

**AEWA EUROPEAN GOOSE MANAGEMENT PLATFORM**



**4<sup>th</sup> MEETING OF THE  
AEWA EUROPEAN GOOSE MANAGEMENT  
INTERNATIONAL WORKING GROUP**

*18-20 June 2019, Perth, Scotland, United Kingdom*



---

**DEFINITION OF MANAGEMENT UNITS IN THE NW/SW EUROPEAN  
POPULATION OF THE GREYLAG GOOSE  
AND IMPLICATIONS FOR MONITORING**



© Jørgen Peter Kjeldsen

## 1. Background

Based on the decisions taken at the 2<sup>nd</sup> AEWA International Species Management Planning Workshop for the Barnacle Goose and the Greylag Goose (NW/SW Europe population) (Leeuwarden, the Netherlands, 19 June 2018) and according to the International Single Species Management Plan (ISSMP) for the NW/SW European Population of the Greylag Goose (*Anser anser*), adopted at the 7<sup>th</sup> Session of the Meeting of the Parties to AEWA (MOP7) in December 2018 in Durban, South Africa, the EGMP Data Centre and the International Modelling Consortium propose in this document biologically defined Management Units (MUs) for the North-west/South-west European Population of the Greylag Goose, based on existing ringing/markings information.

The technical analysis has been conducted by the Office National de la Chasse et de la Faune Sauvage (ONCFS) in France, led by Dr Léo Bacon, with support from the EGMP Data Centre and several international partners. The analysis is based on neckbanding of breeding birds conducted in Norway, Sweden, Denmark, western Germany and the Netherlands and subsequent re-sightings from the range of the population (accessed from [www.geese.org](http://www.geese.org)).

The results have been written up in a scientific manuscript, accepted for publication in the journal *Wildlife Biology*<sup>1</sup>.

## 2. Proposed Management Units

The analysis proposes the definition of three MUs:

**MU1:** Norwegian breeding birds migrating to wintering grounds in the Netherlands and Spain, using stopover sites in Denmark, Germany and France. Breeding birds in this MU do not show any exchange with breeding birds in MU2 during the breeding season.

**MU2:** Swedish and Danish breeding birds, nowadays primarily wintering in the Netherlands, using stopover sites in Germany and, recently, increasingly wintering in Denmark and south Sweden.

**MU3:** Dutch, Belgian and north-west German breeding geese which are primarily sedentary.

This proposal is in line with the preliminary MUs included in the Greylag Goose ISSMP but has now been confirmed with comprehensive data analysis.

The analysis, as well as previous publications also show that within the last 2-3 decades the migratory system has been changing in response to milder winters; hence an increasing proportion of geese remain in north-west Europe rather than migrating to Spain and France. Because of this dynamic situation the delineation of these MUs has to be considered within an adaptive process, and future studies will enable a refinement of the definition of MUs. It shall be noted that no data was available for analysis from Finland and north-east Germany.

## 3. Implications of the use of MUs on monitoring data requirements for assessments

At the 2<sup>nd</sup> meeting of the International Modelling Consortium on 21-22 March 2019 (Kalø, Denmark), the implications for data requirements were evaluated, for an Adaptive Flyway Management Programme (AFMP) based on the three MUs, versus grouping MU1 and MU2, or managing the population as a whole. The basic variables needed for management are population size and offtake (harvest, culling, derogation shooting, egg destruction). Estimates of demographic variables, such as annual survival rates and productivity (percentage of juveniles in the population), as well as exchange rates between MUs would be important variables to include

---

<sup>1</sup> Bacon, L., Madsen, J., Jensen, G.H., de Vries, L., Follestad, A., Koffijberg, K., Kruckenberg, H., Loonen, M., Månsson, J., Nilsson, L., Voslamber, B. & Guillemain, M. 2019. Spatio-temporal distribution of greylag goose (*Anser anser*) resightings on the North-West / South-West European flyway: guidance for the delineation of transboundary management units. *Wildlife Biology* (accepted)

in population models. Survival rates can be derived from Capture-Marking-Resighting (CMR) programs coordinated among the breeding Range States. Productivity can be assessed during summer counts (July), when juveniles are relatively easy to differentiate from adults; such counts will have to be coordinated among breeding Range States.

### **3.1. Use of three MUs (MU1, MU2, MU3)**

In the case the three MUs are used for the AFMP, it will be necessary to assess the population sizes of each MU on a regular basis, preferably at intervals of no longer than three years. Because birds from the three MUs mix in some of the wintering Range States, most pronounced in the Netherlands, it will be difficult to derive an estimate of the numbers belonging to each MU based on the existing mid-winter counts in each Range State, unless systematic marking (CMR) or tracking of geese is continued in each MU, so that it is possible to estimate the proportion of birds coming from each MU in each of the Range States. Since the various MU groups of geese may change their migratory behaviour, marking, re-sighting or tracking efforts will have to be maintained. The estimates could also be based on the existing mid-September counts performed in most countries, except for Norway and Finland. Using mid-September counts also requires a CMR program to estimate the numbers of geese originating from each MU.

An alternative way to derive a population size estimate for each MU is to count the post-breeding population size and the young (in July, or at least before onset of autumn migration) in each Range State. While this may be feasible in some countries (or already is in place in parts of MU3), it will require a major effort in countries like Norway and Sweden, unless an estimate can be based on a stratified random sampling. Common breeding bird censuses can be used as population indexes to follow trends in breeding bird populations and can potentially provide an interpolated total population size in years when total breeding bird population counts are not performed. However, it should be noted that the summer count not only includes breeding birds and their offspring, but also non-breeding geese (immatures and failed breeders). The proportion of non-breeding geese is not fixed but varies with the degree of density dependency in the population and therefore, the translation from summering numbers to breeding pairs is not straightforward.

To estimate the number of geese harvested or shot under derogation from each MU, the number of geese taken in each country needs to be known; if ringing is carried out in each breeding Range State, the relative contribution of the origin of shot geese from each country can be estimated. Furthermore, data on number of geese culled in summer or eggs destroyed is required. Furthermore, regardless of whether counts are conducted in mid-summer or mid-winter, it is necessary to know how much of the take (harvest + derogations) occurs prior to and after the anniversary date of the count. In this respect, a count in summer has advantages over winter, as it is after when culling takes place (during wing-moult) and prior to the hunting season. Mid-winter count in January is just before closure of most hunting seasons on 31 January.

### **3.2. Use of two MUs (MU1+MU2 merged and MU3)**

In the case of using two MUs, for MU3 a population size estimate can be derived from a post-breeding population count. For MU1+MU2, a population size estimate for the summer period can be derived from a total mid-winter count in all wintering Range States, subtracting the post-breeding population count in MU3 and adding the harvest in autumn (as above, requiring that the harvest can be segregated per MU and differentiated in time).

Information about harvest, derogation offtake, culling and egg destruction is required from each Range State.

Moreover, coverage of the mid-winter count will have to be extended, as it currently is likely to underestimate the total population size.

### **3.3. No use of MUs**

If no MUs are used for the AFMP, a population estimate can be derived from an extended mid-winter count performed in all wintering Range States.

Information about harvest, derogation offtake, culling and egg destruction is required from each Range State.

#### **4. Advantages and disadvantages of managing at different MU levels**

As outlined above, managing on a MU basis comes at a cost regarding extra monitoring for a MU-based AFMP. A summary of the monitoring needs using MUs (either three or two) versus no MUs is presented in Table 1 below. In either case, a systematic national reporting of harvests and derogations with a seasonal resolution is required. If MUs are used, it is necessary to maintain an extended protocol for population size monitoring. An internationally coordinated CMR program can provide estimates of the proportion of geese from each MU present in the Range States at the time of population monitoring, the proportion of geese taken from each MU as well as data to estimate annual survival. Systematic summer counts of geese can provide alternative MU population estimates as well as productivity estimates.

If management objectives were similar for all three MUs, there would be no need for a MU approach. However, according to the ISSMP for the Greylag Goose as well as the outcomes of the discussions at the 2<sup>nd</sup> AEWA International Species Management Planning Workshop for the Barnacle Goose and the Greylag Goose (Leeuwarden, the Netherlands, 19 June 2018), management objectives differ to some degree. At least, three arguments for using MUs prevail:

First, according to both the CMS definition of Favourable Conservation Status (applicable to each AEWA listed populations) and the EU Birds Directive, Range States have the obligation, *inter alia*, to maintain the range of the population, which means that the Range States have to ensure that any management measures used do not negatively influence for example the migration by Greylag Geese to Spain. To ensure this, countries will need to document, that in particular MU1 is maintained, as predominantly Norwegian birds still migrate to Spain. The most effective way to monitor this is by application of MU-specific monitoring.

Second, some Range States have a more pronounced desire to manage national breeding populations than others, depending on the tolerance to agricultural damage caused especially by summering geese. While culling of summering geese in the Netherlands primarily affects the sedentary MU3, culling in Norway, if this were a desired management action, would have international implications and would require monitoring of the impact at MU1 level. However, population control during winter in the area of MU3 would affect all three MUs.

Third, some Range States have a more pronounced wish to enhance the opportunities for harvesting geese than others and hence might want to maintain the population at a higher level than other countries. For example, Finland wants to increase the breeding population size to provide hunting opportunities. In order to support this objective, it is important to describe the migratory behaviour of the Finnish birds, to see if harvest regulations can be designed on an international level to provide some protection of the Finnish segment (unless they are completely mixed with geese from other countries). To cater for this, an approach for separate MUs would be most efficient.

In summary this means that from a stakeholders' perspective, most relevant desires are only met when using a concept of three MUs.

Table 1. Overview of monitoring needs using 3 MUs, 2 MUs or no MUs, respectively, for the NW/SW European Greylag Goose population

<b>Variable</b>	<b>3 MUs</b>	<b>2 MUs</b>	<b>No MUs</b>
<b>Population estimate</b>			
Mid-winter count or mid-September count	X	X	X
CMR program to estimate the segment of the three MU's in each winter Range State and exchange rates	X	X	
Summer population count	X	MU3	
<b>Offtake</b>			
Harvest (with seasonal resolution)	X	X	X
Derogation (shooting, culling, egg destruction, with seasonal resolution)	X	X	X
CMR program to estimate the number of geese taken from each MU	X	X	
<b>Demographic variables (optional)</b>			
Adult survival (CMR; marking in breeding Range States)	X	X	X
Productivity (age counts in July in breeding Range States)	X	X	X

## **5. Action requested from the EGM IWG**

The EGM IWG is invited to consider the proposed definition of Greylag Goose MUs and decide on the preferred option, considering the implications for the required monitoring.