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EGMP POPULATION STATUS AND OFFTAKE ASSESSMENT REPORT 2026

Prepared by the EGMP Data Centre
with contributions from the Dutch Modelling Consortium

[*Current version of the document includes chapters on NW Europe (br) population of the Greylag Goose and Russia (br) population and E Greenland (br) population of the Barnacle Goose. As the reporting data for the Taiga Bean Goose and the Svalbard (br) population of the Pink-footed Goose become available later in the reporting cycle, the corresponding chapters will be added subsequently. The document will be revised to update the missing chapters on 1 June (Taiga Bean Goose) and 8 June (Pink-footed Goose).*]

Executive Summary

This report provides the 2026 status, offtake assessment and management guidance for the goose populations managed under the EGMP. The information covers aspects related to population status, survival, productivity, as well as assessment of cumulative impact of derogation and legal hunting and, for some populations, management recommendations.

Greylag Goose – NW Europe (br) population

Despite considerable improvements in data availability, it has still not been possible to establish a dynamic and model-based management at MU level. However, technical progress has been made, including the development of a flyway population model, a utility model used to evaluate various offtake strategies in terms of their ability to meet population targets, and a model for estimating number of breeding pairs from post-breeding counts. In 2022, a post-breeding population of 540,115 individuals was estimated for MU1, resulting in an estimated ~132,000 breeding pairs, and a post-breeding population of 748,110 individuals was estimated for MU2, equivalent to ~180,000 breeding pairs, indicating that both MUs are well above the set targets of 70,000 and 80,000 breeding pairs, respectively. Between 2022 and 2025, population estimates based on post-breeding counts have increased for all Range States conducting such counts. In January 2025, the wintering population was estimated at 802,320 individuals, which also indicates a population size well above the target of approximately 545,000 individuals in winter. With a reported offtake of at least 449,602 Greylag Geese in 2024/2025, we continue to suspect that the reported offtake is biased high. Range States are encouraged to maintain the current harvest levels while continuing to focus on offtake strategies minimizing the need for spring/summer derogation and keeping in mind the decreasing number of Greylag Geese migrating to the southern part of the range.

Barnacle Goose – Russia (br) population

Assessment of the population status of the Russia/Germany & Netherlands population aims to analyse the cumulative impact of derogation and hunting (where legally allowed) on the status of the flyway population and the status of the three individual management units (MUs) which have been defined, for the period 2005/06-2024/25. Data from field counts as well as posterior estimates from the Integrated Population Model (IPM) indicate a flyway population size of about 1.5 million individuals in January 2025, thus four times the FRP. This estimate is slightly below the estimates from January 2024, and data collected in the last five years suggest that the total flyway population size has not undergone an overall growth recently. The Russian breeding population also experienced very low productivity in 2024. The Russian MU1 has by far the largest share (92%) of the total flyway population size. Converted into breeding pairs, numbers in the Russian MU1 are well beyond (5.5 times) the FRP and also well above the 200% threshold level. The Baltic MU2-population in summer 2024 was 1.8 times FRP but has dropped below the threshold of 200% FRP (calling for coordination if significant offtake under derogation affects the local breeding populations in Denmark, Finland or Sweden) as a result of an ongoing decline. In the North Sea MU3-population, the number of breeding pairs has increased (or recovered) lately and was 1.6x FRP, but numbers are still below the 200% threshold, thus requesting coordination of offtake under derogation between Germany and the Netherlands. Gaps in monitoring effort mainly exist in the summer period, both regarding data on abundance and data on productivity.

Barnacle Goose – E Greenland (br) population

After a peak flyway population of 80,000 in 2006 and 2012, abundance declined to 65,516 (55,558 – 76,459) in March 2026. For much of the period of record, abundance on Islay exceeded that in all other wintering areas, but that pattern has been reversed since 2018. Based on the IPM, the total harvest rate of adults has increased over the period of record, from around 0.01 to a peak of 0.05 (0.04 – 0.07) in 2017. Thereafter, harvest rate declined to 0.02 (0.01 – 0.03) in 2025. Annual survival rate of adults (including both harvest and natural mortality) declined at the same time harvest rates were increasing, suggesting that harvest may have contributed to the decline in

flyway abundance, although poorer than average reproduction could also have played a role. There currently is a 1% probability that the March 2026 population is below the FRP of 54,000. However, because of the proximity of the population to the FRP in recent years, the Adaptive Flyway Management Plan requires continued coordination of offtake between Iceland and Scotland to ensure the population does not fall below the FRP.

Action requested from the EGM IWG:

The EGM IWG is requested to take note of the *EGMP Population Status and Offtake Assessment Report 2026* and provide further guidance to the Secretariat and Data Centre.

Preface

This report provides the 2026 status, offtake assessment and management guidance for the goose populations managed under the EGMP. The information covers aspects related to population status, survival, and productivity, as well as assessment of cumulative impact of derogation and legal hunting and, for some populations, management recommendations.

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Acknowledgements

Many individuals are involved in the data collection in each Range State. Those listed in the EGMP Database may be the ones delivering data to the EGMP Data Centre, but not necessarily the ones responsible for the actual data collection. We would therefore like to thank the network of national coordinators and all volunteers and agencies who contributed to the population counts, the hunters and wildlife councils who delivered data to different schemes across the ranges of these populations or provided wings of shot birds (see EGMP Database for further details and full acknowledgements). Furthermore, we also wish to thank the EGMP Task Forces and the EGMP Modelling Consortium for helpful reviews of earlier drafts and the EGMP Range States that contributed to the annual budget of the EGMP Data Centre.

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- All EGMP Range States which have contributed with annual voluntary contributions to the EGMP Data Centre activities.
- Jægernes Naturfond in Denmark for funding development of a flyway-wide decision model for use in investigating population-management strategies for Greylag Geese, as well as the French National Office for Biodiversity and the Dutch Ministry of Agriculture, Nature & Food Quality for funding projects focused on estimates of demographic parameters that will be used in the flyway model and for monitoring of crippling rate.
- A range of national initiatives to improve monitoring programs, particularly the development of monitoring programs to estimate the breeding population of Greylag Geese, in Denmark funded by the Danish Environmental Protection Agency, in Finland funded by the Finnish Wildlife Agency and the Finnish Ministry of Agriculture and Forestry, in Sweden funded by the Swedish Environmental Protection Agency, in Norway funded by the Norwegian Environmental Agency and in France by the National Office for Biodiversity and the Ligue pour la Protection des Oiseaux.
- NatureScot and the Department of Housing, Local Government and Heritage Ireland, for funding development of an integrated population model for the E. Greenland/Scotland & Ireland population of Barnacle Geese and the international census which took place in February 2023.

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- The Ministry of Agriculture, Nature and Food Quality, the Provinces and BIJ12 in The Netherlands for funding development of an integrated population model for the Russian/Germany and Netherlands population of Barnacle Goose, developing a population model for Greylag Geese, and supporting the collection of monitoring data.
- The Finnish Wildlife Agency and Natural Resources Institute for funding development of an integrated population model for Taiga Bean Goose.
- The Danish Environmental Protection Agency for funding the assessment of potential biases in the population counts of Pink-footed Goose.
- The Norwegian Environment Agency, The County Governor of Vestfold and Telemark and the County Governor of Nordland for contribution to the juvenile assessments of Greylag Geese in Norway.

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1 Introduction

The first international management plan to actively manage a migratory population of waterbirds in Europe was adopted in 2012 and implemented in 2013. The plan was for the Svalbard breeding population of Pink-footed Goose and was based on the concept of adaptive management (AM). AM provides a framework for making objective decisions in the face of uncertainty about an ecological system and the impact of management actions. To reduce this uncertainty and improve management over time, AM relies on an iterative cycle of monitoring, assessment, and decision-making.

In 2013, plans for the first iterative cycle were published in the form of a population status report and a harvest assessment report. In May 2016, the European Goose Management Platform (EGMP) was established, following a resolution adopted by the Meeting of the Parties of the African-Eurasian Migratory Waterbird Agreement (AEWA). The platform functions under the framework of AEWA, which provides for the conservation and sustainable use of the migratory waterbird populations it covers. The platform addresses the conservation and management of declining, as well as growing, goose populations in Europe. This is achieved by a coordinated flyway approach amongst all Range States concerned.

The setup of EGMP benefited from experiences with Svalbard Pink-footed Geese and was initially extended to include Taiga Bean Geese. In 2017, four more populations were added to the EGMP; the NW Europe (br) population of Greylag Goose, as well as the three populations of Barnacle Goose: the Russia (br) population, E Greenland breeding population and the Svalbard breeding population. Following the decision by AEWA MOP8 in 2022 to split Taiga Bean Goose, formerly considered as one population consisting of four management units, into four populations, the EGMP encompasses nine populations. In some populations, management units have been established to delineate subpopulations, which are considered to have their own demography and/or dispersal and thus requiring specific management and conservation approaches. Thus, four goose species and their respective populations and management units are currently part of the EGMP (Table 1-1).

Table 1.1. Overview of populations and Management Units (MUs) covered by the EGMP and relevant documents.

Population	**Management/Action Plan (ISSMP/ISSAP)**			**Adaptive Flyway Management Programme (AFMP) / Implementation Plan**		
	Link	**Adopted**	**Expires**	**Link**	**Adopted**	**Expires**
Svalbard (br) population of Pink-footed Goose	ISSMP	2025	2037	[DRAFT AFMP]	[2026]	-
Scandinavia (br) population of Taiga Bean Goose	ISSAP	2025	2037	Not developed	-	-
Finland & NW Russia (br) population of Taiga Bean Goose	ISSAP	2025	2037	Not developed	-	-
Germany & Poland (nbr) population of Taiga Bean Goose	ISSAP	2025	2037	Not developed	-	-
C Asia (nbr) population of Taiga Bean Goose	ISSAP	2025	2037	Not developed		
NW Europe (br) population of Greylag Goose consisting of 2 MUs; MU1 (migratory) and MU2 (sedentary)	ISSMP	2018	2031	AFMP	2020	2026
Russia (br) population of Barnacle Goose consisting of 3 MUs; MU1 (Arctic), MU2 (Baltic) and MU3 (North Sea)	ISSMP	2018	2031	AFMP	2020	2026
E Greenland (br) population of Barnacle Goose	ISSMP	2018	2031	AFMP	2020	2026
Svalbard (br) population of Barnacle Goose	ISSMP	2018	2031	Not developed	-	-

This report, together with the EGMP Database, comprises a joint population status and harvest assessment for all populations covered by the EGMP. The EGMP Database provides a shared platform for the most up-to-date monitoring information on each population managed under the EGMP (including data sources), whereas this report focuses on the assessment results and management guidance, to be reviewed at the annual meeting of the International Working Group.

Previous EGMP reports are available at: https://egmp.aewa.info/resources/publications.

For populations/species where the cumulative impact of derogation and legal hunting is assessed and/or management guidance provided, input and output files of the assessment runs from previous years are available at: https://gitlab.com/aewa-egmp. Most recent files (current assessment) and further details are available from the EGMP Data Centre (egmp@ecos.au.dk).

Information on indicators related to other aspects of the management plans, such as socioeconomic issues and ecosystem services provided by geese, are presented in the Adaptive Flyway Management Programmes (AFMPs) in the annex ‘Indicator factsheets’. All AFMPs are available here: https://egmp.aewa.info/resources/action-and-management-plans-adaptive-flyway-management-programmes.

1.1 The assessment processes

The assessment process is pictured in Figure 1.1-1 and consist of three steps;

1) *Monitoring.*
Periodic monitoring and other data collection is essential for keeping track of the implementation progress for the EGMP ISSMPs, ISSAPs and AFMPs, not least regarding the process for setting hunting regulations and assessing the impact of derogation. Monitoring data refers to measures of abundance (counts or indices based on samples), data on productivity (counts of young and adults) and survival, and data to describe offtake (either hunting bags or derogation data). Monitoring and data collection are ongoing activities, which take place throughout the year, and are conducted according to agreed protocols. Data from monitoring activities are compiled by the EGMP Data Centre, by Sovon Vogelonderzoek Nederland for the Russia (br) population of Barnacle Goose, and by NatureScot for the E Greenland (br) population of Barnacle Goose. See Appendix A for coverage in each country and population and the EGMP Database for overview of data.

2) *Assessment.*
The data produced by monitoring provides information to estimate the status of the populations and are used along with other information to evaluate progress towards reaching management objectives, as well as to facilitate learning after decisions are made.

For populations/species where population models have been developed, demographic information like population size, productivity and survival rates are based on model estimates, and updated as new data are received. For populations/species without population models and/or updated data, the most current information received from the range states and their monitoring networks is presented. Due to delays in acquiring certain data, some information presented in this report will differ from that in previous reports and may also be subject to updates in future reports.

For populations/species where only derogation is allowed, the cumulative impact of offtake is assessed through retrospective and prospective analyses, investigating the effect of derogation at the population and at the MU level. The effect of the current level of derogation and environmental variables (e.g., avian influenza) is also projected into the future.

For huntable populations/species, a harvest strategy is derived, and annual management guidance is provided. This happens either through a formal adaptive harvest management process as for Pink-footed Goose, or through consensus on quotas informed by simulations as is done for the Finland & North-western Russia (br) population of Taiga Bean Goose (formerly known as the Central MU).

No reporting is provided for the Svalbard/SW Scotland population of Barnacle Goose.

3) *Decision-making.*
The decision-making process takes place by national representatives at the IWG annual meetings. Decision making at each decision point considers management objectives, resource status, and knowledge about consequences of potential actions. Decisions are then implemented by means of management actions on the ground.

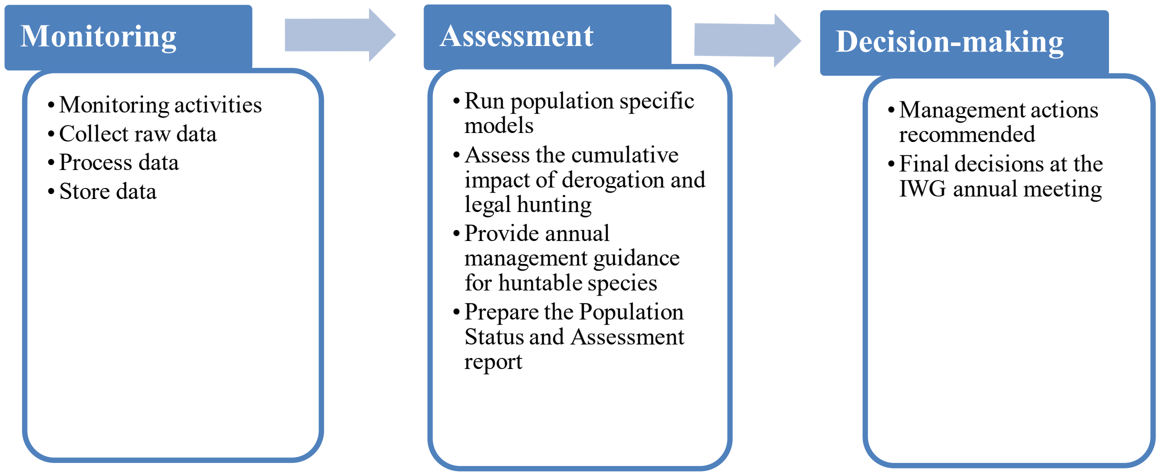

Figure 1.1-1. The EGMP assessment process, including annual activities related to monitoring, assessment and decision-making.

2 Monitoring and assessment methods

2.1 Population size

Counts of geese managed under the EGMP are performed at different times throughout the year. The counts can be either total counts or counts collected through a sampling program with the aim of estimating the total population size and/or to monitor a trend.

January census: All goose populations managed under the EGMP are covered by the International Waterbird Census (IWC), which takes place in January and has been implemented in most countries forming part of the respective Eurasian flyways. These counts focus on wetland areas, but in some countries include schemes specifically for geese as well, covering occurrence in farmland areas. Field work is usually carried out by a large network of volunteers during daytime on feeding sites or at dawn/dusk at roost sites, but precise methods, and especially coverage, may vary slightly between countries. In addition, some countries (e.g., The Netherlands, Belgium) account for missing geese in the network of counting sites by estimating missing counts ("imputed") with algorithms that account for the long-term trend and the phenology in similar census areas within the region (Hornman et al. 2021; Onkelinx et al. 2017). That way the data used for trend calculations represent a complete dataset and is not subject to variation in counting effort. Goose counts are collected by national coordinators and reported to Wetlands International who coordinates the IWC (van Roomen et al. 2025).

For several species, the January census provides the best available knowledge on the size of the total flyway population, as it has relatively high coverage in all countries and has been in place since the late 1950s, allowing for analyses of long-term time series (Fox and Leafloor 2018). Also, it takes place towards the end of the hunting season for most species, thus allowing an assessment of the effects of offtake. However, for widely dispersed species like e.g., Greylag Goose, the January census only provides information on the overall trend of the entire flyway population, as coverage is currently regarded too low to assess total population size. Moreover, the January count is not suitable to assess the size and trend for some populations and specific MUs as birds from different MUs mix during winter. For these reasons, specific counts are also organised at other times during the year, in order to assess the size of the respective MU-populations. Under the EGMP, data from the IWC is currently only used directly in the assessment of the NW Europe (br) population of Greylag Goose.

Autumn census: In continental Europe, special population counts have previously been made for all grey geese (*Anser sp.*) in November, as well as in September for Greylag Goose (Madsen et al. 1999). In recent years, most Range States have performed additional counts, in some cases covering the entire wintering season. A general issue with the autumn counts is that for huntable species, the counts are likely to occur after the start of the hunting season, which from a modelling and assessment perspective complicates the assessment process.

Spring census: Counts during spring, just before the assessment process in May/June and after the hunting season, is on the other hand the best time of the year to provide knowledge on the population size of huntable species shortly before breeding. For the Svalbard (br) population of Pink-footed Goose a total count is organized in early May, just before they leave for the breeding areas and are highly concentrated in only a few areas. For the Finland & North-western Russia (br) population of Taiga Bean Goose, a count (in addition to the autumn and mid-winter count) is organized in March, when most of the population is gathered in Sweden and good coverage is possible. To estimate population sizes of breeding waterfowl and wader species, including Greylag Goose, France has recently introduced a spring census which will take place at regular intervals (currently planned for every six years).

Summer census: For populations where management is performed at a MU level (e.g., Greylag Goose and the Russian population of Barnacle Goose), summer is the only period in which the size of the population in each MU can be assessed. Summer counts take place from mid-July to early September, under the assumption that birds from the respective MUs have not yet left the country or can be accounted for. This type of census does not only cover breeding birds and their offspring, but also failed breeders and non-breeders (i.e., all individuals within the respective MU). So, compared to regular breeding bird surveys in spring (delivering number of breeding pairs), they give a more comprehensive account of abundance (expressed in individuals) in the post-breeding period, while the number of breeding pairs must then be calculated from the results of the post-breeding censuses. Summer counts are carried out during daytime and focus on wetlands and waterbodies, which in summer host nearly all birds during daytime. Hence, coverage is regarded as high (usually >90%), but in some large countries (e.g., Norway and Finland) it is a challenge to coordinate such counts, and alternative sampling approaches have been developed (see Sørensen et al. 2024). Data is collected through volunteer networks but with substantial professional input (more so than during winter). In the IPM-framework, for the Russia (br) population of Barnacle Geese, the number of breeding pairs is set as the number of individuals of 2 years and older divided by 2. For the NW Europe (br) population of Greylag Goose, the number of breeding pairs in the spring is calculated separately for the two management units, based on the results of the post-breeding counts, following the methodology described in Sørensen et al. 2024 (further details provided in Johnson et al. 2024).

All data is provided by national coordinators or agencies, but in some specific cases may also rely on published information (see EGMP Database for details).

2.2 Reproduction

In migratory geese, productivity is typically expressed as the proportion of young in the autumn population and is assessed at the autumn staging and wintering grounds by observing the number of young vs. adults in flocks of geese – also called age-ratio counts. Such age counts have been performed for many European goose populations for several decades by skilled experts, providing a long-term time series of their breeding performance (Madsen, Cracknell, and Fox 1999; Hornman et al. 2024). Counts are usually done in October and November, Greylag Goose is however already assessed during July and August (in some cases in combination with the summer census), as it is otherwise difficult to distinguish juveniles from adults (see Koffijberg 2022). Assessing productivity at the staging and wintering grounds is, however, likely to be affected by several factors as we are compelled to sample from an open population, in which the temporal and spatial age composition can vary, e.g. due to differential migration, mortality and flocking behaviour (Gupte et al. 2019). The effect of such factors has been investigated, with the Svalbard Pink-footed Goose as a case study (Jensen et al. 2023b).

2.3 Offtake and survival

Hunting bags: All range states allowing hunting have harvest monitoring schemes in place; ranging from national harvest data recording across harvest data schemes at regional level(s) to harvest data collection by wildfowling clubs (UK). Data are generally gathered on an annual basis, but often with a time lag in publishing the data. Furthermore, in most countries, data are gathered for each huntable waterbird species. Most countries have legislation that requires harvest bags to be reported by all hunters, with the exception of Sweden, France, UK and Wallonia, Belgium that have no legislation requiring harvest bags to be reported by all hunters. Moreover, in most countries waterbird harvest data are collected for all individual hunters throughout the country, but in some countries, data are only collected for hunting units, or only a sample of hunters is surveyed. Thus, in general there is an absence of harmonisation among the different hunting bag collecting schemes in Europe. Moreover, there is a lack of information on how calculations are made with the local/regional data to produce the national hunting bag statistics. Thus, reliable inference about flyway totals is very difficult to attain (Aubry et al. 2020). Furthermore, it is not always clear whether the national derogation data (see below) are additional to, or included in, the reported hunting data in countries where both hunting and derogation occurs. For some species, bias in hunting bag reporting is suspected (Johnson and Koffijberg 2021). Hunting bag data are available online in the following countries: Belgium, Denmark, Finland, Germany, Greenland, Iceland, Norway and Sweden (a link is provided in each country name).

Derogation: EU Member States are obliged to report all derogations to the European Commission in annual derogation reports (according to Article 9 in the Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds), see EU 2020). However, for a number of Member States, the data is only available after a delay of several years. Furthermore, in some countries this reporting involves several administrative levels and with some uncertainty as to the true number of birds killed. Derogation data are available from the EU Eionet central data repository (https://environment.ec.europa.eu/topics/nature-and-biodiversity/birds-directive_en), but for this report data has also been provided directly by the Range States.

Wings and heads: In Denmark, Iceland, Scotland, and Sweden hunters may, on a voluntary basis, submit wings from shot geese to national wing surveys. These wing samples contribute to the knowledge of the temporal variation in the hunting bag, as well as knowledge of age ratio among shot birds. In Denmark, Sweden, Finland, and Latvia, hunters have also been invited to submit (photos of) heads of shot Bean Geese to the national hunting organisation for sub-species identification to estimate the proportion of Taiga Bean Geese in the hunting bag.

Crippling rate: In several goose species, X-ray images have been used to assess the proportion with embedded shotgun pellets (Noer et al. 2007). The incidence of embedded shotgun pellets is an expression of hunting exposure and also plays an important role in the ISSMP/AFMP process from an ethical viewpoint and as they are sub-lethal injuries potentially affecting fitness of the geese. Crippling rate is defined here as the proportion of individuals with at least one embedded shotgun pellet, assessed by processing of X-ray images. Whereas the crippling ratio is the crippling rate divided by the harvest rate. Harvest rate is defined as the proportion of the population being shot (Clausen et al. 2017). In general, there is a need for standardized crippling assessment, which is in progress among those institutes collecting data.

2.4 Population assessment methods

Integrated population models (IPM) are currently used to derive estimates of abundance and demographic rates for four goose populations covered by the EGMP: Svalbard Pink-Footed Goose (Johnson et al. 2020a), the Finland & North-western Russia (br) population of Taiga Bean Goose (Johnson et al. 2020b), E. Greenland Barnacle Goose (McIntosh et al. 2021), and the Russian-Germany-Netherlands population of Barnacle Goose (Baveco et al. 2021). IPMs represent an advanced approach to modelling, in which all available demographic data are incorporated into a single analysis (Schaub and Abadi 2011). IPMs have many advantages over traditional modelling approaches, including the proper propagation of demographic uncertainty, better precision of demographic rates and population size, and the ability to handle missing data and to estimate latent (i.e., unobserved) variables. They also have the capacity to guide the development of effective monitoring programs. IPMs can also be used to derive optimal offtake strategies or to project the future consequences of offtake strategies that have been defined a priori. Finally, use of a Bayesian estimation framework for IPMs provides a natural framework for adaptation, in which demographic parameters can be updated over time based on observations from operational monitoring programs.

Estimates of abundance, survival, and productivity from an IPM are based on the joint statistical likelihood of all the data used in the model. This likelihood is combined with any prior information that may be available to provide what are called posterior estimates of demography. Because the entire historical record of data is always used, all posterior estimates may change slightly each year as new data are added to the historical record. Moreover, posterior estimates from the IPM are unlikely to match perfectly those derived from an independent analysis of an individual source of data. For example, estimates of survival from analysis of capture-mark-recapture (CMR) data are likely to be slightly different than posterior estimates of survival derived from the IPM. This is because the CMR analysis only uses CMR data, whereas the IPM uses the CMR data, plus census data and all other sources of demographic data, to estimate survival. Thus, a great benefit of using the IPM is more reliable estimates of abundance and demography, which better reflect all the demographic information available for a population, and which are not so sensitive to any sources of bias (e.g., which may occur in CMR-data due to neckband loss or differential survival between marked and unmarked birds).

3.2 Greylag Goose *Anser anser*

This chapter compiles monitoring data on the population status of the NW Europe (br) population of Greylag Goose and provides an update on the establishment of the monitoring and modelling frameworks necessary to perform a dynamic and model-based assessment at MU level (Nagy et al. 2021c).

3.2.1 Range states and management units

The range states for the NW Europe (br) population of Greylag Goose include Norway, Sweden, Finland, Denmark, Germany, The Netherlands, Belgium, France, and Spain. Geese belonging to this population also occur regularly in Poland, Czech Republic and Portugal, but these countries are not included as principal Range States as numbers recorded here constitute less than 1% of the total population. Based on the recognition of regional differences in migratory behaviour and the human-wildlife conflicts related to this population, it has been agreed to define two MUs (Nagy et al. 2021c).

MU1 includes the breeding populations in Norway, Sweden, Finland, and Denmark that subsequently stage and winter also in The Netherlands, Germany, and Belgium. Some birds from this MU migrate to the southernmost wintering sites in France and Spain. MU2 is the mainly sedentary populations of The Netherlands, Belgium, and Germany, including also a small French breeding population of c. 2400 pairs (Figure 3.3-1). Although the German population is generally regarded as sedentary, breeding birds in the eastern part of the country are known to show migratory behaviour (Bairlein et al. 2014).

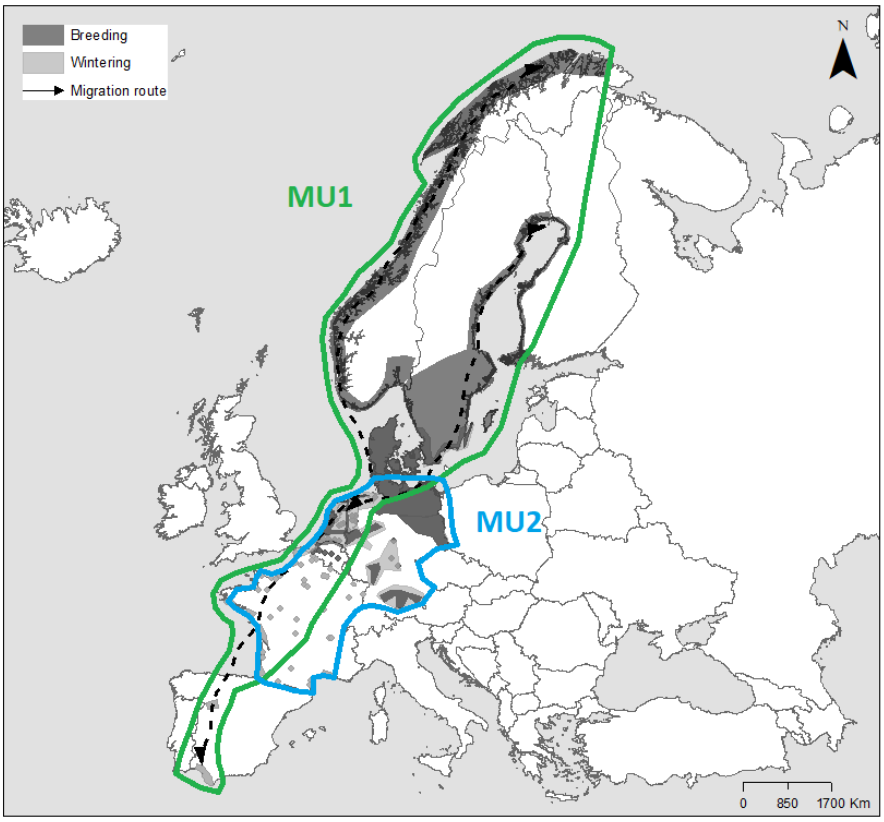

Figure 3.3-1. Annual distribution and main migration routes for the NW Europe (br) population of Greylag Goose including breeding (medium grey) and wintering (light grey) areas, as well as areas which are both used during the breeding and wintering period (dark grey) as presented in the ISSMP (up for evaluation in 2030). The two management units (MUs) are also shown: MU1 for the migratory population (in green) and MU2 for the sedentary population (in blue).

3.2.2 Population FRPs and targets

The FRP for the breeding season is 31,100 pairs for MU1, 72,980 pairs for MU2 and 104,080 pairs for the whole population. The wintering FRP is 370,400 individuals for the entire population (Nagy et al. 2021). Targets for MU1 and MU2 are 70,000 and 80,000 breeding pairs, respectively, resulting in an approximate wintering population size of 545,000 individuals (Nagy et al. 2021c).

3.2.3 Management strategies

In the face of deep uncertainty related to estimates of population size and offtake at the flyway level, an information-gap ("info-gap") decision model was developed in 2020 to allow decision makers to make informed choices about the magnitude of offtake until a dynamic, model-based management of the population could be established based on more reliable monitoring information (Nagy et al. 2021c; Johnson and Koffijberg 2021). As agreed, the info-gap decision model was ceased after a 3-year period, however the dynamic, model-based management has not yet been established as data on population size and/or offtake apparently continue to be biased (and, for some Range States, data availability is limited).

Based on the info-gap decision model, range states agreed on a management criterion of a 15% reduction in the flyway population size over 10 years, which meant an annual finite growth rate of 0.96 – 1.00 (EGM IWG5_MEETING_REPORT). To move beyond the rather crude info-gap approach, the AFMP mandated the establishment of "an internationally coordinated population management programme for both [management units], including offtake under hunting and, if necessary, under derogations, encompassing monitoring, assessment and decision-making protocols" (Nagy et al. 2021c). Considerable progress has been made in this effort, including the development of a flyway population model, which characterizes the dynamics of both breeding segments (MU1 and MU2) and accounts for the mixing of the two segments during autumn and winter. Based on input from the IWG, a utility model for Greylag Geese has also been developed that describes the relative level of satisfaction among stakeholders as the number of breeding pairs deviate from their agreed-upon targets. This utility model can be used to evaluate various offtake strategies in terms of their ability to meet population targets.

It should be noted that the current modelling framework is used to simulate how varying levels of offtake in different seasons and areas might affect whether the MU populations are near their targets when the ISSMP comes up for review in 2030. It is *not* intended to prescribe the magnitude and distribution of offtake at this time because current estimates of offtake are apparently biased high. Moreover, we note that while derogation is a legal means of alleviating local socio-economic conflicts, it cannot be used in a planned manner to meet a population target. However, once more reliable empirical estimates of offtake are available, the model can be used to forecast the population trajectory under those levels of offtake to help determine whether the population is trending toward the target or FRP (e.g., as is done with Barnacle Geese). Also, given reliable estimates of derogations, the model could be used to help prescribe the level and distribution of recreational hunting to help attain population targets.

3.2.4 Assessment protocol

a) Population model

We use a post-breeding projection matrix, decomposed into summer and winter components. The summer component consists of the two breeding management units (MU1 and MU2), and the winter component consists of two wintering areas (North and South) (Figure 3.3-2). There is a broad overlap in the wintering distributions of the two breeding units. The southern unit is largely comprised of MU1 birds and is of special concern as short-stopping of migratory birds may eventually cause the range to fall below the FRR.

We also divide the annual cycle of Greylag Geese into a breeding season (March – August) and a wintering season (September – February) (Figure 3.3-3). We recognize the definition of seasons is somewhat arbitrary as it must represent a compromise of phenology that varies among countries.

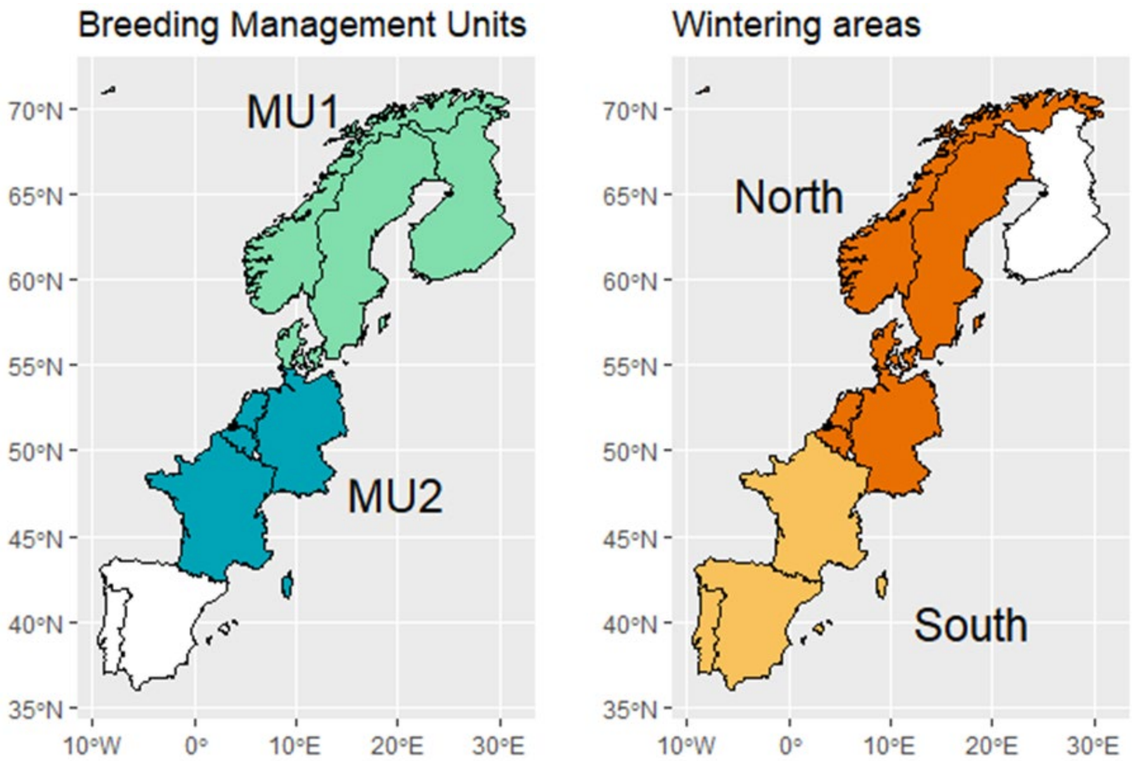

Figure 3.3-2. Breeding management units and wintering areas for the NW Europe (br) population of Greylag Goose.

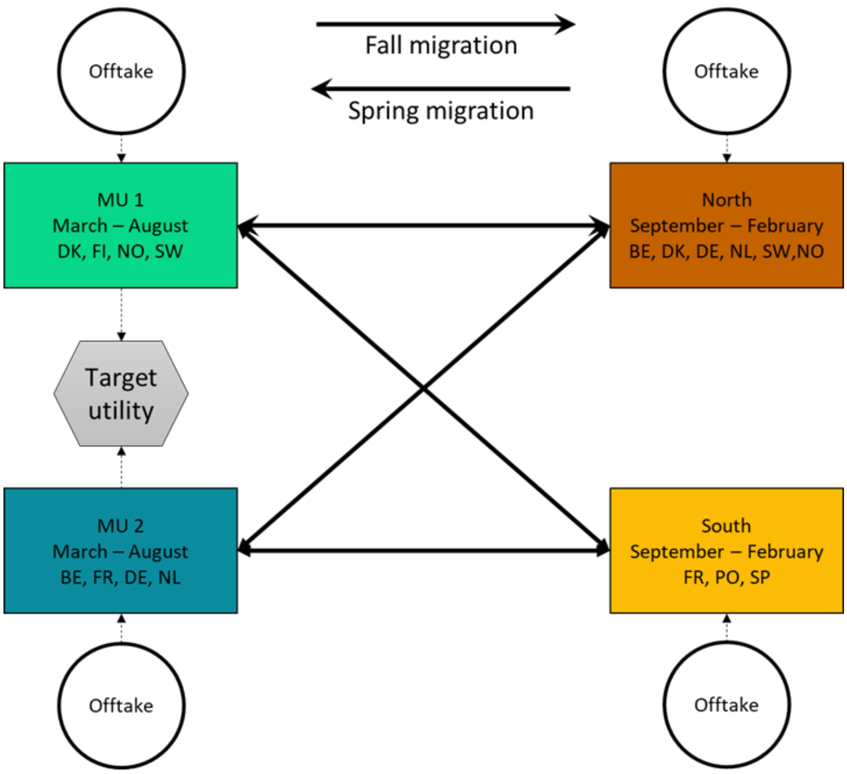

Figure 3.3-3. Diagrammatic representation of the model for the annual cycle of the NW Europe (br) population of Greylag Goose.

The model was parameterized using basic life history information and some limited empirical data (Appendix A.3). The model can be improved with a time-series of post-breeding population sizes in each MU, with the proportion of young in those counts, seasonal (March – August, September – February) offtake by country, and winter counts by country. The summer age ratios are particularly important in helping determine the number of breeding pairs, which is the criteria used in the MU-specific population targets. The biggest obstacle to model improvement and application, however, continues to be the acquisition of reliable empirical estimates of seasonal offtake.

b) Utility function

The effort to better coordinate the offtake of Greylag Geese involves specifying objectives and their relative importance in managing the abundance of Greylag Geese. Beyond an objective to maintain the population in a favourable conservation status, the objectives specified by the ISSMP are depicted in Figure 3.3-4. However, the ISSMP did not prioritize these objectives, and so the IWG was asked to specify their relative importance (also shown in Figure 3.3-4). These objectives and their weights were used to specify population targets of 70 and 80 thousand breeding pairs for MU1 and MU2, respectively (Johnson et al. 2021).

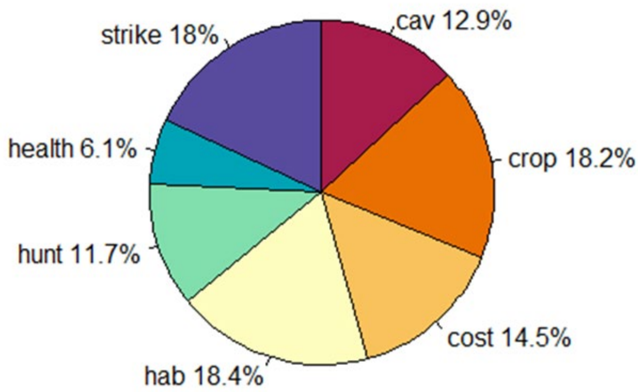

Figure 3.3-4. Relative importance of seven objectives for managing the offtake of the NW Europe (br) population of Greylag Geese. Management objectives are to maximize cultural and aesthetic values (cav), minimize agricultural damage (crop), minimize management costs to governments (cost), minimize deleterious impacts to habitats (hab), maximize satisfaction with the level of recreational hunting (hunt), minimize amenity fouling and disease transmission (health), and minimize bird strikes to aircraft (strike). From Johnson et al. 2021.

3.2.5 Population status

a) Abundance

The population size of the NW Europe (br) population of Greylag Goose is assessed twice a year, during winter and more recently during the post-breeding period in summer/early autumn. The winter abundance represents the total flyway population size, and the post-breeding abundance represents the size of each management unit.

Winter abundance is routinely estimated using the International Waterbird Census (IWC), as well as values from special goose counts in Denmark and the Netherlands. Based on those sources, the estimated population size was 802,320 individuals in January 2025 (Figure 3.3-5), similar to the result of the winter population count in 2023, which indicates a decrease in population size of around 130,000 individuals compared to January 2024. However, as some Range States have yet to report the final IWC results from 2025, the population estimate may not accurately reflect population development, and it remains to be seen whether the population growth has levelled off or will continue in the coming years. As mentioned in Heldbjerg et al.

(2021), estimates from Spain included a high degree of imputing due to data gaps during 2010-2013, which may have resulted in an overestimation of the actual population size by some 200,000 birds during those years. In recent years, Spanish data are not considered to be severely biased, yet we have chosen to keep both graphs (including and excluding Spain) in Figure 3.3-5. The imputed IWC value for January 2025 indicates that around 6,000 Greylag Geese wintered in Spain this year, potentially reflecting continued decline in recent years.

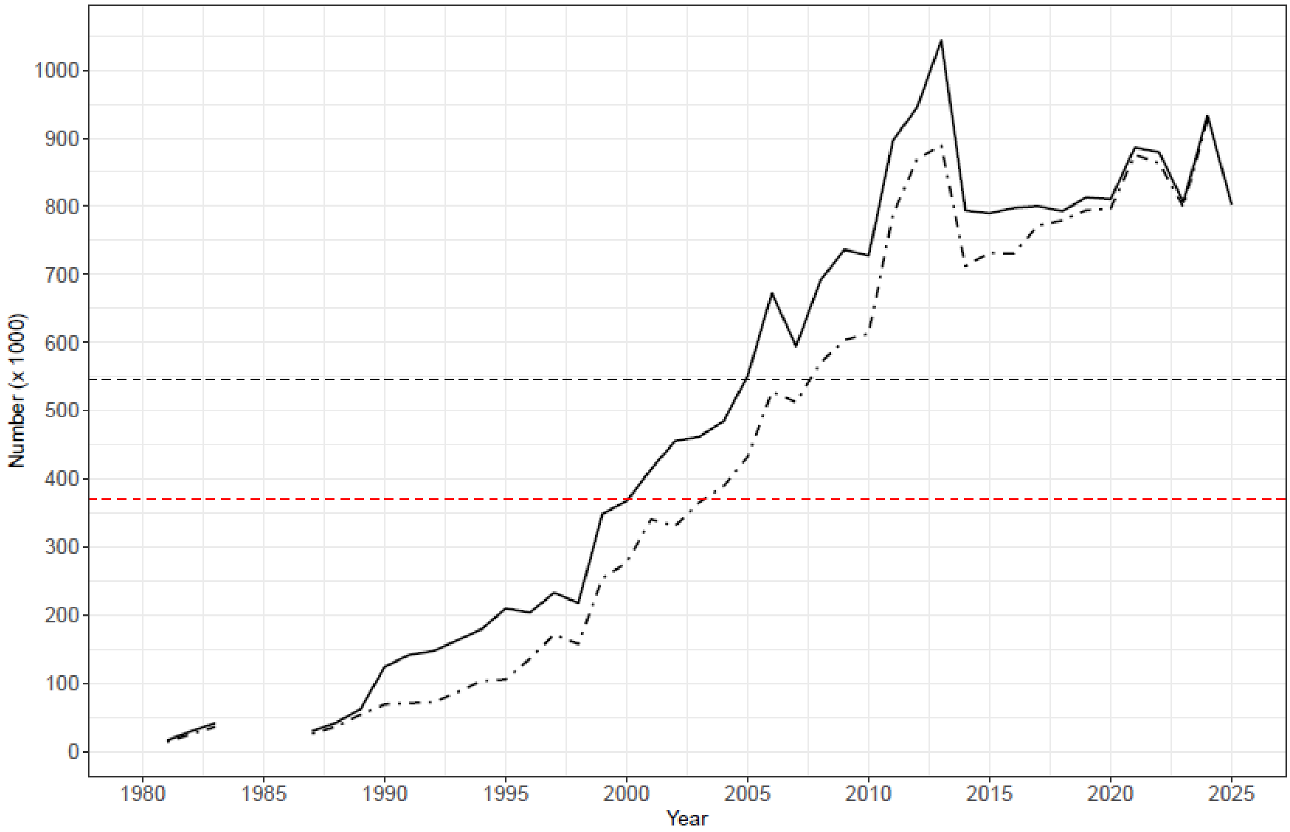

Figure 3.3-5. Development of the size (number of individuals) of the NW Europe (br) mid-winter population of Greylag Goose based on IWC imputed values from 1980-2025, including (solid line) and excluding (dot-dashed line) estimates from Spain. The dashed black line represents the target for the wintering population, and the red dashed line represents the wintering FRP.

Post-breeding abundance estimates are achieved through a combination of long-running and recently established national initiatives. For MU1, annual post-breeding counts have been carried out in Denmark and Sweden during September for decades (Nielsen et al. 2023, Haas et al. 2023). In 2022, Denmark organized an August count to provide a better estimate for the national population size (Jensen et al. 2023a), after which the national September count was moved to August and will be carried out biennially from 2023 onwards. Birds in Finland have also been counted during summer in recent years, but as these birds are assumed to be included in the Swedish September count, they are currently not added to the annual total for MU1. In Norway, counts were carried out at selected sites in August 2022, and a model-based estimate for the population size was subsequently produced, including also previous counts at selected sites, data from the Norwegian breeding bird monitoring scheme, and national hunting bag statistics (see Sørensen et al. 2024). For MU2, counts are carried out and available from parts of Germany (Nordrhein-Westfalen, Niedersachsen and Schleswig-Holstein), The Netherlands and Belgium (Niedersächsische Sommer-Gänsezählung 2025, Koffijberg & Kowallik 2024, Wolff et al. 2023). Numbers from France and Spain are currently regarded as non-essential due to small breeding populations, in some cases originating from feral geese. The number of breeding pairs is estimated every six years in France.

Counts from the post-breeding period produced a minimum of 540,115 individuals in 2022 for MU1, with counts in Denmark and Sweden producing similar results in the following year(s). In 2025, a total of 447,947 individuals were counted in Denmark (August) and Sweden (September) (Figure 3.3.-6). In MU2, 808,171 birds were reported in 2025 (no data available from France, and from Germany data are only available from Nordrhein-Westfalen, Schleswig-Holstein, and Niedersachsen, i.e., only three of the 16 Bundesländer) (Figure 3.3-7).

In 2024, we investigated how the number of breeding pairs in the spring might be calculated from post-breeding censuses for the two management units of the NW Europe (br) Population of Greylag Goose (see Sørensen et al. 2024 and further details provided in Johnson et al. 2024). Although our methods only provide a rough approximation for the number of breeding pairs because empirical data are insufficient to do otherwise, such calculations will help evaluate progress in terms of reaching the agreed targets of 70,000 pairs in MU1 and 80,000 pairs in MU2.

The most recent year of complete data is 2022. For MU1, for a post-breeding population of 540,115 (Sweden, Finland, Denmark, and Norway) the estimated number of breeding pairs was 132,142 (113,293 – 150,852). Around the middle of the last decade, the number of breeding pairs (all countries) in MU 1 was estimated at 84,000 (S. Nagy, personal communication). For MU2, we used a 2022 post-breeding population of 769,875 (Netherlands, Belgium, and Germany (Nordrhein-Westfalen, Niedersachsen, and Schleswig-Holstein)) and a spring population in France of 8,323, resulting in an estimate of 185,432 (147,605 – 206,367)[2] breeding pairs. Be aware that this was an underestimate of the total population size in MU2 as data was only available from three German federal states. Around the middle of the last decade, the number of breeding pairs (all countries) in MU 2 was estimated at 139,400 (S. Nagy, personal communication). Since 2022, population estimates based on post-breeding counts have increased for all Range States conducting such counts (see figures 3.3-6 and 3.3-7).

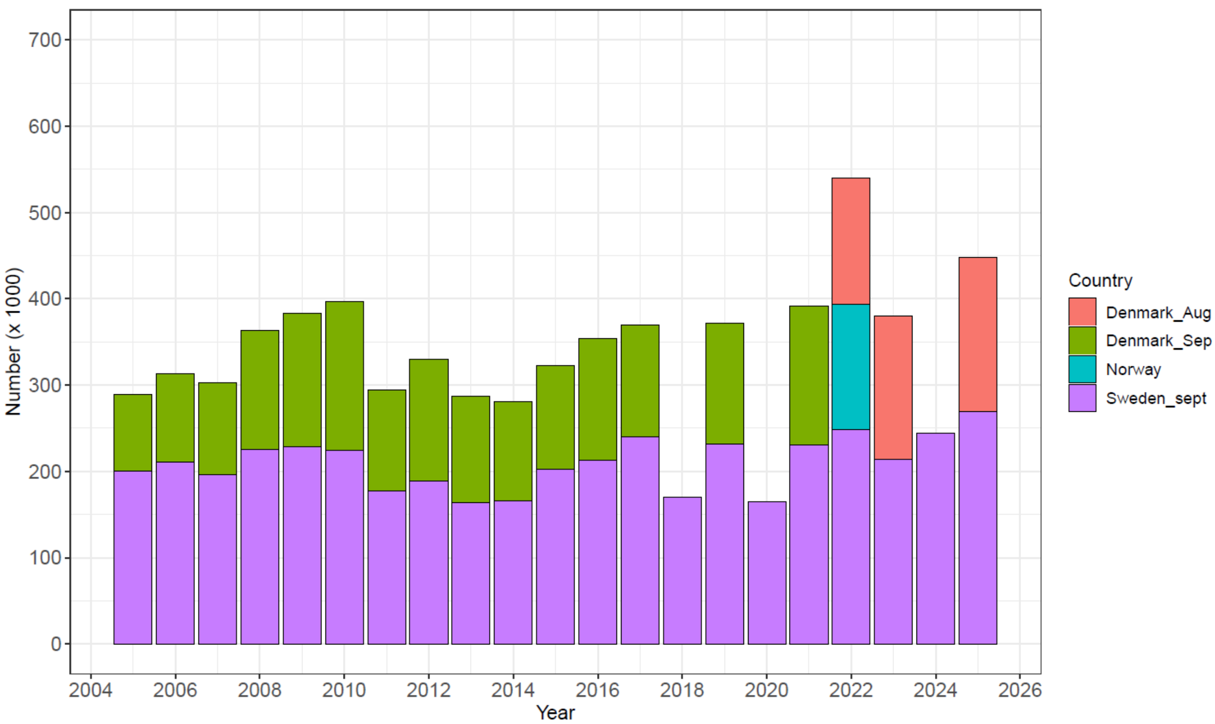

Figure 3.3-6. Number of Greylag Geese counted during the post-breeding counts in MU1 Range States, consisting of available data from Denmark (September 2005-2021, August 2022-2025), Sweden (September 2005-2025), and Norway (2022). Birds breeding in Finland are assumed to be included in the Swedish count.

[2] Note that this estimate has been updated in 2026 based on revised summer counts from Germany.

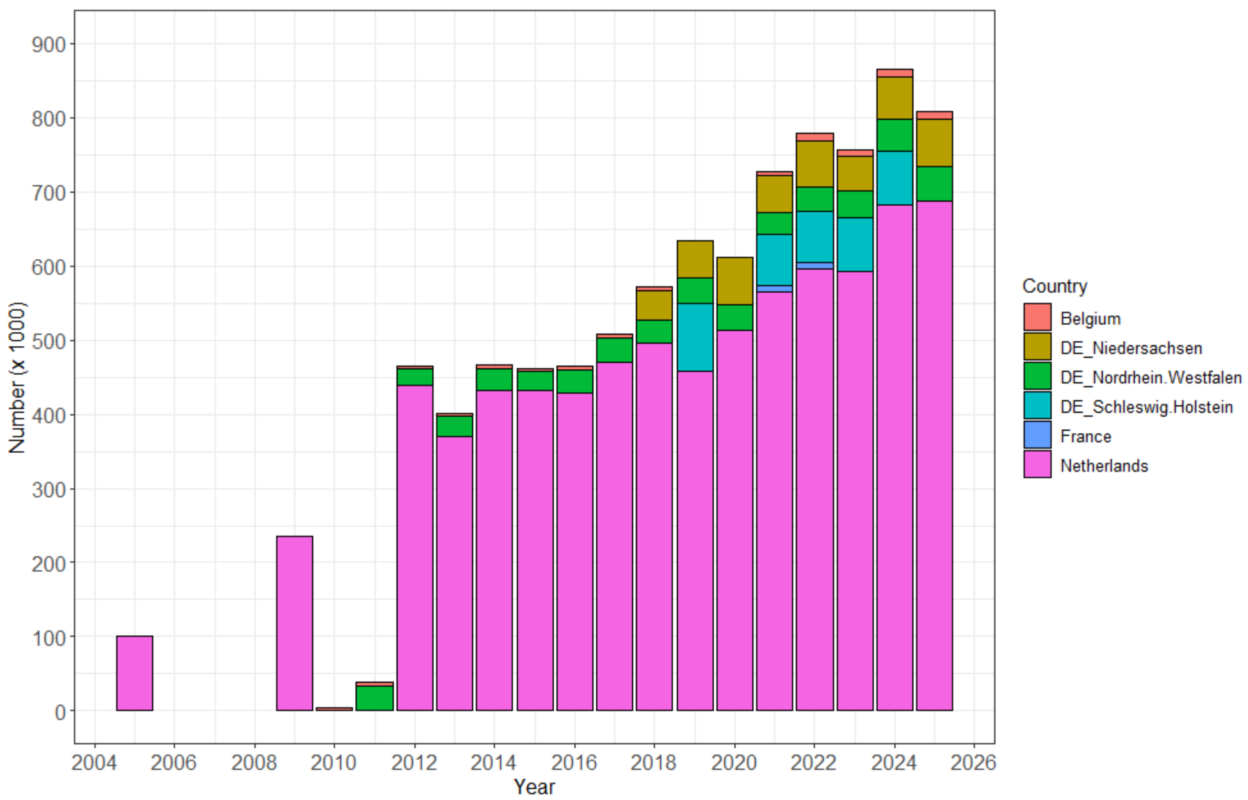

Figure 3.3-7. Number of Greylag Geese counted during the post-breeding counts in MU2 Range States, consisting of available data from Belgium (2010-2018 and 2021-2025), the Netherlands (July 2005, 2009, 2012-2025), Germany (Nordrhein-Westfalen July 2011-2025, Niedersachsen July 2018-2025, Schleswig-Holstein June/September 2019, 2021-2024), and France (2021-2022).

b) Survival and mortality

I) Offtake at population level

Hunting bag estimates are available from all range states except France and sum to 176,297 for the 2024/2025 season. Derogation data from 2024 are available from all range states where derogations have taken place, although data is missing from one Dutch province, and indicate that 273,305 geese were killed under derogation (including lethal scaring permitted at municipality level in Norway, following Norwegian game legislation). A significant reduction in the number of birds killed under derogation has occurred in Denmark, possibly as a result of increased efforts by the national authorities to control that preconditions for granting derogation permits are met.

Data suggest a minimum offtake of 449,602 Greylag Geese in 2024/2025 (Figure 3.3-8), indicating that offtake remains relatively stable across the Range States. Given an estimated summer population of around 1.3 million birds in recent years, and an estimated winter population size of 802,320 individuals in January 2025 (see above), with no indication of a declining trend, there is however reason to believe that offtake data are still biased high. We will continue to investigate this bias further in the coming years, with support from the relevant range states.

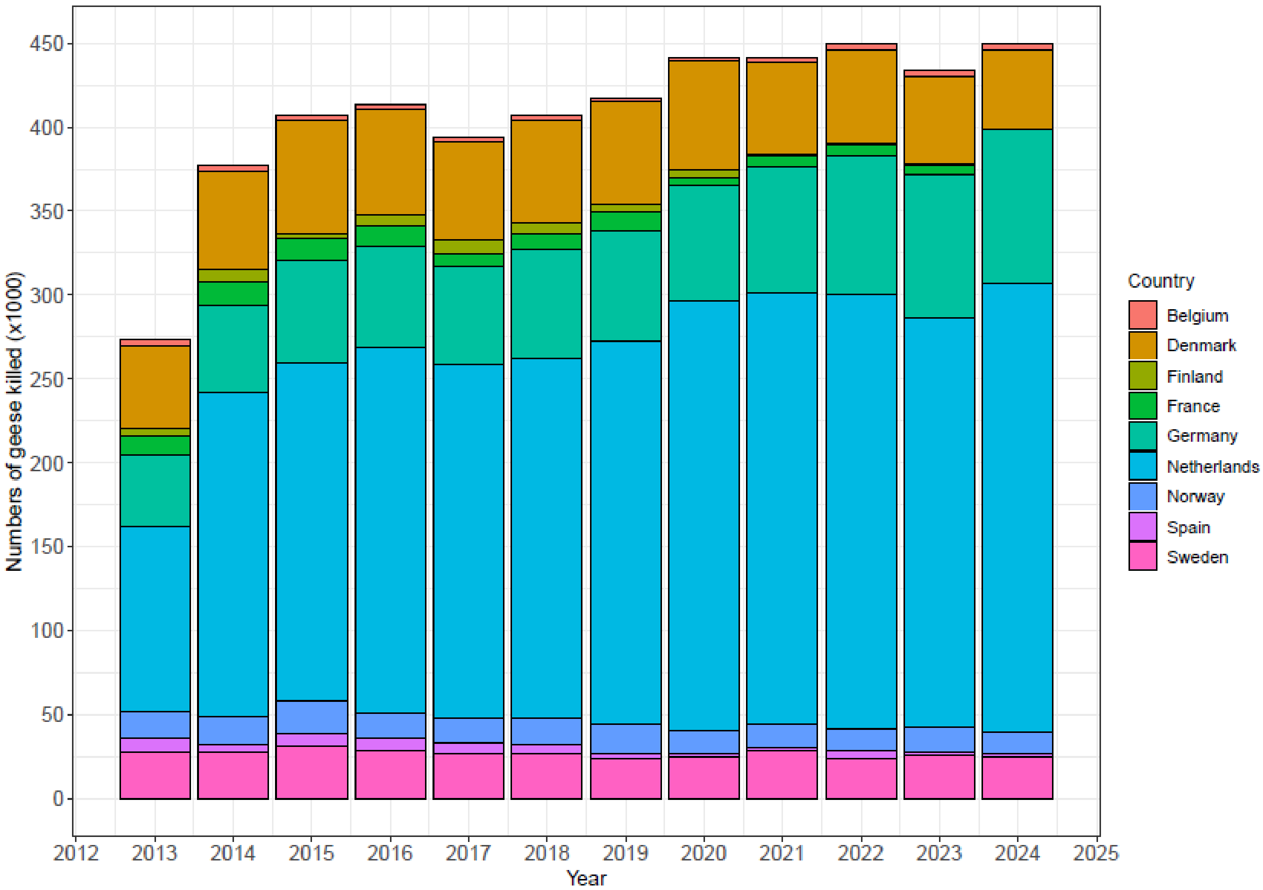

Figure 3.3-8. Total number of Greylag Geese killed under derogation (per calendar year 2013-2024) and hunting (per season from 2013/2014-2024/2025). Data from the Netherlands are incomplete (missing from one province) for 2023 and 2024, and in some years data from Spain include only offtake in Andalucia. Derogation numbers from Norway are estimates, based on information from county governors and municipalities. Offtake in France during 2024/2025 is not yet available.

II) Survival

No updated monitoring results available.

III) Crippling

In contrast to the low crippling rate seen in Pink-footed Goose in recent years (Buij et al. 2026), the crippling rate of Greylag Geese appears to remain relatively high. In 2022, an overall crippling rate of 21 % was found among Greylag Geese caught in Sweden (Månsson et al. 2024), with regional results ranging from 11.7 % to 26.4 %. Updated results from Sweden (n=139) and the Netherlands (n=622) covering the period 2017-2022 have demonstrated adult crippling rates among Greylag Geese of 22 and 30%, respectively, in the two countries during summer (Buij et al. 2026). As study periods overlap, these results are not indicative of a trend. However, the crippling rates presented in Buij et al. (2026) are based on a much larger sample size, covering both MUs, thus indicating a potential cause for concern across the flyway.

c) Reproduction

In MU1, age counts have been carried out in two Range States in 2025. Thus, new information is available from one region in Norway (Vesterålen) and a range of sites in Sweden. In Vesterålen, juvenile percentages have ranged between 4.1 and 40.1% during the years 2020-2025, with the most recent estimate being 32.5%. In Sweden, the juvenile percentage reached a peak in 2024 at 25.0% (Haas et al. in prep.), indicating an unusually productive breeding season following a couple of years with juvenile proportions of 5.0-7.5% (Haas et al. 2023). In 2025, the surveyed flocks contained 20.1% juveniles, thus overall productivity in MU1 appears to remain high (Figure 3.3-9).

For MU2, extensive age counts are available from the Netherlands (Hornman et al. 2024, Sovon Vogelonderzoek Nederland) and North Rhine Westphalia in Germany (Koffijberg & Kowallik 2024). Limited sampling in Niedersachsen (Germany) has also been carried out since 2019. After an initial peak in the Netherlands in the late 1990s, the proportion of juveniles declined markedly, resulting in an average juvenile proportion of 18.0% in the Netherlands and 19.3% in Germany during the last decade. However, peak years with more than 20% juveniles are seen in both Germany and the Netherlands (Figure 3.3-9).

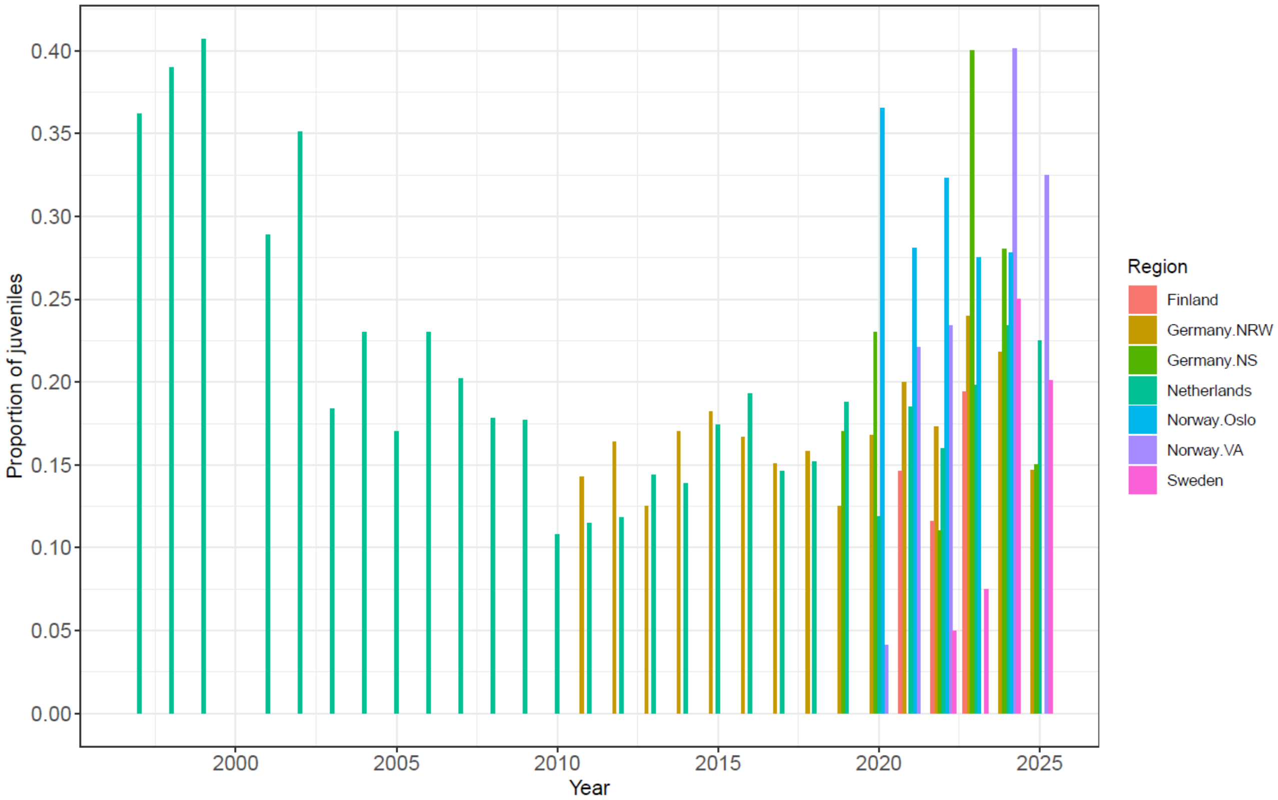

Figure 3.3-9. Proportion of juveniles in the NW Europe (br) population of Greylag Goose in five Range States: Norway (Vesterålen 2020-2022 and 2024-2025, Oslofjord Area 2020-2024), Finland (2022-2023), the Netherlands (1997-2024), Germany (North-Rhine Westphalia 2011-2025, Niedersachsen 2019-2020 and 2022-2025), and Sweden (2022-2025).

3.2.6 Management guidance

In 2023, using the preliminary population model, we simulated all permutations of offtake rates of 0.00 – 0.40 in increments of 0.02 for all seasons and areas (194,481 offtake scenarios). We retained all offtake strategies that had a high probability of meeting both MU targets by the time the ISSMP is due for revision in 2030 (Figure 3.3.-10).

The simulations of the preliminary model demonstrated that no unique level and distribution of offtake would meet MU population targets. Rather, alternative approaches to coordinating offtake must be evaluated ultimately not only in terms of their ability to meet population targets, but also in terms of cost, feasibility, and legal mandates. The 50 offtake strategies with high probability of meeting the MU targets are of two basic types: (a) those with relatively high spring/summer derogation and low winter offtake, and (b) those with low spring/summer derogation and relatively high winter offtake (Figure 3.3-10). In June 2023, the IWG recommended that offtake be concentrated during the wintering period to the extent possible. Again in June 2024 and 2025, the IWG agreed that all Range States will focus on offtake strategies that minimise the need for breeding season derogation.

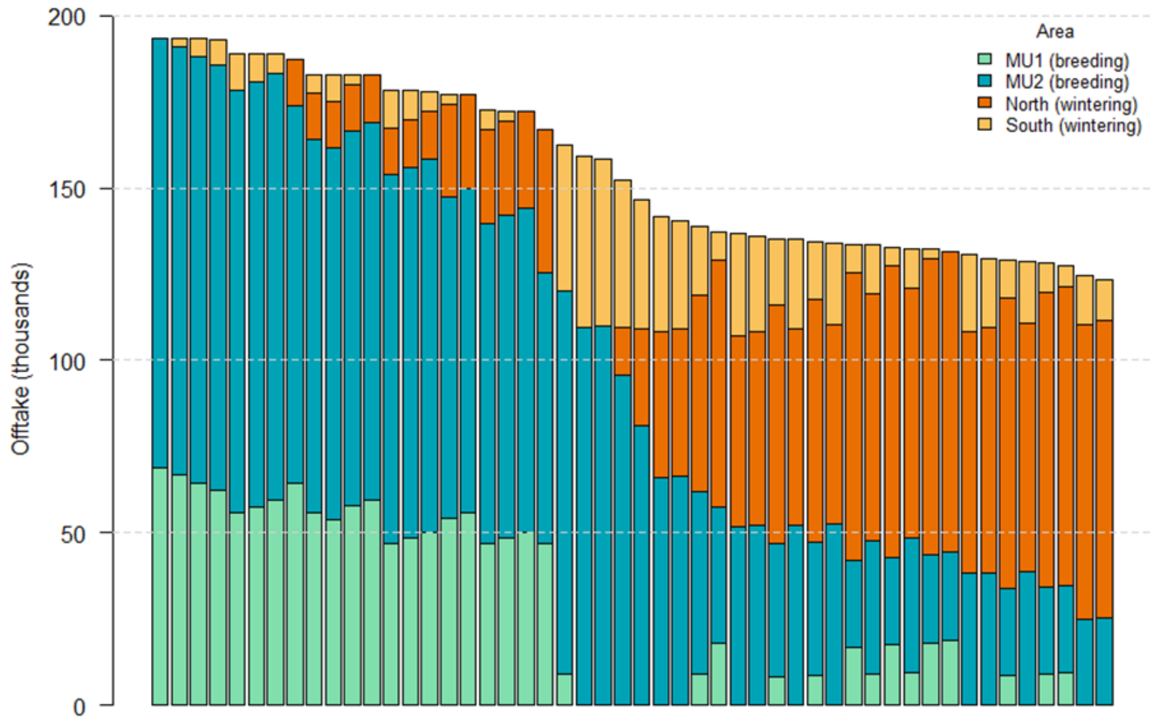

Figure 3.3-10. Fifty alternative offtake strategies for Greylag Geese with high probability of meeting the MU targets by 2030, ordered by decreasing level of total offtake. Values of offtake are the means over the timeframe. Colours correspond to those used in Figures 3.3-2 and 3.3-3.

Comparing the mean levels of offtake for the two sets of management strategies (a and b) with current estimates of offtake implies either that the flyway population is underestimated or the estimates of offtake are biased high, perhaps extremely so. To reconcile discrepancies between reported levels of offtake and those needed to meet population targets, the following data are needed in descending order of priority:

1. Reliable offtake estimates: by country and biannual period (spring-summer: March-August and fall-winter: September-February) for the most recent five calendar years.
2. Summer or early autumn abundance: by country for those conducting such surveys; all years in which they are available.
3. Post-breeding age ratios: all years and countries where available; should include counts of young and total sample size. Data should be provided at the lowest level available (e.g., by flock or location).
4. Winter counts: all years and countries where available.

While data availability has greatly improved in recent years, we still have reason to suspect that either offtake or population counts are biased. While investigating ways to improve the management guidance for the NW Europe (br) population of Greylag Goose, emerging patterns in the migratory behaviour of the population have been identified, and the associated management implications are currently being investigated by an ad-hoc group established following IWG10 (see document AEWA/EGMIWG11.24). Primarily, the work of the ad-hoc working group will improve MU-specific population size estimates and shed further light on the changing distribution of geese through increased short-stopping. This may affect the mean levels and the recommended distribution of offtake between seasons in each MU to reach the population target. At the same time, methods for reporting offtake in the Netherlands are currently undergoing a revision which may affect the overall offtake level.

For the reasons mentioned above, the EGMP Data Centre has postponed a review and revision of the existing population model until 2027, hoping that updated information on population size and offtake will be available for a thorough investigation of population dynamics. Our management recommendations for the coming season are thus to continue focusing on offtake strategies minimizing the need for spring/summer derogation. As the current level of offtake does not seem to jeopardize the population, we see no immediate need for adjustments to the national legislation. However, despite the continued growth in both MUs, we do wish to highlight the declining number of Greylag Geese from MU1 wintering in the southern part of the range and that these birds will be subject to an increasing harvest rate if the current level of hunting is maintained while numbers continue to decline.

3.3 Russia breeding population of Barnacle Goose *Branta leucopsis*

This assessment of the population status of the Russia (br) population aims to investigate the cumulative impact of derogation and hunting (where legally allowed) on the status of the flyway population and the status of the three individual management units (MUs) which have been defined. In addition, it provides guidance for management in 2026/27 and thereafter, for instance covering coordination of derogation measures among countries within one MU, in case the assessment calls for this. Besides, gaps in the monitoring networks are addressed. In line with the framework set out in the AFMP (Nagy et al. 2021b), the assessment is based on an Integrated Population Model (IPM). This model was initially developed for the Russian breeding population (MU1) only and presented during IWG5 in 2020 (Baveco et al. in Nagy et al. 2021b). In 2022, it was extended to the Baltic and North Sea breeding populations and then used in a first full assessment of the population status in 2005-2021 (Jensen et al. 2022). During IWG7 in 2022, it was decided to use the model framework of the IPM for an annual update making use of the newest available monitoring data. In autumn 2022, the IPM was further refined with input from a review made by the EGMP Data Centre and the Norwegian Institute for Nature Research (F. Johnson, K. Layton-Matthews). The current iteration of the IPM reflects the version that has been used after this review, for the assessments 2023-2025.

3.3.1 Range states and management units

The range states for the Russia (br) population of Barnacle Goose include Russia, Finland, Estonia, Sweden, Norway, Denmark, Germany, the Netherlands and Belgium. Among these range states, three management units have been delineated, covering the (Arctic) Russian breeding population (MU1, migratory and containing by far the largest share of the total flyway population), the Baltic breeding population in Finland, Sweden, Estonia, and Denmark (MU2, migratory), and the North Sea breeding population in Germany and the Netherlands (MU3, sedentary) (Figure 3.4-1). Formally, the Norwegian population in MU2 (now expanding from original breeding sites in the greater Oslofjord region) and the Belgian population in MU3 are not covered by the AFMP, as these populations are not recognized as naturally occurring, but derived from feral populations, by the respective country administrations. Still, these birds (altogether < 5,000 individuals and less than 1% of the flyway population) mix with the other birds in winter, so they are included in the monitoring setup and in the input data for the IPM.

During winter (i.e. from October to mid-May), birds from all management units mix in Sweden, Denmark, Germany, the Netherlands and Belgium. All these countries organize the traditional midwinter count (part of the International Waterbird Census) or dedicated goose counts, usually with a very good coverage of the wintering sites of Barnacle Geese. At present, the Netherlands and Germany are still the most important wintering countries, supporting on average about 47% and 27% of the flyway population, respectively (averages from census data collected in January 2023-25). However, in the past ten years other countries, especially Denmark, has received an increasing share of the wintering population while the wintering range has expanded into southern Sweden.

3.3.2 Population FRPs and targets

The FRPs for the breeding season have been defined as 113,000 pairs for MU1, 12,000 pairs for MU2 and 12,000 pairs for MU3 (Nagy et al. 2021b). The FRP for the entire population has been set at 380,000 individuals in winter, reflecting the flyway population size in 2000, when AEWA came into force (Nagy et al. 2021b). As Barnacle Goose is an Annex 1 species of the EU Birds Directive, the AFMP does not aim to maintain the population at or reach a pre-defined target level. Impacts of offtake under derogation is evaluated in retrospective, and management is carried out by each single EU Member State under the conditions for derogation, outlined in Art. 9 of the EU Birds Directive and implemented in national legislation of each EU Member State. Birds in Norway (not an EU Member State) have a similar protective status, following Annex II of the Bern Convention, including derogation-like measures (lethal scaring, not for regulating numbers) to prevent crop damage (in this case granted by, and reported to, the municipalities), if other measures of prevention have failed. Hunting (harvest) is only carried out outside the EU, mainly in Russia.

3.3.3 Management strategies

The AFMP aims to prevent the population or any of its MUs from declining below the specified FRPs (Nagy et al. 2021b). Hence, the FRPs represent the lower limits of the legally acceptable population sizes, but as such do not reflect true targets for population size. Monitoring of the population size and offtake and predictive modelling (IPM) of the cumulative impact of national derogation measures and hunting (where it is legally allowed) is used to inform national decision-making during the IWG-meetings to ensure this. The cumulative impact of derogation and hunting on the development of the population is assessed periodically, along with the likelihood of serious damage to agriculture, risk to air safety and to other flora and fauna, and the non-lethal measures taken to prevent damage/risk, as well as the effectiveness of these. This means that once every year, additional monitoring data provide insight into the population development, whereas once every six years an evaluation of the AFMP is carried out, assessing the implementation progress through the pre-defined indicators (next assessment due in 2026). Within this framework, it has also been agreed to coordinate monitoring of the offtake under derogation and hunting when the size of the population size (of single MUs or for the entire population) is below 200% of the FRP, as a precautionary measure. This includes monitoring of population size, offtake, prediction of population development (by the IPM), and coordination of offtake and conservation measures when necessary. A protocol for this coordination has been subject to discussions in the Task Force for the Russian/Netherlands and Germany population of Barnacle Goose (see doc. AEWA/EGMIWG/7.14 from EGM IWG7 in 2022). So far, it has only been applied in MU3, to avoid the population falling below FRP. During IWG10 it was also discussed whether coordination is needed in MU2 (see also section on Management Guidance).

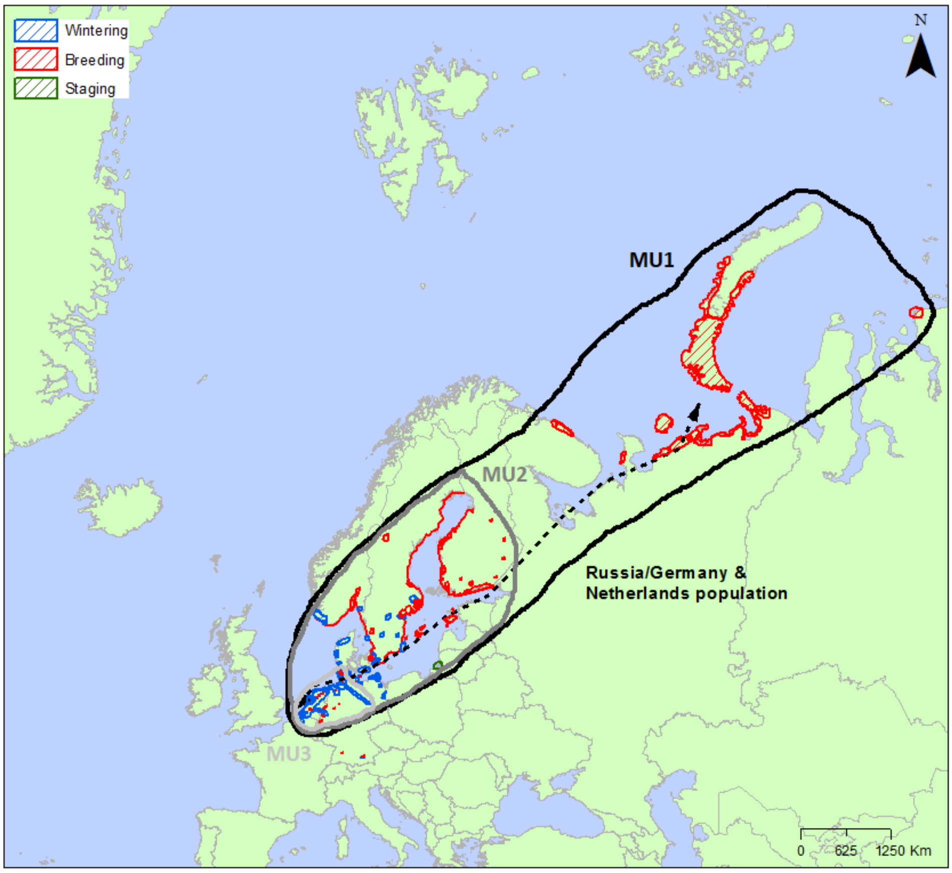

Figure 3.4-1. Management units of the Russia (br) population of Barnacle Goose.

3.3.4 Assessment protocol

The assessment of the status of the Russia (br) population is carried out using an IPM. Input for the model is derived from monitoring data on abundance, productivity, and offtake under derogation, both for summer and winter situations (see Appendix A.4 for coverage in each country and the EGMP Database for an overview of data used). The way the IPM framework accounts for the impact of offtake in the respective management units is shown in Figure 3.4-2. Monitoring data on abundance and productivity have been included up to January 2025 (winter flyway size, based on midwinter counts) and summer 2024 (numbers per MU, based on summer counts). For derogation data the last year taken into account was 2024 (submission of data on offtake under derogation from 2025 to the EU is due September 2026). In case of missing abundance data or incomplete time series, annual growth rates or estimates have been used to provide estimates. This was the case for Schleswig-Holstein in Germany in January 2025 (data not published yet) and for Sweden in January 2021 and 2022 (data missing due to very low coverage during the corona pandemic). Previously missing data from Germany has been provided through recently published census data.

Because summer counts are completely missing prior to 2005, results of the assessment shown in this chapter solely refer to the period 2005-2025. An overview of the longer time series is included in the EGMP Database and the annual status report from 2021 (Heldbjerg et al. 2021). This is especially relevant for productivity, which has declined in the Russian population in the long term, but less so when considered from 2005 onwards. As in the status report from 2025 (Sørensen et al. 2025), the results from September counts have been used in Sweden as a proxy for the size of the summer population. The count is carried out in mid-September, before migratory birds from MU1 have arrived (F. Haas, pers. communication), which has been confirmed by analyses of resightings of marked birds (L. de Vries, pers. communication). Moreover, exchange with the Finnish summer population is considered low, as the Finnish count is done only two weeks earlier than the Swedish count. Nevertheless, the exchange between Finland and Sweden (and perhaps also Denmark) is an issue which still needs further investigation, and preferably confirmation by transmitter- or ringing data (this is work in progress). A complete count in summer, covering all relevant parts of Sweden, is still not considered feasible, so using the September count instead is regarded as the best alternative option at present. Also, gaps in time series for Danish numbers during summer have been interpolated from periodical counts available. Currently, Denmark is the main gap in collection of census data during the summer period (see also Appendix A4).

Following a review by the EGMP in autumn 2022, the IPM was adapted in several ways. A simplification resulted from equating survival from natural mortality in the summer to that in the winter period. A reanalysis was performed of within-year variation in juvenile counts, and different approaches in defining the associated priors were tested. An approach for evaluating the goodness of fit, based on post-predictive checks, has been implemented as well, following the approach taken in the Pink-footed Goose IPM (Johnson et al. 2022).

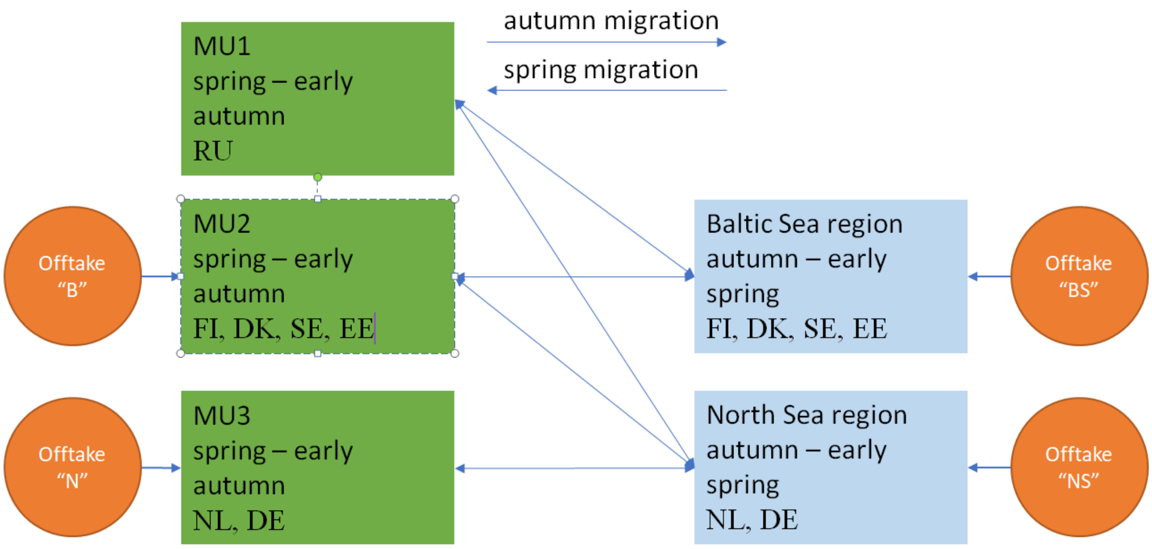

Figure 3.4-2. Overview of the offtake of Barnacle Geese in the different regions experienced by the birds belonging to the different MUs of the Russia (br) population. Local breeding populations (green boxes) in the Baltic Sea and the North Sea areas experience offtake around the breeding period ("B" and "N" respectively). Outside this period (blue boxes), birds of all three MUs experience offtake in their staging and wintering areas ("BS" and "NS" respectively). The scheme is simplified, as in the model and data the first set is split in offtake before and after July 15, and the second in offtake before and after January 15. Half-yearly survival is effectuated directly before and after offtake in staging and wintering areas ("BS" and "NS"). Offtake in Russia is unknown. RU: Russia, FI: Finland, DK: Denmark, SE: Sweden, EE: Estonia, NL: Netherlands, DE: Germany.

3.3.5 Status

a) Abundance

Posterior estimates from the IPM indicate a flyway population size of about 1.5 million individuals (rounded) in January 2025, which is slightly below the numbers estimated for 2024 (Figure 3.4-3). Results from the IPM and results from field counts correspond very well, with all counts being within the 95% credibility intervals of the IPM-estimates. The IPM-estimates for January 2025 resemble those in January 2021-2022, suggesting that the total flyway population size has not undergone an overall growth in the past five years. On a longer term, however, there has been a clear increase (see Heldbjerg et al. 2021) but the rate of increase has levelled off in the past decade. The estimated population size in January 2025 is four times the FRP (100% and 200% levels shown by the dashed line in Figure 3.4-3). Census data indicate that in January 2025, especially wintering numbers in the Netherlands were higher than average (800,000 – second highest winter count recorded so far). Higher numbers in the Netherlands corresponded to lower numbers in Northern Germany (perhaps as a result of a short cold spell prior to the census period), while in Denmark and Sweden numbers were the highest recorded since the start of the counts. On a longer term, wintering numbers in the Netherlands have stabilized since 2012/13 (Hornman et al. 2024) while especially in Germany, Denmark and Sweden they have continued to grow until recently (Blüml & Kruckenberg 2023, Nielsen et al. 2024, Haas 2025), implicating a northeastward expansion of important winter concentrations in the past decade.

Based on the posterior abundance estimates for July, the Russian breeding population (MU1) is by far the largest of all MUs, amounting to approx. 1.6 million individuals (rounded) in July 2024, whereas the Baltic population in MU2 and North Sea population in MU3 are much smaller: 64,000 and 67,000 individuals, respectively (Figure 3.4-3). Based on these figures, numbers in MU1 in the Russian Arctic represent about

92% of the total flyway population and thus will be the major driver for changes in abundance at flyway level. Apart from the large credibility intervals the estimates come with, this population has also continued to increase over the past years whereas the Baltic MU2-population has been declining, and the North Sea MU3-population has been fluctuating around 64,000 individuals since 2015. Some caution is needed for the estimates of the Baltic population, as data from Denmark is largely lacking. Surveys of breeding pairs in the Danish Baltic, however, do point at declines between 2018 and 2021, notably on the island of Saltholm between Denmark and Sweden (Nielsen et al. 2024).

Converted into breeding pairs, the posterior estimate for the size of the breeding population in the Russian MU1 in summer 2024 was 617,000 breeding pairs, thus exceeding 5.5 times the FRP and also exceeding the 200% threshold level by a large margin (Figure 3.4-4). The Baltic MU2-population is well above (1.8 times) the FRP as well (an estimated 22,000 breeding pairs in 2024) but has now fallen below the 200% threshold. The North Sea MU3-population was estimated at 19,000 breeding pairs, 1.6 times FRP (lower limit of 95% credibility interval just above FRP) but still below the 200% threshold of the FRP (Figure 3.4-4).

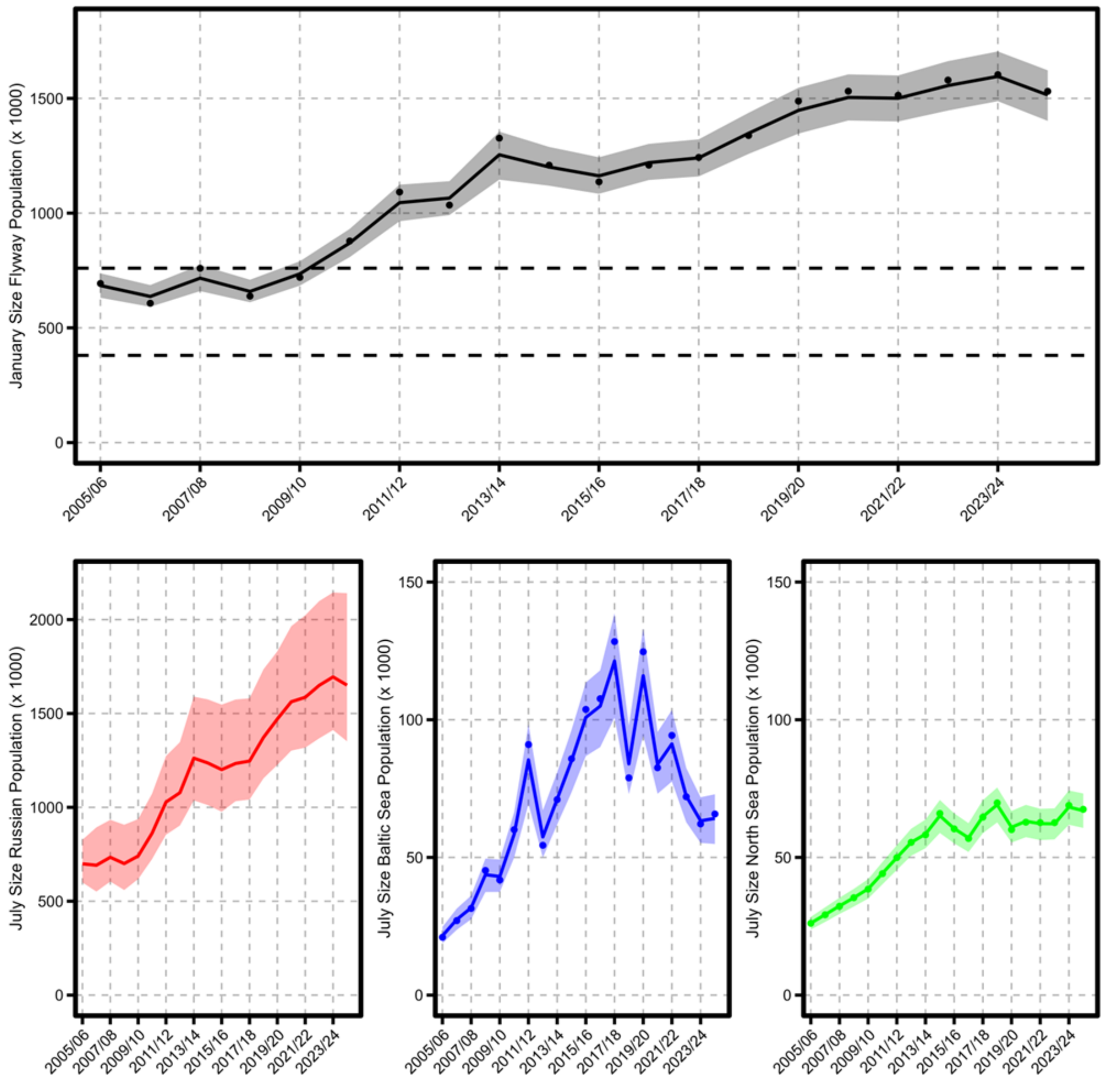

Figure 3.4-3. Top panel: January total flyway population counts (dots) of the Russia (br) population of Barnacle Goose, posterior means based on the IPM (solid line), 95% credible intervals (shaded area) and FRP as well as 200% of the FRP (dashed lines). Bottom panels: July population sizes of the three MU-populations along with posterior means and 95% credible intervals. Left (in red) MU1, centre (in blue) MU2, right (in green) MU3. Note the different scales on the y-axes. Further note that July counts of the Russian population are not available and are estimated as latent variables within the IPM framework (and come with large 95% credibility intervals).

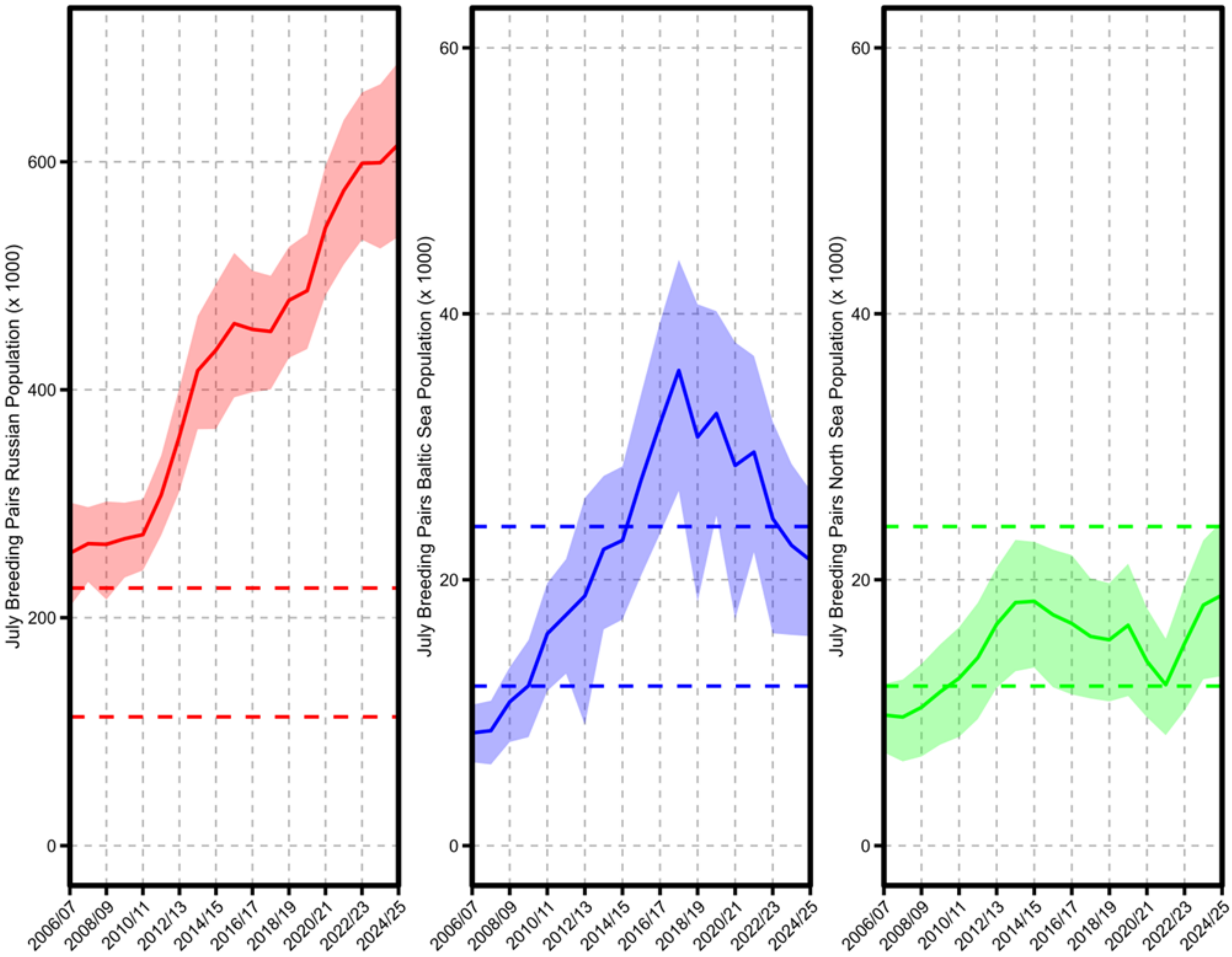

Figure 3.4-4. Posterior means (solid line) and 95% posterior intervals (shaded areas) for the number of breeding pairs in July for the three MU-populations of the Russia (br) population of Barnacle Goose, derived from the IPM. Dashed lines are the FRP as well as 200% of the FRP. Left (in red) MU1, centre (in blue) MU2, right (in green) MU3. In the IPM framework, the number of breeding pairs has been set as the number of individuals of 2 years and older, divided by 2. Note the different scales on the y-axes between MU1 and MU2/3.

b) Mortality and offtake

Survival rates derived from the IPM and combined for summer and winter, show that adults have much higher survival rates than juveniles (Figure 3.4-5, note that last year of the time series is based on incomplete data), which is also according to expectation. Adult survival in all three management units is estimated around 0.95, with little differences between the MUs (also given the credibility intervals). Especially in the Baltic (MU2) population some variation seems to occur, for reasons unknown yet. Combined summer and winter survival for juvenile birds is estimated around 0.50 for the migratory birds in MU1 and MU2 while it is higher (0.58) for the sedentary birds in MU3. In all cases, the posterior credible intervals for juvenile survival are much wider than those for adult survival, and annual variation is more pronounced in all three MUs.

Combined offtake rates have increased over time for all populations (Fig. 3.4-6; compare Fig. 3.4-7 for national assessment). For the Russian (MU1) population, offtake rates for adults and juveniles have stabilized around 3% and 6%, respectively. In the Baltic (MU2) population, there has been a continuous increase in both adult and juvenile offtake rates, now reaching a level around 10%. However, it should be noted that offtake in the Baltic population may be biased somewhat high, as numbers are divided among presumed MU1-birds and presumed MU2-birds. These cannot be distinguished for most of the year, and part of the derogations that are assigned to MU2 may actually affect MU1 (also being the dominant management unit regarding numbers).

For the North Sea (MU3) population, offtake rates increased steeply after 2013, reflecting increase of management by the Dutch provinces in order to halt the ongoing increase of the breeding population and including round-up during wing moult in early summer. As a result, offtake rates for adults and juveniles even exceeded 30% in 2019/20 and 2020/21. But following the outcome of the EGMP-assessment in 2022, showing that numbers in MU3 were approaching FRP, derogation efforts in the Netherlands were reduced and numbers killed went down following the guidance given by the IWG. This is also clearly reflected in the figures presented in Fig. 3.4-7, which show a considerable reduction in offtake under derogation from 2022 onwards. This reduction is solely the impact of reduced management during the summer period. During wintertime, derogations in the Netherlands are locally restricted due to provincial management policies that leave migratory birds partly untouched (e.g. by providing only restricted derogations or provide accommodation areas in which scaring and shooting is not allowed.

In 2025, data assessed for this report show that in the EU countries nearly 51,000 Barnacle Geese were killed under derogation, which is a slight increase from the 49,000 killed in 2023 (Fig. 3.4-7), but still much lower than the numbers around 2020, when management effort to target summer population in the Netherlands reached its peak. In 2022-2024, 79% of all birds killed under derogation were killed in Denmark and the Netherlands. During the period 2022-2024, the use of derogations in Denmark has been slightly reduced whereas in Germany and Sweden there has been an increase. Earlier, an increase was also apparent in Finland, but national court cases nearly brought the number of derogation permits to zero in 2024.

Besides direct offtake, some countries also apply clutch management. This is mainly done in Germany (Schleswig-Holstein), where, in spring 2024, a derogation license to apply clutch management to up to 760 nests was issued, and actually 2322 eggs were treated to prevent hatching (data source European Environment Agency, see Fig. 3.4-7). When assuming an average clutch size of 4 eggs, this would represent about 580 nests.

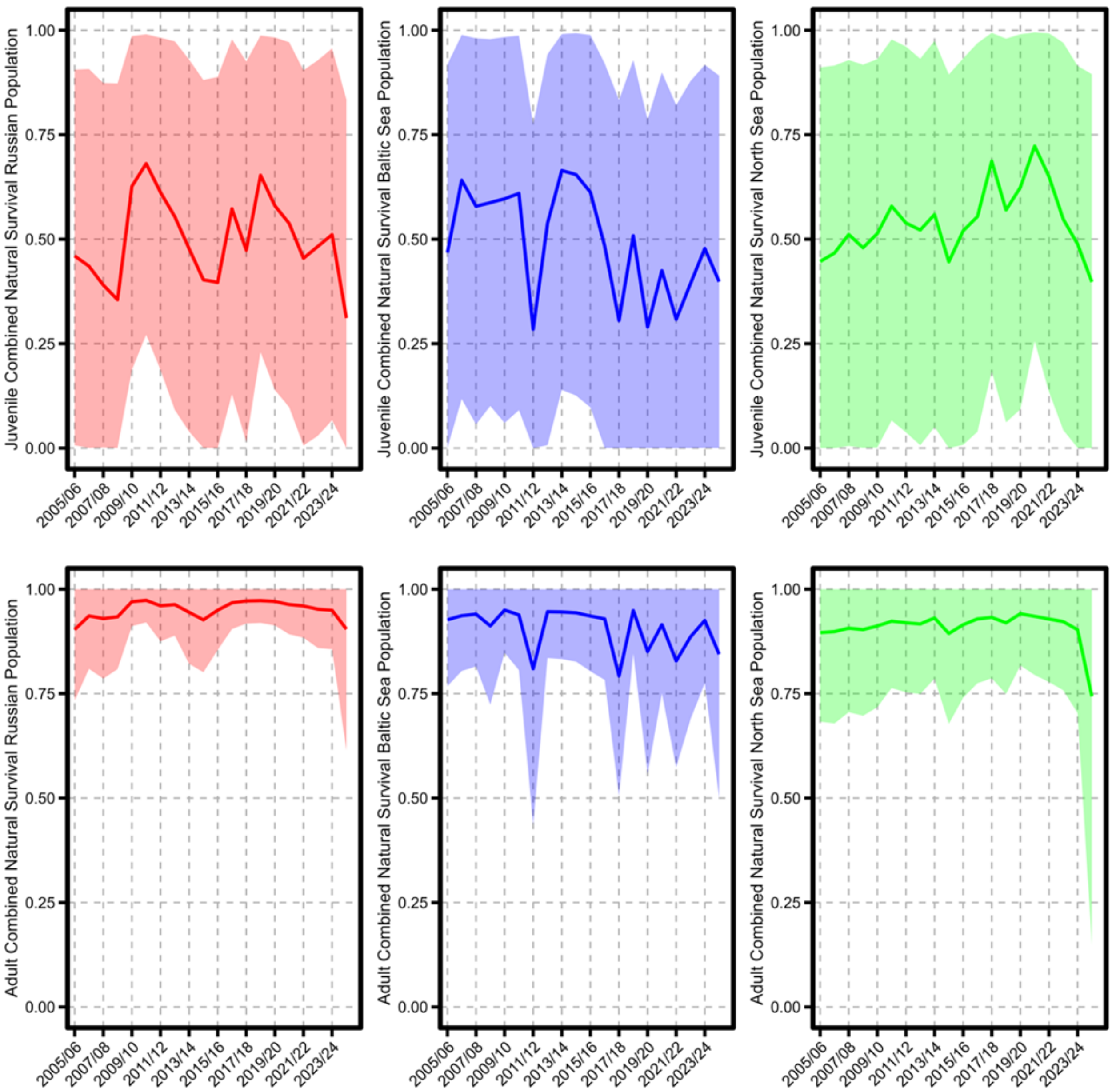

Figure 3.4-5. Posterior means and 95% confidence intervals for combined, i.e., summer and winter, juvenile (upper panel) and adult (lower panel) natural survival for geese in the three MUs of the Russia (br) population of Barnacle Goose. Left (in red) MU1, centre (in blue) MU2, right (in green) MU3. Note that this includes unknown offtake for the Russian population in Russia.

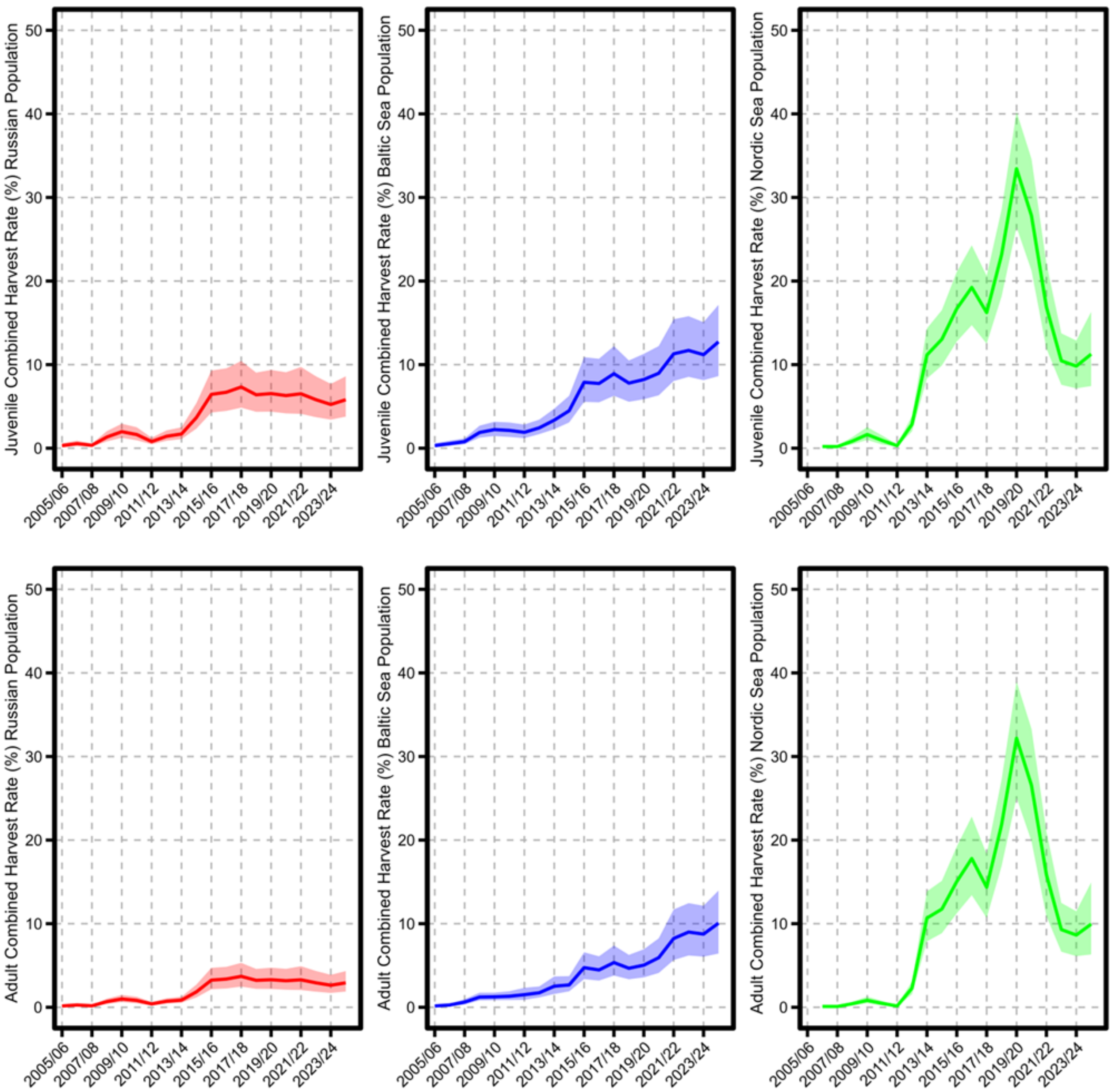

Figure 3.4-6. Posterior means (solid lines) and 95% posterior intervals (shaded area) for the combined derogation offtake rates of juveniles (top panels) and adults (bottom panels) for the three MU-populations of the Russia (br) population of Barnacle Goose. Left (in red) MU1, centre (in blue) MU2, right (in green) MU3.

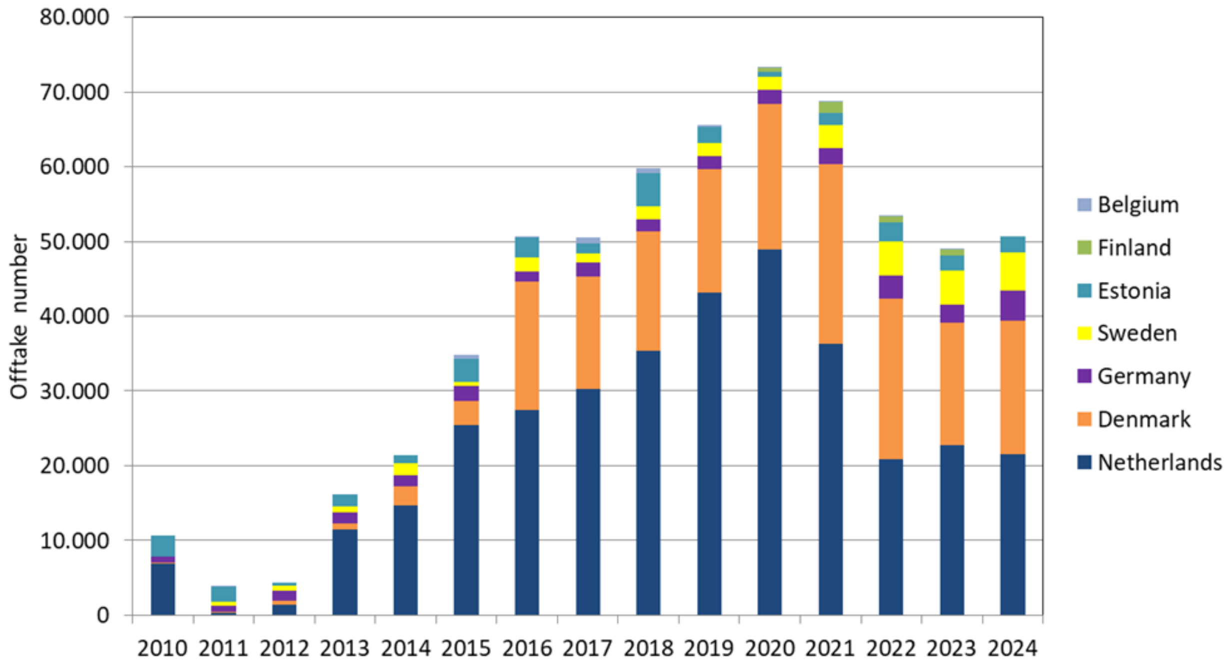

Figure 3.4-7. Number of Barnacle Geese killed under derogation in EU countries during 2010-2023. Data retrieved from national agencies (the Netherlands, Germany, Denmark) or the data viewer of the European Environment Agency (https://www.eea.europa.eu/en/analysis/maps-and-charts/derogations-and-exceptions-table-dashboards). Only offtake by shooting or trapping is included (not clutch-management, see text).

c) Reproduction

The percentage of juveniles, reflecting a proxy for productivity in MU1 and MU2 (according to abundance it will mainly reflect productivity in MU1), in autumn flocks in (mainly) the Netherlands shows a high degree of annual variation. In most years, IPM-estimates are consistently higher, even if the recommended timing of age-ratio assessments in the field has been advanced since 2022 (to October-November), to avoid problems to identify juveniles (due to progress of plumage moult). Estimates for autumn 2024, both IPM-estimates and field data indicate that productivity was actually at a very low level. In the long-term data series from the Netherlands, it could be shown that productivity in the breeding season 2024 in the Russian Arctic was among the lowest since 1974/75. This was not only observed in Barnacle Geese but also other goose and swan species breeding in the same region as has been attributed to an exceptional cold spring and summer (Sovon 2025).

For MU2, productivity estimates based on the IPM show large fluctuations with some tendency to decline over time. Again, IPM estimates are higher than crude field data (of which some are even outside the 95% credibility intervals of the IPM estimates), but it should be noted that this data source is perhaps biased as it is mainly derived from assessment in the Helsinki metropolitan region in Finland, which is likely neither representative of other parts of Finland nor of other breeding populations in the Baltic, notably Sweden and Denmark (M. Mikkola-Roos & A. Lehikoinen, pers communication). Identification issues should not play a role in the field assessments, as these are done directly after the breeding season, when plumage characteristics of juveniles allow for a proper assessment.

Estimates for MU3 are higher than MU1 and MU2 and also show some increase over time (still dominated by large annual variation). Also in this MU, some of the field data is outside the 95% credibility interval of the IPM estimates and as in MU2 identification problems can be ruled out. However, it is not clear to what extent the sample taken in summer (both in the Netherlands and in North Rhine-Westphalia in Germany) is representative for entire MU3 (e.g. no field data are available in Schleswig-Holstein, where clutch management is in place).

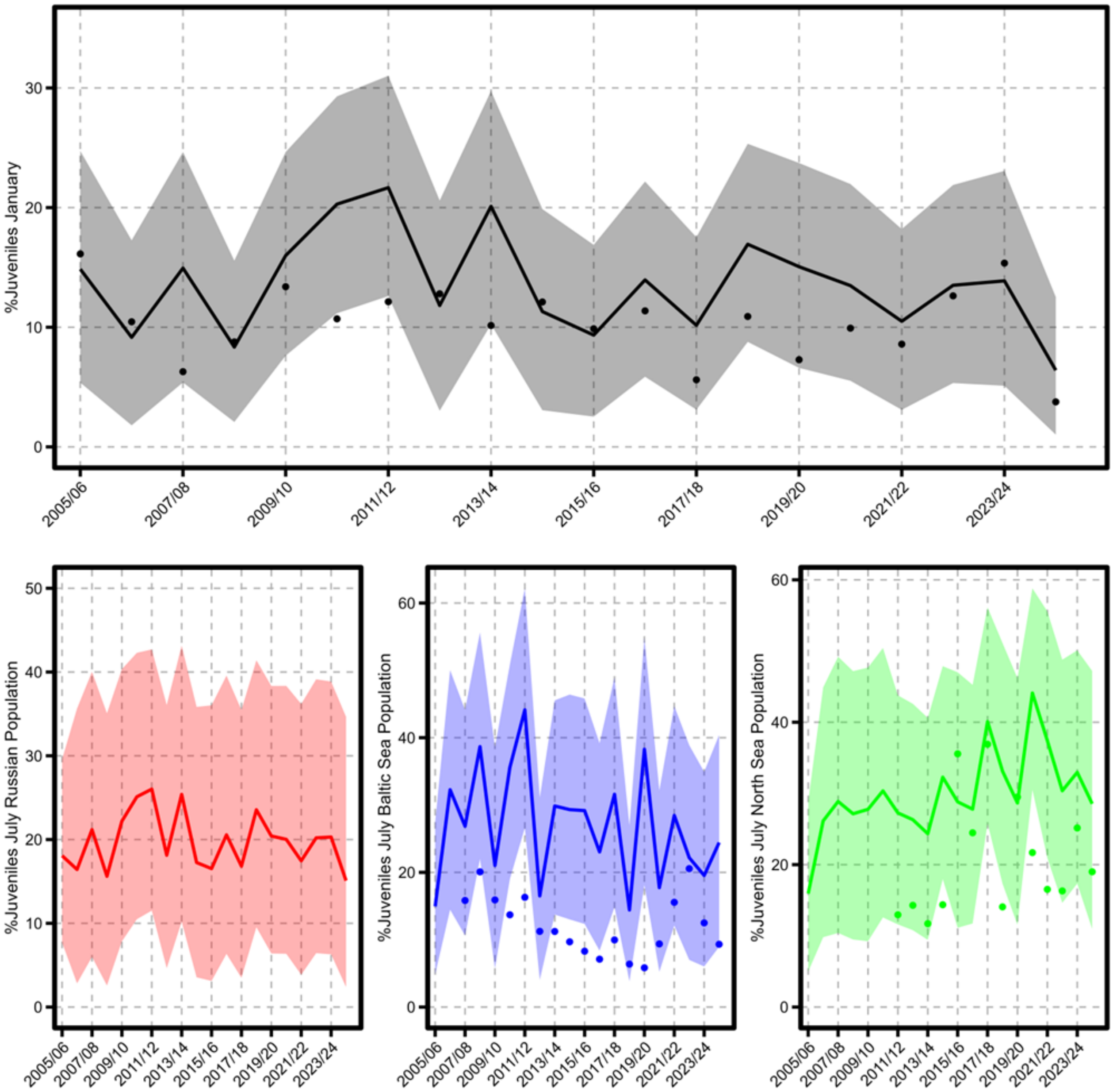

Figure 3.4-8. Top panel: Observed autumn percentage of juveniles (dots) in the Russia (br) population of Barnacle Goose, posterior means (solid line) and 95% posterior intervals (shaded area). Bottom panels: Observed summer percentage of juveniles in the three MUs, along with posterior means and 95% posterior intervals. Left (red) MU1, centre (blue) MU2, right (green) MU3. Note that in MU1 there are no field data to compare with the IPM estimates (they are included in the assessments in autumn, given in the top panel).

3.3.6 Management guidance

The overall results of this year's assessment are broadly similar to those for 2024. The MU3-population of Barnacle Geese in Belgium, the Netherlands and Germany should still be subject to a coordinated derogation approach, in line with the 200% threshold set in the AFMP. The latest model output points at a population level which is again well above the size of the FRP (Figure 3.4-4), but below the 200% threshold. At present derogations affecting MU3 are only granted in the Netherlands. Derogations in Schleswig-Holstein in Germany are likely affecting MU2 and (even more so) MU1-populations only, given the time of the year in which they are undertaken. It remains unknown to what extent large-scale clutch management in Schleswig-Holstein affects total numbers in July and productivity in MU3. In Niedersachsen, no derogation takes place, and Belgium considers its small breeding population to be of feral origin (Nagy et al. 2021b, F. Verhagen pers. communication), so is left out of this coordination. In the Netherlands, a coordinated approach among the provinces (which are each responsible for their own goose management) has been installed in order to facilitate implementation of the AFMP and avoid numbers falling below the FRP. To facilitate this process, the FRPs for the Netherlands in the AFMP have been divided over the 12 provinces (Sovon 2022) and management is assessed annually by the 12 regional wildlife councils.

Worth noticing is the fact that the current IPM-estimates indicate that the Baltic MU2 population has now also fallen below the 200% threshold level and would thus require coordination among Range States (notably Denmark, Sweden, and Finland), as far as actions affecting local breeding populations are undertaken or planned. Based on derogation data collected so far, offtake in these countries likely affect mainly the Russian (MU1) population, but there is still a need to investigate a more data-based division of offtake under derogation in these countries (perhaps differentiating among regions or time of the year), to evaluate to what extent birds from MU2 might be affected.

Regarding the Russian (MU1) population, the results indicate that this population has increased until very recently and that its current population level is way beyond the 200% threshold. Breeding opportunities in the Russian Arctic are also assumed to expand, as shown by Lameris et al. (2023) for Novaya Zemlya, as a result of climate change and increase in available breeding habitat. Whether the similar numbers for summer 2023 and 2024 (Fig. 3.4-3 and 3.4-4) are signs of a stabilisation is too early to assess. Low productivity in the Russian Arctic in 2024 has been attributed to adverse weather conditions during the breeding season (see above). It should be noted though, that the overall flyway population, as assessed in January, and largely dominated by the Russian breeding population, currently does not show an eminent growth.

There is no indication that highly pathogenic avian influenza (HPAI) has resulted in considerable declines, as was initially observed in the Svalbard population of Barnacle Goose. It is unknown if HPAI, among other factors, may have slowed down the earlier population increase. Caliendo et al. (2024) estimated that in 2020/21 and 2021/22 up to 4.8% and 7.4% of the Barnacle Goose present in the Netherlands died of avian influenza. During 2024/25, at least in the Netherlands, higher mortality was again observed among wintering birds but apparently involving fewer birds than during 2020-2022. In the most recent winter, 2025/26, HPAI-casualties of Barnacle Geese were still found, but again numbers seemed to be smaller than in the initial winters 2020-2022, and other species (e.g. Greylag Goose) seemed to be more severely affected.

In terms of monitoring data for the IPM, we can currently derive good winter census results from the extensive IWC and goose counting networks in the range states. It would be desirable to make data for Germany (notably Schleswig-Holstein) available earlier, so all German data could feed into the IPM-calculations in time. Also, regarding productivity, a large sample is collected in autumn in the Netherlands, but preferably this should be extended to Germany, Denmark and Sweden to sample the newly established wintering areas (which potentially may consist of different birds and different rates of productivity).

Regarding data collected in the summer period there are larger and more profound gaps, especially in the Baltic MU2. At present, Finland is the only country in which comprehensive (late) summer counts have been established since 2008. For Sweden, where summer census data were lacking for nearly the entire period of interest, we have now used results from the mid-September count instead. This count is carried out before migratory birds from MU1 arrive, and it is only two weeks after the summer count in Finland (which takes place by the end of August). It is assumed that in this short period, transition rates between the two countries are low, but this assumption should preferably be underpinned by data from resightings of ringed birds or tracking data (which is in progress as part of a Swedish project on Barnacle Geese). Data from resightings of ringed birds do confirm that in both Sweden and Finland the summer counts are carried out before arrival of Russian birds from MU1 (L. de Vries, pers. communication). Besides, given the large fluctuations in the count results for September in Sweden, it is recommended to check whether the coverage of the counts does affect the final results, or if other explanations could be found for some years with low numbers (e.g. earlier emigration to Denmark or other countries further south). This is especially important, as the current data suggests that the numbers in MU2 are below 200% of the FRP and the modus operandi in the AFMP calls forn a coordinated derogation effort (concerning offtake that may affect local breeding populations). Relevant to note in this context is also that breeding numbers in Sweden have declined in the period 2007-2018[1]. So far, data has only periodically been collected in the Oslofjord area in Norway and in Denmark and it is recommended to continue these periodical counts, especially in Denmark, where breeding bird surveys suggest a decline in the number of breeding pairs, at least at local level (Nielsen et al. 2024). Counts have been carried out in Denmark in 2025 but have not yet been processed due to financial constraints. In MU3, it would be highly desirable to include up-to-date counts from Schleswig-Holstein (now available with considerable delay), along with data on productivity (age-ratio counts in summer) and a more timely assessment and publication of these data.

Productivity data from MU2 heavily depend on the Helsinki area in Finland, but additional data have been collected in other regions and will be added in the assessment in 2027. Still, productivity data from especially Sweden and Denmark would allow a more comprehensive assessment of breeding success in the entire Baltic region.

Furthermore, seasonal and MU assignment of offtake still depends on some assumptions and expert judgement, as most data are only available as a total figure for the entire calendar year and assignment to MU-level is challenging. Currently, the Netherlands is the only country with a monthly data resolution, allowing us to make more precise assignment of derogation figures to each respective MU (notably segregating migratory and sedentary populations to a large extent). Also, data from Denmark partly allows this. However, derogations granted often do not take into account seasonal occurrence of birds from different MUs and may even refer to different calendar years (e.g. from July to June). This aspect needs further attention in the preparations for the next IPM-assessments. If Range States within MU2 would investigate their derogation data in detail to discern to what extent birds from MU2 are affected (see above), this would also be beneficial to feed into the IPM in order to carry out a more precise assessment.

3.5 East Greenland breeding population of Barnacle Goose *Branta leucopsis*

3.5.1 Range states and management units

The Range States for the *E. Greenland/Scotland & Ireland population of Barnacle Goose* include Greenland, Iceland, Republic of Ireland and United Kingdom (Figure 3.5-1). The population is managed as one Management Unit (MU) (Jensen et al. 2018, Nagy et al. 2021a).

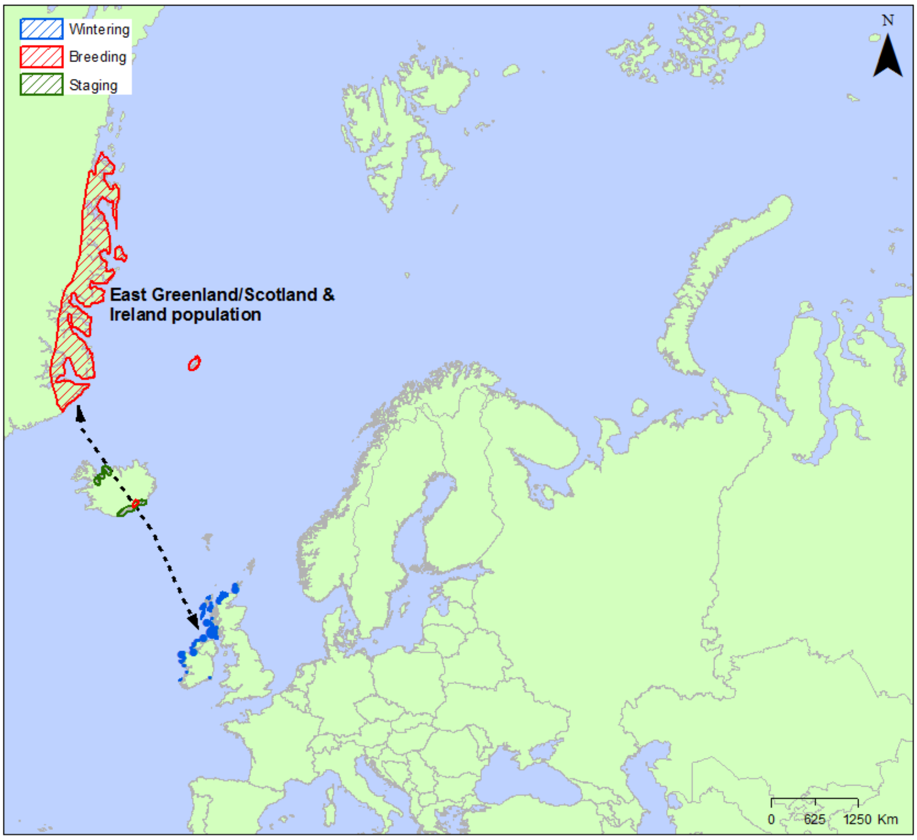

Figure 3.5-1. Annual distribution and migration routes for the E. Greenland/Scotland & Ireland population of Barnacle Geese, including breeding (red), staging (green) and wintering (blue) areas.

3.5.2 Population FRPs and targets

The FRP for the breeding season is 19,400 pairs (Nagy et al. 2021a). The FRP for the entire population has been set at 54,000 wintering individuals. Being an Annex 1 species of the EU Birds Directive, the AFMP does not aim to maintain the population at a certain target level. In EU countries (Ireland) and the UK management is carried out under the conditions for derogation, outlined in Art. 9 of the EU Birds Directive. Furthermore, the species is strictly protected under the Bern Convention. There are open hunting seasons for the species in Iceland (which has entered a reservation in respect of the Bern Convention's Appendix II listing of Barnacle Geese) and Greenland.

3.5.3 Management strategies

The AFMP aims to prevent the population declining below the defined FRPs (Nagy et al. 2021a). Thus, the FRPs represent the lower limit of the legally acceptable population size but does not reflect targets for population reduction. Monitoring of the population size and harvest, and predictive modelling of the cumulative impact of national derogation measures and hunting are used to inform national decision-making to ensure the population remains above the FRPs. The cumulative impact of derogation and hunting and the non-lethal measures taken to prevent damage/risk on the population are assessed periodically, along with the likelihood of serious damage to agriculture and risk to air safety and to other flora and fauna (including the Arctic ecosystems), as well as the effectiveness of these.

Within this framework, it has also been agreed to coordinate monitoring of the population and offtake under derogations and hunting when the actual size of the populations is below 200% of the defined FRP. This includes prediction of population development, coordination of offtake and taking coordinated conservation measures, where necessary. Note, however, that the population size has perhaps never exceeded 200% of the FRP.

As the population is apparently approaching the FRP, it was agreed at IWG9 in June 2024 that Iceland and the United Kingdom should seek agreement on the maximum level of offtake to be permitted (if any) and the split between the two Range States, and further develop and implement a coordination mechanism to ensure adherence to these limits. Since 2024, Iceland and the United Kingdom have informed the EGM IWG in writing on the agreed levels of offtake, the agreed coordination mechanism, and reported on the implementation and adherence to the agreed levels of offtake.

3.5.4 Assessment protocol

In 2020, NatureScot and the Department of Housing, Local Government and Heritage Ireland, funded the development of an integrated population model (IPM) for the purpose of better understanding the population dynamics of the flyway population of E Greenland (br) barnacle geese and in order to inform the management of offtake for the species.

We refer to McIntosh et al. (2023) for the following description of the IPM, which is a pre-breeding census model with an annual time-step and anniversary date in March. Annual change in March abundance is described as:

$$N_{t+1} = N_t\theta\left\{\begin{matrix} \left(1-h_t^i\right)\left(\left(1-p_t^{Islay}\right)+\,p_t^{Islay}\left(1-h_t^s\right)\right)+ \\ r_t\left(1-v^i h_t^i\right)\left(\left(1-p_t^{Islay}\right)+\,p_t^{Islay}\left(1-v^s h_t^s\right)\right)\end{matrix}\right\}$$

where N_t is the March population size at time t, q is the constant rate of natural survival, p_t^{Islay} is the proportion of the March flyway population on Islay at time t, h_t^i is the annual harvest rate in Iceland, h_t^s is the annual harvest rate in Scotland, v^i is the differential vulnerability of juveniles in Iceland, v^s is the differential vulnerability in Scotland, and r_t is the pre-season age ratio (juvenile: adult ratio at the start of the hunting season).

To model annual change in March abundance we assumed that: a) harvest occurs sequentially (first in Iceland, then in Scotland), b) differential vulnerability of juveniles in Scotland is constant throughout the winter (Calvert et al. 2017), c) natural mortality is distributed evenly throughout the year (Gauthier et al. 2001). Lastly, we assumed that shooting mortality is additive to natural mortality as observed in numerous other goose populations (Gauthier et al. 2001, Sedinger et al. 2007, Cooch et al. 2014, Koons et al. 2014).

We assume six months of natural mortality to predict pre-hunting population size:

$$N_t^F = N_{A,t}^S\theta^{6/12} + N_{A,t}^S\theta^{6/12}r_t$$

where N_t^F is the autumn population size and $N_{A,t}^S$ is the adult spring population size.

Harvest occurs first in Iceland (H^I) in the early autumn:

$$H_t^I = N_{A,t}^S\theta^{6/12}h_t^i\left(1+r_t v^i\right)$$

To estimate Scottish harvest (H^S) we assume an additional month of natural mortality and that individuals survive harvest in Iceland. Winter derogation shooting occurs predominantly on Islay, therefore only Islay-wintering birds experience Scottish shooting mortality.

Number surviving Iceland harvest is:

$$(N_t^F - H_t^I)\theta^{1/12} = N_{A,t}^S\theta^{7/12}(1 - h_t^i) + N_{A,t}^S\theta^{7/12}r_t(1 - v^i h_t^i)$$

Scottish harvest (H^S) is then

$$H_t^S = N_{A,t}^S\theta^{7/12}\left\{\left(p_t^{Islay}\left((1 - h_t^i)h_t^s\right)\right) + r_t\left(p_t^{Islay}\left((1 - v^i h_t^i)v^s h_t^s\right)\right)\right\}$$

We estimated annual harvest rates for different age classes.

Adults (h_t^A):

$$h_t^A = h_t^i + \theta^{1/12}\left(p_t^{Islay}\left((1 - h_t^i)h_t^s\right)\right)$$

Juveniles (h_t^J):

$$h_t^J = v^i h_t^i + \theta^{1/12}\left(p_t^{Islay}\left((1 - v^i h_t^i)v^s h_t^s\right)\right)$$

Annual survival rate (s_t) is derived from apparent natural survival (q) and harvest mortality (h_t). Due to an absence of data on unretrieved harvest, crippling losses (unobserved harvest mortality) are implicitly included in the estimate of natural mortality. Adult survival rate is:

$$s_t^A = \theta(1 - h_t^A)$$

and juvenile survival rate is:

$$s_t^J = \theta(1 - h_t^J)$$

Raw data and the results of the 2026 update of the IPM are available from the EGMP Data Centre.

3.5.5 Status

a) Abundance

After a peak population of 80,000 in 2006 and in 2012, posterior estimates of flyway abundance declined to 65,516 (55,558 – 76,459) in March 2026 (Figure 3.5-2). For much of the period of record, abundance on Islay exceeded that in all other wintering areas, but that pattern has been reversed since 2018.

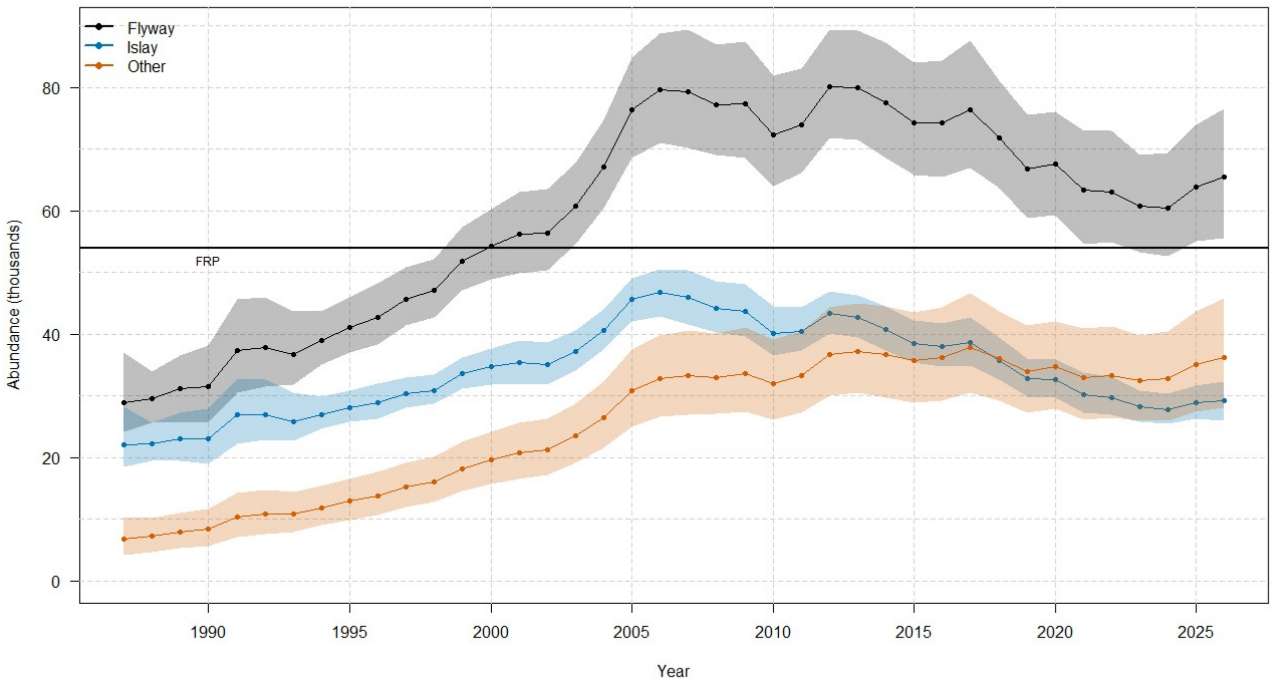

Figure 3.5-2. Development of the March population size of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. The FRP = 54 thousand. Shading represents the 95% credible intervals.

b) *Mortality and offtake*

Natural survival (i.e., 1 – the natural mortality rate) was relatively high and stable until 2007 when it became more variable, with unusually low natural survival during 2007 – 2009, in 2017, and during 2020 – 2021 (Figure 3.5-3). The latter period of low survival might be attributed to an outbreak of avian influenza, but it is difficult to say whether survival was in fact lower than is typical because of the wide credible intervals.

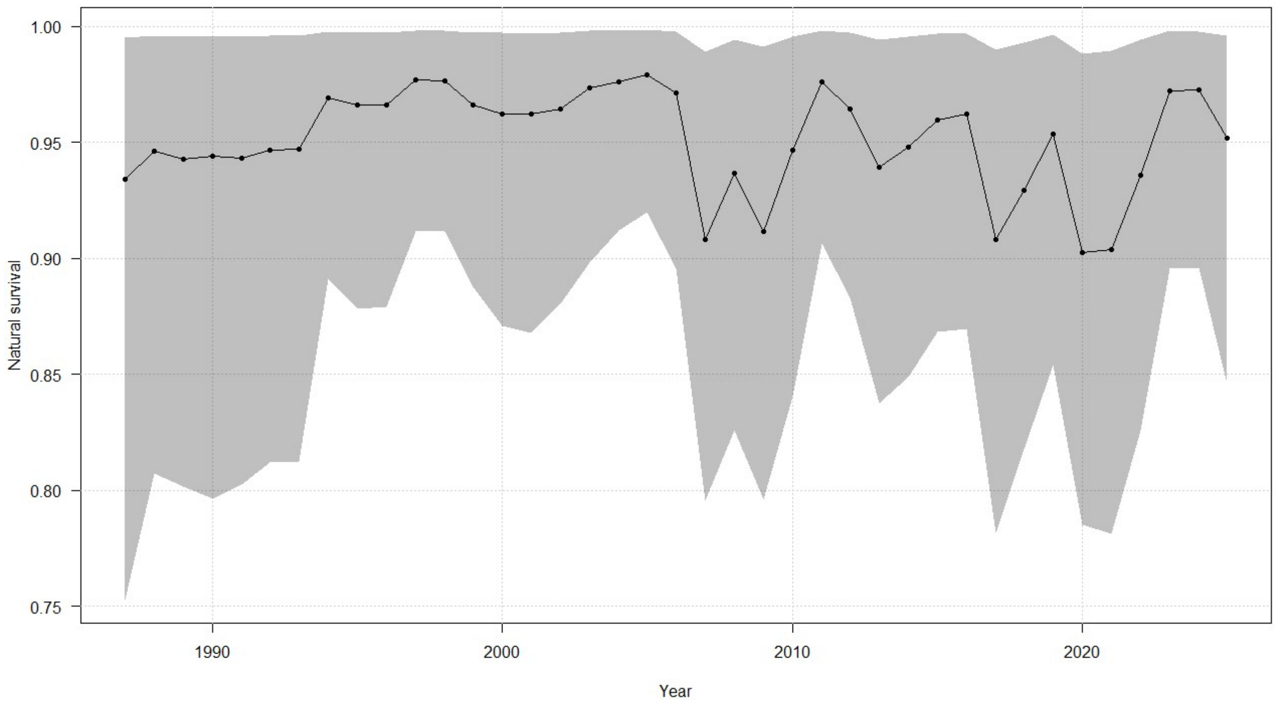

Figure 3.5-3. Natural survival rates (i.e., 1 – the natural mortality rate) of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. Shading represents the 95% credible intervals.

The total harvest rate of adults has increased over the period of record, from around 0.01 to a peak of 0.05 (0.03 – 0.07) in 2017 (Figure 3.5-4). Thereafter, harvest rate declined to 0.02 (0.01 – 0.03) in 2025. Annual survival rate of adults (including both harvest and natural mortality) declined at the same time harvest rates were increasing, suggesting that harvest may have contributed to the decline in flyway abundance (although other factors cannot be ruled out).

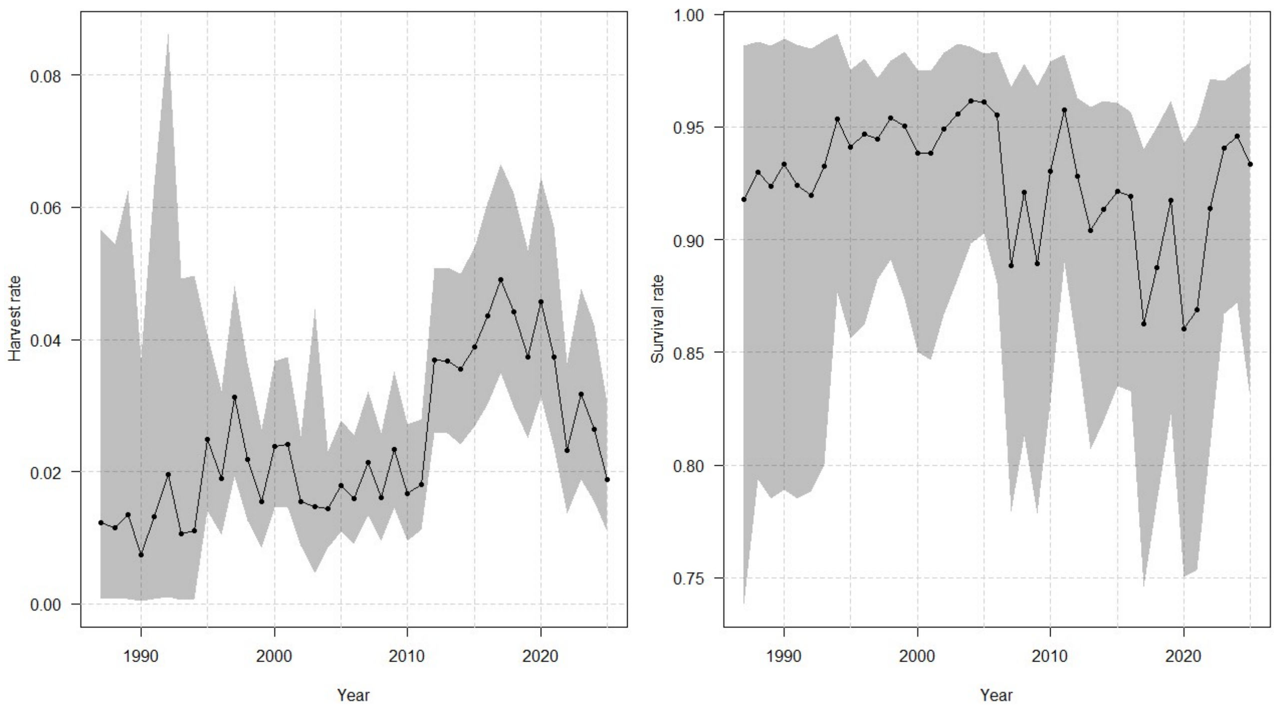

Figure 3.5-4. Adult harvest rates (left) and annual survival rates (right) of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. Shading represents the 95% credible intervals.

Recreational harvest (and overall harvest rate) in Iceland has generally increased over the period of record (Figure 3.5-5, Figure 3.5-6) but substantially decreased in 2025 with an estimated harvest of 1,681 (1,017 – 2,589) individuals. In Scotland, derogations increased starting in 2012 in response to a plan to limit agricultural conflicts but has now been reduced to near zero in response to avian influenza and the observed population decline. The 2025 estimated harvest in Scotland was 233 (54 – 628) individuals.

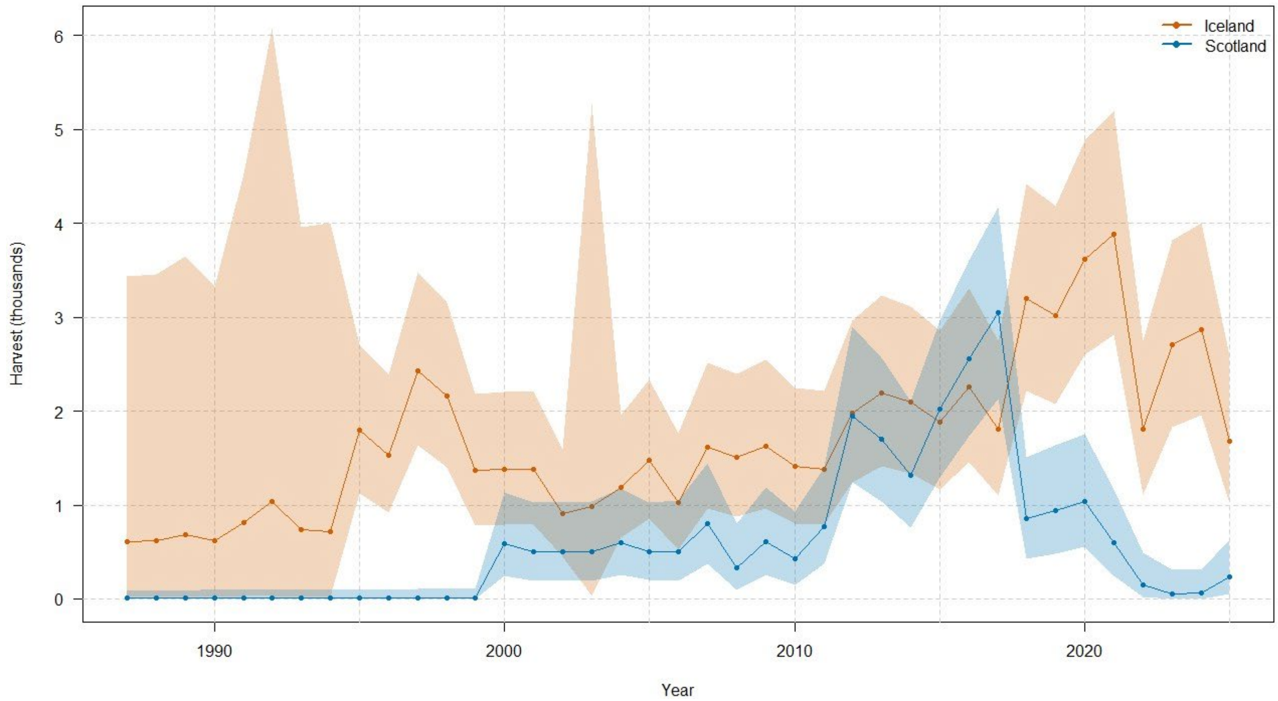

Figure 3.5-5. Offtake of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. Shading represents the 95% credible intervals.

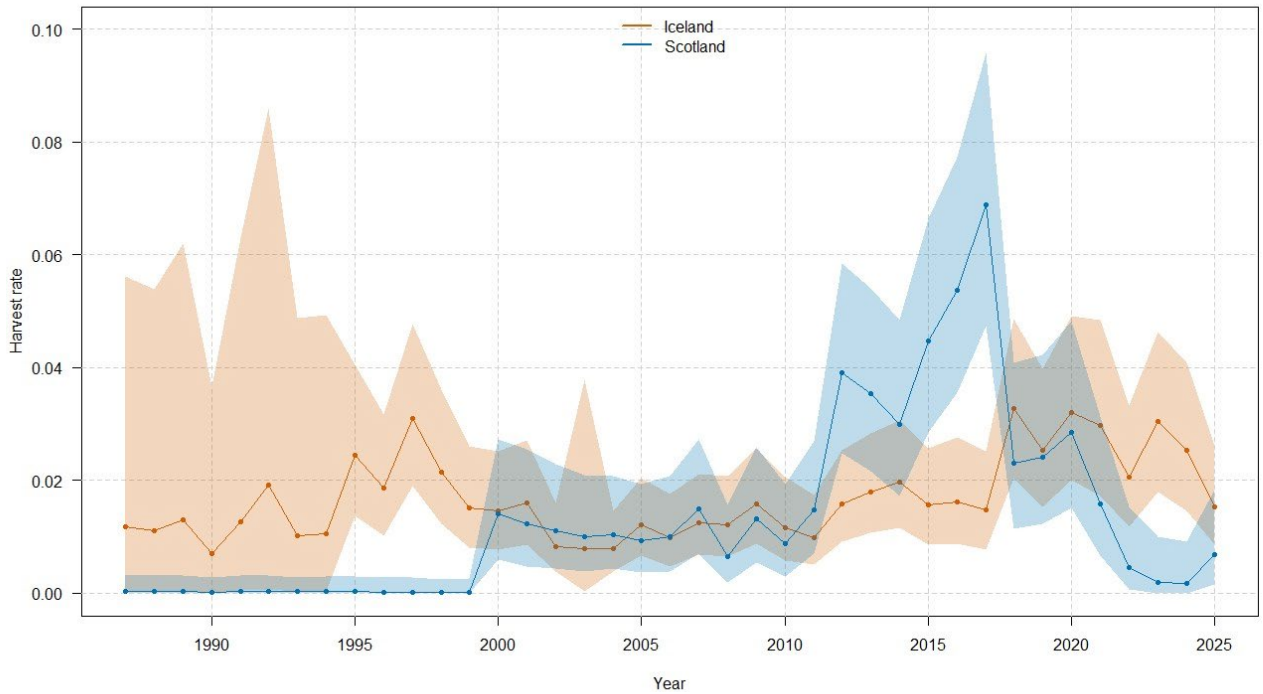

Figure 3.5-6. Harvest rates (including derogations) of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. Shading represents the 95% credible intervals.

c) Reproduction

The post-breeding age ratio has been moderately variable over time, although perhaps somewhat lower since 2006 than previously (Figure 3.5-7). It is possible that this variability in reproduction, along with the lower annual survival rates in more recent years, could have contributed to the more recent decline in flyway population size (Figure 3.5-4).

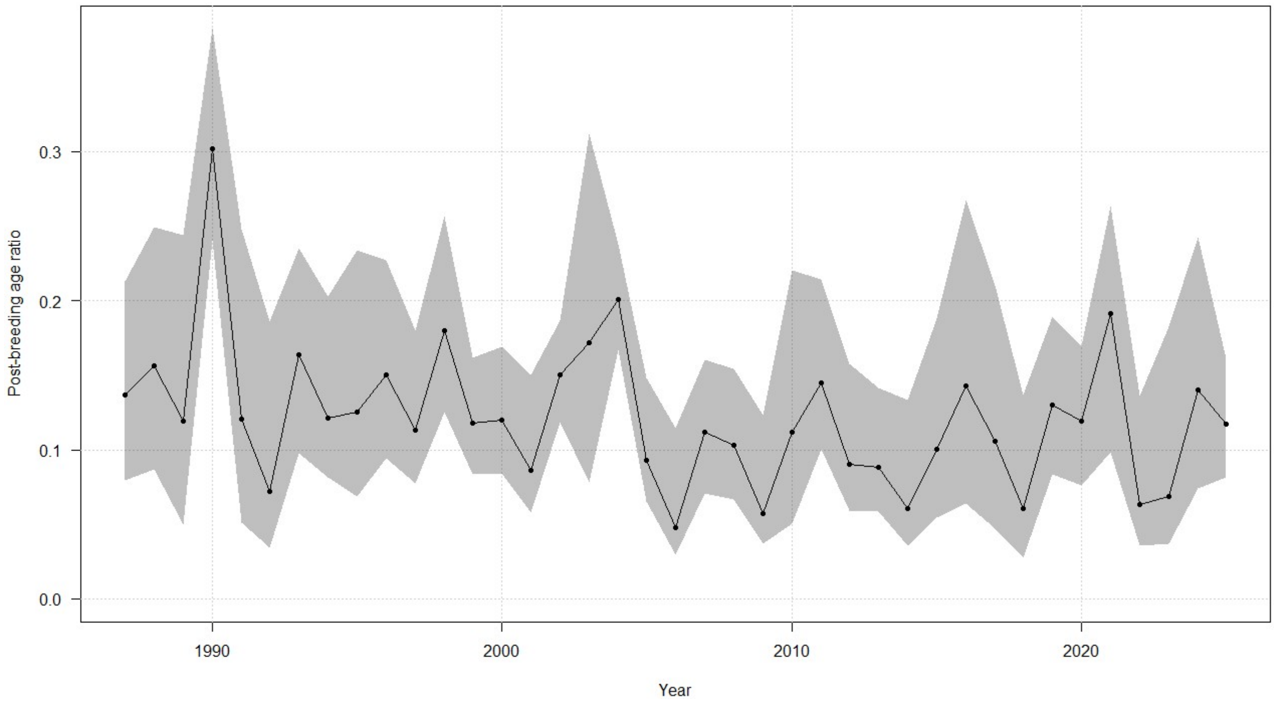

Figure 3.5-7. Post-breeding age ratio of E. Greenland/Scotland & Ireland Barnacle Geese as based on the IPM. Shading represents the 95% credible intervals.

3.5.6 Management guidance

It appears that a combination of factors, possibly including decreased productivity, as well as increased harvest and natural mortality rates, may have been responsible for the decline in flyway abundance over the last decade. Given the harvest rates in 2025, estimates from the IPM give a 1% probability that the March 2026 population is below the FRP of 54,000. However, because of the proximity of the population to the FRP over the past several years, the Adaptive Flyway Management Plan requires tighter coordination of offtake between Iceland and Scotland to ensure the population does not fall below the FRP.

Table 3.5-1 provides a range of scenarios of varying levels of offtake applied to varying spring population sizes to determine the probability (based on the IPM) of the population falling below the FRP the following year. Thus, this table expresses the risk of falling below the FRP for a range of population sizes and levels of offtake *for any given year*. Once an acceptable risk level is established, the table can provide the **maximum** acceptable offtake for any population size. Probabilities account for uncertainty in natural mortality and reproductive rates, as well as for sampling error in estimated population size. Probabilities are updated each time the IPM is updated.

Table. 3.5-1. Approximate probability that the following year's population size of Greenland Barnacle Geese is lower than the FRP of 54k for varying levels of population size and offtake in any given year. The table does not refer to any particular year. March population sizes (in thousands [k]) for any focal year (t) are provided in the leftmost column and varying offtake levels (in thousands [k]) are represented in the top row. Values in each coloured cell represent the probability that the population size in the following year (i.e., t + 1 will be below the FRP, P(Nt+1<54k)). Colour scale represents increasing level of risk, where warmer colours indicate higher probabilities that the population will fall below the FRP.

	Offtake (k)												
March pop (k)	**0**	**0.25**	**0.5**	**0.75**	**1**	**1.25**	**1.5**	**1.75**	**2**	**2.25**	**2.5**	**2.75**	**3**
54	0.29	0.31	0.32	0.34	0.35	0.36	0.38	0.39	0.41	0.43	0.44	0.46	0.47
55	0.23	0.25	0.26	0.27	0.29	0.30	0.32	0.33	0.35	0.37	0.38	0.39	0.40
56	0.18	0.20	0.21	0.23	0.23	0.24	0.25	0.28	0.28	0.31	0.32	0.34	0.35
57	0.14	0.15	0.17	0.17	0.19	0.20	0.21	0.22	0.23	0.24	0.26	0.27	0.29
58	0.11	0.12	0.13	0.14	0.14	0.16	0.16	0.18	0.19	0.19	0.21	0.22	0.24
59	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19
60	0.06	0.07	0.08	0.08	0.09	0.09	0.11	0.11	0.12	0.12	0.13	0.14	0.15
61	0.05	0.05	0.05	0.06	0.06	0.07	0.08	0.08	0.09	0.09	0.10	0.11	0.12
62	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.08	0.08	0.09
63	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07
64	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05
65	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04
66	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03
67	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
68	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01

	Offtake (k)											
March pop (k)	**3.25**	**3.5**	**3.75**	**4**	**4.25**	**4.5**	**4.75**	**5**	**5.25**	**5.5**	**5.75**	**6**
54	0.49	0.51	0.52	0.55	0.56	0.57	0.59	0.60	0.62	0.63	0.65	0.66
55	0.43	0.44	0.46	0.47	0.49	0.51	0.52	0.54	0.55	0.57	0.58	0.59
56	0.37	0.38	0.39	0.41	0.42	0.44	0.46	0.47	0.48	0.50	0.51	0.53
57	0.30	0.32	0.33	0.35	0.36	0.37	0.39	0.40	0.42	0.44	0.45	0.46
58	0.24	0.26	0.27	0.29	0.30	0.32	0.32	0.34	0.36	0.37	0.39	0.40
59	0.20	0.21	0.22	0.24	0.25	0.26	0.28	0.29	0.31	0.31	0.32	0.34
60	0.16	0.17	0.18	0.19	0.20	0.22	0.22	0.23	0.25	0.27	0.28	0.29
61	0.12	0.13	0.14	0.15	0.15	0.18	0.18	0.19	0.20	0.21	0.23	0.25
62	0.10	0.10	0.11	0.12	0.13	0.13	0.14	0.16	0.16	0.17	0.19	0.19
63	0.08	0.08	0.08	0.10	0.10	0.10	0.11	0.12	0.13	0.14	0.15	0.15
64	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.10	0.12	0.12
65	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.08	0.09	0.10
66	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.06	0.06	0.06	0.07	0.08
67	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06
68	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04
69	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03
70	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02

Appendix A – Data overview

A.1. Pink-footed Goose – Svalbard (br) population

[This data be made available on 8 June 2026]

A.2. Taiga Bean Goose

[This data be made available on 1 June 2026]

A.3. Greylag Goose – NW Europe (br) population

Table A.3.1 Overview of available monitoring data in the NW Europe (br) Greylag Goose population. Grey cells mark data for MU1 and blue cells for MU2.
X = data collected annually/regularly and reported to EGMP, x = data collected annually/regularly, (x) = data collected in part of the country and/or not annually, - = no data collected or reported to the EGMP, * = 0 or not relevant range state in this respect.

	NO	SE	FI	DK	DE	NL	BE	FR	ES
Population counts in January (received through IWC or derived from national goose counts)	X	X	*	X	(x)[1]	X	X	X	(x)[2]
Summer count	(x)[3]	X[4]	X[5]	X[6]	(x)[7]	X	X	(x)[8]	*
Productivity	(x)[9]	(x)[9]	(x)[9]	-	(x)[9]	(x)[9]	-	-	-
Hunting bag	X	X	X	X	X[10]	*	X	X[11]	X
Split hunting data into March-Aug and Sep-Feb	(x)[12]	(x)[13]	(x)[14]	(x)[15]	-	*	(x)[16]	X	X
Derogation	(x)[17]	X	X	X	(x)[18]	X	X	*	*
Split derogation data into March-Aug and Sep-Feb	(x)[19]	(x)[20]	(x)[21]	X	-	X	(x)[21]	*	*
Crippling rate		(x)[22]				(x)[22]			

1) Available from IWC most years, but the coverage is unknown.
2) Available from IWC most years, but the coverage is limited.
3) Country-wide estimate from 2022 has been made available. Future count/estimate interval unknown.
4) September count is used. Coverage could be improved, and counts do not account for hunting and migration.
5) To estimate population size, organized counts have been carried out in 2022 and 2023. GPS-tracking has been used to distinguish between birds from the C and NW Europe (br) populations.
6) Counted biennially in August.
7) Available from Nordrhein-Westfalen (since 2011) and Niedersachsen (2018-2023). Data from Schleswig-Holstein is available for June and September 2018-2023.
8) Available every 6 years from 2022.
9) Samples of age ratios from selected sites in N and S Norway provided. See Figure 3.3-10 and the EGMP Database for details.
10) Data Source: Datenspeicher Jagd Eberswalde, Thünen-Institut.
11) Method unknown.
12) Hunting season opens from 21.07. Assume all hunting takes place Sep-Feb.
13) Open hunting season 11.08-31.01. Assume all hunting takes place Sep-Feb. Conditional hunting season: all year, but assume all takes place between March-Aug.
14) Hunting season 10.08-31.12. Assume all hunting takes place Sep-Feb.
15) Hunting season 01.08-31.01. Assume all hunting takes place Sep-Feb.

16) Hunting season 15.07-31.01, but 15.07-14.08 and 01.10-31.01 constrained to prevent (crop) damage in the absence of other satisfying solutions. Open hunting season 15.08-30.09. Assume all hunting takes place Sep-Feb.
17) No routine data collection, but few individuals (~1000).
18) Available in most years.
19) All year, assume all derogation takes place between March-Aug.
20) Derogation period: 01.01-09.08, the majority takes place in July-Aug. Assume all derogation takes place between March-Aug.
21) Assume all derogation takes place between March-Aug.
22) Not collected annually, and only for part of the flyway.

Table A.3.2 Overview of model parameters and their source

Parameter	Description	Value	Source
Φ	annual survival in absence of hunting	0.88	allometric relationship (Johnson et al. 2012)
$\phi(0.90)$	annual survival of young from MU1	0.79	loosely based on Pistorius et al. (2006) and Schneider & Bacon (2022)
α	rate of production of young by birds aged 3+	0.46	derived using ϕ and population growth rate of 1.014 from EGMP Population Status and Offtake Assessment Report (2022)
ψ_1	proportion of MU1 birds wintering in the North	0.67	based on marking data (Leo Bacon, pers. comm.)
ψ_2	proportion of MU2 birds wintering in the North	0.95	based on marking data (Leo Bacon, pers. comm.)
π_1, π_2	fidelity of MU1 and MU2 birds	1.0	Schneider & Bacon (2022), recognizing that lack of fidelity is typically temporary
$\begin{bmatrix} n_{1,1} \\ n_{2,1} \\ n_{3,1} \\ n_{1,2} \\ n_{2,2} \\ n_{3,2} \end{bmatrix}$	initial population sizes (in thousands) in fall 2022, where the first subscript denotes age and the second denotes MU	$\begin{bmatrix} 72.2 \\ 56.4 \\ 201.1 \\ 120.3 \\ 94.0 \\ 334.9 \end{bmatrix}$	derived based on estimates of breeding pairs in 2018 (Szabolcs Nagy, pers. comm.) and the stable age distribution of the matrix model in the absence of harvest
h_{ijk}	rate of offtake of age i, season j, and area k	0.0 to 0.4 in increments of 0.02	simulated to project population sizes in 2030
v_s	differential vulnerability of young in summer	1.0	assumed given no selectivity in summer derogations
v_w	differential vulnerability of young in winter	2.0	assumed to be similar to pink-footed geese (Johnson et al. 2020)

A.4. Barnacle Goose – Russia breeding population

Table A.4. Overview of available monitoring data in the Russia (br) Barnacle Goose population.
X data collected at national level/annually, (x) data collected but not annually and/or not at national level, - data currently not collected, * not relevant range state in this respect.

	RU	FI	EE	SE	NO	DK	DE	NL	BE	Remark
January census	*	*	*	X	*	X	X[1]	X	X	Timely publication of data collected in Schleswig-Holstein (DE) would facilitate assessment of winter counts.
Summer census	-	X	-	X[2]	(x)	(x)	(x)	X	X	Interaction between counts in SE and FI (and DK) needs to be investigated. Timely processing of count data from Denmark would facilitate the annual update of the IPM (most recent data from 2025 was not available).
Productivity, MU1 and MU2	*	*	*	-	*	-	X	X	-	Autumn, Oct-Dec. Data from DE, DK, and SE would be valuable.
Productivity, MU2	*	(x)	-	-	(x)	-	*	*	*	Summer, Jul-Aug. Inclusion of more comprehensive productivity data in FI in 2027 is foreseen. Recommendation to extent productivity assessments to SE and DK.
Productivity, MU3	*	*	*	*	*	*	(x)	X	-	Summer, Jul. DE only North-Rhine Westphalia. Preferably inclusion of data from other parts of DE (Niedersachsen, Schleswig-Holstein)
Offtake, hunting	-	*	*	*	*	*	*	*	*	In EU-countries only derogations.
Offtake, derogations	*	X	X	X	X[3]	X	X	X	X	Mostly annual totals (apart from monthly data in NL), more detailed data requested especially from SE in order to improve estimates for individual MUs.

[1] Note that Germany only submits data based on published count results.
[2] For Sweden, the national count in mid-September is used as a proxy for numbers in summer.
[3] Norway is not an EU Member State but applies similar rules when it comes to management of Barnacle Goose, although derogations are for scaring purposes only.

A.5. Barnacle Goose – East Greenland breeding population

Table A.5. Overview of available monitoring data in the E Greenland (br) Barnacle Goose population.
X data collected (nearly) annually and reported to EGMP, x data collected (nearly) annually, (x) data collected in part of the country and/or not annually, - no data collected or reported to the EGMP, * 0 or not relevant range state in this respect.

	UK	Ireland	Iceland	Greenland
Flyway total every 3 years	X	X	*	*
Islay March count - annual	X	*	*	*
Other totals in Scotland - annual	X	*	*	*
Breeding bird count in Iceland every 3 year	*	*	X	*
Offtake	X	X	X	- / (x)
Productivity	X	-	-	-
Wings	X	*	X	*
Survival	-	-	-	-

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