

Surface spreading of the brine discharge from the seawater reverse osmosis plants: Hamma Water Desalination plant in Algeria

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ABSTRACT

In a contrasting background of declining renewable water resources and increasing demand for drinking water, recourse to seawater desalination appears an attractive alternative to explore. The main role of a seawater desalination plant is therefore to ensure drinking water that meets sanitary norms while causing the least harm to the marine environment. The Hamma Water Desalination (HWD) plant in Algeria has attracted our attention as it drains 500,000 m³/d of seawater on which 300,000 m³/d is being discharged as brine into the shallow water of the Algiers bay at ~8 m water depth. The study deals with monitoring the plant's outfall surrounding area using the satellite images provided by Google Earth Pro software. The horizontal spreading on the water surface caused by the brine jet was tracked over time, and its behavior was analyzed using image processing at different marine conditions. This investigation thus provides a better understanding of the complex behavior of free surface spreading of brine discharges in shallow waters. In this regard, environmental conditions have a significant impact on the horizontal spreading on the water surface, which may affect the dilution process. Based on the satellite observations, this investigation suggests making changes to the design of the HWD plant outfall or replace it with a modern discharge system.

Keywords: Outfall; Brine discharge; Desalination; Satellite imagery

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