

Island or rooftop: which is the best for gulls?

Bernard Cadiou¹, Gwenael Derian², Matthieu Fortin³, H  l  ne Mah  o⁴, Pascal Provost⁵, Philippe Qu  r  ⁶, Pierre Y  sou⁷

¹ Bretagne Vivante - SEPNEB, 19 rue de Gouesnou, BP 62132, F-29221 Brest Cedex 2, France
bernard.cadiou@bretagne-vivante.org @bernard_cadiou



² 3 impasse de la Chataignerie, 56690 Nostang; ³ Bretagne Vivante - SEPNEB,

R  serve naturelle des marais de S  n  , Brou  l Kerbihan, 56860 S  n  ; ⁴ Parc naturel marin d'Iroise, Pointe des Renards, 29217 Le Conquet; ⁵ R  serve Naturelle Nationale des Sept-  les, Station LPO de l'  le-Grande, 22560 Pleumeur-Bodou;

⁶ Grand Site Cap d'Erquy - Cap Fr  hel, 16 rue Notre Dame, 22240 Pl  venen; ⁷ International expert (retired), 3 rue de Ch  teaulin, 44000 Nantes

Contrasting demographic trends between urban and natural colonies

Roof-nesting by different gull species is recorded in many countries. In France, the first cases were noticed in the 1970s. Since then, the colonization of towns and industrial sites has developed considerably, first on the coast and then inland. This phenomenon is particularly important in Brittany where, currently, about sixty municipalities are concerned.

Herring Gull *Larus argentatus* is the more abundant in urban colonies, followed by Lesser Black-backed Gull *L. fuscus* and Great Black-backed Gull *L. marinus*, with 7,600, 750 and 150 breeding pairs (bp) respectively in 2009-2012 in Brittany, representing 28%, 4% and 3% of their whole regional populations. While all the natural colonies are coastal, some urban colonies are located inland (Fig. 1).

The demographic growth in urban colonies contrasts sharply with the decline recorded in breeding numbers of Herring Gull in natural ones, as exemplified by the following cases:

- Mol  ne archipelago, 91% decline, from 5,801 bp in 1988 to 534 bp in 2015, i.e. -8% per annum;
- Glenan archipelago, 76% decline, from 5,816 bp in 1988 to 1,388 bp in 2009, i.e. -7% per annum;
- Sept-  les archipelago, 76% decline, from 7,210 bp in 1965 to 1,755 bp in 2014, i.e. -3% per annum.

Contrasting, the regional urban population has grown from c. 76 bp in 1979 to c. 7,600 bp in 2012, i.e. +15% per annum (Fig. 2).

Four of the nine largest colonies of Herring Gull in Brittany, i.e. exceeding 500 bp, are presently located on rooftops (c. 2,300 bp in Lorient) while the two largest natural colonies each account for c. 1,000 bp (Fig. 1). If these contrasting trends continue in the near future, c. 50% of Herring Gulls in Brittany might be breeding in urban areas by 2020-2025 (Fig. 2).

Increasing roof-nesting gulls have led to conflict with humans, especially due to noise and droppings, as well as localized damage to rooftops or aggressive behaviour toward people approaching nests. Many municipalities and industrial sites have initiated egg-oiling campaigns since the mid-1990s. These campaigns led to mixed results, however, with local decline at the scale of the treated areas leading to dispersion and emigration to other areas within the same town or to neighbouring towns. Thus egg-oiling campaigns have markedly contributed to the establishment of new urban colonies (see also Rock 2005).

In the city of Brest, an egg-oiling campaign was launched in 1993 and conducted annually since then. The whole number of gulls appears to be stabilized at c. 1,000 bp (mainly Herring Gulls with also about 100 bp of Lesser Black-backed Gulls and less than 10 bp of Great Black-backed Gulls). However, over this period gulls have continuously moved and relocated to new, yet untreated, areas in the town.



Natural colony in Sept-  les archipelago and roof-nesting colony in Concarneau

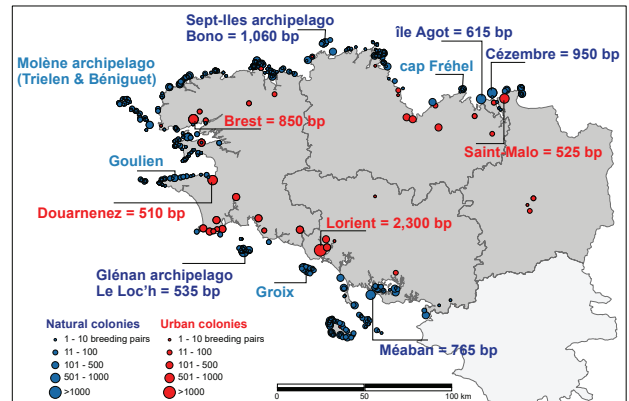


Figure 1. Distribution of natural and urban colonies of Herring Gull in Brittany in 2009-2012 (and location of study colonies mentioned in the text and in Fig. 3)

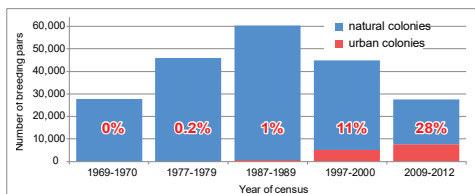


Figure 2. Population trends of Herring Gulls nesting in natural and urban colonies in Brittany (in breeding pairs with associated percentages of urban gulls)

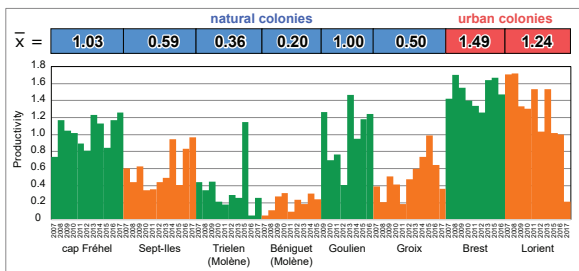


Figure 3. Annual and average productivity of Herring Gulls in natural and urban colonies in Brittany from 2007 to 2017 (see Fig. 1 for location of study colonies)

Further studies are needed

Studies are needed to obtain more precise data on food and foraging ecology, survival, natal and breeding dispersal, comparing urban and natural colonies.

• **Food and foraging areas:** Are urban food resources, e.g. in rubbish bins or earthworms in lawns, sufficient for the local breeders and their young? Is there a difference in abundance and quality of the diet between natural and urban colonies? Tracking birds with GPS can help identify where their feeding areas are and what their diet is.

• **Young and adult survival:** Is there any difference between birds born or breeding in natural and urban colonies? For example, prolonged parental care in urban colonies could influence first year survival.

A ringing programme on urban and natural colonies has been carried out in Southern Brittany since 2015 and would provide data on survival, dispersal and recruitment.

It is essential to fill these knowledge gaps in order to better understand the growth rate observed in urban colonies and allow both a better control of urban populations and the conservation of gull species. This is particularly needed for the Herring Gull which now is on the Red List in some European countries.

Contrasting productivity between urban and natural colonies

Data from colonies located in different areas highlight that productivity is 2.2 greater in urban than in natural colonies, with on average 1.36 and 0.61 young fledged per pair respectively (Fig. 3). Since 2007, productivity higher than 1 chick fledged per pair was rarely recorded in natural colonies, where it more frequently was lower than 0.5 chick fledged per pair. The situation is opposite in urban colonies, with productivity almost always higher than 1 chick fledged per pair (one case of very low productivity at Lorient in 2017 was seemingly due to exceptional chick mortality during a period of heatwave).

Hypotheses to explain the contrasts between urban and natural colonies

Current hypotheses to explain the contrasted situation between urban and natural colonies are based on differences in the level of intra and interspecific predation and differences in abundance of food resources (Rock 2005, Cadiou & Y  sou 2006, Nager & O'Hanlon 2016).

Indeed, competition and predation by Great Black-backed Gull, or predation by American Mink *Neovison vison* or Red Fox *Vulpes vulpes*, appear to be involved locally in the decline of some natural colonies. Conversely, intra and interspecific predation appears to be low in urban colonies (see also Rock 2005).

A decrease in the accessibility and abundance of anthropogenic food resources, especially due to the closure of landfills and reduction in fishery discards, also appear to explain the decline in natural colonies. In urban colonies however, at least part of breeding gulls, which are opportunistic species, have exploited new habitats and new food resources.

Too many knowledge gaps however remain, not allowing to identify the explanatory factors with certainty as well as to prioritize them or to apprehend their interactions.

Acknowledgements



We are very grateful to all the observers, including a number of volunteers, involved annually in gull monitoring in Brittany. Financial support was provided by the Conseil R  gional de Bretagne, the French Ministry of Environment and the city of Brest.

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