

Red-breasted Goose: satellite tracking, ecology and conservation

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Red-breasted Goose *Branta ruficollis* is one of the least studied and strongly threatened goose species in the world. It is currently classified as 'Globally endangered' by the IUCN and as 'Threatened' by BirdLife International and is in Appendix I of CITES Convention (BirdLife International 2014). The species breeds in the Arctic tundra of the Taimyr, Gydan and Yamal peninsulas of Russia (Hunter 2005; plate 98). Although a less northerly breeder than the other *Branta* geese nesting in Siberia (Dark-bellied Brent Goose *B bernicla*, Black Brant *B nigricans* and Barnacle Goose *B leucopsis*), Red-breasted must also await ice melting before it can start nesting and completes the breeding cycle in little over 100 days (Kokorev 1989). The chief peculiarity of the species' ecology is the fact that it shares its nesting territories with birds of prey such as Rough-legged Buzzard *Buteo lagopus* and Tundra Peregrine

Falcon *Falco peregrinus calidus*. The geese establish their breeding colonies (up to 35 nests) close (a few meters to a few 10s of meters) to the predator's nest, relying on the ability of the predator to first detect and then scare off Polar Foxes *Alopex lagopus* looking for incubating waterfowl and waders and their eggs (Kokorev 1995, Kokorev & Quinn 1999, Quinn et al 2003, Rozenfeld et al 2012a).

This paper describes conservation efforts and documents and analyses the first results of satellite tracking of a small number of individuals, which helps to better understand the movements of the species and possible threats during migration and wintering periods.

Population size and movements

The size of the world population is subject to debate. Monitoring is restricted by the low density of

98 Red-breasted Geese / Roodhalsganzen *Branta ruficollis*, female with two-days old goslings, Taimyr peninsula, Siberia, Russia, 17 July 2013 (Didier Vangeluwe/IRSNB)



observers along the migration routes and in significant parts of the wintering area. The remoteness of the breeding area also makes it very challenging to survey breeding sites for population estimates. The population is nevertheless highly restricted in size compared with other Eurasian Arctic geese species, with the notable exception of Lesser White-fronted Goose *Anser erythropus* (Fox et al 2010). Recent fluctuations in numbers are thus difficult to interpret. Is it a true decline or variation due to the surveying effort taking into account the mobility of the geese confronted with cold spells? The good news is that an experienced team of Kazakh and Russian ornithologists has counted an estimated 150 000 Red-breasted Geese during postnuptial migration in October 2012 in northern Kazakhstan (Rozenfeld et al 2012b). A more coordinated specific winter population survey across the entire range is much needed to better understand the trend of the population.

Outside the breeding season, initially steppe habitats but nowadays mostly agricultural areas are used, not only on migration but also for wintering. In the early 1960s, it shifted wintering grounds from the south-western Caspian Sea salt steppes (mainly Kizil-Agach Zapovednik, Aggyol lake and Muggan steppe) to the Romanian and later Bulgarian Dobrogea coastal area, where winter wheat is extensively cultivated since the 1950s (see Vangeluwe & Stassin (1991) for review of historical status). Red-breasted Geese were recorded in the Bulgarian Dobrogea for the first time on 8 December 1961 (Michev et al 1991) and in the region of Shabla lake on 6-8 February 1964 (Donchev 1967). During the non-breeding period, flocks co-exist with Greater White-fronted Geese *A. albifrons albifrons*, roosting on freshwater lakes and commuting to and from agricultural fields to feed during the day (plate 99 and 102). Previous surveys in Bulgaria have established that the area of Durankulak lake and Shabla lake are critical roosting habitats and the nearby Black Sea serves as an important alternative roost site when the lakes are frozen (plate 101). Surrounding cereal crop fields provide the main foraging habitat (Vangeluwe & Snethlage 1992, Vangeluwe et al 1996, Michev & Profirov 1997, Simeonov et al 1997).

Nowadays, Red-breasted Goose's main wintering grounds are primarily found in Bulgaria and Romania. Small numbers winter annually further south along the Mediterranean shores in Greece, where flocks can increase strongly following cold spells (Handrinos 1991, Handrinos & Akriotis

1997, Vangeluwe 2005). During mild winters, large numbers may also winter in Russia and Ukraine. Figure 1 shows sites where at least 500 Red-breasted Geese were found wintering during 2002-12. Further west, Red-breasted Geese are accidentally observed along the western migration flyway of Greater White-fronted Geese. This is particularly the case in Belgium, Britain, Germany and the Netherlands, where the species is an annual visitor in small numbers. Up to several 10s per winter appear in the Netherlands, including family groups in recent years (van den Berg & Bosman 2001, Bijlsma et al 2001; www.dutch-birding.nl, www.waarneming.nl; plate 109). Individuals escaped from captivity are regularly observed in the same countries as well, and there are instances of feral breeding (Lensink et al 2013).

Bulgaria-US Red-breasted Goose project

Threats to Red-breasted Goose populations are poorly understood and the lack of systematic demographic monitoring (size of population and survival data) makes it difficult to evaluate how these threats affect population trends. Illegal hunting, spring hunting in some Russian regions and Kazakhstan, disturbance as a consequence of hunting the associated Greater White-fronted Geese, evolution of agricultural practices in Bulgaria and Romania, and wind farms are probably the most important threats (Cranswick et al 2010). The legal status of the species in its area of distribution is mostly adequate, certainly in the European Union where it is listed in annex I (highest level of protection) of the Bird Directive initially 79/409/EEC, now codified as 2009/147/EC (<http://ec.europa.eu/environment/nature/legislation/birdsdirective>).

The Bulgaria-US Red-breasted Goose project is a joint effort between Le Balkan Bulgaria Foundation and US Fish & Wildlife Service (Simeonov & Possardt 2011). It was established in 2010 with collaboration and support from the Bulgarian Ministry of Environment and Water, San Diego Zoo, Bettembourg's group of Lëtzebuerger Natur – a Vulleschützliga, Mohamed bin Zayed Species Conservation Fund, Branta Tours Birdwatching Company, and Bed & Birding Ltd. Moreover, it is supported by numerous volunteers from Belgium, Bulgaria, the Netherlands, Romania, Russia, Ukraine and USA.

The objectives of the project are: **1** create synergy through national and international cooperation among responsible governmental institutions, conservation non-governmental organizations and stakeholders to implement priority actions



99 Red-breasted Geese / Roodhalsganzen *Branta ruficollis* and Greater White-fronted Geese / Kolganzen *Anser albifrons*, Durankulak, Dobrudja region, Bulgaria, 5 February 2011 (*Tatyana Simeonova/Bed & Birding*) **100** Red-breasted Geese / Roodhalsganzen *Branta ruficollis*, Shabla, Bulgaria, 12 February 2013 (*Pavel Simeonov/redbreastedgoose.org*) **101** Red-breasted Geese / Roodhalsganzen *Branta ruficollis* and Greater White-fronted Geese / Kolganzen *Anser albifrons*, Black Sea coast, Shabla, Bulgaria, 14 February 2013 (*Mladen Vasilev/Bed & Birding*). Birds roost at sea during periods when lakes are frozen.

identified in the Single Species Action Plan; **2** increase scientific knowledge of the movements and behaviour on the wintering grounds and migration routes; **3** identify threats and investigate feeding ecology at stopover sites; **4** facilitate agreements with large cooperatives, agricultural companies and farmers in the coastal Dobrodgea region to implement agri-environmental measures suitable for foraging geese; **5** raise public awareness to promote conservation action; and **6** create a 'Friends of Red-breasted Goose Conservation Network' along the entire flyway that brings conservationists together to share information and help to recover the world population. These objectives reflect and complement the ones outlined

in the Red-breasted Goose Species Action Plan (Cranswick et al 2010). Moreover, we think that nature conservation and development of the local economy are intimately linked and therefore we emphasize development of ecotourism in Dobrodgea by developing ecobirding companies such as Branta Tours Wildlife and Birdwatching Company in Durankulak, which are ready to provide services to accommodate tourists.

Satellite tracking

We developed a programme to deploy GPS satellite transmitters on Red-breasted Geese caught on the wintering grounds and to make the results available to the public on the website www.red-breastedgoose.org



102 Red-breasted Geese / Roodhalsganzen *Branta ruficollis* and Greater White-fronted Geese / Kolganzen *Anser albifrons*, Durankulak, Dobrudja region, Bulgaria, 24 January 2012 (Tatyana Simeonova/Bed & Birding). Typical mixed flock. **103** Red-breasted Geese / Roodhalsganzen *Branta ruficollis*, with Greater White-fronted Geese / Kolganzen *Anser albifrons*, Durankulak, Dobrudja region, Bulgaria, 9 February 2012 (Pavel Simeonov)





FIGURE 1 Sites where at least 500 Red-breasted Geese *Branta ruficollis* were found wintering during 2002-12
(© 2013 Google)

breastedgoose.org. To trap and tag Red-breasted Geese, we used the ancient South Asian/Indian bird trapping technique of foot-nooses. This trapping technique is extremely portable from one trapping site to another, is highly adaptable to many different field conditions and does not scare the feeding geese both on the capture sites and surroundings. Solar powered Argos/GPS PTT (Platform Transmitter Terminal, by Microwave Telemetry Inc, Columbia, Maryland, USA) were attached on the birds as backpacks, with Teflon coated ribbons.

Spring 2012

In February 2012, we deployed one 20 g PTT and two 30 g PTTs on three Red-breasted Geese on their wintering grounds in the Durankulak and Shabla, Bulgaria, to follow their spring migration routes to the Russian tundra. Two of these could only be tracked for a handful of days due to transmitter problems or birds dying (with the transmitter becoming buried). The third, named 'Teddy' (plate 104) after former US President Theodore Roosevelt (1858-1919, an avid birder himself), provided valuable location data and generated strong attention and excitement among the conservation community and the public (Simeonov & Possardt 2012). Along Teddy's route were 10 very important stopover locations (figure 2).

When Teddy entered Kazakhstan, we hoped that nothing would happen to him because of legal spring hunting there. His luck ran out on 15 May when he encountered hunters just before he exited the country. There appear to be good hunt-

ing regulations at locations along the flyway but if these important stopover sites where 1000s of birds rest during migration are regularly being hunted this stresses the need that hunter education and hunting regulations are implemented.

Spring 2013

In February 2013, another three Red-breasted Geese were captured with foot-nooses in Durankulak and fitted with 30 g PTTs: 'Teddy II' (captured 14 February), 'Pavel Patev' (captured 15 February), and 'Aldo Leopold' (captured 21 February). All three were males, Aldo Leopold and Pavel

104 Red-breasted Goose / Roodhalsgans *Branta ruficollis* Durankulak, Dobrudja region, Bulgaria, 18 February 2012 (Tatyana Simeonova/Bed & Birding). 'Teddy' fitted with satellite transmitter.



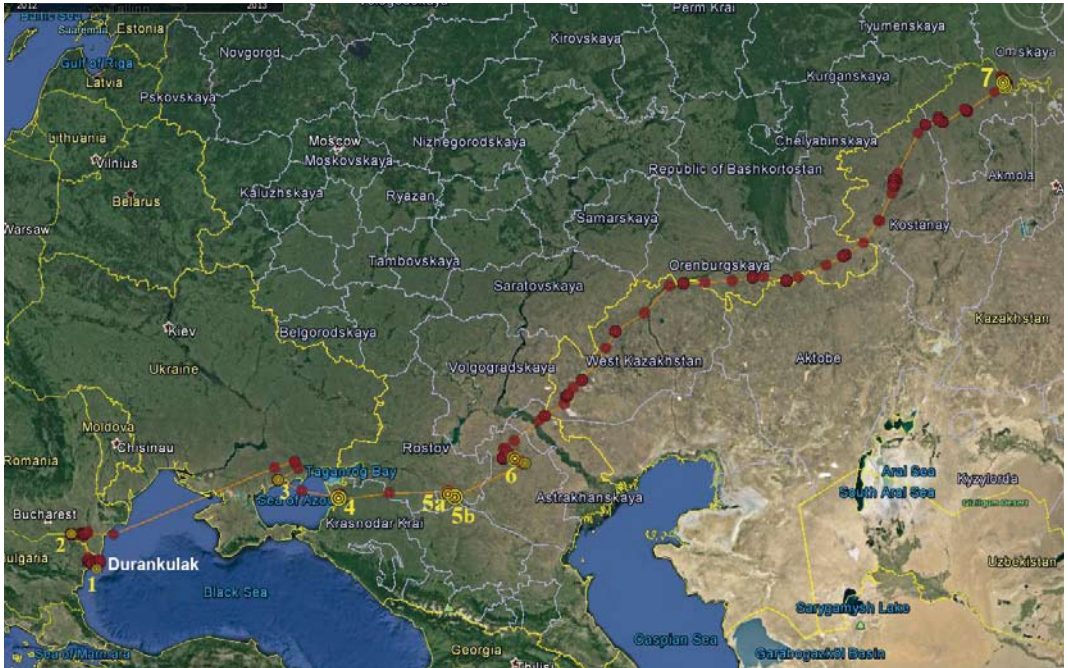


FIGURE 2 Map showing stopover sites (red dots) during 2012 spring migration of Red-breasted Goose *Branta ruficollis* 'Teddy' (© 2013 Google)

105 Red-breasted Geese / Roodhlanganzen *Branta ruficollis*, male (left) and female, Taimyr peninsula, Siberia, Russia, 17 July 2013 (Didier Vangeluwe/IRSNB)





FIGURE 3 Map showing stopover sites (red and white dots) during 2013 spring migration of three Red-breasted Geese *Branta ruficollis* (yellow line 'Aldo Leopold'; orange line 'Pavel Patev'; white line 'Teddy II'). Aldo Leopold was the first Red-breasted Goose carrying a transmitter to successfully reach its arctic breeding grounds. (© 2013 Google, © 2013 Mapabc.com, © 2013 TerraMetrics, © 2013 CNES/Spot Image)

Patev being adults and Teddy II being in its second calendar-year. The results of this first tracking season were published online in Simeonov et al (2013).

Aldo Leopold was named in honor of the father of wildlife conservation of the USA (Aldo Leopold, 1887-1948). This bird left Bulgaria the same day it was released, 21 February. It first went to the Danube delta, Romania, and then visited the Kumo-Manych depression, Russia, where it stayed for three weeks exploring the same staging places as Teddy in 2012. But contrary to Teddy, he did not stop *en route* at Hanskoe lake, on the eastern shore of Azov Sea, Russia. From Manytch, Aldo Leopold flew to Kazakhstan. He crossed the Kazakhstan-Russian border on 26 May at 00:01 and, in only 24 h, covered the huge distance of 1822 km without any stops, reaching the Yenisei gulf at 01:00 on 27 May. This incredible flight was

done at an average speed of 76 km/h, reaching 100 km/h in some stretches and his flight was similar to what was observed during the satellite tracking of post-nuptial migration undertaken in 2012 (Vangeluwe et al 2012). Aldo Leopold was the first Red-breasted Goose carrying a transmitter to successfully reach its arctic breeding grounds (figure 3).

The second tracked goose was named after Pavel Patev (1889-1950), doyen of Bulgarian ornithology and author of *The birds of Bulgaria* (1950), first leader of the Bulgarian Ringing Center established in 1928 and a member of the National Union for Nature Protection founded in the same year. On its journey, goose Pavel Patev was seen, photographed and observed by different Bulgarian, Romanian and Ukrainian ornithologists, bird-watchers and photographers. In the Danube delta, he was observed foraging in the cereal crop fields

adjacent to the northern shore of Sinoe lake, Romania. Ukrainian colleagues also found him refueling near the village Novodmitrovka, Ukraine, located in the northern part of the Crimea. According to their observations, Patev's flock was composed of 176 Red-breasted Geese. Interestingly, Pavel Patev did not stop at Kumo-Manych, Russia, the traditional stopover site in Kalmykia, but stayed in the Sarpa lakes, Russia, and then spent one month, like Aldo, in northern Kazakhstan in the same area where Teddy had been shot in the previous year; northern Kazakhstan appears to be a very important spring migration refueling place along the entire Red-breasted Goose flyway. Pavel Patev reached Taimyr, Russia, on 6 June 2013, 10 days later than Aldo. Aldo Leopold and Pavel Patev were most probably breeding in western Taimyr, north of Norilsk, during July-August 2013. Pavel Patev frequently visited Purinskoye lake, which is a well-known breeding and moulting site for Red-breasted Goose, c 120 km east of Aldo Leopold's supposed breeding location.

Teddy II arrived on the tundra one month later than Aldo Leopold and 20 days later than Pavel Patev. On 24 June 2013, he reached the Yuribey area in the Yamal Peninsula, a well-known breed-

ing site for Red-breasted Geese (Kostin & Mooij 1995, Paskhalny et al 1995, Syroechkovski 1995). Teddy II appeared to follow a different flight path compared with the two other tagged birds, flying further west from the known traditional migratory route. As a second calendar-year bird, it would not yet be breeding this summer.

Autumn 2013 and winter 2013/14

Between August and November, Pavel Patev and Aldo Leopold were on migration, stopping over at numerous locations but primarily at a couple of important places (based on time they spent there). On 26 August 2013, Aldo Leopold left his arctic breeding grounds. At midnight on 28 August, he stopped to refuel at the Yarotose river (Yaroto lake), c 350 km south of his summering area (figure 4). Once on the wintering grounds, he left Manich east of the Sea of Azov in Kalmykia, Russia, on 16 December 2013 and flew directly to the Crimea without any stops. He chose to stay at the bottom end of Arabatsky kosa, part of Sivash National Park, another staging location c 30 km north from where Pavel Patev stayed. The location of Aldo Leopold from January 2014 showed that he was moving back to Kerch, certainly due to changing

106 Red-breasted Goose / Roodhalsgans *Branta ruficollis*, male, Gydan peninsula, Siberia, Russia, 10 July 2012
(Didier Vangeluwe/IRSNB)



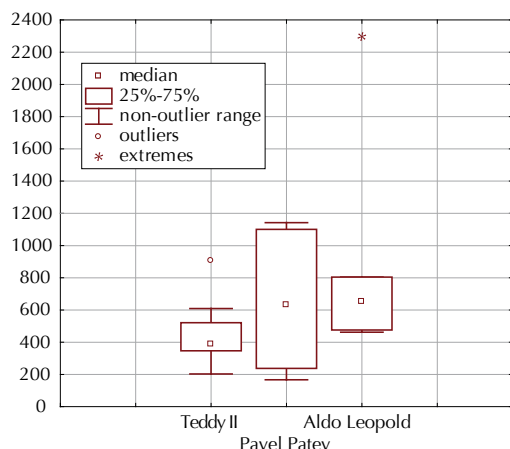


FIGURE 5 Distances covered per day during 2013 spring migration of three Red-breasted Geese *Branta ruficollis* ('Teddy II', 'Pavel Patev' and 'Aldo Leopold')

average distance covered during spring migration is shown in figure 5. Teddy II had relatively (but not statistically significant) shorter distances between stopover sites. Its average distance in flights between resting stages was 400 km. Both adult geese travelled longer distances, on average over 600 km.

Some of the observations *en route* suggest that, during migration, Red-breasted Geese travel together in fairly coherent flocks. Pavel Patev was observed in Romania in the very beginning of the migration and the flock size could be determined to be c 200 individuals. The same size flock was observed in Sinoe, Romania, and in Sivash, Ukraine; on 25 December 2013, nine months after the first observation, the group was still of the same size.

Our results also indicate much larger areas of conservation importance for the species because several of the stopover sites localized by satellite tracking were identified for the first time during this study. It nevertheless remains an open question whether the stopover sites are consistent during spring and autumn migration.

The 2013-14 satellite-tagged birds have sent very valuable location data, and are helping to build upon our initial success in determining migration routes, stopover sites and threats along these pathways. As important as these data will be to guide conservation policy in range countries, this satellite study is a very effective tool in developing public awareness and building stronger national and international coalitions for responsible

governmental institutions to provide the needed regulations to protect Red-breasted Geese on their wintering grounds and migration routes.

Future actions

There is much yet to be done to increase our knowledge on Red-breasted Goose ecology and threatening factors. We are optimistic that our efforts and those of many other concerned conservationists and citizens can clarify the situation and assure a safe future for the species. We also hope to contribute to collaboration among conservation groups, stakeholders and responsible governmental institutions. When conservationists and birders venture to these stopover locations and help conserve the species along the entire fly-way, local communities could benefit in many ways (plate 107).

In the future, we plan to look at the altitude of migration, spatial distribution at stop-over sites and wintering regions, in order to understand better the energy and time budgets of Red-breasted Goose and its ecology, respectively. Our plans are to be based on bigger sample size of tracked birds in the future, which definitely would require funding and collaborations with different international environmental organizations. We hope the results will lead to a more sound and efficient science-based decision to conserve this endangered species shared by so many nations.

Combining the results of our project with the results of other projects to monitor Red-breasted Geese from Taimyr, Russia, started in July 2013 with 11 transmitter-equipped individuals (www.naturalsciences.be/RBG-RBINS) which will further contribute to our knowledge of migration routes and stopover and wintering areas.

Acknowledgements

Numerous volunteers and colleagues from many countries have been hugely important for the success of this project and conservation effort. The volunteers involved are from Belgium, Bulgaria, Germany, the Netherlands, Romania, Russia, Ukraine and USA, all staying and working together at Branta Birding Lodge & Conservation Center (www.birdinglodge.com). We thank the following individuals for their interest and fruitful collaboration: Yuriy Andryushchenko, Mihai Baci, Viktor Badmaev, Marianne van den Berg, Sjaak van den Berg, James Bland, Nicu Calin, Peter Glazov, Paul Goriup, Arjen Heeres, Rob Honing, Vladimir Kazmin, Lena Lebedeva-Hooft, Tanyo Michev, Johan Mooij, Strahil Peev, Daniel Petrescu, Sonia Rozenfeld, Vasiliy Sokolov (Institute of Plant and Animal Ecology, Yekaterinburg, Russia), Sergej Soloviev, Hervé Teerlynck and Mladen Vasilev. Special thanks go to Pavel Zehindjiev for his analysis of distances covered by satellite-tagged birds.

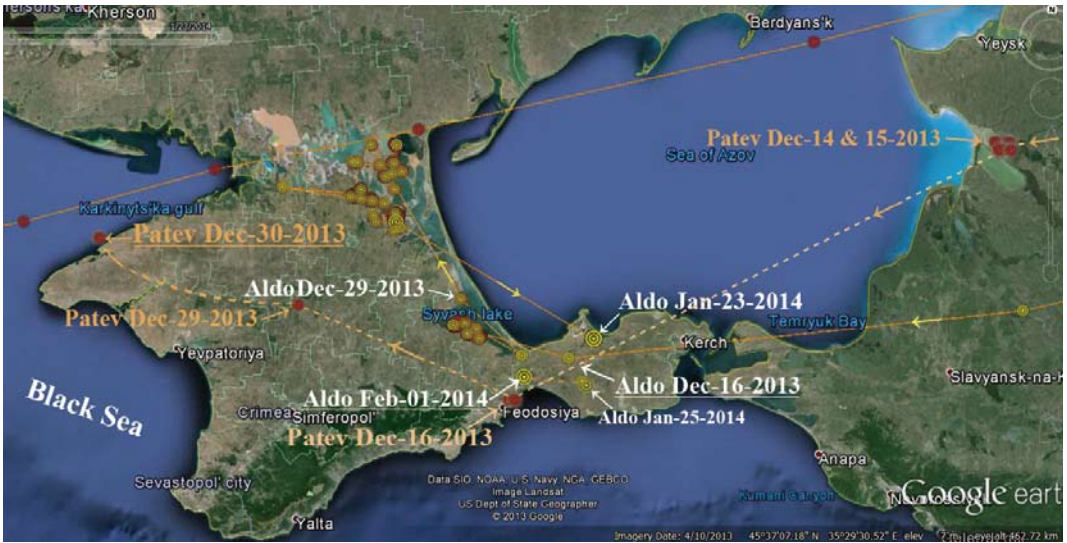


FIGURE 6 Movements during winter of 2013/14 of two Red-breasted Geese *Branta ruficollis* (white 'Aldo Leopold'; orange 'Pavel Patev') (© 2013 Google, (© 2009 GeoBasis-DE/BKG)



FIGURE 7 Movements of three Red-breasted Geese *Branta ruficollis* in 2013 (yellow line 'Teddy II'; pink line 'Pavel Patev'; red line 'Aldo Leopold'), from Durankulak lake, Bulgaria, to Siberia, and their return flight until signals stopped (© 2013 Google, (© 2009 GeoBasis-DE/BKG)

We especially thank the following sponsors for purchasing the satellite transmitters: Bulgaria Ministry of The Environment and Water & The Environment Protection Management Enterprise in Sofia, US Fish & Wildlife Service – Division of International Conservation and Division of Migratory Birds, San Diego Zoo, and the

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107 Red-breasted Geese / Roodhalsganzen *Branta ruficollis* and Greater White-fronted Geese / Kolganzen *Anser albifrons*, Branta Birding Lodge, Durankulak, Dobrudja region, Bulgaria, January 2010 (Pavel Simeonov jr/Branta Tours)

108 Red-breasted Geese / Roodhalsganzen *Branta ruficollis*, Durankulak, Dobrudja region, Bulgaria, 6 February 2012 (Pavel Simeonov)



Samenvatting

ROODHALSGANSEN: 'SATELLITE TRACKING', ECOLOGIE EN BESCHERMING Er is relatief weinig onderzoek gedaan naar Roodhalsgans *Branta ruficollis*, ondanks het feit dat de soort op diverse lijsten als 'bedreigd' staat geclassificeerd. De soort broedt op de Russische toendra. De wereldpopulatie wordt op c 150 000 exemplaren geschat. Exacte aantallen zijn niet bekend omdat de broedgebieden moeilijk toegankelijk zijn en er weinig waarnemers langs de trekroutes zijn. Tijdens de trek vergezellen Roodhalsgansen grote groepen Kolganzen *Anser albifrons*. Enkele 10-tallen exemplaren overwinteren (in langzaam toenemende aantallen) in België, Brittannië en Nederland. Het overgrote deel van de populatie overwintert in Roemenië en (met name) Bulgarije. Overdag foerageren vogels op graan- en maïsakkers en gedurende de nacht slapen zij op de aanwezige meren of op het water van de Zwarte Zee.

Het 'Bulgaria-US Red-breasted Goose project' is een initiatief van Le Balkan Bulgaria Foundation en US Fish & Wildlife Service waaraan vrijwilligers uit België, Bulgarije, Nederland, Oekraïne, Roemenië, Rusland en de VS samenwerken om meer inzicht te krijgen in trekgedrag, populatieomvang en bedreigingen van deze soort. De populatie staat onder zware druk door de jacht, in zowel directe (slachtoffers) als indirecte zin (verstoring). Langs de gehele trekroute wordt gejaagd op Kolganzen. De hen vergezelende Roodhalsgansen worden vaak (onopzettelijk) neergeschoten. Naast deze directe jachtdreiging is er indirecte bedreiging doordat het schieten voortdurend paniek in de groepen ganzen veroorzaakt waardoor ze langdurig de lucht in gaan. Ze kunnen minder tijd aan foerageren besteden en er treedt gewichtsverlies op. Naast de jacht zorgen de windmolens en drukte op de akkers voor verdere slachtoffers of verstoring.

Het projectteam voorziet Roodhalsgansen van GPS-zenders, zodat exemplaren gevolgd kunnen worden op hun trekroutes. In 2012 zijn drie exemplaren gezenderd. Twee zenders stopten al snel met zenden maar 'Teddy (Roosevelt)' kon vanaf de broedgebieden worden gevolgd tot in Kazachstan, waar hij werd neergeschoten. In 2013 zijn eveneens drie ganzen gezenderd. 'Aldo Leopold' en 'Pavel Patev' kozen bij de voorjaarstrek de traditionele route naar de toendra, terwijl de tweedejaars 'Teddy II' een meer westelijke (onbekende) route verkoos en een maand later op de toendra arriveerde. AL en PP verlieten eind augustus de toendra en bezochten diverse pleisterplaatsen. AL verbleef in begin 2014 (door het zachte weer) langdurig in Kerch (oostelijk deel van de Krim), Oekraïne, alvorens hij van de radar verdween. PP was net bezig met zijn laatste deel van de terugvlucht naar Durankulak in Bulgarije toe hij op 30 december 2013 stopte met het sturen van data. 'Teddy II' verdween op 21 oktober 2013 van de radar; in februari 2014 werd bekend dat deze vogel dood was gevonden in Orenburg oblast, Rusland (nabij de grens met Kazachstan). Begin 2014 zijn er weer twee ganzen gezenderd ('Pizho' en 'Sir Peter Scott'), waarvan de data dagelijks binnenkomen.

Door het verzamelen van deze gegevens weten we meer waar de ganzen verblijven en wordt inzichtelijk dat er meer gebieden vragen om bescherming dan voorheen gedacht. Tevens kunnen we met deze data de verantwoordelijke regeringen en andere organisaties aanspreken op hun verantwoordelijkheden voor de bescherming van deze soort en daarbij behulpzaam zijn.

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109 Red-breasted Geese / Roodhalsganzen *Branta ruficollis*, with Dark-bellied Brent Geese / Rotganzen *B. bernicla*, Texel, Noord-Holland, Netherlands, 1 February 2014 (René Pop)

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