

Introduction

- Road salt (NaCl) is a common anthropogenic water pollutant increasing Cl levels
- NaCl application occurs in winter; rainfall and snowmelt wash salt into streams
- Cl levels are higher in urban areas due to road density and runoff
- Increased salinity disrupts aquatic life, reduces growth, increases mortality, and reduces biodiversity
- High Cl can mobilize heavy metals, increasing toxicity risk for human health
- Electrical conductivity increases with dissolved ions, making it a proxy for salt inputs (Cl)

Objectives

Spatial

- Compare EC between urban Manhattan Ave and suburban Highland Ridge to assess land use and runoff impacts on stream chemistry

Temporal

- Compare 2015 vs. 2026 EC to evaluate long-term effects of urbanization and road salt

Hydrologic

- Relate USGS discharge to EC to assess stormflow dilution and ion transport

Methods

- Two stream sampling locations: Urban (Manhattan Avenue) and suburban (Highland Ridge)
- Three 5ml filtered samples collected every Wednesday through Feb 11th to Mar 18th from 4:30pm – 5:30pm at both locations
- Suburban site sampled first, and samples were taken in the middle of the stream when possible
- Vials rinsed with filtered stream water prior to collection, immediately refrigerated

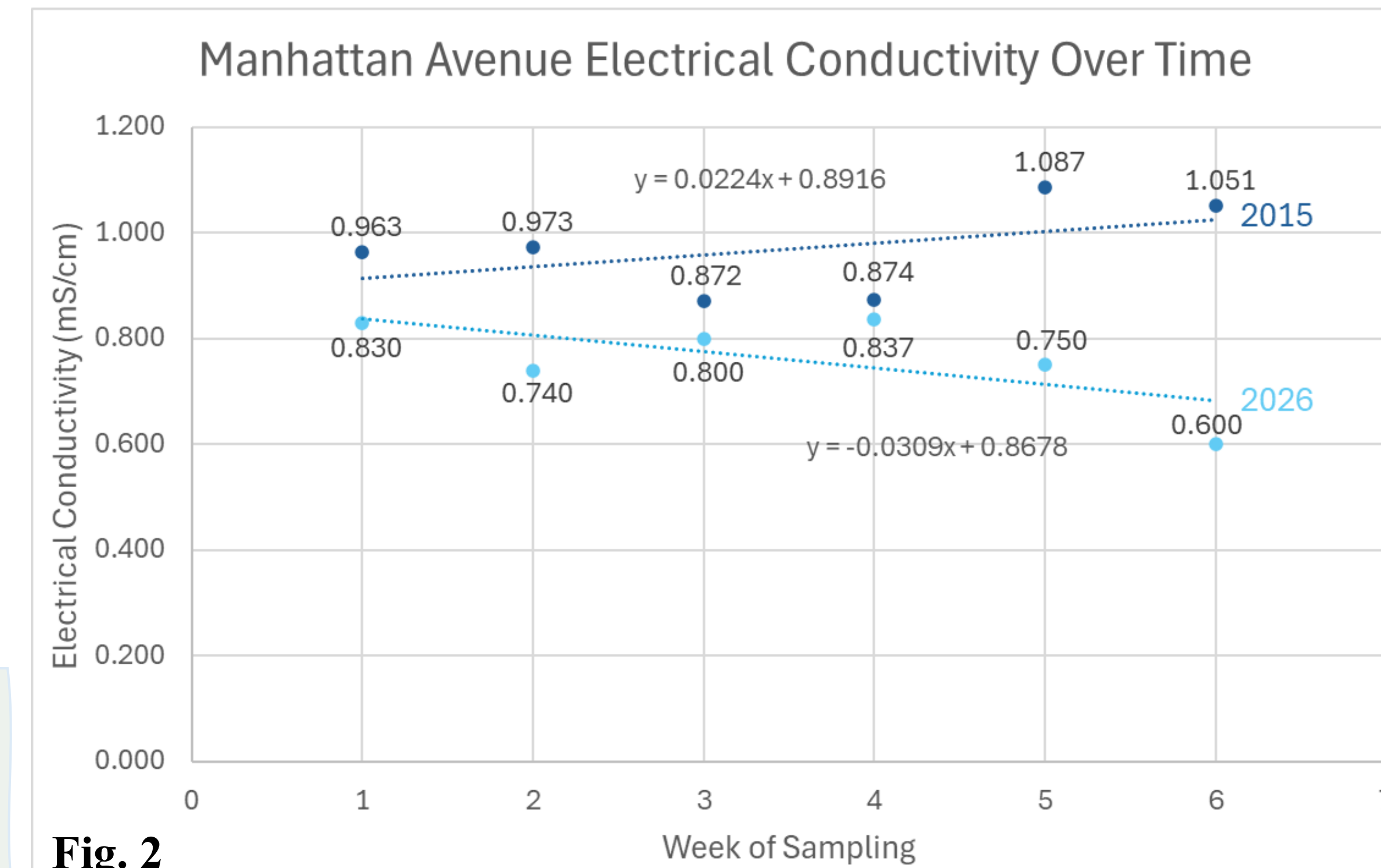
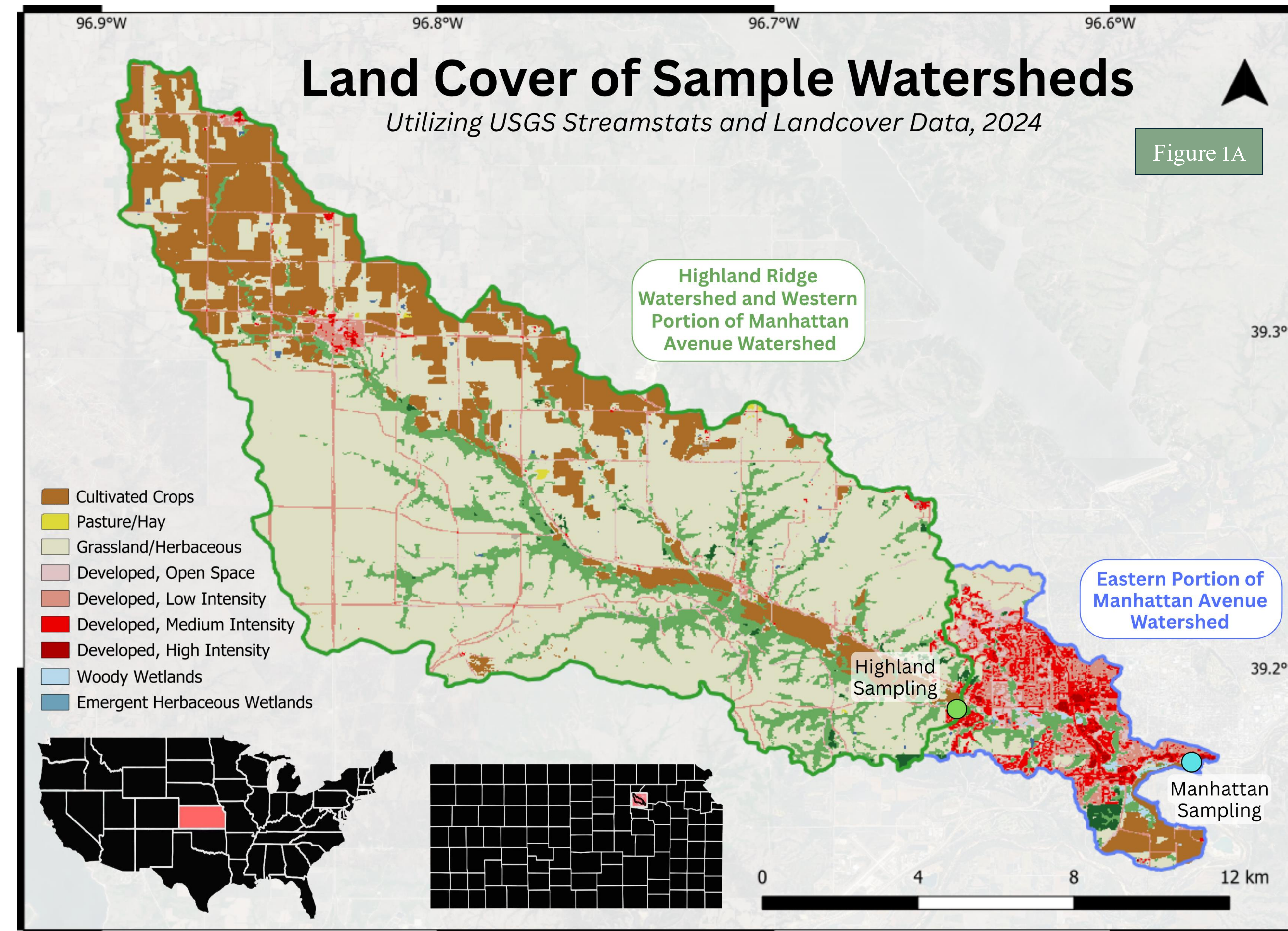


Fig. 2

Figure 2:

- Shows EC in MA location in 2015 and 2026 data sets
- EC is higher in 2015
- MA EC shows more variation than HR

Figure 3:

- Shows EC in HR location in 2015 and 2026 data sets
- EC is higher in 2015
- Overall EC is lower than MA location
- Both HR data sets were relatively uniform

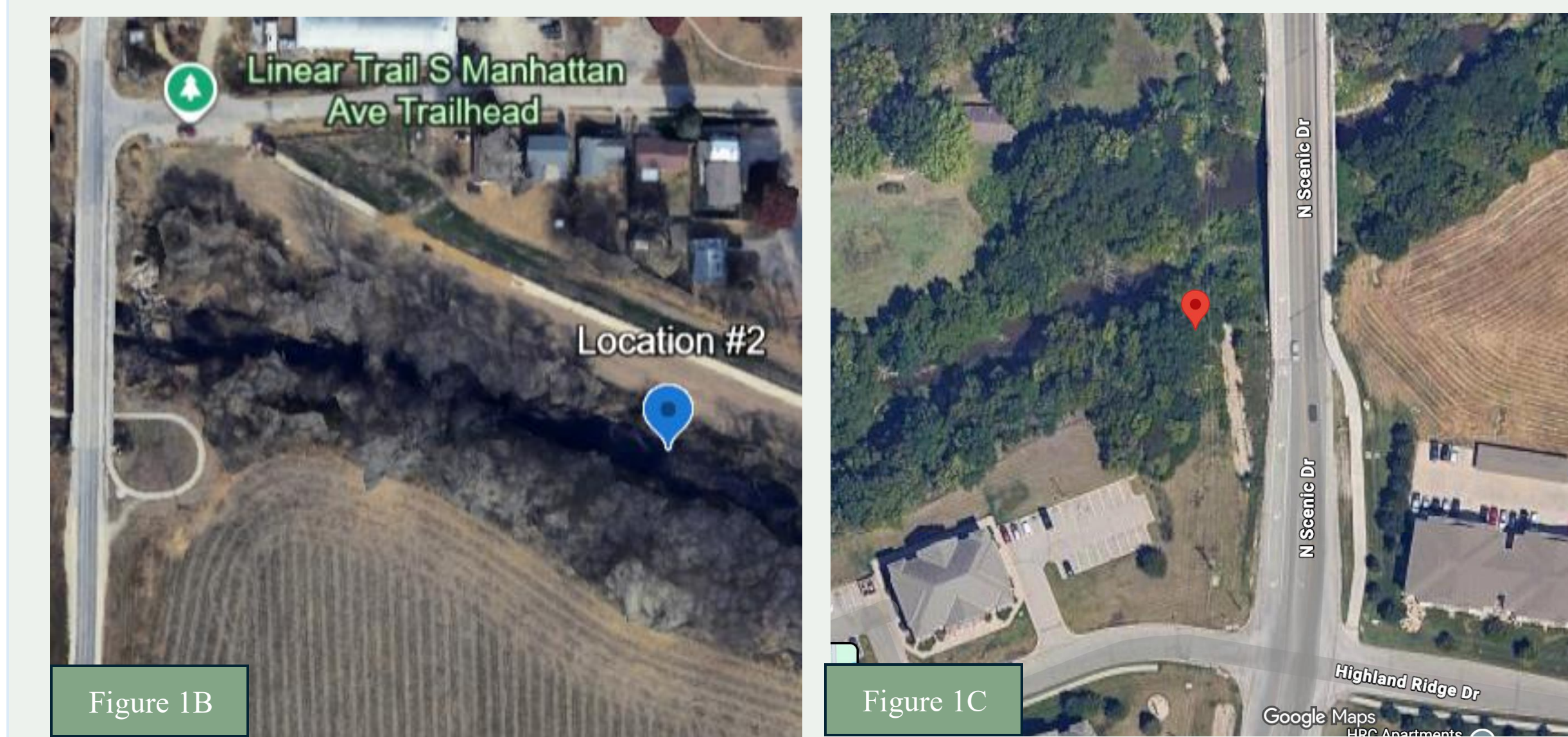


Figure 1A: Land cover of Wildcat Creek sampling locations, with stream watershed delineation for each location; land cover is obtained from 2024 USGS data

Figure 1B: Stream location at Manhattan Avenue is a largely stagnant stream area with significant bank erosion and runoff from both a bridge and large road

Figure 1C: Stream location at Highland Ridge maintains a much lower discharge, but a far higher velocity of currents with minimal bank erosion

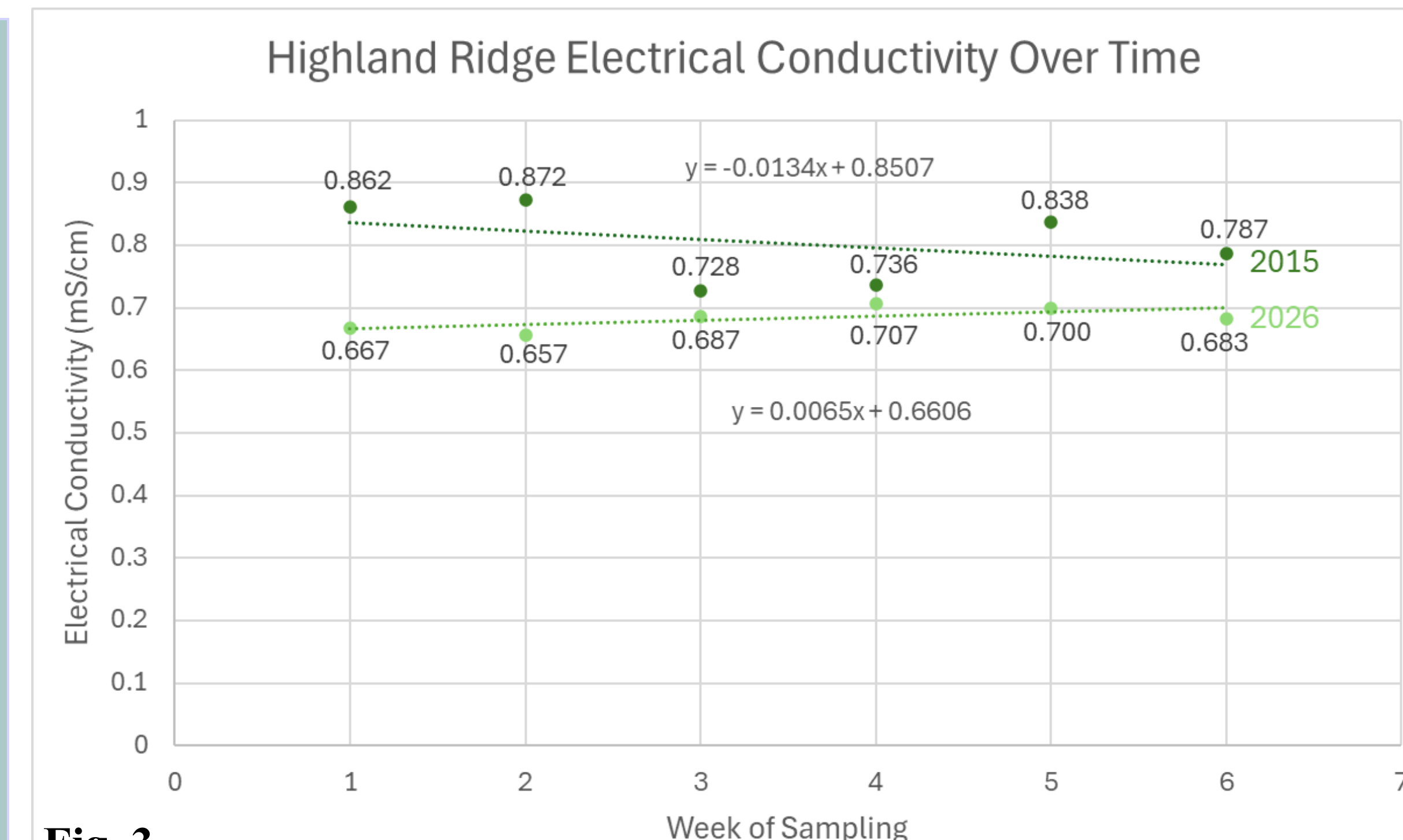


Fig. 3

Results & Discussions

- Urban land cover increased at both Manhattan Ave. (9.58% to 12.68%) and Highland Ridge (4.19% to 6.07%), thus increasing car traffic and pollution
- MA showed higher EC than HR likely from greater urban land cover & anthropogenic pollutants
- EC values were higher in 2015 despite lower urban density, all values in EPA range
- Discharge & precipitation showed negative correlation with EC meaning that streamflow alone does not explain variability
- Further research on chloride levels within the watershed is needed

Acknowledgements

This research builds on Dr. Matthew Kirk's work on nutrient levels in the Wildcat Creek Watershed. We thank Dr. Kirk for his collaboration and our mentor, Dr. Prasad Jayant Deshpande, for his support.