

SMART SEPTIC STRATEGIES: Data Integration to Manage Hidden Infrastructure Threats to Our Homes and Communities

NSF Project ID: 1952183

Brian Bledsoe, University of Georgia
PG, FY2020

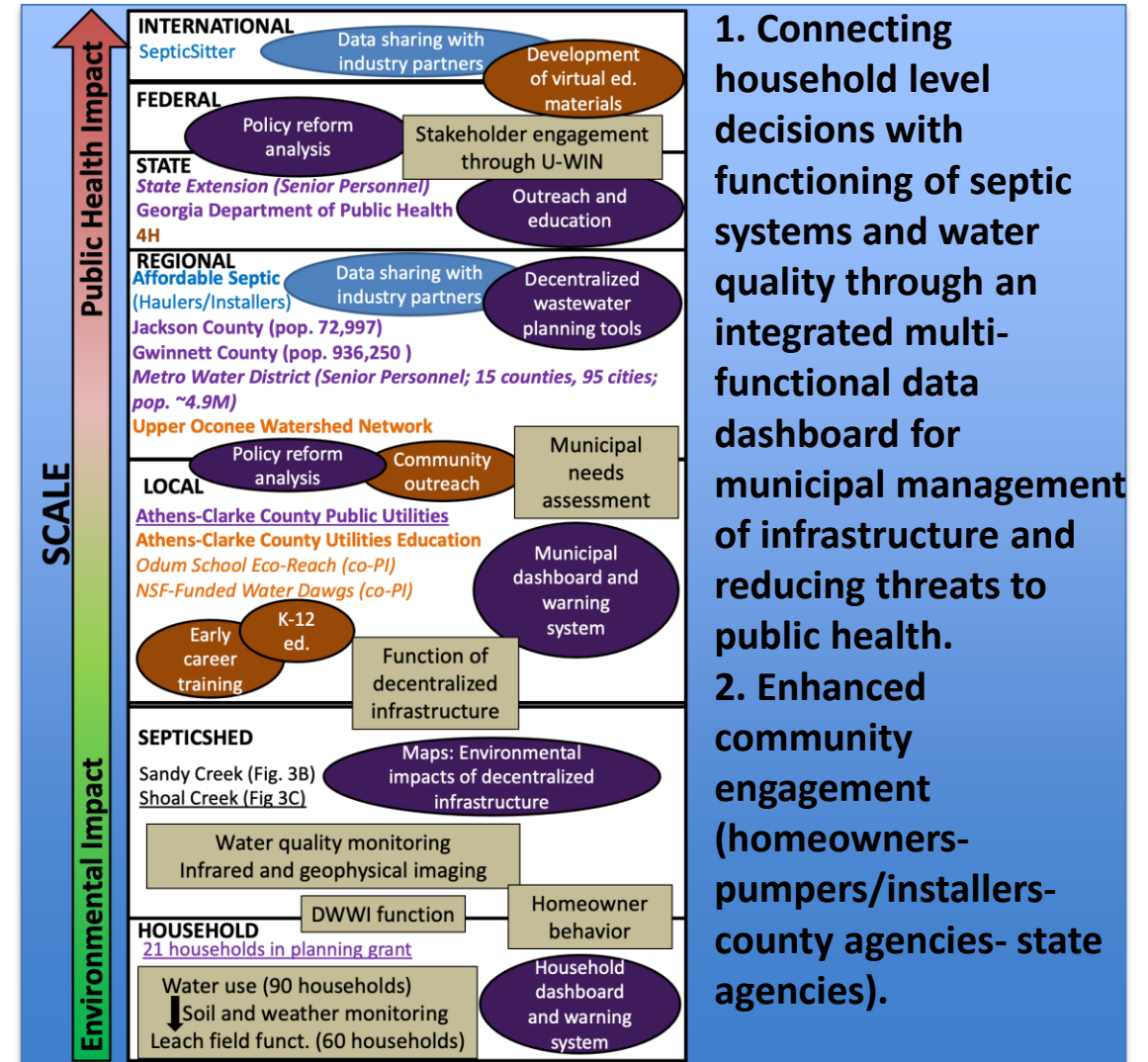
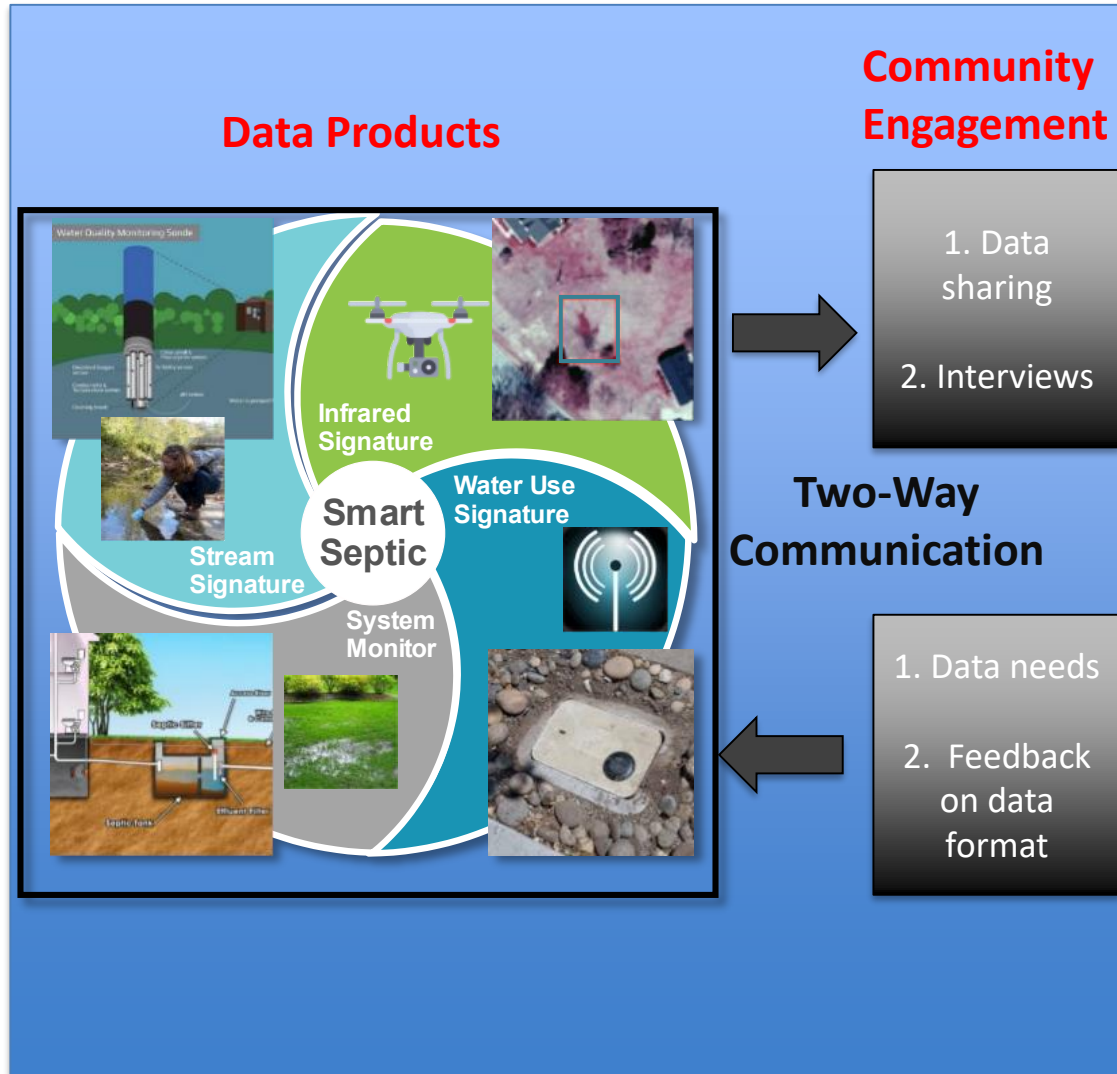
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Community Partners (Name, Institution)

- Athens-Clarke County
- Gwinnett County
- Metropolitan North Georgia Water Planning District (15 Counties and 95 Cities)

Project Overview



Project Overview

Use-Inspired Research

- In the US, almost 30% of homes are served by septic systems that collectively treat > 4 BGD.
- Septic functionality directly depends on water use.
- This hidden infrastructure is often managed poorly and in isolation from water use.
- Behaviors translate to failing or malfunctioning systems that pose a significant threat to household infrastructure, environmental quality and public health.
- Our vision for this project is to empower communities to bring septic systems into the 21st century through smart technology integration.

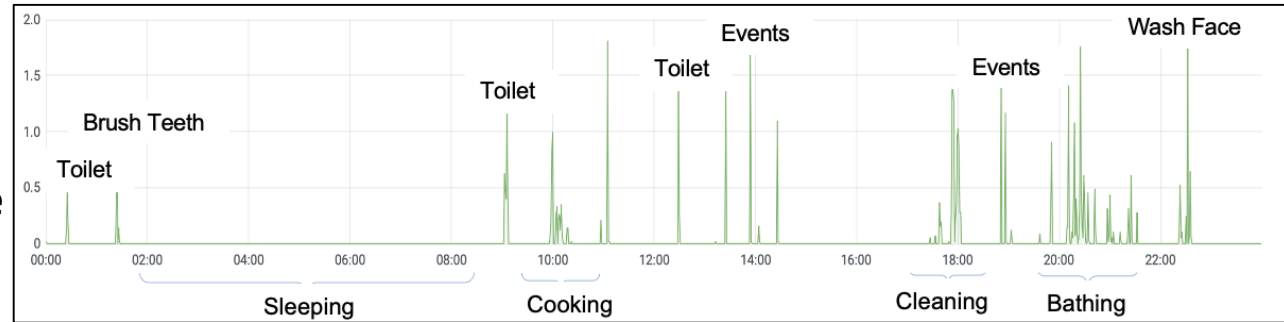
PG Activities

1. High resolution data collection of water use data.
2. Smart septic in-situ monitoring.
3. Automated infra-red detection of failing septic systems.
4. Design of a continuous surface water quality data monitoring.
5. Engagement with local governments and regional water management planning authorities for feedback on current research activities.
6. Stakeholder engagement for updating vision for future IRG proposal.

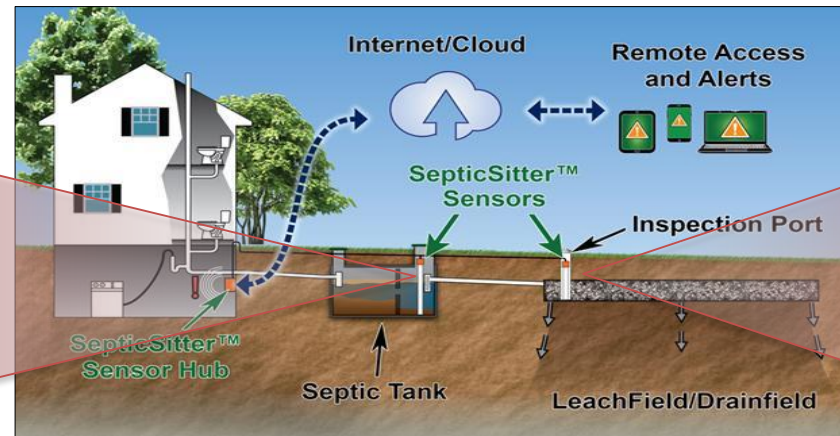
Project Update

RQ 1: SMART SEPTIC IN-SITU MONITORING

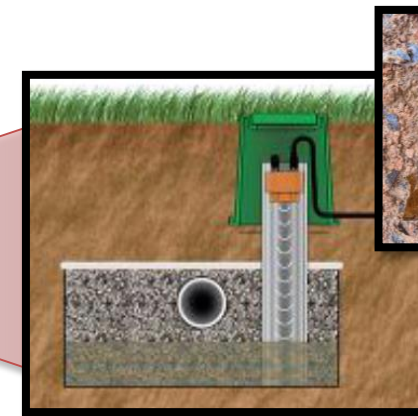
1. **Characterization of water use signature:** High resolution monitoring of water-use data.
2. **Connections between water use and septic system performance:** Installation of septic sitters.



Work with industry partners



Complete septic monitoring system



In-situ septic monitors

RQ 2: SMART SEPTIC TO WASTEWATER MANAGEMENT AT THE COUNTY LEVEL

1. **Evaluation of community buy-in for the data collection efforts:** Household level surveys.
2. **Understand needs of community for developing a wastewater management strategy:** Engagement with community partners.

Project Evolution

Through conversations with our current community partners, we learned about two different approaches that local governments want to adopt for septic system management. These approaches include 1) sustainable management of current and future systems and, 2) phased transition (over decades) to sewers. Both these approaches require involvement from diverse stakeholders (household to state). Thus in our IRG proposal, we have proposed to work with stakeholders and communities across a range of nested scales (homeowner-local government-regional water planning-state public health agencies) to integrate data driven science into either policy.

We conducted socially distanced household level surveys and learned that homeowners were very enthusiastic and supportive of our data collection efforts and wanted to actively participate in the data driven management of septic systems since the possibility of unexpected system failure was a real worry for them. Thus, we have expanded the scope of our study and will be monitoring a larger number of septic systems under different soil types and hydrologic conditions.