

A review of harmful algal blooms (HABs) and their potential impacts on desalination facilities

Ghazay F. Alotaibi^{a,*}, Rashed S. Alasmari^b, Abdullah N. Alzowaid^c

^aSaline Water Desalination Technologies Research Institute, P.O. 8328 Al-Jubail 31951, Saudi Arabia, email: DAlotaibi@swcc.gov.sa

^bGeneral Management of Production Affairs, Saline Water Conversion Corporation, P.O. 5968 Riyadh 11432, Saudi Arabia, email: RAl-Asmari@swcc.gov.sa

^cDeputy Governor for Production and Transportation Affairs, Saline Water Conversion Corporation P.O. 5968 Riyadh 11432, Saudi Arabia, email: Aalzowaid@swcc.gov.sa

Received 13 October 2021; Accepted 8 February 2022

ABSTRACT

Arid countries throughout the world are massively reliant on seawater desalination for their supply of drinking and municipal water. Harmful algal bloom (HABs), frequently referred to as ‘red tides’ due to their vibrant colors are predicted to grow in recurrence and distribution in the coming years where numerous desalination facilities will become increasingly susceptible to damage or shutdown during HAB events. Such a phenomenon, one of the operational challenges facing the industry, can cause significant operational issues that result in increased chemical consumption, increased membrane fouling rates, and in extreme cases, a plant to be taken off-line due to the high biomass of microalgae and a variety of substances that some of these algae produce. Hence, understanding the HABs’ nature, their challenges, and ways in which they can be monitored, treated, and mitigated will allow engineers and operators to address HAB hazards and maintain the integrity of new and existing desalination facilities.

Keywords: Desalination; Harmful algal bloom; Red tide; Algal toxins; Dissolved air flotation

* Corresponding author.