

# Interspecific and Temporal Patterns of Environmental Contaminants in Eggs from Four Seabird Species at Sable Island, Nova Scotia, Canada

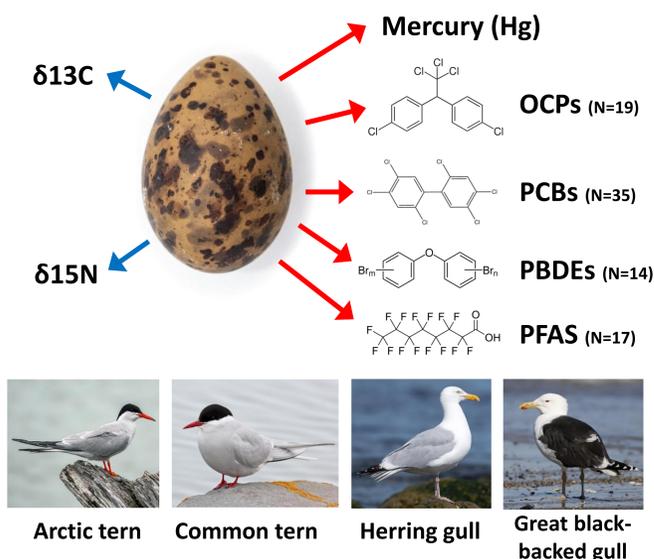
## INTRODUCTION

- **Chemical pollution** is a leading threat to humans, ecosystems, and wildlife.
- **Seabirds** are good models for **monitoring** chemical pollution in the marine environment as they are long-lived, feed at high trophic levels, and **transfer** pollutants to eggs.
- **Sable Island** is a remote island and has been used as a long-term contaminant monitoring site by ECCC.
- Previous studies have found that herring gull eggs from Sable have had **higher average mercury (Hg)** concentrations compared to other Atlantic study sites<sup>[1]</sup>, and **high total perfluoroalkyl substances (ΣPFAS)** concentrations compared to other marine sites across Canada<sup>[2]</sup>.

**Objective:** Compare **interspecific** and **temporal** patterns of contaminants in the eggs of 4 seabird species sampled between 2012 and 2025.

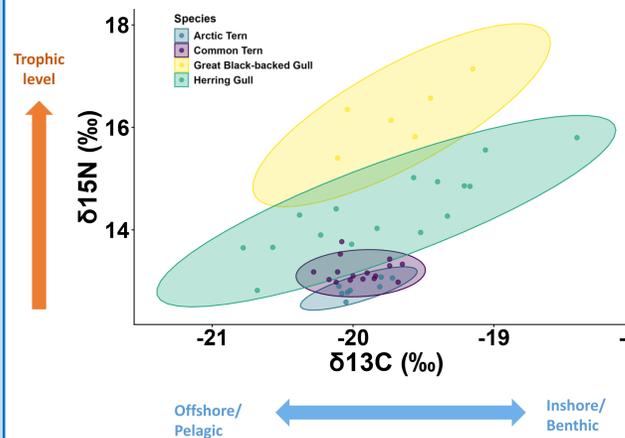
## METHODS

- **15 eggs** from **each** study species were collected in **2012 and 2025**.
- Eggs were analyzed for major contaminants and the stable isotopes  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  to investigate links between foraging ecology & contaminant exposure.

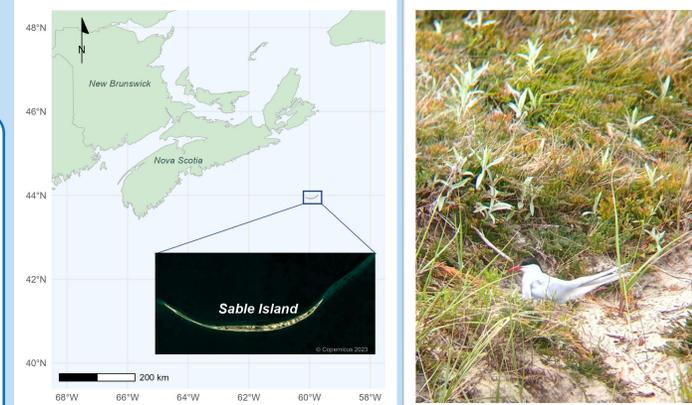
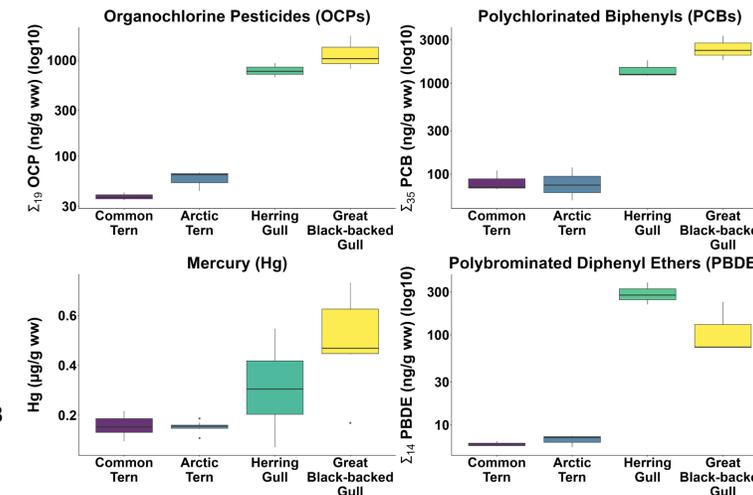


## RESULTS

Stable isotope plots (2012) show evidence of niche partitioning . . .



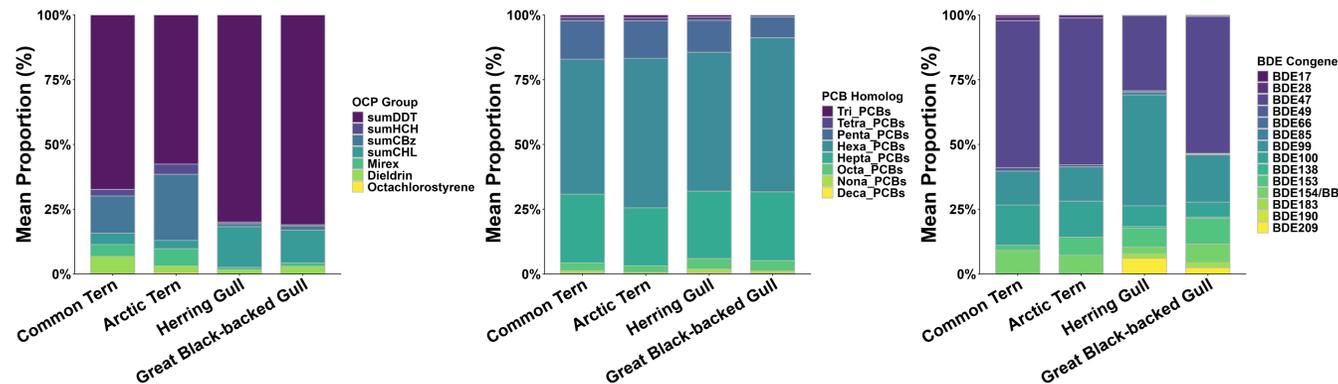
Which is reflected in 2012 contaminant loads



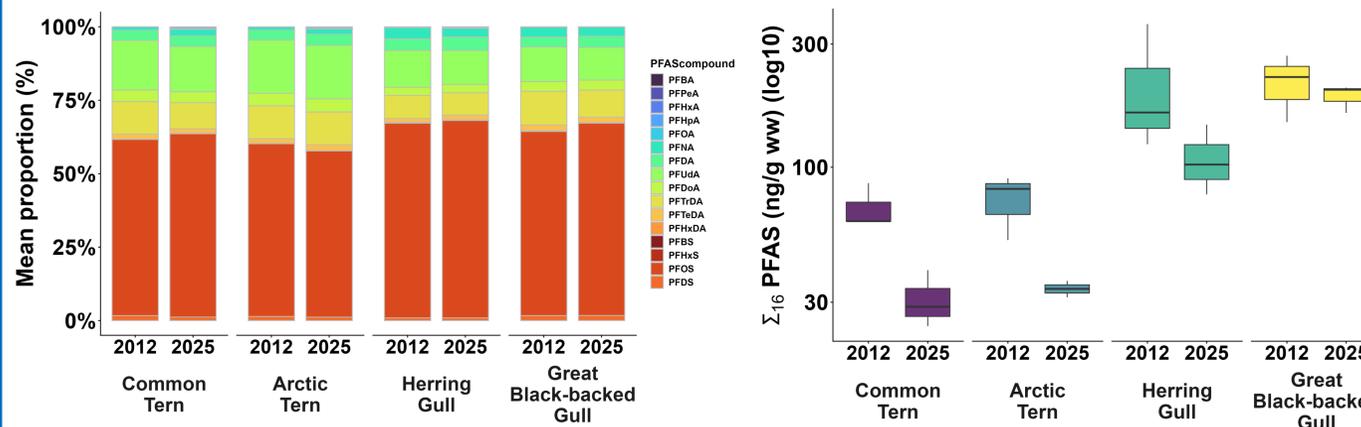
## DISCUSSION

- The high DDE: DDT ratio in all eggs indicates most of the  $\Sigma\text{DDT}$  at Sable Is. is from legacy sources. DDE concentrations in all eggs were below proposed toxicity thresholds<sup>[3]</sup>.
- The high levels of penta-, hexa-, and hepta-chlorinated PCB congeners align with the past production of Aroclor products in Canada. The patterns observed for PCBs (and OCPs) align with trends previously observed in egg contaminant studies<sup>[4]</sup>.
- Herring gull eggs had the highest  $\Sigma\text{PBDE}$  concentrations. The generalist diet of herring gulls, coupled with their higher intake of fish<sup>[5]</sup> compared to black-backed gulls, could explain part of this unique trend.
- **PFAS showed a decrease over the study period.**
  - Could **aqueous fire-fighting foams** from nearby offshore gas platforms explain the unusually high  $\Sigma\text{PFAS}$  levels on Sable?

Contaminant profiles in eggs can lead to a better understanding of seabird exposure:



Temporal data sets allow for the investigation of change over time:



## NEXT STEPS

- Awaiting stable isotope, OCP, PBDE, Hg, & PCB data from 2025 egg collections.
- Model building and post-hoc statistical analysis.

## ACKNOWLEDGEMENTS

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References  
 [1] Burgess NM et al. 2013. Environ Pollut. 172:216–222.  
 [2] Gebbink WA, Letcher RJ. 2012. Environ Pollut. 162:40–47.  
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 [4] Kesic R et al. 2024. Env Pol. 363:125099.  
 [5] Chen D et al. 2012. Env Pol. 168:1–9.