



Sustainability of Water Reuse in the United States

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THE PROBLEM

As populations around the globe and in the United States as well have massively spiked in growth in the last 100 years the usage of water has vastly increased as well. On the current path humans cannot sustain themselves in regards to water. Since the problem affects nearly everyone in every industry and sector this is a problem that is in dire need of solving.

THE PROJECT

The aim of the project was to research a potential source of relief in regards to the impending water disaster, the implementation of water reuse and the how sustainable this production is. This method is defined as when instead of the typical process of treating water at a wastewater treatment plant, releasing into the natural environment and then at some point later is taken in by a water treatment plant and treated before distribution of the water. Water reuse is different in the sense that it has a different method of providing water to customers. The two main types focused on were non-potable reuse. For example that could include water leaving a wastewater treatment plant to go directly to a farm to be used for the watering of plants. Then, the other type focused on in this paper is direct potable reuse which is where water leaves a wastewater treatment plant and then go directly to an altered water treatment plant that is prepared for wastewater effluent. The project was done in a multi step research starting with the current challenges the implementation of water reuse in the United States has

It then moved on to studying the ecological impact of water reuse, demonstrating that it has both the potential for positives to the environment as well as possible negatives that may need further research. It was then researched the economic impact of water reuse and how it can benefits communities in the long run. Then to show that implementation is possible various in the various types of water reuse existing places where water reuse is implemented.

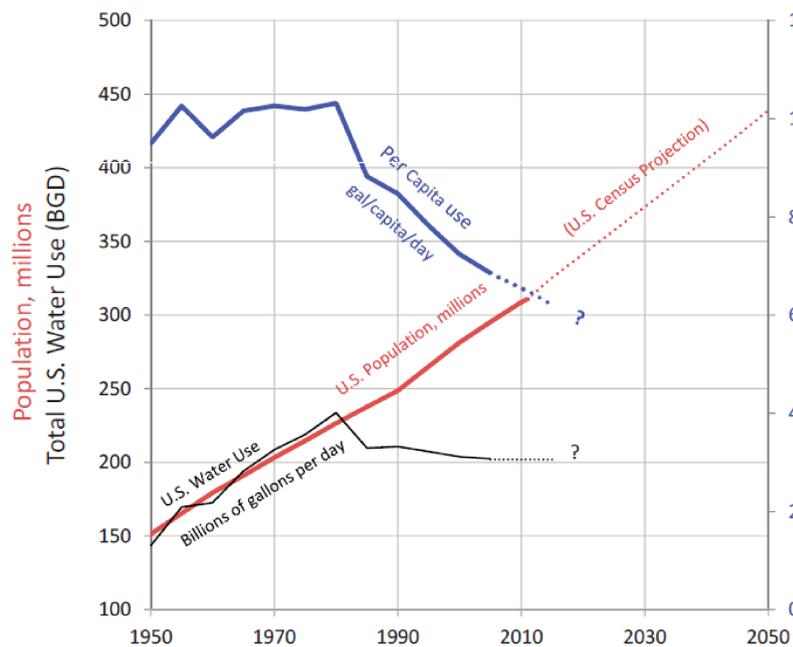
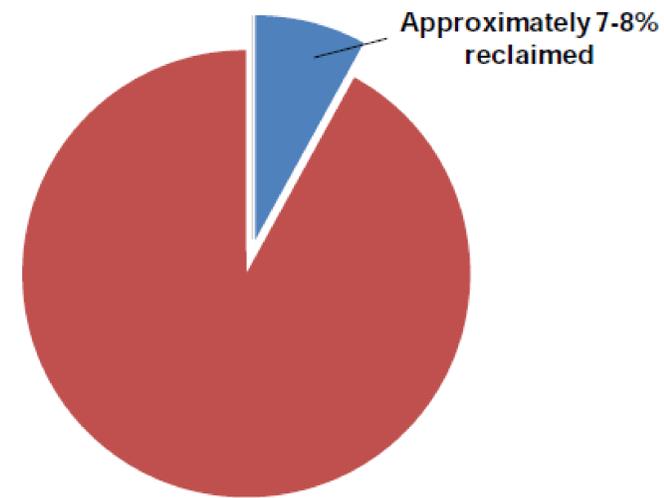


Figure 1. The comparison of water use in the United States to water usage (Water Reuse 2012)



The United States produces approximately 32 billion gallons of municipal effluent per day.

SUSTAINABILITY

If climate and population models are even slightly true then water is going to be the limiting factor of human growth in the foreseeable future. Thankfully, after researching the topic of water reuse it seems like a very sustainable use of resources. With industrial applications it allows the consumer to buy non-potable water at a more economical rate than for potable uses. Then they can treat to the various levels needed for each application instead of receiving highly treated water when unnecessary at times. Furthermore it promotes problem solving as each place can explore various methods of treatment. Then, agriculture seems to be another great area for water reuse. While there is a minor risk of contaminants the water can be treated at a higher rate and still be more economical for agricultural uses. Another area that has really been seen as a great alternative to more expensive options is injection of reuse water into aquifers, especially near oceans as this prevents seawater from moving inland underground. The final and most important in my opinion application of water reuse is direct water reuse. This will allow societies to skip a step of water treatment and create a nearly closed loop of water usage. I believe that this is the future of water usage and will allow urban areas even in a very arid environment to not only survive but thrive. I have learned a great deal of water usage, its application and distribution as well as a great deal of other knowledge in regards to water. This is really great as it has both altered my perspective on water as well as prepared me for a job in Civil Engineering in which I can use my applied knowledge of both sustainability and water to create more and more sustainable systems.

Figure 2. Current water use in the United States as compared to total wastewater treated (Matthews et al., 2011).

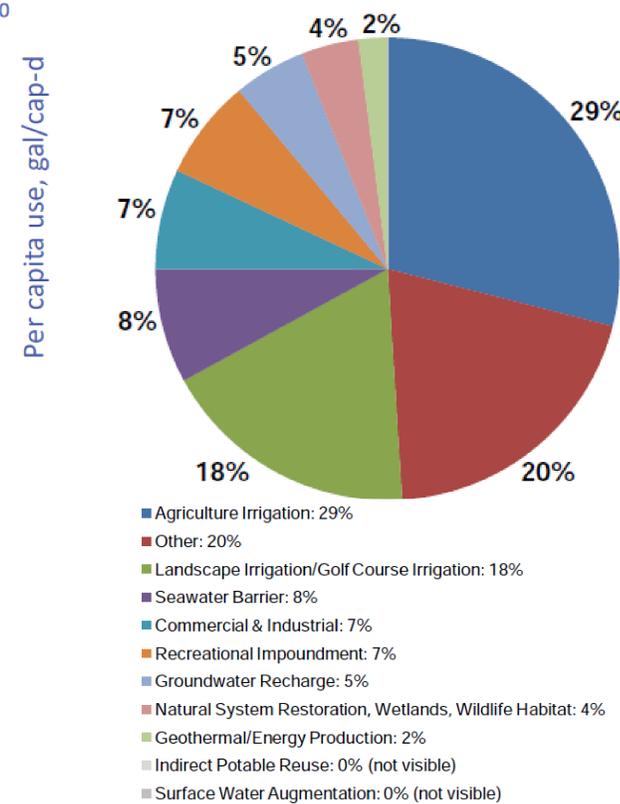


Figure 3. Diagram of broken down water reuse in the United States (Matthews et al. 2011).