

Matagorda Bay Mitigation Trust 2023-2024 Funding Cycle

Title: Evaluating Ecological and Human Health Risk of PFAS in Matagorda Bay

Contract #067

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Q2 October 2024 Progress Report

Q2 Update:

We have begun testing water samples taken from each oyster reef in Matagorda Bay for PFAS contamination and have continued to process oyster tissue samples for body burden analysis. We are also currently preparing to establish an oyster culture in the Nielsen Lab for Phases 2 and 3.

Phase 1:

Water samples collected concurrently with oysters during Q1 have been prepped for analysis for PFAS contamination using EPA Method 531.1 *“Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid”* (Figure 1), a method that will be performed at UT MSI. This method will the presence of 22 PFAS (Table 1). Water samples are currently undergoing PFAS extraction using Solid Phase Extraction (SPE) following Method 531.1 (Figure 5). Briefly, each water sample is defrosted from -20°C, spiked with the EPA 537.1 Method isotopically-labelled internal standards, run through the PFAS-free resin SPE columns (Bond Elut-LMS, 500mg 6mL; Agilent Technologies) recommended by the EPA, and placed at -20°C until elution. Samples will be sent to the Analytical Core Laboratory at UT MSI once eluted for PFAS analysis on the IM Q-TOF LC-MS. In addition, the method to process and analyze the oyster tissue (i.e., meat) collected is currently underway. We have begun to work through optimization of US EPA method EPA 712-C-16-004 *“Ecological Effects Test Guidelines OCSPP 850.170 Oyster Bioaccumulation Factor (BCF)”* and EPA draft method 1633 for biotic tissue samples. Samples will be analyzed using modified EPA methods 533 and 537.1, with one instrument modification that is permitted under section 1.6 of EPA Method 537.1. This includes the use of IM Q-TOF LC-MS rather than LC-MS/MS, which allow for more cost-effective analyses with higher-mass accuracy and mass-defect filtering.

Phases 2 and 3:

We are currently preparing to establish an oyster culture in the Nielsen Lab, following best practices via guidance from the experts at the Texas A&M AgriLife Research Mariculture Laboratory in Corpus Christi, TX. We recently met with Dr. Chris Hollenbeck to discuss logistics for establishing oyster cultures and experimental methods for Phases 2 and 3.

References

¹<https://www.sgsaxys.com/2021/09/14/epa-announces-availability-of-epa-1633-draft-pfas-method-developed-by-sgs-axys-sgs-axys-continues-to-expand-range-of-pfas-testing-methods/>

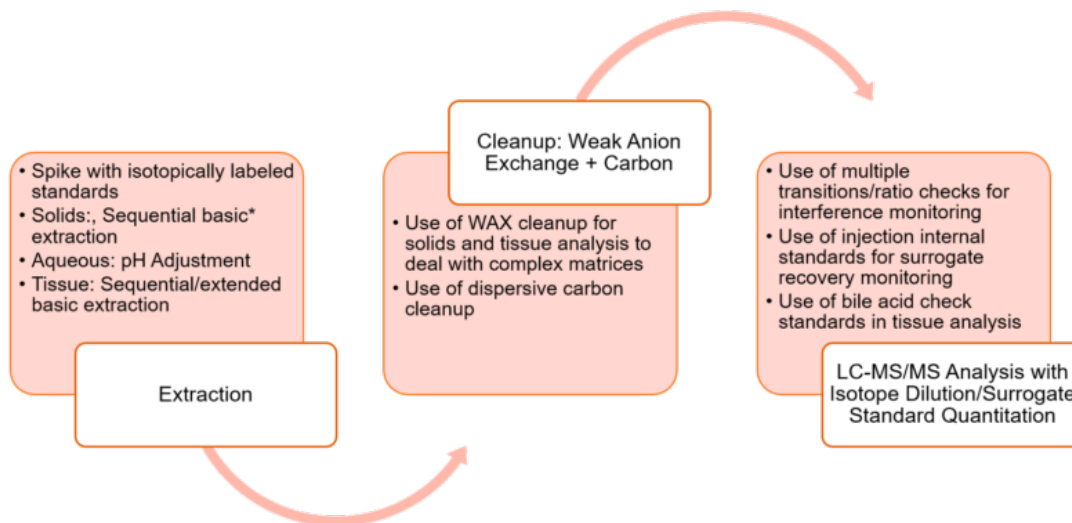


Figure 1. Extraction and analysis methods used for water and sediment samples for PFAS analysis using EPA Methods 1633 and 537.1. Schematic provided by SGS AXYS Analytical Services, LTD¹.

Analyte	Internal Standard Reference
PFBS	2
PFHxA	1
HFPO-DA	1
PFHpA	1
PFHxS	2
ADONA	1
PFOA	1
PFOS	2
PFNA	1
9Cl-PF3ONS	2
PFDA	1
NMeFOSAA	3
PFUnA	1
NEtFOSAA	3
11Cl-PF3OUdS	2
PFDoA	1
PFTTrDA	1
PFTA	1
¹³ C2-PFHxA	1
¹³ C3-HFPO-DA	1
¹³ C2-PFDA	1
d5-NEtFOSAA	3
¹³ C2-PFOA- IS#1	-
¹³ C4-PFOS- IS#2	-
d3-NMeFOSAA- IS#3	-

Table 1. PFAS to be analyzed using EPA Method 537.1 for water samples taken from each sampling site in Matagorda Bay.