

Can fishing in the Ross Sea be sustainable?

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Humans have removed 90% of the big fish from every ocean in the planet, except for the Southern Ocean, especially the Ross Sea. But that may be changing. Since 2003, the largest (more than twice as big as the next species) fish in Antarctica is being removed from the Ross Sea. That fish is the Antarctic toothfish, usually sold as Chilean seabass. The fishery target is to reduce the total number of adult toothfish by 50% over a 35 year period.

Is the fishery affecting the Antarctic ecosystem? If so, how, and by how much? A team of researchers, led by Point Blue Conservation Science, sought to answer these questions by focusing on the potential impact of the fishery on a toothfish predator, the Weddell seal.

Weddell seal mothers may lose as much as 40% of their body mass while nursing their pups. To breed again, they must recover this mass. How quickly they recover is also correlated with the chances their pup survives and reaches adulthood, all of which eventually affects seal population numbers.

Besides being the largest fish in Antarctic waters, toothfish is also among the most energy-rich. Because of these two factors, it has been suggested that toothfish may be critical for mass recovery in mother seals.

Using all the scientific evidence available, the team constructed a model to determine how much energy the seals must consume during the recovery period to maintain population numbers. That model was coupled with a simulation of prey consumption to establish the role of toothfish in sustaining seal populations.

The results show that some consumption of toothfish is paramount for Weddell seals to maintain a stable population numbers. There are substantial reasons to expect that Weddell seal populations are already severely impacted by the fishery. Findings also suggest that the fishery may be sustainable at lower extraction rates.

This research highlights areas of critical importance for further study and monitoring to ensure that the fishery is managed sustainably. Important and

feasible metrics to monitor include seal population numbers, breeding propensity, diving effort, and toothfish consumption rate.

Main Points

- Weddell seals may not recover sufficiently from nursing their pups without toothfish, the largest and among the most energy-dense fish in Antarctic waters.
- The toothfish fishery is likely already adversely affecting seal populations.
- The fishery may be sustainable at lower extraction rates.
- Monitoring of seal populations is important to ensure this fishery is sustainable.

Salas, L., N. Nur, D. Ainley, J. Burns, J. Rotella, and G. Ballard (in press). Coping with the loss of large, energy-dense prey: A potential bottleneck for Weddell Seals in the Ross Sea. *Ecological Applications*.
<http://onlinelibrary.wiley.com/doi/10.1002/eap.1435/full>