

A Solution To Fla.'s Water Problems

Law360, New York (September 20, 2013, 1:54 PM ET) --

Explosive population growth during the late 20th century and continuing into the 21st century has put a serious strain on the traditional water supply sources in Florida. In response to this growing need, Florida's water utilities are forced to seek alternative sources to accommodate future drinking water demands.



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One emerging and accepted source of potable water is treatment by desalination. In fact, Florida leads the country in the use of desalination technology.

Through its comprehensive and progressive permitting process, Florida's regulatory agencies oversee, and in fact encourage, the use of desalination technology to reduce the state's reliance on traditional ground and surface water sources. As a result, more water is available for natural resource and environmental purposes.

Desalination technology may be considered innovative, but only in the sense that it utilizes cutting-edge science to develop potable water from nontraditional water sources. On the other hand, desalination is not experimental, as the technology is well-proven and widely utilized in Florida. Furthermore, Florida's environmental regulatory agencies promote desalination as a viable option for meeting the state's future water supply needs.

Status of Desalination Technology in Florida

Desalination is expected to play an ever-increasing role in meeting the state's future water use needs. With salt water intrusion impacting a greater number of public water supply groundwater wells in Southeast Florida, and an increase in demand from traditional ground and surface water sources throughout the state, Florida must look to alternative sources to meet future drinking water needs.

In fact, a number of areas throughout the state have been designated as areas of critical water supply, water use caution areas, water resource caution areas, and priority water resource caution areas by the state's water management districts.

It was in these areas of limited supply that the first attempts were made to extract freshwater from salt water. Florida's water management districts, charged with permitting and planning water use and water supply, have specifically identified desalination as an alternative water supply necessary to meet Florida's growing water demands.

The technology for producing freshwater from saline sources is well-established. The most common desalination technology, reverse osmosis (RO), produces 96 percent of the nation's desalinated water. Indeed, Florida has "set the pace" for the use of desalination technology in the United States with more than 140 desalination plants with a cumulative capacity of more

than 515 million gallons per day (MGD).

This production of potable drinking water in Florida is more than twice that of the second-highest state, California. However, for the most part, the source water treated at desalination plants in Florida is not saltwater or ocean water, but mainly less salty brackish ground and surface waters.

In 2005, the Florida Legislature created the Water Protection and Sustainability Program to encourage the use of alternative water supplies, including desalination, by making state funds available to the water management districts for alternative water supply construction projects.

During the first three years of the program, 22 percent of the project funds comprised of brackish water desalination projects. Thus, it is clear that not only has Florida recognized a need for alternative water supplies, including desalination, but has provided a financial mechanism to support such projects. Unfortunately, as part of statewide budget cuts, the program was defunded in 2010.

Statewide, there are three seawater desalination plants; two older plants in Key West with a capacity of 3 MGD and the newest plant in Tampa, producing 25 MGD. The Tampa Bay Water plant, the largest seawater desalination plant east of the Mississippi, has sparked tremendous interest nationally and internationally due to its low cost per gallon of water produced.

The Southwest Florida Water Management District (SWFWMD), as part of a public-private partnership, assisted in the development and funding of the Tampa Bay Water plant. The Tampa Bay Water plant is located adjacent to the TECO – Big Bend Power Plant, which helped in reducing the construction and operation costs. Despite some early setbacks, the Tampa desalination plant is considered a model for future desalination projects throughout the country.

Future development and implementation of seawater desalination technology is being studied for application in other areas of the state. For example, the Coquina Coast desalination project in Flagler County is a regional system proposed by the St. Johns River Water Management District (SJRWMD) and a consortium of utilities.

The SJRWMD assisted the utilities with planning and preliminary design of the Coquina Coast plant. With funding through the Water Protection and Sustainability Program discontinued in 2010, the utilities are forced to seek alternative financing arrangements. One option that has been discussed is forming a partnership with a private entity to fund, in whole or in part, construction of the facility.

Additionally, the South Florida Water Management District (SFWMD) recently funded a study to examine the cost savings of co-locating reverse osmosis seawater treatment facilities with existing electric power plants. This co-location creates efficiencies as heated source water originating from the power plant increases the effectiveness of the membranes to extract

freshwater.

The SFWMD study applied this concept to a number of potential sites along the southeast and southwest coast of Florida and narrowed the possibilities to three existing power plant sites. The sites identified were Port Everglades, Fort Lauderdale and Fort Myers with an estimated total plant capacity of 65 MGD.

Based on the numerous examples of successful implementation of desalination technology, and the concerted effort of the state's regulatory agencies to pursue future desalination projects, desalination has been proven to be a feasible and cost-effective technology promoted throughout the state.

General Permitting Rules Applicable to Permitting a Desalination Plant in Florida

The Florida Department of Environmental Protection has jurisdiction over public water supply systems, including desalination plants, producing potable water. However, unlike traditional water treatment plants, desalination plants have unique permitting considerations tied to disposal of the treatment byproduct, the brine concentrate.

In Florida, desalination concentrate is primarily discharged to surface waters, land applied, deep well injected, or discharged to sanitary sewers. For example, the Tampa Bay Water facility discharges its concentrate to surface waters after blending with water from the adjacent power plant.

Chapter 403, Florida Statutes, encourages the development of alternative water supplies using desalination technology. Specifically, Section 403.0882, Florida Statutes, states:

The Legislature finds and declares that it is in the public interest to conserve and protect water resources, provide adequate water supplies and provide for natural systems, and promote brackish water demineralization as an alternative to withdrawals of freshwater groundwater and surface water by removing institutional barriers to demineralization and, through research, including demonstration projects, to advance water and water byproduct treatment technology, sound waste byproduct disposal methods, and regional solutions to water resources issues. In order to promote the state objective of alternative water supply development, including the use of demineralization technologies, and to encourage the conservation and protection of the state's natural resources, the concentrate resulting from demineralization must be classified as potable water byproduct regardless of flow quantity and must be appropriately treated and discharged or reused.

Through Section 403.0882, the Florida Legislature has codified its support for the use of desalination technology.

Pursuant to Chapter 403, Florida Statutes, the FDEP promulgated rules regulating desalination plants and management of desalination brine concentrate. Found in Chapter 62, Florida

Administrative Code, these rules address, among other things, the following issues related to desalination plants:

- Permitting process (Rule 62-4);
- Brine and concentrate discharge to surface waters (Rule 62-4.200);
- Discharge quality and toxicity requirements (Rule 62-4.244);
- Guidelines for testing of receiving waters (Rule 62-246);
- Surface waters and water quality standards (Rules 62-301, 302);
- Groundwater classes, standards and exemptions (Rule 62-520);
- Underground injection control (Rule 62-528);
- Drinking water standards, monitoring and reporting (62-550);
- Reclaimed water blending and land application (Rule 62-610);
- Water quality-based effluent limitations (Rule 62-650); and
- Industrial wastewater facilities (Rule 62-660).

The FDEP also created a streamlined authorization process for small utilities that use a desalination process that present minimal environmental risk.

In addition to permitting through the FDEP, other agencies may have either regulatory jurisdiction or review and commenting authority over desalination plants. These agencies include: U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Coast Guard.

While no specific permit may be necessary from these agencies, it is important to consider their jurisdiction and authority during the initial planning stages of a desalination plant, such as site selection.

To provide further incentives for the use of desalination and other alternative water supplies (AWS), in 2013, the Florida Legislature passed Senate Bill (SB) 364.

SB 364 creates longer duration permits for AWS. The bill requires issuance of a permit duration of at least 30 years, and possibly as long as 37 years, for an AWS facility. An issue faced by some water utilities is that financing companies are reluctant to issue 30-year bonds if the water use permit was not guaranteed throughout the financing period. By extending permit durations for AWS, some of the funding difficulties experienced by water utilities should be addressed.

In sum, it is clear that desalination is well-documented through numerous successful projects as one option to address long-term water supply planning. There are numerous federal and state regulatory considerations when planning and designing a desalination plant. However, the

Florida Legislature has taken steps to support and promote the use of desalination technology as an AWS with certain permitting incentives.

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