

Comparing Nitrogen Levels and Land Use in Streams within the Lake Champlain Basin



Champlain Basin
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Results

Introduction

- Nitrogen is a naturally occurring nutrient.
- Farmers use nitrogen fertilizer to make crops grow faster in agricultural areas (Manuel, 2014).
- In urban areas, nitrogen ends up on major roadways due to the vehicular exhaust, and is then washed into rivers during storms (Davidson, et.al., 2010).
- An overabundance of nutrients can cause algae blooms and eutrophication in underwater ecosystems .
- Algae blooms can produce harmful toxins that are dangerous for organisms to come in contact with.
- While nitrogen is an important nutrient in the environment, too much of it can have negative ecological impacts (Robertson & Vitousek, 2009).
- I hypothesized that agricultural sites would have higher nitrogen levels due to the fertilizer used.

Materials & Methods

Field Work

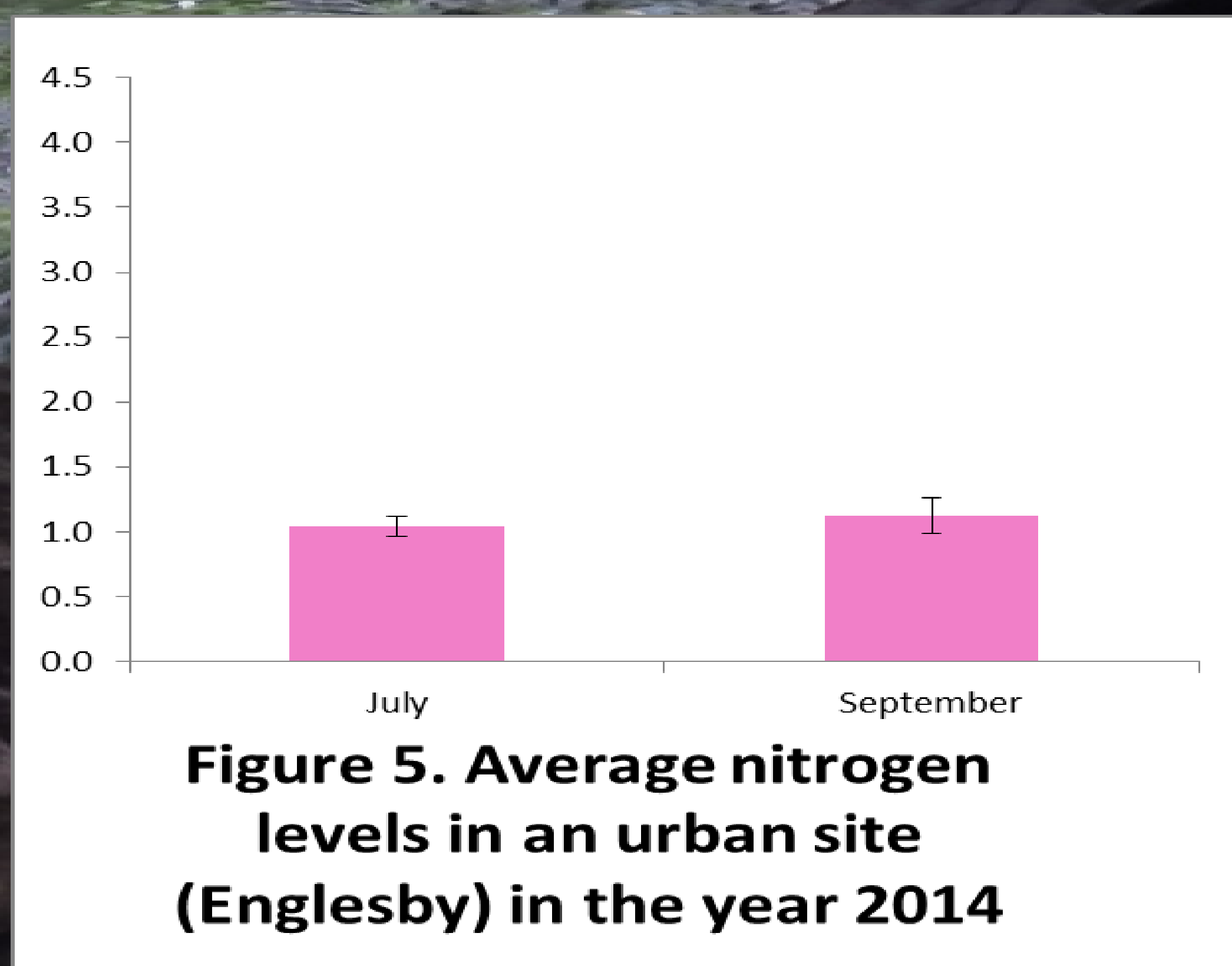
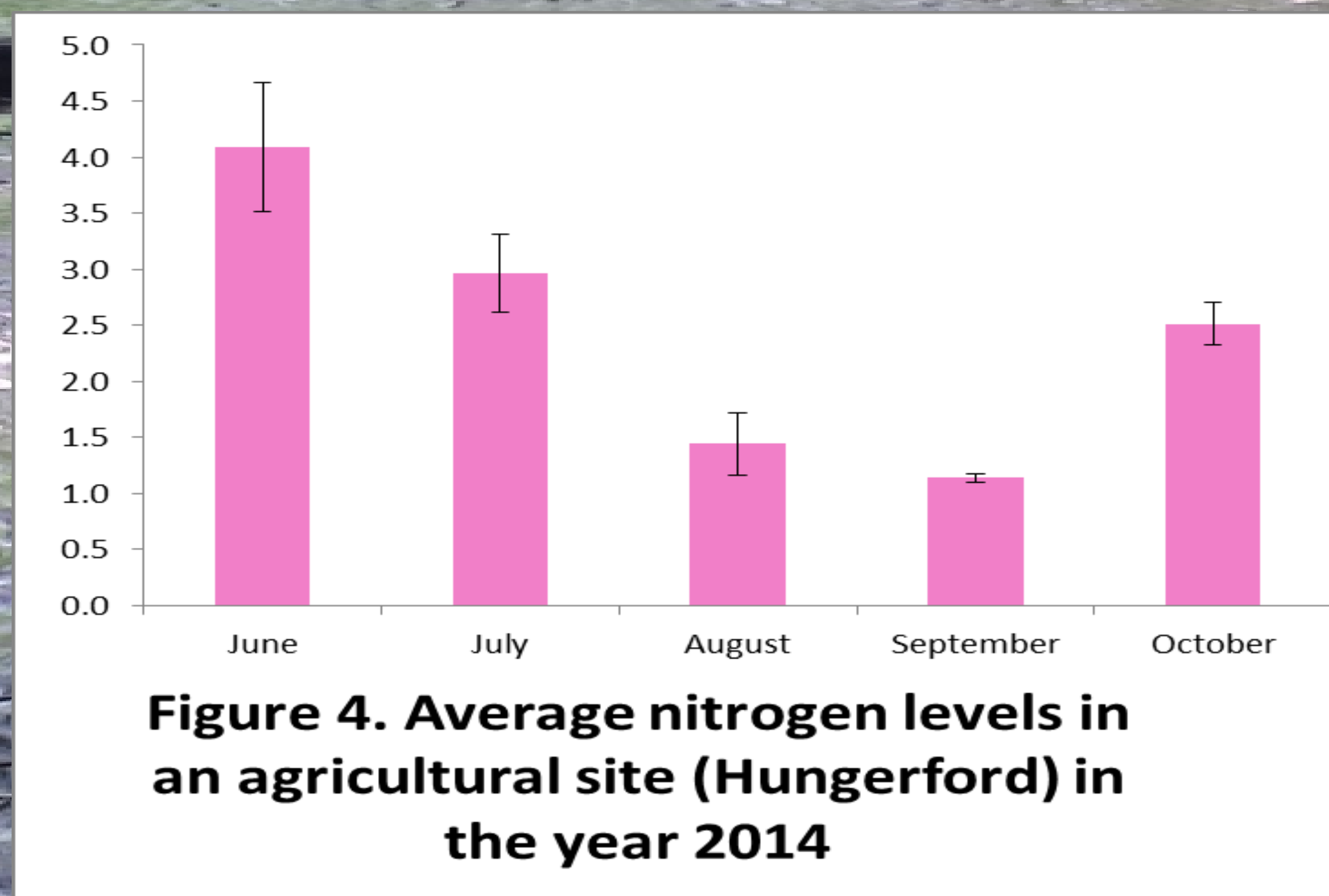
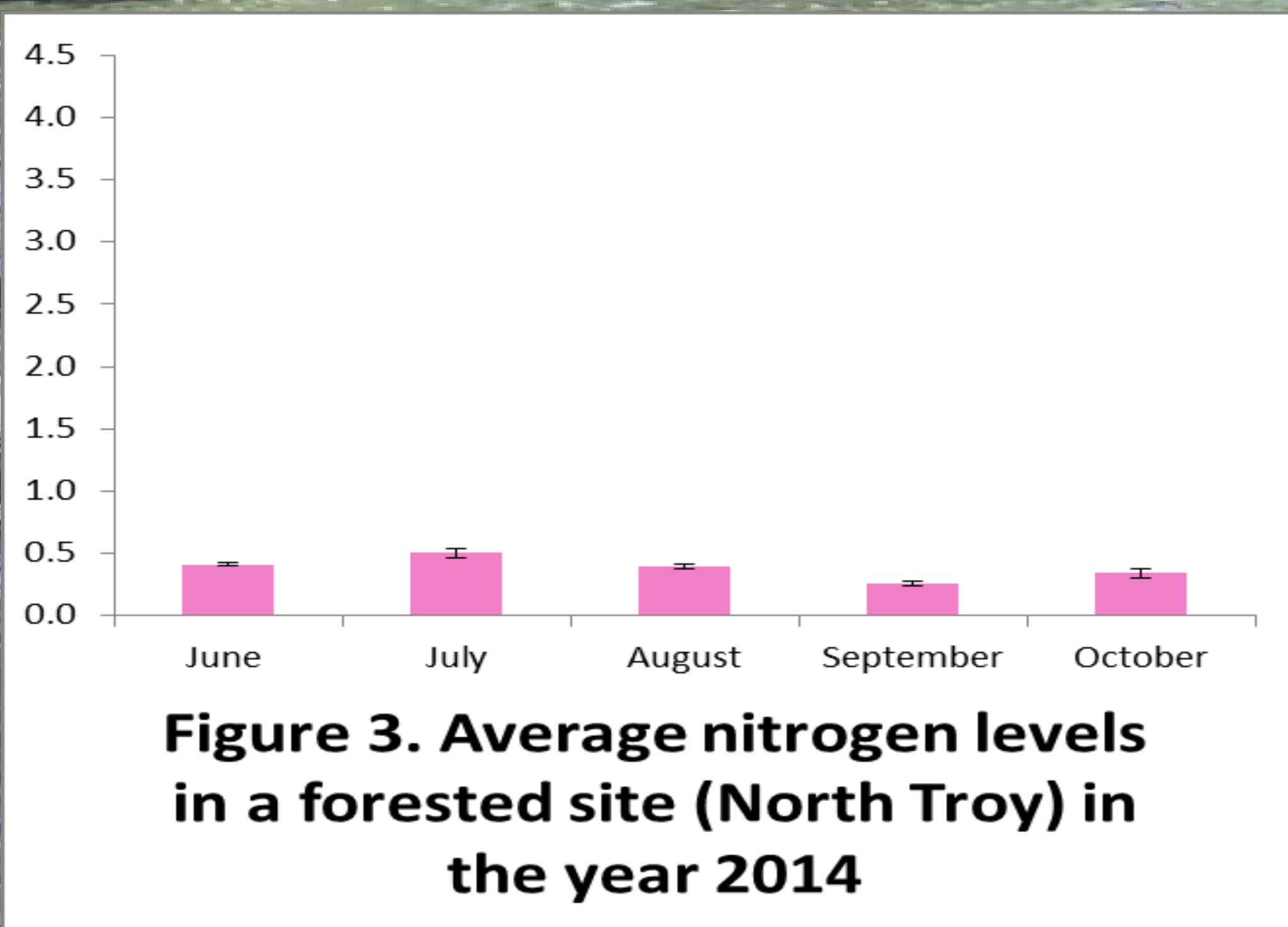
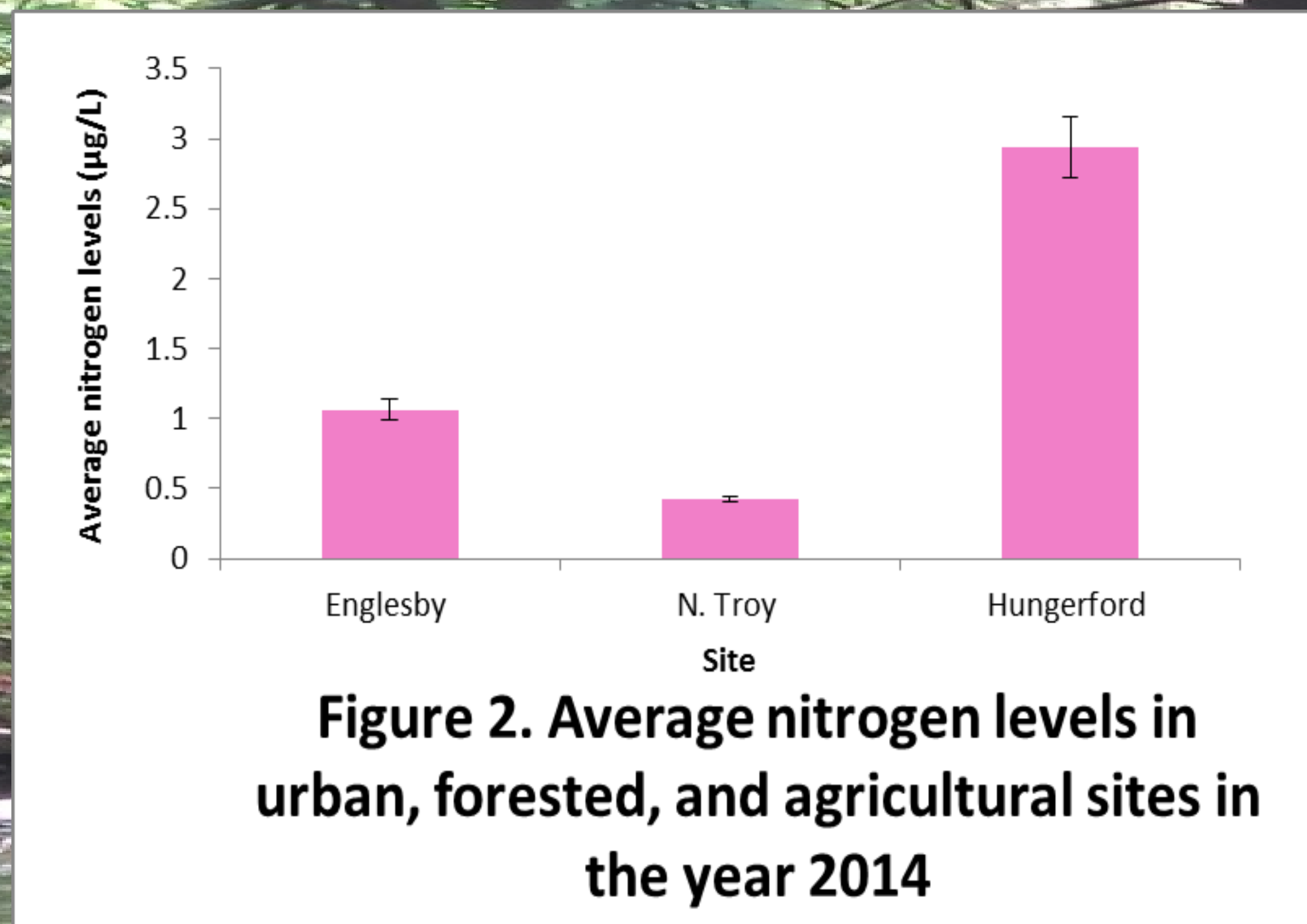
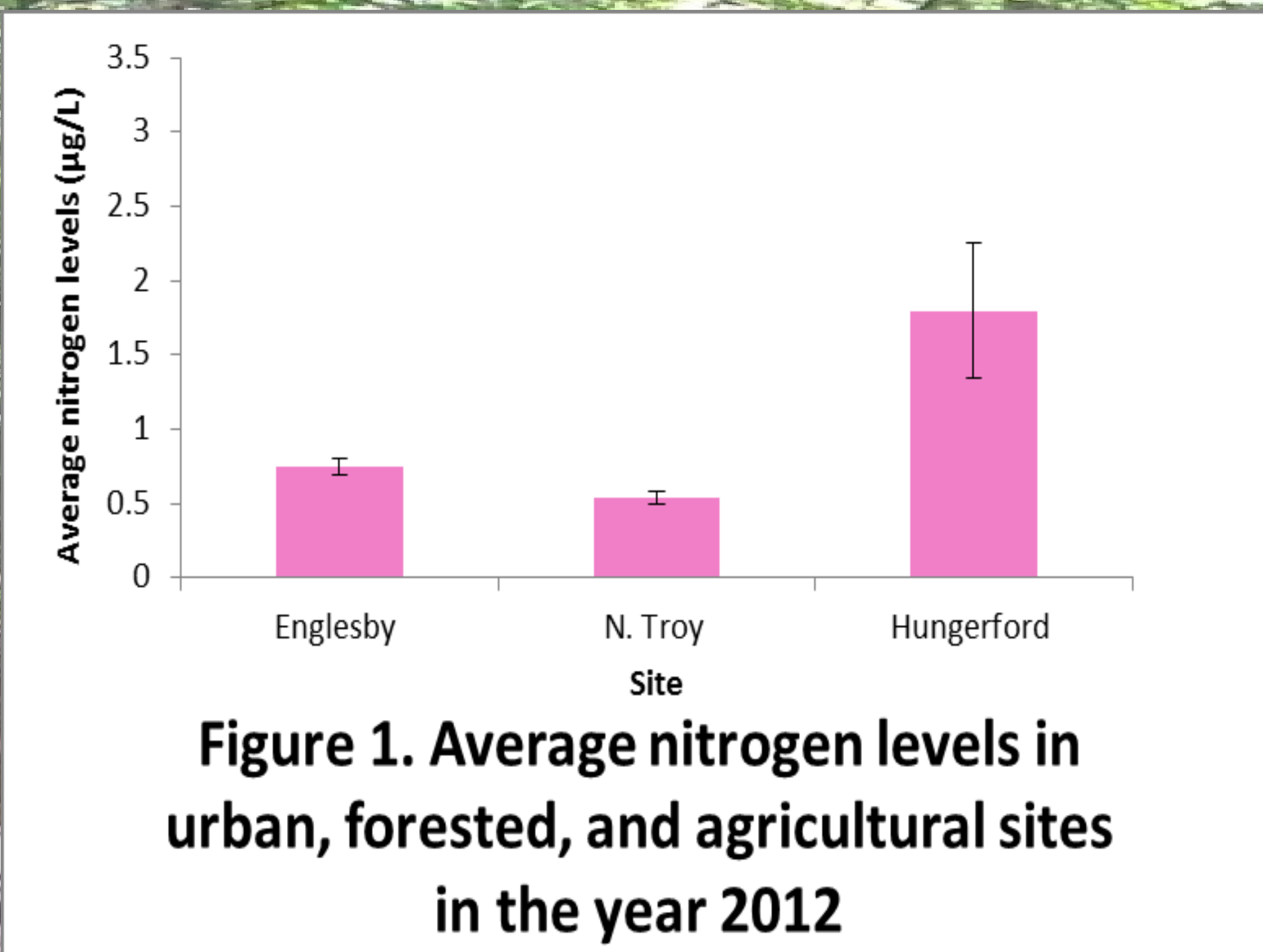
- ISCOs, automated water samplers housed at USGS gauging stations on rivers of interest, collect water samples when instructed via a pulse per USGS programming
- These pulses occur when the river is at an elevated height, typically during and directly following storm events. The ISCO stops sampling once the stream has returned to base level
- The base level of streams is also measured via hand grab samples taken during field visit

Laboratory Analysis

- Copper cadmium is used to turn nitrate to nitrite. Nitrite is then converted to a compound that can be measured colorimetrically in $\mu\text{g/L}$

GIS

- Land use data collected from EPSCoR online database



Discussion

- Agricultural site (Hungerford) had highest nitrogen levels, supporting hypothesis.
- Agricultural sites are point sources of nutrients, urban sites are non-point sources.
- Adding nitrogen to crops is crucial in today's crop production and is essential to keep up with food production needs, however a substantial amount of nitrogen escapes into the environment (Robertson & Vitousk, 2009).
- Many farms in Vermont that could be causing pollution, far fewer residents than most areas, not much nitrogen produced by humans
- Lack of coal and oil-burning plants in Vermont, less urban pollution (Manuel, 2014).
- In forested areas, there is no source of nitrogen other than the atmosphere, explaining the results for North Troy.

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