



# DRASTICALLY DIFFERING WINTERS MODIFY ICE QUALITY AND UNDER-ICE THERMAL HABITAT AND PRODUCTIVITY IN LAKE SIMCOE

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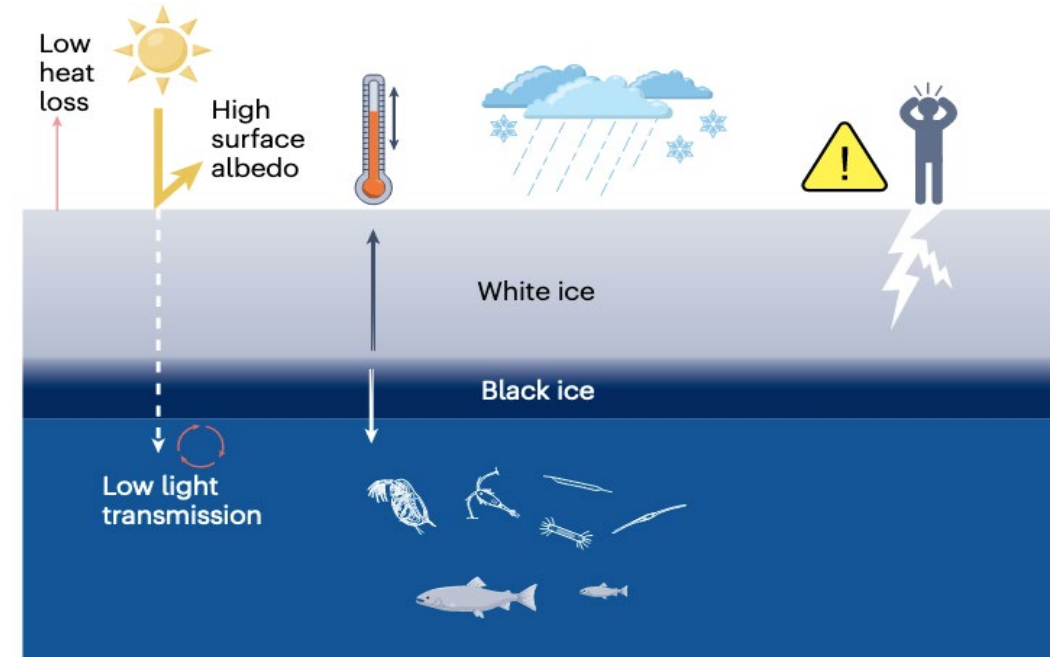
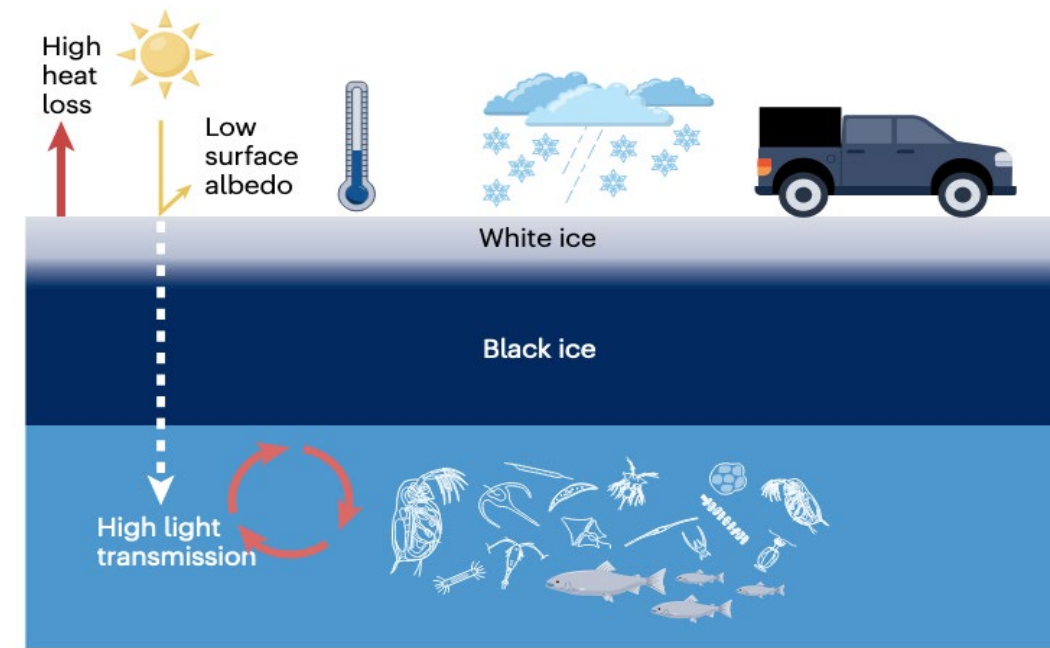
# Thank you!

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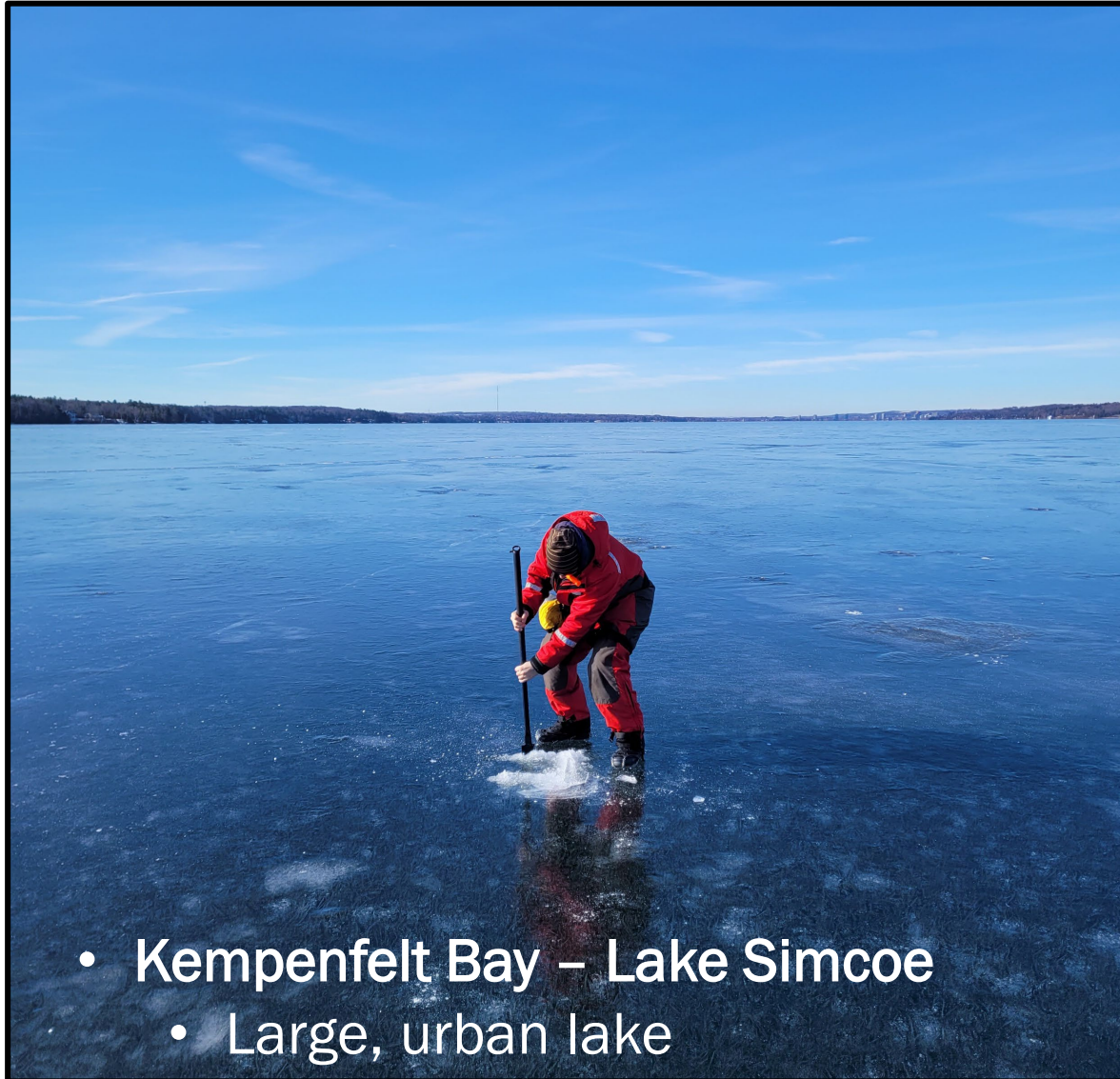


# Warming winters are changing our relationship to ice cover

- White ice may weaken ice cover
  - Human safety implications
- White ice has a higher albedo
  - Biogeochemical implications
- **Research Question:** How does winter hydroclimate variability impact ice quality and under-ice water quality conditions?

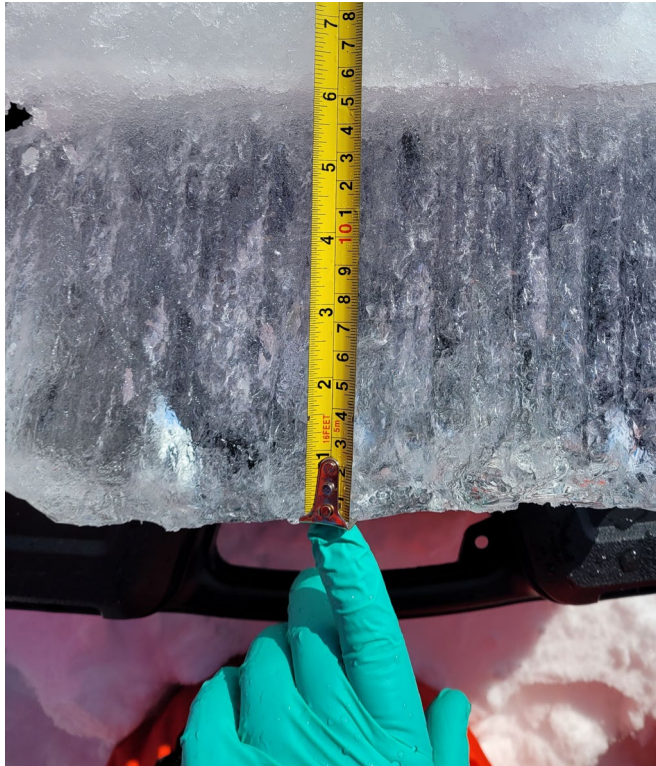


# We sampled ice quality and under-ice water quality variables during a warm, dry year (2024) and a cold, snowy year (2025)

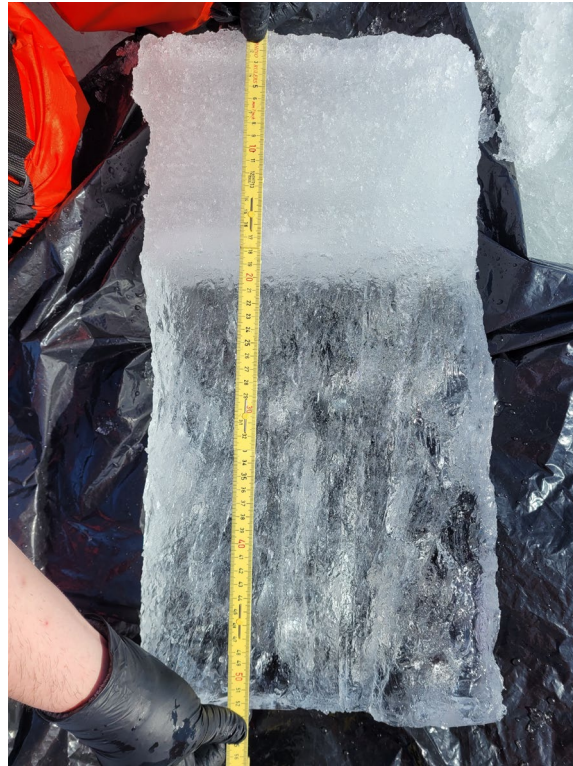


# Lake ice thickness significantly thinner during the warm year

Kempfenfelt Bay – Lake Simcoe

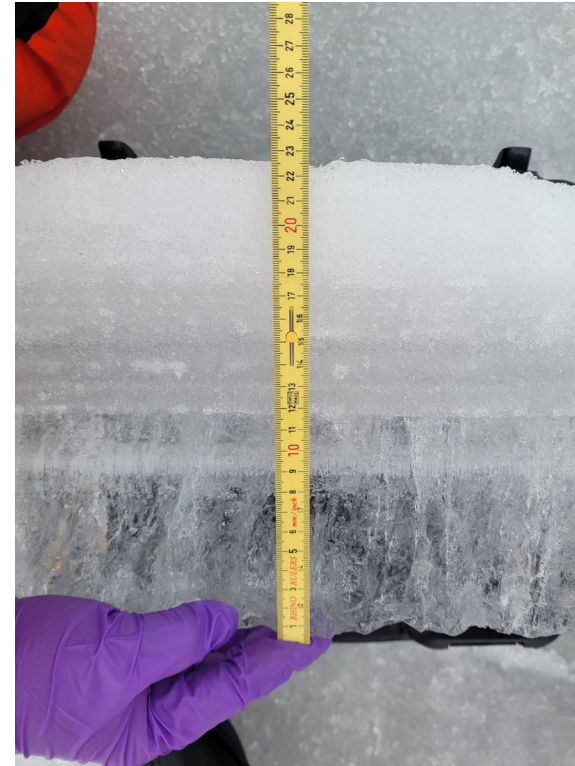


Feb. 20, 2024  
15 cm



Mar. 10, 2025  
52 cm

Paint Lake – Deep Site



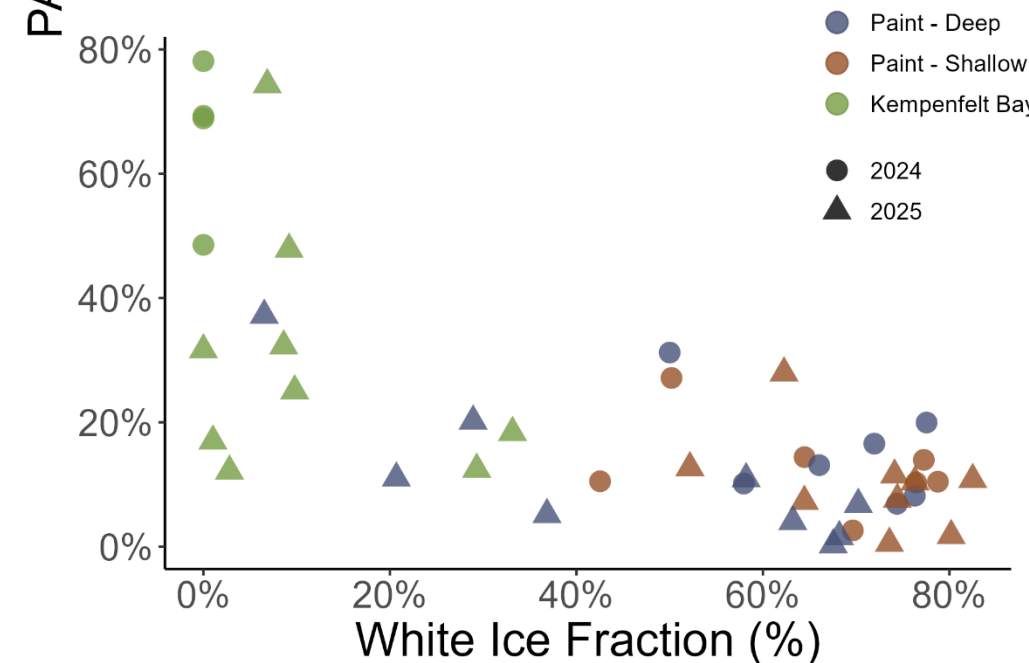
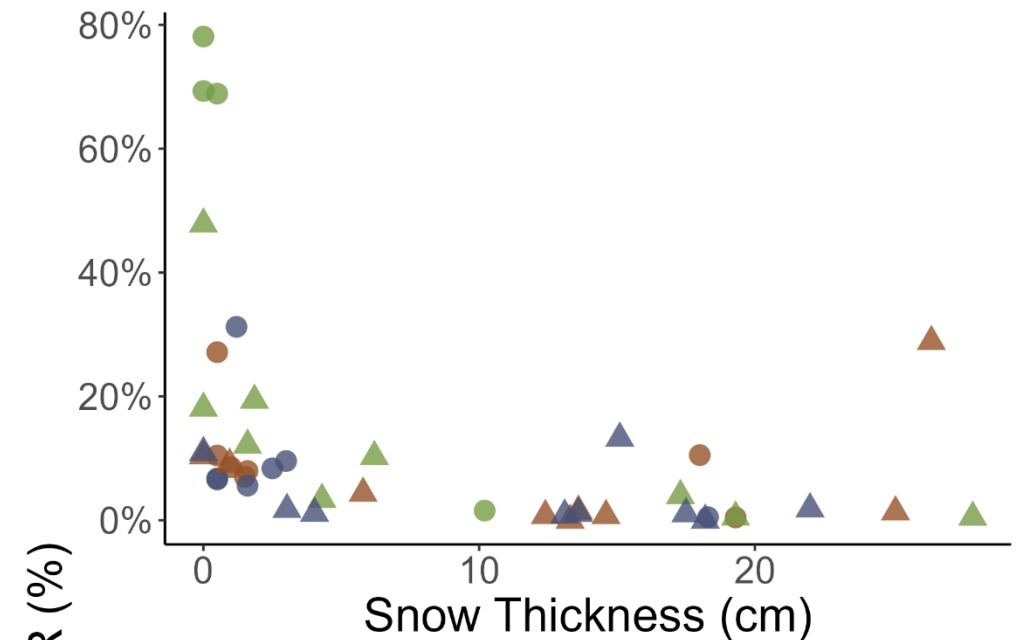
Mar. 06, 2024  
22.5 cm



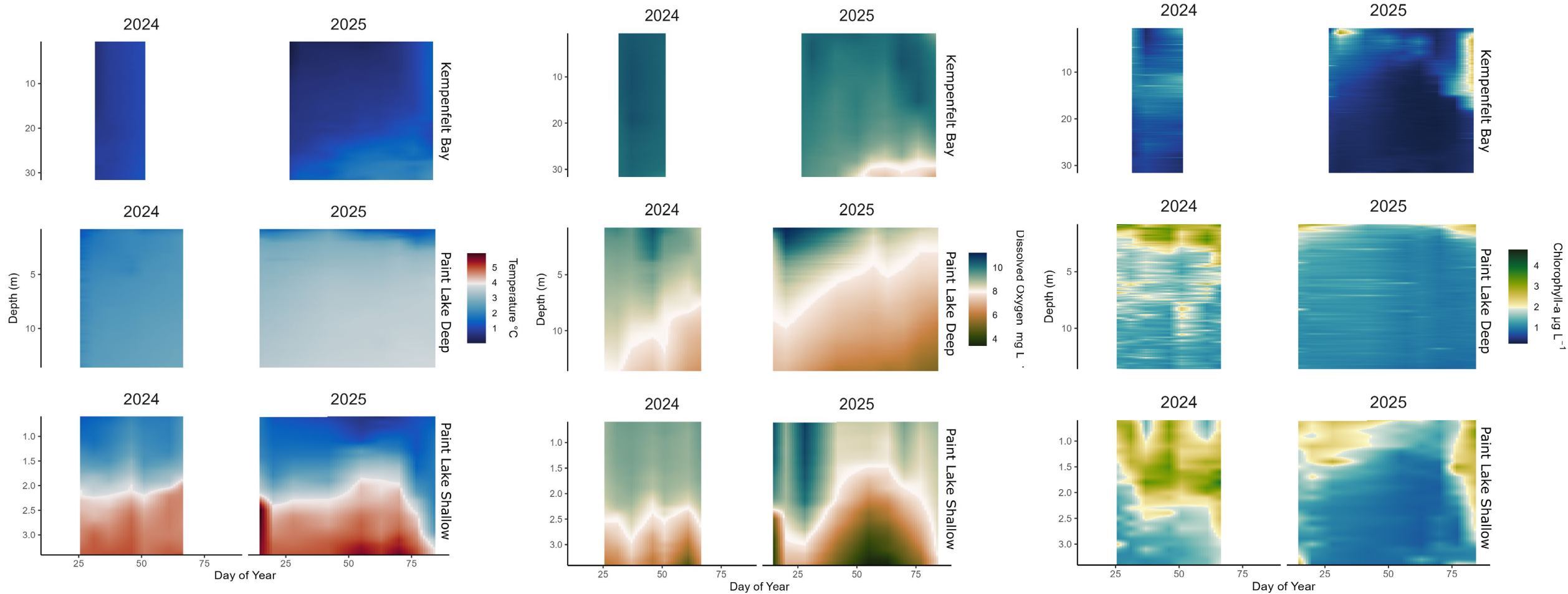
Mar. 11, 2025  
51 cm

# Snow cover strongest limiter of photosynthetically active radiation (PAR)

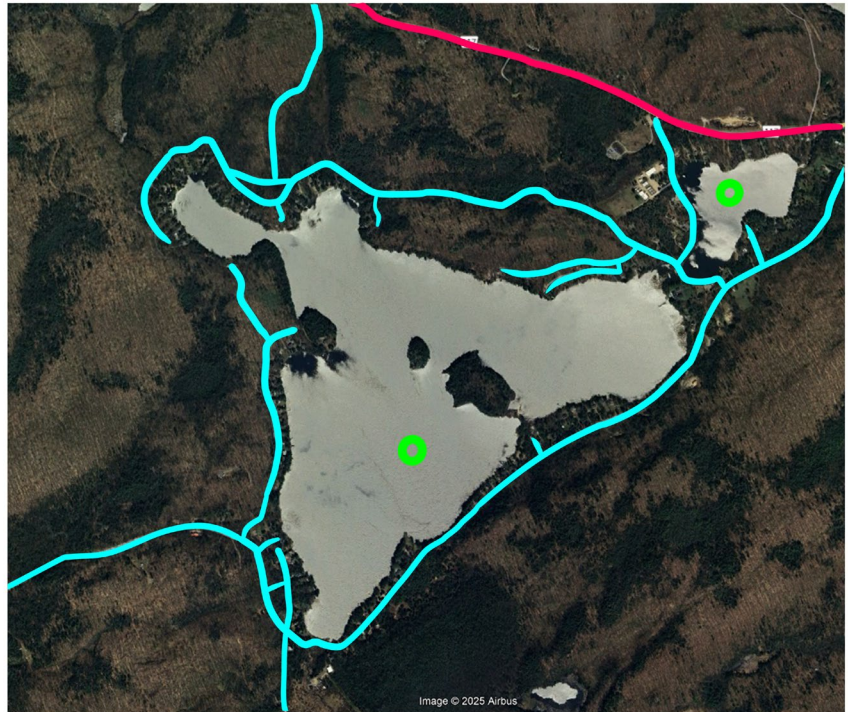
- Snow >3 cm diminished PAR transmission below 5% of incident radiation
- White ice limits PAR transmission, but less than snow



# The warm year had cooler under-ice water temperatures, higher dissolved oxygen, and higher chlorophyll-a

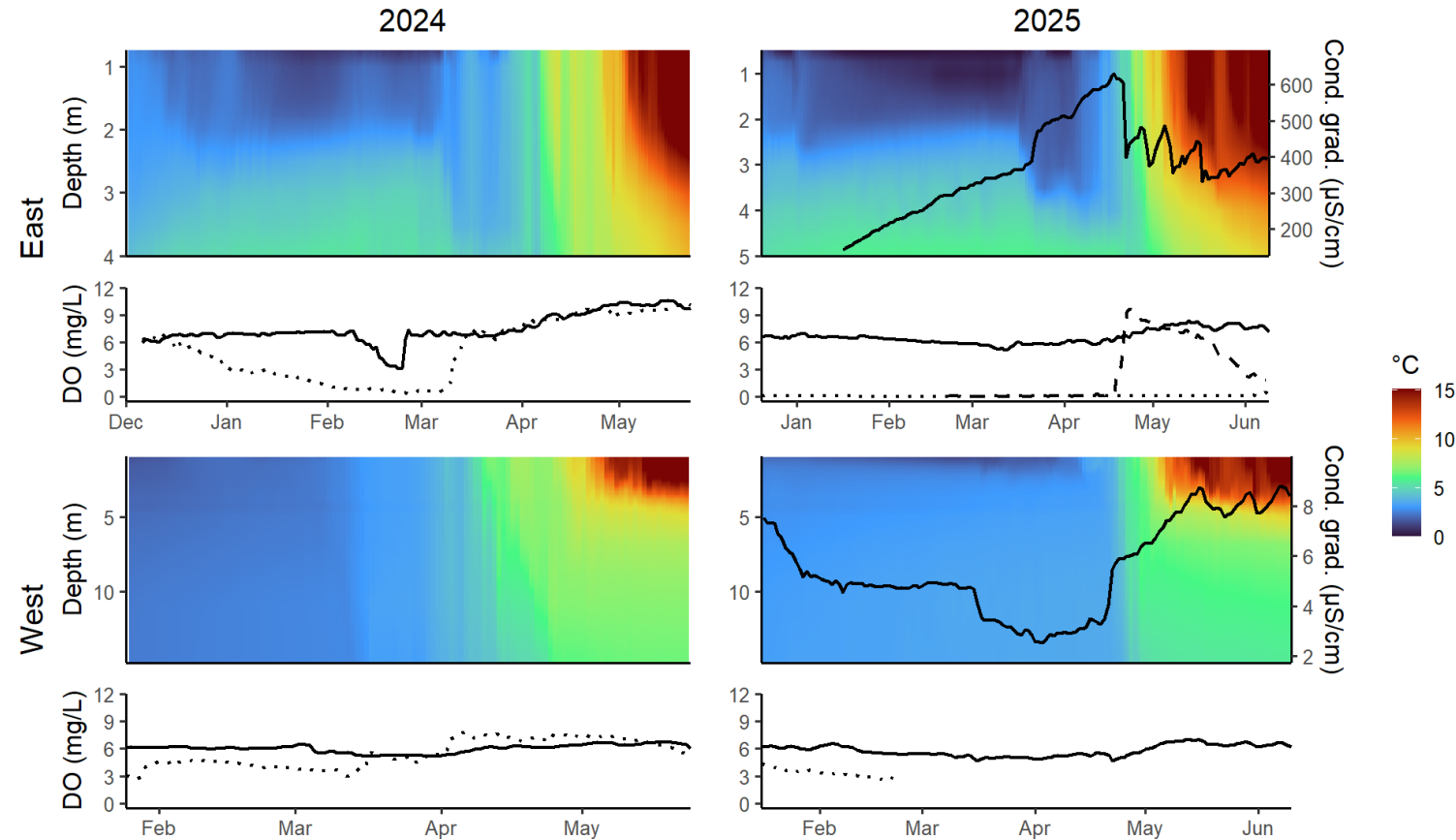


# Even low road salt inputs in a rural, shallow system impact under-ice water quality



— Salted roads — Unsalted roads ● Sampling sites

- Thermal warming (6 °C)
- Anoxic conditions ( $< 1 \text{ mg L}^{-1}$ )
- Basin failed to mix in spring



# Lake Ice – Navigating New Routes by Iris Lautermilch

