

Black-headed Gull *Chroicocephalus ridibundus*

Summary

Black-headed Gull is projected to increase considerably in population size in the INTERREG VA area from 1998-2002 to 2050 under climate change, particularly in Dumfries & Galloway. Unusually, the projected trend in abundance was not matched by the trend in presence, and therefore abundance projections may be less reliable for this species. Overall, Black-headed Gull is projected (with poor confidence) to have high opportunity under climate change in the INTERREG VA area.

Table 1. Current (observed) and future (projected) Black-headed Gull population size (breeding pairs) in GB & Ireland, INTERREG VA area and MarPAMM management areas.

Area	1998-2002	Projection for 2050
UK & Ireland	141871	220934 ↑ 56%
INTERREG VA area	15633	37588 ↑ 140%
Argyll	668	1286 ↑ 93%
Co. Down – Co. Louth	2203	6184 ↑ 181%
N Coast Ireland – N Channel	3641	6902 ↑ 90%
Outer Hebrides	1011	2381 ↑ 136%

Under climate change, Black-headed Gull **population size** is projected to **increase** considerably in the INTERREG VA area between 1998-2002 and 2050, at an even higher rate than across Britain and Ireland as a whole (Table 1, Fig. 2a).

Black-headed Gull is projected to **increase** in **abundance** almost everywhere across the INTERREG VA area, but at a particularly high rate in Dumfries & Galloway (Fig. 2a). Unusually, the projected change in presence (Fig. 2b) was opposite that of the projected change in abundance, suggesting that there may be little new colonisation, and even that the abundance projections may be unreliable.

This work was produced as part of the Marine Protected Area Management and Monitoring (MarPAMM) project. MarPAMM has been supported by the European Union's INTERREG VA Programme, managed by the Special EU Programmes Body.

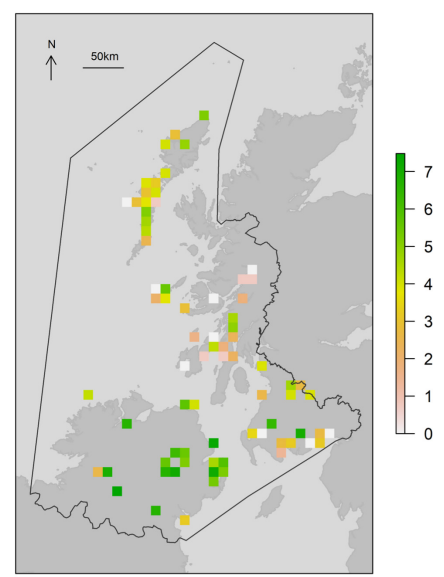
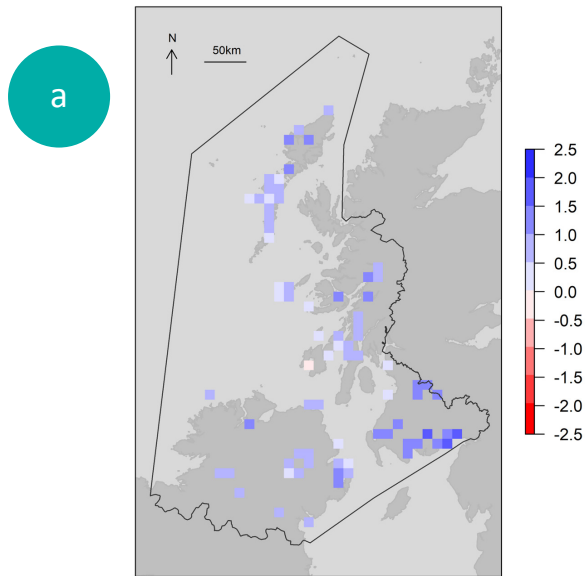


Figure 1. Observed Black-headed Gull abundance (log breeding pairs), 1998-2002. Black polygon = INTERREG VA area.

Projected change in breeding pairs



Projected change in presence probability

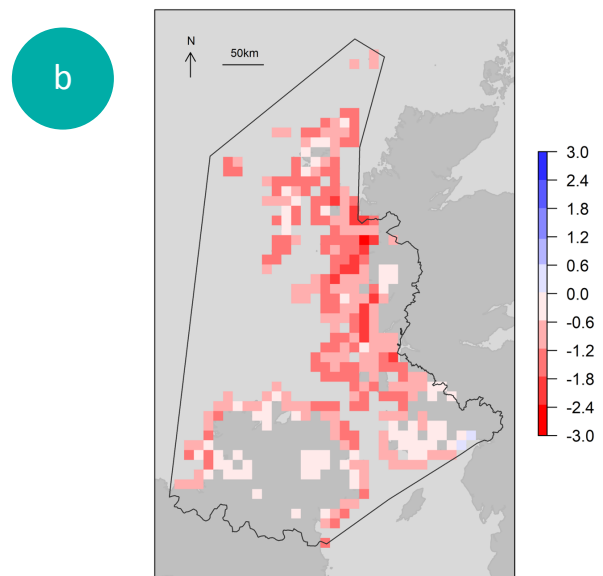


Figure 2. Projected change (1998-2002 to 2050; log proportional change) in: a) Black-headed Gull breeding pairs, for all cells where Black-headed Gull was present in 1998-2002; (b) Black-headed Gull presence probability for all squares where any seabird was censused in 1985-1988 or 1998-2002. White/blue = increase, red = decrease. Black polygon = INTERREG VA area.

Model predictive power was good for the presence/absence component of the model, but poor for the abundance component*. Black-headed Gull presence/absence and abundance had significant relationships with terrestrial climate, oceanographic and nuisance variables (Table 2).



Table 2. Effect on presence and abundance for significant variables in model*. Variables included in table if significant in at least one model component; field left blank if variable not significant in that model component. Variables shown in parentheses represent quadratic terms. Projections made using full model (i.e. not just significant variables).

Variable	Presence	Abundance
Breeding season maximum temperature		+
(Breeding season maximum temperature) ²		+
Winter minimum temperature	-	-
Breeding season precipitation	-	-
(Breeding season precipitation) ²	+	
Breeding season potential energy anomaly	-	
Breeding season sea surface temperature		+
(Breeding season sea surface temperature) ²	+	
Coast length	+	
Distance inside coast	+	

Table 3. Projected change for Black-headed Gull at the ten sites with the most breeding pairs in 1998-2002. Sites are as defined in Seabird 2000 census. Superscript denotes MarPAMM management region, where applicable: A, Argyll; B, Co. Down - Co. Louth; C, North Coast Ireland - North Channel; D, Outer Hebrides.

Site	Breeding pairs, 1998-2002 (count)	Projected breeding pairs, 2050 (median & 95% CI*)	Projected % change in breeding pairs (median & 95% CI*)
Lower Lough Erne	2560	4790 (1229, 18569)	+87.1 (-52, +625.4)
Strangford Lough ^B	1806	5575 (852, 27474)	+208.7 (-52.8, +1421.3)
Larne Lough ^C	1478	2257 (79, 21794)	+52.7 (-94.7, +1374.6)
Lough Neagh – Armagh sites	1262	2320 (170, 18207)	+83.8 (-86.6, +1342.7)
Loch Ken	1145	6754 (1306, 28184)	+489.9 (+14.1, +2361.5)
Lough Neagh – Tyrone sites	1070	1637 (457, 5368)	+53 (-57.3, +401.7)
Lough Neagh – Antrim sites ^C	937	1664 (311, 8080)	+77.6 (-66.9, +762.3)
Inch Island ^C	800	2178 (407, 11286)	+172.2 (-49.1, +1310.7)
Monaghan Lakes	800	1330 (229, 7253)	+66.3 (-71.4, +806.7)
Loch Moan	550	2047 (239, 15318)	+272.1 (-56.5, +2685)

* See main report for details of modelling, variables, categories of model predictive power and derivation of confidence intervals for projections.

Climate Change Mechanisms

The review of climate change mechanisms affecting seabirds (Johnston et al. 2021) identified that gulls as a group are typically influenced indirectly by climatic variation, mediated through food supply. Low-lying gull nests are susceptible to flooding, and so sea level rise or increased storminess under climate change may reduce population size or productivity. Black-headed Gull breeding success can be negatively influenced by cold spring temperatures.

Overall, climate change is projected (with **poor confidence**) to present Black-headed Gull with **low risk** and **high opportunity** in the INTERREG VA area.

Citation: Black-headed Gull species factsheet. From Davies, J.G., Humphreys, E.M. & Pearce-Higgins, J.W. 2021. Projected future vulnerability of seabirds within the INTERREG VA area to climate change. Report to Agri-Food and Biosciences Institute and Marine Scotland Science as part of the MarPAMM Project. BTO, Thetford



For more information on the MarPAMM project please visit the project website:

www.mpa-management.eu