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The Fourche Creek Litter Awareness Project

### Keep Little Rock Beautiful: Little Rock's litter problem

There is a major littering problem in the City of Little Rock due to the amount of waste that is tossed onto the ground. This littering problem is negatively impacting Fourche Creek, which is an important watershed<sup>1</sup> in Arkansas. During rain events, the litter is transported by water through storm drains<sup>2</sup>. The storm drain water empties into streams, which eventually empties into Fourche Creek. Litter also ends up in Fourche Creek due to the additional illegal dumping that occurs adjacent to these waterways. This litter, and the chemical pollutants derived from this litter, accumulates in Fourche Bottoms. The presence of items such as plastics, tires, cigarettes, motor oil, fertilizers, and pesticides are negatively impacting the entire ecosystem of Fourche Creek, including its humans, animals, plants, and water.

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<sup>1</sup> A watershed is an area of land that drains all of the streams and rain fall to a common outlet

<sup>2</sup> Storm drains are designed to prevent flooding by redirecting stormwater into near bodies of water

Plastics are a commonly littered item because of their single-usage as well as the amount of people who use and dispose of plastic items. There are seven different kinds of plastics. Each category of plastic contains different chemical and physical makeup, and are used for different purposes. According to [Plasticsforchange.org](http://Plasticsforchange.org), the different types of plastics are as follows: polyethylene terephthalate (PET), high-density polyethylene (HDPE), polyvinyl chloride (PVC), low-density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), and other plastics. Some examples of the different types of plastics are as follows: water bottles and soft drink bottles (PET), cleaning supply bottles, such as laundry detergents, bleaching agents, etc. (HDPE), plastic packing and food foils (PVC), shopping bags (LDPE), toys and car bumpers (PP), take-out containers (PS), and polycarbonate, nylon, and fiberglass (other plastics).

Plastics are observably one of the most littered items that end up in Fourche Creek. Items such as styrofoam cups, styrofoam take-out containers, plastic bottles, and plastic bags. Plastic items are harmful to the environment for a few different reasons: they are not biodegradable,

they break apart into tiny pieces, and they contain harmful chemicals (Lindwall). The fact that plastics do not break down means that they can last in nature up to 500 years or more, while breaking apart into tiny pieces of plastic called microplastics (Lisa). Microplastics are harmful because they cannot be seen with the naked eye, causing microplastics to be extremely difficult to clean up. Some of the chemicals that are in plastics are classified as endocrine disruptors, which can cause hormonal imbalances, reproductive issues such as infertility, and in extreme cases cancer (Lindwall).

Plastic items pose a major threat to wildlife, both terrestrial and aquatic. Animals can get trapped in plastic products like plastic bags or plastic rings. If an animal were to get trapped in a plastic bag or get a plastic ring stuck on some part of their body, it would be difficult for them to manually remove these items. A plastic bag could block the animals' air passages, which leads to suffocation. A plastic ring could cause the animals' bodies to become deformed as the body will attempt to grow around the foreign object. Animals also often ingest microplastics because they can be mistaken for food. These bits of

plastic begin to accumulate in the animals' bodies, and tend to block their airways, digestive systems, and can even puncture internal organs such as the throat, lungs, stomach, or intestines (Lindwall).

An overwhelming presence of plastic items can also threaten plant life and water quality. If there is an abundance of plastic items in one area, it takes up physical space needed for plants to grow properly. Plants might be smothered, deprived of sufficient nutrients needed to be healthy, or deprived of sunlight, which is necessary for photosynthesis. Exposure to microplastics can also have a negative impact on soils, sediments, and freshwater because of the leaching of potentially toxic substances, which could have long-term negative effects on the ecosystem (“Plastic planet: How tiny plastic particles are polluting our soil”).

The large amounts of plastic present in Fourche Creek can also cause water blockages. This disrupts the natural flow of water necessary for proper water cycles. The water cycle is important for water quality because it keeps the water from becoming stagnant and allows the water to recycle itself, in a sense, that helps it stay cleaner (“Why are water

cycle processes important?”). Plastic items negatively impact the water quality by contaminating it with unwanted chemicals and tiny plastic particles that are merely impossible to remove (Lindwall). The chemicals can cause harm to animals and disrupt the natural pH of the water, which could threaten the health of fragile living organisms that live in the water (“Why is pH important to organisms”). The physical presence of plastic also just makes the water look nasty and unpleasant.

Tires are a larger item that end up in Fourche Creek due to illegal dumping. Tires are manufactured to be durable, so they take hundreds to thousands of years to break down (Lisa). If too many tires are disposed of in one area, it could lead to tire piles. Tires are a threat to the environment because they contain harmful chemicals that seep out over time, causing harm to organisms (Rogers). Tires also contain heavy metals and oil, which contributes to the contamination of surrounding water and soil, ruining their quality (Rogers). Leaching of heavy metals, toxic chemicals, and oils damage nearby plants, which can reduce growth (Rogers). Tires also threaten the growth of plants due to the

physical space they take up, which can prevent new growth from happening or squash and smother already existing plants.

The presence of tires is harmful to wildlife because the leaching of heavy metals, toxic chemicals, and oils threaten the health of animals, and can cause reduced growth and reproductive issues (“Are Tires Toxic to Animals?”). Aquatic animals are the most vulnerable because they absorb the chemicals through their gills and bodies (“Are Tires Toxic to Animals?”). Land animals sometimes get stuck in tires and are unable to escape without the aid of humans, so they end up dying. It is also important to note that tires that sit on land and collect water pose a threat to human health as well because the water acts as a breeding ground for disease carrying insects like mosquitoes (Rogers). According to the CDC, mosquitoes carry many different diseases such as Zika virus, West Nile virus, malaria, chikungunya, or dengue. These diseases can cause extreme illness and discomfort to those who contract any of these viruses.

Cigarette butts are one of the most littered items throughout the world at around 4 trillion butts littered per year (“5 ways cigarette litter

impacts the environment”). Even when thrown far away from any bodies of water, they can get swept into storm drains where they get into water systems. Cigarettes are harmful to the environment because they are not biodegradable, so they are likely to break up into smaller pieces. Cigarette butts are sometimes ingested by animals, causing harm to their digestive system. More importantly, cigarette butts contain harmful chemicals like nicotine, arsenic, and some heavy metals. These chemicals get released into the environment and indirectly damage the health of animals, especially aquatic animals (“Smoking and the Environment - How Smoking Harms the Planet”).

Motor oil tends to end up in Fourche Creek due to illegal dumping. Oftentimes people do not know how to properly dispose of their old motor oil, or they find it easier and quicker to just dump it directly in the creek or storm drains near their house. Other times, leaking motor oil from a car, motorcycle, truck, or other vehicles goes to the street and then is washed into storm drains, which eventually ends up in the water systems (“Education in Nonpoint Source Pollution Prevention”). Motor oil is harmful to the environment because it does not dissolve in water

(“Auto Fluids Fact Sheet”). It lasts a long time in nature and has a tendency to stick to everything, like animals and plants, which suffocates them. Motor oil can also impair natural processes such as oxygen replenishment and photosynthesis as well as depleting soil from its natural nutrients, making it less productive (King).

To put things in perspective, a pint of oil can produce a slick of approximately one acre of water (“Auto Fluids Fact Sheet”). One quart of motor oil can pollute 250,000 gallons of water (“Education in Nonpoint Source Pollution Prevention”). Motor oil and petroleum products are toxic to people, wildlife, and plants, especially used motor oil. Used motor oil contains toxic substances like polycyclic aromatic hydrocarbons, which can cause cancer. Used motor oil also contains higher percentages of tiny pieces of metal such as lead, zinc, and arsenic that accumulate in the oil due to engine erosion. Also, lubricants from cars add to the polluting potential of used motor oil (King).

Fertilizers and pesticides are both used in lawn care. Fertilizers provide plants with nutrients, while pesticides provide plants with pest control and protection. However, if improperly applied or used in



excess, stormwater runoff will carry fertilizers and pesticides directly into storm drains where they eventually empty out into Fourche Creek (“Education in Nonpoint Source Pollution Prevention”). Fertilizers are harmful to the environment because they contain nitrates and phosphates, which creates a toxic environment for aquatic life, an excessive growth of algae, and decreases oxygen levels (“Environmental Issues: How Do Fertilizers Affect the Environment”). When the algae begins to decay, the decaying process uses up oxygen in the water that fish and other wildlife need in order to survive (“Education in Nonpoint Source Pollution Prevention”). Too much algae can cause water quality problems as well as make boating, fishing, and swimming unpleasant (“Education in Nonpoint Source Pollution Prevention”).

On the other hand, pesticides can cause high levels of soil and water toxicity, which leads to long term damage. Pesticides are also known for causing death or harm to non-targeted organisms as well as run the risk of creating superbugs that become resistant to the effects of pesticides. Both fertilizers and pesticides can cause health issues such as

cancer and chronic diseases in humans (“Environmental Issues: How Do Fertilizers Affect the Environment”).

Each of the items cause reasonable harm to the ecosystem, and humans are not excluded. Humans are also animals and are a part of nature, not separated from it, meaning we are negatively impacted as well. Human survival relies on the earth’s resources. Therefore, humans’ quality of living relies on Earth’s health status. This is why we should care about the negative impact littering has on Fourche Creek and our environment as a whole. For example, people fish out of Fourche Creek. When consuming fish, the health of the fish is important. However, the health levels of fish relies on the water’s chemical and physical quality. If there continues to be gross amounts of littered waste that ends up in Fourche Creek, then the health of the fish will be impossible to keep well. The fish are continuously exposed to toxic chemicals to both the fish and those who consume them. The fish are also predisposed to having larger amounts of plastics in their system than usual, which is not good for a human to consume. People also enjoy getting on the water at Forche Creek. People are able to get on the water in smaller watercraft.

However, a lot of waste makes it difficult to get through and the waste makes the nature-experience dirty and unpleasant.

The environment is important to protect and take care of, even if it is on a more local scale. Luckily, there are actions we can take to improve the litter issue in our city. First, we should be more mindful by following the six Rs: refuse, reduce, reuse, repair, recycle, and rethink. We can refuse items like single use plastics and replace them with reusable items to reduce the amount of plastic waste. We can repair items so that they can be reused, or rethink the ways certain items can be used and give them a new purpose. We must recycle items that are able to be recycled so they are dealt with properly instead of having those items end up in landfills.

We should also be more active. We can volunteer, help with cleanups, join an Adopt-A-Street Program, an Adopt-A-Highway Program, an Adopt-A-Trash Boom Program, or join a Stream Team. Volunteering and joining programs are a great way to get involved in our community while helping reduce litter that ends up on the sides of

the roads and in our waterways. The more people that become involved, the less we have to do individually.

We should also be more vocal. We can reach out to state, city, and local officials and inform them of the issue at hand and why they should take action to help reduce the litter problem in Little Rock. Speaking with friends, teachers, neighbors, and colleagues is also a way to be more vocal because they can provide their own expertise and knowledge on the issue, and create a more collaborative approach to solving the problem.

Working with Keep Little Rock Beautiful allowed me the opportunity to be a part of something that I find important and that I personally care about. I have lived in Little Rock all of my life. I have gone to school in Little Rock and I am continuing to further my education in Little Rock. I have found that working on this internship has provided me the chance to help out my community by researching how litter in this city is negatively impacting our ecosystem, and different actions we can take to work in solving the issue. Through my efforts, I am now part of something that is going to help inform people

about an unspoken issue in my home town of Little Rock, while bringing awareness to the issue. While I have learned more factual information about how certain littered items cause harm to the environment, I have also learned new skills. I have learned what it is like to work with a team of people, taking suggestions from others, and building on top of my work. I have been able to learn a lot about putting together presentations as well as designing a brochure. I found it exciting when I was able to incorporate my artistic eye while putting together the deliverables.

While I could have been more strict with deadlines, I still feel as though I did a sufficient job in performing the tasks that were assigned to me.

The overall experience from this internship will follow me through other endeavors I pursue in the future when it comes to my college and professional career.

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