The 14th meeting of the Goose Specialist Group

Steinkjer, Norway 17 – 22 April 2012

Programme, abstracts and list of participants

Nord-Trøndelag University College

Steinkjer 2012

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Sponsored by:

NORWEGIAN DIRECTORATE FOR NATURE MANAGEMENT

Fylkesmannen i Nord-Trøndelag

County Governor in Nord-Trøndelag, Department of the Environnment

Nord-Trøndelag University College

Front cover: Pink-footed Geese near Steinkjer May 2011 ©Paul Shimmings

Nord-Trøndelag University College

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Steinkjer 2012

Welcome to Steinkjer and to the 14th meeting of the Goose Specialist Group!

The 14th meeting of the Goose Specialist Group is hosted by the Nord-Trøndelag University College (Høgskolen i Nord-Trøndelag – HiNT) and is held at HiNTs facilities in Steinkjer, Norway.

The meeting has received financial sponsorship from The Norwegian Directorate for Nature Management (DN), from The Department of the Environment at the County Governor in Nord-Trøndelag (Fylkesmannen i Nord-Trøndelag, miljøvernavdelingen), as well as from HiNTs own central funds. All of these organizations are kindly thanked for their generous support.

In addition, a number of participants received a financial grant to attend the meeting from Faunafonds in the Netherlands - without such support some of the participants would have been unable to attend.

The idea for hosting this meeting in Norway arose during discussions in a bar in Sweden during the 12th GSG meeting in Höllviken, and planning of this current meeting in Steinkjer began in February 2011.

The board of the Goose Specialist Group (comprising Bart Ebbinge -chair, Tony Fox, Thomas Heinicke, Konstantin Litvin, Jesper Madsen, Johan Mooij, Ingunn Tombre, Berend Voslamber) have been closely involved in getting the meeting off the ground. A committee was established to organize practical aspects surrounding the meeting (comprising Sonja Ekker, Rolf Terje Kroglund, Tor Kvam, Per Ivar Nicolaisen, Paul Shimmings, Jan Eivind Østnes). A further committee was established to plan the scientific content of the programme (Carl Mitchell, Jouke Prop, Paul Shimmings, Ingunn Tombre).

Programme

Talks are scheduled to last 15 minutes, except for plenary talks which are scheduled to last 40 minutes. In addition, 5 minutes will be allowed for questions. Chairpersons for the various sessions will be announced later. Fuller details regarding the workshop on hunting will be announced later. Any alterations to the programme will be announced during the meeting.

17th April

Arrival and registration

18:00 – 20:00 Welcome and informal social gathering in evening (Rådhuset – Town Hall)

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18th April

07:30 – 09:00: Breakfast

09:15 – 09:30 Opening of meeting

09:30 – 09:45 Announcements

Goose agriculture interactions and management

09:45 – 10:05 Adaptive co-management and geese; case studies and experience from Norway – Ingunn Tombre

10:05 – 10:25 Towards the first European adaptive flyway management plan: the case of the Svalbard pink-footed goose - Jesper Madsen

10:25 – 10:45 Experiments to reduce agricultural damage by scaring Pink-footed Geese using Border collies – Bart Ebbinge

10:45 – 11:15 Coffee break

11:15 – 11:35 Challenges in the management of the Taiga Bean Goose - Arto Marjakangas

11:35 – 11:55 The national Action Plan of Lesser White-Fronted Goose conservation and study in Kazakhstan - Sergey Yerokhov

11:55 – 12:15 Safeguarding the Lesser White-fronted Goose Anser erythropus in key wintering sites in Greece - Maria Panagiotopoulou

12:15 – 12:35 Resource selection pattern of Bar-headed Goose during the non-breeding season - Tsewang Namgail

12:35 – 12:55 Agri-environment measure for Red-breasted Goose in Romania / Agri-environmental measures to support the foraging grounds of wintering geese in Bulgaria – finally adopted and operational – Nicky Petkov

13:00 – 14:30 Lunch

Geese coping with a changing environment

14:30 – 14:45 Introduction

14:30 – 14:50 Nesting habitats of Barnacle Geese: natural limits and species expansion – Olga Pokrovskaya

14:50 – 15:10 Barnacle geese colonies on the Timanskiy seacoast of the Barents sea in 2009 – Dmitry Dorofeev

15.10 – 15:30 Recent changes in the distribution of Iceland Greylag Geese during the non-breeding season: Implications for monitoring - Carl Mitchell

15:30 – 15:50 Distribution and population trends of wintering Greylag Geese in Spain - Andy Green

15:50 – 16:25 Coffee break

16:25 – 16:45 Icelandic greylags wintering in Norway - Arne Follestad

16:45 – 17:05 Seasonal habitat use by radio-marked greylag geese (Anser anser) in a recreational area in Bavaria - Anke Kleinhenz

17:05 – 17:25 Feral Greylag Geese – why do they fare so well? - Friederike Woog

17:25 – 17:45 Recent developments of Pinkfeet wintering in Belgium: combined effects of climate change, disturbance and agricultural land use? - Eckhart Kuijken

18:00 – 20:00 Evening meal

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19th April

07:30 – 09:00 Breakfast

09:10 – 09:20 Announcements

Migration

09:20 – 09:40 Preliminary results of goose ringing in the Fertõ-Hanság National Park/Western Hungary in late autumn 2010 - Marta Ferenczi

09:40 – 10:00 Spring Migration Of Bean Goose On The European North-East Of Russia - Oleg Mineev

10:00 – 10:20 Inventorying and monitoring of major geese stage areas during spring migration on the European part of Russia - Peter Glazov

10:20 – 10:40 Migration of Lesser White-fronted Goose equipped with satellite transmitters in European Russia - Vladimir Morozov

10:40 – 11:00 Coffee break

Workshop to discuss marking techniques

11:00 – 11:20 European colour-ring Birding : colour-ringed birds from the (canon)net to the (inter)net – Dirk Raes

11:20 – 11:40 Migration of Greylag Geese tagged in Norway and Spain using Gps devices: First results from a new joined European research program - Mathieu Boos

11:40 – 12:00 Migration phenology, detailed routes and change in role of stopovers for the Svalbard barnacle goose Branta leucopsis as revealed by satellite tracking - Larry Griffin

12:00 – 12:20 Harnesses on geese - Berend Voslamber

13:00 – 14:30 Lunch

14:30 – 15:30 Discussions on marking techniques

Workshop on monitoring and database management

15:30 – 15:50 International Waterbird Census - strengthening coordinating waterbird monitoring and conservation - Taej Mundur

15:50 – 16:20 Coffee

16:20 – 16:40 Collecting observations from and feedback to volunteer observers through the website www.geese.org ##speaker to be announced later

16:40 – 17:45 Discussions on monitoring, database management and the role of GSG

18:00 – 20:00 Evening meal

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20th April

07:30 – 09:00 Breakfast

09:30 Excursion by bus (exact times and route to be confirmed)

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21st April

07:30 – 09:00 Breakfast

09:10 – 09.25 Announcements

Theme. Constraints on goose population size and distribution

09:25 – 10:10 Phenological mismatch greatest in the Arctic for migratory herbivores - Joel Schmutz

10:10 – 10:30 Geese surfing the wave of temperature acceleration during spring migration - Bart Nolet

10:30 – 10:50 Density dependence in geese revisited: confounded by the impact of global warming? - Jouke Prop

10:50 – 11:25 Coffee

11:25 – 11:45 Optimal timing of reproduction in arctic breeding barnacle geese - Maarten J.J.E. Loonen

11:45 – 12:05 Diurnal Variation In Behaviour Of Pink-Footed Geese (Anser Brachyrhynchus) During Spring Migration In Trøndelag, Norway - Magda Chudzinska

12:05 – 12.25 Barnacle goose (Branta leucopsis) feeding ecology on Kolguev island: the pattern of use of the nutritional resources in tundra habitats - Sonia Rosenfeld

12:30 – 14:00 Lunch

14:00 – 14:20 The Effects Of Snow Cover And Forage Availability On The Nesting Success Of Svalbard Pink-Footed Geese - Helen Anderson

14:20 – 14:40 Pink-footed and barnacle geese squeezed between Arctic fox and polar bear: how to avoid nest predation - Tom van Spanje

14:40 – 15:00 Nesting Of White-Fronted Geese And Barnacle Geese Near Peregrine Falcons On Kolguev Island - Elmira Zaynagutdinova

15:00 – 15:20 Prevalence of antibodies against Toxoplasma gondii in non- migratory and Arctic migratory geese: Mapping the seroprevalence over the fly route and season - Cecilia A. M. Sandström

15:20 – 15:40 Panmixia in Mallards and Widespread Genetic Introgression with other Duck Species: a Model for Geese? - Herbert Prins

15:40 – 16:00 Coffee break

Theme: Workshop on hunting - *Times and speakers to be announced in due course*

Close of meeting

Evening – conference dinner

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22nd April

Departure / informal gatherings after breakfast (hotel)

Abstracts – oral presentations

Abstracts are arranged in alphabetically order after the surname of the first (main) author.

The effects of snow cover and forage availability on the nesting success of Svalbard Pink-footed Geese.

Helen Anderson[1]*, Jesper Madsen[2] & René van der Wal[1]

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Keywords: territory quality, snowmelt date, nest availability, food availability, starvation-induced risk taking, *Anser brachyrhynchus*

Pink-footed geese *Anser brachyrhynchus* arrive in Svalbard in May and, after a brief period feeding at pre-nesting sites, move to their nesting grounds. Geese nest both on exposed south-facing tundra valley slopes, which experience early snowmelt, and on the more sheltered sides of steep cliffs, and initiate egg-laying when snowmelt allows access to nests. Here we show how territory quality, including extent of snow cover and forage availability, affects the nesting success of Pink-footed Geese at a sheltered south-east facing cliff colony (Nøisdalen) and an exposed south-west facing tundra valley slope colony (Gåseflatene); both within Sassendalen. Percentage snow cover in late-May was negatively correlated with total number of nests and with number of successful nests in both Nøisdalen and Gåseflatene. However, when late-May snow cover was high (82%), nesting success in Nøisdalen (4%) was significantly lower than in Gåseflatene (43%). When snow cover was low (45%), the nesting success of the two colonies was very similar (Nøisdalen = 67%, Gåseflatene = 61%). Nøisdalen birds had to travel significantly further from the nest to find food (338 m ± 32) than Gåseflatene birds (32 m ± 3) and the presence of forage species in the immediate nest vicinity was significantly less at Nøisdalen than at Gåseflatene. Hence, it appears that when nest initiation is delayed due to late snowmelt, the starvation-induced risk taking adopted by geese is greater for Nøisdalen birds, resulting in increased predation of Nøisdalen nests and lower nesting success than in Gåseflatene.

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Migration of Greylag Geese tagged in Norway and Spain using GPS devices : First results from a new joint European Research Program

Mathieu Boos[1]*, Vincent Schricke[2], Andy J. Green[3], Paul Shimmings[4], Hugues Lefranc[3], Juan A. Amat[3], Cristina Ramo[3] and Arne Follestad[4]

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Keywords: *Anser anser*, monitoring, GPS/GSM, hunting, habitat use.

Greylag Geese *Anser anser* populations are steadily increasing in Europe, but migration strategies may differ according to the breeding grounds birds originate from. Most geese flying over France to Spain come from Scandinavia or Germany, although an increasing number of individuals tend to winter as far north as The Netherlands. Based on existing data, Greylag Geese from Norway might have a different migration pattern than those from other countries, part of them being long-migrants flying through France to Spain where they could be subjected to hunting.

France is not a main wintering ground for Greylag Geese but about 20,000 birds (of unknown origin) are annually shot at stopovers. The aim of this new research program initiated by the French government, with the support of several partners, is to understand the migration pattern and routes of Greylag Geese flying over or staging in France, especially for those from Norway or those wintering in Spain. Thus in addition to the ringing and recovery/resighting program launched in Northern Europe for several years, we fitted GPS/GSM devices on about 30 Greylag Geese using backpack harnesses. Monitoring Greylag Geese using GPS devices is a tedious task that has shown several failures. Aggressiveness and strong pecking of the geese toward the harness and devices has needed several technical adjustments. After experiments on captive and wild geese we are now confident in the method used. Data are still scarce, but preliminary results reveal that geese show different departure dates and local movements before true migration. Further tagging operations are needed and planned for 2012 to improve our project.

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Diurnal variation in behaviour of Pink-footed Geese *Anser brachyrhynchus* during spring migration in Trøndelag, Norway.

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Keywords: *Anser brachyrhynchus*, diurnal behaviour, stopover site

During spring migration, Pink-footed Geese *Anser brachyrhynchus* stop in mid Norway to refuel before their onward flight to the Svalbard breeding grounds. In mid Norway, geese feed on pastures, stubble as well as newly sown grain fields. The aim of the paper is to describe diurnal variations in the behaviour of geese and to examine whether these variations are driven by digestibility of food geese feed on or also by external factors such as distance to the roost, disturbance and flock size.

Based on diurnal flock scans of activity budgets (observations carried out between 05h00 and 22h00 hrs) in each habitat type, we fitted a model containing all predictors we believe may influence geese behaviour. The number of feeding and alert geese on fields displayed a strong diurnal trend, which varied among habitat types, frequent and sporadic disturbance, but not flock size. On roost sites, geese also showed diurnal variation in resting and alertness. The observed diurnal variation differed from what has been found on the wintering grounds indicating that during spring, birds increase their foraging intensity in order to meet energetic and nutritional demands in a short time. Seasonal availability of habitats as well as density dependence due to a rapidly growing population size may also shape diurnal variations in goose behaviour.

This study, in combination with diurnal variation in habitat choice derived from a combination of flock scanning and detailed GPS satellite telemetry, may give an input for establishing detailed energy budgets for geese at studied stopover sites.

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Barnacle Geese colonies on the Timanskiy seacoast of the Barents sea in 2009

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Keywords: *Branta leucopsis*, salt marshes, colonies

In 2009, a section of the Timansky seacoast from Peschanka-To Lake to lower Velt river (a distance of *c.*180 km) was surveyed (68 05`37,34``N 50 03`41,25``E). On this section of the seacoast we found and described 12 Barnacle Goose *Branta leucopsis* nesting colonies. Seven of them were described for the first time.

The colony on the islands in the north part of Peschanka-To Lake consisted of 196 nests. On the coasts of Sengeysky strait we found 5 colonies:

1) SE of strait, on the continental part of the coast on the low and middle marshes (1,096 nests)
2) On high marshes SE coast of Sengeysky island (52 nests)
3) On low sandy island in SE part of strait (4 nests)
4) On low sandy islands in SW part of strait (135 nests)
5) On low and middle marshes on SW coast of the Sengeysky island (*c.*200 nests).

Broods of goslings were found in the Jung-yakha River mouth and in the Velt River mouth, but nesting colonies were not found there. In all colonies, except colony #2, geese nests in mixed colonies with large gulls *Larus spp.*

On the biggest colony in Kolokolkova bay, near Tobseda, 1,384 nests were found. The colony on Kambalnichya Pakha Bay south of Tobseda has declined – only 27 nests were found. On the low sandy islands in the mouth of the bay we found 1,003 nests. On the island with low and middle marches in Neruta River mouth there were 536 nests.
Altogether on this part of the Timansky coast *c*.4,700 Barnacle Goose nests were recorded.

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Experiments to reduce agricultural damage by scaring Pink-footed Geese using Border collies

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Keywords: *Anser brachyrhynchus*, agricultural damage

In the key staging area of Pink-footed Geese *Anser brachyrhynchus* in the Dutch province of Friesland, 37 farmers cooperated in systematic scaring experiments using trained Border collies in 2009/2010. The total area of these farms was 1,748 ha scattered over an agricultural area of 27,397 ha. The question we tried to answer is whether geese would return less often to fields from where they had been chased off. We used observations of marked Pink-footed Geese and compared the temporal and spatial distribution of these geese during the experimental season using the four previous seasons winters as a base-line.

We analyzed 31,209 observations pertaining to 1,902 individual birds. The probability that a marked Pink-footed Goose was observed in a ‘no-go’ area was indeed lowest in the season when Border collies were used. An even stronger effect was noticeable when we looked at the probability of return to a ‘no-go’ area within the same season. In the previous winters this probability was 55-60 %, but in the experimental season it was reduced to 23 %

Damage assessment indicated however that the farmers on the ‘no-go’ areas suffered an even higher yield loss during the season when the geese were regularly

chased from their fields. This can be caused by an influx of ignorant geese to these 'no-go' fields that spend more time grazing on these 'no-go' fields. When undisturbed, geese will often not graze but sleep in the middle of the day on fields, and may keep away newcomers by merely being present there.

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Preliminary results of goose ringing in the Fertõ-Hanság National Park/Western Hungary in late autumn 2010

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Keywords: *Anser albifrons albifrons, Anser fabalis rossicus*, goose ringing project, Pannonic region

In November 2010, a goose ringing project in Western Hungary was organized as part of an international cooperation between the University of West Hungary, Wetlands International (WI), the WI Goose Specialist Group, the Fertõ-Hanság National Park and Birdlife Hungary. Goose catching was focused on Greater White-fronted Geese *Anser albifrons albifrons* and Tundra Bean Geese *Anser fabalis rossicus*, which are regularly wintering around Lake Fertő. The main goal was to collect new data about the poorly known migration pattern of geese, wintering in the Pannonic region and to find out possible connections and exchange to wintering populations in Western and South-eastern Europe. All caught geese were ringed with metal rings of the Hungarian Bird Ringing Centre and additionally marked with individually coded neckbands (Tundra Bean Geese and Greylag Geese *Anser anser* with yellow neckbands, Greater White-fronted Geese with black neckbands). In addition, an adult male Greater White-fronted Goose of a family with two offspring was mounted with a GPS transmitter and a light green leg ring.

In total, 48 individuals of three goose species (35 Tundra Bean Geese, 10 Greater White-fronted Geese, 3 Greylag Geese) were caught and marked. Up to February 2012, we have received 259 reports (258 sightings, 1 bird reported shot) from 40 of 47 color-marked geese (171 reports of Tundra Bean Geese, 74 of Greater White-fronted Geese and 14 of Greylag Geese). Neck-banded birds were reported alive

from 7 different countries in the wintering areas, mainly from Germany, Hungary and Poland, while one Greylag Goose was reported shot in December 2011 from Northern Algeria.

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Icelandic Greylag Geese wintering in Norway

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Keywords: *Anser anser*, wintering areas, Norway

Norwegian and Icelandic populations of Greylag Geese *Anser anser* have been thought to be well separated due to different staging and winter areas. Approximately 40 neck-banded Icelandic Greylag Geese have, however, been observed in Norway during the winter. Only 2-3 Greylag Geese ringed in Norway (out of 3,640 neck-banded) have been recorded remaining in the country to winter, thus it seems reasonable to suggest that the main wintering population in Norway is made up of Icelandic birds. They have been observed north to Lofoten / Vesterålen, as well as inland in Central Norway, but (probably) during cold, snowy spells they move to the south.

The increase in Icelandic birds in winter in Norway has co-incided with a northward shift in wintering areas in Scotland towards the Northern Isles. The total numbers vary from year to year; often 1,000-2,000 birds being counted, but sometimes 5,000-10,000+ may be present. Such high numbers represent a significant proportion of the Icelandic population, and for sound management of this population it is important to establish a monitoring scheme for wintering Greylag Geese in Norway.

Two observations suggest some mixing with Norwegian birds on their breeding grounds. If they interbreed, it could be important to do genetic studies. Few marked birds have been seen in Norway in consecutive years, and ~50% have subsequently been seen in Scotland. This could indicate that Norway might be an occasional flyway endpoint for a proportion of the Icelandic Greylag Goose population.

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Inventory and monitoring of major geese stage areas during spring migration in the European part of Russia

P.M. Glazov[1], K.E. Litvin[2], O.B. Pokrovskaya[2], A.E. Dmitriev[1], G.M. Tertitsky[1], A.A. Medvedev[1]

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Keywords: migration of geese, spring stopovers, degradation of agricultural land

Trophic factor play a leading role in forming migration routes. Migration routes pass through the most 'environmentally friendly' places where migratory birds can find enough food and resting places during their stopovers.

Over the last few centuries geese have become connected with artificial landscapes created by man - agricultural land. Transformations of these landscapes and changes in land use have a great effect on aspects of goose migration.

Degradation of agricultural land and unregulated hunting are the leading factors reducing the number of geese in spring staging areas. As a result of changes in the spatial structure of agriculture, mass stopovers of geese on the spring migration have changed. Some of the protected areas created in the 1970-1980s do not now provide full protection for the main concentrations of geese.

To study the structure of the goose flyways, a ringing program was started in the Kostroma region (Kologriv). During 2008 – 2011, 238 Greater White-fronted Geese *Anser albifrons albifrons* were caught and ringed. Resigtings of marked individuals were received from The Netherlands, Germany, Belgium, Denmark, Poland, Estonia and Bulgaria. Marked individuals have been recorded near the areas the geese were caught indicating high fidelity to the stopover areas on spring migration. There exists a real need to expand areas of banding and monitoring of marked geese in Russia and Eastern Europe.

The development of programs promoting the observation of geese and resighting neckbands is necessary. For these purposes, the site http://www.rusgeese.ru/ for birdwatchers and hunters has been created.

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Migration phenology, detailed routes and change in role of stopovers for the Svalbard Barnacle Goose *Branta leucopsis* as revealed by satellite tracking

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Keywords: *Branta leucopsis*, Satellite-tracking, stopover, wind farm, GPS

Since 2006, WWT has deployed almost 30 satellite-tracking devices on Svalbard Barnacle Geese *Branta leucopsis*. These tags have provided a wealth of detailed information on the foraging and roosting sites of these geese, the typical patterns of habitat use on the wintering grounds and individual home range characteristics. During migration the tags have shown how the traditional understanding of the flyway and the role of stop-over sites is no longer valid for the population as a whole; the extended use of the Solway Firth as a wintering site and spring staging site having been demonstrated. The ability of a significant proportion of the geese to largely by-pass Norwegian staging sites and migrate straight to summering areas and still be able to attempt to breed needs to be examined in relation to the 'Green Wave' hypothesis. Use of island and cliff nesting sites has been mapped in many areas and the relation of these to subsequent moult sites has also been documented. In addition, the detailed understanding of the conditions under which spring migration is initiated coupled with the GPS-rich tracking information has allowed objective responses to be made within the realm of the onshore and offshore wind farm debate with the aim of furthering the conservation of this protected species. The idiosyncratic responses of individual birds to certain weather conditions are demonstrated and the relatively small dimensions of the "pinch points" through which almost the entire population is migrating along the Norwegian coast are highlighted.

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Seasonal habitat use by radio-marked greylag geese (*Anser anser*) in a recreational area in Bavaria

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Keywords: *Anser anser*, habitat-use, telemetry, management

Greylag Geese *Anser anser* are settling in new places in Germany since the 1990s. Lake Altmuehlsee was built 25 years ago and is now the largest breeding area of Greylag Geese in Northern Bavaria. The rising number of Greylag Geese has led to increasing damage to agriculture and tourism. To determine viable management strategies, we investigated the habitat use of Greylag Geese in the vicinity of Lake Altmühlsee during June to August 2010 and 2011 by radio-marking adult geese with GSM and VHF-radio-backpacks. GPS-bearings were taken every 6 hours (at 7 and 11 am and 3 and 11 pm; every Wednesday and Saturday we took points hourly).

To evaluate this data we used ArcGIS. We found that the geese stay close to islands when the goslings are six to eight weeks old. When the goslings are eight to ten weeks old they extend their feeding places to the tourist beaches. As soon as they can fly (around 10 to 14 weeks) they do not use the tourist beaches anymore and move to the agricultural areas surrounding the lake (~1km from the shore). In late

August the geese leave the lake.

To keep geese off the beaches and farm land we propose to develop attractive, undisturbed areas in the vicinity of the lake. We believe that this spatial habitat management will reduce agricultural damage and problems with geese on tourist beaches.

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Do carrot and stick differ? Experiences with a large-scale goose management scheme in The Netherlands

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key words: goose management, Natura 2000, agri-environmental schemes

As a result of increasing numbers of geese and an inflation of payments for agricultural crop damage, experiments with a different approach to goose management in The Netherlands has been carried out since 2005. Throughout the country, 80,000 ha of agricultural grassland and nature reserves were designated as goose reserves. Together with Natura 2000 sites, these areas offer geese undisturbed feeding opportunities. Outside these goose reserves (and Natura 2000 sites), active scaring was practised, including shooting on Greylag Geese *Anser anser* and White-fronted Geese *A.albifrons*. This carrot and stick approach aims to concentrate geese in the reserves and reduce crop damage on agricultural fields outside the reserves. Results from monthly goose counts (including detailed mapping of single flocks in GIS) were used to evaluate this new management scheme over a period of six years. For all species considered, there was no significant concentration effect in the goose reserves. Causes and backgrounds are discussed with respect to general patterns in goose numbers and distribution, designation process of the reserves, scaring strategies and carrying capacity.

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Recent developments of Pinkfeet wintering in Belgium: combined effects of climate change, disturbance and agricultural land use?

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Keywords: population trends, *Anser brachyrhynchus*, shooting ban, site fidelity, habitat use, disturbance

The coastal polders of Flanders function as the southernmost winter quarters for Svalbard Pink-footed Geese. During the last 50 years the population has increased from 12,000 to 65,000-70,000. The proportion of the population wintering in Flanders increased to >90% in the 1990s but declined to below 50% during the last decade, probably as an effect of climate change with increasing numbers staying in Denmark.

At the regional scale interesting trends concerning numbers, phenology and regional distribution occurred. The overall picture has been mainly influenced by the national shooting ban on Arctic geese since 1981/82. However, this protective measure did not directly contribute to the more recent total population increase. The regional distribution reflects a striking site fidelity of Pink-feet (neckband observations), in contrast to the more mobile White-fronted Geese. Most core wintering sites of geese were designated as a SPA in 1988.

Meteorological factors (strength of winters, snow cover and spring temperatures) seem to determine the recently stabilising of wintering numbers. Earlier spring departures during the last decade is important in relation to agriculture (no significant spring grazing). This early migration partly results from the efficient habitat use (no goose shooting). In recent decades the traditional grassland habitat preference has significantly shifted to an increased use of harvested fields (remainders of potatoes, sugar beet and maize, some of them sown with winter-wheat). The area of these crops has increased and has caused a steady decrease of high value permanent grassland in the Oostkustpolders.

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Optimal timing of reproduction in arctic breeding Barnacle Geese

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Keywords: *Branta leucopsis*, timing of reproduction, arctic

Timing of reproduction is an important life history in breeding birds affecting breeding success and survival. In the arctic, the length of the breeding season and the hostile winter are major constraints which have been successfully solved in the life history traits of arctic breeding geese. They time their migration and reproduction on a strategy to exploit the tundra and to depart with their offspring when winter returns.

In the past decades we have observed a global temperature increase, but the arctic has warmed even more than the rest of the world. What are the consequences for geese moving along their flyway and arriving on the breeding grounds where spring is starting earlier and earlier? Do they need to change their schedule? Where are the

constraints for an adaptation to these observed changes for which we predict a continuing trend in the future?

More than two decades of observation on Barnacle Geese *Branta leucopsis* have shown the potential and problems to adapt to a warming arctic. In this presentation, the consequences for life history decisions will be shown from a perspective of the individual. Can the individual still adapt to the unidirectional trend or are selection and survival needed to shape the adaptation of the population?

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Towards the first European adaptive flyway management plan: the case of the Svalbard pink-footed goose

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Keywords: adaptive management, agricultural conflict, *Anser brachyrhynchus*, flyway, population target

In its Strategic Plan for 2009-2017, the African-Eurasian Waterbird Agreement (AEWA) is calling for means to manage populations which cause conflicts with human economic activities. The Svalbard population of the pink-footed goose *Anser brachyrhynchus* has been selected as the first test case for such an international species management plan to be developed. The population size has increased considerably over the past decades, reaching an estimated 69,000 individuals in 2010. The continued growth of the population is a conservation success story, yet its increasing population size, along with other goose species, has progressively brought them into conflict with agricultural interests as well as having other environmental and social implications. Agricultural conflicts have been registered throughout the current flyway (Norway, Denmark, The Netherlands and Belgium), in particular with an increase in conflicts noted in Norway during spring. Furthermore, there is concern about degradation of vulnerable tundra vegetation in Svalbard due to increasing goose grazing intensities.

The flyway plan is currently in the process of approval by AEWA, to be implemented in 2013. The plan document outlines the status of the population, the proposed goal, objectives and management framework based on the principals of adaptive management. This framework is intended to provide systematic monitoring and evaluation procedures of management actions and their impacts, in order to learn and adapt. In this presentation the key components of the plan will be outlined, including the use of population target setting and hunting as a means of reducing the growth of the population.

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Challenges in the management of the Taiga Bean Goose

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Key words: *Anser fabalis fabalis*, habitats, hunting, management, action plan

The Taiga Bean Goose *Anser fabalis fabalis* population has declined during the last two decades. In Finland, Bird Atlas surveys suggest that the breeding population has declined especially in important breeding areas in central Lapland and northern central Finland. The possible causes of the decline include changes in breeding habitats, hunting and interspecific competition, though data are lacking. The availability and quality of breeding habitats may have decreased due to drainage, logging and peat production. The annual hunting bag in Finland has remained on average at 6,500 individuals since the 1990s, despite the population decline. In the 2000s, Bean Geese were mainly shot in southern and central Finland, and the bag correlated positively with that of the Greylag Goose *Anser anser* and Canada Goose *Branta canadensis*, both of which show increasing trends. In addition, the Bean Goose bag seems to be biased to adults. For these reasons, hunting was restricted in 2010 and 2011 by shortening the open season for the Bean Goose over most of the country. Finally, interspecific competition among sympatric anatids may have increased.

The Taiga Bean Goose population is in need of urgent management efforts throughout the flyway, and further research is needed to gain better knowledge on key population issues such as the breeding population size, vital rates and hunting mortality. Aims and measures relevant for management should be defined in an international action plan. In Finland, a national action plan for the Bean Goose is under preparation.

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Spring migration of the Bean Goose in the European north east of Russia

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Keywords: *Anser fabalis*, migration, phenology

Observations of Bean Goose *Anser fabalis* migration were carried out from 1970-2005. The migration of geese from the Severnaya Dvina basin, partly from the basins of rivers Kama-Vyatka northwards passes through the territory of the Komi Republic. In the basin of Sysola Ryver (Syktyvkar City area), Bean Geese being to appear

between 2 April and 8 May, with a mass migration of birds passing through between 22 April and 23 May. Birds migrate in small groups (up to 10 individuals) and in flocks (40-300 individuals) in the morning, evening and at night. In the area between the two rivers Vashka and Vim (in the western part of the Komi Republic), flocks of 100-150 individuals migrates to the north in the last third of May. In the basin of the Upper Pechora River, intensive migration of Bean Geese occurs from 23 April to the middle of May and in the Lower Pechora River geese migrate to the north and north-east between 10-31 May. At stop-over (staging) sites, gatherings of up to 1,000 geese use swamps and flood-plain habitats in the basins of the rivers Vichegda, Vim, Sisola, Middle and Lower Pechora.

On the Malozemelskaya and Bolshezemelskay tundra, geese arrive from the west, migrating to the north and north-east along the Barents Sea coast, and also from basins of the rivers Vim and Pechora. On the Barents Sea coast, the first Bean Geese appear between 23 April and 25 May, flocks of 10-200 individuals occur and mass migration starts between 11-27 May. Migrants stops and rest on the coastal laida, vast swamps and grassy lowlands. To the north-west of the Yugorskij peninsula (Yugorskij Shar channel), Bean Geese arrive between 9-20 May and migration is not pronounced. On the eastern part of the peninsula (Kara Sea coast), the first geese were recorded on 7 to 9 May. Between 23-28 May and 9-14 June, migrants (flocks of 10-25 individuals) flew to the north, east and west without stopping.

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Recent changes in the distribution of Iceland Greylag Geese during the non-breeding season: Implications for monitoring.

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Keywords: *Anser anser*, monitoring, changes in winter distribution

The population of Greylag Geese *Anser anser* breeding in Iceland has fluctuated at about 100,000 individuals since the late 1980s, despite an annual harvest of 20-40% of the post-breeding population through hunting each autumn. During the last thirty years there has been a major shift in the winter distribution of the population. From previously supporting virtually no Greylag Geese, numbers wintering on Orkney have steadily increased from the early 1990s such that by the late 2000s, Orkney supported up to 70,000 of the Iceland birds (or 70% of the entire population). At the same time, large areas of east and southern Scotland and northern England have been abandoned as wintering areas. From about 2000, several thousand Iceland Greylag Geese have been recorded wintering in south west Norway and, from 2005,

several thousand geese began to over winter in Iceland (effectively stopping migration altogether).

This major shift in the winter quarters has presented problems for adequate monitoring with more birds now frequenting areas with fewer counters and large water body roosts (often protected for this population) being abandoned. At the same time as the Iceland population shifted its winter quarters north, Greylag Geese breeding in Britain began to increase – markedly in north Scotland. The presence of large numbers of summering Greylag Geese in areas frequented by wintering Iceland birds has also presented problems in assessing population levels of each population.

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Migration of Lesser White-fronted Goose equipped with satellite transmitters in European Russia

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Key words: *Anser erythopus*, migration, satellite tagging

Three Lesser White-fronted Geese *Anser erythopus* were fitted with satellite transmitters in two areas. The first one was marked at the western macro-slope of the Polar Urals 40 km eastwards from Vorkuta city in Northern Russia. Ten adult Lesser White-fronted Geese were tagged there in 2004, 2006 and 2011. The second area is situated in the upper reaches of the Bolshaya Rogovaya River, approximately 100 km to the west of Vorkuta, where two geese were tagged.

Autumn migration starts in late August/early September. The satellite-signals have shown that these Lesser White-fronted Geese have 2 or 3 stopover (staging) sites during autumn migration. Two of them lasted 2-6 weeks, whereas the other one lasted for one week. The first important staging area is located in the Lower Ob river Valley or at the Baydarata Bay of the Kara Sea. The birds stage there for 2-3 weeks. The second, and most important staging area, where Lesser White-fronted Geese stop for 4-6 weeks, is situated in Northern Kazakhstan (Kustanay Region and adjacent areas of Russia and Kazakhstan). Some birds stop in a third staging area for a shorter period (one week) in the mouth of Ob River or in the Lower Ob River.

The total duration of the autumn migration is about 12 weeks (~3 months). The wintering grounds of Lesser White-fronted Geese breeding in the Polar Urals and adjacent territories are situated in Azerbaijan, at the Kyzyl-Agach Bay, or in Mesopotamia, Tiger River basin (Iraq). Geese from the same breeding areas can winter in Iraq one year and in Azerbaijan another year.

Spring migration starts in March, and lasts about 8-12 weeks (~2-3 months). The geese have more stopovers (4-7), but they are shorter (from 1 to 3 weeks) than in

autumn. Staging areas are situated in the Manych Valley and in the north of the Caspean Sea (at the Kizlyar Bay), in Western Kazakhstan (the Ural River mouth and northwards), Northern Kazakhstan (Kustanai Region), south and north of Western Siberia. The longest stops (for 3 weeks) are in Manych Valley and in the Kustanai Region.

This satellite tagging effort on Lesser White-fronted Goose has revealed formerly unknown staging areas. It has made it possible to estimate the duration of each stopover, evaluate the importance of different stopover sites for the geese, rediscover their wintering grounds in Iraq and prove strong site fidelity of the Lesser White-fronted Geese to their breeding grounds. This is very important knowledge needed to implement conservation measures for this globally threatened species that faces severe treats from illegal hunting/accidental shooting along the migration routes and in the wintering areas. This is still a problem despite the fact that the species it is legally protected in all countries that it occurs along this migration route.

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Update on Strategic Developments for Strengthened Waterbird Monitoring in the African-Eurasian flyways

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Key words: Waterbirds, monitoring, coordination, international partnership

The International Waterbird Census (IWC) was started in 1967 and has gradually become the most extensive global biodiversity monitoring scheme, covering >15,000 sites annually. It has been developed to monitor the changes in the status and distribution of waterbird populations and to assist with the identification of internationally important sites for waterbirds. The IWC and the information services produced based on the data coming from it, such as the AEWA Conservation Status Report and the global Waterbird Population Estimates, are widely recognised sources of policy relevant information.

In 2009-2010, Wetlands International (WI) carried out a review of the IWC with the purpose of identifying what are the key information needs stakeholders expect from an international waterbird monitoring scheme and what skills and processes should be in place to fulfil these requirements. The review concluded that a major benefit of the IWC programme is that one streamlined data aggregation process can contribute to the information needs of AEWA, the EU Birds Directive and the Ramsar Convention. These information needs can be satisfied through the combination of policy-relevant analyses and making available population and site network level overviews. WI now has developed a forward plan (2012-2014), which has adopted a modular approach to the development of a strengthened and well resourced waterbird monitoring programme in the African-Eurasian flyway and coordinated by the newly established African-Eurasian Waterbird Monitoring Partnership. It

recognises that complementary schemes are needed to cover farmlands (geese, swans, some waders) and on sea (seaducks), etc. which are not well covered by the core IWC counts.

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Resource selection pattern of Bar-headed Goose during the non-breeding season

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Keywords: *Anser indicus*, resource selection, habitat, India

The Bar-headed Goose *Anser indicus* is one of the most prominent waterfowl in the central Asian Flyway. It breeds in the Palearctic and flies over the highest peaks in the Himalayan Range to spend the winter months on the Indian sub-continent. India is the most important wintering area for the species in south Asia. Burgeoning human population and rapid industrial development, however, threaten the continued survival of the species in the region. Conservation efforts are often marred by an apparent lack of ecological information on the species. We capitalized on satellite telemetry and remote sensing data to study the habitat use of this charismatic and highly threatened species. Twenty-five individuals were marked with GPS transmitters in December 2008. We only used the locations from winter months (December to March) to determine their resource use pattern. Generalized Linear Models (GLM) indicated that wetland type, land-cover type and temperature are the most important factors that influence habitat selection by Bar-headed Goose. Resource Selection Functions (RSF) showed that the species preferred grasslands, and avoided woodlands, croplands and shrublands. In case of wetland types, the geese preferred wetland complexes (areas with 0-25% wetland). Coastal wetlands and rivers were used in proportion to their availability, while lakes were avoided. These results have important implications for identifying areas including potential Ramsar sites for their long-term protection in India and elsewhere.

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Safeguarding the Lesser White-fronted Goose *Anser erythropus* in key wintering sites in Greece

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Keywords: *Anser erythropus*, Fennoscandian, hunting, poaching, smart patrol system (SPS)

The Fennoscandian Lesser White-fronted Goose (LWfG) population has undergone an alarming population decline during the last 50 years. During the last five years it has remained relatively stable and it is estimated at some 20 breeding pairs. Hunting and poaching is the most important threat to the survival of the LWfG populations globally. The Fennoscandian population winters almost entirely in Greece, which is currently acting as a bottleneck for this population, due to hunting and poaching in the wintering sites of the species. Since September 2011, a new international LIFE+ project has begun (LIFE10 NAT/GR/000638), whose main objective is to reduce mortality rates relating to hunting and poaching at the wintering and staging sites of the LWfG (wwf.fi/lwfg).

In order to address this threat, the principal conservation action of this new project comprises the design and application of a state-of-the-art patrolling system (Smart Patrol System – SPS) in order to protect the Fennoscandian LWfG flock at its main wintering areas in Greece. The areas will be under 24hr CCTV surveillance while the main flock is present, allowing suspicious/illegal events to be dealt with immediately. The system will have a high demonstrative value as its design will allow future use in other areas for the protection of threatened species. Intensive patrolling will also be carried out in staging and wintering sites in Bulgaria, in order to monitor the population and its threats and to locate new potential LWfG sites.

International cooperation and networking is of paramount importance for the conservation of the LWfG, and the flyway approach taken on this LIFE+ project is expected to have significant benefits on the Fennoscandian LWfG population.

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Agri-environmental measures to support the foraging grounds of wintering geese in Bulgaria – finally adopted and operational.

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Key Words: wintering geese, agri-environmental measure, *Branta ruficollis*, foraging grounds

The agri-environmental expert team of the Bulgarian Society for the Protection of Birds (BSPB) successfully defended the need of the start of a new geese foraging areas measure as part of the National Agri-Environmental Programme (NAEP). The measure initially proposed at the drafting of NAEP back in 2007, was re-drafted and submitted to the Ministry of Agriculture and Food. The proposed measure will cover the main areas of concentration of wintering geese in Bulgaria – coastal Dobrudga area, Burgas region, Danube riverside and some areas around big artificial dams in Southern Bulgaria. The payment will subsidize farmers for seeding wintering wheat in those areas as the favoured food resource of the geese in Bulgaria. The farmers have to commit for a five year period. Restrictions include no use of rodenticides till the middle of March and no deliberate scaring of geese from their fields. Territories including wind turbine installations are not be eligible for support through the measure.

In addition to the introduction of the measure, the team of BSPB within the framework of a Life Programme funded project –"Safe Grounds for the Redbreasts" (LIFE/NAT/BG-09/000230) along with experts from the Wildfowl & Wetlands Trust (WWT) are undertaking experimental studies to identify suitable geese friendly farming options including arrangement of crop rotation and types used for crop rotation. The results will feed into improvement of the measure and development of specific Red-breasted Goose *Branta ruficcolis* foraging areas. This additional study has been launched in winter 2011-2012 to clarify the impact of goose grazing on crops in Coastal Dobrudga – the main wintering ground of the Red-breasted Goose.

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Nesting habitats of Barnacle Geese: natural limits and species expansion

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Key words: *Branta leucopsis*, nesting habitats, arctic

Barnacle Geese *Branta leucopsis* population growth entails utilization of new nesting habitats. Besides traditional habitats on cliffs, rocky outcrops, canyons and small

offshore islands, new colonies in the 1980–1990s on Kanin Peninsular, Kolguev Island and in Malozemelskaya tundra were established on coastal habitats (salt marshes, flat sandy islands and spits) which are mostly protected from Arctic Foxes *Vulpes lagopus*. At first, colonies in freshwater habitats arose on coastal dunes of Eastern Kolguev Island, later in Kolokolkova Bay. Geese breeding at these colonies reared broods at salt marshes and coastal areas.

In 1994, about 200 Barnacle Goose nests were found on sedge-moss-shrub habitats in the Lower Peschanka River area, Eastern Kolguev. In 1995, the total number of breeding geese in the delta exceeded 5,000 pairs, most of them nesting on salt marshes. In 2006, the numbers was estimated at about 60,000 breeding pairs, most of which nested in fresh water habitats. In 2011, the colony expanded and about 250 pairs of geese bred on an area which was unoccupied in 2008. Most of Barnacle Geese that nest near the coast move inland to rear broods. Nowadays, Barnacle Geese on Kolguev Island use many different nesting habitats: river bank slopes (sometimes near nests of Peregrine Falcon *Falco peregrinus*), sandy-clayey circus within hilly areas, sedge-moss lowlands and bogs with or without willows, typical tundra habitats, the bottoms of lake depressions and even abandoned oil fields. The nesting success is usually high in all habitats. So, we could predict further growth of the Kolguev population of Barnacle Geese.

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Panmixia in Mallards and Widespread Genetic Introgression with other Duck Species: a Model for Geese?

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Keywords: *Anas platyrhnchos*, genetic introgression

Mallards *Anas platyrhnchos* occur throughout the northern hemisphere, from the Atlantic to the Pacific Oceans. They even occur in Greenland. With new molecular tools (Single Nucleotide Polymorphism mapping) we studied whether this duck population with its vast extent of distribution and very large population size is genetically structured. Basically it is not! Except for the Greenland population, which is really quite distinct, the Mallard shows an amazing amount of gene flow thus putting question marks to the concept of the biological basis of the flyway concept.

We also found that Mallard regularly interbreed with other duck species within the genus Anas, and that they have done this for tens of thousands of years. Yet they have stayed morphologically (and genetically) distinct from the other Anas species. This has important consequences. Firstly, all Anas species together may form some supra-population. Secondly, the small but regular genetic exchange between the species of the super-species complex may ensure continued adaptability in the face of fast environmental changes. And thirdly, it re-emphasizes the importance of experimental results that female choice for male plumage maintains species barriers much more than genetic barriers.

Geese are also known to easily cross breed. Yet their plumage patterns are much less expressive. We thus want to discover whether Anser-species also form a supra-population and how they maintain species-integrity over time. To that end we need many DNA-samples and we hope you will cooperate in helping us.

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Density dependence in geese revisited: confounded by the impact of global warming?

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Keywords: *Branta leucopsis*, climate change, breeding performance

Rapidly increasing goose populations are expected to exhibit density-dependent growth. However, an analysis of long-term datasets is complicated because the effects of population size and climate change may become confounded. The impact of population size on reproductive performance might be obscured, or spuriously overestimated, by the unstoppable increase of ambient temperatures. In this paper, I explored ways in which the reproductive performance of Barnacle Geese *Branta leucopsis was* affected. Was it by density effects alone, or by effects of climate change as well? I used information on reproductive success collected in a local breeding population in Svalbard (Nordenskiöldkysten) from 1977 onwards.

In the spring staging area along the Norwegian coast, goose performance was affected by climatic conditions. Intake rates and fat deposition rates were negatively related to ambient temperatures during the first half of the staging period, and positively related to temperatures during the second half. Spring temperatures have increased along the Norwegian coast, however with large spatial variation. As a consequence, the optimal area for spring staging has moved northwards. On the breeding grounds, reproductive success was closely related to the timing of snow melt. Rapidly increasing spring temperatures in Svalbard caused earlier snow melt. Associated with this, geese shifted incubation forward. When testing various parameters simultaneously, the timing of snow melt was the prime factor determining reproductive success of Barnacle Geese, followed by population size and temperatures at spring staging sites. By including weather data in models explaining variation in reproductive success, density-dependent effects appeared 50% stronger than when changes in climate were ignored.

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Agri-environment measure for Red-breasted Goose in Romania

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Keywords: *Branta ruficollis*, agri-environment scheme, Romania

During the winter, Romania holds approximately 40% of the global population of the Red-breasted Goose *Branta ruficollis*. The geese formerly roosted and fed on the costal lakes around the Black Sea, but, in recent years, the geese have shifted to inland lakes and/or the Danube. These areas were identified during fortnightly counts conducted in Romania as part of the Red-breasted Goose Common Monitoring and Research Programme starting in 2003/04. Grazing geese cause losses of winter wheat with economic consequences for the Romanian farmers. These losses were quantified as being between 17 – 31 % on winter wheat in the study. Winter feeding ecology studies of the Red-breasted Geese were conducted by DH. In order to minimise this conflict, the Romanian Ornithological Society, the BirdLife partner in Romania, devised an agri-environment measure with the aim to secure feeding areas for this endangered species. The measure was proposed in summer 2011 to the Ministry of Agriculture and Rural Development, and approved by the European Commission in 2012, the first year in which farmers can start applying. The measure focuses on supplying geese with corn in the first weeks of their arrival, and with wheat for the rest of their stay in Romania, either by creating corn feeding points per hectare or by leaving unharvested corn in the fields. We target farmers with arable land located in the Important Bird Areas where the geese occur, covering more than 90% oftheir feeding and roosting areas in Romania.

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European colour-ring Birding: colour-ringed birds from the (cannon) net to the (inter) net.

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Keywords: colour-ringing, register, co-ordination

With the arrival of the internet, it was decided that European colour-ring Birding (www.cr-birding.be) should succeed « *Aperçu des programmes de marquage d'oiseaux à l'aide de bagues couleur, collier et marques allaires en* Europe » (R. Flamant in Aves 31 : 65-186, 1994). A successful First European colour-ring Meeting was organised in Belgium and, by 2007, almost 1,500 colour ring projects of just over 300 bird-species were registered.

Some 15 years after the start, a new website saw daylight. SOVON got involved, EURING sponsored the project and **www.cr-birding.org** was born. The site is based on a content management system, people can select criteria to find 'the solution', a project-leader or www.geese.org.

The number of projects for geese are : Bean Goose (19), Pink-footed Goose (8), Greater White-fronted Goose (19), Lesser White-fronted Goose (11), Greylag Goose (35), Bar-headed Goose (3), Snow Goose (10), Emperor Goose (2), Canada Goose (16), Barnacle Goose (11), Brent Goose (11), Red-breasted Goose (5), Egyptian Goose (6), Ross Goose (1), Goose hybrids (2)

Today the database holds just over 2,000 colour ring projects of almost 370 bird species. Some colour-ring information is still available on the old website, but step-by-step, projects are being transferred to the new website.

There have been 22,109 visits (of which 11,532 were unique) since the start of cr-birding.org (1 Mar 2011 to 1 Feb 2012).

Co-ordination of all European colour-ring projects is necessary and European colour-ring Birding is the best platform. Transfers of the projects from the old to the new site continues. The module's 'trusted editor' is active and ringing stations or group coordinators can insert their own data. Recently, a Google cloud connect Geese file has been tested.

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Distribution and population trends of wintering Greylag Geese in Spain

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Keywords: *Anser anser*, population trends, Spain

We summarize available information on the population size and trends of wintering Greylag Geese *Anser anser* in Spain during the last four decades. Since the first national census carried out at the beginning of 1970s, the wintering population of

Greylag Geese in Spain has experienced a moderate increase. At the same time, its distribution has expanded, and besides the Guadalquivir marshes (Doñana), which was easily the most important wintering site before 1990, sites further north such as Villafáfila, Nava, Boada, and Pedraza lagoons in Castilla-Leon region as well as in Guadiana wetlands in Extremadura, have become important wintering sites. Some of these wetlands have changed following wetland restoration, others following changes in agricultural practices. While the number of Greylag Geese wintering in the Guadalquivir marshes in the south have remained relatively stable, the number of geese wintering in Castilla-Leon lagoons in the north has experienced a strong increase. However, numbers wintering in The Netherlands have increased much faster, so that a progressively lower proportion of the flyway population is wintering in Spain. Climatic effects and the level of flooding in the temporary marshes have an important influence on the numbers of geese wintering in Doñana.

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Barnacle Goose *Branta leucopsis* feeding ecology on Kolguev island: the pattern of use of the nutritional resources in tundra habitats

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Keywords: *Branta leucopsis*, Kolguev Island, feeding ecology

The main goal of this study was to show the dependence of the Barnacle Goose *Branta leucopsis* breeding in new sites far from the sea on Kolguev Island from the feeding base quality. Field studies were undertaken between 27 May and 29 July 2011. We used a coprological cuticular method for samples analysis. We choose 3 areas as model plots – slope, lake depression, willow-sedge bog tundra. Samples from 10 incubating females in every plot were collected once every 10 days. Simultaneously we made cuts. To determine the diet spectrum, we also gathered samples in anthropogenic habitats, river deltas, along the coastline and salt marshes. 169 samples from Barnacle Geese were analyzed, 53 from Greater White-fronted Geese *Anser albifrons albifrons*, 3 from Bean Gees *Anser fabalis* and 7 from Reindeer *Rangifer tarandus*.

On the tundra, Barnacle Geese use willow (up to 67%), mosses (up to 41%), *Ranunculus pallasii* (up to 39%), *Cyperaceae, Poaceae and Dycotiledonae* (up to 63%) even in the habitats where *Carex aquatilis* is dominant. Barnacle Geese feed intensively during the nesting period, not restricting the spectrum of feeding plants. There is a tendency to combine the nesting and feeding areas. They use habitats without salt marsh vegetation throughout the breeding season. High breeding success suggests that incubating females fed adequately on the tundra. The absence of broods and moulting bird's migration to salt marshes shows the feeding base does not influence the gosling's growth. The overlap of the diets is great but all

the feeding recources (except salt marshes) are almost unlimited. The concurrence with other goose species during the brood rearing period and moulting stages is possible.

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Prevalence of antibodies against Toxoplasma gondii in non- migratory and Arctic migratory geese: Mapping the seroprevalence over the fly route and season

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Keywords: *Toxoplasma gondii,* arctic breeding geese, parasite

Toxoplasma gondii, an intracellular coccidian parasite found worldwide and pathogenic to virtually all warm blooded animals, requires a cat (family Felidae) to complete its full lifecycle. Even though there are no wild felids on Spitsbergen and domestic cats are prohibited, *T. gondii* has been found in resident predators such as the arctic fox and the polar bear, suggested to be entering the ecosystem via migratory birds. The objective of this study was to identify infected goose populations at various latitudes to understand the dynamics of infection and disease. To investigate how *T. gondii* enters the pristine Arctic, a single blood-sample was collected from selected migratory geese species (*Anser anser, A. brachyrhynchus, Branta canadensis, B. Leucopsis*) at: 1) Arctic breeding area in Russia and on Spitsbergen, 2) at non-Arctic breeding grounds (the Netherlands) and 3) at wintering grounds in Netherlands and Denmark.

A direct agglutination test (DAT) was used on plasma for evidence of antibodies towards *T. gondii*. In re-sampled birds at Spitsbergen, a significant seroreversion was

observed in 42% of seropositive adults, showing no detectable antibody after 12 months. Adults were seropositive at all locations (arctic, temperate, breeding and wintering grounds) while all juveniles sampled at breeding grounds were negative. The absence of *T. gondii*-specific antibodies in all juveniles, but their presence in 8 month old immature birds on wintering grounds, strongly suggests that adults are introducing the parasite to the high Arctic via infection on the wintering grounds.

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The Effects of Climate Variation: How well do geese match their breeding phenology with the environment?

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Keywords: climate change

The timing of breeding is constrained in arctic ecosystems and small temporal differences in when individuals breed can have large effects on fitness. Arctic ecosystems are generally warming more rapidly than other ecosystems which, for migratory species, can cause an imbalance, or mismatch, between when they have evolved to breed versus when it is optimal to breed environmentally. We are conducting a circumpolar meta-analysis that strives to understand the ecological conditions that contribute to establishing a mismatch, as well as its magnitude and impact. For instance, what is the degree of concordance of 'green up' on migratory staging areas with 'green up' on breeding areas, and how influential is this concordance on the magnitude or impact of mismatch? Using NDVI (Normalized Difference Vegetation Index, a measure of green biomass) data to reflect phenology, we quantified degree of mismatch at breeding areas and found that mismatch is progressively greater at higher latitudes. The pattern is likely a consequence of an adaptive constraint caused by high among-year variance in phenology relative to short seasons. Thus far, few demographic impacts of mismatch have been documented in geese, but that will likely change as a function of the pattern (mean and variability) of future climate change.

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Pink-footed and barnacle geese squeezed between Arctic fox and polar bear: how to avoid nest predation

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Keywords: arctic-nesting geese, predation, *Branta leucopsis, Anser brachyrhynchus, Ursus maritimus*

Recently, polar bears *Ursus maritimus* in Svalbard have adopted a strategy of obtaining food in summer by plundering goose colonies. Bears eating eggs is not a new phenomenon; however the intensity of predation and the spatial scale at which this happens is unprecedented in modern times. Over the past eight years, we recorded polar bear performance in colonies of barnacle *Branta leucopsis* and pink-footed goose *Anser brachyrhynchus,* and registered predation rates of goose nests. The average number of barnacle goose nests taken by a single bear was 71, with a maximum number of 300. All bears taken together, the predation rate of a single colony was up to 91% of the nests. Extensive polar bear predation of pink-footed goose nests in our study area has only just begun, and the predation rate of all available nests was still relatively low (20%). By considering the choice of nest location in the tundra landscape and the goose behaviour distracting predators from the nest, we show that both goose species were adapted to minimize nest predation by Arctic foxes *Vulpes lagopus.* However, when it comes to avoiding predation by the novel predator (polar bear) goose performance appears maladaptive. We explored how geese would distribute their nests to minimize predation by polar bear and arctic fox. The carrying capacity of coastal tundra stretches for nesting geese would shrink drastically.

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Adaptive co-management and geese; case studies and experience from Norway

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Keywords: Pink-footed goose, adaptive co-management, agricultural conflicts, hunting, Trøndelag

Expanding populations of migratory geese conflict with agriculture throughout Europe as they forage on pastures and arable land. This conflict has intensified in recent decades due to a combination of increased numbers of geese wintering and breeding in Europe and their transition from feeding in natural habitats or extensively grazed areas to intensively farmed agricultural land. Hence, there is a need for initiatives that alleviate the conflicts, as well as action/management plans both at a regional, national and international level. Various management tools and economic incentives have been used, including so-called agri-environment schemes whereby farmers are financially supported in order to modify their farming practises in an advantageous environmental direction. In this talk we will present two projects where processes around the Svalbard-breeding population of Pink-footed Goose *Anser brachyrhynchus* are the main focus. In these two projects we investigate and demonstrate an adaptive organisation and co-management in a region where farming is challenged by the presence of thousands of geese causing damage to crops. Adaptive management requires involvement from local and regional stakeholders and managers, and in our projects we aim to include them as project results are discussed with managers and stakeholders. We then develop, in an adaptive

process, management recommendations (hypothesis-based) for the conflict areas. Results and experience from these processes will be presented.

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Harnesses on geese

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Key words: satellite transmitter harness, *Anser anser*, problems

In several goose species harnesses are used to attach satellite transmitters or GPS-data-loggers. These harnesses are constructed in such a way that they drop from the birds after about two year. It is assumed that after these two years some weak points in the harness are break and the harness will fall of the bird.

Is this true? Sometimes the birds are seen again after the harness has dropped down and everyone thinks: ok, the system works! But has anyone ever seen what really happens? We don't think so after what we have seen in our birds.

What happened? We have some studies on Greylag Geese in different project about which we will give our experiences below.

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Geese surfing the wave of temperature acceleration during spring migration

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Keywords: GPS tracking, green wave, growing degree days, temperature sum, white-fronted goose

Many migratory herbivores seem to follow the flush of plant growth during migration in order to acquire the most nutrient-rich plants. This has also been hypothesized for arctic-breeding geese, but so far no test of this so-called 'green wave' hypothesis has been performed at the individual level. During four years, a total of 30 Greater White-fronted Geese *Anser albifrons albifrons* was tracked using GPS transmitters, of which 13 yielded complete spring migration tracks. From those birds we defined stopover sites and related the date of arrival at each of these stopovers to temperature sum (growing degree days, GDD), snow cover, accumulated photoperiod and latitude.

We found that geese arrived at spring stopovers close to the peak in GDD jerk; the 'jerk' is the third derivative, or the rate of change in acceleration, and GDD jerk maxima therefore represent the highest acceleration of daily temperature per site. Day of snow melt also correlated well with the observed arrival of the geese. Factors not closely related to onset of spring, i.e. accumulated photoperiod and latitude, yielded poorer fits. A comparison with published data revealed that the GDD jerk occurs 1–2 weeks earlier than the onset of spring derived from NDVI (Normalized Difference Vegetation Index, a measure of green biomass), and probably represents the very start of spring growth. Our data therefore suggest that White-fronted Geese track the front of the green wave in spring.

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Feral Greylag Geese – why do they fare so well?

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Keywords: Anser anser, Limiting factors, ecology in winter, urban, behavioural plasticity

Since 2002, the State Museum of Natural History has organised the ringing and monitoring of feral Greylag Geese *Anser anser* in Stuttgart, southwest Germany. The population was established from releases of captive birds in the mid 1980s. The first successful breeding was recorded in 1995. By 2010, the number of breeding pairs had grown to 17 with 46 fledglings produced. The peak number of geese counted within the city limits up to 2010 was 306 individuals. Between 2002 and 2010, 359 Greylag Geese have been ringed with a blue plastic leg ring, allowing individual identification and thus monitoring of movements, breeding success and behaviour. Within the city, geese use several parks that offer plenty of grazing in direct proximity to lakes for taking refuge. Being an apparently optimal goose habitat, however, birds also face several limiting factors in urban areas (i.e. close contact to people, dogs causing disturbances and mortality, limited safe nesting sites, predation of eggs and young goslings by crows and herons). What behaviours do the geese show in response to these factors?

Unlike wild Greylag Geese, the Stuttgart birds remain in the vicinity most of the year even during harsh winters thus saving the cost of migration. Although birds' abdominal profiles decline towards the end of winter, they develop strategies to cope

with ice and snow. Feral geese in urban areas may be successful not only because of the good habitat but also because of their behavioural plasticity.

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The national Action Plan for Lesser White-Fronted Goose conservation and study in Kazakhstan

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Keywords: migration, *Anser erythropus* , habitat conditions, threats to species survival, hunting, poaching, actions on elimination of threats

Implementation of the National Action Plan of the Lesser White-fronted Goose (*Anser erythropus L.*) conservation is beginning in Kazakhstan. In 2012-2014, actions will be implemented, directed on increasing the survival rate of this endangered species. Many lakes and surrounding agricultural landscapes in the north and northwest of the state are crucial in supporting migrating "western" Lesser White-fronted Geese.

Results of the monitoring there in 2009-2011 outlined the necessity of undertaking urgent and effectual measures for eliminating factors which are reducing the western population. The main factors, negatively influencing the geese and their habitats are hunting and an unstable water regime. Actions to decrease the poaching level and other negative factors (fisheries, farming and recreation) influence the reduction, will be undertaken. In key migtration (stop-over) places rest zones (seasonal reserves) will be created and Management Plans for these territories will be introduced. Various methods to distribute knowledge about the status of the Lesser White-fronted Goose and necessary conservation actions among the local communities will be undertaken. Scientific research for collectoion of the current key information for the correction of planning actions will continue.

For this Action Plan to be realised, the Working Group was formed which includes national and foreign experts, specialists in biodiversity and environment protection, wildlife and hunting inspectors and media representatives. A national authorized structure (the Forestry and Hunting Committee) supervises the Working Group activity.

Monitoring of their success and efficiency will be made at an annual Working Meeting. The main sponsor in realising the Action Plan is AEWA, allocating necessary financial assets, from 2013. Target financial support will be provided from the government of Kazakhstan.Though the present Action Plan doesn't possess legislative status, it is a basis for planning of other actions for Lesser White-fronted

Goose conservation in Kazakhstan at all levels. The monitoring of the success and efficiency of the actions will be annually made at a session of National Working group with the subsequent transfer of the report to the authorized structure.

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Nesting of White-fronted Geese and Barnacle Geese near Peregrine Falcons on Kolguev Island

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Key words: *Anser albifrons albifrons, Branta leucopsis, Falco peregrinus*

Barnacle Geese *Branta leucopsis* at Kolguev Island nest mostly in colonies on the coastal marshes. White-fronted geese *Anser albifrons albifrons* nest all over the island. Both species also tend to breed in colonies near Peregrine Falcon *Falco peregrinus* nests.

The size of the colonies near peregrines is not more than 50 nests. White-fronted geese nest in aggregations around every accessible peregrine nest. Barnacle Geese prefer territories near larger waterbodies. White-fronted Geese and Barnacle Geese have the same breeding terms on Kolguev Island. Geese nested 5 days earlier near peregrine nests than at other areas. Geese prefer to nest near peregrines because the falcon protects them against Arctic foxes *Vulpes lagopus*. Nevertheless, nesting success of geese on Kolguev Island is generally very high because of absence of rodents (79-92%) and didn't increase near falcons. Barnacle Geese nesting success was 91 % beside peregrine nests. Some Barnacle geese nest over again on the territory where Peregrine falcon bred in the previous year, but did not appear in the following year. As a result, their breeding successes were reduced by up to 16 %, while in large colonies on marshes, nesting success was 94 %. White-fronted Geese breeding in colonies without any protector were not found.

In general, nesting beside protective species is very profitable for geese. However, breeding success of geese beside falcons doesn't increase on Kolguev. Moreover nesting conservatism plays a nasty trick with Barnacle Geese. Geese possibly get more favorable time budgets when they can spend more time for feeding and resting under protection. Nevertheless, this assumption is to be studied in detail.

Abstracts – posters

Tundra Bean Geese *Anser fabalis rossicus* in Central and Southern Sweden

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Key words: Tundra Bean Goose, Central Sweden, Southern Sweden

Thousands of Tundra Bean Geese *Anser fabalis rossicus* migrate through northern Sweden in spring. Neckband and satellite transmitter studies have shown a linkage to the North Scandinavian breeding population. We expected that this population could reside in Central and Southern Sweden outside the breeding season and, in September 2009, we started a study to map the occurrence of *rossicus* in these parts of Sweden.

The study was based on a combination of counts and neckband sightings, and received financial support from the Swedish Wetland Fund. Surveys were carried out during day-time at feeding and resting sites, which enabled reliable distinction of Taiga and Tundra Bean Geese.

Single birds or small flocks of Tundra Beans were detected at most of the surveyed sites, >100 *rossicus* were only found at the following places: Östen, Tåkern, Kvismaren, Segersjön and Ledskärsviken (all Central Sweden), Hammarsjön, Trolle-Ljungby, Mörlunda/Hultsfred and Mörbylanga/Öland (Southern Sweden). The highest overall number for these sites was 9,195 individuals (October 2009).

During autumn migration (Sep-Oct), most Tundra Bean Geese concentrated on three sites in Central Sweden (Östen, Tåkern, Kvismaren), where numbers regularly exceeded 1,000 birds per location. During the winter months (Nov-March), lake Hammarsjön/Skåne was the most important site; with up to 5,200 birds present (November 2010). In mid April, concentrations of several hundred *rossicus* were found at the following places in Central Sweden: Östen, Tåkern, Ledskärsviken. The results show, that the Tundra Bean Goose is a common visitor in Central and Southern Sweden from September to April.

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Preliminary results of Tundra Bean Goose ringing in Northern Scandinavia

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Key words: *Anser fabalis rossicus*, ringing, neckband observations, Scandinavia

During the last decade it has been proven that the majority of breeding Bean Geese in northernmost Scandinavia are Tundra Bean Geese *Anser fabalis rossicus*. In 2003-2010, 108 *rossicus* birds were neckbanded in Northern Scandinavia at staging sites in Porsanger/Norway (n=10, black), Luleå/Sweden (29, blue), Umeå/Sweden (1, blue), and at a moulting site on Varanger/Norway (68, yellow).By February 2012 we had received 1,368 reports of 95 birds, of which only three birds were reported dead. Approximately 85% of the reports were from Sweden and 10% from Norway. The other countries were Germany (n=44), Netherlands (13), Denmark (10), Finland (3), and Estonia, Poland and UK (1 each).

Observations suggest the following annual schedule: Main staging sites during autumn (Sep-Oct) are in Central Sweden (lakes Östen, Tåkern, Kvismaren). In late autumn and in mild winters, most birds gather around Hammarsjön in Skåne/Sweden, which seems to be the core area during the winter months. Spring migration starts in March and the geese use Östen and Tåkern as staging sites until mid April, where some even remain until early May. Further north, sites in Uppland and near Umeå are used by small numbers in spring, while the majority uses sites near Luleå/Northern Sweden, where they stay until the first week of May. In the second and third decade of May, birds use staging sites close to the breeding areas in northernmost Norway.

Neckband sightings confirm that, during the 2010/11 winter, many Tundra Bean Geese undertook cold weather movements from Skåne to Germany, Denmark and into The Netherlands.

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Evidence of landscape scale displacement. The impact of windfarm development in Coastal Dobrudga on distribution of foraging flocks of Red-breasted Goose *Branta ruficollis* and the 'Ponto-Anatolian' flyway population of Greater White-fronted Goose *Anser albifrons*.

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Key words: Branta ruficollis, windfarms, foraging geese, displacement

The coastal Dobrudga region is the major wintering ground of the currently endangered goose species – the Red-breasted Goose *Branta ruficollis* – classified as IUCN Endangered. The area also holds up to over 60% of the 'Ponto-Anatolian' flyway population of the Greater White-fronted Goose *Anser albifrons*. In the early 2000s, a fast, uncoordinated and uncontrolled development of windfarms started in the area without appropriate EIA and SIA. Despite efforts and initialized infringement procedure by European Commission against the Bulgarian Government and open case file by Bern Convention, the uncontrolled development of the windfarm industry in the area without any strategic spatial planning continues, with fast steps in a mushroom growing manner.

We have analysed available and new data sets of the distribution of foraging flocks in the pre-construction (1998-1999 and 1999-2000) and post construction period (2009-2010 and 2010-2011). All the data has been imputed into GIS layers. To present the density of foraging flock distribution and changes in the two separate periods a map of kernel density was created. The spatial analysis is showing a clear landscape scale shift of the distribution density of the Red-breasted Goose and other geese in relation to the location of the currently operational windfarms, which could not be attributed to crop rotation or weather conditions. The currently proposed wind turbine projects in the area will pose a serious displacement threat to the key foraging locations and would undermine the future of Bulgarian coastal Dobrudga as a key and safe wintering area for geese.

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Evolutionary benefits of breeding in the Arctic

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Keywords: arctic-breeding geese, Branta leucopsis

Twice a year, arctic-breeding geese embark on an energy draining long-distance migration. A low risk of infection by pathogens in polar regions may be one of reasons why many birds undertake a long migration to breed in the Arctic. To test this idea we compared the health status and survival of barnacle geese *Branta leucopsis* from three different types of areas: (1) remote, pristine sites in Spitsbergen, (2) locations close to human settlements in Spitsbergen, (3) breeding locations in a temperate area (The Netherlands). We supposed that these three locations reflect a gradient of increasing concentrations of pathogens. The response of geese to inferred pathogen pressure was derived from the activity of the immune system (assessed by morphology of blood cells and by concentrations of anti-bodies in the blood). The immune system was most active in geese breeding in the temperate area, and lowest activities were recorded in the remote Arctic sites. Intermediate activity was observed in geese close to human settlements in the Arctic. Annual survival was higher in geese breeding in the remote sites than in geese at the other locations. The observations support the hypothesis that a reduced pathogen pressure adds to the benefits of breeding in the Arctic. Work is in progress to record actual concentrations of pathogens in the environment.

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Potential causes of the declining Greenland white-fronted goose population

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Keywords: behaviour, breeding, decline, Greenland white-fronted goose, telemetry

The global Greenland White-fronted Goose *Anser albifrons flavirostris* population has declined markedly, from 35,900 in 1999 to just over 22,500 in 2011. Although the cause of the decline is not understood, consistently low reproductive success in Greenland is believed to be responsible. The purpose of this project is to help determine likely causes of the decline through analysis of long-term datasets of

counts and marked individuals, deployment of GPS telemetry devices, and behavioural observations. Wintering flock counts of Greenland White-fronts across Ireland and the UK have fluctuated over the last 30 years; by using a robust meta-population model, we hope to identify key components of variation within and among years. Although low breeding propensity is an established feature of the Greenland White-front, we seek to identify additional factors that have further reduced reproductive success in the last 15 years. One factor may be prolonged parent-offspring relationships, which are unique to Greenland White-fronts. It is unknown whether these associations are the result - rather than cause - of low recruitment. Over the next two years, we will deploy GPS tags containing accelerometers on Greenland white-fronts to compare the migration strategies, behaviour and energy balance of birds wintering in Wexford, Ireland and Loch Ken, Scotland. Accelerometers will provide behavioural data every few minutes, enabling inference about which patterns of timing, energy accumulation and behaviour predispose successful breeding. By combining studies of Greenland White-fronted Geese at the individual and population level, we hope to determine potential mechanisms responsible for the decline and offer management recommendations for restoring the population to favourable conservation status.

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