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Hat Island gets a drink from the sea

- *After 40 years of problems, islanders turn to reverse osmosis*

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Imagine owning property where you planned to build your dream home, then are told that you can't build because there is insufficient water or that the water is contaminated with saltwater and it tastes and smells like iron.

This is not unusual, in fact, it's happening in many places throughout the nation, including here in Washington state.



Photos courtesy of Washington Public Works Board

Hat Island's reverse osmosis water plant.

Hat Island, located in Possession Sound near the San Juan Islands, has had water problems for more than 40 years. The community of 954 lot owners has struggled with six water wells plagued with saltwater intrusion.

Due to this problem, the state Department of Health has periodically put a building moratorium in place because the water did not meet drinking water standards.

In the summer months, saltwater intrusion was not the only problem. The wells were unable to provide sufficient water when the island's population increased to over 300.

Finding no relief in sight, the Hat Island community hired engineering firm Gray & Osborne and worked closely with the Departments of Health and Ecology to research alternatives.

One alternative was to drill more wells, but for 40 years wells had not been able provide an adequate supply of quality drinking water. Another alternative was to build a reverse osmosis desalination plant. With an overabundance of seawater, the island's inhabitants believed that this alternative had promise.

Reverse osmosis or RO has been used for more than a century, but it did not become a commercial process until the early 1960s, when a highly effective

membrane was developed.

Because RO operates at a comparatively low temperature and is relatively energy efficient, it is used in various applications, such as waste water treatment, mineral reclamation, food productions, water purification, aquariums and, in the case of Hat Island, desalination.



Salt water passes through filters inside the plant and comes out as drinking water.

The process has been used throughout the world, especially in areas known for water shortages, such as the Dead Sea, India, Africa and the United States. RO plants are found from Arizona, which has the largest plant, to Washington state, which has five relatively small RO desalination plants operating in the San Juan Islands and now one plant operating on Hat Island.

The capacity of the Hat Island system is greater than the ones in the San Juans. The other significant difference is the Hat Island system is owned and operated by a private community while the San Juan systems are publicly owned.

Although this was a better alternative than drilling wells, it came at a significant cost to the residents. The community assessed itself \$960 per lot and applied for a loan from the Drinking Water State Revolving Fund loan program. This program, established in 1996 by Congress, is federally funded and part of the reauthorization of the Safe Drinking Water Act to promote and protect the public's health.

Jointly administered by the state's Public Works Board and Department of Health, Drinking Water Division, the program is intended to improve publicly and privately owned drinking water systems. It helps Class A water systems repair and rehabilitate their system by offering low-interest loans.

Over \$125 million has been committed by the program to improving drinking water throughout the state. In 1999, Hat Island was awarded a loan of about \$800,000 to rebuild its system.

How RO works

The Hat Island RO system includes two wells on the beach. The water goes through three round 6-foot-tall fiberglass filters that strain out impurities and minerals down to microns, particles so small they are nearly impossible to see with the naked eye. The water then goes into another set of filters, removing even tinier impurities.

After the filters, water enters a high-pressure pump, boosting it to 650 pounds of pressure per square inch. This forces the water through the membranes that are located in three horizontal cylinders, each about 20 feet long and 8 inches in diameter. When it comes out, it is very pure, very drinkable water.

The Hat Island community tasted its first drink of RO water on Feb. 12, 2003, ending 40 years of water issues. The island is ready for the summer crowd.

With a lot of persistence and hard work this community was able to reverse its water issues by using what was already abundant around the island. The community of Hat Island not only improved its water problem but also found a way to preserve the delicate systems of its existing aquifers.

Enid Melendez has worked with the Public Works Board since 1996, and is the client services representative statewide for all private water systems on Drinking Water State Revolving Fund loans.

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