

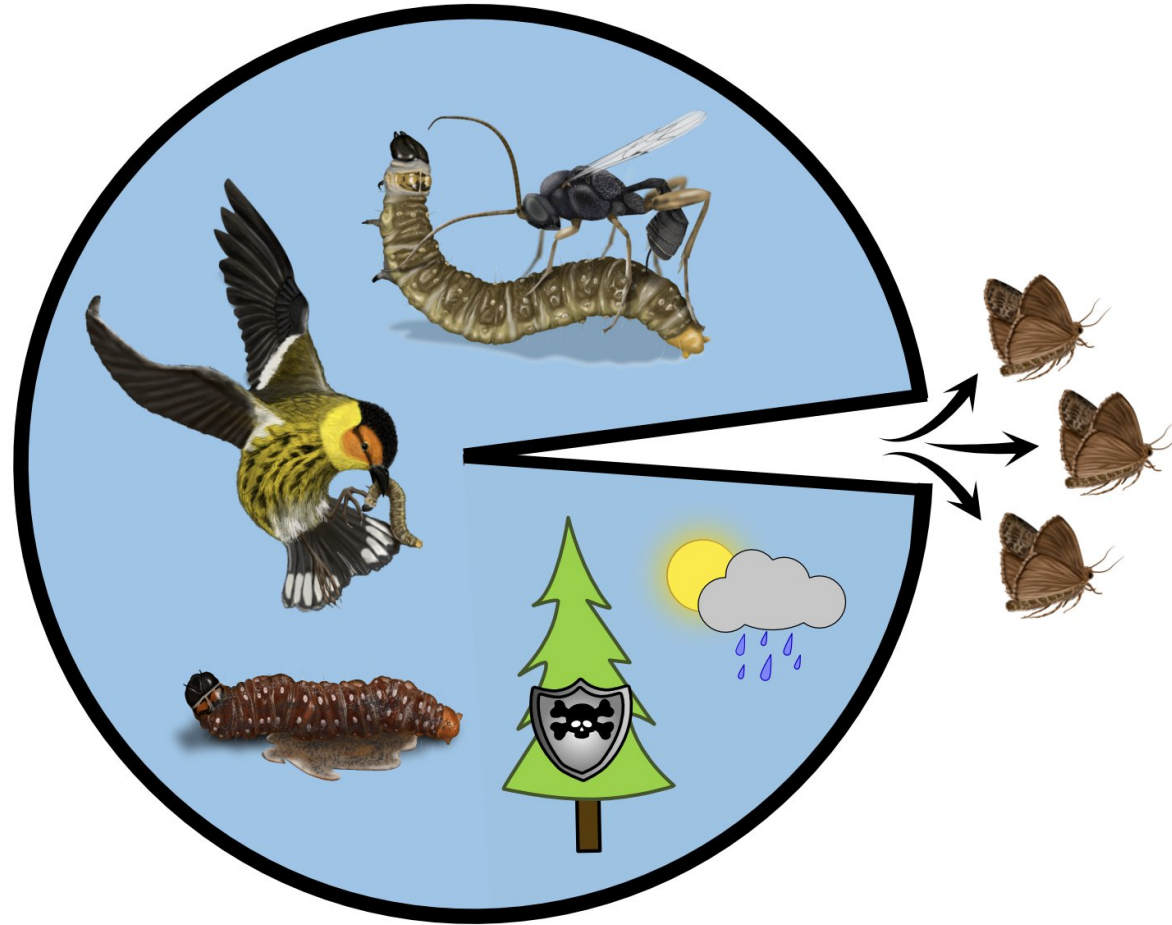
Early Intervention Strategy: Can we suppress spruce budworm outbreaks?

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Co-authors: S. Edwards, L. Amos-Binks, J.J. Bowden, D. Carleton, C. Edge, C. Hennigar, P. James, D. MacLean, V. Martel, E. Moise, B. Morin, A. Morrison, E. Owens, M. Stastny, J. Régnière

Budworm are easy to kill



But...suppressing outbreaks is hard

Outbreaks Rest on a Razor's Edge

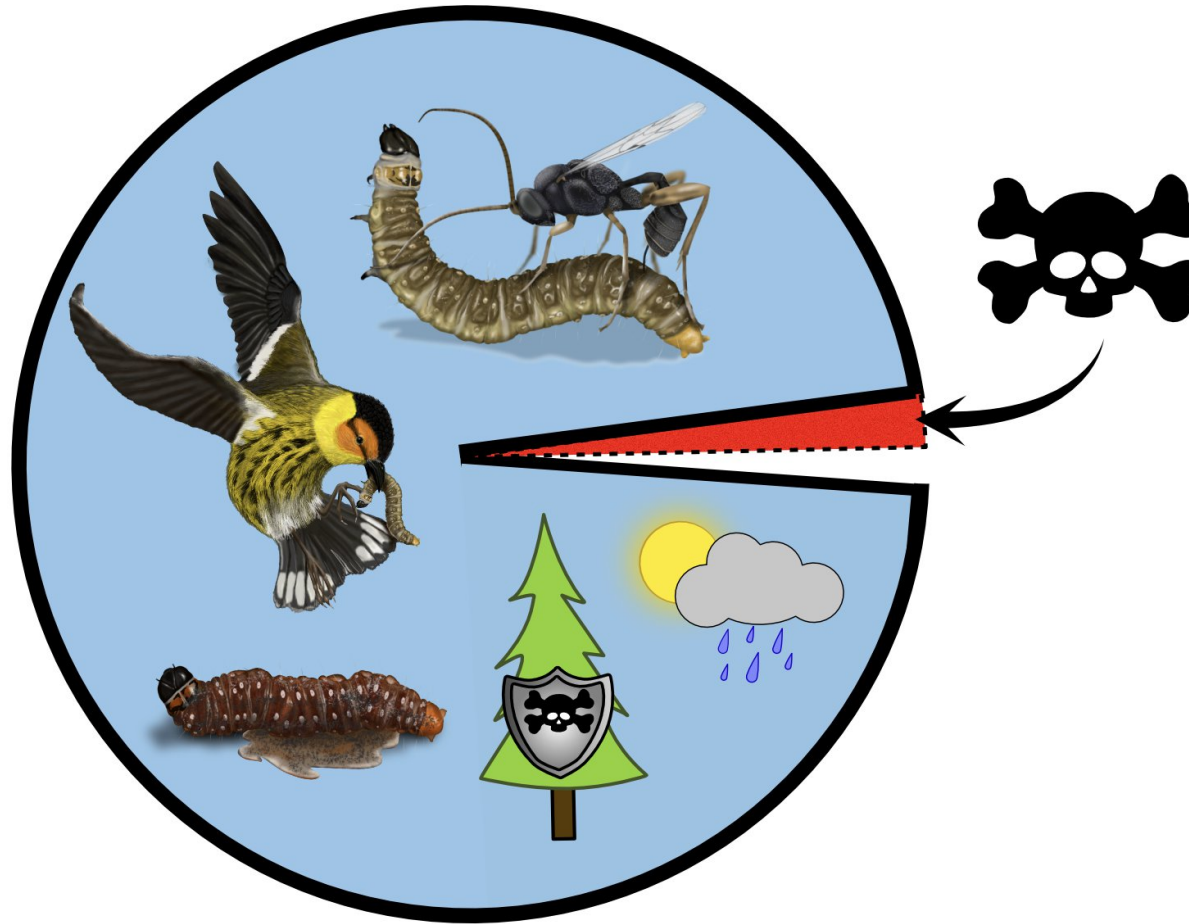


$\geq 99\%$ mortality



$\leq 98\%$ mortality

Can we “Add” mortality?



The Problem: Compensation

Reason #1: High Fecundity



~180 eggs
Per female

Reason #2: Prolific dispersers



Foliage Protection Strategy: Suppress high densities to limit defoliation <50%
and keep trees alive – let the outbreak run its course

Managing Compensation: A How-to Guide




*To suppress outbreaks we suppress compensation
(i.e., 'add' mortality):*

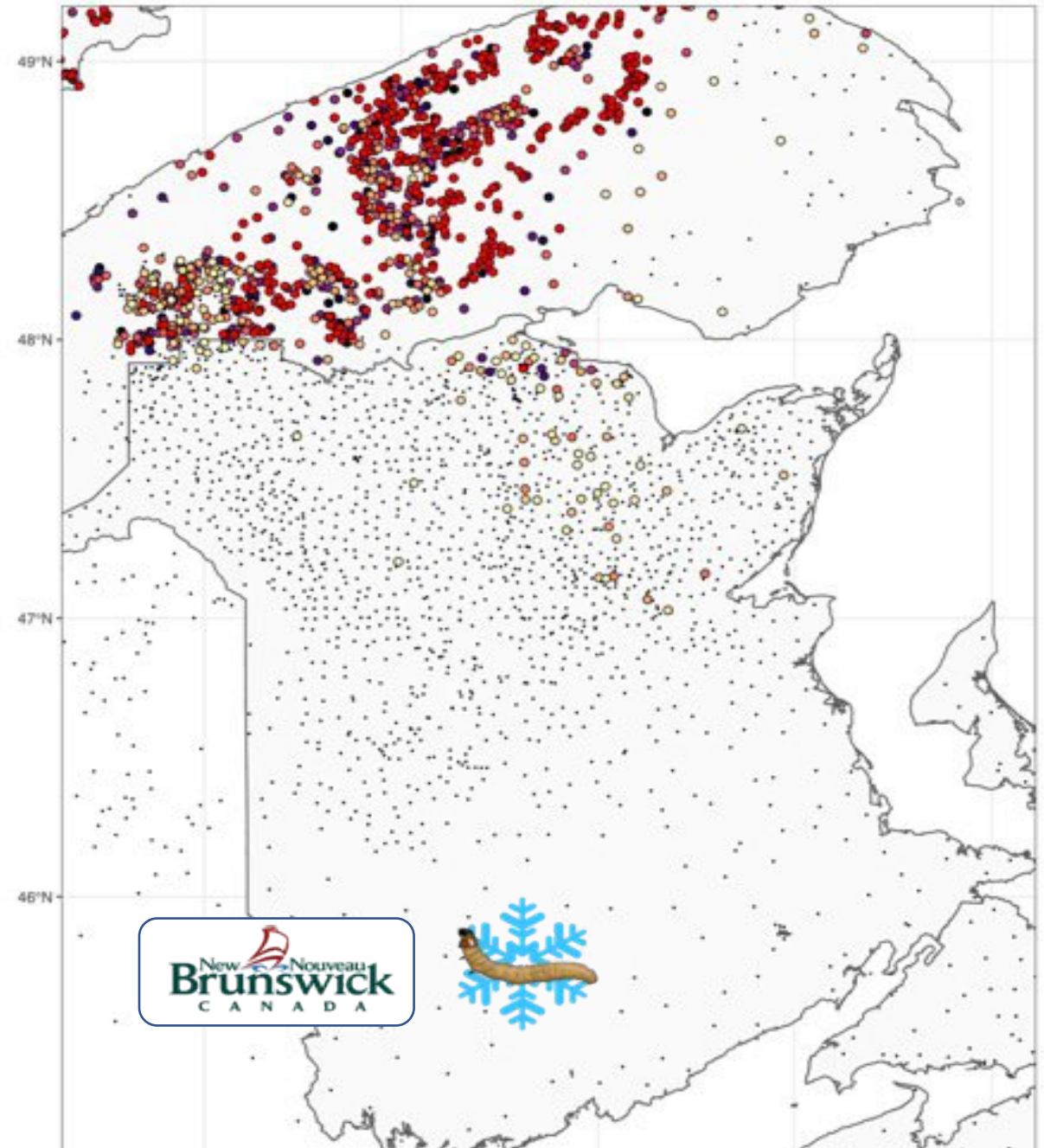
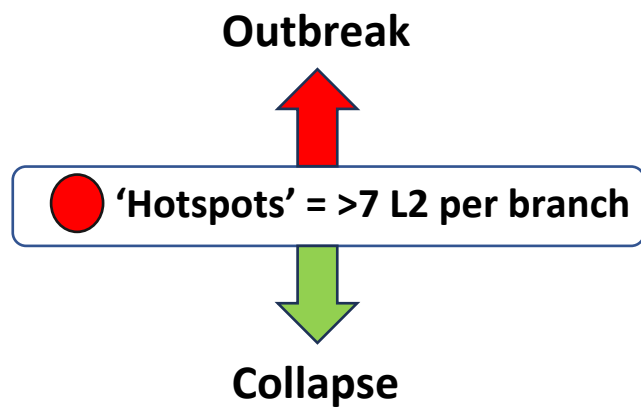
- 1) Early intervention - Impose control during early rise
- 2) Limit reinvasion – Areawide management
- 3) Limit non-target impacts – Btk and tebufenozide

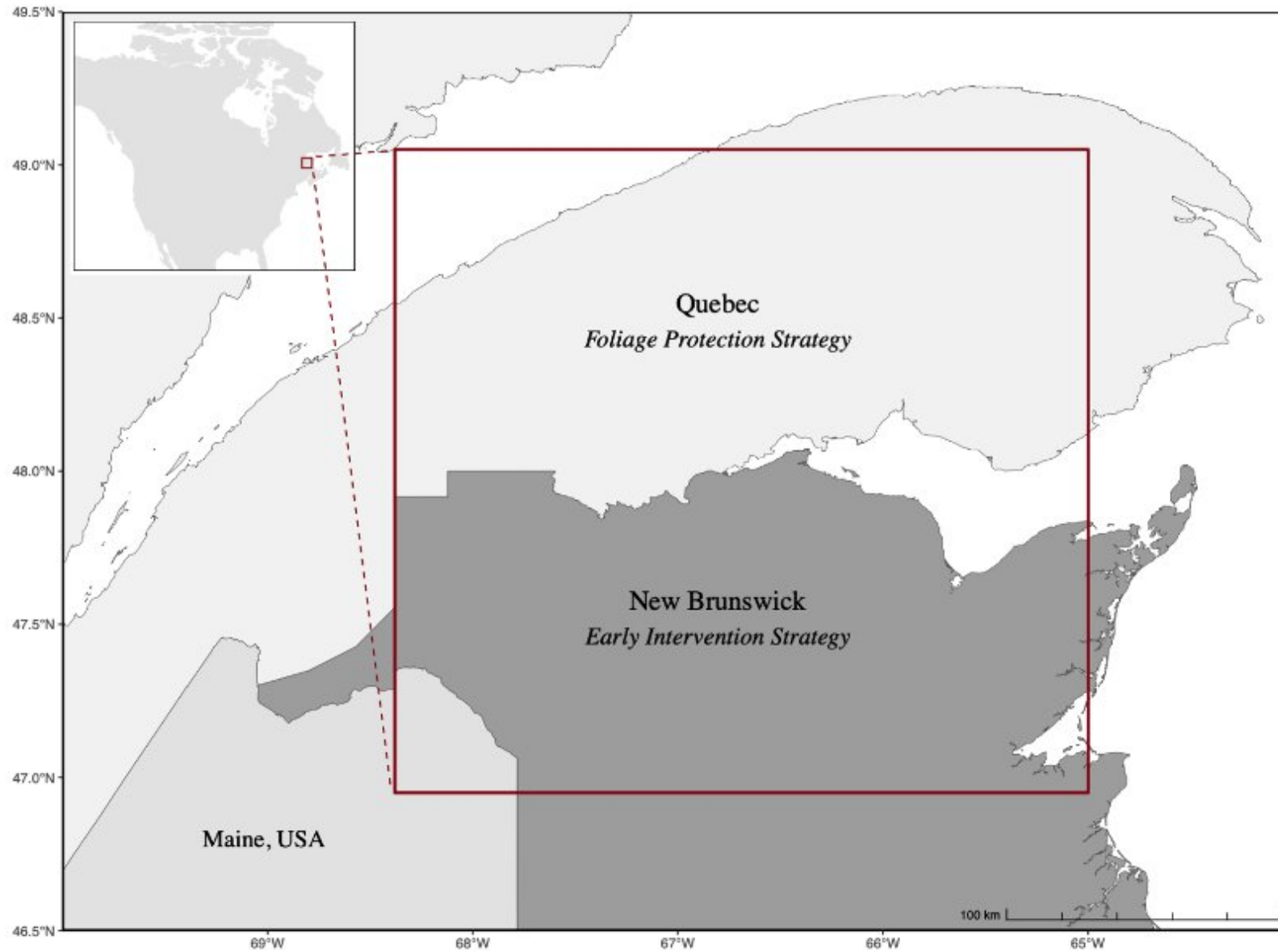
Early Intervention Strategy

*Johns et al. (2019) A conceptual framework for the Early Intervention Strategy: Can outbreaks be stopped?
Forests. 10: 910.*

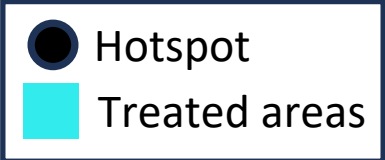
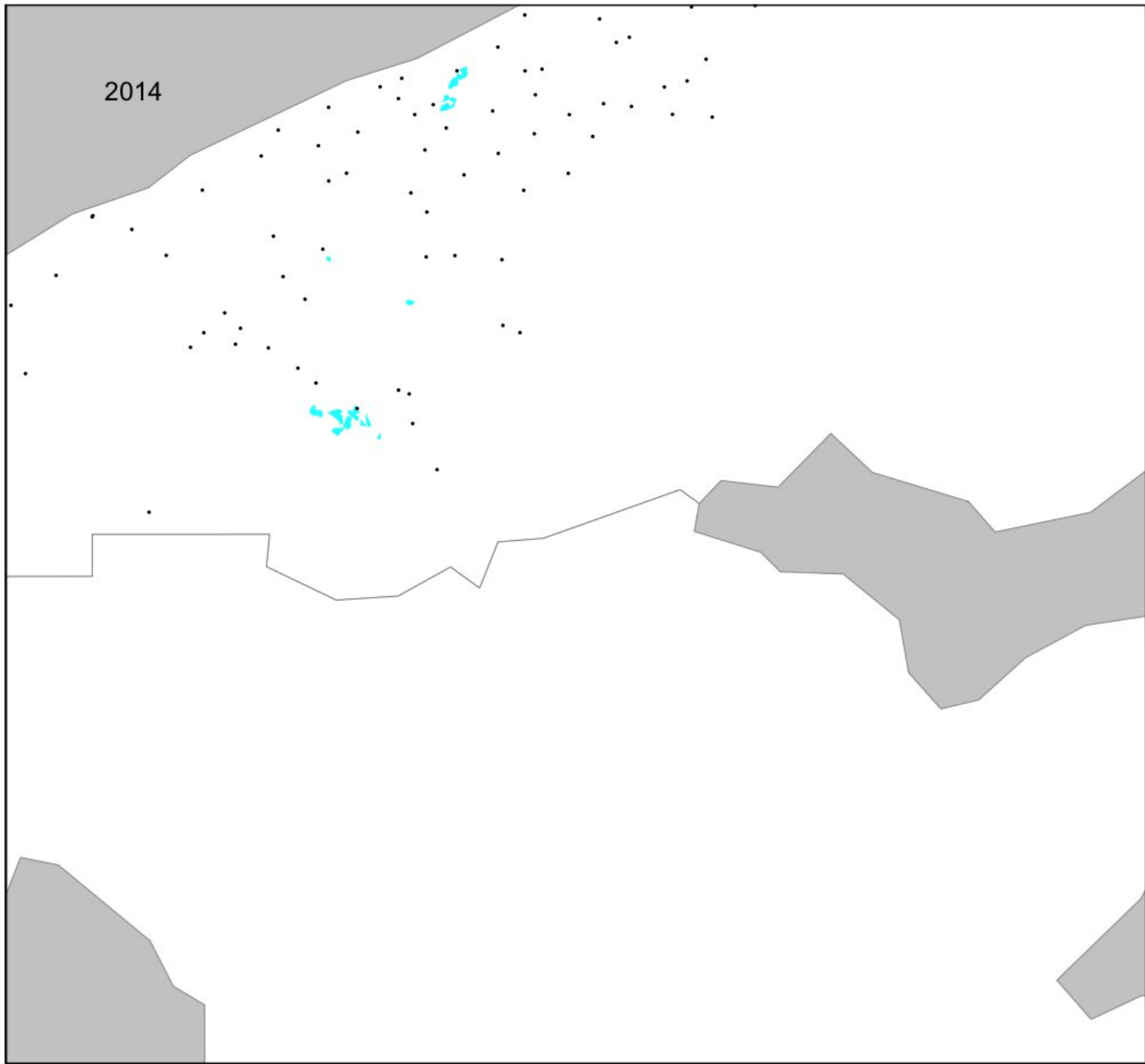
Is the Early Intervention Strategy effective?

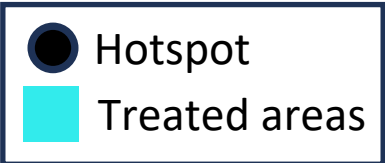
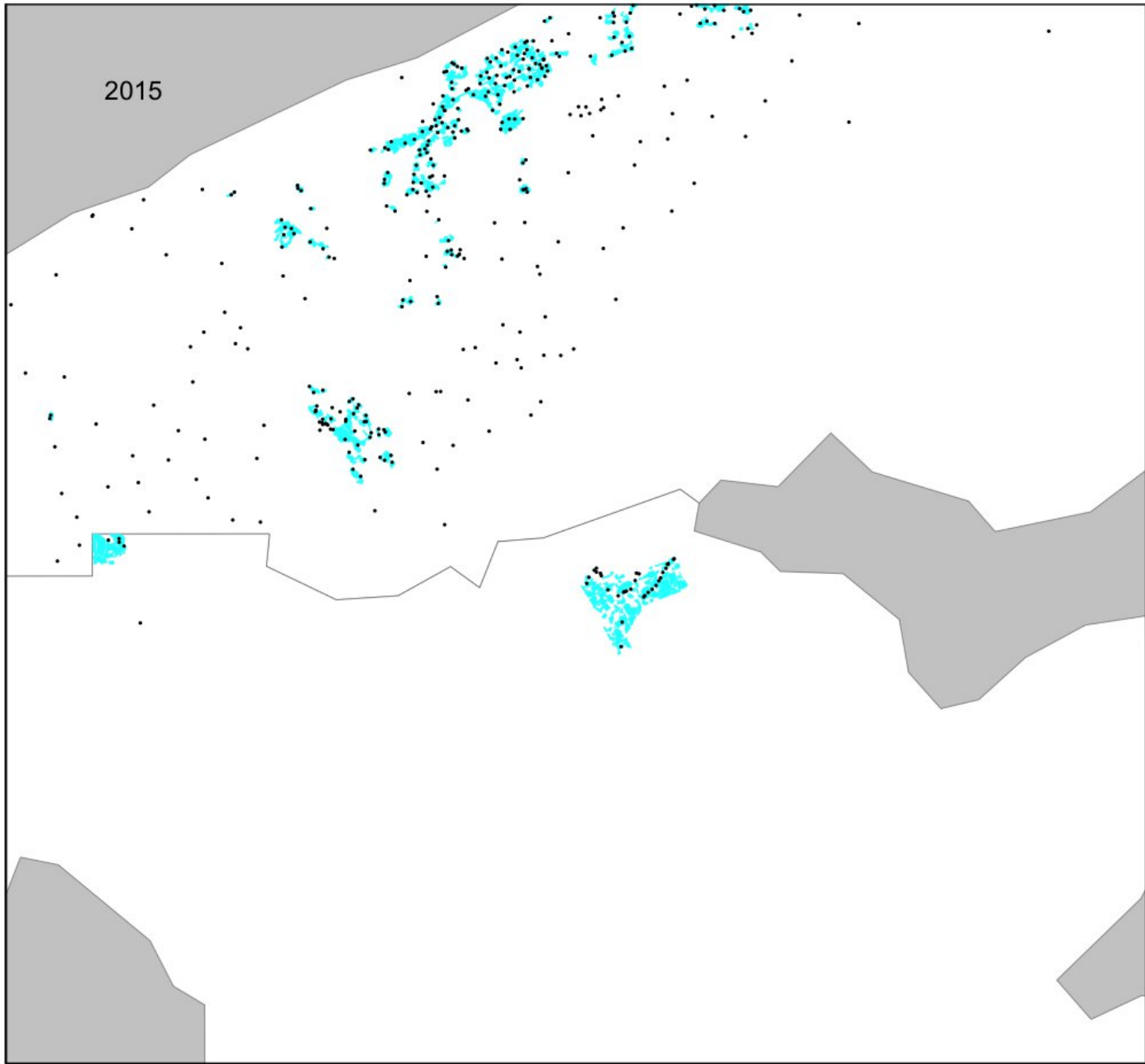
-  Initiated by NB in 2014
-  Provincial surveys of 'hotspots'
-  What is a 'hotspot'?

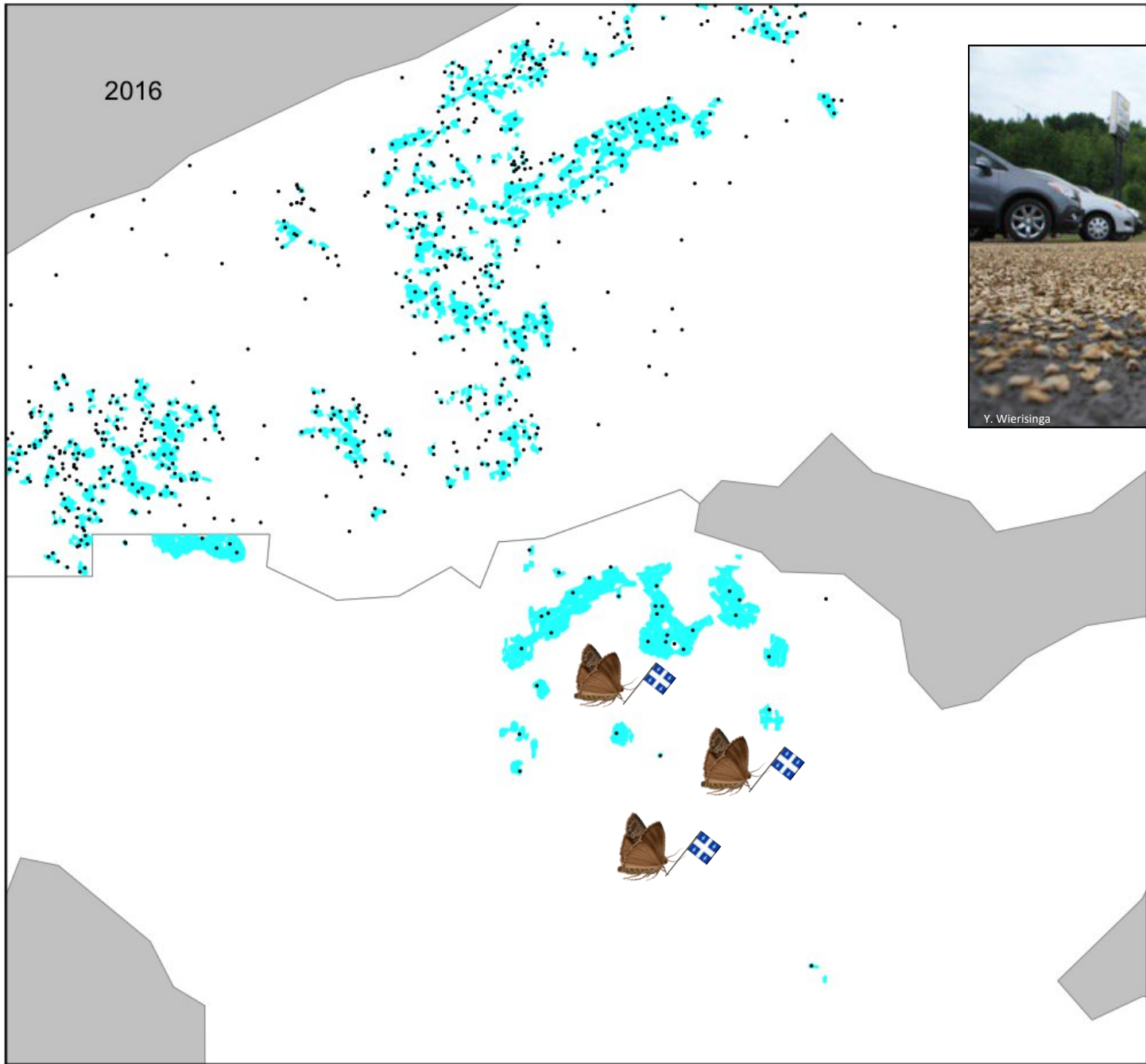




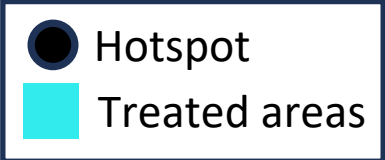
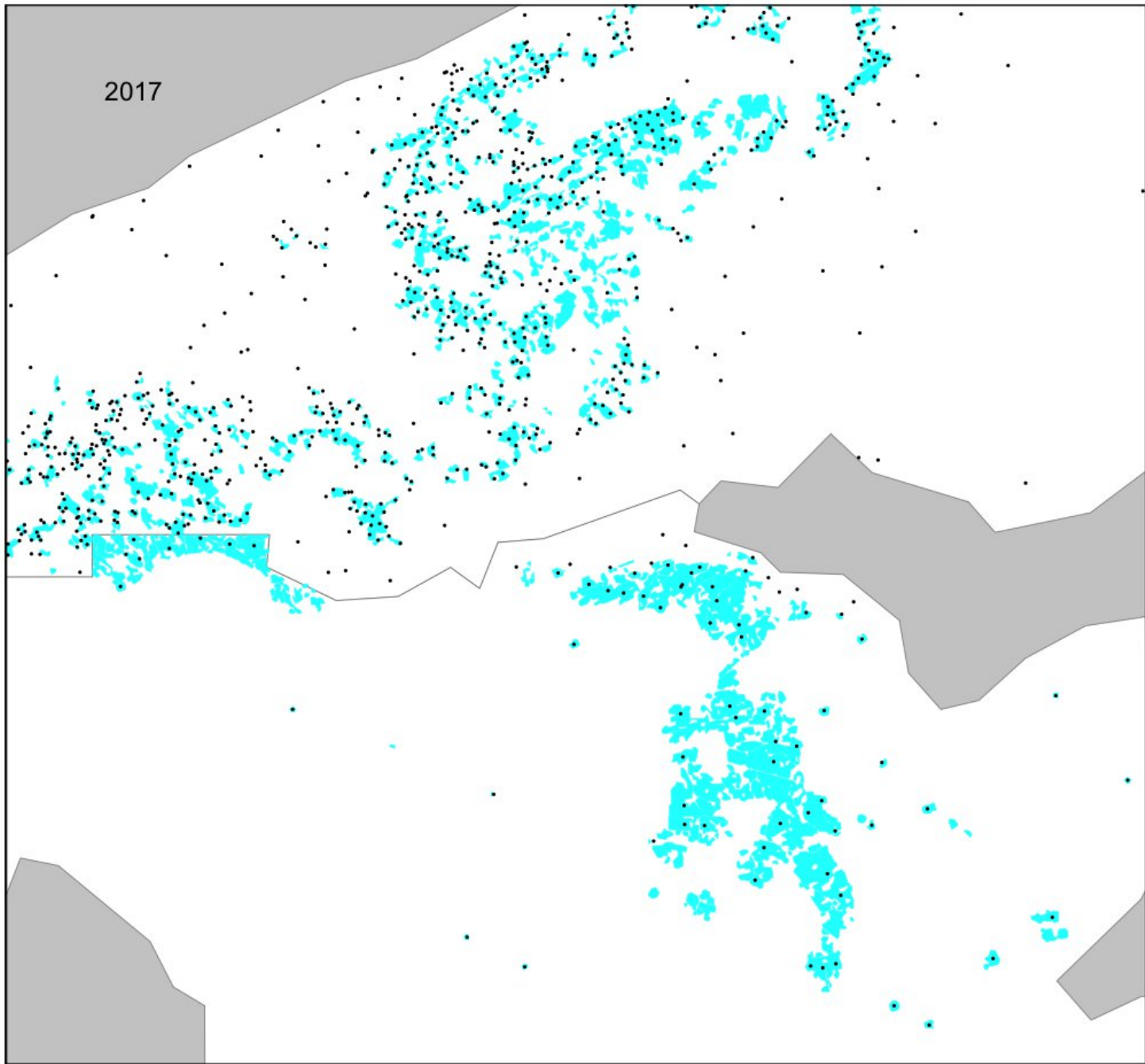
****Not a comparison of Early Intervention vs. Foliage Protection effectiveness****

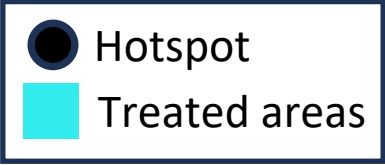
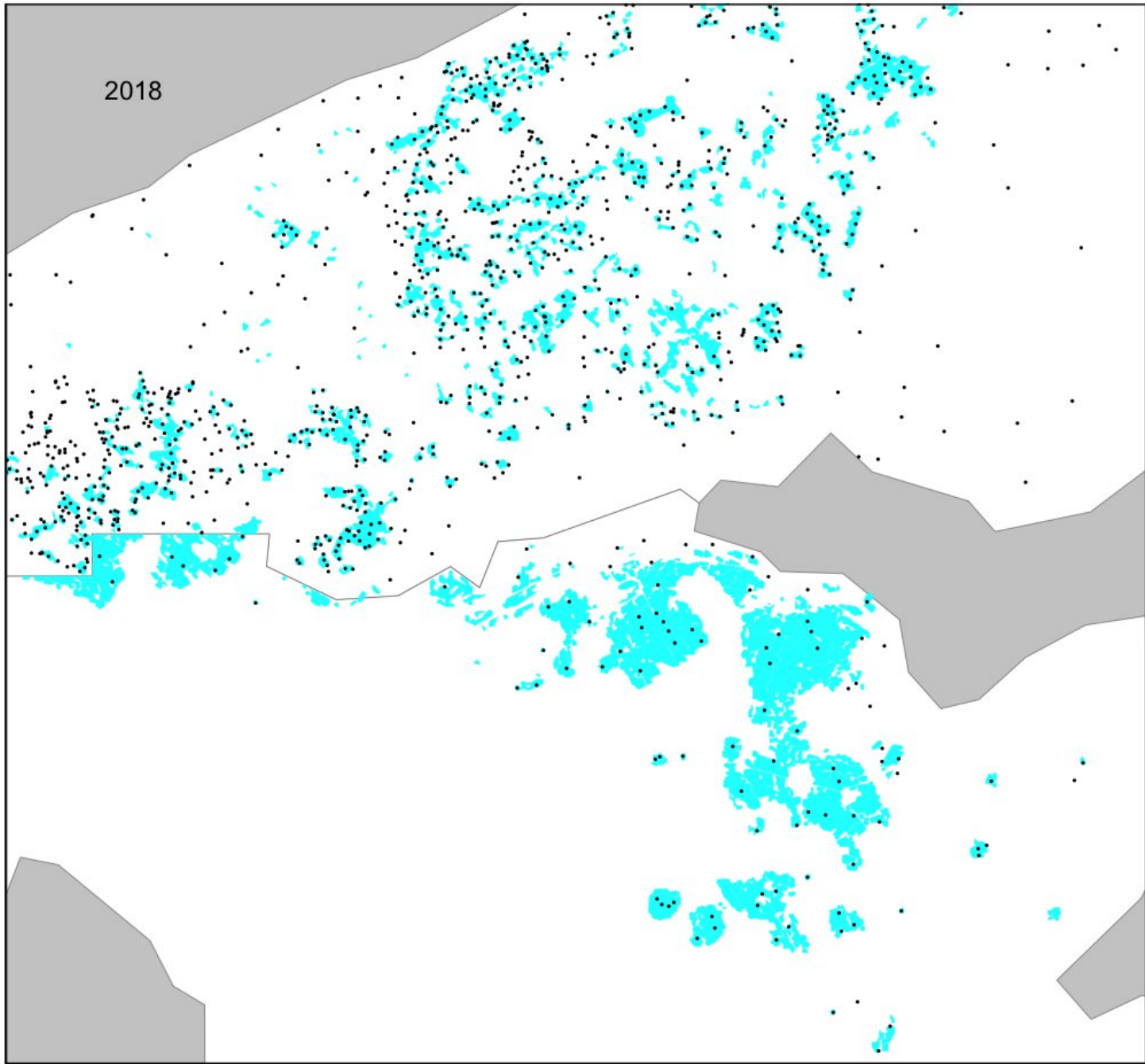


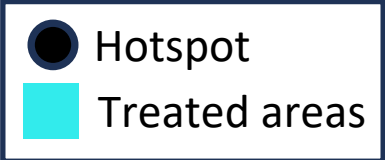
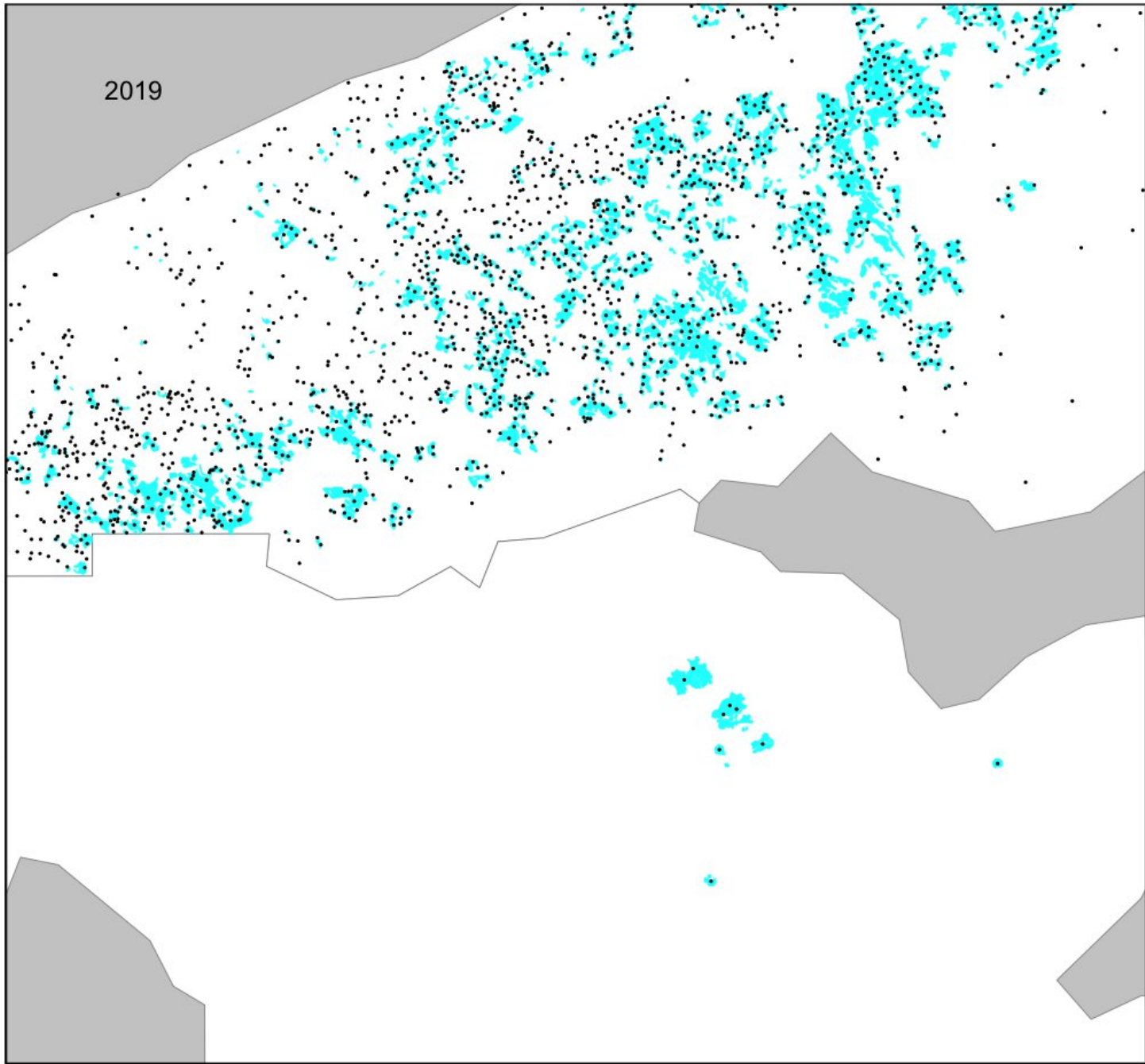


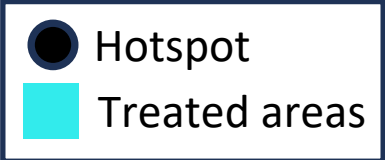
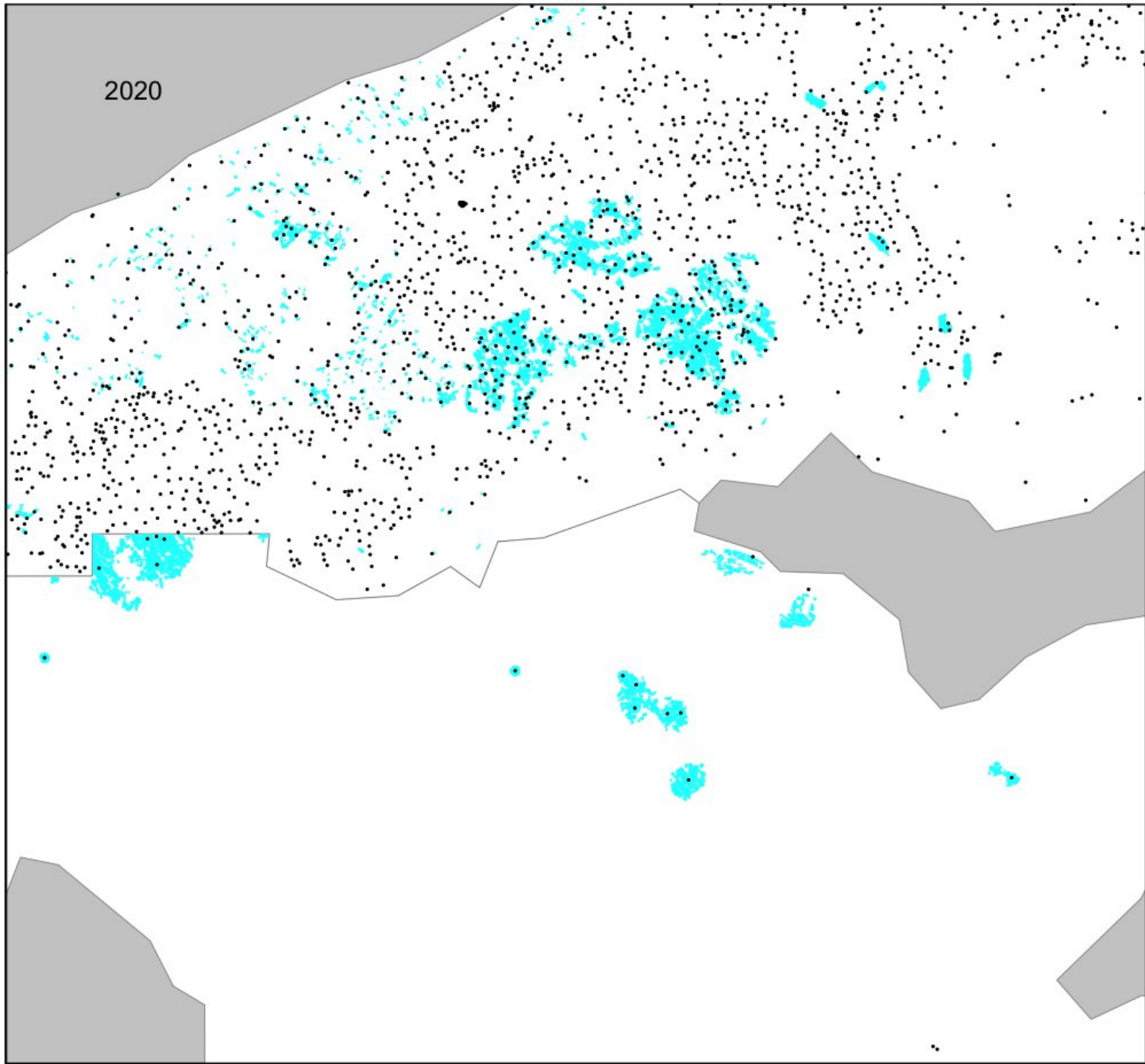


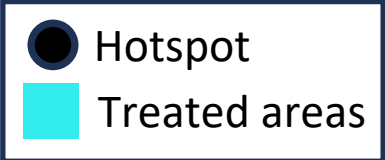
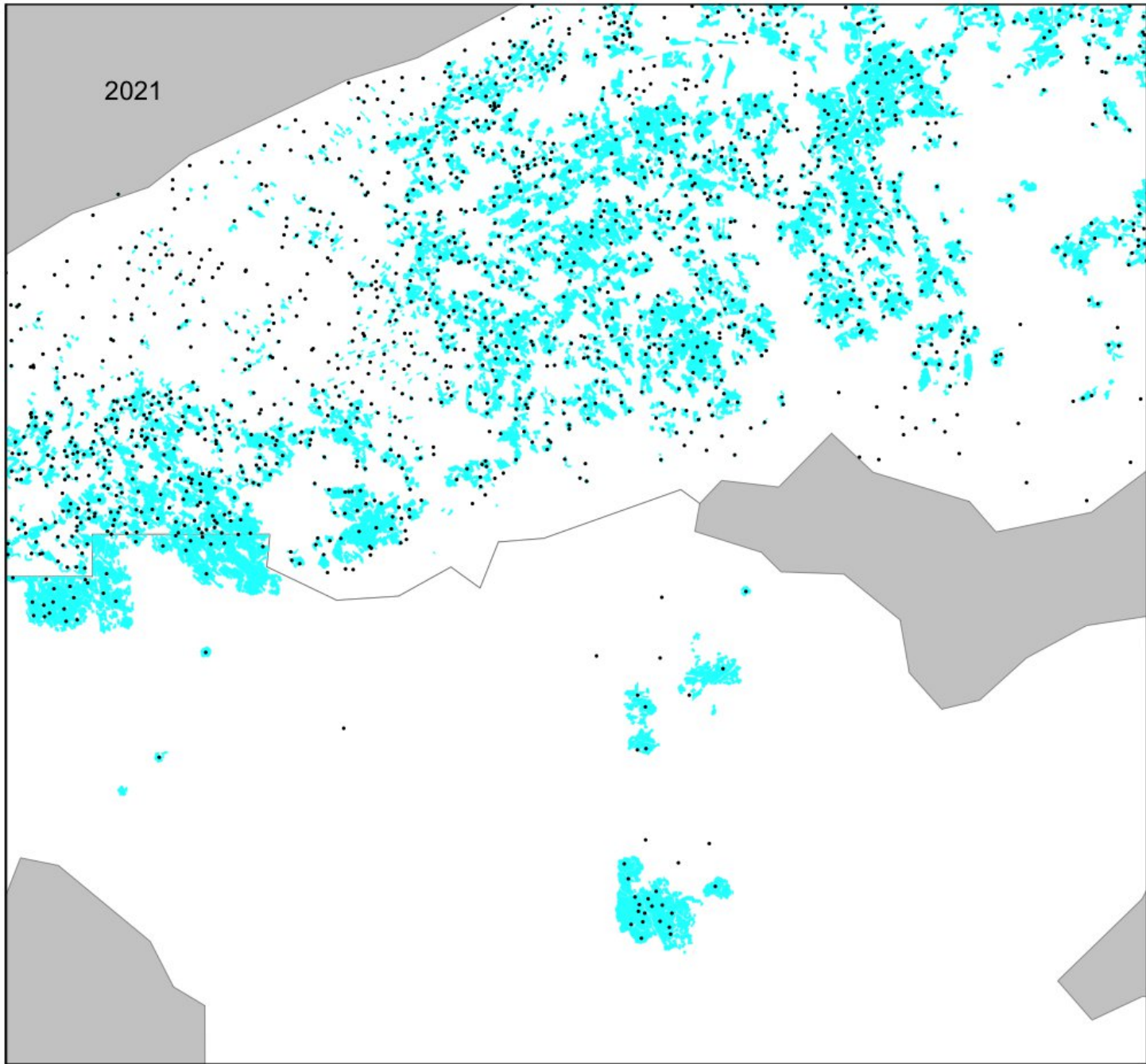
- Hotspot
- Treated areas

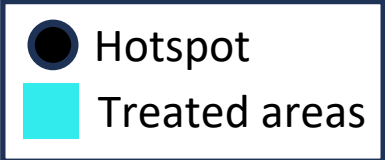
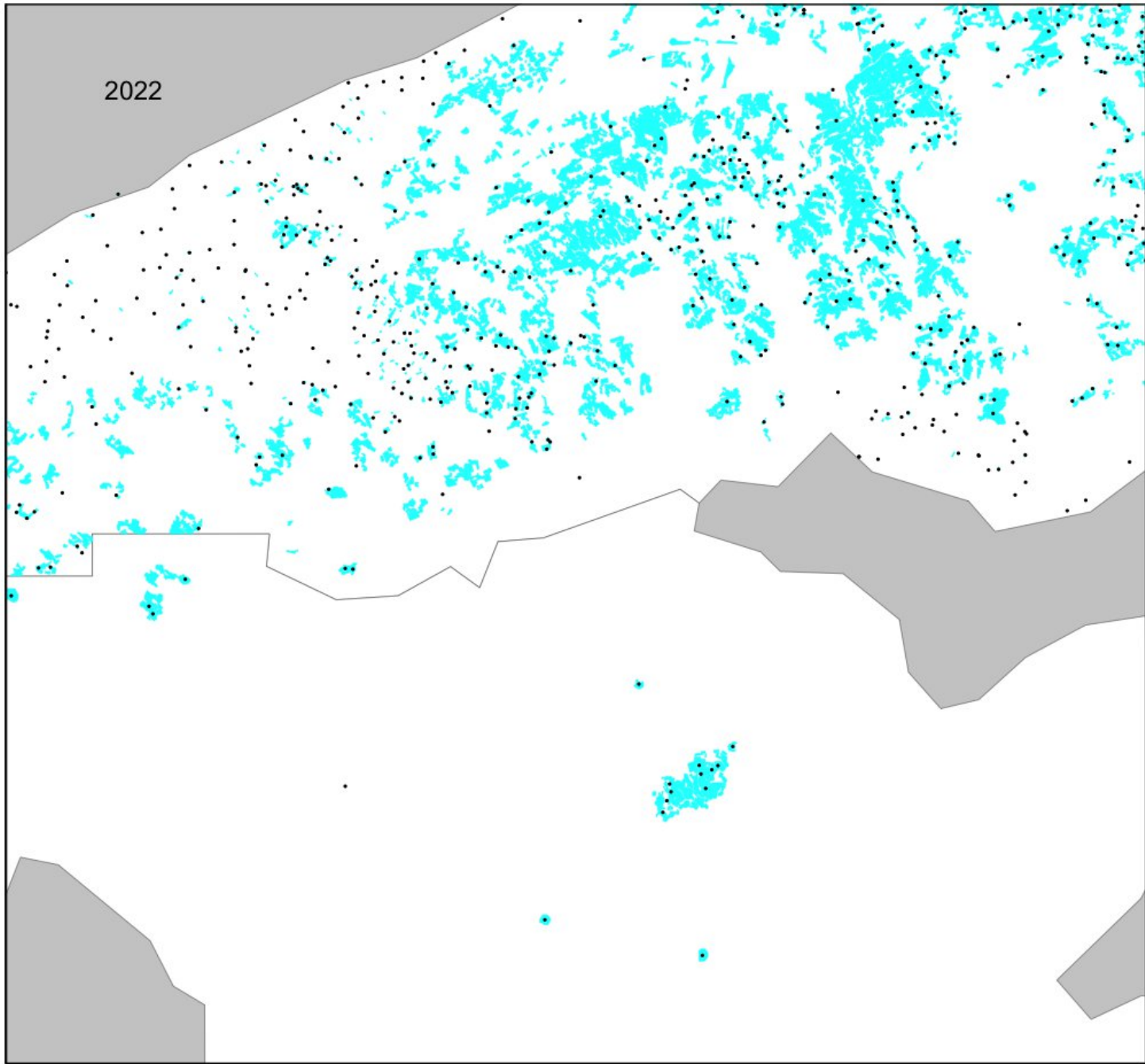


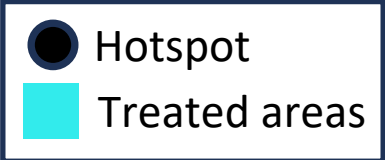
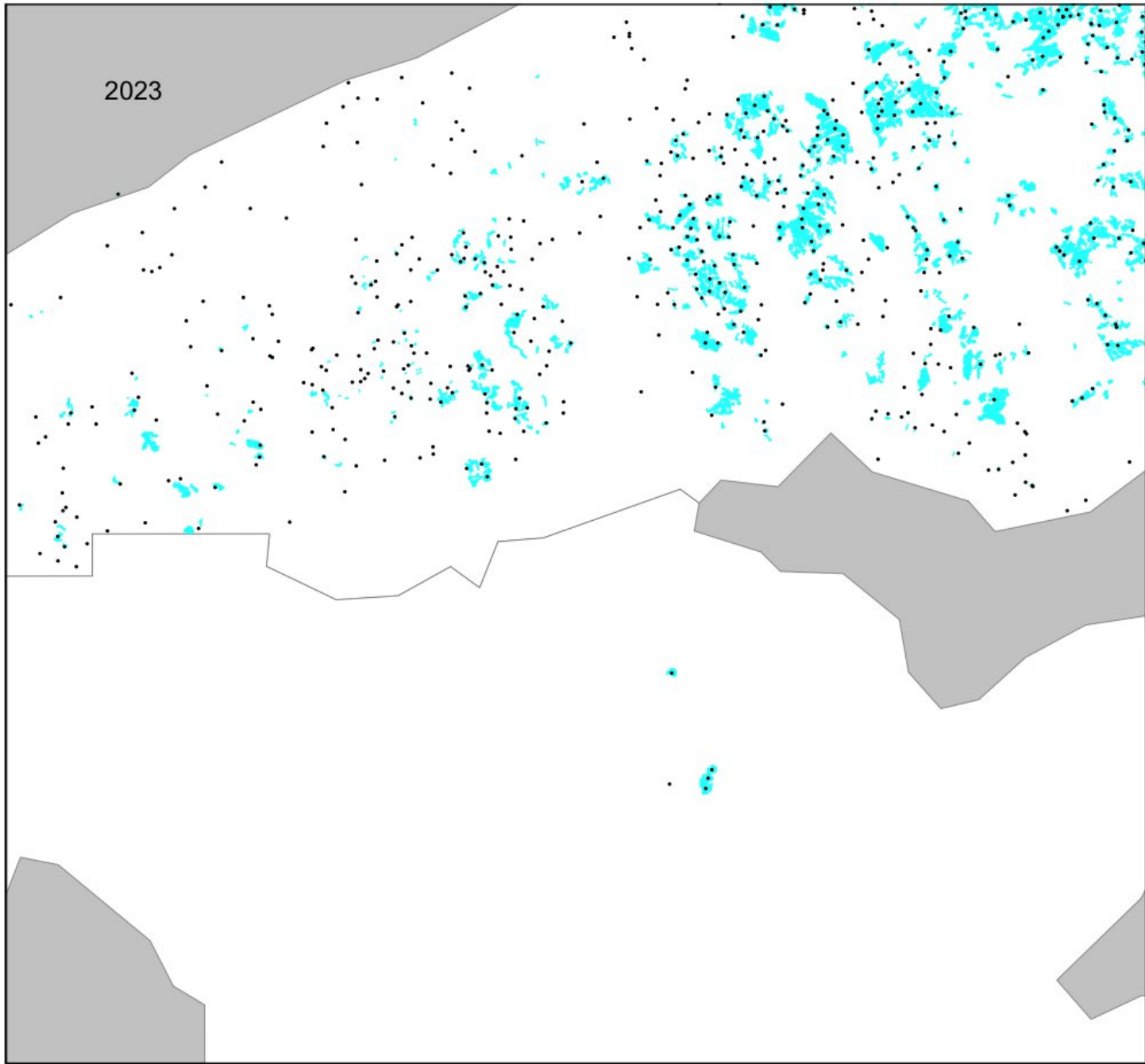


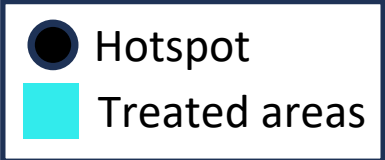
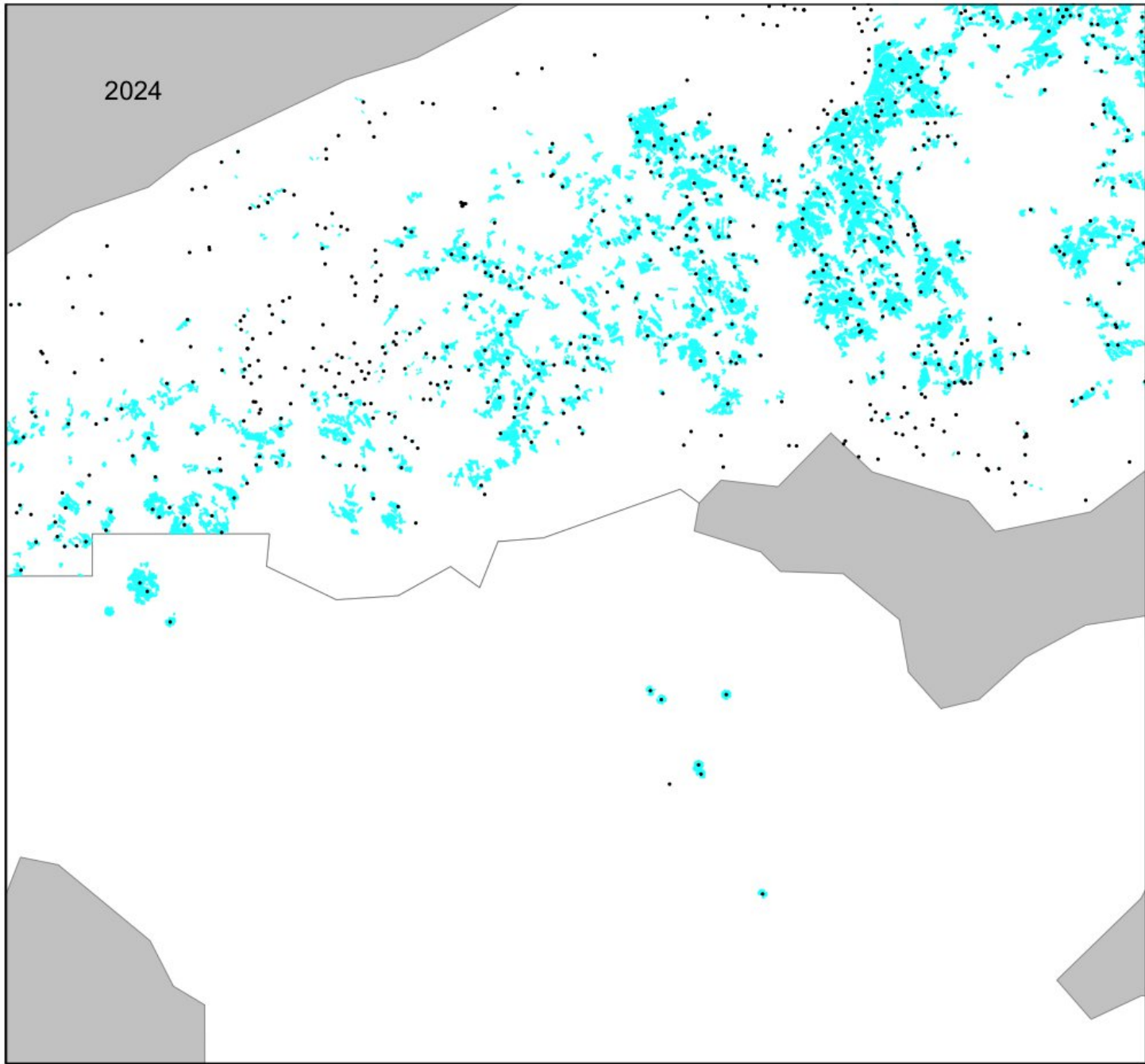




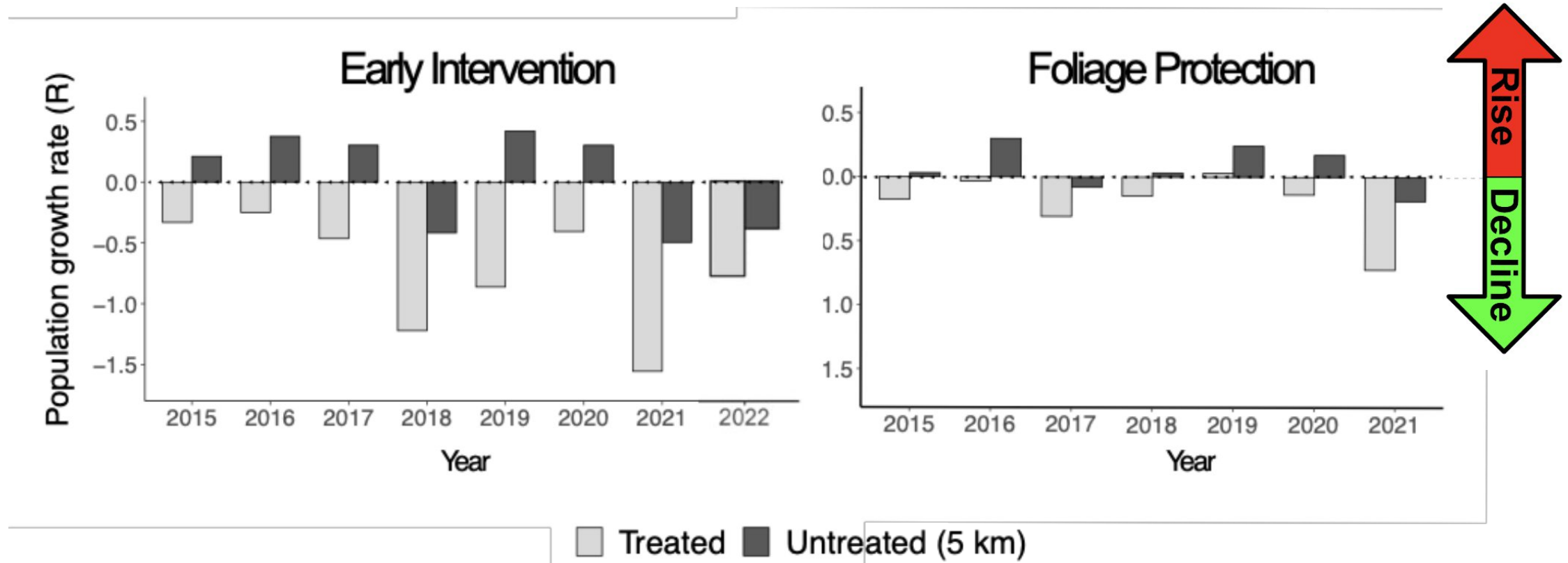




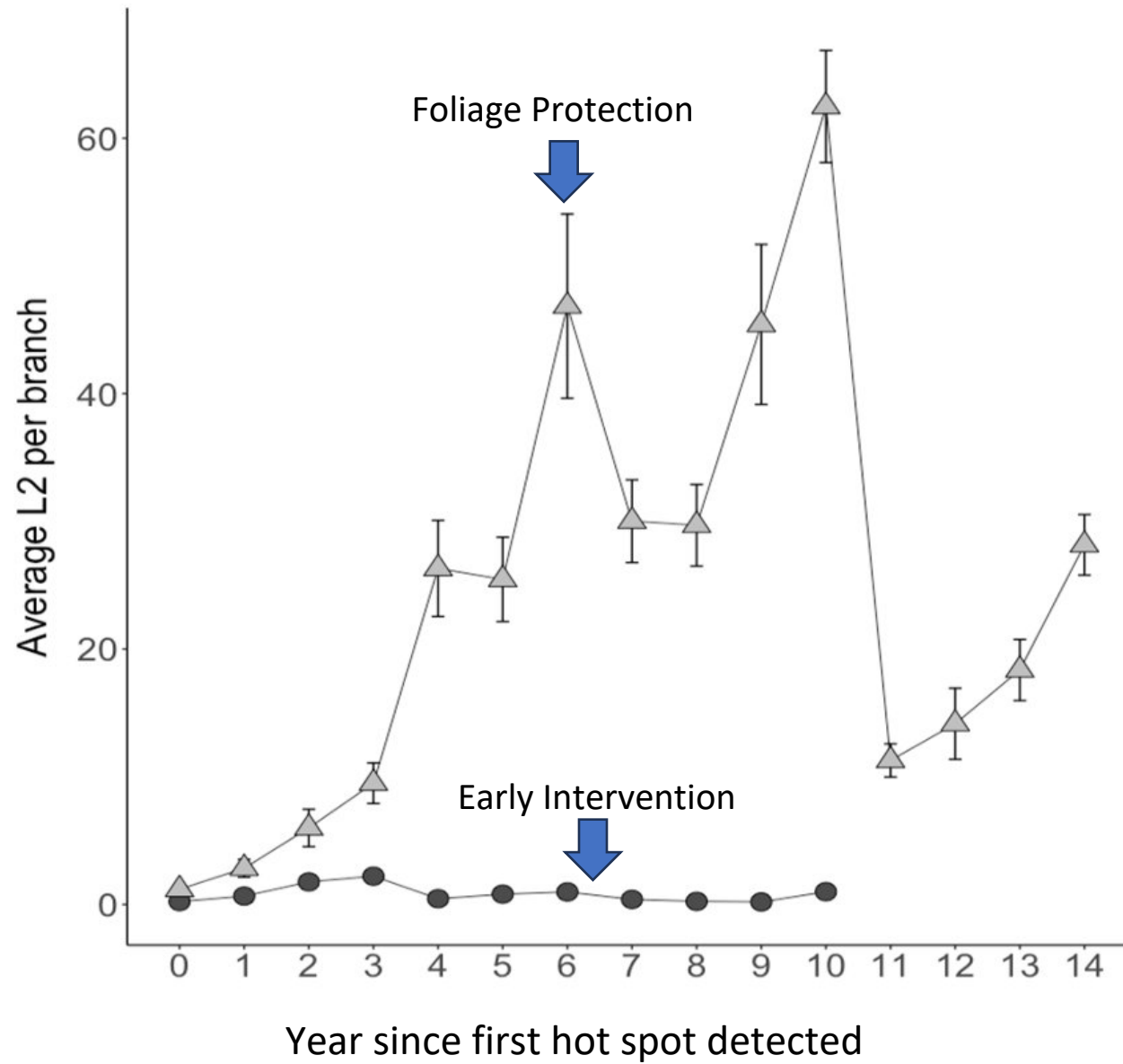




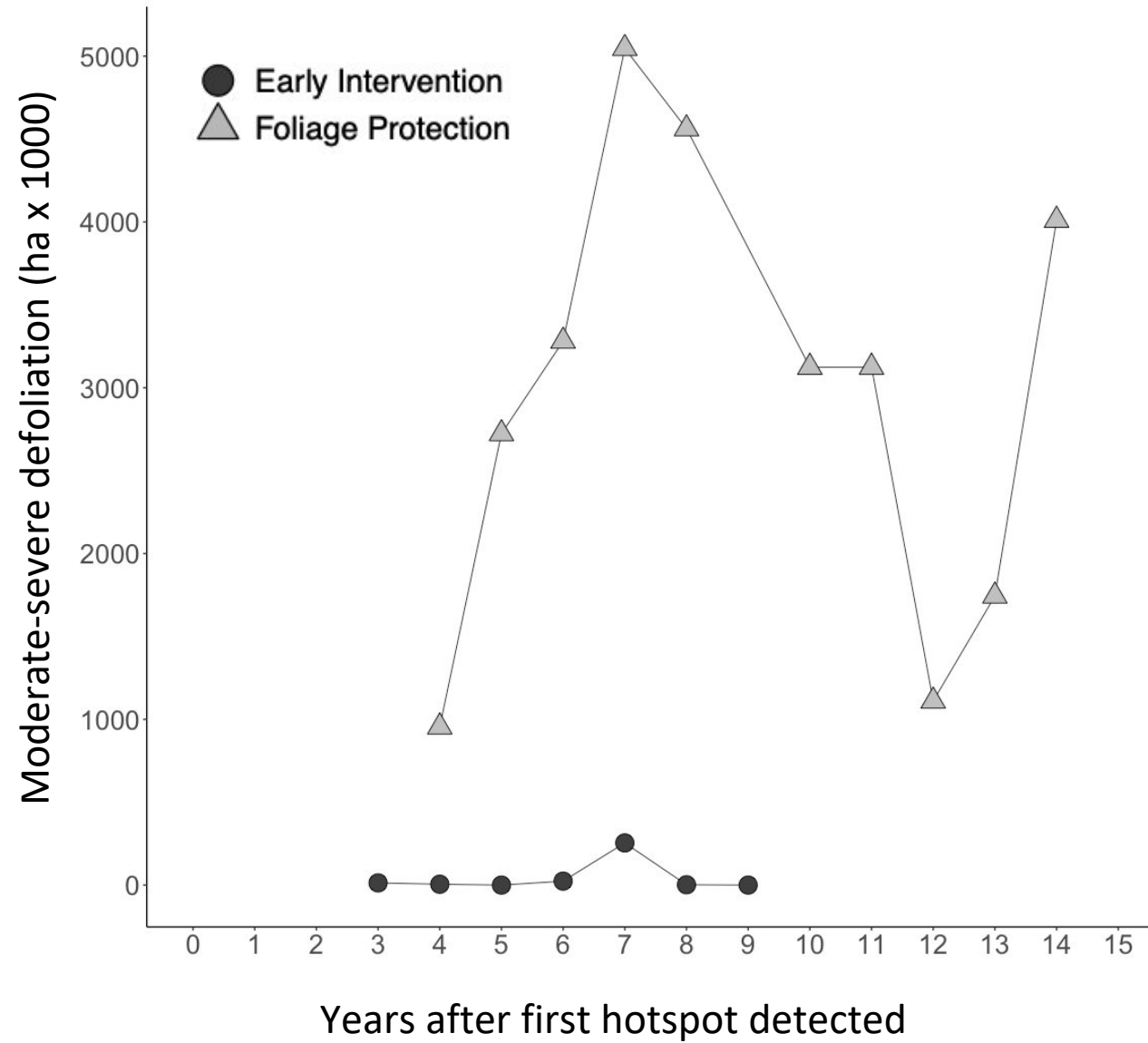
“Add” mortality?



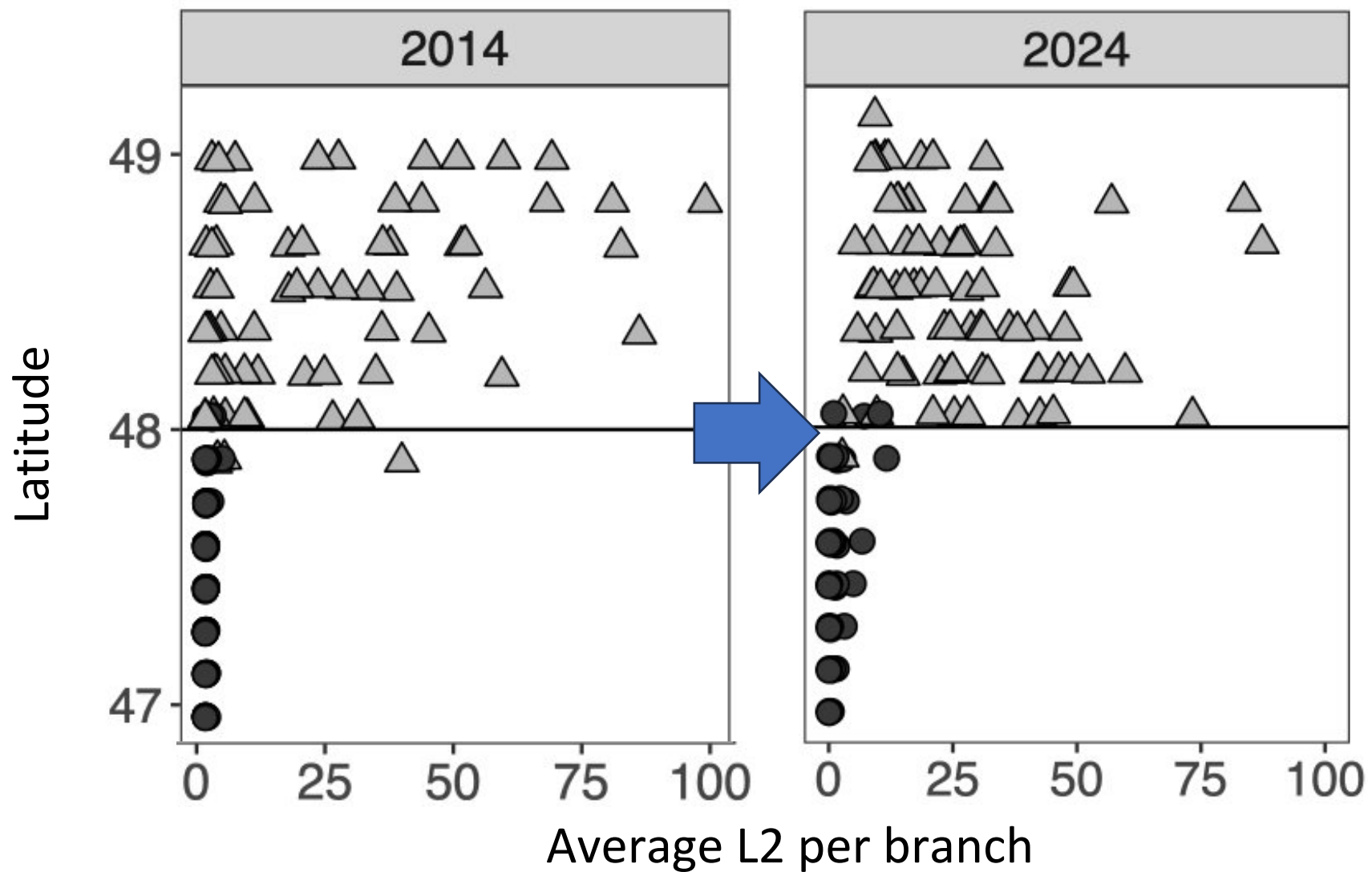
Population density



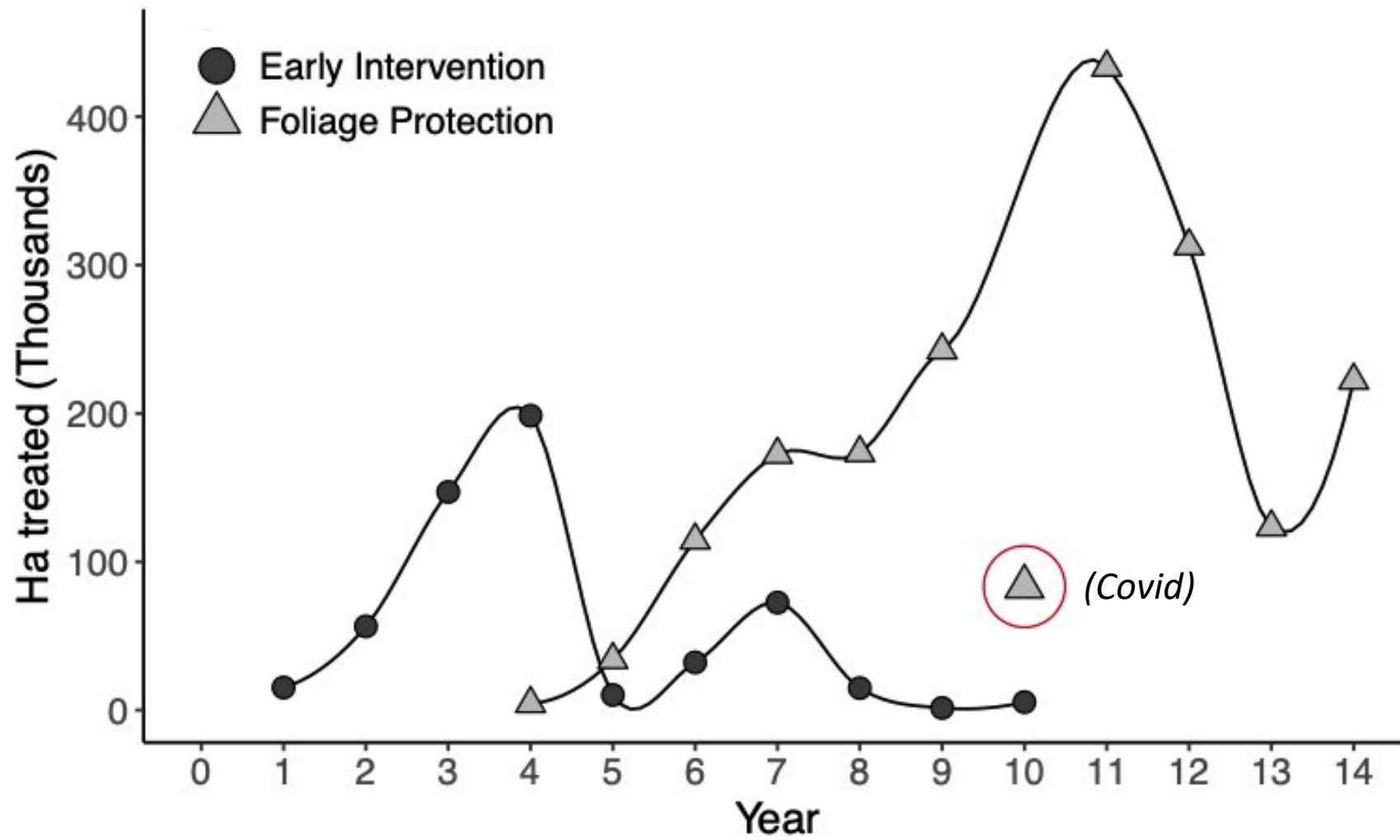
Defoliation



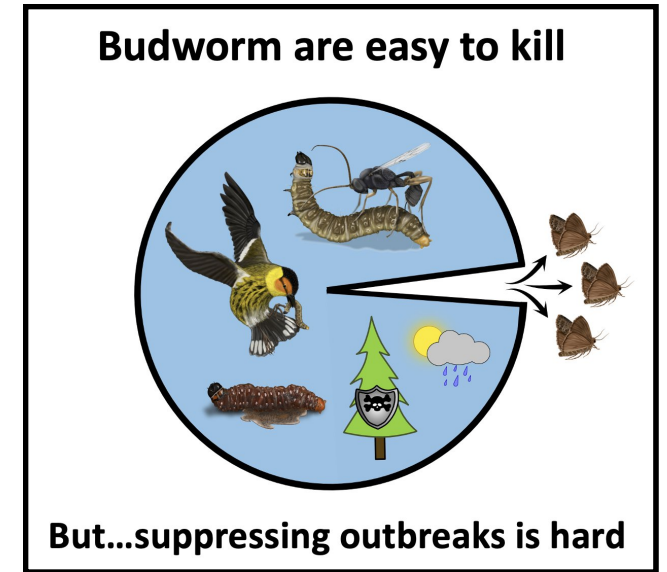
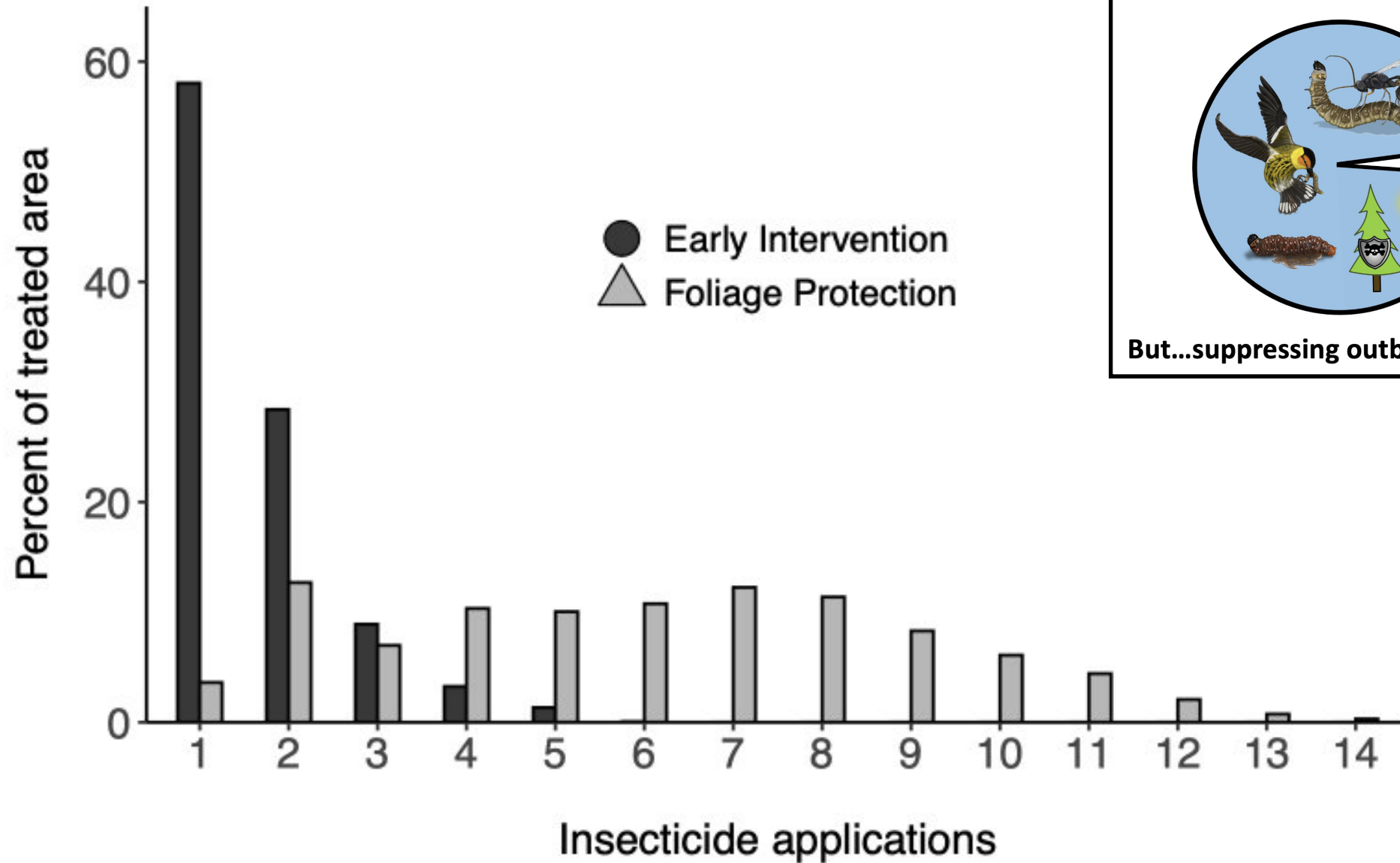
Density: North vs. South



Insecticide: Timing and Quantity



Insecticide: Retreatment



Is Early Intervention Working?

 Results are encouraging

 Synergistic effects of climate change and silviculture?

 EIS is complementary to Foliage Protection

 Can EIS be outsourced? Can we do EIS better?

Johns et al. (2026) *Adaptive Area-Wide Management for Suppressing Spruce Budworm Outbreaks: Effectiveness of the Early Intervention Strategy*. Journal of Pest Science. *Published*




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