include Makowhai Stream and aquatic organisms living in the stream, and humans via the consumption of aquatic biota (tuna/eel) containing elevated levels of PFAS.

Complete pathways include organisms directly exposed to contaminated surface water. Potentially complete pathways include humans being indirectly exposed via the consumption of tuna/eel containing PFAS.

7.2 Human Health Risk Assessment

The concentrations of total PFOS and sum of PFOS+PFHxS reported in tuna/eel samples collected from Makowhai Stream are significantly elevated above the recommended 'do not consume' guidelines for recreational finfish developed by MPI. As such, consumption of eel from Makowhai Stream may pose a risk to human health.

If not already in place, it is recommended that signage is installed warning people that fish from the stream are unsafe to eat, and the findings of this report should be shared with iwi and hapū.

Tuna collected from upstream location SW4 reported lower concentrations of PFAS. The levels reported were above the FSANZ trigger points for further investigation, but below the MPI recreational finfish consumption guidelines. This suggests that tuna caught in the upper reaches of Makowhai Stream, north of State highway 3, may pose a low risk to human health if consumed, however further sampling in this part of the waterway would be needed to confirm this.

It is also important to note that the MPI consumption guidelines were derived using the FSANZ tolerable daily intake (TDI), standard adult and child servings of fish (150 g and 100 g respectively) and consumption frequency data from the general population. The guidance assumes that on average, adults consume freshwater fish less than twice a month. However, we note that there are still gaps in knowledge of consumption levels (and hence exposure) when considering traditional harvesting and consumption of mahinga kai species such as tuna, and this assumption may be incorrect.

Concentrations of PFOS, PFOA and PFHxS in watercress were below the relevant MPI trigger points for further investigation, which suggests that consumption of watercress from these locations poses a low risk to human health.

7.3 Ecological Risk Assessment

In four of the five locations, concentrations of PFOS in surface water are below the 95% species protection level DGV but exceed the 99% species protection level DGV. Sampling of tuna muscle and liver has confirmed that PFAS are bioaccumulating in these organisms to levels that are unsafe for human consumption. However, due to a lack of suitable ecological health criteria for tuna/eel, the level of risk to the tuna is unclear.

The US EPA has derived ecological tissue criteria for PFAS in fish tissue/muscle that are considered to be protective of the fish. As outlined by the US EPA, these criteria are intended to indicate threshold concentrations such that where concentrations are below these guidelines, specific risks to aquatic organisms are deemed to be low and acceptable, whereas concentrations above the relevant criteria may harm the growth and reproduction of aquatic organisms or kill them (US EPA, 2024).

As described in Section 4, the tissue criteria were calculated using the US EPA's water quality criteria for freshwater and accepted bioaccumulation factors and are considered to be protective of aquatic life from risks associated with PFOA or PFOS bioaccumulation. The tissue criteria are effectively a translation of the water quality criteria which were derived via water toxicity studies, they are not a direct assessment of effects to the fish. Nevertheless, the concentrations reported in some of the tuna are significantly elevated above the US EPA tissue criteria, which suggests there may be a risk to the health of the tuna.

8.0 Discussion and Conclusion

Sampling has confirmed elevated levels of PFAS in tuna/eel from the lower Makowhai Stream which exceed the recommended safe levels for human consumption derived by MPI. Consumption of tuna/eel from this stretch of Makowhai Stream poses a risk to human health and should be avoided.

PFAS were also reported in samples of watercress collected from Makowhai Stream, however the concentrations are below the FSANZ trigger points for further investigation. As such the risk to human health from the consumption of watercress are considered to be low.

PFAS concentrations in water samples from Makowhai Stream were comparable to previous monitoring rounds. In four of the five locations, concentrations of PFOS exceed the 99% species protection level. When comparing these results by sample location, there is an overall decline in the concentrations of PFAS from upstream to downstream.

The tuna liver sample results reported in the current investigation ranged from 38 – 1,400 µg/kg and are comparable to, albeit slightly lower, than those reported in the Massey University study, which found concentrations of PFOS in the livers of nine short-fin eel within the Ōhakea region ranging from 878 – 3,867 µg/kg (Marulli de Barletta, 2026). A caveat here is that the exact sampling locations of the Massey University study are unknown, so a direct comparison is not possible. It is also uncertain how the ages of the tuna in the two studies compare. Tuna are known to be very long lived (shortfin eel can live for more than 20 years and longfin eel for more than 60 years⁴) and will often stay in the same 10-30 m stretch of water for many years (Jellyman and Sykes, 2003). Their relatively long lifespan can make tuna highly susceptible to the bioaccumulation of contaminants such as PFAS.

The current investigation has been limited to five individual tuna/eel, however given the similarity between samples, including those collected from the same location, and the results reported by Marulli de Barletta (2026), the findings from the current investigation are considered representative of the levels of PFAS in tuna resident in Makowhai Stream.

Given the potential risks to consumers of customary and recreationally caught tuna in Makowhai Stream, appropriate communication and engagement is recommended to ensure iwi/hapū and the wider community are informed of the findings.

While PFOS concentrations in tuna were significantly higher than the USEPA criteria it is not clear from this investigation if the concentrations of PFOS in the tuna are having an adverse effect on them.

Consideration should be given to assessing the ecosystem health of Makowhai Stream and the potential for adverse ecological impacts to be occurring to aquatic organisms, including tuna/eel. This could be undertaken via fish condition assessments such as the relative condition factor and assessment of fish recruitment.

⁴ <https://niwa.co.nz/te-kuwaha-and-maori/tuna-information-resource/tuna-biology-and-ecology/tuna-age-and-methods-ageing>

9.0 References

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10.0 Limitations

This report has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Horizons Regional Council and others (not directly contracted by PDP for the work), including New Zealand Defence Force. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the report. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

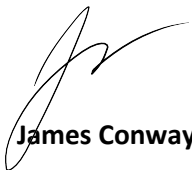
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Yours faithfully

PATTLE DELAMORE PARTNERS LIMITED

Prepared by



James Conway

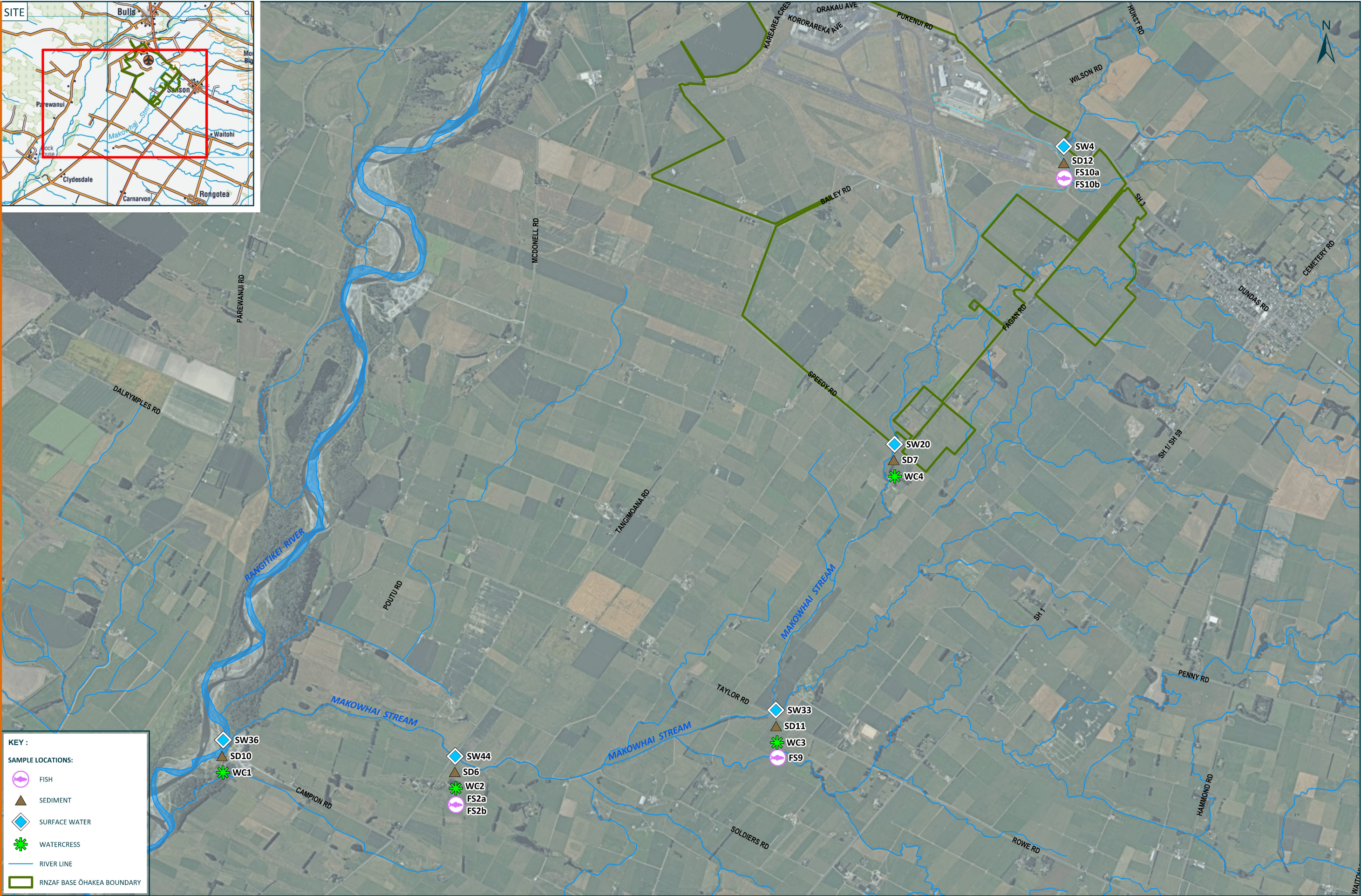
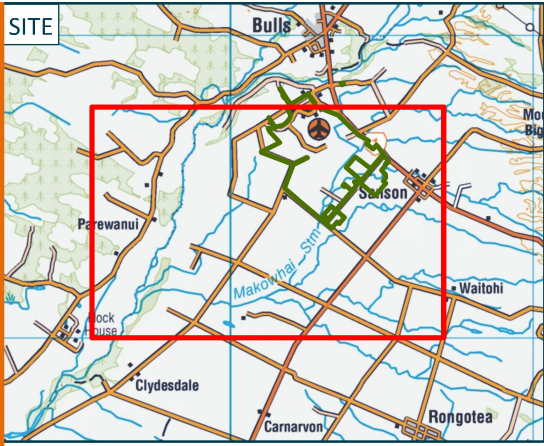
Service Leader - Contaminated Land

Reviewed and Approved by

pp 

Nerena Rhodes

Technical Director – Contaminated Land



KEY :

SAMPLE LOCATIONS:

- FISH
- SEDIMENT
- SURFACE WATER
- WATERCRESS
- RIVER LINE
- RNZAF BASE ŌHAKEA BOUNDARY



SCALE : 1:30,000 (A3)

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SOURCE:
1. AERIAL IMAGERY (FLOWN 2021-2022) SOURCED FROM THE LINZ DATA SERVICE <https://data.linz.govt.nz/> AND LICENCED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.
2. CADASTRAL/TOPOGRAPHICAL INFORMATION AND INSET DERIVED FROM LINZ DATA.

CLIENT



FIGURE

FIGURE 1: SAMPLE LOCATION PLAN

PROJECT

ENVIRONMENTAL SAMPLING – MAKOWHAI STREAM, ŌHAKEA

Appendix A: Quality Assurance / Quality Control

Table A-1: PFAS Sample Results - Quality Assurance/Quality Control ¹

PFAS Quality Assurance / Quality Control Samples								
Location Code	SW33		% RPD	SD12		% RPD		
Field ID	SW33	SW33A		SD12	SD12A		Field Blank	Trip Blank
Sample Type	Primary Water Sample	Duplicate		Primary Sediment Sample	Duplicate		SW4A	SW44A
Sampled Date	24/06/2026	24/06/2026		24/06/2026	24/06/2026		24/06/2026	24/06/2026
Lab Report Number	4251559.5	4251559.12		4251559.10	4251559.14		4251559.13	4251559.11
PFAS in Water (Trace) - Summary								
PFOA	0.0079	0.0082	4%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Total PFOS ²	0.031	0.036	15%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Sum of PFHxS and PFOS ³	0.062	0.068	9%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Total PFAS ⁴	0.23	0.24	4%	< 0.046	< 0.046	NC	< 0.06	< 0.06
Perfluorocarboxylic Acids								
PFBA	0.0177	0.0181	2%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFPeA	0.062	0.064	3%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFHxA	0.05	0.051	2%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFHpA	0.0195	0.021	7%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFOA	0.0079	0.0082	4%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFNA	0.0022	0.0028	24%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFDA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFUnDA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFDoDA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFTrDA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFTeDA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Perfluorosulfonic Acids								
PFPrS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFBS	0.0039	0.0042	7%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFPeS	0.0034	0.0032	6%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
L-PFHxS	0.026	0.028	7%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Branched-PFHxS (total)	0.005	0.005	4%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Total PFHxS ²	0.031	0.033	6%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFHpS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
L-PFOS	0.0154	0.0177	14%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Branched-PFOS (total)	0.016	0.018	11%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Total PFOS ²	0.031	0.036	15%	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFNS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFDS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFDoS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
Fluorotelomer sulfonic Acids								
4:2 FTS	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
6:2 FTS	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
8:2 FTS	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
10:2 FTS	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
Fluorotelomer Carboxylic Acid								
FPrPA (3:3 FTCA)	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
FPePA (5:3 FTCA)	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
FHpPA (7:3 FTCA)	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
Miscellaneous								
F-53B minor (11Cl-PF3OUdS)	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
F-53B major (9Cl-PF3ONS)	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
ADONA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
HFPO-DA	< 0.002	< 0.002	NC	< 0.0010	< 0.0010	NC	< 0.002	< 0.002
NFDHA	< 0.005	< 0.005	NC	< 0.0010	< 0.0010	NC	< 0.005	< 0.005
PFEESA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFMPA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFMBA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
EtFOSAA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
MeFOSAA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
FOSA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
MeFOSA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
EtFOSA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
MeFOSE	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
EtFOSE	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
PFECHS	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010
P37DMOA	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010	NC	< 0.0010	< 0.0010

Notes:

1. Results in µg/L.

2. Total PFOS, PFHxS are calculated by summing monomethyl, dimethyl and linear isomers. Where an isomer is below the detection limit it is not added to the summation. This is following the method in the reported lab results.

3. Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.

4. Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.

% RPD	Relative percent difference
-------	-----------------------------



Appendix B: Sample Results Tables

Table B-1: Select PFAS Sample Results - Eel

PFAS in Fish (µg/kg) ¹						FSANZ Human Health Trigger Points for Investigation ¹		MPI Consumption Guidelines for Recreational Catch Freshwater Finfish ³		US EPA Recommended Freshwater Aquatic Life Water Quality Criteria ⁴
Field ID	FS10a	FS10b	FS9	FS2a	FS2b					
Corresponding SW Location	SW4		SW33	SW44						
Sampled Date	25/06/2026	25/06/2026	25/06/2026	24/06/2026	24/06/2026	Finfish (all)	Fish Liver ²	Action Level ⁵	Do Not Consume Level ₆	Fish Muscle
Lab Report Numbers	26-14578-9 26-14578-10	26-14578-6	26-14578-11 26-14578-12	26-14578-7 26-14578-8	26-14578-5					
PFAS in Eel Flesh - Summary										
PFOA	0.04	0.06	0.74	0.31	0.22	41	-	-	-	133
Total PFOS ⁷	6.4	11	315	389	253	5.2	-	30	>125	87
Sum of PFHxS and PFOS ⁸	6.6	11	320	394	254	5.2	-	-	-	-
Total PFAS ⁹	8.2	13	330	404	262	-	-	-	-	-
PFAS in Eel Liver - Summary										
PFOA	0.24	Liver not sampled	3.2	185	Liver not sampled	-	2,240	-	-	-
Total PFOS ⁷	38		920	1,401		-	280	-	-	-
Sum of PFHxS and PFOS ⁸	39		945	1,436		-	280	-	-	-
Total PFAS ⁹	45		998	1,694		-	-	-	-	-

Notes:

1. Assessment of potential dietary exposure to perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) occurring in foods sampled from contaminated sites, Supporting Document 2 - Table 8. Food Standards Australia New Zealand (FSANZ), April 2017.

2. Assumed to be occasionally consumed food (FSANZ, 2017).

3. Consumption guidelines to Minimise Food Safety Risk due to PFOS in Recreational Catch Freshwater Finfish - advice provided by Ministry for Primary Industries (MPI).

4. Final Recommended Aquatic Life Criteria and Benchmarks for Select PFAS sourced from <https://www.epa.gov/system/files/documents/2024-09/pfoa-pfos-pfas-final-factsheet-2024.pdf>

5. Based on the MP guidance which states "Risk Managers should take action when the concentration in finfish is above 30 µg/kg (micrograms per kilogram). For example, Risk Managers should consider warning signs in affected areas, possibly for different species and for specific stretches of waterways, to limit consumption of finfish".

6. The 'do not consume level' set by MPI is for a child (2-10 years) and assumes a serving size of 100 g. The do not consume level for an adult is >250 µg/kg (based on a serving size of 150 g).

7. Total PFOS is the sum of linear and branched isomers.

8. Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.

9. Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.

-	Guideline unavailable.
41	Italics- Exceeds FSANZ Human Health Trigger Point for Investigation.
30	Bold - Exceeds MPI Action Level for PFOS Concentrations for Recreational Catch Finfish.
30	Shaded - Exceeds MPI Do Not Consume Level for PFOS Concentrations for Recreational Catch Finfish.
30	Underlined - Exceeds US EPA Recommended Freshwater Aquatic Life Criteria.

Table B-2: PFAS Sample Results - Eel ¹

PFAS in Fish (Eel) (µg/kg)						FSANZ Human Health Trigger Points for Investigation ²	MPI Consumption Guidelines for Recreational Catch Freshwater Finfish ³		US EPA Recommended Freshwater Aquatic Life Water Quality Criteria ⁴
Field ID	FS10a	FS10b	FS9	FS2a	FS2b				
Corresponding SW Location	SW4	SW4	SW33	SW44	SW44				
Sample Matrix	Fillet, skin on	Fillet, skin on	Fillet, skin on	Fillet, skin on	Fillet, skin on				
Sampled Date	25/06/2026	25/06/2026	25/06/2026	24/06/2026	24/06/2026	Finfish (all)	Action Level ⁵	Do Not Consume Level ⁶	Fish Muscle
Lab Report Number	26-14578-9	26-14578-6	26-14578-11	26-14578-7	26-14578-5				
PFAS in Fish (Eel) - Summary									
PFOA	0.04	0.06	0.74	0.31	0.22	41	-	-	133
Total PFOS ⁷	6.4	11	315	389	253	5.2	30	>125	87
Sum of PFHxS and PFOS ⁸	6.6	11	320	394	254	5.2	-	-	-
Total PFAS ⁹	8.2	13	330	404	262	-	-	-	-
Perfluorocarboxylic Acids									
PFBA	0.23	0.21	0.23	0.15	< 0.01	-	-	-	-
PFPeA	< 0.01	0.02	0.45	0.09	0.02	-	-	-	-
PFHxA	0.10	0.06	0.35	0.04	0.03	-	-	-	-
PFHpA	0.22	0.21	1.7	1.1	0.20	-	-	-	-
PFOA	0.04	0.06	0.74	0.31	0.22	41	-	-	133
PFNA	0.12	0.16	2.3	1.5	3.2	-	-	-	-
PFDA	0.09	0.13	0.45	0.35	0.74	-	-	-	-
PFUnDA	0.39	0.42	0.57	0.72	0.91	-	-	-	-
PFDoDA	0.07	0.09	0.19	0.15	0.13	-	-	-	-
PFTiDA	0.31	0.29	0.21	0.12	0.08	-	-	-	-
PFTeDA	0.03	0.04	0.08	0.05	0.02	-	-	-	-
Perfluorosulfonic Acids									
PFBS	0.02	0.02	0.02	0.02	0.02	-	-	-	-
PFPeS	< 0.01	< 0.01	0.06	0.04	0.01	-	-	-	-
Total PFHxS ⁷	0.18	0.24	5.3	5.3	1.4	-	-	-	-
PFHpS	0.01	0.02	0.84	0.47	0.47	-	-	-	-
Total PFOS ⁷	6.4	11	315	389	253	5.2	30	>125	87
PFNS	0.01	0.03	1.2	2.8	1.2	-	-	-	-
PFDS	0.01	0.02	0.28	1.2	0.34	-	-	-	-
PFDoS ¹⁰	< 0.01	0.02	0.25	0.96	0.18	-	-	-	-
Fluorotelomer sulfonic Acids									
4:2 FTS	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
6:2 FTS	< 0.01	< 0.01	< 0.01	0.02	< 0.01	-	-	-	-
8:2 FTS	< 0.01	< 0.01	< 0.01	0.03	< 0.01	-	-	-	-
Fluorotelomer Carboxylic Acid									
FPiPA (3:3 FTCA) ¹⁰	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-
FPePA (5:3 FTCA) ¹⁰	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-
FHpPA (7:3 FTCA) ¹⁰	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-
Miscellaneous									
F-53B minor (11CI-PF3OUdS) ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
F-53B major (9CI-PF3ONS) ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
ADONA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
HFPO-DA ¹⁰	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-
NFDHA ¹⁰	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-
PFEESA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
PFMPA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
PFMBA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
EtFOSAA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
MeFOSAA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
FOSA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
MeFOSA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
EtFOSA ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
MeFOSE ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-
EtFOSE ¹⁰	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-

Notes:

- Results in µg/kg.
- Assessment of potential dietary exposure to perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) occurring in foods sampled from contaminated sites, Supporting Document 2 - Table 8. Food Standards Australia New Zealand (FSANZ), April 2017.
- Consumption guidelines to Minimise Food Safety Risk due to PFOS in Recreational Catch Freshwater Finfish - advice provided by Ministry for Primary Industries (MPI).
- Final Recommended Aquatic Life Criteria and Benchmarks for Select PFAS sourced from <https://www.epa.gov/system/files/documents/2024-09/pfoa-pfos-pfas-final-factsheet-2024.pdf>
- Based on the MP guidance which states "Risk Managers should take action when the concentration in finfish is above 30 µg/kg (micrograms per kilogram). For example, Risk Managers should consider warning signs in affected areas, possibly for different species and for specific stretches of waterways, to limit consumption of finfish".
- The 'do not consume level' set by MPI is for a child (2-10 years) and assumes a serving size of 100 g. The do not consume level for an adult is >250 µg/kg (based on a serving size of 150 g).
- Total PFHxS and total PFOS are the sum of the respective linear and branched isomers.
- Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.
- Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.
- Extra analytes are provided from the EPA1633 suite, but these are not validated and are provided for reference only.

-	Guideline unavailable.
41	Italics- Exceeds FSANZ Human Health Trigger Point for Investigation.
30	Bold - Exceeds MPI Action Level for PFOS Concentrations for Recreational Catch Finfish.
30	Shaded - Exceeds MPI Do Not Consume Level for PFOS Concentrations for Recreational Catch Finfish.
30	Underlined - Exceeds US EPA Recommended Freshwater Aquatic Life Criteria.

Table B-2: PFAS Sample Results - Eel ¹

PFAS in Fish (Eel) (µg/kg)				FSANZ Human Health Trigger Points for Investigation ²
Field ID	FS10a	FS9	FS2a	
Corresponding SW Location	SW4	SW33	SW44	
Sample Matrix	Liver	Liver	Liver	
Sampled Date	25/06/2026	25/06/2026	24/06/2026	Fish Liver ³
Lab Report Number	26-14578-10	26-14578-12	26-14578-8	
PFAS in Fish (Eel) - Summary				
PFOA	0.24	3.2	185	2,240
Total PFOS ⁴	38	920	1,401	280
Sum of PFHxS and PFOS ⁵	39	945	1,436	280
Total PFAS ⁶	45	998	1,694	-
Perfluorocarboxylic Acids				
PFBA	0.29	0.46	< 0.01	-
PFPeA	< 0.01	1.3	0.11	-
PFHxA	0.11	0.93	< 0.01	-
PFHpA	1.2	13	4.9	-
PFOA	0.24	3.2	185	2,240
PFNA	0.22	< 0.01	0.4	-
PFDA	0.27	1.6	1.4	-
PFUnDA	1.1	2.0	2.6	-
PFDoDA	0.20	0.67	0.53	-
PFTriDA	1.9	1.5	0.54	-
PFTeDA	0.08	0.20	0.16	-
Perfluorosulfonic Acids				
PFPrS	-	-	-	-
PFBS	0.03	0.05	0.07	-
PFPeS	0.03	0.25	< 0.01	-
L-PFHxS	-	-	-	-
Branched-PFHxS (total)	-	-	-	-
Total PFHxS ⁴	1.1	24	35	-
PFHpS	0.09	5.2	3.9	-
L-PFOS	-	-	-	-
Branched-PFOS (total)	-	-	-	-
Total PFOS ⁴	38	920	1,401	280
PFNS	0.14	15	33	-
PFDS	0.09	4.1	14	-
PFDoS ⁷	0.05	3.1	9.3	-
Fluorotelomer sulfonic Acids				
4:2 FTS	< 0.01	< 0.01	< 0.01	-
6:2 FTS	< 0.01	0.11	< 0.01	-
8:2 FTS	0.03	0.03	0.14	-
10:2 FTS	-	-	-	-
Fluorotelomer Carboxylic Acid				
FPrPA (3:3 FTCA) ⁷	< 0.1	< 0.1	< 0.1	-
FPePA (5:3 FTCA) ⁷	< 0.1	< 0.1	< 0.1	-
FHpPA (7:3 FTCA) ⁷	< 0.1	0.15	3.1	-
Miscellaneous				
F-53B minor (11Cl-PF3OUds) ⁷	< 0.01	< 0.01	< 0.01	-
F-53B major (9Cl-PF3ONS) ⁷	< 0.01	< 0.01	< 0.01	-
ADONA ⁷	< 0.01	< 0.01	< 0.01	-
HFPO-DA ⁷	< 0.1	< 0.1	< 0.1	-
NFDHA ⁷	< 0.1	< 0.1	< 0.1	-
PFEESA ⁷	< 0.01	< 0.01	< 0.01	-
PFMPA ⁷	< 0.01	< 0.01	< 0.01	-
PFMBA ⁷	< 0.01	< 0.01	< 0.01	-
EtFOSAA	< 0.01	< 0.01	< 0.01	-
MeFOSAA	< 0.01	< 0.01	< 0.01	-
FOSA	< 0.01	0.03	0.05	-
MeFOSA ⁷	< 0.01	< 0.01	< 0.01	-
EtFOSA ⁷	< 0.01	< 0.01	< 0.01	-
MeFOSE ⁷	< 0.01	< 0.01	< 0.01	-
EtFOSE ⁷	< 0.01	< 0.01	< 0.01	-

Notes:

- Results in µg/kg.
- Assessment of potential dietary exposure to perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) occurring in foods sampled from contaminated sites, Supporting Document 2 - Table 8. Food Standards Australia New Zealand (FSANZ), April 2017.
- Assumed to be occasionally consumed food (FSANZ, 2017).
- Total PFHxS and total PFOS are the sum of the respective linear and branched isomers.
- Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.
- Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.
- Extra analytes are provided from the EPA1633 suite, but these are not validated and are provided for reference only.

-	Guideline unavailable.
280	Italics- Exceeds FSANZ Human Health Trigger Point for Investigation.

Table B-3: PFAS Sample Results - Watercress

PFAS Watercress (µg/kg)					FSANZ Human Health Trigger Points for Investigation ¹	
Field ID	WC4	WC3	WC2	WC1	Vegetables (all) ²	Leafy Vegetables ³
Corresponding SW Location	SW20	SW33	SW44	SW36		
Sampled Date	25/06/2026	25/06/2026	24/06/2026	24/06/2026		
Lab Report Number	26-14578-03	26-14578-01	26-14578-02	26-14578-04		
PFAS in Watercress- Summary						
PFOA	< 0.01	< 0.01	< 0.01	< 0.01	8.8	119
Total PFOS ⁴	0.229	2.31	0.767	2.774	1.1	15
Sum of PFHxS and PFOS ⁵	0.274	2.392	0.772	2.852	1.1	15
Total PFAS ⁶	9.21	7.81	2.94	3.79	-	-
Perfluorocarboxylic Acids						
PFBA	2.757	1.982	0.819	0.365	-	-
PFPeA	5.523	3.207	1.193	0.484	-	-
PFHxA	0.544	0.18	0.069	< 0.01	-	-
PFHpA	0.048	< 0.01	< 0.01	< 0.01	-	-
PFOA	< 0.01	< 0.01	< 0.01	< 0.01	8.8	119
PFNA	< 0.01	< 0.01	< 0.01	0.037	-	-
PFDA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFUnDA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFDoDA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFTeDA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
Perfluorosulfonic Acids						
PFBS	0.059	0.052	0.045	0.047	-	-
PFPeS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
Total PFHxS ⁴	0.045	0.082	< 0.01	0.078	-	-
PFHpS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
Total PFOS ⁴	0.229	2.31	0.767	2.774	1.1	15
PFNS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFDS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFDoS ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
Fluorotelomer sulfonic Acids						
4:2 FTS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
6:2 FTS	< 0.01	< 0.01	0.044	< 0.01	-	-
8:2 FTS	< 0.01	< 0.01	< 0.01	< 0.01	-	-
Fluorotelomer Carboxylic Acid						
FPiPA (3:3 FTCA) ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
FPePA (5:3 FTCA) ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
FHpPA (7:3 FTCA) ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
Miscellaneous						
F-53B minor (11Cl-PF3OUdS) ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
F-53B major (9Cl-PF3ONS) ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
ADONA ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
HFPO-DA ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
NFDHA ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
PFEESA ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
PFMPA ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
PFMBA ⁷	< 0.1	< 0.1	< 0.1	< 0.1	-	-
EtFOSAA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
MeFOSAA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
FOSA	< 0.01	< 0.01	< 0.01	< 0.01	-	-
MeFOSA ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
EtFOSA ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
MeFOSE ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-
EtFOSE ⁷	< 0.01	< 0.01	< 0.01	< 0.01	-	-

Notes:

- Assessment of potential dietary exposure to perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) occurring in foods sampled from contaminated sites, Supporting Document 2 - Table 8. Food Standards Australia New Zealand (FSANZ), April 2017.
- The value for vegetables (all) is the value adopted by FSANZ as the trigger point for further investigation. It has been included for reference.
- The value for leafy vegetables as derived by FSANZ has been included as it is considered this best represents watercress.
- Total PFOS is the sum of linear and branched isomers.
- Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.
- Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.
- Extra analytes are provided from the EPA1633 suite, but these are not validated and are provided for reference only.

-	Guideline unavailable.
2.3	Bold - Exceeds FSANZ Human Health Trigger Point for Investigation for all vegetable types

Table B-4: PFAS Sample Results - Surface Water¹

PFAS Samples in Surface Water						Guidelines	
Field ID	SW4	SW20	SW33	SW44	SW36	ANZG for 95% Species Protection - Default Guideline Values ²	ANZG for 99% Species Protection - Default Guideline Values ²
Location Code	SW4	SW20	SW33	SW44	SW36		
Sampled Date	24/06/2026	24/06/2026	24/06/2026	24/06/2026	24/06/2026		
Lab Report Number	4251559.90	4251559.7	4251559.5	4251559.3	4251559.1		
PFAS in Water (Trace) - Summary							
PFOA	< 0.0010	0.0132	0.0079	0.0058	0.0066	220 ³	19 ³
Total PFOS ⁴	< 0.0010	0.043	0.031	0.028	0.024	0.9	0.02
Sum of PFHxS and PFOS ⁵	< 0.0010	0.075	0.062	0.052	0.049	-	-
Total PFAS ⁶	< 0.06	0.42	0.23	0.16	0.18	-	-
Perfluorocarboxylic Acids							
PFBA	0.0023	0.032	0.0177	0.0116	0.0150	-	-
PFPeA	< 0.0010	0.145	0.062	0.038	0.048	-	-
PFHxA	< 0.0010	0.104	0.050	0.031	0.037	-	-
PFHpA	< 0.0010	0.037	0.0195	0.0130	0.0153	-	-
PFOA	< 0.0010	0.0132	0.0079	0.0058	0.0066	220 ³	19 ³
PFNA	< 0.0010	0.0043	0.0022	0.0017	0.0021	-	-
PFDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFUnDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFDoDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFTeDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
Perfluorosulfonic Acids							
PFPrS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFBS	< 0.0010	0.0031	0.0039	0.0028	0.0030	-	-
PFPeS	< 0.0010	0.0030	0.0034	0.0029	0.0027	-	-
L-PFHxS	< 0.0010	0.027	0.026	0.021	0.021	-	-
Branched-PFHxS (total)	< 0.0010	0.0047	0.0045	0.0033	0.0036	-	-
Total PFHxS ⁴	< 0.0010	0.032	0.031	0.024	0.025	-	-
PFHpS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
L-PFOS	< 0.0010	0.0196	0.0154	0.0142	0.0114	-	-
Branched-PFOS (total)	< 0.0010	0.023	0.0159	0.0134	0.0127	-	-
Total PFOS ⁴	< 0.0010	0.043	0.031	0.028	0.024	0.9	0.02
PFNS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFDS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFDoS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
Fluorotelomer sulfonic Acids							
4:2 FTS	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
6:2 FTS	< 0.002	0.006	< 0.002	< 0.002	< 0.002	-	-
8:2 FTS	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
10:2 FTS	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
Fluorotelomer Carboxylic Acid							
FPrPA (3:3 FTCA)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
FPePA (5:3 FTCA)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
FHpPA (7:3 FTCA)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
Miscellaneous							
F-53B minor (11Cl-PF3OUdS)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
F-53B major (9Cl-PF3ONS)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
ADONA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
HFPO-DA	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	-
NFDHA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	-	-
PFESA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFMPA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFMBA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
EtFOSAA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
MeFOSAA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
FOSA	0.0012	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
MeFOSA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
EtFOSA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
MeFOSE	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
EtFOSE	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
PFECHS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-
P37DMOA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	-

Notes:

- Results in µg/L.
- ANZG 2026, Toxicant default guideline values for aquatic ecosystem protection: Perfluorooctane sulfonate (PFOS) in freshwater. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. CC BY 4.0. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia.
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality – interim default guideline values as reproduced in PFAS National Environmental Management Plan Version 3.1 – Table 8. The Heads of EPAs Australia and New Zealand (HEPA), 2026.
- Total PFOS, PFHxS are calculated by summing monomethyl, dimethyl and linear isomers. Where an isomer is below the detection limit it is not added to the summation. This is following the method in the reported lab results.
- Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.
- Total PFAS is calculated by summing the concentrations of individual compounds. Where one compound is below detection, it is not included in the summation.

-	No guideline value available
3.6	Concentration exceeds 99% ecological guidelines.

Table B-5: PFAS Sample Results - Sediment ¹

PFAS in Sediment					
Field ID	SD12	SD7	SD11	SD6	SD10
Corresponding SW Location	SW4	SW20	SW33	SW44	SW36
Sampled Date	24/06/2026	24/06/2026	24/06/2026	24/06/2026	24/06/2026
Lab Report Number	4251559.10	4251559.8	4251559.6	4251559.4	4251559.2
PFAS in Sediment - Summary					
PFOA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Total PFOS ²	< 0.0010	0.0026	< 0.0010	0.0033	< 0.0010
Sum of PFHxS and PFOS ³	< 0.0010	0.0029	< 0.0010	0.0033	< 0.0010
Total PFAS	< 0.046	< 0.046	< 0.046	< 0.046	< 0.046
Perfluorocarboxylic Acids					
PFBA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFPeA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFHxA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFHpA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFOA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFNA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFUnDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFDoDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFTrDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFTeDA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Perfluorosulfonic Acids					
PFPrS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFBS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFPeS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
L-PFHxS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Branched-PFHxS (total)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Total PFHxS ²	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFHpS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
L-PFOS	< 0.0010	0.0021	< 0.0010	0.0031	< 0.0010
Branched-PFOS (total)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Total PFOS ²	< 0.0010	0.0026	< 0.0010	0.0033	< 0.0010
PFNS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFDS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFDoS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Fluorotelomer sulfonic Acids					
4:2 FTS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
6:2 FTS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
8:2 FTS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
10:2 FTS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Fluorotelomer Carboxylic Acid					
FPrPA (3:3 FTCA)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
FPePA (5:3 FTCA)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
FHpPA (7:3 FTCA)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Miscellaneous					
F-53B minor (11Cl-PF3OUdS)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
F-53B major (9Cl-PF3ONS)	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
ADONA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
HFPO-DA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
NFDHA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFEESA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFMPA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFMBA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
EtFOSAA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
MeFOSAA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
FOSA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
MeFOSA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
EtFOSA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
MeFOSE	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
EtFOSE	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
PFECHS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P37DMOA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010

Notes:

- Results in mg/kg.
- Total PFOS, PFHxS are calculated by summing monomethyl, dimethyl and linear isomers. Where an isomer is below the detection limit it is not added to the summation. This is following the method in the reported lab results.
- Summations are made by adding compounds Total PFOS, Total PFHxS together. Where one compound is below detection, it is not included in the summation.

Appendix C: Laboratory Reports

NOTE: Please acknowledge receipt of these samples by signing this form and emailing to submitter.

From: Pattle Delamore Partners Ltd

Office: ☐ Auckland ☐ Hamilton ☐ Tauranga ☒ Wellington ☐ Christchurch ☐ Invercargill
☐ Whangarei ☐ Napier ☐ Nelson

To: Hill LabsSubmitted by: J CampbellPh No.: 021 653089

Quote No.:

PDP Job No.: A0274440086

Chain of Custody Record

Sent:

Name: J CampbellSignature: JdeDate and time: 25/6/26

Received:

☐ Room temp. ☐ Chilled Temp.: 10.4°C
☐ Frozen

Name:

Signature:

Date and time:

Additional

Job No: Date Recv: 26-Jun-26 07:20**425 1559**Received by: Nathaniel Sue

3142515594

Results to:

☐ lab.samples@pdp.co.nz☒ Email submitter: Jess Campbell @pdp.co.nz☒ Email other: James Conway @pdp.co.nzPriority: ☐ Normal ☐ High ☐ Urgent

Results required by: ___ / ___ / ___

Invoice to:

☐ PDP☐ Other:

Sample ID	Date	Time	Sample type	Analyses Requested	Notes
SW86	24/6		FW	I hold Cold	
SD10			SED		
SW44			PW		
SD6			SED		
SW33			PW		
SD11			SED		
SW20			PW		
SD7			SED		
SW4			FW		
SD12					
SW44a	24/6		PW	I hold Cold	
SW33a					
SW4a					
SD4a					

Sample type: S Soil GW Groundwater SAL Saline FW Freshwater GEO Geothermal SW Stormwater
 SED Sediment BIO Biota WW Wastewater P Potable O Other:

For physical address see www.pdp.co.nz**Note: Samples may contain dangerous or hazardous substances**

Page ___ of ___

PDP Auckland
 Tel: +64 9 523 6900

PDP Hamilton
 Tel: +64 7 949 7880

PDP Tauranga
 Tel: +64 7 985 6440

PDP Wellington
 Tel: +64 4 471 4130

PDP Christchurch
 Tel: +64 3 345 7100

PDP Invercargill
 Tel: +64 3 422 1690

PDP Whangarei
 Tel: +64 9 523 6900

PDP Napier
 Tel: +64 9 523 6900

PDP Nelson
 Tel: +64 27 329 1398

Job Information Summary

Page 1 of 1

Client:	Pattle Delamore Partners Limited	Lab No:	4251559
Contact:	Jessica Campbell	Date Registered:	26-Jun-2026 2:21 pm
	C/- Pattle Delamore Partners Limited	Priority:	High
	PO Box 6136	Quote No:	81087
	Wellington 6141	Order No:	
		Client Reference:	A027440006
		Add. Client Ref:	
		Submitted By:	J Conway
		Charge To:	Pattle Delamore Partners Limited
		Target Date:	03-Jul-2026 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	SW36 24-Jun-2026 9:10 am	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
2	SD10 24-Jun-2026	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil
3	SW44 24-Jun-2026 10:40 am	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
4	SD6 24-Jun-2026 10:40 am	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil
5	SW33 24-Jun-2026 2:30 pm	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
6	SD11 24-Jun-2026 2:30 pm	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil
7	SW20 24-Jun-2026 3:20 pm	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
8	SD7 24-Jun-2026 3:20 pm	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil
9	SW4 24-Jun-2026	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
10	SD12 24-Jun-2026 2:00 pm	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil
11	SW44a 24-Jun-2026 10:50 am	Blank	PFAS15, PFAS15	PFAS in Water (Trace)
12	SW33a 24-Jun-2026 2:50 pm	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
13	SW4a 24-Jun-2026	Surface Water	PFAS15, PFAS15	PFAS in Water (Trace)
14	SD12a 24-Jun-2026	Sediment	PSoil125pfas, PSoil125pfas	PFAS in Soil

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Sediment			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	2, 4, 6, 8, 10, 14
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. In-house based on ASTM D7968.	0.0010 - 0.046 mg/kg dry wt	2, 4, 6, 8, 10, 14
Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
PFAS in Water (Trace)	Co-solvation. LC-MS/MS analysis. In-house based on ASTM D8421.	-	1, 3, 5, 7, 9, 11-13



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-01
Description: Cress A027440006 25/6/26 WC3 11am

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	1,982
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	3,207
Perfluorohexanoic acid (PFHxA)	307-24-4	10	180
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	<10
Perfluorooctanoic acid (PFOA)	335-67-1	10	<10
Perfluorononanoic acid (PFNA)	375-95-1	10	<10
Perfluorodecanoic acid (PFDA)	335-76-2	10	<10
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	<10
Perfluorododecanoic acid (PFDoA)	307-55-1	10	<10
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	<10
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	<10
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	52
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	82
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	<10
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	2,310
Perfluorononanesulfonate (PFNS)	375-95-1	10	<10
Perfluorodecanesulfonate (PFDS)	335-77-3	10	<10
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	<10
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-02
Description: Cress A027440006 24/6/26 WC2

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	819
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	1,193
Perfluorohexanoic acid (PFHxA)	307-24-4	10	69
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	<10
Perfluorooctanoic acid (PFOA)	335-67-1	10	<10
Perfluorononanoic acid (PFNA)	375-95-1	10	<10
Perfluorodecanoic acid (PFDA)	335-76-2	10	<10
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	<10
Perfluorododecanoic acid (PFDoA)	307-55-1	10	<10
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	<10
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	<10
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	45
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	<10
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	<10
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	767
Perfluorononanesulfonate (PFNS)	375-95-1	10	<10
Perfluorodecanesulfonate (PFDS)	335-77-3	10	<10
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	<10
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-03
Description: Cress A027440006 25/6/26 WC4

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	2,757
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	5,523
Perfluorohexanoic acid (PFHxA)	307-24-4	10	544
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	48
Perfluorooctanoic acid (PFOA)	335-67-1	10	<10
Perfluorononanoic acid (PFNA)	375-95-1	10	<10
Perfluorodecanoic acid (PFDA)	335-76-2	10	<10
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	<10
Perfluorododecanoic acid (PFDoA)	307-55-1	10	<10
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	<10
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	<10
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	59
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	45
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	<10
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	229
Perfluorononanesulfonate (PFNS)	375-95-1	10	<10
Perfluorodecanesulfonate (PFDS)	335-77-3	10	<10
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	<10
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-04
Description: Cress A027440006 24/6/26 WC1

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	365
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	484
Perfluorohexanoic acid (PFHxA)	307-24-4	10	<10
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	<10
Perfluorooctanoic acid (PFOA)	335-67-1	10	<10
Perfluorononanoic acid (PFNA)	375-95-1	10	37
Perfluorodecanoic acid (PFDA)	335-76-2	10	<10
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	<10
Perfluorododecanoic acid (PFDoA)	307-55-1	10	<10
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	<10
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	<10
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	47
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	78
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	<10
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	2,774
Perfluorononanesulfonate (PFNS)	375-95-1	10	<10
Perfluorodecanesulfonate (PFDS)	335-77-3	10	<10
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	<10
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-05
Description: Eel fillet A024770001 24/6/26 FS2b 12pm

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	<10
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	23
Perfluorohexanoic acid (PFHxA)	307-24-4	10	32
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	197
Perfluorooctanoic acid (PFOA)	335-67-1	10	218
Perfluorononanoic acid (PFNA)	375-95-1	10	3,206
Perfluorodecanoic acid (PFDA)	335-76-2	10	742
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	906
Perfluorododecanoic acid (PFDoA)	307-55-1	10	131
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	78
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	22
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	16
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	12
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	1,368
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	470
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	253,060
Perfluorononanesulfonate (PFNS)	375-95-1	10	1,156
Perfluorodecanesulfonate (PFDS)	335-77-3	10	335
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	177
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-06
Description: Eel fillet A027440006 25/6/26 FS10b

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	212
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	24
Perfluorohexanoic acid (PFHxA)	307-24-4	10	63
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	208
Perfluorooctanoic acid (PFOA)	335-67-1	10	55
Perfluorononanoic acid (PFNA)	375-95-1	10	162
Perfluorodecanoic acid (PFDA)	335-76-2	10	129
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	418
Perfluorododecanoic acid (PFDoA)	307-55-1	10	88
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	291
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	36
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	16
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	239
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	16
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	10,563
Perfluorononanesulfonate (PFNS)	375-95-1	10	31
Perfluorodecanesulfonate (PFDS)	335-77-3	10	23
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	17
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-07
Description: Eel fillet A024770001 24/6/26 FS2a 12pm

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	146
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	88
Perfluorohexanoic acid (PFHxA)	307-24-4	10	37
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	1,092
Perfluorooctanoic acid (PFOA)	335-67-1	10	310
Perfluorononanoic acid (PFNA)	375-95-1	10	1,503
Perfluorodecanoic acid (PFDA)	335-76-2	10	350
Perfluoroundecanoic acid (PFUDA)	2058-94-8	10	721
Perfluorododecanoic acid (PFDoA)	307-55-1	10	151
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	117
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	47
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	24
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	39
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	5,317
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	470
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	388,528
Perfluorononanesulfonate (PFNS)	375-95-1	10	2,813
Perfluorodecanesulfonate (PFDS)	335-77-3	10	1,161
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	963
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	24
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	34
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-08
Description: Eel liver A024770001 24/6/26 FS2a 12pm

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	<10
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	107
Perfluorohexanoic acid (PFHxA)	307-24-4	10	<10
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	4,915
Perfluorooctanoic acid (PFOA)	335-67-1	10	185,052
Perfluorononanoic acid (PFNA)	375-95-1	10	382
Perfluorodecanoic acid (PFDA)	335-76-2	10	1,374
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	2,612
Perfluorododecanoic acid (PFDoA)	307-55-1	10	534
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	544
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	155
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	47



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	66
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	34,908
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	3,904
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	1,400,782
Perfluorononanesulfonate (PFNS)	375-95-1	10	32,525
Perfluorodecanesulfonate (PFDS)	335-77-3	10	13,846
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	9,315
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	139
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	3,135
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-09
Description: Eel fillet A027440006 25/6/26 FS10A

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	231
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	<10
Perfluorohexanoic acid (PFHxA)	307-24-4	10	98
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	220
Perfluorooctanoic acid (PFOA)	335-67-1	10	43
Perfluorononanoic acid (PFNA)	375-95-1	10	117
Perfluorodecanoic acid (PFDA)	335-76-2	10	87
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	392
Perfluorododecanoic acid (PFDoA)	307-55-1	10	68
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	311
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	29
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	17
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	<10
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	175
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	10
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	6,385
Perfluorononanesulfonate (PFNS)	375-95-1	10	14
Perfluorodecanesulfonate (PFDS)	335-77-3	10	11
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	<10
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-10
Description: Eel liver A027440006 25/6/26 FS10A

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	288
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	<10
Perfluorohexanoic acid (PFHxA)	307-24-4	10	107
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	1,153
Perfluorooctanoic acid (PFOA)	335-67-1	10	242
Perfluorononanoic acid (PFNA)	375-95-1	10	223
Perfluorodecanoic acid (PFDA)	335-76-2	10	273
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	1,129
Perfluorododecanoic acid (PFDoA)	307-55-1	10	199
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	1,869
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	76
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	31
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	27
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	1,052
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	87
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	38,026
Perfluorononanesulfonate (PFNS)	375-95-1	10	135
Perfluorodecanesulfonate (PFDS)	335-77-3	10	90
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	54
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	33
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-11
Description: Eel fillet A027440006 25/6/26 FS9

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	229
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	448
Perfluorohexanoic acid (PFHxA)	307-24-4	10	347
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	1,678
Perfluorooctanoic acid (PFOA)	335-67-1	10	740
Perfluorononanoic acid (PFNA)	375-95-1	10	2,339
Perfluorodecanoic acid (PFDA)	335-76-2	10	449
Perfluoroundecanoic acid (PFUdA)	2058-94-8	10	566
Perfluorododecanoic acid (PFDoA)	307-55-1	10	190
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	210
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	77
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	<10



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	19
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	56
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	5,292
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	837
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	314,530
Perfluorononanesulfonate (PFNS)	375-95-1	10	1,205
Perfluorodecanesulfonate (PFDS)	335-77-3	10	279
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	251
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	<10
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	<10
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	<100

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist



Certificate of Analysis

Pattle Delamore Partners Ltd
Level 2, 109 Fanshawe Street
Auckland 1010
Attention: James Conway
Phone: +64 021 053 5119
Email: james.conway@pdp.co.nz

Lab Reference: 26-14578
Submitted By: James Conway
Date Received: 30/07/2026
Date Completed: 26/08/2026
Order Number: -
Reference: -

Sample Details

LIMS ID: 26-14578-12
Description: Eel liver A027440006 25/6/26 FS9

Results Summary

PFAS in Biota (EPA1633 Suite)

Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
Perfluorocarboxylic acids (PFCA)			
Perfluorobutanoic acid (PFBA)	375-22-4	10	464
Perfluoropentanoic acid (PFPeA)	2706-90-3	10	1,318
Perfluorohexanoic acid (PFHxA)	307-24-4	10	930
Perfluoroheptanoic acid (PFHpA)	375-85-9	10	12,843
Perfluorooctanoic acid (PFOA)	335-67-1	10	3,203
Perfluorononanoic acid (PFNA)	375-95-1	10	<10
Perfluorodecanoic acid (PFDA)	335-76-2	10	1,642
Perfluoroundecanoic acid (PFUDA)	2058-94-8	10	2,046
Perfluorododecanoic acid (PFDoA)	307-55-1	10	669
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	10	1,541
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	10	197
Per and polyfluoroether carboxylic acids (PFECA)			
Hexafluoropropylene oxide dimer acid (HFPO-DA)*	13252-13-6	100	<100
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)*	919005-14-4	10	<10
Perfluoro-3-methoxypropanoic acid (PFMPA/PF4OPeA)*	377-73-1	10	<10
Perfluoro-4-methoxybutanoic acid (PFMBA/PF5OHxA)*	863090-89-5	10	<10
Nonafluoro-3,6-dioxaheptanoic acid (PFDHA/NFDHA/PFO2HpA)*	151772-58-6	100	<100
Perfluorosulfonamido substances (PFASA)			
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	10	25



Target	CAS	LoR (ng/kg)	Concentration (ng/kg)
N-methyl perfluorooctanesulfonamide (N-MeFOSA)*	31506-32-8	10	<10
N-ethyl perfluorooctanesulfonamide (N-EtFOSA)*	4151-50-2	10	<10
N-methyl perfluorooctanesulfonamidoaceticacid (N-MeFOSAA)	2355-31-9	10	<10
N-ethyl perfluorooctanesulfonamidoaceticacid (N-EtFOSAA)	2991-50-6	10	<10
N-methyl perfluorooctanesulfonamidoethanol (N-MeFOSE)*	24448-09-7	10	<10
N-ethyl perfluorooctanesulfonamidoethanol (N-EtFOSE)*	1691-99-2	10	<10
Perfluorosulfonic acids (PFSA)			
Perfluorobutanesulfonate (PFBS)	375-73-5	10	49
Perfluoropentanesulfonate (PFPeS)	2706-91-4	10	251
Perfluorohexanesulfonate (PFHxS)	355-46-4	10	24,315
Perfluoroheptanesulfonate (PFHpS)	375-92-8	10	5,164
Perfluorooctanesulfonate (PFOS)	1763-23-1	10	920,280
Perfluorononanesulfonate (PFNS)	375-95-1	10	15,363
Perfluorodecanesulfonate (PFDS)	335-77-3	10	4,148
Perfluorododecanesulfonate (PFDoS)*	79780-39-5	10	3,062
Perfluoroether sulfonic acids (PFESA)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)*	756426-58-1	10	<10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)*	763051-92-9	10	<10
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)*	113507-82-7	10	<10
Fluorotelomer sulfonates (FTSA)			
1H,1H,2H,2H-perfluorohexanesulfonate (4:2 FTS)	757124-72-4	10	<10
1H,1H,2H,2H-perfluorooctanesulfonate (6:2 FTS)	27619-97-2	10	108
1H,1H,2H,2H-perfluorodecanesulfonate (8:2 FTS)	39108-34-4	10	31
Fluorotelomer carboxylic acids (FTCA)			
3-Perfluoropropyl propanoic acid (3:3 FTCA)*	356-02-5	100	<100
2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA)*	914637-49-3	100	<100
3-Perfluoroheptyl propanoic acid (7:3 FTCA)*	812-70-4	100	151

Method Summary

PFAS in Biota (EPA1633 Suite): QuEChERS extraction, SPE cleanup, and analysis by LC-HRMS. Analytes with asterisks (*) are not currently validated.

Dr. Jacob Jaine
Senior Research Scientist

Certificate of Analysis

Page 1 of 9

Client:	Pattle Delamore Partners Limited	Lab No:	4251559	SPV1
Contact:	Jessica Campbell	Date Received:	26-Jun-2026	
	C/- Pattle Delamore Partners Limited	Date Reported:	02-Jul-2026	
	PO Box 6136	Quote No:	81087	
	Wellington 6141	Order No:		
		Client Reference:	A027440006	
		Submitted By:	J Conway	

Sample Type: Sediment

Sample Name:	SD10 24-Jun-2026	SD6 24-Jun-2026 10:40 am	SD11 24-Jun-2026 2:30 pm	SD7 24-Jun-2026 3:20 pm	SD12 24-Jun-2026 2:00 pm	
Lab Number:	4251559.2	4251559.4	4251559.6	4251559.8	4251559.10	
Individual Tests						
Dry Matter	g/100g as rcvd	77	46	89	62	48

Sample Name:		SD12A 24-Jun-2026
Lab Number:		4251559.14
Individual Tests		
Dry Matter	g/100g as rcvd	51

Sample Type: Sediment

Sample Name:	SD10 24-Jun-2026	SD6 24-Jun-2026 10:40 am
Lab Number:	4251559.2	4251559.4

PFAS in Soil - Summary

PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0033
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0033
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046

PFAS in Soil - Perfluorocarboxylic Acids

PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTriDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Perfluorosulfonic Acids

L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0031
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Sediment				
		Sample Name:	SD10 24-Jun-2026	SD6 24-Jun-2026 10:40 am
		Lab Number:	4251559.2	4251559.4
PFAS in Soil - Perfluorosulfonic Acids				
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0033
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
		Sample Name:	SD11 24-Jun-2026 2:30 pm	SD7 24-Jun-2026 3:20 pm
		Lab Number:	4251559.6	4251559.8
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0026
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0029
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Sediment				
		Sample Name:	SD11 24-Jun-2026 2:30 pm	SD7 24-Jun-2026 3:20 pm
		Lab Number:	4251559.6	4251559.8
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0021
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0026
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
		Sample Name:	SD12 24-Jun-2026 2:00 pm	SD12A 24-Jun-2026
		Lab Number:	4251559.10	4251559.14
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Sediment				
		Sample Name:	SD12 24-Jun-2026 2:00 pm	SD12A 24-Jun-2026
		Lab Number:	4251559.10	4251559.14
PFAS in Soil - Perfluorocarboxylic Acids				
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDODA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
Sample Type: Aqueous				
		Sample Name:	SW36 24-Jun-2026 9:10 am	SW44 24-Jun-2026 10:40 am
		Lab Number:	4251559.1	4251559.3
PFAS in Water (Trace) - Summary				
PFOA	Perfluorooctanoic acid	µg/L	0.0066	0.0058
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.024	0.028
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	µg/L	0.049	0.052
Total PFAS	Total of Reported PFAS in Water	µg/L	0.18	0.16

Sample Type: Aqueous				
		Sample Name:	SW36 24-Jun-2026 9:10 am	SW 44 24-Jun-2026 10:40 am
		Lab Number:	4251559.1	4251559.3
PFAS in Water (Trace) - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	µg/L	0.0150	0.0116
PFPeA	Perfluoropentanoic acid	µg/L	0.048	0.038
PFHxA	Perfluorohexanoic acid	µg/L	0.037	0.031
PFHpA	Perfluoroheptanoic acid	µg/L	0.0153	0.0130
PFOA	Perfluorooctanoic acid	µg/L	0.0066	0.0058
PFNA	Perfluorononanoic acid	µg/L	0.0021	0.0017
PFDA	Perfluorodecanoic acid	µg/L	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	µg/L	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	µg/L	< 0.0010	< 0.0010
PFTrDA	Perfluorotridecanoic acid	µg/L	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	µg/L	0.0030	0.0028
L-PFPeS	Perfluoropentanesulfonic acid	µg/L	0.0027	0.0029
L-PFHxS	Perfluorohexanesulfonic acid	µg/L	0.021	0.021
B-PFHxS	Perfluorohexanesulfonic acid - Branched	µg/L	0.0036	0.0033
PFHxS	Perfluorohexanesulfonic acid - Total	µg/L	0.025	0.024
L-PFHpS	Perfluoroheptanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	µg/L	0.0114	0.0142
B-PFOS	Perfluorooctanesulfonic acid - Branched	µg/L	0.0127	0.0134
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.024	0.028
L-PFNS	Perfluorononanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Fluorotelomer sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
6:2 FTS	6:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
8:2 FTS	8:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
10:2 FTS	10:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	µg/L	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	µg/L	< 0.002	< 0.002
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	µg/L	< 0.005	< 0.005
PFEESA	Perfluoro[2-ethoxyethane]sulfonic acid	µg/L	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	µg/L	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	µg/L	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	µg/L	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	µg/L	< 0.0010	< 0.0010

Sample Type: Aqueous				
		Sample Name:	SW33 24-Jun-2026 2:30 pm	SW 20 24-Jun-2026 3:20 pm
		Lab Number:	4251559.5	4251559.7
PFAS in Water (Trace) - Summary				
PFOA	Perfluorooctanoic acid	µg/L	0.0079	0.0132
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.031	0.043
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	µg/L	0.062	0.075
Total PFAS	Total of Reported PFAS in Water	µg/L	0.23	0.42
PFAS in Water (Trace) - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	µg/L	0.0177	0.032
PFPeA	Perfluoropentanoic acid	µg/L	0.062	0.145
PFHxA	Perfluorohexanoic acid	µg/L	0.050	0.104
PFHpA	Perfluoroheptanoic acid	µg/L	0.0195	0.037
PFOA	Perfluorooctanoic acid	µg/L	0.0079	0.0132
PFNA	Perfluorononanoic acid	µg/L	0.0022	0.0043
PFDA	Perfluorodecanoic acid	µg/L	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	µg/L	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	µg/L	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	µg/L	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	µg/L	0.0039	0.0031
L-PFPeS	Perfluoropentanesulfonic acid	µg/L	0.0034	0.0030
L-PFHxS	Perfluorohexanesulfonic acid	µg/L	0.026	0.027
B-PFHxS	Perfluorohexanesulfonic acid - Branched	µg/L	0.0045	0.0047
PFHxS	Perfluorohexanesulfonic acid - Total	µg/L	0.031	0.032
L-PFHpS	Perfluoroheptanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	µg/L	0.0154	0.0196
B-PFOS	Perfluorooctanesulfonic acid - Branched	µg/L	0.0159	0.023
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.031	0.043
L-PFNS	Perfluorononanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Fluorotelomer sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
6:2 FTS	6:2 Fluorotelomersulfonic acid	µg/L	< 0.002	0.006
8:2 FTS	8:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
10:2 FTS	10:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	µg/L	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	µg/L	< 0.002	< 0.002
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	µg/L	< 0.005	< 0.005
PFEESA	Perfluoro[2-ethoxyethane]sulfonic acid	µg/L	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	µg/L	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	µg/L	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010

Sample Type: Aqueous				
		Sample Name:	SW33 24-Jun-2026 2:30 pm	SW 20 24-Jun-2026 3:20 pm
		Lab Number:	4251559.5	4251559.7
PFAS in Water (Trace) - Miscellaneous				
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	µg/L	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Summary				
PFOA	Perfluorooctanoic acid	µg/L	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	< 0.0010	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	µg/L	< 0.0010	< 0.0010
Total PFAS	Total of Reported PFAS in Water	µg/L	< 0.06	< 0.06
PFAS in Water (Trace) - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	µg/L	0.0023	< 0.0010
PFPeA	Perfluoropentanoic acid	µg/L	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	µg/L	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	µg/L	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	µg/L	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	µg/L	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	µg/L	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	µg/L	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	µg/L	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	µg/L	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	µg/L	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	µg/L	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	µg/L	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	µg/L	< 0.0010	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	µg/L	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	< 0.0010	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Fluorotelomer sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
6:2 FTS	6:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
8:2 FTS	8:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
10:2 FTS	10:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	µg/L	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	µg/L	< 0.002	< 0.002
NFDHA	Nonfluoro-3,6-dioxahexanoic acid	µg/L	< 0.005	< 0.005
PFEESA	Perfluoro[2-ethoxyethane]sulfonic acid	µg/L	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	µg/L	< 0.0010	< 0.0010

Sample Type: Aqueous				
		Sample Name:	SW 4 24-Jun-2026	SW 44A 24-Jun-2026 10:50 am
		Lab Number:	4251559.9	4251559.11
PFAS in Water (Trace) - Miscellaneous				
PFMBA	Perfluoro-4-methoxybutanoic acid	µg/L	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	µg/L	0.0012	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	µg/L	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	µg/L	< 0.0010	< 0.0010
		Sample Name:	SW 33A 24-Jun-2026 2:50 pm	SW 4A 24-Jun-2026
		Lab Number:	4251559.12	4251559.13
PFAS in Water (Trace) - Summary				
PFOA	Perfluorooctanoic acid	µg/L	0.0082	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.036	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	µg/L	0.068	< 0.0010
Total PFAS	Total of Reported PFAS in Water	µg/L	0.24	< 0.06
PFAS in Water (Trace) - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	µg/L	0.0181	< 0.0010
PFPeA	Perfluoropentanoic acid	µg/L	0.064	< 0.0010
PFHxA	Perfluorohexanoic acid	µg/L	0.051	< 0.0010
PFHpA	Perfluoroheptanoic acid	µg/L	0.021	< 0.0010
PFOA	Perfluorooctanoic acid	µg/L	0.0082	< 0.0010
PFNA	Perfluorononanoic acid	µg/L	0.0028	< 0.0010
PFDA	Perfluorodecanoic acid	µg/L	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	µg/L	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	µg/L	< 0.0010	< 0.0010
PFTriDA	Perfluorotridecanoic acid	µg/L	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Perfluorosulfonic Acids				
L-PFPs	Perfluoropropanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	µg/L	0.0042	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	µg/L	0.0032	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	µg/L	0.028	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	µg/L	0.0047	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	µg/L	0.033	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	µg/L	0.0177	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	µg/L	0.0178	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	µg/L	0.036	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	µg/L	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	µg/L	< 0.0010	< 0.0010
PFAS in Water (Trace) - Fluorotelomer sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
6:2 FTS	6:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
8:2 FTS	8:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
10:2 FTS	10:2 Fluorotelomersulfonic acid	µg/L	< 0.002	< 0.002
PFAS in Water (Trace) - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	µg/L	< 0.002	< 0.002

Sample Type: Aqueous				
		Sample Name:	SW33A 24-Jun-2026 2:50 pm	SW4A 24-Jun-2026
		Lab Number:	4251559.12	4251559.13
PFAS in Water (Trace) - Miscellaneous				
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	µg/L	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	µg/L	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	µg/L	< 0.002	< 0.002
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	µg/L	< 0.005	< 0.005
PFEESA	Perfluoro[2-ethoxyethane]sulfonic acid	µg/L	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	µg/L	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	µg/L	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	µg/L	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	µg/L	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	µg/L	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	µg/L	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	µg/L	< 0.0010	< 0.0010

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Sediment			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	2, 4, 6, 8, 10, 14
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. ASTM D7968 Online (modified).	0.0010 - 0.046 mg/kg dry wt	2, 4, 6, 8, 10, 14

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
PFAS in Water (Trace)	Co-solution. LC-MS/MS analysis. ASTM D8421 Online (modified).	-	1, 3, 5, 7, 9, 11-13

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 29-Jun-2026 and 02-Jul-2026. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.



Kim Harrison MSc
Client Services Manager - Environmental



Appendix D: Field Sheets

SUBJECT

REF / JOB No.

DATE

DESIGNED BY

CHECKED BY

SW36 → no bista samples caught in nets
→ water cress sample taken
→ caught 1x bullie
1x whitebait
lots of shrimp.

SD10
WC1

SW44A = top blank.

SW44 → 2 x eels processed
1 x large released
6 x babies

SD6
WC2
FS2a
FS2b.

SW33 → duplicate sw (SW33A) +
SD11
2x small nets placed.

FS9a
WC3

SW20 → water + sea taken - WC4

SD
SW20

SW4 → water + feed
2x small nets

SW4 - SW4A
SD12
SD12A

Fish x 2 FS10A
FS10B

SUBJECT

23-25 June 2026.

REF / JOB No.

A027440006

DATE

Jess + Chloe

DESIGNED BY

CHECKED BY

SW36

samples taken: SW36
SD10
WC1

SW44

samples taken: SW44
SW44A (trip blank)
SD6
WC2
FS2a
FS2b

SW33

samples taken: SW33
SW33a (duplicate)
SD11
F9a

SW20

samples taken: SW20
SD7
WC4

SW4

samples taken: ~~SW4~~ SW4
SW4A (field blank)
SD12
SD12A (duplicate)
FS10a
FS10b

SURFACE WATER SAMPLING FORM

Site: SW36
 Sample ID: AD27440006
 Weather: dry, overcast
 Sampling Equipment: YSI Quatro.
 Flow Method: —

Date/s: 24/6/26
 Sampler Initials: JC/CW

Time	Water Temp. (°C)	pH (pH Units)	SPC EC (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L, %)	Turbidity (NTU)	Water Appearance *
0955	9.8	7.06	760	-11.1	56.37 56%	/	clear slightly turbid.

*CL = clear; CO = cloudy; TU = turbid; SA = sandy

Duplicate	Label

Blank	Label

Field Calibration ☐

Comments

- PPMs water + sediment taken.
- water cross taken.

SURFACE WATER SAMPLING FORM

Site:

SW44

Date/s:

24/6/26

Sample ID:

Ans 24770000

Sampler Initials:

TC / CW

Weather:

overcast, dry

Sampling

487

Equipment:

Flow Method:

Time	Water Temp. (°C)	pH (pH Units)	EC (μS/cm)	ORP (mV)	Dissolved Oxygen (mg/L, %)	Turbidity (NTU)	Water Appearance *
1140	10.5	7.34	771	-20.4 103.1	8.0, 72.1		cloudy / discoloured

*CL = clear; CO = cloudy; TU = turbid; SA = sandy

Duplicate	Label

Blank	Label

Field Calibration

9

Comments

[illegible]

SURFACE WATER SAMPLING FORM

Site: A027440006

Date/s: 24/6/26

Sample ID: SW33

Sampler Initials: JC/CW

Weather: dry overcast

Sampling Equipment:

Flow Method: _____

Time	Water Temp. (°C)	pH (pH Units)	EC (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L%)	Turbidity (NTU)	Water Appearance *
230	10.7	7.18	585	115	9.6 / 8.1		CL

*CL = clear; CO = cloudy; TU = turbid; SA = sandy

Duplicate	Label
SW33	
SW33A	
SD11	

Blank	Label

Field Calibration ☐

Comments

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

SURFACE WATER SAMPLING FORM

Site: JW-20

Sample ID: A027440006

Weather: raining

Sampling Equipment: YSI

Flow Method: _____

Date/s: 24/6/26

Sampler Initials: JC/CW

Time	Water Temp. (°C)	pH (pH Units)	EC (μS/cm)	ORP (mV)	Dissolved Oxygen (mg/L, %)	Turbidity (NTU)	Water Appearance *
330	10.5	6.96	262.2	100.9	7.54 67.7%	/	clear some tannins

*CL = clear; CO = cloudy; TU = turbid; SA = sandy

Duplicate	Label
SW 20	
SD7	

Blank	Label

Field Calibration ☐

Comments

[illegible]

SURFACE WATER SAMPLING FORM

Site:

1027440001

Date/s:

24/6/26

Sample ID:

SW4

Sampler Initials:

JZ/CW

Weather:

raining

Sampling

481

Equipment:

Flow Method:

Time	Water Temp. (°C)	pH (pH Units)	EC (μS/cm)	ORP (mV)	Dissolved Oxygen (mg/L, %)	Turbidity (NTU)	Water Appearance *
4pM	10.6	7.24	575	107	5.34 mg/L		Turbid
					481 %		

*CL = clear; CO = cloudy; TU = turbid; SA = sandy

Duplicate	Label
SW4	
SW4a - Field blank.	

- Check
chises
photos
for
USI
readings

Blank	Label

Field Calibration

☐

Comments

[illegible]

Appendix E: Site Photographs



Photograph 1: Fyke nets set at SW4.



Photograph 2: Tuna/eel FS10b caught at SW4



Photograph 3: Tuna/eel FS10a caught at SW4.



Photograph 4: Fyke nets set at SW33.



Photograph 5: Juvenile tuna caught at SW33, released.



Photograph 6: Tuna/eel FS9 caught at SW33.



Photograph 7: Fyke net set at SW44.



Photograph 8: Tuna/eel FS2a and FS2b caught at SW44.



Photograph 9: Fyke net set at SW36.

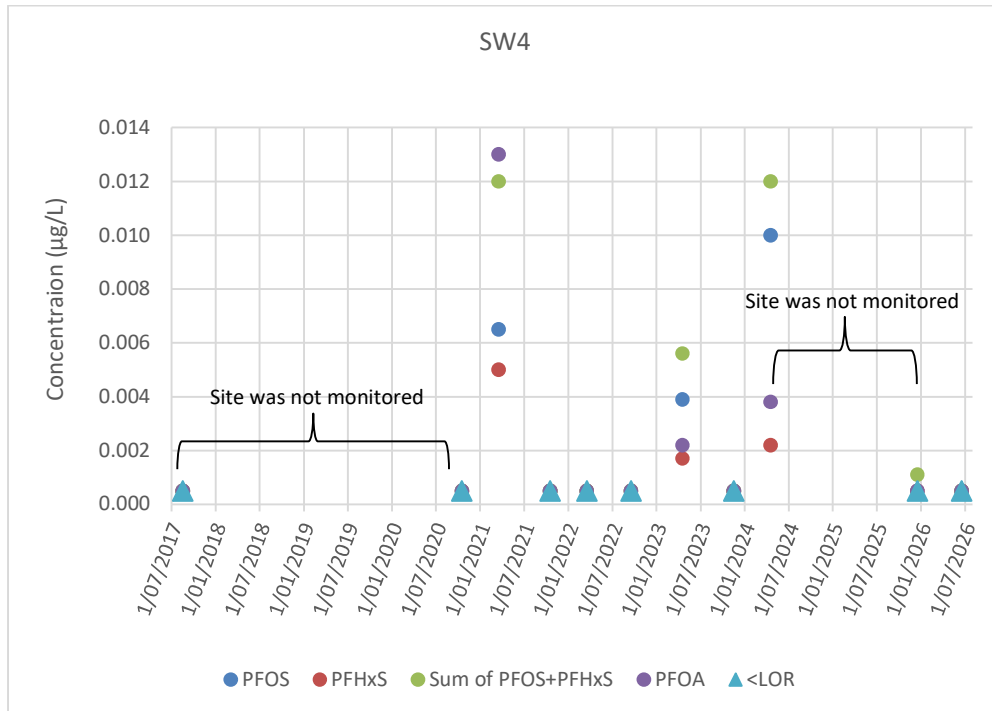


Photograph 10: Bully caught at SW36, released.

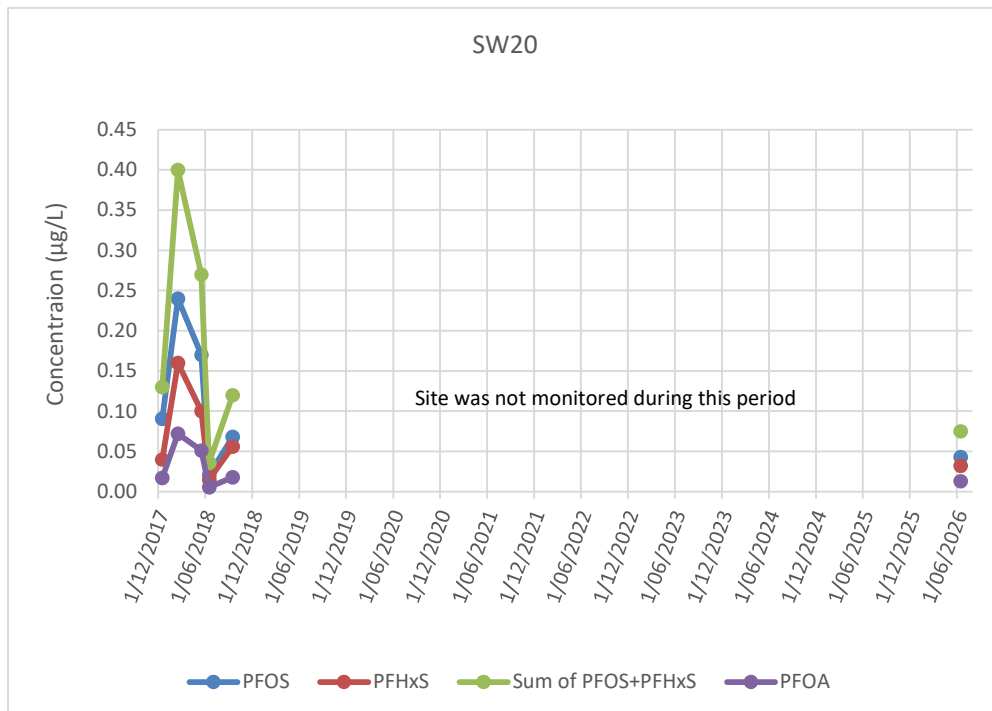


Photograph 11: Inanga caught at SW36, released.

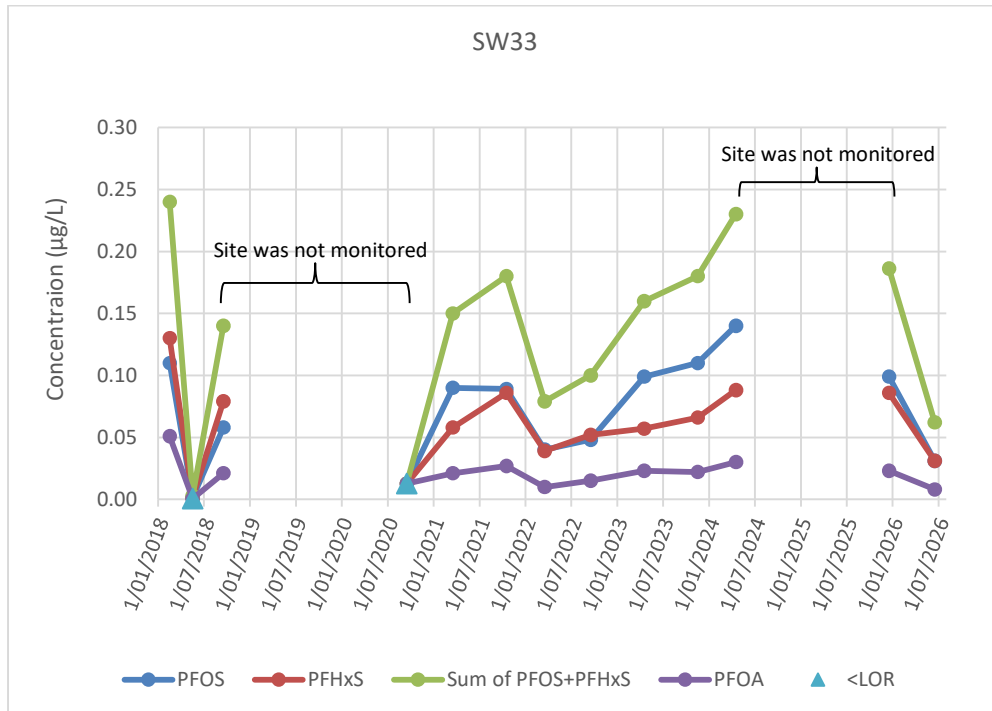
Appendix F: Timeseries Plots



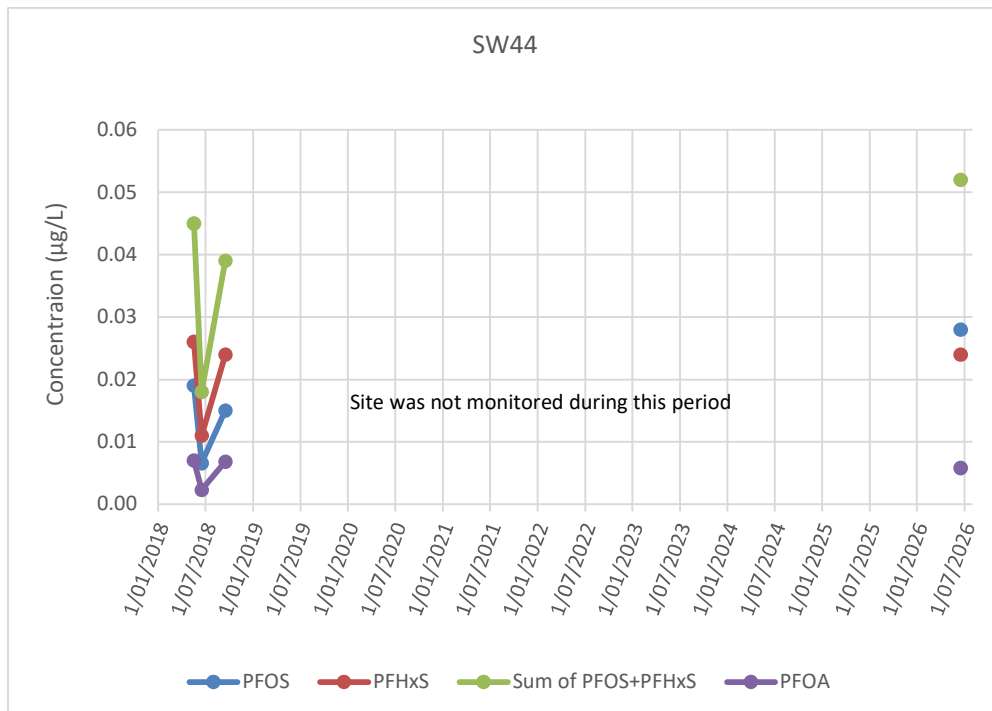
Plot 1: Timeseries plot showing select PFAS concentrations over time at surface water monitoring location SW4. Monitoring typically occurred on a six-monthly basis, except where shown. Samples reported below the laboratory level of reporting (LOR) are shown as a blue triangle and are plotted at half the LOR.



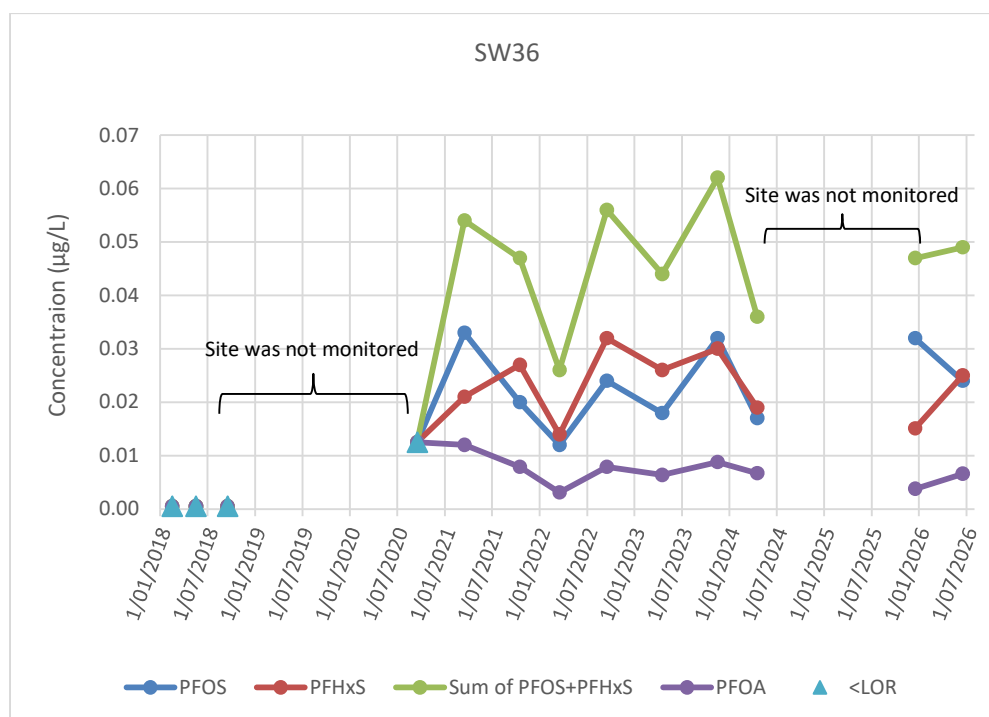
Plot 2: Timeseries plot showing select PFAS concentrations over time at surface water monitoring location SW20. Note, SW20 is not regularly monitored, hence the large gap in data between 2018 and 2026.



Plot 3: Timeseries plot showing select PFAS concentrations over time at surface water monitoring location SW33. Monitoring typically occurred on a six-monthly basis, except where shown. Samples reported below the laboratory level of reporting (LOR) are shown as a blue triangle and are plotted at half the LOR.



Plot 4: Timeseries plot showing select PFAS concentrations over time at surface water monitoring location SW44. Note, SW44 is not regularly monitored, hence the large gap in data between 2018 and 2026.



Plot 5: Timeseries plot showing select PFAS concentrations over time at surface water monitoring location SW36. Monitoring typically occurred on a six-monthly basis, except where shown. Samples reported below the laboratory level of reporting (LOR) are shown as a blue triangle and are plotted at half the LOR. Note the higher LOR for sample reported in September 2020.



horizons.govt.nz

24 hour freephone 0508 800 800
fax 06 952 2929 | **email** help@horizons.govt.nz
Private Bag 11025, Manawatu Mail Centre, Palmerston North 4442