

# GOOSE BULLETIN

## ISSUE 27 – NOVEMBER 2021

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**GOOSE BULLETIN** is the official bulletin of the Goose Specialist Group of Wetlands International and IUCN.

**GOOSE BULLETIN** appears as required, but at least once a year in electronic form. The bulletin aims to improve communication and exchange information amongst goose researchers throughout the world. It publishes contributions covering goose research and monitoring projects, project proposals, status and progress reports, information about new literature concerning geese, as well as regular reports and information from the Goose Database.

Contributions for the **GOOSE BULLETIN** are welcomed from all members of the Goose Specialist Group and should be sent as a Word-file to the Editor-in-chief. Authors of named contributions in the **GOOSE BULLETIN** are personally responsible for the contents of their contribution, which do not necessarily reflect the views of the Editorial Board or the Goose Specialist Group.

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## Editorial

In Issue 26 from November 2020 I wrote: “The year 2020 will be remembered as the year of Covid-19.” So: what about 2021? This was the year of the big “UN Climate Change Conference, COP 26” in Glasgow, which should be the year of a “historic breakthrough” in the worldwide discussions about stopping the obvious warming up of the world’s climate. However, most people in the rich industrialised countries seem to be more worried about the threats by the next wave of the apparently never ending Covid-19 pandemic than about the threats for worldwide ecosystems and for humanity by the ongoing warming up of our planet. Some people even deny the existence of both a Covid-19 pandemic and climate warming and are seemingly unconcerned about either.

The many extreme weather events in almost every part of the world, the melting ice sheets in the Arctic and the Antarctic as well as glaciers in mountain areas, the continuing thawing process of permafrost soils all make it very obvious that something is happening with our climate. This leaves little doubt that the worldwide temperatures are rising, climate systems become more unstable and the deviation from the average are becoming more and more extreme. The changes in the world’s climate over the past decades makes it clear that climate change will be the most important issue for the future and will overlay all other problems.

For Arctic breeding species, the warming climate causes increasing problems because of the rapid speed and major regional differences in temperature rise, which is already considerable higher in Arctic zones compared to temperate regions. As a result, the sequence of prevailing conditions experienced along the flyway corridors of migratory Arctic breeding species is increasingly being disrupted. Mid-winter thaws followed by refreezing in winter causes high lemming mortality and local damage to the tundra vegetation. Advanced snow melt and early vegetation growth can result in Arctic birds arriving too late for their offspring to benefit from optimal food conditions. Milder conditions means more predators survive on breeding areas, while predators from more temperate zones, like red foxes, are spreading northwards, while Polar Bears suffer as pack ice diminishes and they become restricted to Arctic coasts. These interactions result in declining reproductive success and higher mortality rates. The need for research has never been greater! We need to understand the changing ecology of Arctic breeding migratory bird species as indicators of climate change and to meet their conservation challenges. As a community of goose researchers we should define our role in this important matter.

In the previous two issues of the GOOSE BULLETIN we asked the GSG-members for their visions of the future: “Please let us know, what you think about it. Send your opinion to the Editorial Board of the Goose Bulletin, to give the Board of the Goose Specialist Group a lead where to go in future, . . .”

Do you want to know how many reactions we got? ..... null, zero, nothing!!

You still have the possibility to react! Please let us know what you think about it and stay healthy!

**The next issue of the GOOSE BULLETIN is planned to appear in May 2022, which means that material for this issue should have reached the editor-in-chief not later than the 31st of March 2022.....but earlier submission is, of course, always permitted, if not actively encouraged!**

Editor in chief



## **Recent improvements of the Latvian goose hunting bag statistics**

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In today's management of goose populations, hunting is an important tool in regulating population sizes, both when the number of individuals is "too small" and when it is "too large". In threatened populations, the aim is to reduce losses to hunting (JONES et al. 2008, MARJAKANGAS et al. 2015) while for numerous populations, hunting can be used to reduce the number of individuals to a target level (MADSEN & WILLIAMS 2012). A prerequisite of efficient use of hunting for managing population sizes is, however, that hunting statistics are of a high standard. That is especially true for similar-looking taxa, where a threatened taxon often is lumped together with a related taxon. In Europe, there are two such pairs – Taiga Bean Goose and Tundra Bean Goose, and Lesser White-fronted Goose and Greater White-fronted Goose.

The number of geese making stop-overs in Latvia in spring amounts to more than 850,000 birds (KAMPE-PERSSON 2020a). The majority of these is made up of Tundra Bean Geese and Greater White-fronted Geese. There are also two taxa with an unfavourable conservation status regularly staging in Latvia, the Lesser White-fronted Goose and the Taiga Bean Goose, each represented by two distinct groups (KAMPE-PERSSON 2020b, KAMPE-PERSSON & BOIKO 2019). At least 1,000 Taiga Bean Geese from the Central Management Unit make a short stop-over in the westernmost part of the country in the end of February, later in a late spring, while a similar number from the Eastern Management Unit 1 stage about one month later in the eastern and northern parts of the country. The two groups of Taiga Beans are supposed to use the same migration routes in autumn, but very little is known due to lack of monitoring (KAMPE-PERSSON 2020a). About 15 Lesser White-fronted Geese from the Scandinavian population stage for about one month during the period 8 April–13 May in the central and eastern parts of the country. Lesser White-fronted Geese from the North Fennoscandian population stage more irregularly and then only in the western part of the country, usually during the period 17–30 April, occasionally in May. The only staging area, where birds from both populations have been found staging, is Svēte flood-plain, an IBA situated just north of Jelgava. In autumn, birds from the Scandinavian population migrate west of the Baltic Sea, while birds from the North Fennoscandian most likely rarely stage in Latvia nowadays. Thus, the only time Lesser White-fronts are exposed to hunting in Latvia nowadays is during licence shooting in spring, if individuals are mis-identified as Greater White-fronted Geese.

The aim of this short contribution is twofold. Firstly, to outline measures taken in Latvia to improve the national goose hunting statistics and by that setting the country in a better position to fulfil the intentions of the international action plans. Secondly, to show how the quality of the Latvian goose hunting statistics stepwise have improved during the last decade.

### **Open season and licence shooting**

The open hunting season for geese in Latvia is 15 September–30 November. Quarry taxa are Taiga Bean Goose, Tundra Bean Goose, Greater White-fronted Goose, Greylag Goose (since 2008) and Canada Goose (since 2008). Up to the mid-1980s, also the Lesser White-fronted Goose was an allowed species, and there was also an open season in spring, from the arrival of the geese until 10 May.



During the last few decades, especially after joining the European Union in 2004, Latvian agriculture was modernised and it is now largely quite similar to that in western and central Europe. Contemporaneously, especially during the last few years, Latvian farmers started to complain about crop damage caused by geese (KEIŠS 2019). The main problem was, very surprisingly, economic losses of fieldbean *Vicia faba*. It has been shown, that Bean Geese in captivity reject all kinds of beans as food (LEO VAN DEN BERGH personal communication). So, it came as a surprise, when Bean Geese started to feed on field beans, just after that the crop had germinated. The reason was that germination makes the beans soft and palatable, at the same time as it is easy for the geese to follow the rows and find the beans. To mitigate these damages, farmers wanted to hunt geese in spring (KEIŠS 2019). After discussions with the authorities, 350 farmers wanted licenses to shoot 20 geese each and finally, 60 farmers got licenses for ten geese each and 80 farmers got licenses for five geese each ([www.daba.gov.lv](http://www.daba.gov.lv)). Allowed species were Taiga Bean Goose, Tundra Bean Goose, Greater White-fronted Goose and Canada Goose. To mitigate damages in cereal fields, licences were valid 15 March to 31 May (JĒKABS DZENIS in litt).” (KAMPE-PERSSON 2020b).

In Latvia, the hunting year runs from 1 July–30 June. As the number of bagged geese are published among the last of all hunted species, it takes almost a year before the official hunting bags of the open season are available.

### **Hunting bag studies**

In 2014, Linda Dombrovska initiated a project, in which hunters were asked to take photos of the heads of the BeanGeese they had shot and submit these images to the Latvian Hunters’ Association. The aim was to determine the taxonomic composition of the Bean Goose harvest in Latvia. As this project became annual, the request changed and the hunters are nowadays asked to report all hunted geese in this way and to submit at least two images of each bird, one each of the head and the body (with one wing spread).

Mandatory submission of a photo image of every goose bagged during the licence shooting in 2020 made it possible not only to check that only permitted taxa were shot but also to split the bagged Bean Geese into Taiga and Tundra. If any Lesser White-fronted Goose had been shot by mistake, it would have been possible to take actions to minimize the risk of it happening in the future.

Determination of taxon and age of Bean Geese hunted in autumn is an easy task when holding the birds in the hand. Doing the same using photo images can be a challenge however, especially when the photos are taken by inexperienced volunteers. The Bean Geese shot during licenced hunting in 2020 were easily identified to taxon, mainly due to the fact that they had been shot on growing crops and for that reason the carcasses were dry. Of the Bean Geese hunted during the open seasons in 2014–2020, about 95 % were easily identified to taxon. The images needing a closer examination were almost all of inferior quality, all of them showing wet individuals, birds that had been retrieved from water. A wet bird gives an impression of being darker and slimmer than a dry bird, effects that have to be taken into account when determining the taxon.

The sites from where photo images of hunted Bean Geese have been submitted are well distributed over the country, showing a similar distribution as that of spring-staging Taiga Bean Geese (KAMPE-PERSSON & BOIKO 2019). However, the proportion of the hunted bean geese that are reported by images vary greatly among districts, from almost none to all. Efforts to persuade more hunters to report the geese they hunt have included information about how to take the photos and where to submit them, the importance of such data and feed-back of results by articles in the leading hunting magazine (e.g. KAMPE-PERSSON 2019, STIPNIECE 2020). The number of reported Bean Geese has increased slowly through the years (Table 1), but the aim ought to be to reach at least half-way to the reporting frequency achieved in Denmark in the 1960s.

Table 1. Results of the Latvian hunting bag studies, 2014–2020. Number of Taiga Bean Geese (TaBG), Tundra Bean Geese (TuBG), Taiga + Tundra Bean Geese (BeG), Greater White-fronted Geese (GWfG), Greylag Geese (GG), Barnacle Geese (BaG), Canada Geese (CG) and Brent Geese (BrG) among the submitted images of hunted geese in the autumns of 2014–2020. Since 2018, Tundra Bean Geese and Greater White-fronted Geese have been aged.

	TaBG			TuBG			BeG	GWfG		GG	BaG	CG	BrG
		Ad	Juv	Tot				Ad	Juv				
<b>2014</b>	2	–	–	32	34	–	–	–	–	–	–	–	–
<b>2015</b>	0	–	–	22	22	–	–	–	–	–	–	–	–
<b>2016</b>	0	–	–	87	87	–	–	–	–	–	–	–	–
<b>2017</b>	0	–	–	97	97	–	–	–	–	–	–	–	–
<b>2018</b>	1	58	22	80	81*	2	13	0	0	0	0	0	0
<b>2019</b>	1	72	41	113	114	37	48	1	0	1	1	1	1
<b>2020</b>	2	75	55	130	132	28	25	24	2	0	0	0	0

\* = images of another 49 bean geese (and at least 60 Greater White-fronted Geese) could not be used, as they had been photographed at too long distance.

In Denmark, all goose hunters received a questionnaire in 1961, 1965 and 1966, asking them to specify how many individuals of each taxon they had shot. Of the total number of geese hunted in these three years, 45%, 54% and 48%, respectively, were accounted for by the submitted replies (FOG 1977). As a comparison, the Latvian percentage was 6.6% in 2019 (Tables 1 and 2). What has to be done to markedly increase that percentage?



Table 2. Annual goose hunting bags in Latvia in 1967–2019 and the license hunting bag in 2020. The hunting year lasts from 1 July to 30 June and is here denoted by the starting year. Open seasons for geese have been 15 September–30 November (A) and from the arrival of the geese in spring to 10 May (S). For mitigation of crop damage in 2020, licenses were issued to 140 farmers to shoot a total of 1,000 geese during the period 15 March–30 May (L). Sources: Official bags 1967–2012, and average bags 1967–2007 and 2008–2012 (Vīksne 2013), bag 2013 (Marjakangas et al. 2015), official bags 2014–2019 (www.zm.gov.lv), splitting of bean goose data on Taiga and Tundra in 2014–2020 (see Table 1) and license hunting bag in 2020 (Jēkabs Dzenis in litt). NA = not available at the moment of writing. – = no data.

	S	Taiga	Tundra	Bean	GWfG	LWfG	Greylag	<i>Anser sp</i>	<i>Branta sp</i>
1967	A+S	–	–	–	–	–	–	490	–
1973	A+S	–	–	–	–	–	–	900	–
1992	A	–	–	–	–	–	–	615	–
1996	A	–	–	–	–	–	–	940	–
1997	A	–	–	–	–	–	–	1,515	–
1998	A	–	–	–	–	≤ 1	–	–	–
1999	A	–	–	–	–	–	–	1,076	–
2000	A	–	–	–	–	–	–	1,409	–
2001	A	–	–	–	–	–	–	1,893	–
2002	A	–	–	–	–	–	–	1,251	–
2004	A	–	–	–	–	–	–	388	–
2005	A	–	–	–	–	–	–	599	–
2006	A	–	–	–	–	–	–	558	–
2007	A	–	–	–	–	–	–	987	–
1967–2007	A+S	–	–	c. 40 %	c. 60 %	–	–	100%	–
2008	A	–	–	–	–	–	–	2,239	–
2009	A	–	–	–	–	–	–	2,001	–
2010	A	–	–	–	–	–	–	1,143	–
2011	A	–	–	–	–	–	–	2,011	–
2012	A	–	–	–	–	–	–	2,012	–
2008–2012	A	c. 300	c. 400	c. 700	c. 1,060	–	c. 120	1,881	–
2013	A	c. 300	c. 638	938	324	–	221	1,483	–
2014	A	17	1,196	1,213	400	–	178	1,791	0
2015	A	20	1,403	1,423	388	–	200	2,011	0
2016	A	11	930	941	321	–	308	1,57	2
2017	A	0	1,238	1,238	430	–	256	1,924	0
2018	A	25	2,008	2,033	1,083	–	884	4	72
2019	A	15	1,725	1,74	783	–	2,343	4,866	926
2020	L	1	24	25	45	–	0	70	0
2020	A	1.5 %	98.5 %	NA	NA	NA	NA	NA	NA

Providing the reporting frequency is high enough to make the sample representative, this method has large advantages compared to other methods (for genetic methods, see HONKA et al. 2017). The only things needed are an e-mail address to which the hunters can submit their photo images and an expert that after the season determines taxon and age of the hunted geese. However, to make it work properly, one person ought to regularly check the submitted photos and reply to any questions the hunters might have.

Due to low numbers of images submitted in the first two autumns (Table 1), data for the years 2014–2016 were pooled. The percentage of Taiga Bean Geese in the pooled sample and the following four autumns were 1.4%, 0%, 1.2%, 0.9% and 1.5%, respectively.

The pooled data for the years 2014–2020 give a proportion of Taiga Bean Geese of 1.1 %. That percentage can be compared to the proportion of Taiga Bean Geese among the spring-staging Bean Geese in Latvia, which is about 0.6 % (KAMPE-PERSSON 2020a).



### Hunting bag statistics

The usability of the Latvian goose hunting statistics has improved significantly during the last decade (Table 2). Up to 2012, only a figure for the total number of hunted geese was given. In 2013, the total was split on species and from 2014 onwards, the bean geese have been split on Taiga and Tundra. The table should be self-explanatory, but a few remarks might help.

The figure of approximately 300 Taiga Bean Geese bagged annually in the years 2008–2013 was clearly an overestimation due to lack of adequate data (KAMPE-PERSSON & BOIKO 2019). Unmarked Lesser White-fronted Geese hunted during the open season have very likely in most cases been mis-identified and reported as Greater White-fronted Geese. That is probably not a real problem nowadays, due to the species extreme rarity as staging bird in autumn. The situation is different in spring, but if any Lesser White-fronted Geese are shot by mistake during licenced hunting that will be known, as it is mandatory to submit photo images of every shot goose. The Canada Goose is the only *Branta* species that is allowed to be hunted. However, as especially Barnacle Geese but also some Brent Geese are shot in autumn (see Table 1), the Canada Geese are in Table 2 reported as *Branta* sp.

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## Critical assessment of the international conservation of the Lesser White-fronted Goose *Anser erythropus*

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### Abstract

The Lesser White-fronted Goose *Anser erythropus* has apparently lost extensive areas of its high-quality winter habitat in South Eurasia, areas with seminatural/natural vegetation including e.g. steppe vegetation. Recently this has concerned remnants in Greek Macedonia, around the Caspian Sea area, and in China especially in the Yangtse River basin. Recent studies on the size of the subpopulations of the species, their genetics and conservation status have shown that the basis for international cooperation is in the need of a profound alteration. In particular, hunting as a population-limiting factor has probably been overestimated and should be reconsidered. The AEWA working group should need an updated plan and new ruling of the work.

**Keywords:** Lesser White-fronted Goose, limiting factors, habitat loss, genetics, international cooperation.

### 1. Introduction

In 2005, the Finnish government and a number of non-governmental organizations, including our own, held an international meeting on the Lesser White-fronted Goose *Anser erythropus* (later LWfG). The main focus was to enhance the conservation status of the species. The meeting failed as it did not agree upon common conclusions. However, the meeting gave an impulse to various actions such as the recommendation produced by the Scientific Committee of the Convention on the Conservation of the Migratory Species (later CMS) and the formation of the AEWA Lesser White-fronted Goose Working Group. In 2008 the AEWA (Agreement on the Conservation of African-Eurasian Migratory Waterbirds) adopted its action plan (later Plan) (JONES et al. 2008). Later also the EU Commission has organized a meeting to co-ordinate the actions within the EU region (KREMLIS 2017).

After 2005, many scientific papers have been published, e.g. on the ecology, migration behaviour, genetics and, in particular, on the population size of the species. In view of this information it is time to make an assessment on the present conservation status of the species and to suggest proposals for future actions.

Table 1. The subpopulations, their size (according to ANONYMOUS 2021a, PORTAL 2019, ROZENFELD et al. 2019 and AO et al. 2020), east-west length of the habitat of the four subpopulations and the available information of the wintering range as % of all birds where they stay.

Subpopulations	Swedish	"Fennoscandian"	Mid-Russian	East-Russian	Total
1. Population size	110-130	100	48 500	6 800	55 600
2. % of the total	0,2	0,2	87	12	100
3. East-west extension of the habitat (1000 km)	0.8	1	3.6	3.9	8.4
4. Geese per 1000 km	125	100	13 500	1 744	6 617

Globally, there exists four flyways connecting the breeding and wintering ranges of the LWfG. Birds using the same flyway are said to form a subpopulation (Table 1).

The LWfG is a monophyletic species with no subspecies described. Taking this into account and its wide distribution, there must exist an active gene flow between the subpopulations (DIÉZ-DEL-MOLINO et al. 2020, JONES et al. 2008).

The Mid Russian subpopulation is by far the largest one. The two westernmost subpopulations are small, far below the minimum for a favourable conservation status. The East Russian subpopulation is rapidly decreasing (AO et al. 2020). As the breeding range of the LWfG essentially consists of a narrow strip through the Eurasian continent (e.g. YEROKHOV 2013) it is possible to estimate the relative size of the range of each subpopulation and so determine the relative population density for each. A comparison shows that the two small westernmost subpopulations should have possibilities for further growth — at least they have much room in their breeding ranges.

Most Arctic goose populations have grown in recent years, some enormously (FOX & MADSEN 2017). The LWfG is a clear exception, with almost no growth (see e.g. FOX et al. 2010). The population crash in the 1950s affected all four subpopulations. Today only the Mid Russian subpopulation seems to have recovered to a sustainable conservation status. The western ones have not even begun to recover. Today only about 100 LWfG use the flyway via Hungary. This is about 0,1% of the number before the population crash (cf. STERBETZ 1982).

This article deals mostly with current problems hindering the LWfG from regaining a favourable conservation status in the sense of the Habitat Directive Art. 1 of EU nature conservation legislation.

The author has taken part in the negotiations on the development of CMS and AEWA as a civil servant on behalf of the Finnish Government.

## **2. The CMS Scientific Council recommendation**

The CMS Scientific Council's recommendation on LWfG conservation was approved by consensus in Nairobi on 18<sup>th</sup> November 2005. It covers 8 points:

1. "It is desirable to have a wide genetic diversity among wild Lesser Whitefronts."
2. "Given the small size of the wild Fennoscandian population, if possible, a captive breeding population of birds from this source should be established and maintained as a priority."
3. "every effort should be made to conserve the Fennoscandian birds down their traditional migration routes into south eastern Europe and Caspian/ Central Asian region."
4. "doubts do remain about the genetic make up of the existing free-flying birds, originally introduced into the wild in Fennoscandia and winter in the Netherlands."
5. "Given the possibility that the above mentioned free-flying birds, or their descendants, may pose a risk to the genetic make-up of the wild Fennoscandian population, the Scientific Council is of the opinion that these birds caught and removed or otherwise remove from the wild.... We recommend that a feasibility study be undertaken as a matter of urgency."
6. "We believe that there is nothing against establishing a group in captivity of pure-bred Lesser Whitefronts from the wild, western Russian stock.... However, we do not believe that it is appropriate to release such birds to the wild now or in the immediate future."

7. “For the present, we do not support the introduction of Lesser Whitefronts into flyways where they do not occur naturally.”
8. “We consider that it would be appropriate to re-examine the issues once more in five years.”

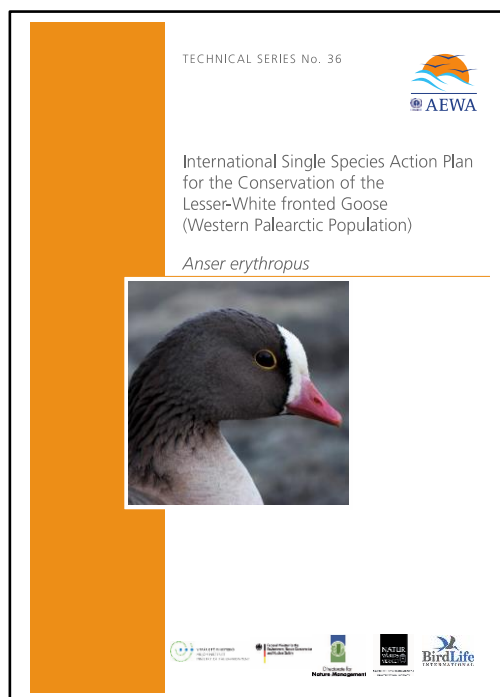
The CMS recommendation was made in a situation when:

- a tiny southwest migrating subpopulation had been re-inforced in Sweden by the project of the Swedish Hunters’ Association using Lambart von Essen’s method (VON ESSEN 1996). The project is supported by the Swedish government and many non-governmental organizations;
- the Norwegian original subpopulation was still decreasing after the earlier collapse;
- no LWfG had been found breeding in Finland since the mid 1990’s. This was in spite of reintroduction efforts by a Finnish WWF project supported by the government (MARKKOLA & KARVONEN 2020). Fledged young LWfG had been released in Lapland without foster parents. Some of these birds had been found in several places in Western Europe but none returned back to breeding sites in Finland, as far as we know.
- a Finnish-Swedish genetic study (RUOKONEN et al. 2000) had claimed that the captive LWfG population used for re-stocking in these countries seemed to be contaminated by genes from the Greater White-fronted Goose. Releasing of LWfG had already been stopped in Finland, probably because of preliminary information on the results of this study and obviously because of the poor outcome of releases without foster parents.
- private persons in Finland had established the association “Friends of the Lesser White-fronted Goose” (later the “Friends”) maintaining the Finnish captive stock of Swedish origin LWfG. They aimed at a re-introduction of the species in Finland using the Swedish Lambart von Essen’s method with Barnacle Geese as foster parents.

The CMS Scientific Council recommendation (later CMS rec.) was clearly directed against Lambart von Essen’s method, in particular against the projects of the Swedish Hunters’ Association (see above points 4, 5 and 7 of the CMS rec.) and the Finnish “Friends”.

### 3. The Plan and its implementation

The recommendations of the CMS Scientific Council in all details are taken into account in the Plan. The goal of the Plan is: “To restore LWfG to a favourable conservation status within the AEWA agreement area.” In the preface of the Plan, the AEWA Executive Secretary Bert Lenten writes: “... to secure a population size of over 25 000 individuals for the Western main (= Mid Russian) subpopulation and over 1 000 individuals for the Fennoscandian subpopulation.” Strangely, the Plan deals only with the “Fennoscandian” and Mid Russian (Western main) subpopulations. When mentioning the Swedish subpopulation, the Plan states: “According to previous agreements between the Fennoscandian Range States and in line with AEWA’s mission, the main focus of this plan is the conservation of the wild populations.”



Apparently, the wording "Range States" refers only to Norway and Finland and the Plan does not regard the Swedish re-inforced natural subpopulation as wild.

In Sweden, in spite of the critical attitude of the CMS and the Plan, the re-inforcement project was continued. However, some changes were made to the Swedish project. ANDERSSON (2016) gives a detailed description on the project. A completely new captive population was established from a newly imported Russian wild LWfG. Foster parents were not used after year 1999. A feasibility study (See point 5 of the CMS rec.) was made. The author (OTTWALL 2008) concludes: "to capture Swedish Lesser White-fronted Geese for genetic screening and refinement by removal of apparent hybrids is a pointless action and not feasible."

Later on, the existence of alien genes in the captive population turned out to be highly questionable. All grey goose species are genetically very close to each other and hybridization has taken place several times during their speciation (cf. OTTENBURGHS et al. 2016a, OTTENBURGHS et al. 2016b and OTTENBURGHS et al. 2017). Finally, DIÉZ-DEL-MOLINO et al. (2020) have been able to show that there has not been any introgression of Greater White-fronted Goose genes into the Swedish LWfG captive population used for reinforcement (cf. CMS rec.point 4).

Recent studies have shown that LWfG were seen in Western Europe already before the Swedish project was started (e.g. MOOIJ 2010). This is contrary to the CMS recommendation's point 7 suggestion that the flyway produced by the Swedish project is not natural.

Furthermore, DIÉZ-DEL-MOLINO et al. (2020) were able to prove that the Swedish LWfG subpopulation was more isolated from the Russian subpopulation than the Norwegian and thus must have had a different wintering range, probably in Western Europe.

In Finland, also the "Friends" continued the breeding and re-introduction project using birds of Swedish captive origin. The first release of a LWfG goslings with foster parents was done in 2004. In the same autumn and winter, the geese were observed in The Netherlands (Fig. 2). Thereafter Finnish nature conservation authorities initiated a police check of this action. That led to a court case against "the Friends" for having "released an alien species (the LWfG) into the wild". The Lapland LLaplans local court, however, decided that the released LWfG were not an alien species in Finland and dismissed the charge. No one appealed this decision. So, it became legally binding.

In autumn 2005, a heavy snowstorm hit the Finnish breeding facilities and the captive LWfG population suffered heavily. No further releases were done until in 2009. Now the "Friends" were sued again, although the case was identical to the previous one.



Fig. 1. Pentti Alho carrying a wounded adult LWfG for care. Handling and human presence are kept to a minimum. The geese are kept as naturally shy as possible.  
(Photo L. Kahanpää. )





Fig. 2. The LWfG "Finny", released in 2004 In Finland, here with her foster parents in the Netherlands. (Photo Gert Huizers.)

This time, to fabricate a difference, at first only the Barnacle Geese were called alien, but in the local court the "Friends" were again also accused of releasing LWfG. This time the "Friends" lost the case in the local court but appealed to the Rovaniemi Court of Appeal which did not change the decision. According to the verdict in 2011, the chairman of the "Friends" and two others had violated the Finnish Nature Conservation Act's

(1096/1996) paragraph 43:1 preventing the Spread of Non-Native Species). The verdict of the local court was based on the following arguments:

1. The Barnacle Goose is not breeding in Lapland and could cause ecological damage there. Therefore, the species shall be regarded as a locally non-native/alien species in Lapland.
2. The Finnish captive LWfG are hybrids.

These two court decisions mentioned above— contradictory as they are — must be seen as elements of the implementation of the Plan in Finland.

In 2014 those who got the court decision complained to the EU Commission that these two especially protected species of the Bird Directive cannot be non-native/alien species. The final decision of the EU Commission was given May 22, 2017 (KREMLIS 2017). It states: "The Commission does not take position on the question whether or not a species is alien or native to an EU Member State.....Through this reporting exercise, all EU Member states report on the status and trend of each wild bird species naturally occurring in the EU territory of the Member State. Finland has reported to the Commission through the article 12 reporting exercise in 2013. Both *Anser erythropus* and *Branta leucopsis* are reported by Finland in its national report. This indicates that Finland considers these species as native species in their territory. (KREMLIS 2017)."

Table 2. The most important threats according to the plan.

**According to the AEWA Lesser White-fronted Goose plan, the most important threats are the following (JONES et al. 2008):**

1. Hunting on staging and wintering grounds (CR)
2. Agricultural intensification on staging and wintering grounds (H)
3. Construction of dams and other type of river regulation (H)
4. Knowledge limitation (M)
5. Potential genetic introgression of alien genes into the wild Fennoscandian population from captive bred birds. (Lengthy discussion on the potential threats)

(Threat categories: CR= critical, H=high, M=medium)

#### 4. Hunting as a possible factor limiting population growth

The Plan (Table 2) and the Portal to the Lesser White-fronted Goose (later Portal) (Table 3) emphasize hunting as an important limiting factor for population growth. YEROKHOV (2013) agrees with this opinion when writing about the Mid Russian subpopulation: “Hunting is the most serious factor limiting any possible increase in Lesser White-fronted Goose numbers.” He also lists some other threats like water regulation regimes, poisoning and disturbance by recreation activities.

Table 3. The most important threats according to the Portal.

**The Portal to the Lesser White-fronted Goose lists the threats as follows in this order:**

1. High mortality due to illegal hunting and accidental shooting.
2. Disturbance, such as human activities like e.g. traffic, hiking and tourism in the breeding areas and bird watching at some of the stop over sites, agriculture and hunting.
3. Habitat loss and degradation. The feeding conditions along the migration routes and in the winter areas have deteriorated through transformation of the natural steppes into cultivated land, and many wetlands have been drained.

“High mortality due to high hunting pressure is sufficient to explain the decline of the LWfG populations.” (PORTAL 2019).

In line with this idea on hunting, the Swedish project was developed to avert hunting pressure by re-creating the south-western migration route of the LWfG (VON ESSEN 1996).

In Norway, special attention is paid to eliminate hunting pressure in the breeding, stop-over and wintering areas. Both national projects include efforts to eliminate predators, especially Red Foxes in the breeding areas. In spite of these measures, the population growth has been limited or absent. The size of each subpopulation is about 100 birds in autumn (Table 1). This is far below their previous size, which must have been several thousands before the population crash in the 1950s (c.f. SOIKKELI 1973, HAAPANEN 2012)

This indicates that hunting may not be the key factor limiting population growth. If it were, then the population growth would not stagnate so soon. Instead, it should react like the numbers of the Whooper Swan *Cygnus cygnus* in Finland. By the end of World War II, hunting of the already protected swan was completely stopped by strict conservation measures, and the effect was immediate. The population started to grow at a steady rate of 11%/year, in the southern part of the country up to 14%/year (HAAPANEN 1987) (Fig. 3).

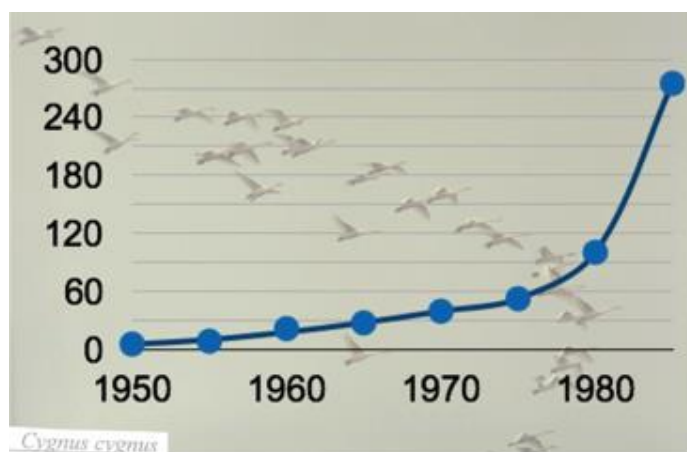


Fig. 3. The growth of the breeding Whooper Swan population in Finland 1949-1986 (according to Haapanen 1987).



Fig. 4. Shot Lesser White-fronted Geese

In Finland population growth continues, and today the Whooper Swan is widespread over the country and more numerous than ever in known history. The conclusion might be that hunting is not the key factor limiting the Swedish nor “Fennoscandian” sub-populations’ growth today.

Not today! But in former times it may well have been important. For instance, could the decline of Western European wintering numbers of LWfG, before the global population crash in the 1950s, have been the result of excessive

hunting? (cf. MOOIJ 2010, HAAPANEN & KAHANPÄÄ 2020)

## 5. The most probable limiting factors

If hunting is not the key limiting factor today, then there must be some other. MADSEN (1994) while agreeing that the reasons are poorly known, continues that the population decline has probably been caused primarily by deleterious factors on the wintering grounds, such as deterioration of feeding conditions through the transformation of steppes to cultivated land. As it is well known in the southern part of the former Soviet Union, large areas were taken to cultivation since the late 1950’s with various success. The same trend may have occurred elsewhere, too.

The Swedish subpopulation. In the first years of Swedish LWfG reinforcement, the subpopulation started to grow smoothly (KOFFIJBERG & VAN WINDEN 2013), not exponentially but faster than linearly anyway. But in 2012 and 2013 it experienced a serious decline (WILLEBRAND & WILLEBRAND 2018) when the subpopulation was hit by heavy predation on the breeding grounds. Red Foxes and White-tailed Eagles caused high mortality (SCHEKKERMAN & KOFFIJBERG 2019). Later, enhanced predator control has had some effect and now the subpopulation is slowly recovering (LILJEBÄCK & KOFFIJBERG 2020).

Recovery was and is slow. This indicates problems also off the breeding season. The Swedish LWfG form only a tiny proportion of all wintering geese in the wintering range in The Netherlands. Being the smallest geese there, they may suffer from food competition. However, Dutch experts (JAN BEEKMAN and GERARD OUWENEEL, oral inf.) are of the opinion that food cannot be a limiting factor for Swedish LWfG in The Netherlands. If they are right, then continued predation control should lead to a faster population growth in coming years.

The “Fennoscandian” subpopulation. The “Fennoscandian” subpopulation stays at about 10% of the numerical goal of the Plan. These Norwegian-breeding LWfG winter in Greece, but with a decreasing population trend (VOUGIOUKALOU & MANOLOPOULOS 2020). Their habitat has significantly dwindled, is fragmented and the geese are disturbed by continuous human presence. The Evros Delta and Lake Kerkini are what is left of a formerly large wintering area, mainly in Macedonia. (DEMENTZI et al. 2017). Competition on food must be hard as it is utilized to close to 100% (KARMINIS et al. 2017). In former times this subpopulation regularly continued migration from Greece up to the Caspian Sea region.



This does not happen anymore; only during frosty periods the geese still may disappear from Greece to an unknown place.

Maybe the reason is that the “Fennoscandian” subpopulation has reached the carrying capacity of its winter habitats or even passed over.

The Mid Russian subpopulation. According to Table 1, the Mid Russian subpopulation has not only reached but surpassed the numeric goals of the Plan by 190 %. The wintering sites are poorly known but in order to maintain a rather large number of geese, the



Fig. 5. Lesser White-fronted Goose of the Mid Russian subpopulation  
(Photo V.V. Morozov)

wintering sites of this subpopulation must provide fairly good conditions. Formerly well visited stop-over sites at the Caspian Sea seem to have lost their value (c.f. ISAKOV 1972, VASILIEV et al. 2006, LAMPILA 2017).

The main autumn migration follows the Ob river. Some years large numbers of LWfG are found foraging near various lakes in Kostanay / Kazakhstan, near different lakes depending on the weather. Their relative success may be due to this high adaptability to conditions. Anyhow, there is reason for concern: Their final wintering sites may currently lie in Iraq and Syria where the human need for water and food is heavy and the social situation is very unstable.

The East Russian subpopulation. In China in the Yangtse river basin, the LWfG are totally dependent on ephemeral vegetation since there is considerable disturbance on agricultural land and domestic fowl use the available food (ZHAO et al. 2018). So, in China food availability obviously limits the number of wintering LWfG (WANG et al. 2013a, WANG et al. 2013b). The geese are in fact rapidly decreasing (21,000 in 2005 to 6,800 at present) and the recent observations of LWfG in Japan (190 specimens) are too few to compensate for this (AO et al.2020).

Based on these observations in most cases — if not all — the insufficient size and/or condition of the winter habitat seems to limit the recovery of the LWfG after the population crash in the 1950s.

## 6. Discussion

NORDENHAUG & NORDENHAUG (1984) were able to show that SOIKKELI’s (1973) observations on the population crash concerned the whole Fennoscandian breeding population in the three countries, Finland, Norway and Sweden. The breeding range had been fragmented and the population size was less than 500 birds.

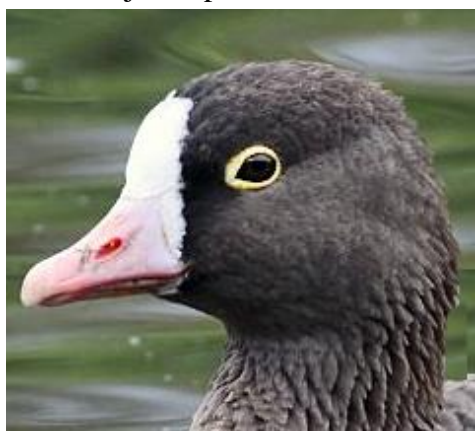
In Sweden, the Swedish Hunters’ Association started in 1981 its project to reintroduce LWfG into Swedish Lapland. WWF Finland followed Sweden using from Sweden originated captive birds. In Finland WWF project did no use foster parents. Although quite many fledged young LWfG were released the birds apparently did not come back to the Finnish Lapland. The project was supported by the Finnish Ministry of Environment.

The Finnish project was, however, closed as mentioned above because the captive population was thought to be contaminated by alien genes from the Greater White-fronted Goose. The “Friends” association was established when the WWF project was closed. The “Friends” used the Lambart von Essen method with foster parents. It worked (Fig. 2) but “legal problems” on the alien genes came into the picture.

The recent studies by OTTENBURGHs et al. (2016a, 2016b, 2017) have shown that RUOKONEN et al. (2000) may per se have made right observations but their conclusions were based on deficient analysis of genetic material. Further on, DIÉZ-DEL-MOLINO et al. (2020) were able to show that in Sweden the released LWfG from the original Swedish captive stock were not contaminated by alien genes. Alien genes in the captive population of the “Friends” of Swedish origin lacks documentation. Therefore, the decision of the Finnish court 2011 was not based on evidenced facts. However, it caused the “Friends” project to cease.

As mentioned above, the Mid Russian subpopulation has even surpassed the numerical goals of the Plan while the “Fennoscandian” subpopulation stays at only 10 % of the goal. The same applies more or less to the Swedish subpopulation. Based on the available information on the winter situation in Greece and in the Netherlands, it seems that the Swedish subpopulation would have better chances than the “Fennoscandian” for further growth towards a sustainable conservation status.

The East Russian subpopulation seems to be rapidly declining as shown by the recent studies (AO et al. 2020). It faces challenges in its winter habitat in China. Generally, for the maintenance of any LWfG subpopulations, it is most important to guarantee good conditions of the wintering habitats, where ever they may be. Traditional stop over sites are of major importance, too.



The “Fennoscandian” and the East Russian population are in their wintering range more or less dependent on the semi natural/ natural habitat with a very restricted area. The habitat in Evros delta is losing its value as bushes are penetrating to the meadows (VOUGIOUKALOU et al. 2020). The Swedish population and those migrating with greater White-fronted Geese originating most probably from the European part of the Russian breeding range use mostly cultivated land as winter feeding habitat.

Although the Mid Russian population has lost extensive areas of their winter habitat around the Caspian Sea, they must still have large unknown areas to feed and stay. To my understanding the finding and maintenance of these areas is of enormous importance for the future of the global LWfG population.

## 7. Conclusions

The AEWA Plan should be rewritten so that the essential problems are highlighted. The Plan itself and the CMS Scientific Committee recommendation ask for a follow-up and updates every 5th year. This need has accumulated to a major task, since by now many of the “basic facts” in the Plan have been inadequate.

A practical obstacle to the revision of the Plan is the lack of genuine cooperation in the AEWA Working Group. The following is a quote from the home page of the Swedish Hunters’ Association:



*“The opposition from Norway and Finland is the single most important reason why AEWA has failed to update the international action plan for the species (cf. CMS rec. 8). This is especially disappointing as the Action plan is obsolete and includes misguided recommendations.”*

In the recent 3rd and 4th meetings of the AEWA Working Group, the Finnish member representing the Ministry of the Environment opposed updating the Plan. His position was in line with the official policy of the Ministry (as answered to the author’s official question). The Plan is still in its original form (ANONYM 2021b). Other examples of the poor cooperation: Some geese raised from Russian origin birds were donated from Sweden to Norway to enhance the genetic diversity of the “Fennoscandian” subpopulation. After their first migration south, one of them returned to Norway in spring. There it was eliminated! Norwegian authorities also decided to eliminate another Swedish LWfG which had continued its spring migration up to Norway.

The Lesser White-fronted Goose Working Group consists only of AEWA Agreement parties. They cover less than 0,5% of the LWfG population and their legal competence covers even less, only the EU region. Seen against this background, it looks strange that the working group proposes activities e.g. in Russia, Iran, Azerbaijan and other non-EU countries.

For effective actions in any range state, a competent body is needed to take responsibility. According to AEWA ruling, it is possible to replace the present working group by an expert group to which all range states, not just the AEWA parties, could nominate a member. This would solve many of the problems concerning the cooperation and the competence of the group.

Such an expert group could hopefully also update the AEWA Plan so that it would emphasize valid problems of conservation and cooperation between range states. In particular, it should call for efforts to find and evaluate the winter habitats and stop-over sites of the various subpopulations. Everything possible should be done to secure the quality of these areas. Important sites shall be evaluated if they can be maintained or restored. This will demand international cooperation of the range states and especially their institutions accountable for nature conservation, water management, agriculture policy etc.

Also — of particular interest for us in Finland and Western Europe as a whole— an updated Plan would surely affect the obsolete LWfG policy of the EU Commission. Hopefully the EU Commission would renew its policy in line with what is presented here and reject many of the present "goals" (c.f. KREMLIS 2017).

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Lauri Kahanpää has contributed to the preparation of the manuscript. He has taken the figure 1.

Gert Huizers has taken in 2004 the figure 2 showing “our LWfG” in the Netherlands.

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## Why the ancient Meidum Geese painting is not a mystery new species...

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A lot has been said and discussed after a sensational paper, published in a Journal of Archaeology, An Australian paleontologist claimed that the painting of the Meidum Geese - an ancient Egypt fresco depicts an extinct unknown to science species of goose (ROMILIO 2021).



Painting of geese from the tomb of Nefermaat and Itet, Egypt, Old Kingdom, Reign of Snefru (ca. 2575-2551 BC)

Yes, BUT NO!

It is claimed that based on the so-called “Tobias criteria” (TOBIAS et al. 2010) for species delineation it differs significantly to be a separate species and in the popular reprints, there is even a computer-generated image based on the ancient fresco.

So let's look objectively at what we see on the ancient painting.



If we focus on the Red-breasted Goose (*Branta ruficollis*) look alike birds first we see two birds, one behind the other. The front one which is claimed by the new paper to be an unknown new species has several features that clearly indicate for a juvenile/first calendar year bird of the well-known species – *Branta ruficollis*.

Looking into one of the field guides for bird identification let's take one authored by SVENSSON et al. 1999 what we see in the description is that adult birds show only two white stripes on folded wing and have big red patch on the cheek which leaves very narrow white banding. On the other hand for the young birds it says that it shows several up to 5 whitish wing bars on folded wing and the red patch is small with lot of white on the area or it could even be missing. So clearly these wing bands seem to be indicative for the aging of the species.



Well if you are a goose expert and with fair amount of experience working with the Red-breasted Goose you would know few things about aging the birds and one of them is that red cheek and breast could moult to adult plumage much faster in the winter than the wing pattern and late in the winter period around February/March when cheek and breast pattern could not be clearly identified especially in some captive birds as they are very similar between the adult and young birds, one could still securely identify the birds from the wing/back pattern. The young birds always show more greyish coloration compared to glossy dark black of adult birds and always show a hint of one or two extra dim stripes on the wing, while adult birds will show two clear wing bars and nothing else. The internet provides images of the species, and I found the image below on the site of Romanian photographer (<https://drumetuleclecticbirds.myportfolio.com/branta-ruficollis>) and surprise surprise look what I found:



Strangely some of the obviously young birds show surprisingly different red-breast and cheek pattern and depending on the posture and position of the neck and head the white area varies a lot! Unlike that of the adult or subadult birds. And keep in mind that the Red-breasted Goose, as many would know, reach adulthood in 4-5 years therefore the wing pattern will stay different longer (until first spring) than the cheek and breast pattern. But let's see one of the other pictures of this Romanian photographer





What do we see – several wing bars a lot of white on cheek and belly black colouration does not show the typical white-black stripes towards the end of the black patch as in adults but more similar to what we see in the ancient Meidum Geese fresco. Something typical in first year birds is that there is a hint of scales pattern in the breast and belly which is still visible in this picture here by the same Romanian photographer. Have a look as well at this FB page album for more comparison of adult and young birds (<https://www.facebook.com/media/set/?vanity=Redbreasted.Goose&set=a.362121580542217>)

Could the ancient painter have depicted this by simply painting black dots on the red? Well, I am not an artist and do not claim to have explored ancient Egypt painting technique, but why not.... And well think now, could it be possible that the ancient artist has stylized the geese enough so that they might look a bit different to a non-geese expert.

I would say yes.

We do not know, what is the case of these geese, were they visiting in ancient times the Nile valley, or the Egyptians traded them with some neighborhood country or got them as a gift?

I am not sure, but birds being depicted along other grazing geese might have occurred either as regular or vagrants in the ancient Egypt kingdom, when the Sahara was much greener than now. The species occurs as regular, unregular or vagrant species in over 50 countries and hey guess what – it is listed as Vagrant species for Egypt as well!

The species is known to has historically shifted its wintering distribution at least once - in the 1960s moving from the W Caspian shores to the N-NW Black Sea shores, so one may think that it might have occurred in the ancient times in Egypt more regularly or regularly enough to be depicted by one of the Egypt tombs artists.



But let's summarize what we know about the bird in front:

- the grayish back may indicate a young or subadult bird,
- the three white stripes very well match the pattern of a young bird,
- the big white gap on neck also could be linked to the fact that the bird is young one,
- the fact that there is no black-white stripe marking on the belly, but just dark black solid colour again is very typical of young Redbreasts compared to adult birds.

We do not see the bird behind so well, but it is a more deep red colour, has a narrow white gap around the red cheek patch and typical stripes at the end of the belly patch, which together indicate an adult bird.

All in all considering that the species is even today considered a vagrant in Egypt we have no reason to put doubt on the species being present in ancient times. Moreover today, records of the species have been recorded in Iraq, Iran and even as vagrant to India!





Young birds do have smaller cheek patch and thus the white gap is larger and looks bigger so this can easily make an ancient artist paint it with bigger white than realistically. Here all this visible on a first c.y bird photographed in Kazakhstan by me in autumn of 2011.



Red-breasted geese depicted by Robert Gillmor showing black trace around the red breasts, not always visible, but present in the colouration of the species and depicted in the Egyptian painting.



Now knowing the age differences that might have been depicted in the ancient fresco let's see how the old artist of 18 and 19<sup>th</sup> centuries depicted the species. I did take the time to look at some old lithographs of the species and check how well they depict the species features, including adult/juvenile differences. Claiming that the ancient Egyptian artist should be reflecting correctly and exactly the features of the species then 3-4 thousand years following them should be able to reflect even more precise the features of the species.

 <p>ANSER ruficollis. <i>Rothhals-Gans.</i> alt. M.</p>	<p><b>Author: Naumann, Johann Andreas, 1747-1826</b> <i>Naturgeschichte der Vögel Deutschlands</i></p> <p>This lithograph of early 1800 depicts clearly by the two wing stripes an adult bird, but cheek patch is typical for a juvenile bird, as well as the brown-greyish colouration of the wing and the lack of the zebra pattern at the belly, which is just faintly marked. Despite that one can clearly recognize the species.</p>
 <p>1/4</p>	<p><b><i>A history of the birds of Europe : including all the species inhabiting the western palaearctic region (1871-1881).</i> Author: Dresser, H. E. (Henry Eeles)</b></p> <p>Well depicted Red-breasted Goose, however with this black dark wing and back it clearly depicts the adult bird, but the wing bars are far too many for an adult bird., while the juvenile bird is fairly well depicted.</p>



*The birds of Great Britain, systematically arranged, accurately engraved, and painted from nature (says the original text of the book)*

*By Lewin, William, d. 1795*

So now what we have here is again Red-breasted Goose, but hey what a coloration! There is no separation of the cheek patch and breasts, almost lacks any white marking between the redbreasts and black side of the neck, no white stripes on a very colourful wing and back instead of greyish or black. And what shall we say here – the species is vagrant, but just because 1700s is not far enough for as a period to claim an extinct species! Never applied Tobias criteria, but surely applying it here should give a marked difference between that lithograph and the nominate Red-breasted Goose species.

We looked at just three of the old 18-19 century lithographs, but there are still a number of them that represent the species in a slightly different detail from reality, shall we say they looked at another species when painting these or it was simply artists interpretation of the species, or of his memories of the species or reflection of very badly stuffed bird in a collection?!? And think about that – the people in ancient Egypt for sure did not had binoculars or telescopes!

All in all – artists as by no means the authors of the Meidum Geese are as well always present their view of the animal/bird they paint. Sometime there is some interpretation of some features, sometime they create the paintings from memories.

We do not know what is the story behind the Meidum Geese, which were also thought at some point to be fake if you look on the Internet as well. It might be the artists painted them from distant memories, or from contemporary records of wild vagrants to the country at the time of painting (they are vagrants in Egypt nowadays as we mentioned).

The other two species of geese present are not that exactly replicated as well so a bit of guessing is needed to assume which species is depicted. But one is for sure – they do have a lot of identifiable features of Red-breasted Goose (*Branta ruficollis*) and in no way it could be derived that they represent an extinct unknown species!



*Copies of the Meidum Geese and a Red-breasted Goose made by Howard Carter himself in watercolour*



**Carter MSS. vii.1.4.1**

**watercolour, 9.5 by 10.6 cm**

**Location and dating:** Maidûm, tomb of Nefermaet and Itet, chapel of wife Itet, temp. Snefru (4th Dynasty), now in Cairo, Egyptian Museum

**Topographical Bibliography:** iv.93-4

**Previous reproductions:** none.

*The elaborate image of two Red-breasted Geese from the famous 'Geese of Maidûm' scene in the mastaba of Itet at Maidûm (4th Dynasty) belongs among the most frequently debated, celebrated and reproduced masterpieces of Egyptian art. This depiction of the Red-breasted Goose represents one of only two pictorial representations of this species known from ancient Egyptian sources. The other is a headless version from a painted wall of the Decorated Tomb (No. 100) at Hieraconpolis. The bird is now only a very rare vagrant to Egypt. (Jiří Janák and John Wyatt)*

*The first two illustrations are copies of the two birds to the right of centre of the 'Geese of Maidûm'. They can only be Red-breasted Geese although the diagnostic broad white flank stripe has been under-emphasized as it also is in Carter's painting of the actual bird. There are no possible confusion species. (John Wyatt)*

ROMILIO, A. (2021): Assessing 'Meidum Geese' species identification with the 'Tobias criteria'. - Journal of Archaeological Science: Reports. DOI: 10.1016/j.jasrep.2021.102834.

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## Why the ancient Meidum Geese painting might show an unknown species...

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### Introduction

In a tomb or mastaba, located near the Egyptian Meidum Pyramid, which was built by the pharaoh Snefru (reign 2610-2590 B.C) and belonged to pharaoh's son Nefermaat, the Italian Egyptologist Luigi Vassalli (1812-1887), was credited to have found the famous wall painting of the so-called "Meidum Geese," in 1871. The painting was situated on the northern wall of a tomb-chapel dedicated to Nefermaat's wife Atet or Itet. Vassalli removed the painting and brought it to the Egyptian Museum in Cairo, where it is exposed until today.

The painting shows six geese of which both birds at the outside are easily recognized as grazing Greylag geese. Left of the middle there is a pair of safeguarding White-fronted Goose and right of the middle a pair of "Red-breasted-Goose-like" birds. Whereas the Greylag and White-fronted geese are very realistic depictions of both species, the other goose pair only has a superficial resemblance with the Red-breasted Goose (Fig. 1).



Fig. 1. Image of the so-called "Meidum Geese" from the tomb-chapel of Itet in the mastaba of Nefermaat and Itet in Meidum, nowadays exhibited in the Egyptian Museum of Cairo (© Wikipedia)

### Is the Meidum Geese painting a fake?

In March 2015 the archeological community was shocked by the statement of the Italian archeologist Francesco Tiradritti that the painting of the Meidum Geese might be a fake (JARUS 2015). According to Tiradritti, Vassalli did not find the painting in the tomb of Nefermaat, but painted it himself. He argued that

1. two of the three depicted goose species, namely Bean and Red-breasted Goose, do not winter in Egypt,
2. some of the colours of the depicted geese are unique in Egyptian art,
3. the birds seem to be of the same size, which is untypical for Egyptian art.
4. the Meidum geese might be painted over another older painting.

Zahi Hawass, the famous Egyptian archaeologist, egyptologist, and former Egyptian Minister of State for Antiquities Affairs, reacted immediately and contradicted Tiradritti in April 2015. He argued that these goose species were migrating to Egypt and also are depicted in other tombs. Also the colours and the way the geese are depicted are not unusual and can be found in other tombs. Hawass concludes: "The Meidum Geese painting follows the spirit of the ancient Egyptian artists and also the symmetrical style that they used." Furthermore he quotes a number of renowned international egyptologists, who confirmed the genuineness of the painting (HAWASS 2015a & b).



Besides the painting originally was part of a bigger painting, showing a wildfowl trapping scene (Fig. 2). This painting was situated on the northern wall of the chapel in the tomb of Nefermaat. The northern wall is the usual location of hunting scenes in ancient Egyptian tombs (HAWASS 2015a, STEVENSON SMITH 1949).

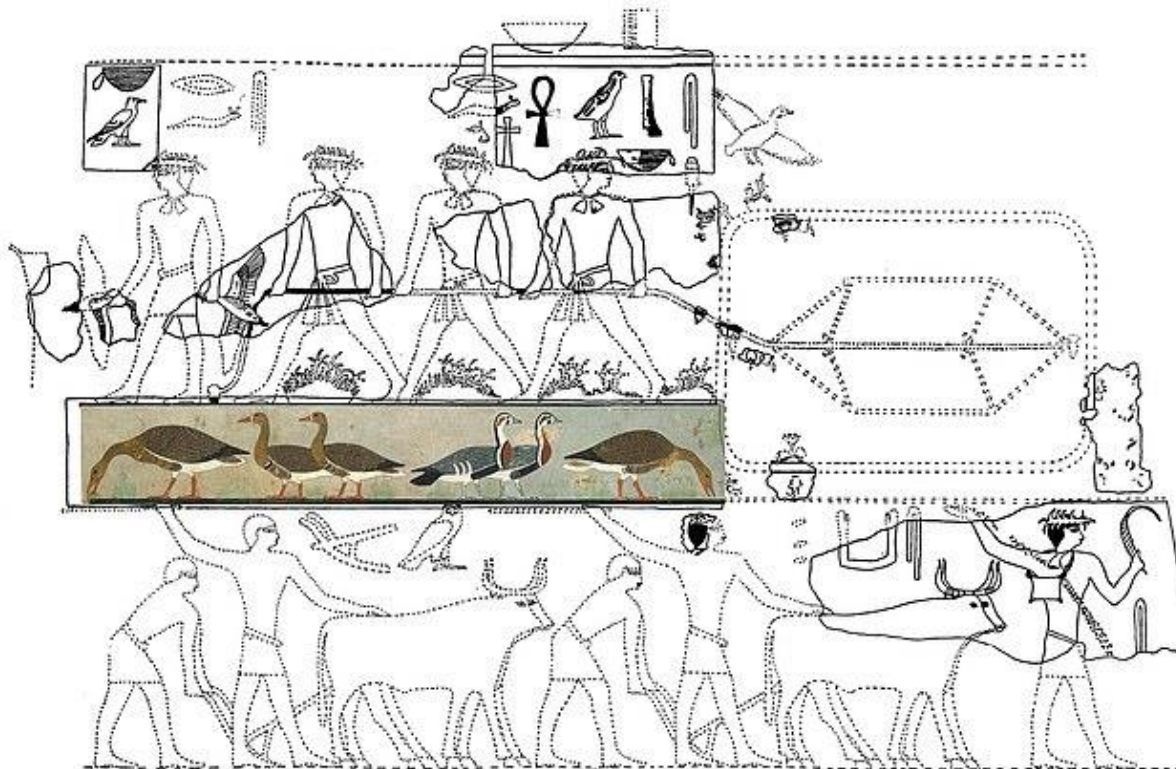


Fig. 2. Restoration of the swamp scene on the north wall of the tomb chapel of Atet in the mastaba of Nefermaat and Atet in Meidum (after STEVENSON SMITH 1949)

In the mastaba of Nefermaat and Itet there is another painting with a goose trapping scene (Fig. 3). In this painting there also are grazing geese near the clap-net, this time two Greylag Geese. The three goose pairs of the famous Meidum painting as well as these two Greylag Geese might have been used by the goose catchers as decoy birds.

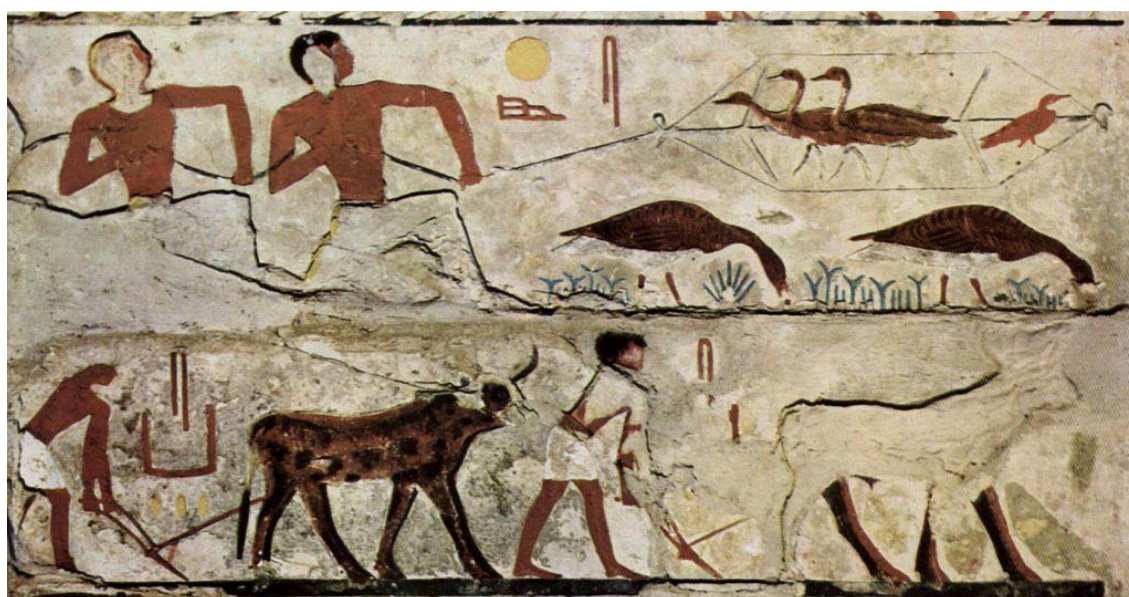


Fig. 3. Wall painting from the mastaba of Nefermaat in Meidum (© Wikipedia).

The similarity of these possible “decoy birds” in form, colouring and pose shows that the painting of the three goose pairs of the famous Meidum goose painting are not unique. The special technique used for drawing the scenes in Nefermaat’s tomb (see Fig. 2 & 3) is unique in ancient Egyptian art and only known from this tomb. The unique style of the Meidum Geese painting and the paintings in the tomb of Nefermaat and Itet is obviously no proof of fraud, but proof of the affiliation of the Meidum Geese to the paintings of Nefermaat’s Mastaba.

Without further discussing the archeological and egyptological arguments of this dispute, Tiradritti’s statement about the ecology and species affiliation of the Meidum Geese can not be left without comments.

First of all the grazing geese at the outside of the painting obviously are no Bean Geese, but without any doubt Greylag Geese (*Anser a. anser*). Nowadays the wintering area of this species reaches as far south as Algeria, Tunisia, Turkey and Iraq (ALPHÉRAKY 1905, CRAMP & SIMMONS 1977). It is not unrealistic to presume that Greylag Geese formerly also regularly wintered in the Nile delta.

The Greater White-fronted Goose (*Anser a. albifrons*) nowadays in some years winters in Egypt in small numbers (ALPHÉRAKY 1905, CRAMP & SIMMONS 1977).

Bones of both species were found in a food gift in the tomb of the wife of Ramses III (reign 1186 - 1155 BC) (BOESSNECK 1986), which indicates that both species might have visited Egypt as winter guests and were caught for consumption.



Fig. 4 Greylag Goose and two White-fronted Geese depicted on the Meidum wall-painting.

The third species of the Meidum geese shows great similarity with the Red-breasted Goose (*Branta ruficollis*). This species seems to have been a regular winter guest in ancient Egypt and have been trapped and consumed as well as depicted on wall decorations from the beginning of the first Dynasty (2950 - 2332 BC) onwards, which is shown by e.g. goose bones in a food gift in a tomb complex of Umm el-Qaab (Abydos) (1<sup>st</sup> Dynasty), the painting in the tomb of Nefermaat in Meidum (4<sup>th</sup> Dynasty) as well as a depiction on the wall of the causeway of pharaoh Sahure (reign 2489 - 2475 BC) in Abusir (5<sup>th</sup> Dynasty), which indicates that these geese might have been wintering in the Nile delta at that time (ALPHÉRAKY 1905, EL-AREF 2015).

Based on the arguments of HAWASS as well as the facts about the historical distribution of the Greylag, White-fronted and Red-breasted Goose mentioned above, it seems that it is not unrealistic to assume that the painting of the Meidum Geese is an authentic painting of ancient Egypt and not a fake.



## What is wrong with the Red-breasted Geese on the Meidum painting?

In February 2021 the Australian scientist Anthony Romilio stated that the Red-breasted-Goose-like birds on the Meidum painting were quite unlike modern Red-breasted Geese (ROMILIO 2021). He concluded: “*Considering that other faunal representations from the Chapel of Itet show accurate modern species-level portrayals, it is unclear if the third ‘Meidum Geese’ type depicts a novel phenotype of an extinct taxon, a misrepresentation of an extant but locally extinct taxon, or is a fabrication that has incorporated several goose features.*” (Fig. 4 & 5).



Fig. 5. Detail from the Meidum frieze with Red-breasted-Goose-like geese.

After application of the criteria of TOBIAS et al. 2010 Romilio stated that Egypt had “*a biodiverse history, rich with extinct species*”, that the third goose type did not plausibly match with Red-breasted Geese and apparently is an unknown and nowadays extinct goose species (Fig. 6).



Fig. 6. Comparison of the Red-breasted-Goose-like geese from the Meidum frieze with a Red-breasted Goose, after ROMILIO 2021.

Romilio’s clear conclusion is not carried along by a number of Red-breasted Goose experts (see PETKOV 2021, in this issue).

The wetlands of the Nile Delta as well as along the Nile are key sites for millions of Eurasian migratory birds in spring and autumn. These birds were an important protein source for the people of ancient Egypt.



There is a lot of evidence that the annual passage of millions of migratory birds each year activated many people to get hold of at least a part of this wealth. From descriptions, wall paintings, food gifts in tombs and bird remnants in food garbage, it is obvious that the ancient Egyptians tried hard to capture as much of these migratory birds as possible. They used nets, traps, throwstick, spear as well as bow and arrow to hunt all kinds of birds, from songbird to pelicans and herons. In the wetlands annually large numbers of waterbirds were caught with clap-nets by skilled and well-coordinated teams of fowlers, who partly used decoy-birds, to attract the waterbirds to their nets. A part of the trapped birds was killed and prepared for consumption immediately, some were kept in enclosures for representation or for later consumption, others were further processed and stored in jars. As is shown on some wall paintings a part of the captive birds were not only fed to survive, but even stuffed to become really fat (BAILLEUL-LESUER 2012, BOESSNECK 1986, BREVICK 2019, SLINGENBERG 2016).

These hand fed birds were not only used for consumption, mostly by the better situated part of the people, but also placed in a tomb as a food-gift for the deceased. Most of the fed and stuffed birds were Cranes, but also Greylag and White-fronted Geese, which were beloved food for the Egyptian elite (BAILLEUL-LESUER 2012, BOESSNECK 1986, BREVICK 2019, SLINGENBERG 2016) and must have been common winter guests in ancient Egypt (Fig. 7).

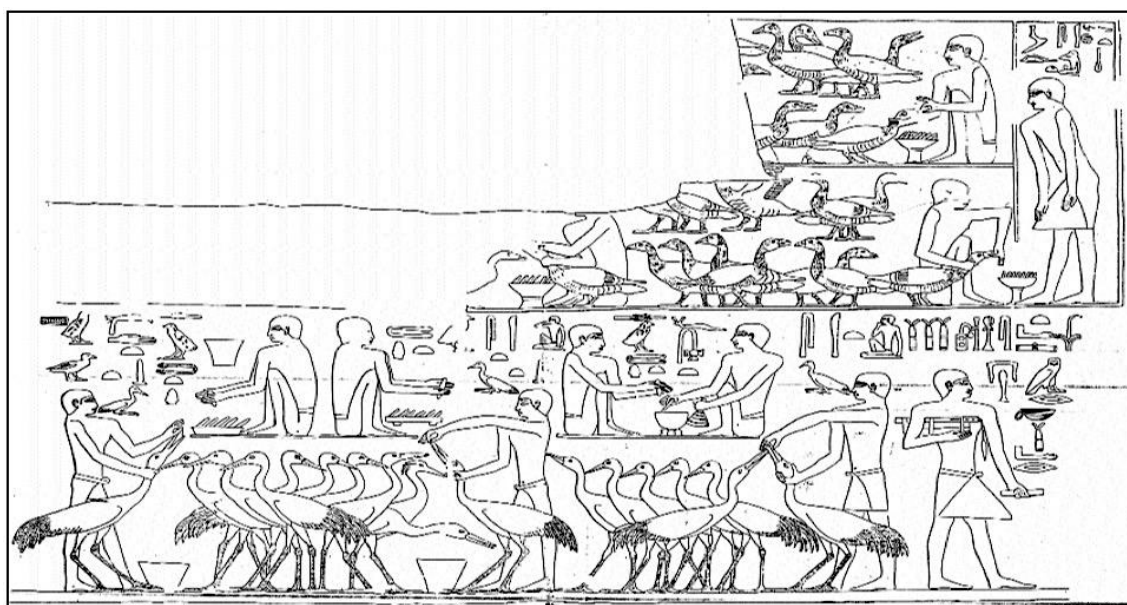


Fig. 7. Tomb frieze with captive cranes and geese fed by hand (mastaba of Ty, Saqqara, after VASIC & VASIC 2000)

Besides this handfeeding of more or less common birds, there also seems to have been a practice of force-feeding of more rare species, maybe as a delicacy for wealthy people or as a special food-gift for prosperous deceased or to sacrifice the gods.

On wall decorations of the causeway of the pharaoh Sahure (reign 2487–2475 BC) at the Abusir Necropolis from the beginning of the 5<sup>th</sup> Dynasty (2504 - 2347 BC) as well as in the tomb of Ptah-hotep, a vizier of pharaoh Djedkare Isesi (penultimate pharaoh of the 5<sup>th</sup> dynasty, reign c. 2410 - 2380 BC), in Saqqara a number of wall paintings show how the food store for the afterlife of the deceased was produced (EL-AREF 2015). Besides hunting scenes the drawings depict, how the food was prepared and stowed in the mastaba. The afterlife menu of Ptah-hotep also included waterbirds, under which several goose species.

On one of the paintings the Red-breasted-Goose-like has a further, albeit stylized, appearance (Fig. 8). The picture is a reconstruction of the damaged original on one of the tomb walls and was painted about 200 years after the completion of the Meidum frieze.

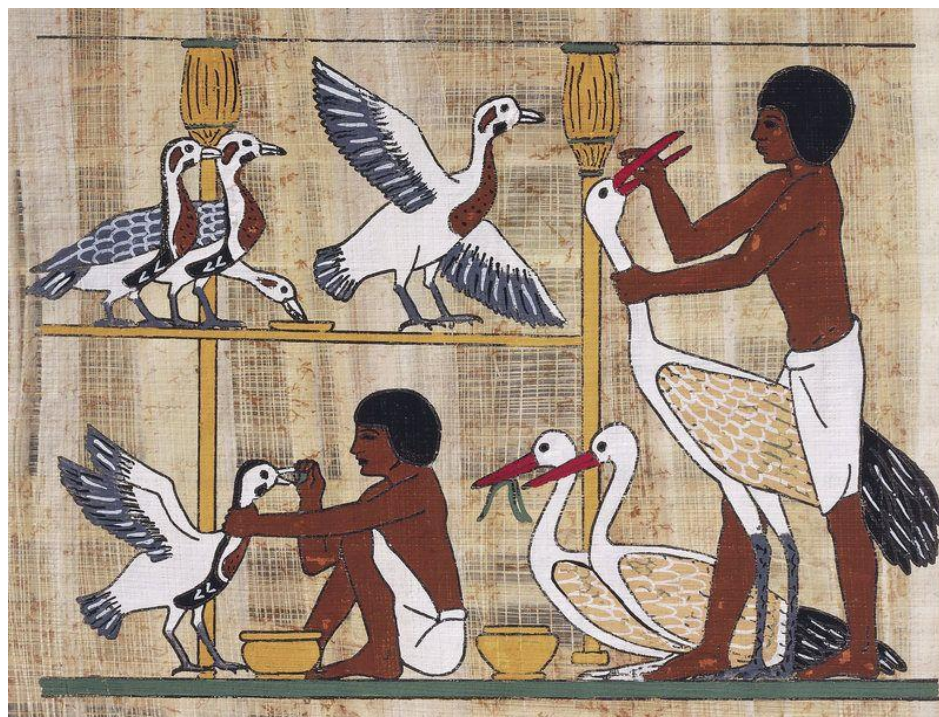


Fig.8. Force-feeding geese, papyrus, reconstruction of a relief from the mastaba of Ptahhotep at Saqqara (5<sup>th</sup> dynasty).

Critics of Romilio’s interpretation of the Meidum frieze argue that the Egyptian artist just made some mistakes as he depicted the Red-breasted Goose. Petkov (2021, in this issue) argues: “The other two species of geese present are not that exactly replicated as well so bit of guessing is needed to assume which species is depicted. But one is for sure – they do have a lot of identifiable features of Red-breasted Goose (*Branta ruficollis*) and in no way it could be derived that they represent an extinct unknown species!”.

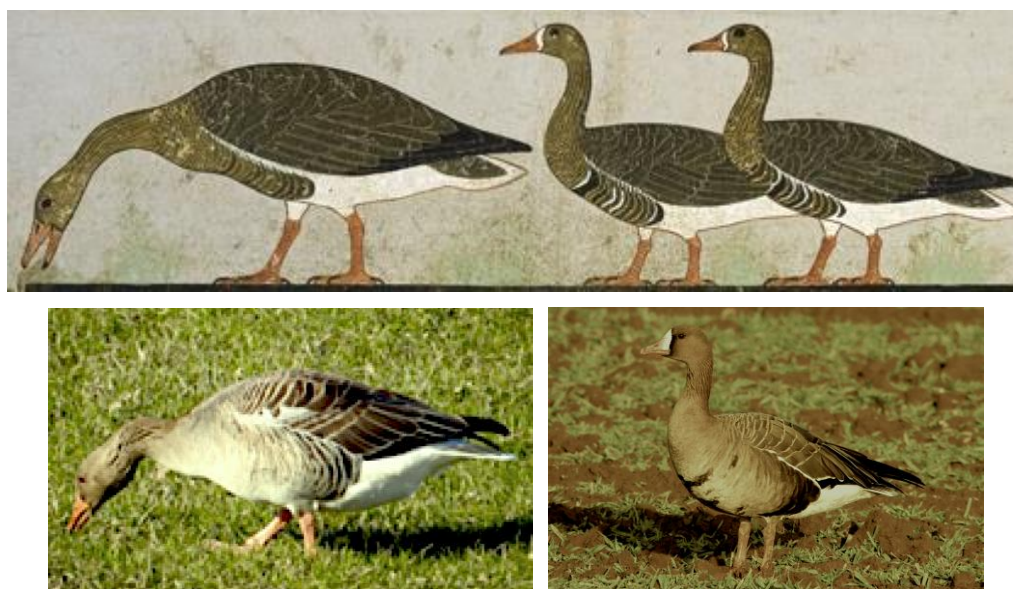


Fig. 9. Comparison of the geese of the Meidum frieze (above) with photos from the Greylag Goose (below, left) and White-fronted Goose (below, right).

STEVENSON SMITH (1949) wrote about the Meidum frieze, “*the artist has reached a new sureness and skill which in the paintings falls little short of perfection in the beauty of line, the careful delineation of small details, and the clear, bright colour.*” After the study of numerous Egyptian Wall paintings with birds, BAILLEUL-LESUER (2012) stated: “*Undoubtedly, ancient Egyptian artists possessed a developed sense of observation when it came to representing the avian world. .... Artists also paid great attention to representing the species of birds destined to enter the menu of the deceased in the afterlife.*” Comparing the recent photographs with the about 4,000 year old wall painting portrayal of the Greylag and White-fronted Goose (Fig. 9) one only can agree with this statement.

Which leaves us with the question: why there are so big differences between present Red-breasted Goose and the birds depicted in the Meidum frieze (Fig. 6)?

Considering the high quality and realistic depiction of the Greylag and White-fronted Goose it does not seem plausible that the Egyptian artist has drawn a third goose species out of a vague memory and therefore made a lot of mistakes in his depiction of the Red-breasted Goose. Moreover about 400 years later another Egyptian frieze painter has drawn the same non-existing faulty goose, although – according to his drawing – these birds were kept, hand fed and stuffed, which means the artist must have had enough possibilities to observe the birds and to make a correct depiction.

Except when the later artist has known the birds from the Meidum frieze and just copied and stylized them, the unknown goose was depicted by both artists independent from each other. Because such a goose nowadays is unknown and not known from older literature and according to Romilio’s analysis shows enough differences to the Red-breasted Goose to be a different species.

## Conclusion

To explain these differences, partly considering the findings of OTTENBURGHES et al. 2016a & b & 2017, there are three options:

- the Egyptian painters painted a (sub)species of the Red-breasted Goose now extinct
- since the “birth” of the species 5.5-6 Million years ago the Redbreasted Goose developed two (or even more) subspecies that met again after the end of one of the latest glacials and hybridized with the result the Red-breasted Goose we know now,
- the “original” Red-breasted Goose did not have such extended red and black coloured parts and developed these in the past millions of years. The antique Egyptians saw specimen of the species as these were not yet so colourful as they are today, i.e. their painting show us a Red-breasted Goose “in statu nascendi”.

Due to the strong resemblance with the Red-breasted Goose and the few pieces of evidence, it does not seem unrealistic that this Red-breasted-Goose-like bird represents a now unknown ancestor or subspecies of the Red-breasted Goose, which at least during the time of the Old Kingdom, wintered in Egypt.

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## **Outstanding ornithologist of the past: John James Audubon (1785-1851)**

Johan H. Mooij

John James Audubon was born 26 April 1785 as Jean Rabine in Les Cayes in the French colony of Saint-Domingue (now Haiti). He was the illegitimate son of a French naval officer, privateer, dealer of slaves and planter Jean Audubon and a French creole chambermaid, called Jeanne Rabine, both originating from Brittany in France. His mother died as the little Jean was about half a year old. After the death of his mother another mistress of his father took care of him, until his father took him and a half-sister to a family property in Couëron, near Nantes in France, in 1781, where they were raised by their father and his French wife Anne Moynet Audubon. In 1794 the married couple Audubon adopted both children and Jean Rabine was renamed Jean-Jacques Fougère Audubon.



Porträt Johan James Audubons von John Syme, 1826 (© Wikipedia)

During his youth in France Audubon junior lived an aristocratic life; he learned to play violin and flute, dancing and horseback riding and liked to roam through nature, collecting natural curiosities and drawing things he saw. This free life had to end as Napoleon was calling all young French men to enter his army. To avoid the conscription in Napoleons army, Jean-Jacques father organised him a false passport and in 1803 the young Audubon left France for Pennsylvania (USA), where his father had bought a farm, called Mill Grove, after he had sold his plantation in Haiti in 1789. The first Period of his life in the USA he lived with friends of his father, who taught him English, but not long after his arrival he decided to live his own life on the farm of his father and returned to the free life of a country gentleman, all day fishing, shooting and drawing animals, mostly birds.

During his time at Mill Grove he met the daughter of one of his neighbours, Lucy Bakewell. Both of them shared a high number of common interests and she became his wife five years later. Together with Jean Ferdinand Rozier, the son of a friend of his father, Audubon tried to make a living as a merchant along the frontier between western civilisation and Indian lands between 1805 and 1811. In periods with low business activities he turned to hunting and fishing to feed his family. During his business and hunting trips he made detailed field notes about the things he saw, made drawings, mainly of birds and stuffed animals he shot in a more or less natural position.

In 1811 he left the business partnership with Rozier and Audubon started to work as an ornithologist and painter. In 1812 he became an American citizen and he started a new trade business with the brother of his wife. Until 1819 business went well and Audubon became a wealthy man. He founded a flour mill, bought land and slaves, went hunting and fishing and improved his preparation and painting skills.



After 1819 he went bankrupt and had to spend some time in jail because of his debts. Subsequently he made a living by painting portraits, selling paintings and teaching painting. Besides, his wife Lucy, a learned teacher, supported the family by her work as a local teacher. In this time Audubon started to travel with gun and paintbox with the intention to find and paint all American birds and to produce a publication about the North American avifauna, called “The Birds of America”.

After he failed to find enough money for the publication of his book he left America in 1826 and travelled to Great Britain, where he was told, it would be easier to generate money for a publication of book about the American avifauna. In Great Britain he was received with great enthusiasm and after a short while he had collected enough money to start publishing. Between 1827 and 1838 Audubon’s “The Birds of America” was released as a series of printed coloured bird paintings, which wealthy people could subscribe. The complete set of paintings contained 435 hand-coloured prints showing nearly 500 bird species, without any text. Between 1831 and 1839 an accompanying text, written with the Scottish ornithologist William MacGillivray, was published separately in five volumes, called “Ornithological Biographies”. Later editions of “The Birds of America” - consisting of seven to eight volumes - contained about 500 paintings, one painting pro species, and included the accompanying text.



Passenger Pigeon *Ectopistes migratorius*  
by Audubons (© Wikipedia)

The publication of his book made him a prominent and wealthy man. He bought an about 20 acre estate in northern Manhattan, where he, his wife Lucy and their two sons lived until Audubon’s death in 1851. He took care of new editions of his avifauna, made a number of further expeditions through Northern America and described and painted another almost 40 bird species to be included in the newer editions of “The Birds of America”. Together with his friend reverent John Bachman (1790–1874) he wrote “The Viviparous Quadrupeds of North America” (1845– 1849), which was illustrated with paintings, mainly by his son John Woodhouse Audubon and was published after his death. In 1848 he showed the first obvious signs of Alzheimer’s disease and died at his estate in January 1851.

But Audubon is not without controversy. It is proved that Audubon falsified and freely invented “scientific” data, invented, described and painted new species and tried to impress his sponsors and potential competitors by publishing these. Besides he used knowledge and materials of partners without mentioning their contribution in his publications and polished-up and refurbished his biography. These facts triggered discussions about Audubon's scientific qualifications as well as his honesty and trustworthiness.



Painting of general-in-chief Thomas-Alexandre Dumas Davy de la Pailleterie (1762-1806), by Olivier Pichat 1883 (© Wikipedia)

These reflections about Audubon's personality and qualification nowadays are overlaid by a discussion about his attitude to slavery. As a number of famous Americans, like George Washington, Thomas Jefferson, Andrew Jackson, who kept slaves during their lifetime and never freed them, Audubon kept slaves, sold and bought slaves depending of his financial situation. Unlike the french "black general" Thomas Alexandre Dumas (1762-1806), the father of the famous

French novelist Alexandre Dumas the Older (1802-1870), like Audubon the illegitimate son of a Frenchman and creole servant, born in nowadays Haiti, who all of his life fought for the ideals of the French revolution and against slavery, Audubon never questioned slavery.

But notwithstanding these obvious and inexcusable dark sides in his biography John James Audubon still is a remarkable person and an outstanding ornithologist of the past. Apart from some fraud-species Audubon discovered 25 new species and 12 new subspecies, he created an own style of drawing birds in action, which was unique for his time and set high standards for subsequent bird painters. Besides he produced the first overview of North American birdlife and had an enormous influence on ornithology and natural history in Northern America.



## New Publications 2019 – 2021

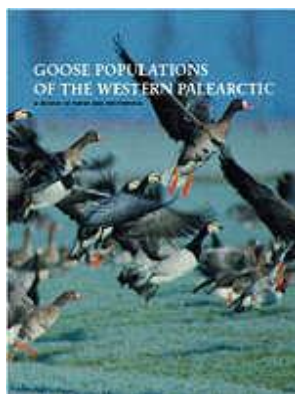
- ANTONOV, A.I., M.S. BABYKINA & A.B. POPOVKINA (2019): Results of long-term monitoring of spring goose migration in Khingansky Nature Reserve, Russia. – Casarca 21: 119-131.
- AO, P., X. WANG, D. SOLOVYEVA, F. MENG, T. IKEUCHI, T. SHIMADA, J. PARK, D. GAO, G. LIU, B. HU, T. NATSAGDORJ, B. ZHENG, S. VARTANYAN, B. DAVAASUREN, J. ZHANG, L. CAO, A.D. FOX (2020): Rapid decline of the geographically restricted and globally threatened Eastern Palearctic Lesser White-fronted Goose *Anser erythropus*. – Wildfowl, Special Issue 6: 206-243.
- ARTEMYEV, A.V., M.V. MATANTSEVA & S.A. SOMONOV (2019): Taiga Bean Goose (*Anser fabalis fabalis*) on spring stopover site near Olonets, Republic of Karelia, Russia. – Casarca 21: 81-89.
- BARANYUK, V.V. (2019): Methodology of monitoring the Snow goose population of Wrangel Island, Russia. – Casarca 21: 53-72.
- BARANYUK, V.V., U.V. BABIY & D. KRAEGE (2019): Monitoring of the Snow goose population on Wrangel Island in 2017. – Casarca 21: 90-106.
- CAO, L., X. DENG, F. MENG, A.D. FOX (2020): Defining flyways, discerning population trends and assessing conservation challenges of key East Asian Anatidae species: an introduction. - Wildfowl, Special Issue 6: 1-12.
- CAO, L., F. MENG, J. ZHANG, X. DENG, Y. SAWA, A.D. FOX (2020): Moving forward: how best to use the results of waterbird monitoring and telemetry studies to safeguard the future of Far East Asian Anatidae species. - Wildfowl, Special Issue 6: 293-319.
- CONOVER, M.R. & M.G. FRANK (2021): Survival and recruitment among non-migratory Canada geese (*Branta canadensis*): Influence of gosling sex, hatching date, mass at fledging, and family type. - Waterbirds 43:299-306.
- DAMBA, I., L. FANG, K. YI, J. ZHANG, N. BATBAYAR, J. YOU, O.-K. MOON, S.-D. JIN, B.F. LIU, G. LIU, W. XU, B. HU, S. LIU, J. PARK, H. KIM, K. KOYAMA, T. NATSAGDORJ, B. DAVAASUREN, H. LEE, O. GOROSHKO, Q. ZHU, L. GE, L. CAO, A.D. FOX (2020): Flyway structure, breeding, migration and wintering distributions of the globally threatened Swan Goose *Anser cygnoides* in East Asia. – Wildfowl, Special Issue 6: 97-123.
- DENG, X., Q. ZHAO, D. SOLOVYEVA, H. LEE, I. BYSYKATOVA-HARMEY, Z. XU, K. USHIYAMA, T. SHIMADA, K. KOYAMA, J. PARK, H. KIM, G. LIU, W. XU, B. HU, D. GAO, B. HE, Y. ZHANG, T. NATSAGDORJ, B. DAVAASUREN, S. MORIGUCHI, D. BABYKINA, A. ANTONOV, A. STEPANOV, J. ZHANG, L. CAO, A.D. FOX (2020): Contrasting trends in two East Asian populations of the Greater White-fronted Goose *Anser albifrons*. – Wildfowl, Special Issue 6: 181-205.
- DÍEZ-DEL-MOLINO, D., J. VON SETH, N. GYLLENSTRAND, F. WIDEMO, N. LILJEBÄCK, M. SVENSSON, P. SJÖGREN-GULVE & L. DALÉN (2020): Population genomics reveals lack of greater white-fronted introgression into the Swedish lesser white-fronted goose. – Nature Research, Scientific Reports (2020) 10:18347. <https://doi.org/10.1038/s41598-020-75315-y>
- DOROFEEV, D.S., P.M. GLAZOV & K.E. LITVIN (2018): Present status of the Barnacle Goose (*Branta leucopsis*) on Vaygach Island. – Casarca 20: 13-27.
- FOX, A.D., M. FREDERIKSEN, T. HEINICKE, K.K. CLAUSEN & H.P. VAN DER JEUGD (2021): Annual survival estimates of Taiga *Anser fabalis* and Tundra Bean Geese *A. serrirostris* wintering in the Netherlands, 1967-1987. - J. Ornithol. 162: 925-929.

- GARMS, O.YA. (2018): Anseriform fauna of Barnaul and its environs (Altay Kray, Western Siberia). - Casarca 20: 63-87.
- GERASIMOV, YU.N. & YU.R. ZAVGAROVA (2019): Spring migration of Anseriformes at the mouth of the Bolshaya Vorovskaya River, western Kamchatka, Russia. - Casarca 21: 132-144.
- GLAZOV, P.M., J.A. LOSHCHAGINA, A.V. KONDRATYEV, E.M. ZAYNAGUTDINOVA, H. KRUCKENBERG & I.G. POKROVSKY (2021): The Long-Term Monitoring of Bird Populations on Kolguev Island in the Barents Sea. - Arctic 74, Suppl. 1: 23 – 40. <https://doi.org/10.14430/arctic73845>.
- GRISHCHENKO, M., H. H. T. PRINS, R. C. YDENBERG, M. E. SCHAEPMAN, W. F. DE BOER & H. J. DE KNEGT (2019): Land use change and the migration geography of Greater White-fronted geese in European Russia. - Ecosphere 10(8): e02754. 10.1002/ecs2.2754.
- KAMPE-PERSSON, H. (2020): Occurrence of the Lesser White-fronted Goose *Anser erythropus* in Latvia: linking migration to conservation. - Environmental and Experimental Biology 18: 249–259.
- LI, C., Q. ZHAO, D. SOLOVYEVA, T. LAMERIS, N. BATBAYAR, I. BYSYKATOVA-HARMEY, H. LI, V. EMEL'YANOV, S.B. ROZENFELD, J. PARK, T. SHIMADA, K. KOYAMA, S. MORIGUCHI, J. HOU, T. NATSAGDORJ, H. KIM, B. DAVAASUREN, I. DAMBA, G. LIU, B. HU, W. XU, D. GAO, O. GOROSHKO, A. ANTONOV, O. PROKOPENKO, O. TSEND, A. STEPANOV, A. SAVCHENKO, G. DANILOV, N. GERMOGENOV, J. ZHANG, X. DENG, L. CAO, A.D. FOX (2020): Population trends and migration routes of the East Asian Bean Goose *Anser fabalis middendorffii* and *A. f. serrirostris*. - Wildfowl, Special Issue 6: 124-156.
- LUUKKONEN, B.Z., O.E. JONES III & R.W. KLAVER (2021): Canada goose survival and recovery rates in urban and rural areas of Iowa, USA. - Journal of Wildlife Management 85: 283-292.
- MARKKOLA, J.A. & R.T. KARVONEN (2020): Changing environmental conditions and structure of a breeding population of the threatened Lesser White-fronted Goose (*Anser erythropus* L.). - Ornis Fenn. 97:113-130.
- NATYKANETS, V.V., O.A. OSTROVSKY & I.A. BOGDANOVICH (2020): Species composition, abundance and status of waterbirds wintering in Belarus. - Casarca 22: 155-181.
- NOLET, B.A., K.H.T. SCHREVEN, M.P. BOOM, T.K. LAMERIS (2020): Contrasting effects of the onset of spring on reproductive success of Arctic-nesting geese. - The Auk 137, 1: 1-9, <https://doi.org/10.1093/auk/ukz063>.
- OTTENBURGH, J., J. HONKA, G. MÜSKENS & H. ELLEGREN (2020): Recent introgression between Taiga Bean Goose and Tundra bean Goose results in an largely inhomogeneous landscape of genetic differentiation. - Heredity 125: 73-84. <https://doi.org/10.1038/s41437-020-0322-z>.
- ROBERTS, A.J., J.L. DOOLEY, B.E. ROSS, T.C. NICHOLS, J.O. LEAFLOOR & K.W. DUFOUR (2021): An integrated population model for harvest management of Atlantic brant. - Journal of Wildlife Management 85:897-908.
- ROGACHEVA, E.V. & A.A. NAZAROV (2018): The status of Anseriformes in the Turukhan River basin (Eastern western Siberia, Russia) in the 1960s-1970s. - Casarca 20: 113-124.
- ROZENFELD, S.B., D.O. ZAMYATIN, D. VANGELUWE, G.V. KIRTAEV, N.V. ROGOVA, L. CAO & A.B. POPOVKINA (2018): The Taiga Bean Goose (*Anser fabalis fabalis*) in Yamalo-Nenets Autonomous Okrug. - Casarca 20: 28-52.



- ROZENFELD, S.B., G.V. KIRTAEV, M.YU. SOLOVIEV & N.V. ROGOVA (2018): 2018): Waterfowl of the Gydan Peninsula and adjacent islands and the prospects for their conservation. – Casarca 20: 88-112.
- SAWA, Y., C. TAMURA, T. IKEUCHI, K. FUJII, A. ISHIOGOSHI, T. SHIMADA, S. TATSUZAWA, X. DENG, L. CAO, H. KIM, D. WARD (2020): Migration routes and population status of the Brent Goose *Branta bernicla nigricans* wintering in East Asia. – Wildfowl, Special Issue 6: 244-266.
- SEMENOV, A.R. (2019): Encounters with Aleuthian Cackling geese (*Branta hutchinsii leucopareira*) on the Kuril Islands, Russia, in August and September 2019. – Casarca 21: 150-152.
- SHUTOVA, E.V. & M.N. KOZHIN (2018): The Barnacle Goose (*Branta leucopsis*) in Kandalaksha Bay of the White Sea. – Casarca 20: 127-129.
- SKALOS, D.A., J.M. EADIE, D.R. YPARRAGUIRRE, M.I. WEAVER, S.L. OLDENBURGER, C.R. ELY, J.L. YEE & J.P. FLESKES (2021): Body condition of winter Pacific greater white-fronted geese. - Journal of Wildlife Management 85: 484-497.
- SPITSYN, V.M. (2018): Taiga Bean Goose (*Anser f. fabalis*) sighting on Yuzhny Island of the Novaya Zemlya Archipelago. – Casarca 20: 125-126.
- SPITSYN, V.M. & G.S. POTAPOV (2019): Western Taiga Bean Goose (*Anser fabalis fabalis*) in the vicinity of Arkhangelsk, Russia. – Casarca 21: 145-146.
- TIMOSHENKO, A.YU. (2020): Records of the Brent Goose (*Branta bernicla*) in Kostanay Oblast, Kazakhstan. – Casarca 22: 67-71.
- VAN DELLEN, A.W. & J.S. SEDINGER (2021): Nest density and competing risks: A long-term investigation of black brant (*Branta bernicla nigricans*) nest survival. - Wilson Journal of Ornithology 132: 379-387.
- VOUGIOUKALOU, M. & A. MANOLOPOULOS (2020): Monitoring the Lesser White-fronted Goose in Greece 2018-2020. - Hellenic Ornithological Society/Birdlife Greece. 13 pp.
- YAN, M., K. YI, J. ZHANG, N. BATBAYAR, Z. XU, G. LIU, B. HU, B. ZHENG, A. ANTONOV, O. GOROSHKO, G. ZHAO, B. DAVAASUREN, T. ERDENECHIMEG, J. NERGUI, I. DAMBA, L. CAO, A.D. FOX (2020): Flyway connectivity and population status of the Greylag Goose *Anser anser* in East Asia. - Wildfowl, Special Issue 6: 157-180.

## Literature



### Goose populations of the Western Palearctic

The Goose Specialist Group made an impressive compilation (edited by Jesper Madsen, Tony Fox & Gill Cracknell) of our knowledge on the status and distribution of the goose populations of the Western Palearctic. This book is not for sale anymore, but a digital copy can be downloaded for free from:

[http://issuu.com/jesper\\_madsen/docs/goosepopulationswestpaleartic](http://issuu.com/jesper_madsen/docs/goosepopulationswestpaleartic)

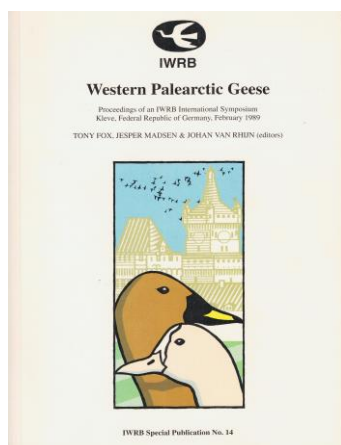
or from

<http://bios.au.dk/en/knowledge-exchange/about-our-research-topics/animals-and-plants/mammals-and-birds/goose-populations-of-the-western-paleartic/>



## Proceedings of the Klever, the 10<sup>th</sup> and the 12<sup>th</sup> meeting of the GSG

Furthermore it is still possible to receive a printed copy of the official proceedings of earlier meetings of the Goose Specialist group, as there are:



Proceedings Goose Meeting 1989  
(Kleve, Germany)

Interested? Please contact:  
[johan.mooij@bskw.de](mailto:johan.mooij@bskw.de)



Proceedings Goose 2007  
(Xanten, Germany)

Interested? Please contact:  
[johan.mooij@bskw.de](mailto:johan.mooij@bskw.de)



Proceedings Goose 2009  
(Höllviken, Sweden)

Interested? Please contact:  
[leif.nilsson@zooekol.lu.se](mailto:leif.nilsson@zooekol.lu.se)

## Proceedings of the 14<sup>th</sup> meeting of the Goose Specialist Group

The proceedings of the 14<sup>th</sup> meeting of the Goose Specialist Group held in Steinkjer, Norway in April 2012 have been published in the online journal *Ornis Norvegica*, which is the scientific journal of the Norwegian Ornithological Society (Norsk Ornitologisk Forening – NOF). You can find articles from the 2012 meeting, as well as a number of other ornithological papers which are surely of interest on the journal website:

<https://boap.uib.no/index.php/ornis/issue/view/62>

## Proceedings of the 15<sup>th</sup> meeting of the Goose Specialist Group



The proceedings of the 15<sup>th</sup> meeting of the Goose Specialist Group held in Arcachon, France in January 2013 have appeared as a special edition of the journal **Wildfowl**.

By sending an email to [wildfowl@wwt.org.uk](mailto:wildfowl@wwt.org.uk) a printed copy of this Special Issue (nr.3) can be ordered at the cost of £17 plus an additional £3.50 for credit card transactions.

It also can be downloaded for free at:

<http://wildfowl.wwt.org.uk/index.php/wildfowl/issue/view/285>

## The journal Wildfowl

Wildfowl is an international scientific journal, published annually by Wildfowl Press, and previously published by the Wildfowl & Wetlands Trust (from 1948–2020).

The journal appeared originally as the Annual Report of The Severn Wildfowl Trust at the end of the Trust's first working year in 1947. From the outset it presented the results of scientific research in order to improve knowledge and understanding of wildfowl populations. It disseminates original material on the ecology, biology and conservation of wildfowl (Anseriformes) and ecologically associated birds (such as waders, rails and flamingos), and on their wetland habitats. Research and review articles related to policy development and application are welcome. Material on habitat management is also sought, particularly where this is directed to the conservation of wildfowl and other wetland birds.

In 2020, the WWT took a decision that it would no longer publish the journal, as part of its plans to refocus as a wetland conservation charity.

The journal however continues to thrive with support from the waterbird research and conservation community, and is now being published by “Wildfowl Press”, a newly-formed publisher dedicated to the journal, with pdfs also being made available online as usual.

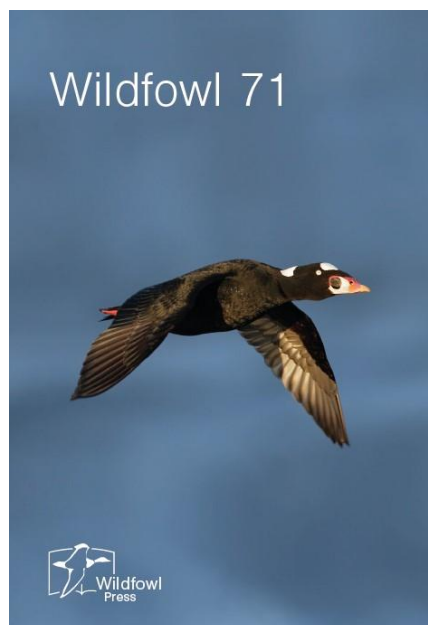
Impact factor: 1.417 (2020)

The complete back catalogue of Wildfowl is available via the Open Journal System at <https://wildfowl.wwt.org.uk/index.php/wildfowl>

The current Issue is Wildfowl 71:

The IUCN-SSC waterbird specialists groups (Swan, Ducks, Geese, Threatened Waterbirds) support “their Wildfowl Journal” as well as its publisher the “Wildfowl Press”.

Those interested in having access to or receiving future issues of the journal please send an email to Eileen Rees on her personal email, at <[ReesEileenC@gmail.com](mailto:ReesEileenC@gmail.com)>, including indicating whether they might be willing to subscribe to the journal. Either for online access to papers and/or for printed copy.



### Instructions to authors

The Goose Bulletin accepts all manuscripts dealing with goose ecology, goose research and goose protection in the broadest sense as well as Goose Specialist Group items.

All manuscripts should be submitted in English language and in electronic form. Text files should be submitted in “.doc”-format, Font “Times New Roman 12 point”, tables and graphs in “.xls”-format and pictures in good quality and “.jpg”-format.

Species names should be written with capitals as follows: Greylag Goose, Greenland White-fronted Goose etc. Follow an appropriate authority for common names (e.g. Checklist of Birds of the Western Palearctic). Give the (scientific) Latin name in full, in italics, at first mention in the main text, not separated by brackets.

Numbers- less than ten use words e.g. (one, two three etc) greater than 10, use numbers with blank for numbers over 1 000.

In case of doubt please look at the last issue of the Goose Bulletin.

