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Aspects of environmental impacts of seawater desalination: Cyprus as a case study

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ABSTRACT

Cyprus relies on seawater desalination for a large part of its drinking water supply, with reverse osmosis providing more than 95% of the total desalination capacity in the country. Nevertheless, the environmental impacts of desalination for the Cypriot environment remain poorly understood. Using a combination of mining existing governmental and corporate survey data and reports, this study explores the scale of desalination in Cyprus, the impacts on the coastal marine environment and its overall carbon footprint. Surveys of *Posidonia oceanica* seagrass meadows show strongly reduced density of shoots and leaf surface area, respectively. Analysis of the available data relating to the overall production of desalinated water and energy consumption reveals that 68.7 million m³ of desalinated water were produced in Cyprus in 2017, resulting in the release of 160 ktons of CO₂ equivalent, representing around 2% of the total carbon emissions in Cyprus. The results are directly applicable for understanding the impacts of brine discharge on seagrass meadows, one of the most common types of Mediterranean seabed ecosystems and useful for providing guidance to decision makers as they are striving to achieve a zero-carbon economy. Strategies for achieving greater sustainability in terms of reduced CO₂ emissions and less brine discharge are discussed.

Keywords: Cyprus; Brine; Carbon footprint; Desalination; *Posidonia oceanica*; Seagrass

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