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Water system worth its salt

By **Peyton Whitely**
Times Snohomish County bureau

HAT ISLAND — This speck of land about five miles off Everett bears little resemblance to Yuma, Ariz. But when it comes to getting a drink of water, they're in the same boat.

The island in Possession Sound and the desert community have limited sources of fresh water.

And both are turning to the same solution: reverse-osmosis desalination.

That's fancy talk for making fresh water out of salt water.

For Hat Island, also known as Gedney Island, it means an end to more than 40 years of water problems.

For the state and region, it could have far-reaching implications in easing shortages resulting from thin mountain snowpacks.

"What are all these people going to do about water?" asked Skip Stienstra, manager for Hat Island Inc., a private, nonprofit residents organization. "There's a solution sitting right here."

Hat Island's plant began supplying water to island customers this month and is the largest desalination system in the state. Five systems are in operation in the San Juan Islands, but they have less capacity than the Hat Island plant.

The San Juans' biggest plant, on Guemes Island, puts out 28,800 gallons of water a day. Hat Island can produce 40,000 gallons a day.

Desalination systems have been common in countries and aboard ships all over the world since becoming feasible in the 1950s. The main drawback is the high cost of desalination compared with pumping fresh water out of the ground or taking it from rivers.

Yuma has the world's largest reverse-osmosis plant, producing 72 million gallons a day. There are more than 12,500 desalination plants using varying technologies in 120 countries.

Hat Island's demands are of a far smaller scale, but the basic elements of the problem are similar.

In Hat Island's case, the difficulties date to the 1960s, when the island was purchased by developers who promoted plans for a resort with an airport, a restaurant, a marina and daily ferry service to Everett.

The marina was built. Lots were sold. Roads were bulldozed. Wells were dug. But the developers went bankrupt.

As the years passed, the owners of the 954 lots on the island struggled along with water from six wells. The wells suffered from continual problems with saltwater intrusion. The state periodically put building moratoriums in place because water quality didn't meet standards. That prevented property owners from building homes and depressed land values.

"In the old stuff, you could taste iron, you could smell iron," said Dick Spadt, who shares water-

system operating chores with Stienstra.

But in 1997, a new state program was begun, the Drinking Water State Revolving Fund, which distributes federal funds to upgrade small and medium-size water systems. More than \$86 million has been committed to improved drinking water through the fund, which makes the money available to communities at reduced interest rates.

"If it wasn't for the state revolving fund, this project would be probably another four years down the road," Stienstra said.

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Stienstra said.

In December 1999, Hat Island residents voted to assess themselves \$960 for each lot to build the plant. The whole system, including the 1,428-square-foot treatment building, cost about \$816,000, Stienstra said.

How desalination works

Hat Island's desalination process starts with two wells, 64 and 70 feet deep, drilled on a beach to allow access to seawater and using the sand as an initial filter.

That water goes through three round 6-foot-tall fiberglass filters that strain out impurities and minerals down to 25 microns (a micron is 1 millionth of a meter). The water then goes into another set of filters, removing impurities down to 5 microns.

Then it goes into a high-pressure pump, boosting it to 650 pounds of pressure per square inch.

Lastly, it goes into three horizontal cylinders, each about 20 feet long and 8 inches in diameter, stacked vertically, with lots of tubing emerging in places.

"This is where all the filtration takes place," said Stienstra.

The effect is that brackish salt water is pumped through membranes from the outer surfaces of the tubes into pipes in the middle. The water goes in salty. It comes out fresh.

Stienstra compares it to water soaking through a paper towel.

The American Water Works Association describes it as the reversal of the osmosis process. In reverse osmosis, the association explains, pressure is applied to the water, which allows fresh water to flow through a membrane, leaving the minerals behind.

The salts, in turn, are flushed into a concentrate solution and fed down a drain, where they're transferred outside to a settling pond and allowed to return to Possession Sound.

In Southern California, where large-scale desalination is being considered to help slake the region's growing thirst for fresh water, environmentalists say the process can damage the environment.

For every two gallons of water filtered, one gallon of drinking water is produced. The remaining, highly concentrated salt water goes back to the sea. In heavy concentrations, that brine can kill small sea creatures, according to the California Coastal Commission. Scientists are studying its effects on dolphins and other mammals.

But it's at a small spigot near the ends of the long white tubes where the effect of the process becomes clear.

Stienstra takes a paper cup and fills it. The water has no taste. It's like water should be.

Tests show the water is usually 99.9954 percent pure, Stienstra said. "There's nothing in this water, and that's a good thing."

Water at a higher price

The fresh water comes at a cost for Hat Island residents, who will pay more than customers of most traditional water districts.

Hat Island's basic charge for using 1 to 3,000 gallons of water a month in the winter is 0.0025 cent per gallon; the summer rate is double that.

In the Alderwood Water District, for comparison, the basic single-family winter-rate charge is \$1.22 for each 100 cubic feet, which amounts to 748 gallons of water. That figures out to 0.001631 cent a gallon, or about 65 percent of the Hat Island rates.

Nonetheless, the implications for Hat Island, where fading signs warn of periodic water shortages and urge residents to conserve, are expected to be profound.

The 1-1/2-mile-long island has 30 permanent residents and at this time of year uses 3,000 to 4,000 gallons of water a day, said Stienstra.

On nice days in the summer, when the weekend property owners arrive, the population can rise to 300 to 400 people and the island sometimes uses 30,000 to 40,000 gallons a day, a level that could not be maintained with the old system.

Now, Stienstra notes, the new system easily will be able to meet such demands. If more is needed, the new plant can be expanded for about \$200,000, doubling capacity to 80,000 gallons a day.

Stienstra said the changes are expected to vastly alter lifestyles on Hat Island, where a view cabin can be purchased for \$149,000 and a waterfront home is available for \$257,000.

"If you've got water, everything else becomes worth more," Stienstra said.

Hat Island water now is supplied to 237 connections, Spadt said.

"Next year, there'll be a lot more connections coming in, you can bet on that," he said.

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