

Semi-Closed Containment Systems: A possible solution for reducing particulate organic pollution from Norwegian salmon farms



SCAN ME

Nutrient Waste from Salmon Farms

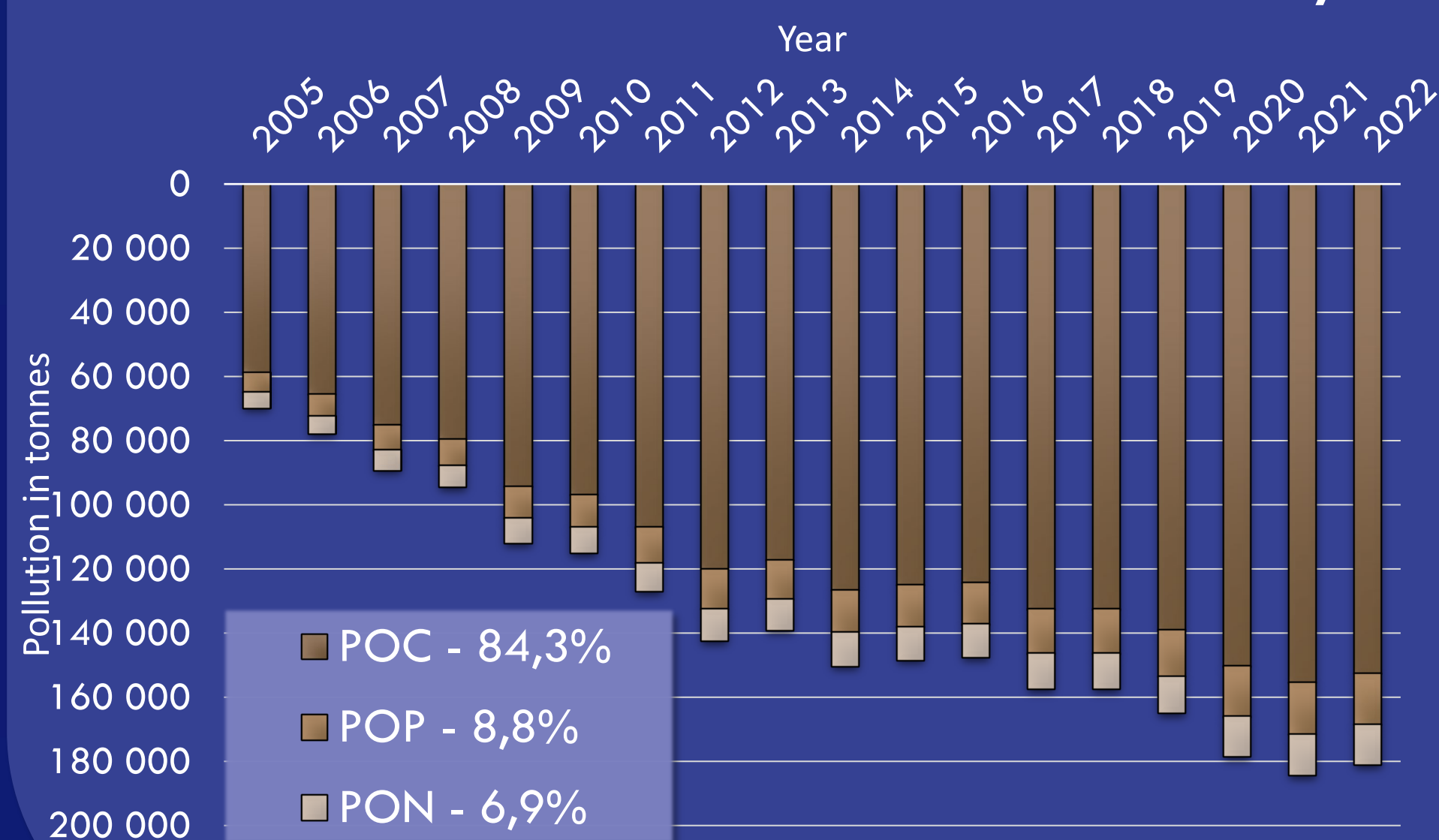
Salmon farms emit a significant amount of nutrient waste. This pollution can have adverse consequences on both local and regional ecosystems.

Carbon (C), Nitrogen (N), Phosphorus (P)
Particulate Organic C, N, P (POC, PON, POP)
Dissolved Organic C, N, P (DOC, DON, DOP)
Dissolved Inorganic N, P (DIN, DIP)

How much do salmon farms pollute ?

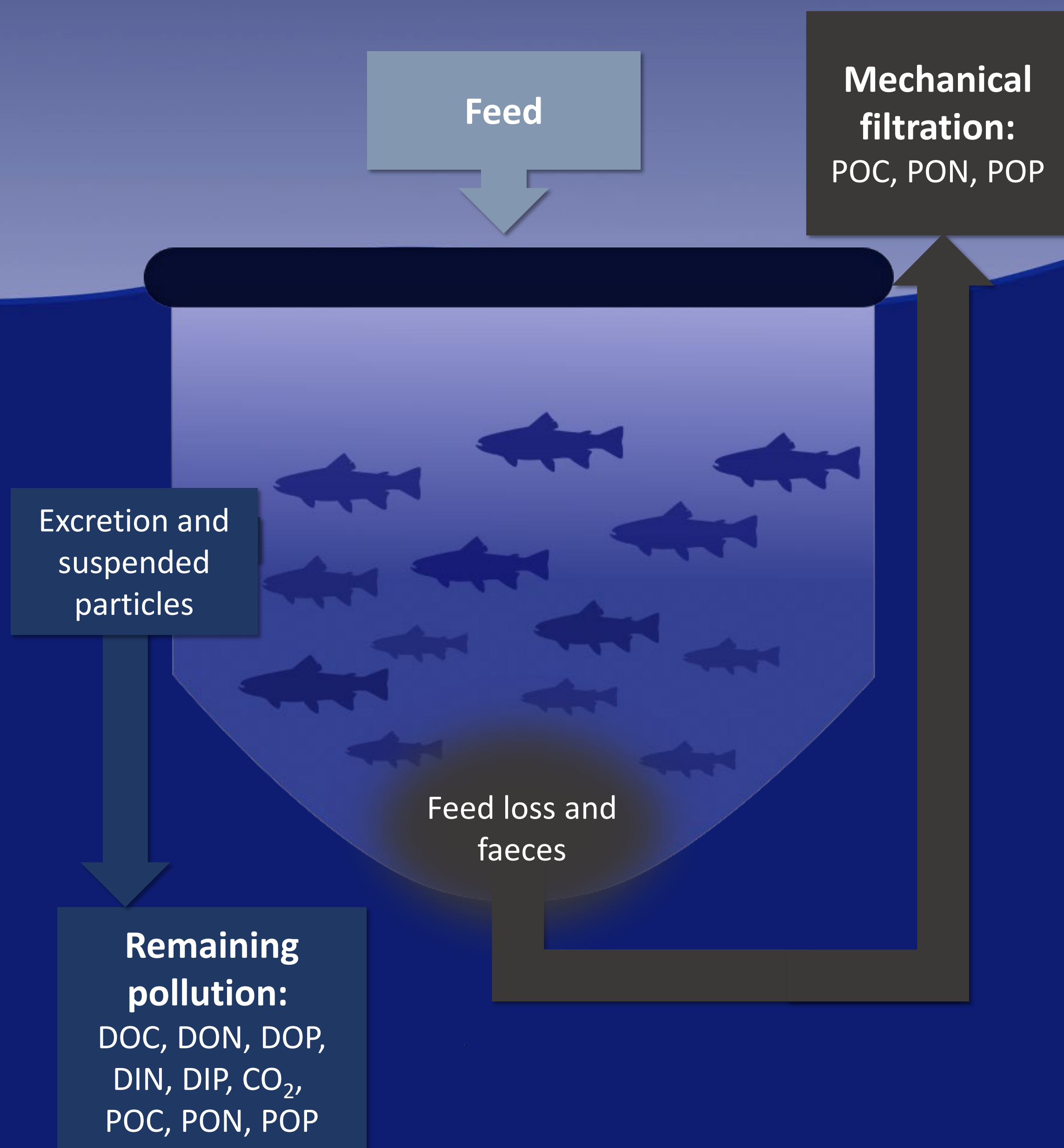
Based on feed data¹ we calculated² the Particulate Organic Matter (POM) pollution from salmon farms in Norway between 2005-2022.

Total POM from salmon farms in Norway



Semi-Closed Containment Systems (S-CCS)

Unlike traditional open net pens, S-CCS employs enclosed barriers to capture particulate organic pollution. However, it currently filters only a portion of solid waste, allowing some nutrient waste to enter the surrounding water column.



The Potential for Reducing Particulate Organic Pollution with S-CCS (2022)

The filtration capacity of S-CCS varies with design, technology, and filtration methods. We explore three potential reduction scenarios with filtration rates of 40%, 60%, and 80%, based on the numbers from 2022.

Possible reduction with S-CCS	Released POM (tonnes)
S-CCS remove 40% of particulate waste	108 625,38
S-CCS remove 60% of particulate waste	72 416,92
S-CCS remove 80% of particulate waste	36 208,46
Control, no particulate waste removed	181 042,29

S-CCS mitigate the environmental impact of salmon farms by removing a portion of POM, providing a valuable resource that may be utilized for biogas production or as fertilizer.



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References:

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- Wang, C. and Olsen, Y. (2023) 'Quantifying regional feed utilization, production and nutrient waste emission of Norwegian salmon cage aquaculture', *Aquaculture Environment Interactions*, 15, pp. 231-249.