

Kayla Koenig, Nick Grey, Andrea Marquardt, Melissa Lenczewski, Tomoyuki Shibata
Northern Illinois University Department of Environmental Studies

Introduction

Surface water can be influenced greatly by runoff from surrounding environments and it could affect aquatic life as well as human health.

The objective of this study was to assess

- Water quality impact on aquatic life and human health.
- Potential impacts on water quality from surrounding environment and seasonal effects.

Methods and Materials

- Study Site: Kishwaukee Watershed- South Branch
 - 127 water samples; 18 sites
 - Tested from May 2018 - May 2019

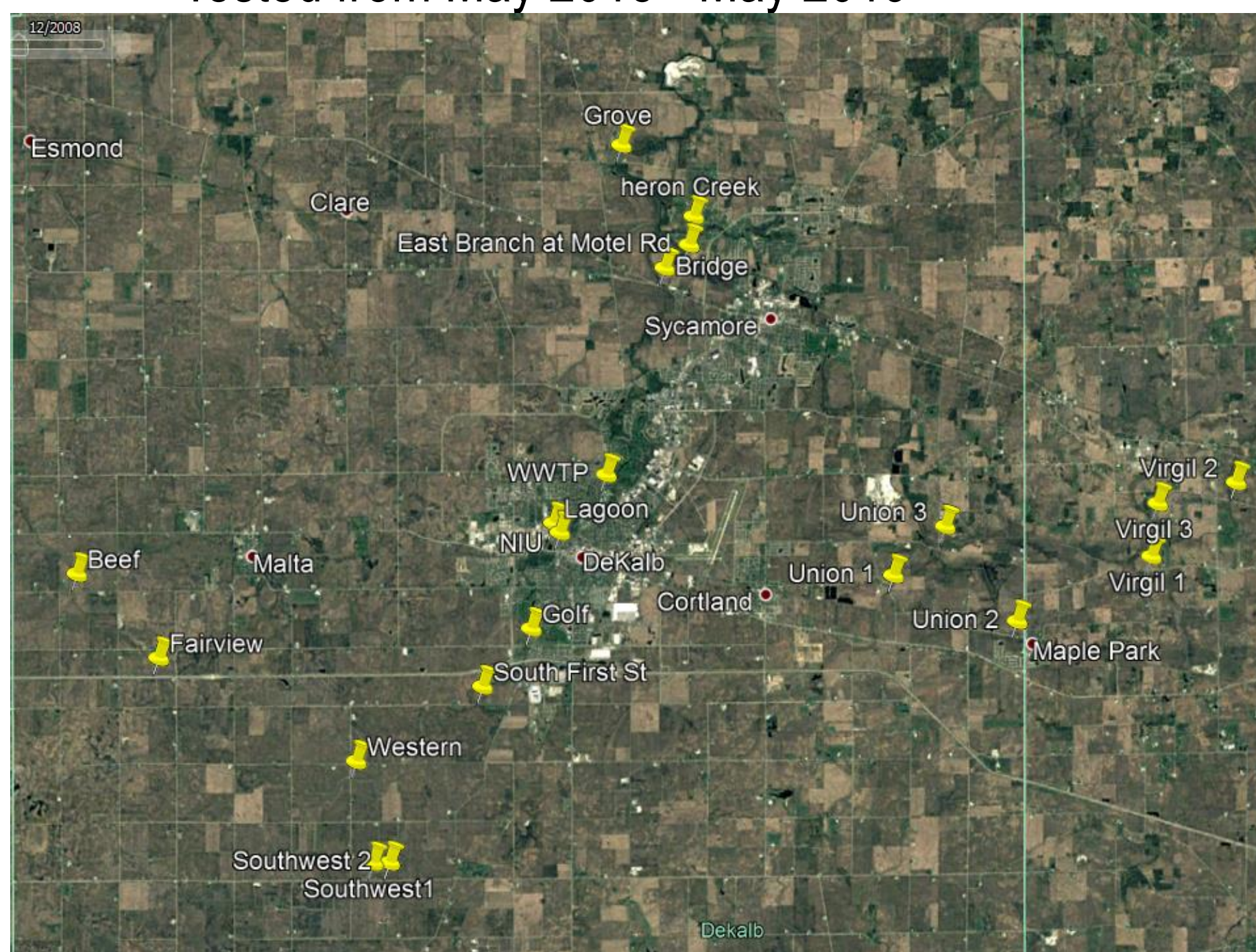


Fig. 1. Study Sites

- Water Testing
 - Hach HQ40d multi-parameter meter (onsite)
 - Exact Micro 20 (in lab)
- Data Analysis
 - SPSS



Fig.2. Sampling



Fig. 3. Broken Bridge Winter

Results

	Hach HQ40d multi-parameter meter							Exact Micro 20						
	pH	LDO (mg/L)	Turbidity (NTU)	Ammonia (PPM)	Nitrite (PPM)	Nitrate (PPM)	Sulfate (PPM)	Hydrogen Sulfide (PPM)	Calcium (PPM)	Phosphate (PPM)	Iron (PPM)	Chlorine (PPM)	Alkalinity (PPM)	
Overall	N	109	101	126	121	125	123	125	108	113	125	115	117	118
	Range	5.8-10	4.8-750	3.5-343	0.01-2.9	0.005-1.5	0.06-30	1-210	0.005-0.4	10-400	0.015-3.9	0.015-5.9	0.005-90	75-210
	Mean	8.2±0.91	190±0.29	23±0.26	0.14±0.49	0.11±0.89	13±0.72	40±0.028	0.033±0.76	247 ±0.40	0.38±0.99	0.5±0.35	0.92±0.86	196±0.45
Standards	Human Health Ambient Water	5.0-9.0					10,000							
	Aquatic Life	6.5-9.0					2.0				1,000		20,000	

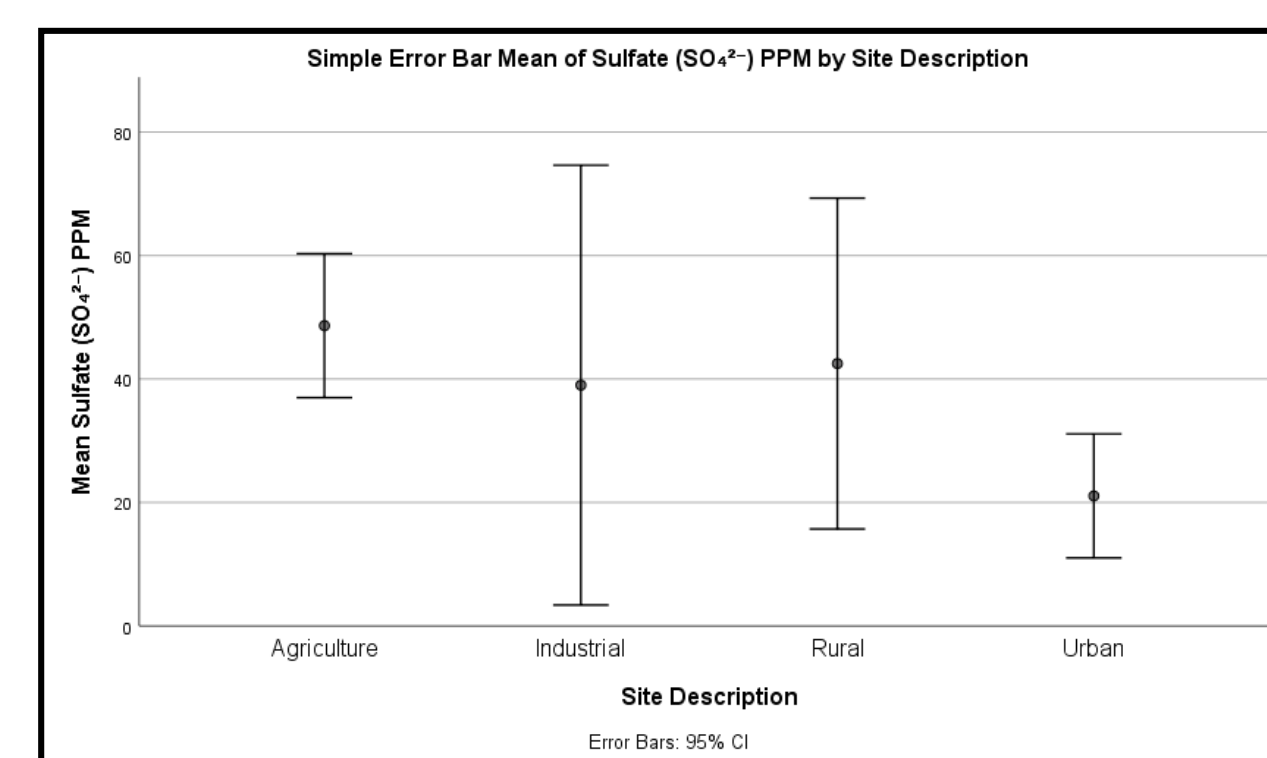


Fig. 4. Sulfate by site ($p=0.028$)

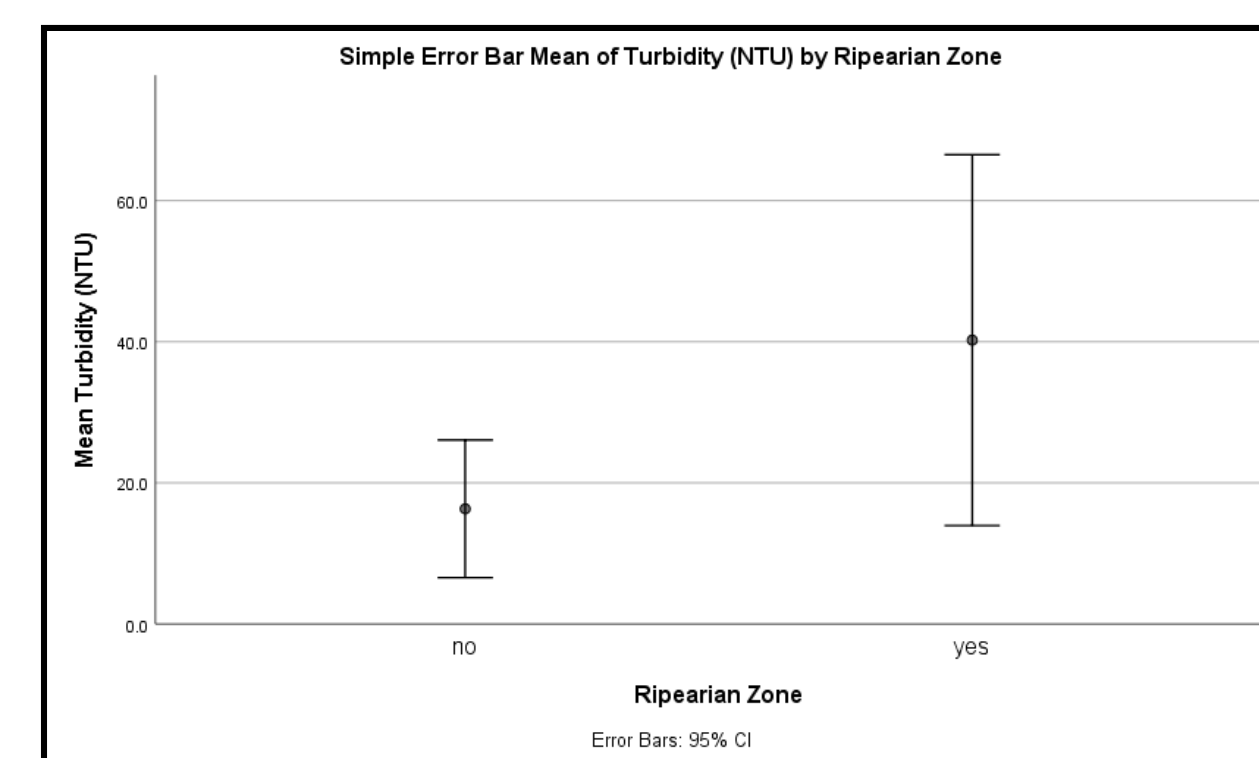


Fig. 5. Turbidity by zone ($p=0.051$)

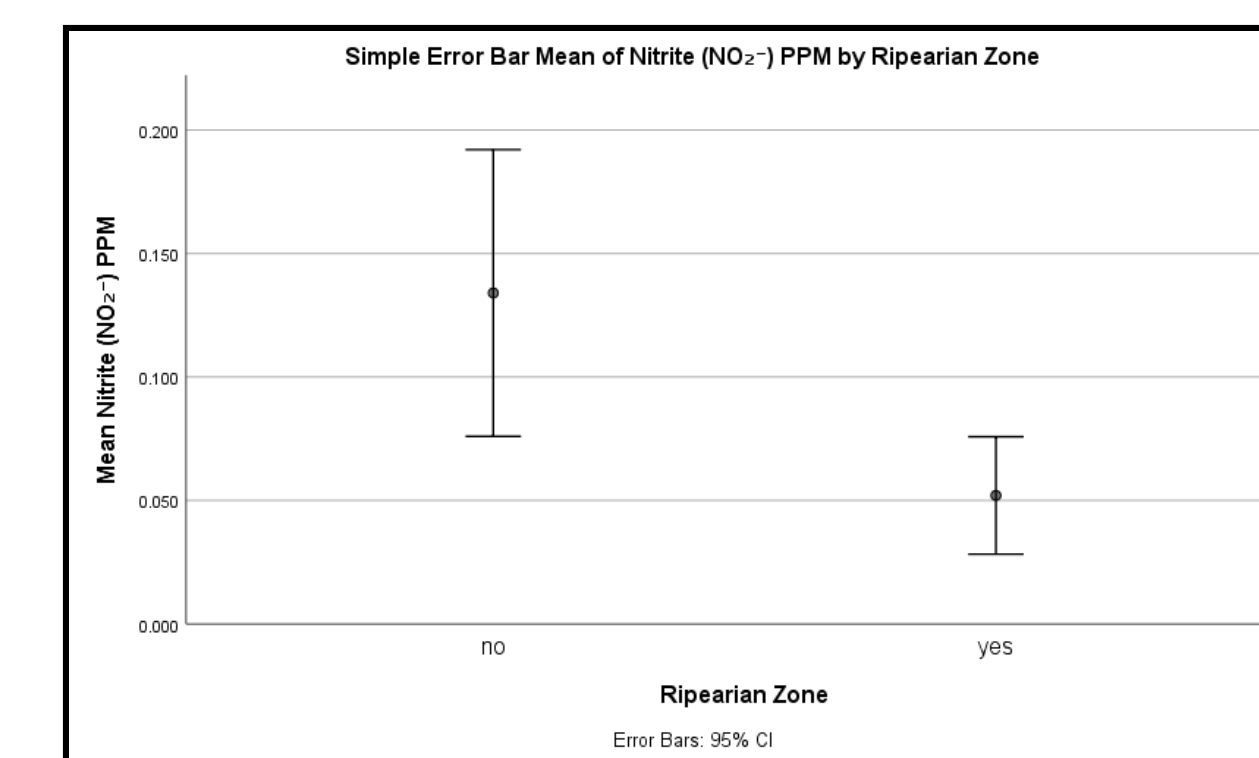


Fig. 6. Nitrite by zone ($p \leq 0.01$)

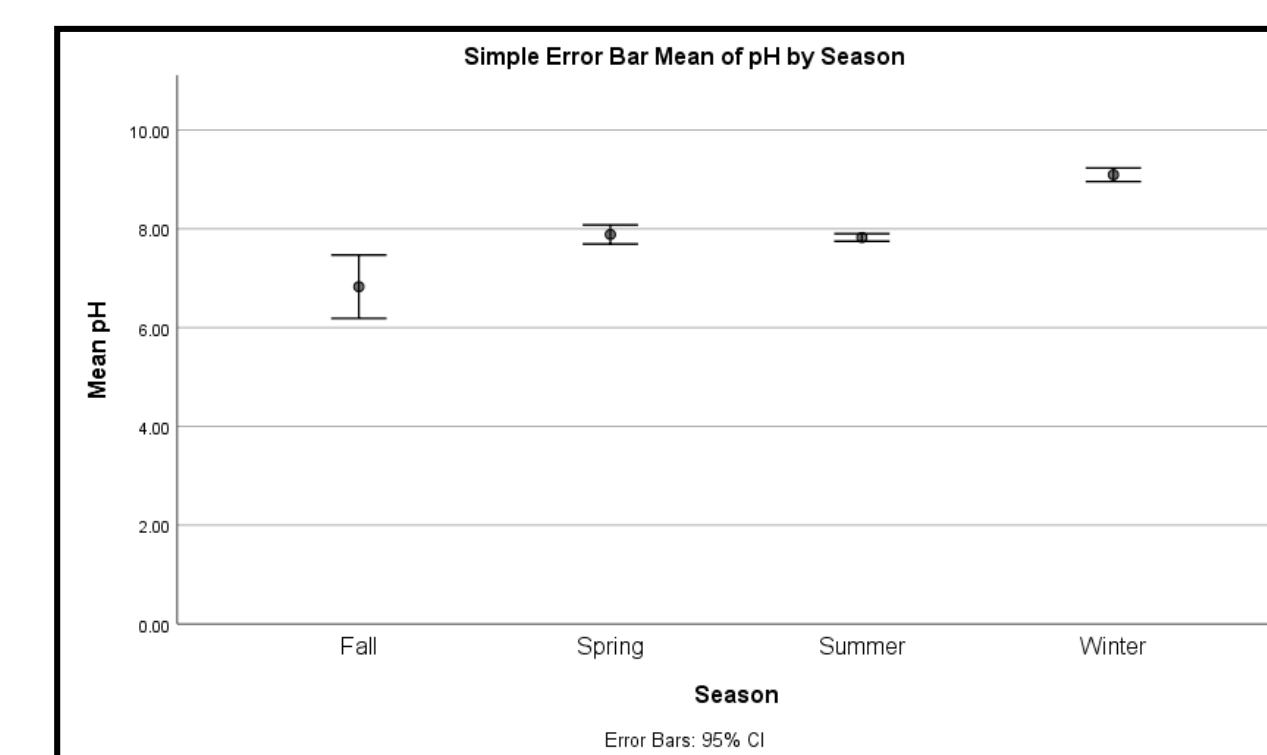


Fig. 7. pH by season ($p=0.032$)



Fig. 8. Broken Bridge Summer

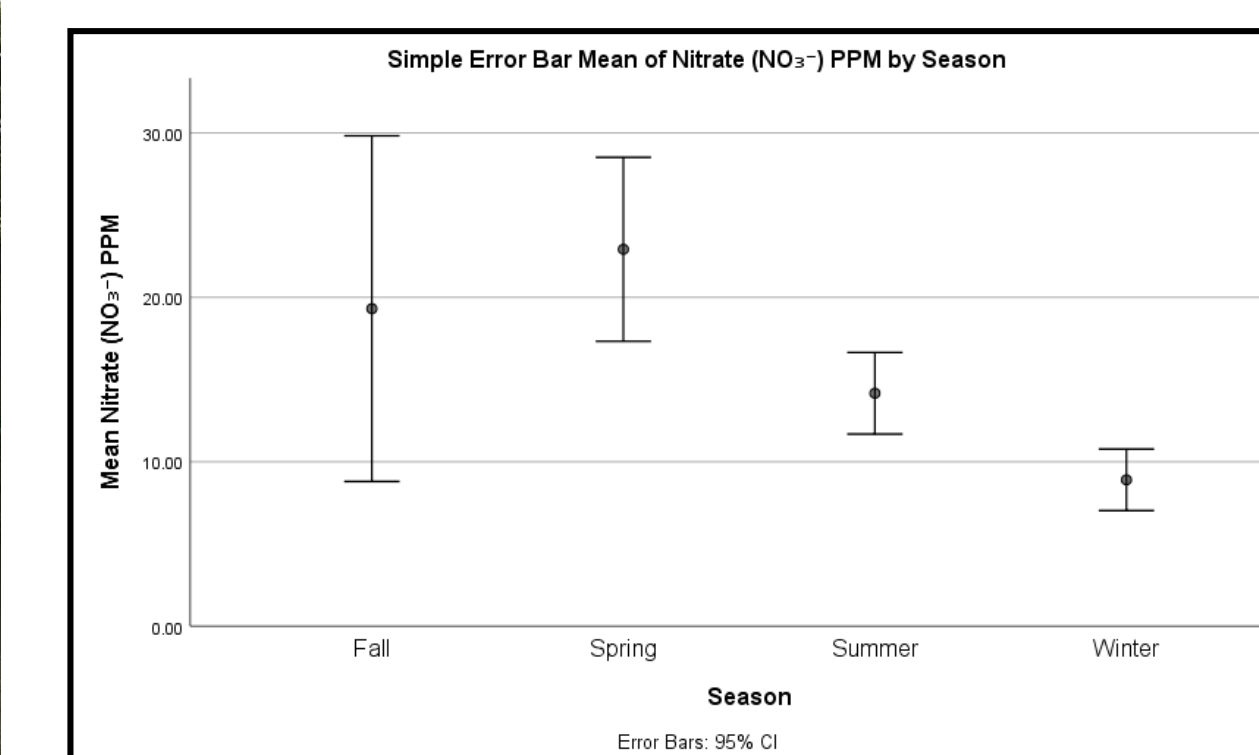


Fig. 9. Nitrate by season ($p \leq 0.01$)

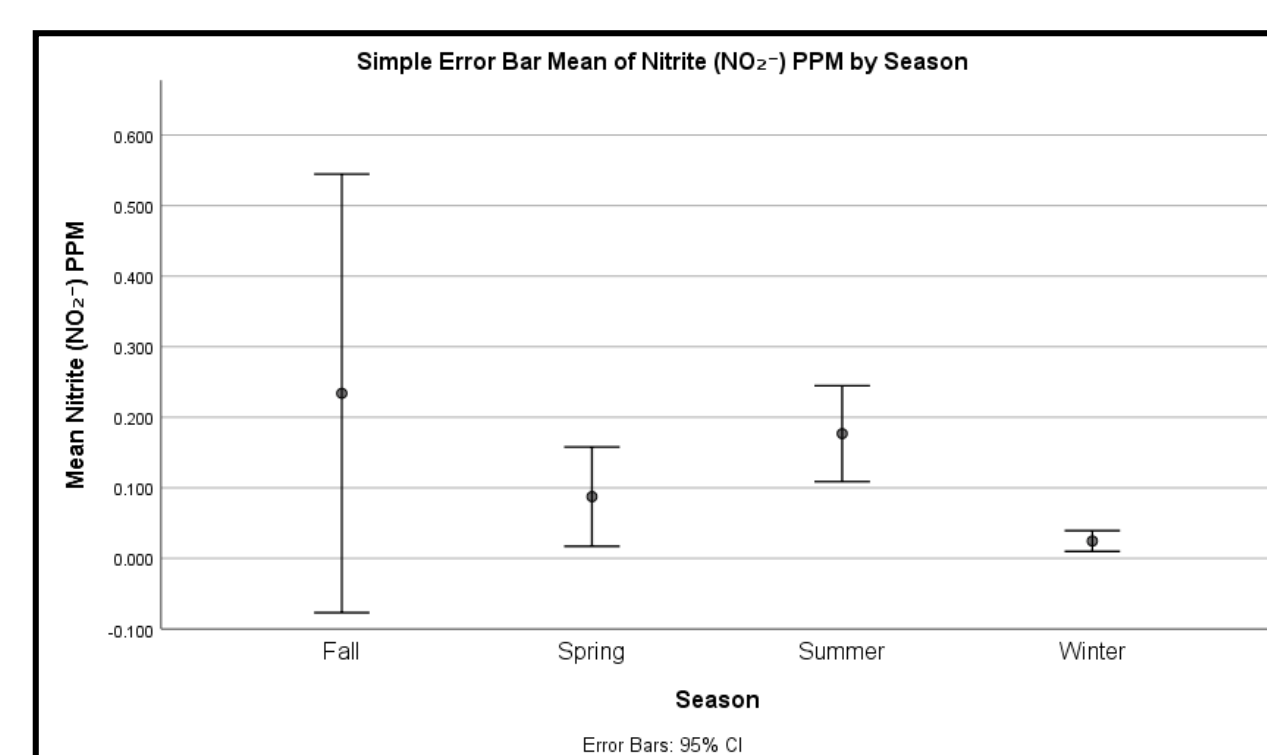


Fig. 10. Nitrite by season ($p=0.001$)

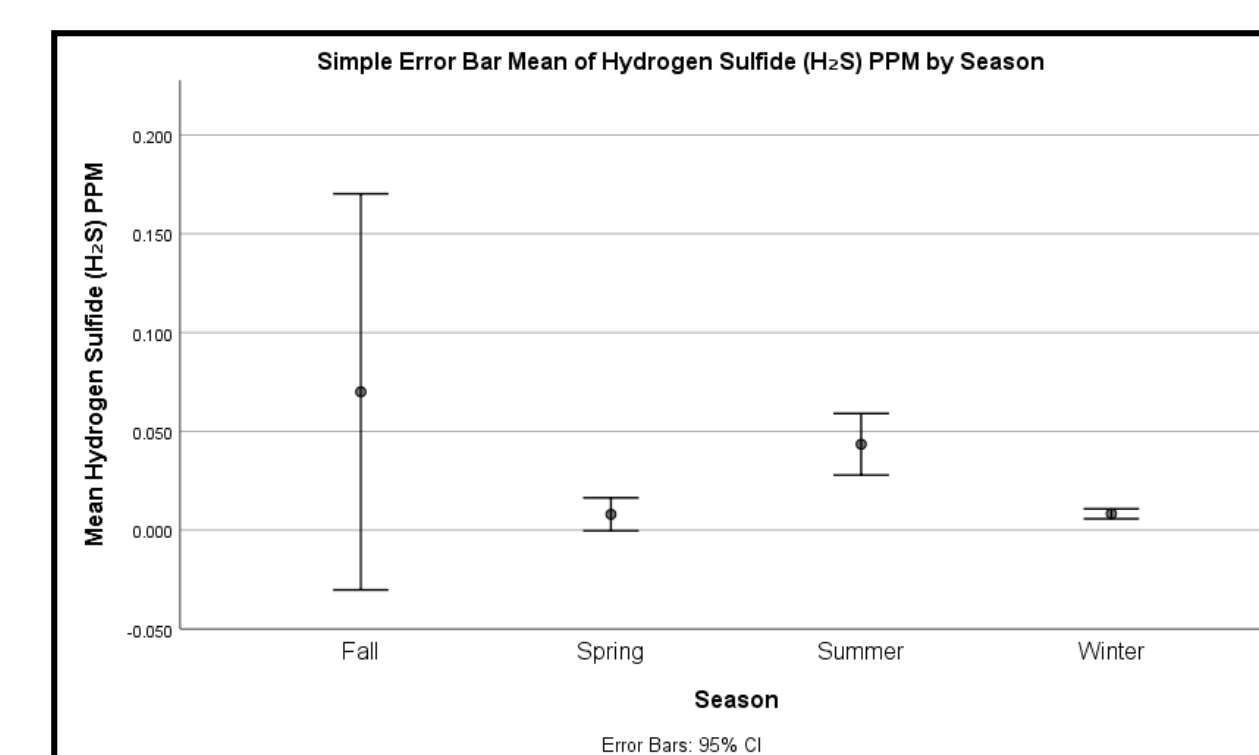


Fig. 11. Hydrogen sulfide by season ($p \leq 0.01$)

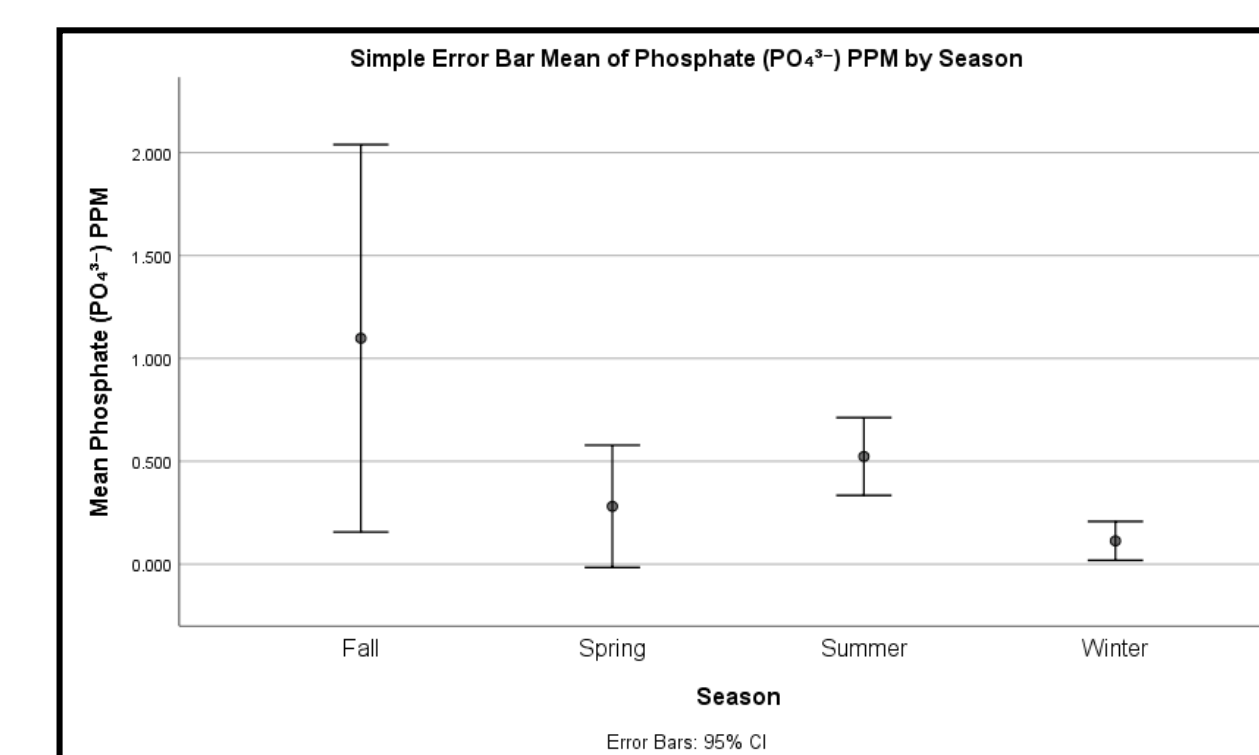


Fig. 12. Phosphate by season ($p=0.006$)

Results

- Highest effect on water quality is seasonal rather than the surrounding environment or presence of a riparian zone
 - pH, nitrite, nitrate, phosphate and hydrogen sulfate
- Nitrite was found to be significantly different with riparian zone presence and season
- pH value was the only value found out of aquatic and human standards
 - 23/109 (21.1%) exceeded aquatic life criteria
 - 19/109 (17.4%) exceeded human health criteria
 - 19/23 (82.6%) occurred in the winter
 - 4/ 23 (17.4%) occurred in the fall
- Ammonia, Nitrate and Nitrite are negatively correlated with pH ($p \leq 0.01-0.04$)

Discussion

- Nitrate and Nitrite would exceed drinking water standards; however the Kishwaukee River is not utilized as drinking water so it is not a public threat
- Aquatic Health however is being effected by fertilizers, which is evident through the pH
- Dekalb is an agricultural county so eliminating fertilizer is not reasonable, possibly using more neutral fertilizers would create a safer pH for aquatic life
- A future study could be helpful to explore more options

Literature Cited

United States Environmental Protection Agency. EnviroAtlas. National Recommended Water Quality Criteria - Aquatic Life Criteria Table. Retrieved: February, 5, 2019, from epa.gov/enviroatlas
United States Environmental Protection Agency. EnviroAtlas. National Recommended Water Quality Criteria - Human Health Criteria Table. Retrieved: February, 5, 2019, from epa.gov/enviroatlas

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Contact Info

Kayla Koenig: z1852511@students.niu.edu