

## Introduction

- Urban streams that look and function differently from more natural, unimpacted streams is dubbed by Walsh et al. 2005 as “urban stream syndrome”
- Urban streams suffer from low-diversity biotic community dominated by tolerant taxa, poor water quality, and degraded physical habitat (Klein, 1979).
- Large-scale patterns of stream structure can also be altered along urbanization gradients due to past dredging and channeling projects usually designed to mitigate flooding or facilitate near stream development (Konrad C. P., 2016).
- The City of Menomonie has historically used Galloway to act as an open channel for stormwater drainage systems.

## Goals and hypothesis

- Examine the relationship between urbanization gradients, instream physical habitat, and aquatic macroinvertebrate assemblages to determine how improvement efforts have affected overall stream health in Galloway Creek.
- Explore the connections between alterations to the riparian corridor and in-stream physical habitat. This work comprises the beginning of a larger interdisciplinary effort to rehabilitate the Galloway Creek corridor as a functional ecosystem.
- We hypothesize that although reach-level improvements have been made, water quality and macroinvertebrate community composition quality will decrease as Galloway Creek flows through Menomonie.

## Site

- Galloway Creek is a small 2.6-mile-long spring-fed creek that flows through residential areas in Menomonie. Its headwaters are located south of Phelan Park and eventually drains into the Red Cedar River. The sub-watershed of Galloway Creek is approximately 777 hectares and heavily urbanized
- The Red Cedar watershed is located in west-central Wisconsin and drains 1,893 square miles.

## Methods

- Seven sampling sites were identified and mapped along Galloway Creek representing an urbanization gradient from its headwater southwest of Menomonie to its mouth at the Red Cedar River (Figure 1).
- Sampling was conducted on October 11, 2019, September 6, 2020, then biweekly from March 5, 2021, to April 2, 2021.
- At each site, stream depth, width, turbidity, pH, conductivity, water temperature, air temperature, and flow rate were measured. Sampling followed UW-Extension Water Action Volunteers Stream Monitoring Network Protocols
- Macroinvertebrate sampling was conducted at each site in accordance with the type of habitat found at that particular sampling site (Hawkins et al., 1993)

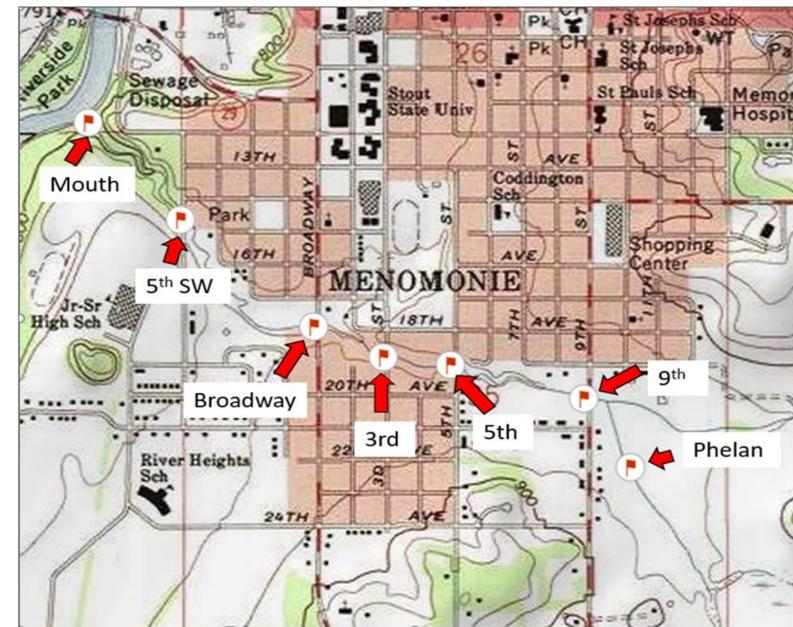


Figure 1. Map showing site locations of along Galloway Creek



Figure 2. Spring 2021 conductivity sampling



Figure 3. Macroinvertebrate sampling

## Discussion

- Macroinvertebrate community data showed evidence of taxon with high pollutant tolerance.
- Large remnant pieces of channelization are located along Galloway Creek. The creek was first channelized during WWII through the Works Progress Administration program, with large concrete sections being poured from the 9th street site down to the mouth.
- Riparian corridor quality along Galloway Creek is found to be of moderate-low quality. Common Buckthorn, Bush Honeysuckle, Garlic Mustard, Dames Rocket, Black Locust were all identified in the City of Menomonie owned land by 5th St. SW (Galloway Creek Community Restoration Project).
- Corridor restoration is beginning on a new reach Fall 2021
- If restoration is effective at improving degraded urban stream ecosystems, both the geomorphology and biota at restored sites would more closely resemble forested sites than would their urban counterparts (Violin et al. 2001)

## Acknowledgments

- UW Stout Grant Office for funding the project through the Student Research Grant
- We would like to thank Dr. Keith Gilland for his tutelage, assistance, and expertise.



Figure 4. Extensive erosion is common in the corridor



Figure 5. Failing WPA channelization project

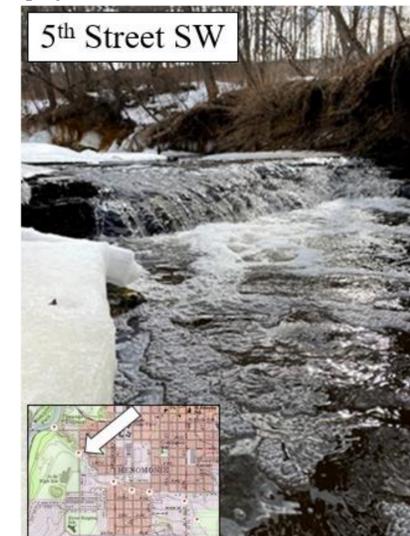


Figure 6. Waterfall at 5th Street W

## Results

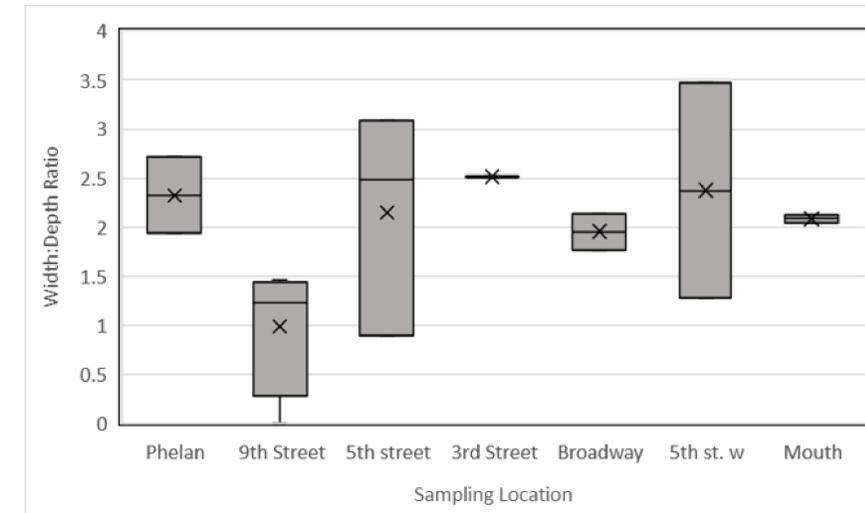
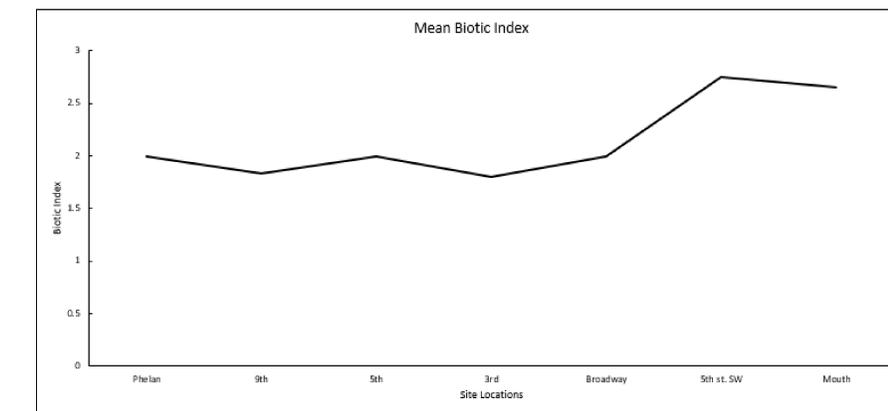


Figure 7. Box and Whisker Plot of width:depth ratio



Average biotic index= 2.14

Quality	Biotic Index Range
Excellent	3.6+
Good	2.6 - 3.5
Fair	2.1 - 2.5
Poor	1.0 - 2.0

Figure 8. Line graph showing Biotic Index across sites.



Figure 9. A new reach-level corridor restoration project is being implemented between 5th st. W and Broadway

## References

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