

Project Overview

A comprehensive research project to evaluate the fate and transport of PFAS from land applied biosolids is underway at Virginia Tech University’s Shenandoah Valley Agricultural Research and Education Center (SVAREC) in Raphine, VA. A portion of the SVAREC farm has been permitted by VA DEQ for the purpose of conducting research of land applied biosolids. Prior to this study, the SVAREC farm has never received land applied biosolids, providing a unique opportunity to examine the fate and transport of PFAS in a controlled manner. The project team and key roles are summarized in Table 1.

Table 1. SVAREC – Fate & Transport of Land Applied Biosolids Study: Project Team

Name / Affiliation	Role / Responsibility
Dr. Malcolm Taylor - WSSC Water	Primary Investigator (PI) / Project Coordinator
Ata Adeel - MWCOG	Project Coordinator & Administration director
Dr. Gabriel Pent / Anna Cappellina - Virginia Tech	SVAREC Farm Manager / Research Associate
Hui Li / Kang Xia- Michigan State University (MSU)	Co PI / PFAS analysis lab coordination
Azam Hossain / Fred Rischmiller-University of DC	Co PI / Field research program manager
DJ Wacker - Brown & Caldwell	Program Support / Outreach development
Mike Oliver - Synagro Inc.	Land Application Services
Heather Fritz - Maryland Environmental Services	Inspection / Regulatory Compliance

Current funding, provided by NRCS will cover labor costs for an onsite research coordinator (VT employ), supplies and analytical fees (To MSU) for background testing and 2-3 rounds of testing. A summary of the testing protocol and intended sample matrix is provided below. Biosolids will be applied in Spring 2026 and potentially Fall 2026 (pending crop nutrient needs). The intent is to secure additional funding to land apply / sample again Fall 2027 and thereafter, funding availability pending.

1. Three treatments
 1. WSSC Water Biosolids
 2. DC Water Biosolids
 3. Control – Farm as typically done in absence of biosolids
2. Monitor PFAS in the following mediums
 1. Background / ambient levels
 1. Soil samples – for all 3 plots
 2. Currently used fertilizers
 3. Rainwater (can be collected as available throughout study)
 4. Adjacent creek (surface water)
 2. Soil profiles
 3. Shallow groundwater (via pan type lysimeter)
 4. Surface runoff (where available)
 5. Plant tissue

Biosolids from WSSC Water and DC Water will be applied by Synagro in accordance with permit requirements and all applicable ordinances. A nutrient management plan has been developed to calculate application rates based on nutrient content of the biosolids, soils and plant uptake. Maryland Environmental Services (MES) will provide inspection services to ensure all land application practices are recorded and in accordance with regulatory guidelines.

Summary

Whereas there are a multitude of research studies on the potential impacts of land applied biosolids on soil PFAS levels across the U.S., there are only a very few studies specific to the DC Metro area (MD, VA etc.) using locally produced biosolids products. Many of the existing studies in the U.S. utilize legacy data and are based on a variety of assumptions in an effort to assess long term impacts. Moreover, another subset of studies focuses on lab scale experiments, simulating extreme conditions (ultra-high PFAs levels etc.) which are unrepresentative of real-world practices. The principal intent of this study therefore is to examine the fate and transport of PFAS from locally sourced biosolids on VA farm and pasture fields. The study will be conducted at full-scale, representative of conditions typically practiced in the land application of domestic biosolids.

Study results will be shared with regulators, state and local legislators, the biosolids & farming community and stakeholders. A primary goal of this project is to provide vital data on the fate and transport of PFAS from land applied biosolids to provide guidance in the development of biosolids regulations and management decisions based on scientifically vetted data representative of real-world conditions.

For more information contact: malcolm.taylor@wsscwater.com