

Sea lions fuel ocean life

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Sea lions. Credit: SATC

Like whales, sea lions are contributing to marine ecosystems in the most fundamental way possible, research by a Flinders graduate has found.

Dr. Trish Lavery, who established that Southern Ocean [sperm whales](#) offset their [carbon emissions](#) by defecating iron on phytoplankton, has found that the digestive mechanisms of Australian sea lions mean that they too are making vital nutrients available to the first tier of the [marine food chain](#).

Her research, published in the Public Library of Science journal [PLoS ONE](#), found that the sea lion gut has a characteristic microbiome, or bacterial profile, that is high in types of bacteria able to metabolise iron

and phosphorus.

“While bacteria are net consumers of nutrients in energy-poor environments, in nutrient-rich environments like the surface of a faecal particle, bacteria can make soluble more vital nutrient elements from faecal matter than they require for their own growth,” Dr Lavery said.

“This leads to leaching of these nutrients into the surrounding waters where they can become available for free living phytoplankton microbes.”

Dr. Lavery said the sea lions may therefore help to keep nutrients where they can be incorporated into the food chain.

“The bacteria in Australian sea lion faeces may limit nutrient sinkage to depth and enhance the persistence of nutrients in the photic zone where they are available to support primary production by phytoplankton.”

And for creatures whose cold marine environment makes a layer of protective fat a valuable asset, Dr Lavery also found evidence that the metabolism of sea lions is actually geared towards obesity.

Her study found a ratio of crucial bacteria similar to that in previous studies of obese humans and obese mice.

“This suggests that the gut microbiome may confer a predisposition towards the excess body fat that is needed for thermoregulation within the cold oceanic habitats foraged by Australian [sea lions](#),” she said.

Provided by Flinders University

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