Can Stormwater be captured and used as Greywater?

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***Abstract*—One of California's biggest recurring problems is drought. The extreme shortage of water throughout the state causes many to lose access to water for daily use. California is heavily reliant on its groundwater supply. However, alternative methods of water collection can be very important in order to mitigate the state's water shortage. Stormwater is the precipitation from rain that the state experiences. While stormwater can damage the environment and infrastructure it interacts with, it can also be a possible solution to water shortage. By treating stormwater and funneling it off into plants in need of water, California can decrease its freshwater usage. Another alternative water collection method is using greywater, wastewater that hasn't interacted with toilet pollutants. Greywater can be used to irrigate plants, and can also be used to flush toilets. This is important because toilet water is a leading cause of urban water use. By using greywater in toilets, cities can significantly reduce their water needs. In conjunction with conventional water collection methods, using stormwater and greywater can help mitigate the water shortage in California.**

I. Introduction

California, although being the most populous state in the United States, is one of the states that experiences the most water shortage in the country. Throughout its history, California is no stranger to droughts, a recurring feature to many regions across the state. As groundwater levels plummet substantially during water shortages, more than 2,000 household wells went dry over the course of the recent three years in the state.

In effort to tackle this challenge, multiple methods have been explored as possible solutions. In dry seasons, the state relies on water that derives from sources such as reservoirs, melting snowpacks, and stormwater. Additionally, groundwater is a vital resource for California, and accounts for around 60% of the state's water supply in years of drought [4].

II. Stormwater

Stormwater is defined as precipitation from rain and snowmelt that does not enter the groundwater system. Stormwater picks up pollutants as it flows and transports them to rivers and lakes. Some of these pollutants are sediment, motor oil, and trash, while others are less visible, such as dissolved metals, nutrients, oxygen-demanding substances, and organic chemicals. These will cause obvious damage to the environment. [1] Stormwater can erode roads and bridges, causing structural damage to roads and bridges. And it can damage underground drainage systems, which can cause flooding. This can seriously damage various infrastructure in the city. [5]

III. Greywater

Greywater is wastewater that is not treated but not as contaminated as toilet water. Can come from many different household appliances that use water, such as showers or washing machines[2]. In some cases, greywater can be used to replace freshwater. For example greywater can be used to irrigate plants. By either moving greywater directly from its outflow to irrigation or by creating a tank, plants can receive greywater for their growth[3]. However, it is important not to use greywater to irrigate plants that are for human consumption, as it could contaminate the plants[2]. Greywater can also be used to flush toilets. By reusing water for flushing toilets, all of the water that the toilet demands wouldn't need to be fulfilled by new freshwater, lowering the water cost of using the toilet [3]. By using greywater, people can greatly reduce their water usage, conserving more water and mitigating water shortage.

IV. MAKING USE OF STORMWATER

While most of California's water supply comes from surface and groundwater supplies, its water supply is expanding to start using stormwater and greywater [6]. By doing so, California can meet its water demands and get closer to ending water shortage. If all of California was to collect stormwater, it would be able to make up for 1/4th of its water usage [7]. Some cities, such as San Francisco already do this: they collect the water that enters their storm drain system, send it to treatment plants, and treat it for reuse [7]. Additionally, there is a possible idea floating around the state that would entail directly funneling the excess storm water into plants and foliage. That way, the freshwater cost of plants and irrigation systems would be greatly lowered [7]. Making use of stormwater both treated and untreated can greatly increase California's water supply, and limit the amount of freshwater needed and used throughout the state.

V. CONCLUSIONS

In conclusion, the heavy reliance on underground water of the state of California underscores the importance of finding sustainable alternatives such as stormwater and greywater. Although storm water has the potential of damaging infrastructure or carrying pollutants, it will be viable when treated and utilized properly such as irrigation or other non-potable uses. Similarly the greywater derived from households also presents a significant role in reducing the waste of fresh water consumption in urban areas since the greywater can be used for toilet flushing and plant irrigation.

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