**1st MEETING OF THE AEWA EUROPEAN GOOSE MANAGEMENT INTERNATIONAL WORKING GROUP**

*14 – 16 December 2016, Kristianstad, Sweden*

# ADAPTIVE HARVEST MANAGEMENT PROGRAMME FOR THE TAIGA BEAN GOOSE (*ANSER F. FABALIS*) – SET-UP PHASE

## PROPOSED DECISIONS

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## Introduction

This document presents proposals for decisions on the various elements of the set-up phase of the Adaptive Harvest Management programme for the Taiga Bean Goose. These proposals are to be discussed and agreed at the 1st meeting of the AEWA European Goose Management International Working Group (AEWA EGM IWG) in order to allow proceeding to the iterative phase (cf. document AEWA/EGM IWG 1.7).

## 1. Management Units of and Population Targets for the Taiga Bean Goose

The Management Units (MU) and population targets for the Taiga Bean Goose (TBG) were adopted by the 6th Session of the Meeting of the Parties to AEWA (MOP6) as an integral part of the International Single Species Action Plan (ISSAP) for the sub-species. They are therefore presented here for information purposes only and do not require further discussion and agreement. The MUs and population targets form the core base of the implementation of the ISSAP including the Adaptive Harvest Management (AHM).

### 1.1 Definition of Management Units; sub-species-specific hunting management (Taiga *fabalis* vs. Tundra *rossicus*)

Management Units adopted in the ISSAP are based on current but developing understanding of Taiga Bean Goose distribution and flyways. For pragmatic and administrative reasons, the delineation of the MUs defined in the ISSAP follows national and within-country administrative borders.

New detailed information of birds frequenting areas outside of the defined MUs can be taken into account in national level planning of hunting regulations where necessary and practical.

Undertaking tailored hunting management for each of the two sub-species (Taiga *fabalis* and Tundra *rossicus*) needs to be considered. The most efficient way to manage the harvest of Bean Geese in view of the two sub-species is through national level regulations based on information about the spatial and temporal differences in the occurrence of the two sub-species.

For example, Finland has identified a region where the vast majority of staging Bean Geese are Tundra Bean Goose *A. fabalis rossicus* and therefore this area could have different regulations compared to TBG (-dominated) areas.

<u>Management Units (as defined in the ISSAP)</u>

This Action Plan covers the entire sub-species (*Anser f. fabalis*) which is confined to the Western Palearctic and western parts of the Eastern Palearctic. Four sub-populations can be recognized based on their different breeding and wintering areas, which serve as management units for the purpose of this Action Plan:

- **Western sub-population** (breeding in Northern and Central Sweden and Southern and Central Norway, wintering in Northern Denmark and Northern and Eastern United Kingdom; current 2014 estimated winter population size 1,500 individuals)
- **Central sub-population** (breeding in Northernmost Sweden, Northern Norway, Northern and Central Finland and adjacent North-western parts of Russia, wintering mostly in Southern Sweden and South-east Denmark; 35,000 individuals)
- **Eastern 1 sub-population** (breeding in upper Pechora region and western parts of west Siberian lowlands of Russia, wintering mostly in North-east Germany and North-west Poland; 15,000 individuals)

- **Eastern 2 sub-population** (breeding in eastern parts of west Siberian lowlands of Russia, wintering in North-west China, South-east Kazakhstan and east Kyrgyzstan; winter population size unknown)

In addition to the range states mentioned above, Taiga Bean Geese also occur regularly in Estonia, Latvia, Lithuania, the Netherlands, Ukraine and Belarus during migration or in small numbers in winter.

*Figure 1. Geographical representation of the provisional flyway units delineated for the Taiga Bean Goose population, identified to support the establishment of management units for the purpose of this Action Plan. The numbers refer to estimated current population sizes accompanied by indicative trends, and the broken lines link breeding areas (light grey) with specific winter quarters (dark grey). The dotted area indicates linkages between breeding areas in northern Fennoscandia and known moulting areas in Novaya Zemlya and the Kola Peninsula*

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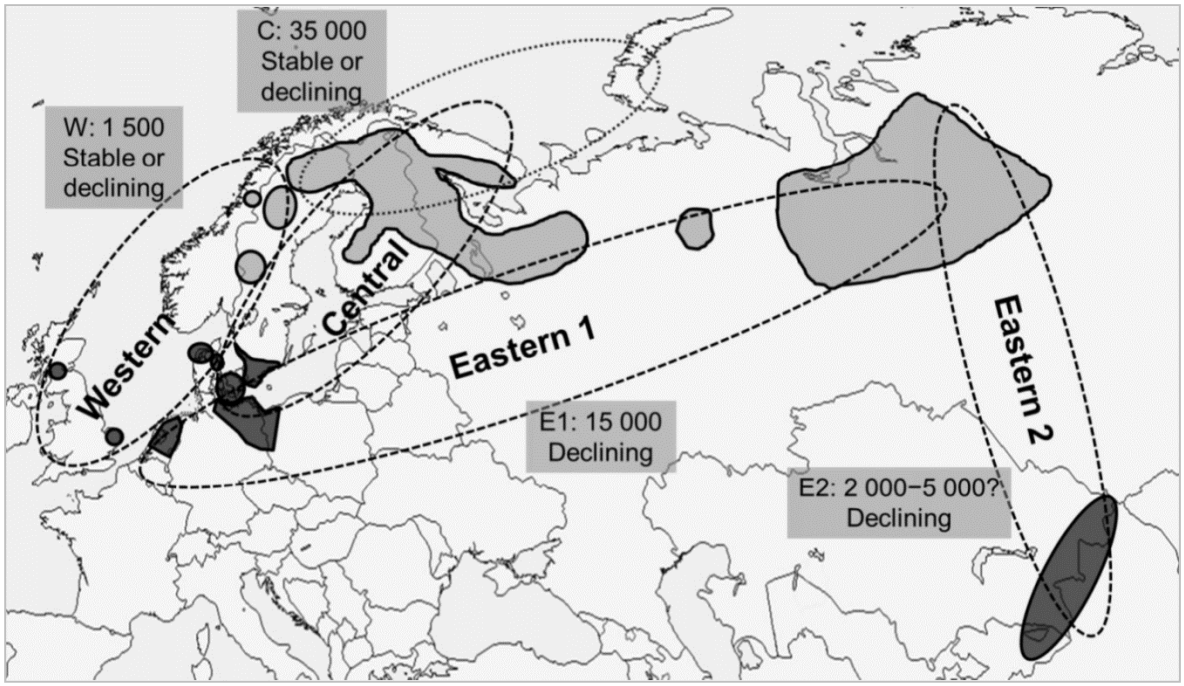


## 1.2 Population targets for the Management Units (as determined in the ISSAP adopted by AEWA MOP6)

Long-term Goal

To restore and maintain the population at the favourable conservation status of around 165,000-190,000 birds (5,000-10,000 individuals in Western, 60,000–80,000 individuals in Central and 100,000 individuals in Eastern 1 & 2 sub-populations, with stable or increasing trends).

The **Purpose** of this Action Plan, is to stabilise the overall population size as well as the numbers in each sub-population at least at their current levels within 5 years, and to enable the sub-populations to start to recover and increase within 10 years.

Where the population target in the ISSAP is set as a range rather than an exact number, for modelling purposes, the median of the range has been used (7,500 in Western and 70,000 in Central MUs).

## 2. Structure of the Annual Iterative Phase of the Adaptive Harvest Management Process and Harvest Quota Division between Range States

### 2.1 Structure of the annual iterative phase

The purpose of the European Goose Management Platform is to provide the mechanism for a structured, coordinated and inclusive decision-making and implementation process for the sustainable management of goose populations in Europe, with the objective of maintaining them in a favourable conservation status, while taking into account concerns of relevant stakeholders and the pertinent legislative frameworks and regulations.

The Svalbard Pink-footed Goose International Species Management Plan (SPfG ISMP) and its ongoing implementation process have provided an example of a viable way to implement AHM in Europe.

The SPfG AHM process has established a structured annual cycle for data collection, AHM assessment and decisions for international harvest quota.

For reasons of cohesion and coordination between the management of the different goose species and populations, it is recommended that the TBG AHM process follows the established structure of the SPfG AHM process as far as possible and both processes shall be adjusted where necessary and practical.

The proposed structure for the annual TBG AHM cycle is presented bellow in two different figures (Figures 2 and 3) and Table 1, providing three different ways of visualisation and containing different levels of detail. The structure is generic and applies to all MUs. However, note that the timelines in Figure 2 are only indicative and do not imply a decision on open hunting season. Further, in this paper data and considerations are provided to inform a decision on if and when to have an open hunting season for each of the MUs.

*Figure 2. Proposed structure for annual TBG AHM cycle (Gantt chart) – indicative timeline December 2016 – December 2019 The regular and derogation hunting in depicted in darker brown, while spring hunting in Belarus and Russia is in lighter brown. Hunting seasons are based on information contained in Annex 4 of the TBG ISSAP.*

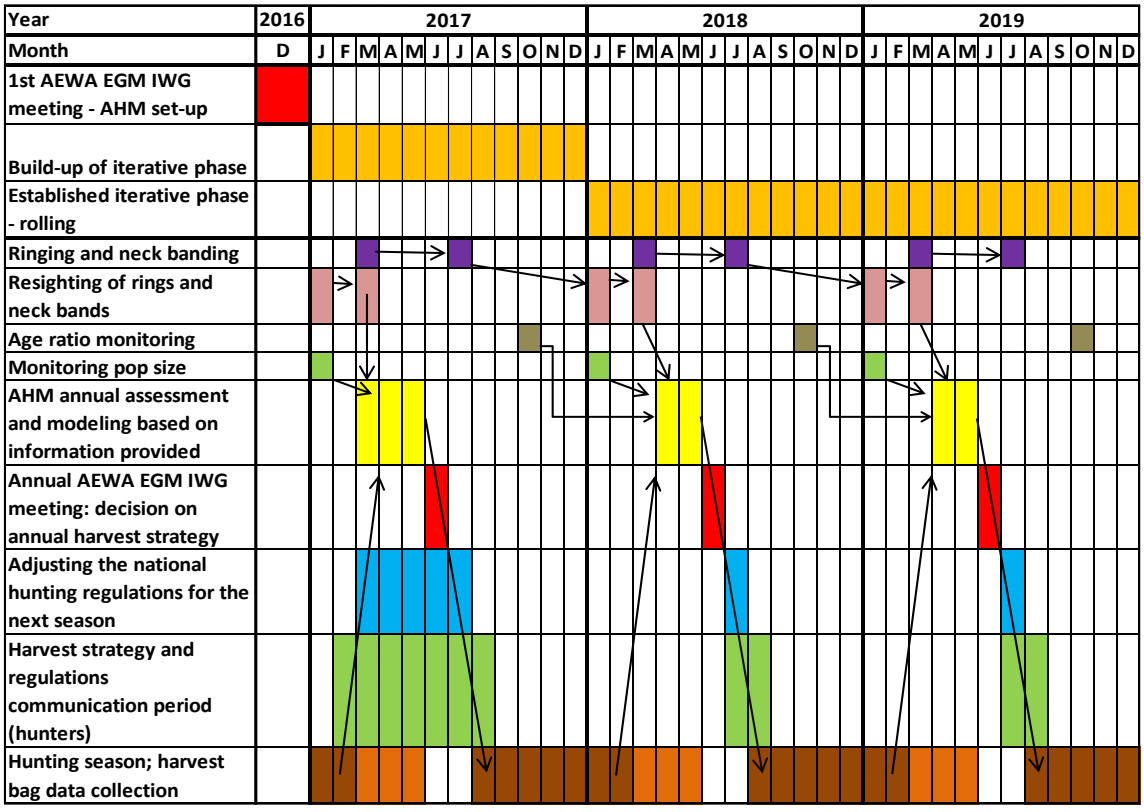

*Table 1. Proposed structure for annual TBG AHM cycle. Hunting seasons are based on information contained in Annex 4 of the TBG ISSAP.*

| | **Monitoring** | | **AHM Assessment** | | **Decision on annual hunting quota** | | **Hunting seasons** |
|---|---|---|---|---|---|---|---|
| | **Essential to get started** | **High priority for development of adaptive harvest management** | **Assessments** | **Modelling** | **International** | **National** | |
| **January** | Population size (January); Harvest bag data collection | Resighting of rings and neck bands | | | | | Regular hunting season and derogations; spring hunting season (Belarus and Russia) |
| **February** | | | | | | | |
| **March** | | Ringing and neck banding at staging areas; resighting of rings and neck bands | | | | | |
| **April** | | | Collate annual demographic data and estimate population size | | | | |
| **May** | | | Estimate annual hunting bag | Model optimal harvest strategy | | | |
| **June** | | | | | AEWA EGM IWG meeting - harvest strategy decided | | |
| **July** | | Ringing and neck-banding at moulting areas. | | | | National hunting regulations adjusted | Communicate revised hunting regulations |
| **August** | Harvest bag data collection | | | | | | Communicate revised hunting regulations (August); Regular hunting season |
| **September** | | | | | | | |
| **October** | | Sampling age ratio in autumn flocks | | | | | |

| | Monitoring | | AHM Assessment | | Decision on annual hunting quota | | Hunting seasons |
|---|---|---|---|---|---|---|---|
| **November** | | | | | | | |
| **December** | | | | | | | |

*Figure 3. Proposed structure for annual TBG AHM cycle (circular graph). Hunting seasons are based on information contained in Annex 4 of the TBG ISSAP.*


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| **Proposed decision:** | The AEWA EGM IWG is invited to adopt the proposed structure for the TBG AHM annual cycle, which is subject to further adjustments in forthcoming meetings, as necessary. |

## 2.2 Harvest quota division between range states

The annual sustainable harvest assessment provides an estimate of allowable harvest in respect to population status, objectives, uncertainties and decision makers risk tolerance. The allowable harvest is given at Management Unit level. This requires a decision on how to divide the total allowable harvest between the range states with open season in each Management Unit, if and when it is decided that harvest can take place.

In the SPfG AHM process, this division was easily achieved and it was agreed to do it on the basis of long-term average harvest numbers and the relative proportions per range state derived from the existing data. This is a simple, logical and pragmatic principle which is suggested to also be followed in the TBG AHM process.

The following considerations should be taken into account when defining the principles of harvest quota division for the Taiga Bean Goose:

- The division is to be based on long-term average harvest numbers before the recent closures of hunting seasons in Finland and Denmark.
- In many countries the TBG harvest estimate is highly inaccurate (rather a guestimate) and no sub-species separation of harvest data is currently available. Furthermore, division of harvest between different Management Units where they overlap spatially in some range states is solely dependent on expert opinion.
- In the face of all these uncertainties, the quota division may warrant adjustment in future, if more precise estimates of past harvest numbers become available, and when agreed by the relevant range states.

The estimate of the Taiga Bean Goose harvest per range state (Table 2) is based on the data provided in the process of compiling the ISSAP. Please note that TBG is not a quarry species in Kazakhstan, the Netherlands, Norway and the United Kingdom.

*Table 2. Estimates of TBG harvest per range state and MU (as per the TBG ISSAP).*

| | RU (guestimate) | FI | SE | DK | EE | LV | LT | UA | BY | PL | DE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Average harvest*** | **10,000** | **6,500** | **3,600** | **1,600** | **300** | **300** | **300** | **100** | **100** | **500** | **500** | ***23,800*** |
| Western | N/A | N/A | 200 | 200 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | **400** |
| Central | 2,000 | 6,500 | 3,400 | 1,400 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | **13,300** |
| Eastern 1 | 7,000 | N/A | N/A | N/A | 300 | 300 | 300 | 100 | 100 | 500 | 500 | **9,100** |
| Eastern 2 | 1,000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | **1,000** |

On the basis of the available data for past average harvest numbers in the TBG range states and following the above-described principle of quota division, below are presented the proposed relative proportions of future harvest quotas of the relevant range states in each Management Unit:

*Table 3.1. Proposed relative proportions of future harvest quotas in the Western MU*

| **Western MU** | **SE** | **DK** |
|---|---|---|
| Proportion | 50 % | 50 % |

*Table 3.2. Proposed relative proportions of future harvest quotas in the Central MU*

| **Central MU** | **RU** | **FI** | **SE** | **DK** |
|---|---|---|---|---|
| Proportion | 15 % | 49 % | 26 % | 10 % |

*Table 3.3. Proposed relative proportions of future harvest quotas in the Eastern 1 MU*

| **Eastern 1 MU** | **RU** | **EE** | **LV** | **LT** | **UA** | **BY** | **PL** | **DE** |
|---|---|---|---|---|---|---|---|---|
| Proportion | 77 % | 3 % | 3 % | 3 % | 1 % | 1 % | 6 % | 6 % |

*Table 3.4. Proposed relative proportions of future harvest quotas in the Eastern 2 MU*

| **Eastern 2 MU** | **RU** |
|---|---|
| Proportion | 100 % |

| | |
|---|---|
| **Proposed decision:** | The AEWA EGM IWG is invited to adopt the proposed harvest quota division between the relevant range states in each MU, which is subject to possible adjustment in future. |

## 3. Adaptive Harvest Management Programme (predictive models and management alternatives)

A group of experts, led by Fred A. Johnson of the United States Geological Survey, has made progress on the development of an Adaptive Harvest Management programme for Taiga Bean Geese (document AEWA/EGM IWG 1.8). The AHM program is based on predictive modelling using currently available data to inform the decision on the annual allowable harvest of Taiga Bean Geese at a management unit level. Once a routine monitoring program is in place to compare observed population dynamics with model predictions, demographic models and parameters can be updated annually to improve harvest decisions.

### 3.1. Adaptive Harvest Management programme for Taiga Bean Geese (predictive models)

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| **Proposed decision:** | The AEWA EGM IWG is invited to adopt document AEWA/EGM IWG 1.8 containing initial elements of an Adaptive Harvest Management programme for Taiga Bean Geese developed on the basis of predictive models. |

### 3.2 Management alternatives

The Adaptive Harvest Management programme for Taiga Bean Geese has identified several different management alternatives for the Central MU, depending on the relative importance of reaching the population goal and providing harvest opportunity. For the Western MU and the Eastern 1&2 MUs combined, the same principles can be used, but specification of a harvest strategy is not possible at this time because critical demographic information is lacking for these management units (i.e. either population carrying capacity or the current rate of population growth).

The ISSAP specifies a population goal for the Central MU of 60,000 – 80,000 individuals in winter; thus, a preliminary harvest management objective function is to minimise the difference between this goal and

actual population size. The dangers of harvesting at a constant level are well known, and harvest is more likely to be sustainable if a constant harvest *rate* is used (i.e. absolute harvest is changed to reflect stochastic changes in population size). Possible harvest rates in the range 0 – 0.1 in increments of 0.01 were examined over 5, 10, 15, and 20-year time horizons. The harvest rates that best fulfilled the management objective (i.e. the optimal harvest rates) for the different time horizons are provided in Table 4. A trade-off thus exists between harvest opportunity and the time required to grow populations to desired levels; what makes for an acceptable trade-off is a social, not a scientific, question.

*Table 4. Identified management alternatives for the Central MU with the objective of reaching and maintaining the median population target of 70,000 birds (median) under different time horizons*

| Harvest rates (management alternatives) for the Central Management Unit | Time horizon in years to reach the population target of 70,000 birds (predictive model) |
|---|---|
| 0,00 (= 0%) | 5 |
| 0,02 (= 2%) | 10 |
| 0,05 (= 5%) | 15 |
| 0,06 (= 6%) | 20 |

For the Western and Eastern 1&2 MUs only the time required to reach the population target in the absence of harvest was examined. The Western and Eastern MUs would require at least 10 and 13 years, respectively, to reach their minimum goals under the most optimistic of scenarios. Anthropogenic-related mortality, density dependence, or environmental variation could extend these time frames considerably.

*Table 5. Time horizon in years to reach the population target (7,500 birds for Western MU, 100,000 birds for Easter 1&2 MUs; both median) under most optimistic scenario with no harvest and no density dependence*

| Management Unit | Time horizon in years to reach the population target under most optimistic scenario (no harvest, no density dependence) |
|---|---|
| Western | 10 |
| Eastern 1&2 | 13 |

| | |
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| **Proposed decision:** | • For the **Central MU**, the AEWA EGM IWG is invited to discuss and adopt one of the outlined management alternatives (preferred trade-off between time horizon for population recovery and harvest opportunities).<br>• For the **Western and Eastern 1&2 MUs** the AEWA EGM IWG is invited to adopt closed hunting season until such time as further management alternatives could be possibly outlined for consideration on the basis of strengthened datasets. |

## 4. Monitoring Programme

Monitoring of population parameters and harvest is the prerequisite for assessing the population response to management actions and for successful Adaptive Harvest Management.

The application of the Adaptive Harvest Management programme for TBG is based on available estimates of population size in mid-winter and harvest bag. This simple model is the first step in applying AHM for the sub-species. More and higher quality data will be needed to produce more complex models so that the Adaptive Harvest Management programme benefits from higher rigor.

To support and further strengthen the implementation of the iterative phase of the AHM, reliable annual estimates of 1) population size in January and 2) harvest bag, need to be regularly provided as a matter of essential priority to allow informed decision making.

In addition, monitoring of survival and reproductive success/age ratio can increase the precision of predictive models and it is recommended that schemes are developed to provide sufficient datasets on these parameters for more detailed modelling.

It is essential that the population size estimate in January and the harvest bag data separate the two sub-species (Taiga *fabalis* and Tundra *rossicus*).

The annual decision-making process requires rapid data flow from field counts to national co-ordinators and ultimately to the European Goose Management Platform Data Centre. Quality assured data from the January counts on population size and the harvest bag from the previous season should be available to the Data Centre for processing no later than 15 May each year. In the face of lack of hunting bag data from spring hunting in Belarus and Russia, the spring harvest will be estimated on the basis of recoveries of marked birds.

Should a management alternative with harvest rate above zero be adopted for the Central MU, for 2017 there needs to be a 'fast-track' process to provide January population data and harvest bag by early March to allow sufficient time for decision-making with regard to the 2017 hunting season.

Table 6 below presents an outline of the proposed monitoring programme for the TBG which, upon adoption, will require further planning and development. Certain elements of the monitoring programme are essential for improved AHM and shall be launched as soon as possible. Others are recommendable and their timelines for development and launch are more relaxed.

The overall coordination to the monitoring programme will be provided by the EGMP Data Centre with inputs from the national monitoring scheme and in cooperation with other partners and schemes, such as the International Waterbird Census.

*Table 6. Proposal for monitoring programme for Taiga Bean Goose (outline)*

| **Subject** | **Monitoring or research activity** | **Key points of activity** | **Season/interval** | **Responsibility** | **Timeframe / importance** |
|---|---|---|---|---|---|
| Population size and trend | Integrated international monitoring scheme | Improved coordination | Mid-January | Data Centre and national schemes in all MUs | Immediate (January 2017 onwards) / Essential |
| | | Extension of coverage | As required | Data Centre | |
| | | Separation of sub-species | **Annual**/biannual | Data Centre | |
| | | Recruitment & training of counters | Annual | Data Centre & national schemes | |
| Hunting bags | Advanced bag reporting systems | True bag sizes | Hunting season/annual | National authorities | Immediate (from season 2016-2017 onwards)/ Essential |
| | | Separation of sub-species (picture, feather sample) | | | |
| | | Crippling rate, estimate to be included in the total legal harvest mortality | | | |
| Illegal take | Method to assess the level | Level of illegal take to be accounted in the harvest assessment as a proportion of total mortality | Annual | National authorities | Development 2017-2018 / High |
| Productivity | Productivity monitoring scheme | Juvenile percentage | September –annual | National schemes in all MUs | Development 2017-2018 / High |
| | | Family flock size | | National schemes in all MUs | |
| | | Training of counters | | Data Centre | |
| | | Index of breeding success from breeding areas | July - annual | National authorities | Development 2017-2018 / Provisional |

| Subject | Monitoring or research activity | Key points of activity | Season/interval | Responsibility | Timeframe / importance |
|---|---|---|---|---|---|
| Survival | International neck-banding and neck-band monitoring scheme | Increasing the number of birds marked | Mainly winter & staging/annual process with assessments every 3 years | Data Centre and national research groups | Development 2017-2018 / High |
| | Telemetry study | Training of observers | | Aarhus University and national research groups | Provisional |
| | Stable isotope analysis of feathers | Collection of feather samples | | Aarhus University and national research groups | Provisional |

| | |
|---|---|
| **Proposed decision:** | The AEWA EGM IWG is invited to adopt the outline of the proposed monitoring programme and to commit supporting its further development and effective implementation financially and by other means. |