

October 2010



Water Resource  
Fact Sheet Series

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### For More Information

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<http://www.dep.state.fl.us/water/waterpolicy/index.htm>

## Desalination

By the year 2025, Florida's fresh water demand is expected to reach about 8.7 billion gallons per day. The state cannot meet its future demand for water by relying solely on traditional ground and surface water sources. Desalination, the removal of salts from seawater and brackish water sources, is one of several alternative water supplies that could help meet the projected increase in demand.

### How Do Desalination Plants Work?

Water desalination can be accomplished by distillation, ion exchange, freezing, and use of membrane technology. In Florida, reverse osmosis, a membrane technology, is by far the most common. The reason is reverse osmosis generally has lower energy costs than the other desalination technologies.

Reverse osmosis uses pressure to force salty water through a semi-permeable membrane that keeps the salt on one side and allows pure water to pass through to the other side. This process creates a salty brine byproduct that must be safely managed to protect the environment.

### Is Desalination Already Being Used in Florida?

Yes. Florida leads the nation in the use of desalination technology, in both the number of facilities using the process (more than 140) and the gallons of potable water produced each day (about 515 million gallons). The majority of source water treated at desalination plants in Florida is not saltwater, but brackish ground and surface waters. Florida has over 100 brackish water reverse osmosis plants, serving mostly the central and southern peninsular portions of the state.

Only a few Florida plants draw their source water from coastal seawater. Tampa Bay Water's desalination facility is the only large-scale reverse osmosis facility in the state using seawater. However, seawater desalination technology is being considered in other areas, such as the Coquina Coast project in Flagler County.

### What Are Some Advantages of Using Desalination?

Brackish water and seawater are readily available in many areas of Florida, potentially creating a large source of potable water after treatment. In addition, the "drought resistant" nature of desalination makes it an attractive alternative to those water sources that rely on rainfall.

## Why Isn't Desalination Used More Widely?

One reason seawater desalination is not used more widely is its relatively high cost. It probably will not be used on a large scale in Florida as long as less expensive options are available and capable of meeting demand. Still, modifications of the traditional reverse osmosis process, including more energy efficient pumps, longer lasting membranes, and blending with other technologies, such as distillation, are reducing the costs of desalination. As it becomes more cost competitive, desalination likely will become more common.

Another consideration is the quantity of water than can be produced. Even though Tampa Bay Water's facility is the largest seawater desalination plant in North America, it can currently produce only 25 million gallons a day (mgd) at full capacity. This amount is only a portion of the 182 mgd of water needed by the utility.

## What Are the Environmental Concerns Related to Desalination?

Environmental concerns limit the places where seawater desalination plants can be located. The brine remaining after drinking water production must be disposed of by deep well injection or by diluting the brine before returning it to the environment. Otherwise, the increased salinity can cause significant damage to sea grass, shellfish beds, and other estuarine species adapted to lower salinity.

Locating desalination facilities at or near existing coastal power plants can minimize environmental impacts. This can occur when the brine is diluted with power plant cooling waters in areas with sufficient tidal flushing to wash the byproduct out to sea. In addition, co-location can reduce energy needs, capital cost, and operational costs.

Another environmental concern is desalination's contribution to climate change. Desalination technologies have greater energy consumption and associated greenhouse emissions compared to traditional water supplies. As the salt content of the source water increases, there is a proportional increase in the energy usage and greenhouse gas emissions.

## Where Can I Get More Information?

Recently, DEP published a report on desalination that examined available desalination technologies, analyzed existing desalination projects in Florida, and recommended ways to effectively implement desalination in an environmentally safe and cost-effective manner. The report is available at: <http://www.dep.state.fl.us/water/docs/desalination-in-florida-report.pdf>.