Northern Ireland Seabird Report 2021

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Northern Ireland Seabird Report 2021

Contents

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Editorial

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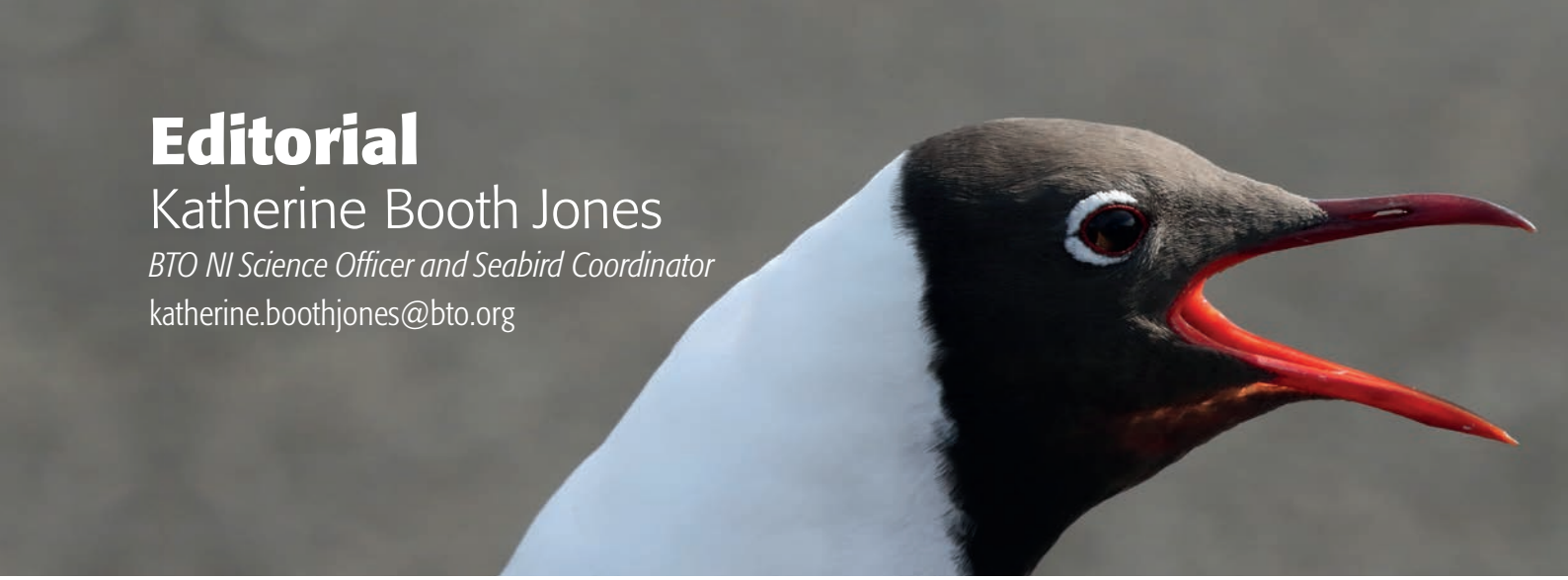


BLACK-HEADED GULL, BY NEAL WARNOCK

This is the ninth edition of the *Northern Ireland Seabird Report*, covering 2021. This report is the published outcome of the work of the Northern Ireland Seabird Network of volunteers, overseen by the British Trust for Ornithology (BTO) on behalf of the Northern Ireland Environment Agency (NIEA). As always, at the core of the Seabird Network in Northern Ireland are our surveyors. Some work for government bodies such as NIEA, and others on behalf of Non-Government Organisations (NGOs) such as Royal Society for the Protection of Birds (RSPB), Ulster Wildlife and the National Trust. All are important contributors through the provision of data for 2021 and previous years, and provide advice and guidance from their expert staff. I am grateful for their co-operation and assistance. Many other surveyors are volunteers who give their time freely to help. The amount and quality of work undertaken by volunteers in Northern Ireland is exemplary, and we are fortunate that many enthusiastic and talented people are part of the Northern Ireland Seabird Network. I would like to thank everyone who has contributed to this report. I would also like to thank NIEA for their continued financial support for both the Seabird Coordinator role and for the production of this annual report.

This 2021 report on breeding seabirds in Northern Ireland follows the format of the preceding reports. However, this year has been the second consecutive year affected by the COVID-19 pandemic. While lockdowns and health considerations did not hamper the season as much as in 2020, in a few cases surveys were not possible for some species and locations. With this caveat, I have kept the colony-level detail from previous years, even where data are absent or have changed little since our last report. It is important that this report represents a summary of current species knowledge, and that reference to other, earlier, reports is not necessary. In this we are taking a similar stance to the online Seabird Monitoring Programme (SMP) report published by the Joint Nature Conservation Committee (JNCC, 2021).

As in previous years, several articles by seabird researchers, conservationists and volunteers have been included. These provide further detail on seabird-related topics and highlight some of the exciting seabird research being undertaken in Northern Ireland and further afield. I am very grateful to the authors for giving their time to produce these articles.

One new addition to this year's report is a summary of the results of the INTERREG VA-funded Marine Protected Areas Management and Monitoring project (MarPAMM[1]), which funded a complete census of Rathlin Island and a section of the north Antrim coast between Runkerry and Murlough. These counts, and those collected by NIEA, NGOs and our NI Seabird Network volunteers will be an important addition to the UK- and Ireland-wide Seabirds Count census (2015–21), which has now drawn to a close.

Naturally this summary does not discuss all the data collected annually, but all records are of real value in understanding Northern Ireland's seabirds. A report such as this is only as robust as the data that we can collect, so if you have additional seabird population data, either recent or historic, then please share them with to me and the SMP (https://app.bto.org/seabirds/public/index.jsp). Although the national census period has closed, I would encourage volunteers to continue to monitor their seabirds, as long-term, annual data collection is exceedingly valuable in tracing the health of our marine ecosystems. In particular, breeding success data are rare in Northern Ireland, and therefore I would love to hear from anyone interested in contributing.

[1]The €6M MarPAMM project is supported by the European Union's INTERREG VA Programme, managed by the Special EU Programmes Body (SEUPB). https://www.mpa-management.eu

Seabird Monitoring Overview

GREAT CORMORANTS, BY KEVIN KIRKHAM

Seabird colony censuses in the UK and Ireland

There have been three national seabird censuses covering the UK and Ireland which have focussed on collecting abundance counts at colonies. The first, Operation Seafarer, was conducted in 1969 and 1970 by the then recently formed Seabird Group. More than 1,000 surveyors took part. The results were summarised in Cramp *et al.* (1974) *The Seabirds of Britain and Ireland*. Operation Seafarer was a major achievement and provided the first comprehensive and detailed account of the abundance and distribution of breeding seabirds in the UK and Ireland. However, Operation Seafarer also highlighted major problems in accurately counting some species, namely Storm Petrels *Hydrobates pelagicus*, Leach's Storm Petrels *Oceanodroma leucorhoa*, Manx Shearwaters *Puffinus puffinus*, Razorbills *Alca torda*, Common Guillemots *Uria aalge*, Black Guillemots *Cepphus grylle* and Atlantic Puffins *Fratercula arctica*.

The second census, known as the Seabird Colony Register (SCR), was instigated by the then Nature Conservancy Council and the Seabird Group. Most fieldwork was carried out from 1985 to 1988. The results were published in Lloyd *et al.* (1991) *The Status of Seabirds in Britain and Ireland*. The SCR provided the first assessment of nationwide trends through comparison with results from Operation Seafarer. Recently developed survey techniques provided more reliable baseline estimates for Common Guillemot, Razorbill and Black Guillemot and served as the foundation for future monitoring of seabird populations. Crucially it also allowed the national importance of individual colonies to be compared, and for sites to be designated as Special Protection Areas (SPAs) under the EC 'Birds Directive'. A legacy of the Seabird Colony Register was the establishment of the Seabird Monitoring Programme (SMP, see below).

The third national census was Seabird 2000. It was co-ordinated by the Joint Nature Conservation Committee (JNCC) in partnership with other organisations: Scottish Natural Heritage (SNH), Countryside Council for Wales (CCW), Natural England (NE), NIEA, RSPB, the Seabird Group, Shetland Oil Terminal Environmental Advisory Group (SOTEAG), Birdwatch Ireland, and National Parks and Wildlife Service (Dept. of Environment, Heritage and Local Government, Republic of Ireland). Fieldwork was carried out from 1998 to 2002. Seabird 2000 provided population information on the 24 species of seabird which regularly breed in the UK and Ireland, estimating that over eight million seabirds breed in Britain and Ireland each year. Coverage was as comprehensive as possible and included, for the first time, counts of inland colonies. The updated population estimates contributed to the monitoring of existing, and identification of new SPAs, while providing updated national trends. Seabird 2000 used – at that time recently developed – playback techniques and therefore was able to provide reliable baseline estimates for petrel and shearwater populations. The results were published in Mitchell *et al.* (2004) *Seabird Populations of Britain and Ireland* and demonstrated that the seabird assemblage that breeds here is of great international importance.

The fourth national census, Seabirds Count (https://jncc.gov.uk/our-work/breeding-seabird-national-censuses), was developed by the SMP Partnership and was coordinated by JNCC. Data collection for the census was undertaken between 2015 and 2021, after delays caused by the COVID-19 pandemic required an extension from 2020. Also postponed from 2020 to 2021, the MarPAMM project supported census efforts in Northern Ireland and western Scotland. In Northern Ireland, Rathlin Island and the coastline between Runkerry and Murlough in Co. Antrim were surveyed by the BTO for MarPAMM, as these areas required intensive boat- and land-based survey techniques, which are very difficult to cover through volunteer effort. Throughout this report where

MarPAMM census counts are referred to, the full results can be found in Booth Jones *et al.* (2022). On top of the professional coverage required for these difficult areas, the continued support of the volunteer Northern Ireland Seabird Network who contribute to this report annually has played a vital role in filling monitoring gaps.

The Seabird Monitoring Programme (SMP)

Since 1986, seabird populations in the UK and Ireland have been monitored through the SMP (https://jncc.gov.uk/our-work/seabird-monitoring-programme) coordinated on behalf of partnership organisations by JNCC. Annual data on breeding abundance and breeding success of seabirds are collected from a large network of sites, both regionally and nationally, to enable species' conservation status to be assessed. To examine trends at individual colonies, at country level and across the whole UK, it is essential that sites can be monitored consistently for many years.

Data on breeding abundance – the number of breeding pairs or individuals – provide a medium to long-term measure of how populations are faring. Data on breeding success/productivity – the number of chicks fledged per breeding pair – are regarded as a short term or more immediate measure of changes in the wider environment (Parsons *et al.*, 2008).

Studies at the four SMP key sites (Isle of May, Canna, Fair Isle and Skomer) provide extra information on adult survival, and for a limited number of species, on diet and phenology, which are used to help to diagnose the changes in abundance. Additional data on survival rates at other sites is collected through the BTO's Retrapping Adults for Survival (RAS) scheme (Horswill *et al.*, 2016), although there are only two current RAS sites for seabirds in Northern Ireland.

The SMP generates modelled annual indices of abundance and breeding success from these data, which are reported online (JNCC, 2021: https://jncc.gov.uk/our-work/smp-report-1986-2019). Where possible trends are given at the scale of the UK- or country/regional-level, but where coverage is only possible at individual sites, the indices are shown at the site level. The SMP is a vital programme for monitoring seabird population trends between the full national censuses.

Why monitor seabirds?

The SMP enables its partners to monitor the health of the marine environment and inform seabird conservation issues. Monitoring seabirds is important for several reasons:

- seabirds are an important component of marine biodiversity in the UK;
- seabirds are top predators and a useful indicator of the state of marine ecosystems;
- human activities impact upon seabirds, both positively and negatively, and these effects should be monitored;
- the UK is internationally important for seabirds;
- seabirds are protected by law and the UK has obligations to monitor and protect populations; and
- monitoring provides data which underpin targeted conservation policy development and action.

The Northern Ireland Seabird Coordinator role

In 2013, NIEA initiated funding for a 'Northern Ireland Seabird Coordinator' post at BTO. The main aim of the Seabird Coordinator is to facilitate an increase in annual seabird monitoring across Northern Ireland. Critical to this is the active support and engagement of volunteer seabird monitors (the Northern Ireland Seabird Network), who collect much of the seabird data in Northern Ireland. The Coordinator works closely with JNCC to ensure that all monitoring data collected by volunteers feeds into the SMP online database (http://jncc.defra.gov.uk/smp), which has included the creation of a definitive register of Northern Ireland sites (see below). The role also includes the compilation of an annual report on the state of seabird populations (this report), with input from the Northern Ireland Seabird Steering Group, consisting of independent experts, the RSPB, the National Trust and NIEA. The Steering Group also advises on the programme of activities for the Coordinator, the development of the Northern Ireland Strategy for Seabird Monitoring, and the evolution of the Northern Ireland Seabird Network. The initial five-year plan has now been extended to 2023 and the Seabird Coordinator role is included in the duties of the BTO Senior Research Ecologist for Northern Ireland. This role is unique and provides an exemplar for better support and co-ordination of annual monitoring of seabirds in Britain and Ireland.

The Northern Ireland Strategy for Seabird Monitoring

In 2013, a strategy for seabird monitoring in Northern Ireland was developed (Northern Ireland Seabird Data Collection Strategy 2014–19, unpublished report to NIEA). The strategy provided the context and set minimum requirements for the annual monitoring of breeding seabirds in Northern Ireland to facilitate effective management of this natural resource. It focused on the monitoring of populations and productivity in Northern Ireland while also facilitating further detailed studies of those populations. The main objectives were:

- to identify priorities for seabird monitoring in Northern Ireland;
- to identify priorities for seabird research in Northern Ireland;
- to gather data which will assist NIEA and conservation NGOs in managing protected seabird species and habitats;
- to increase the number of seabird breeding sites monitored annually; and
- to increase the number of people involved in seabird monitoring in Northern Ireland.

The strategy for 2014–19 was held in place during 2020–21 due to the ongoing COVID-19 pandemic and the impact of this on seabird monitoring and the Seabirds Count census. However, looking forward the DAERA Marine and Fisheries Department, in collaboration with an advisory group of stakeholders, aims to develop a Northern Ireland Seabird Conservation Strategy. This strategy aims to identify and address monitoring gaps and priorities and will therefore inform seabird monitoring in Northern Ireland in from 2023 onwards.

The Northern Ireland sites register

During 2013, a full register of all known, possible or potential seabird nesting sites, consistent with the SMP site register, was created by the Northern Ireland Seabird Coordinator and which provided definitive spatial boundaries for each site. This means that every part of the Northern Ireland coastline now has a recording section for data entry in the SMP online database. All known inland sites are also listed. Sites are grouped by general area into ‘Master Sites’. Master Sites usually can contain a number of different sub-sites, for example along stretch of coastline or in a large lough, or they might contain just one site, for example a small, isolated lough. Due to legacy issues from historical record keeping and the way data are held in the SMP online database, a separate site register is maintained for Black Guillemot.

Breeding Seabirds in Northern Ireland in 2021

Katherine Booth Jones

BTO NI Science Officer and Seabird Coordinator

NORTHERN FULMAR, BY KEVIN KIRKHAM

The following species accounts summarise the known status of each breeding seabird species in Northern Ireland (see Table 1). The accounts also provide a summary of population trends at the main breeding sites, where data exists. These data were collected by many volunteers and site wardens across Northern Ireland and a list of those contributors is given at the end of this report. Many other people have contributed records from the 1960s onwards, when concerted monitoring began for some species.

Table 1: Seabird species breeding in Northern Ireland

Species	NI Priority[1]	BoCCI Status[2]	UK BoCC[3]	IUCN Red List[4] (Europe)
Northern Fulmar	N	AMBER	AMBER	Vulnerable
Manx Shearwater	N	AMBER	AMBER	Least Concern
European Storm Petrel*	N	AMBER	AMBER	Least Concern
Great Cormorant	N	AMBER	GREEN	Least Concern
European Shag	N	AMBER	RED	Least Concern
Great Skua	N	AMBER	AMBER	Least Concern
Black-legged Kittiwake	N	RED	RED	Vulnerable
Black-headed Gull	Y	AMBER	AMBER	Least Concern
Mediterranean Gull	N	AMBER	AMBER	Least Concern
Common Gull	N	AMBER	AMBER	Least Concern
Lesser Black-backed Gull	N	AMBER	AMBER	Least Concern
Herring Gull	Y	AMBER	RED	Least Concern
Great Black-backed Gull	N	GREEN	AMBER	Least Concern
Little Tern*	Y	AMBER	AMBER	Least Concern
Sandwich Tern	N	AMBER	AMBER	Least Concern
Common Tern	N	AMBER	AMBER	Least Concern
Roseate Tern	Y	AMBER	RED	Least Concern
Arctic Tern	N	AMBER	AMBER	Least Concern
Common Guillemot	N	AMBER	AMBER	Least Concern
Razorbill	N	RED	AMBER	Least Concern
Black Guillemot	N	AMBER	AMBER	Least Concern
Atlantic Puffin	N	RED	RED	Endangered

[1]Northern Ireland Priority species are those identified during the preparation of the Northern Ireland Biodiversity Strategy (2002) and subsequently, using criteria set out by stakeholders (http://www.habitas.org.uk/priority); [2]Birds of Conservation Concern in Ireland 4 (Gilbert *et al.*, 2021); [3]UK Birds of Conservation Concern 5 (Stanbury *et al.,* 2021); Due to the delay in completion of Seabirds Count census surveys due to the COVID-19 pandemic, seabird status has not been revised for the BoCC5. [4] The IUCN Red List of Threatened Species 2021 (BirdLife International, 2021). * Not currently breeding, historical records only.

In Northern Ireland, the Birds of Conservation Concern Ireland (BoCCI) list is used for flagging species conservation issues (Gilbert *et al.*, 2021). Following the 2021 reassessment, three species were moved from the Amber list to the Red List in Ireland due to their conservation importance at an international level: Black-legged Kittiwake (Globally Vulnerable, IUCN), Atlantic Puffin (Endangered, IUCN) and Razorbill (Near Threatened, IUCN). Since the last assessment in 2013 (Colhoun & Cummins, 2013), declines were less severe for Herring Gull and Black-headed Gull populations, resulting in these moving from Red to Amber, and Great Black-backed Gulls moved from Amber- to Green-listed. The UK list, BoCC5, was also updated in 2021 but because the new Seabirds Count census results were not available, assessments of the status of seabird species were not updated (Stanbury *et al.*, 2021).

There are some notable differences between the All-Ireland BoCCI list (Gilbert *et al.*, 2021) and the UK Birds of Conservation Concern list (Stanbury *et al.*, 2021). In particular, European Shag (hereafter Shag), Herring Gull and Roseate Tern are Red-listed in the UK list, while Amber-listed in the Ireland list. Although data were lacking from important colonies at Rathlin Island and the Maidens in recent years, Shags appeared to stable in Northern Ireland, and likewise while Kittiwakes remained relatively stable or declined at a lower rate than the rest of the UK (Leonard, 2016a), their increased global conservation status has resulted in their move to the Red List in the BoCCI4 (Gilbert *et al.*, 2021). The Roseate Tern is not Red-listed on the island of Ireland as it is in the UK, since it supports the largest European colony for the species at Rockabill in Dublin (Leonard & Wolsey, 2016). Despite this, the Roseate Tern remains a precarious breeding species in Northern Ireland with only one confirmed breeding pair annually in recent years. Great Cormorants (hereafter Cormorant) are Amber-listed in the Ireland list compared Green-listed in the UK list due to the localised breeding criteria (more than 50% of the breeding population was found at 10 or fewer sites), and Razorbill are Red-listed in the Ireland list compared to Amber-listed in the UK list, again due to their increased global conservation status (Birdlife International, 2015) since the last UK-level assessment.

Seabird surveys of abundance and breeding success in the UK and Ireland are undertaken using standard survey guidelines for each species as described in in the SMP handbook (Walsh *et al.*, 1995). Tables 2 and 3 briefly outline the survey units and methods used for estimating the numbers of each species under consideration in Northern Ireland. For consistency and for convenience to volunteers in Northern Ireland we recommend following the methods and the timings outlined in Table 3 for recording seabird abundance.

Table 2: Units for surveys of seabird numbers/abundance.

Unit	Abbreviation	Description
Apparently Occupied Nest	AON	An active nest occupied by a bird, pair of birds, or with eggs or chicks present.
Apparently Occupied Territory	AOT	When nests cannot be discerned (e.g. for Great Skua), the presence of a nest may be inferred at the time of year when nests are likely to be complete or eggs are newly hatched by the presence of an incubating adult, or adult displaying territorial behaviour.
Apparently Occupied Site	AOS	An active site occupied by a bird, pair of birds, or with eggs or chicks present. Used for species without obvious nests such as Northern Fulmar.
Apparently Occupied Burrow	AOB	An apparently active and occupied burrow which may have a nest.
Individuals	IND	Individual birds.

Species accounts are structured as follows:

Overview – conservation status, a brief description of the species characteristics, population size estimates from censuses and SMP trends for abundance and breeding success for the UK as a whole and for Northern Ireland (available up to 2019: JNCC, 2021).

Abundance in 2021 – a summary of the latest data available on breeding abundance at monitored sites in Northern Ireland, with historical site-level trends where data are available. For species with sufficient site-level data for visualisation, abundance is plotted per year and data gaps represent a lack of survey coverage during that year for that site. Where data are available for the majority of years, a smoothed trend curve is fitted through the data points using a local polynomial regression fitting method ('loess') in the R package 'ggplot2', version 3.3.5 (R version 4.0.3). The curve is presented with a standard error 95% confidence interval at around the smoothed curve. For abundance data which represent the entire population of Northern Ireland (or near-to), for example, for Mediterranean Gulls and tern species, cumulative plots are given.

Table 3: A brief description of count methodology and timing based on Walsh *et al.* 1995. For an explanation of units, see Table 2.

Species	Unit	Notes
Northern Fulmar	AOS	Count between 09.00 and 17.30, and 15 May to 5 July. Apparently Occupied Sites are those ledges suitable for nesting with a bird present (Population–monitoring method 1, Walsh *et al.*, 1995).
Manx Shearwater	AOB	Late May to mid-June. Survey using tape playback between 09.00 and 17.00 (Population–monitoring method 2, Walsh *et al.*, 1995).
Great Cormorant	AON	Count period 15 May to 25 June (Population–monitoring method 1, Walsh *et al.*, 1995).
European Shag	AON	Count period 1 May to 25 June.
Great Skua	AOT	Count period late May to June.
Black-legged Kittiwake	AON	Count late May to mid-June. Only count completed nests with at least one adult attending.
All gull species	AON IND	Count late May to mid-June. Counts of adults on nests, or transects to count nests. Alternatively, flush counts of individual adults (Population–monitoring method 1, 3, or 5, Walsh *et al.*, 1995).
All tern species	AON IND	Count mid-June. Counts of adults on nests, or transects to count nests. Alternatively, flush counts of individual adults (Population–monitoring method 1, 2 or 3, Walsh *et al.*, 1995).
Common Guillemot	IND	Count between 08.00 and 16.00, and from 1–21 June, with ~5 repeats if possible. Birds on tidal rocks or sea excluded.
Razorbill	IND	Count between 08.00 and 16.00, and from 1–21 June, with ~5 repeats if possible. Birds on tidal rocks or sea excluded.
Black Guillemot	IND	Count any birds seen within c. 300 m of the shore and any on land, between 05.00 and 09.00, and from 26 March to 15 May.
Atlantic Puffin	IND	Ideally, AOS/AOB should be counted, following methods described in Walsh *et al.*, 1995. For small colonies, as may be present in Northern Ireland (outside of Rathlin Island), count individuals above ground, flying over the colony and birds within 200 m of the shore in April (Census-method 3, Walsh *et al.*, 1995). Evening or early morning visits will produce highest counts.
European Storm Petrel	AOB	European Storm Petrels do not currently breed in Northern Ireland, therefore no recommendations are specifically made here.

Breeding success in 2021 – a summary of the latest data available on site-level breeding success in Northern Ireland. For species with sufficient data for visualisation, productivity is plotted per year across sites for which productivity is monitored. In these plots, a trend curve is fitted through the data points using the methods described for breeding numbers above. However, it should be noted that these trends are based on small sample sizes and are not weighted for sample size per site and are therefore best used as a quick visual representation only and should be interpreted with caution.

A table detailing specific counts of breeding numbers at defined SMP Master Sites in Northern Ireland between 2015 and 2021 can be found in Table 8 in the Appendix on page 78.

Priority gaps in 2021 and onwards

There will always be sites that require professional effort or additional equipment to fully survey. Each year the Northern Ireland Seabird Steering Group meets to review coverage and the table below outlines sites and species of particular priority.

Table 4: Key seabird monitoring gaps identified by the Northern Ireland Seabird Steering Group in 2021.

Site	Difficulties and gaps	Planned coverage
Mew Island and Big Copeland, the Copeland Islands, Co. Down	Access requires landowner permissions and a boat. Big Copeland is a large island and requires experienced survey effort. The important gull and tern colonies on Mew and Big Copeland have not been surveyed in recent times.	No
The Gobbins, Co. Antrim	Boat-based surveys are essential and previously good annual coverage was achieved, providing both abundance and breeding success data.	No
The Skerries, Co. Antrim	Access is difficult, requires a boat and permission from the owner via NIEA.	Coverage achieved in 2021, but the islands would benefit from regular monitoring. This site may also host an unmonitored population of Black Guillemot.
Sheep Island, Co. Antrim	Access to the island itself is dangerous and surveying requires a boat. Views of breeding seabirds are limited from boat-based surveys. The full island is best surveyed using a drone.	Coverage achieved by drone in 2021 but the island would benefit from regular monitoring and more comprehensive coverage.
North and South Rock, Outer Ards, Co. Down	Small islands requiring a boat to observe nesting Cormorants and gulls.	No
The Maidens	Access by boat is difficult as the islands are surrounded by strong tides and there is no safe landing area. This site is important for Shag in Northern Ireland.	Good annual coverage for Black Guillemot, but no coverage for Shag.
Strangford Lough, Co. Down.	The complex system of islands in Strangford Lough may hold breeding Black Guillemots, however surveying these requires a boat.	No
Rathlin Island, the Skerries and Sheep Island	While mostly considered to be absent as breeding seabirds in Northern Ireland, European Storm Petrels are difficult to survey and may be present on islands such as Rathlin Island, the Skerries and Sheep Island. Playback equipment and access to a boat are necessary to survey European Storm Petrels.	No

Abundance data are the most commonly collected data in Northern Ireland and provide the most important measure of how our seabirds are faring through time. However, monitoring breeding success and adult survival provides the context by which potential environmental drivers such as climate change, prey availability and predation can be linked to population changes. In Northern Ireland, these data are sparse or non-existent for many species. There are great examples of volunteer-led breeding success monitoring currently underway in Northern Ireland, for example at Portrush and Maggy's Leap for Black-legged Kittiwake and for Black Guillemot at Annalong, while RSPB, National Trust and Ulster Wildlife provide invaluable breeding success information for the islands they monitor, particularly for terns. Despite these efforts, breeding success data have nevertheless not been collected recently for many other species. Now that the Seabirds Count census period is complete, the Northern Ireland Seabird Coordinator aims to increase support for volunteers wishing to collect these vital data. Monitoring adult survival is achieved through general metal ringing and colour-ringing studies (such as Retrapping Adults for Survival, RAS: https://www.bto.org/our-science/projects/ringing/surveys/ras), activities that are rare in Northern Ireland. BTO is currently developing training support to boost seabird ringing around the UK through the Seabird Appeal (https://www.bto.org/how-you-can-help/help-fund-our-work/appeals/our-lost-seabirds). Material is currently being developed which aims to encourage people to take up seabird ringing and offer support for setting up new seabird projects. Non-ringers can also contribute by reporting sightings of ringed birds (https://app.bto.org/euring/lang/pages/rings.jsp).

Get involved!

If you are interested in seabird monitoring in Northern Ireland, please get in touch with the Seabird Coordinator (katherine.boothjones@bto.org) to be added to the Northern Ireland Seabird Network. You can also find some simple introductions to monitoring common species in Northern Ireland in the following Google Drive online: https://bit.ly/NI_Seabird_Guidance, which are also available on request from the Seabird Coordinator.

You can see an interactive, zoomable version of the coverage maps online by following this link: https://bit.ly/NI_Seabird_Sites. The online maps are coloured by coverage and split between sites for 'all-seabirds' and for Black Guillemots, reflecting the division of the SMP database by these categories. If you 'click' on a site of interest it will be highlighted, showing the extent of the site, its name and information on whether it is currently assigned to a volunteer. Please explore these online maps if you are interested in contributing seabird monitoring data in Northern Ireland. If you would like help viewing these maps or would like to discuss coverage of any of the sites, please get in touch.

Northern Fulmar

Fulmarus glacialis

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in BoCC5 (2021), EC Birds Directive – migratory species, Vulnerable – IUCN Red List (Europe).

STEPHEN DUNBAR

Overview

Synopsis: Northern Fulmars (hereafter Fulmar) are tube-nosed seabirds around the size of a small gull that nest in loose cliff-based colonies. They can use relatively small cliff faces, sometimes several miles inland. They are non-migratory and can be seen all year round. The name Fulmar means 'foul gull' (Robinson, 2005).

UK population size, abundance and breeding success trends: Fulmars are very common in northern Britain. The UK population of Fulmar increased between the 1969–70 and 1985–88 censuses (from ~291,000 to 517,000 pairs) but remained stable between 1985–88 and 1998–2002 when 501,609 pairs were recorded. The latest UK breeding population estimate is 350,000 (195,000–680,000) (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). An increase in the use of commercial discards has been cited as one of the reasons for a massive increase in breeding range and population size across the North Atlantic in the 20th century (Mitchell *et al.*, 2004), and that changes in legislation around fisheries may be partly responsible for Fulmar declines (Bicknell *et al.*, 2013). The SMP report highlights that the index for 2019 was 37% below the baseline, the lowest since the index began in 1986 (JNCC, 2021). Fulmar has been upgraded from Green-listed to Amber-listed in the latest Birds of Conservation Concern Ireland due to an increase in their priority status across Europe (Gilbert *et al.*, 2021).

At the UK level, the annual productivity index has been variable but generally increasing since 2006 and in 2019 was 0.39 chicks/AOS (JNCC, 2021). Analysis of the SMP dataset by Cook and Robinson (2010) found that the mean breeding success of Fulmars had declined at a rate of 0.05 chicks per nest per year between 1986 and 2008. This equates to a decline in breeding success of 11%. Using available life history information (population size, clutch size, age at first breeding and survival rates of different age classes), Cook and Robinson (2010) predicted that the UK Fulmar population would decline by about 12% over 25 years.

Northern Ireland population size, abundance and breeding success trends: In Northern Ireland, Fulmars are a widespread breeding species, with the most important site being at Rathlin Island. Other notable sites were Downhill and Binevenagh on the north coast, although numbers here have declined, and The Gobbins and Muck Island on the east coast. Small numbers are scattered around the coast where suitable cliff habitat occurs. Between the 1985–88 and 1998–2002 censuses Fulmar numbers increased in Northern Ireland from 3,540 to 5,992 breeding pairs (Mitchell *et al.* 2004, JNCC, 2021). Since Seabird 2000, annual monitoring indicates that numbers in Northern Ireland have generally decreased, following the trend for the UK as a whole (JNCC, 2021).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

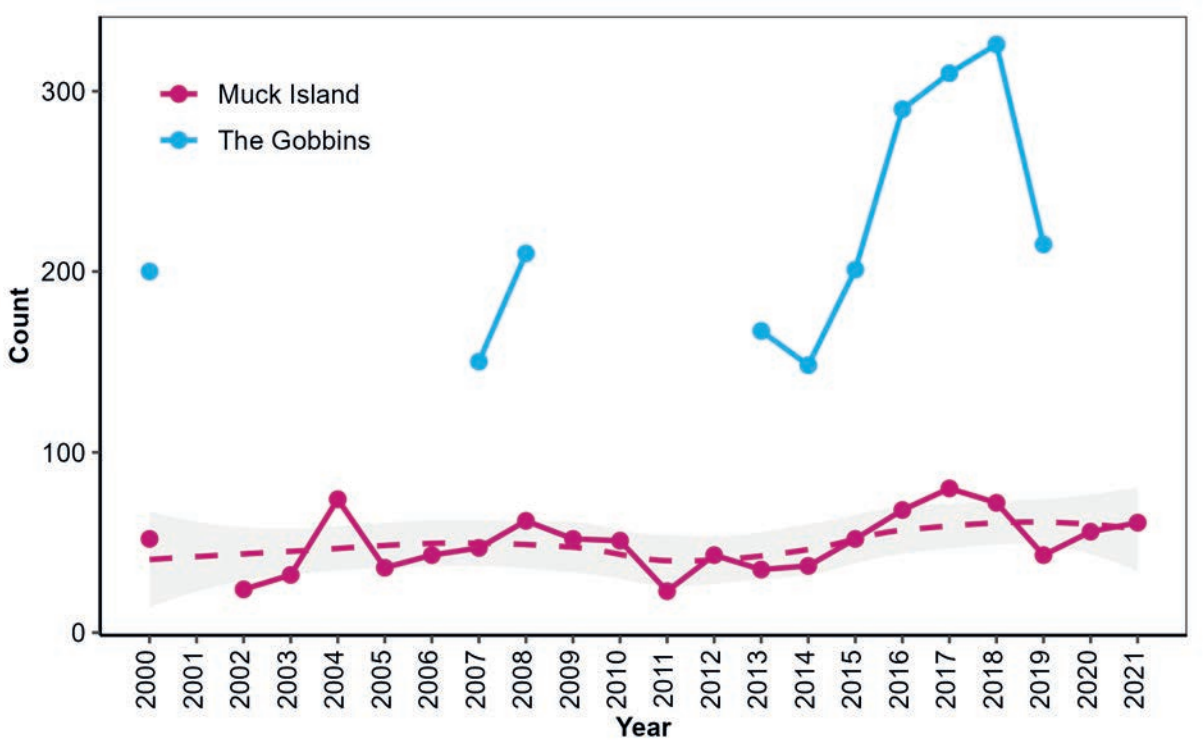
The final year of the Seabirds Count census spurred some significant effort on the north and east coasts to achieve good coverage. In particular, NIEA staff were able to cover Binevenagh (11 AOS) and Downhill (130 AOS) in Co. Londonderry. Counts of Fulmar at Downhill during the Seabirds Count census period (2015–21) have fluctuated (mean count 101 AOS, 95% CI: 75–127 AOS), but the peak count of these (made in 2016: 135 AOS) is well below the Seabird 2000 count of 995 AOS (86% decline). Binevenagh had not been surveyed since 2000, and since then Fulmar numbers have declined at the site by 95%. Sponsorship of a boat

survey by BTO volunteer and Trustee Steve Hunter and coverage by a NI Seabird Network volunteer team allowed a full survey of the Skerries, where 43 AOS were recorded.

A full census of Rathlin Island and of the north Antrim coastline between Runkerry and Murlough occurred as part of the MarPAMM project in 2021. On Rathlin, Fulmar had declined since the 1998–2002 census by 38% to 1,038 AOS, while between Runkerry and Murlough, Fulmar declined by 25% to 1,152 AOS.

Good coverage was achieved generally around the east Co. Antrim coast this year, where a low but relatively stable number of Fulmars was recorded. However, the colonies here are now 73% below Seabird 2000 counts. Numbers continued to decline at Black Head, dropping from 31 AOS recorded in 2019 and 19 AOS in 2020 to just 6 AOS this year (Table 8, Appendix). The Gobbins was not counted in 2020 or 2021 but declined sharply in numbers between 2018 and 2019 (Figure 1). However, neighbouring Muck Island was surveyed, with numbers reaching 61 AOS following a decline in 2019. Although this population is smaller than that of The Gobbins, Fulmar numbers here have shown a more stable trend since the 1998–2002 census (Figure 1).

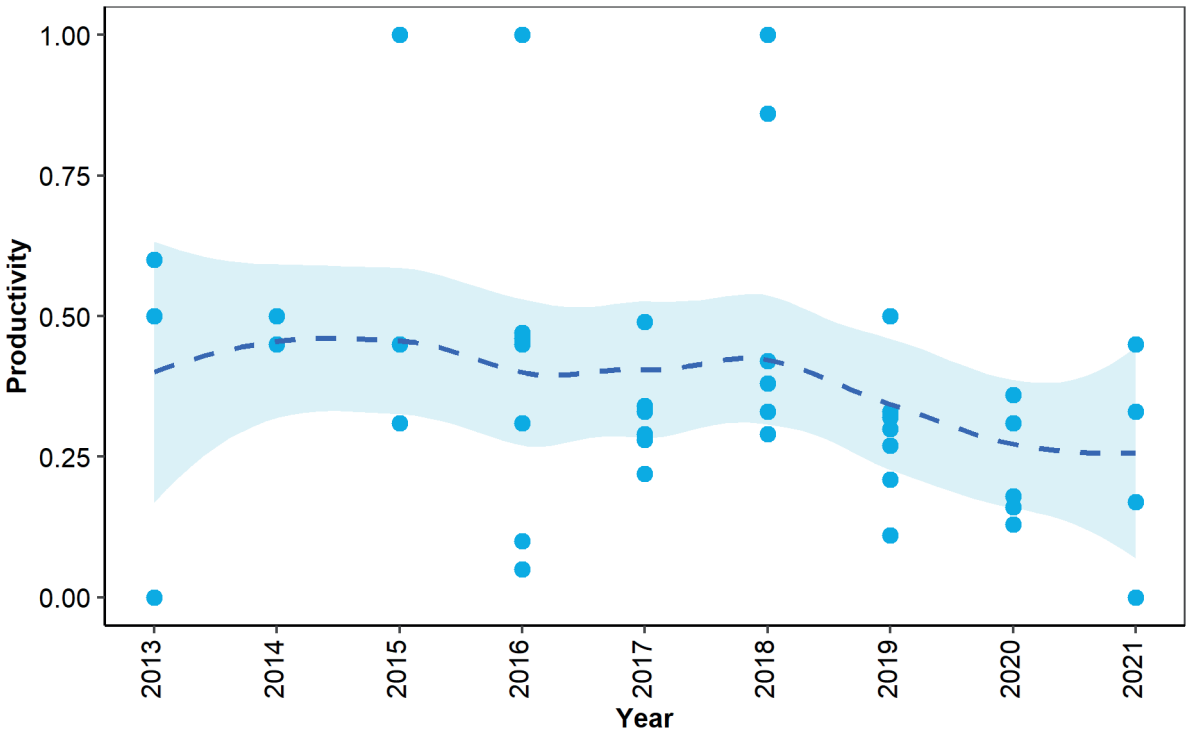
Figure 1: Fulmar counts (AOS) at Muck Island (purple) and The Gobbins (blue), 2000–21. The dashed line represents the Locally Weighted Least Squares Regression trend in Fulmar numbers over time at Muck Island (no trend for The Gobbins, due to missing data). The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

Over the past nine years, Fulmar productivity has been highly variable between Northern Irish colonies and breeding seasons (Figure 2). In 2021, Fulmar productivity was monitored at five sites along the north Co. Antrim coast. Figure 2 appears to show a slight decline in productivity among Fulmar colonies in Northern Ireland since 2013, but average productivity across the north coast sites between 2019, 2020 and 2021 was similar (0.29, 0.23 and 0.28, respectively). The lack of data from other sites around Northern Ireland in 2021 limits the inference that can be made on regional-level productivity.

Figure 2: Fulmar productivity (chicks/AOS) 2013–21 across a range of sites in Northern Ireland. Sites measured for Fulmar productivity include: Ballygalley Head, Lighthouse Island, Maggy's Leap, Muck Island, Portmuck, The Gobbins, sections of the North Coast master site, Park Head and Portnaboe. The dashed line represents the Locally Weighted Least Squares Regression trend in productivity over time. The shaded region represents the 95% confidence interval around the trend. The total number of nests monitored per year were: 2013 (unrecorded), 2014 (unrecorded), 2015 (101 AOS), 2016 (unrecorded), 2017 (201 AOS), 2018 (247 AOS), 2019 (375 AOS), 2020 (240 AOS), 2021 (197 AOS).



Manx Shearwater

Puffinus puffinus

Conservation status: Amber-listed in the BoCC4 (2020–26), Amber-listed in BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

SARAH KELMAN / BTO

Overview

Synopsis: Manx Shearwaters are burrow-nesting, tube-nosed seabirds. They are highly pelagic, spending most of the year at sea and only coming ashore under the cover of darkness to avoid avian predators. They are also the longest-living seabird recorded in the UK, with one recorded as at least 55 years old (Robinson, 2005).

UK population size, abundance and breeding success trends: Most of the world's population of Manx Shearwaters breeds in Britain and Ireland (Hamer & Hill, 1997; Mitchell *et al.*, 2004). At the time of the last census, an estimated 299,678 AOS were counted in the UK (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). However, the secretive, burrow nesting lifestyle of Manx Shearwaters makes them a difficult species to survey, and the breeding population of Manx Shearwater was only comprehensively surveyed for the first time during Seabird 2000 (1998–2002, Mitchell *et al.*, 2004). Annual changes in breeding abundance are not reported by the SMP, while changes in survey methods over time have meant that population trends from the censuses across the UK are not reliable. The largest colony in the world is on the island of Skomer in Wales. Recent surveys of strongholds in Wales and in Scotland suggest that the population of these islands may have increased by 50% to around 600,000 AOS since the last 1988–2002 census (JNCC, 2021).

Due to the difficulty in surveying Manx Shearwater burrows, few sites in the UK are monitored for productivity. Among these, average Manx Shearwater productivity was 0.65 chicks per pair per year between 1986 and 2019, and there is little year-to-year variation (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: The only confirmed extant colony in Northern Ireland is on the Copeland Islands, where there are birds on Lighthouse Island and Big Copeland. The Copeland Islands were surveyed in 2021, but figures are not yet available. During the previous survey in 2007 (Stewart & Leonard, 2007), there were approximately 3,444 AOB (95% CI: 2,620–4,269) on Lighthouse Island and 1,406 AOB (95% CI: 612–1,432) on Big Copeland. There was an apparent 5.3% increase on the previous survey in 2000, although the former survey result was within the confidence limits of the 2007 population estimate. The presence of European Rabbits (*Oryctolagus cuniculus*) on Mew for the last 15 years may have facilitated colonisation by breeding Manx Shearwaters due to the creation of suitable nesting burrows (Rhodes, 2017).

Rathlin Island formerly held a colony of unknown size (Brooke, 1990) but the species has not been confirmed breeding for many years (Liam McFaul, RSPB, pers. comm.) and surveys for Seabird 2000 (1998–2002) did not detect any birds (Mitchell *et al.*, 2004). Deane (1954) estimated 150 AOB on Rathlin Island but the Operation Seafarer (1969–70) figure was 1,000–10,000 AOB (Mitchell *et al.*, 2004). The inaccessibility of the cliffs and the cryptic nature of the species make these estimates unreliable. All that is certain is that a huge decline has occurred on the island, probably to extinction.

Breeding success was monitored on Lighthouse Island by Copeland Bird Observatory between 2007 and 2013, using study burrows. These consist of modified burrows with a concrete slab placed over the nesting chamber to allow easy access. In the seven years of monitoring, average breeding success on Copeland (0.74 chicks/AOB) was usually a little higher than at other sites in the UK (0.65 chicks/AOS, JNCC, 2021), although extremely wet weather in 2007 resulted in a success rate of just 0.38 chicks per pair.

Abundance in 2021

There is no annual surveying of Manx Shearwaters in Northern Ireland, but a census of the Copeland Islands was made as part of the MarPAMM project in 2021, with results to be reported in 2022. On Rathlin Island, calling birds were noted on a number of occasions on the north cliffs between May and July (RSPB).

Breeding success in 2021

No breeding success data are available for recent years. In 2018, a sample of study burrows on Lighthouse Island was monitored by the Oxford Navigation Group (https://www.oxnav.org) with the support of the Copeland Bird Observatory. Of the 117 burrows checked, 39 contained eggs and were shallow enough to follow to the chick rearing phase. In August (date not recorded), 30 of these study burrows contained chicks. If it is assumed that chick presence in August is a good (if slightly inflated) indicator of the number of fledged young (Tim Guilford, pers. comm.), the productivity of the sample of occupied nests in 2018 was 0.77 chicks per pair. Methods may not have been consistent with previous years monitoring; therefore, this estimated productivity has not been included in Table 5 for comparison.

Table 5: Manx Shearwater productivity at Copeland Bird Observatory.

Year	Nests sampled	Chicks hatched per pair	Chicks fledged per pair
2007	71	Not recorded	0.38
2008	67	0.70	0.67
2009	76	0.83	0.82
2010	65	0.88	0.88
2011	60	0.86	0.86
2012	50	0.78	0.76
2013	54	0.82	0.80

European Storm Petrel

Hydrobates pelagicus

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in BoCC5 (2021), EC Birds Directive – listed in Annex 1 and as a migratory species, Least concern – IUCN Red List (Europe).

JOE PENDER

Overview

Synopsis: European Storm Petrels (hereafter Storm Petrl) are sparrow-sized tube-nosed seabirds. They are highly pelagic, only returning to land to breed. They eat mostly plankton and small fish on the surface of the sea without alighting, almost appearing to walk on water, pattering across the water's surface (Robinson, 2005).

UK population size, abundance and breeding success trends: The UK breeding population of European Storm Petrel was only comprehensively surveyed for the first time during Seabird 2000 (1998–2002) using a standard playback method (Mitchell *et al.*, 2004; Ratcliffe *et al.*, 1998), when ~25,700 pairs were estimated (Mitchell *et al.*, 2004). Surveys for Storm Petrels are intensive and costly, and therefore rare, however recent surveys of Scottish islands suggest an increase in population size since the 1998–2002 census (JNCC, 2021). While new monitoring techniques such as passive infra-red and endoscopes are being tested for their usefulness in monitoring storm petrels, these methods are still costly in terms of fieldwork effort and equipment (Perkins *et al.*, 2017). For similar reasons, there is a lack of annual data collected on productivity.

Northern Ireland population size, abundance and breeding success trends: The species has no known breeding sites in Northern Ireland. In their review of the birds of Ireland, Ussher and Warren (1900) stated that "two small islands off the north coast of Antrim" were reported to have populations of storm petrels. The only small islands which they could realistically have been referring to are Sheep Island, Antrim and one of The Skerries. A volunteer visit to the Skerries in 2021 reported that there were few areas of suitable nesting habitat available on the islands for Storm Petrels, and that the large gull population on Large Skerries where Rabbit burrows could provide some nesting habitat may deter Storm Petrels from breeding here. Deane (1954) reported up to a dozen pairs on Sheep Island, but the species is considered unlikely to be still there. It may be present on Rathlin Island but no surveys have been conducted. The nearest colony is on Sanda Island, Scotland which is just 37 km to the east.

SARAH KELMAN / BTO

Great Cormorant

Phalacrocorax carbo

Conservation status: Amber-listed in the BoCCI4 (2020–26), Green-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

JON LEES

Overview

Synopsis: The Great Cormorant (Cormorant) is a widespread breeding species, often found in dense colonies. The characteristic open-winged posture they adopt after fishing is due to the need to dry their feathers, which are not waterproof (Robinson, 2005).

UK population size, abundance and breeding success trends: The UK population estimate from the Seabird 2000 (1998–2002) census was 8,900 AON, an increase of 10% since the previous census (JNCC, 2021). The UK breeding abundance index for Cormorants 1986–2019 indicates that the population increased between 1986 and 1995, and while it declined slightly after 2005, the 2019 index was 30% above the baseline (JNCC, 2021). The latest UK winter population estimate is 64,500 (Frost *et al.*, 2019; Woodward *et al.*, 2020).

UK productivity remained fairly constant between 1991 and 2019, with nests fledging 1.84 chicks on average (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: The increase seen at the UK level between the 1985–88 and 1998–2002 censuses was in contrast to the trend in Northern Ireland, where Cormorant numbers dropped from 736 AON to 663 AON during the same period. There are no inland breeding colonies of the European sub-species (*Phalacrocorax carbo sinensis*) in Northern Ireland. Cormorants have historically principally bred at two sites – Sheep Island (north coast, Co. Antrim) and Bird Island (Strangford Lough). In 2010, the Sheep Island colony split with some birds moving to The Skerries. Smaller numbers are found at The Gobbins and Burial Island on the Outer Ards Peninsula, although the latter site is not monitored annually. The latest Northern Ireland winter population estimate is approximately 2,500 (Frost *et al.*, 2019; Woodward *et al.*, 2020).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

Long-term annual data dating back to 1986 are available for Bird Island, Strangford Lough, where numbers increased erratically until 2005, to a peak of 490 AON (Figure 3). Since then, numbers have fallen but appeared to be increasing again in recent years. An unusually low count was recorded in 2020, likely due to survey delays caused by COVID-19 restrictions, and the count of 370 AON in 2021 is more comparable with that of 388 AON in 2019.

Numbers of Cormorants on Sheep Island declined between 2005 and 2015, before stabilising in more recent years (Figure 4). A full census of Sheep Island was carried out using a drone as part of the MarPAMM project in 2021, finding 139 AON. This was the highest count since 2010 which may be in part due to the better coverage achieved using the vantage of the drone (Booth Jones *et al.*, 2022). The Skerries have not been surveyed for as long as Sheep Island, and counts have varied substantially between years. It seems probable that the original population of Sheep Island is now spread between the two sites (Figure 4), while exchange with the colony at Inishowen (Co. Donegal) is also thought possible but has not been validated (e.g. by movements of colour ringed birds). In 2021, boat-based surveys of the Skerries recorded 82 AON, which was a decline on the 2019 count but within the range recorded since 2010.

Periodic counts of the numbers at The Gobbins cliffs dating back to 1969 have shown fluctuating numbers in recent years, dropping to as low as two AON in 2007, returning to 33 AON in 2008. Unfortunately, The Gobbins could not be surveyed in 2020 or 2021.

Figure 3: Cormorant count (AON) at Bird Island, Strangford Lough, 1986–2021. The dashed line represents the Locally Weighted Least Squares Regression trend in Cormorant numbers over time. The shaded region represents the 95% confidence interval around the trend.

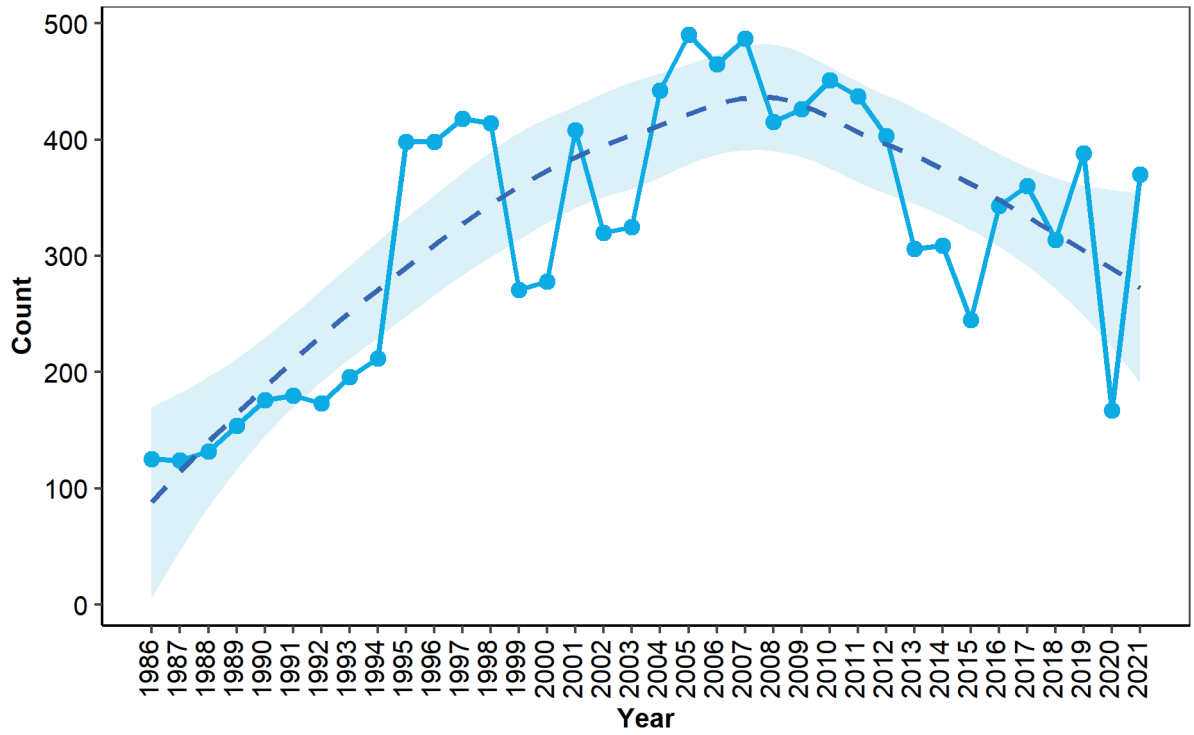
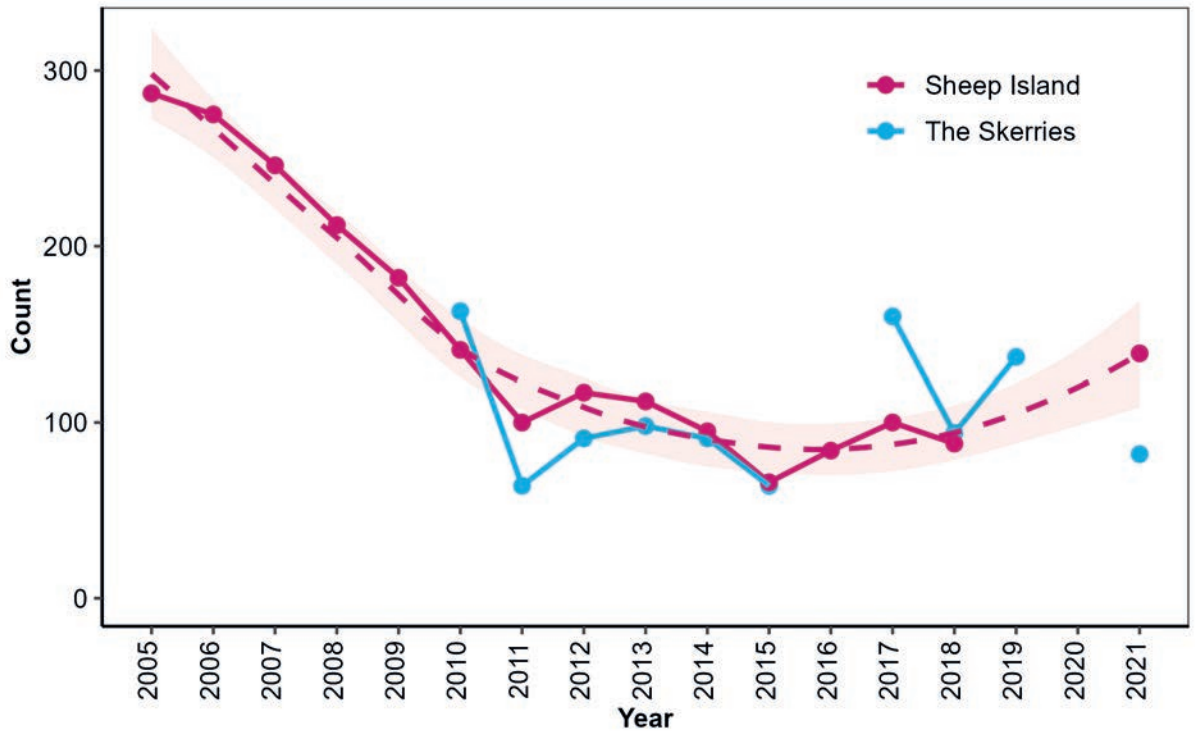


Figure 4: Cormorant counts (AON) at the Skerries and Sheep Island, 1985–2021. The Skerries were not surveyed before 2010, as it was believed that no Cormorants were present, and were not surveyed in 2016 or 2020. Sheep Island was not surveyed in 2019 or 2020. The dashed line represents the Locally Weighted Least Squares Regression trend in Cormorant numbers over time at Sheep Island (no trend for The Skerries, due to missing data). The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No Cormorants were monitored for breeding success in 2021. Due to their breeding asynchrony, many visits are required to colonies through the season to assess the productivity of Cormorants. Historically, NIEA have made single-visit surveys to Sheep Island and the Skerries annually to count numbers of eggs and chicks in the Cormorant colonies, however the multiple visits required to generate true productivity estimates are not made. In 2021, 4 AON produced 3 chicks (0.75 chicks/AON) in Portrush (Cliff Henry, pers. comm.).

European Shag

Gulosus aristotelis

Conservation status: Amber-listed in the BoCCI4 (2020–26), Red-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Leaat Concern – IUCN Red List (Europe).

KEVIN KIRKHAM

Overview

Synopsis: Slightly smaller than the Cormorant, the European Shag (Shag) is endemic to the north-east Atlantic and the Mediterranean. It is a marine inshore species that is almost never observed out of sight of land (Mitchell *et al.*, 2004). The name of the Shag refers to the tuft of feathers on its head (Robinson *et al.*, 2005).

UK population size, abundance and breeding success trends: Over a third of the world population breeds in the UK and Ireland (JNCC, 2021). The UK population size was estimated to be 26,565 AON at the last census in 1998–2002 (Mitchell *et al.*, 2004). The UK breeding abundance index shows a 49% decline between 1986 and 2019, though this decline has been predominantly in Scotland with populations in England and Wales showing little change (JNCC, 2021). Latest estimates put the UK population at 17,500 (13,500–20,500) (Woodward *et al.*, 2020). Annual return rates of adults are usually in the order of 80–90% (JNCC, 2021) but Shags are vulnerable to one-off events such as extreme winter storms and the return rate may drop to below 15% because of their impact (Frederiksen *et al.*, 2008; Heubeck *et al.*, 2015). The latest UK winter population estimate is 110,000 (Frost *et al.*, 2019; Woodward *et al.*, 2020).

The shortage of sandeels is thought to have contributed to low productivity in some years. In Scotland, Shag productivity was on average 1.28 chicks per pair between 1986 and 2019 (JNCC, 2021). Population Viability Analysis calculations by Cook and Robinson (2010) suggested that if all demographic parameters remained the same (survival, clutch size, etc.) the UK population would decline by 9% over a period of 25 years.

Northern Ireland population size, abundance and breeding success trends: In Northern Ireland, the Shag is mostly restricted to Co. Antrim, with the largest colonies being at The Maidens (offshore from Larne) and Rathlin Island, with other breeding pairs scattered widely around the coast in smaller groups. The Seabird 2000 (1998–2002) census estimated that there were 301 AON in Northern Ireland, and that this was a decrease of 32% since the previous census (JNCC, 2021).

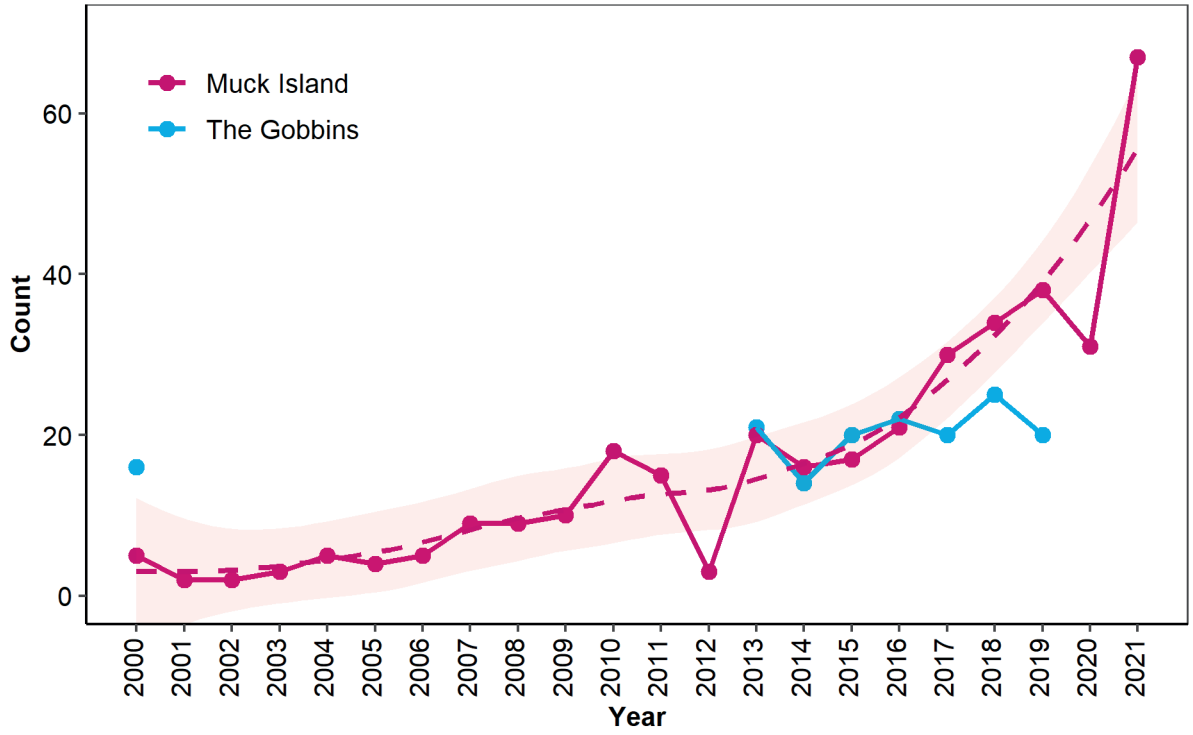
The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

The Maidens, a major colony of Shag in Northern Ireland, remains uncounted in recent years; the last count was an estimated 20 AON in 2018, down from 97 AON recorded in 2000. A full census of Rathlin Island and of the north Antrim coastline between Runkerry and Murlough occurred as part of the MarPAMM project in 2021. On Rathlin, Shag had increased by 28% since the 1998–2002 census to 74 AON, while between Runkerry and Murlough, Shag were only recorded nesting on Sheep Island, and had declined by 76% to 21 AON.

Elsewhere on the north coast, 32 AON were recorded on the Skerries, a decline of 50% on the last count made in 2015 (although higher than the 11 AON recorded in 2000), and small numbers were also recorded at Downhill (13 AON) and in the Portrush sub-sites (8 AON). Numbers at Muck Island have continued to increase since 2000, and reached a peak of 67 AON in 2021, the highest count for the site on record (Figure 5). Although not counted in 2020 or 2021, numbers at The Gobbins nearby were at their highest recorded in 2018 (Figure 5) having increased by 11% since Seabird 2000 (1998–2002).

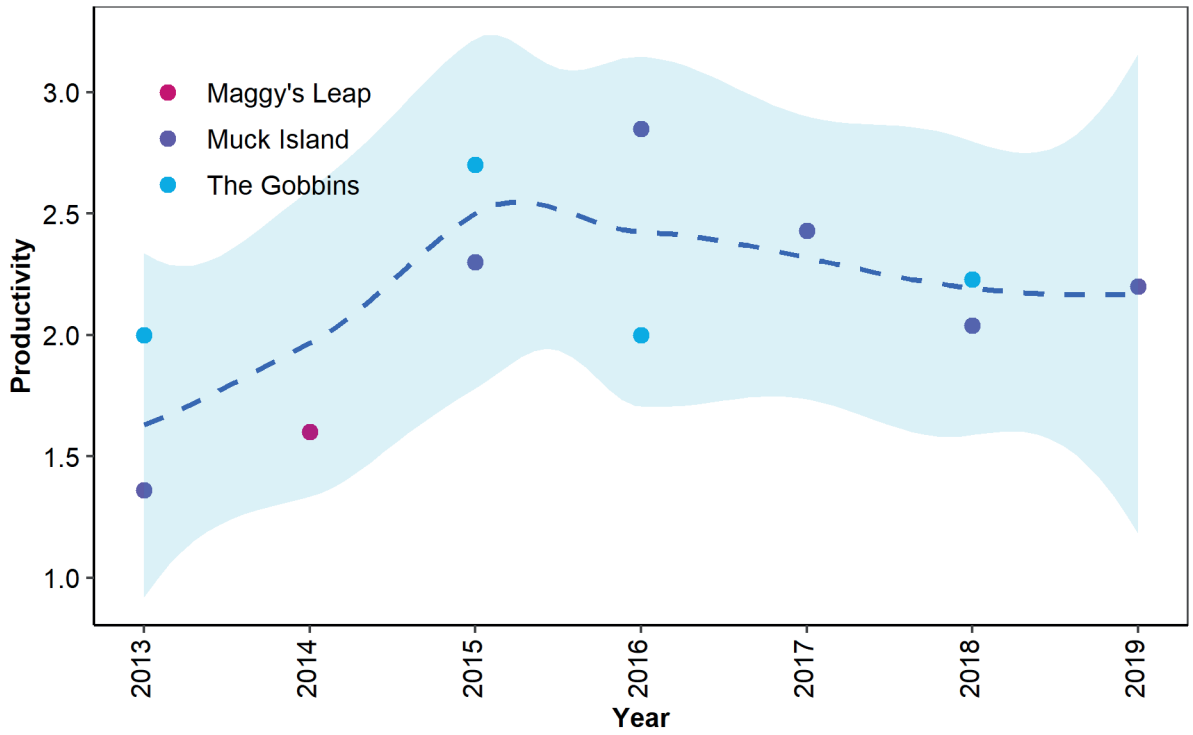
Figure 5: European Shag counts (AON) at Muck Island (purple) and The Gobbins (blue), 2000–21. The dashed line represents the Locally Weighted Least Squares Regression trend in Cormorant numbers over time at Muck Island (no trend for The Gobbins, due to missing data). The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No productivity data for Shag were collected in 2021. In 2019, the Muck Island colony produced 44 chicks from 20 nests, a slightly higher figure than in the previous two years (Figure 6, Kerry Leonard, pers. comm.). Productivity data has not been recorded at The Gobbins since 2018. Figure 6 shows the yearly productivity data for Shag at Muck Island, The Gobbins and one recording from Maggy's Leap, and shows that there is considerable variation between years and sites. However, it is worth noting that the number of nests monitored per year is likely to also be variable and, in some cases, (e.g. 2014) very low. Although the trend in productivity across these sites appears to be fairly stable in recent years, the trend line has a large 95% confidence interval (blue shading) as a result of the small number of sites being monitored for Shag and records not being available for all years.

Figure 6: Productivity (Chicks/AON) for European Shags 2013–19 at Muck Island (dark blue), The Gobbins (pale blue) and Maggy's Leap (purple). No data were available for 2020 or 2021. The dashed line represents the Locally Weighted Least Squares Regression trend in productivity over time. The shaded region represents the 95% confidence interval around the trend. The total number of nests monitored per year were only noted in 2014 (5 AON) and 2019 (20 AON).



Great Skua

Catharacta skua

Conservation status: Amber-listed in the BoCCI4 (2020–2026), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

STEPHEN DUNBAR

Overview

Synopsis: Great Skuas are Great Black-backed Gull-sized, heavy-set seabirds, also colloquially known as 'Bonxies', a name that may derive from the old Norse for 'dumpy' (Robinson, 2005). Great Skuas are known for their aggressive behaviour towards human intruders on their territories (Mitchell *et al.*, 2004).

UK population size, abundance and breeding success trends: During the Seabird 2000 (1998–2002) census, the UK held 60% (9,634 AOT) of the world's population of Great Skua (Mitchell *et al.*, 2004). Orkney and Shetland are the core breeding areas, but the species has now spread through northern Scotland to the Western Isles (JNCC, 2021). The UK population is increasing, by 148% between the 1969–70 and 1985–88 censuses and by a further 26% by Seabird 2000 (JNCC, 2021). Therefore, the recent breeding attempts on Rathlin are not surprising. Annual sampling of breeding abundance is insufficient to generate reliable population trends for the UK, country level or at individual sites.

Productivity across the UK has varied between 0.2 and 1.1 chicks per pair between 1986 and 2018 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Great Skua are a rare breeding species on the island of Ireland (Burke *et al.*, 2020). The first occurrence of Great Skuas breeding in Northern Ireland occurred in 2011 on Rathlin Island. This pair has an average breeding success of 1.67 chicks per year since their arrival (JNCC, 2021). In the Republic of Ireland, the first breeding occurred in the late 1990s in Co. Mayo (Mitchell *et al.*, 2004) and there are now approximately 15 AOT, although no complete survey has been undertaken (Steve Newton, pers. comm.).

Abundance in 2021

RSPB reported the usual 1 AOT on the RSPB reserve on the island, while MarPAMM surveys recorded a total of 2 AOT for the whole island, with other individuals also present.

Breeding success in 2021

The one pair on the RSPB reserve fledged a single chick in 2021 (RSPB).

Black-legged Kittiwake

Rissa tridactyla

Conservation status: Red-listed in the BoCCI4 (2020–26), Red-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Vulnerable – IUCN Red List (Europe).

ANDY CARDEN

Overview

Synopsis: The Black-legged Kittiwake (Kittiwake) is the most numerous gull species in the world, and perhaps surprisingly, also the most numerous breeding gull in the UK (Woodward *et al.*, 2020). Unlike the UK's other gull species, the Kittiwake is closely tied to the sea and adapted to nesting on steep sea cliffs, although it has recently taken to nesting on man-made structures (JNCC, 2021).

UK population size, abundance and breeding success trends: In the Seabird 2000 (1998–2002) census, the UK population was estimated to be 378,847 AON, a decline of 25% since the previous census (Mitchell *et al.*, 2004). Annual SMP data indicate that numbers had declined by 52% between 1986 and 2019 (JNCC, 2021). The latest estimate of Kittiwake population size in the UK is 205,000 (175,000–255,000) (Woodward *et al.*, 2020).

Kittiwake productivity in the UK is linked has increased since a low point in 2007; between 2014 and 2019 it was 0.62 chicks per pair (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Relative to the overall UK and Ireland trend since 1986, and its historical status, the Northern Ireland population is still reasonably stable. The largest colony by far in Northern Ireland is on Rathlin Island, the second largest colony at The Gobbins being only approximately 10% the size of the Rathlin Island colony. Other small colonies are dotted around the coast at Muck Island, Maggie's Leap, Castlerock, Carrick-a-rede, Dunluce and the Skerries. Colonies at Gun's Island and Strangford Lough have become extinct in the last 15 years. The last census estimated that Northern Ireland held 13,060 AON. Kittiwake have been upgraded from Amber-listed to Red-listed in the latest Birds of Conservation Concern Ireland due to being classified Globally Vulnerable (Gilbert *et al.*, 2021).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

Coverage in 2021 was very good (Table 8, Appendix) and while populations at individual colonies are fluctuating – presumably in response to local conditions – the overall theme in recent years appears to be one of growth for most colonies around the coastline.

The MarPAMM census of Rathlin found that Kittiwake increased on the island by 38% to 13,706 AON since the 1998–2002 census, while numbers have been very variable within the RSPB's study plot on Rathlin in recent years (Table 8, Appendix). MarPAMM surveys of the north Antrim coastline between Runkerry and Murlough found that Kittiwake had declined by 10% to 792 AON .

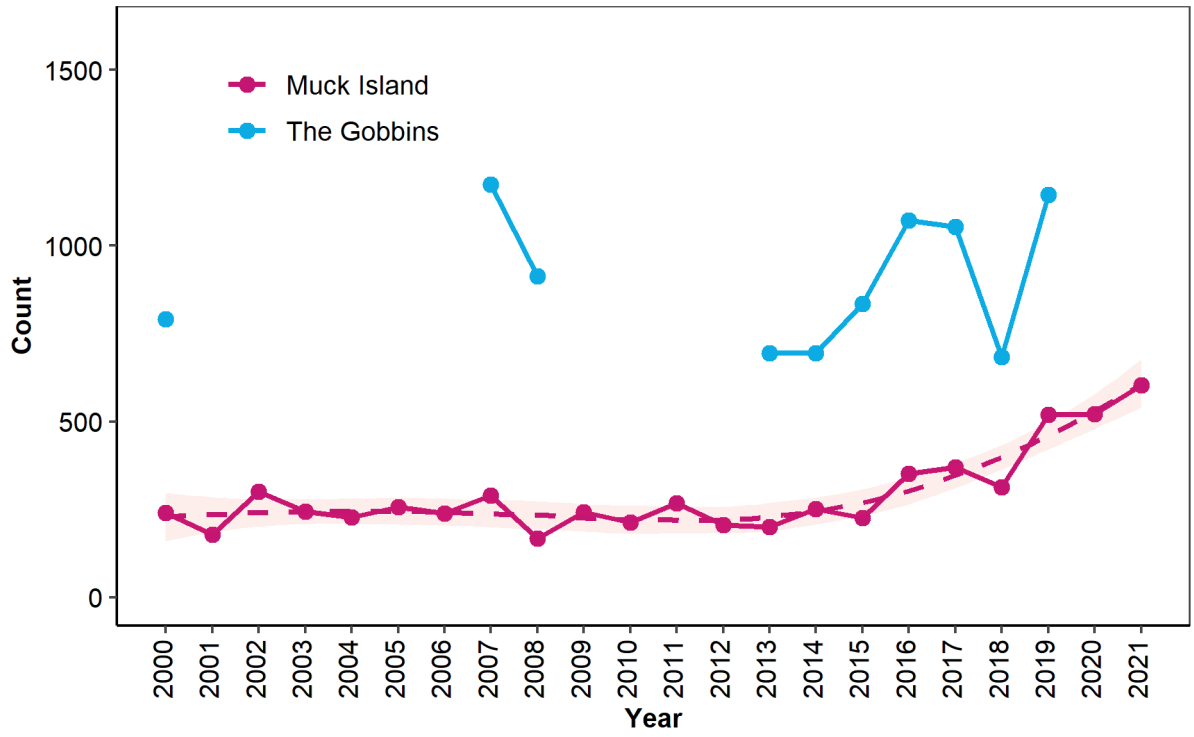
The colony at Portrush is divided into sub-sites to ease counting, and seven of these 10 sites were monitored this year. Kittiwake at Portrush appear to have increased annually during the Seabirds Count census period (2015–21) and the combined site total was 423 AON in 2021.

In its 22nd consecutive year of survey, the population of Kittiwake on Muck Island increased again to 603 AON, the highest total counted on the island since the first count for the SCR in 1987 (830 AON). Although there

are no records for 2021 or 2020, in 2019 The Gobbins held 1,145 AON, the highest count since 2007 and an increase of 68% over 2018 (Table 8, Appendix).

Numbers of Kittiwake in Maggy's Leap to Newcastle increased yet again to 759 AON in 2020, following a pattern of increase since 2015 (Table 8, Appendix).

Figure 7: Black-legged Kittiwake counts (AON) at Muck Island (purple) and The Gobbins (blue), 2000–21. No data were available for The Gobbins in 2020 or 2021. The dashed line represents the Locally Weighted Least Squares Regression trend in Kittiwake numbers over time at Muck Island (no trend for The Gobbins, due to missing data). The shaded region represents the 95% confidence interval around the trend.

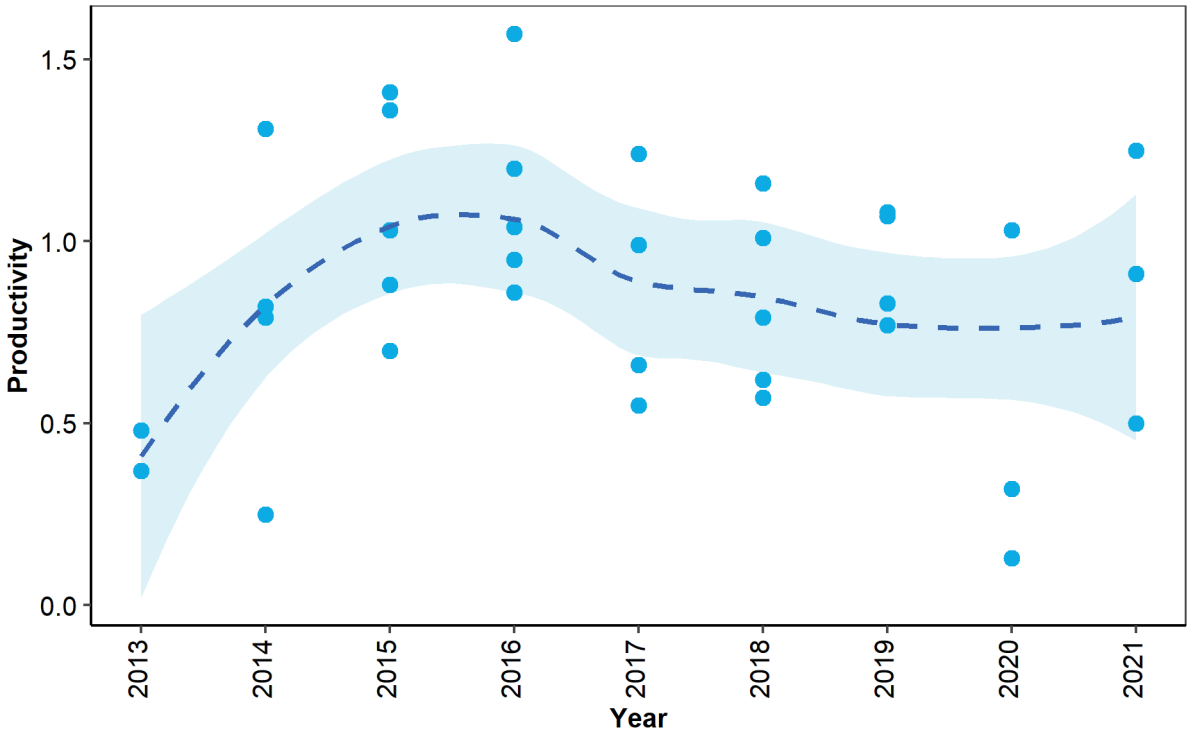


Breeding success in 2021

Three sites were monitored for productivity in 2021: Muck Island (Andy Crory, Ulster Wildlife), Donard Cove (Andy Carden) and Portrush (Cliff Henry). In 2021, breeding success remained lowest at Muck Island (0.50 chicks/AON), but the record low productivity seen at Portrush in 2020 (0.13 chicks/AON) recovered to 1.25 chicks/AON in 2021. The productivity at Donard Cove was 0.91 chicks/AON, therefore fairly similar to previous years.

There has been an overall downward trend in breeding success since a peak in 2016 (Figure 8), but monitored sites were more productive in 2021 (on average 0.49 chicks per AON in 2020, 0.89 in 2021). However, more certainty around this trend could be gained by an increase in the number of sites monitored. Research suggests that 0.80 chicks per pair are needed to maintain steady breeding populations of Kittiwakes (Coulson, 2017), a productivity value exceeded on average (0.87 chicks per pair, 95% CI 0.75–0.98) by study colonies in Northern Ireland between 2013 and 2021.

Figure 8: Kittiwake productivity (chicks/AON) 2013–21 across a range of sites in Northern Ireland. Sites measured for Kittiwake productivity include: Donard Cove, Muck Island, Portrush, Rathlin Island and The Gobbins. The dashed line represents the Locally Weighted Least Squares Regression trend in productivity over time. The shaded region represents the 95% confidence interval around the trend. The total number of nests monitored per year were: 2013 (unrecorded), 2014 (253 AON), 2015 (666 AON), 2016 (unrecorded), 2017 (364 AON), 2018 (314 AON), 2019 (1,052 AON), 2020 (756 AON), 2021 (888 AON).



Black-headed Gull

Chroicocephalus ridibundus

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe), Northern Ireland Priority species (Northern Ireland Biodiversity Strategy 2002).

EDMUND FELLOWES / BTO

Overview

Synopsis: Black-headed Gulls are small gulls found throughout the UK both around the coasts and inland. They are particularly abundant in the winter when the UK breeding population is joined by migrants from continental Europe (Wernham, 2002). Black-headed Gulls are now common in gardens, although similarly to other gull species, their urbanisation appears to be a recent phenomenon (Robinson, 2005).

UK population size, abundance and breeding success trends: The Black-headed Gull is a common breeding species in the UK, with 5.6% of the world population recorded during Seabird 2000 (1998–2002), around 140,000 pairs (Mitchell *et al.*, 2004). It is unclear how the population may compare to previous decades because previous UK and Ireland surveys were incomplete, with many inland colonies remaining uncounted. Therefore, although Seabird 2000 showed an apparent increase, this was due to more comprehensive surveying that may have masked an actual population decline (JNCC, 2021). SMP trends suggest the population has increased by 21% since 1986 (JNCC, 2021). The UK is estimated to host nearly 2,200,000 individuals in the winter (Burton *et al.*, 2013; Woodward *et al.*, 2020).

In the UK, productivity fluctuates from 0–1.3 chicks/AON, however the most recent UK productivity average was 0.48 chicks per pair in 2019 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: In Northern Ireland, the Black-headed Gull is a widespread breeding species in relatively few large colonies, with major concentrations at Strangford Lough, Belfast Lough, Larne Lough, Copeland Islands, Lough Neagh and Lower Lough Erne. In the Seabird 2000 (1998–2002) census, 4,037 AON were counted in Northern Ireland, a decline of 12% since the previous census. The winter population of Northern Ireland is estimated to be 44,000 individuals (Burton *et al.*, 2013; Woodward et al., 2020). Black-headed Gull has been downgraded from Red-listed to Amber-listed in the latest Birds of Conservation Concern Ireland due to less-severe declines in recent years (Gilbert *et al.*, 2021).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021). The potential impacts of predators such as American Mink (*Mustela vison*) (Craik, 1997), Eurasian Otters (*Lutra lutra*) and rats (*Rattus* spp.) on inland colonies in Northern Ireland are largely unstudied. Collecting productivity data for Black-headed Gulls is a high priority.

Abundance in 2021

The MarPAMM census of Rathlin found that Black-headed Gull had almost declined to extinction (-99%) since the 1998–2002 census (when there were 383 AON), with only 5 AON counted on the island in 2021.

Numbers at Larne Lough grew from just 109 AON in 1987 to a high of 3,102 AON in 2016 (Figure 9; Table 8, Appendix). This was the first time in several years that a completely accurate census was carried out. While the completeness of the 2016 count is likely to have been responsible for some of the increase in recorded numbers, Black-headed Gull populations can fluctuate between years, something which has been previously seen at Larne Lough. In 2021, 2,236 AON were counted, 15% down on the last complete count from 2019.

Numbers of Black-headed at RSPB's Belfast Lough reserve reached a recent peak of 806 AON in 2020 and declined from this to 702 AON in 2021. At RSPB's Portmore Lough reserve, 121 AON were recorded, only a slight increase on the number counted in 2020 (104 AON, Table 8, Appendix).

No surveying for Black-headed Gulls was carried out in Strangford Lough during 2020 due to the COVID-19 outbreak, but in 2021 1,420 AON were counted by the National Trust and WWT, the highest record since 2017 (Figure 10, Table 8, Appendix). However, the breeding population of Strangford Lough appears to have mostly stabilised since 2013 after a large decline from the peak seen in the early 1990s (Figure 10).

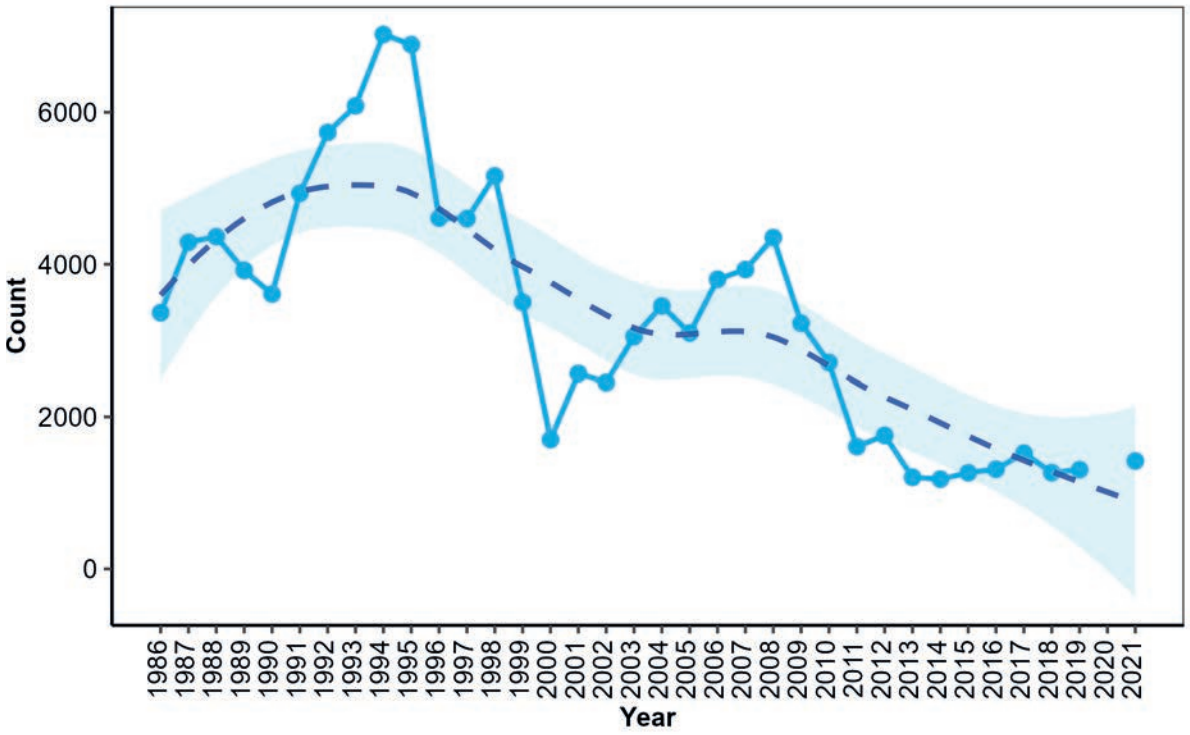
There are also breeding populations in Co. Fermanagh; Moorlough Lake supported 95 AOT in 2018 but has not been counted since 2018, while Lower Lough Erne had 1,416 AON in 2021, an 18% decline on 2019 numbers (Table 8, Appendix).

Peak flush counts made by the Lough Neagh Partnership between May and June 2021 in Lough Neagh (excluding Portmore Lough RSPB reserve) totalled 6,612 individuals. Abundance data are challenging to collect consistently from the Lough Neagh islands making between-year comparisons difficult, particularly given late counts due to COVID-19 restrictions in 2020. A count of the main breeding islands gave an estimate of 11,595 individuals in 2016, but numbers have fallen in recent years with approximately 8,120 individuals counted in 2017 and 8,906 in 2018 (Table 8, Appendix; Bob Davidson and Stephen Foster, pers. comm.). Lough Neagh supported 30,000 breeding pairs of Black-headed Gulls on 12 islands in the 1980s; subsequently the gulls have abandoned breeding on Shallow Flat and Coney Island Flat, and have decreased in number on Padian Island, Owen Roe and Scaddy Island (Allen & Mellon, 2018).

Unusually, one AON was observed on Lighthouse Island in the Copeland archipelago this year.

Figure 9: Black-headed Gull counts (AON) at Larne Lough, 1987–2021. A full count was not possible in 2020, therefore the purple point represents an incomplete count.

Figure 10: Black-headed Gull counts (AON) at Strangford Lough, 1986–2021. The dashed line represents the Locally Weighted Least Squares Regression trend in Black-headed Gull numbers over time at Strangford Lough. The shaded region represents the 95% confidence interval around the trend. No counts took place in 2020.



Breeding success in 2021

Black-headed Gulls at Portmore Lough RSPB reserve fledged 125 chicks from 97 pairs (1.29 chicks/AON), higher than the last record made in 2019 at the reserve (1.08 chicks/AON). The last record of breeding success at Larne Lough was in 2019, which was approximately 1.50 chicks/AON (RSPB).

Mediterranean Gull

Larus melanocephalus

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – Annex 1 and migratory species, Least Concern – IUCN Red List (Europe).

IAN ENLANDER

Overview

Synopsis: Slightly larger and stockier than the Black-headed Gull with a stouter bill, the Mediterranean Gull is a relative newcomer to the UK and Ireland's breeding seabird assemblage. Mediterranean Gulls expanded their range and population size from their traditional distribution around the Black Sea and eastern Mediterranean in the 1950s and 1960s (JNCC, 2021), with their first confirmed breeding in the UK occurring in Hampshire in 1968 (Slack, 2007).

UK population size, abundance and breeding success trends: From just one pair in the 1985–88 census there were over 100 AON during Seabird 2000 (1998–2002) and it is estimated that the current UK population is somewhere between 1,500 to 2,000 AON (JNCC 2021). Most large colonies are located in south and south-east England, although the species' distribution is expanding northward with smaller colonies becoming established elsewhere. In the winter, numbers of Mediterranean Gulls increase to 4,000 individuals (Woodward *et al.,* 2020).

Few productivity data are collected for Mediterranean Gulls, and as result productivity at the UK-level is not reported. Productivity at one of the UK's largest colonies, in Langstone Harbour, England, increased from 1.04 to 1.38 chicks per pair between 2015 and 2019 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Mediterranean Gulls are a rare breeding species on the island of Ireland (Burke *et al.*, 2020). After first breeding in Co. Antrim 1995, initially between one and three AON were recorded annually in Northern Ireland, across three different sites. Numbers have gradually increased, however, particularly since Mediterranean Gulls started breeding at Belfast Lough RSPB reserve in 2016.

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

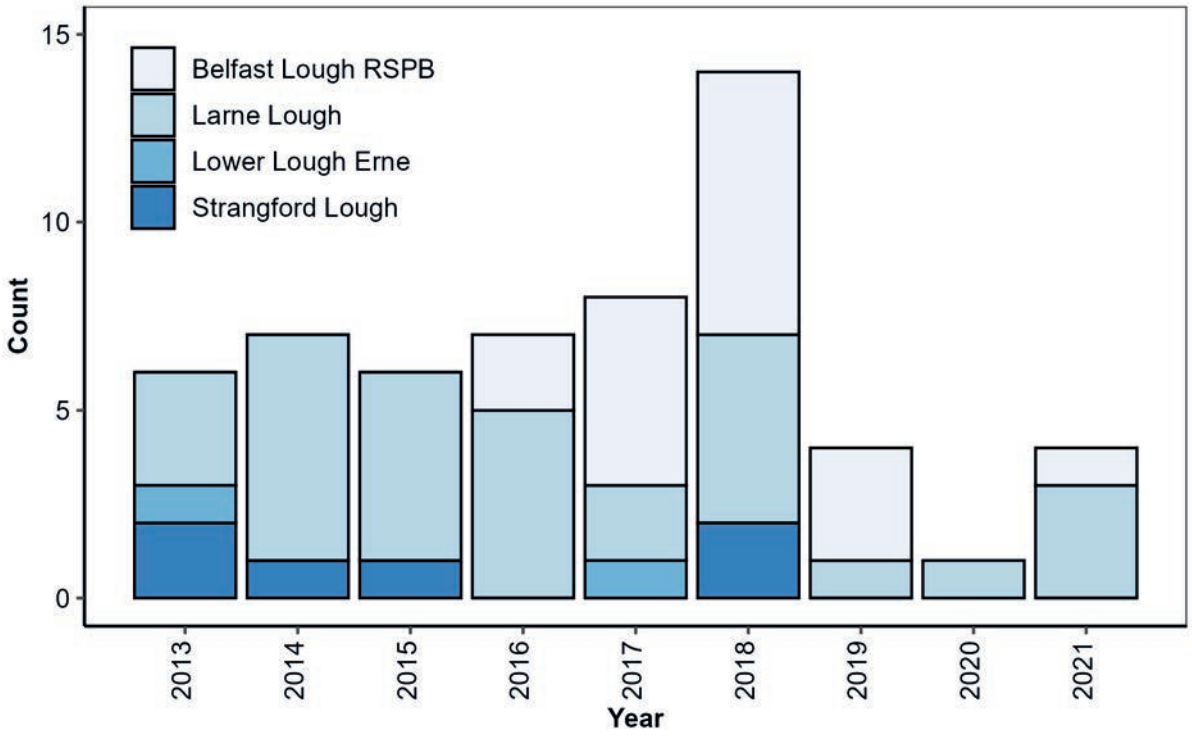
Abundance in 2021

Numbers of breeding Mediterranean Gulls appear to have dropped since the peak in 2018 (14 AON, Figure 11, Table 8, Appendix), although due to COVID-19 fieldwork restrictions, few records were made in 2020. In 2021, there were only four confirmed breeding pairs, 3 AON at Larne Lough and 1 AON at RSPB's Belfast Harbour reserve. One individual Mediterranean Gull was observed in Strangford Lough this year, but none were recorded as present in Lower Lough Erne or Lough Neagh.

Breeding success in 2021

Due to the low number of breeding pairs in Northern Ireland, assessment of breeding success is very limited. However, one chick fledged from the single pair at Belfast Lough and two from the three nests at Larne Lough (RSPB), therefore the overall figure for 2021 was 0.75 chicks/AON. The productivity of Mediterranean Gulls was estimated to be 1.75 chicks/AON at Larne Lough and 2.17 chicks/AON in Belfast Lough in 2018, although again numbers were very low (RSPB).

Figure 11: Cumulative Mediterranean Gull count (AON) in Northern Ireland, 2013–21. No data were available for 2020 from Belfast Lough or Strangford Lough. The total bar height represents the number of Mediterranean Gull pairs per year, and the colour represents the number in each site.



Common Gull

Larus canus

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

RASMUS SLOTH PEDERSEN

Overview

Synopsis: A dainty gull, resembling a small Herring Gull, the Common Gull nests colonially around coasts and inland sites. In North America the species is often referred to as the Mew Gull. The Common Gull is the classic gull of sports fields, and can often be seen paddling its feet to encourage worms to surface in grassy areas (Robinson, 2005).

UK population size, abundance and breeding success trends: Scotland held 98% of breeding Common Gulls in the UK during Seabird 2000 (1998–2002) (Mitchell *et al.*, 2004), so the rest of the UK is relatively insignificant for this species. Over half (57%) of the breeding Common Gulls in Seabird 2000 bred inland (Mitchell *et a*l., 2004). In the Seabird 2000 census, there were an estimated 48,714 AON in the UK but because inland colonies were not counted in previous censuses, a comprehensive estimate of Common Gull population change is not available. Due to its importance in the UK context, the Scottish trend can be used cautiously to represent the UK-level trend and shows a 75% decline in coastal breeding Common Gulls between the last census (1988–2002) and 2019 (JNCC, 2021). The winter population of Common Gull in the UK is estimated to be 710,000 (680,000–730,000) (Burton *et al.*, 2013; Woodward *et al.*, 2020).

Common Gull productivity is not well studied at the UK-scale, but a long-term study on the impact of American Mink predation on gulls and terns in western Scotland found that between 1989 and 2019 average productivity was 0.38 chicks per pair (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Historically the Common Gull was a scarce breeding species in Northern Ireland, belying its name. However, coastal-nesting Common Gulls had increased in their population size from 192 to 383 AON between the 1985–88 and 1998–2002 censuses, and small numbers have appeared at several locations, although unfortunately not formally monitored (Kerry Leonard, pers. comm.). For example, one such new colony was discovered in late July 2013 at Torr Head, Co. Antrim. By far the largest concentrations are on the Copeland Islands and at Strangford Lough, and inland at Lower Lough Erne. Approximately 10,000 Common Gulls visit Northern Ireland in the winter (Burton *et al.*, 2013; Woodward *et al.*, 2020).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

The MarPAMM census of Rathlin Island found that the Rathlin population stayed fairly stable since the 1998–2002 census, at 69 AON (an 8% increase). No accurate counts of Common Gulls could be discerned between Runkerry and Murlough during the MarPAMM surveys, however a total of 19 AOT was estimated to be present, and there are no records of this species nesting in the area during the 1998–2002 census.

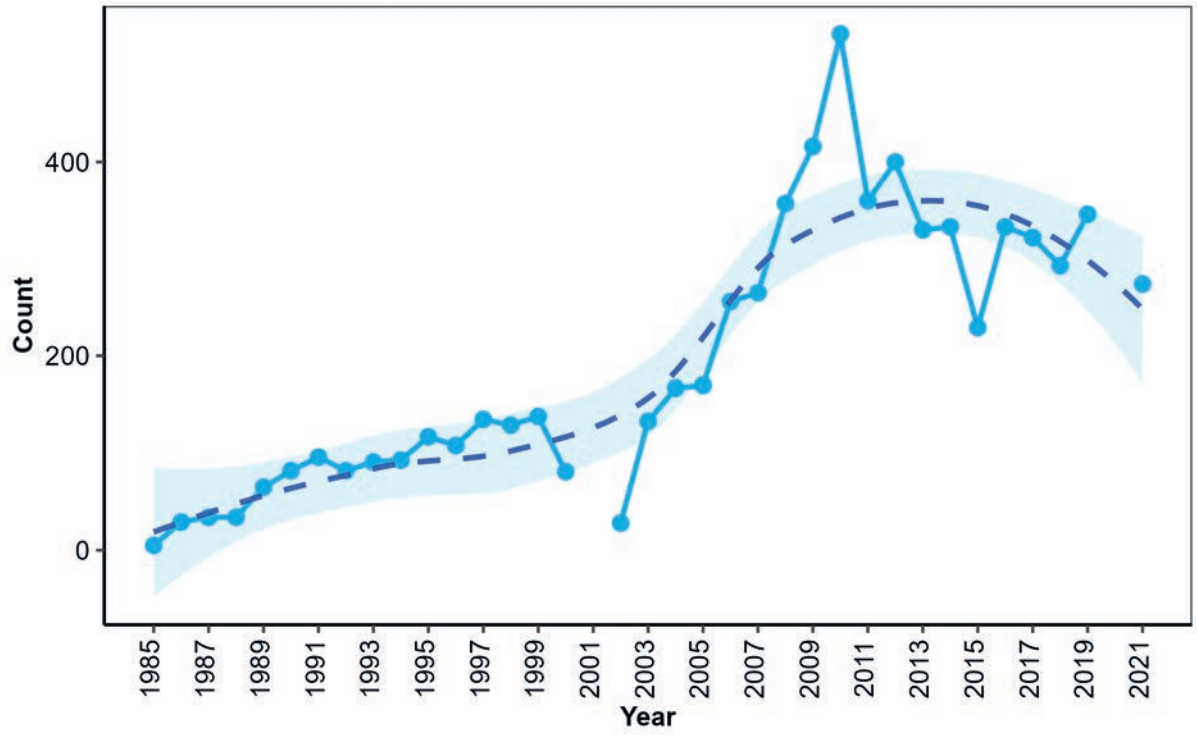
On the Copeland Islands, although numbers have dropped, birds have spread out from a few large sub-colonies to form new satellite sub-colonies around the shore of all three islands. The Copeland Islands have not been completely surveyed since 2012 when there were 452 AON, down from a peak of 830 AON in 2009. In 2018, 15 AON were recorded on Lighthouse Island.

Numbers of Common Gulls increased steadily in Strangford Lough in the 1990s, but since have been less stable, with a huge increase in the 2000s followed by a decline in the early 2010s (Figure 12). Due to restrictions on fieldwork, counts of Common Gull in Strangford Lough were not possible in 2020 but in 2021 the count was 274 AON (Figure 12, Table 8, Appendix).

The next largest colony is in Lower Lough Erne, where an estimated 249 AON were counted in 2021. Counts were not carried out in 2020 for comparison. In 2019, it was not possible to count one important colony at Lower Lough Erne, so although the count of 337 AON was the highest on record (Table 8, Appendix), this was probably an underestimate (Brad Robson, RSPB, pers. comm.).

Numbers of Common Gull at the smaller Larne Lough colony increased to 22 AON in 2020 but have been variable in recent years (Figure 13). A few Common Gulls breed at Carlingford Lough, and in 2021 there were only 5 AON (Table 8, Appendix). Up to 9 AON have been recorded annually in the Outer Ards since 1986, and 7 AON were recorded in 2021.

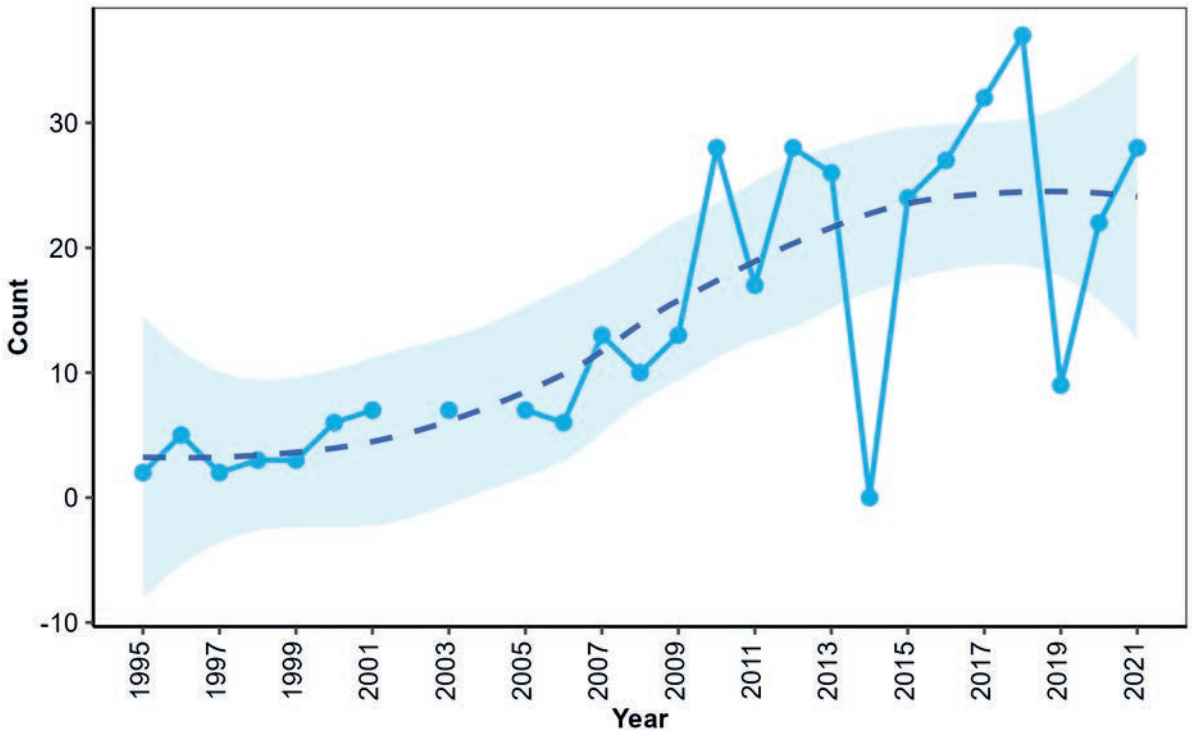
Figure 12: Common Gull counts (AON) at Strangford Lough, 1985–2021. No counts were made in 2001 or 2020. The dashed line represents the Locally Weighted Least Squares Regression trend in Common Gull numbers over time. The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

The only breeding season data to be collected in 2021 was at Larne Lough by the RSPB, where 28 AON produced 16 chicks (0.57 chicks/AON), which was similar to 2020 (0.59 chicks/AON).

Figure 13: Common Gull counts (AON) at Larne Lough, 1995–2021. No counts were made in 2002 or 2004. The dashed line represents the Locally Weighted Least Squares Regression trend in Common Gull numbers over time. The shaded region represents the 95% confidence interval around the trend.



Lesser Black-backed Gull

Larus fuscus

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

JONATHAN CLARK

Overview

Synopsis: Lesser Black-backed Gulls nest colonially often with other gull species, particularly Herring Gulls (Mitchell *et al.*, 2004). However, unlike Herring Gulls, many Lesser Black-backed Gulls from the UK migrate to the Iberian Peninsula or North Africa during the non-breeding period (Mitchell *et al.*, 2004; Rock, 2002).

UK population size, abundance and breeding success trends: During Seabird 2000 (1998–2002) the UK held 38% of the estimated world population. At this time, the breeding population was estimated at 111,960 AON, an increase of 40% over the previous census period (JNCC, 2021). However, with the species' spread to inland urban sites, it is likely that some colonies remained uncounted. As a result, the downwards trend in the Lesser Black-backed Gull abundance index over the last 20 years is based only on natural-nesting gulls and may not be representative of the UK whole (JNCC, 2021). Although many of the UK's breeding Lesser Black-backed Gulls migrate during the winter, the winter population is estimated to be 130,000 (120,000–130,000) (Burton *et al.*, 2013; Woodward *et al.*, 2020), boosted by an influx of birds from Iceland and Scandinavia.

At the UK-level, productivity measured at natural-nesting colonies (defined as moors, cliffs, marshes, beaches and other areas of semi-natural habitat, i.e. non-urban) was 0.52 chick per pair between 1989 and 2019 (JNCC, 2021). The factors causing low productivity in Lesser Black-backed Gulls are not fully understood but include predation at some colonies. There is a lack of equivalent productivity estimates for urban sites.

Northern Ireland population size, abundance and breeding success trends: The Lesser Black-backed Gull is a widespread breeding species in Northern Ireland, mainly in a few large colonies at Strangford Lough, Copeland Islands, and inland at Lower Lough Erne and Lough Neagh. There are smaller numbers at Rathlin Island, The Skerries and Muck Island. Across Northern Ireland as a whole, numbers of coastal-nesting Lesser Black-backed Gulls doubled between the 1969–70 and 1985–88 censuses, and increased further to 131% by 1998–2002, when 1,033 AON were counted. Inland colonies were only censused for the first time in Seabird 2000 (940 AON), so trends are unavailable for these sites (JNCC, 2021). Central Belfast was the only urban colony to be surveyed in Seabird 2000, with 63 AON recorded (Mitchell *et al.*, 2004), but the full extent of urban nesting Lesser Black-backed Gulls is unknown in Northern Ireland. As many as 10,000 Lesser Black-backed Gulls may occur in Northern Ireland in the winter (Burton *et al.*, 2013; Woodward *et al.*, 2020).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

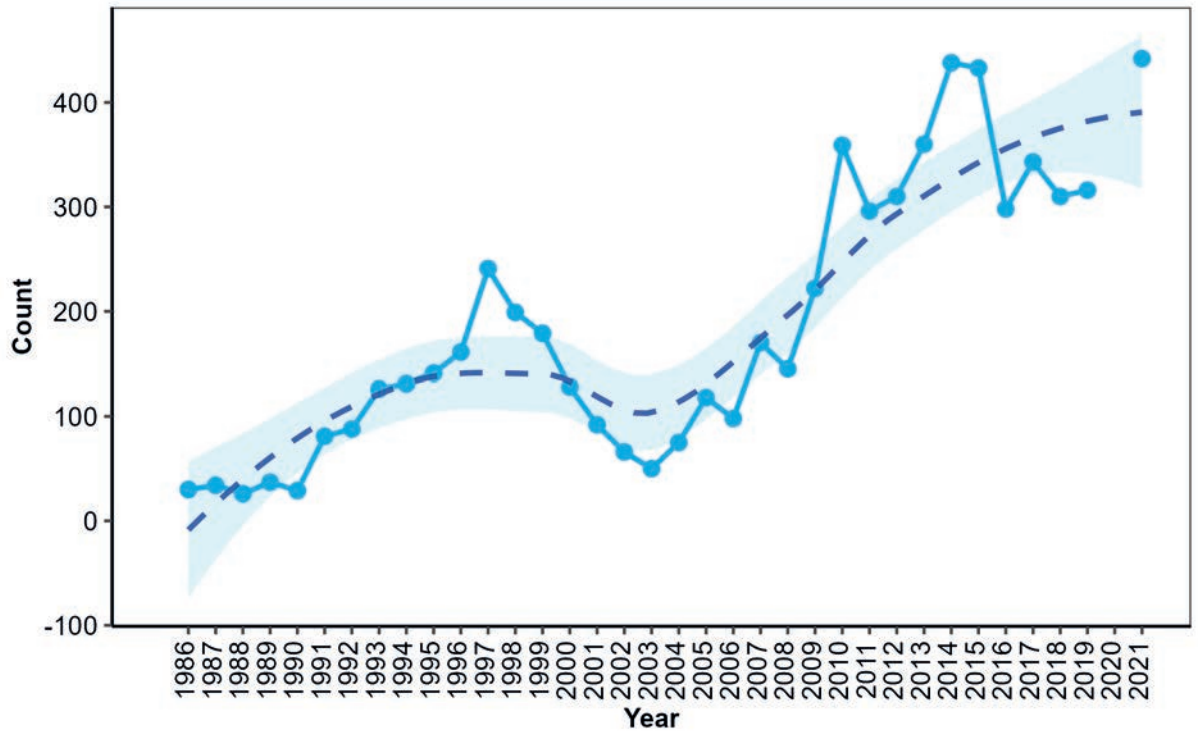
Lower Lough Erne supports a large proportion of the Lesser Black-backed Gulls in Northern Ireland, and in 2021 this population was estimated to be 1,437 AON, which is a small decline on the last record from 2019 (1,584 AON, Table 8, Appendix). Another large concentration is found in Strangford Lough where, with the exception of a dip in the late 1990s and early 2000s, the population has risen since the records began in 1987. In 2021 442 AON were recorded, the largest count on record. Peak flush counts made by the Lough Neagh Partnership between May and June in Lough Neagh (excluding Portmore Lough RSPB reserve) totalled 1,713 individuals (Table 8, Appendix).

While the loughs are generally well covered for Lesser Black-backed Gulls, coastal colonies are less regularly covered, or coverage is incomplete. Addressing part of this gap, the MarPAMM census of Rathlin found that Lesser Black-backed Gulls increased on the island by 309% to 519 AON since the 1998–2002 census, while between Runkerry and Murlough, they increased by 1,200% to 91 AOT/AON. Additionally, a volunteer survey of The Skerries counted 537 AON, a significant and under-recorded population.

A volunteer team led by the Copeland Bird Observatory surveyed large gulls on Lighthouse Island in 2018, 2019 and 2021. The count in 2021 was 390 AON, 39% fewer than the number recorded in 2019. Gulls nesting on Big Copeland and Mew Island remain uncounted.

True numbers of urban-nesting gulls remain difficult to quantify, however in 2018 and 2019 NIEA-funded surveys of central Belfast recorded a peak of 221 AON (unpublished data Booth Jones *et al.*, 2020). While much higher than the last record made for the 1998–2002 census (63 AON), this is still likely to be an underestimate due to the complexity of the roofscape in the survey area. Urban nesting appears to be an increasing phenomenon in Northern Ireland, and records of roof nesters from volunteers would be welcome.

Figure 14: Lesser Black-backed Gull counts (AON) in Strangford Lough, 1986–2021. No data were collected in 2020. The dashed line represents the Locally Weighted Least Squares Regression trend in Lesser Black-backed Gull numbers over time. The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No colonies were monitored for breeding success in 2021.

Herring Gull

Larus argentatus

Conservation status: Amber-listed in the BoCCI4 (2020–26); Red-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

JONATHAN CLARK

Overview

Synopsis: The Herring Gull is slightly larger than the Lesser Black-backed Gull. It was historically widespread in Britain and Ireland and is largely resident (Mitchell *et al*., 2004). It nests in a range of habitats, from rocky coastlines to rooftops, but is less widespread inland compared to the Lesser Black-backed Gull. Although quite common on roofs now, this behaviour was first observed in the 1920s in south-west England (Robinson, 2005).

UK population size, abundance and breeding success trends: Herring Gulls suffered a steep decline in the late 1980s, largely due to botulism (Mitchell *et al*. 2004). Between the 1969–70 and 1985–88 censuses, Herring Gulls declined by 43% and declined a further 13% by 1998–2002, to 130,230 AON (JNCC, 2021). However, with the species' spread to inland urban sites, it is likely that some colonies remained uncounted. The SMP report does not produce a combined urban- and natural-nesting abundance index for Herring Gull due to the low sample from urban sites, but the natural-nesting index for 2019 was 56% below the 1986 baseline (JNCC, 2021). Based on existing UK demographic parameters (survival, clutch size, etc.) Cook and Robinson (2010) predicted a 60% decrease in the national population over 25 years. During the winter, visitors from Scandinavia swell the Herring Gull population to around 740,000 (710,000–780,000) (Burton *et al.*, 2013; Woodward *et al.*, 2020).

While in the previous decade productivity was variable with an underlying declining trend, between 2000 and 2010 productivity stabilised at around 0.60 chicks per pair and was 0.57 in 2019 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: The population in Northern Ireland declined by 96% between the 1985–88 and 1998–2002 censuses to just 709 AON (Cramp *et al.*, 1974; JNCC, 2021; Mitchell *et al.*, 2004). Concentrations of Herring Gulls occur on the Copeland Islands and at Strangford Lough. Smaller colonies are on Rathlin Island, Burial Island, Muck Island and The Skerries. The population of Rathlin Island declined from 4,037 AOT in 1985 to just 19 AOT in 1999 (Mitchell *et al.*, 2004). A similar decline occurred on the Copeland Islands, from approximately 7,000 AOT in 1985 to 225 AOT in 2004. The figures for Strangford Lough mirror this trend, with a large and rapid decline in the mid-1980s, numbers reaching a low point just after the turn of the century. Since 2007, numbers of AOT at Copeland and Strangford have shown sustained growth. Herring Gull has been downgraded from Red-listed to Amber-listed in the latest Birds of Conservation Concern Ireland due to less severe declines in recent years (Gilbert *et al.*, 2021). As many as 10,000 Herring Gulls may occur in Northern Ireland in the winter (Burton *et al.*, 2013; Woodward *et al.*, 2020).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

The primary population of Herring Gulls in Northern Ireland is found in Strangford Lough, where numbers have been steadily increasing after a decline in the late 1980s and 1990s (Figure 15). The 2021 count of 1,389 AON is the largest count since 1987 (2,825 AON). The other major colony spanning the three Copeland Islands has not been completely surveyed since 2012. However, in 2018, 2019 and 2021 volunteers from Copeland Bird Observatory conducted full surveys of Lighthouse Island, with 483 AON being counted in 2018 and 2019, and 585

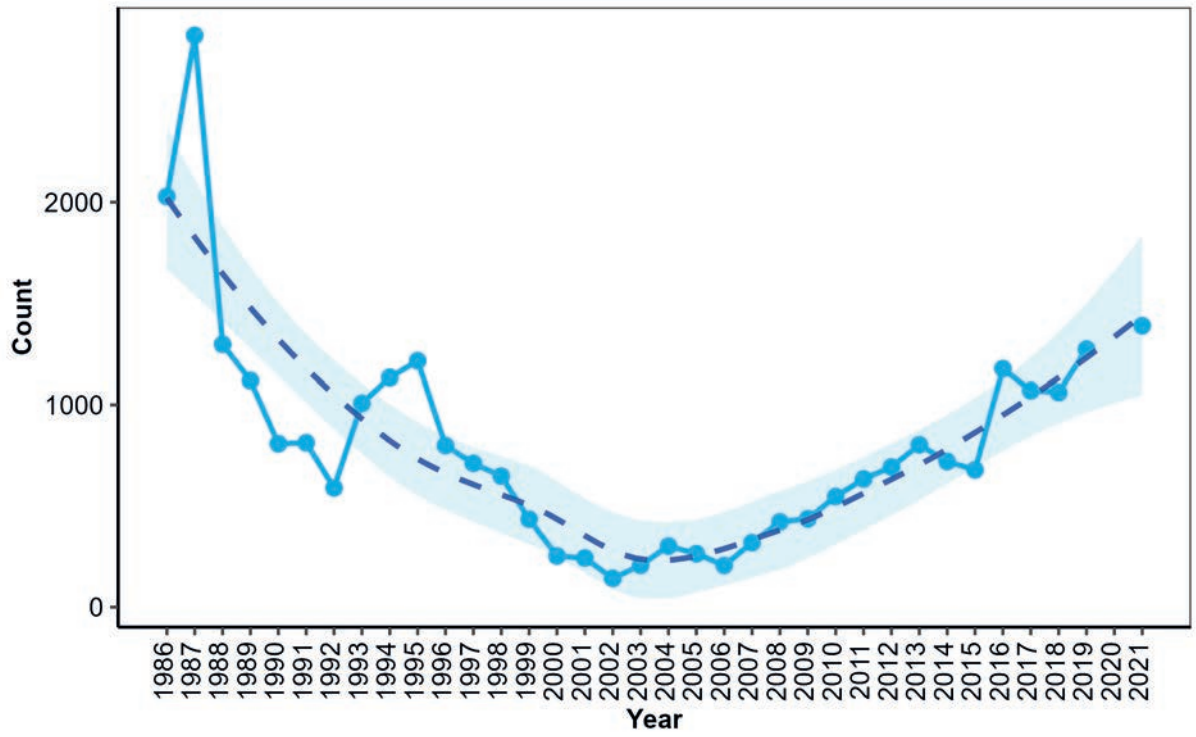
AON counted in 2021. The 2021 population estimate is a 485% increase on the peak count during the last census period (1998–2002, 100 AON).

Coastal colonies on the north coast are less well recorded, but addressing part of this gap, the MarPAMM census of Rathlin found that Herring Gulls increased on the island by 493% to 83 AON since the 1998–2002 census, while between Runkerry and Murlough, they increased by 645% to 82 AOT/AON. A volunteer-led survey of The Skerries revealed that it hosted an estimated 229 AON.

It is likely that urban-nesting Herring Gulls are on the rise around Northern Ireland, but few data exist outside of central Belfast. An NIEA-funded vantage-point survey from two of the tallest buildings in Belfast found that the very small population of eight AON recorded in the 1998–2002 census had increased to 39 in 2019 (unpublished data Booth Jones *et al.*, 2020). Due to the complexity of the roof-scape and the limited number of vantages, observed Herring Gull AONs are likely to be an underestimate of the total number present in central Belfast.

Small numbers have bred inland at Lower Lough Erne since records began in 2000, but none were recorded in 2021 (Table 8, Appendix).

Figure 15: Herring Gull numbers (AON) at Strangford Lough, 1986–2021. No data were collected in 2020. The dashed line represents the Locally Weighted Least Squares Regression trend in Herring Gull numbers over time. The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

RSPB monitored 12 AON in Carlingford Lough, which fledged six chicks (0.50 chicks/nest).

Great Black-backed Gull

Larus marinus

Conservation status: Green-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

STEPHEN MAXWELL

Overview

Synopsis: The Great Black-backed Gull is the largest of the gulls, with an average wing length of around 470 mm and average weight of 1.5 kg (Robinson, 2005). They have an extensive breeding range across the north Atlantic. Great Black-backed Gulls are mostly found in open shore habitats during the breeding season (Robinson, 2005).

UK population size, abundance and breeding success trends: The Outer and Inner Hebrides and the Northern Isles of Scotland are the main strongholds for Great Black-backed Gulls in the UK and Ireland (JNCC, 2021). During the 20th century their range and numbers grew on both sides of the Atlantic, rebounding from a period of decline that rendered the species virtually extinct as a breeder in Britain towards the end of the previous century (Mitchell *et al.*, 2004). The UK population has been relatively stable across census periods, and at Seabird 2000 (1998–2002) it was estimated to be 16,735 AON, while recent estimates are similar to this at 15,000 (7,200–19,000) pairs (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). However, the UK abundance index was 14% below the 1986 baseline in 2019 (JNCC, 2021). During the winter, numbers of Great Black-backed Gulls increase to 77,000 (72,000–82,000) (Burton *et al.*, 2013; Woodward *et al.*, 2020).

There is no clear trend in the productivity of Great Black-backed Gulls, which has varied between 1.7 and 0.7 chicks per pair since 1986, but monitoring across the UK has shown that productivity has generally increased since the early 2000s (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: The population of Great Black-backed Gull in Northern Ireland declined by 74% from 240 AON to 71 AON between the 1969–1970 and 1998–2002 censuses (JNCC, 2021). However, the Northern Irish population appears to have more than doubled since the last census and numbers have also increased by 38% in the Republic of Ireland (JNCC, 2021), resulting in a downgrading from Amber-listed to Green-listed in the latest Birds of Conservation Concern Ireland (Gilbert *et al.*, 2021). The most important site in Northern Ireland is on Great Minnis's Island, Strangford Lough. The second most important colony is probably now at Burial Island, Outer Ards peninsula. Although this colony has not been completely surveyed since 1998 (when no birds were present), a population has again established itself on the island (Kerry Leonard, pers. comm.). Approximately 1,000 Great Black-backed Gulls occur in Northern Ireland during the winter (Burton *et al.*, 2013; Woodward *et al.*, 2020).

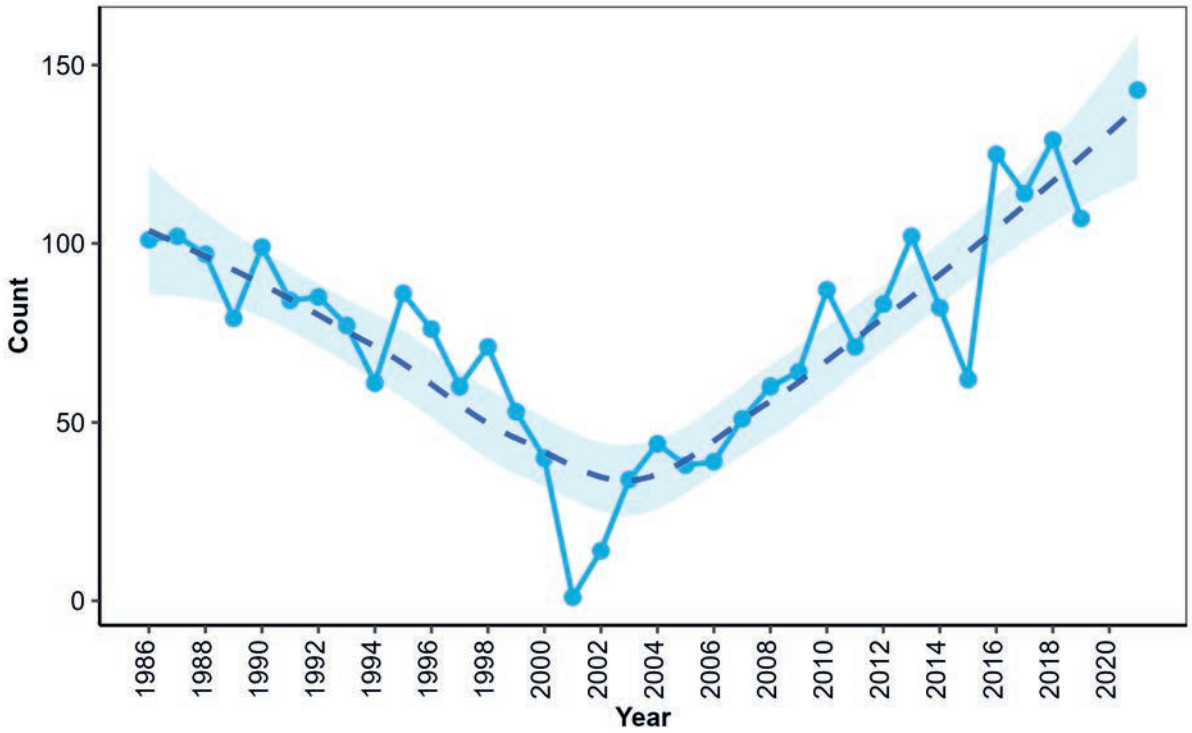
The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

The largest count of Great Black-backed Gulls since 1972 was made in Strangford Lough in 2021, with 143 AON recorded. It was also a particularly good year for the species on Muck Island, where historically 0–5 AON have been observed (Table 8, Appendix). However, in 2021 this population increased to 11 AON. Four Great Black-backed Gull AON were also counted on the Skerries.

The MarPAMM census of Rathlin found that Great Black-backed Gulls increased on the island by 300% to 12 AON since the 1998–2002 census, while between Runkerry and Murlough, they increased by 17% to 7 AOT/AON. Inland at Lough Neagh, 2 IND were observed, while 1 IND was recorded at Lower Lough Erne.

Figure 16: Great Black-backed Gull counts (AON) at Strangford Lough, 1986–2021. No data were collected in 2020. The dashed line represents the Locally Weighted Least Squares Regression trend in Great Black-backed Gull numbers over time. The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No nests of Great Black-backed Gull were monitored in Northern Ireland in 2021.

Little Tern

Sternula albifrons

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – listed in Annex 1 and as a migratory species, Least Concern – IUCN Red List (Europe), Northern Ireland Priority species (Northern Ireland Biodiversity Strategy 2002).

PHILIP CROFT / BTO

Overview

Synopsis: Little Terns are the UK's smallest breeding tern species. They are exclusively coastal, usually nesting on beaches where their eggs are so well camouflaged they are almost invisible (Robinson, 2005).

UK population size, abundance and breeding success trends: Numbers of Little Tern in the UK declined (-23%) between the 1985–88 census and the most recent census (1998–2002). Although the population of 1,927 AON was higher during Seabird 2000 than during the original census of 1969–70 (JNCC, 2021), recent estimates suggest the population size has reduced to 1,450 pairs (Holling & the Rare Breeding Birds Panel, 2017; Woodward *et al.*, 2020).

The breeding success of Little Terns varies greatly from year to year. The average breeding success was 0.51 chicks per pair between 1986 and 2008 (JNCC, 2020).

Northern Ireland population size, abundance and breeding success trends: Little Terns are a rare breeding species on the island of the Republic of Ireland (Burke *et al.*, 2020), with main breeding concentrations on the east coast. In Northern Ireland they have always been an infrequent breeding species and have not been reported as definitely nesting since 1996.

Abundance in 2021

No breeding attempts were reported in 2021.

Sandwich Tern

Thalasseus sandvicensis

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – Annex 1 and migratory species, Least Concern – IUCN Red List (Europe).

STEPHEN MAXWELL

Overview

Synopsis: The Sandwich Tern is the largest species of tern breeding in Northern Ireland. It is known for its extremely variable population trends and distribution, caused by the tendency for large numbers of individuals to move between colonies (JNCC, 2021). Sandwich Terns almost always nest in shared colonies with Black-headed Gulls, potentially benefitting from the gulls' aggressive nest defence in response to predators (Smith, 1975).

UK population size, abundance and breeding success trends: The UK holds approximately 10% of the world population of Sandwich Terns (JNCC, 2021). Census data indicate that the UK population increased by 33% between the 1969–70 and 1985–88 censuses, but that numbers then declined by 15% by 1998–2002 (JNCC, 2021). Annual SMP data indicate that current numbers are similar to the 1986 baseline, and the most recent population estimate is 14,000 (13,000–15,000) pairs (JNCC, 2021; Woodward *et al.*, 2020).

UK productivity averaged 0.66 between 1986 and 2008 (JNCC, 2020), but averaged 0.41 chicks per pair in 2019 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: During Seabird 2000 (1998–2002), the population size of Sandwich Tern in Northern Ireland was 1,954 AON, an 11% decline since the previous census. The most recent estimate puts the Northern Ireland population at around 1,500 pairs (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). In Northern Ireland most Sandwich Terns breed in a few large colonies at Strangford Lough, Larne Lough, Lower Lough Erne and Cockle Island, Groomsport. Sandwich Tern has the most complete and consistent monitoring record over the longest period and of any seabird species in Northern Ireland.

The collection of productivity data in Northern Ireland has been limited, but between 1990 and 2019 the mean breeding success was 0.31 chicks per pair per year (JNCC, 2021).

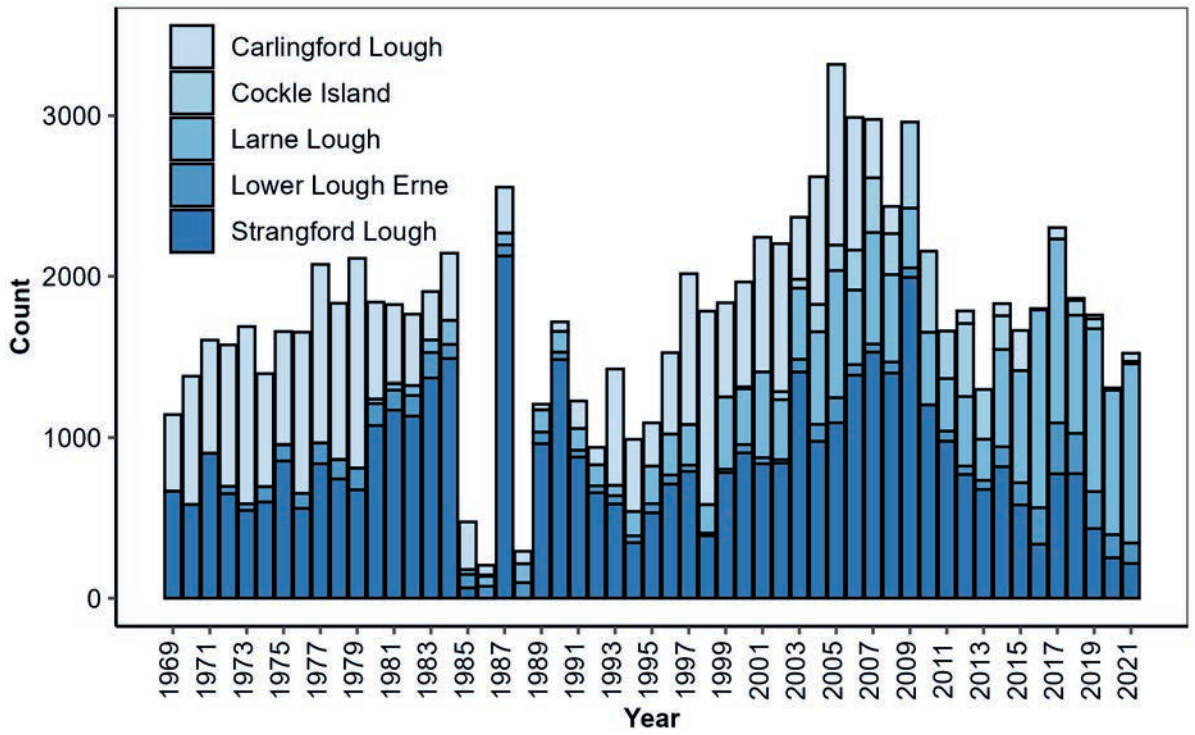
Abundance in 2021

Presenting the total populations for the main coastal colonies together (Figure 17) is advantageous as terns may move colony from year to year and it allows an overall appraisal of the Northern Ireland population.

The count of Sandwich Terns at Strangford Lough is the longest running population count of seabirds in Northern Ireland, and celebrated its 50th year in 2018 (Hugh Thurgate, pers. comm.). This year the count was the third consecutive annual decline since 2018, falling to 217 AON (see page 76 for Strangford Lough nesting report), while a small but stable number of nests remained on Cockle Island, Outer Ards (14 AON). The largest colony of Sandwich Terns in Northern Ireland currently nests in Larne Lough, where 1,113 AON were counted in 2021. Numbers of Sandwich Terns have been very small in Carlingford Lough in recent years (Table 8, Appendix), therefore the count of 52 AON this year appears to show a small recovery, although is still low compared to the 250 AON recorded in 2015.

Sandwich Terns can also be found inland at Lower Lough Erne where 126 AON were counted in 2021, continuing a decline from a peak in 2017 of 316 AON.

Figure 17: Cumulative Sandwich Tern counts (AON) at Carlingford Lough, Cockle Island, Larne Lough, Lower Lough Erne and Strangford Lough, 1969–2021. Sandwich Terns were not counted in Carlingford Lough and were an estimate at Larne Lough in 2020. The total bar height represents the number of Sandwich Tern pairs per year, and the colour represents the number in each site.



Breeding success in 2021

Between 2014 and 2021, Sandwich Tern productivity has been measured intermittently at three main colonies: Carlingford Lough (RSPB), Strangford Lough (National Trust) and Larne Lough (RSPB), with Carlingford being the most consistently monitored (Table 6). Over this time period and across all loughs, productivity ranged from 0 to 1 chicks/AON, and was on average 0.33 (95% CI: 0.16–0.49). In 2021, breeding success was greatest in Larne Lough where a total of 1,113 AON produced 500 chicks (0.45 chicks/AON), whereas at Carlingford and Strangford Loughs breeding success was extremely poor (0 and 0.08 chicks/AON, respectively). Despite improving breeding success at Carlingford Lough from 2011–15 due to an intensified programme of monitoring and conservation, productivity has been consistently low in recent years, caused by the suspected predation of eggs and young by Otter (Matthew Tickner, RSPB, pers. comm).

Breeding success has been monitored intermittently at Lower Lough Erne since 1990, but no data were collected in 2021. The success rate has rarely been greater than 0.50 chicks/AON and usually much lower (Brad Robson, RSPB, pers. comm.).

Table 6: Productivity (chicks/AON) of breeding Sandwich Terns at Carlingford Lough between 2014 and 2021. No productivity data were collected in 2020.

Year	Productivity
2014	0.66
2015	0.56
2016	0
2017	0
2018	0.15
2019	0.83
2020	-
2021	0

Common Tern

Sterna hirundo

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – listed in Annex 1 and as a migratory species, Least Concern – IUCN Red List (Europe).

JONATHAN CLARK

Overview

Synopsis: Despite their name, Common Terns are not the most abundant UK tern species but are probably the most familiar because their breeding range extends around much of the coastline and inland to lakes and loughs across most of the UK (JNCC, 2021; Robinson, 2005).

UK population size, abundance and breeding success trends: Although the UK population rose slightly between the 1969–70 and 1985–88 censuses, numbers fell to 11,838 AON by Seabird 2000 (1998–2002), a similar number as recorded in the first census (JNCC, 2021) and the latest UK population estimate, 11,000 AON (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). Analysis of annual SMP data indicates that the population has decreased by 10% between 1986 and 2019 (JNCC, 2021).

Productivity fluctuates between years as it is heavily influenced by weather conditions, predation and foraging success. Between 1986 and 2019, UK breeding success varied between approximately 0.30 and 0.80 chicks per pair per year and in 2019 averaged 0.45 chicks per pair per year (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Common Terns are the most widespread breeding tern species in Northern Ireland with coastal and inland populations. Historical data for the main Northern Ireland colonies are incomplete. In the late 1980s, there was a sudden increase in Common Terns to over 1,000 AON and, by the early 21st Century, there were over 2,000 AON. Since this peak the population has again declined and the most recent estimate is around 1,400 AON (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). Significant numbers breed at several sites on Lough Neagh but these are patchily monitored. The main coastal sites are Strangford Lough, Larne Lough, Belfast Lough and Carlingford Lough.

Productivity data for Common Terns in Northern Ireland show they had an average fledging rate of 0.65 chicks per pair per year between 1999 and 2019 (JNCC, 2021).

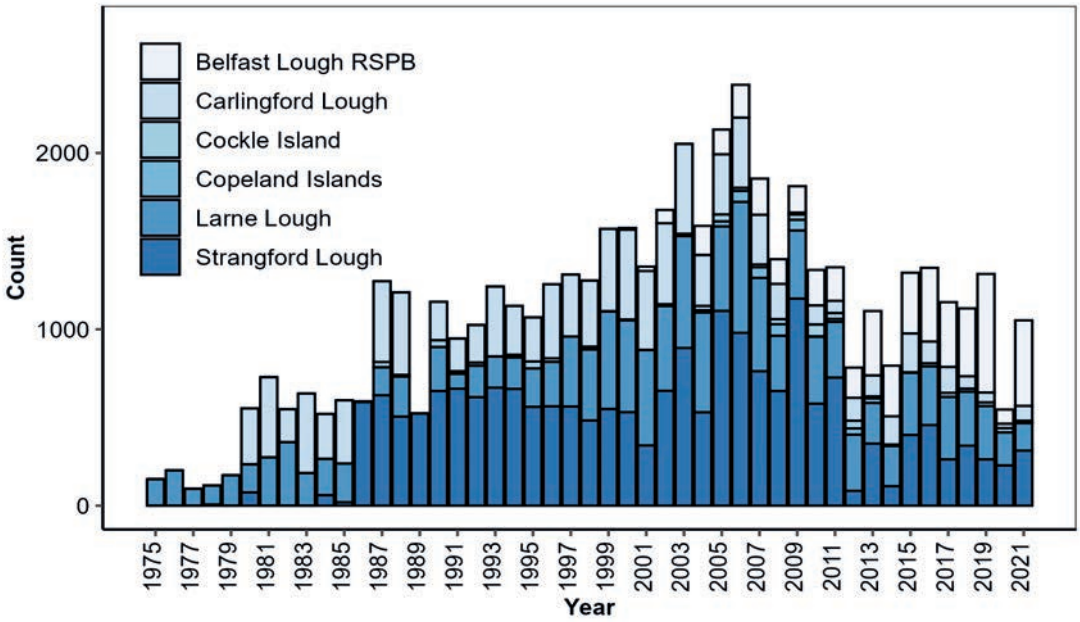
Abundance in 2021

Numbers of Common Terns appear to have recovered after a bad year in 2020, when the total coastal Northern Irish population (including Belfast Lough RSPB, Carlingford Lough, Cockle Island, Larne Lough and Strangford Lough) more than halved from 2019 levels due to losses at Larne and Belfast Loughs (Table 8, Appendix). This decline was thought to be genuine rather than due to the impact of COVID-19 on surveys since tern monitoring was not affected. The particularly low count in 2020 for RSPB Belfast Lough was caused by an American Mink (Neovison vison) getting onto the reserve (RSPB).

This year saw an 92% increase on 2020 total counts to 1,077 AON, driven by gains at Belfast Lough (from 80 to 485 AON) and Strangford Lough (228 to 312 AON). Because they are not counted as consistently, Common Terns on the River Lagan tern rafts are not included in the main coastal total. However, in 2021, 32 AON were observed, indicating that this small colony is gradually increasing (Table 8, Appendix).

Common Terns can also be found breeding inland, and in 2021 37 AON were recorded at Portmore Lough RSPB reserve. This is less than in 2020 (68 AON) but may be due to late counts and difficulties with the visibility of nests (RSPB, pers. comm.). In addition to this, flush counts totalling 260 IND were recorded by the Lough Neagh Partnership around the lough externally to the reserve, where counting nests is more challenging. At Lower Lough Erne, 26 AON were recorded in 2021, the lowest count since 2014.

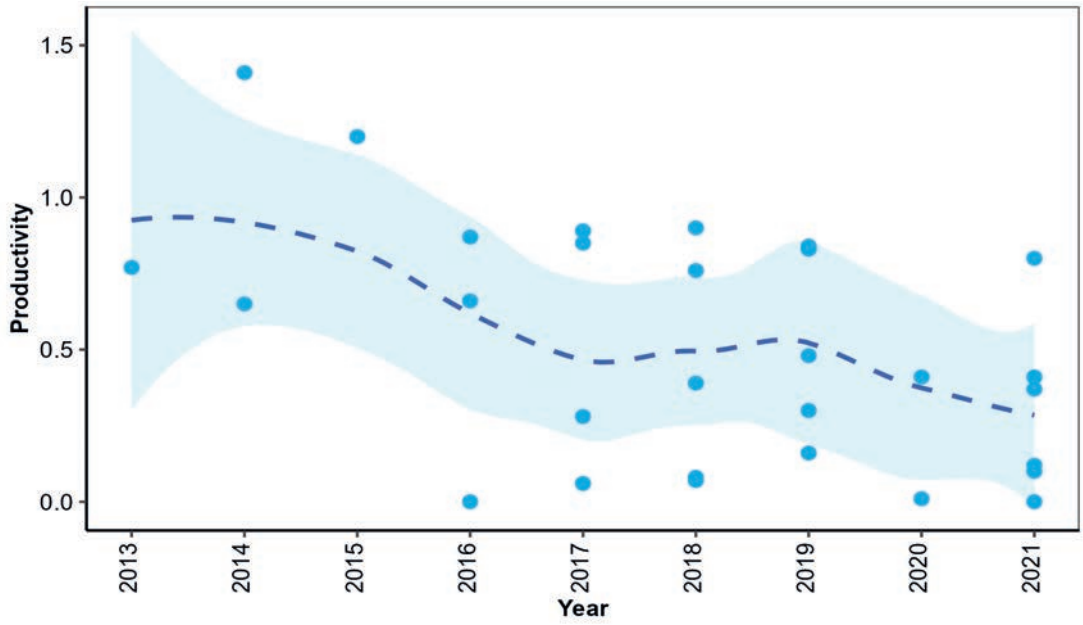
Figure 18: Cumulative Common Tern numbers (AON) at Belfast Lough RSPB, Carlingford Lough, Cockle Island, Copeland Islands (not counted since 2013), Larne Lough and Strangford Lough, 1975–2021. The total bar height represents the number of Common Tern pairs per year, and the colour represents the number in each site.



Breeding success in 2021

Six sites were monitored for breeding success in 2021 (Figure 19), with an average of 0.30 chicks/AON (95% CI: -0.01–0.61). While not all are surveyed every year, a range of sites have received some monitoring effort since 2013, and the overall picture is of a low and declining breeding success. Colonies at Larne Lough (157 AON) and Belfast Lough RSPB (485 AON) suffered particularly low breeding success in 2021, at only 0.10 and 0.12 chicks/AON respectively (RSPB). Only five nests were monitored in Strangford Lough in 2021, with no chicks fledged (Maurice Turley, WWT, pers. comm.). Elsewhere on the lough, while not formally monitored, fledging success appeared to be good (see Strangford Lough Nesting Report, page 76). Although difficulties viewing the rafts made monitoring breeding success difficult at Portmore Lough, this colony had the highest breeding success of 2021, at 0.80 chicks/AON (RSPB).

Figure 19: Common Tern productivity (chicks/AON) 2013–21 across five sites in Northern Ireland (Belfast Harbour RSPB, Carlingford Lough, Lagan Tern Raft, Larne Lough, Portmore Lough RSPB and Strangford Lough). The dashed line represents the Locally Weighted Least Squares Regression trend in productivity over time. The shaded region represents the 95% confidence interval around the trend. The total number of nests monitored per year were: 2013 (unrecorded), 2014 (unrecorded), 2015 (84 AON), 2016 (unrecorded), 2017 (280 AON), 2018 (483 AON), 2019 (618 AON), 2020 (215 AON), 2021 (778 AON).



Roseate Tern

Sterna dougallii

Conservation status: Amber-listed in the BoCCI4 (2020–26), Red-listed in the BoCC5 (2021), EC Birds Directive – listed in Annex 1 and as a migratory species, Least Concern – IUCN Red List (Europe), Northern Ireland Priority species (Northern Ireland Biodiversity Strategy 2002).

TOM CADWALLENDER / BTO

Overview

Synopsis: Roseate Terns are whiter than the Common Tern and sometimes have a pinkish tinge, likely obtained from the carotenoid Astaxanthin found in their diet (Hays *et al.*, 2006). Roseate Terns were nearly hunted to extinction for the millenary trade in the 19th century, and although they did recover in numbers during the 20th century, they are now the most range-restricted tern species in the UK with breeding occurring at only a few colonies (JNCC, 2021).

UK population size, abundance and breeding success trends: In the Seabird 2000 (1998–2002) census only 56 AON were recorded, a decline of 83% from the previous census. However, the population is now showing some early signs of recovery and in 2018 there were 118 AON (Holling & and the Rare Breeding Birds Panel, 2010). In Scotland, the main colony at the Firth of Forth appears to have been extirpated, partly due to competition for nesting sites with gulls, and now only single pairs appear in mixed tern colonies in Scotland (JNCC, 2020). The only colony in England, on Coquet Island, has had greater success, increasing during the last decade from under 40 AON to over 100 AON (JNCC, 2021). It may have benefitted from emigration from other sites, as well as the provision of nest sites and protection from predators (JNCC, 2021). Declines in Roseate Terns in Wales may have been due to emigration to more suitable breeding sites in the Republic of Ireland, and only a single pair were recorded to have nested in 2018 (Holling & and the Rare Breeding Birds Panel, 2010). The stronghold for the species within the British Isles now in the east of the Republic of Ireland at Rockabill Island and Lady's Island Lake.

The breeding success of Roseate Terns in UK colonies has been moderate to high, probably due to increased conservation efforts. Since 2000, productivity has varied between approximately 0.40 and 0.80 chicks per pair per year (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Historically Mew Island in the Copeland Group was one of the major sites for Roseate Tern in Ireland (Thompson, 1851). However, the species ceased to breed in Northern Ireland around 1880 before apparently re-colonising in the first quarter of the 20th century (Deane, 1954) and good numbers were again breeding on Mew by 1941 (Williamson *et al.*, 1941) before rapidly decreasing to extinction on the island in the 1950s. Carlingford Lough formerly held a population of up to 40 AON in 1987. Numbers of Roseate Terns were also highest in the late 1980s in Larne Lough but have clung on as a breeding species there since, albeit in very small numbers. Between the 1985–88 and the 1998–2002 censuses, the number of Roseate Terns in Northern Ireland declined by 94% from 62 to 4 AON.

Although only a single pair of Roseate Terns has nested in Northern Ireland in recent years. The species productivity in Northern Ireland between 1991 and 2019 was 0.68 chicks fledged per pair per year (JNCC, 2021).

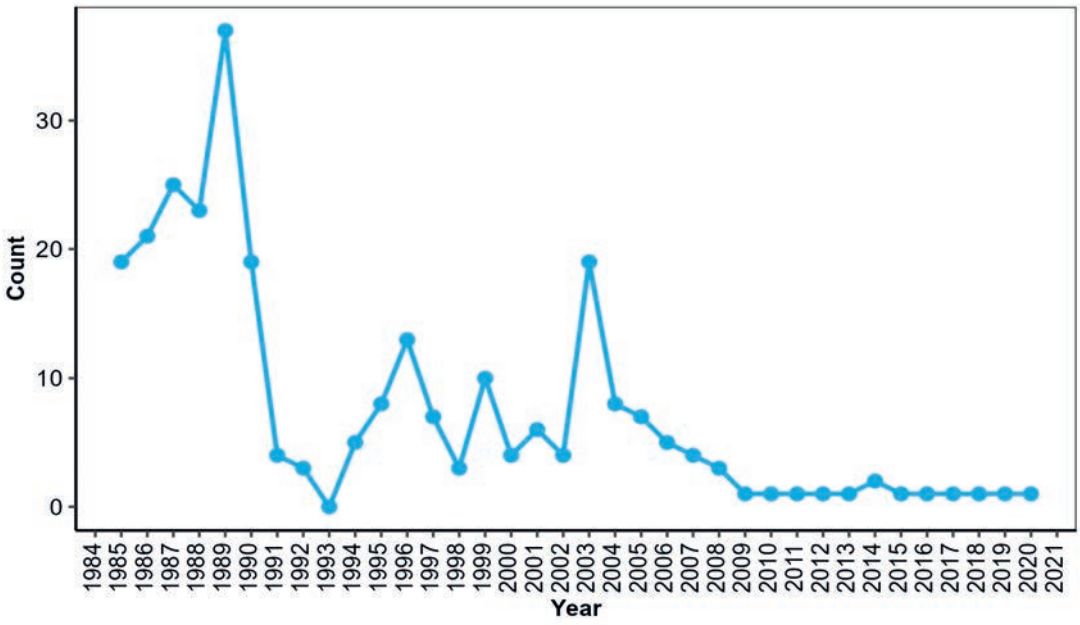
Abundance in 2021

In 2021, there was again a single pair at Larne Lough (Figure 20). Roseate Terns were observed late in the season at Cockle Island (see Strangford Lough Nesting Report, page 76).

Breeding success in 2021

The pair at Larne Lough fledged one chick in 2021 (RSPB).

Figure 20: Roseate Tern population counts (AON) at Larne Lough, 1985–2021.



Arctic Tern

Sterna paradisaea

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – listed in Annex 1 and as a migratory species, Least Concern – IUCN Red List (Europe).

IAN ENLANDER

Overview

Synopsis: Similar in appearance to the Common Tern, but with a longer tail and without any black on the beak, the Arctic Tern is the commonest tern species in the UK. However, due to its more northerly distribution, it is less familiar to many than the Common Tern (JNCC, 2021).

UK population size, abundance and breeding success trends: The UK population has fluctuated greatly since the 1960s. There was an apparent 50% increase in numbers between the 1969–70 and 1985–88 censuses, though there is uncertainty as to the true magnitude of this change due to questions of compatibility of methods between censuses. At the last census, the population was estimated to be 53,380 AON, a decrease of 31% since 1985–88 (Mitchell *et al.*, 2004). Annual SMP data indicate that current numbers are similar to the 1986 baseline (JNCC, 2021). Arctic Terns suffer the lowest breeding success of any seabird species in the UK, remaining below 0.30 chicks per pair in most years, potentially linked to prey shortages, extreme weather, and predation (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: In Northern Ireland the species is concentrated into just a few colonies including the Copeland Islands, Strangford Lough, Belfast Harbour, Bird Island, Green Island and Cockle Island. The population grew in the intervals between the previous censuses, rising by 257% between 1969–70 and 1985–88, and again by 78% to 767 AON by Seabird 2000 (1998–2002, JNCC, 2021). Since the last census, Arctic Tern numbers peaked in 2006 at 1,854 AON, which included counts of all major colonies.

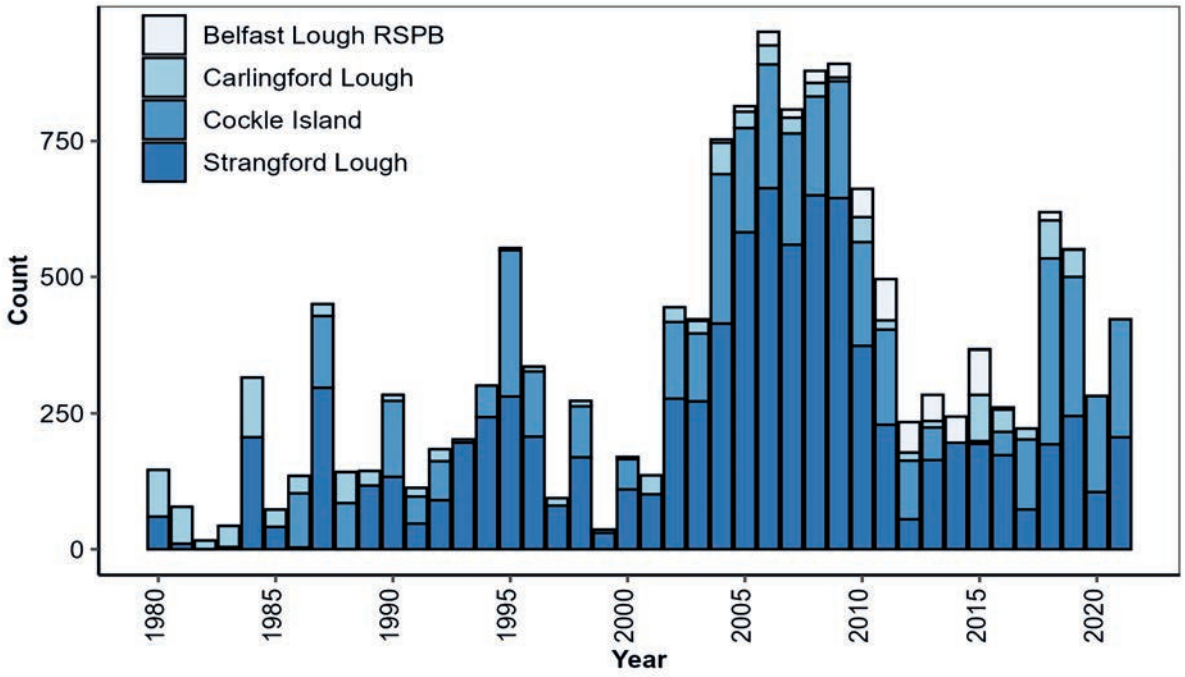
Between 1991 and 2019, Arctic Tern breeding success in Northern Ireland was similar to that elsewhere in the UK, producing an average of 0.30 chicks per pair per year (JNCC, 2021).

Abundance in 2021

Colonies of Arctic Terns around Northern Ireland are highly variable in their size year-to-year (Figure 21). In the last 25 years, the Copeland Islands and Strangford Lough have held the majority of breeding Arctic Terns in Northern Ireland. The colony at the Copeland Islands fluctuated between 600 and 1,250 AON between 2000 and 2013, but no full survey has taken place on all three islands since 2013. During rare access to Big Copeland, approximately 200 Arctic Tern AON were estimated to be present in 2020 (Gareth Platt, pers. comm.), more than the estimate for the previous year (75 AON, Table 8, Appendix). In 2019, 150 individuals were present on Lighthouse Island, Copelands, and these experienced a complete breeding failure potentially due to high levels of predation from Jackdaws, *Corvus monedula* (Chris Acheson and David Galbraith, Copeland Bird Observatory, pers. comm.). No Arctic Terns nested on Lighthouse Island in 2021 (Katherine Booth Jones, Copeland Bird Observatory, pers. obs.).

Numbers present at Strangford Lough have plummeted in the past decade, falling from a high of 663 AON in 2006 (Figure 21). There was a recovery from the low 2020 count, with breeding Arctic Terns increasing by 96% to 206 AON in 2021 (Table 8, Appendix). Although numbers of Arctic Terns were between 48 and 83 AON in Belfast Lough RSPB between 2010 and 2015, they have been much scarcer since, with only a single breeding pair in 2019 and none in 2020 or 2021 (Table 8, Appendix). The Cockle Island, Outer Ards population has been particularly variable, but also increased by 22% in 2021 to 216 AON. Arctic Terns were not fully counted at Carlingford Lough in 2021.

Figure 21: Cumulative Arctic Tern counts (AON) at Belfast Lough RSPB, Carlingford Lough, Cockle Island and Strangford Lough 1980–2021. Arctic Terns were not counted at Carlingford Lough in 2020 or 2021. The area filled represents the number of Arctic Tern pairs per year, and the colour represents the number in each site.



Breeding success in 2021

No Arctic Tern productivity data were collected in 2021 or 2020. In 2019, the 50 AON at Green Island, Carlingford Lough produced an estimated 24 chicks (0.48 chicks/AON, Matthew Tickner, RSPB, pers. comm.) an improvement over the 0.04 recorded in 2018. Likewise, breeding success was higher in 2019 than in 2018 in Strangford Lough, where a total of 252 AON across multiple islands produced 190 chicks (0.75 chicks/AON, Wolsey, 2019). This is in stark contrast to 2018 when Arctic Terns had an extremely low productivity of 0.01 chicks/AON due to the effects of Storm Hector and significant predation by large gulls and Otters.

Common Guillemot

Uria aalge

Conservation status: Amber-listed in BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

JON LEES

Overview

Synopsis: The Common Guillemot (hereafter Guillemot) is one of the most abundant seabirds in the northern hemisphere (JNCC, 2021). Guillemots are extremely gregarious and colonies can contain many tens of thousands of individuals, and these very large populations occur both in the Atlantic and Pacific Oceans (JNCC, 2021).

UK population size, abundance and breeding success trends: The UK and Ireland censuses in 2000 showed a large population increase compared to the previous survey, although some of this may have been due to better coverage and survey methods (JNCC, 2021). Between the 1969–70 and 1998–2002 censuses, the numbers of individuals recorded rose from 611,281 to 1,416,334. The most recent estimates put the population size at approximately 950,000 individuals (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). Annual SMP data indicate that numbers in 2019 were 86% above the 1986 baseline, although it was noted that that figure should be treated with caution as the large number of smaller colonies included in the sample were likely to have had a disproportionate influence on the index (JNCC, 2021).

The average breeding success of Guillemots in the UK between 1986 and 2002 was approximately 0.70 chicks per pair, but subsequently declined steeply until 2007. Recent years have seen a recovery in breeding success and in 2019, productivity was 0.62 chicks fledged per pair (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: In Northern Ireland the main colony is on Rathlin Island with smaller satellites at The Gobbins, Muck Island and at scattered cliff faces between Ballycastle and Portrush. Between the 1969–70 and 1985–88 censuses, the numbers of Guillemot appeared to remain stable, but had more than doubled to 98,546 individuals by Seabird 2000 (JNCC, 2021). Following a 50% decrease between 1999 and 2007, numbers of Guillemots rose by 60% to 130,445 individuals in 2011, when the last full survey was undertaken of Rathlin (Allen *et al.*, 2011). This made Rathlin the largest colony in the UK and Ireland. Recent estimates of Guillemots population size in Northern Ireland are slightly lower, at 65,000 individuals (Mitchell *et al.*, 2004; Woodward *et al.*, 2020).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

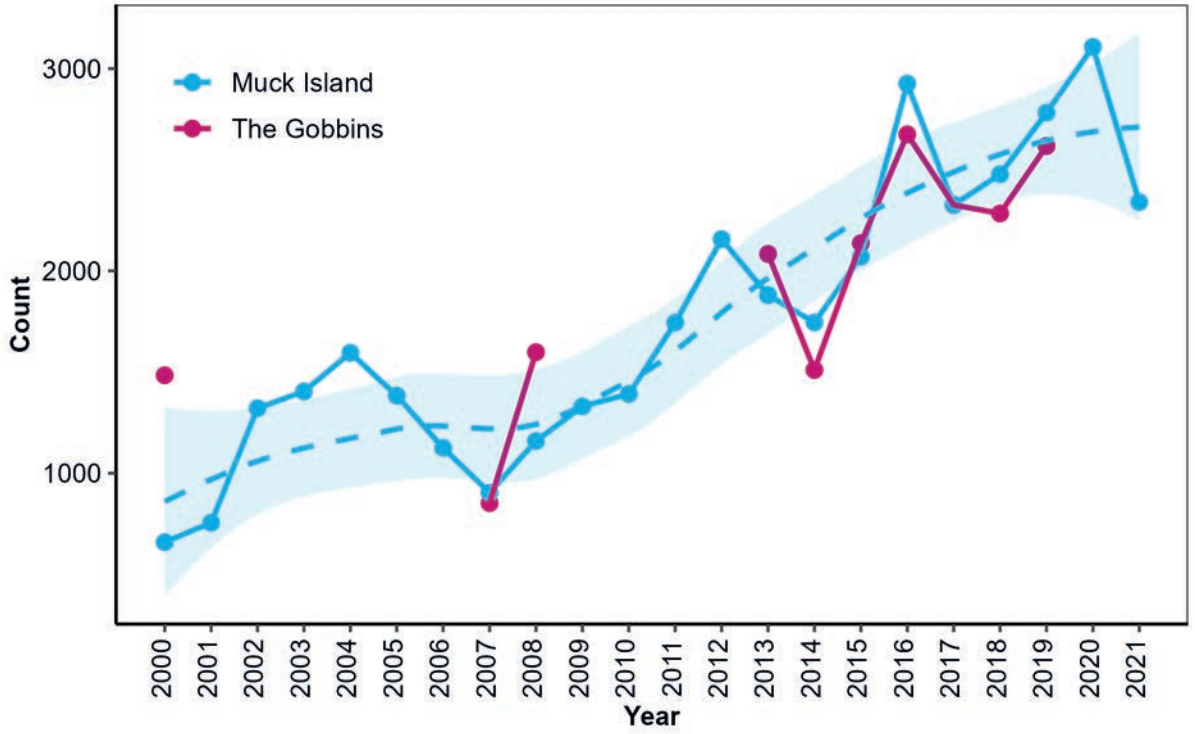
Abundance in 2021

Numbers of Guillemot at Muck Island, which has received continuous monitoring for this species since 2002, declined by 25% between 2020 and 2021 to 2,340 IND. However, this colony has had a generally positive trend since 2007, reaching a peak of 3,107 IND in 2020 (Figure 22). While no surveying was carried out on The Gobbins in 2020 or 2021, in past years the trend at this neighbouring site has generally matched that seen on Muck Island (Figure 22).

On Rathlin Island, the RSPB carry out annual comparative counts of study plots to monitor population levels (Figure 22). While no data were available for 2019 or 2020, in 2021 only 677 Guillemots were counted in the study plots, which was a decline of 80% on the 2018 count. However, a full census of Rathlin Island was carried out for MarPAMM in 2021 and found a total of 149,510 IND, which was an increase of 56% on the census of

1998–2002. This currently makes it the UK's largest breeding colony of Guillemots, in terms of SMP sites. Along the north Antrim coast between Runkerry and Murlough Guillemots increased by 57% to 981 IND since the last census.

Figure 22: Common Guillemot counts (individuals) at Muck Island and The Gobbins, 2000–21. No data were collected at The Gobbins in 2020 or 2021. The dashed line represents the Locally Weighted Least Squares Regression trend in Guillemot numbers over time at Muck Island (no trend for The Gobbins, due to missing data). The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No breeding success data were collected for Guillemot in 2021 or 2020. In 2019 a sample of 29 nests (not a formal Seabird Monitoring Programme plot) was monitored on Rathlin Island near the West Light, producing 19 jumplings (0.66 chicks/AON, Else & Watson, 2019).

Razorbill

Alca torda

Conservation status: Red-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Least Concern – IUCN Red List (Europe).

LINDSAY HODGES

Overview

Synopsis: The Razorbill is an auk of the North Atlantic and Arctic Ocean, breeding on both sides of the Atlantic. Razorbills nest on ledges with Guillemots and Kittiwakes, but also frequently in clefts, holes and under boulders. Their eggs are individually marked for easy recognition on busy ledges (Robinson, 2005).

UK population size, abundance and breeding success trends: Razorbill populations showed successive increases between the national censuses, though the population of 132,734 individuals recorded at the time of the first census in 1969–70 may have been underestimated because the small ledges they nest on can often be hidden from view, making them difficult to count (JNCC, 2021; Mitchell *et al.*, 2004). By Seabird 2000 (1998–2002), the estimated population size was 187,052 individuals, a 21% increase on the previous 1985–88 census. The latest estimates put the population size at approximately 165,000 (100,000–250,000) individuals (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). The UK breeding abundance index was 195% above the 1986 baseline in 2019, although wide confidence intervals mean this apparent increase should be treated with caution (JNCC, 2021).

Productivity was stable from 1986 to 2001 but declined to 0.38 chick/pair in 2008. Productivity has increased since and an average of 0.63 Razorbill chicks were fledged per pair in 2019 (Miles *et al.*, 2015).

Northern Ireland population size, abundance and breeding success trends: Between the 1969–70 and 1985–88 censuses, the numbers of Guillemot increased by 58%, and had more than doubled to 24,084 individuals by Seabird 2000 (JNCC, 2021). In Northern Ireland the main colony is on Rathlin Island with smaller satellites at The Gobbins, Muck Island and at scattered cliff faces between Ballycastle and Portrush. The last full survey of Rathlin, in 2011, recorded 22,975 individuals (Allen *et al.*, 2011), when it was the second largest colony of Razorbills in the UK at the time (JNCC, 2021). Razorbills been upgraded from Amber-listed to Red-listed in the latest Birds of Conservation Concern Ireland due to their increased European status (Gilbert *et al.*, 2021).

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

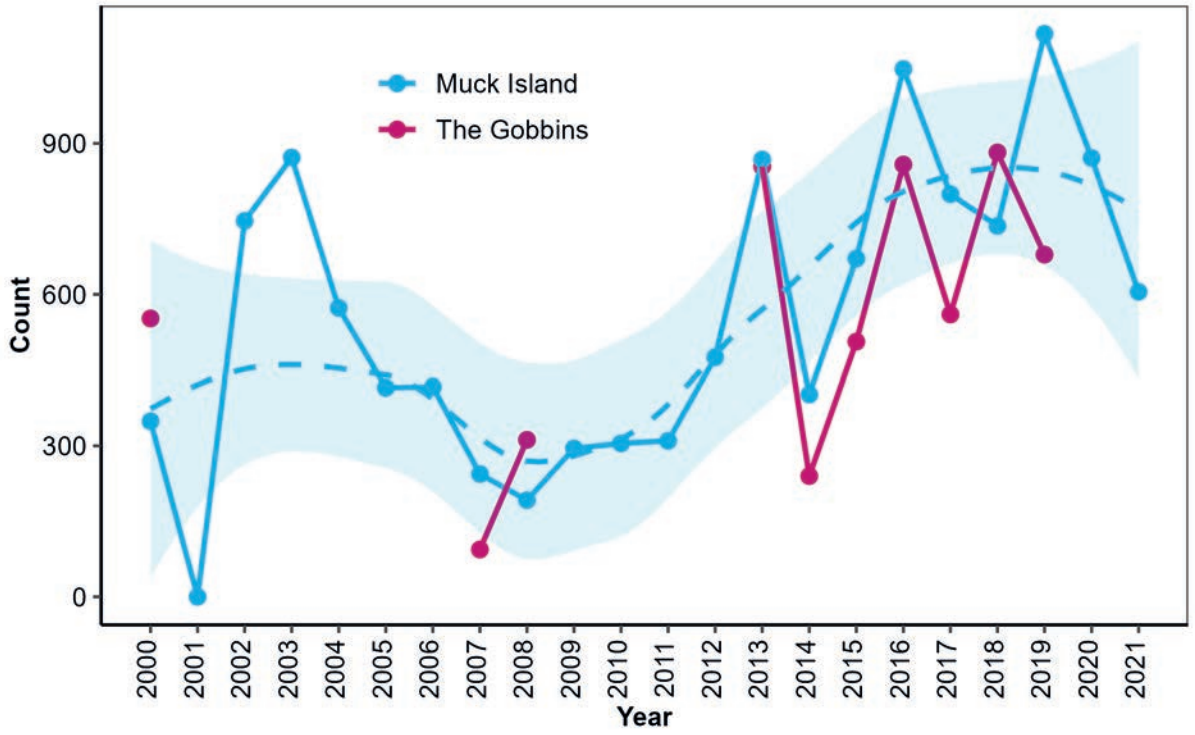
Razorbills were recorded at four sites in 2021 (Table 8, Appendix). For the first time, approximately 20 IND Razorbills were recorded on land on Lighthouse Island in the Copeland archipelago, and while these were not breeding individuals as far as could be discerned, it may be a sign of future breeding (Katherine Booth Jones, Copeland Bird Observatory, pers. obs.).

The number of Razorbills was at the highest level ever recorded on Muck Island in 2019 at 1,118 IND, but since then it has fallen, with numbers in 2021 their lowest since 2014 (Figure 23). It should be noted that numbers of Razorbills in attendance at the colony can be subject to large fluctuations, as in some years, many birds may not breed. Numbers at the neighbouring colony at The Gobbins decreased by 23% between 2018 and 2019, to 679 IND (Figure 23), but no counts were carried out in 2020 or 2021.

No data were available for the Rathlin Island RSPB study plots in 2019 or 2020, but in 2021, only 158 IND were recorded, which was a 73% decline on the last record made in 2018 (Table 8, Appendix). A full census of Rathlin Island and of the north Antrim coastline between Runkerry and Murlough occurred as part of the

MarPAMM project in 2021. These surveys found that Razorbills increased very slightly (by 7%) on Rathlin to 22,421 IND since the 1998–2002 census, making it the UK's third largest Razorbill conony by SMP site. In contrast, on the north coast stretch Razorbills declined by 70% to 582 IND.

Figure 23: Razorbill counts (individuals) at Muck Island (blue) and The Gobbins (pink) 1987–2021. No data were available for The Gobbins in 2020 or 2021. The dashed line represents the Locally Weighted Least Squares Regression trend in Razorbill numbers over time at Muck Island (no trend for The Gobbins, due to missing data). The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

No Razorbill productivity data were available in 2021, but in 2019 a sample of 17 nests (not a formal Seabird Monitoring Progamme plot) were monitored on Rathlin Island near the West Light, producing six successful fledglings (0.35 chicks/nest, Else & Watson, 2019).

Black Guillemot

Cepphus grylle

Conservation status: Amber-listed in the BoCCI4 (2020–26), Amber-listed in the BoCC5 (2021), Least Concern – IUCN Red List (Europe).

CHRISTINE CASSIDY

Overview

Synopsis: The striking Black Guillemot (or Tystie) is a circumpolar auk which in the UK has historically been a predominantly Scottish species. They can be found around rocky shores and nest in natural or artificial crevices, making records of breeding pairs difficult. When Black Guillemots carry fish in their bills the way the fish point suggest that some individuals are 'right-handed', whilst some are 'left-handed' (Ewins, 1988).

UK population size, abundance and breeding success trends: There was insufficient coverage in the 1969–70 census to create a robust population estimate for Black Guillemot. Numbers appeared to remain stable between the 1985–88 census (37,745 individuals) and Seabird 2000 (38,714 individuals) (JNCC, 2021), however recent estimates put the population at around 19,500 individuals (Mitchell *et al.*, 2004; Woodward *et al.*, 2020). The SMP abundance index for Black Guillemot is very uncertain, but appears to have been relatively stable at 50–75% below the 1986 baseline (JNCC, 2021).

There was no statistically significant trend in Black Guillemot productivity at study sites (restricted to Orkney and Co. Down), which was on average 1.05 chicks per pair between 1986 and 2018 (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Between the censuses in 1969–70 and 1985–88 Black Guillemot expanded their range in the Irish Sea, adopting the use of artificial structures such as harbour walls and jetties as nest sites. This is likely to have contributed to the 120% increase in Black Guillemots between the 1985–88 and 1998–2002 censuses, to 1,174 individuals (JNCC, 2021). However, in 2017 and 2018, colonies representing 80% of the population recorded during Seabird 2000 were surveyed, with a total of 879 individuals recorded. The 11% decline observed may indicate a change in fortune for Black Guillemot in Northern Ireland (JNCC, 2021).

The breeding success of Black Guillemots in Northern Ireland is mostly monitored through a study colony in Bangor, Co. Down (Greenwood, 2010; Leonard & Wolsey, 2014). On average between 1986 and 2018 productivity was 0.98 chicks per nest (JNCC, 2021).

Abundance in 2021

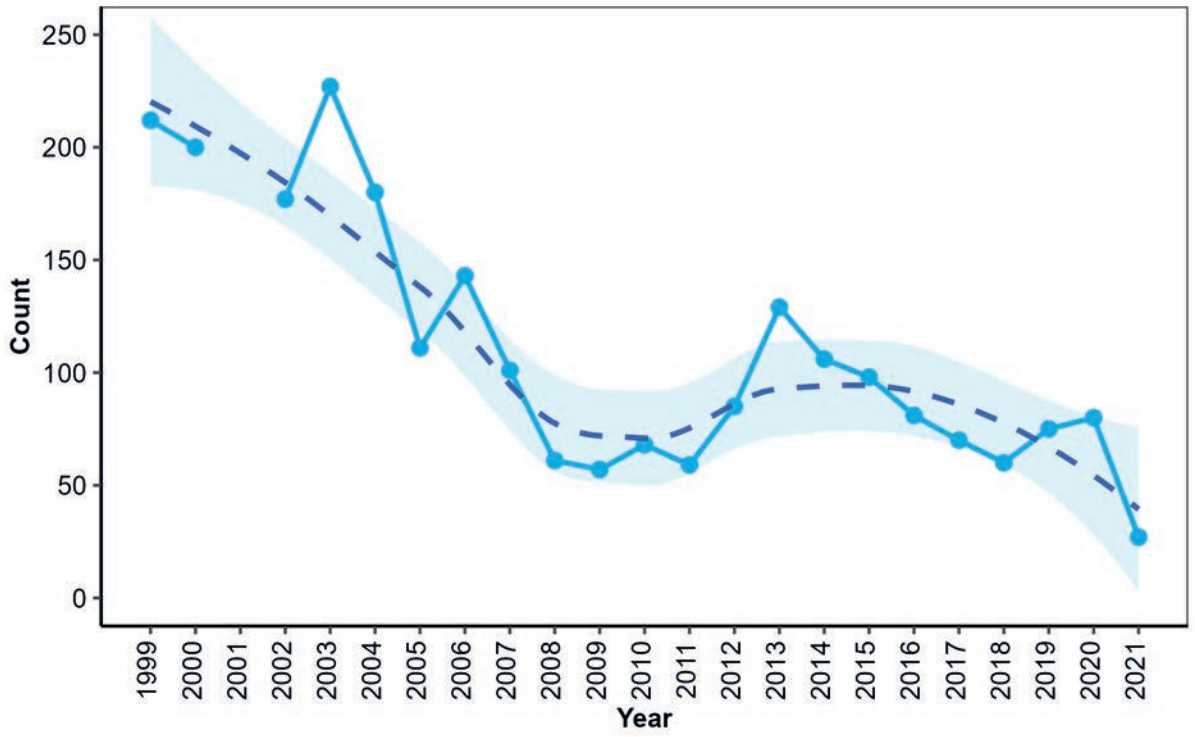
While the number of counts for Black Guillemots was greatly restricted by the 2020 COVID-19 lockdown, monitoring effort was exceptional in 2021, with 22 sub-sites surveyed by volunteers (Table 8, Appendix). A total of 718 Black Guillemots was counted around the coast in 2021, with the greatest concentrations found at The Maidens (60 IND), Bangor Marina (75 IND), on Lighthouse Island (60 IND) and at Annalong Harbour (58 IND). At Bangor and The Maidens these counts were higher than the previous counts (32% above 2019 counts and 244% above 2020 counts, respectively), while the Lighthouse Island count of individuals was the same as in 2019. Work carried out as part of the MarPAMM project in 2021 counted 27 AOS on the island (Johnston *et al.*, 2022).

The count of individual Black Guillemots at Annalong was 53% higher than in 2020, but the number of AOS was stable between the years (22 AOS in 2020, 21 AOS in 2021), despite disruption to the colony caused by harbour restoration work.

Notably this year a survey of the Skerries observed that there were 54 IND late in the season (June). While this is too late to get a good indication of the true number of breeders, it is a colony that has not been counted for the SMP in the past.

The Rathlin Island population has declined dramatically since the Seabird 2000 census (Figure 24), with only 27 IND counted in 2021.

Figure 24: Black Guillemot counts (individuals) at Rathlin Island, 1999–2021. No data were available for 2000. The dashed line represents the Locally Weighted Least Squares Regression trend in Black Guillemot numbers over time. The shaded region represents the 95% confidence interval around the trend.



Breeding success in 2021

Productivity data were collected for Lighthouse Island and Annalong Harbour in 2021. At Lighthouse Island, 24 AOS were followed to chick stage out of the total of 27 AOS. Although the ultimate fate of all of the chicks could not be monitored, 19 chicks were presumed to have fledged, giving an estimated productivity of 0.79 chicks/nest (Johnston *et al.*, 2022 and the Copeland Bird Observatory). At Annalong Harbour 21 AOS produced 10 chicks (0.48 chicks/AOS), a nearly identical estimate to that recorded in 2020 despite the harbour restoration works (Marc Vinas and Jessica Koquert, pers. comm.).

Atlantic Puffin

Fratercula arctica

Conservation status: Red-listed in BoCCI4 (2020–26), Red-listed in the BoCC5 (2021), EC Birds Directive – migratory species, Endangered – IUCN Red List (Europe).

STEPHEN DUNBAR

Overview

Synopsis: The Atlantic Puffin (Puffin) is the most iconic and well-loved of all North Atlantic seabirds. They are a secretive bird on land, nesting in burrows, and until recently relatively little was known about their pelagic lifestyle. Their colourful beaks have been recorded carrying up to 83 small fish in one go (Robinson, 2005).

UK population size, abundance and breeding success trends: Around 10% of the world population of Puffins breeds in the UK and Ireland, where it is the second most abundant breeding seabird (Mitchell *et al.*, 2004). The UK population of Puffin increased by 13% between the 1969–70 and, 1985–88 censuses, and by a further 19% to 580,714 AOB by Seabird 2000 (JNCC, 2021). However, due to their burrow-nesting habits and often remote breeding sites, Puffins are a difficult species to monitor. Therefore, data collection is biased towards smaller colonies and counts of individuals, rather than AOB. Counts of individuals can vary quite markedly between years compared to counts of apparently occupied burrows and this makes it impossible to generate a reliable breeding abundance index for the UK population (JNCC, 2021).

The breeding success of Puffins has been variable throughout the recording period, declining from the 1990s to early 2000s before then rising again (JNCC, 2021). More recently in 2019, average breeding success was 0.71 chicks per pair (JNCC, 2021).

Northern Ireland population size, abundance and breeding success trends: Although there was an apparent increase of 86% in Puffin AOB between the 1969–70 and 1985–88 censuses, Puffins had declined by 40% to 1,610 AOB by Seabird 2000 (JNCC, 2021). Due to their increased European status, Puffins have been upgraded from Amber-listed to Red-listed in the latest Birds of Conservation Concern Ireland report (Gilbert *et al.* 2021). The main colony in Northern Ireland is on Rathlin, which holds approximately 98% of the Northern Irish population. Small numbers also breed at The Gobbins and some are occasionally seen at Muck Island although breeding has not been confirmed. A conservation project on the Copeland Islands, using decoys and sound lures to attract birds, has resulted in a new colony with breeding confirmed in 2015 (Wolsey & Smyth, 2017). This was a tremendous achievement and hopefully the start of a viable colony, proof that the use of sound lures and decoys can work for this species without the need for translocations.

The collection of productivity data in Northern Ireland has been limited; therefore productivity estimates cannot be modelled at the regional-level (JNCC, 2021).

Abundance in 2021

No Puffins were observed at Muck Island this year, and only 1 AOB was recorded in the Rathlin Island RSPB reserve (Table 8, Appendix). The full census of Rathlin for MarPAMM revealed a count of 407 IND, which represented a decline of 74% since the 1998–2002 census. However, it must be noted that all censuses of Puffin on Rathlin Island are made later in the season than recommended (Walsh *et al.*, 1995) due to the logistical difficulty of surveys, and therefore may not closely indicate the true size of the breeding population (Booth Jones *et al.*, 2022). MarPAMM surveys also recorded 2 IND at Sheep Island.

Puffins continued to be present in encouraging numbers at Lighthouse Island, Copeland Islands, where a peak of 68 IND was estimated in May. The area of potential AOB, while not currently monitored, appeared to have

expanded outside the traditionally used steep grassy area on the east of the island, where decoys had previously been used to attract the Puffins (Wolsey & Smyth, 2017, Katherine Booth Jones, Copeland Bird Observatory, pers. obs.).

In 2019, a peak count of 54 individuals was recorded at The Gobbins, in the same range as counts during 2013–18 (Table 8, Appendix).

Breeding success in 2021

No productivity data were collected in 2021. In 2016, two chicks fledged from the newly established colony on Lighthouse Island (Copeland Bird Observatory), but without an estimate of the number of active burrows the breeding success of the colony remains unknown. Despite yearly use of the colony by Puffins, there have been no confirmed fledglings since, due to the difficulty of recording breeding success on the island.

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Projected future abundance of seabirds in Northern Ireland under climate change

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STEPHEN MAXWELL

Introduction

In common with much of the world's biota, seabirds are threatened by climate change. Many of our seabird species in Northern Ireland (NI) are near the edge of their breeding range, meaning that small changes in climate could cause major changes in abundance or presence. In order to allocate limited conservation resources efficiently, we need to assess the vulnerability of our seabirds to climate change. As part of the Marine Protected Areas Management and Monitoring (MarPAMM) project, we predicted seabird abundance in the INTERREG VA area (Western Scotland, NI and the border counties of Ireland) in 2050 (Davies *et al.*, 2021). Here we present seabird breeding abundance projections for NI in particular and discuss how they will be used to inform seabird conservation.

Methods

We made our projections of future seabird breeding abundance by estimating the relationship between local environmental conditions (climate/oceanography) and per-colony seabird abundance. Using this fitted relationship, we projected seabird abundance into the future under projected future climate (emissions scenario RCP8.5, the scenario most consistent with the current global trajectory).

Seabird breeding abundance data were derived from the two most recent national seabird censuses: Seabird Colony Register (1985–88; Lloyd *et al.*, 1991) and Seabird 2000 (1998–2002; Mitchell *et al.*, 2004). We made two methodological innovations on most previous projection studies: firstly, as well as basing our projections on climate data (air temperature and rainfall; Met Office Hadley Centre, 2018), we also used oceanographic data. Seabird demography is driven by conditions both on land and at sea (Johnston *et al.*, 2021), and yet except for Russell *et al.* (2015), future projections of seabird abundance or occurrence in North-West Europe have been based solely on climate. Therefore, to make our environmental data more relevant to seabirds, we additionally included data (De Dominicis *et al.*, 2018; 2019) on sea surface temperature and potential energy anomaly (a measure of ocean stratification) in the environmental dataset.

The second innovation we made was to account for spatial effects in the model. This is because spatial effects such as seabird dispersal between neighbouring sites, or chance geographical association between environmental variables, can make it difficult to correctly identify relationships between seabird and environmental variables. Unlike previous studies, we accounted for spatial effects explicitly within the model in order to address this issue.

Results and discussion

The model ran or had enough data to produce projections for 19 of the 25 seabird species that breed in the UK and Ireland (UK&I). Of these, 16 species breed in NI: projections are presented for these species in Table 1. For Sandwich Tern, the model behaved unusually, being based on relatively few data, and the results for this species should be interpreted with particular caution.

Uncertainty was high in the projections: 95% credible intervals for the projected breeding abundance in 2050 are very wide, overlapping with Seabird 2000 abundance for all species except Arctic Tern. However, like similar studies focusing on UK&I and/or NW Europe (Huntley *et al.*, 2007; Johnston *et al.*, 2013; Russell *et al.*, 2015), our median projection for most species is that they will decline in NI under climate change by 2050. Of the 16 species, we predict that 12 will decline and four will increase.

We predict that six species (Fulmar, Arctic Tern, Sandwich Tern, Black Guillemot, Puffin and Guillemot) will decline in breeding abundance by more than 50%.

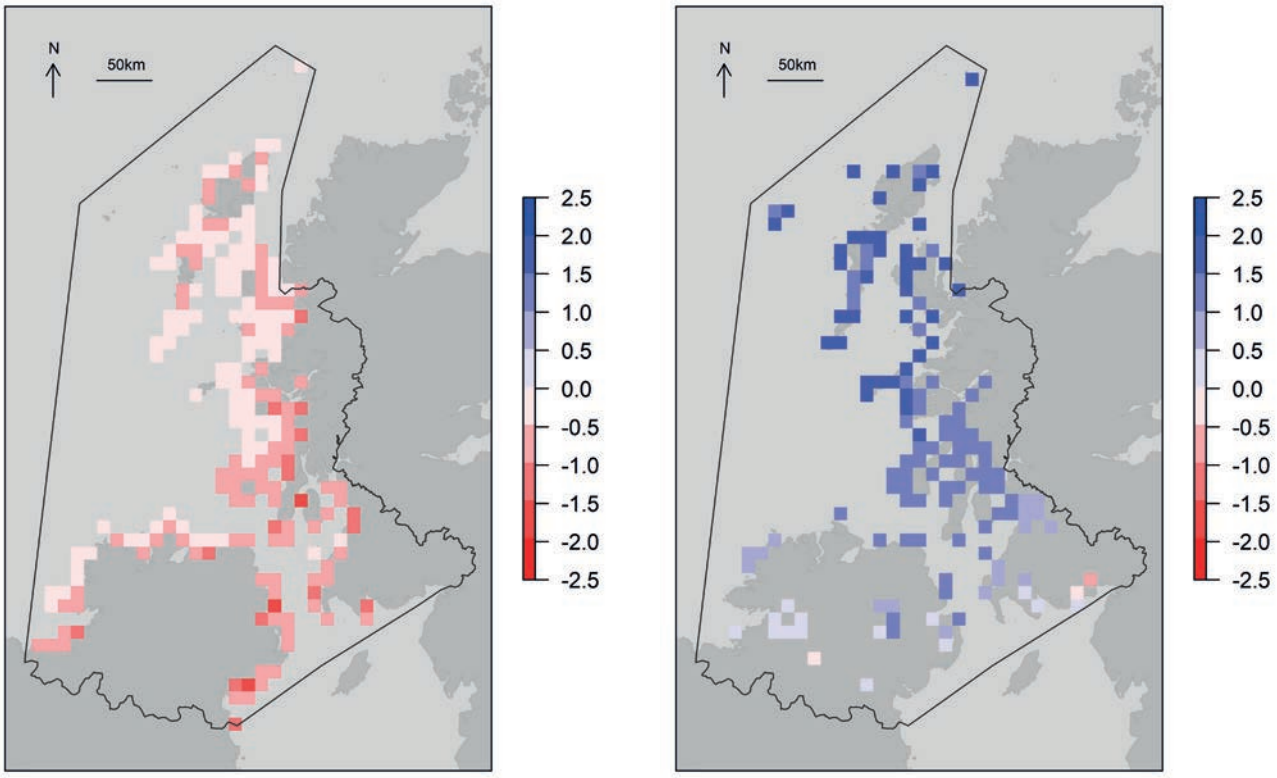
Table 1. Projected future breeding abundance change in NI for 19 seabird species under climate change. Data-poor species with less reliable model performance are asterisked.

Species	Seabird 2000 count (NI)	Predicted NI abundance, 2050 (median and 95% CI)	Predicted change (median %, NI)	% of UK&I population in NI (Seabird 2000)	% of UK&I population in NI, 2050 (median prediction)
Fulmar	5,992	2,877 (770–9,326)	-52.0	1.1	2.0
Cormorant	663	825 (85–4,117)	+24.4	4.9	6.8
Shag	301	938 (91–5,260)	+211.6	0.9	2.1
Black-headed Gull	10,106	19,971 (3,264–116,364)	+97.6	7.1	9.0
Common Gull	557	438 (68–1,984)	-21.3	1.1	0.9
Great Black-backed Gull	76	69 (19–279)	-8.9	0.4	0.4
Herring Gull	714	616 (156–2,159)	-13.8	0.5	0.6
Kittiwake	13,060	8,410 (1364–39,063)	-35.6	3.1	4.4
Lesser Black-backed Gull	1,973	4,651 (561–33,533)	+135.7	1.7	3.7
Arctic Tern	767	69 (4–639)	-91.0	1.6	0.6
Common Tern	1,704	1,291 (194–7,726)	-24.2	12.3	9.0
Sandwich Tern*	1,954	291 (7–59,931)	-85.1	14.0	6.8
Black Guillemot	1,174	474 (104–1,722)	-59.6	2.7	1.8
Puffin	1,610	258 (11–2,993)	-84.0	0.3	0.4
Razorbill	24,084	12,443 (2,260–54,489)	-48.3	11.1	11.6
Guillemot	98,546	46,749 (5,722–280,816)	-52.6	6.3	6.0

Seabird breeding abundance changes are expected to vary spatially (Figure 1), due to spatial variation in projected climate change. Seabird declines are generally projected to be more pronounced in the south and east of UK&I (not shown), depending on the species. Therefore, although seabird species are generally expected to decline in NI, those declines may generally be lower in NI than for the UK&I population as a whole. Broadly, NI may host a larger proportion of the UK&I population of gulls and Cormorants and Shags and a lower proportion of the UK&I population of terns under climate change than at present (Table 1).

Our results should be interpreted with caution, for several reasons (for full limitations see Davies *et al.*, 2021). Firstly, the model's predictive power was generally low: the relationship between observed and predicted abundances was weak for most species. Secondly, NI represents a small proportion of the area over which projections were made. At this scale, projections for individual colonies can sway the total abundance, and so more local projections may be less accurate than those for the entire study area. Thirdly, our approach does not capture all aspects of climate change that are relevant to seabirds. For example, we do not include sea level change, which is likely to reduce the nesting habitat for some low-lying coastal nesting species such as terns (Johnston *et al.,* 2021). Finally, climate change is not the only environmental factor driving change in seabird populations: factors such as invasive species, overfishing and land use change may drive seabird populations in the opposite direction than they are driven by climate change.

Figure 1. Projected change (1998–2002 to 2050; log proportional change) in abundance across INTERREG VA area under climate change, for: a) Black Guillemot; b) Lesser Black-backed Gull. Change presented for all cells where species was present in 1998–2002. Blue = increase, red = decrease. Black polygon = INTERREG VA area.



Applications and future work

Seabird abundance projections from the present study will be used to help conserve NI's seabirds, as part of the MarPAMM project. Projections for the INTERREG VA area have been combined with an assessment of the mechanisms by which climate change affects seabirds (Johnston *et al.*, 2021) to produce climate change vulnerability assessments for each species (Davies *et al.*, 2021). Alongside specific recommendations for conservation approaches to counteract or compensate for climate change impacts (Pearce-Higgins *et al.*, 2021), these vulnerability assessments will be used to inform management. The colony-level projections have also been fed into projections of at-sea species distributions, to inform marine planning (Cleasby *et al.*, 2021).

Monitoring of seabirds is critical to inform understanding of their ecology and conservation. The results of the current census (Seabirds Count) will be valuable for following up the work of the present study, for two reasons. Firstly, by confronting our site-level projections (albeit for 2050) with observations, we can assess their accuracy and the extent to which climate change is already driving change in seabird populations. Secondly, the model can be refined using the additional data. This will particularly help refine the oceanography-seabird abundance relationship, which was solely based on data from the latter (Seabird 2000) time-step.

Acknowledgements

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Essentially a seabird: the Manx Shearwater

Paris Jagger and Ollie Padget
Oxford Navigation Group

SARAH KELMAN / BTO

Of Northern Ireland's 22 breeding seabird species, none lives longer than the Manx Shearwater. In 2008, the record for the longest-lived individual was set at 50 years, 11 months and 21 days, and indeed birds in their late 30s and older are not at all uncommon. Weighing barely more than a can of coke and with a wingspan of around 90 cm, it is impressive enough that these little seabirds reach the coasts of South America on migration – let alone that over a 50-year lifetime this bird would have travelled the distance almost 100 times.

The age of these remarkable animals is fascinating not just for what it tells us about them, but also for what it reveals of our relationship with them – and with seabirds around the world. Written records of Manx Shearwaters exist as far back as 1668, but oral histories much further. According to legend, Norse sailors journeying near the Hebridean island of Rum were so alarmed by their call (a loud, repetitive and breathy cackling) that they concluded the island must be populated by fearsome trolls. In much of Northern Ireland and the western British Isles, the species was commonly eaten, or used as lobster bait. The extent of the species would once have been far greater than its now 300,000 pairs attest to, before both humans and the rats they introduced depopulated former colonies.

Just how familiar previous generations were with the species is evident in the proliferation of local names for them – while all European languages have their own descriptions, the islands of Ireland and Britain have produced, by some counts, well over 20 names in different dialects. With breeders found as far afield as Maine and the Azores, and their annual migration to the Patagonian Shelf, these birds' interactions with humans are, furthermore, as widespread as they are old.

Yet despite the history of our species' cohabitation, little was known about the lives of these extraordinary birds until very recently. A collector's book from the 1960s (Tunnicliffe, 1965) explains that the shearwater "is essentially a seabird, though it does not travel far out to sea" and migrates "probably to Spanish coastal waters". What we have learnt in the 60 years since, however, has shifted our opinion of them. We know now that these birds regularly travel hundreds of miles out to sea for a single meal for their chicks, and thousands more to reach the coast of Argentina every winter on migration. Over a lifetime, that adds up to many millions of miles around the Atlantic. In scientific papers nowadays, the words Manx Shearwater are rarely seen without the word pelagic – meaning living across the open ocean. "Essentially a seabird" could, in fact, hardly be a better description.

How we came to understand the lives of Manx Shearwaters owes partly to the rapid changes in technology of recent years, but partly also to the decades of commitment of bird enthusiasts to monitoring a handful of colonies across Ireland and Britain. Miniaturised technology has let researchers put smaller trackers on smaller birds, allowing us to follow their journeys at sea and discover what sightings from boats and land could never tell us. Much of this work was done on Skomer Island in Wales, the world's biggest colony of Manx Shearwaters. However, it is from the Northern Irish colony that we have learnt the most about their longevity.

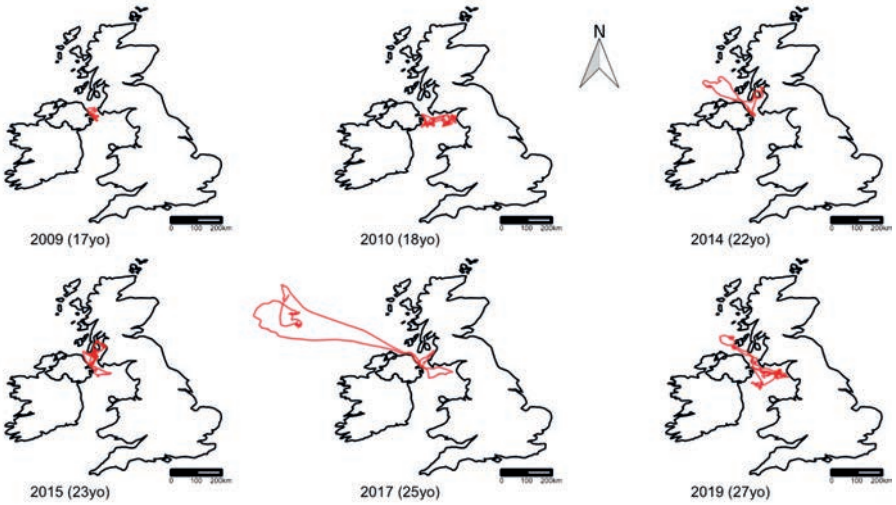
Lighthouse Island, in the Copeland archipelago off Belfast Lough, is home to around 4,000 pairs of Manx Shearwaters. It is also home to the Copeland Bird Observatory, set up in the 1950s to observe and record the goings-on of local species. As with much ornithological work, the primary way of monitoring birds was (and is) to fit them with a metal leg ring bearing a number that identifies them if re-caught. Thanks to the commitment of dozens of volunteer ornithologists visiting Lighthouse Island over the last 70 years, ringing has left us with a resource probably unrivalled anywhere except for the albatross colonies of the Antarctic. The majority of adult

birds on the colony are ringed – if you were to go out on the colony in the summer at night when they visit their nests and catch one, you'd be unlucky not a find a ring on its leg. Of these, perhaps 20% were ringed as chicks. Since eggs across the colony are laid within a couple of weeks of each other, this means we can age these animals to within a month or so.

Though interesting in itself, data on the age of birds is indispensable for understanding their behaviour and life history. It helps us to understand the details of how they choose their mates, how they learn to navigate in the pelagic environment and gain the skills needed to exploit oceanic resources efficiently, as well as informing us about survival rates – a key demographic parameter needed to understand population growth (or decline) and resilience.

Surveying burrow-nesting seabirds such as Manx Shearwaters is extremely difficult, but from playback surveys and demographic parameters, there is no evidence for a decline in the Northern Irish or British shearwater populations. Naturally the same cannot be said for many of the country's other seabird species. On Copeland this year we watched Arctic Terns try and fail to breed, a sight not uncommon across the UK, despite hopes that in some places lockdown restrictions might have given them some respite during the breeding season.

The Oxford Navigation Group has been working on known-age Manx Shearwaters breeding on Copeland and combining the information gained from ringing studies with modern technology. The maps show the GPS-recorded foraging trips of ES11008, ringed as a chick in 1992, across the years the group has studied it from 2009–19. It visits a variety of locations around the northern British Isles and the island of Ireland to forage, probably on pelagic fish. How shearwaters find their way and learn to exploit marine resources are some of the questions that we are beginning to answer using modern technology to track this enigmatic species



However, not all this year is bad news for seabirds. In October, the UK and Ireland committed to the renewal, and extension, of the OSPAR Convention's protection of the North-East Atlantic, specifically with them in mind. Along with 13 other signatories, they are dedicated to 50 objectives for maintaining the biodiversity of the region covering the North Atlantic Current and Evlanov Sea basin. Extensive tracking data, including data from the Copeland Manx shearwater colony, showed this area to be a foraging hotspot for more than six million seabirds of 21 species (Davies *et al.*, 2021). Through regulation of fishing activities across an area the size of the UK and Germany combined, the new Marine Protected Area should reduce threats to seabirds from ocean pollution, overfishing and bycatch.

While this has the potential to improve things for seabirds at sea, more immediate dangers are often posed at their breeding sites themselves. Mammalian predators like rats can decimate seabird colonies, making easy prey of unguarded eggs and chicks. Thanks in part to ongoing biosecurity efforts, many of the country's seabird colonies have not yet been exposed to them. However, many former breeding sites have been lost completely, and for some it remains to be seen how long they can hold out.

Rathlin Island, the only inhabited island on the Causeway Coast, suffers both rats and Ferrets *Mustela putorius* subsp. *furo*, the latter brought to the island around 35 years ago. Known as a stronghold for many seabird species,

including Black-legged Kittiwakes, Guillemots, Razorbills and Fulmars, Rathlin's status as a bastion for Puffins has been slipping, with a >50% decline in the last 20 years – as burrow-nesters like shearwaters, Puffins are especially vulnerable to these predators. Yet, as of September, their future is looking more hopeful. A new project, Rathlin Acting For Tomorrow (RAFT), will receive £4.5 million to deliver a number of natural heritage and community benefits, including wildlife conservation targets – notably eradicating Brown Rats (*Rattus norvegicus*) and Ferrets. RAFT, funded by six organisations (including EU LIFE, DAERA and RSPB NI), will begin in 2022 and run for five years. As well as improving the fortunes of its Puffins, it is hoped that other species that once bred on Rathlin will return, such as Manx Shearwaters and Storm Petrels.

Whether any of these projects come to fruition, and how, is just one more source of uncertainty in the future of Northern Ireland's seabirds. Yet more attention on these issues, and more opportunities for research, can only inspire others to safeguard them further. It is owing to the quiet work of an unknown number of volunteers that we know so much about the country's oldest seabird. As we continue to learn more from these known-age animals, and from technology like GPS, we will only be better equipped for making decisions concerning them in future.

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Tern colour ringing in Larne Lough

Roisin Kearney
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EDMUND FELLOWES / BTO

A long time ago in a galaxy far, far away (i.e. pre-COVID), I was excitedly looking forward to the upcoming 2020 seabird breeding season. The summer is my favourite time of year, when the seabirds arrive. When visiting a seabird colony represents a full sensory experience; from the visual spectacle, to the noisy cacophony, all the way to the omnipresent guano smell and not to forget the furious touch as you are dive bombed by the adult birds. This year had a special significance as I was about to embark on my first colour ringing project. I had contributed to several other colour ringing projects over the years, but this was the first that I organised and arranged by myself. And what better species to start with than terns?! This is a rhetorical question as these elegant (and angry) seabirds are by far the best birds, in my heavily biased opinion.

I work for the RSPB in Northern Ireland (NI) as a Conservation Officer though my main role deals with planning and casework and most of my days are spent at my laptop reading reports about various developments and providing advice and recommendations to ensure they are not harmful to nature and wildlife. However, as I am one of the few licenced BTO ringers in the RSPB in NI, they let me out occasionally to assist with some of the on-the-ground work.

This colour ringing project was to be carried out on behalf of RSPB NI and the site in question, Blue Circle Island in Larne Lough, is an incredible site for breeding seabirds. For those of you who don't know the site and the wonderful work that has gone into it over the years by the RSPB, I would recommend reading the excellent article in the 2018 NI Seabird Report (Woulahan *et al.*, in Booth Jones & Wolsey, 2019) which described the history of this site much better than I could. Suffice to say, it is an incredible site with an incredible history. Somewhere in the region of 5,000 pairs of seabirds of twelve different species regularly nest on the island. In terms of the colour ringing, we were targeting the Sandwich Terns and Common Terns. We would also be keeping an eye out for the Roseate Terns and hopefully ringing their chicks too. Blue Circle Island has the absolute honour of holding the only breeding pair of Roseate Terns in Northern Ireland and as such we would be keeping a special watch for them.

The purposes of the colour ringing were varied. In the autumn, terns tend to congregate at stopover sites across the UK and Ireland and ringing will allow us to see which of these sites are important for Blue Circle birds which can help inform protection of these sites. Once the birds have left our shores, we can then see where the birds spend their winters and where they stop off on the way. In a few years, when these colour ringed birds start to return to breed, we can see if they return to Blue Circle or end up breeding at another site. Additionally, terns are very mobile species and can move around between colony sites. External factors, such as storms washing away nests at a site, can cause terns to move between different sites and potentially attempt breeding at a second site. The use of colour rings would allow us to determine the movement of the terns should this occur. Should there be a bad year at Blue Circle in the future, it would allow us to determine whether losses at the site were balanced by gains elsewhere (i.e. movement to another colony).

Sadly, as with everything in life at the time, COVID-19 scuppered my 2020 plans for colour ringing. Apart from the lockdown restrictions in place, I was also placed on furlough for the whole summer season which meant I couldn't do anything even vaguely 'work' related. While this was frustrating, I didn't resent doing my bit to help stop the spread, I just kept my fingers crossed for the next summer season.

The 2021 breeding season eventually rolled around (even though at the time it felt like an age!). While

restrictions were still present at the time, they were not as severe as the previous summer so we could work within their bounds and I was long back from furlough. So, all the licences were arranged with BTO, RSPB and NIEA (so many forms!) and finally my very own colour ringing project was up and going, to my immense relief!

Restrictions at the time limited how many people we were allowed take on the boat out to the island. Monika Wojcieszek, the RSPB Assistant Conservation Officer, was in charge of the practicalities of getting us out there and driving the boat. She monitors all the RSPB NI tern nesting sites in NI and is a wealth of knowledge about terns and Blue Circle. Apart from myself and Monika, we were able to take two other folks out with us on each visit. I put the call out among local ringers and got an excellent take up! Chances to get out to Blue Circle Island are rare, so I had enough eager volunteers to help out and I am so thankful for their help.

Once out on the island, we started the ringing while Monika carried out the censusing of the nests of the island. Monika is also a BTO ringing trainee and assisted in the ringing of the terns once the nest counting had been completed. As we were trying to limit disturbance to the breeding birds, our time on the island was limited to one hour so we tried to be as efficient as possible.

While the plan had been to ring both Sandwich and Common Terns on Blue Circle, we ended up not ringing any Common Terns at all on the island. Unfortunately, the Common Terns did not seem to have a great year on Blue Circle Island, with only small chicks found each time we went out. The chicks need to be closer to fledging size to fit the colour ring and we were not able to locate any chicks that got that far. It could be issues with predation as the Common Terns tended to nest around the edges of the island outside the predator exclusion fence. Or perhaps they were outcompeted by the Sandwich Terns for the prime nesting locations. In order to colour ring at least a few Common Terns, we decided to change tactics. RSPB NI also manages Swan Island in Larne Lough, a smaller island but quite close to Blue Circle. The Common Terns appeared to be doing better on this island, so we decided to try there. After sorting out updated licences (as Swan Island is also a designated site and so requires permission from NIEA), we managed to colour ring a few Common Terns, though in much smaller numbers than the Sandwich Terns.

Over the course of four trips, we managed to ring 102 Sandwich Terns, colour ringing 97 of them, and 14 Common Terns, with nine of them getting a colour ring. The cream of the crop, the Roseate Tern pair, also produced two chicks which were both given a standard BTO metal ring as well as the Roseate 'special' ring which is a metal ring but designed to be read more easily in the field.

However, the work is not done just because the ringing is finished. As I mentioned, this was the first colour ringing project that I had full responsibility for and that meant that I was responsible for re-sightings too, which was a new experience for me. Some frantic requests to RSPB colleagues and other ringers to see about the best ways to set up a ringing database to log sightings ensued. Database layouts seems to vary across different ringers, but I sorted out something that worked for me and was easy to pull out sightings from.

The next phase was actually dealing with re-sightings from the public. I had no idea how many, or how few, I would get. The worry quickly set in that no

Tern chicks are fitted with a metal ring on the right and a colour-ring on the left, each bearing a unique identifying number. Photo Roisin Kearney.

one ever sees any of my birds and I would get nothing back at all! But thankfully I needn't have worried, with the first re-sighting rolling in on the 6th July, for a Sandwich Tern that had only been ringed less than three weeks previously! As of the time of writing this article (end of October 2021), I have had 40 of my 97 Sandwich Terns re-sighted, some multiple times in different sites, with 79 re-sightings in total. While admittedly I have no other project to compare this too, I am considering this to be an amazing success so far!

I currently have re-sightings for Sandwich Terns from 19 different locations so far, all within the UK and Ireland apart from one in France. By far the biggest number of sightings came in from Stranraer, Scotland with 17 individual Sandwich Terns being spotted over the month of July. So many birds that I have to wonder if they are getting the ferry across...

Colour-ringed tern recoveries (yellow points) and the location of Larne Lough, blue house symbol.

Unfortunately, I cannot say that I have had the same level of success with the Common Terns with only one of them being re-sighted so far, down in Dublin Port. While some of this is likely to be purely down to the fact that a much smaller number of them were colour ringed, given the poor breeding season they seemed to be having in Larne Lough, it may be that not all of them survived to fledge. However, I am an optimist at heart, so I still hope to get a few more of them re-sighted.

Going forward, the RSPB hopes to continue colour ringing at both Blue Circle and Swan Island. The more data we have, the better a picture we can build up of the birds' movements and biology.

All in all, I am excited to see what information this project brings in the future and hope that it is useful, even in some small way, to help conserve these exceptionally amazing birds!

Our Sandwich and Common Tern were ringed with a dark green leg ring with a white 3-digit code starting with the number '3'. If you spot one of these birds, please email your sighting to the project using LarneLoughTerns@rspb.org.uk.

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BIOSECURITY FOR LIFE

SAVE OUR SEABIRDS FROM INVASIVE PREDATORS

Tessa Coledale

Biosecurity Officer for Wales and Northern Ireland

Since introducing the Biosecurity for LIFE project in the 2019 BTO Northern Ireland seabird report, we have been busy working with land managers, key stakeholders, and communities to improve biosecurity at five Northern Irish Special Protection Area (SPA) offshore island sites designated for breeding seabirds. Seabirds are one of the most threatened bird groups in the UK and globally. One of the key threats to UK seabirds is the presence of invasive non-native mammalian predators which can decimate breeding colonies by eating eggs, chicks, and adult birds. Seabirds have not evolved to defend themselves from these skilled hunters, introduced to islands by humans. New incursions are reported every year from islands around the UK and climate change among other factors is expected to make these a more common occurrence. The main aims of the project are to reduce the chance of invasive predators reaching UK seabird islands where they aren't already present, ensure surveillance is in place to quickly detect if an invasive predator does reach an island and use this vital early detection to ensure a rapid response to an incursion to prevent an invasion.

Such a rapid incursion response was put into action in July 2021 when a headless rat was found on Lighthouse Island in the Copeland Islands. Shortly after the report a full incursion response was carried out by Copeland Bird Observatory volunteers who quickly put out additional biosecurity surveillance devices. These included tracking cameras, tracking tunnels that collect ink footprints, and flavoured wax chew blocks that record teeth marks. The team did a great job at refreshing and checking these devices weekly until the end of October with no further evidence of rats seen. The main creature attracted to these non-toxic monitoring devices appeared to be snails who were rather partial to the peanut butter used as a bait within the tracking tunnels! It is likely that the dead rat had either washed up or been brought over to the island from the mainland by a gull, something we have recorded on other islands around the UK previously. This work to confirm rats had not made their way to the Copeland Islands was vital as just one pregnant female can wreak havoc on a seabird island, producing a colony of 300 rats in just over eight months! If further evidence of rats had been found, we would be well placed to quickly remove them before they could become established.

Not all the islands Biosecurity for LIFE work on in Northern Ireland are free of invasive predators, although this is hopefully about to change. We are very excited to be working with the Rathlin Acting For Tomorrow (RAFT) project to ensure that effective biosecurity measures are in place before the rat and feral Ferret eradication begins. Eradications are costly and logistically challenging and can ultimately be unsuccessful if there isn't awareness around the continued need for

biosecurity to prevent reinvasions. Since our first trip to Rathlin in August 2021 work has been carried out to raise awareness of the issues and how people can help. Boat operator packs have been distributed to both Rathlin and Ballycastle harbour masters for them to use during their meetings with visiting yachts. These packs highlight key steps boat owners can take to ensure their boats don't become host to a stowaway invasive non-native mammalian predator. There are also boat operator packs geared towards tour boat operators and fishing vessels, this information has proved valuable during discussions with people working in these sectors.

Biosecurity is also being bought to the attention of visitors to Rathlin through our leaflets found at Ballycastle Tourist Information Centre and our posters displayed at the ferry terminal. With over 50,000 visitors travelling to Rathlin every year the ferry is a key risk area for potentially carrying invasive predators onboard via people's bags or vehicles. A training workshop over the winter of 2021/22 will ensure that ferry staff know the signs to look out for and barriers they can put in place to prevent invasive predators reaching Rathlin. Another potential pathway for invasive predators on to the island is via the refuse collection service. It has been useful to tour the Ballycastle depot and inspect the various refuse vehicles to gain a better understanding of how this service currently works and assess what future improvements could help biosecurity. The refuse team already carry out one of the most important biosecurity measures by only taking empty, clean refuse vehicles on to Rathlin thereby reducing the chance of hitchhikers such as rats hiding within them. Everybody we have spoken to on Rathlin and in Ballycastle seems very excited by the launch of the RAFT project and very keen to help with ongoing biosecurity and awareness raising. This is wonderful to see as it really does take an entire community to make eradications and ongoing biosecurity on inhabited islands successful.

Going clockwise from top right: Meetings have been held with the Rathlin harbourmaster, Ballycastle harbourmaster, Rathlin fishermen, Rathlin refuse collection team at the Ballycastle depot and Rathlin ferry terminal staff at Ballycastle.

Smaller uninhabited sites Biosecurity for LIFE work on in Northern Ireland include the low-lying, tern-filled islands found in Larne (Swan Island and Blue Circle Island) and Carlingford Lough (Green Island). RSPB staff and volunteers do biosecurity checks of flavoured wax chew blocks, looking for rodent teeth marks, when they visit these islands to monitor tern productivity. There are fewer routes for invasive predators on to these islands but other issues to contend with such as winter storm damage washing away the biosecurity surveillance devices! As these islands are so small, in future years biosecurity surveillance devices will be removed over winter and reinstalled in early spring to ensure the islands are free of invasive predators before the terns' arrival.

Other unforeseen issues the project has come across include being furloughed for six months in 2020 along with the COVID-19 restrictions that we have now become all too accustomed to. Along with weather and potential disturbance during seabird breeding season this means we are yet to land on Sheep Island to install biosecurity surveillance measures. A biosecurity plan is currently being drafted for the site detailing potential pathways for invasive predators on to the island, barriers to these pathways as well as strategies for routine monitoring and incursion response. This will help bring Sheep Island up to speed with all our other Northern Irish sites during 2022.

Sheep Island will be covered along with the other four Northern Irish SPA offshore island sites designated for breeding seabirds, by our Rapid Incursion Response Hub (RIRH). This hub will hold all the kit required for detecting invasive non-native mammalian predators and responding if an island incursion occurs. Apart from

people bringing invasive predators to islands either unintentionally or intentionally, invasive predators can swim (rats can swim over a mile, sometimes over double this distance), float on debris to islands or be carried by animals such as gulls as may have been the case on Lighthouse Island. Luckily with the Lighthouse Island response the Copeland Bird Observatory already had an active volunteer team to quickly set up the extra surveillance measures provided by the project, and to carry out the necessary checks. We want each island to have the same level of protection so that a response to a possible incursion can ideally be activated within 48 hours. To achieve this, we are establishing and training a large volunteer team for the Northern Ireland hub, similar to the model used by the mountain rescue or RNLI. With eight RIRH's being set up across the UK, this is an exciting time for the expansion of island biosecurity into the public arena in the UK and an important step to help keep our island wildlife safe.

If you're interested in volunteering for a RIRH or simply want to keep up to date with the project, keep your eyes on our website biosecurityforlife.org.uk, follow us on Twitter @biosecurityLIFE or come and have a chat when you see us at marinas or event stands during 2022.

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2021 Seabird Nesting Report for Strangford Lough

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The spring and summer of 2021 was a season with significant increases for some species and the absence of any obvious, catastrophic predation or damaging weather events. Productivity across the large gulls and terns seemed to be 'relatively good' compared to other years. The number of breeding Great Black-backed Gulls hit their second highest total ever of 143 AON. This was the highest count for this species since 1972. Herring Gulls reached their highest breeding numbers since 1986, 1,389 AON, up 9% on 2019 with the second highest breeding count on record. Lesser Black-backed Gulls reached their highest ever breeding population of 442 AON, up 40% on 2019. So, the story for the large gull species on the Lough is that they are all increasing and thriving. However, their ranges are expanding onto islands formerly dominated by Black-headed Gulls and terns, notably on Ogilby and now Dunnyneill.

The smaller gulls fared less well in 2021 with 274 AON of Common Gull representing a 20.8% decrease on 2019 though the number of breeding Black-headed Gulls on the Lough itself remained reasonably stable at 566 AON, a small decrease of 3.7% on 2019. The colony at Castle Espie increased to 854 AON in 2021 giving a total Lough population of 1,420 AON, an 8.8% increase on 2019. The future success or otherwise of Black-headed Gulls could have a direct bearing on the survival of the Lough's Sandwich Tern population, given their close relationship at many breeding colonies (Smith 1975).

In 2021, Arctic and Common Terns bounced back a bit from the lows of 2020 with a 37% increase in Common Tern to 312 AON and a 91% increase in Arctic Tern to 201 AON. A small number of Common Tern are now nesting at Castle Espie with 5 AON this year. Breeding success on the lough was thought to be good with a notable number of near-to-fledging and fledged Common Tern youngsters seen on Swan Island in late summer. However, no young fledged at Castle Espie. In contrast there is increasing concern for the future of the Lough's Sandwich Tern. This species has been at a very low ebb for four of the past six years and has now declined to its lowest ever total since recording began, just 217 pairs, down 14% on last year. Usually if there is a dip in numbers one year, they bounce back the next, but this hasn't been the case in the last four years. The total of 217 pairs might also have been an overestimate as the 18 AON found on North Boretree Rock on 17 June this year may have been a re-lay attempt by birds failing early on Swan Island (a count of 158 nests on Swan Island on 26 May was considered to account for all nesting Sandwich Tern but included a number of failed clutches possibly resulting from egg chilling on 20 May, a very wet day with winds gusting to near gale). On 17th May no nests were encountered on North Boretree Rock. Also, historically North Boretree Rock has generally been used after nesting failure elsewhere. So, this year's total count for Sandwich Tern may only have been 199 pairs.

The only other years in which a population of less than three hundred pairs was recorded was last year and in 1973. This is a species that had consistently maintained a core population on Strangford Lough of between approximately 750 and 1,200 breeding pairs. In three years, 1985,1987 and 1988 it reached in excess of 2,000 pairs, representing about half of the total Irish population. In 2021 although there were some losses during incubation on Swan Island due to abandonment (probably resulting from egg chilling in heavy rain), Sandwich Tern productivity seemed reasonable with no significant predation of chicks recorded up to the end of the third week of June. A small colony of 39 pairs established itself on Jackdaw Island this year, the first to do so since 1988. In the 1980's Jackdaw Island had iconic status with a 'mega' colony of 1,918 breeding pairs of Sandwich Tern recorded in 1985. The 2021 Jackdaw Island breeding population may have been made up of re-locators

from the total colony failures on Dunnyneill and Blackrock in 2020. Neither these islands had any significant nesting Sandwich Tern in 2021 (Dunnyneill had just one, Blackrock, none). It is just possible that the Jackdaw Island Sandwich Tern colony established in 2020 as the island wasn't visited in the truncated census of the COVID-19 year.

This year saw the second year of the colour ringing project for Sandwich Tern on the lough and despite the low overall number of breeding pairs, 108 chicks were colour ringed. In the late summer and early autumn there were 33 re-sightings of these birds involving 18 individuals, principally on the coast of North Wales and North West England. Eighteen fledged young would give a minimum productivity in 2021 of 0.08 chicks per pair.

Of the other seabirds Cormorants bounced back from the low of 167 AON last year to 370 AON in 2021, although the 2020 figure needs to be treated with caution due to the late date of the count. 2019's count of 388 AON is probably a more reliable one on which to make a comparison. No breeding Mediterranean Gulls were located this year though one adult was observed at the small Black-headed Gull colony on Jackdaw Island on 8 June.

Breeding seabirds on Cockle Island off Groomsport Harbour fared well in 2021, at least until the end of incubation. The Black-headed Gull colony of 134 AON was the least vulnerable to wash-outs as it was located on the top of rock strata above the height of the shell beach, as was the Common Gull colony of 7 AON. However, later visits were not made to assess productivity. Arctic Terns were up 22% on 2020 to 216 AON. Common Terns always nest in significantly lower numbers on the island and a count of 13 pairs although a little lower than normal wasn't considered to be anything to worry about and may have been an underestimate due to the lack of time available to make repeated counts of aerial adults and the partial obscuring of incubating birds by rocks. Sandwich Tern are currently at a low ebb on Cockle with 14 AON recorded in 2021, the same as for last year. There were late season observations of a number of Roseate Terns on the island (A. McGeehan, pers. comm.) including some partaking in courtship feeding. These birds almost certainly represent post-breeding dispersal movements from the colony on Rockabill but are interesting nonetheless. Given the small area of island that now sits above the high tide mark there is little room for manoeuvre in terms of encouraging settlement of breeding Roseate Terns in the future. However, in 2022 the National Trust intend placing a small number of Roseate Tern nest boxes on the island in case any of these late summer visitors turn up in again in the Spring.

Appendix: Species Counts

Table 8: Cumulative counts (N) of all species of seabird within Seabird Monitoring Programme (SMP) 'Master Sites' in Northern Ireland between 2015 and 2021. The number of sub-sites surveyed in a Master Site, an indication of relative survey effort between years, is included in brackets next to the count unless the sub-sites were not specified (NR = not recorded). Hyphens (-) denote that no data were collected. Seabirds are counted using recommended census units from Table 3, unless specified with the record. EST means that numbers are an estimate, based on the best available method. Asterisks (*) denote that the count was made late in the season and therefore may include non-breeders .

		2015	2016	2017	2018	2019	2020	2021
Species (Count units)	**Master Site**	**N (sites)**	**N (sites)**	**N (sites)**	**N (sites)**	**N (sites)**	**N (sites)**	**N (sites)**
Fulmar	Binevenagh	-	-	-	-	-	-	11 (5)
(AOS)	Downhill	135 (6)	78 (4)	81 (4)	88 (6)	95 (5)	-	130 (6)
	North Antrim Coast	16 (10)	37 (10)	38 (10)	16 (9)	21 (4)	4 (1)	12 (7)
	The Skerries	-	-	-	-	-	-	43 (5)
	Sheep Island	-	-	-	-	-	-	61 (1)
	Rathlin Island (RSPB reserve)	-	-	28 (3)	25 (3)	10 (NR)	-	7 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	1,038 (25)
	Giants Causeway Coast	-	-	-	55 (5)	134 (2)	66 (1)	209 (4)
	Causeway Coast	-	-	-	84 (1)	100 (3)	159 (3)	880 (18)
	East Antrim Coast	31 (21)	45 (16)	60 (11)	34 (12)	40 (14)	32 (13)	39 (10)
	Larne Lough to Portmuck	2 (2)	2 (1)	6 (1)	2 (1)	3 (1)	-	2 (1)
	Muck Island	52 (1)	68 (1)	80 (1)	72 (1)	43 (1)	56 (1)	61 (1)
	The Gobbins	201 (5)	290 (NR)	310 (NR)	326 (5)	215 (5)	-	-
	Blackhead	3 (1)	3 (1)	29 (1)	30 (1)	31 (1)	19 (1)	6 (1)
	Whitehead	3 (1)	3 (1)	5 (1)	7 (1)	5 (1)	8 (1)	7 (1)
	Copeland Islands	-	-	-	6 (1)	8 (1)	-	13 (1)
	Maggy's Leap to Newcastle	12 (1)	-	-	-	2 (1)	2 (1)	0 (1)
Cormorant	North Antrim coast	-	-	-	-	-	4 (1)	0 (7)
(AON)	The Skerries	64 (1)	-	60 (1)	94 (1)	137 (1)	-	82 (6)
	Sheep Island	66 (1)	84 (1)	100 (1)	88 (1)	-	-	139 (1)
	The Gobbins	0 (5)	12 (NR)	13 (NR)	12 (5)	0 (5)	-	-
	Outer Ards	-	-	-	53 (7)	77 (7)	0 (3)	0 (2)
	Strangford Lough	245 (NR)	343 (NR)	360 (NR)	314 (NR)	388 (NR)	167 (NR)	82 (NR)
	Lough Neagh and Lough Beg SPA (Antrim)				-	-	620 Ind (6)*	330 Ind (6)

	Lough Neagh and Lough Beg SPA (Tyrone)				-	-	150 Ind (3)*	64 Ind (3)
	Lough Neagh and Lough Beg SPA (Armagh)				-	-	0 Ind (3)*	108 Ind (3)
Shag	Downhill	3 (2)	0 (4)	-	0 (6)	38 (1)	-	13 AON, 1 Ind (6)
(AON)	North Antrim coast	2 (1)	1 (10)	1 (10)	2 (9)	0 (7)	0 (1)	8 (7)
	The Skerries	64 (1)	-	-	-	-	-	32 (6)
	Sheep Island	66 (1)	-	-	-	-	-	21 AON, 22 Ind (1)
	Rathlin Island (RSPB reserve)	42 (NR)	47 (NR)	51 (NR)	55 (NR)	65 (NR)	-	38 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	74 (25)
	Causeway Coast	-	-	-	-	-	-	14 (18)
	The Maidens	-	-	-	20 (NR)	-	-	-
	Muck Island	17 (1)	21 (1)	30 (1)	34 (1)	38 (1)	31 (1)	67 (1)
	The Gobbins	20 (5)	22 (NR)	20 (NR)	25 (5)	20 (5)	-	-
	Maggy's Leap to Newcastle	4 (1)	3 (1)	-	-	0 (1)	15 (1)	12 (1)
	Donard Cove	3 (1)	3 (1)	5 (1)	-	9 (1)	0 (1)	-
Great Skua	Rathlin Island (RSPB reserve)	-	1 (NR)	1 (NR)	1 (NR)	1 (NR)	-	1 (NR)
(AOT)	Rathlin Island – full island census	-	-	-	-	-	-	2 (25)
Kittiwake	Downhill	92 (2)	-	-	0 (6)	0 (5)	-	102 (6)
(AON)	North Antrim coast	207 (10)	279 (10)	236 (10)	293 (9)	332 (6)	141 (1)	423 (7)
	The Skerries	-	-	-	-	-	-	58 (6)
	Sheep Island	-	-	-	-	-	-	230 AON, 75 Ind (1)
	Rathlin Island (RSPB reserve)	-	-	340	313 (3)	56 (NR)	-	61 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	13,706 (25)
	Causeway Coast	-	-	-	-	-	-	562 AON, 635 Ind (18)
	Muck Island	225 (1)	351 (1)	369 (1)	314 (1)	519 (1)	521 (1)	603 (1)
	The Gobbins	835 (5)	1,072 (NR)	1,053 (NR)	683 (5)	1145 (5)	-	-
	Maggy's Leap to Newcastle	483 (1)	-	-	513 (1)	671 (1)	717 (1)	759 (1)
Black-headed Gull	Rathlin Island – full island census	-	-	-	-	-	-	5 (25)
(AON)	Copeland Islands	-	-	-	-	-	-	1 AON (1)

	Larne Lough	1,825 (2)	3,102 (2)	3,060 (2)	2,895 (2)	2,618 (2)	2,000 EST (1)	2236 (2)
	Belfast Harbour	~450 (1)	386 (1)	717 (1)	607 (1)	560 (1)	806 (1)	702 (1)
	Outer Ards	135 (NR)	67 (NR)	93 (7)	189 (7)	239 (7)	-	134 (7)
	Strangford Lough	1,265 (NR)	1,312 (NR)	1,524 (NR)	1,267 (NR)	1,305 (NR)	-	1,420 (NR)
	Carlingford Lough	1 (1)	-	-	-	-	-	-
	Lower Lough Erne	1,026 (NR)	1,238 (NR)	1,216 (NR)	1,218 (NR)	1,718 (NR)	-	1,416 (NR)
	Moorlough Lake	0 (1)	66 Ind (1)	-	93 (1)	-	-	-
	Lough Vearty	5 (1)	-	0 (1)	-	-	-	-
	Lough Neagh and Lough Beg (Londonderry)	-	250 Ind (2)	-	40 (3)	-	20 Ind (1)	2 Ind (1)
	Lough Neagh and Lough Beg (Antrim)	95 (1)	4,565 Ind 95 AON (9)	115 (1)	191 AON, 4,368 Ind (8)	-	104 AON, 7,454 Ind (8)*	121 AON, 3,990 Ind (7)
	Lough Neagh and Lough Beg (Tyrone)	-	6,750 Ind (4)	-	4,250 Ind (3)	-	2,700 Ind (2)*	2,400 Ind (3)
	Lough Neagh and Lough Beg (Armagh)	-	30 Ind (6)	-	118 Ind (5)	-	18 Ind (1)*	220 Ind (3)
	Antrim Town	-	15 (1)	-	-	-	-	-
Mediterranean Gull (AON)	Larne Lough	5 (2)	5 (2)	2 (2)	5 (2)	0 (2)	1 (2)	3 (2)
	Belfast Harbour	-	2 (1)	5 (1)	7 (1)	3 (1)	-	1 (1)
	Strangford Lough	1 (NR)	0 (NR)	0 (NR)	2 (NR)	0 (NR)	-	1 Ind (NR)
	Lower Lough Erne	1 (NR)	1 Ind (NR)	1 (NR)	1 Ind (NR)	1 Ind (NR)	-	0 (NR)
	Lough Neagh and Lough Beg (Antrim)	-	1 Ind (9)	-	2 Ind (8)	-	-	0 (6)
Common Gull	Rathlin Island (RSPB reserve)	76 (NR)	84 (NR)	70 (NR)	62 (NR)	21 (NR)	-	30 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	69 (25)
	Causeway Coast	-	-	-	-	-	-	EST 16 AOT (18)
	East Antrim Coast	-	-	22 Ind (1)	-	-	0 (14)	EST 3 AOT (3)
	Larne Lough	24 (NR)	27 (NR)	32 (NR)	37 (NR)	9 (2)	22 (2)	28 (2)
	Muck Island	20 (1)	-	51 Ind (1)	-	0 (1)	34 EST (1)	23 (1)
	Outer Ards	-	1 (NR)	9 (7)	10 (7)	9 (7)	0 (1)	7 (1)
	Copeland Islands	-	-	-	15 (1)	30 Ind (1)	-	-
	Strangford Lough	229 (NR)	333 (NR)	322 (NR)	293 (NR)	346 (NR)	-	274 (NR)
	Carlingford Lough	1 (1)	3 (1)	6 (1)	6 (1)	9 (1)	1 EST (1)	5 (1)

	Lower Lough Erne	163 (NR)	189 (NR)	143 (NR)	262 (NR)	337 (NR)	-	249 EST (NR)
	Lough Vearty	16 (1)	3 (1)	8 Ind (1)	-	-	-	-
	Lough Galboly	0	-	22 Ind (1)	-	13 Ind (1)	-	-
	Lough Neagh and Lough Beg (Antrim)	-	-	-	-	-	-	2 Ind (6)
	Lough Neagh and Lough Beg (Armagh)	-	15 (6)	-	0 (8)	-	-	0 (3)
Lesser Black-backed Gull (AON)	The Skerries	-	-	-	-	-	-	3 + 534 EST (6)
	Sheep Island	-	-	-	-	-	-	88 AOT (1)
	Rathlin Island – full island census	-	-	-	-	-	-	519 (25)
	Causeway Coast	-	-	-	-	-	-	2 AOT, 1 AON, (18)
	East Antrim Coast	-	-	-	-	-	-	2 Ind (3)
	Muck Island	-	-	-	-	-	13 EST (1)	11 (1)
	Belfast Harbour	-	-	1 (1)	1 (1)	-	-	-
	Belfast (city centre)	-	-	-	101 (1)	221 (1)	-	-
	Copeland Islands	-	-	-	365	547 (1)	-	390 (1)
	Strangford Lough	433 (NR)	298 (NR)	343 (NR)	310 (NR)	316 (NR)	-	442 (NR)
	Carlingford Lough	-	-	-	-	-	-	0 (1)
	Lower Lough Erne	1,211 (NR)	1,185 (NR)	1,316 (NR)	1,622 (NR)	1,584 (NR)	-	1,437 EST
	Lough Neagh and Lough Beg (Londonderry)	-	0 (2)	-	230 Ind 20 AON (3)	-	0 (1)*	0 (1)
	Lough Neagh and Lough Beg (Antrim)	-	980 Ind (9)	-	830 Ind (8)	-	1,303 Ind (6)*	878 Ind (6)
	Lough Neagh and Lough Beg (Tyrone)	-	353 Ind (4)	-	360 Ind (3)	-	380 Ind (3)*	585 Ind (3)
	Lough Neagh and Lough Beg (Armagh)	-	390 Ind (6)	-	612 Ind 3 AON (5)	-	320 Ind (3)*	250 Ind (3)
	Antrim Town	-	600 (1)	-	-	-	-	-
Herring Gull (AON)	North Antrim coast	-	-	-	-	-	-	1 AOT
	The Skerries	-	-	-	-	-	-	25 + 204 EST
	Sheep Island	-	-	-	-	-	-	55 AOT (1)
	Rathlin Island – full island census	-	-	-	-	-	-	83 (25)
	Causeway Coast	-	-	-	-	-	-	11 AON, 8 AOT, 28 Ind (18)

	East Antrim Coast	-	-	-	-	-	-	36 Ind (3)
	Muck Island	-	-	-	-	-	17 EST	18 (1)
	The Gobbins	2 (5)	2 (NR)	1 (NR)	-	0 (5)	-	-
	Belfast (city centre)	-	-	-	16 (1)	39 (1)	-	-
	Outer Ards	-	-	-	187 (3)	199 (7)	0 (1)	0 (1)
	Copeland Islands	-	-	-	483 (1)	483 (1)	-	585 (1)
	Strangford Lough	679 (NR)	1,177 (NR)	1,070 (NR)	1,061 (NR)	1,273 (NR)	-	1,389 (NR)
	Maggy's Leap to Newcastle	4 (1)	-	-	-	1 (1)	1 (1)	0 (1)
	Carlingford Lough	-	0 (1)	-	-	1 (1)	-	12 (1)
	Lower Lough Erne	4 (NR)	5 (NR)	5 (NR)	5 (NR)	3 (NR)	-	0 (NR)
	Lough Neagh and Lough Beg (Antrim)	-	-	-	-	-	-	2 Ind (6)
	Antrim Town	-	15 (1)	-	-	-	-	-
Great Black-backed Gull (AON)	The Skerries	-	-	-	-	-	-	4 (6)
	Sheep Island	-	-	-	-	-	-	7 AOT (1)
	Rathlin Island – full island census	-	-	-	-	-	-	12 (25)
	The Maidens	-	-	-	8 Ind (1)	-	-	-
	Muck Island	1 (1)	-	2 (1)	2 (1)	0 (1)	4 (1)	11 (1)
	The Gobbins	2 (5)	1 (NR)	2 (NR)	2 (5)	0 (5)	-	-
	Outer Ards	-	-	-	40 (3)	42 (7)	0 (1)	0 (1)
	Strangford Lough	62 (NR)	125 (NR)	114 (NR)	129 (NR)	107 (NR)	-	143 (NR)
	Maggy's Leap to Newcastle	3 (1)	-	2 (1)	-	1 (1)	-	0 (1)
	Carlingford Lough	2 (1)	2 (1)	2 (1)	4 (1)	0 (1)	-	0 (1)
	Lower Lough Erne	2 (NR)	4 (NR)	4 (NR)	2 (NR)	3 (NR)	-	1 (NR)
	Lough Neagh and Lough Beg (Antrim)	-	-	-	-	-	-	1 Ind (6)
	Lough Neagh and Lough Beg (Armagh)	-	1 (6)	1 (1)	1 (5)	-	2 AOT (2)*	1 Ind (3)
Sandwich Tern (AON)	Larne Lough	694 (2)	1,229 (2)	1,141 2)	732 (2)	1,010 (2)	900 EST (1)	1,113 (2)
	Outer Ards	0 (1)	0 (1)	-	92 (3)	61 (7)	14 (2)	14 (1)
	Strangford Lough	581 (NR)	337 (NR)	775 (NR)	776 (NR)	434 (NR)	252 (NR)	217 (NR)
	Carlingford Lough	250 (1)	7 (1)	71 (1)	13 (1)	24 (1)	-	52 (1)
	Lower Lough Erne	138 (NR)	226 (NR)	316 (NR)	250 (NR)	230 (NR)	143 (NR)	126 (NR)
Common Tern (AON)	Larne Lough	353 (2)	333 (2)	355 2)	307 (2)	303 (2)	187 (NR)	157 (2)
	Belfast Harbour	344 (1)	418 (1)	367 (1)	385 (1)	672 (1)	80 (1)	485 (1)

	Belfast Channels	7 (1)	12 (1)	13 (1)	-	17 (1)	29 (1)	32 (1)
	Outer Ards	3 (NR)	18 (NR)	23 (7)	17 (7)	21 (7)	25 (3)	13 (1)
	Strangford Lough	401 (NR)	457 (NR)	262 (NR)	340 (NR)	262 (NR)	228 (NR)	312 (NR)
	Carlingford Lough	220 (1)	123 (1)	147 (1)	70 (1)	56 (1)	25 (1)	84 (1)
	Lower Lough Erne	30 (NR)	41 (NR)	51 (NR)	52 (NR)	54 (NR)	36 (NR)	26 (NR)
	Moorlough Lake	0 (1)	4 (1)	-	2 (1)	-	-	-
	Lough Neagh and Lough Beg (Antrim)	84 (1)	240 Ind 75 AON (9)	271 Ind 102 AON (4)	246 Ind 135 AON (8)	128 AON (1)	68 AON (1), 75 Ind (6)*	37 AON (1)* + 159 Ind (6)
	Lough Neagh and Lough Beg (Tyrone)	-	-	-	-	-	-	2 Ind (3)
	Lough Neagh and Lough Beg (Armagh)	-	3 Ind (6)	60 Ind (1)	123 Ind (5)	-	-	99 Ind (3)
Roseate Tern (AON)	Larne Lough	1 (2)	1 (2)	1 (2)	1 (2)	1 (2)	1 (1)	1 (2)
Arctic Tern	Sheep Island	-	-	-	-	-	-	2 Ind (1)
(AON)	Larne Lough	1 (2)	0 (2)	0 (2)	0 (2)	0 (2)	0 (1)	0 (2)
	Belfast Harbour	83 (1)	4 (1)	0 (1)	15 (1)	15 (1)	0 (1)	0 (1)
	Outer Ards	105 (NR)	43 (NR)	269 (7)	343 (7)	255 (7)	177 (3)	216 (1)
	Copeland Islands	-	-	-	46 (1)	75 AON, 150 Ind (2)	200 EST (1)	0 (1)
	Strangford Lough	194 (NR)	173 (NR)	73 (NR)	193 (NR)	245 (NR)	105 (NR)	201 (NR)
	Carlingford Lough	85 (1)	41 (1)	20 (1)	70 (1)	50 (1)	-	-
Common Guillemot	Sheep Island	-	-	-	-	-	-	703 (1)
(Ind)	Rathlin Island (RSPB reserve)	-	-	3,470 (3)	3,454 (3)	-	-	677 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	149,510 (25)
	Causeway Coast	-	-	-	-	-	-	278 (18)
	Muck Island	2,070 (1)	2,926 (1)	2,554 (1)	2,478 (1)	2,782 (1)	3,107 (1)	2,340 (1)
	The Gobbins	2137 (5)	2,675 (5)	2,326 (5)	2,284 (5)	2,617 (5)	-	-
Razorbill	The Skerries	-	-	-	-	-	-	28 (6)
(Ind)	Sheep Island	-	-	-	-	-	-	221 (1)
	Rathlin Island (RSPB reserve)	716 (NR)	698 (NR)	707 (3)	683 (3)	-	-	146 (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	22,421 (25)
	Causeway Coast	-	-	-	-	-	-	361 (18)
	Muck Island	671 (1)	1,048 (1)	799 (1)	736 (1)	1,118 (1)	871 (1)	605 (1)
	The Gobbins	506 (5)	858 (5)	560 (5)	882 (5)	679 (5)	-	-
	Copeland Islands	-	-	-	-	-	-	20 EST (1)

Puffin	Sheep Island							2 (1)
(Ind)	Rathlin Island (RSPB reserve)	3 (NR)	5 (NR)	6 (3)	3 (3)	75 (1)	-	1 AOB (NR)
	Rathlin Island – full island census	-	-	-	-	-	-	407 (25)
	Muck Island	-	-	-	-	-	1 (1)*	0 (1)
	The Gobbins	63 (5)	52 (5)	57 (5)	55 (5)	54 (5)	-	-
	Copeland Islands	-	-	-	100 Ind, est 11 yes - can't geyt in	106 (1)	106 (1)*	68 (1)
Black Guillemot	Lough Foyle – Tysties	-	6 (2)	0 (3)	-	-	-	20 (1)
(Ind)	Magilligan to Castlerock – Tysties	-	-	-	-	16 (1)	-	10 (1)
	The Barmouth (River Bann) to Portrush Bay – Tysties	15 (1)	11 (1)	-	22 (1)	26 (1)	-	17 (1)
	Portrush Harbour	-	18 (1)	22 (1)	14 (1)	25 (1)	-	25 (1)
	The Skerry Islands – Tysties	-	-	-	-	-	-	54 (1)*
	The White Rocks to Runkerry Point – Tysties	-	-	-	-	-	-	5 (1)
	Runkerry to Benbane Head – Tysties	30 (1)	-	-		62 (1)		58 (2)
	Bengore Head	-	-	-	-	3 (1)	-	-
	Portbradden / Island Lean Quay / Carrickarede – Tysties	-	7 (1)	-	-	0 (1)	-	16 (2)
	Ballycastle – Tysties	-	12 (3)	-	-	-	-	10 (2)
	Rathlin Island – Tysties	98 (1)	81 (1)	70 (1)	60 (1)	-	80 (1)	27 (1)
	Larne to Torr Head – Tysties	65 (1)	8 (2)	78 (4)	84 (4)	9 (5)	58 (1)	70 (10)
	Larne Lough and Island Magee – Tysties	202 (3)	195 (3)	117 (3)	161 (3)	11 (1)	16 (1)	91 (2)
	Muck Island	6 (1)	8 (1)	0 (1)	14 (1)	-	42 (1)	4 (1)
	Whitehead Town – Tysties	3 (1)	0 (1)	0 (1)	1 (1)	0 (1)	-	1 (1)
	Carrickfergus to White Head – Tysties	174 (2)	135 (2)	198 (2)	140 (1)	93 (1)	-	-
	Belfast (Harbour) – Tysties	122 (1)	113 (1)	113 (1)	-	-	8 (1)	58 (3)
	Belfast to Grey Point – Tysties	-	0 (1)	0 (1)	7 (1)	0 (1)	-	7 (1)
	Grey Point to Bangor –Tysties	-	0 (1)	0 (1)	-	1 (1)	-	4 (1)
	Bangor – Tysties	-	56 (1)	0 (1)	76 (1)	57 (1)	-	75 (1)
	Bangor to Groomsport – Tysties	-	0 (1)	0 (1)	10 (1)	-	-	-
	Groomsport – Tysties	9 (1)	10 (1)	16 (1)	-	-	-	-
	Copeland Islands – Tysties	-	-	-	100 (1)	60 (1)	-	60 Ind, 27 AOS (1)

	Donaghadee – Tysties	10 (1)	8 (1)	6 (1)	-	9 (1)	-	-
	Ballywalter – Tysties	8 (1)	8 (1)	2 (1)	-	8 (1)	-	-
	Ballywalter to Ballyhalbert – Tysties	-	-	0 (1)	-	-	3 (1)	-
	Ballyhalbert – Tysties	4 (1)	2 (1)	0 (1)	-	1 (1)	-	-
	Portavogie – Tysties	12 (1)	12 (1)	2 (1)	-	12 (1)	-	-
	Strangford Lough – Tysties	10 (1)	9 (1)	30 (7)	23 (4)	-	0 (2)	10 (2)
	Strangford to Ardglass – Tysties	-	-	-	-	-	-	14 (1)
	Ardglass – Tysties	16 (1)	16 (1)	18 (1)	-	-	-	-
	Bloody Bridge to Newcastle – Tysties	-	-	-	9 (1)	26 (1)	6 (1)	-
	Mourne Coast – Tysties	-	-	-	25 (1)	11 (11)	-	-
	Annalong Harbour – Tysties	-	39	0	34	58	38	58 Ind, 21 AOS (1)
	Kilkeel Harbour – Tysties	26 (1)	-	-	6 (1)	-	-	14 (1)
	Carlingford Lough – Tysties	33 (1)	23 (1)	27 (1)	57 (1)	42 (1)	-	37 (1)

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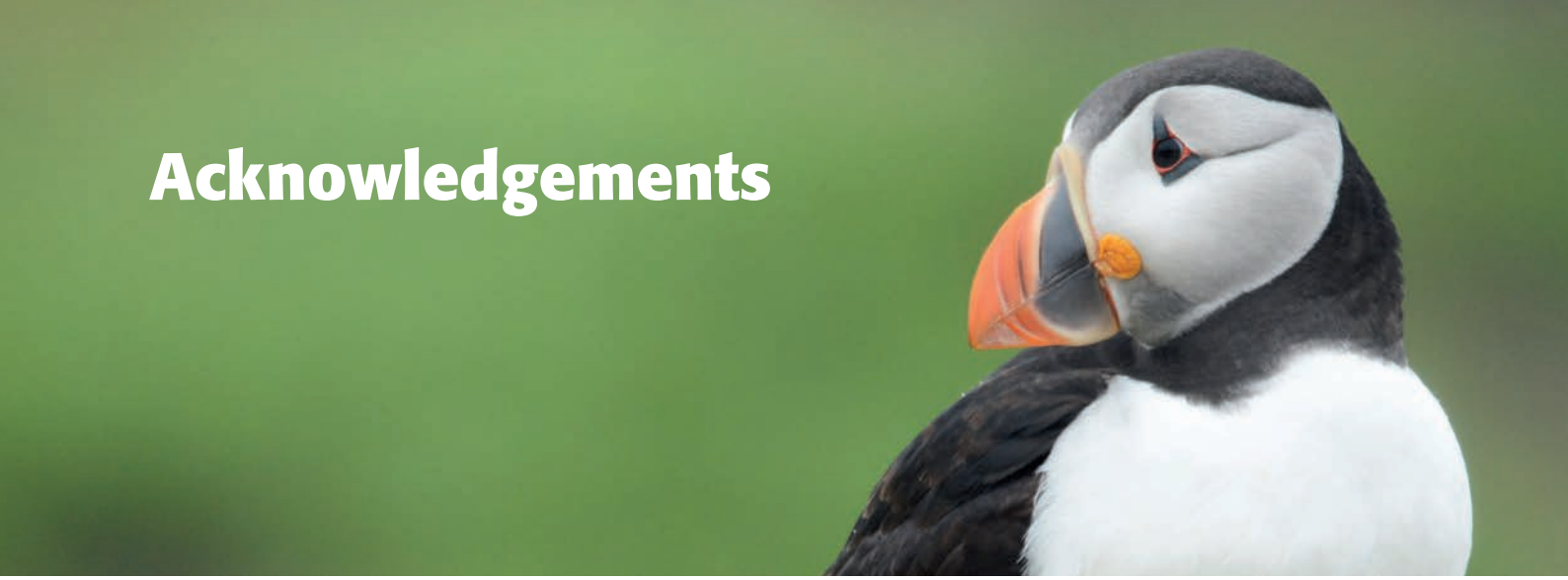

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