Desalination and Water Treatment
www.deswater.com
33 (2011) 267–272
September
1944-3994 / 1944-3986 © 2011 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2011.2651

Impact of desalination byproducts on marine organisms: A case study at Chuja Island Desalination Plant in Korea

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Received 30 November 2010; Accepted in revised form 28 March 2011

ABSTRACT

Desalination of seawater has become an important and growing industry due to the present water shortage in the world. However, the desalination may result in environmental impacts, mainly derived by the discharge into adjacent coastal waters of brine and additives produced during the desalination processes (e.g., biocides and membrane cleaning chemicals). To measurement of environmental impact by desalination, we approached environmental impact assessment (EIA) procedure [1] for the desalination plant of Chuja Island in South Korea. We conducted a series of marine bioassays using three phytoplankton, rotifer, benthic copepod and one fish species for source water, discharged brine waters and chemical additives. There was no significant toxicity of brine discharge on tested organisms but high toxicity was found at the chemical additives as chlorine and membrane cleaning chemical. In terms of the habitat susceptibility it is located in relatively insensitive habitat, open rocky shore with gravel bottom. Based on these results, even the environmental impacts by Chuja desalination plant were not significant currently, monitoring strategies have to be established and conducted to estimate long-term effects from desalination in marine ecosystem such as hard-bottom benthic monitoring along the shorelines of brine discharged area and toxicity estimation of byproducts and chemical additives using local representative marine species.

Keywords: Desalination; Environmental impact assessment; Toxicity; Phytoplankton; Zooplankton; Fish; Habitat susceptibility; Chuja Island desalination plant

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