

Sydney's desalination discharge boosts fish life in time of climate uncertainty

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Desalination outlet fish life. Credit: McLennans Diving Service

In a time of global climate uncertainty and growing populations, reliance on alternative sources of drinking waters is ever-increasing. New research, led by Southern Cross University, has found an unexpected benefit at the Sydney Desalination Plant: the excess salty water discharge attracts lots of fish.

Lead researcher, Professor Brendan Kelaher from the University's National Marine Science Centre, said there was an almost three-fold increase in [fish](#) numbers around the desalination discharge outlet.

"There was a 279 percent increase in fish life. It is an important result, as large-scale [desalination](#) is becoming an essential component of future-proofing the [water](#) supplies of major cities, such as Sydney, Perth, and Melbourne," Professor Kelaher said.

"With growing populations and climate uncertainty, water security has become a global concern. Desalination is one way to help shore up water supplies in many parts of the world."

The seven-year study was jointly conducted by Southern Cross University and the University of New South Wales both before and after Sydney Desalination Plant's initial start-up in 2010, as well during a period when the plant temporarily ceased operations.

The results "Effect of Desalination Discharge on the Abundance and Diversity of Reef Fishes" are published today (December 19) in the journal *Environmental Science & Technology*.

"At the start of this project, we thought the hypersaline brine would negatively impact fish life. We were both surprised and impressed at the clear positive effect on the abundance of fish, as well as the numbers of fish species," Professor Kelaher said.

"Importantly, the positive effects on fish life also included a 133 percent increase in fish targeted by commercial and recreational fishers.

"As to why fish like it so much, we think they might be responding to turbulence created by dynamic mixing associated with the high-pressure release of the brine. However, more research is needed."

The Sydney Desalination Plant, one of the largest in the world, was restarted in January 2019 due to the ongoing drought and below-average rainfall across catchments. It produces up to 15 percent of Sydney's drinking water with the potential for future expansion.

The plant uses reverse osmosis to convert salty seawater into fresh drinking water. This process results in massive amounts of hypersaline brine discharged 300 m offshore.

"Supporting growing populations in coastal areas will require infrastructure development," Professor Kelaher said.

"Like the Sydney Desalination Plant, we should design these assets to not only minimize environmental impacts but also capitalize on opportunities for habitat enhancement."

More information: Brendan P. Kelaher et al. Effect of Desalination Discharge on the Abundance and Diversity of Reef Fishes, *Environmental Science & Technology* (2019). [DOI: 10.1021/acs.est.9b03565](https://doi.org/10.1021/acs.est.9b03565)

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