



Simulation of brine discharge near sea farms in the Korea Strait

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ABSTRACT

Seawater desalination is a solution to water shortage problems for expanding coastal cities. However, seawater desalination leads to the discharge of brine into the coastal area. Brine of 60 psu in salinity might have an impact on the coastal ecosystem and environment. Accordingly, careful attention must be paid to determine the location of the outfall, especially as there are sea farms widely distributed along the Korean coast. In this study, the horizontal spreading of brine from different outfall positions was simulated using a three-dimensional circulation model to predict exactly the area affected by the brine. Model results showed that the brine spread offshore along the bottom layer as a result of its dense properties. It was found that the minimum distance of the outfall from the coast should be 0.5 km to avoid impact of salinity increase on sea farms and the coast within 0.5 psu. An alternative is dilution of the discharge by mixing with freshwater. If the salinity of the discharge is less than 40 psu, there would be little change in salinity for neighboring sea farms in this study.

Keywords: Seawater desalination; Brine discharge; Outfall position; Three-dimensional circulation model; Mixing

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