Desalination in South Florida – Frequently Asked Questions

What is desalination?

Desalination removes dissolved substances in groundwater, seawater and municipal wastewaters making water fit for human consumption, irrigation, industrial use and other purposes. In the past, distillation was the most widely used desalination process, but use of electrodialysis and particularly reverse osmosis, is increasing. Electrodialysis retains clean water and allows salts to pass. Reverse Osmosis (RO) purifies saltwater by forcing it through semi-permeable membranes, allowing water to pass but retaining the impurities of heavy metals and compounds such as lead and nitrates called concentrate or reject that must be safely disposed. The filtered water is so pure that it must be post-treated and blended with other sources for potable supply.

What is the difference between brackish water and seawater?

The primary difference between these two sources of water is in the amount of dissolved salts. Seawater contains higher amounts of dissolved salts (from 15,000 milligrams per liter (mg/l) to over 35,000 mg/l of total dissolved solids). Brackish water has 1,000-15,000 mg/l. The greater the salt content of the water, the higher the pressure or electric power needed to treat water using membranes, resulting in higher energy costs.

Why is desalination an important issue in Florida?

With more than 120 desalination plants in Florida, our state leads the nation in desalination. Texas has 38, California, 33. Florida leads because the water underneath, east and west of the peninsular is salty. The increasing demand for water, coupled with the state's vulnerability to drought events, compel water planners to consider all alternatives. The 2001 and 2007 droughts stressed surface water systems, but seawater sources are not affected by drought.

How does everyone benefit from seawater desalination?

Desalination benefits everyone in Florida through diversification of our choices. Treating seawater to serve coastal Florida reduces competition with the Everglades initiatives and relieves dependence on existing conventional surface water and groundwater supply sources. Using seawater by coastal residents could increase availability of surface water for water users located away from the coast. Consequently, seawater desalination can indirectly benefit people who live farther away from the coast.

How does desalination affect the environment or climate change?

Environmental Protection Agencies have specific guidelines that must be followed by builders of desal facilities to avoid harmful effects to environments. Environmental impact studies are conducted to identify, investigate and issue recommendation regarding possible impacts of disposing waste on land, air, and water. In the recently completed Tampa Bay seawater project, monitoring has shown no significant impacts on fauna and flora. Highly concentrated salts, the major by-products of desalination, can be safely disposed using best management practices. Desalination does not substantially affect climate change because its activities are insignificant compared to others. Advances in

energy recovery devices and low pressure RO systems are substantially reducing power demand and the carbon footprint.

How much does desalination cost?

Advancements in reverse osmosis technology have brought desalination costs closer to other alternatives. Ten years ago, desalinated water cost more than $9 per 1000 gallons, but today, the range is $2 to $5 per 1000 gallons. Israel's world-largest desal water costs about $2 per 1000 gallons and the recently completed 25 MGD Tampa Bay plant produces water at about $3 per 1000 gallons. The cost depends on whether the source water is brackish groundwater or seawater. Brackish water desalination costs less than seawater desalination because it contains less dissolved salts. The total costs also depend on the amount of pre-treatment and post-treatment needed. Because of available grants, subsidies and innovative financing, the costs are not entirely passed to the end user.

Some pros and cons of water desalination

Pros

- Provides a dependable, drought-proof source of water
- Provides an alternative that could allow other stressed water sources to recover.
- Prevents water "wars" and addresses the state legislation for source diversification
- Provides the way of the future either for potable or wastewater treatment due to advancing technologies and the associated reduction in costs
- Provides high quality water
- Saves construction of future dams and reservoirs.

Cons

- Still more expensive than traditional sources due to high energy consumption
- Concentrate or waste brine from the desal process is an environmental concern
- Intakes and discharge points may present harm to marine life
- Permitting desal plants is still difficult

Does the District support or fund desalination projects?

The District's Regional Water Supply Plans have recognized desalination as an economically viable method and support it through the Alternative Water Supply Grant Program. Other state grant programs, federal appropriations and private/public partnering may be used to fund desalination projects.

How many brackish and seawater desalination plants are currently in operation in Florida?

Florida has more than 130 desalination plants. In the SFWMD, there are about 26 facilities using brackish water and reverse osmosis treatment with a total capacity of over 140 MGD. In addition, there is over 120 MGD of RO capacity under construction within our District. Statewide, there are three seawater desalination facilities, the two oldest in Key West with a capacity of 3 MGD and the newest in Tampa producing 25 MGD.

Are there plans to build more desalination plants in Florida?

Every fiscal year, the District receives applications for new desalination facilities. Regarding seawater, the District completed a feasibility study in December 2006. The

study identified three locations where seawater treatment facilities could be co-located with electric power plants to take advantage of abundant plant cooling water and existing intake and discharge facilities. Utilities are considering moving forward more thoughtfully and deliberately, in view of the experience gained from the new Tampa Bay seawater plant.

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