

AEWA EUROPEAN GOOSE MANAGEMENT PLATFORM



**4th MEETING OF THE
AEWA EUROPEAN GOOSE MANAGEMENT
INTERNATIONAL WORKING GROUP**

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



**PROCESS FOR THE DEVELOPMENT OF THE
ADAPTIVE FLYWAY MANAGEMENT PROGRAMME FOR THE
NORTHWEST/SOUTHWEST EUROPEAN POPULATION OF THE GREYLAG GOOSE**



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1. Background

The International Single Species Management Plan (ISSMP) for the Northwest/Southwest population of the Greylag Goose (*Anser anser*) was developed according to Paragraph 4.3.4 of the AEWA Action Plan, which provides for developing ISSMPs for populations which cause significant damage, in particular, to crops and fisheries. In addition, it responds to AEWA Resolution 6.4, which requested the establishment of a multi-species goose management platform and process to address the sustainable use of goose populations and to provide for the resolution of human-goose conflicts, targeting as a matter of priority Barnacle and Greylag Geese.

The ISSMP for the Northwest/Southwest European population of the Greylag Goose was adopted at the 7th Session of the Meeting of the Parties to AEWA (MOP7), 4-8 December 2018 in Durban, South Africa, following various stakeholder workshops and extensive consultation with the Range States and relevant stakeholders.

The ISSMP provides a mandate for developing a population-specific Adaptive Flyway Management Programme (AFMP) for the Northwest/Southwest European population of the Greylag Goose, recognising that there are regional differences in migratory behaviour and the human-wildlife conflicts involved within this population. This AFMP shall be formally adopted by the European Goose Management International Working Group (EGM IWG) and then reviewed periodically.

2. Purpose of the AFMP

The purpose of the AFMP is to establish an agreement amongst Range States on the implementation of those activities in the Greylag Goose ISSMP that require coordination at the population and/or Management Unit (MU) level.

Specifically, the AFMP will address the following activities:

- 1) Establish hierarchical population targets at flyway, MU and national levels iteratively to ensure national targets are consistent with the flyway targets and with legal requirements at all levels¹;
- 2) Establish an internationally coordinated population management programme (including both hunting and, if necessary, killing under derogations) for the transboundary MUs encompassing monitoring, assessment and decision-making protocols².

In addition, the AFMP will assist Range States in coordinating the implementation of their derogation schemes and will therefore contain information that is relevant for assessing the need for derogations at Range State level³.

The implementation of further activities of the Greylag Goose ISSMP will be elaborated in the MU-specific workplans, following the same principle of the non-AHM⁴ workplan for the Taiga Bean Goose.

Moreover, it should be noted that Range States remain responsible for national planning and implementation within the framework of the ISSMP.

According to the Greylag Goose ISSMP, the following items shall be included as part of the AFMP:

1. Definition of Management Units (MUs);
2. Definition of Favourable Reference Values (FRVs) for the population/MUs;
3. MU-specific analysis⁵ of:
 - a. Characterisation of the spatial and temporal extent and trends of damage to agriculture and of risks to human health and air safety as well as to other flora and fauna that can be attributed to the MU in question, including predicted future changes in these;
 - b. Description of the methods applied in the past assessments [*for the need for derogations*] for each country and recommendations for the development of future guidelines for assessments;
 - c. Description of the methods applied or tested to prevent damages and to reduce risks, their effectiveness and sufficiency to tackle the problem;
 - d. Understanding of the link between population level and damages or risk;
 - e. Information on habitat conservation measures including designation of Special Protection Areas (SPAs) under Article 4(2) of the Birds Directive:
 - i. List of SPAs and other protected areas designated for the Greylag Goose;
 - ii. Management of the species and the damage inside and outside SPAs;
 - iii. Tackling damage prevention inside and outside SPAs (accommodation areas, derogations, etc.).

¹ Means objective 4, Activity 4.1 in the Greylag Goose ISSMP

² Means objective 4, Activity 4.2 in the Greylag Goose ISSMP

³ See Box 1 of the Greylag Goose ISSMP

⁴ AHM stands for Adaptive Harvest Management

⁵ See Box 1 of the Greylag Goose ISSMP

4. Definition of targets as necessary, that are above the FRVs for the population, the MUs and Range States – based on work carried out by the International Modelling Consortium and agreed by the EGM IWG;
5. Protocols for adaptive management and monitoring;
6. Workplans for the ISSMP actions relevant to the population/MUs.

3. Proposed Outline of an AFMP for the Greylag Goose

Main body of the AFMP:

1. Introduction

Description on the purpose and scope of the AFMP.

2. Definition of Management Units (MUs)

This section will include the MUs as agreed by the EGM IWG4 (see document AEWA/EGMIWG/4.14).

3. Definition of Favourable Reference Values (FRVs)

The FRVs for the Greylag Goose will be included in this section, as agreed at EGM IWG4 (see document AEWA/EGMIWG/4.16/Rev.1).

4. Population targets above the FRVs

Population targets are set above the FRVs for agreed MUs based on an MCDA⁶ process. Documentation of the MCDA process will be provided in an Annex to the AFMP.

5. Monitoring indicators and programmes

Clear and effective monitoring indicators and programmes are identified to measure whether the management objectives are met.

6. Protocols for the iterative phase (decision making, monitoring and assessment)

Management actions are evaluated systematically and adapted accordingly for improved management. The detailed protocols will be added as an Annex to this document.

The following sections will be added as Annexes to the AFMP:

Annex 1. MU-specific workplans

Annual MU-specific workplans will be included and reviewed by the EGM IWG at their annual meetings. Workplans will include priority activities identified in the ISSMP that are not related to achieving population targets, as well as other activities agreed by the EGM IWG at their annual meetings.

Annex 2. Box 1 of the ISSMP for the Greylag Goose

- a. Characterisation of the spatial and temporal extent and trends of damage to agriculture and of risks to human health and air safety, as well as to other flora and fauna that can be attributed to the population/MU in question, including predicted future changes in these;
- b. A description of the methods applied in the past assessments [*for the need for derogations*] for each country and recommendations for the development of future guidelines for assessments;

⁶ MCDA stands for Multi-criteria Decision Analysis

- c. Description of the methods applied or tested to prevent damages and to reduce risks, their effectiveness and sufficiency to tackle the problem;
- d. Understanding of the link between population level and damages or risk;
- e. List of SPAs and other protected areas designated for the Greylag Goose;
- f. Management of the species and the damage inside and outside SPAs;
- g. Tackling damage prevention inside and outside SPAs (accommodation areas, derogations, etc.).

Annex 3. Population Models

This section will include the Greylag Goose population models that will be prepared by the Data Centre to inform decisions.

Annex 4. MCDA process

The documentation of the MCDA process will be presented, including the decision alternatives and stakeholder priorities.

Annex 5. Impact Models

This section will include models that will assess the predicted outcomes of defined management actions on the fundamental objectives set in the ISSMP.

Annex 6. Protocols for the iterative phase (decision making, monitoring and assessment)

Protocols for the iterative phase will be presented in this section, in order to systematically evaluate management actions and adapt them accordingly for improved management.

4. Provisional⁷ Steps and Timeline for the Development of the AFMP

The development of the AFMP requires a number of steps that are highly dependent on the timely availability of funding and human resources, to provide for a transparent management process informed by robust science.

The timeline below indicates an approximate timeframe in which various elements of the AFMP can realistically be delivered subject to the availability of resources.

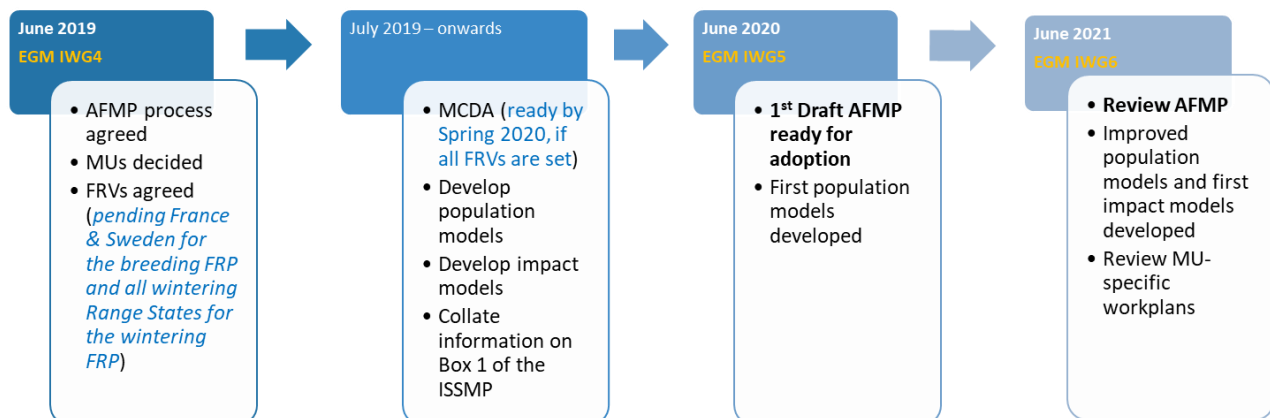


Figure 1. Provisional timeline for the development of the AFMP

⁷ The timeline for the development of the AFMP is subject to the timely availability of data, funding and human resources.

At the EGM IWG4 in June 2019 Range States are expected to agree on the proposed process for the development of the AFMP and on the proposed MUs for the Greylag Goose presented in document AEWA/EGMIWG/4.14.

At the same time, Range States are also expected to agree on the definition of FRVs at the national level for the breeding season and at supranational level for the wintering season for the NW/SW European Population of the Greylag Goose (see document AEWA/EGMIWG/4.16/Rev.1). Considering that there is no FRV for the breeding season suggested for France as it is deemed to be a marginal breeder in the country, it is expected that France will inform the Secretariat about any possible nationally-defined FRV by **12 July 2019**. In addition, Sweden, which is the only country where the Greylag Goose triggers SPA designation during breeding season, should consider whether the suggested national FRV (see Table 2 in document AEWA/EGMIWG/4.16/Rev.1) is consistent with their site protection obligations and also inform the Secretariat by 12 July 2019.

Finally, all wintering Range States are requested to review the suggested figures of wintering birds within the SPA network, (see Table 2 in document AEWA/EGMIWG/4.16/Rev.1), in the light of their SPA targets and inform the Secretariat by **12 July 2019** if any revision is needed.

Only once the FRVs have been set for each country, a Multi-criteria Decision Analysis (MCDA) can be applied, as agreed at the AEWA International Management Planning Workshop for the Barnacle Goose and the Greylag Goose, which took place on 19 June 2018, in Leeuwarden, the Netherlands. More details on the MCDA process, timeframe and costs are provided in Annex 1 to this document.

From July 2019 onwards, the International Modelling Consortium will be working on the development of population models. During the 2nd Meeting of the International Modelling Consortium, which took place in Kalø, Denmark on 21-22 March 2019, it was suggested that the capacity from ONCFS (i.e. Dr Leo Bacon, who has been working on the definition of the Greylag Goose MUs) would be requested to develop the population models, in collaboration with the EGMP Data Centre. In addition, Sweden has instigated scientific work focussing on the relationships between goose population sizes and agricultural damage.

However, dynamic impact models (based on agent-based simulations) still have to be refined and finalised (by the Data Centre) and could be presented to the EGM IWG6 in June 2021 as part of the iterative phase, if additional funding is provided. Moreover, the EGMP Data Centre will collate the information from the Range States needed concerning damage and site protection (Box 1 of the Greylag Goose ISSMP) with input from the International Modelling Consortium and the EGMP Agriculture Task Force as necessary. However, data on risks to air safety and other flora and fauna are currently not collated and assessed for the whole population and will require additional funding. Annex 2 of this document provides a justification and description of the need of additional capacity in the EGMP Data Centre to accomplish these tasks within the indicated timeline.

Subject to the availability of resources a first draft of the AFMP for the Greylag Goose, including the results of the first models and MU-specific workplans, is expected to be ready for adoption at the 5th Meeting of the European Goose Management International Working Group (EGM IWG5) in June 2020.

Following June 2020, the AFMP, including the models and MU-specific workplans, will be reviewed for EGM IWG6 in June 2021.

The following resources are required to ensure the timely delivery of each step in the process:

Table 1. Key decisions and resources needed for the development of the Greylag Goose AFMP

Decision / activity	Responsibility	Extra resources needed	Timeframe for decision or funding to be provided
AFMP process agreed	EGM IWG	n/a	June 2019 (agreement)
MUs agreed	EGM IWG	n/a	June 2019 (agreement)
FRVs agreed	EGM IWG	n/a	June 2019 (agreement)
FRVs provided by France and verified Sweden for breeding season. All wintering Range States provide SPA-level targets for the Greylag Goose or verify figures of wintering birds inside the SPA network.	France, Sweden and all wintering Range States	n/a	12 July 2019
MCDA	EGMP Data Centre	Total costs: EUR 31,400 Co-funding secured: EUR 23,000 (provided by Norway) Co-funding needed: EUR 8,400	July 2019 (funding provided) Refer to Annex 1 for more details
Development of population models	ONCFS, EGMP Data Centre, International Modelling Consortium	Staff time provided at ONCFS	July 2019 (confirmation of staff time)
Collate data for Box 1	EGMP Data Centre, Range States, International Modelling Consortium & Agriculture Task Force	Academic Technician to collate information for Greylag Goose and Barnacle Goose (Russia/Germany & Netherlands population) at the EGMP Data Centre (position also to develop the impact models, see below); 20% time per year for 2 years (EUR 38,400 of overall budget for the position of EUR 192,000)	July 2019 (funding for academic technician position provided) Refer to Annex 2 for more details
Development of impact models	EGMP Data Centre & International Modelling Consortium	Academic technician position to develop impact models for Greylag Goose and Barnacle Goose (Russia/Germany & Netherlands population)	July 2019 (funding for academic technician position provided) Refer to Annex 2 for more details

		(position also to collate data for Box 1, see above); 80% time per year for 2 years (EUR 153,600 of overall budget for the position of EUR 192,000)	
AFMP compilation	EGMP Secretariat, Data Centre & external consultant	EUR 5,650	December 2019 (funding provided)

5. Data Needs for the Purpose of the AFMP

The following data is required to ensure the timely delivery of each step in the process:

Table 2. Data needs for the development of the Greylag Goose AFMP

Purpose / activity	Type of data	Responsibility	Timeframe for data to be provided
Harvest assessment	Capture-Mark-Recapture material (neck-banding and metal ringing)	National Research Institutes, EURING and DC	November 2019
Harvest assessment	Population counts (mid-winter)	Range States and Data Centre	March 2020
Harvest assessment	Total offtake by hunting and derogations and their seasonal distributions	Range States and Data Centre	March 2020
Agricultural impact assessment	Damage assessment, compensation, subsidies paid, derogation offtake statistics (according to the indicators proposed by the Agricultural Task Force)	Range States, Agricultural Task Force and DC	March 2020
Air safety risk assessment	Bird strike statistics	Range States and Data Centre	March 2021
Ecosystem impact assessment	Extent of reedbed degradation caused by Greylag Geese	Range States and Data Centre	March 2021
Harvest assessment updates	Population counts (summer; pending decisions on MUs)	Range States and Data Centre	March 2021
Agricultural impact models	Damage assessment statistics	Range States, Agricultural Task Force and DC	March 2021

Action requested from the EGM IWG

- Agree on the proposed content and outline of an AFMP for the Greylag Goose;
- Take note of the indicative timeline for the development of the AFMPs and the steps that are involved;
- Take note of the resources that are required for the entire process for the timely delivery of the AFMP by June 2020.

Annex 1

Multi-criteria Decision Analysis

At the AEWA International Management Planning Workshop for the Barnacle Goose and the Greylag Goose, which took place on 19 June 2018, in Leeuwarden, the Netherlands, Range States agreed to apply the Multi-criteria Decision Analysis (MCDA) process for the Greylag Goose (Doc. AEWA/EGMIWG/4.14).

MCDA (Huang et al. 2011) is widely used in natural resource management. The purpose of the MCDA is to combine scientific information with social objectives and help decision makers to attain a preferred decision alternative.

The following section will describe how this exercise can be applied within the framework of the Greylag Goose management process and provide an indicated timeline and resource estimate.

For Greylag Geese, we must first consider management objectives described in the ISSMP and then use the best information available to predict the consequences of alternative population goals for each of those objectives. The best choice of population goal is the one that maximises the weighted sum of consequences across objectives using weights provided by decision makers. MCDA explicitly recognises multiple management objectives and inherent tradeoffs and relies on decision makers to determine the relative importance of objectives.

In terms of process, the first phase will involve identification of relevant objectives of the ISSMP, articulation of several candidate population goals and assessment of the potential consequences of those candidates. Relevant objectives will be identified by the International Modeling Consortium as those that are, or are likely will be, substantively affected by population size at the flyway or MU level. Ideally, the potential consequences of various population sizes are based on empirical models. Although population models for Greylag Geese are in development, they will not be ready in time, nor will they likely be sufficient to address all objectives. Thus, we will rely on expert opinion of members of the Modeling Consortium (and other scientists knowledgeable about the interaction of humans and Greylag Geese). Expert opinion is widely used in the absence of empirical information and can be a valuable tool for public policy decision-making if rigorous protocols are followed (Morgan 2014).

The expert elicitation will be followed by the assignment of management-objective weights, reflecting the relative importance of each objective, by decision makers. EGM IWG representatives of the Range States of the Greylag Goose and other stakeholders will participate in this exercise. We will use a technique known as swing weighting (Gregory et al. 2012) to identify weights using the results of the expert elicitation described above. Because it is likely that objective weights will vary among decision makers, we will conduct a sensitivity analysis to determine the extent to which that variability affects the preferred choice of the population goal. A simplified consequence table (without consequence scores, objective weights, or specific candidate population goals) is shown below for illustrative purposes.

Table 3. *Simplified consequence table*

Objective	Goal	Objective weight	Alternative population goals		
			“low”	“medium”	“high”
Probability of population \leq FRP	minimize				
Agricultural damage and conflicts	minimize				
Management cost	minimize				
Sustainable hunting	maximize				

The project will require approximately ten months to complete (see below). All project activities involving the Modeling Consortium (and other experts) and decision makers will be conducted via email (with follow-up phone calls if necessary).

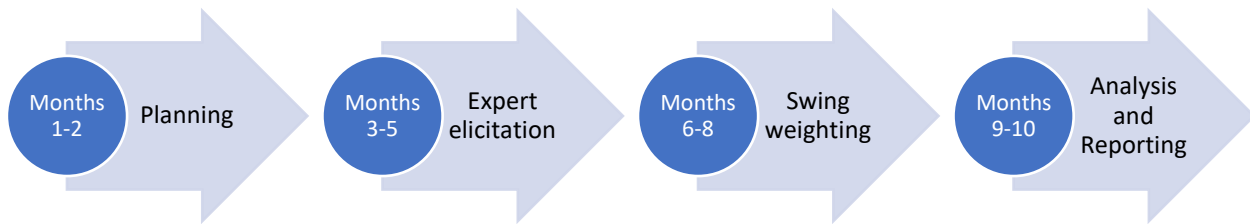


Figure 2. MCDA timeline

The following estimated budget is needed for the entire process:

Principle investigator (280 hours):	EUR 25,800
Academic technician (70 hours):	EUR 5,600
Total:	EUR 31,400

It should be noted that the MCDA can only be delivered if the FRVs have been agreed by the EGM IWG and the necessary funds have been provided on time. More specifically, the results of the MCDA will need to be delivered at the latest by April 2020 in order to allow running the population models against the targets and propose management options to the EGM IWG5 in June 2020.

Literature Cited

- Gregory, R., L. Failing, M. Harstone, G. Long, T. McDaniels, and D. Ohlson.** 2012. Structured Decision Making: A Practical Guide to Environmental Management Choices. John Wiley & Sons, Ltd., West Sussex, UK.
- Huang, I. B., J. Keisler, and I. Linkov.** 2011. Multi-criteria decision analysis in environmental sciences: ten years of applications and trends. *Science of the Total Environment* 409:3578–3594.
- Morgan, M. G.** 2014. Use (and abuse) of expert elicitation in support of decision making for public policy. *Proceedings of the National Academy of Sciences* 111:7176–7184.

Annex 2

Justification for Extra Financial Resources (Academic Technician based at Aarhus University) needed to collate Information on Management Actions and Development of Impact Models

The EGMP Data Centre, the International Modelling Consortium and the Agriculture Task Force are currently collating data needed for the assessments described in Box 1. This includes statistical data on the extent of agricultural damage and actions taken to mitigate this damage. However, data is still lacking to undertake a complete assessment, as indicated in Box 1. Furthermore, there has not been any initiative yet to collate and assess information concerning risks to air safety, as well as risks to other flora and fauna for the entire population. Collating this data will require an extra effort which is currently unfunded.

Moreover, the development of Impact models to assess and predict the future development of agricultural damage, in particular, is currently not included in the ongoing work within the EGMP Data Centre nor the International Modelling Consortium.

Aarhus University (AU) and Wageningen University have developed some models which can be used as a basis for the predictive impact models required for the Greylag Goose process. It is proposed to use landscape-scale agent-based simulation tools (the so called ALMaSS system developed by AU), which can take into account land use, farming practices, number of geese competing for the resources as well as management actions (such as derogation and hunting, designation of accommodation areas, nature management).

In order to parameterise and test these models for the Greylag Goose (and at the same time for the parallel process concerning the Barnacle Goose) an Academic Technician, closely affiliated to the Aarhus University ALMaSS modelling group, the EGMP Data Centre and the International Modelling Consortium, would be an efficient solution.

The Academic Technician would focus on the following tasks:

1. Collating information for the Box 1 assessments for the Greylag Goose (and for the Barnacle Goose) with 20% of his/her time over 2 years (July 2019-July 2021);
2. Developing and testing impact models for the Greylag Goose (and for the Barnacle Goose) for selected countries (e.g. regions/provinces in Denmark, the Netherlands and Sweden for which detailed landscape models have been developed by AU) with 80% of his/her time over 2 years (July 2019-July 2021).

The total costs for the Academic Technician are estimated at EUR 192,000 for the 2 years (July 2019-July 2021).