To: U.S. Waterkeeper groups **From:** Waterkeeper Alliance **Date:** April 14, 2022

WATERKEEPER 2022 PFAS Survey of U.S Watersheds: FAQs

1. Project Overview

Per- and polyfluoroalkyl substances (PFAS) are persistent organic contaminants that are pervasive throughout water supplies in the United States. Point sources are many, including industrial wastewater, landfill leachate, WWTP effluent, and contamination from the use of firefighting foams at airbases and airports across the country. PFAS are highly mobile in the environment and readily make their way to drinking water resources like surface water.

Waterkeeper Alliance has organized a comprehensive PFAS contamination survey of watersheds in the U.S. This will be the most extensive PFAS monitoring study conducted in the U.S., analyzing collection samples taken simultaneously in surface waters across the country. To enable advanced and convenient Point-of-Site sampling for Alliance members, we have selected a PFAS water test kit (WTK) developed by Cyclopure Inc. of Illinois.

Our goal is to have each U.S. Waterkeeper affiliate perform two water sample collections, one upstream and one downstream, from a selected river or stream in their watershed area. Sample collections will be analyzed over the summer. Results will be published in an Alliance report dated August 2022 for submission as part of Clean Water Act proceedings in Washington DC.

2. Who is Cyclopure?

Cyclopure is a materials technology firm that has developed a novel adsorbent (known as DEXSORB®) that is derived from renewable cyclodextrins with high selectivity for diverse PFAS structures, regardless of chain length, structure, or functional group. DEXSORB is being commercialized for multiple PFAS-related uses, including (i) environmental monitoring, (ii) household filtration products, and (iii) municipal + industrial treatment systems.

3. What is the Cyclopure WTK?

Under a grant from the **National Institute of Environmental Health Sciences (NIEHS)**, Cyclopure developed a PFAS test kit that uses DEXSORB to provide a convenient, affordable and accurate way to detect PFAS compounds in tap water and surface water.

Introduced at the beginning of 2020, the company has tested over 1,200 water samples for PFAS in 41 states. Water testers include residents, community groups, research institutions, and environmental organizations.

The PFAS sampler consists of a 250 ml collection cup with a DEXSORB-loaded extraction disc in a bottom filter. Using the PFAS sampler, the company can accurately measure and quantify the presence of short and long-chain PFAS in a convenient Point-of-Site and Time Specific extraction method.

4. How does sample collection work?

Point-of-Site sample extraction is made easy by filling the collection cup with 250 mL of the water sample and then allowing the water to pass through the DEXSORB-loaded extraction disc.

This typically takes 20 minutes. While draining, it is important to set the cup on top of the 250 mL HDPE drain bottle. Setting on other surfaces like the ground should be avoided.

Once all water passes through the PFAS sampler, pour the drain bottle out and keep it for future use. The PFAS sampler is ready for return to Cyclopure's lab; there is no shipping of water.

5. How are PFAS recovered and measured at the Cyclopure lab?

When the WTK is received, Cyclopure analytical chemists perform standard solid-phase extraction (SPE) to recover PFAS compounds collected in the DEXSORB extraction disc. The eluted PFAS sample is subsequently analyzed on an HPLC-MS/MS (QExactive hybrid quadrupole orbitrap, ThermoFisher).

Analytical procedures use isotope dilution for PFAS measurement and quantification. The analysis of water samples has been validated to the requirements of EPA Methods 533, 537, and 1633 (draft), and follow instrument procedures for internal standardization and calibration.

6. How many PFAS compounds does Cyclopure test for?

Cyclopure tests for 55 PFAS structures, including 21 precursors and all PFAS listed under EPA Methods 533, 537 and 1633 draft. See attached Appendix for the complete list.

7. What are the reporting limits of Cyclopure analytical methods?

The limit of quantification (LOQ) for all 55 PFAS tested under Cyclopure analytical methods is 1 - 2 ppt (ng/L). Reporting limits have been validated to the accuracy criteria of EPA methods, including Minimum Reporting Limit (MRL) confirmation.

8. How is Cyclopure testing different?

Cyclopure testing for PFAS follows the same analytical methods as other commercial labs, and has been validated by EPA's Demonstration of Capability Quality Control Requirements.

Prior to the analysis of HPLC-MS/MS, Cyclopure and other commercial labs process water samples using standard SPE methods to extract and recover PFAS.

The difference in methods is that other labs perform PFAS extractions *in the lab* on water samples collected by customers, while Cyclopure customers perform PFAS extractions *in the field* using the company's DEXSORB-loaded extraction disc. Field extraction avoids trip contamination; PFAS are adsorbed and securely locked into DEXSORB's cyclodextrin cups.

DEXSORB is a confirmed and highly selective adsorbent for PFAS, currently used in residential filtration products and the treatment of PFAS contaminated surface water and groundwater. The rapid kinetics, high capacity, and selective PFAS adsorption of DEXSORB uniquely enable Point-of-Site sample extraction, providing a convenient and accurate way to test tap and surface waters for PFAS.

9. How should I select a test location?

Select a river or stream in your Waterkeeper area, preferably in proximity of industrial activity, a wastewater treatment plant, or a landfill site (either closed or operating). If your watershed is entirely natural, pick your favorite river or stream. Two water samples should be taken: one upstream of the "point source" and one downstream. It is important to take collections from the **upper clear layers of the surface water source**. Dip the collection cup away from the water's edge. Sediments should be avoided.

If you would like assistance in selecting a test location, Cyclopure's environmental monitoring team will be available to schedule Zoom calls to advise. They have worked with other groups to design watershed test plans for Chicago IL, Detroit MI, and Charleston SC.

Please take **GPS coordinates** for both of your test locations. This is important for the geospatial mapping of the Waterkeeper PFAS watershed survey.

10. How much water should I collect for each WTK?

The outside of each WTK collection cup contains volume markings and should be filled with water samples to the maximum 250 mL line. Please wear included gloves during this step.

11. After filling the WTK with a water sample, what should I do next?

After filling, the WTK will start to filter/drain through a hole in the cup bottom, passing through the DEXSORB-loaded extraction disc. Sample filtration takes about 20 minutes. Some filtrations may be slower. Be patient. This is the most important part of the process.

12. Where should I place the WTK during water sample extraction?

Set the WTK collection cup to drain atop the 250 mL HDPE bottle included with the test kit, placing the WTK over the bottle opening. See attached Sample Guide - photo 4. This keeps the collection cup elevated above the ground, while filtered water passes out of the drain hole in the bottom of the cup. The extraction disc and blue plastic filter should not come in contact with the ground. Water collected in the HDPE bottle can be poured on the ground after filtration is complete. Replace the cap and save the bottle for use at your second test location.

13. How do I return the WTK to Cyclopure after sampling?

After sampling, the WTKs should be placed back in their original boxes and sent back to Cyclopure. Use the included return shipping label. It is not necessary to return the drain bottle.

14. What will the PFAS Survey report on?

The Waterkeeper report will be the first simultaneous nationwide test survey of U.S. watersheds. Waterkeepers and Cyclopure will collaborate in the preparation of the report. It will present a comprehensive discussion of PFAS detections, which will report on the 55 PFAS structures tested for by the WTK.

The Report will organize findings in geographical groupings. Upstream and downstream measurements for each watershed will be included in appendices with associated GPS identifiers and a listing of the local Waterkeeper group that performed the sampling.

The Waterkeeper Alliance plans to submit its report at the end of summer in connection with Clean Water Act proceedings in Washington DC.

15. Webinar Information Session.

We have organized a planning session webinar with Cyclopure environmental engineers and PFAS monitoring specialists for May 10, 2022, at 1:00 pm Eastern Time. During the session, Cyclopure specialists will provide further details about the DEXSORB WTK sampling process and be available to answer questions. Webinar sign up here:

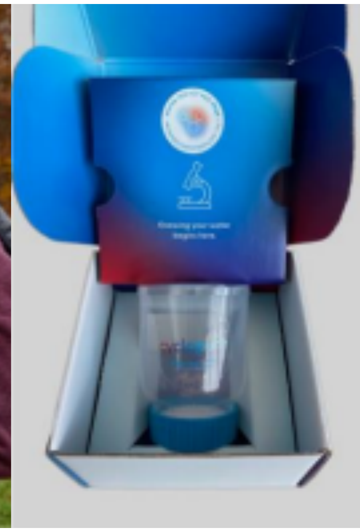
https://waterkeeper.zoom.us/meeting/register/tZAkd-GorjgpGNcPxCAvs47sQlob8m3uyHoh

CYCLOPURE

16. Who Will Pay?

This activity will be funded by Waterkeeper Alliance with no out-of-pocket cost to you. Cyclopure has offered the Waterkeeper Alliance a discounted price on its PFAS water test kits, and has volunteered services of test coordination, a compilation of data, and report writing.

Cyclopure WTK for PFAS – Sample Collection Guide

1. ***Prepare a test plan to identify sampling locations*.** 2. ***WTK is ready when you are*.**

4. ***Draining is Sampling*.** Be patient; this is when PFAS extraction happens. Use the 250 mL drain bottle. Don't disturb the white extraction disc in the blue filter, and keep the filter from contacting the ground.

3. ***Make Sampling fun*.** Bring a friend, wear gloves, and sample clear water (avoid sediment). Take photos of your activities, so we can include them in our Waterkeeper Alliance PFAS Report.

Appendix.

PFAS detected by Cyclopure analytical methods.

Compound Abbreviation CAS# EPA 1633 Perfluorobutanoic Acid PFBA 375–22–4 Y Perfluoropentanoic Acid PFPeA 2706–90–3 Y Perfluorohexanoic Acid PFHxA 307–24–4 Y Perfluoroheptanoic Acid PFHpA 375–85–9 Y Perfluorooctanoic Acid PFOA 335–67–1 Y Perfluorononanoic Acid PFNA 375–95–1 Y Perfluorodecanoic Acid PFDA 335–76–2 Y Perfluoroundecanoic Acid PFUnA 2058–94–8 Y Perfluorododecanoic Acid PFDoA 307–55–1 Y Perfluorotridecanoic Acid PFTrDA 72629–94–8 Y Perfluorotetradecanoic Acid PFTeA 376–06–7 Y Perfluoropropane Sulfonic Acid PFPrS 423–41–6 Perfluorobutane Sulfonic Acid PFBS 375–73–5 Y Perfluoropentane Sulfonic Acid PFPeS 2706–91–4 Y Perfluorohexane Sulfonic Acid PFHxS 355–46–4 Y Perfluoroheptane Sulfonic Acid PFHpS 375–92–8 Y Perfluorooctane Sulfonic Acid PFOS 1763–23–1 Y Perfluorononane Sulfonic Acid PFNS 474511–07–4 Y Perfluorodecane Sulfonic Acid PFDS 335–77–3 Y Perfluorododecane Sulfonic Acid PFDoS 79780–39–5 Y 4:2 Fluorotelomer Sulfonate 4:2 FTS 414911–30–1 Y 6:2 Fluorotelomer Sulfonate 6:2 FTS 425670–75–3 Y 8:2 Fluorotelomer Sulfonate 8:2 FTS 481071–78–7 Y 10:2 Fluorotelomer Sulfonate 10:2 FTS 120226–60–0 Perfluorobutane Sulfonamide FBSA 30334–69–1 N–Methylperfluorobutanesulfonamide MeFBSA 68298–12–4 Perfluorohexane Sulfonamide FHxSA 41997–13–1 Perfluorooctane Sulfonamide PFOSA 754–91–6 Y Perfluorodecane Sulfonamide FDSA N/A N–Ethylperfluorooctane–1–Sulfonamide NEtFOSA 4151–50–2 Y N–Methylperfluorooctane–1–Sulfonamide NMeFOSA 31506–32–8 Y Perfluorooctane Sulfonamido Acetic Acid FOSAA 2806–24–8 N–Ethyl Perfluorooctane Sulfonamido Acetic Acid NEtFOSAA 2991–50–6 Y N–Methyl Perfluorooctane Sulfonamido Acetic Acid NMeFOSAA 2355–31–9 Y N–methyl perfluorooctanesulfonamidoethanol NMeFOSE 24448–09–7 Y N–ethyl perfluorooctanesulfonamidoethanol NEtFOSE 1691–99–2 Y Hexafluoropropylene Oxide Dimer Acid HFPO–DA 13252–13–6 Y 4,8–Dioxa–3H–Perfluorononanoate ADONA 919005–14–4 Y Perfluoro–3–Methoxypropanoic Acid PFMPA 377–73–1 Y Perfluoro–4–Methoxybutanoic Acid PFMBA 863090–89–5 Y Perfluoro–3,6–Dioxaheptanoic Acid NFDHA 151772–58–6 Y 9–Chlorohexadecafluoro–3–Oxanone–1–Sulfonic Acid 9Cl–PF3ONS

756426-58-1 Y 11-Chloroeicosafluoro-3-Oxanonane-1-Sulfonic Acid 11CL-PF3OUdS 763051-92-9 Y Perfluoro(2-ethoxyethane) Sulfonic acid PFEESA 113507-82-7 Y Perfluoro-4-ethylcyclohexane Sulfonic Acid PFECHS 646-83-3 8-Chloroperfluoro-1-Octanesulfonic Acid 8Cl-PFOS 777011-38-8 3-Perfluoropropyl Propanoic Acid 3:3FTCA 356-02-5 Y 2h,2h,3h,3h-Perfluorooctanoic Acid 5:3FTCA 914637-49-3 Y 3-Perfluoroheptyl propanoic acid 7:3FTCA 812-70-4 Y 2H-Perfluoro-2-dodecenoic acid FDUEA 70887-94-4 2H-perfluoro-2-decenoic acid FOUEA 70887-84-2 Bis(perfluorohexyl)phosphinic acid 6:6PFPi 40143-77-9 (Heptadecafluorooctyl)(tridecafluorohexyl) Phosphinic Acid 6:8PFPi 610800-34-5 Bis(perfluorooctyl)phosphinic acid 8:8PFPi 40143-79-1 N-(3-dimethylaminopropan-1-yl) perfluoro-1-hexanesulfonamide N-AP-FHxSA 50598-28-2