



EMWD

Salinity and Water Softeners

What is Salinity?

Salinity is viewed as one of the most under-recognized water quality threats in the southwest. Salinity is the concentration of dissolved mineral salts in water. More than just ordinary table salt, but salts that include calcium, magnesium, sodium, sulfate, and chloride.



Agricultural and urban activities have increased salinity in many groundwater basins, impairing the quality of freshwater. In fact, groundwater basins in California have been abandoned in the past because of high salinity levels.

Other sources of salinity include natural weathering process, agricultural and storm runoff, and urban waste discharged into the sewer system, such as household cleaning products and industrial and commercial brines (salts).

Salinity Levels in Water Supplies

Salinity is commonly expressed as Total Dissolved Solids (TDS) in milligrams per liter (mg/L) or parts per million (ppm). Drinking and recycled waters with salinity levels of more than 1,000 mg/L or ppm exceed the Maximum Contaminant Level (MCL) for secondary drinking water standards, which are established for contaminants that do not affect health but are used to monitor the aesthetics of the water. High salinity water could be considered impaired for certain applications.

<u>Natural Source Water</u>	<u>Total Dissolved Solids (mg/L)</u>
Snowfall and Rainfall	5 to 10
Snowmelt and Rainfall Runoff in Watersheds	50 to 100
Groundwater	200 to 10,000
Colorado River Water at Imperial Dam	750
Ocean Water	35,000

Impacts of Salinity

Salinity deteriorates residential, commercial, and industrial appliances and fixtures. Some industries also require onsite treatment to address salinity.

High levels of salinity can also affect the ability to produce and use recycled water - considered a critical resource in augmenting California's water supplies - as utilities may be denied permits to utilize recycled water by California's Regional Water Quality Control Boards when salt levels impair beneficial uses. For instance, throughout California, plants at parks, golf courses, and school grounds are irrigated with



Controlling Salt from Water Softeners



The use of residential self-regenerating water softeners to treat water hardness is one of the contributing

factors to high levels of salinity in our local groundwater supplies.

Controlling all sources of salinity is necessary to protect water quality. Unlike naturally occurring sources of salinity, the salinity from residential self-regenerating water softeners can be controlled at the source!

When It Comes to Salts in Water Softeners...

The salts from self-regenerating water softeners contribute to increased salinity in our water supplies, inhibiting water recycling for irrigation and other uses, as well as impacting beneficial uses, such as drinking water and agricultural irrigation.

It makes sense to remove salinity at the source rather than remove it at the treatment plant, which would require additional technologies and significantly raise utility rates.

Reducing salinity from residential self-regenerating water softeners is an important first step toward protecting the quality of existing water supplies and providing usable recycled water to address the water needs of California.

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Salinity Inhibits Water Recycling



Recycled water - the product of highly treated municipal wastewater - is a critical resource in expanding California's water supplies.

Recycled water provides a safe and reliable source of high-quality water that can be used for agricultural and landscape irrigation, commercial laundries and car washes, industrial processes, dust control, and groundwater recharge.

Using recycled water for these purposes saves our scarce drinking water supplies. We also need less imported water when we augment our water supplies with recycled water.

However, higher salinity levels in wastewater impair the ability to produce usable recycled water, as the technologies to remove salinity are costly. Furthermore, higher salt levels can limit the beneficial uses of recycled water.

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recycled water. Unfortunately, as salinity in wastewater increases - from sources such as water softeners - the salinity level of recycled water increases which can affect the growth and health of plants, causing damage like leaf burn, leaf drop, and plant death. Recycled water is a critical resource that needs to be protected from increasing levels of salinity.

How Residential Self-Regenerating Water Softeners Increase Salinity

Self-regenerating water softeners are used to remove calcium and magnesium (the minerals responsible for water hardness) from water, which reduces scaling and can increase the useful life of household plumbing and appliances.

As part of the regeneration process, a strong salt solution is flushed through the system to remove calcium, magnesium, and other minerals that accumulate in the water softener. The byproduct is a salty waste, called brine, which is typically discharged into the wastewater collection system.

On average, a single residential self-regenerating water softener can discharge a pound of salt per day and between 70 to 300 gallons of water per week when it regenerates and "flushes" away the brine. In addition, 20-25 percent of homes in California have water softeners. Therefore, residential self-regeneration water softeners are a significant source of salinity.

What is EMWD Doing to Reduce Salinity in Local Water Supplies?

EMWD has two desalination plants in operation and one desalination plant under design to help address salinity in our local groundwater supply. EMWD uses the reverse osmosis process for salty groundwater (brackish water) collected from desalter wells to produce potable (drinking) water. This process essentially reverses the natural flow of water across a permeable membrane to remove impurities - such as an excess amount of salt - from the brackish water. The desalinated water is then blended with other fresh water sources before it is delivered to customers.

The brine produced from the EMWD desalination process is piped to Orange County Sanitation District through the Santa Ana Regional Interceptor pipeline where it is further treated and discharged to the ocean.

Desalters require a lot of energy to remove salts from water. So the saltier our groundwater is, the more money it costs to clean up!



What is the Solution?

Every day, citizens can significantly decrease salinity by changing or eliminating their use of self-regenerating water softeners. Options include:

- **Remove your water softener.** Hard water poses no health hazard, and removing your water softener system can save you thousands of gallons of water per year, depending on the water quality, age, and type of water softener you own.
- **Use a portable exchange service.** Devices are available that provide the exact same service as a self-regenerating water softener, except that the water softening company discharges the salt brine into a permitted facility where it will not affect water supplies.
- **Look for a salt-free anti-scaling device.** The water softener industry is actively developing salt-free devices that inhibit scale, some of which are now becoming available on the U.S. market.