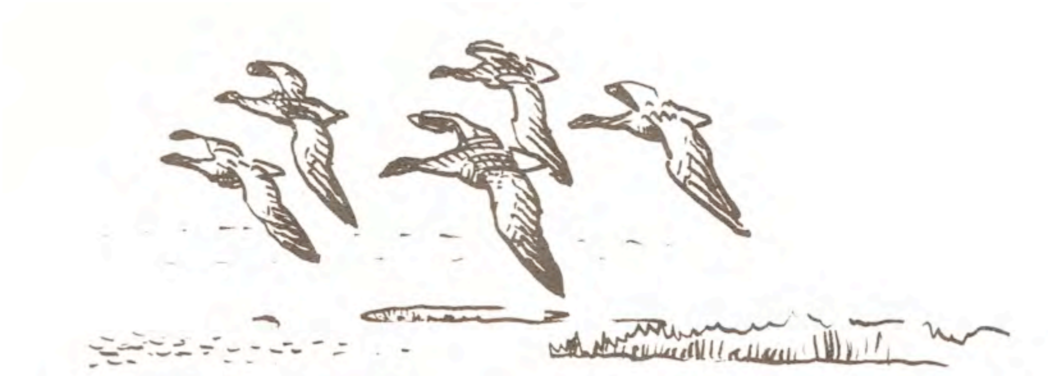

GOOSE BULLETIN

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

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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

Since 2016, in politics and the media, we are regularly confronted with discussions about “fake news” and “alternative facts”. Although it is not a new phenomenon that fraudulent information is spread or data are modified to support individual interests, the current popularity of the internet and social media has made it much easier today.
The distribution of false or modified information is not only confined to politics and the media, but also occurs in science, where several types of manipulation are evident. The most common is the manipulation of results under the influence of the sponsor of a piece of research, e.g. when research financed by the tabacco industry casts doubt on whether smoking is causing health problems. Another type of “fake-news-spreading” is the biased use of all results and arguments to support personal prejudice, e.g. using data about the cyclic warming-up and cooling-down phases of our planet to deny the man-induced climate warming or the one-sided selection of facts as a proof for an “intelligent design” as an alternative to the evolution of species.
Such manipulated information can be more attractive to society and politics than the accurate information. Multiplicated thousandfold on social media, such “alternative facts” can influence public opinion and politics.
Our mission as scientists is to intervene and clearly take a stand on such practices. We must be better at communicating our efforts, results and conclusions to the public. Free access to scientific publications and scientific data continues not to be the norm. In most cases, the price for downloading a publication is higher than buying an entire book. The results of all good science should be just as easily accessible as “fake news”!
Another important mission of science is to cross borders and barriers. In our political challenging times, science has to act as a link between states and peoples. We have to sustain independent science, uninfluenced by those who finance it and performed according the standards of good scientific practice. When scientists hold different opinions about the interpretation of facts, they should be subject to open balanced scientific debate. Scientists of all nations should meet regularely in spite of the political stresses that exist between states.
The GOOSE BULLETIN is an open access internet journal, accessible by everybody, open for the publication of reliable information and good scientific work, but also for discussions according to the rules of science. We try to make our small contribution to the aims of the scientific community and are waiting for your manuscripts!

The next issue of the GOOSE BULLETIN is planned to appear in November 2017, which means that material for this issue should have reached the editor-in-chief not later than the 31st of August 2017..........but earlier submission is, of course, always permitted, if not actively encouraged!

The Editorial Board

First announcement of the 18th conference of the Goose Specialist Group of the IUCN Species Survival Commision and Wetlands International from 27-30 March 2018 in Klaipėda, Lithuania.

We are pleased to announce that the 18th conference of the Goose Specialist Group of the IUCN Species Survival Commission and Wetlands International will take place on **27 – 30 March 2018 in Klaipėda, Lithuania**. The event will be hosted by the Open Access Centre for Marine Research of Klaipeda University and Baltic Valley and Lithuanian Ornithological Society, on behalf of the Goose Specialist Group of Wetlands International and IUCN-SSC.

The conference includes plenary talks by leading goose experts, and invites oral and poster presentations, symposia and round table discussions, as well as a field trip to the Nemunas River floodplains.

Topics will include a variety of research fields, including the impacts of global change on waterfowl and populations, migration and reproduction ecology, eco-physiology and the management of waterfowl. Other topics related to goose ecology, research and threats are also most welcome.

Proposals for organising the symposia, special workshops and round table discussions should be submitted **by 1 October 2017**.
Abstract submission and registration will be opened before summer 2017.

The conference will be held at the **University Campus of the Klaipėda University, Herkaus Manto 84, Klaipėda, Lithuania**.
Please visit the conference website http://apc.ku.lt/geese

Organisers Wetlands International, IUCN SSC, Klaipėda University, Baltic valley

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Advantages of neckband GPS tags on grey geese

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Abstract
Large birds like geese and swans have been followed by individual ringing or satellite and GPS tracking for a long time, allowing for many new insights into their ecology and behaviour. Until recently, most tags have been deployed using a harness on the back of the birds. Many geese of the genus *Anser* have, however, been shown to damage such tags relatively quickly, necessitating the development of alternative tag designs. Here we compare our experiences with deploying GPS backpacks versus GPS tags that were integrated in a plastic neckband for three different species: Greylag Geese (*Anser anser*), Greater White-fronted Geese (*A. a. albifrons* and *A. albifrons flavirostris*) and Taiga Bean Geese (*A. f. fabalis*). Generally, neckbands performed better than backpacks; they had longer lifetimes (electronics and attachment) with similar or higher survival rates of the birds. Thus, we recommend the use of lightweight neckband tags with a smooth internal surface and no external antenna for those species. Since neckband tags also seem suitable for juvenile grey geese, we propose the possibly to extend its applicability also to other, smaller species.

Introduction
Following individual birds such as geese with rings and other marks has a long tradition (BAIRLEIN & SCHAUB 2009) and has led to many insights into the survival, ecology and behaviour of this species group (REES et al. 2005). Global Positioning System (GPS) tags are now widely used to follow many species of geese to further explore their movements and behaviour in relation to the environment and management issues (BRIDGE et al. 2011).

Until recently, most geese were equipped with GPS tags that were fitted on their back with a harness (GLAHDER et al. 1998). This ensured that the relatively heavy tags were carried close to the birds' centre of mass. However, there were many reports, especially from the genus *Anser*, that birds had either removed or interfered with the backpack tags, since the geese could easily reach the tags with their bills (VOSLAMBER et al. 2010). Care was also needed in fitting the harnesses. The harness needed to to be loose enough to accommodate any increase in body mass during the pre-migration fattening, but not too loose such that the harness might have become entangled with vegetation or

the head or feet of the goose. Conversely, if the harness was fitted too tightly, it may have impaired body growth, an important consideration when marking juvenile birds, or caused tissue damage.
To overcome these difficulties, the authors have helped with the development and testing of GPS tags that are integrated into plastic neckband collars. These have the advantage that the geese cannot reach and interfere with the tags as easily as those mounted on the back. Furthermore, solar panels on the tags cannot be covered by the wings (which can result in low charge rates) and characters can be added to the outside of the neckbands that can be read in the field and reported by observers to independently quantify bird survival (even if the tags have stopped working). In the past, there have been positive experiences with simple plastic, neckbands with characters (without GPS tag unit) that were regularly reported by a large number of volunteers (MACINNES & DUNN 1988). Additionally, the mass of GPS and transmission modules has reduced sufficiently, such that the neckband GPS tags are thought to be of reasonable mass to be carried by geese around their necks.
Here we report on the performance of three species of *Anser* geese tagged with GPS neckbands that had been equipped with backpack tags in the past: Greylag Geese, Greater White-fronted Geese and Taiga Bean Geese. We describe tag design and attachment, provide details about goose survival and tag longevity and discuss when and why GPS neckbands should be preferred over backpacks for tracking grey geese.

Tracking Greylag Geese in The Netherlands and Greece
Greylag Geese were caught in two of their breeding locations, (i) in the Ooijpolder in The Netherlands and (ii) in Prespa, Greece. In The Netherlands, the geese were caught in family groups during their annual wing moult in June 2009, 2010 and 2011. A total of 45 adult birds were equipped with different types of GPS tags: 23 birds were tagged with GPS backpacks, five of them working on a fixed battery (madebytheo, 64 g), and 18 were rechargeable with a solar array (Bureau Waardenburg, 70 g, see Figure 1).

Figure 1. Greylag Goose equipped with a battery powered backpack tag in The Netherlands in 2009. Even after the tag was fixed on the back of the bird (left) with an extremely sturdy Teflon harness, the goose quickly damaged the harness and soon afterwards lost the tag (right; the tag has slipped off the back and is left hanging beneath the bird).

Especially sturdy harnesses were constructed from nylon rope inside Tygon and Teflon tubes (LAMERIS et al. 2016). The other 22 birds were equipped with a battery powered GPS tag integrated in a neckband (madebytheo, 58 g, Figure 2).

Figure 2. Greylag Geese in the Netherlands (left) and in Greece (right) equipped with neckband GPS collars. The old models (left) were powered by batteries only, whereas the new ones can re-charge their batteries using a solar array.

In Greece, Greylag Geese were caught with cannon nets, close to their breeding grounds after their annual moult (October 2012, October 2013 and July 2015). A total of nine adult geese were equipped with solar GPS tags in a neckband (madebytheo, 45 g (first batch of four) and 34 g (second batch of five); Figure 2).

The GPS data collected by the tags was used to study local movements of predominantly resident populations of Greylag Geese in both countries. Here, we report on the tag lifetimes and survival of the geese. All birds with backpack tags were also fitted with a coded plastic neckband and the birds fitted with a GPS tag in a neckband had a unique code engraved on it, enabling individual recognition in the field by observers to estimate tag and goose survival. Tag lifetime was calculated as the time between catching/release and when the last data were received. Note that the GPS data collected by madebytheo tags had to be downloaded with a local Bluetooth link in the field after the bird was identified by its neckband code. Therefore, the determined tag lifetimes of, on average (mean value), 26 and 57 days (backpacks, battery and solar (both Netherlands)) and 180 and 280 days (neckbands, battery (Netherlands) and solar (Greece)) were always lower than bird lifetimes (backpacks: 800 (battery) and 600 (solar) days; neckbands: 840 (battery) and 410 (solar, Greece) days), which were considered underestimates (Figure 3).
Bird lifetime was calculated as the number of days between catching and the last observation of the bird. This probably underestimated the real lifetime of the bird (post-tagging), since it was likely that the focal bird remained alive after the last positive observation.

No differences were detected in bird lifetime between geese carrying backpack or neckband tags (Wilcoxon rank sum test; $W=356.5$, $p=0.71$). However, tag lifetime was much lower among backpacks than in neckbands (Wilcoxon rank sum test; $W=193.0$, $p=0.002$; Figure 3). Of the 23 birds that carried a backpack, at least 15 were observed without a tag or with a loose tag, i.e. damaged harness (see Figure 1). Moreover, many tags were damaged by the strong bill of the geese. This finding confirmed previous observations (VOSLAMBER et al. 2010) that Greylag Geese are very effective in damaging all types of backpacks.

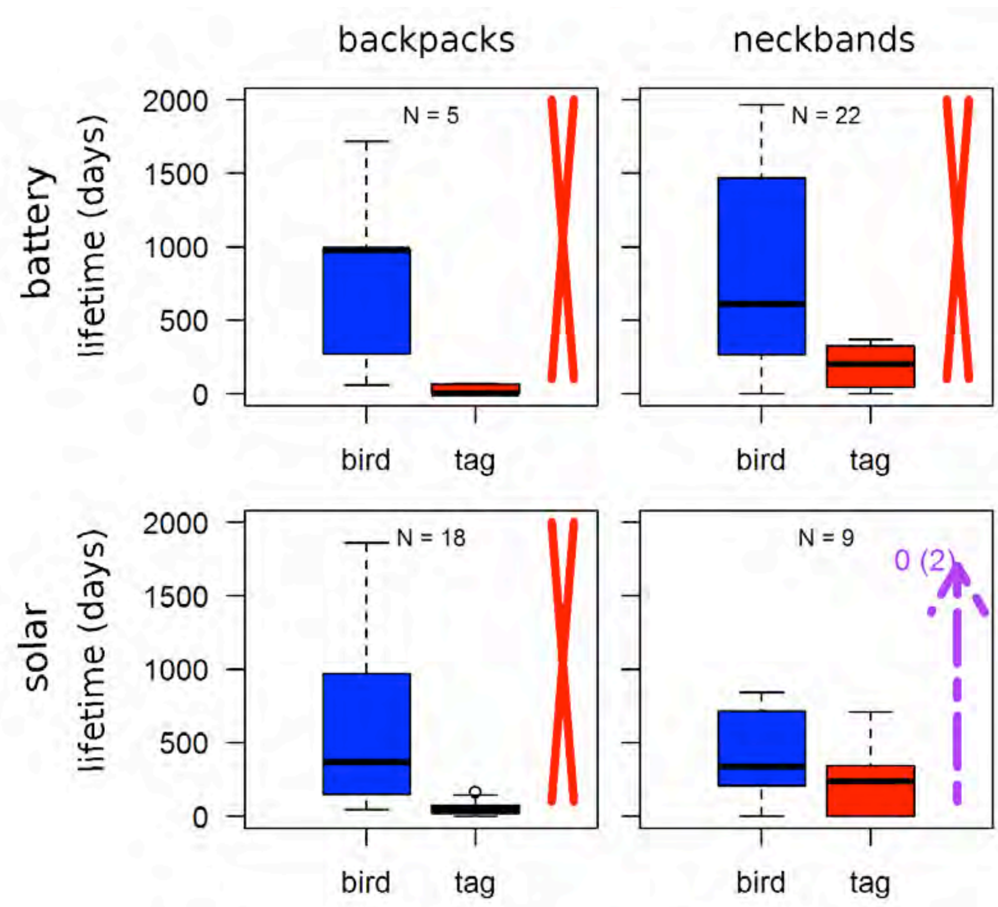

Figure 3. Boxplots of lifetimes of adult Greylag Geese (blue) and their tags (red) after being tagged in the summers of 2009-2015 with the two different tag types. N indicates the sample size of birds released with tags. The large arrow (or cross signifying zero in the first three subplots) indicates how many tags (birds) were still running (alive) on 1 January 2016, so it is likely that the lifetimes will increase. Note that geese with solar neckbands were tagged in Greece, whereas all others were tagged in The Netherlands.

We assumed that apparent survival of Greylag Geese in both countries did not differ between summer and winter, and was not largely determined by a specific period of the year, i.e. due to higher hunting pressure (VAN TURNHOUT et al. 2003).

Annual survival was calculated by the square of half-year survival estimates (Table 1). For geese with backpacks this gave an annual survival probability of 0.64 (battery, The Netherlands) and 0.52 (solar, The Netherlands), and for geese with neckbands of 0.67 (battery, The Netherlands) and 0.61 (solar, Greece). These estimates were very similar for the different tag types, but considerably lower than the previously determined annual survival rate of 0.85 of Greylag Geese without GPS tags (VAN TURNHOUT et al. 2003).

Table 1. Survival probabilities of Greylag Geese with different types of tags until the next main stage (winter/summer), i.e. about half a year. As these birds were mainly sedentary, no migration was involved.

Half-year survival after tagging	**backpacks**	**neckbands**
battery tag	0.80	0.82
solar tag	0.72	0.78

Tracking Greater White-fronted Geese in Russia and The Netherlands

Greater White-fronted Geese were caught in family groups (i) in their breeding grounds on Kolguev Island, Russia during the post-breeding moult in 2013 and (ii) during the winter in The Netherlands with the help of the Dutch Goose Catcher Association from 2013 to 2015 (KÖLSCH et al. 2016a). On the breeding grounds, 22 geese were fitted with backpack solar GPS transmitters (e-obs, 45g; 16 adults, 6 juveniles; Figure 4) and 72 geese were fitted with neckband solar GPS loggers (University of Konstanz, 35g; 40 adults, 32 juveniles; Figure 5). On the wintering grounds, 40 geese were fitted with backpack solar GPS transmitters (e-obs, 45g; 19 adults, 21 juveniles) and three adult geese were fitted with new solar neckband GPS transmitters (madebytheo, 35g; Figure 5). Backpack tags were attached with sturdy harnesses made from nylon in Tygon and Teflon tubes (LAMERIS et al. 2016). To determine survival rates independently, all neckband collars had a large individual code which could be read using a telescope; geese equipped with backpacks in The Netherlands (but not on Kolguev) carried additional plastic, numbered neckbands (Figure 4).

Figure 4. Greater White-fronted Goose equipped with a backpack GPS transmitter. On the right, three such GPS transmitters after retrieval from hunters or after being found in the field: the geese had bitten the tags and damaged the harnesses, tag antennas and casings.

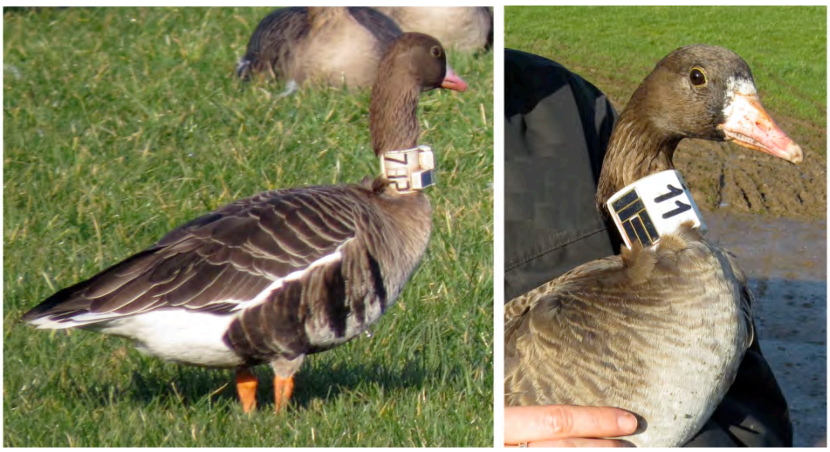

Figure 5. Greater White-fronted Geese equipped with neckband GPS logger in the field after carrying it for about two years (left) and new neckband GPS-GPRS (General Packet Radio Service) transmitter (right) before release. The solar cells and identifiable characters are clearly visible.

The summer and winter catching data sets were treated separately, because there were strong differences in hunting pressure during the autumn and spring migration periods which led to a difference in survival in the months after tagging. Therefore we only report half-year survival rates. During both tagging seasons, the geese were caught more than four weeks before the onset of migration, so that short-term, tag-induced habituation effects on their behaviour (DEMERS et al. 2003, NUIJTEN et al. 2014) were not likely to affect migration performance. Furthermore, juveniles that were equipped with tags during late summer were smaller than those tagged during winter, which may have led to differences in survival.

The tracking data were used for analyses about migration and wintering movement (KÖLSCH et al. 2016a), but here we report on the performance of GPS neckbands in terms of goose survival and tag longevity. Therefore, we have determined the length of time that each of the tags was functioning and sending data (tag lifetime) and the length of time between catching and when the bird's neckband code was last reported by volunteer bird watchers (bird lifetime/survival). Note that tag lifetime was likely to be underestimated for the neckband GPS loggers (Figure 6), as data had to be retrieved from them via a UHF connection with a base station after identification of the collar code in the field. Moreover, for the geese equipped with backpack GPS transmitters in summer 2013 (Figure 6), no independent bird lifetime could be determined, because those birds did not carry numbered neckbands. Half-year survival probabilities were determined for the period between the tagging event and arrival on the winter/summer site (i.e. about 3-6 months later; Table 2).

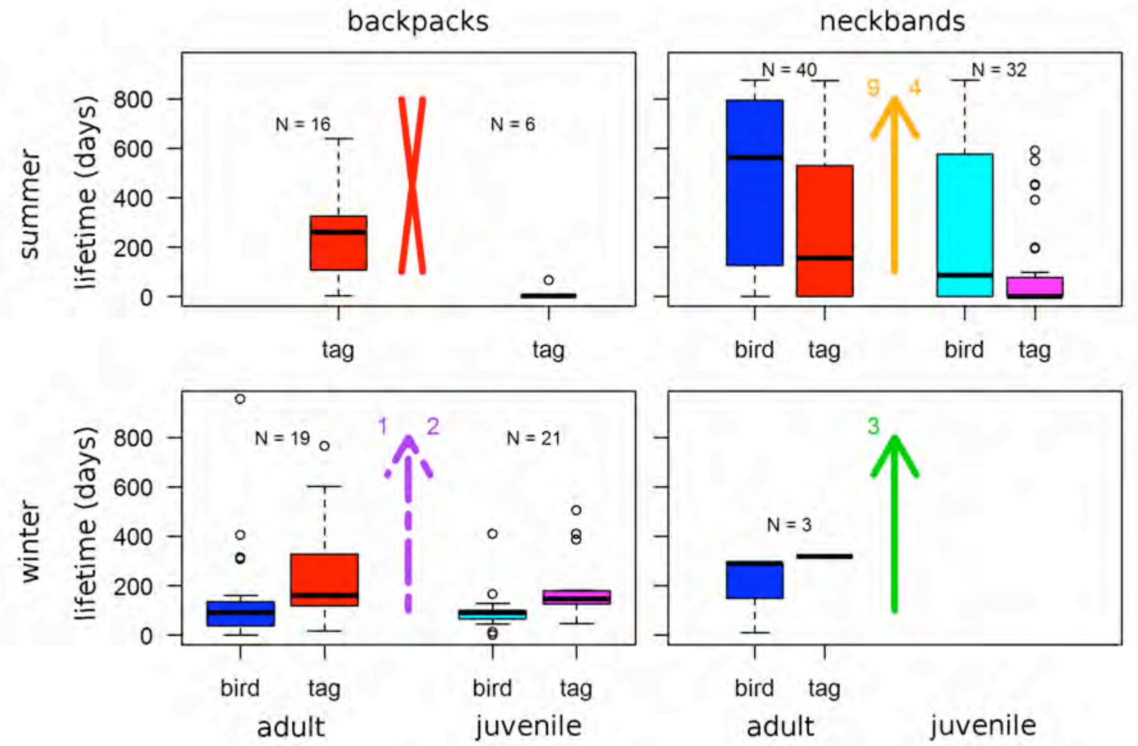

Figure 6. Boxplots of lifetimes of Greater White-fronted Geese (blue) and tags (red) after being tagged in summer 2013 or winter 2013/14 and 2014/15 with the two different tag types. N indicates the sample size of birds released with tags. The large arrows (and cross, i.e. none, in the first subplot) indicate how many tags/birds were still alive/running on 1 January 2016, so it is likely that the lifetimes will increase. Note that geese that were equipped with backpacks in summer 2013 could not be observed, because they did not carry a plastic number neckband.

Of the backpack transmitters that had been deployed on adult geese on the breeding grounds in 2013, the tag lifetime was, on average, 250 days and the half-year survival of the geese was 0.63 (Figure 6, Table 2). In contrast, none of the six juvenile geese that were equipped with those tags on Kolguev reached the wintering grounds. Thus, backpack transmitters seem not to be suitable for tagging juveniles before their first autumn migration.

The lifetime of geese with the neckband loggers based on sightings of adults and juveniles tagged during the same time (summer 2013) was longer: on average 560 days for adults and 90 days for juveniles. Tag lifetimes of the GPS neckband loggers were underestimates, since they relied on sampling effort (150 days for adults, 90 days for juveniles). Half-year survival probabilities were comparable between the two tag types for adults (0.63 and 0.72). They were relatively high for juveniles with neckband tags (0.44), but not for juveniles with backpacks (0.00), if considering reported high mortality rates of young geese during their first half year (Kear 2005). In addition, at least 13 of the geese marked with neckband loggers were still alive at the time of writing (January 2016) and more data may potentially be retrieved.

Of the geese that were equipped with GPS tags during the winter, the differences in tag lifetime and survival between backpack and neckband tags were even greater, even though the sample sizes for neckband tags were small. Of the 40 birds equipped with backpack tags, only 0.53 of the adults and 0.33 of the juveniles made it to the breeding grounds (Table 2). Tag lifetimes were 250 days (adults) and 180 days (juveniles) respectively, and only three of the birds were still alive at the time of writing (January 2016; Figure 6). This high mortality was mainly due to heavy spring hunting pressure and predation by eagles (e.g. *Haliaeetus albicilla*) in Belarus and Russia; of the 40 tagged birds, at least 15 were shot and six predated during spring migration. Many of the backpack tags were retrieved from hunters or in the field, and were heavily damaged by the birds (e.g. antenna missing, harnesses eaten through; Figure 4). In contrast, all of the three adult geese with neckband tags made it to the breeding grounds and back again to the winter quarters (Table 2). Tag lifetimes of the solar neckbands were ~320 days (Figure 6) up to January 2016 and may increase still further.

Table 2. Survival probabilities of Greater White-fronted Geese with different types of tags until the next main stage (winter/summer), i.e. about half a year, including one migration.

Half-year survival after tagging	backpacks		neckbands	
	adult	juvenile	adult	juvenile
summer	0.63	0.00	0.72	0.44
winter	0.53	0.33	1.00	-

Tracking Greenland White-fronted Geese and Taiga Bean Geese in Scotland

Between 2008 and 2013, Greenland White-fronted Geese were regularly caught with cannon nets close to Loch Ken in Central Scotland (Galloway) in February/March. In 2008 and 2010, five and three adult males, respectively, were equipped with 45 g solar GPS/ARGOS (Advanced Research and Global Observation Satellite) and 40 g non-solar GPS/ARGOS LC4 backpacks (Microwave Telemetry Inc. “MTI”; Figure 7), and in both 2012 and 2013, six adult males were outfitted with non-solar ACC (accelerometer)/GPS backpacks (e-obs, 49g; Figure 7). Both backpack types were mounted on neoprene bases and fitted with elastic harnesses (single strand 7 mm braided elastic for MTI tags and 3 mm shock cord for the e-obs tags).

Figure 7. Greenland White-fronted Geese equipped with backpack GPS transmitters and numbered neck rings. On the left, the Microwave GPS/ARGOS tag with an external antenna is very visible on the bird, whereas on the right the e-obs ACC/GPS tag with an internal antenna is less visible.

In 2011 and 2013, an additional four and three adult Greenland White-fronted Geese were equipped with solar GPS neckband tags at the same site (2011: Alana (Bluetooth download), 39g; 2013: Ecotone (download by UHF (Ultra High Frequency) or GSM (Global System for Mobile Communications), 30-43g; Figure 8).

Both neckband types had painted number codes to allow for observer recognition, the other birds were additionally fitted with coded, coloured neck and leg rings to determine survival independently of tag functionality.

Figure 8. Greenland White-fronted Geese with Alana neckband GPS tag after deployment (left) and with Ecotone GPS-GSM neckband tag in the field (right). The solar cells and numbers are clearly visible.

Taiga Bean Geese were caught with cannon nets in Falkirk, Scotland, each October in 2011-2013 (MITCHELL et al. 2016). Based on the experience with Greenland White-fronted Geese, they were only equipped with neckband tags: three adults in 2011 with solar GPS/Bluetooth (Alana, 35g, Figure 9), three adults and three juveniles in 2012 with solar GPS/UHF or GPS/GSM (Ecotone, 29-46g) and three adults in 2013 with solar GPS/UHF or GPS/GSM (Ecotone, 30-45g). Those collars also had number codes painted on for individual recognition by observation and birds were fitted with additional coloured leg rings.

Figure 9. Taiga Bean Geese with neckband GPS tags (left Ecotone 3D printed, right Ecotone glued onto a normal collar) after deployment. The middle picture shows an Alana neck ring that was removed from a recaptured bird: cracked and ready to have fallen off soon.

For this part of the study, times of the year of tag deployment per species were similar, so data sets were combined by tag type (backpack or neckband) and goose species, disregarding differences in the characteristics of tags of different manufacturers. Both the tagged Greenland White-fronted and Taiga Bean Geese were closely observed during each winter and the survival rates as well as tag lifetime (including if the bird was still wearing the tag) were highly reliable. One exception, however, were the e-obs backpacks that were often not visible on the back of the geese, so may have been shed by the bird.

In general, the lifetime of the Greenland White-fronted Geese was higher, even if not significantly higher, when the birds carried neckband tags (average 950 days) than backpacks (average 530 days; Wilcoxon rank sum test, $W=41.0$, $p=0.11$; Figure 10). The number of geese still alive in January 2016 was similar, so differences in year of tagging were unlikely to have a large effect here. Tag functionality seemed longer, but not significantly so, for backpacks (average 200 days) than for neckbands (average 70 days; Wilcoxon rank sum test, $W=103.0$, $p=0.07$), likely due to the shorter time that this latter type of tags were under development. Note that none of the neckband tags manufactured by Alana provided any data, which lowered the average lifetime. This manufacturer is not in business anymore. If excluding the Alana tags from our analysis, tag functionality of neckband tags (average 158 days) was similar to backpack tag types (Wilcoxon rank sum test, $W=25$, $p=0.68$).

The survival of Taiga Bean Geese with neckband tags was similarly high, even for juveniles (adults: average 860 days, juveniles: average 940 days). As more neckband tags from Ecotone were used in this data set, tag lifetimes were somewhat higher (adults: average 280 days, juveniles: average 130 days), one tag was still running at the time of writing (January 2016).

The clearly longer lifetime of Greenland White-fronted Geese when carrying neckband tags vs. backpack tags became especially clear when we compared the half-year survival (including one migration event) after tagging (Table 3), which was 0.4 with backpack and 1.0 with neckband. The same high half-year survival (1.0) was evident for Taiga Bean Geese with neckband tags, confirming that this tag type was suitable for both species. Interestingly, three of the Greenland White-fronted Geese were able to remove their backpack tags shortly after deployment and one lost its GPS neckband after about 1.5 years. Also one of the neckbands on Taiga Bean Geese was cracked and therefore removed during recapture (Figure 9).

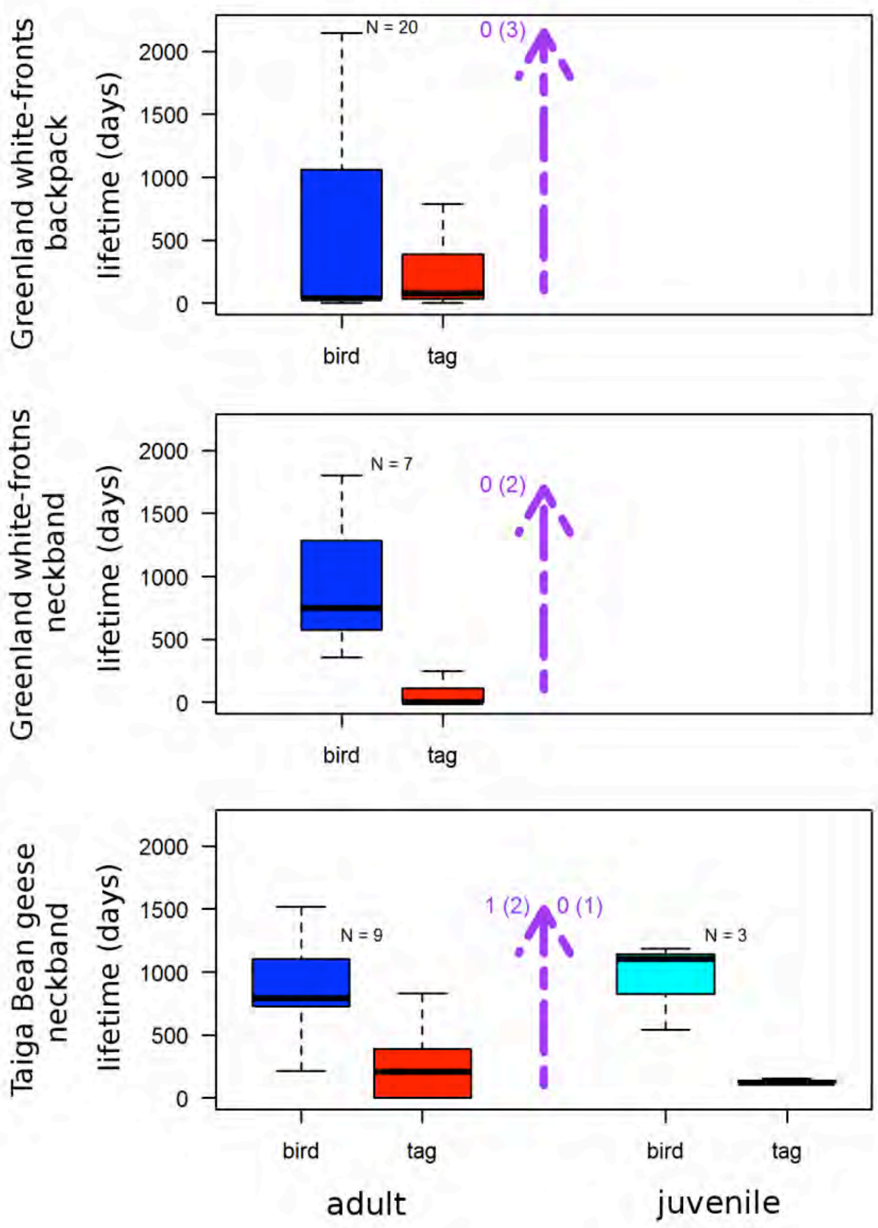

Figure 10. Boxplots of lifetimes of Greenland White-fronted Geese and Taiga Bean Geese (blue) and tags (red) after being tagged in February/March or October 2008-2013 with the two different tag types. N indicates the sample size of birds released with tags. The large arrows indicate how many tags (birds) were still running (alive) on 1 January 2016, so it is likely that the lifetimes will increase. Note that the duration of tag functionality was always lower than bird lifetime.

Table 3. Survival probabilities of Greenland White-fronted Geese and Taiga Bean Geese with different types of tags until the next main stage (summer), i.e. about half a year, including one migration.

Half-year survival after tagging	**backpacks**		**neckbands**	
	adult	**juvenile**	**adult**	**juvenile**
Greenland White-fronted Geese	0.40	-	1.00	-
Taiga Bean Geese	-	-	1.00	1.00

Discussion

We have shown that for three species of *Anser* geese, the use of neckband GPS tags has several advantages over the use of GPS backpacks attached with harnesses. The geese were less likely to damage the neckband tags and they were also suitable for tracking juvenile geese. Geese seem to be less affected by the neckbands in the mid to long term and neckband numbers can be independently reported from bird observers without the need to additionally fit the geese with extra rings.

Several studies have reported a short term habituation effect of neckband tags for swans and geese (DEMERS et al. 2003, MENU et al. 2000, NUIJTEN et al. 2014), but these effects were similar for backpack tags (KÖLSCH et al. 2016b) and disappeared after a few weeks or months. Also, the initial fear of neckband icing has been lessened by studies showing that it is exceptionally rare and in some cases does not have long-term effects (FOX et al. 2014, MADSEN et al. 2001). Furthermore, geese show large variation in their aggressiveness against being handled as well as in the degree to which they damage the tags, indicating that it might be sensible to not only select larger and heavier, but also calmer birds for tagging. However, our experience (not reported here) also shows that somewhat more aggressive birds have higher survival, even if our sample sizes are small.

Geese are most vulnerable to mortality (i) during their long migration flights and (ii) when being hunted which they try to escape by flight. Therefore the effect of tags on flight aerodynamics is important. We expect that the cross-sectional profile of a backpack tag is larger than that of neckbands and causes more drag and additional turbulence during flight. This might negatively influence manoeuvrability and flight energetics. In addition, more body parts are touched by the harness and backpack than a neckband, which could cause irritation to the birds during flight. However, on the other hand, neckbands are attached away from the centre of gravity of the bird and might therefore have an increased negative effect on flight energetics. Therefore, we suggest using a lower threshold of about 1.5-2% of the body mass for neckbands rather than the widely accepted 3-5% for backpack tags (BRANDER & COCHRAN 1969).

In order to achieve solar charge for backpacks, the tag must sit relatively high above the feathers, which not only has an effect on flight aerodynamics, but might also distort thermo-regulation of the bird. The complete feather contouring is broken up, rendering the birds more susceptible to water ingress into the lower layers of the plumage and consequent heat loss.

This effect might be increased if the tag causes feather abrasion directly on top of the back, as was reported by a hunter that had shot one of the Greater White-fronted Geese fitted with a backpack tag in Northern Germany about 1.5 years after tag deployment.

From the point of view of animal welfare and behaviour, researchers have to balance the quality of the obtained data with any discomfort to the treatment animals which must be kept to a minimum (ZUTPHEN et al. 2001). Thus, we have taken great effort in the past few years to support development and test neckband GPS tags with the best sensors and least discomfort for the geese. The neckband GPS transmitters (madebytheo) deployed on Greater White-fronted Geese in winter 2014/2015 collected regular GPS bursts (10-40 GPS positions at high frequency, e.g. 1 Hz) and acceleration data to inform us about movement and behaviour of the geese. Furthermore, they were as light as possible (35g; <2% of the body weight of a Greater White-fronted Goose), well balanced with the battery and GPS module on opposite sites, contained two solar panels on opposite sides for optimal energy harvest and sent all their data regularly via the GPRS network. Similarly, Ecotone have made great advances in reducing the mass and profile of their collar tags to less than 25g and less than 1cm respectively with no external aerials whilst providing high frequency GPS and acceleration data for either UHF and/or GSM download.

Thus, the newest and most convenient technology has been combined with the most suitable tag design and attachment method for these species, opening up new possibilities for data collection and research projects. The concluding recommendations for future tracking studies on geese and swans include:

- Considering recent tag developments, there should be no need to exceed the 2% tag percentage of body mass unless there are extenuating circumstances;
- Unless the tags are ARGOS-PTT enabled they should have no external aerials and tag manufacturers should thus be encouraged to make all aerials internal;
- ARGOS –PTT type backpack tags with long aerials should be avoided wherever possible (for flyways of geese and swans that breed or winter in remote areas where there is no GSM contact, tags can store GPS data for later transmission when migrating to less remote areas);
- Internal surfaces of collar tags should be as smooth as possible to avoid any feather wear although some feather curl at the base of the neck is unavoidable even for standard plastic collars;
- Collar tags should be used whenever possible to avoid other possible welfare issues that can be envisaged for backpack tags fitted using either Teflon or elastic harnesses;
- Now that collar tags can typically be less than 30g and have extremely low profiles and small dimensions, efforts should be made to assess their application to the study of the smaller *Branta* species where collar use has generally been avoided in the past.

Acknowledgements
The authors are grateful to a great group of volunteers who assisted during the ringing and later observations of the tracked Greylag Geese. The Greek tags of this part of the study were funded by the Bodosakis Foundation and by the Green Fund from the Ministry of Environment in Greece. The Dutch study was funded by the Dutch Ministry of Agriculture, Nature and Food Quality, Faunafonds, Schiphol airport and the province of Noord-Holland. We would like to thank Alterra Wageningen-UR, the Institute for Wetlands and Waterbird Research (IWWR) e.V. and the Dutch Society of Goose catchers for the financial and technical support in catching and tagging the Greater White-fronted Geese in their Dutch wintering grounds.

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

Monitoring and identification of key sites of Lesser White-fronted goose (*Anser erythropus*) in Baydaratskaya Bay and adjacent territories

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Introduction

Current trends in social and economic development within the breeding areas of Lesser White-fronted Geese *Anser erythropus* (LWFG) in Russia have had a demostrable positive effect on the conservation status of the species. The human population of the Russian Extreme North has decreased palpably in the past few decades. As a result, hunting and recreational impacts, as well as the intensity and scale of exploration work in the area, have also lessened. This, in turn, has ironically favoured the conservation of all waterfowl species, including Lesser White-fronted Geese in the Arctic.

In contrast, construction of gas pipelines in Yamal has been suspected to worsen ecological conditions in some parts of the peninsula and adversely affect waterfowl populations in particular. It is widely accepted that the intensity of disturbance and hunting activities will increase considerably in areas surrounding gas and oil pipelines. At the present time, raw hydrocarbons are pumped from their source in the Yamal Peninsula through pipelines laid on the bottom of Baydaratskaya Bay. These pipelines also traverse the coastal marine marshes, which, as was shown in our 2012–2014 research (ROZENFELD 2014) are used by Lesser White-fronted Geese as staging sites when they migrate from the Extreme North to their wintering grounds (Fig. 1). Since there has been concern that these areas must not be lost as staging sites of Lesser White-fronted Geese, we carried out a series of detailed surveys in Baydaratskaya Bay (ROZENFELD 2014).

Fig. 1. Marine coastal marshes in Baydaratskaya Bay

Material, methods and the survey area

In the few past years, we have obtained a large amount of data on the status, abundance and distribution of the Lesser White-fronted Goose on the Yamal Peninsula in the nesting period (ROZENFELD et al., 2014). New counts carried out in August 2015 make it possible to provide greater insight in the potential problem associated with hydrocarbon development. From 11 to 13 August 2015, using an ultra-light hydroplane A 27, we surveyed a large area that included Baydaratskaya Bay itself and some of the adjacent territories (Fig. 2).

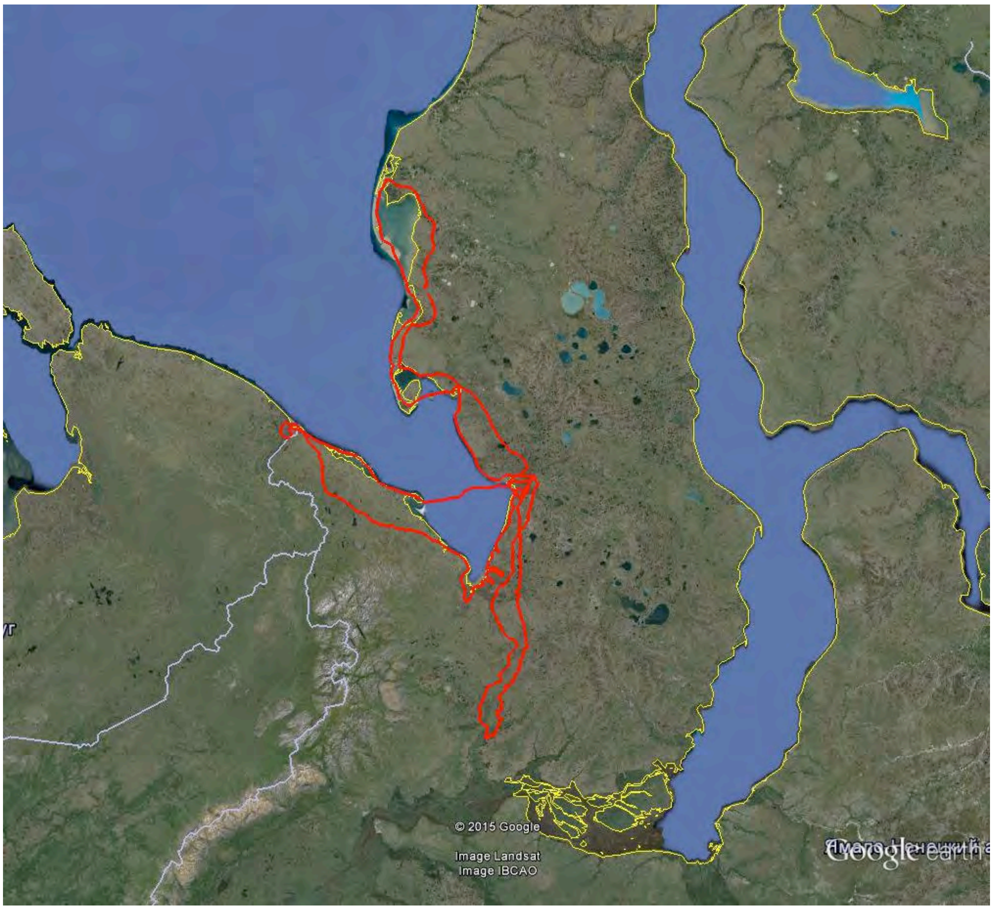

Fig. 2. Layout of the routes (red lines) and overview the surveyed area in August 2015 (total length 1925 km)

Over a longer period (7–25 August) we spent several days walking or surveying from a boat along a 400 km route, exploring the territory around the mouth of the Yuribey River to record Lesser White-fronted Goose flocks and broods there, analyzing 1,927 photographs to identify Lesser White-fronted Geese and assess their numbers in the flocks of different waterfowl species.

Results of field survey

In the survey area, we encountered 28 single broods, moulting and post-moulting gatherings of Lesser White-fronted Goose, including flocks consisting only of the target species and those mixed with some Greater White-fronted Geese *A. albifrons albifrons* and/or a few Bean Geese *A. fabalis*. One brood was found in the company of a group of Red-breasted Geese *A. ruficollis*. Lesser White-fronted Geese and Greater White-fronted Geese were not recorded in the majority of cases amongst the larger groups of Bean Geese (see Figs. 3–6).

Fig. 3. A mixed moulting flock of Lesser White-fronted Geese and Greater White-fronted Geese.

Fig. 4. A moulting brood of Lesser White-fronted Geese in a flock of Red-breasted Geese.

Fig. 5. Moulting groups of Lesser White-fronted Geese

Fig. 6. Broods of Lesser White-fronted Geese in a river canyon.

Total numbers and distribution of Lesser White-fronted goose in the study area

We counted a total of 1,352 Lesser White-fronted Geese including 391 goslings (see distribution map in Fig. 7). The proportion of juveniles among Lesser White-fronted Geese, similar to amongst Greater White-fronted Geese (see Table 1 for details).

Table 1. Results of goose counts in the study area

Species	*Anser erythropus*	*Anser albifrons*	*Anser fabalis*	*Branta ruficollis*
Number of closely observed birds	879	2,304	130	27
% juveniles	36.4	36.6	26.9	62.9

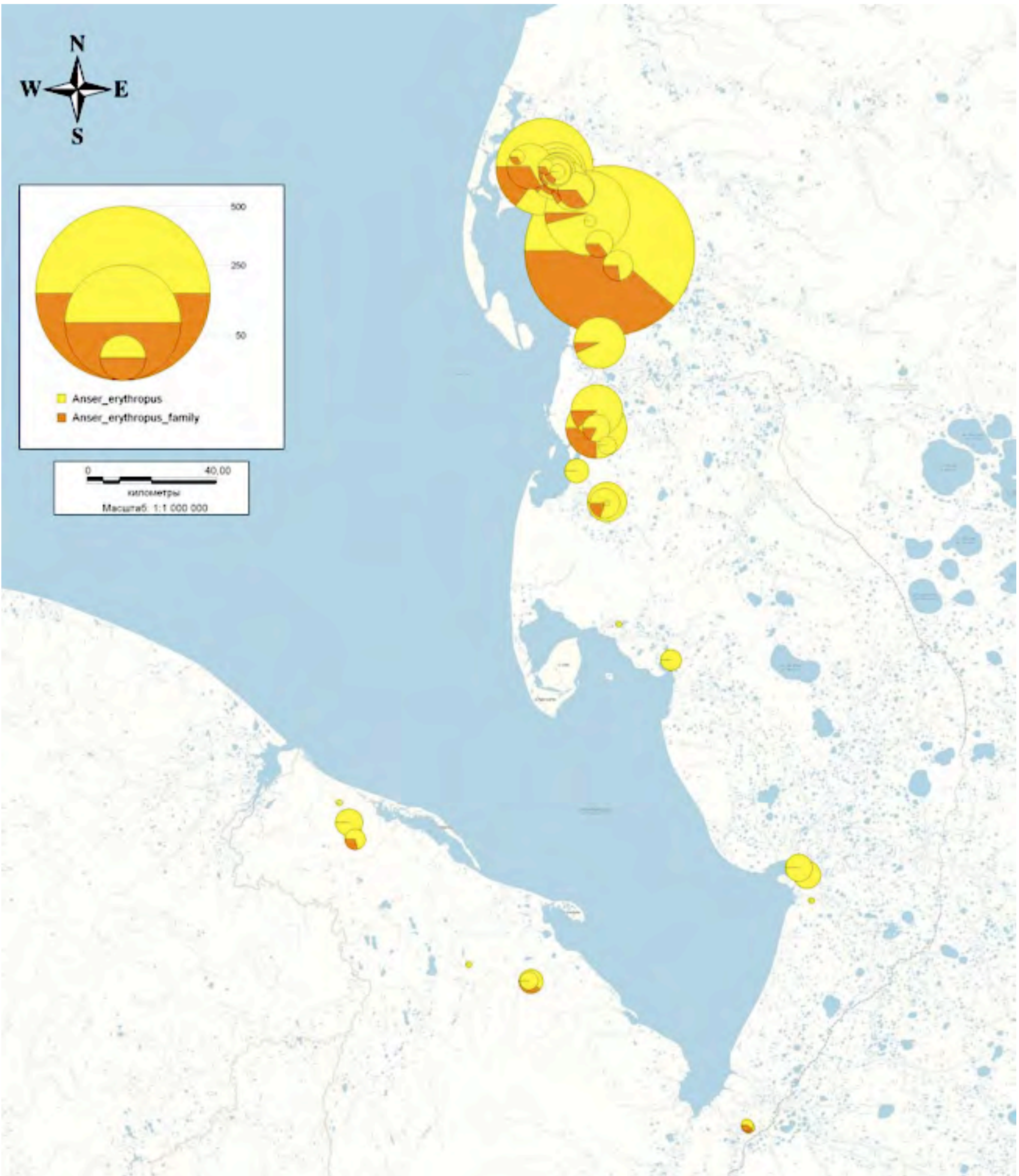

Fig. 7. Distribution and numbers of Lesser White-fronted Geese in the study area (yellow: unaccompanied adults; orange: adults with goslings).

The average proportion of Lesser White-fronted Geese among all the geese individuals counted in the study area in August 2015 was about 9% (Fig. 8).

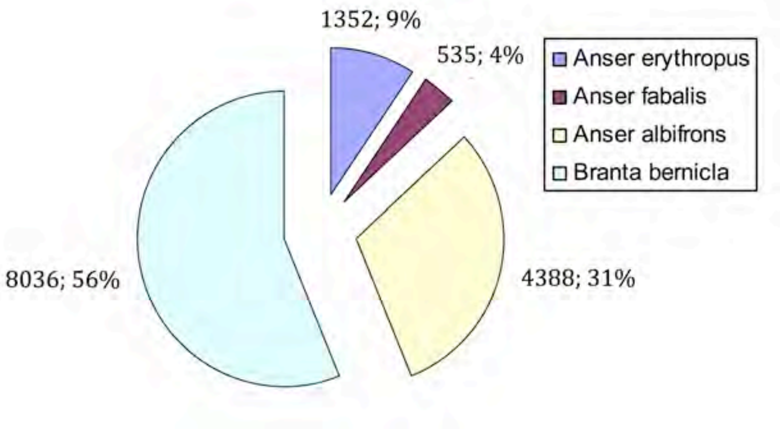

Fig. 8. Relative abundance (%) of four goose species in the study area according to field counts

The distribution of Lesser White-fronted Geese in the gatherings and groups of other goose species is shown in Fig. 9.

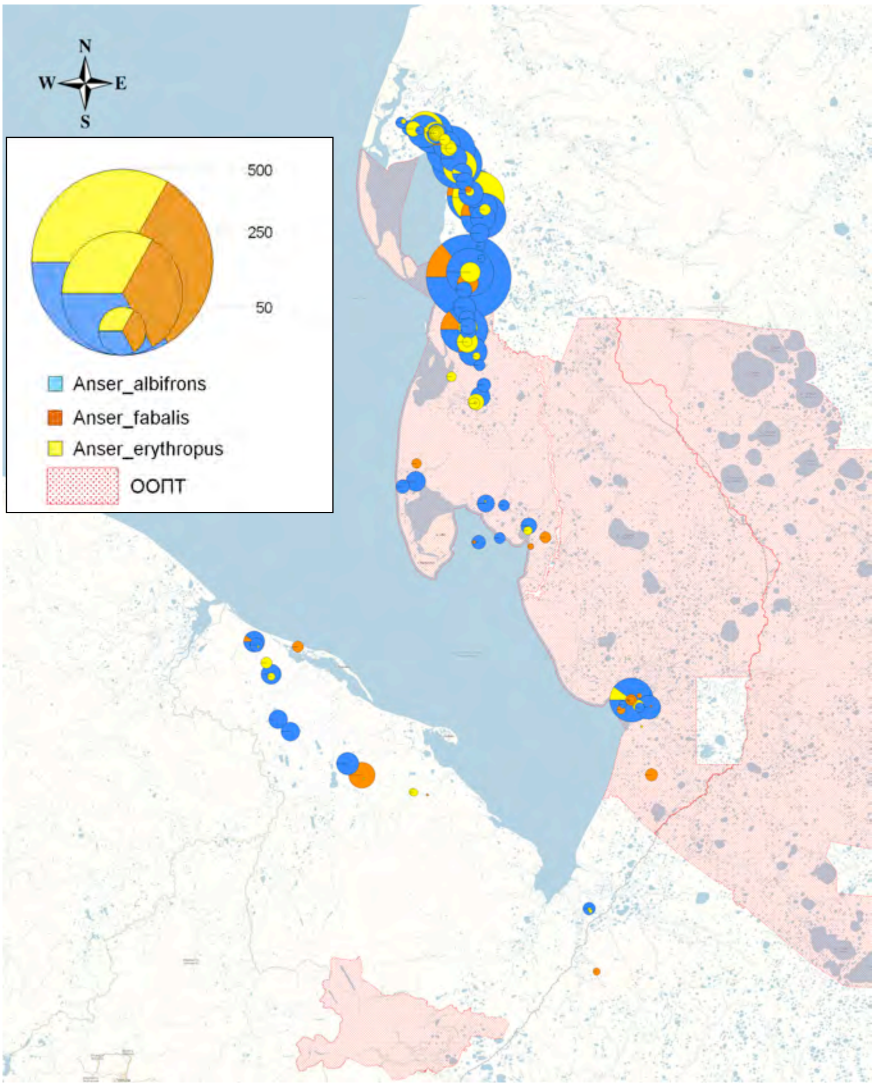

Fig. 9. Distribution and abundance of three goose species in surveyed area, purple polygons indicate specially protected natural areas

The first Lesser White-fronted Geese that were able to fly after their wing moult were encountered in 2015 as early as 11 August. Flocks flying in a southerly direction were first observed on 20 August.

Discussion

In their thirteen-year old review of the species' status by V. MOROZOV and E. SYROYECHKOVSKI (2002), the number of nesting Lesser White-fronted Geese was roughly estimated at 700–1000 individuals. Our latest survey data enables a contemporary and more precise assessment of 961 adult Lesser White-fronted Geese on the Yamal Peninsula in August 2015, of which 766 adults were in gatherings with broods. Revisiting the keys sites for Lesser White-fronted Geese in the Stshuchia River basin shown that the territory which was formerly considered as one of the most important areas for the species (MOROZOV & SYROYECHKOVSKI 2002), has probably lost its significance. We found no broods of Lesser White-fronted Geese there during our survey in 2015. In 2014, only two broods of Lesser White-fronted Geese were found in this area throughout the entire survey period. Instead, significant numbers of White-fronted Geese were present in an area much further north than previously recorded. Whether the nesting range of both species have moved northwards or if the species has always nested there remains unknown because the area remains largely unexplored.

Lesser White-fronted Goose family (V.V. Morozov)

Despite our lack of knowledge, it would be highly informative to investigate this phenomenon in further detail, since one possible explanation for these shifts may be the influence of global warming resulting in spreading of species ranges in the Extreme North.

With regard to an effective conservation of the Lesser White-fronted Goose, the northerly shift of its range requires better insight into its geographical distribution and abundance with respect to the existing network of protected areas for waterfowl in the Arctic, with a view to taking new measures to better protect the most important areas for the species in the study area.

Anthropogenic impact in the study area

Information obtained during the current study indicated that the gas pipeline construction in Baydaratskaya Bay has not caused any detectable decrease in the abundance of Lesser White-fronted Geese so far and apparently to date has had no adverse effects on survival. We have also not recorded any cases of poaching in the area. At the same time, there are some signs of ongoing positive changes in people's attitude towards the protection of key sites of the Lesser White-fronted Goose population. For example, the Yamalski wildlife sanctuary ('zakaznik') is now regularly patrolled by security staff. In all the outposts situated inside the sanctuary, signboards were erected in August 2015 to warn against any hunting, recreation and tourist activities in the protected areas.

Some of the key areas for Lesser White-fronted Geese discovered during our study fall within the currently existing network of specially protected natural areas. However, there remain some key sites where Lesser White-fronted geese temporary gather in large numbers in those areas which are most frequently visited by hunters. All the moulting sites discussed above, for instance, fall outside the specially protected natural areas (see Fig. 9).

Acknowledgements

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A novel harness for attaching tracking devices to migratory geese

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Abstract
Harness attachments have been used for almost 30 years to equip migratory swans and geese with tracking devices. Harnesses for geese need to be sturdy and have the possibility to be adjusted during deployment to fit individual geese. Here we present a novel harness for attaching tracking devices to migratory geese which fits these requirements. The harness is novel in two ways: it is premade but can be adjusted to the size of the bird during deployment, and it is constructed out of three layers (Teflon, Tygon and nylon) to ensure sturdiness as well as smoothness. We provide instructions on how to construct the harness as well as how to deploy it on a bird and encourage others to use this harness to track migratory geese and possible other larger bird species.

1. Introduction

Tracking devices attached using harnesses have been used to track the migratory journeys of geese and swans for almost 30 years (NOWAK et al. 1990; SEEGAR et al. 1996). Using harness attachments to equip birds with tracking devices is the best solution for most species including several smaller species of geese, because 1) the device can be positioned above the centre of gravity of the bird and the weight can thus be best supported and 2) a sizeable surface for solar power cells can be optimally positioned for solar charging. However, ill-fitting harnesses can have strong adverse effects on birds, and in some cases harnesses have been found to reduce survival rates (WARD & FLINT 1995) and induce changes in behaviour (GLAHDER et al. 1997). Also, harnesses sometimes unintentionally break or wear down, and especially larger geese are capable of destroying harnesses with their strong beaks. The type of harness, the quality and sturdiness of the material and the way the harness fits the individual bird can be decisive in reducing the influence on the bird, the longevity of the harness itself, and eventually how representative the tracking data are for normal behaviour.

We developed a novel harness to attach tracking devices to larger birds, with the aim to make a sturdy harness which can be used on medium-sized geese and that can be adjusted in size while fitting the harness on a bird. We have used this harness since 2012 to track the migration of Arctic nesting geese, including Brent Geese *Branta bernicla*, Barnacle Geese *B. leucopsis* and Greater White-fronted Geese *Anser albifrons*. Here we describe our methods to construct the harness, and to deploy it on a goose.

2. Harness construction

Materials

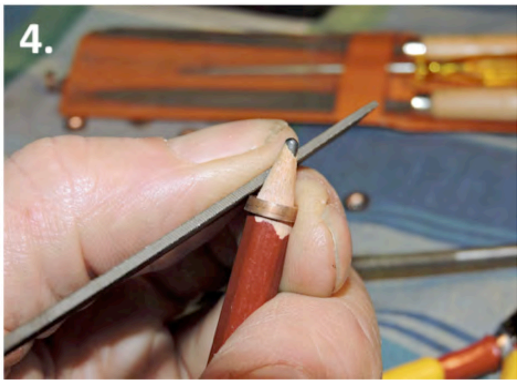
The harness consists of three main components: straps, attachment rings and crimping rings. The straps of the earliest made harnesses (used on brent geese) consisted of two layers: Tygon tube (outside diameter 4mm, inside diameter 2.2mm, VWR) with nylon (2.2mm, Ledent) as inner layer. The Tygon gives the harness a tubular shape, in order to create a smooth harness which does not rub against the birds' skin and to prevent the bird from getting a good grip with its bill. For larger species of geese, a third layer of tubular Teflon (pattern 8476, .25", Bally Ribbon Mills, USA) is added as an outer layer to increase sturdiness. Attachment rings were 6 - 10mm stainless steel key rings. Stainless steel as a material for the rings is important especially when the harness is used on species than occur in saline environments. Crimping rings are copper rings, 4 – 8mm in width, cut from a 12mm copper pipe. Copper can bend but does not break after bending, as would aluminium, for example. The harness is tailor-made to fit each study species. Other materials and tools needed to construct the harness include: superglue, a lighter, knitting needle, 0.3 mm sewing thread, small cutting pliers, pipe cutter, hand file, chainsaw file and a drill (including milling cutter).

Construction

Below, we provide instructions how to construct the harness in the text and the figures below. The dimensions provided and which we use here is to fit a device for a Barnacle Goose, the harness being 80 cm in length and weighing 16 grams.
Instructions including a larger set of pictures as well as a video resource will be placed on www.tobseda.com.

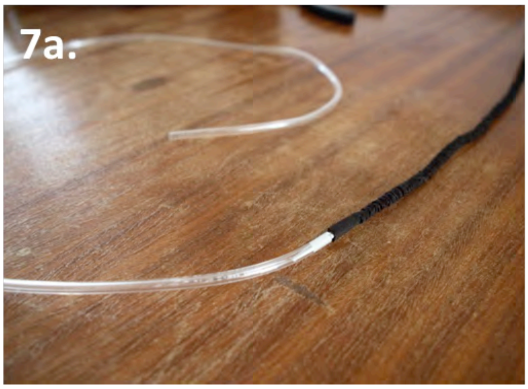
Making copper rings

1. Cut small (4mm), medium (6mm) and wide (8mm) copper rings from a copper pipe, using a pipe cutter. The easiest way is to attach the copper pipe in a drill, firmly attaching the pipe cutter on the other end, and using the drill to rotate the pipe.
2. Now polish the inside of the ring on both sides, using a milling cutter in a drill, while holding the ring in a set of pliers (best used are ringing pliers for banding birds).
3. Polish the inside again, holding the ring in the pliers and filing with a long thin file (normally used to sharpen chainsaws)
4. Polish the outside of the ring, placing the ring on a pencil and using a hand file.
5. Make sure all sharp edges are gone, so the ring can shift smoothly on the harness.



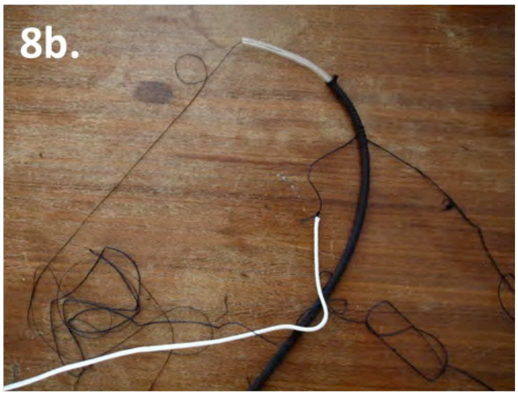
Constructing the harness

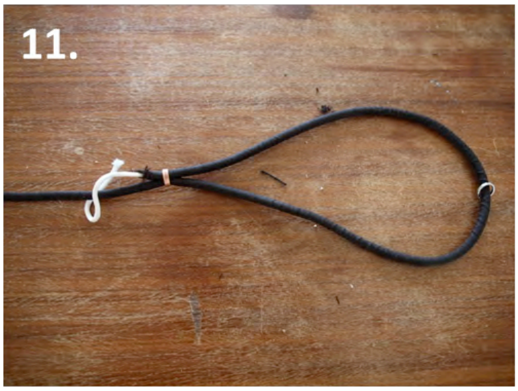
6. Clip off a piece of 75cm Tygon and roughly 80cm Teflon. 100 cm of Nylon rope is used, but it is best to not clip this off before the end of step 8.
7. Put the Teflon on a knitting needle, and put the Tyfon tip on the tip of the needle (a). Now use pliers to pull the Teflon over the Tygon, and pull it (b), all the way until the Tygon sticks out of the Teflon on both sides.
8. Attach the Nylon rope to a strong thread or yarn. It is best to use thread normally used to sew buttons on coats. You can strengthen the tip of the rope by burning it slightly with a lighter, then put the thread through using a needle (a). Suck (using your mouth) the thread through the Tygon tube (b). If the thread is too heavy to suck through, attach it to a lighter thread which you can suck trough. Pull the thread gently until the nylon pops out on the other end. This can be a quite difficult process as it depends on how well the thread is connect to the nylon and how smooth the tip is. Try improving the smoothness of the tip by clipping off most of the hardened parts after burning. When the nylon is taken entirely through the Tygon tube, you can either pull the entire length of the nylon rope trough (without clipping, so the whole bundle of nylon), so you avoid having to re-attach the tread after the first harness, or clipp off the nylon when it sticks out at both sides of the Tygon by roughly 10 cm.



9. Now fit the Teflon neatly around the Tygon by pushing and rubbing towards the ends of the strap.
10. Put an attachment ring around the Teflon. You can attach this attachment ring to a large keyring, which you can use to hang the harness on a doorknob for example, to be able to fit all the rings nice and straight.
11. Make sure both ends of the strap (including nylon) are of equal lengths. Then put a medium-sized copper ring next to the keyring, and pull the other end of the harness through the copper ring, to create a noose in which the keyrings sits. This is the top-end of the harness.

12. Put a wide copper ring on the strap, and pull the other end of the harness through the ring, so you now have both ends of the strap through the ring. You have now created a hole for the head.
13. Now, on both ends of the harness, place a small copper ring, followed by a keyring, and pull the end of the harness through the copper ring, thereby creating a small noose in which the keyring sits.
14. Tie knots in the nylon at the end of the straps. Detach the large keyring from the attachment ring at the top-end of the harness and attach the tracking device to this attachment ring.





3. Fitting the harness on a bird

By adjusting the location of the crimping rings it is possible to adjust the harness to the size of the individual bird during deployment.
Attaching the harness is best done by two persons: an experienced person attaching the harness and another person holding the bird on the lap. It is best to sit facing each other, with the head of the bird facing the person attaching the harness.

1. Pull the head loop over the head of the bird.
2. Take one strap and pull it under the wing, while making sure not to get any wing feathers between the strap. Then reach the tracking device which now sits on the back with the straps. Attach the keyring of the strap to the tracking device, while making sure it does not sit too tight.
3. Repeat the process for the other strap and wing.
4. Check whether the parts of the strap sticking out from the outer copper rings (including nylon) are of equal length on both sides!
5. Make sure the harness sits well between the feathers of the geese in front of the breast, by actively putting the harness between the breast feathers. Check (by feeling) whether the copper ring is located right above the sternum. If not, shift it up or down.
6. The harness should be loose enough to allow for the bird to gain fat prior to spring migration. Check how tight the harness sits by feeling 1) whether you can put 1.5 – 2 fingers horizontally under the logger and 2) whether the loop around the neck is not too tight. The logger should sit flat while lifting it with your fingers, not leaning towards the front or the back.
7. Adjust the harness is necessary, making it smaller or larger by pushing the strap material through the copper rings. Make sure the straps on both sides are still of equal length!
8. If the harness is well adjusted to the bird, squeeze all four copper rings shut with a pair of plyers. Then you can fix the ends of both straps. Undo the knots. Then clip the Teflon + Tygon (not the nylon!) with a set of clipping pliers, until about 2cm above the copper ring. Pull the Teflon down a bit and cut a little bit more of the tygon, so the Teflon falls over it. Now make a knot on top of the Teflon.
9. Put superglue on the knot (while making sure you don’t put glue on the bird!), wait until it is dry, and clip the nylon until about 0.5 cm from the knot. Make sure you don’t put glue on the birds’ feathers.

4. Conclusion

We have here described how to construct a novel harness to attach tracking devices to migratory geese and are keen to encourage others to use this type of harness.
We see scope to use this harness for other species or groups of larger birds, and the harness has been successfully used on European Honey Buzzards *Pernis apivorus* (VANSTEELANT et al. 2015), but we recommend careful forethought and tests in captivity before using it on wild birds. Expertise in making the harness but especially in attaching the harness on the bird is of vital importance, and we are happy to collaborate with any researchers interested in using the harness.

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Greater White-fronted Goose family (A. Steins).

Outstanding Ornithologist of the past: Jean Théodore Delacour (1890–1985)

Johan H. Mooij

Jean Théodore Delacour (26 September 1890 in Paris, France – 5 November 1985 in Los Angelos, USA) was a US ornithologist and aviculturist of French origin.

He was born in Paris into a wealthy family and grew up on the Chateau Delacour in Villers-Brettoneux near Amiens (Picardie), one of the family estates. There he experienced an untroubled youth and became interested in landscape gardening, birds and aviculture. From his generous pocket money he started to build aviaries in the park of the state and to breed rare birds. Subsequently he bought more and more bird species and later also mammals and thus established a private zoo.

After finishing school, he studied at the universities of Paris and Lille and completed his studies at the University of Lille with a doctorate in biology.

During the First World War, Delacour served in the French army, a war in which his brother was killed and the Delacour estate as well its private zoo were devastated.

Chateau Delacour in Villers-Brettoneux near Amiens (Picardie)

His wartime experiences were so destructive that he decided not to found his own family, but his love for birds remained. After the war he bought Chateau Clères, in Clère, north of Rouen (Normandie) and again converted its park in a private zoo, which still exists today. After a few years the park Delacour managed to realise his dream to create a paradise on earth. Small, delicate and rare birds were still kept in aviaries, but a large number of exotic animals, such as gibbons, gazelles, kangaroos, flamingos, cranes, numerous kinds of waterfowl, and other wildlife roamed freely through his park.

He kept about 3,000 individuals belonging to more than 500 species, some of which were extremely rare.

Chateau Clères, in Clère, north of Rouen (Normandie)

Between the two World Wars he conducted an expedition almost every year and explored the Guianas and Venezuela as well as Madagaskar and Indo-China until the beginning of the Second World War and brought from these expeditions a collection of more than 30,000 birds and 8,000 mammals. He discovered several new species and hundreds of new subspecies. Delacour published his findings in a number of books and scientific papers.

Shortly before the outbreak of the Second World War, Chateau Clères burned down and during the war a part of Delacour's paradise was disrupted by the German occupation. Only the intervention of his friend and renowned German colleague Erwin Stresemann saved the rest of his collection, left over after war damage and he ravages of hunting by German officers. Delacour himself fled to the USA in 1940, where his American colleagues helped him to get a job at the Bronx Zoo in New York. This position left him enough time to review the bird collections of the Amercan Museum of Natural History and to make systematic revisions in number of bird taxa, which were published in a long sequence of scientific papers. In 1952, he became director of the Los Angeles County Museum of History, Science and Art and engaged himself in the community of aviculturalists and horticulturalists of southern California. Between 1950 and 1975 he published a series of illustrated handbooks about "The Pheasants of the World" (1951), "Wild Pigeons and Doves" (1959) as well as the four-volume monography "The Waterfowl of the World" (1951-1964) and (with Dean Amadon) the "Curassows and Related Birds" (1973).

Besides his official activities, from the 1950s onwards, he restored Chateau Clères and its park almost to its former splendour. In 1910, he was one of the co-founders of the Ligue de Protection des Oiseaux (LPO, now BirdLife France) and was for very many years its president. In 1920 he founded the leading ornithological journal in France, L'Oiseau, and was its editor until the Second World War. In 1922, he was one of the founders of the International Council for Bird Preservation (ICBP, nowadays BirdLife International) and subsequently was its president for many years. In 1938, he served as Secretary General of the Ninth International Ornithological Congress, which met at Rouen. This international meeting offered the opportunity to show the splendour of the park around the Chateau Clères to the participants.

After his retirement in 1960 he divided his time seasonally between France and the United States, spending the summer at Chateau Clères in France and the winter mainly in Los Angeles. After a big celebration of his 95th birthday he had to be admitted in hospital, where he died a few days later of heart failure.

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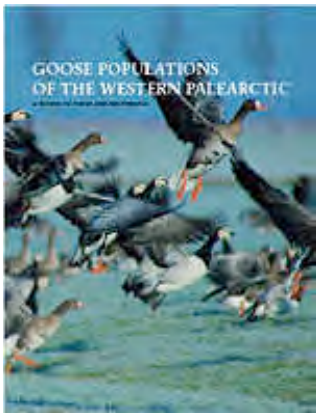

The Goose Specialist Group made an impressive compilation (edited by Jesper Madsen, Tony Fox & Gill Cracknell) of our knowledge on the status and distribution of the goose populations of the western palearctic. This book is not for sale anymore, but a digital copy can be downloaded for free from:
http://issuu.com/jesper_madsen/docs/goosepopulationswestpalearctic
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http://bios.au.dk/en/knowledge-exchange/about-our-research-topics/animals-and-plants/mammals-and-birds/goose-populations-of-the-western-palearctic/

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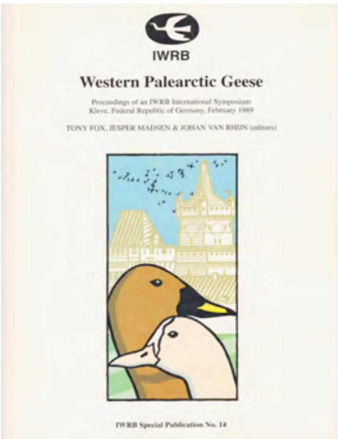

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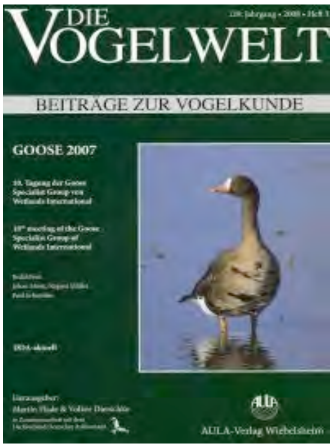

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Proceedings Goose 2009
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Proceedings of the 14th meeting of the Goose Specialist Group

The proceedings of the 14th 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 15th meeting of the Goose Specialist Group

The proceedings of the 15th 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 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 WWT journal Wildfowl

Wildfowl is an international scientific journal, published annually by the Wildfowl & Wetlands Trust (WWT).
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 now 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.
The complete back catalogue of Wildfowl is available via the Open Journal System at http://wildfowl.wwt.org.uk

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

Call for help:

As discussed during the Höllviken meeting we invite all goose researchers to send their publications to our data bank of geese literature. Not only international but also local publications (including those in languages other than English) are most welcome.
Please send your publications, preferably as a pdf file, to Fred Cottaar - fred.cottaar@tiscali.nl.

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.

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