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This paper has been altered: Two small portions are blocked out in grey (lack of supporting documentation). Conclusion and data are the students own.

### Urban Runoff Impacts On Waterbodies

As civilization has improved technologically and physically, our pollution has also greatly increased. I believe that urban non point pollution in the city, like antifreeze from cars, hair products, pesticides and various other chemicals, have caused a great deal of change to the quality and diversity of animals in our water. This conclusion is mainly based on chemical water testing in places like Cypress Creek using Drop Test Kits and parameters, the history of Memphis' waterbodies and the growing state of waters downstream of our watershed. Using these findings, I will reveal the diminishing condition of our water and how to possibly prevent further damage.

Memphis, Tennessee is a city known for many things like its famous barbecue, St. Jude and FedEx but also for its amazing water quality. Aquifers, which are bodies of rock that contain or transmit groundwater, are the reason for our exceptional tap water. Our aquifer is made up of several layers, which are mainly sand, that filter out pollutants. While our water we currently drink is safe, because it is from a couple thousand years ago, our present actions could potentially harm the lives of our descendants. Also, when we litter and pollute water, not only do we harm the future of our aquifers, but we damage bayous like Gayoso, rivers like the Mississippi and downstream waters. We are all taught to recycle our paper and plastic, not waste electricity and try carpooling but many other things we do in everyday life are also harmful to our water and our health.

Drop Test Kits contain tubes that hold samples from a specific body of water and different reagents to test the amount of chemicals in the water. At Cypress Creek, I tested for several chemicals including chlorine, phenols, copper and dissolved oxygen. The average amount of chlorine in creeks is around 1 to 2 mg/L. At Cypress Creek, when testing upstream, we found an average of 0.09 mg/L which is practically normal. Although this amount of chlorine may not be safe in other bodies of water, for creeks like Cypress it is regular. Along with these findings, the amount of copper and phenols were also in the average range while dissolved oxygen was low. Dissolved oxygen supports aquatic life in streams. A satisfactory amount of dissolved oxygen in a biodiverse stream would be over 10 ppm while the amount at Cypress Creek was lower since it is less biologically diverse. While chemical testing is an accurate measurement of the current water quality. “Chemical water testing is like taking a snapshot with a camera at that moment. But streams are always moving and flowing. So that changes.” (Sharon Gordon, Storm Water Project Coordinator)

The Mississippi River stretches over many states which means it has plenty of places to be polluted. Non point pollutants are washed into the river by rainstorms and through storm drains. This is a concern for all living things in water because with the presence of chemicals in water, life will lessen. Also, in places like the Texas-Louisiana coast at the Gulf of Mexico, there is a “dead zone”. This means there is such little oxygen in the water, no life is sustainable. This happens when algae grows rapidly from fertilizer and then it dies which takes away all of the oxygen in the water. Without oxygen, fish cannot survive and neither can plants.

Pollution from waste and sewage did not only affect our water, but also our health. In an article published by Ann Arbor Courier, it is said, “The Bayou Gayoso is blamed for all the sickness that has occurred in that city; and there is thrown garbage and all conceivable species of

filth.” This sickness that is mentioned is referring to the Yellow Fever. It is assumed that the writer believed that the Bayou Gayoso was the main reason for the Yellow Fever since it contained such a large amount of sewage and litter that contaminated the air. Today, Gayoso is buried and cleaned out by Gayoso trash booms which is a mechanical bar that collects litter from the water. The city is spending **tens of millions of** dollars on this system and while it does extract litter and give more storage capacity, it washes debris and litter into the Wolf River. This is a problem for the aesthetics of our city and for our potential tourist rates. These trash booms are stopping litter from entering the Mississippi River so that it will not drift downstream, but it does not stop any chemicals from flowing. This does not solve the issues with “dead zones” forming and killing biodiversity in the water.

Not only is trash thrown in water but also in landfills where it can take up to 1,000 years for it to start breaking down. During my time at Green Camp, we collected and sorted through litter in a city park. Of this trash, roughly 62% was non recyclable and 38% was recyclable. The main items found were non recyclable plastics. The decomposition times for the plastic items alone was anywhere from 50 years to 1000 years. If not picked up by us or stopped by a trash boom, it would have gone straight into a waterbody. To better our water and our environment, we can make small changes to begin. Normal disposable diapers can take up to 550 years to start breaking down. By switching to cloth diapers, we may be using more water for washing them but it is tiny compared to the amounts of diapers that have piled up in our landfills in the last century. Other trash items like plastic drink holders or straws can be washed into the water and can easily be fatal to fish or sea creatures that get tangled up or choked.

In summary, pollution does affect water quality and the overall health of humans and animals. By being aware of all kinds of pollutants carried to waterbodies by storm water runoff

and recycling all eligible items, we can easily better our water quality and diversity of aquatic life. Also, by learning the history of water and its pollutants, we can better understand how to care for our water bodies. “Those who do not learn history are doomed to repeat it” (George Santayana). After all, water is the basis of human life and a necessity for all living things.