Riparian Preserve Soil Samples

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Background & Methods

Problem

As clean water becomes more scarce, reusing wastewater will be increasingly vital in an arid climate. The characteristics of arid soil, such as high mineral concentrations, may directly effect microbial population, stunting crop fertility. The objective of this research is to determine how micronutrients are impacted by wastewater and ultimately how the use of wastewater contributes to microbial taxonomy.

Approach

Soil samples were collected from Pond 7 after the basin was drained and approximately two weeks of drying. The samples were gathered in a bisect manor that ranged from the remaining waters edge to the tree line of Pond 7.[1]

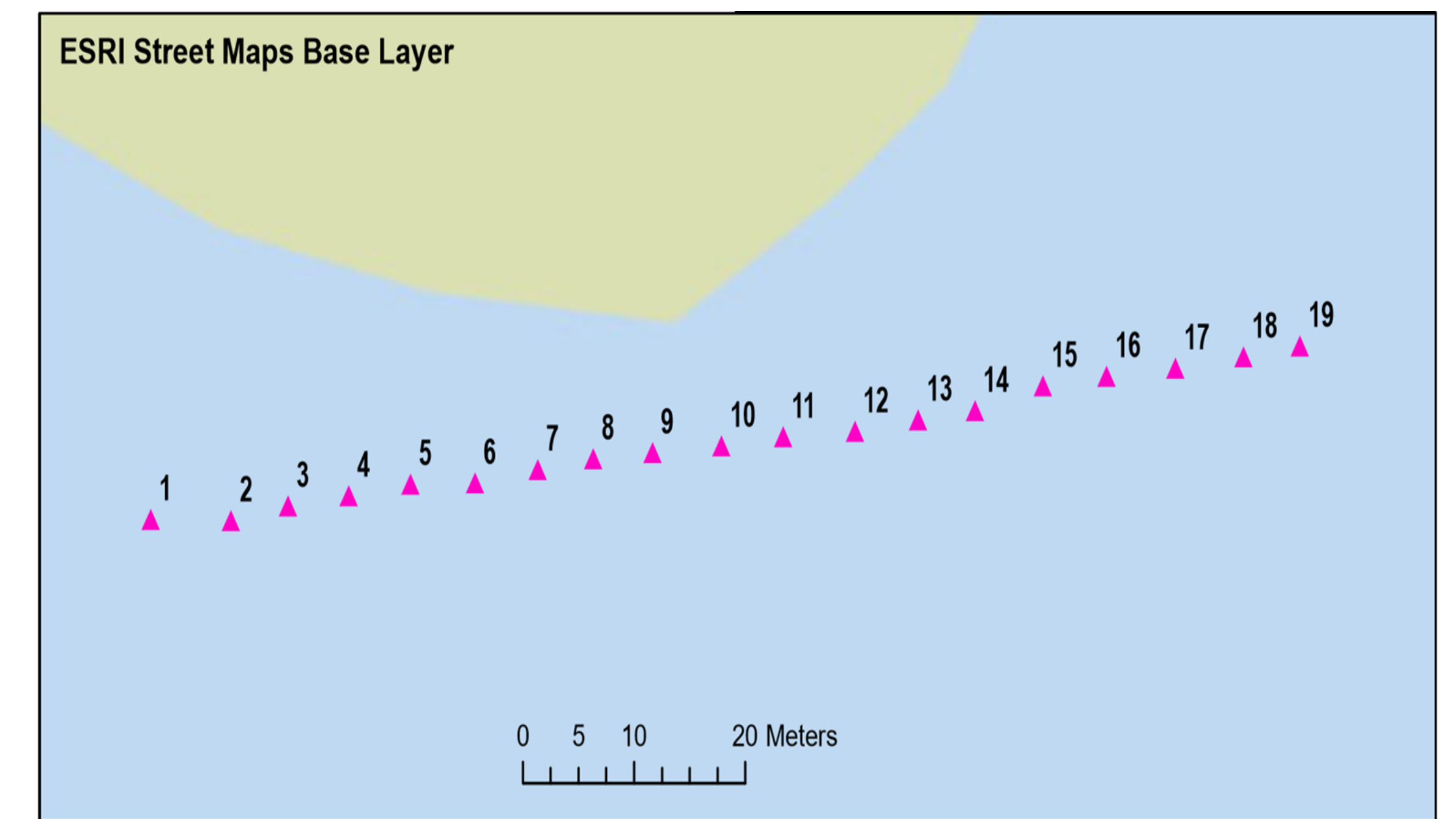

Figure 1: Aerial View of Riparian Preserve

Figure 2: Aerial Geomap of Pond 7 Sampling

Results

- DNA analysis performed on soil samples provided microbe populations in the taxonomic form of phylum and class.
- Microbe richness increases as soil texture becomes more rough, and abundance also depends on oxygen and nutrient availability.
- Some microbe classes are in need of further breakdown to identify unique respiration and metabolic mechanisms.
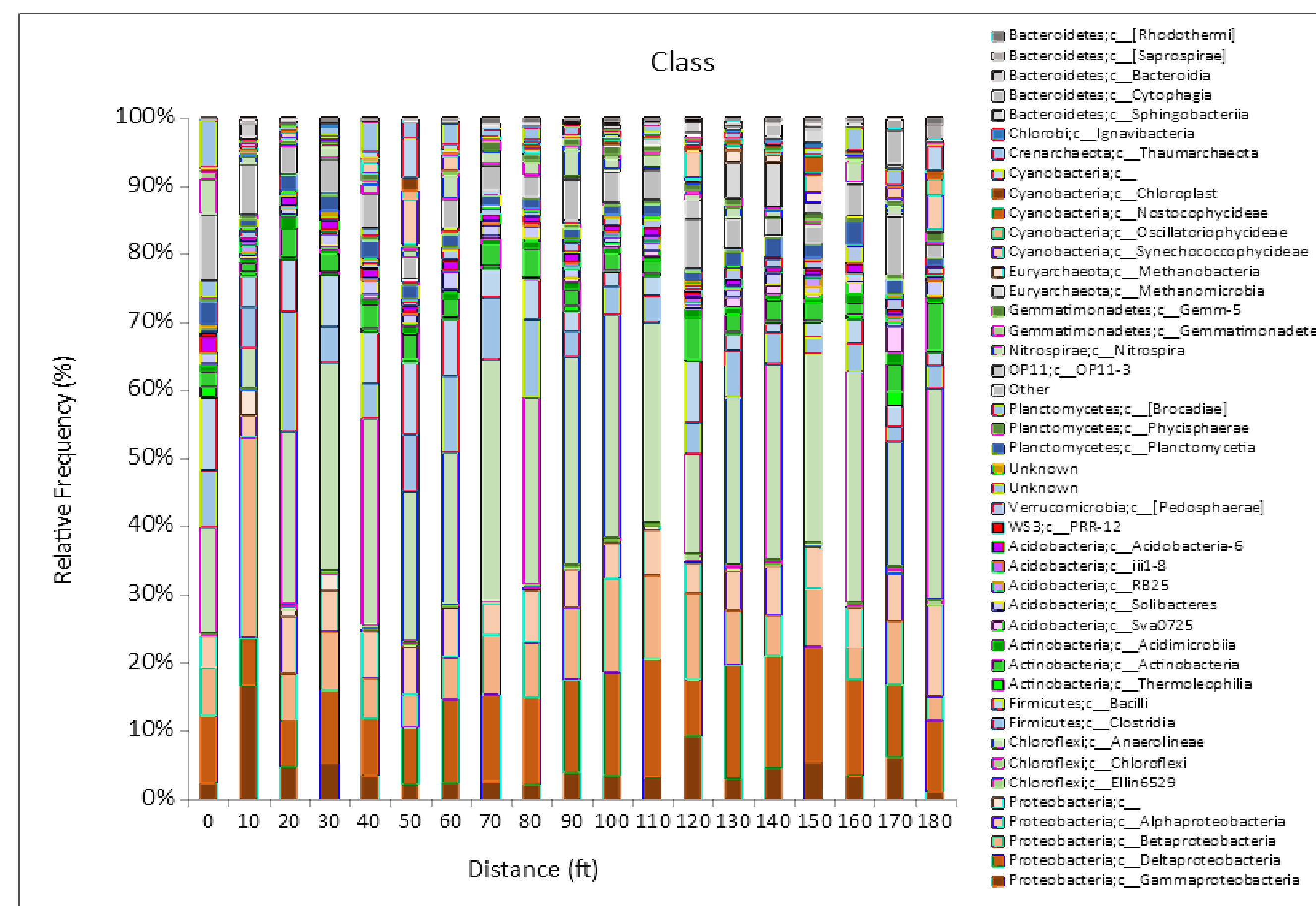

Figure 3: Microbe Class Populations for Riparian Preserve Soils

- Populations are broken into phylum and class in **Table 1** and **Figure 3.**

Figure 4: Riparian Preserve Sample pH & Salinity with Respect to Distance

- The nineteen soil samples show a classification mixture of **58%** clay, **26%** clay loam and **16%** sandy clay loam.
- The fluctuation in both pH and salinity may be explained by the "wave-like" pattern of white minerality on the surface of the soil at the day of sampling.

Table 1. Respiratory and Metabolic Characteristics of Present Microbes.

Bacteria	Chloroflexi	Proteobacteria			Firmicutes	
Class	Anaerolineae	Deltaproteo-bacteria	Betaproteo-bacteria	Alphaproteo-bacteria	Clostridia	Bacilli
Phototrophic				**		
Saprophytic					**	
Anaerobic	**	**				**
Aerobic		**	**			**

Conclusions & Next Steps

Steps moving forward may include testing for bulk density, trace organics (C, N, K and P), antibiotics (cefotaxime, chloramphenicol, erythromycin, gentamicin, lincomycin, rifampicin, sulfadiazine, tetracycline, tylosin, vancomycin, triclosan, cetylpyridinium chloride, nalidixic acid and ciprofloxacin), microbial health, micronutrients and the direct analysis of agricultural product health when produced using reclaimed water.

Acknowledgements

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