
The 15th meeting of the Goose Specialist Group



Arcachon, France : 8 - 11 January 2013



Programme, abstracts and list of participants

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Sponsored by :



Welcome to Arcachon and to the 15th meeting of the Goose Specialist Group with a focus on Brent geese.

The 15th meeting of the Goose Specialist Group (GSG) is hosted by the Palace of Congress, place very close to the basin of Arcachon where several thousands of Brent geese (*Branta b. bernicla*) winters every year.

The meeting has received financial sponsorship from Office National de la Chasse et de la Faune Sauvage (ONCFS), Oiseaux Migrateurs du Paléarctique Occidental (OMPO), Fédération Nationale des Chasseurs (FNC), Fédération départementale des Chasseurs de Gironde (FDC33), Maison de la Chasse, Mairie d'Arcachon, Conseil Régional d'Aquitaine, Conseil Général de Gironde and la Fédération des Associations de Chasse et conservation de la faune sauvage de l'UE (FACE). All of these organizations are kindly thanked for their generous support.

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

The idea for hosting this meeting in France arose during the 13th meeting of GSG in Elista, Russia in march 2011, and planning of this current meeting in Arcachon began just after the 14th meeting of GSG in Norway in april 2012.

The board of the Goose Specialist Group (comprising Bart Ebbinge - chair, Tony Fox, Thomas Heinicke, Konstantin Litvin, Jesper Madsen, Johan Mooij, Ingunn Tombre, Berend Voslamber) have been closely involved in the preparation of this meeting.

A committee was established to organize practical aspects surrounding the meeting (comprising for ONCFS Pierre Migot, Guillaume Rousset, Jean-Marie Boutin, David Gaillardon, Brigitte Bonnemains, Hélène Melkebeke, Isabelle Rivault, Thierry Thomas, Anne Floch and Valérie Guérineau, and for the Palace of Congress, Virginie Dochez)

A further committee was established to plan the scientific content of the programme (Bart Ebbinge, Kendrew Colhoun, David Ward and Vincent Schricke)

Vincent Schricke
On behalf of the conference organizers

Provisional programme

Talks are scheduled to last 15 minutes. In addition, 5 minutes will be allowed for questions. Chairpersons for the different sessions are proposed and will be definitely announced later. Any alterations to the programme will be announced during the meeting.

Monday, January 7th

17:00 -19:00 Arrival and registration (Palace of Congress)

19:00 Evening cocktail offered by the Council of Arcachon

Tuesday, January 8th

09:00 Opening words by the Chairman of GSG & the Head of Research Unit of ONCFS
Session 1 on Populations sizes of all Brent Goose populations world wide

09:15 Dark-bellied Brent Goose (*Branta bernicla bernicla*) in the Bassin d'Arcachon
wintering : counting methodology and results.--Caroline Péré.

09:35 The wintering of Dark-bellied Brent Goose (*B. b.bernicla*) in France : trends in
number and spatio-temporal distribution. -- Loic Valéry, Vincent Schricke, Sophie Le
Dréan-Quenec'hdu & Roger Mahéo.

09:55 Population development and breeding success of Dark-bellied Brent Geese
(*B.b.bernicla*). -- Barwolt S. Ebginge, Jan Blew, Preben Clausen, Klaus Günther, Colette
Hall, Chas Holt, Kees Koffijberg, Sophie Le Dréan-Quenec'hdu, Roger Mahéo & Stefan
Pihl.

10:10 Multilocus phylogeography and population structure of High Arctic North American
Brant geese. -- Sandra Talbot, G. Kevin Sage, Judy Gust, Jolene Rearick, David Ward &
Dirk Derksen.

10:30 -11:00 Coffee break

Session 2 on Populations sizes of all Brent Goose populations world wide (Preben
Clausen)

11:00 Eastern High Arctic Brant (*B.b.hrota*) in the Canadian Arctic : range and breeding
biology. -- Kendrew Colhoun, Stuart Bearhop, Gudmundur A. Gudmundsson, Josee
Lefebvre & Austin Reed.

11:20 Home-ranges and habitat use of East Atlantic Light-bellied Brent Geese
(*B.b.hrota*) in a changing world - a satellite telemetry study. -- Kevin Kuhlmann Clausen,
Preben Clausen, Jens Peder Hounisen, Marie Silberling Vissing & Anthony David Fox.

11:40 The Netherlands as a winter refuge for Light-bellied Brent Geese (B.b.hrota). -- Kees Koffijberg

12:00 North American Atlantic Brant (B.b.hrota) - Breeding distribution and vital rates over the past 30 years. -- Kathy Dickson.

12:30-14:00 Lunch break

Session on Eelgrass and Brent/Brant Goose (Sean Boyd)

14:00 The Pacific Black Brant (B.b.nigricans) and its wintering habitat in Mexico. -- Eduardo Palacios & Jorge E. Simancas-Ortiz.

14:20 Behavior and nutritional ecology of Zostera feeding Dark-bellied Brent Geese (B.b.bernicla) in the White Sea. -- Preben Clausen, Anne Dekinga, Anita Koolhaas & Rudolf H Drent.

14:40 Effect of tides on the abundance, feeding frequency and strategies of Pacific Black Brant (B.b.nigricans) at Ojo de Liebre Lagoon, B.C.S, Mexico. -- Molina Fabiola, Carmona Roberto & Clemente Fernando.

15:00 Strangford Lough as a critical staging area for East Canadian High Arctic Light-bellied Brent Geese (B.b.hrota). -- Kerry Mackie, Paddy Mackie, Hugh Thurgate & Alex Portig.

15:20 Habitat selection by Brent Geese (B.b.bernicla) on different scales. -- Adriaan Dokter & Wimke Fokkema.

16:00-16:30 Coffee break

Session on Red-breasted Geese and Greylag Geese (Olga Pokrovskaya)

16:30 Preliminary results from GPS remote tracking of Red-breasted Geese (*Branta ruficollis*) from Gydan Peninsula (Russia) breeding grounds. -- Didier Vangeluwe, Sonia Rozenfeld, A.E. Dmitriev & V. Buleau.

16:50 Numbers of Red-breasted Goose (*B.ruficollis*) and Lesser White-fronted Goose (*Anser erythropus*) in Northern Kazakhstan's stopover in autumn 2012. -- Alexey Timoshenko, Sonia Rozenfeld & V. Vilkov.

17:10 France as a staging and wintering area for Greylag Geese (*Anser anser*) from sightings of neck-banded Nordic birds. -- Leif Nilsson & Vincent Schricke

17:30 What disturbs a goose and its family ? Disturbance reactions of Greylag Geese (*Anser anser*) in urban and recreational areas. -- Anke Kleinhenz, Katharina Burkhardt & Andreas Konig.

17:50 Progress in Greylag Goose (*Anser anser*) monitoring using GPS devices : further results from the joined European research program. -- Mathieu Boos, Arne Follestad, Andy J. Green, Petr Musil, Paul Shimmings, Hugues Lefranc, Juan A. Amat, Cristina Ramo, Michal Podhrazsky & Vincent Schricke.

18:10 Posters session

19:00 Dinner

Film video : Brent geese in the bassin d'Arcachon (10 minutes long)

Wednesday, January 9th

Session on Population Dynamics (Alexander Kondratyev)

09:00 Development of an individual-based model of Black Brant (*B.b.nigricans*) in Humboldt Bay, USA. -- Richard Stillman, Kevin A. Wood, David H. Ward, Mark Petrie & Jeffrey M. Black.

09:20 Faltering lemming cycles reduce productivity and population size of Dark-bellied Brent Geese (*B. b.bernica*). -- Bart A. Nolet, Silke Bauer, Nicole Feige, Yakov I. Kokorev, Igor Yu. Popov & Barwolt S. Ebbsing.

09:40 Shifts in winter distribution of Black Brant (*B.b.nigricans*) in the Eastern pacific flyway: changes in the abundance and distribution of eelgrass in Alaska and Baja California. -- David Ward, Kyle Hogrefe & Christian Dau.

10:00 Using social network analysis to investigate individuality in social position in Light-bellied Brent Geese (*B.b.hrota*). -- Matthew Silk, Andrew L. Jackson & Stuart Bearhop.

10:20 -10:40 Coffee break

Session on rapidly increasing populations of Barnacle Geese in Russia and in the Netherlands (Bart Nolet).

10:40 Barnacle Goose (*Branta leucopsis*) on Kolguev Island - current status and perspectives of population growth. -- Alexander Kondratyev, Elmira M. Zaynagutdinova & Helmut Kruckenberg

11:00 Nesting success of Barnacle Goose (*B.leucopsis*) in Peschanka delta (Kolguev Island) in 2012. -- Olga Pokrovskaya & Dmitry Dorofeev.

11:20 Influence of expanding Barnacle goose (*B.leucopsis*) populations on White-fronted Geese (*Anser albifrons*) on Kolguev Island. -- Elmira M Zaynagutdinova, Alexander Kondratyev & Helmut Kruckenberg.

11:40 Survival and dispersal in a newly founded temperate Barnacle Goose (*B.leucopsis*) colony. -- Henk van der Jeugd.

12:00 Posters session

12:30-14:00 Lunch break

Session on miscellaneous items (Vincent Schricke)

14:00 Dynamics in the White-fronted Goose (*A.albifrons*) hunting bag in the European part of Russia in 1960-2009 based on ring recovery data. -- Dmitry Dorofeev & Kostantin Litvin.

14:20 Land use changes in Russia and its impact on migrating geese. -- Mikhail Grishchenko.

14:40 Status of Lesser White-fronted Geese (*A.erythropus*) in Lower Saxony (NW Germany) - new research on western part of flyway. -- Helmut Kruckenberg, Thorsten Kruger & Holger Buschmann.

15:00 New data on migration route of Lesser White-fronted Geese (*A.erythropus*) mapped by satellite telemetry -- Vladimir V. Morozov, T. Aarvak & I.J. Oien.

15:20 Numbers of Lesser White-fronted Geese (*A.erythropus*) in Europe: a follow-up of predictions. -- Lauri Kahanpaa.

15:40 Does every goose count ? Pitfalls in surveys of breeding geese in urban areas. -- Christine Kowallik.

16:00 Hybridization in geese. -- Jente Ottenburghs.

16:20 Comparison of Erysipelas and Fowl cholera in geese. -- Kamila Bobrek

16:50 – 17:10 Coffee break.

Session on breeding and preparing for breeding (David Ward)

17:10 Iceland is a fuel station serving as springboard for migrating East Canadian High Arctic Light-bellied Brent Geese (*B.b.hrota*) into the Arctic. -- Gudmundur A. Gudmundsson, Kendrew Colhoun & Stuart Bearhop.

17:30 Body condition of Pacific Black Brant (*B.b.nigricans*): using the abdominal profile index (API) as a measure of fat accumulation during spring migration in British Columbia. - Sean Boyd.

17:50 Feeding ecology of Dark-bellied Brent Goose (*B.b.bernica*) in the Russian Arctic. -- Sonia Rozenfeld.

18:10 Dark-bellied Brent Geese (*B.b.bernica*) breeding in a den of thieves : pros and cons of nesting close to egg predators. -- Jimmy de Fouw, Roeland A. Bom, Raymond H.G. Klaassen, Gerhard J.D.M. Müskens, Peter de Vries, Yakov I. Kokorev, Barwolt S. Ebbinge & Bart A. Nolet.

19:30 dinner

Thursday, January 10th

09:15-21:00 Conference excursion by bus to the ornithological reserve of Teich and excursion by boat (visit of the bassin d'Arcachon), conference dinner at Cap-Ferret.

Friday, January 11th

Session on migration (Wimke Fokkema)

09:00 Migration ecology and affiliation patterns of western & eastern high arctic Brant (B.b.hrota). -- Sean Boyd, David Ward & Kendrew Colhoun.

09:20 The rate of site tenacity of Dark-bellied Brent geese (B.b.bernicla) to moulting sites on the Taimyr peninsula. -- Barwolt S. Ebbinge, Gerhard J.D.M. Müskens, Peter Prokosch, Yakov I. Kokorev, Bernard Spaans & Yevgeny E. Syroechkovkiy.

09:40 Fall migration stopover of Dark-bellied Brent Geese (B.b.bernicla) on Baydaraskaya coasts within the gas pipe line construction area. -- Olga Pokrovskaya.

10:00 The Mute Swan (Cygnus olor) in the Bassin d'Arcachon. -- Jesus Veiga.

10:20 -11:00 coffee break

Session on tracking individually marked geese (Kendrew Colhoun)

11:00 Autumn migration routes and behaviour of east Atlantic Light-bellied Brent Geese (B.b.hrota) , in relation to breeding status and weather conditions assessed by satellite telemetry and direct observations. -- Marie Silberling Vissing, Preben Clausen, Kevin Kuhlmann Clausen, Jens Peder Hounisen & Anthony David Fox.

11:20 Development of a long-term mark/resightings programme for East Canadian High Arctic Light-bellied Brent geese (B.b.hrota). -- Graham McElwaine, Kendrew Colhoun, Gudmundur A. Gudmundsson, Stuart Bearhop, Kerry Mackie & Alyn Walsh.

11:40 New development of the website www.geese.org to track individually marked geese. -- Barwolt S. Ebbinge.

12:00 General discussion and closing of the meeting

12:30-14:00 Lunch

14:00 Departure

Abstracts – oral presentations

Abstracts are arranged in alphabetically order after the surname of the first

Comparison of erysipelas and fowl cholera in geese

Kamila Bobrek, Andrzej Gawel, Marcin Nowak

The Faculty of Veterinary Medicine Wrocław University of Environmental and Life Sciences, Poland

email : kamila.bobrek@up.wroc.pl

Key words : erysipelas, fowl cholera, geese

One of the most frequently occurring diseases in geese is fowl cholera. The disease often causes extensive losses among the flock. Equally high mortality was recorded during occurrence of erysipelas among flocks of geese.

Purpose:

The study aims at comparing of two diseases - erysipelas and fowl cholera - with regard to clinical symptoms, necropsy and histopathological changes and comparing sensitivity of isolates to antibacterial chemotherapy.

Materials and methods:

Material for the study were geese which had died suddenly without symptoms, in the number of over 5 birds per day. Birds were subjected to anatomopathological examination during which the post mortem lesions was described. Swabs from internal organs for microbiological tests were taken according to the instruction of the University's Veterinary Laboratory Epi-vet, in which the microbiological tests were made. From the isolated strains the antibiogram was made.

Conclusions:

Clinical signs of erysipelas and fowl cholera are similar and in acute form have a sudden course with high mortality without earlier symptoms. The post-mortem lesions of both diseases are associated with vascular damages, which is manifested during the autopsy with subepicardial ecchymotic haemorrhages and the liver and spleen enlargement. Amoxicillin is an effective medicament in case erysipelas and fowl cholera outbreak. Due to similar course, autopsy changes and drug sensitivity, giving a final diagnosis demands performance of a microbiological test and isolation of an etiological factor from the organs. It is necessary because veterinarians could classify erysipelas as fowl cholera.

Progress in Greylag Goose (*Anser anser*) monitoring using GPS devices : further results from the joined European research program

BOOS Mathieu¹, Arne FOLLESTAD², Andy J. GREEN³, Petr MUSIL⁴, Paul SHIMMINGS⁴, Hugues LEFRANC³, Juan A. AMAT³, Cristina RAMO³, Michal PODHRAZSKY⁵ and Vincent SCHRICKE⁶

¹ Research Agency in Applied Ecology, Naturaconst@, 14 rue principale 67270 Wilshausen, FRANCE. Email: . direction@naturaconsta.com

² NINA P.O. Box 5685 Sluppen, NO-7485 Trondheim, NORWAY

³ Wetland Ecology Dept Doñana Biological Station-CSIC C/ Américo Vespucio s/n 41092 Sevilla, SPAIN

⁴ Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences, Kamycka 1176, Praha 6 - Suchdol, CZ-165 21, CZECH REPUBLIC

⁵ Department of Zoology, Faculty of Sciences, Charles University, Vinicna 7, Praha 2, CZ-128 44, CZECH REPUBLIC

⁶ Office National de la Chasse et de la Faune Sauvage, CNERA AM, 39 Boulevard Einstein, CS 42355, 44323 Nantes Cedex 3, FRANCE

Keywords : migration ; GPS/GSM ; hunting ; habitat use

Greylag geese populations are steadily increasing in Europe, but migration strategies may differ according to the breeding grounds birds originate from. France is a main stopover area in western Europe. Greylag geese is an important quarry species and according to sustainable hunting and population management purposes, the French government, with support of several national and European partners, has launched an ambitious monitoring program to better understand the migration pattern and routes of greylag geese flying over or staging in France, especially for those from Norway or wintering in Spain and those originating from Czech Republic (Central Europe breeding population). Thus, in addition to the ringing and recovery/resighting program launched in Northern Europe for several years, we fitted GPS/GSM devices on about 30 geese using backpack harnesses or collars. We show that both attaching methods are equivalent and valuable since they do not adversely affect flight behaviour of the birds. From the results recorded in 2012 we confirm that hunting in postmoulting or postbreeding areas in Norway triggers the birds to flee southward but this pattern is less marked in Denmark where hunting (also foraging) areas and close refuges leads the birds to stay more longer before moving to the Netherlands. Together with data from central Europe and from geese fitted on Wintering grounds in Spain, it is suggested that greylags show rather individual or flock migration strategies or both. But this hypothesis needs to be further investigated.

Body condition of Pacific Black Brant (*B. b. nigricans*) : using the abdominal profile index (API) as a measure of fat accumulation during spring migration in British Columbia

W. Sean Boyd

Science and Technology Branch,
Environment Canada,
Pacific Wildlife Research Centre,
RR 1 - 5421 Robertson Rd., Delta, B.C., Canada, V4K 3N2
email: sean.boyd@ec.gc.ca

Keywords : Black Brant, body condition, API, spring migration, British Columbia

Each spring, Pacific Flyway Brant (*Branta bernicla nigricans*) stage in the Parksville-Qualicum area on the east coast of Vancouver Island, British Columbia. We used abdominal profile index (API) as a surrogate of body condition to measure fat accumulation in these birds between 1999 and 2004 (and to a lesser extent since then).

Mean API scores were high in 1999 and 2000 and did not differ but scores were significantly lower in the following four years (2001-2004 inclusive). Also, API slopes (= fat deposition rates) estimated from marked birds declined significantly, to the point where Brant did not accumulate reserves in 2004.

The Parksville-Qualicum area supports a large Pacific Herring (*Clupea pallasii*) spawn. In addition to eelgrass, Brant forage intensively on Herring eggs when present. Disturbance rates are among the highest recorded globally, with the largest single source of disturbance being Bald Eagles (*Haliaeetus leucocephalus*). Eagle numbers have been increasing at 8% per year and both eagle and human/dog disturbance rates have increased in recent years. The high levels of disturbance experienced by Brant at Parksville-Qualicum may have reduced fat accumulation rates and ultimately body condition which, in turn, may have had negative effects on spring migration and egg laying.

To manage spring staging Brant in British Columbia, we need to understand the relationship between:

- 1) staging variables of individual body condition, timing of migration and length of stay,
- 2) staging variables and food availability and rates/sources of disturbance, and finally
- 3) staging variables and fitness (annual survival and reproductive rates).

Migration ecology and affiliation patterns of western & eastern high Arctic Brant (*B.b.hrota*)

W. Sean Boyd, Science & Technology Branch, Pacific Wildlife Research Centre, Environment Canada, RR1- 5421 Robertson Rd., Delta, British Columbia, Canada, V4K 3N2;

email: sean.boyd@ec.gc.ca

David Ward, US Geological Survey, Alaska Science Center, 1011 E. Tudor Rd., Anchorage, AK 99503, USA;

email: david_ward@usgs.gov

Kendrew Colhoun, Wildfowl & Wetlands Trust, Castle Espie Wetland Centre, Comber, Co. Down BT23 6EA;

email: i.webs@virgin.net

Key words: Brant, migration, satellite, Melville, Bathurst

In 2005 we captured Western (WHA) and Eastern High Arctic (EHA) brant (*Branta bernicla hrota*) on Melville and Bathurst islands, Nunavut Canada. Family groups were targeted for capture and adult males were marked with satellite transmitters using an implant protocol.

All 20 Melville males followed a fall coastal route around Alaska and staged at Izembek Lagoon on the Alaska Peninsula. Seventeen birds flew from Izembek to northern Puget Sound WA, and the satellite data suggested a non-stop, trans-oceanic route. In Puget Sound, the majority of winter detections (ca. 70%) were from a relatively small area encompassing Samish Bay and Padilla Bay (ca. 150 km² total). Ten tagged brant survived the winter with functional transmitters and migrated north. Of these, 7 birds followed an interior route across the Yukon.

The 3 Bathurst males adopted different migration strategies. The earliest departing bird staged on the west coast of Iceland for 18 days. One bird made landfall for a matter of hours on the south Icelandic coast before departing for Scotland. The third bird (with a family unit) by-passed Iceland entirely, making a direct oceanic crossing from eastern Greenland to NW Scotland in < 30 hours. All 3 birds were observed in Ireland in the winter of 2005/06.

The satellite data suggest a geographic dividing line between Melville and Bathurst islands, with WHA brant nesting to the west and EHA brant to the east. The data also suggest differences in timing and habitat use patterns at Izembek Lagoon that may maintain genetic differences between WHA and Pacific black brant.

Light-bellied Brent goose (B.b.hrota) in Havre de la Sienne

Philippe Burgevin,

Conservatoire du littoral – Délégation Normandie, 5-7, rue Pémagnie BP 546 14037 Caen cedex

email : ph.burgevin@conservatoire-du-littoral.fr

Key words : Light-bellied Brent Goose, Natura 2000 habitats, Management, Climate change, Sea level rise

With up to a thousand individuals (> 90% of the national wintering, also exceeding the threshold of international importance), the Sienne harbour is, with Irish sites, a major wintering site for light bellied brent goose (LBBG).

Overgrazed salt marshes of Urville are well-known for their Brent Geese concentration, easily observable from the touristic road. Even if Puccinellia develops especially in conditions of overgrazing, the issue of hosting the geese on that site should be compatible with a favorable conservation status of the saltmarsh and with an agricultural activity : in fact, geese feeding on Urville saltmarsh during the sheeps-retirement-period create a competition salt marshes lambs.

The presence of Light-bellied Brent Goose (LBBG), iconic and revealing a conservation status of habitats in Sienne harbour, therefore deserves further expertise to the situation. The Licco European program, which will offer new data for the site (habitats mapping, LIDAR surveys and simulations of sea level rise...) is the opportunity to implement a research program that will give a better knowledge of the LBBG and help to determine a salt marsh management favorable to LBBG and compatible with a good conservation status and economic activity.

During next years, this project will study the Sienne harbour spatiotemporal use by the LBBG and the influence of global warming on the presence of LBBG in the Sienne harbor.

Home-ranges and habitat use of East Atlantic Light-bellied Brent Geese (*B.b.hrota*) in a changing world – a satellite telemetry study

Kevin Kuhlmann Clausen , Preben Clausen, Jens Peder Hounisen, Marie Silberling Vissing & Anthony David Fox.

Department of Bioscience, Aarhus University, Grenåvej 14, DK-8410 Rønne, Denmark.

email: kc@dmu.dk

Key words : Brent geese, *Zostera*, habitat use, energetics, climate change

Eutrophication-induced declines in *Zostera* distribution, and increasingly ceased management of salt marsh habitats throughout the last couple of decades, have severely altered the food availability of light-bellied brent geese *Branta bernicla hrota* in their Danish spring staging areas. This has forced the birds to seek alternative foraging opportunities on a nation-wide scale. Using two years of GPS-satellite data from spring staging birds in a mosaic landscape of *Zostera*, salt marsh and agricultural fields, we re-evaluate habitat use and home-range size of individual geese. We show highly variable exploitation patterns and significant differences in daily flight budgets of individual birds, and demonstrate how this might affect brent goose behaviour and the ability to maintain a positive energy balance. Based on modelled impacts of the ongoing climate change on coastal habitats, we discuss how future habitat exploitation might possibly move towards an increasingly terrestrial lifestyle, as rising sea levels and associated coastal squeeze threaten to further reduce the distribution and availability of traditional coastal food sources.



Behavior and nutritional ecology of *Zostera* feeding Dark-bellied Brent Geese (*B.b.bernicla*) in the White Sea

Preben Clausen¹, Anne Dekinga², Anita Koolhass² & R.H. Drent³

¹ Department of Bioscience, Aarhus University, Grenåvej 14, 8410 Rønne, Denmark

² Department of Marine Ecology, Royal Netherlands Institute for Sea research (NIOZ), P.O. Box 59, NL-1790 AB Den Burg (Texel), The Netherlands

³ Animal Ecology Group, University of Groningen, P.O. Box 11103, NL-9700 CC Groningen, The Netherlands

email: pc@dmu.dk

Key words : *Zostera marina*, time and energy budget, turn-over, stop-over

Dark-bellied Brent Geese make a jump of approx. 5,000 km from their spring-staging areas in the Wadden Sea to their breeding areas in high Arctic Siberia. This is a mission

impossible unless they stop to refuel *en route*, and they do so in two major areas in the White Sea region - first the White Sea proper and secondly on the Kanin Peninsula. In 1995-96 we studied the migration, turn-over and stop-over ecology of spring staging Brent Geese in the "Dry Sea" north of the island Mudyug on the eastern shore of the White Sea. This site was used by up to 27,300 birds in the last week of May. They fed almost exclusively on a 6 km² *Zostera marina* bed in the centre of the tidal bay, and commuted between this at low-tide and some sandy spits and banks at high-tide. Although food densities were low, the Brent Geese had reasonable daily energy budgets, particularly because they had the lowest diurnal flight-budget of any local Brent Goose population studied so far. We present daily energy budgets and estimate stop-over fattening rates of the staging geese.

¹ Rudolf H. Drent who died on 9 September 2008 initiated the studies of the Dark-bellied Brent Geese in the White Sea region in 1994 and worked with us in the Mudyug area in 1995-96.

Eastern High Arctic Brant (B.b.hrota) in the Canadian Arctic : range and breeding biology

Kendrew Colhoun¹, Stuart Bearhop², Sean Boyd³, Gudmundur A Gudmundsson⁴, Josee Lefebvre⁵ & Austin Reed⁵

¹ The Wildfowl & Wetlands Trust, Castle Espie Wetlands Centre, Ballydrain Rd., Comber, Co. Down BT23 6EA;

² Centre for Ecology and Conservation, School of Biosciences, University of Exeter, Cornwall Campus, Penryn, Cornwall TR10 9EZ, UK;

³ Science & Technology Branch, Pacific Wildlife Research Centre, Environment Canada, RR1- 5421 Robertson Rd., Delta, British Columbia, Canada, V4K 3N2;

⁴ Náttúrufræðistofnun Íslands, Icelandic Institute of Natural History, P.O.Box 5320, IS-125 Reykjavik, Iceland;

⁵ Science and Technology Branch, Environment Canada, Québec, Canada
email : <mailto:i.webs@virgin.net>

Key words : Light-bellied Brent goose, breeding range, flyway

With the Canadian-Icelandic-Irish flyway being described as late as the early 1970s, knowledge of the migration of ECHA Brant populations is relatively poor.

This paper describes the usage of the breeding range, reviewing existing sources of information and recent sources including satellite telemetry, aerial surveys, as well as observations and recoveries of ringed birds. The migration from Iceland typically initiates at the end of May, with birds arriving in the breeding range within 2-7 days. Data on the breeding biology of this flyway population remains very scant indeed, based primarily on one published paper. Expeditions in August 2005 and June/July 2007 have added to our knowledge base. In June 2007 we discovered an unusually high density of breeding birds, mainly in two colonies on small offshore islands in Eureka Sound, Axel Heiberg Island (80° N). In 35 nests examined clutch size varied from 1 to 6 eggs, with a mean of 4.15 (SD=0.85, n=33). Estimated hatching dates varied from 8 to 14 July with a distinct peak on 11-12 July. When compared with other studies on *B.b.hrota*, all of which occurred at lower latitudes (64-70° N), we found no evidence of delayed nesting or reduced clutch

size attributable to the extreme northerly location of our study area. We conclude that our population benefits from a local microclimate which attenuates Arctic summer temperatures and provides a reduced spring snow pack, allowing early nesting.

Knowledge of distribution, feeding ecology of adults and chicks etc remains very limited and is the subject of proposed work in 2014 and 2015.

Dark-bellied Brent Geese (B.b.bernicla) breeding in a den of thieves: pros and cons of nesting close to egg predators

Jimmy de Fouw^{1, 4}, Roeland A. Bom^{1, 4}, Raymond H.G. Klaassen^{1, 5}, Gerard J.D.M. Müskens², Peter P. de Vries¹, Yakov I. Kokorev³, Barwolt S. Ebbinge² & Bart A. Nolet¹

¹ Department of Animal Ecology, Netherlands Institute of Ecology (NIOO-KNAW), PO Box 50, NL-6700 AB Wageningen, The Netherlands;

² Team Animal Ecology, Alterra Wageningen - UR, PO Box 47, 6700 AA, Wageningen, The Netherlands

³ Extreme North Agricultural Research Institute (RAAS), Komsomolaskaya Street 1, Norilsk, 663302, Russia;

⁴ Present address: Department of Marine Ecology, NIOZ Royal Netherlands Institute for Sea Research, PO Box 59, 1790 AB Den Burg (Texel), The Netherlands

⁵ Present address: Dutch Montagu's Harrier Foundation, PO Box 46, 9679 ZG Scheemda, The Netherlands

email: b.nolet@nioo.knaw.nl

Key words : B.b.bernicla, egg predation by gulls, guanofication, nest association, protective shield

Dark-bellied brent geese basically have two main breeding strategies to cope with arctic fox predation: nesting on the mainland tundra within the territory of snowy owls or nesting on small islands. These islands are also inhabited by gulls. On the one hand, gulls predate on the goose eggs when given the opportunity. On the other hand, gulls enrich the soil with their guano, potentially offering good feeding conditions which may help to reduce the goose female's nest recess duration and hence egg predation risk. In 2004-2008, we measured clutch size of brent geese in the third week of incubation in relation to the distance to gulls' nests. We found that, as expected, clutch size was smaller in years when lemmings were scarce, reflecting prey switching by gulls (from lemmings to goose eggs). Moreover, in all but the lemming peak year, clutch size decreased with distance to gulls' nests. Ebbinge & Spaans (2002) proposed that brent geese obtain protection from the nearest gull against other gulls. An experiment with artificial nests however revealed that the egg predation rate also decreased with distance to gulls' nests, unlike predicted by this protective shield hypothesis. Available nitrogen in plants was higher closer to gulls' nests, reflecting the guanofication by the gulls. We therefore propose that the high nitrogen availability close to gulls enables the female geese to reduce nest recess time, limiting egg predation by gulls when lemmings are scarce.

North American Atlantic Brant (*B.b.hrota*) – Breeding distribution and vital rates over the past 30 years

Kathy Dickson

Population Conservation and Management

Canadian Wildlife Service

email : kathy.dickson@ec.gc.ca

Key words : Atlantic Brant, breeding distribution, abundance, vital rates

Over the past 30 years there is evidence of change in relative distribution within the breeding grounds of Atlantic Brant (*Branta bernicla hrota*); these changes apparently are not associated with trends in abundance, survival or productivity rates. Telemetered birds followed in 2002 and 2003 suggested proportionately more use of the northern part of the breeding range around Nunavut's Foxe Basin¹. A 2002 survey of the coast also suggested proportionately more birds in the north part of the breeding range when compared to similar surveys conducted in the early 1980s². A 2010 study of nesting Brant on Southampton Island, at the southerly edge of the breeding range, showed that while the total number of goose nests (four species combined) remained about the same as 30 years previously, the number of Brant nests declined dramatically (from 300 - 400 nests, to about 70³). The driver for the distribution change is not known, but may be related to deteriorating habitat conditions and interspecific competition where Snow, Ross's and Cackling Geese are particularly abundant. Despite these changes, monitoring of the total wintering population showed no long term trend since 1960, with the population hovering around 140,000 individuals⁴. Nor is there evidence of change in adult annual survival rates; the mean rate for birds banded at Southampton Island was 0.785 for the period 1956-75¹ and 0.797 during 2001-09⁵. Productivity indices do not show strong tendencies since 1976⁴.

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⁵Dufour, K., P. Castelli, K.M. Dickson, in prep. Survival and recovery rates of Atlantic Brant, 1976-2009

Habitat selection by Brent Geese (*B.b.bernicla*) on different scales

Adriann M. Dokter & Wimke Fokkema

Institute of Biodiversity and Ecosystem Dynamics

University of Amsterdam, Science Park 904

1098 XH Amsterdam, The Netherlands

email : a.m.dokter@uva.nl

Key words : Brent goose, tracked birds, habitat selection, migration route

In spring 2012, 30 brent geese have been equipped with GPS loggers of the Bird Tracking System developed by the University of Amsterdam (UVA-BITS). With these loggers, we want to detect the habitat selection of individuals along the entire migration route, with a particular focus on the role of seagrasses within their yearly cycle. Because of the high resolution of the measurements, the loggers make it possible to study movements at different spatial and temporal scales. The first part of the talk will focus on individual movement patterns and habitat selection on the scale of the flyway, presenting the first long-distance tracking data obtained with the system. In the second part of the talk we will couple fine-scale movement patterns on the saltmarshes of Schiermonnikoog to (a) biotic characteristics of the preferred habitat. This will be done to investigate the following questions : does fine-scale habitat selection within a habitat type take place ? And if so : what characteristics are selected for and why ?

Dynamics in the White-fronted goose (*A.albifrons*) hunting bag in the European part of Russia in 1960–2009 based on ring recovery data

Dimitry Dorofeev, GSDSG ,

email: dmitrdorofeev@gmail.com

Kostantia Litvin, Bird Ringing Centre of Russia IEE RAS

email: kelitvin@gmail.com

Key words : White-fronted Goose, migration, hunting

At present all official data about hunting bags are being gathered without division into species in two baskets – “ducks” and “geese”. In Russia there are 6 game geese species and they have different biology, nesting grounds, migration routes etc. White-fronted goose is the most common game species in Russia. We suggested that recovery rate in spring and in autumn within one year is equal. Our investigations were made for two areas of the European part of Russia – North-West (Arkhangelskaya, Vologodskaya, Karelia, Leningradskaya, Murmanskaya, Novgorodskaya, Pskovskaya regions, total 604 recoveries) and Central (Vladimirskaya, Ivanovskaya, Kaluzskaya, Moscovskaya, Ryasanskaya, Smolenskaya, Tverskaya, Tulsckaya, Yaroslavskaya, 505 recoveries). Geese, migrating through these areas use the same wintering places in Western Europe and same nesting grounds. In 1960’s ratio of reported ring recoveries from spring hunting season to recoveries from autumn hunting season was 1,6 in NW area and 11,86 in the Central area. “Loop” migration route explains this difference (Kistchinski, 1979). Some geese in spring migrate across Central area of Russia and in autumn they return to wintering places across NW area. Between 1969 and 1985 years spring hunting season was closed in the most considered regions. The fraction of spring hunting bag has been increasing since the middle of 1980’s in both areas. Ratio of spring/autumn recoveries changed in NW area in 1980’s to 4,2; in 1990’s – 6,8 and in 2000’s - 11,2. In the Central area it changed in 1980’s to 5,8; in 1990’s – 15,8; in 2000’s – 22,1. Relative decrease of autumn bag can be a result of reduction of the population, that uses “loop” migration route and with agricultural land degradation. Number of WFG in wintering grounds continues to grow in spite of the increase of spring hunting bag (Fox et al, 2010).

Does every goose count ? Pitfalls in surveys of breeding geese in urban areas

Christine. Kowallik, Biol. Station Westl. Ruhrgebiet, Loesorter Str. 119, 47137 Duisburg, Germany

email : christine.kowallik@bswr.de

Key words : breeding geese, urban area, number, Germany

In many European countries geese, especially Greylag-, Canada- and Egyptian Geese are breeding in urban parks and on gravel pits used for recreation. During 2010-2012 a survey of breeding geese was carried out in four lakes in the city of Duisburg, Germany, in order to monitor population control measures. Geese usually breed on islands and leave the nest site as soon as the goslings have hatched. When comparing nest counts and counts of all birds present throughout the breeding season, it turned out that we never see all breeding pairs. Even if we counted very progressively: every two geese as a pair and every single goose in the vicinity of the island as a guarding male, the number of territorial pairs never matched the number of nests counted. In many other studies, it has been stated that counts of individuals often consist of a mix of breeding birds and non-breeders. However, in our study area it seems that non-breeders are absent at the breeding sites and males often leave their female alone to feed in nearby areas, thereby missed during frequent counts of territorial pairs.

Status of Lesser White-fronted Geese (*A. erythropus*) in Lower Saxony (NW Germany) – new research on western part of flyway

Helmut Kruckenberg, Thorsten Krüger & Holger Buschmann

Helmut Kruckenberg Am Steigbügel 3, 27283 Verden (Aller)

email: helmut.kruckenberg@tournatur.de

NABU Niedersachsen, Alleestr. 36, 30167 Hannover www.nabu-niedersachsen.de

Key words : Lesser White-fronted Goose, status, Germany

By using all reports the occurrence of Lesser White-fronted Geese in Lower Saxony was analysed. Since 1907 In Lower Saxony 156 records of 261 Lesser Whitefronted Geese *Anser erythropus* were documented in 100 winter half-years in the period from 1907/08 to 2006/07, the first records going back to the 9th December 1907. From the period before 1970 only accidental findings were reported, whereas a strong increase in the number of records occurred in the 1990s and continued in the 2000s. Since the mid-1990s the Lesser White-fronted Goose has been a regular, annually occurring migratory bird in Lower Saxony. A clear spatial concentration of the records can be identified in the northwest of Lower Saxony in the region of East Frisia i. e. in the Dollart-Lower Ems-Region (Rheiderland, Emsmarschen) with the Krummhörn including the Leybucht, which are key sites of the occurrence. Other important sites are the Middle Elbe and the Lower Elbe. During autumn migration the first Lesser Whitefronted Geese reach Lower Saxony in mid-October. From early December the numbers rise steadily until early March and culminate markedly in the first decade of March (median = 2nd March). After that the numbers decrease but remain at a relatively high level until the first third of April, and finally the occurrence peters out until the end of April. During 1996/97 until 2006 several

marked LWFG from Sweden and Finland were reported, but most of the observations were of unmarked birds, mostly solitaire or pairs. Since 1998 – when color-marking of Greater Whitefronted Geese started – the number of records increased.

Due to EU bird directive Lesser Whitefronted Goose is listed in appendix I. However, protection of this species is an important topic for nature protection in Lower Saxony especially since hunting on Bean and Greater Whitefronted Geese was opened in 2008. So, German BirdLife partner Naturschutzbund NABU in Lower Saxony started in cooperation with IWWR e.V. and county authorities for nature protection and wadden sea nationalpark an project to get better informations about numbers, distribution and threats of Lesser Whitefronted Geese. A short project information will be given.

The NABU LWFG project is financially supported by Niedersächsische Wattenmeerstiftung und BINGO ! Umweltlotterie Niedersachsen.

Strangford Lough as a critical staging area for East Canadian High Arctic Light-bellied Brent Geese (*B.b.hrota*)

Kerry Mackie¹, Paddy Mackie¹, Hugh Thurgate¹ & Alex Portig²

¹ *Wildfowl & Wetlands Trust, Castle Espie, Co. Down, N. Ireland*

² *Strangford Lough Wildlife Scheme, The National Trust, Castleward, Strangford, Co. Down, N Ireland*

email : kerry.mackie@wwt.org.uk

Key words : Light-bellied Brent goose, wintering period, Zostera beds, Northern Ireland

Strangford Lough in Northern Ireland is well known as an internationally important staging/wintering area for the Canadian breeding stock of Light-bellied Brent geese. Key to this is the presence of Ireland's largest beds of inter-tidal *Zostera* which, during peak periods, hold up to 90% of the flyway population at any one time.

In this paper we present an historical overview from the early 20th C to present, of the changing status of brent at this site which dropped to as little as 500 birds mid-century to recent peaks of 38,000. Many changes have occurred within this important area during the period where brent were extensively hunted until the early 1950's and periodic monitoring of *Zostera* beds has shown how availability of this resource has changed through time. Supposition as to the abundance of geese in the first half of the last century is made from bag returns and written observations in hunting journals. Irregular counts began within the period 1951-62 with regular monthly counts from 1965 followed by additional weekly autumn counts from 1992 to present. These have documented changes in both migration phenology and the volume of birds now using the site which in spite of multiple designation is still under threat from a variety of sources.

Development of a long-term mark/resightings programme for East Canadian High Arctic Light-bellied Brent Goose (*B.b.hrota*)

Graham McElwaine¹, Kendrew Colhoun², Gudmundur A Gudmundsson³, Stuart Bearhop⁴, Kerry Mackie² & Alyn Walsh⁵

¹ Irish Brent Goose Research Group (IBGRG), 100 Strangford Rd, Downpatrick, County Down, BT30 7JD, UK

² Wildfowl & Wetlands Trust, Castle Espie, Ballydrain Road, Comber, County Down, BT23 6EA, UK

³ Icelandic Institute of Natural History, P.O. Box 5320, IS-125, Reykjavik, Iceland

⁴ University of Exeter, Cornwall Campus, Penryn, Cornwall, TR10 9EZ, UK

⁵ National Parks and Wildlife Service, Wexford Wildfowl Reserve, North Slob, Wexford, County Wexford, ROI

email : i.webs@virgin.net

Key words : Light-bellied Brent Goose, marking/resightings programme, phenology, flyway

In 2001 the IBGRG, Wildfowl & Wetlands Trust and Icelandic Institute of Natural History embarked on a long-term colour-marking/resightings programme on the Canadian-Irish flyway population of Brent. As with similar schemes elsewhere the central aims have included understanding survival rates, migratory movements, site fidelity etc. By mid-November 2012, a total of c. 3,540 individual geese (ie. excluding retraps), have been caught and marked with coloured leg-bands, and a total of 105,165 re-sighting records have been entered in the database.

Here we describe the aims and some outputs of the project over the 11 year period (2001-2012) which include those associated with the long-term study of individually marked birds. Constant-effort ring-reading data from Strangford Lough and Dublin Bay are used to examine the phenology at these two major, yet very different, sites. An overview of the distribution, staging and movement of the geese within the flyway is given.

We attribute the continuing success of our project to recognition of the potential of 'citizen science' in making a valuable contribution, promoted through educational and outreach activities and backed up by a small team of dedicated 'staff'. Our well-established links with academic institutions provides both motivation and direction to the overall delivery of an AEWA conservation programme. Some of the practical issues involved in handling very large volumes of data and in ensuring that the project momentum can be maintained are also discussed!

New data on migration route of Lesser White-fronted Geese (*A.erythropus*) mapped by satellite telemetry

Vladimir.V. Morozov¹, T. Aarvak, I.J. Øien²

¹ Russian Research Institute for Nature Protection, Znamenskoye-Sadki, Moscow 117628, Russia,

² Norwegian Ornithological Society/BirdLife Norway, Sandgata 30b, N-7012 Trondheim, Norway

Email : piskulka@rambler.ru

Key words : Lesser White-fronted Goose, migration, satellite tagging

The tagging of Lesser White-fronted Geese (LWfG) at the western macro-slope of the Polar Urals have shown that geese breeding that area migrate to the wintering grounds along the Ob River valley, have staging areas in the northern Kazakhstan and Manych Valley and winter in Azerbaijan and Mesopotamia. It means that Lesser White-fronted Geese breeding at the Polar Urals belong to main western population of the species. Contrary to that, the birds of Fennoscandian population have absolutely different wintering grounds and choose some other migration routes. Although some LWfG of Fennoscandian population migrate across Northern Kazakhstan and Manych Depression, they winter in South-Eastern Europe.

We are still uncertain where the boundary between these two population is situated. In order to clear up this question four Lesser White-fronted Geese were fit with satellite transmitters in the lowland of the eastern part of Bolshezemelskaya Tundra about 100 km westwards from Vorkuta city in 2011 and 2012. Information on migration routes were received from 2 transmitters. Firstly, both birds migrated to southeast, crossed the Urals and stopped in Ob River valley. Then, they followed along the Ob River to Northern Kazakhstan where they had long stop. Finally, the birds migrated to Manych Valley.

Thus, satellite tracking indicates that Lesser White-fronted Geese breeding at Bolshaya Rogovaya River belong to the main western population and we have to look for the boundary between Fennoscandian and main western population further westwards of Bolshaya Rogovaya River.

In addition, we have received some new information on staging areas. The birds tagged in 2012 had long-time stops in Northern-Kazakhstan Region (Petropavlovsk) situated far to the northeast from traditional staging area in Kustanai Region. The second new staging area birds tagged in 2012 was revealed at Chograi reservoir (Eastern Manych) which was not observed for Lesser White-fronted Geese breeding in the Polar Ural.

France as a staging and wintering area for Greylag Geese (Anser anser) from resights of neck – banded Nordic birds

Leif Nilsson & Vincent Schricke

Leif Nilsson, Department of Biology, University of Lund, Ecology Building, S-223 62 Lund, Sweden

email: leif.nilsson@biol.lu.se

Vincent Schricke, Office National de la Chasse et de la Faune Sauvage, CNERA Avifaune Migratrice, 39, Boulevard Albert Einstein, - CS 42355- 44323 Nantes Cedex 3,

email : vincent.schricke@oncfs.gouv.fr

Key words : Greylag Goose, marked birds, France

Neck-banding of geese including the Greylag Goose has been undertaken in several countries for some time. In the Nordic countries, neck-banding of Greylag Geese started as a Nordic project in 1984 and is still continuing. During the first years, about 60% of the marked geese from SW Scania and 80% of the geese from Norway wintered in Spain, the rest staying in the Netherlands. However, only a small percentage of the marked birds were seen on staging areas in France. The large majority of reports of neck-banded geese were from the western part of the country with concentrations to wetlands close to

the coast. Over the years marked changes in the migration patterns of the Greylag geese were seen. During the years 2006 – 2012, only 10% of the January readings of geese from Scania and 40% of the Norwegian readings were from Spain. Thus a much smaller proportion of the geese from the two countries pass France on migration, even if this might be compensated for by an increase in the population. The migration schedule also changed, the Greylags leaving Sweden later in autumn and arrive earlier in spring and up to 25% stay in the country for the winter.

Faltering lemming cycles reduce productivity and population size of Dark-bellied Brent Geese (*B.b.bernicla*)

Bart A. Nolet¹, Silke Bauer^{1, 5}, Nicole Feige^{1, 6}, Yakov I. Kokorev², Igor Yu. Popov⁶ & Barwolt S. Ebbsinge⁴

¹ Department of Animal Ecology, Netherlands Institute of Ecology (NIOO-KNAW), PO Box 50, NL-6700 AB Wageningen, The Netherlands;

² Extreme North Agricultural Research Institute (RAAS), Komsomolaskaya Street 1, Norilsk, 663302, Russia;

³ A.N. Severtsov Institute of Ecology and Evolution (RAS), 33 Leninskij prospekt, Moscow, 119071, Russia;

⁴ Team Animal Ecology, Alterra Wageningen-UR, PO Box 47, 6700 AA, Wageningen, The Netherlands

⁵ Swiss Ornithological Institute, 6204 Sempach, Switzerland;

⁶ Present address: NABU-Naturschutzstation e. V., Bahnhofstraße 15, 47559 Kranenburg, Germany;

email: b.nolet@nioo.knaw.nl

Key words : *Branta b. bernicla*, climate change, density dependence, reproductive success, Taimyr Peninsula

In dark-bellied brent geese reproduction fluctuates strongly in concert with the three-year lemming cycle at the breeding grounds in Taimyr Peninsula (Siberia). Summers & Underhill (1991), analysing the population growth period until 1988, did not find evidence for density-dependence, but thereafter the population levelled off and even decreased. The question is whether this levelling off (and decline) is caused by changes in lemming cycles, population density or other factors like carry-over effects. We derived breeding success from proportions of juveniles, and we used an information-theoretic approach to investigate which environmental factors best explained the variation in breeding success over nearly 50 years (1960 – 2008). We subsequently combined GLM predictions of breeding success with published survival estimates to project the population trajectory since 1991 (year of maximum population size). In this way we separated the effects of lemming abundance and population density on population development. Breeding success was mainly dependent on lemming abundance, the onset of spring at the breeding grounds, and the population size of brent geese. No evidence was found for carry-over effects. Negative density-dependence was operating at a population size above c. 200,000 individuals, but the levelling off of the population could be explained by faltering

lemming cycles alone. Why lemming cycles are faltering in the last two decades is unclear, but this may be associated with changes in winter climate in the Arctic.

Hybridization in geese

Jente Ottenburghs, Wageningen University and Research Centre, Resource Ecology Group (REG), Droevendaalsesteeg 3a 6708 PB Wageningen, The Netherlands
email : jente.ottenburghs@wur.nl

Key words : hybridization, introgression, adaptation, species boundaries

Hybridization appears to be widespread in birds, often accompanied by the exchange of genetic material across species boundaries, referred to as introgression. Especially the Anseriformes (ducks, geese and swans) experience high levels of hybridization. The occurrence of numerous wild hybrids between several goose species indicates that there might be a considerable amount of genetic exchange within this bird family. Furthermore, if certain exchanged genes or genomic regions provide an adaptive advantage, this could lead to adaptive trait transfer between species. In such a way introgressive hybridization can play a significant creative role in the evolutionary history of goose populations. However, if the occurrence of hybridization and the subsequent exchange of genetic material becomes too large species integrity might be jeopardised. Therefore, certain genomic regions should be unsusceptible to introgression, since they preserve species-specific characteristics and/or contribute to reproductive isolation between species.

The Pacific Black Brant (*B.b.nigricans*) and its wintering habitat in Mexico

Eduardo Palacios and Jorge E. Simancas-Ortiz. Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. (CICESE Unidad La Paz). Miraflores #334 Col. Bellavista. La Paz, Baja California Sur, México 23050.
email: epalacio@cicese.mx

Key words : Black Brant, wintering period, habitat, Mexico

The Pacific Black Brant (*Branta bernicla nigricans*) is a priority migratory species shared by Canada, U.S. and Mexico. It winters on the Pacific coast of the U.S. and northwest Mexico. In Mexico it is legally protected as a Threatened Species. Aerial surveys on the west coast of North America and Mexico during the winter have shown that the wintering population has declined. In the last 10 years the downward trend of the wintering population in northwestern Mexico is significant. The average of the last 10 years has been 99.190 Brant wintering in Mexico and its decrease was -20%. One of the causes is habitat loss and degradation due to natural and human disturbances. We assessed the quality of wintering habitat in Bahía de San Quintin, Baja California, México. Based on two satellite images (2000 and 2011), we estimated that in 11 years, the relative amount of eelgrass declined at an annual rate of 2.03%. Between 1987-2000, the rate was 1.03% (Ward et al. 2003). We evaluated the effect of human and natural disturbance on time activity budget and we found that the impact of disturbances on brant foraging time is

unsignificant. We developed a habitat suitability index for brant, which indicates that 77% of the area has a potential ability of medium to very high. The relevance of northwest Mexico for wintering Brant, deserves better understanding of their ecology in the region and to continue its long-term population monitoring.

Dark-bellied Brent Goose (*Branta bernicla bernicla*) in the Bassin d’Arcachon wintering : counting methodology and results

Caroline Péré,

Fédération départementale des Chasseurs de Gironde

10, chemin de Labarde, CS 70124

33291 Blanquefort Cedex, France

email : caroline.pere@fdc33.com

Key words : Brent Goose, boat, wintering, eelgrass, counting methodology

Large bay with the most important maritime eelgrass meadow in Europe, the Bassin d’Arcachon is the southernmost site of wintering Dark-bellied Brent Goose in the Western Palearctic. It hosts 50% of the wintering French Brent Goose since 1992.

Counts are conducted from October to March since 1986 without interruption and are made by boats at low tide.

Counting methods have evolved to take notice of the changing behavior of birds. During the first counting, Brent Geese came out of the bay to land on the sandbanks at the entrance of it. Since several years now, Brent Geese do not come out. They remain within the bay on the seagrass *Zostera*.

In the 80s, the number reached 20 000 birds. Then, since ten years, the number rose to around 30 000 birds. Since 2000, the number increased again to reach 60 000 birds.

Nesting success of Barnacle Goose (*B. leucopsis*) in Peschanka delta (Kolguev Island) in 2012

Olga. Pokrovskaya¹, Dmitry. Dorofeev²

¹ Bird Ringing Center of Russia, IEE RAS

² Goose, Swan and Duck Study Group of Northern Eurasia

email : olga.b.pokrovskaya@gmail.com

Key words : Barnacle Goose, breeding success, Kolguev Island, Russia

The world biggest colony of Barnacle Geese is situated in Lower Peschanka area, Eastern Kolguev. Since 2006 this colony is known for its extremely high hatching success and not only success itself is very special in this area but also the distribution of successful nests.

In 2012 we mapped 2455 nests in Lower Peschanka area and for 1605 of them we know the fate. Average hatching success of Barnacle geese was 86,68% (n=1547). Predictably highest hatching success (93,7%, n=680) occurred on the main part (“core” of colony) between rivers Peschanka and Podzemnaya. On this area two families of Arctic Fox were breeding but even their activity didn’t have strong impact on nesting success of geese. In the same time average hatching success of birds nesting on the edges of colony was also relatively high – 85,9% (n=669). These peripheral are easily accessible and often visited by Arctic Foxes but Barnacle Geese are quiet successful in protecting nests. Against our expectation lowest nesting success was shown for small colony under protection of Peregrine Falcon situated across the river from main colony: only 28,3% of nests (n=54) hatched. Most of clutches on this colony were predated by Arctic Fox.

Kolguev Island is free of lemmings and in this conditions such a big goose colony attracts a lot of predators (Arctic and Red Foxes, gulls etc.). In spite of it nesting success of Barnacle Geese for many years stays on a high level and activity of predators cannot stop growth of the colony.

Fall migration stopover of Dark-bellied Brent Geese (*B.b.bernicla*) on Baydaratskaya Bay coasts within the gas pipe line construction area

Olga. Pokrovskaya, Bird Ringing Centre of Russia, IEE RAS
email : olga.b.pokrovskaya@gmail.com

Key words : Brent Goose, gas pipe line, feeding ecology, migration, Russia

In first decade of September 2012 we worked on eastern Yugorski peninsular and western Yamal peninsular, on Baydaratskaya Bay coasts in the zone where underwater part of gas pipe line crops up. Landscapes within this area are rather destroyed; several rotational camps are situated in coastal zone and a lot of heavy caterpillar vehicles work now for pipe line construction.

In spite of all these negative factors a lot of geese use this area for migration stopover. From 6 to 10 of September we counted 930 individuals of Brent Goose and around 2800 “grey” geese (mixed flocks of White-Fronted Goose and Bean Goose).

Brent geese feed mostly on salt marshes with *Carex subspathacea* in a very short distance from working people and vehicles (from 10 to 300 meters); flash distance was also relatively short; all geese we saw were in a good body conditions.

How such anthropogenically changed area can be attractive for migrating geese? There are three main reasons. First of all within this area hunting is totally prohibited because of the gas pipe line. Natural landscapes are also very suitable for goose feeding. And another attractive moment is a way of land reclamation which is used in this area: as far as immediate recovery of tundra vegetation is impossible, the reclamation of damaged areas done by planting seeds of common field grasses like *Phleum pratense*, *Dactylis glomerata* and *Festuca pratensis*. Seeding is connected only with construction process and not with season or plant phenology so even in early autumn quiet big areas is covered with fresh seedlings of grass suitable for goose feeding.

The area might be important for migrating geese not only in autumn and more research needed, especially during spring migration.

Feeding ecology of Brent Goose (*B. b. bernicla*) in the Russian Arctic

Sonia Rozenfeld

Severtsov Institute of Ecology and Evolution,
Russian Academy of Sciences, Russia

email : rozenfeldbro@mail.ru

Key words : Brent Goose, feeding ecology, breeding period, Russian Arctic

Feeding ecology of Brent Goose were studied in 6 different areas: the core zone of the breeding range on the islands of the Kara Sea and the Taimyr coast, the marginal part of the range in the inner areas of Taimyr, and the eastern edge of the range at the Anabar Bay. Feeding of Black Brant was observed in a typical site in the colony in the north of the Lena Delta.

We have compared the diet of 7 different Brent Goose populations during the breeding period and of pullies in 4 locations. In the Brent Goose diet, 38 species of vascular plants are found regularly and about 15 species occasionally.

In all study areas, the basic food was related to availability of the most common plants in the surroundings of the breeding site. Two different types of diet are characteristic during the nesting period. The first type is typical for geese in all study areas in Taimyr including polar deserts of the Kara Sea islands and inland tundra. The second type was observed in geese inhabiting flat marshy islands in the Anabar Bay and the Lena Delta. Different subspecies of the Dark-bellied Brent and Black Brant had almost similar diet. The coastal islands of such type are the most widespread breeding habitats of the Black Brants in Asian tundra, so the diet with high share of sedges, which is more typical for the larger *Anser* geese, is common for most of the Asian Black Brants.

Using social network analysis to investigate individually in social position in Light-bellied Brent Geese (*B.b. hrota*)

Matthew Silk¹, Andrew L. Jackson² & Stuart Bearhop¹

¹ Centre for Ecology and Conservation, University of Exeter, Tremough Campus, Penryn, Cornwall, TR10 9EZ, UK

² Trinity Centre for Biodiversity Research, Trinity College Dublin, College Green, Dublin 2, Ireland

Email : mjs234@exeter.ac.uk

Key words : Brent Goose, social structure, fission-fusion

Light-bellied brent geese (*Branta bernicla hrota*) have a highly fluid fission-fusion social system during non-breeding periods. There has been negligible research on fission-fusion sociality in avian systems, and more generally little is known about the causes and consequences of variation in the social environment an individual experiences in unstable social systems. We use social network analysis on resighting data to examine social structure in winter and spring staging populations of this species and determine whether

there are individual differences in social position. We can then use supplementary behavioural, body condition and reproductive data to investigate the correlates of different social strategies/environments, and whether these differ across the annual cycle. I will present results that demonstrate the validity of using social network approaches to make inferences about sociality at an individual level in colour-ringing studies, where it is not possible to identify every individual population. I will then go on to show the results obtained from a spring 2012 field season in Iceland, sharing both our current knowledge on the factors that contribute to population-level social structure and individual social position in this study system, and some evidence for variation in social position having important consequences at an individual level. Understanding how the social environment an individual experiences interacts with phenotype and condition has important implications for understanding social behaviour and individual-decision making in this system, as well as making it possible to make predictions about social structure in migratory bird species more generally.

Development of an individual-based model of Black Brant (*B.b.nigricans*) in Humboldt Bay, USA

Richard A. Stillman^{1*}, Kevin A. Wood¹, David H. Ward², Mark Petrie³ & Jeffrey M. Black⁴

¹ School of Applied Sciences, Bournemouth University, Fern Barrow, Talbot Campus, Poole, Dorset, BH12 5BB, UK.

² United States Geological Survey, Alaska Science Center, 4210 University Drive, Anchorage, AK 99508-4626, USA.

³ Ducks Unlimited Inc., Western Regional Office, 3074 Gold Canal Drive, Rancho Cordova, CA 95670-6116, USA.

⁴ Department of Wildlife, Humboldt State University, Arcata, CA 95521, USA.

email : rstillman@bournemouth.ac.uk

Key words : Climate change; Human disturbance; Sea level rise; Stop-over site.

We describe the development of an individual-based model to predict how Pacific Black Brant foraging on eelgrass (*Zostera marina*) at a spring stopover site, Humboldt Bay, will be affected by predicted future changes in food availability, sea level and human disturbance. Black Brant use Humboldt Bay as a stopover site between January and May, on their annual migration over the Pacific flyway between their overwintering area in Mexico and their Arctic breeding grounds. The model tracks the foraging decisions and mass of each bird in the bay as it attempts to maximise its rate of mass gain by feeding in locations with the highest biomass of available eelgrass. The model incorporates the eelgrass food resource, and the tidal changes in availability of the food to the birds. The model birds choose where to feed based on the tide height and the biomass of eelgrass close enough to the water surface to be consumed. The model predicts changes in the distribution of birds through the tidal cycle, the proportion of time birds spend feeding each day and their rates of body mass gain. The model can be used to predict how environmental change within the bay influences the number of birds that can consume enough food for their onward migration from the bay.

Multilocus Phylogeography and Population Structure of High Arctic North American Brant Geese

Sandra Talbot, G. Kevin Sage, Judy Gust, Jolene Rearick, David Ward, and Dirk Derksen

U.S. Geological Survey-Alaska Science Center, 4210 University Dr., Anchorage, AK 99508

Sean Boyd, Canadian Wildlife Service, Delta, BC, Canada

Kathryn Dickson, Canadian Wildlife Service, Ottawa, ON, Canada

James Robinson, Wildfowl and Wetlands Trust, Slimbridge, UK

Preben Clausen, National Environmental Research Institute, Roende, Denmark

Bart Ebbinge, Alterra Green World Research, The Netherlands

email: dward@usgs.gov

Key words : Brent geese, *Branta bernicla*, phylo geography, population structure

Genetic diversity and distribution of species in northern latitudes, including arctic nesting geese, has been greatly influenced by fluctuating climatic conditions associated with Pleistocene glacial cycles. High levels of natal, breeding and winter site fidelity suspected for brant geese (*Branta bernicla*) prompted us to investigate patterns of population subdivision and test hypotheses associated with subspecies nomenclature, locations of potential Pleistocene refugia for brant geese, and the relative contribution of these refugia to the postglacial colonization of North America. We used three types of molecular markers with contrasting modes of inheritance (autosomal and sex-linked microsatellite markers and mtDNA control region data) to 1) evaluate localities hypothesized as ice-free areas or glacial refugia in other arctic vertebrates, including western and eastern Beringia and the western and Eastern High Arctic Canadian Archipelagos; and 2) test for concordance between current stock/subspecies designations and genetic partitions. We found significant populational and regional substructuring that roughly corresponded to subspecies designations. Interestingly, brant geese nesting in western high Arctic habitats on Melville and Prince Patrick islands showed greater affinities to black brant (*B.b.nigricans*) based on nuclear markers, but greater affinities to Atlantic brant (*B.b.hrota*) based on mitochondrial DNA. Further, brant nesting on Bathurst Island, <100 kilometers to the east, grouped consistently with *B. b. hrota* and eastern high Arctic populations. The data are consistent with a western high Arctic contact zone between post-Pleistocene expansion of brant from a Beringian refugium, and brant expanding out of an eastern Canadian refugium, as observed in a number of other high latitude vertebrate species, coupled with higher levels of male rather than female-mediated gene flow.

Numbers of Red-breasted Goose (*B.ruficollis*) and Lesser White-fronted Goose (*Anser erythropus*) in Northern Kazakhstan' stopover in autumn 2012

Alexey Timoshenko, Sonia Rozenfeld, Vilkov V.

Association of biodiversity conservation of Kazakhstan (ACBK), Severtsov institute of Ecology and evolution of Russian Academy of sciences, Severokazakhstansky State university

email : aur.timoshenko@mail.ru

Key words : Red-breasted Goose, Lesser-White-fronted goose, autumn counts, Kazakhstan

The geese were counted on the lakes and surrounding vicinities by 3 monitoring groups from 25.09 -16.10 2012 r. in Kazakhstan. The dates of counts were choose with a glance of data from tugged birds. For the estimation of total amount of geese we used the early morning counts. Data on species and age ratio were collect in daytime and evening. For more detailed information we made the photos of each flock (n = 3975). For exclude the overestimation due to movement of geese concentrations during all the time of the fieldwork, we support the contact between the group's members and gamekeepers. We made the counts with interval of 3-4 days in the lakes where the essential geese concentrations observed. The data about number, age and species ratio were receive in the peak of migration. As the most of the lakes were dry and due to the very strong protection measures took by the game husbandries the number of geese on some lakes was from 230 000 to 530 000 individuals. In October 2012 we counted 871 600 WFG, 111 500 GLG, 150 600 RBG and 30 700 LWFG. The ratio of the young birds were 54.5% (n = 3477) WFG, 46,5% (n = 422) RBG, 43,6% (n = 532) LWFG and 69,8% (n = 2245) GLG. Our data suggest the underestimation of the population of RBG and LWFG on the wintering sites. And possible effectiveness of the realized measures for their protection.

The wintering of Dark-bellied Brent Goose (*B. b. bernicla*) in France: trends in number and spatio-temporal distribution

Loïc Valéry¹, Vincent Schricke², Sophie Le Drean-Quenec'hdu³ & Roger Mahéo⁴

¹ Muséum National d'Histoire Naturelle

Service du Patrimoine Naturel

Bât 25 - Campus de Beaulieu – Avenue du Général Leclerc – 35042 Rennes cedex

email. lvalery@mnhn.fr

² Office National de la Chasse et de la Faune Sauvage

CNERA Avifaune Migratrice

39 Boulevard Albert Einstein – CS 42355 – 44323 Nantes cedex 3

email. vincent.schricke@oncfs.gouv.fr

³ 10, rue de la Mézière,

35520 Melesse

email : sophie.le-drean-quenechdu@wanadoo.fr

⁴ 34, rue de Brocéliande

56000 Vannes

email : roger.maheo@wanadoo.fr

Key words : Brent goose, France, wintering , trends in number, spatio-temporal distribution

The Dark-bellied Brent Goose *Branta bernicla bernicla* is a migratory species that each year connects its arctic breeding area, mainly located in coastal tundra of northern Russia (i.e. Taimyr Peninsula), to its western European wintering sites. From the early 1980s

onwards, France receives an average of about 40% of the world population on its coastline every winter. The aim of the presentation is to draw up a brief overview of the wintering of Brent geese at national scale during the last 30 years. Particularly, trends in number of main wintering sites and their phenology of use will be detailed. Types of habitat exploited by geese, threats and conservation options that should be encouraged will also be presented.

Preliminary results from GPS remote tracking of Red-breasted Geese (*Branta ruficollis*) from Gydan Peninsula (Russia) breeding grounds.

Didier Vangeluwe¹, Sonia. Rozenfeld,² A. E. Dmitriev³ and V. Bulteau¹

¹ Royal Belgian Institute of Natural Sciences, 29 Vautier Street, 1000 Brussels, Belgium
email : Didier.Vangeluwe@naturalsciences.be

² Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia;
email: rozenfeldbro@mail.ru

³ Institute of Geography, Russian Academy of Sciences, Moscow, Russia

The Red-breasted Goose *Branta ruficollis* is a Russian endemic emblematic of the tundra environment. It combines the paradoxal characteristics to be amongst the most colourful and thus most charismatic artic geese species and the least studied. Moreover his status is chaotic with a world population estimated between 30.000 and above 100.000 individuals during the last 25 years (BirdLife International, 2012, Rozenfeld, 2012). It is listed as “endangered” according to IUNC Red List categorization (IUCN, 2012). No clear reason documents the evolution of the population size.

The most lacking knowledge for a better understanding of the true evolution of the population and eventual ad hoc management and conservation seems to be the strategy (-ies) of migration (including phenology and localisation of all stopovers) and the land use both on staging and wintering areas (rate of site fidelity, relation between roosting places and feeding grounds). Several teams are surveying the flyway of the species in Russia, Kazakhstan, Ukraine, Romania, Bulgaria and Greece but more quantitative are needed.

To participate to this objective we have tagged during July 2012 on North East Gydan Peninsula 10 breeding Red-breasted Geese with GSM-GPS devices.

So far (11/11/2012), a grand total of 595 locations were received from 4 geese. Despite this technical under achievement, some interesting results were collected regarding flightless moult, migration timing, stopover locations and migration strategy.

The mute swan (*Cygnus olor*) in the Bassin d’Arcachon

Jésus Veiga, Julien Haas & Caroline Péré

Fédération départementale des Chasseurs de Gironde
10, chemin de Labarde, CS 70124
33291 Blanquefort Cedex, France
email : veigajesus@hotmail.fr

Key words : Mute Swan, plane, counting, moulting, eelgrass

The Mute Swan is a species growing in territorial distribution and increasing in number in Europe since the middle of last century. This species is found throughout the year on the Bassin d'Arcachon. This wetland is used for fifteen years as a moulting site by many swans that seem to come from other areas, at least in part.

In 2008, the Hunters' Federation of the Gironde began to count the number of mute swans during the summer and specify they location.

Counts are made at low tide by plane from June to November.

The data collected for five years show the evolution of the bird numbers in summer and their spatial distribution. Mute Swans are more numerous in July and August.

Autumn migration routes and behaviour of East Atlantic Light-bellied Brent Geese (*B.b.hrota*), in relation to breeding status and weather conditions assessed by satellite telemetry and direct observations

Marie Silberling Vissing, Preben Clausen, Kevin Kuhlmann Clausen, Jens Peder Hounisen and Anthony David Fox

Department of Bioscience, Aarhus University, Grenåvej 14, 8410 Rønne, Denmark

email : pc@dmu.dk

Key words : productivity, temperature, wind, day-length, decision

We followed Light-bellied Brent Geese *Branta bernicla hrota* on spring and autumn migration in 2001 and 2011 and show that both migration episodes were conducted equally rapidly and almost non-stop, despite expectations that birds would be more time limited in spring. Rich feeding opportunities in the arctic and at the final destinations, in combination with lack of suitable feeding habitat at potential staging areas along the route, most likely explain the rapid and direct autumn migration pattern in the population. We then combine satellite telemetry speed computations with ground-based observations of Brent Geese arriving to Denmark in autumn, back-calculate their departure time from the Arctic, and test the influence of environmental parameters affecting the physiological states and departure decisions of Light-bellied Brent Geese *Branta bernicla hrota* from the Svalbard breeding grounds, and how this affected arrival time in Denmark. We found no delay or advance in arrival times in Denmark over the last decades, but a reduction of dispersion additionally influenced by average summer temperatures. In addition, breeding success delayed early-arriving Brent Geese and June temperature advanced late-arriving Brent Geese in Denmark. Day length was the most important factor to explain departure from Svalbard, while weather parameters seemed to be less important. It therefore seems that future climate changes primarily will have an indirect effect on autumn migration phenology through the influence on prevailing conditions e.g. breeding success and refuelling opportunities that is considered being important for physiological states of Brent Geese at departure. Further weather condition events triggering departure e.g. frost and clear sky, will, according to predicted climate changes decrease, making weather conditions influence on departure decisions even less important.

Shifts in Winter Distribution of Black Brant (B.b.nigricans) in the Eastern Pacific Flyway : Changes in the Abundance and Distribution of Eelgrass in Alaska and Baja California

David Ward and Kyle Hogrefe, U. S. Geological Survey-Alaska Science Center,
Anchorage, AK 99508

email: dward@usgs.gov; khogrefe@usgs.gov

Christian Dau U. S. Fish and Wildlife Service - Migratory Bird Management - Region 7,
Anchorage, AK 99503.

email: christian_dau@fws.gov

Key words : Black Brant, winter distribution, shifts, California, Alaska

Winter distribution of the eastern Pacific black brant (*Branta bernicla nigricans*) has shifted northward from low (Baja California) to high (Alaska) temperate areas over the last half century. To understand whether this shift in winter distribution is linked to changes in abundance and distribution of eelgrass we conducted comprehensive assessments of eelgrass distribution and abundance at primary wintering areas in Baja California (Bahia San Quintin, Laguna Ojo de Liebre, Laguna San Ignacio) and Alaska (Izembek and Kinzarof lagoons). We assessed changes in spatial distribution and biomass of eelgrass using a combination of satellite remote sensing techniques and boat-based point surveys. Results indicated a decline in both spatial extent and aboveground biomass of eelgrass across the three embayments in Baja California with greatest losses at Bahia San Quintin, a key spring staging area for brant in Mexico. Eelgrass trends in Alaska were less conclusive; however a companion remote sensing study showed that the number of days when shorefast ice covered eelgrass beds has declined, indicating that eelgrass accessibility has increased for brant. The northward shift in brant numbers is likely related to changing climatic conditions that have resulted in greater availability of eelgrass in Alaska and declines in eelgrass abundance and distribution in Baja California.

Influence of expanding Barnacle goose (B. leucopsis) populations On White-fronted goose (Anser albifrons) on Kolguev Island

E.M. Zaynagutdinova

St-Petersburg State University, Zanevsky pr.,29,22, 195196 Saint Petersburg, Russia

email: zem9@rambler.ru

A.V. Kondratyev

H. Kruckenberg

Key words : Barnacle Goose, White-fronted goose, breeding period, grazing habitats, Russia

Barnacle geese appeared on Kolguev island in 1980-s. At first they colonized small islets, then deltas of big rivers. The biggest colony of Barnacle geese is situated in the delta of Peschanka river. Nesting success and brood size of White-fronted geese in the vicinities of this colony started to suffer from intensive predation pressure.

In 1990s and 2000s Barnacle geese and White-fronted geese nested in mixed or monospecific colonies in central Kolguev in association with Peregrine falcons. Hatching

success of White-fronted geese was higher than in unprotected nesting sites. Nest sites around Peregrine falcon were occupied earlier than on the edge of the colonies, with Barnacle Geese tending to expel White-fronts from the core protected area. In 2011-2012 all colonies in central Kolguev around Peregrine falcons were occupied by Barnacle geese only.

During brood rearing and molting period both species feed on similar plant species and mixed flocks of both species use the same areas in the center of the island for feeding. Lake shores and creek valleys with intensive Barnacle geese grazing have lower resulting grass height, than other areas. Continuous growth of Barnacle Geese population on the island will lead to increase of these heavily grazed areas in favourable White-fronted geese feeding habitats. Future feeding conflicts for grazing habitats between Barnacle Geese and White-fronted Geese are therefore anticipated.

Abstract - posters

Abstracts are arranged in alphabetical order after the surname of the first

Two attachment methods for monitoring Greylag Geese (*Anser anser*) movements using GPS devices : a confident progress on free ranging populations

Mathieu Boos¹ and Arne Follestad²

¹ Research Agency in Applied Ecology, Naturaconst@, 14 rue principale 67270 Wilshausen, FRANCE.

email: direction@naturaconsta.com

² NINA, P.O. Box 5685 Sluppen, NO-7485 Trondheim, NORWAY

Key words : GPS/GSM, harness, collar, flight behaviour, geese.

Monitoring migratory bird movements and their use of stopover sites is of great interest to improve wildlife management, especially among geese. Despite ringing and neck-banding is still a method used widespread, GPS devices have become more and more common in recent years. One requirement of such devices is that they must be well supported by the birds and do not disturb their behaviour, especially when flying. According to the monitoring research program on Greylag geese supported by the French Ministry of Ecology, with the collaboration of several partners in Europe, we checked the validity of backpack harnesses and collars including GPS/GSM devices, on migratory strategy (range, stopover area, timing of departure and arrival) of greylag geese caught and fitted in Norway. Ten Greylag geese were fitted with backpack GPS/GSM devices (100g, less than 3% of body mass) using reinforced Teflon harnesses and 5 geese with GPS/GSM collar loggers that were battery and solar powered (50g, less than 2% of the birds' body mass). From our results obtained over the first large "autumn migration", there is no significant difference ($P > 0.15$) in departure and arrival latitudes or dates nor in the distances travelled (range) between the geese fitted with collars and backpack harnesses. To conclude, despite each method has technical and handling advantages and drawbacks both are very useful for the monitoring of greylag geese without adversely affecting the flight behaviour of the birds. This gives a confident methodological support for further research programs on Greylag geese and possibly other bird species.

Improved saltmarsh management can counteract climate change - safeguarding future waterbird habitats.

Kevin Kuhlmann Clausen), Michael Stjernholm & Preben Clausen

Department of Bioscience, Aarhus University, Grenåvej 14, DK-8410 Rønne, Denmark.

Email: (kc@dmu.dk)

Key words : Light-bellied Brent Geese, Climate change, Saltmarsh, Management, Sea level rise

Based on a high-resolution digital elevation model and two scenarios for projected rise in near-future sea levels, we employ an ArcMap allocation model to foresee the areal loss of salt marsh associated with climate change in 16 bird protection areas important to light-bellied brent geese *Branta bernicla hrota*. In addition, we quantify the extent of inadequate salt marsh management, and investigate the potential to compensate for climate change-induced losses by means of more efficient management. Our models indicate that by the end of this century 15.3 % - 43.6 % of existent salt marshes will be flooded due to coastal squeeze and that inadequate managed salt marsh presently make up around 51.1 %. Thus, re-establishing areas of well-managed marshes can counterbalance the loss expected from rising sea levels during the next century. This will benefit both wader populations with current unfavourable conservation status and salt marsh dependent herbivorous waterfowl such as brent geese and wigeon.

Two annual migratory cycles of Ebbe, a satellite tracked brent goose (B.b.hrota)

Preben Clausen, Kevin Kuhlmann Clausen, Jens Peder Hounisen, Marie Silberling Vissing, and Anthony David Fox

Department of Bioscience, Aarhus University, Grenåvej 14, 8410 Rønne, Denmark
email : pc@dmu.dk

Key words : annual flight budget, site faithfulness, satellite telemetry

Since St Joseph, Ebbinge, and Prokosch initiated individual ringing schemes on dark-bellied brent geese in 1972, an immense amount of information on individual birds behavior and site-use have been compiled in this, as well as the other two brent goose populations wintering in Europe. Over 10,000 birds have been caught in the three populations, and >750,000 resightings compiled from these. Although our knowledge of individual birds site-use in Europe is immense, our understanding of what they do outside their wintering quarters is limited.

Telemetry have gradually opened this knowledge gap, with trackings of spring and summer movements of brent geese back in 1997-2001, but it was not until 2011 we got a full annual cycle of a goose. We report on the light-bellied brent gander Ebbe¹, who during his first year-cycle flew >11,500 km. He used seven Arctic sites (two pre-breeding stop-over sites, one breeding site, one moult-site, and three post-moult sites), and returned to winter on only two sites, an autumn and early winter site followed by a late winter and spring-staging site. He is now well advanced in his second cycle, have passed the 24,000 km mark since capture, and in this years cycle he used more or less the same suite of sites in spring and in the Arctic, but took a distinctly different autumn-migration route.

¹ Ebbe is named after and to honour our retired technician Ebbe Bøgebjerg, successor of Jens Peder Hounisen as our cannon-net operator, who caught 141 light-bellied brent geese (and thousands of other birds) during his work-life at Kalø.

Population development and breeding success of East Canadian High Arctic Light-bellied Brent Goose (*B.b.hrota*) 1960 - 2012.

Kendrew Colhoun, Gudmundur A Gudmundsson¹ and Kerry Mackie

The Wildfowl & Wetlands Trust, Castle Espie Wetlands Centre, Ballydrain Rd., Comber, Co. Down BT23 6EA

¹ Náttúrufræðistofnun Íslands, Icelandic Institute of Natural History, P.O.Box 5320, IS-125 Reykjavik, Iceland

email : i.webs@virgin.net

Key words : Light-bellied Brent Goose, breeding success, flyway

The East Canadian High Arctic breeding population of Light-bellied Brent Goose has a trans-Atlantic migration, detailed monitoring of which is principally limited to counts in the autumn-spring period in Iceland, Ireland and other parts of NW Europe as south as western France.

Here we present an historic overview of autumn (September/October), mid-winter (January) and spring (May) counts and annual productivity assessments. There were few estimates of the size of the population prior to the mid 20th century but it appears likely that the population declined due to hunting pressure from 1850 to 1900, remained at fewer than 10,000 birds until *Zostera* recovered and hunting was banned around 1950. The first complete census in 1960/61 estimated the population at ca. 11,900 individuals and subsequent surveys showed the population to fluctuate at 8-16,000 through the 1960s and 1970s. A series of highly successful breeding seasons in the early 1980s probably contributed to peak counts then of 20-25,000 birds, dropping thereafter to mid-1990 peaks of c. 16,000. In the 15 years since, the population has shown a sustained increase, firstly towards c. 30,000 birds in the early 2000s to in excess of 40,000 birds in the early 2010s.

Although productivity has remained highly variable throughout (1960-2010; mean 14% range: <1 – 46%) part of the explanation for the growth since 2000 has been the above-average productivity (21%) in seven of eleven years (2000 – 2010).

Can Brent geese be used as a proxy of the good health of the eelgrass habitat ?

Sébastien Dalloyau

email : sebastien.dalloyau@lpo.fr

Key words : Brent Geese, eelgrass, spatial adjustment, tidal habitat quality

Evolution of seagrass habitat has been recognized as an important indicator that reflects the overall health of coastal ecosystems. Seagrass habitat is recognized for its high biodiversity and its high sensitivity to changes in water quality and mechanic anthropic perturbation. Seagrass biomass provides food and nursery area for numerous marine vertebrates and invertebrates and has also been shown to be exploited by herbivorous birds. Optimal foraging patches of herbivorous bird species are distributed according to the resource abundance (the functional response mechanisms). We test a method to correlate temporal and spatial adjustment of geese to eelgrass patches depletion in order

to evaluate how Brent geese *Branta bernicla bernicla* wintering population reflects the health of coastal eelgrass beds *Zostera noltii*. This method has been applied in three major eelgrass beds (1,564 ha) in the Pertuis Charentais, the second most important eelgrass habitats in France. Each site differs in terms of bird number, eelgrass density, geographical and sedimentary characteristics. This approach aims to give a key for nature managers to estimate the health of the seagrass beds based on wintering bird population surveys.

Black Brant (B.b.nigricans) start to mix with Dark-bellied Brent Geese (B.b.bernicla) wintering in Western Europe

Barwolt S. Ebbinge,

Centre for Ecosystem Studies, Alterra Wageningen University, P.O. Box 47, NL-6700 AA Wageningen, the Netherlands.

email: bart.ebbinge@wur.nl

Roeland A. Bom,

Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, the Netherlands.

email: roeland.bom@gmail.com

Gerhard J.D.M. Muskens,

Centre for Ecosystem Studies, Alterra Wageningen University, P.O. Box 47, NL-6700 AA Wageningen, the Netherlands.

email: gerard.muskens@wur.nl

Key words : Black Brant, Dark-bellied Brent Geese, mixed colonies

The circumpolar distribution of Brent (Brant) Geese shows the nominate race (*bernicla*) as breeding on the Taimyr Peninsula and migrating westward to winter in western Europe, whereas Black Brant (*nigricans*) breeding in the Lena Delta and further east in NW-America, migrating eastward to winter along both coasts of the Pacific. Increasingly individuals of *nigricans* are being observed among *bernicla* in western Europe, and mixed pairs of the two races have been observed with offspring. Catches of in total 4,866 moulting Brent Geese in the Pyasina Delta in western Taimyr between 1991 and 2006 consisted exclusively of *bernicla*. Recoveries and resightings showed that these birds from central arctic Siberia exclusively migrate westward to winter in western Europe..

In 2008, in the Pyasina Delta 30 % of moulting males caught, and 14 % of moulting females showed intermediate patterns of necklaces, while otherwise their plumage was *bernicla*-like. Canon-net catches in winter in Europe so far yielded 3 catches of *nigricans* among a total of 8,150 birds captured. Interestingly all 5 (3 +2) *nigricans* caught were adult males. As is known in many goose species males are the ones that disperse to other breeding areas, whereas most females show natal philopatry. We therefore hypothesize that male *nigricans* from eastern Siberia disperse westward and interbreed with female *bernicla*. In the literature mixed colonies of both races have been described in 1997 in the Olenok delta, just in between the Lena Delta and the Taimyr Peninsula.

Cultural Inheritance Drives Site Fidelity and Migratory Connectivity in a Long Distance Migrant

Xavier A. Harrison^{1,2}, Tom Tregenza¹, Richard Inger¹, Kendrew Colhoun³, Deborah A. Dawson², Gudmundur A. Gudmundsson⁴, David Hodgson¹, Gavin J. Horsburgh², Graham McElwaine⁵, & Stuart Bearhop¹

¹ Centre for Ecology and Conservation, University of Exeter, Tremough Campus, Penryn, Cornwall, TR10 9EZ, UK

² NERC Biomolecular Analysis Facility – Sheffield, Department of Animal and Plant Sciences, Alfred Denny Building, University of Sheffield, Western Bank, Sheffield, South Yorkshire, S10 2TN, UK.

³ Wildfowl and Wetlands Trust, Castle Espie, Ballydrain Road, Comber, County Down, BT23 6EA, Northern Ireland, UK.

⁴ Icelandic Institute of Natural History, P.O. Box 5320, IS-125 Reykjavik, Iceland.

⁵ 100 Strangford Road, Downpatrick, Co. Down, BT30 7JD, UK.

email : i.webs@virgin.net

Key words : migration, population genetics, dispersal, kin structure

Cultural transmission is thought to be a mechanism by which migratory animals settle into habitats but little evidence exists in wild populations because of the difficulty of following individuals over successive generations and wide geographic distances. Cultural inheritance of migration routes represents a mechanism whereby geographic isolation can arise between groups and could constrain individuals to potentially sub-optimal sites within their range. We combined a pedigree of related light-bellied Brent geese (*Branta bernicla hrota*) with 6-years of observations of marked birds to calculate dispersal distances of adult offspring from their parents in both Ireland and Iceland. In both countries, the majority of offspring were found to recruit into or near their parental sites, indicating migratory connectivity in the flyway. Despite this kin structure, we found no evidence of genetic differentiation. We suggest the existence of migratory connectivity of sub-populations is far more common than previous research indicates and that cultural information may play an important role in structuring reproductive isolation among them.

Carry-Over Effects Reveal Reproductive Costs in a Long Distance Migrant

Richard Inger^{1*}, Xavier A. Harrison¹, Graeme D. Ruxton², Jason Newton³, Kendrew Colhoun^{4,7}, Gudmundur A. Gudmundsson⁵, Graham McElwaine⁶, Matthew Pickford¹, David Hodgson¹ & Stuart Bearhop^{1*}

¹ Centre for Ecology and Conservation, School of Biosciences, University of Exeter, Cornwall Campus. Penryn, Cornwall TR10 9EZ.

² Division of Environmental and Evolutionary Biology, Institute of Biomedical & Life Sciences, Graham Kerr Building, University of Glasgow, Glasgow, G12 8QQ. UK.

³ NERC Life Sciences Mass Spectrometry Facility, Scottish Universities Environmental Research Centre, Rankine Avenue, East Kilbride, G75 0QF, UK.

⁴ Wildfowl and Wetlands Trust, Castle Espie Wetlands Centre, Ballydrain Road, Comber, County Down, BT23 6EA, UK.

⁵ Icelandic Institute of Natural History, PO Box 5320, IS-125 Reykjavik, Iceland.

⁶ 100 Strangford Road, Downpatrick, Co. Down, BT30 7JD, UK. ⁷R.S.P.B. Northern Ireland Headquarters, Belvoir Park Forest, Belfast, BT8 4QT, UK.

email⁴ : i.webs@virgin.net

Key words : *Branta bernicla hrota*, Carry-over effects, Intermittent Breeding, Reproductive Costs, Stable Isotopes.

For many animals the consequences of “decisions” made at one point in their life may not always be borne immediately. For example, numerous studies have demonstrated the trade off between current and future breeding success across multiple taxa. It is becoming increasingly clear that such processes may also operate among seasons, such that the conditions experienced at one point in the annual cycle may have significant downstream impacts, or “carry over effects”, and this is particularly evident among migratory species. We therefore predict that certain combinations of reproductive and migratory strategy could lead to profound carry over effects. Here we investigate how winter habitat selection in a long distance migrant, with extended parental care (*Branta bernicla hrota*) is influenced by parental status and how this has a counterintuitive effect on subsequent breeding success. Dominant individuals and groups generally monopolise the best quality resources. In the case of geese, families are dominant, however our findings highlight a hidden cost to raising a family. Stable isotope analysis demonstrates that later in the non-breeding season, adults with families utilise lower quality resources than non-breeders. This is likely caused by parents being constrained in habitat choice by the lower foraging efficiency of their juveniles. Consequently parental adults end the winter in poorer condition than non-breeders. We further demonstrate that parents in one year are less likely than expected to breed again in the next year and suggest that this is caused by conditions during the non-breeding period being carried over into the breeding season.

Breeding of Eastern High Arctic Brant (B.b.hrota) near Axel Heiberg and Ellesmere islands, Nunavut Canada

Josée Lefebvre and **Austin Reed**¹, Environment Canada, Québec, Canada

Kendrew Colhoun, Wetlands and Wildfowl Trust, UK

Gundmundur Gundmundsson, Icelandic Institute of Natural History

email¹ : austin.reed@sympatico.ca

Key Words : Eastern High Arctic Brant, *Branta bernicla hrota*, Axel Heiberg Island, Ellesmere Island, breeding ecology,

This poster outlines the results of studies on the breeding ecology of Eastern High Arctic Brant (*Branta bernicla hrota*) at a high latitude site (ca. 80° N) conducted in the eastern Canadian Arctic in 2007. The project was supported by Environment Canada, the International Polar Year, the Polar Continental Shelf Project, The Wildfowl and Wetlands Trust, and the Icelandic Institute of Natural History. A total of 35 nests were examined, mainly in two colonies on small offshore islands. Clutch size varied from 1 to 6 eggs, with a mean of 4.15 (SD=0.85, n=33). Estimated hatching dates varied from 8 to 14 July with a

distinct peak on 11-12 July. When compared with other studies on *B. b. hrota*, all of which occurred at lower latitudes (64-70° N), we found no evidence of delayed nesting or reduced clutch size attributable to the extreme northerly location of our study area. We conclude that our population benefits from a local microclimate which attenuates arctic summer temperatures and provides a reduced spring snow pack, allowing early nesting.

Effects of Climate-induced Changes in Plant Phenology on Migration, Breeding, and Redistribution of Eastern Pacific Black Brant

David Ward, Jerry Hupp, Tyrone Donnelly, and John Reed

U. S. Geological Survey-Alaska Science Center, Anchorage, AK 99508

email : dward@usgs.gov

Key words : Black Brant, global climate change, plant phenology effects

There is considerable evidence that global climate change has led to an advancement in the phenology of spring green-up and extended the growing season of plants at high northern latitudes. What is not clear is how well black brant and other geese have adapted to these shifts in plant phenology by modifying the timing of migration and nesting. Lack of synchrony between the timing of peak nutrient availability and the timing of hatch can have significant consequences for population dynamics and distribution of black brant. In this study we analyze the evidence in long-term changes in plant phenology across different biomes of Alaska using satellite remote sensing techniques. We correlate this variability with ground-based measurements of the timing of avian migration and breeding. Specifically, we determine if the timing of spring green-up is synchronized across arctic and sub-arctic breeding areas or whether the process has become fractured across biomes, potentially disrupting the timing of migration and breeding, and putting the eastern Pacific black brant population at risk for decline. Finally, we provide collaborative evidence to support aerial survey data for a northward shift of the breeding population in Alaska.

List of participants

BELGIUM

Griffin Cy
Vangeluwe Didier

cy.griffin@face.eu
didier.vangeluwe@naturalsciences.be

CANADA

Boyd Sean
Dickson Kathy

sean.boyd@ec.gc.ca
kathy.dickson@ec.gc.ca

DENMARK

Clausen Kevin
Clausen Preben

kc@dmu.dk
pc@dmu.dk

FINLANDE

Kahanpää Lauri

lauri.v.kahanpaa@jyu.fi

FRANCE

Arnauduc Jean-Pierre
Boos Mathieu
Boutin Jean-Marie
Burgevin Philippe
Dalloyau Sébastien
Leray Gilles
Migot Pierre
Péré Caroline
Sarasa Mathieu
Schricke Vincent
Steinmetz Julien
Valéry Loïc
Veiga Jésus
Yesou Pierre

jparnauduc@chasseurdefrance.com
direction@naturaconsta.com
jean-marie.boutin@oncfs.gouv.fr
ph.burgevin@conservatoire-du-littoral.fr
sebastien.dalloyau@lpo.fr
gilles.leray@oncfs.gouv.fr
pierre.migot@oncfs.gouv.fr
caroline.pere@fdc33.com

vincent.schricke@oncfs.gouv.fr
julien.steinmetz@oncfs.gouv.fr
lvalery@mnhn.fr
jesusveiga@hotmail.fr
pierre.yesou@oncfs.gouv.fr

GERMANY

Kowallik Christine
Kleinhenz Anke
Kruckenberg Helmut
Mooij Johan

christine.kowallik@bswr.de
anke.kleinhenz@wzw.tum.de
helmut.kruckenberg@blessans.de
johan.mooij@t-online.de

GREECE

Logotheti Annita

a.logotheti@spp.gr

INDIA

Humbert-Droz Blaise

blaisehumbert@gmail.com

IRELAND

Colhoun Kendrew
Mackie Kerry
McElwaine Graham
Murphy Gerry

i.webs@virgin.net
kerry.mackie@wwt.org.uk
grahammcelwaine@btinternet.com
gbmurphy@eircom.net

ICELAND

Gudmundsson Gudmundur mummi@ni.is

KASAKHSTAN

Timoshenko Alexey naur_timoshenko@mail.com

MEXICO

Molina Fabiola fademoca@gmail.com

Palacios Castro Eduardo epalacios@cicese.mx

NETHERLANDS

Dokter Adriaan a.m.dokter@uva.nl

Ebbing Bart bart.ebbing@wur.nl

Ebbing-Dallmeijer Doortje doortje.dallmeijer@gmail.com

Fokkema Wimke w.fokkema@rug.nl

Grishchenko Mikhail mikhail.grischenko@wur.nl

Koffijberg Kees kees.koffijberg@sovon.nl

Muskens Gerhard gerard.muskens@wur.nl

Nolet Bart b.nolet@nioo.knaw.nl

Ottenburghs Jente jente.ottenburghs@wur.nl

Ouweneel Gerard glo@xs4all.nl

Ouweneel Elizabeth glo@xs4all.nl

Revoort Henk h.revoort@mineleni.nl

Van Bommel Frans f.vanbommel@mineleni.nl

Van Wieren Sip sip.vanwieren@wur.nl

Van der Jeugd Henk h.vanderjeugd@nioo.knaw.nl

Van der Valk Joachim joachim.vandervalk@vogelbescherming.nl

Voslamber Berend berend.voslamber@sovon.nl

NORWAY

Follestad Arne arne.follestad@nina.no

POLOGNE

Bobrek Kamila kamila.bobrek@up.wroc.pl

RUSSIA

Dorofeev Dmitry dmitrdorofeev@gmail.com

Kondratyev Alexander akondratyev@mail.ru

Morozov Vladimir piskulka@rambler.ru

Pokrovskaya Olga olga.b.pokrovskaya@gmail.com

Rozenfeld Sonia rozenfeldbro@mail.ru

Zaynagutdinova Elmira zem9@rambler.ru

SWEDEN

Nilsson Leif leif.nilsson@bio.lu.se

UNITED KINGDOM

Ellis Matt matt.ellis@basc.org.uk

Rees Eileen eileen.rees@wwt.org.uk

Silk Matthew mjs234@exeter.ac.uk

Stillman Richard rstillman@bournemouth.ac.uk

USA

Ward David dward@usgs.gov

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