

Urban Waterways

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Abstract

The purpose of this report is to inform readers about the effects of urbanization on waterways. Data will be inferred and compared from present and past to acknowledge and protect the future of waterways. Hypothesis: Does urbanization have any effect on waterways? The overall report discusses urbanization being critical on waterways.

Introduction

“We are a water city,” said Joe Royer, owner of Outdoors Inc. who frequently kayaks in the Mississippi River. Mr. Royer was interviewed in the local newspaper titled *Memphis Flyer*. In addition to the Mississippi River, there are tributaries that flow into the Mississippi River such as the Wolf River, Loosahatchie River, and Nonconnah Creek. The quality of Memphis water in aquifers is unknown to many people. Even the numerous people in Memphis don’t know how pure Memphis aquifer water is. In response to the unawareness of the water quality of Memphis, studies were performed in June of 2018 by participants in Green Camp from City of Memphis Storm Water Department.

The study was performed to understand, discover, and ignite curiosity in learning about water in urban and non-urban places. The students learned about the history of constructing the urbanized stream, Cypress Creek, and statistics of chemicals in the waterways. Cypress Creek empties into the Wolf River. Trash was collected at McKellar Lake and split into two groups of non-recyclables and recyclables. Nonconnah Creek empties into McKellar Lake. Another waterway, Bateman Bridge, also known as part of Ghost River, is a non-urbanized stream that is a recreational paddle boat area. The Ghost River section at Bateman Bridge was sampled and studied for chemicals and biological life which is linked to the Wolf River. The specific study of the waterways identifies the effects of urbanization and will bring awareness to Memphis, Tennessee and all other urban cities today and tomorrow. Observing and

recording the urban problems can help support the prevention of future negative urbanization within waterways.

Materials and Methods

Chemical testing requires materials to thoroughly identify the substances in urban and non-urban waterways. Some materials that were used were vacu-vials with reagent, photometer, thermometer, sample cylinders, and pH meter. Materials that were used during biological testing were dip nets, dichotomous key, magnifying lens and thermometer. When biological life was caught with the dip nets, the dichotomous key helped identify the macroinvertebrates. The vacuum vials helped analyze the amount of phenols, copper, dissolved oxygen and chlorine in Bateman Bridge and Cypress Creek. Materials used at McKellar Lake were a scale, gloves, and trash bags.

Results

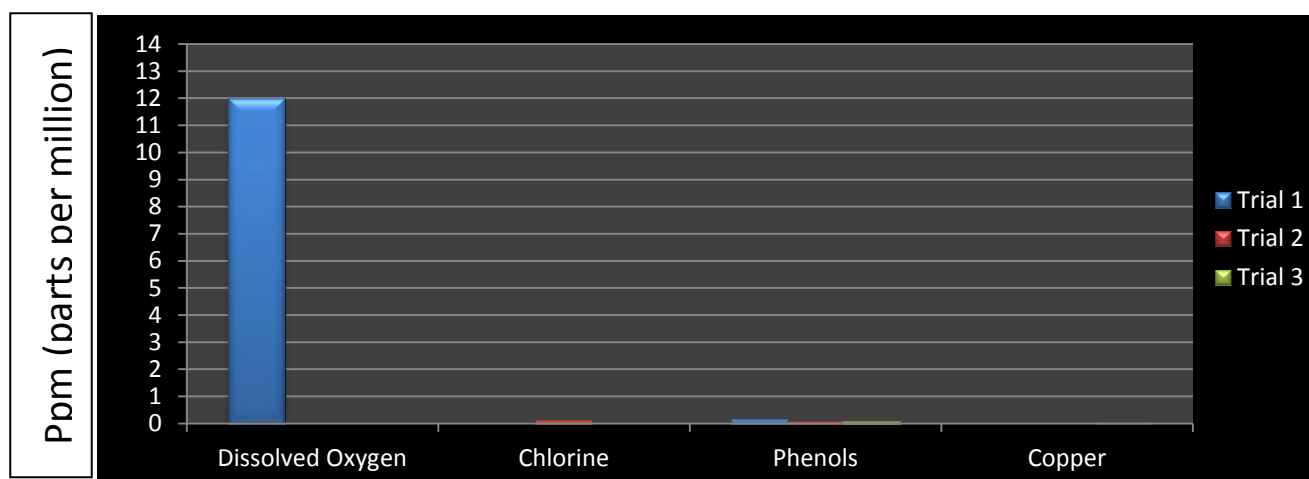
McKellar Lake Trash Results

Total pounds of recyclables collected:	39.25 lbs.
Total non-recyclables collected: 11.95 lbs.	Total recyclables collected: 17.30 lbs.
Total percentage of non-recyclables: 40%	Total percentage of recyclables: 60%

Chemical Testing Results

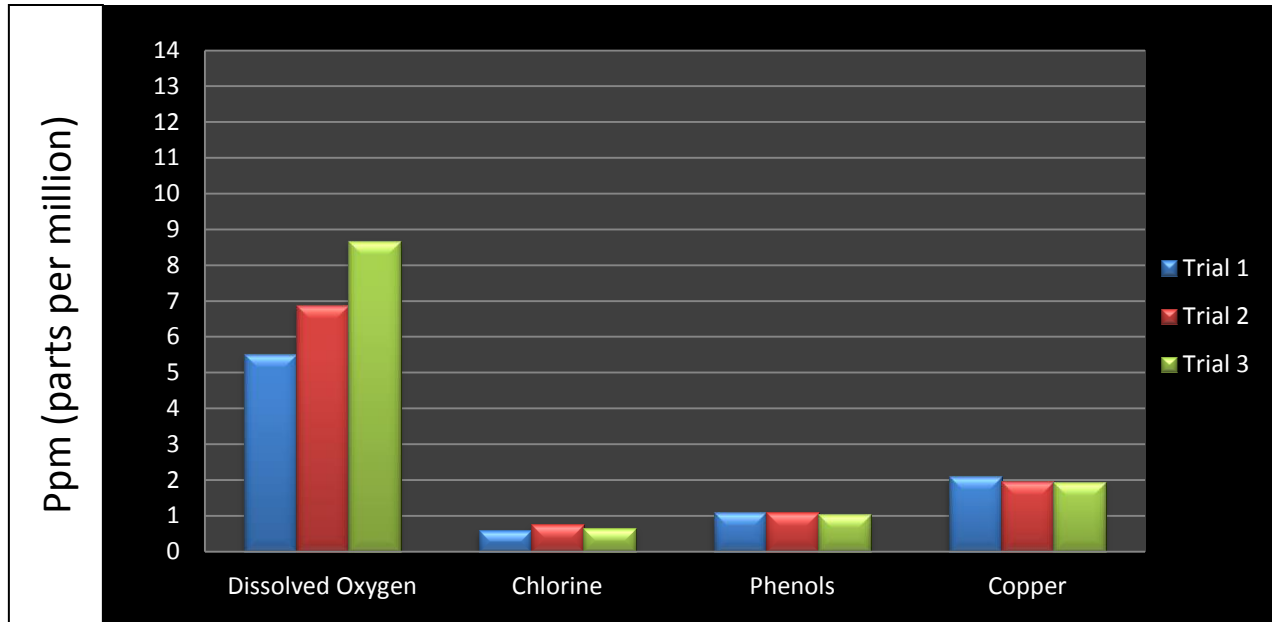
Cypress Creek: Jun. 12, 2018

Temperature: 31.1°C pH: 10.1



Bateman Bridge: Jun. 13, 2018

Temperature: 27.1°C pH: 8



Biological Testing at Bateman Bridge

Name of Organisms	Number of Organisms Identified
Mayfly	2 or 3
Dragonfly (Eastern Blue Dancer)	10+
Mosquito	2000+
Frog	2
Butterfly (Spring Azure)	4
Spring Cricket	Could be heard but not seen
Fly	5
Mollusk	1

Discussion

Based on the results of Cypress Creek and Bateman Bridge, the differences of data show Bateman Bridge had more chemicals. According to Cypress Creek Environmental Program the history of the data seemed reversed. To dive into details of both waterways, Bateman Bridge showed larger amounts of chemicals [see graphs 1&2] than Cypress Creek. However, despite little amounts of pollution, Cypress Creek's habitat had been degraded. According to the Cypress Creek Environmental Program, (C.C.E.P.) before 1963, the creek had been used for disposing sanitary waste. In effect, the waste seeped into the sediment causing biological organisms to migrate or die. According to Wolf River Conservancy (W.R.C.), Bateman Bridge is a recreational area, known as Lost Swamp, and a non-polluted waterway.

From the results of both waterways, the likely reason is both may have more chemical contaminants at periods of time. For instance, the data from Jun. 12, 2018 at Cypress Creek had a slight amount of chemicals in the creek. However, it rained before the creek was tested, according to the National Weather Service. That could possibly be why there were small amounts of chemicals in the creek in Jun. 12, 2018. Some chemicals that were tested for occur naturally in waterways which are copper and phenol. Phenols can be present naturally, industrially, domestically, and agriculturally. The amount of phenols at Bateman Bridge was higher than Cypress Creek. The reasoning could be there are more trees near the stream. Naturally occurring phenols are present as decomposition from organic matter being deposited into waterways such as Bateman Bridge. Bateman Bridge had higher amounts of copper than at Cypress Creek also. The reasoning behind that is boats usually have copper-based bottom paints which prevent growth of algae, barnacles, etc. There is a possibility the boats used at Bateman Bridge could have that bottom paint on the hulls. The amount of dissolved oxygen at Cypress Creek was higher than at Bateman Bridge maybe because the water stirred up bubbles on the rough, concrete floor. Dissolved oxygen determines if biological life is in the area. Although, Bateman Bridge did not have as much as Cypress Creek, it had enough dissolved oxygen to support biological life. Bateman Bridge has a many, many more animals and plants than at Cypress Creek.

Conclusion

Urbanization's effects on waterways can hurt rivers, even oceans. National Geographic magazine emphasized plastic being dumped into oceans each year carelessly. 18 billion pounds are being dumped into oceans each year. As stated by News Deeply, the European Space Agency (E.S.A.) is developing technology to track ocean plastic from space. The results from McKellar Lake concluded that trash can destroy habitable water areas by breaking down and spreading chemicals throughout the waterway ecosystem. History from Cypress Creek was about the area being used as a waste site. Given these points, urbanization can hurt the future of waterways by making them uninhabitable. Not only does it affect animals and plants, but people along the Mississippi River use that as drinking water and fishing which can be

contaminated leading to people having diseases. Signs near the Wolf River warn people not to eat the fish within the rivers because they can be polluted and cause us to have sicknesses. Therefore, the hypothesis, which does urbanization affects waterways, seems very affirmative that it does have negative effects.

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