

Long-Term Water Loss and Impacts on a Water System

According to Scientific American, water covers 70 percent of the Earth's surface. The percentage might lead some people to believe that water will always be plentiful. It's a distribution problem, right? As a result of drought, pollution, and lack of access, the water supply is continually being impacted. In some places, there's too much – in other areas, conservation is essential for anyone to have any water. It all depends on the local situation.

Several decades ago, a small town in southeast Kansas resorted to damming up a stream to provide water for the town's treatment plant. That city was fortunate to connect to a public wholesale water supply district. It was no more damming up the small stream. In January 2023, the city of Atchison, Kansas was encouraging water consumers to conserve. When steady streams of ice chunks began floating down the Missouri River in December, Atchison's water plant could not be supplied directly from the river. The flow was also being held up by a partially frozen riverbed. The water in the Missouri River no longer flowed by gravity into the city's treatment plant, but needed to be pumped. Drought affects much more than southwest Kansas; sand bars are showing in sections of the Missouri River!

Water systems – and "saving" water

Public water systems can play a role in conserving water by not wasting a commodity that otherwise can be provided to customers. Simply put, water loss costs money.

Is there an acceptable unaccounted-for (non-revenue) water loss for a public water system? There is always going to be some loss. A system that sells more water than it produces or purchases has a metering or recording error somewhere. KRWA's experience for decades is that an unaccounted-for water loss of up to 15 percent is not a reason for a water system to hit the panic button. But no one should be happy with the status quo. There will

The city of Atchison has been operating two pumps to pump 3.7 million gallons per day from the Missouri to the treatment plant. As of February 6, the river level is 2.8 feet below the intake for the city's treatment plant.

If the unaccounted-for (non-revenue) water is 15 percent one month and then much higher, e.g., 32 percent the next month, and then declines back to 13 percent the next month that indicates a likely problem in meter reading or bookkeeping. Leaks do not heal themselves.

always be “some loss” – but lost water is lost revenue. The cost of unaccounted-for water can be significant, especially if the system has a high purchase or production cost.

So, what can we do? First and foremost, we need to practice water conservation at the local level. A water loss that takes a significant spike upwards requires attention to find the cause. It is also essential to watch the trends – daily, weekly, monthly and annually. A slow leak may not show a drastic difference on a week-to-week basis. Comparing the loss from the previous month can provide a gauge of the situation. We sometimes find inaccurate meter readings or there can be errors in bookkeeping. If the unaccounted-for water is 15 percent

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New operators can benefit from training to become familiar with conducting a water loss survey. Leaks are often a challenge to locate. Remember that small leaks may not show on a month-to-month audit. Trends can be monitored as some spikes are expected, i.e., higher water use during spring and summer due to people watering lawns, filling pools, etc. However, if the spike is more significant than the previous year, that could indicate a leak.



Testing a sampling of customer meters is a part of thorough water loss survey. This photo shows meters from a water district connected in series to save time on testing.

World Wildlife Fund Comments

Water covers 70 percent of our planet, and it is easy to think it will always be plentiful. However, freshwater – the stuff we drink, bathe in, irrigate farm fields with – is incredibly rare. Only three percent (3%) of the world’s water is fresh water, and two-thirds of that is tucked away in frozen glaciers or otherwise unavailable for our use.

As a result, some 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarce for at least one month of the year. Inadequate sanitation is also a problem for 2.4 billion people – they are exposed to diseases, such as cholera, typhoid fever, and other water-borne illnesses. Two million people, mostly children, die each year from diarrheal diseases alone.¹

¹ World Wildlife Fund. Water Scarcity | Threats | WWF. World Wildlife Fund. Published 2022. Accessed February 5, 2023. <https://www.worldwildlife.org/threats/water-scarcity>

-LINE STOPPING

3/4" - 60"

-LINE TAPPING

2" - 60"

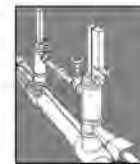
-VALVE INSERTION

4" - 16"

-VALVE TURNING

-PIPE REPAIR

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Does Earth Have the Same Amount of Water as Always?

Many people, including myself, ask the question if the Earth has the same amount of water as it always had. Thanks to a “Google Search”, I found this answer on the Internet by a group at Cambridge.

The Earth is effectively a closed system and the total amount of water it contains is essentially constant. Now, some of that water is stored in humans temporarily while they're alive. So, the more humans there are, the greater the volume of water stored in that reservoir. Now, on average, a human will hold about 40 liters of water and if we take the world's population at around 7 billion, that gives a total volume of about 280 billion liters held in humans which is a lot at almost 1/3 of a cubic kilometer.

However, the total volume of water that exists on the whole of the Earth, in whatever form - liquid, solid, gas or biological- is about 1.4 billion cubic kilometers. So the volume represented by people is just a tiny fraction. It's not even a billionth of the total amount of water. In fact, to make it a billionth, we'd have to increase the world's population about five times. So, in short, yes, humans are a reservoir for the world water, but the amount of water that represents is really just a drop in the ocean.²



² Is the Earth's Total Water Finite. n.d. The Naked Scientists. Accessed February 6, 2023. <https://www.thenakedscientists.com/articles/questions/earths-total-water-finite>.

Being trained in monitoring and correcting high water loss helps water districts and cities track their leakage. It also provide a baseline to know when leaks occur. Good operators make a habit to check for leaks on a routine basis as part of the water system operation. The prevention of water loss and routine monitoring is imperative to ensure that water as a resource remains stable and plentiful. KRWA has staff who are knowledgeable and experienced with water loss issues. Let the Association know if anyone can be of help. System operators will also benefit from the multiple training sessions scheduled during the 2023 KRWA Conference, March 28 – 30, about leak monitoring, detection and different technological advances in water operations.

Tony Kimmi has worked as a Tech Assistance for KRWA since October 2009. He has extensive experience in the operation of construction equipment. He has assisted in the construction of several rechlorination stations and ongoing monitoring of water quality issues. Tony enjoys providing assistance to public water systems.



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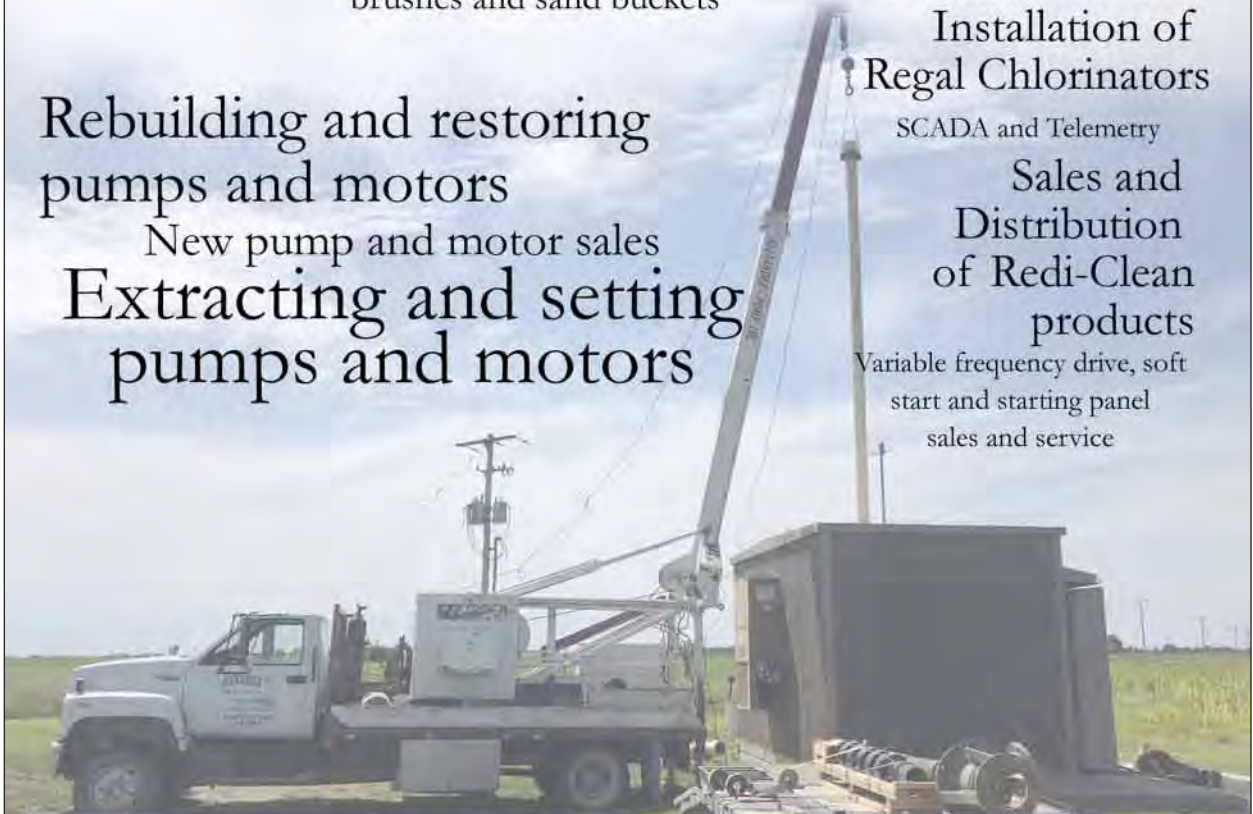
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