

Evidence of a four-year population cycle for the Rusty Blackbird (*Euphagus carolinus*)

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By

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- The Rusty Blackbird has received much attention in the last decade because of widespread evidence of a drastic decline.
- There has been much speculation about the causes of this decline.



- While some have blamed in part blackbird control programmes in the US, others do not consider it a likely cause based on the fact that other blackbird populations targeted by these controls have not declined in numbers as much as that of the Rusty Blackbird.



- We present data that suggest high annual variability of the Rusty Blackbird reproductive success in the boreal forest, with a possible 4- to 5-year cycle in productivity.
- This could explain why the Rusty Blackbird is more susceptible to control programmes than other blackbird species (Red-winged Blackbird, Brown-headed Cowbird and Common Grackle)



Study area

- Data from the Observatoire d'oiseaux de Tadoussac (OOT), located 3km east of the mouth of the Saguenay River at the St. Lawrence River estuary, were analysed.



Study area

- The Tadoussac observatory is an ideal site to study boreal forest migrants, as these concentrate along the north shore of the St. Lawrence River during their diurnal movements, which occur in a generally westerly direction.



Tadoussac





Tadoussac sand dunes (00T)



Photo: Thomas Bibeau



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Parc national du Saguenay



Photo: Michel Savard



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Methods

- Migrating birds are counted daily each hourly periods as they fly over the two observers, located 800m apart from each other; one on the coast and one inland.
- Counts start each day at 8:00 AM and stop at around 4:00 PM.
- 11 years of data from the Tadoussac observatory were analysed.



Methods

- Data from the ÉPOQ data base, which contains thousands of bird checklist records, were also analysed.
- Only checklists with at least one observation of the Rusty Blackbird were used (mean number of birds per checklist)
- Data were divided according to season: spring (early March to late May) and fall (August to late November).



Boreal Owl



Photo: Michel Savard



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Methods (Boreal Owls)

- The Tadoussac observatory has been banding owls since 1996 using two net enclosures simultaneously: one broadcasting Northern Saw-whet Owl calls, the other Boreal Owl calls.

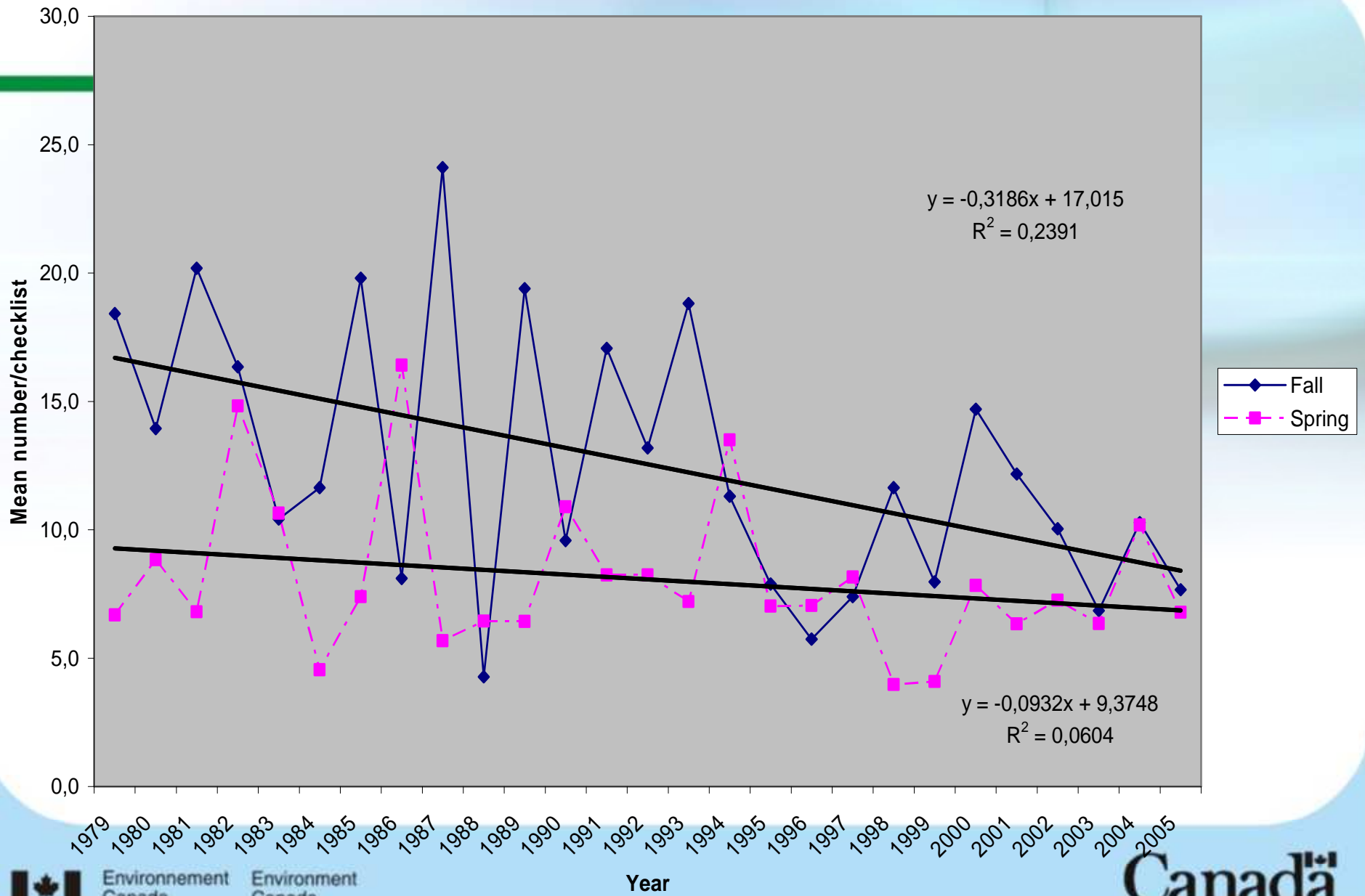


Methods

- Boreal Owl records from the ÉPOQ data base were analysed in the same fashion as those for the Rusty Blackbird, but using only data from early October to late February (winter).



Trend in Rusty Blackbird number in Québec



Rusty Blackbird (ÉPOQ)

- Spring data suggest a 3 to 4-year cycle in abundance
- Fall data suggest a two-year cycle



- Pearson's correlation for Fall and Spring Rusty Blackbird abundance:

$$R^2 = 0.70;$$

($P < 0.001$; $n = 27$ years)



- The fall ÉPOQ data suggest a possible decline in Rusty Blackbird abundance

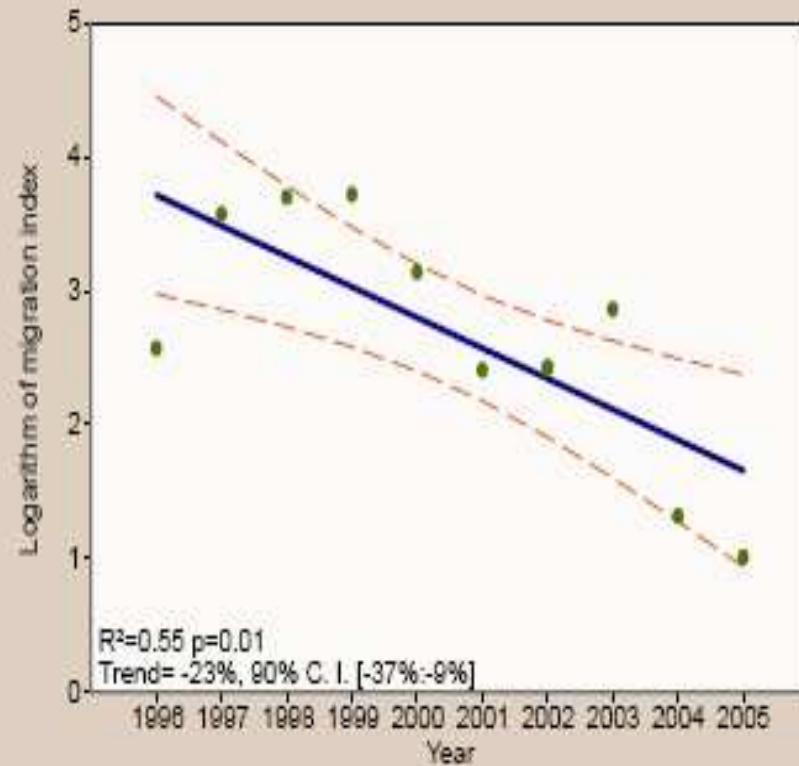
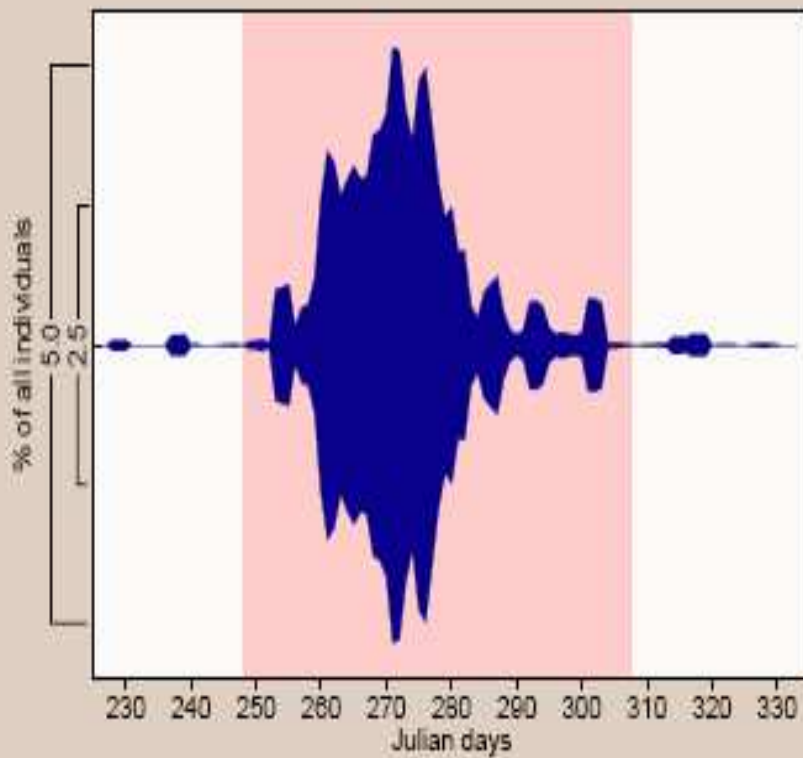
$$R^2 = 0.24$$



- Similarly, the Tadoussac observatory data suggest a greater decline
($R^2 = 0.55$, $p = 0.01$)
- with a trend of -23%
(90% CI: -37% to -9%)



Rusty Blackbirds Trend at OOT



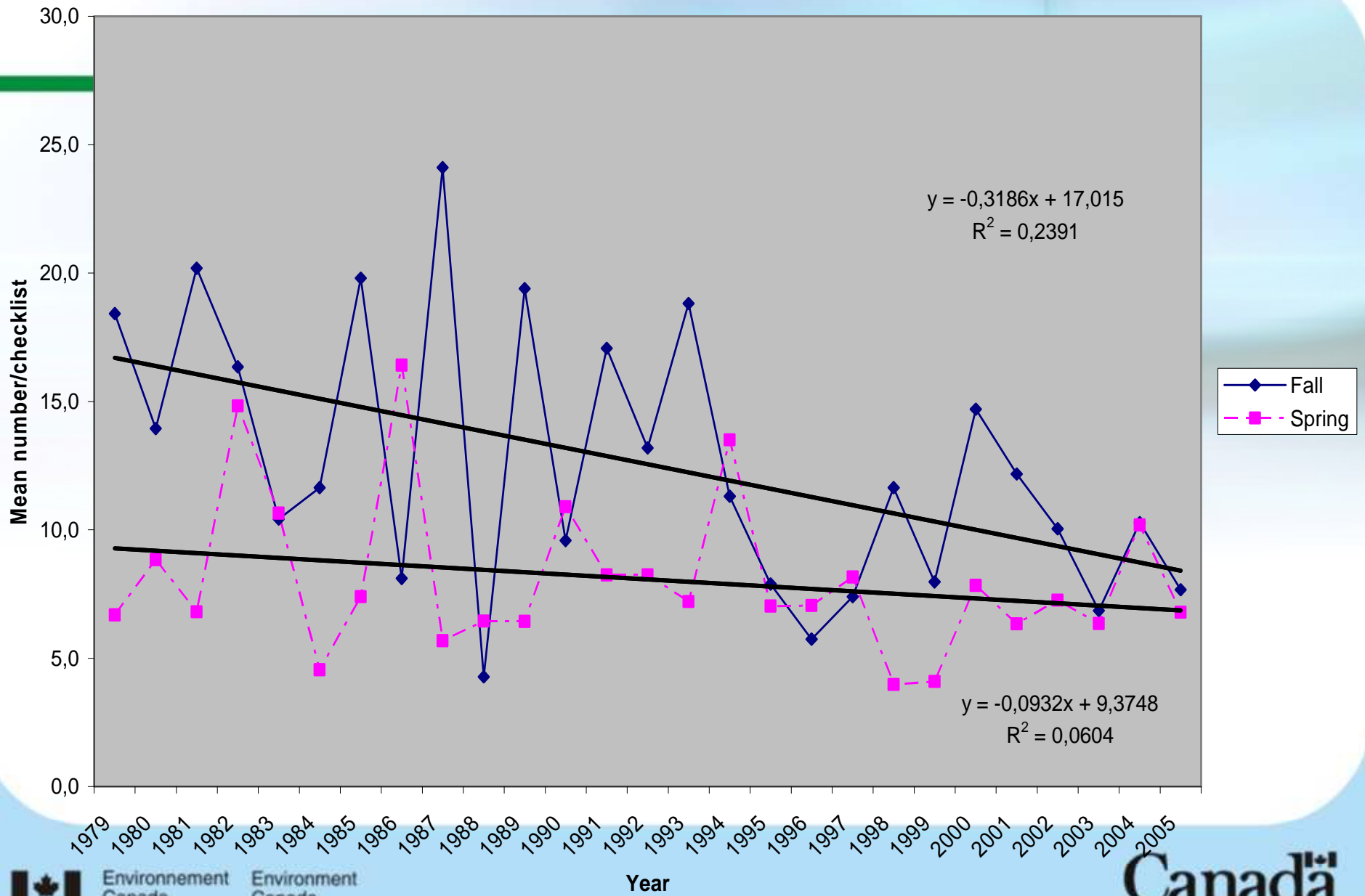
- It should be noted that the area covered by the Tadoussac observatory is much smaller than that covered by the ÉPOQ data base.
- There was no significant correlation between ÉPOQ and Tadoussac data: $R^2 = -0.11$, $n = 10$ years



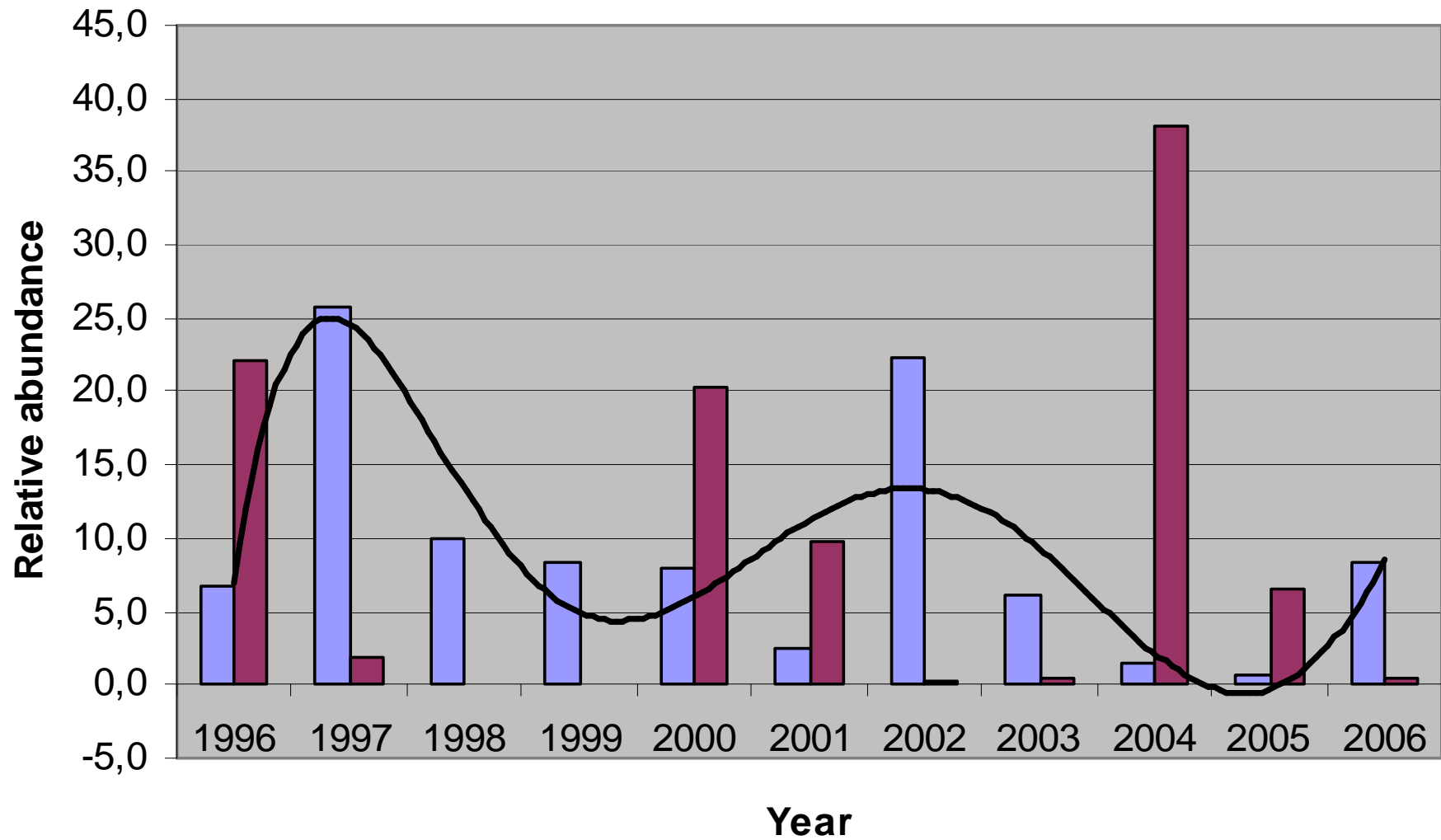
- Because the Tadoussac observatory samples a smaller portion of the boreal forest, it is likely that it provides a more sensitive picture of yearly fluctuations in the Rusty Blackbird reproductive success.



Trend in Rusty Blackbird number in Québec

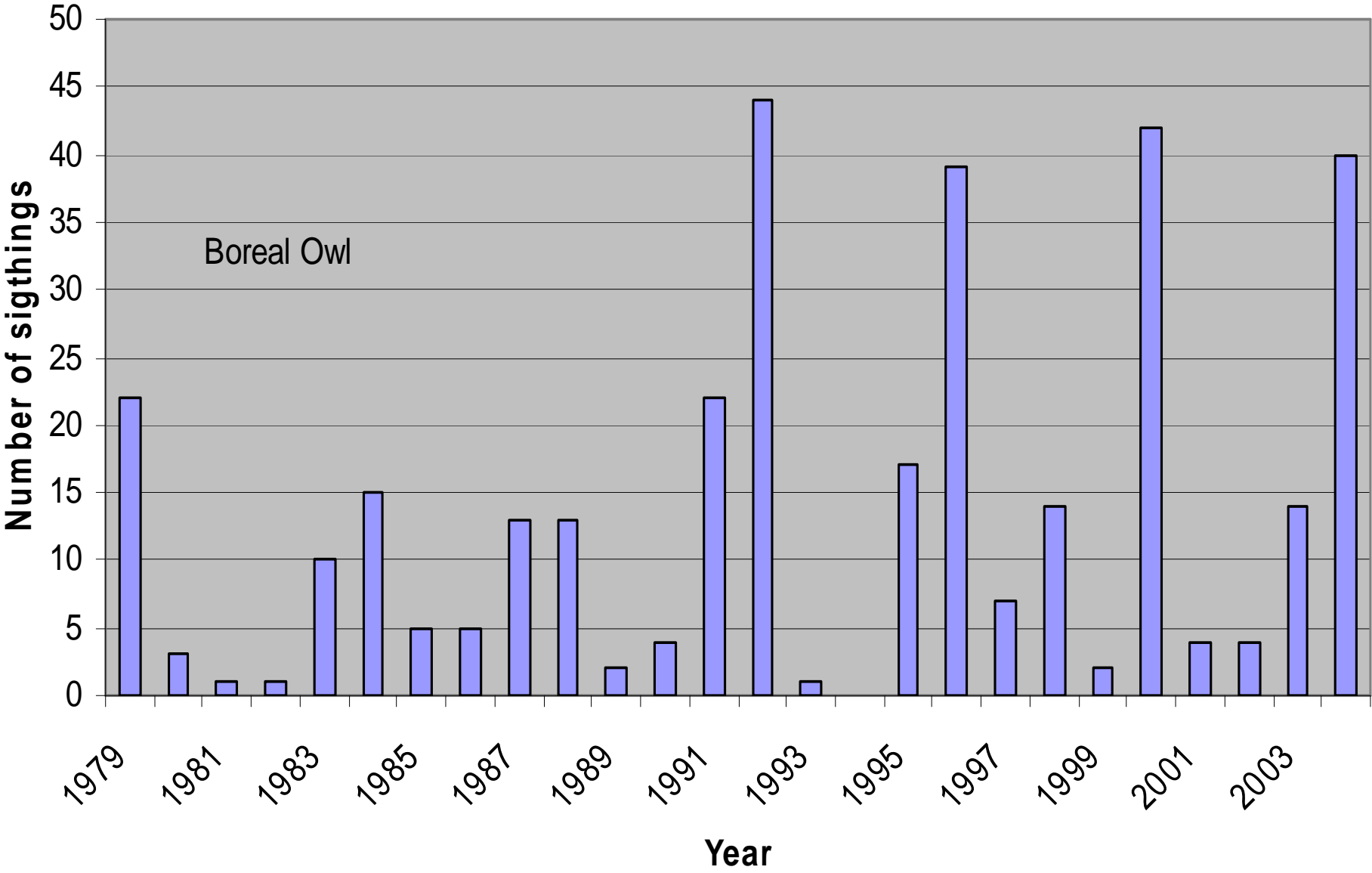


Data from the Observatoire d'oiseaux de Tadoussac



■ Rusty Blackbird ■ Boreal Owl — Poly. (Rusty Blackbird)

Data from the ÉPOQ data base



Rusty Blackbird



Photo: Samuel Denault



- The two large Rusty Blackbird movements recorded at the Tadoussac observatory occurred after a massive movement of Boreal Owls out of the boreal forest



- The relationship between Boreal Owl and Red-backed Vole abundances is well documented: Boreal Owls move out of the boreal forest in years of low vole abundance, which occurs approximately every four years.



- In years of low vole abundance, small predators such as the Pine Marten and other weasels, as well as avian predators, prey more on birds, have lower reproductive success, and greater mortality rates.
- Predation on birds by weasels has been shown to be inversely correlated with vole density.



- Peaks in Rusty Blackbird numbers that occur 1-2 years following those of the Boreal Owls movements suggest that productivity is strongly limited by predation (adults and nests) in the boreal forest, except in years when vole populations start to increase and small predators are at their lowest density.



- Such cyclic reproductive success in parts of the boreal forest could explain why the Rusty Blackbird is more vulnerable to control programmes than other blackbirds, whose reproductive success does not vary as much.



- The boreal forest is characterised by several abundance cycles:
 - Seed and fruit production: 2 years
 - Small mammal cycles: 4 years
 - American Hare cycles: 10 years
- These cycles affect prey and predator abundance, as well as reproductive success.
- Most species breeding in the boreal forest are affected by these fluctuations



Thank you



Merci!

