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FLOATING WETLANDS PILOT STUDY FOR WASTEWATER MANAGEMENT:

Two-Year Evaluation for Treatment of Emerging Contaminants

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Front cover photo: Constructed floating wetlands at the Cowes Wastewater Treatment Plant, Victoria.

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Definitions and abbreviations

SHORT FORM	FULL FORM
4:2FtS	1H,1H, 2H, 2H-Perfluorohexane sulfonic acid
6:2FtS	1H,1H, 2H, 2H-Perfluorooctane sulfonic acid
8:2FtS	1H,1H, 2H, 2H-Perfluorodecane sulfonic acid
ADONA	4,8-Dioxa-3H-perfluorononanoic acid
CFW	Constructed floating wetlands
CWWTP	Cowes Wastewater Treatment Plant
EtFOSE	N-ethyl perfluorooctanesulfonamidoethanol
GenX / HFPO-DA	Hexafluoropropylene oxide dimer acid
HRT	Hydraulic retention time
LC-HRMS	Liquid chromatography high resolution mass spectrometry
LC-MS/MS	Liquid chromatography tandem mass spectrometry
LC-PFCAs	Long chain-Perfluoroalkyl carboxylic acids (carbon chain length of seven or more)
LC- PFSAs	Long chain- Perfluoroalkane sulfonic acids (carbon chain length of six or more)
MeFOSE	N-methyl perfluorooctanesulfonamidoethanol
N-EtFOSA	N-ethyl perfluorooctanesulfonamide
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
N-MeFOSA	N-methyl perfluorooctanesulfonamide
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFAS	Per- and poly-fluoroalkyl substances
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutanesulfonic acid
PFDA	Perfluorodecanoic acid
PFDoA	Perfluorododecanoic acid
PFDS	Perfluorodecanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHpS	Perfluoroheptanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluorononanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFOSA	Perfluorooctanesulfonamide
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentanesulfonic acid
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFUdA	Perfluoroundecanoic acid
Precursor	Polyfluoroalkyl substances (e.g., 8:2 FTS) that may degrade to form more stable PFAAs during chemical oxidation or other processes.
SC-PFCAs	Short chain-Perfluoroalkyl carboxylic acids (carbon chain length of less than seven)
SC-PFSAs	Short chain- Perfluoroalkane sulfonic acids (carbon chain length of less than six)
TOP assay	Total Oxidizable Precursor Assay
WPW	Westernport Water utility

Executive summary

Per- and polyfluoroalkyl substances (PFAS) is now recognized as a Global Pollutant of Concern. It can be found in various environmental media including surface water and ground water that can be used for recreational purposes, livestock and human drinking water. Over the last 5 years, PFAS has emerged as a significant challenge for the wastewater treatment industry, due to its occurrence in municipal wastewater and biosolids. Despite the low-level PFAS contamination for target PFAS typically monitored, the discharge of PFAS-contaminated waters into the environment remains a potential concern in both short- and long-term, due to the risk of accumulation in biota over time. Furthermore, studies have indicated the presence of unknown PFAS in wastewater samples, suggesting that the actual PFAS load into the environment may be higher than perceived through traditional targeted analysis. Hence, there is a growing need for approaches that can effectively monitor and manage the increasing broad range of PFAS in environments and reduce the PFAS load in discharged effluents.

As part of Westernport Water's (WPW) collaborative efforts with CSIRO, Deakin University's Blue Carbon Lab, Clarity Aquatic, and Covey Associates, we have undertaken a Floating Wetland Pilot study (CFW) at the Cowes Wastewater Treatment Plant (CWWTP) to assess the effectiveness of wetland plants to provide multiple benefits, such as improved water quality (e.g., nutrient and emerging contaminants removal) and reduced greenhouse gas emissions. This report summarizes the outcomes of a study conducted to assess the effectiveness of CFW in the uptake and accumulation of emerging contaminants, specifically, PFAS.

The objectives of this project are to:

- Investigate the removal efficiency of targeted PFAS by wetland plant species from wastewater;
- Assess the influence of growth and developmental stage on PFAS uptake and distribution between roots and shoots in various wetland plant species;
- Gain further insights – through selected sample analysis – into the presence, uptake, and distribution of unknown PFAS in waters, sediments, and plant species from the CWWTP floating wetland pilot trial.

The pilot-scale CFW system consisted of 60 Clarity Aquatic CFW modules (2.35 m x 2.35 m each) which were installed at the polishing lagoon of the CWWTP in Victoria for a period of ~22 months (May 2023 to February 2025). Each module contained 15 inter-changeable polypropylene baskets (57 cm x 38 cm x 17 cm each) filled to half-depth with aggregate, with each basket planted with two plants of the same species (P1: *Baumea articulata*; P2: *Phragmites australis*; P3: *Bolboschoenus caldwellii*).

During the study period, water (pre and post CFW), sediment (below the CFWs), and plant tissue (roots and shoots) samples were collected at nine-time intervals for targeted PFAS, total oxidizable precursor (TOP) assay, and suspect screening with putative identification of unknown PFAS (nontarget analysis). In addition, three random baskets per plant species were selected at the time of harvesting (Sep-24 and Feb-25), to measure both wet and dry weights of roots and shoots.

Key outcomes from this study highlight the performance of CFWs as a natural-based solution for mitigating PFAS migration from wastewater treatment plants to the receiving environment. The results demonstrate that while PFAS removal can take time, several processes contribute to this reduction, with varying effectiveness depending on PFAS characteristics and plant species.

• **PFAS Removal**

- **Time dependence:** Observable PFAS removal by the CFWs was evident after one year, indicating the removal may require a longer establishment period. During the initial establishment phase, several processes likely occurred: (1) plant adaptation and growth in the receiving waters, and (2) the development of biofilms on plant roots, among others.
- **Sorption and sedimentation:** Greater removal of long-chain PFAS (LC-PFAS) compared to short-chain PFAS (SC-PFAS) suggests that sorption processes, potentially via biofilms and/or sediments, play a key role. This is consistent with the tendency for sorption of PFAS to organic phases to increase with chain length. Sedimentation appeared to contribute significantly to the removal of long-chain PFAS, which were detected at high concentrations in the sediments.
- **Precursor removal:** CFWs were effective in removing precursors from the treated water, potentially with settling of sediments. Sorption of precursors to sediments is likely as these are generally larger and have higher molecular weight (as detected in nontarget analysis). The stability of PFAS precursors in sediments remains uncertain, and their potential to release PFAAs into water over time may require further management.

• **Plant Uptake and Accumulation**

- **Plant growth and uptake patterns:** Plants can accumulate PFAS in the roots and shoots. At a given time point, the concentration of PFAS is generally higher in the roots than the shoots. In both tissue types, SC-PFAS accumulated more than LC-PFAS. PFAS uptake generally increased with time, although at longer time points, significant growth of plants can result in a dilution of concentrations.
- **Species-specific uptake:** Uptake differed for the three plants. *Baumea articulata* was the most effective in concentrating PFAS to harvestable portions of the plant, i.e. shoots, while *Phragmites australis* showed the highest total accumulation based on the mass of harvestable tissues.
- **Precursor accumulation:** Plants were also able to remove precursors from water, accumulating them in their tissues, although at concentrations lower than those found in the sediments.
- These outcomes highlight the benefits of an engineered natural based solution (NbS) i.e., CFW for mitigating the risk of PFAS migration from wastewater treatment plants to the receiving environment.

Recommendations for future work

- **Validating the performance of CFWs:** The effect of the CFWs did not become apparent until the later stages of the study period, emerging after plant establishment period, 12 months from installation. It is recommended to continue monitoring the system to validate the treatment process and demonstrate that the CFW can consistently produce water of the required quality across a range of operational conditions.
- **Removal mechanisms:** While the precise mechanisms for PFAS removal cannot be fully confirmed, it is likely that the processes involve a combination of sorption (to sediments or plant

roots/biofilms) and plant uptake. Further research is needed to fully elucidate these mechanisms. Research focused specifically on the accumulation of PFAS in biofilm and biofilm-plant relationships is required to elucidate the consequence of changes in water quality on the dynamics of biofilm communities that could lead to the mobilisation of PFAS.

- **Management of PFAS-contaminated sediments:** Despite that CFWs were also effective in removing PFAS precursors from the treated water, likely through sorption to sediments, the stability of these precursors in sediments remains uncertain, and their potential to release PFAAs into the water over time warrants further investigation.
- **Combined approaches:** To further improve PFAS removal efficacy, CFW coupling with other treatment approaches (e.g., aeration) could be considered. To concentrate PFAS in the root zone and remove water depth as a potential limitation, a diffuse aeration system could be used to push PFAS to the water surface where they can be rapidly taken up by plants via roots. Air bubbles act as carriers for surfactant PFAS, lifting them to the water's surface alongside the root zone and plant media, thereby increasing the availability of PFAS for plant uptake.

1 Introduction

As part of Westernport Water's (WPW) collaborative efforts with CSIRO, Deakin University's Blue Carbon Lab, Clarity Aquatic, and Covey Associates, we have undertaken a Floating Wetland Pilot study (**Figure 1**) at the Cowes Wastewater Treatment Plant (CWWTP). This study is a testament to the team's commitment to improving sustainable outcomes addressing climate change and environmental stewardship. The Floating Wetland Pilot study assessed the effectiveness of wetland plants to provide multiple benefits, such as improved water quality (e.g., nutrient and emerging contaminants removal) and reduce greenhouse gas emissions.

CSIRO's role in this project is to assess the effectiveness of constructed floating wetlands (CFW) in the uptake and accumulation of per- and poly-fluoroalkyl substances (PFAS). Under laboratory conditions, native wetland plants have demonstrated potential for PFAS removal via plant uptake, supporting their use as an effective and efficient treatment for contaminated wastewater (Awad *et al.* 2022a). This research is a crucial step towards optimising CFW performance through physical parameters (e.g., hydraulic retention time, hydraulic loading rate, and bed depth) and biological factors (e.g., selecting plant species for uptake, transformation, and accumulation). This project showcases the application of floating wetlands for PFAS removal from treated wastewater at a pilot scale.



Figure 1. CFWs at the polishing lagoon, Cowes Wastewater Treatment Plant.

The objectives of the CSIRO component of the overall project were to:

- Investigate the removal efficiency of targeted PFAS by wetland plant species from wastewater;
- Assess the influence of plant growth and developmental stage on PFAS uptake and distribution between roots and shoots in various wetland plant species;
- Gain further insights – through selected sample analysis – into the presence, uptake, and distribution of unknown PFAS in waters, sediments, and plant species from the CWTP floating wetland pilot trial.

This final report summarises the outcomes of the CSIRO component of the overall project.



Figure 2. CFWs at time of harvesting.

2 Scope of Work

Water, sediment and plant tissue samples were collected between May 2023 and February 2025 for targeted PFAS, total oxidizable precursor (TOP) assay, and suspect screening with putative identification of unknown PFAS (nontarget analysis). The numbers of samples collected for each sample type during the pilot trial is summarised in Table 1. Sample preparation and the chemical analyses, including targeted PFAS quantification, TOP assay precursor analysis, and nontargeted screening for additional PFAS are summarised in Appendix A.

Table 1. Sample type and numbers for PFAS analysis at various developmental stages

Sample Round	Analysis	Water			Sediment	Plant		Weed
		Raw	Pre-CFW	Post CFW	Under CFW	Roots	Shoots	Shoots
T0 (baseline) May 23	Target PFAS		3 ^a		3 ^a	3	4	
	Nontarget PFAS		3			4	4	
	TOPA					4	4	
T1 (2-month) Jul 23	Target PFAS	2	2	2	2	6 ^b	6 ^b	
	Nontarget PFAS	2	2	2	2			
	TOPA	1	1	1	2			
T2 (4-month) Sep 23	Target PFAS		3 ^a	3 ^a	3 ^a	6 ^b	6 ^b	
	Nontarget PFAS		3	3	2	4	4	
	TOPA		2	2	2	4	4	
T3 (6-month) Nov 23	Target PFAS		3 ^a	3 ^a	3 ^a	6 ^b	6 ^b	
	Nontarget PFAS							
	TOPA							
T4 (8-month) Jan 24	Target PFAS		3 ^a	3 ^a	3 ^a	6 ^b	6 ^b	
	Nontarget PFAS							
	TOPA							
T5 (12-month) May 24	Target PFAS		3 ^a	3 ^a	3 ^a	9 ^c	9 ^c	
	Nontarget PFAS			2	2			
	TOPA		1	1	2	4	4	
T6 (15-month) Aug 24	Target PFAS		3 ^a	3 ^a	3 ^a	9 ^c	9 ^c	3
	Nontarget PFAS		3	3	2			
	TOPA							
T7 (18-month) Nov 24	Target PFAS		3 ^a	3 ^a	3 ^a	9 ^c	9 ^c	
	Nontarget PFAS							
	TOPA							
T8 (21-month) Feb 25	Target PFAS		3 ^a	3 ^a	3 ^a	9 ^c	9 ^c	3
	Nontarget PFAS							
	TOPA		1	1	2	4	4	

^a3: 3 replicate; ^b 6: 3 replicate x 2 plant species; ^c 6: 3 replicate x 3 plant species

SAMPLING

Water samples were collected from the CFWs (pre and post CFW) at nine-time intervals (T0: May 23; T1: Jul 23; T2: Sep 23; T3: Nov 23; T4: Jan 24; T5: May 24; T6: Aug 24; T7: Nov 24; T8: Feb 25) over 21 months. Surface sediment samples were collected below the CFWs, and plant (roots and shoots) samples were collected from the three species (P1: *Baumea articulata*; P2: *Phragmites australis*; P3: *Bolboschoenus caldwellii*) at the same nine-time intervals (T0-T8). In addition, samples of weeds (W1: *Carex appressa*; W2: *Celery buttercup*) grown within the CFWs were also collected at T6 and T8.

ANALYSES

Samples were analysed using a combination of targeted, precursor, and nontargeted approaches to provide a comprehensive assessment of PFAS presence. Targeted analysis quantified 27 known PFAS, including 18 perfluoroalkyl acids (PFAAs)—comprising 11 perfluorocarboxylic acids (PFCAs) and 7 perfluorosulfonic acids (PFSAs)—and 9 known precursors. To assess the presence of additional precursor compounds that may degrade into stable PFAAs, TOP assay was conducted. This involved chemically oxidising the samples to convert precursors into measurable PFCAs. To detect PFAS beyond the target list, nontargeted analysis was also performed, allowing for the identification of previously unmonitored or unknown PFAS. All analyses were conducted in-house at CSIRO. Details for each analysis could be found in Appendix A.

CALCULATIONS

PFAS concentrations in water samples were reported in ng/L, while concentrations in sediment and plant tissues were reported in ng/g. To estimate PFAS precursor levels using the TOP assay, PFCA concentrations before and after oxidation were compared. Although several studies reported detection of PFSAs post oxidation, the mechanism for PFSA generation from TOP assay is not well understood (Ateia *et al.* 2023). Ateia *et al.* (2023) recommended to use PFCAs data only to determine sum of PFAAs as precursor transformation should just lead to PFCAs only during the TOP assay. Consequently, in this report, PFCAs were converted to nmol/L for water samples and nmol/g for sediment and plant samples, standardising concentrations by the molecular amount of each compound. The difference in PFCA concentrations (expressed in nmol, Eq.1) between each sample before and after oxidation was used to estimate the concentration of PFAS precursors.

$$\text{Precursors}_{est} = \sum_{i=1}^n \frac{PFCA_{OX_i}}{M_i} - \sum_{i=1}^n \frac{PFCA_{nonOX_i}}{M_i} \quad (1)$$

Where, Precursors_{est} is the estimated PFAS precursors concentration (nmol/L for water sample or nmol/g for solid sample); $PFCA_{OX_i}$ is the measured PFCA species after oxidation (ng/L for water sample or ng/g for solid sample); M_i is the molar mass of each PFCA species (nmol/ng); $PFCA_{nonOX_i}$ is the measured PFCA species before oxidation (ng/L for water sample or ng/g for solid sample); n is number of measured PFCA species (11).

At the time of harvesting (Sep-24 and Feb-25), three random baskets per plant species were selected, and both roots and shoots were harvested for wet weight measurement. The plant materials were then spread in a covered area and left to dry for seven days before recording dry weights. Average wet and dry weight per plant species during each time of harvesting are shown in Figure 3. Using these dry weight values and the measured PFAS uptake for each species, the total

PFAS uptake per m² of floating wetlands was calculated using Eq. 2. In addition, the wet and dry weights of harvested shoots and weeds at each harvesting event (Sep-24 and Feb-25) were measured and results shown in Table B. 1, Appendix B.

$$PFAS\ uptake = n_{basket} \times (W_R \times \sum_{i=1}^n PFAS_{R_i} + W_S \times \sum_{i=1}^n PFAS_{S_i}) \quad (2)$$

Where, *PFAS uptake* is the total PFAS uptake per m² of CFWs (ng/m²); *n_{basket}* is number of baskets per m² of CFWs (3); *W_R* is the average dry weight of roots per basket (g); *PFAS_{R_i}* is the measured PFAS species in roost tissue (ng/g); *W_S* is the average dry weight of shoots per basket (g); *PFAS_{S_i}* is the measured PFAS species in shoots tissue (ng/g); *n* is number of measured PFAS species (20).

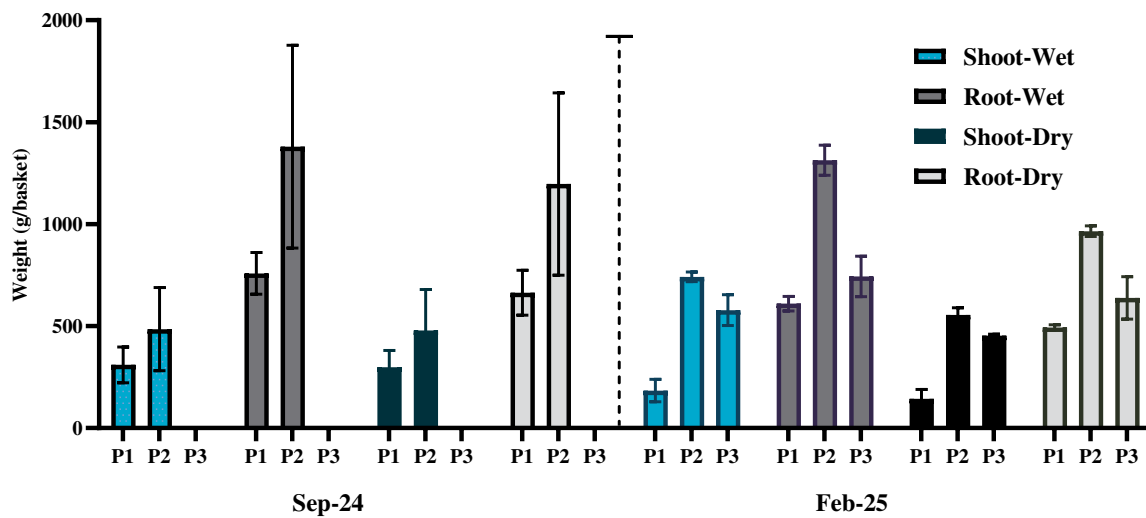


Figure 3. Wet and dry weights per basket for each plant species at the time of harvesting (Sep-24 and Feb-25). P3 was not harvested at the first harvesting point (Sep-24) as it was just planted (May-24) to replace 50% of the P2 species.



Figure 4. CFWs after plant harvesting. **Inset:** Harvested plant materials.

3 Results and discussion

The contaminant removal by CFW treatment system depends on the fraction of water in the system that passes through a root zone, and the residence time distribution within those root zones. As such, understanding the hydraulics of the entire lagoon and CFW system is crucial in order to assess and enhance contaminant removal efficiency (Lucke *et al.* 2019; Awad *et al.* 2024). Lagoons and CFW are typically evaluated or designed based on a nominal hydraulic retention time (HRT), calculated as the volume divided by rate of discharge. Water depth is another key aspect to be considered when designing CFW systems. Deep water allows for the formation of a free water zone beneath floating modules which minimises the contact of roots, water and microorganisms.

During the study period (May 2023 to Feb 2025), the average (\pm S.D.) daily inflow to the lagoon was 43.8 (\pm 8.4) L/s, ranging from 33.8 to 70.3 L/s (Figure B 1b, Appendix B). The water level within the lagoon averaged 2.1 (\pm 0.2) m and ranged from 1.1 to 3.2 m (Figure B 1a, Appendix B). These water levels were higher than the recommended value (0.8–1.0 m) to prevent the formation of a free water zone (Colares *et al.* 2020). Using the correlation between the water level and the lagoon area obtained from the WPW team (Figure B 2, Appendix B), the daily lagoon volume was calculated, leading to the determination of the average volume per month during the study period. The HRT (Figure 5) for each month was calculated based on the total inflow during that month and corresponding average volume. The HRTs were found to be ranged between 1.0 to 2.3 days.

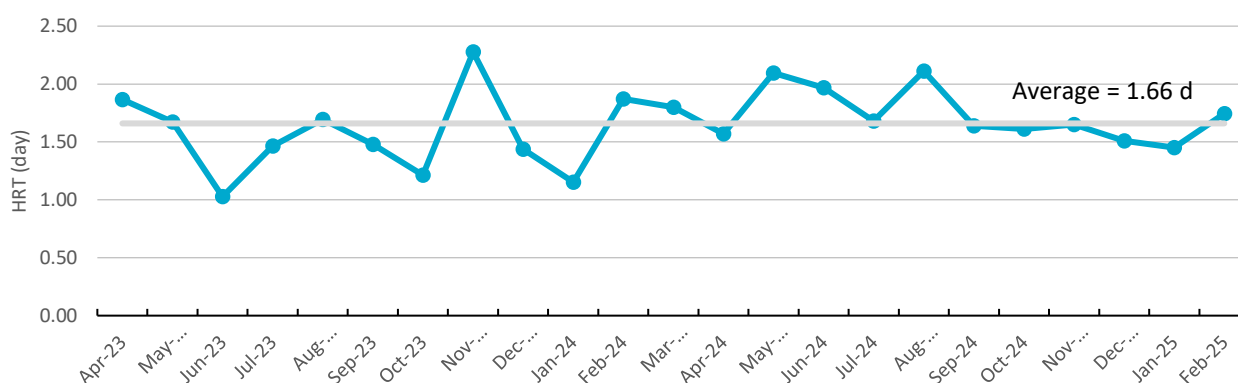


Figure 5. The Hydraulic Retention Time values during the study period.

It is also important to note that CFW performance could be site-specific and that the same plant species may exhibit different behaviours under different environmental conditions. Matrix composition (e.g., pH, electrical conductivity, dissolved organic carbon, nutrients), PFAS chemicals, and concentration could affect the plant growth rates and CFW performance. For example, as nutrient levels in the water matrix increase, root and shoot biomass also increase (Awad *et al.* 2022b); consequently, the accumulation of contaminants in plant tissues could also increase. The quality of inflow waters to the lagoon (measured at the inflow to the treatment channel by the Blue Carbon Lab team) remained relatively stable throughout the study period, with average values of 7.33 pH, 93% dissolved oxygen (DO), 946 μ S/cm, 18.3 $^{\circ}$ C, 7.63 mg/L Nitrate, 11.4 mg/L total Kjeldahl nitrogen (TKN) and 8.2 mg/L total phosphorus (TP).

3.1 PFAS concentrations in water samples

Targeted PFAS

Figure 6 shows the average PFAS concentrations for each functional group (PFCAs and PFSA) and carbon numbers (i.e., long-chain, LC vs short-chain, SC) in water samples collected pre- (Inf) and post-CFW (Eff) after 2, 4, 6, 8, 12, 15, 18 and 21 months from the CFW installation. The PFAS concentrations in each water sample collected during the study are shown in Table B. 2, Appendix B .

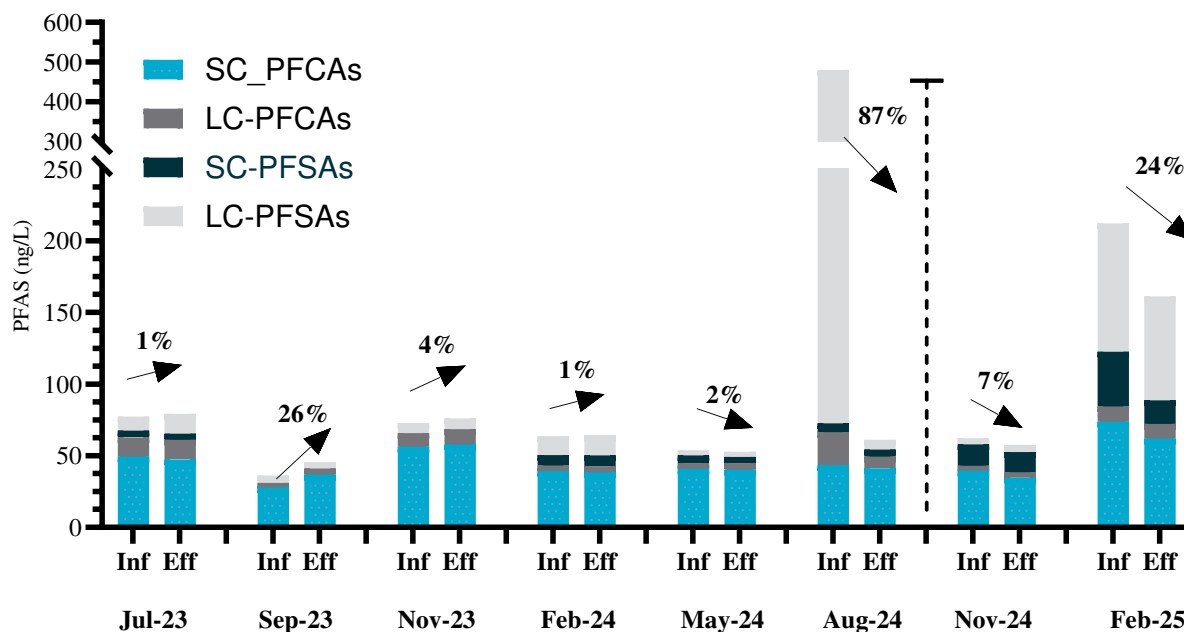


Figure 6. Average PFAS concentrations in Pre-CFW and Post-CFW water samples for each function group (PFCAs vs PFSA) and per carbon numbers (LC vs SC).

PFAS Concentrations (During Plant Establishment Period, 12 months from installation)

- No differences were found for the total PFAS in Pre- and Post- CFW samples (Ave \pm S.D.: 60.8 ± 14.7 vs 63.8 ± 13.0 ng/L).
- SC-PFCAs were higher than SC-PFSAs species for both Pre-CFW and Post-CFW (Pre-CFW: 42.7 ± 9.6 vs 3.5 ± 2.9 ng/L; Post-CFW: 44.2 ± 7.8 vs 3.2 ± 2.9 ng/L).
- LC-PFCAs concentrations were similar to LC-PFSAs for both Pre-CFW and Post-CFW (Pre-CFW: 6.8 ± 4.0 vs 7.8 ± 3.5 ng/L; Post-CFW: 7.5 ± 3.9 vs 8.7 ± 4.5 ng/L).
- The highest concentrations of PFAS found in Pre-CFW waters were: PFPeA > PFHxA > PFOA > PFOS.
- The same trend was observed in Post-CFW waters: PFPeA > PFHxA > PFOA > PFOS.
- Precursors included in the target PFAS list were negligible in both Pre-CFW and Post-CFW.

PFAS Concentrations (Second year (15-month to 21-month period))

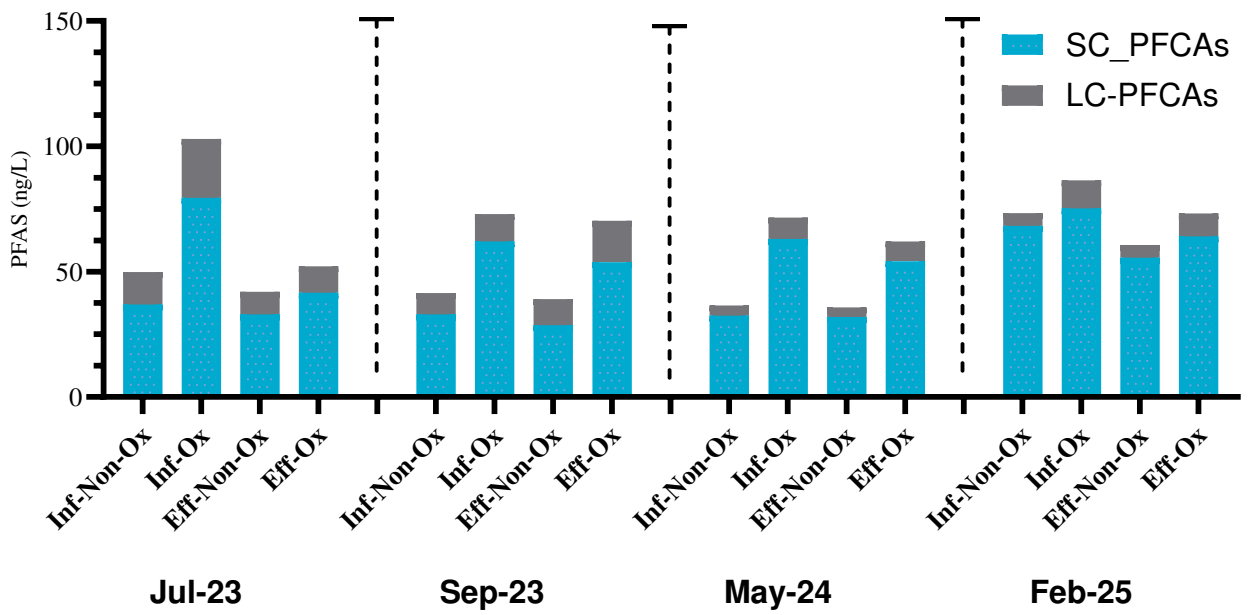
- Total PFAS were lower in Post-CFW samples compared to Pre-CFW (Ave \pm S.D.: 93.3 ± 48 vs 252 ± 173 ng/L), equivalent to an average removal of 40%.
- The highest removal was for LC-PFSAs (30%) followed by SC-PFSAs (27%), LC-PFCAs (19%) then SC-PFCAs (11%).
- Using the average monthly flow data (Figure B 1b, Appendix B), total treated water volume was calculated between Sep-24 and Feb-25 (15-month to 21-month period) and was found to be ~695 ML. Using the average removal values of PFAS species during the same period (reported above), the system removed 4.3, 3.6, 5.5 and 13.0 g of SC-PFCAs, LC- PFCAs, SC- PFSAs and LC- PFSAs, respectively.

Precursor estimates

Average PFAS concentrations and estimated precursors concentrations after oxidation (TOP assay analysis) in water samples collected pre- and post-CFW are shown in Figure 7. PFAS concentrations in each water sample after oxidation (TOP assay analysis) are shown in Table B. 3, Appendix B .

- For all exposure time points, PFCAs were higher in oxidised water samples collected Pre-CFW compared to those collected Post-CFW (Jul-23: 103 vs 52 ng/L; Sep-23: 73 vs 70 ng/L; May-24: 72 vs 62 ng/L; Feb-25: 86 vs 73 ng/L).
- For all exposure time points (except Feb-25), estimated precursors were higher in water samples collected Pre-CFW samples compared to those collected Post-CFW (Jul-23: 0.15 vs 0.03 nmol/L; Sep-23: 0.10 vs 0.08 nmol/L; May-24: 0.11 vs 0.08 nmol/L; Feb-25: 0.04 vs 0.04 nmol/L)
- Using the calculated total treated water volume between Sep-24 and Feb-25 (15-month to 21-month period), the estimated precursors removal via the system was calculated and was found to be ~9,000 nmol (equivalent to an average reduction of 20%).

(a)



(b)

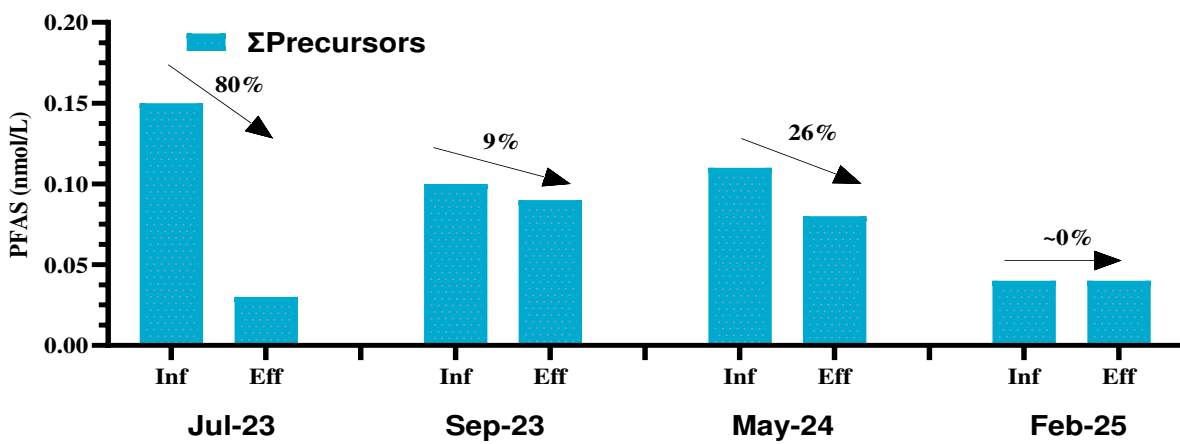
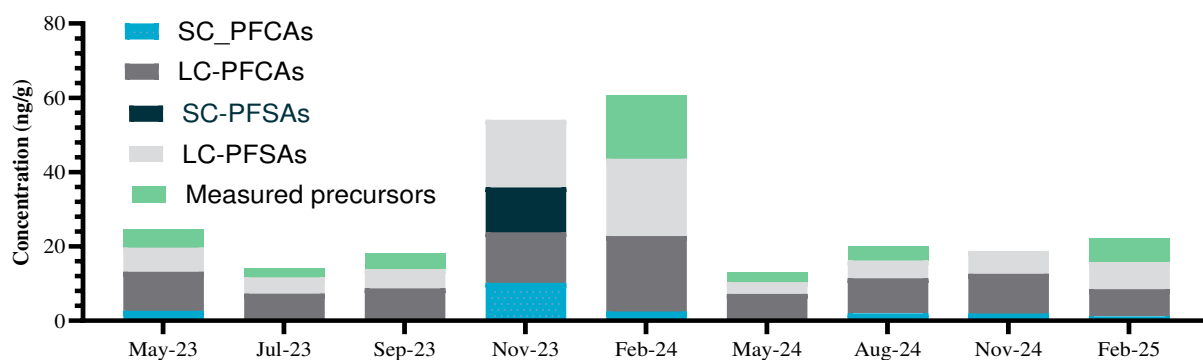


Figure 7. Total PFAS concentrations (ng/L) before and after oxidation (a) and estimated precursors concentrations (nmol/L) from the TOP Assay analysis in Pre-CFW and Post-CFW water samples (b). Non-targeted analysis tentatively identified 13 precursors that were not in the list of target analytes (See Table B. 8, Appendix B).

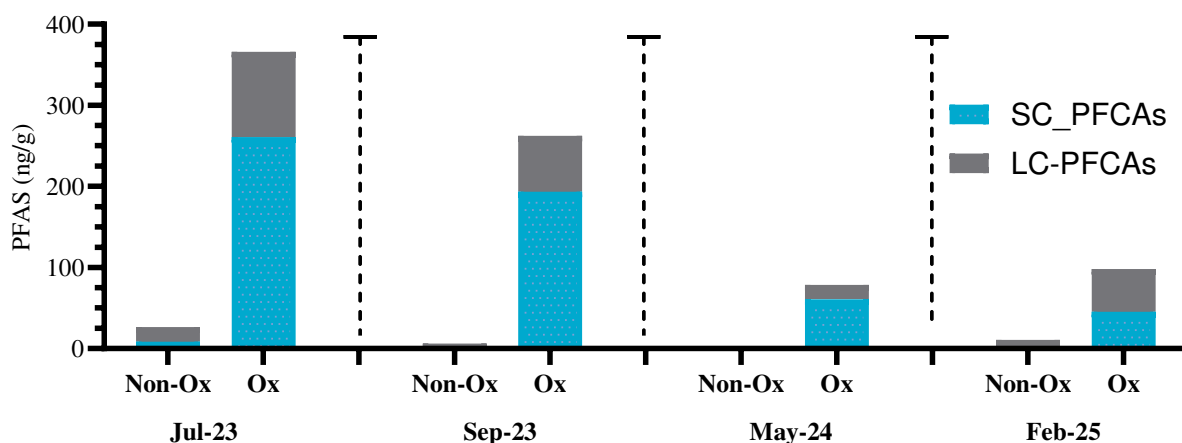
3.2 PFAS concentrations in sediments

Average PFAS concentrations in sediment samples collected from the lagoon before the CFW installation and from under the CFW after 2, 4, 6, 8, 12, 15, 18 and 21 months from the CFW installation are shown in Figure 8. The PFAS concentrations in each sediment sample collected during the study are shown in Table B. 4, Appendix B . PFAS concentrations in each sediment sample after oxidation (TOP assay analysis) are shown in Table B. 5, Appendix B .

(a)



(b)



(c)

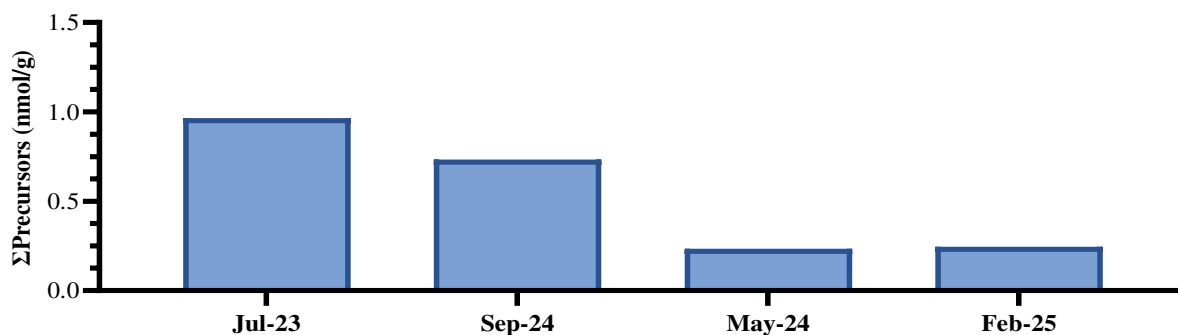


Figure 8. Average PFAS concentrations of target analytes (a), and before and after oxidation (b), and estimated precursors concentrations (c) from the TOP Assay analysis in sediment samples. Non-targeted analysis tentatively identified 6 precursors that were not in the list of target analytes (See Table B. 8, Appendix B).

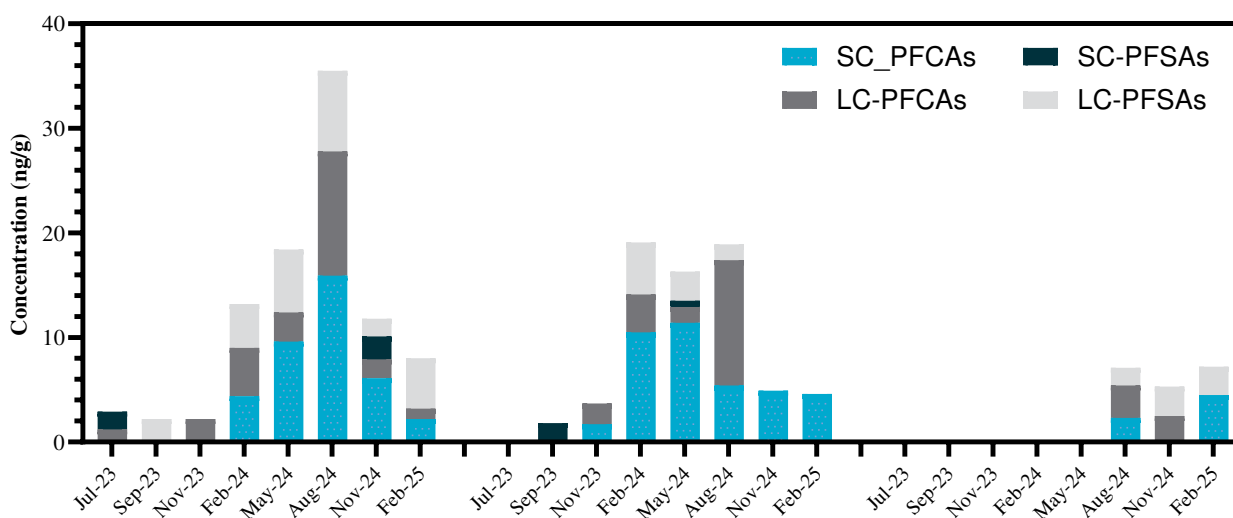
PFAS Composition

- For all sediment samples, the highest relative abundance was for LC-PFCAs species (Ave \pm S.D.: $44 \pm 10\%$) followed by LC-PFSAs ($30 \pm 4\%$), measured precursors ($17 \pm 10\%$), then SC- species ($7 \pm 6\%$ for SC-PFCAs & $2 \pm 7\%$ for SC-PFSAs)
- In contrast to the water samples, the highest concentrations of PFAS found in sediments were: PFOS > PFDA > PFOA > PFDoA. This aligns with the literature as LC-PFAS generally exhibit higher sorption to organic phases compared to SC-PFAS.
- For all exposure time points, PFCAs were higher in oxidised sediment samples compared to non-oxidised samples (Oxidised/non- oxidised ratio: ~ 14 for T1, ~ 41 for T2, ~ 39 for T5 and ~ 9 for T8)
- Average precursors concentration (quantified by the TOP Assay) was estimated to be ~ 0.545 nmol/g (range: $0.235 - 0.965$ nmol/g) for sediments collected during the study period.

3.3 PFAS concentrations in plant tissues

Average PFAS concentrations in root and shoot samples harvested after 2, 4, 6, 8, 12, 15, 18 and 21 months from the CFW installation are shown in Figure 9a and Figure 9b, respectively, while PFAS concentrations in each plant tissue (roots and shoots) harvested during the study are shown in Table B. 6, Appendix B . Average PFAS concentrations in weed samples collected from the CFW are shown in Figure B 3 Appendix B . Furthermore, average PFAS concentrations after oxidation (TOP assay analysis) in root and shoot samples harvested after 4, 12 and 21 months from the CFW installation are shown in **Figure 10**, while PFAS concentrations in each plant tissue (roots and shoots) harvested during the study are shown in Table B. 7, Appendix B .

(a)



(b)

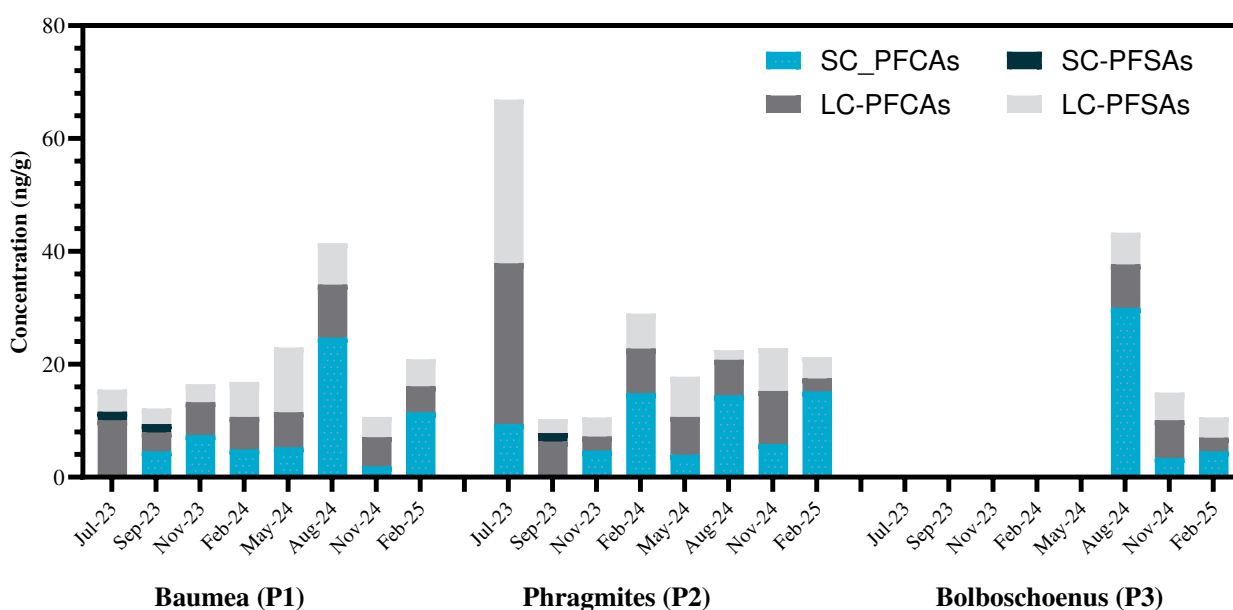
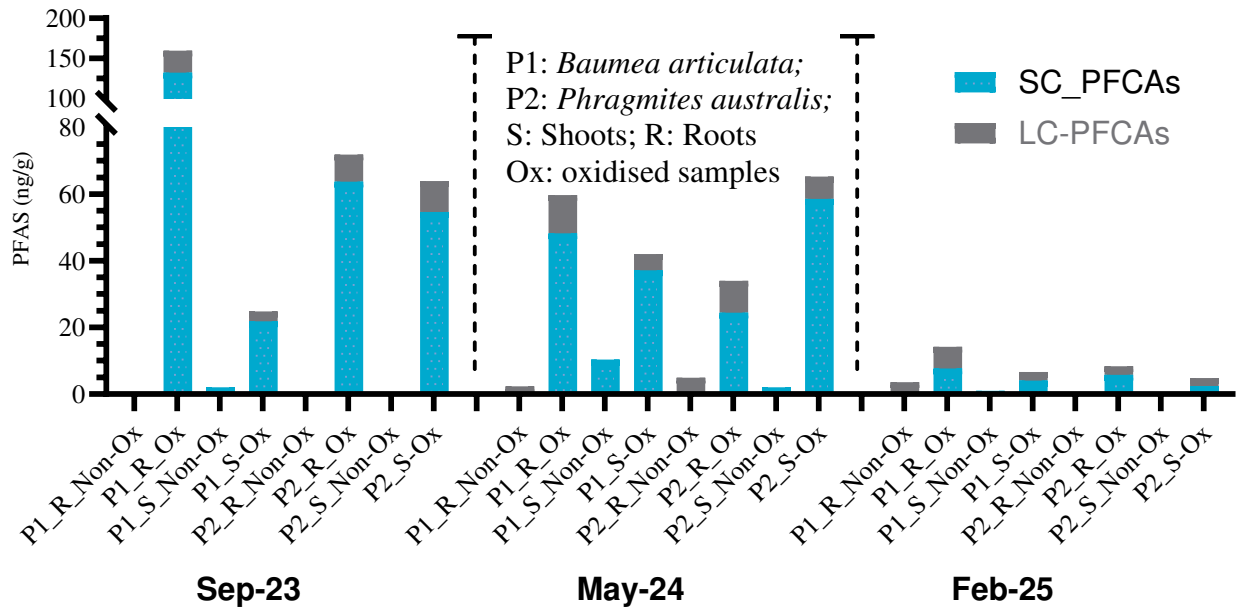


Figure 9. Average PFAS concentrations in shoot (a) and root (b) samples.

(a)



(b)

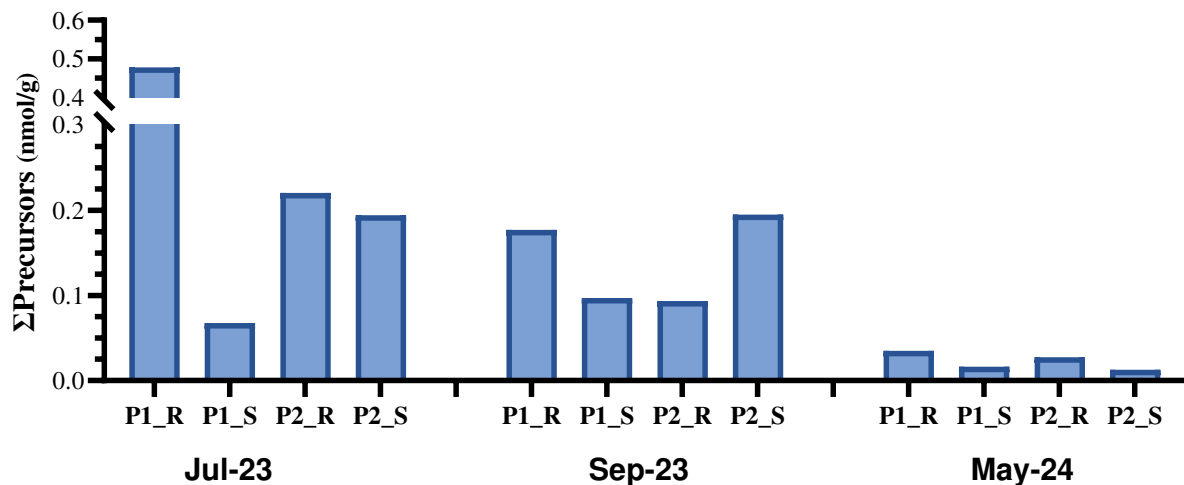


Figure 10. Average PFAS concentrations before and after oxidation (a), and estimated precursors concentrations (b) from the TOP Assay analysis in plant samples.

PFAS Accumulation in Roots and Shoots

• Roots

- Based on the average values during the study period, the highest PFAS accumulation in one gram of plant roots was found to be for *Phragmites australis* (P2) followed by *Bolboschoenus caldwellii* (P3) then *Baumea articulata* (P2), i.e., 25.0 ± 16.8 vs 23.0 ± 14.5 vs 19.7 ± 9.1 ng/g).
- For all plant species, the highest accumulation in roots was observed for SC-PFCA compounds (P1: 7.6 ng/g; P2: 8.6 ng/g; P3: 12.7 ng/g), followed by LC-PFCAs (P1: 6.3 ng/g; P2: 8.7 ng/g; P3: 5.6 ng/g) and LC-PFSAs (P1: 5.4 ng/g; P2: 7.7 ng/g; P3: 4.7 ng/g). The accumulation of SC-PFSAs was very limited (average: <0.4 ng/g), as these species were present at the lowest levels (near the detection limit) in the water matrix.

- During the study period, the precursors PFAS accumulation in one gram of root tissue was found to be higher for *Baumea articulata* (P2) compared to *Phragmites australis* (P2) (Average: 0.23 vs 0.11 nmol/g) – In contrast to the roots, the highest PFAS accumulation in one gram of shoots was found to be for *Phragmites australis* followed by *Baumea articulata*, i.e., 0.06 vs 0.13 nmol/g).
- Shoots
 - For all plant species, PFAS accumulated in plant shoots but in a lower level than those in root tissues – In contrast to the roots, the highest PFAS accumulation in one gram of shoots was found to be for *Baumea articulata* followed by *Phragmites australis* then *Bolboschoenus caldwellii*, i.e., 11.8 ± 10.5 vs 8.7 ± 7.5 vs 6.5 ± 0.9 ng/g).
 - During the plant establishment period (12 months from the installation), results for both P1 and P2 indicate that the PFAS accumulation in shoots increased with time. However, this trend was not observed during the second year (15-month to 21-month period). This could be potentially because of the massive growth of the plants (Figure B 4) resulting in a dilution effect.
 - Similar to the roots, the highest accumulation in shoots was observed for SC-PFCA compounds (P1: 4.8 ng/g; P2: 4.8 ng/g; P3: 2.3 ng/g), followed by LC-PFCAs (P1: 3.2 ng/g; P2: 2.4 ng/g; P3: 1.9 ng/g) and LC-PFSAs (P1: 3.3 ng/g; P2: 1.2 ng/g; P3: 2.4 ng/g). The accumulation of SC-PFSAs was very limited (average: <0.4 ng/g), as these species were present at the lowest levels (near the detection limit) in the water matrix.

Uptake of PFAS By Various Plants

- The differences between plants supports results from various laboratory studies that report on varying tendencies of plants to uptake PFAS (Awad *et al.* 2024). Differences in uptake could be attributed to variations in plant root characteristics (e.g., root length, projected area, and surface area), as well as differences in plant growth rates and leaf area.
- Weeds were also found to accumulate PFAS (Figure B 3). Weed with leaves showed high uptake of PFAS in both roots and shoots. This aligns with findings from previous studies that have suggested the use of weeds for PFAS phytoremediation (He *et al.* 2023).

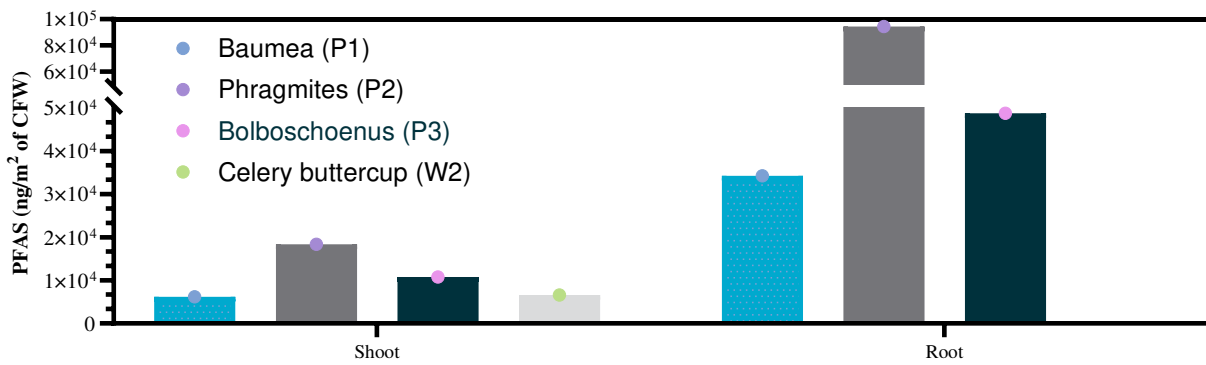
Total PFAS Uptake per Square Meter of CFWs

- Using average weight of roots and shoots (Figure 3) and average PFAS uptake between Sep-24 and Feb-25 (15-month to 21-month period) (Figure 9), the total PFAS uptake per m² of CFWs (Eq.2, ng/m²) for each plant species were calculated and shown in Figure 12a. The highest PFAS accumulation was found to be for *Phragmites australis* followed by *Bolboschoenus caldwellii* then *Baumea articulata*.
- In addition, the precursors accumulated per m² of CFWs was calculated (Figure 12b) using average weight of roots and shoots (Figure 3) and average estimated precursors (Figure 10). The highest PFAS accumulation was also found to be for *Phragmites australis* followed by *Bolboschoenus caldwellii* then *Baumea articulata*.



Figure 11. Weeds grow within the CFWs during the plant establishment period (12 months from the installation).

(a)



(b)

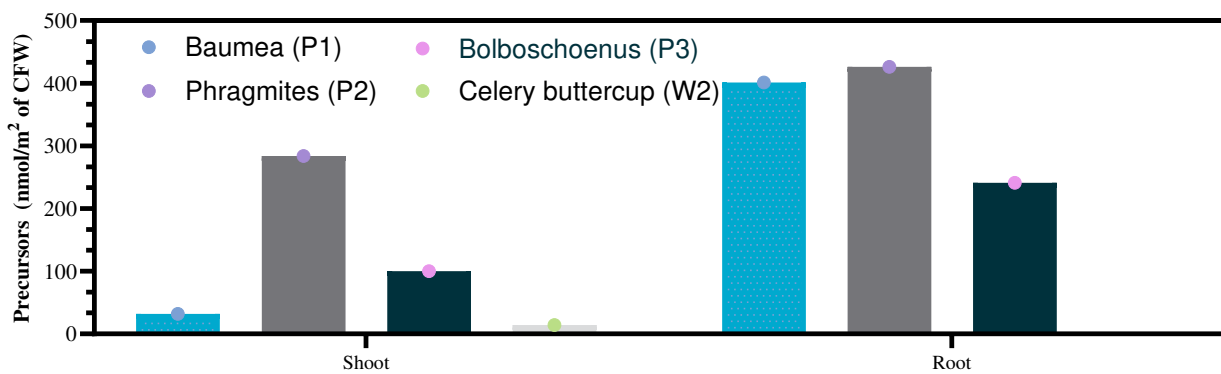


Figure 12. Total PFAS (a) and estimated precursors (b) accumulated in the plant tissues (roots and shoots) for each species between Sep-24 and Feb-25 (15-month to 21-month period). TOP assay analysis was conducted for P1 and P2 only. Consequently, precursors rates for P3 and W2 were assumed to be equivalent to the minimum values of measured precursors for P1 and P2.

4 Outcomes

The two-year pilot trial demonstrates that constructed floating wetlands (CFWs) can be used as a natural-based solution for mitigating PFAS contamination in wastewater. While PFAS removal by CFWs may take time, the study observed a substantial reduction in PFAS concentrations after one year, highlighting the need for an initial establishment phase. Key processes such as plant adaptation, growth, and the development of biofilms on plant roots likely occurred during this phase to promote PFAS removal in the second year.

The results revealed that long-chain PFAS (LC-PFAS) were more effectively removed than short-chain PFAS (SC-PFAS), suggesting that sorption processes—potentially involving sediments and plant roots—play a key role in their removal. Sedimentation was also identified as an important mechanism for PFAS removal, particularly for long-chain PFAS, which were detected at high concentrations in the sediments. The CFWs were also effective in removing PFAS precursors from the treated water, likely through sorption to sediments. However, the stability of these precursors in sediments remains uncertain, and their potential to release PFAAs into the water over time warrants further investigation.

This study also found that plants accumulated PFAS in both roots and shoots. However, at any given time point, concentrations in shoots were generally lower — likely controlled by the plant's ability to translocate PFAS. *Baumea articulata* was particularly effective at concentrating PFAS in its harvestable shoots, while *Phragmites australis* showed the highest overall accumulation based on the mass of harvestable tissues. Additionally, plants also accumulated PFAS precursors, though at lower concentrations than those found in sediments.

Overall, the findings highlight the potential of CFWs to reduce PFAS concentrations in wastewater and prevent their migration into the receiving environment. The mechanisms behind PFAS removal are likely multifaceted, involving sorption to various media, such as sediments and plant roots, along with plant uptake. Further research is needed to understand these mechanisms and identify ways to enhance PFAS removal efficiency. For example, the hydraulic retention time (HRT) in the treatment lagoon only ranged between 1.0 and 2.3 days. Increasing the HRT could potentially improve the extent to which each removal mechanism can reduce PFAS concentrations in the water. Though the extent by which this can be done will depend on the ability of the whole WWTP system to support longer retention times without negatively impacting treatment performance, system maintenance, and/or water requirements. Additionally, the long-term stability of PFAS precursors and their potential re-release into the water should be explored to determine factors that may influence re-release. Identifying best practices for managing settling sediments, whilst reducing potential re-release of PFAS, will be essential. These studies will be crucial in optimising the performance of CFWs as an effective PFAS mitigation strategy.

It is important to note that performance could also be site-specific and that the same plant species may exhibit different behaviours under different environmental and operational conditions. From a field perspective, key design and operation parameters for CFW include HRT, plant surface coverage and water depth. These parameters and its effect on PFAS removal efficiency by CFW are not yet fully understood. In addition, matrix composition (e.g., pH, electrical conductivity, dissolved organic

carbon, nutrients), PFAS chemicals, and concentration could also affect the CFW performance. Field-scale assessments, such as the one summarised in this report at Cowes Wastewater Treatment Plant, are necessary to demonstrate that CFW can consistently treat water to the required standards under differing conditions.

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Appendix A Sample preparation and analytical determination of PFAS

A.1 PFAS standards and solvents

PFAS standards used in this study included 11 perfluorocarboxylic acids, 7 perfluorosulfonic acids, and 9 precursors. Isotopically labelled counterparts for 20 PFAS were used as internal standards. All the PFAS standards and isotopic internal standards were purchased from Wellington Laboratories (Canada). The complete list is in Table A. 1. Ammonium acetate salt used to prepare the mobile phase was from Sigma Aldrich (minimum 98% purity). Methanol (LC-MS Chromasolv $\geq 99.9\%$) used in all sample preparations and as LC mobile phase (Honeywell). Milli-Q water was from a Milli-Q QPOD system (18.2 M Ω -cm, 2.0 ppb TOC).

A.2 Sample preparation

WATER

All aqueous samples (i.e., raw, pre-, and post-CFW) were centrifuged to allow solids to settle at the bottom of the containers. Approximately 250 mL of each liquid sample was then subjected to solid-phase extraction using a Strata PFAS (WAX/GCB) cartridge, following the manufacturer's recommendations. The procedure included conditioning with methanol containing 0.1% ammonium hydroxide, methanol, and phosphate buffer (pH = 7). The sample, spiked with 5 ng of PFAS stable isotope mixture (extracted internal standards, EIS), was then loaded onto the cartridge. Washing steps included water and a 50:50 water:methanol mixture with 0.1% formic acid. Once the cartridges were dry, they were eluted using methanol with 0.1% ammonium hydroxide. The original sample containers, which may have contained residue or sediments, were also rinsed with methanol containing 0.1% ammonium hydroxide, and the rinsates were passed through the cartridge. The recovered eluates were then placed under a gentle stream of nitrogen at 40°C to reduce the volume to below 1 mL. The final samples for analysis were spiked with 13C8 PFOS as non-extracted internal standards (NIS) and diluted to 1 mL with methanol. Note that total PFAS is reported for the water samples, which includes PFAS in the dissolved phase and PFAS in the remaining suspended solids.

SEDIMENTS

PFAS in the sediments were extracted by ultrasonication using alkaline methanol (i.e., methanol with 1% ammonia) as extraction solvent. Briefly, 0.1-0.5 g sample was weighed into a 10 mL PP tube, to which 5 ng of PFAS stable isotope mixture (in methanol) was added. After 30 minutes, 5 mL of alkaline methanol was added to the soil, vortex mixed, then sonicated under a water bath for 20 minutes. The tubes were then collected then centrifuged at 2500 g for 10 minutes. The 1st extract was then transferred into a clean 10 mL PP tube using a disposable Pasteur pipette. The soil was then subjected to another round of extraction, and the 2nd extract was combined with the 1st extract collected. The pooled extracts were placed under 40 °C and a gentle stream of N₂ to reduce the volume to approximately 1mL. The extracts were then passed through a Bond-Elut cartridge (100

mg packing material), recovering the extracts in a PP HPLC vial. Another 500 µL of methanol transferred to the 10 mL PP tube to rinse, then passed through the same Bond-Elut cartridge, and recovering the same extracts in the same PP HPLC vial. The extracts were again placed under 40 °C and gentle stream of N₂ to reduce the volume to below 1 mL. The final samples for analysis were spiked with 13C8 PFOS as non-extracted internal standards (NIS) and diluted to 1 mL with methanol.

PLANTS

Plant tissues were freeze dried, then ground using a stainless-steel coffee grinder. Extraction of the tissue samples was based on ultrasonication using alkaline methanol (i.e., methanol with 0.1 % ammonia) as extraction solvent. Briefly, 0.1 g tissue was weighed into a 10 mL PP tube, to which 5 ng of PFAS stable isotope mixture (in methanol) was added. After 30 minutes, 5 mL of alkaline methanol was added to the tissue, vortex mixed, then sonicated under a water bath for 15 minutes. The tubes were then collected and centrifuged at 2500 *g* for 10 minutes. The 1st extract was then transferred into a clean 10 mL PP tube using a disposable glass pipette. The tissue was then subjected to another round of extraction, and the 2nd extract was combined with the 1st extract collected. The pooled extracts were placed under 40 °C and a gentle stream of N₂ to reduce the volume to approximately 1 mL. The extracts were then passed through a Bond-Elut cartridge (250 mg packing material), recovering the extracts in a PP HPLC vial. Another 500 µL of methanol transferred to the 10 mL PP tube to rinse, then passed through the same Bond-Elut cartridge, and recovering the washing in the same PP HPLC vial. The extracts were again placed under 40 °C and gentle stream of N₂ to reduce the volume to below 1 mL. The final samples for analysis were spiked with 13C8 PFOS as non-extracted internal standards (NIS) and diluted to 1 mL with methanol.

As part of QA/QC, blanks, fortified blanks, matrix blank, and fortified matrix blanks were also prepared and subjected to the same extraction procedure.

TOP Assay

Select samples were subjected to a total oxidisable precursor (TOP) assay to determine the amount of PFAS precursors that are present in the samples. Samples were extracted following the sample procedures described for water and solids extraction, without addition of stable isotopes. These samples were split into two aliquots, one for oxidation, and one to serve as a non-oxidised control, blown to dryness, and reconstituted in water. Five molar NaOH was added to all samples for a final concentration of 750 mM. Three hundred sixty millimolar K₂S₂O₈ was added to samples for oxidation, while 360 mM Na₂SO₄ was added to non-oxidised control samples. All samples were exposed to 85 °C for 6 hours in a water bath. The pH was checked regularly to ensure that it remained above 12 for the entire duration of the oxidation reaction. At the end of the oxidation, samples were allowed to cool down and internal standards were added as noted above. The oxidised aqueous solutions were then liquid-liquid extracted with ethyl acetate, followed by recovery and evaporation of the ethyl acetate to dryness and reconstitution in methanol with 5 ng of PFAS stable isotope mixture for LC/QQQ-MS analysis.

A.3 LC-MS/MS Analysis

Analysis for PFAS was undertaken by liquid chromatography tandem mass spectrometry (LC-MS/MS) using a Thermo TSQ Altis Triple Quadrupole Mass Spectrometer equipped with Thermo

Scientific UltiMate 3000 HPLC system. Multiple reaction monitoring was used for quantification and confirmation. Chromatographic conditions for separation and mass spectrometric detection are summarised below. Data were acquired and processed using the TraceFinder 4.1 software. PFAS were quantified using isotope dilution methodology or, when isotopes were not available, using an external calibration curve.

CHROMATOGRAPHY

Separation was accomplished using a Phenomenex Kinetex 2.6 μm C18, 100 x 2.1 mm, column. The column temperature was maintained at 40 °C. The gradient program used two mobile phases (A: 5 mM ammonium acetate; B: methanol) at a flow rate of 0.25 mL/min. The gradient elution started with 5% B which was held constant for 3.9 min, increased to 20% B by 4 min, then increased to 98% B by 13.5 min. This condition was kept constant until 18 min, then the mobile phase was immediately switched to 10% B at 18.1 min, finishing with a total run time of 25 min.

MASS SPECTROMETRY

Analytes coming out of the column were introduced to the mass spectrometer and detected by negative electrospray ionisation (ESI-). The detection parameters are in [Table A1](#).

QUANTIFICATION

PFAS were quantified based on internal standard calibration. The concentration of the standards ranged from 0.1 to 50 $\mu\text{g/L}$, which were prepared in 100% methanol, similar to the samples. For target analytes without corresponding mass-labelled standards, quantification was done using a surrogate internal standard with the same functional group and closest chain length. For analytes that did not have surrogate internal standards, quantification was done using an external calibration curve.

A.4 LC-HRMS Analysis

The non-target analysis of PFAS was conducted in the same extracts prepared for target analysis, using a liquid chromatography-Orbitrap Exploris 120 Mass Spectrometer at ESI- mode (Thermo Fisher Scientific) with a resolution up to 120,000 using a data-dependent method. Separation was accomplished using a Phenomenex Kinetex 2.6 μm C18, 100 x 2.1 mm, column maintained at 40°C. The gradient program used two mobile phases (A: 5 mM ammonium acetate; B: methanol) at a flow rate of 0.3 mL/min. The gradient elution started with 0% B which was held constant for 1 min, then increased to 95% B by 10 min. This condition was kept until 12 min, then decreased to 0% B by 13 min, finishing with a total run time of 15 min. The detection parameters include 4 data-dependent MS2 scans at stepped collision energies (15, 35, and 55%) and 15,000 resolution for every molecular ion scan at 120,000 resolution. Dynamic exclusion for 7 seconds after each MS2 scan enabled more unique MS2 spectra to be collected. Successive data processing was performed with Compound Discoverer Software (Thermo Fisher Scientific). A built-in data-processing workflow for PFAS screening was used with minor modifications, which includes detecting and grouping compounds, comparing with compound databases within 3 ppm mass error, filling gaps, etc. The NIST PFAS Suspect List (<https://data.nist.gov/od/id/mds2-2387>) together with a list of PFAS stable isotopes containing a total of 4,976 structures was primarily referenced. To refine the resulting compounds list, compounds with a retention time < 1.0 min, incorrect isotopologue patterns, or poor

chromatographic peak shapes were eliminated. Multiple entries of the same compound, which are possibly from isomers, were combined as the total concentration. To semi-quantify the concentrations, the intensities of each compound from total ion chromatogram (TIC) were normalized by comparison to the isotope-labeled internal standards, if available. Compounds were reported in Table B. 8, Appendix B only if at least 2 occurrences were found in all samples.

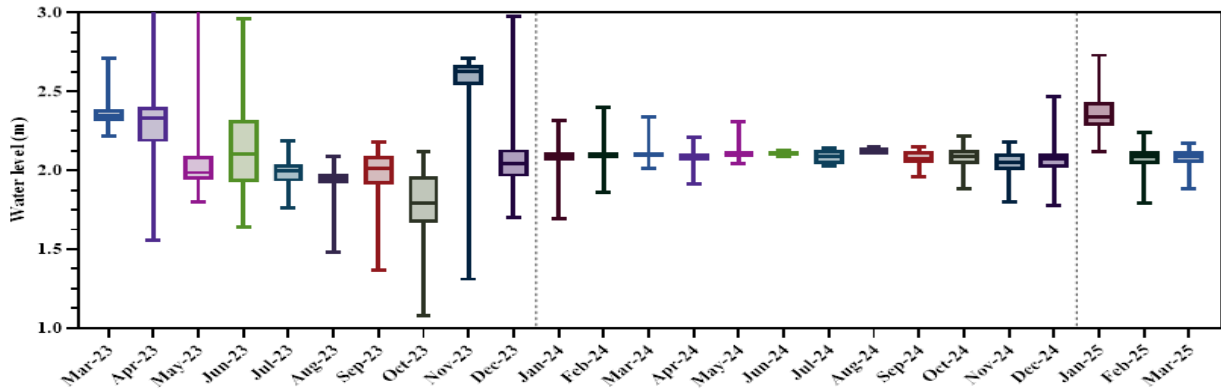
Table A. 1. LC-MS/MS analysis parameters

Compound	Retention Time (min)	Precursor (m/z)	Product (m/z)	Collision Energy (V)
PFBA	3.97	212.979	168.97	9
PFPeA	10.44	262.976	219.042	9
PFHxA	11.69	312.973, 312.973	119.042, 268.97	18.76, 9
PFHpA	12.56	362.97, 362.97	168.97, 319.042	15.53, 9
PFOA	13.28	412.966, 412.966	169, 369.042	16.1, 9
PFNA	13.86	462.963, 462.963	219.012, 418.97	15.23, 9
PFDA	14.35	512.96, 512.96	269.042, 469.042	15.8, 9
PFUdA	14.77	562.957, 562.957	269.03, 518.97	16.94, 9
PFDoA	15.14	612.954, 612.954	319.042, 569	17.54, 9
PFTrDA	15.45	662.95, 662.95	169, 618.83	20, 13
PFTeDA	15.72	713, 713	369, 669	18.87, 9
PFBS	10.86	298.943, 298.943	79.957, 98.956	34, 29
PFPeS	11.85	348.94, 348.94	80.042, 99	33.66, 31
PFHxS	12.67	398.937, 398.937	79.957, 98.956	39, 35
PFHpS	13.35	448.933, 448.933	80.012, 98.97	37.6, 36.2
PFOS	13.88	498.93, 498.93	79.957, 98.956	47, 40
PFNS	14.36	548.927, 548.927	80.071, 98.97	42.34, 40.67
PFDS	14.77	598.924, 598.924	80.042, 98.929	44.92, 43.48
4:2 FTS	11.59	326.974, 326.974	81.042, 307.042	26.07, 18.11
6:2FTS	13.25	426.968, 426.968	81.042, 406.988	29.94, 21.45
8:2FTS	14.33	526.962, 526.962	81.012, 506.97	34.83, 24.37
10:2 FTS	15.15	627.033, 627.033	81.073, 606.975	32, 32
PFOSA	15.54	497.946, 497.946	78.071, 478.042	29.37, 22.51
N-MeFOSA	16.36	511.95, 511.95	168.95, 218.96	27, 26
N-EtFOSA	16.61	525.98, 525.98	169.04, 218.96	28, 26
N-MeFOSAA	14.57	569.967, 569.967	418.97, 482.988	18.42, 14.06
N-EtFOSAA	14.79	583.983, 583.983	418.97, 526.03	18.34, 18.26
MeFOSE	16.15	616.1	58.9	25
EtFOSE	16.36	630.109	58.8	25
M4-PFBA	6.66	216.993	172	9
M3-PFPeA	10.45	266	222	9
M2-PFHxA	11.68	315	270	9
M4-PFHpA	12.94	366.983	321.98	9
M4-PFOA	13.28	417	372	9
M5-PFNA	13.88	468	423	9
M2-PFDA	14.35	515	470	9
M2-PFUdA	14.77	564.964	519.97	9
M2-PFDoA	15.14	614.96	569.97	9
M2-PFTeDA	15.72	714.954	669.96	9
M3-PFBS	10.87	301.8	80.5	34
M(18O2) PFHxS	12.67	403	103	35
M4-PFOS	13.9	503	99	40

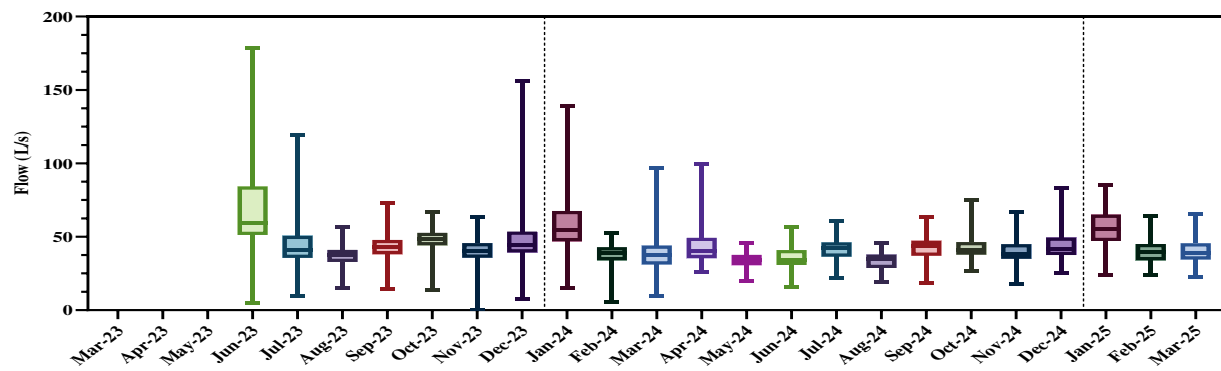
M8-PFOS	13.9	506.8	79.9	47
M2-FTS 4:2	11.59	328.981	308.96	18
M2-FTS 6:2	13.25	428.975	408.96	21
M2-FTS 8:2	14.33	528.968	508.96	24
M8-PFOSA	15.55	505.8	172	25
D3-N-MeFOSA-M	16.35	515	169	15
D5-N-EtFOSA-M	16.59	531	169, 218.9	15, 25
D7-MeFOSE	16.11	622.8	59.1	25
D9-EtFOSE	16.32	639.2	58.9	35

Appendix B Supplementary information

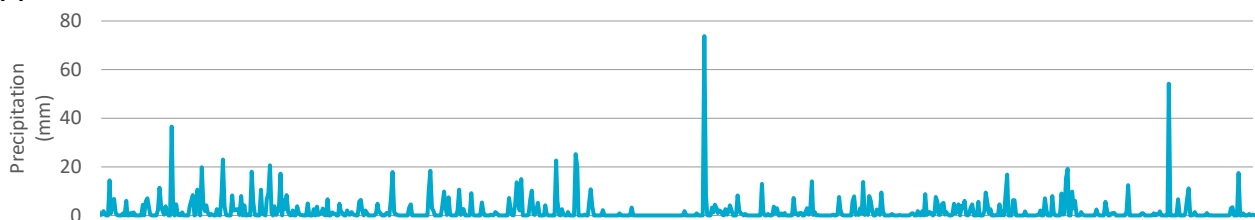
(a)



(b)



(c)



(d)

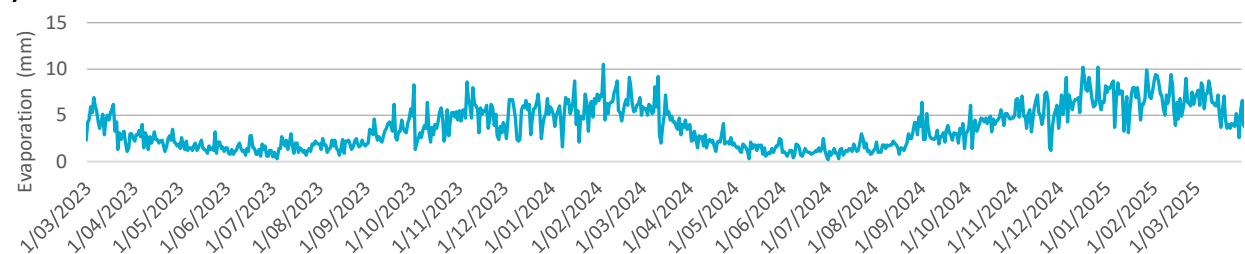


Figure B 1. Daily lagoon water level (a) and daily inflow (b) obtained from WPW team, precipitation (b) and evaporation (d) rates for Station 86119 VENTNOR (OAKLANDS), Phillip Island. Weather data obtained from SILO database.

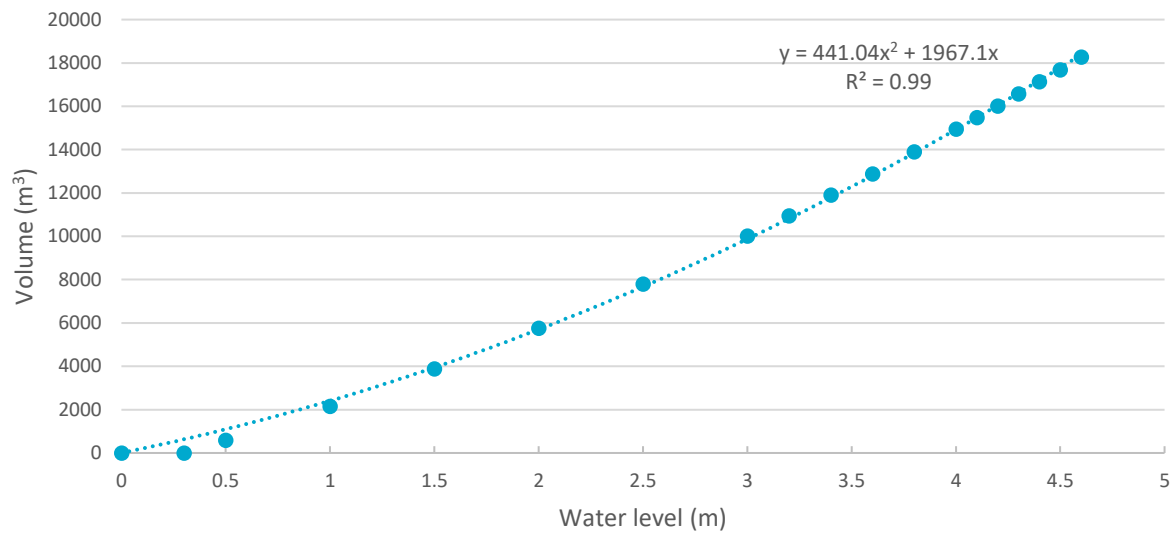


Figure B 2. Correlation between lagoon volume and water level within the lagoon. Data obtained from WPW team.

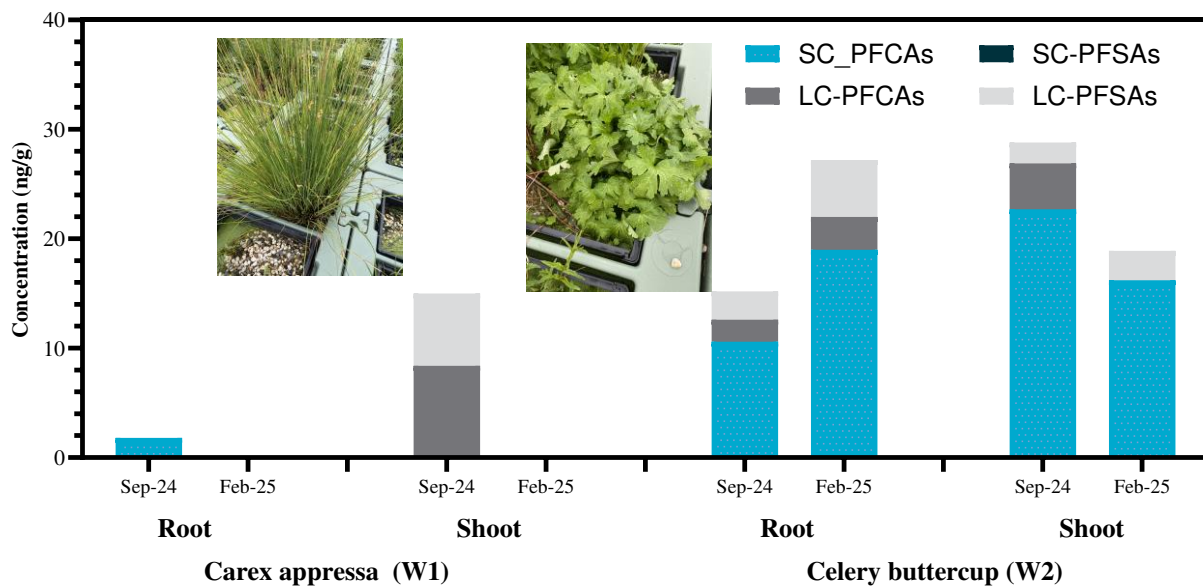


Figure B 3. PFAS concentration in weed samples collected at T7 (Nov-24) and T8 (Feb-25) from the CFWs.

Table B. 1. Wet weights (kg) of harvested shoot materials from the CFWs at various time points.

	<i>Baumea articulata</i> (P1)	<i>Phragmites australis</i> (P2)	<i>Bolboschoenus caldwellii</i> (P3)	Weeds (W)
Mar-24				280
Sep-24		20		194
Mar-25	27.15	327.6	120.9	

Table B. 2 Concentration of PFAS species (ng/L) in water samples collected during the study period.

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T0 (May-23)	Pre-CFWs	7.7	27.1	13.2	1.8	29.9	3.5	<1	<1	<1	<1	<1	5.1	<1	3.4	<1	6.6	<1	<1	<1	<1	<1	<1	
	Pre-CFWs	7.0	24.6	14.2	1.4	11.0	1.8	<1	<1	<1	<1	<1	4.1	<1	1.7	<1	3.8	<1	<1	<1	1.8	<1	<1	
	Pre-CFWs	7.0	24.1	14.2	1.7	22.6	4.3	<1	<1	<1	<1	<1	5.0	<1	2.6	<1	11.3	<1	<1	<1	21.5	<1	<1	
T1 (Jul-23)	Raw	21.6	539	8.0	2.3	8.3	<1	14.9	<1	<1	1.2	1.1	4.1	10.2	35.6	<1	5.0	<1	<1	<1	<1	<1	1.3	
	Raw	19.2	618	10.4	2.2	8.2	<1	14.8	<1	<1	1.5	<1	6.2	12.0	32.5	<1	6.5	<1	<1	<1	<1	<1	1.2	
	Pre-CFWs	10.5	20.2	16.2	3.6	11.0	<1	2.1	<1	<1	<1	<1	5.3	<1	6.0	<1	4.5	<1	<1	<1	<1	<1	<1	
	Pre-CFWs	9.7	18.7	16.1	3.5	10.5	<1	3.5	<1	<1	<1	<1	4.3	<1	4.9	<1	4.2	<1	<1	<1	17.1	<1	<1	
	Post-CFWs	8.8	19.2	14.7	3.8	9.7	<1	2.7	<1	<1	<1	<1	4.1	<1	6.5	<1	6.1	<1	<1	<1	<1	<1	<1	
	Post-CFWs	8.8	19.6	16.5	3.6	11.8	<1	2.9	<1	<1	<1	<1	4.6	<1	8.4	<1	6.8	<1	<1	<1	9.6	<1	<1	
T2 (Sep-23)	Pre-CFWs	<2	24.2	4.7	<1	3.1	<1	<1	<1	<1	<2	<1	<1	<1	2.7	<1	2.5	<3	<2	<2	<2	<2	<1	<1
	Pre-CFWs	<2	18.9	8.3	<1	2.9	<1	<1	<1	<1	<2	<1	<1	<1	2.9	<1	2.8	<3	<2	<2	<2	<2	<1	<1
	Pre-CFWs	<2	23.3	4.4	<1	3.3	<1	<1	<1	<1	<2	<1	<1	<1	2.6	<1	1.9	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	<2	19.5	10.0	<1	3.3	<1	<1	<1	<1	<2	<1	<1	<1	2.6	<1	2.6	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	<2	21.4	8.7	<1	3.8	<1	<1	<1	<1	<2	<1	<1	<1	2.7	<1	2.8	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	<2	25.6	19.8	4.1	5.4	<1	<1	<1	<1	<2	<1	3.3	4.6	49.1	2.1	139	<3	<2	<2	17.0	<1	<1	
T3 (Nov-23)	Pre-CFWs	6.6	31.8	16.3	1.6	6.1	2.1	1.5	<1	<1	<1	<1	<1	<1	2.6	<1	4.9	<3	<2	<2	<2	<2	<1	<1
	Pre-CFWs	6.0	32.1	16.0	1.8	5.7	2.1	1.5	<1	<1	<1	<1	<1	<1	2.9	<1	4.2	<3	<2	<2	<2	<2	<1	<1
	Pre-CFWs	6.1	32.5	16.2	1.5	5.9	2.2	1.4	<1	<1	<1	<1	<1	<1	2.6	<1	4.2	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	6.3	34.4	18.1	1.8	7.0	2.4	1.6	<1	<1	<1	<1	<1	<1	2.7	<1	5.1	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	5.7	34.1	17.2	1.9	7.0	2.3	1.6	<1	<1	<1	<1	<1	<1	2.4	<1	5.2	<3	<2	<2	<2	<2	<1	<1
	Post-CFWs	<2	33.7	17.0	2.0	6.7	2.0	1.6	<1	<1	<1	<1	<1	<1	2.3	<1	4.5	<3	<2	<2	<2	<2	<1	<1
T4 (Jan-24)	Pre-CFWs	5.4	22.3	9.7	<1	3.9	<1	<1	<1	<1	<1	<1	7.3	<1	1.6	<1	10.7	<1	<1	<1	<1	<1	<1	<1
	Pre-CFWs	5.9	23.4	10.2	1.0	3.8	<1	<1	<1	<1	<1	<1	7.3	<1	1.5	<1	11.1	<1	<1	<1	<1	<1	<1	<1
	Pre-CFWs	5.2	23.1	9.7	1.1	3.8	<1	<1	<1	<1	<1	<1	7.0	<1	1.7	<1	13.4	<1	<1	<1	<1	<1	<1	<1
	Post-CFWs	4.4	23.7	9.7	1.1	4.4	<1	<1	<1	<1	<1	<1	7.7	<1	1.3	<1	12.1	<1	<1	<1	<1	<1	<1	<1
	Post-CFWs	4.8	23.0	9.8	<1	4.3	<1	<1	<1	<1	<1	<1	7.9	<1	1.5	<1	17.6	<1	<1	<1	<1	<1	<1	<1
	Post-CFWs	5.9	23.5	10.2	1.0	4.5	<1	<1	<1	<1	<1	<1	6.8	<1	1.5	<1	8.7	<1	<1	<1	<1	<1	<1	<1

Sample Round	Location	MeFOSE	EtFOSE	PFOSA	N-MeFOSA	N-EtFOSA	NMeFOSAA	NEtFOSAA
T0 (May-23)	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
T1 (Jul-23)	Raw	<1	<1	1.4	<10	<10	<1	<1
	Raw	<1	<1	1.3	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	1.1
	Post-CFWs	<1	<1	<1	<10	<10	<1	1.0
	Post-CFWs	<1	<1	<1	<10	<10	<1	1.1
T2 (Sep-23)	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Pre-CFWs	<1	<1	<1	<10	<10	<1	<1
	Post-CFWs	<1	<1	<1	<10	<10	<1	<1
	Post-CFWs	<1	<1	<1	<10	<10	<1	<1
	Post-CFWs	<1	<1	1.1	<10	<10	<1	<1
T3 (Nov-23)	Pre-CFWs	NQ	NQ	<1	<10	<10	2.6	1.9
	Pre-CFWs	NQ	NQ	1.0	<10	<10	2.5	1.7
	Pre-CFWs	NQ	NQ	1.0	<10	<10	2.1	1.4
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	1.7
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	1.5
	Post-CFWs	NQ	NQ	1.0	<10	<10	<1	1.4
T4 (Jan-24)	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1

*< indicates below the laboratory reporting limits; NQ = not quantified

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T5 (May-24)	Pre-CFWs	4.0	18.3	19.3	<1	4.1	<1	<1	<1	<1	<1	<1	5.2	<1	1.4	<1	2.0	2.0	<1	<1	<1	<1	<1	
	Pre-CFWs	4.3	18.3	18.3	<1	4.3	<1	<1	<1	<1	<1	<1	5.3	<1	1.5	<1	2.0	2.0	<1	<1	<1	<1	<1	
	Pre-CFWs	4.3	18.5	20.6	<1	4.1	<1	<1	<1	<1	<1	<1	5.2	<1	1.3	<1	2.2	2.2	<1	<1	<1	<1	<1	
	Post-CFWs	5.6	18.2	17.7	<1	4.6	<1	<1	<1	<1	<1	<1	3.8	<1	1.6	<1	2.2	2.2	<1	<1	<1	<1	<1	
	Post-CFWs	5.3	18.5	17.4	<1	4.4	<1	<1	<1	<1	<1	<1	4.5	<1	1.2	<1	2.0	1.9	<1	<1	<1	<1	7.9	<1
	Post-CFWs	5.3	18.5	17.8	<1	4.6	<1	<1	<1	<1	<1	<1	4.8	<1	1.6	<1	2.0	1.9	<1	<1	<1	<1	7.7	<1
T6 (Aug-24)	Pre-CFWs	4.9	19.3	15.9	1.2	8.3	8.5	1.7	4.3	<1	<1	<1	5.9	<1	5.9	9.4	479.0	<1	<1	<1	<1	1.5	<1	<1
	Pre-CFWs	6.1	19.9	16.7	1.4	11.2	15.0	2.7	7.1	<1	<1	<1	5.3	<1	7.3	25.4		2.4	<1	<1	<1	2.3	<1	<1
	Pre-CFWs	5.6	20.9	17.1	1.3	10.1	9.7	1.7	4.6	<1	<1	<1	6.9	<1	17.7	4.8	294.9	<1	<1	<1	<1	3.2	<1	<1
	Post-CFWs	5.3	20.9	18.1	1.1	5.7	1.8	<1	<1	<1	<1	<1	5.2	<1	2.3	<1	8.1	<1	<1	<1	<1	2.0	<1	<1
	Post-CFWs	4.6	18.0	15.1	1.2	7.5	2.3	1.2	<1	<1	<1	<1	4.7	<1	1.4	<1	3.6	<1	<1	<1	<1	2.6	<1	<1
	Post-CFWs	4.2	18.2	16.0	1.0	4.6	2.3	<1	<1	<1	<1	<1	4.9	<1	1.4	<1	3.1	<1	<1	<1	<1	1.3	<1	<1
T7 (Nov-24)	Pre-CFWs	5.8	18.2	15.8	<1.5	3.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	14.8	<1.5	2.1	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Pre-CFWs	5.9	16.7	16.6	<1.5	3.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	15.0	<1.5	2.2	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Pre-CFWs																							
	Post-CFWs	4.2	18.1	15.2	<1.5	3.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	14.6	<1.5	2.1	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Post-CFWs	4.0	12.3	15.3	<1.5	3.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	13.7	<1.5	2.2	<1.5	3.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Post-CFWs																							
T8 (Feb-25)	Pre-CFWs	1.9	44.8	23.5	1.6	7.4	2.9	1.5	1.4	<1	1.1	<1	57.1	<1	3.7	1.8	80.1	<1	<1	<1	<1	<1	1.9	
	Pre-CFWs	10.7	40.6	27.4	2.0	8.4	2.8	1.6	1.3	<1	<1	<1	52.4	1.0	5.0	15.1		1.4	<1	<1	<1	<1	10.7	
	Pre-CFWs																							
	Post-CFWs	11.7	30.6	16.7	1.8	6.9	2.0	1.8	<1	<1	3.7	8.0	4.1	<1	2.4	1.2	54.8	<1	<1	<1	<1	<1	11.7	
	Post-CFWs	14.5	33.9	19.1	1.8	7.5	3.1	1.6	<1	<1	<1	<1	40.1	<1	3.9	2.0	82.4	<1	<1	<1	<1	<1	14.5	
	Post-CFWs																							

Sample Round	Location	MeFOSE*	EtFOSE	PFOSA	N-MeFOSA	N-EtFOSA	NMeFOSAA	NEtFOSAA
T5 (May-24)	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
T6 (Aug-24)	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
T7 (Nov-24)	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ					
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ					
T8 (Feb-25)	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Pre-CFWs							
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs	NQ	NQ	<1	<10	<10	<1	<1
	Post-CFWs							

*< indicates below the laboratory reporting limits; NQ = not quantified

Table B. 3 Concentration of PFAS species (ng/L) before and after oxidation (TOP Assay) in water samples collected during the study period

Sample Round	Location	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS
After Oxidation																							
T1 (Jul-23)	Raw	10.5	21.8	41.3	21.1	2.6	<1	1.7	<1	<2	<1	10.5	2.8	<1	2.1	<1	5.7	<3	<2	<2	<2	<1	<1
	Pre-CFWs	15.3	29.5	34.6	22.2	1.4	<1	<1	<1	<2	<1	15.3	3.5	<1	6.8	<1	13.0	<3	<2	<2	<2	<1	<1
	Post-CFWs	17.0	17.0	7.6	8.7	1.8	<1	<1	<1	<2	<1	17.0	3.3	<1	11.1	<1	14.5	<3	<2	<2	<2	<1	<1
T2 (Sep-23)	Pre-CFWs	34.7	21.9	17.0	11.6	<1	<1	<1	<1	<2	<1	34.7	5.2	<1	<2	<1	18.2	<3	<2	<2	<2	<1	<1
	Pre-CFWs	21.7	16.2	12.5	8.2	1.0	<1	<1	<1	<2	<1	21.7	<1	<1	3.1	<1	10.9	<3	<2	<2	<2	<1	<1
	Post-CFWs	20.5	19.6	14.3	9.8	3.0	<1	1.7	<1	<2	<1	20.5	3.9	<1	5.0	<1	4.9	<3	<2	<2	<2	<1	<1
	Post-CFWs	22.5	17.6	13.1	10.0	1.7	<1	2.7	2.0	<2	<1	22.5	4.2	1.1	<2	<1	9.1	<3	<2	<2	<2	<1	<1
T5 (May-24)	Pre-CFWs	6.2	18.6	26.9	13.6	9.2	<1	<1	<1	<2	<1	<1	2.0	<1	1.4	<1	2.7	<3	<2	<2	<2	<1	<1
	Pre-CFWs	6.3	19.1	24.7	10.7	7.8	<1	<1	<1	<2	<1	<1	1.9	<1	1.4	<1	2.5	<3	<2	<2	<2	<1	<1
	Post-CFWs	5.4	16.1	22.6	11.3	8.4	<1	<1	<1	<2	<1	<1	1.9	<1	1.0	<1	3.9	<3	<2	<2	<2	<1	<1
	Post-CFWs	4.8	16.3	23.4	8.6	7.3	<1	<1	<1	<2	<1	<1	1.9	<1	1.1	<1	3.5	<3	<2	<2	<2	<1	<1
T8 (Feb-25)	Pre-CFWs	7.0	39.6	25.3	3.4	11.1	<1	<1	<1	<2	<1	<1	4.6	<1	2.3	<1	4.4	<3	<2	<2	<2	<1	<1
	Pre-CFWs																						
	Post-CFWs	7.7	31.9	21.2	3.2	9.1	<1	<1	<1	<2	<1	<1	4.5	<1	2.1	<1	6.5	<3	<2	<2	<2	<1	<1
Post-CFWs																							
Before oxidation																							
T1 (Jul-23)	Raw	120.1	7.1	1.3	5.5	1.7	6.3	1.9	<1	<2	<1	<1		4.0	<1	5.2	120.1	<3	<2	<2	<2	<1	<1
	Pre-CFWs	18.8	14.8	3.3	8.3	1.2	2.2	1.3	<1	<2	<1	4.9	72.4	8.5	<1	16.3	18.8	<3	<2	<2	<2	<1	<1
	Post-CFWs	16.9	12.9	3.2	6.5	<1	2.5	<1	<1	<2	<1	4.0	28.6	8.9	<1	19.4	16.9	<3	<2	<2	<2	<1	<1
T2 (Sep-23)	Pre-CFWs	21.2	13.6	<1	4.7	<1	3.6	<1	<1	<2	<1	8.0	20.0	6.5	<1	16.7	21.2	<3	<2	<2	<2	<1	<1
	Pre-CFWs	17.3	13.6	<1	5.3	<1	<1	<1	<1	<2	<1	5.5	7.2	3.6	<1	13.0	17.3	<3	<2	<2	<2	<1	<1
	Post-CFWs	18.0	8.3	<1	3.9	<1	6.1	2.2	<1	<2	<1	5.4	3.7	3.7	<1	9.4	18.0	<3	<2	<2	<2	<1	<1
	Post-CFWs	21.0	10.1	<1	4.6	<1	1.7	<1	<1	<2	<1	7.3	2.3	2.4	<1	9.5	21.0	<3	<2	<2	<2	<1	<1
T5 (May-24)	Pre-CFWs	3.8	15.4	14.6	1.1	4.2	<1	<1	<1	<2	<1	<1	3.1	<1	1.5	<1	2.3	<3	<2	<2	<2	<1	<1
	Pre-CFWs	3.6	13.9	11.4	1.0	3.7	<1	<1	<1	<2	<1	<1	2.8	<1	1.3	<1	2.0	<3	<2	<2	<2	7.9	<1
	Post-CFWs	3.5	14.1	11.7	1.1	3.8	<1	<1	<1	<2	<1	<1	3.0	<1	1.6	<1	2.3	<3	<2	<2	<2	<1	<1
	Post-CFWs	3.2	14.2	15.1	1.1	3.8	<1	<1	<1	<2	<1	<1	2.9	<1	1.7	<1	2.5	<3	<2	<2	<2	<1	<1
T8 (Feb-25)	Pre-CFWs	5.1	39.6	22.0	1.6	5.1	1.1	1.3	<1	<2	<1	<1	5.2	<1	1.9	<1	3.7	<3	<2	<2	<2	<1	<1
	Pre-CFWs																						
	Post-CFWs	5.2	30.6	18.4	1.3	5.0	1.4	1.2	<1	<2	<1	<1	5.4	<1	1.3	<1	5.7	<3	<2	<2	<2	<1	<1
Post-CFWs																							

Round	Location	MeFOSE*	EtFOSE	PFOSA	N-MeFOSA	N-EtFOSA	NMeFOSAA	NEtFOSAA
After Oxidation								
T1 (Jul-23)	Raw	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T2 (Sep-23)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T5 (May-24)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T8 (Feb-25)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
Before Oxidation								
T1 (Jul-23)	Raw	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T2 (Sep-23)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T5 (May-24)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
T8 (Feb-25)	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Pre-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10
	Post-CFWs	<1	<10	<3	<1	<1	<1	<10

*< indicates below the laboratory reporting limits; NQ = not quantified

Table B. 4 Concentration of PFAS species (ng/g) in sediment samples collected during the study period.

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS
T0 (May-23)	Under-CFWs	2.9	<1.5	<1.5	<1.5	<1.5	<1.5	5.1	<1.5	3.8	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	10.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		2.6	<1.5	1.5	<1.5	<1.5	<1.5	4.6	1.6	3.3	<1.5	2.1	<1.5	<1.5	<1.5	<1.5	5.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		2.6	<1.5	<1.5	<1.5	<1.5	<1.5	4.8	<1.5	3.6	<1.5	2.3	<1.5	<1.5	<1.5	<1.5	3.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T1 (Jul-23)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.7	<1.5	2.4	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	3.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.7	<1.5	2.3	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	5.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T2 (Sep-23)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.0	<1.5	2.0	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	3.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.8	<1.5	3.0	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	4.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.3	<1.5	2.9	1.5	2.4	<1.5	<1.5	<1.5	<1.5	7.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T3 (Nov-23)	Under-CFWs	<1.5	9.7	15.3	<1.5	10.5	<1.5	4.7	2.6	<1.5	<1.5	<1.5	<1.5	23.4	15.9	0.0	11.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.5	2.3	<1.5	<1.5	<1.5	<1.5	10.0	2.7	0.0	10.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	9.3	<1.5	4.1	<1.5	<1.5	<1.5	<1.5	<1.5	3.1	0.0	0.0	3.4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T4 (Jan-24)	Under-CFWs	<1.5	3.0	<1.5	<1.5	2.1	2.5	3.5	2.2	4.0	<1.5	1.9	<1.5	<1.5	3.8	<1.5	7.9	<1.5	5.4	<1.5	<1.5	<1.5	<1.5
		<1.5	3.1	<1.5	<1.5	1.7	2.4	2.6	2.0	3.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	6.6	<1.5	5.3	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	13.5	3.4	4.6	2.6	4.8	<1.5	2.2	<1.5	<1.5	4.8	<1.5	13.6	<1.5	5.5	<1.5	<1.5	<1.5	<1.5
T5 (May-24)	Under-CFWs	<1	<1	<1	<1	2.9	<1	4.2	<1	1.8	<1	<1	<1	<1	1.0	<1	4.8	<1	<1	<1	<1	<1	1.2
		<1	<1	<1	<1	1.6	<1	2.4	<1	1.4	<1	<1	<1	<1	<1	<1	1.8	<1	<1	<1	<1	<1	<1
		<1	1.1	<1	<1	2.4	<1	3.1	<1	1.8	<1	<1	<1	<1	<1	<1	3.2	<1	<1	<1	<1	<1	1.3
T6 (Aug-24)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	1.89	<1.5	5.70	<1.5	2.29	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.45	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	1.91	<1.5	6.07	<1.5	2.16	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.32	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T7 (Nov-24)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	5.9	<1.5	3.1	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	4.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		3.0	<1.5	<1.5	<1.5	<1.5	<1.5	4.5	<1.5	2.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.6	<1.5	<1.5	<1.5	<1.5	<1.5	3.0
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.2	<1.5	2.7	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	5.8	<1.5	1.7	<1.5	<1.5	<1.5	<1.5
T8 (Feb-25)	Under-CFWs	<1	<1	<1	<1	1.1	<1	6.2	<1	3.4	<1	1.6	<1	<1	<1	2.4	4.6	4.8	<1	<1	<1	<1	<1
		<1	<1	<1	<1	<1	<1	2.0	<1	1.3	<1	<1	<1	<1	<1	1.1	2.5	2.5	<1	<1	<1	<1	<1
		<1	<1	<1	1.6	<1	<1	3.2	<1	2.1	<1	1.1	<1	<1	<1	<1	3.7	3.6	<1	<1	<1	<1	<1

Sample Round	Location	MeFOSE	EtFOSE	PFOSA	N-MeFOSA	N-EtFOSA	NMeFOSAA	NEtFOSAA
T0 (May-23)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	2.2	2.9
		<1.5	<1.5	<1.5	<1.5	<1.5	2.0	2.5
		<1.5	<1.5	<1.5	<1.5	<1.5	2.4	2.6
T1 (Jul-23)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.7
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.0
T2 (Sep-23)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.8
		<1.5	<1.5	<1.5	<1.5	<1.5	1.6	2.9
		<1.5	<1.5	<1.5	<1.5	<1.5	2.1	3.3
T3 (Nov-23)	Under-CFWs	<1.5	<1.5	4.7	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	4.3	<1.5	<1.5	<1.5	<1.5
T4 (Jan-24)	Under-CFWs	na	na	2.8	21.3	<15	<5	<5
		na	na	2.7	<15	<15	<5	<5
		na	na	2.8	<15	<15	<5	<5
T5 (May-24)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	1.7	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	1.7	<1.5
T6 (Aug-24)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	2.07	1.93
		<1.5	<1.5	<1.5	<1.5	<1.5	2.85	2.24
T7 (Nov-24)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T8 (Feb-25)	Under-CFWs	<1.5	<1.5	<1.5	<1.5	4.1	3.0	3.4
		<1.5	<1.5	<1.5	<1.5	1.6	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<1.5

*< indicates below the laboratory reporting limits; NQ = not quantified

Table B. 5 Concentration of PFAS species (ng/g) before and after oxidation (TOP Assay) in sediment samples collected during the study period

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS
After Oxidation																							
T1 (Jul-23)	Under-CFW	<1.5	<1.5	28.6	37.8	23.3	5.3	6.5	3.9	9.8	<1.5	1.8	11.0	<1.5	<1.5	<1.5	34.0	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
		<1.5	70.9	144.7	237.7	126.2	12.5	6.1	4.1	8.5	<1.5	<1.5	7.0	<1.5	<1.5	<1.5	21.9	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
T2 (Sep-23)	Under-CFW	<1.5	35.9	77.8	96.5	46.6	8.1	8.9	4.2	9.0	<1.5	1.8	9.9	<1.5	17.7	<1.5	118.5	<2.5	5.2	<1.5	<1.5	<1.5	<1.5
		<1.5	29.3	52.3	94.7	38.5	2.4	6.3	<1.5	7.6	<1.5	2.4	8.3	<1.5	1.9	<1.5	35.6	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
T6 (May-24)	Under-CFW	6.0	6.3	10.3	6.7	11.2	4.5	11.5	<2	4.03	<2	<2	<2	<2	<2	<2	3.9	<3	<2	<2	<2	<2	<2
		6.2	6.1	9.5	6.7	12.2	4.4	12.1	<2	4.03	<2	<2	<2	<2	<2	<2	5.1	<3	<2	<2	<2	<2	<2
		5.5	5.3	9.8	6.0	11.7	4.5	13.2	<2	4.10	<2	<2	<2	<2	<2	<2	4.1	<3	<2	<2	<2	<2	<2
T8 (Feb-25)	Under-CFW	18.1	17.3	15.4	15.9	20.9	10.9	25.0	2.3	8.4	2.9	4.2	<1	<1	<2	<1	6.3	6.3	<2	<2	<1	<1	<1
		5.1	6.0	6.7	6.5	9.5	4.2	8.9	1.2	3.4	1.6	2.0	<1	<1	<2	<1	4.4	4.4	<2	<2	<1	<1	<1
Before Oxidation																							
T1 (Jul-23)	Under-CFW	<1.5	4.2	2.9	3.6	11.3	<2	<1.5	<1.5	4.0	<1.5	<1.5	<1.5	<1.5	96.8	7.4	16.0	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	2.1	<1.5	8.6	<2	<1.5	3.0	<1.5	<1.5	4.1	7.3	<1.5	33.6	<1.5	12.5	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
T2 (Sep-23)	Under-CFW	<1.5	<1.5	<1.5	<1.5	2.7	<2	<1.5	<1.5	3.9	<1.5	<1.5	6.8	<1.5	<1.5	5.8	4.3	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
		<1.5	<1.5	<1.5	<1.5	<1.5	<2	<1.5	<1.5	3.4	<1.5	<1.5	6.9	<1.5	<1.5	<1.5	5.4	<2.5	<2.5	<1.5	<1.5	<1.5	<1.5
T6 (May-24)	Under-CFW	<2	<2	<2	<2	<2	<2	3.8	<2	<2	<2	<2	<2	<2	<2	<2	4.4	<3	<2	<2	<2	<2	<2
		<2	<2	<2	<2	<2	<2	4.9	<2	2.4	<2	<2	<2	<2	<2	<2	5.7	<3	<2	<2	<2	<2	<2
		<2	<2	<2	<2	<2	<2	4.8	<2	<2	<2	<2	<2	<2	<2	<2	4.7	<3	<2	<2	<2	<2	<2
T8 (Feb-25)	Under-CFW	<1	<1	<1	<1	1.0	<1	5.2	<1	2.5	<1	1.5	<1	<1	<2	<1	4.4	4.4	<2	<2	<1	<1	<1
		1.8	<1	<1	<1	1.8	1.0	3.2	<1	2.5	<1	1.3	1.1	<1	<2	<1	4.5	4.5	<2	<2	<1	<1	<1

Sample Round	Location	MeFOSE	EtFOSE	PFOSA	N-MeFOSA	N-EtFOSA	NMeFOSAA	NEtFOSAA
After Oxidation								
T1 (Jul-23)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T2 (Sep-23)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T6 (May-24)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T8 (Feb-25)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
Before Oxidation								
T1 (Jul-23)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T2 (Sep-23)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T6 (May-24)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
T8 (Feb-25)	Under-CFW	<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5
		<1.5	<1.5	<1.5	<1.5	<15	<15	<1.5

*< indicates below the laboratory reporting limits; NQ = not quantified

Table B. 6 Concentration of PFAS species (ng/g) in plant samples collected during the study period.

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T0 (May-23)	P1-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	1.6	<2.0	<1.0	
	P1-Shoots	<1.5	2.8	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	2.0	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	3.4	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	1.6	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0
	P2-Shoots	1.8	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0
T1 (Jul-23)	P1-Roots	144.4	<1.5	<1.5	<1.5	25.2	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	8.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	1.5	<1.5	<1.5	<1.5	3.8	<1.5	<3.0	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	<1.5	<1.5	<1.5	<1.5	1.4	<1.5	<3.0	<1.5	2.2	<1.5	1.8	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	1.8	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	9.5	<1.5	<1.5	<1.5	3.6	<1.5	<3.0	<1.5	<1.5	<1.5	6.0	<1.5	<1.5	3.6	<1.5	20.7	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	17.4	<1.5	<1.5	<1.5	45.3	32.9	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	38.2	<1.5	156.7	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	2.9	<1.0	<1.5	<2.0	<1.0
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
T2 (Sep-23)	P1-Roots	1.7	<1.5	<1.5	<1.5	<1.0	<1.5	3.3	<1.5	2.7	<1.5	2.2	<1.5	<1.5	<2.0	<1.5	4.6	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	3.1	<1.5	2.5	<1.5	2.1	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	<1.5	2.0	1.8	<1.5	<1.0	1.5	3.5	<1.5	2.4	<1.5	2.0	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.9	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	3.1	<1.5	2.4	<1.5	2.1	1.8	<1.5	<2.0	<1.5	3.6	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	<1.0	1.6	3.4	<1.5	2.6	<1.5	2.2	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Roots	<1.5	<1.5	<1.5	<1.5	2.1	1.7	3.7	<1.5	2.6	<1.5	2.2	<1.5	<1.5	<2.0	<1.5	2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	<1.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	

Values for other PFAS compounds (i.e., MeFOSE, EtFOSE, PFOSA, N-MeFOSA, N-EtFOSA, NMeFOsAA and NEtFOsAA) are below the detection limit for all samples.

Sample Round	Location	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUDA	PFDoA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T3 (Nov-23)	P1-Roots	10.4	<1.5	<1.5	<1.5	12.0	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	2.8	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	1.8	4.8	<1.5	<1.5	2.6	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	3.3	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Roots	2.1	1.8	<1.5	<1.5	2.7	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	3.6	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	2.7	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2- Roots	<1.5	2.2	<1.5	<1.5	2.2	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	3.2	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2- Roots	4.7	1.9	<1.5	<1.5	3.1	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.0	<1.5	4.7	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0
	P2- Roots	<1.5	2.6	<1.5	<1.5	2.2	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	2.4	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	2.4	<1.5	<1.5	<1.5	1.7	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	2.3	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
	P2-Shoots	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<2.0	<1.5	<2.0	<1.5	<1.5	<1.0	<1.5	<2.0	<1.0	
T4 (Jan-24)	P1-Roots	4.3	<1.5	<1.5	<1.5	4.6	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.7	<1.5	5.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Roots	4.0	<1.5	<1.5	<1.5	4.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Roots	6.5	1.6	<1.5	<1.5	3.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	<1.5	4.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Shoots	6.2	<1.5	<1.5	<1.5	3.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Shoots	5.7	<1.5	<1.5	<1.5	4.0	<1.5	2.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	5.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2- Roots	19.3	<1.5	<1.5	<1.5	9.5	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2- Roots	3.4	2.1	<1.5	<1.5	5.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2- Roots	17.2	<1.5	<1.5	<1.5	3.5	<1.5	2.0	<1.5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	2.8	<1.5	5.2	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2-Shoots	3.5	<1.5	<1.5	<1.5	2.4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2-Shoots	16.9	<1.5	1.9	<1.5	3.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.3	<1.5	5.1	<1.5	<1.5	<1.5	<1.5	<1.5	
	P2-Shoots	<1.5	1.9	<1.5	<1.5	4.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
T5 (12-months)	P1-Roots	<1	<1	<1	<1	2.0	<1	2.1	<1	<1	<1	<1	<1	<1	<1	<1	3.0	<1	<1	<1	<1	<1	<1	
	P1-Roots	<1	<1	<1	<1	1.9	<1	4.7	<1	1.2	<1	<1	<1	<1	<1	<1	4.9	<1	<1	<1	<1	<1	<1	
	P1-Roots	<1	<1	<1	<1	2.1	<1	2.3	<1	<1	<1	<1	<1	<1	<1	<1	3.1	<1	<1	<1	<1	<1	<1	
	P1-Shoots	<1	<1	<1	<1	5.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.8	<1	<1	<1	<1	<1	<1	
	P1-Shoots	2.4	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	
	P1-Shoots	<1	<1	<1	<1	1.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	P2- Roots	<1	<1	<1	<1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	P2- Roots	<1	1.0	<1	<1	2.7	<1	5.3	<1	1.1	<1	<1	<1	<1	<1	<1	5.9	<1	<1	<1	<1	<1	<1	
	P2- Roots	13.8	<1	<1	<1	2.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	P2-Shoots	2.1	2.8	<1	<1	4.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	P2-Shoots	1.5	2.0	<1	<1	1.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	P2-Shoots	5.5	1.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

Values for other PFAS compounds (i.e., MeFOSE, EtFOSE, PFOSA, N-MeFOSA, N-EtFOSA, NMeFOSAA and NEtFOSAA) are below the detection limit for all samples.

Sample Round	Location	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTTrDA	PFTTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T6 (Aug-24)	P1-Roots	2.47	<1.5	<1.5	<1.5	12.90	<1.5	2.65	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	10.51	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Roots	4.75	<1.5	<1.5	<1.5	2.65	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	6.19	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Roots	59.81	<1.5	4.35	<1.5	4.69	<1.5	4.18	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.59	<1.5	<1.5	<1.5	<1.5	<1.5	
	P1-Shoots	5.37	<1.5	<1.5	<1.5	28.15	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	18.67	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	5.40	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.92	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Shoots	40.82	<1.5	<1.5	<1.5	2.03	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	12.78	<1.5	<1.5	<1.5	2.77	<1.5	5.43	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	7.22	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	13.56	<1.5	<1.5	<1.5	2.75	<1.5	3.26	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.69	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	12.32	1.86	<1.5	<1.5	2.30	<1.5	2.50	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.60	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	3.82	4.20	<1.5	<1.5	1.57	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	2.68	<1.5	<1.5	<1.5	32.03	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	12.10	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	2.94	<1.5	<1.5	<1.5	2.36	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T7 (Nov-24)	P1-Roots	<1.5	<1.5	<1.5	<1.5	2.1	<1.5	3.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Roots	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	2.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Roots	3.0	<1.5	<1.5	<1.5	2.6	<1.5	3.1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Shoots	3.6	2.7	<1.5	<1.5	1.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.5	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Shoots	<1.5	<1.5	<1.5	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.6	<1.5	<1.5	<1.5	<1.5	2.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P1-Shoots	7.5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	1.6	2.2	1.9	<1.5	4.5	1.7	10.9	<1.5	2.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	12.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	4.9	<1.5	<1.5	<1.5	2.3	<1.5	4.4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2- Roots	<1.5	<1.5	<1.5	<1.5	2.6	<1.5	3.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	4.2	2.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P2-Shoots	3.5	<1.5	<1.5	<1.5	1.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T8 (Feb-25)	P1-Roots	2.2	<1	<1	<1	1.4	<1	2.9	<1	1.1	<1	<1	<1	<1	<1	<1	4.7	4.7	<1	<1	<1	<1	<1	
	P1-Roots	19.0	<1	1.0	<1	1.8	<1	3.9	<1	1.0	<1	<1	<1	<1	<1	<1	6.3	6.3	<1	<1	<1	<1	<1	
	P1-Roots	13.5	<1	<1	<1	1.2	<1	2.5	<1	<1	<1	<1	<1	<1	<1	<1	3.6	4.0	<1	<1	<1	<1	<1	
	P1-Shoots	2.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.4	3.5	<1	<1	<1	<1	<1	
	P1-Shoots	2.6	<1	<1	<1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.5	3.5	<1	<1	<1	<1	<1	
	P1-Shoots	1.6	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	7.3	7.4	<1	<1	<1	<1	<1	
	P2- Roots	13.9	<1	<1	<1	1.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.9	3.9	<1	<1	<1	<1	<1	
	P2- Roots	11.6	<1	<1	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	3.7	3.8	<1	<1	<1	<1	<1	
	P2- Roots	20.1	<1	<1	<1	1.1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	3.7	3.8	<1	<1	<1	<1	<1	
	P2-Shoots	5.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.1	1.1	<1	<1	<1	<1	<1	
	P2-Shoots	1.8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.4	1.4	<1	<1	<1	<1	<1	
	P2-Shoots	6.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.0	2.0	<1	<1	<1	<1	<1	

Values for other PFAS compounds (i.e., MeFOSE, EtFOSE, PFOSA, N-MeFOSA, N-EtFOSA, NMeFOSAA and NETFOSAA) are below the detection limit for all samples.

Sample Round	Location	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS	
T6 (Aug-24)	P3-Roots	59.40	<1.5	<1.5	<1.5	4.37	<1.5	4.28	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	6.41	<1.5	<1.5	<1.5	<1.5	<1.5	59.40	
	P3-Roots	27.45	<1.5	<1.5	<1.5	4.10	<1.5	3.42	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.72	<1.5	<1.5	<1.5	<1.5	<1.5	27.45	
	P3-Roots	3.27	<1.5	<1.5	<1.5	5.18	<1.5	1.81	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.72	<1.5	<1.5	<1.5	<1.5	<1.5	3.27
	P3-Shoots	<1.5	1.96	<1.5	<1.5	2.43	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.74	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P3-Shoots	<1.5	<1.5	<1.5	<1.5	4.70	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.94	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	P3-Shoots	<1.5	3.61	<1.5	<1.5	2.28	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
T7 (Nov-24)	P3-Roots	<1.5	2.0	<1.5	<1.5	2.6	<1.5	3.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	4.9	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P3-Roots	2.4	1.7	<1.5	<1.5	3.4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	3.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P3-Roots	<1.5	1.6	<1.5	<1.5	4.9	<1.5	4.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	6.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P3-Shoots	<1.5	<1.5	<1.5	<1.5	3.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	5.3	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P3-Shoots	<1.5	<1.5	<1.5	<1.5	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	P3-Shoots	<1.5	<1.5	<1.5	<1.5	2.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	W1-Shoots	<1.5	1.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	
	W1-Roots	<1.5	<1.5	<1.5	<1.5	2.6	<1.5	5.8	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	6.6	<1.5	<1.5	<1.5	<1.5	<1.5	
	W2-Shoots	7.1	15.6	<1.5	<1.5	4.2	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.9	<1.5	<1.5	<1.5	<1.5	<1.5	
W2-Roots	10.6	<1.5	<1.5	<1.5	2.0	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.6	<1.5	<1.5	<1.5	<1.5	<1.5		
T8 (Feb-25)	P3-Roots	4.9	<1	<1	<1	1.5	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	4.5	4.5	<1	<1	<1	<1	<1	
	P3-Roots	3.2	<1	<1	<1	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.9	3.1	<1	<1	<1	<1	<1	
	P3-Roots	5.8	<1	<1	<1	<1	<1	1.2	<1	<1	<1	<1	<1	<1	<1	<1	3.5	3.6	<1	<1	<1	<1	<1	
	P3-Shoots	1.5	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.7	2.7	<1	<1	<1	<1	<1	
	P3-Shoots	8.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.7	2.7	<1	<1	<1	<1	<1	
	P3-Shoots	3.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.6	2.6	<1	<1	<1	<1	<1	
	W2-Root	19.0	<1	<1	<1	1.4	<1	1.6	<1	<1	<1	<1	<1	<1	<1	<1	5.2	5.4	<1	<1	<1	<1	<1	
	W2-Stem	12.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.0	<1	<1	<1	2.6	3.0	<1	<1	<1	<1	<1	
	TW2-leaf	19.9	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.4	2.5	<1	<1	<1	<1	<1	

Values for other PFAS compounds (i.e., MeFOSE, EtFOSE, PFOSA, N-MeFOSA, N-EtFOSA, NMeFOSAA and NEtFOSAA) are below the detection limit for all samples; *< indicates below the laboratory reporting limits; NQ = not quantified

Table B. 7 Concentration of PFAS species (ng/g) before and after oxidation (TOP Assay) in plant samples collected during the study period.

Sample Round	Location	PFBA*	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUdA	PFDoA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	4:2 FtS	6:2 FtS	8:2 FtS	10:2 FtS
After Oxidation																							
T8 (Feb-25)	P1-Shoots	2.2	<1	1.4	1.1	2.4	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.7	1.7	<2	<2	<1	<1	<1
	P1-Shoots	<1	<1	1.5	1.0	2.6	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.7	1.7	<2	<2	<1	<1	<1
	P1-Roots	2.0	2.0	2.4	1.7	3.6	1.0	3.4	<1	1.3	<1	<1	<1	<1	<2	<1	3.3	3.3	<2	<2	<1	<1	<1
	P1-Roots	2.6	1.5	1.8	1.5	3.3	<1	2.6	<1	<1	<1	<1	<1	<1	<2	<1	3.9	3.9	<2	<2	<1	<1	<1
	P2-Shoots	1.0	<1	1.2	1.1	2.3	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.3	1.3	<2	<2	<1	<1	<1
	P2-Shoots	<1	<1	1.4	1.1	2.5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.2	1.2	<2	<2	<1	<1	<1
	P2-Roots	1.8	1.1	2.0	1.2	2.7	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	2.3	2.3	<2	<2	<1	<1	<1
	P2-Roots	1.7	1.1	1.5	1.2	2.5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	2.0	2.0	<2	<2	<1	<1	<1
Before Oxidation																							
T8 (Feb-25)	P1-Shoots	1.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.7	1.7	<2	<2	<1	<1	<1
	P1-Shoots	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.3	1.3	<2	<2	<1	<1	<1
	P1-Roots	<1	<1	<1	<1	1.2	<1	2.7	<1	1.1	<1	<1	<1	<1	<2	<1	3.4	3.4	<2	<2	<1	<1	<1
	P1-Roots	<1	<1	<1	<1	<1	<1	2.4	<1	<1	<1	<1	<1	<1	<2	<1	3.0	3.0	<2	<2	<1	<1	<1
	P2-Shoots	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.3	1.3	<2	<2	<1	<1	<1
	P2-Shoots	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1.4	1.4	<2	<2	<1	<1	<1
	P2-Roots	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	2.3	2.3	<2	<2	<1	<1	<1
	P2-Roots	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	2.1	2.1	<2	<2	<1	<1	<1

Values for other PFAS compounds (i.e., MeFOSE, EtFOSE, PFOSA, N-MeFOSA, N-EtFOSA, NMeFOSAA and NETFOSAA) are below the detection limit for all samples; * < indicates below the laboratory reporting limits; NQ = not quantified

Table B. 8. Putative identification of PFAS in water and sediment samples by non-target analysis. From the resulting compound list, additional fifty-three distinct PFAS (excluding quantified PFAS) were identified through non-targeted analysis. Note though that target analysis using LC-MS/MS is still more sensitive than HRMS, hence some species measured by LC-MS/MS may not have been found here.

In water samples:

Putative Formula	Putative Identification	Calculated Mass	Pre CFW (T0)			Pre CFW (T1)		Post CFW (T1)		Pre CFW (T2)			Post CFW (T2)			Pre CFW (T6)			Post CFW (T6)		
			1	2	3	1	2	1	2	1	2	3	1	2	3	1	2	3	1	2	3
C3 H3 F3 O2	1:2 Fluorotelomer carboxylic acid	128.0086							Y		Y										
C4 H F9 O2 S	perfluorobutane sulfinate	283.9556															Y	Y	Y	Y	Y
C4 H5 F3 O2	1:3 fluorotelomer carboxylic acid	142.0242				Y	Y	Y	Y												
C5 H F9 O4 S	Keto-perfluoropentane sulfonate	327.946																			
C5 H4 F9 N O2 S	N-methyl perfluoro-1-butane sulfonamide	312.982							Y												
C7 H Cl F12 O3	Chloro-Perfluoro Ether octanoic acid	395.9425					Y	Y													
C7 H2 F12 O3	H-substituted Perfluoro Ether octanoic acid	361.9809																			
C7 H2 F12 O4	Dioxa-H-perfluorononanoic acid	377.9759																			
C7 H3 F7 N2 O	(Heptafluorobutyl)imidazole	264.0129				Y	Y	Y	Y												
C7 H4 F12 O3 S	Trifluoropropanyl nonafluorobutane sulfonate	395.9687																			
C7 H5 F9 O2 S	Perfluoro-4-(prop-1-ene-1-sulfonyl)butane	323.986	Y		Y																
C8 H10 F9 O3 P S	4:2 fluorotelomer thia ethyl phosphonic acid	387.9944				Y	Y	Y	Y										Y	Y	
C8 H15 F5 N2 O2 S	N-Trimethylammoniopropyl perfluoroethane sulfonamide	298.0778																			
C8 H5 F7 N2 O2	Perfluoropropyl-6-methylpyrimidine-2,4(1H,3H)-dione	294.0235				Y	Y	Y		Y	Y					Y	Y	Y	Y	Y	Y
C8 H6 Cl F9 O2	Nonafluoroheptyl carbonochloridate	339.9921																			
C8 H6 F12 O5	1H,1H,11H,11H-Perfluorotetraethylene glycol	410.0024																			
C8 H9 F7 O5	Heptafluoropropyl-ribofuranose	318.0331				Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y		Y
C9 H11 F9 O3	3-[[Nonafluoroethyl]oxy]propane-1,2-diol	338.056	Y		Y					Y	Y	Y	Y	Y	Y						
C9 H13 F6 N O2	3:2 Hydrogen-substituted fluorotelomer betaine	281.0853														Y	Y	Y	Y		
C9 H14 F5 N O4 S	2:2 fluorotelomer sulfonamido-hydroxypropyl ethanoic acid	327.0569				Y			Y												
C9 H15 F7 N2 O2 S	N-Trimethylammoniopropyl perfluoropropane sulfonamide	348.0732							Y												
C9 H5 F7 O	4-(Heptafluoropropan-2-yl)phenol	262.0226				Y	Y	Y	Y												
C9 H5 F9 N2 O2	Nonafluoro-7,7-diisocyanatoheptane	344.0204			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							
C10 H2 F12 O	(Perfluoropropyl)(perfluorophenyl)methanol	365.9904																			
C10 H4 F11 N O2 S	N-(2,4-Difluorophenyl)-nonafluorobutane-1-sulfonamide	410.9798				Y	Y	Y	Y												

In sediment and plant samples:

Putative Formula	Putative Identification	Calculated Mass	Sediment (T1)		Sediment (T2)		Sediment (T6)		P1 Shoot (T6)		P1 Root (T6)		P2 Shoot (T6)		P2 Root (T6)	
			1	2	1	2	1	2	1	2	1	2	1	2	1	2
C3 H3 F3 O2	1:2 Fluorotelomer carboxylic acid	128.0086														
C4 H F9 O2 S	perfluorobutane sulfinate	283.9556														
C4 H5 F3 O2	1:3 fluorotelomer carboxylic acid	142.0242	Y	Y												
C5 H F9 O4 S	Keto-perfluoropentane sulfonate	327.946														
C5 H4 F9 N O2 S	N-methyl perfluoro-1-butane sulfonamide	312.982	Y													Y
C7 H Cl F12 O3	Chloro-Perfluoro Ether octanoic acid	395.9425														
C7 H2 F12 O3	H-substituted Perfluoro Ether octanoic acid	361.9809														
C7 H2 F12 O4	Dioxa-H-perfluorononanoic acid	377.9759														
C7 H3 F7 N2 O	(Heptafluorobutyl)imidazole	264.0129														
C7 H4 F12 O3 S	Trifluoropropanyl nonafluorobutane sulfonate	395.9687														
C7 H5 F9 O2 S	Perfluoro-4-(prop-1-ene-1-sulfonyl)butane	323.986														
C8 H10 F9 O3 P S	4:2 fluorotelomer thia ethyl phosphonic acid	387.9944									Y					
C8 H15 F5 N2 O2 S	N-Trimethylammonioethyl perfluoroethane sulfonamide	298.0778														
C8 H5 F7 N2 O2	Perfluoropropyl-6-methylpyrimidine-2,4(1H,3H)-dione	294.0235														
C8 H6 Cl F9 O2	Nonafluoroheptyl carbonochloridate	339.9921		Y	Y	Y										
C8 H6 F12 O5	1H,1H,11H,11H-Perfluorotetraethylene glycol	410.0024														
C8 H9 F7 O5	Heptafluoropropyl-ribofuranose	318.0331														
C9 H11 F9 O3	3-[(Nonafluorohexyl)oxy]propane-1,2-diol	338.056														
C9 H13 F6 N O2	3:2 Hydrogen-substituted fluorotelomer betaine	281.0853														
C9 H14 F5 N O4 S	2:2 fluorotelomer sulfonamido-hydroxypropyl ethanoic acid	327.0569														
C9 H15 F7 N2 O2 S	N-Trimethylammonioethyl perfluoropropane sulfonamide	348.0732					Y	Y								
C9 H5 F7 O	4-(Heptafluoropropan-2-yl)phenol	262.0226									Y				Y	Y
C9 H5 F9 N2 O2	Nonafluoro-7,7-diisocyanatoheptane	344.0204														
C10 H2 F12 O	(Perfluoropropyl)(perfluorophenyl)methanol	365.9904														
C10 H4 F11 N O2 S	N-(2,4-Difluorophenyl)-nonafluorobutane-1-sulfonamide	410.9798														
C10 H6 F7 N3 O	Heptafluoro-N'-[(pyridin-4-yl)methylidene]-butanehydrazide	317.0393														
C10 H9 F7 N2 O2	Ethyl [5-(heptafluoropropyl)-1H-pyrazol-3-yl] acetate	322.0549														
C10 H9 F9 O3	Nonafluoro-2-hydroxyheptyl prop-2-enoate	348.0416														

C11 H11 F7 N2 O2	Ethyl [3-(perfluoropropyl)-1-methyl-1H-pyrazol-5-yl]acetate	336.0703	Y		Y	Y	Y	Y									
C11 H13 F11 N2 O	N-dimethyl ammonio propyl-perfluorohexane amide	398.0855	Y	Y	Y	Y											
C11 H6 F16 O	Hexadecafluoro-9-(vinyloxy)nonane	458.0169															
C12 H11 F13 N2 O	Tridecafluoro-1-(4-methylpiperazin-1-yl)heptan-1-one	446.0667															
C12 H18 F9 N O3 S	hydroxypropyl trimethyl 4:2 fluorotelomer sulfonamide	427.086															
C12 H4 Cl2 F6 N4 O S	Fipronil	435.939	Y	Y					Y				Y	Y			Y
C13 H16 F9 N O4	4:3 2-methylester-fluorotelomer betaine	421.0933															
C13 H19 F9 N2 O4 S	N-trimethylammoniopropyl perfluorobutane sulfonamido propanoic acid	470.0929															
C13 H21 F9 N2 O4 S	N-dihydroxybutyl dimethylammoniopropyl perfluorobutane sulfonamide	472.1084															
C13 H21 F9 N2 O5 S	N-dihydroxy propyl dimethyl ammonio hydroxymethyl propyl-perfluorobutanesulfonamide	488.1035															
C13 H21 F9 N2 O5 S2	N-sulfopropyl dimethylammoniopropyl N-methyl perfluorobutanesulfonamide	520.0753															
C13 H5 F9 O2	2-(Nonafluorobutyl)-4H-1-benzopyran-4-one	364.0145								Y	Y						
C13 H8 F9 N3 O3	4-Hydroxy-3-(hydroxyimino)-4-(nonafluorobutyl)-1,3,4,5-tetrahydro-2H-1,5-benzodiazepin-2-one	425.0432															
C14 H11 F7 N2 O2	N'-[(2Z)-Heptafluoro-4-oxohept-2-en-2-yl]benzohydrazide	372.0698								Y	Y						
C14 H17 F11 N2 O6 S	N-carboxymethyl dimethylammoniopropyl-perfluoropentane sulfonamido acetic acid	550.0629															
C14 H17 F13 O	1-(1,3-Dimethylbutoxy)-2-(perfluorohexyl)ethane	448.1085															
C14 H21 F9 N2 O S	4:2 fluorotelomer thia ethanamido propyl trimethyl ammonium	436.1227								Y	Y						
C15 H15 F17 N2 O4 S	N-Carboxymethyl dimethylammoniopropyl-perfluorooctanesulfonamide	642.0496															
C15 H17 F17 N2 O3 S	N-hydroxyethyl dimethylammoniopropyl perfluorooctanesulfonamide	628.0701															
C15 H21 F9 N2 O3	N-methylethyl-carboxymethyl dimethyl ammonio propyl perfluoropentane amide	448.1418	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
C16 H12 F7 N3 O3	Ethyl 5-(heptafluorobutanamido)-1-phenyl-1H-pyrazole-4-carboxylate	427.0775															
C17 H21 F13 O	Tridecafluoroheptadec-10-en-1-ol	488.1396															
C17 H23 F13 O	Tridecafluoroheptadecan-1-ol	490.1549															
C18 H17 F7 N2 O2	5-(4-tert-Butylphenyl)-N-heptafluorobutyl-1,2-oxazole-3-carboxamide	426.1169	Y	Y	Y	Y	Y										
C18 H24 F7 O2 P	Phosphinic acid, dibutyl-, 4-heptafluorobutylphenyl ester	436.1405												Y			Y

* Y – identified by LC-HRMS

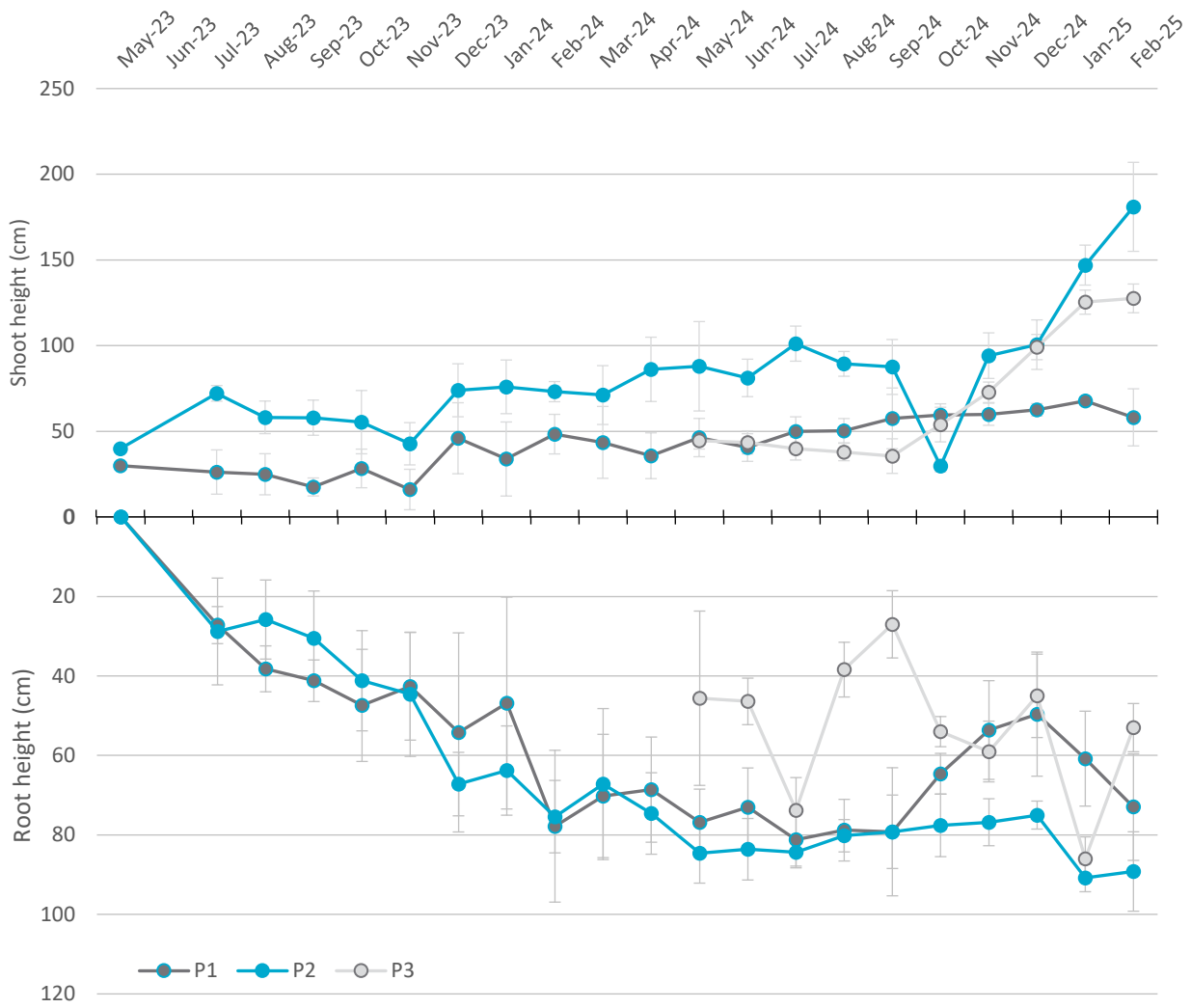


Figure B 4. Average (\pm SD) of shoots and roots height during the study period. Measurements conducted by the WPW team



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