Great Black-backed Gull *Larus marinus*

Summary

Great Black-backed Gull is projected to increase slightly in population size in the INTERREG VA area from 1998-2002 to 2050 under climate change, with some declines in the east of the area. Overall, climate change is projected (with poor confidence) to have low impact on great black-backed gull in the INTERREG VA area.

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

Area	1998-2002	Projection for 2050
GB & Ireland	19610	16417 ↓ -16%
INTERREG VA area	4953	5043 ↑ +2%
Argyll	1560	1699 ↑ +9%
Co. Down – Co. Louth	55	47 ↓ -15%
N Coast Ireland – N Channel	180	198 ↑ +10%
Outer Hebrides	2003	2021 ↑ +1%

Under climate change, Great Black-backed Gull **population size** is projected to **increase** slightly in the INTERREG VA area between 1998-2002 and 2050, contrasting with a projected decline across Britain and Ireland as a whole (Table 1, Fig. 2a).

Great Black-backed Gull **abundance** trend is projected to **vary** across the INTERREG VA area, with declines likely in the east of the area (Fig. 2a). It is unlikely that new sites will become more suitable for Great Black-backed Gull under climate change (Fig. 2b); therefore this projected slight increase in abundance is unlikely to be supplemented by additional colonisation.

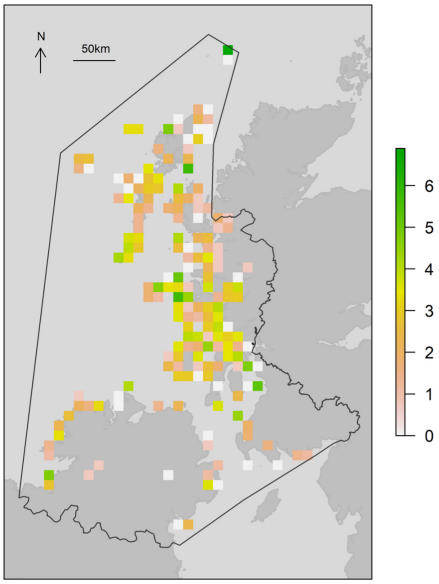

Figure 1. Observed Great Black-backed Gull abundance (log breeding pairs), 1998-2002. Black polygon = INTERREG VA area.

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.

Projected change in breeding pairs

Projected change in presence probability

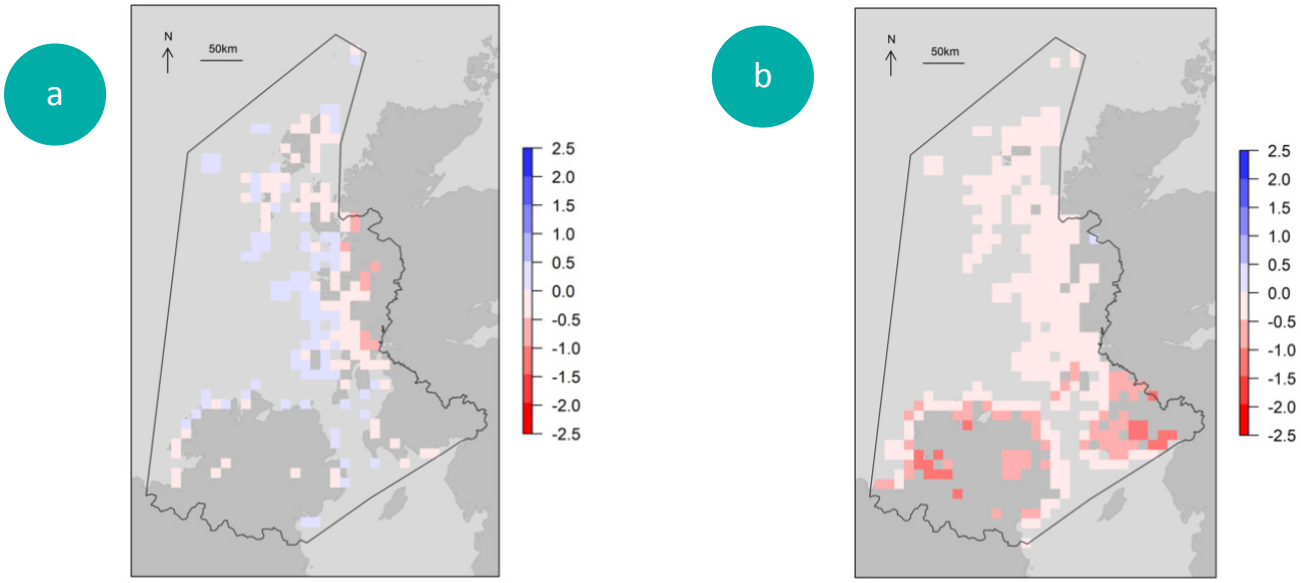

Figure 2. Projected change (1998-2002 to 2050; log proportional change) in: a) Great Black-backed Gull breeding pairs, for all cells where Great Black-backed Gull was present in 1998-2002; (b) Great Black-backed Gull presence probability for all squares where any seabird was censused in 1985-1988 or 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, and moderate for the abundance component*. Great Black-backed 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	-	-
Winter minimum temperature	+	+
Winter precipitation	-	-
Breeding season potential energy anomaly	-	
Winter potential energy anomaly	+	+
Bathymetry		+
$(\text{Bathymetry})^2$		-
Coast length	+	+
Distance inside coast		-
Small islands area		+

Table 3. Projected change for Great Black-backed 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*)
North Rona[D]	983	962 (218, 3540)	-2.1 (-77.8, +260.1)
Treshnish Isles[A]	342	407 (103, 1323)	+19.1 (-69.9, +286.8)
Shiant Islands[D]	310	304 (101, 781)	-2 (-67.3, +152)
Lady Isle	200	182 (43, 699)	-8.8 (-78.5, +249.4)
CollA	176	217 (55, 723)	+23.4 (-69, +310.7)
Loch Fyne	168	124 (40, 363)	-26.3 (-76, +116.1)
Mull[A]	154	142 (37, 481)	-7.6 (-75.7, +212.4)
Tiree[A]	139	177 (41, 634)	+27.7 (-70.5, +356.3)
Little Cumbrae	120	116 (32, 357)	-3.2 (-73.2, +197.4)
Inishmurray	117	115 (21, 462)	-2.1 (-82, +294.5)

* 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. In the north-west Atlantic, Great Black-backed Gull breeding success is negatively related to stratification due to cold SSTs, probably due to effects on food supply. In the north-east Atlantic, Great Black-backed Gull's range dynamics (both in the breeding season and in winter) are related to the NAO.

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

Citation: Species factsheet for Great Black-backed Gull. From Davies, J.G., Humphreys, E.M. & Pearce-Higgins, J.W. 2021. MarPAMM *Lot 5: Projected future vulnerability of seabirds within the INTERREG VA area to climate change. Report to Agri-Food and Biosciences Institute and Marine Scotland Science. BTO, Thetford.*

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

www.mpa-management.eu