



Emerging Pollutants: Protecting Water Quality for the Health of People and the Environment

Understanding the Prevalence and Occurrence of Antimicrobial Resistance in Urban Karst Groundwater Systems

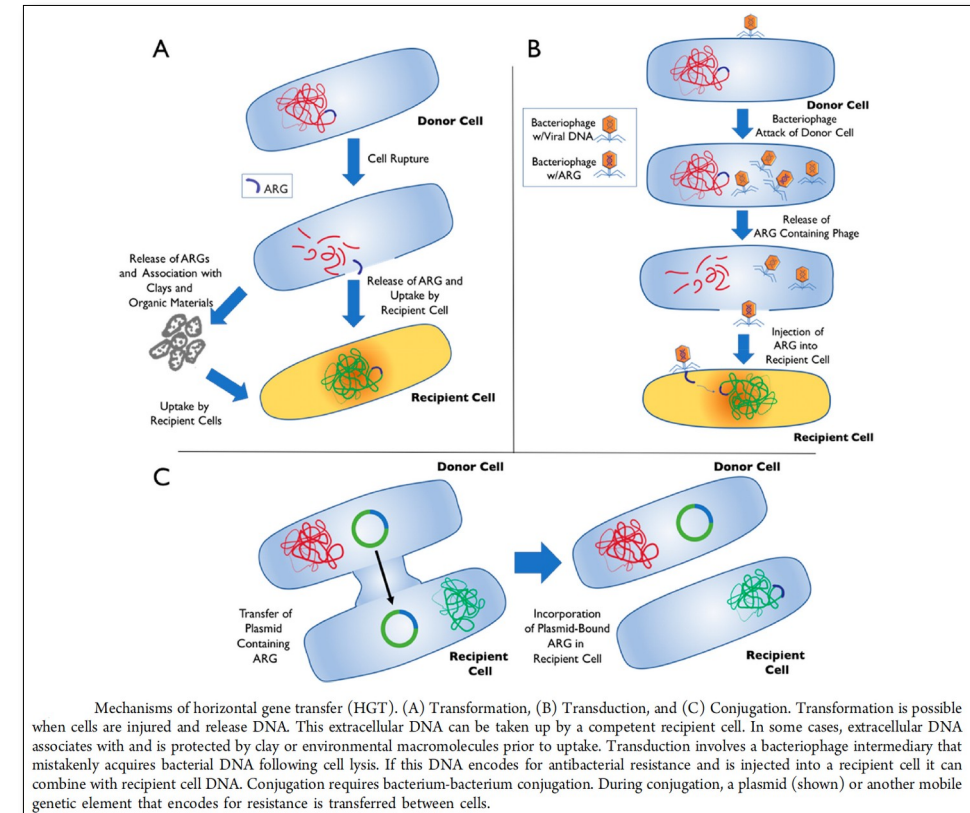
Rachel Kaiser

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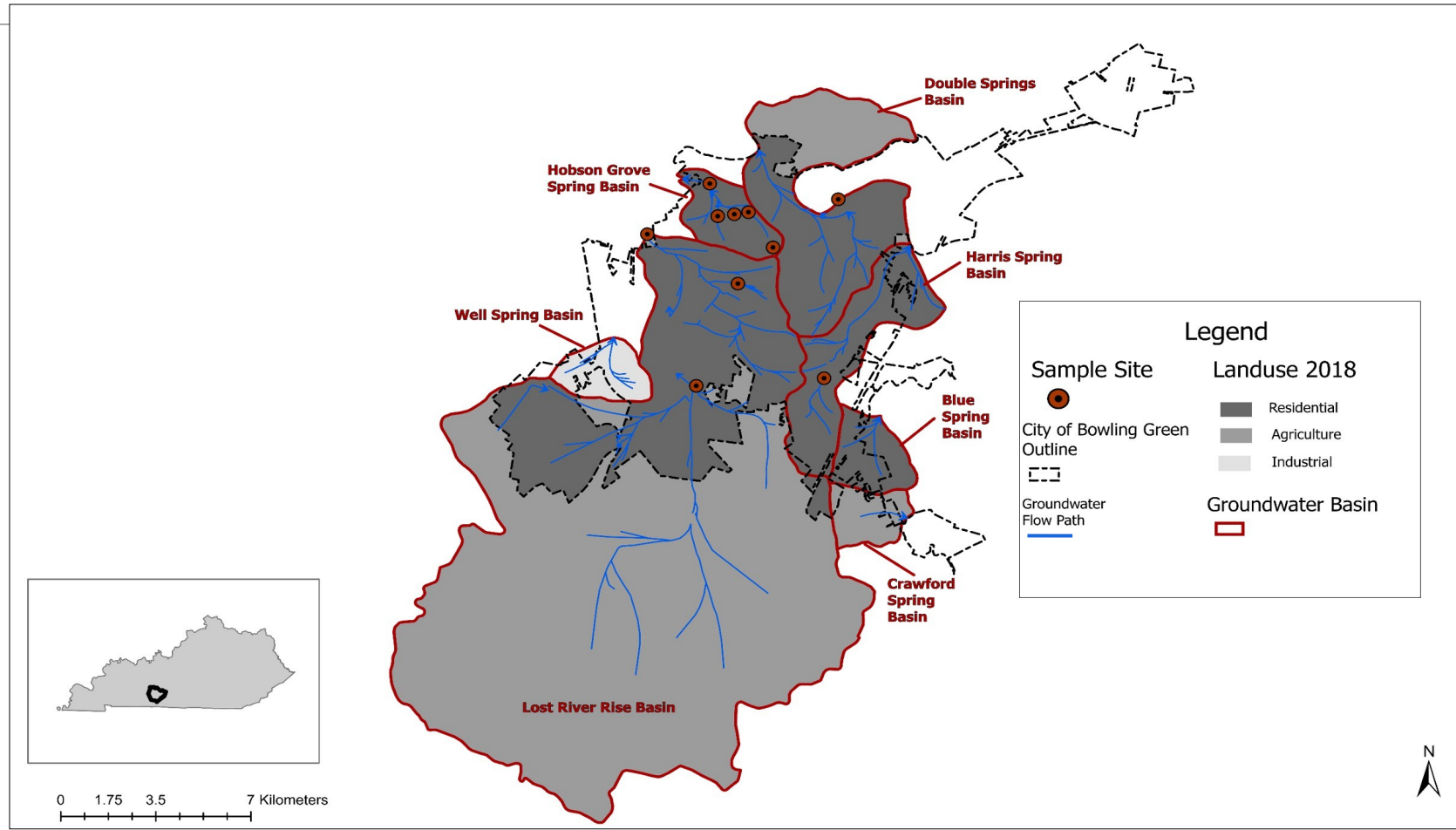
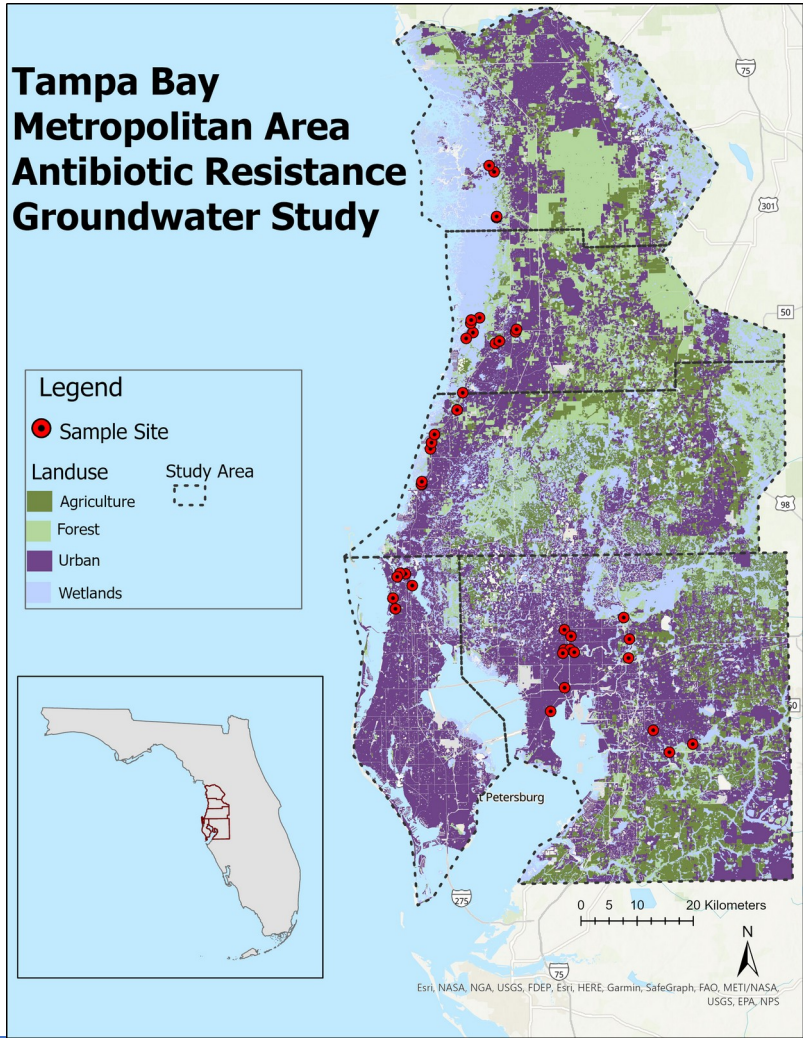
Introduction

- Antimicrobial resistance is a global crisis significantly impacting human health
 - 700,000 annual deaths and \$100 trillion in productivity losses globally
- Water resources are considered the primary environmental reservoir and dissemination pathway
- Groundwater is a global reservoir for antimicrobial resistance
- Karst groundwater supplies 1.18 billion people (16.5% of the global population) with drinking water
- Understanding the occurrence and dissemination of antimicrobial resistance in urban karst groundwater systems

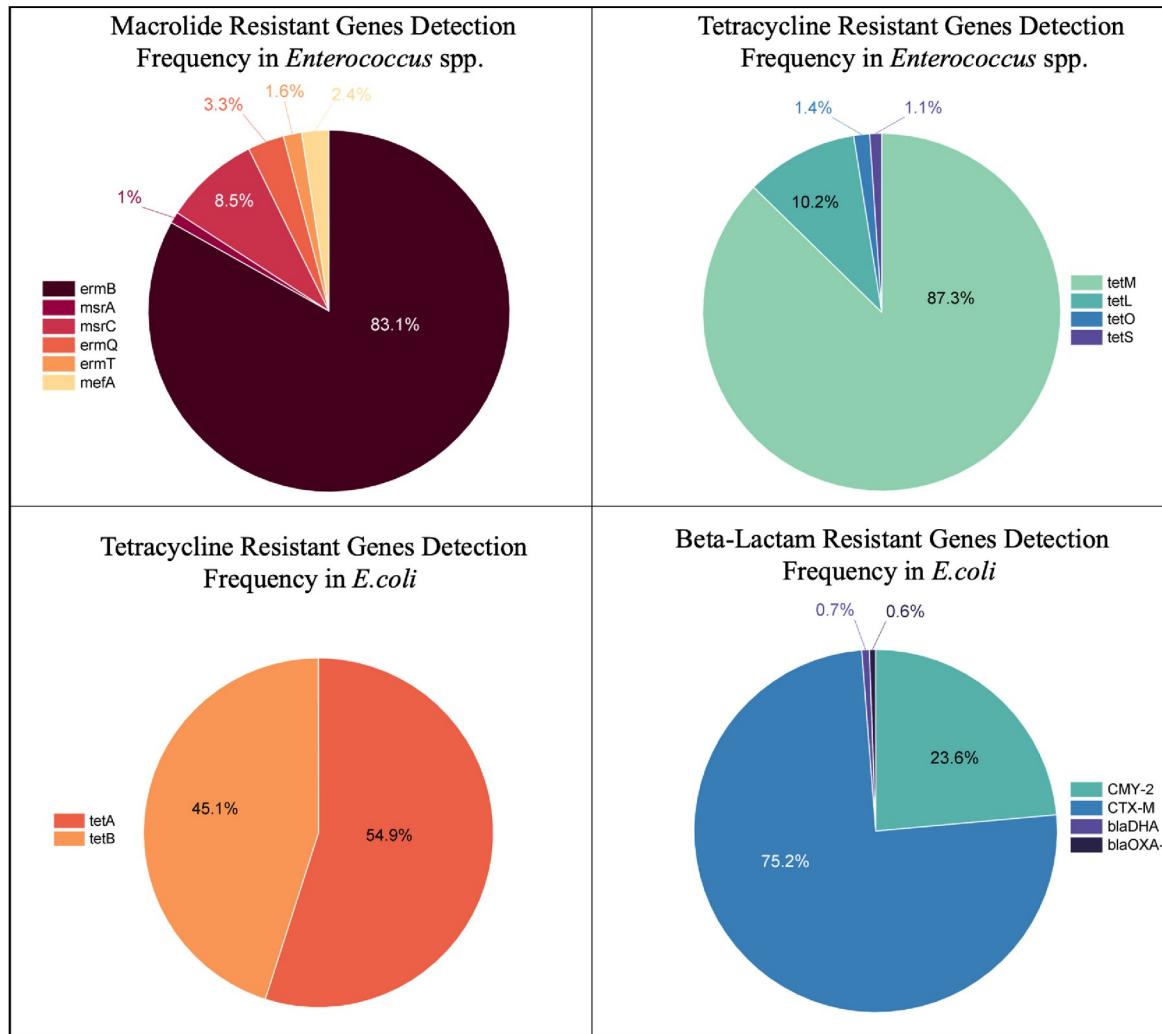


Study Area

Tampa Bay Metropolitan Area Antibiotic Resistance Groundwater Study



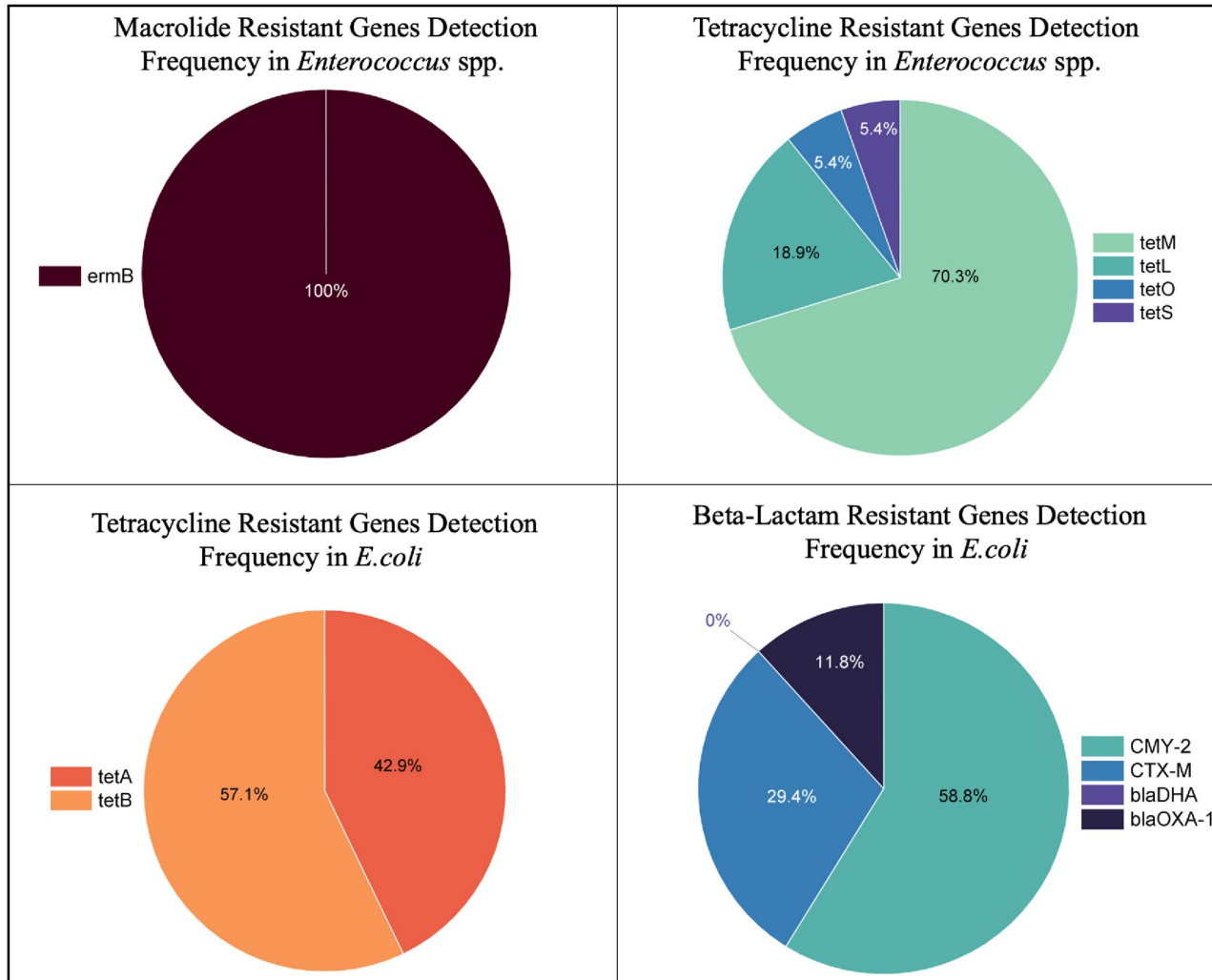
Findings



Kentucky Study Area

- Ubiquitous presence of antibiotic-resistant *Enterococcus* spp. and *E. coli* indicator bacteria
- ARGs detected here are primarily associated with urban practices and clinically relevant antibiotic classes

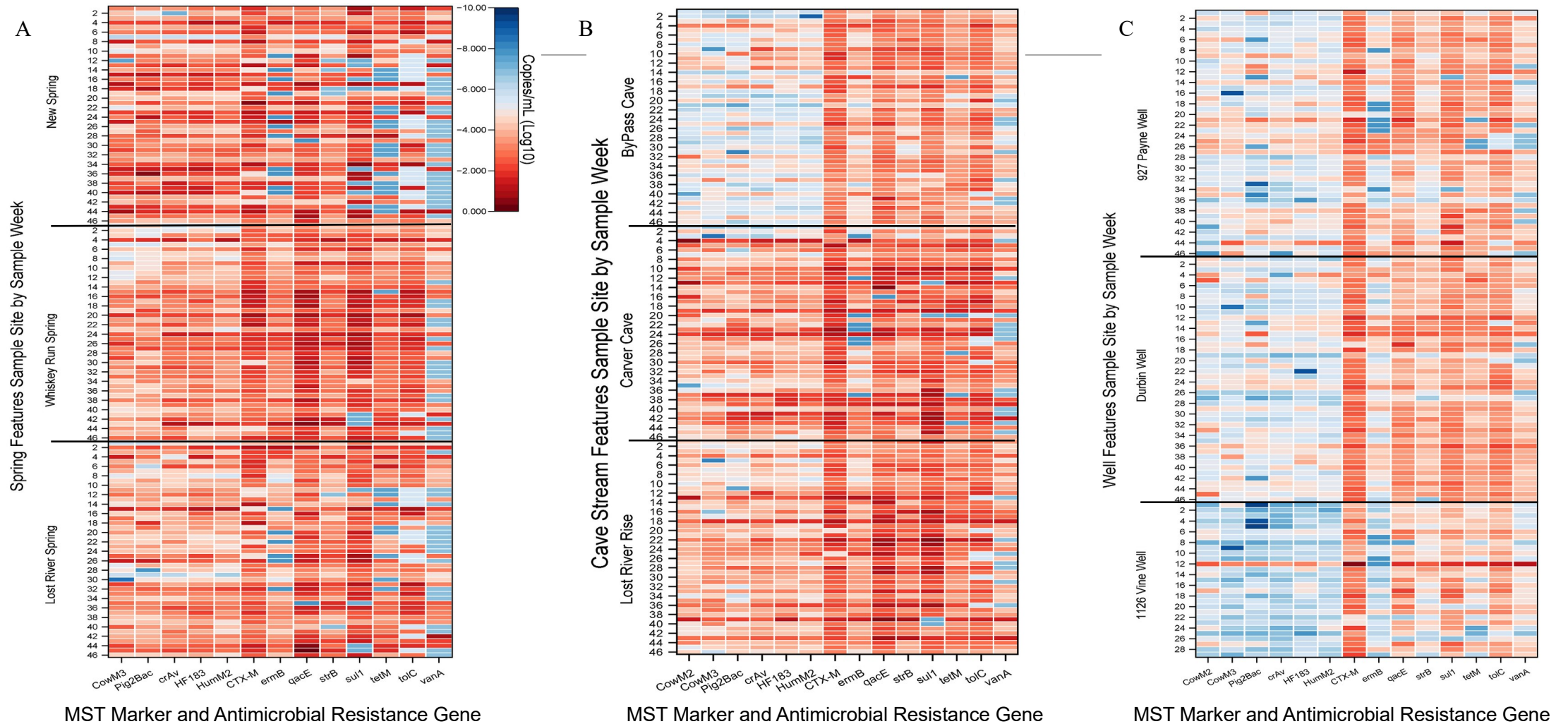
Findings



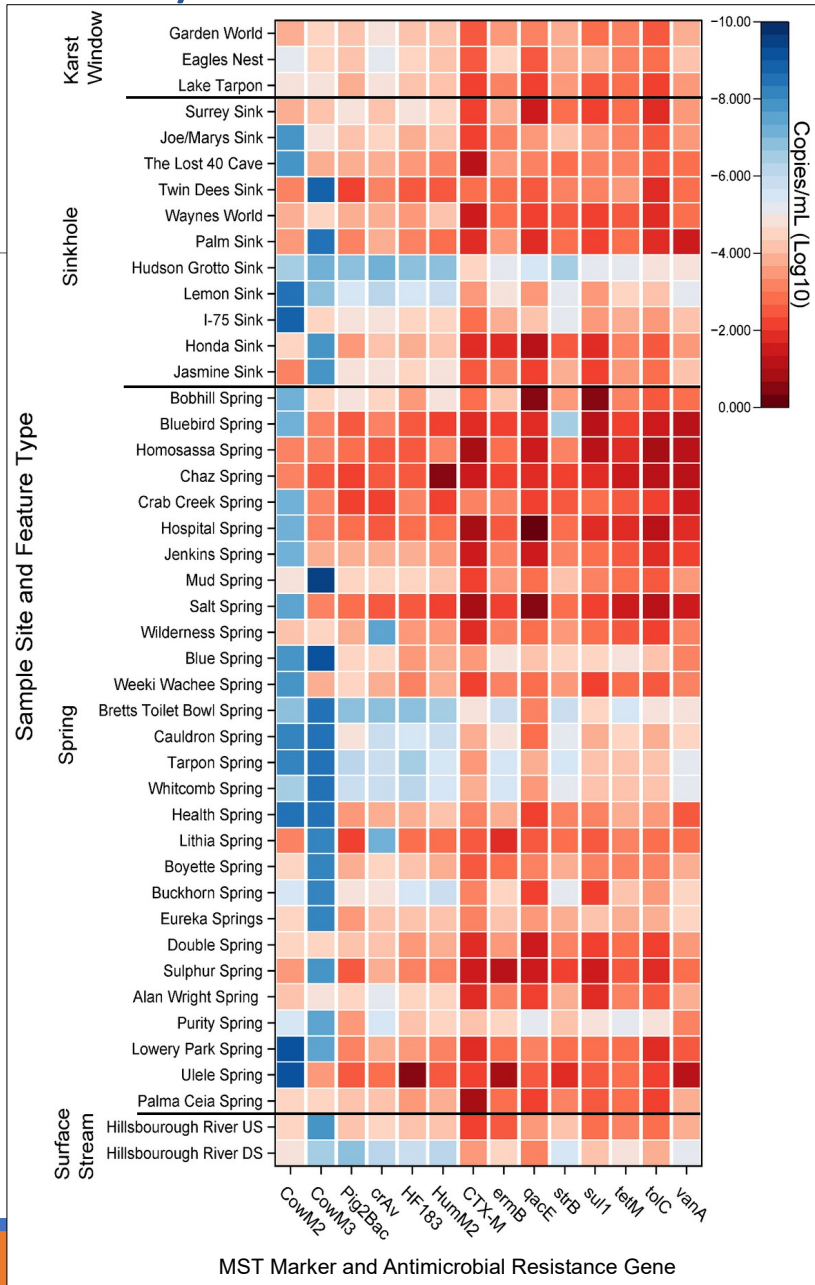
Florida Study Area

- Similar to Kentucky findings
- ARB are spread throughout the urban karst aquifer
- Regardless of mixed landuse, the urban associated genes exhibit a consistent prevalence

Kentucky Study Area



Florida Study Area



- A prominent occurrence of human MST markers
- Highlighting the urban influence on this system regardless of mixed landuse within recharge basins
- Spring and cave stream features present higher percentage of occurrence regardless of landuse
 - Indicating a constant input of human waste

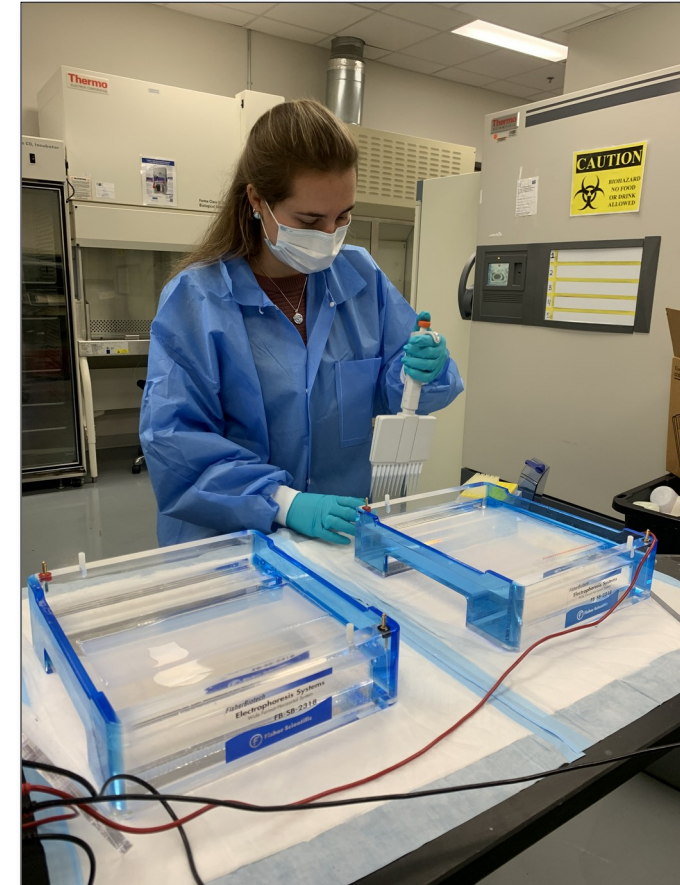
Findings

Antimicrobial resistance is disseminated throughout urban karst aquifers, threatening human health

The consistent occurrence of ARB and ARGs, despite seasonality, could be a result of the buffered groundwater environment

Karst feature type and temporal parameters are driving AMR development

There is a need to monitor and regulate resistance within urban karst groundwater



Questions

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