

FRESH WATER

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Southeast Florida's fresh water supply won't meet the demands of residents, agriculture, and industry in the next 25 year if the area continues to grow at its present rate.

This projection by the South Florida Water Management District came only months before the release of an area water-use management plan.

The plan — the result of five years of research — examines alternative ways of providing a balance between increasing consumption, steady supply, rising consumer costs and the environmental impact of various storage facilities.

Although the final results of the study are not available yet, some details on consumption and storage alternatives in the past and their effects on the environment are.

Over the past 15 years, the amount of water consumed in Fort Lauderdale has doubled. In Hollywood, the amount has increased 310 per cent; in Pompano the increase has soared to 365 per cent; and in Boca Raton consumption has increased 285 per cent in one decade.

While the amount of consumption steadily climbs each year — often surpassing population increases — the amount of available fresh water has remained the same.

Florida depends solely on rainfall for its fresh water.

"We receive an average annual rainfall of 60 inches, but are only able to use 12 to 18 inches. The rest is lost through evaporation or into the ocean because we have no way of storing it," Stan Winn, water-use plan manager, said.

Water management district figures show that during the past decade, Fort Lauderdale experienced the largest amount of rainfall, 79 inches, in 1966, and smallest amount, 38.7 inches, in 1971.

Currently, all of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering half the original Everglades and the Biscayne aquifer which lies 2 to 100 feet underground.

According to Winn, Southeast Florida's future water shortage problems can be solved now by developing new methods and facilities to capture, store, treat and transport all the rainfall the area receives.

At present the most economically and environmentally feasible alternatives are:

- Desalinization which would involve forcing brackish water in the Floridian aquifer 1,000 feet below the ground through a tightly woven plastic membrane, allowing only water molecules to pass through and keeping bacteria, fungi and salt out.

Until recently this process was considered too costly, but studies have shown the cost would be comparable to that of a chemical treatment plant, Winn said.

This process is not the same as the distillation plant in Key West which takes salt water from the ocean and purifies it. Such plants are more costly to construct and require more energy to complete the purification process than desalinization.

Desalinization is not used by any public water plants. But one West Palm Beach company manufacturing the facility has sold it to area condominiums unable to hook up to city water lines.

Bill Wigglesworth, general manager of the basic water division of Basic Technology, Inc., said the process can produce thousands of gallons of fresh water daily from otherwise unusable water by removing all of the chlorides, chemicals and organics at a cost ranging from 20 to 80 cents per 1,000 gallons.

- Deep well injection, which would require the water management district to pump fresh water into the Floridian aquifer for storage. Because the water in this aquifer is brackish and denser than the fresh water being pumped in, the fresh water would form an impermeable bubble and float on top of the aquifer similar to the way oil floats on water.

The water would remain in the aquifer for a period of up to one year and would be used during Florida's dry season in late fall and winter. One official said there would be some mixing of the waters at the bubble's perimeter, but that the bulk of the water would remain pure. He added that because the water would be pumped into the aquifer under pressure, the water could easily be retrieved by relieving the pressure and letting the water flow freely upward.

- Backpumping, which would allow the water management district to pump rainfall from urban areas to the conservation areas. The main drawback is that it would allow urban nutrients such as chemical sprays and fertilizers to enter the Everglades, possibly causing damage to wildlife and vegetation there.

(Continued on Page 19)

Dwight Goforth, a fisheries biologist with the Florida Game and Fresh Water Fish Commission, said pumping such nutrients into the area would cause an algae boom.

According to Goforth, the algae would draw on the water's dissolved oxygen supply needed by fish, clams and other aquatic species and vegetation.

Winn said any positive or negative effects of backpumping would depend on how the rain water was distributed and how long it remained in the area.

Too much additional water over the breeding grounds of fish could reduce or result in a change of species of fish living in the conservation areas. Vegetation also could be affected depending on the plants seeding and germination periods, Winn said.

Goforth warned that if the water level were not allowed to naturally fluctuate between dry and wet periods, a thick, oozy sediment called detritus would accumulate at the bottom of the water. Detritus is made up of deposits of the remains of dead animals and plants on the floor of the body of water, and the only way to prevent it is to let the area dry completely so that the deposits harden.

If the area is not allowed to dry out, Goforth said the detritus would have to be removed by dredging.

Another drawback of backpumping may be its effects on land animals.

According to Goforth, many Everglades animals such as deer, roundtail rats and snakes depend on the area for food and breeding grounds. A change in the vegetation and a decrease in dry land could kill many of these animals in as little as two or three years.

Also, reducing the amount of fresh water that reaches the ocean may affect bay areas.

"The increased salinity of the water might be good for some species while damaging to others. Fish that don't like the change will migrate to other areas. Bottom sediment and vegetation unable to migrate will either adapt or die," Winn explained.

- Forward pumping, which would bring water east to the coast to be stored in wells and fresh waters canals. If stored in canals, the water would be prevented from entering the ocean by salinity dams. Such dams also would block all boat traffic between the canals and the ocean.

Keeping this high "fresh water head" near the ocean would also help prevent salt water intrusion. Currently, most wellfields are located near the coast to serve populated areas more easily and cheaply. But such a location poses a daily threat of salt water contamination of the fresh water wells.

Because sea water is heavier than fresh water, it tends to move inland below the ground unless balanced by a fresh water head. When an increased demand is placed on a well that is not being replenished either through groundwater

seepage from the Biscayne aquifer or from direct rainfall, the salt and fresh water mix, making the water unfit for human consumption or agricultural use.

Wells in Pompano Beach and Dania currently are experiencing salt water intrusion. When this happens, the amount of water removed from the well must be reduced. Sometimes the well must be shut down until it can rebuild its fresh water supply.

All wells are checked for salt water intrusion twice a month during the dry season and once a month during the wet season by the United States Geological Survey.

According to a geological survey spokesman, Dania has been constantly plagued by the problem.

Julian Allen, Dania utilities superintendent, said the city was forced to shut down two wells at its treatment plant in 1973. Of two wells being used since that time, one has been closed and the other will be as soon as two new wells are built further inland at a cost of \$275,000.

Winn said an important question that will be answered by the wateruse management plan is: does the amount of water control growth, or does growth control the amount of available water?

Peggy Volke, chief planner in charge of Broward County's comprehensive land-use plan, said the water problem in Broward could be managed. "It just depends on how much money people want to put into various facilities," she said.

While the land-use plan was being drafted, Mrs. Volke said it was presented to the water management district for comment.

The district indicated it would approve one draft which set the county's ultimate population at 1.8 to 2 million.

"Beyond this level it would be necessary to augment existing supplies through importation of water from other sources," the district wrote Mrs. Volke.

South Florida Regional Planning Council member Dorothy Bergamaschi agreed that water plays an important role in area planning.

"We have to be careful that we don't seal up a large portion of the land surface with construction so that water can't penetrate and replenish the aquifer.

"Also, if we strip away too much land and replace it with concrete, we won't have the soil to filter out many of the chemicals and wastes before the water reaches the aquifer," Miss Bergamaschi said.

Dick Clark, Florida Industrial Board member, said that before the board contacts industries to invite them to relocate in southeast Florida, it investigates how much water, electricity and space the company would need and whether it would pollute the environment.

(Continued on Page 20)

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Pollution both by individuals and industries also has contributed to the decrease in the fresh water supply.

Despite strict pollution laws, the county's health department warns against bodily contact with any inland waterways.

"Wastewater is dumped into the canals and stormwater runoff carrying pesticides, chemicals and animal droppings also enters canals and lakes. In most cases there is not enough fresh water to dilute the wastewater," said Tom Mueller, a sanitary engineer with the department's environmental division.

Mueller said bacteria counts are taken monthly in the waterways, but "one day the bacteria count could be normal and the next day it could be different. Bodily contact with inland canals poses a risk, especially with hepatitis."

Winn warns that even with all the in-depth planning, a water shortage similar to Southern California's could occur here if the state experienced a drought lasting more than a year.

"The California shortage occurred from a lack of rainfall, not inadequate planning," Winn said.

WATER USE MAY TRIPLE

WEST PALM BEACH — Southeast Florida residents must be willing to make financial and environmental tradeoffs to ensure themselves an adequate supply of fresh water for the future.

The first draft of the South Florida Water Management District water use plan explained several water storage alternatives and costs — both to the consumer and to the environment.

Although no specific recommendations were made, staff members indicated increased water storage in Lake Okeechobee, back-pumping water from coastal area canals to conservation areas, and increased wellfield development are the most viable alternatives.

The district is responsible for water control and management of 16 South Florida counties, including Broward and Palm Beach.

By the year 2020 the district has predicted fresh water consumption will triple from its current rate, requiring 1.6 billion gallons of water to be pumped daily to individuals, industries and farmers.

All of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering 50 per cent of the original Everglades, and the Biscayne aquifer. District officials said these areas won't be able to store the additional water in future years unless some structural changes are made.