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6th International Swan Symposium

6th
International
Swan Symposium
16-19 Oct 2018
Tartu, Estonia

Programme and book of abstracts

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Welcome to Tartu

6th International Swan Symposium

Main building of Estonian University of Life Sciences, Kreutzwaldi 1, Tartu, Estonia:

16–19 October 2018

We warmly welcome you to Tartu for the 6th International Swan Symposium, hosted jointly by the Estonian University of Life Sciences and the Estonian Ornithological Society, and co-organised with the Wildfowl and Wetland Trust from the UK. We sincerely thank our Partners and Sponsors for their support of the meeting.

The International Swan Symposium is a truly international event, which continues a series of meetings of the Wetlands International/IUCN-SSC Swan Specialist Group (SSG) held over the past 45 years. The SSG is a global network of swan specialists working on the monitoring, research, conservation and management of swan populations. In particular, it aims to facilitate effective communication, and to transfer of knowledge and best practice, between SSG members and others with an interest in swan management and conservation. Previous international symposia of the Wetlands International/IUCN-SSC Swan Specialist Group have been held at Slimbridge (UK, 1971), Sapporo (Japan, 1980), Oxford (UK, 1989), Virginia (USA, 2001), and Maryland (USA, 2014). Information about these meetings and the SSG's recent activities are available on the group's website at http://www.swansg.org/.

In 2018, the 6th International Swan Symposium will be held from 16–19 October in the main building of Estonian University of Life Sciences in Tartu, Estonia. The symposium aims to share knowledge on swans from across the globe, with information presented on their biology, habitats, population dynamics, census techniques, monitoring, management and conservation. A workshop on the implementation of the AEWA International Single Species Action Plan for the conservation of the Bewick's Swan is scheduled for the last day of the meeting. We have excellent speakers from Eurasia and America, with 36 oral presentations and 12 posters covering a variety of swan species. We anticipate more than 80 delegates from 17 countries, and have planned a full itinerary for your visit.

We hope that you will take this opportunity to discover Tartu, which is a second largest city in Estonia with populated of 100,000 people. It is a historical Hanseatic city and a main university town. Dating back to 1030, it is the oldest city in Estonia. We encourage you to visit the University of Tartu's main building, the Town Hall Square, Toome Hill, the Estonian National Museum and St John's Church, which is a famous for its thousands of medieval terracotta figures.

We look forward to seeing our old friends and meeting new ones.

Welcome!

Leho Luigujõe
Estonian University of Life Sciences

Eileen C. Rees
Wildfowl and Wetland Trust

Margus Ots
Estonian Ornithological Society

A Mute Swan incubating a clutch of eggs in spring. Photo credit: Kevin Wood.

Scientific Committee

Dr Kevin Wood (Chair):	Principal Research Officer, Wildfowl & Wetlands Trust, UK.
Dr Preben Clausen:	Senior Researcher, Department of Bioscience, Aarhus University, Denmark.
Dr Craig Ely:	Research Wildlife Biologist, Alaska Science Centre, US Geological Survey (USGS), USA.
Professor Cao Lei:	Professor, University of Science and Technology, People's Republic of China.
Dr Aivar Leito:	Research Professor, Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Estonia.
Dr Eileen Rees:	Research Fellow, Wildfowl & Wetlands Trust, UK.
Dr Jeff Snyder:	Assistant Professor, Department of Biology, Western Oregon University, USA.
Dr Diana Solovyeva:	Leading Researcher, Institute of Biological Problems of the North, Russian Academy of Sciences, Russia.
Dr Radosław Włodarczyk:	Assistant Professor, Department of Biodiversity Studies and Bioeducation, University of Lodz, Poland.

Programme

15.10.2018, Monday

	ARRIVAL

16.10.2018, Tuesday

9.00 - 9.30	**REGISTRATION AND COFFEE**
9.30 - 10.00	**WELCOME**
	PLENARY/ KEYNOTE
10.00-10.40	Eileen C. Rees, Lei Cao, Jonathan Coleman, John Cornely, Craig R. Ely, Carl Mitchell, Jeff W. Snyder & Yerko A. Vilina - **The conservation status of the world's swan populations**
10.40-11.00	**Coffee**
	SESSION: TRENDS IN NUMBERS
11.00 - 12.20	Leif Nilsson - **Changes in number and distribution of wintering Mute Swans (*Cygnus olor*) in Sweden, 1967 -2017**
11.20 - 11.40	Kevin A. Wood, Martin J. Brown, Ruth L. Cromie, Geoff M. Hilton, Conor Mackenzie, Julia L. Newth, Deborah J. Pain, Christopher M. Perrins, Eileen C. Rees - **Mute Swan population recovery following regulation of environmental lead in Great Britain**
11.40 - 12.00	Yerko A. Vilina, Romina V. Flores, Nelson Lagos - **Population Trends of Black-necked Swan (*Cygnus melanocoryphus*) in a Mediterranean Wetland of Chile**
12.00 - 14.00	**Lunch / posters to the wall**
	SESSION: TRENDS IN NUMBERS
14.00 - 14.20	Preben Clausen, L. Nilsson, T. Langendoen, Rasmus due Nielsen, Ib Krag Petersen, A.D. Fox - **Implications for flyway-population estimates when adding the unknowns: estimating annual national totals of swans and coots from regular IWC and irregular national censuses in Denmark and Sweden 1968-2016**
14.20 - 14.40	Sergey A. Kouzov, E. M. Zaynagutdinova, I. M. Mikhailov, P. R. Batova - **Spring stopovers of swans on the Gulf of Finland**
14.40 - 15.00	Julius Morkūnas, Rasa Morkūnė - **Expansion of Northwest European Whooper Swan population and European Mute Swan population**

15.00 - 15.20	Yerko A. Vilina, Hernán Cofré, Leslie Ramírez - **Colonization and Population Trends of the Coscoroba Swan (*Coscoroba coscoroba*) in a Mediterranean Wetland in Central Chile**
15.20 - 16.00	**Coffee**
	SESSION: POPULATION CENSUS
16.00 - 16.20	Colette Hall, Olivia Crowe, Graham McElwaine, Ólafur Einarsson, Neil Calbrade, Eileen C. Rees - **The Icelandic Whooper Swan: a steadily growing population**
16.20 - 16.40	Preben Clausen, B. Laubek, L. Nilsson, J. Wahl, C. Sudfelt, M. Wieloch, W. Meissner, P. Shimmings, Bjørn Harald Larsen, M. Hornman, T. Langendoen, A. Lehikoinen, L. Luigujõe, A. Stīpniece, S. Svazas, L. Sniaukstra, V. Keller, C. Gaudard, K. Devos, Z. Musilová, N. Teufelbauer, E. Rees, A.D. Fox - **Development of the Northwestern European Whooper Swan *Cygnus cygnus* population, January 1995-2015: results of international mid-winter counts at five-year intervals**
16.40 - 18.30	**POPULATION CENSUS WORKSHOP**
18.30 - 21.30	**WELCOME RECEPTION**

17.10.2018, Wednesday

	SESSION: HABITAT AND RESOURCE USE
9.00 - 9.20	Elmira M. Zaynagutdinova, I. M. Mikhailov - **Feeding of Bewick's swans during spring migration on the south coast of the Russian part of the Gulf of Finland**
9.20 - 9.40	Sergey Kouzov, V. Nikitina, A. Burdo, A. Kravchuk - **Features of Mute Swan feeding on Kurgalsky peninsula in spring season and role of diatoms in Swans diets**
9.40 - 10.00	Hans-Joachim Augst, Bernd Hälterlein, Katrin Fabricius - **From stopover to wintering: Bewick`s Swans in Schleswig-Holstein/Northern Germany in winter 2017/2018**
10.00- 10.20	Jeffrey W. Snyder - **Analysis of aquatic macrophyte abundance and distribution in Henry's Fork of the Snake River Trumpeter Swan (*Cygnus buccinator*) wintering ground through Harriman State Park of Idaho, 1988 and 2011-2017**
10.20 - 10.40	Wim Tijsen, Kees Koffijberg - **The ups-and-downs in polder Wieringermeer, Netherlands, as a staging area for Bewick's Swans**

10.40 - 11.20	**Coffee**
	SESSION: BREEDING BIOLOGY
11.20 - 11.40	Jeffrey W. Snyder, Bill Long, Victoria B. Fliehr - **Trumpeter Swan (*Cygnus buccinator*) egg temperatures in relation to cygnet survivorship in the Yellowstone ecosystem**
11.40 - 12.00	Randall T. Knapik, David R. Luukkonen, Scott R. Winterstein - **Assessment of density dependence in breeding productivity of a North American Mute Swan population**
12.00 - 12.20	Diana Solovyeva, Anastasia Mylnikova, Sergey Vartanyan - **Living child-free: density-dependent regulation in Bewick's Swans (*Cygnus columbianus bewickii*)**
12.20 - 14.00	**Lunch**
	SESSION: MOVEMENTS AND MIGRATION
14.00 - 14.20	Dmitrijs Boiko, Martin Wikelski - **Moulting sites of Latvian Whooper Swan (*Cygnus cygnus*) cygnets tagged with transmitters in summer 2016**
14.20 - 14.40	Gyula Kovács, Péter Szinai, Tamás Tari, Dániel Winkler - **GPS telemetry of Mute Swan in Hungary – preliminary results**
14.40 - 15.00	Craig R. Ely, David C. Douglas - **Influence of Breeding Latitude on Timing of Spring Migration in the Largest Arctic-breeding Bird**
15.00 -15.20	Junjian Zhang, Xueqin Deng, Diana Solovyeva, Anastasia Mylnikova, Olga Prokopenko, Alexey Antonov, Thomas Lameris, Lei Cao - **Migration of Tundra Swans (*Cygnus columbianus bewickii*) in the Eastern Palearctic using GSM tracking: difference between two breeding populations**
15.20 - 16.00	**Coffee, posters down**
	SESSION: MOVEMENTS AND MIGRATION
16.00 - 16.20	Radosław Włodarczyk, Tomasz Janiszewski, Adam Kaliński - **Some notes about Mute Swan (*Cygnus olor*) population demography based on recovery data**
16.20 - 16.40	Ruslans Matrozis - **30 years (1988-2017) of the study of a Mute Swan (*Cygnus olor*) population in Riga (Latvia)**
16.40 - 17.00	Sergey Kouzov, A. Kravchuk - **Influence of spring phenology on migration strategies of swans and their use of different types of migration sites in the Eastern part of the Gulf of Finland**

17.00 - 17.20	Yerko A. Vilina, Romina V. Flores, Nelson Lagos - **Population Trends of the Black-necked Swan (*Cygnus melancoryphus*) in the most relevant wetlands of Central Southern Chile**
	Dinner on your own in downtown

18.10.2018, Thursday

8.30 - 17.00	**Field trip to Eastern Estonia**
	(Tartu-Ilmatsalu-Laeva-Mustvee-Kodavere-Lahepera-Kolkja-Aardlapalu)
18.00 - ...	**Conference dinner**

19.10.2018, Friday

	SESSION: CONSERVATION OF THE NORTHWEST EUROPEAN BEWICK'S SWAN POPULATION
9.00 - 9.20	Eileen C. Rees, Nina Mikander, Szabolcs Nagy - **Bewick's Swan Expert Group: implementation of the AEWA Single Species Action Plan within range states**
9.20 - 9.40	Kevin A. Wood, Julia L. Newth, Kane Brides, Mike Burdekin, Anne L. Harrison, Steve Heaven, Charlie Kitchin, Leigh Marshall, Carl Mitchell, Jessica Ponting, Dafila K. Scott, Jon Smith, Wim Tijsen, Geoff M. Hilton, Eileen C. Rees - **Bewick's Swans in NW Europe: do changes in population size reflect changes in food resources?**
9.40 - 10.00	Kees Koffijberg, Menno Hornman - **Back to the roots: long-term changes in feeding habits of Bewick's Swans (*Cygnus columbianus bewickii*) in The Netherlands**
10.00- 10.20	Rascha J.M. Nuijten, Kevin A. Wood, Trinus Haitjema, Eileen C. Rees, B.A. Nolet - **Phenological changes in a migratory swan coping with climate change**
10.20 - 11.00	**Coffee**
	SESSION: CONSERVATION OF THE NORTHWEST EUROPEAN BEWICK'S SWAN POPULATION
11.00 - 11.20	Rascha J.M. Nuijten, Bart A. Nolet - **Aquatic foraging during Bewick's Swan migration: the significance of the White Sea (part 2)**

11.20 - 11.40	Julia L Newth, A. Belousova, P. Glazov, S. Uvarov, S. Kanyukov, G. Mikhailova, A. Chistiakov, I. Semenov, R.A. McDonald, A. Nuno, S. Bearhop, S. Dench R. L. Cromie, Kevin A Wood, Eileen C. Rees - **Reducing the poaching of Bewick's Swans in the Russian Arctic**
11.40 - 12.00	Viv Jones, Carole Roberts, Gina Charnely, Tatyana Moisenko, Hannah Robson - **Can lake sediments be used to understand Bewick Swan (*Cygnus columbianus bewickii*) declines? Determining trajectories of ecological change in Arctic lakes using palaeolimnology**
12.00 - 12.20	S. B. Rozenfeld, S. V. Volkov, N. V. Rogova, M. Yu. Soloviev, G. V. Kirtaev, D.O. Zamyatin, D. Vangeluwe - **The Bewick Swan (*Cygnus columbianus bewickii*): Expansion of the Asian populations to the west. Is this true?**
12.20 - 14.00	**Lunch**
	SESSION: CONSERVATION OF THE NORTHWEST EUROPEAN BEWICK'S SWAN POPULATION
14.00 - 14.20	Preben Clausen, Pelle Andersen-Harild, Hans Erik Jørgensen, Bjarke Laubek, Rasmus Due Nielsen, Ib Krag Petersen, Uffe Gjøl Sørensen, A.D. Fox - **The stable, the declining and the increasing: results from 50 years of swan censuses in Denmark 1967-2016 explained**
14.20 - 14.40	Leho Luigujõe - **Bewick's Swan in Estonia and their conservation**
14.40 - 15.40	**CONSERVATION OF THE NORTHWEST EUROPEAN BEWICK'S SWAN POPULATION WORKSHOP**
15.40 - 16.00	**Coffee**
16.00 - 18.00	**CONSERVATION OF THE NORTHWEST EUROPEAN BEWICK'S SWAN POPULATION WORKSHOP**
	Dinner on your own in downtown

POSTER SESSION

(Tuesday-Wednesday, possibly into Friday)

- Dmitrijs Boiko, Julius Morkūnas - **Distribution, size and habitat choice of the Whooper Swan population breeding in Latvia and Lithuania, 1973 – 2017**
- Jeffrey W. Snyder, Carl D. Mitchell, David Delehanty, David Bush - **Efficacy of micro-radio transmitters placed on newly-hatched Trumpeter Swan (*Cygnus buccinator*) cygnets at Grays Lake National Wildlife Refuge, Idaho, USA**
- Dmitrijs Boiko, Julius Morkūnas - **Natal dispersal of Whooper Swans in Latvia and Lithuania**
- Vladimir Borisov, Larisa Cheblikyna - **Nesting and autumn migration of swans on the east coast of the Pskov-Chudskoye Lake**
- Leho Luigujõe, Kalev Rattiste - **Numbers, distribution and trends of swans wintering in Estonia**
- Julius Morkūnas, Liutauras Raudonikis, Vita Monkuvienė - **Overlap of electricity grid and swan staging areas in Lithuania**
- Leho Luigujõe, Kalev Rattiste - **Swan monitoring in Estonia**
- Sergej A. Soloviev, Irina A. Shvidko, Oleg S. Soloviev - **Swans of the south-western part of Western Siberia**
- Eileen C. Rees, Larry R. Griffin, Baz Hughes - **Tracking Bewick's Swans in relation to wind farms: the importance of cumulative impact assessment**
- Rascha J.M. Nuijten, Kevin A. Wood, Trinus Haitjema, Eileen C. Rees, Bart A. Nolet - **Migratory swans adapting to climate change: short-stopping or short-staying?**
- Bill Long, Doug Smith, Walter Wehtje Bill Rudd - **Connecting the dots: Partnering to restore Trumpeter Swan (*Cygnus buccinator*) populations in the Greater Yellowstone Ecosystem through the release of captive birds**
- Hekki Hanso **– Väike Väin power line - a great danger to staging and migrating waterfowl.**

POST-CONFERENCE EXCURSIONS (extra cost)

- 20.10.2018, Saturday, 8.30 - 20.00, one bus (40 pers)
  Soomaa National Park, Pärnu Bay, Overnight at Ojako

- 21.10.2018, Sunday, 8.30 - 20.00
  Matsalu National Park, Overnight at Haeska

- 22.10.2018, Monday, 8.30 - 15.00
  Silma Nature Reserve, Bus will stop at Tallinn Airport

Whooper Swans amongst a flock of Common Pochard at WWT Welney (eastern England). Photo credit: Dan Evans

ABSTRACTS

Session: Plenary

Tuesday 16th; 10:00–10:40

A Whooper Swan coming in to land. Photo credit: Juha Soininen / WWT.

The conservation status of the world's swan populations.

Eileen C. Rees[1], Lei Cao[2], Jonathan Coleman[3], John Cornely[4], Craig R. Ely[5], Carl Mitchell[6], Jeff W. Snyder[7] & Yerko A. Vilina[8]
[1]Wildfowl & Wetlands Trust, United Kingdom; [2]University of Science and Technology, People's Republic of China; [3]Queensland, Australia; [4]Trumpeter Swan Society, USA; [5]US Geological Survey, USA; [6]U.S. Fish & Wildlife Service (retired), USA; [7]Western Oregon University; [8]Universidad Santo Tomás, Chile.

Recent estimates of the world's "true" swan populations (*Cygnus* sp.) indicate that there are currently between 1.3–2.3 million birds in 7 species, increasing by 10–25,000 individuals (in 8 species) if the Coscoroba Swan (*Coscoroba coscoroba*) is included as an honorary swan. Much of the uncertainty relates to the number of swans in the Southern Hemisphere, particularly for Black Swans (*Cygnus atratus*) in Australia. Long-term monitoring in Europe and North America indicates that most populations increased following the introduction of national and international legislation to protect the species during the early- to mid-20th century. Trumpeter Swan (*Cygnus buccinator*) notably increased from just 69 individuals known to exist in 1935 (although some flocks were not recorded at the time) to c. 63,000 birds at the present time. The increase in North American and European populations is also associated with a shift by the birds from their traditional wetland habitats (including areas lost through drainage) to feed on farmland, especially arable crops and improved pasture. Less is known about the trends and conservation status for the swans in central and eastern Asia and for the Southern Hemisphere species, though count and research programmes introduced in China added to those underway in Japan and Korea have greatly enhanced our knowledge of swan populations on the East Asian flyway. Most of the Northern Hemisphere swan populations have continued to show increasing/stable trends over the last 20 years, an exception being the decline in the NW European Bewick's Swans since the mid-1990s following an increase in its population size during the 1970s–1980s. This is now being addressed through implementation of an AEWA International Single Species Action Plan, developed to improve the conservation status of this population. Plans to change enforcement regulations of the Migratory Bird Treaty Act in the United States are also of concern as potentially undermining protection for Trumpeter Swans in North America. Trends for the Black Swans in Australia and for the Black-necked Swan (*Cygnus melancoryphus*) in South America are poorly known, because of the large numbers involved for the former and a lack of coordinated counts across difficult terrain for the latter. The Black-necked Swan is considered susceptible to droughts associated with El Nino events and climate change, and more extensive monitoring is required to determine whether the species is fluctuating or in decline.

Session: Trends in numbers

Tuesday 16th; 11:00–15:20

A Whooper Swan coming in to land. Photo credit: Juha Soininen / WWT.

Changes in number and distribution of wintering Mute Swans Cygnus olor in Sweden, 1967 -2017

Leif Nilsson[1]
[1]*University of Lund, Sweden.*

Wintering Mute Swans have been surveyed in Sweden within the framework of the International Waterfowl Counts since the start in January 1967. In addition to the IWC-counts three country-wide surveys were undertaken. The annual midwinter indices for the Mute Swan have shown a significant increasing trend since the start of the counts. Numbers from the countrywide surveys indicate an increase from 7300 wintering Mute Swans in the country in 1971 to about 50000 in January 2015. Mute Swans were found wintering along the coasts of south Sweden and also in smaller numbers inland. Over the years there was a marked shift in the distribution of the species with the majority in the south in 1971 with only about 20% found in the archipelagos of the east coast to less than 20% here in 2015 and more than 50% in the east coast archipelagos. Larger flocks were mostly found in shallow areas in the southern parts of the country, whereas the Mute Swans in the archipelagos were well spread even found at the outermost skerries in the Stockholm archipelago. In mild winters these swans stayed close to the breeding sites feeding on submerse vegetation in sheltered places among the small islands. Indices from the Swedish breeding bird surveys showed a similar increasing trend as the winter counts. The increase in wintering numbers and distribution was more marked, probably an effect of milder winters in the Baltic making it possible for the swans to winter in the archipelagos and further north.

Regulation of environmental lead results in wildlife population recovery.

Kevin A. Wood[1], Martin J. Brown[1], Ruth L. Cromie1, Geoff M. Hilton[1], Conor Mackenzie[1], Julia L. Newth[1,2], Deborah J. Pain[1], Christopher M. Perrins[3] & Eileen C. Rees[1]
[1]Wildfowl & Wetlands Trust, United Kingdom; [2]University of Exeter, United Kingdom; [3]University of Oxford, United Kingdom.

Legal regulation of human activities is a key mechanism for alleviating anthropogenic impacts on biodiversity. While conservationists frequently request the regulation of toxic substances such as lead, which can be harmful to animals even at low levels of exposure, no studies to date have assessed population-level responses to such regulation. Without an understanding of the effectiveness of legislation, such regulations may be undermined or revoked and opportunities to make amendments to improve the legislation may be missed. Here, we show that the increase in the Mute Swan *Cygnus olor* population in Great Britain over 49 years was best explained by the regulation of lead fishing weights, rather than by changes in food supplies or winter temperature. We also found a reduction in the proportion of individuals dying of lead poisoning after regulation, suggesting that higher survival rates were the demographic driver of increased population size. Legal restriction therefore succeeded in alleviating, although not eliminating, the impact of poisoning on mute swans. Restrictions on the use of toxic substances, and their release into the environment, would provide an effective conservation mechanism for reducing negative effects of human activities on wildlife populations. At a time when many policy makers prefer to rely on voluntary actions or market forces to achieve change, our study highlights that legal regulations on human activities can be an effective means of alleviating anthropogenic impacts on biodiversity.

Population Trends of Black-necked Swan (*Cygnus melancorhypus*) in a Mediterranean Wetland of Chile.

Yerko A. Vilina[1], Romina V. Flores[1,2] & Nelson Lagos[1]
[1]Universidad Santo Tomás, Chile; [2]Universidad de Chile, Chile.

The lagoons, estuaries and saltmarshes are a system that conform the El Yali wetland, which is one of the most important Mediterranean region wetlands for the diversity of Chilean waterbirds. Since 1996, only a part of this wetland is protected as a National Reserve and as a Ramsar site (Costera, Matanza and Colejuda lagoons). El Yali wetland is a relevant area for the conservation of the Black-necked Swan and other waterbird species. During rainy winters this swan feeds in the wetland in significant numbers of individuals and after the occurrence of El Niño-Southern Oscillation (ENSO), the swans that remain during spring and summer also breed here. Since 1989, in this study we analysed the population trends of Black-necked Swan in the different lagoons that compose El Yali wetland. The importance of the protected area by the Natural Reserve and the Ramsar Convention has lost its relevance due to natural disturbances, the occurrence of a tsunami in 2010 that affected the Costera lagoon and also by human impact due to the illegal extraction of water, the Matanza lagoon has been drained. The most relevant site for the swans and place where the swans breed are not protected, are private areas that are subject to a strong pressure for the use of its waters destined for agriculture and holiday houses. Only in these sites the abundances of Black-necked Swan continue to be associated to the rainfall caused by ENSO.

Implications for flyway-population estimates when adding the unknowns: estimating annual national totals of swans and coots from regular IWC and irregular national censuses in Denmark and Sweden 1968-2016.

Preben Clausen[1], Leif Nilsson[2], Tom Langendoen[3], Rasmus Due Nielsen[1], Ib Krag Petersen[1] & A.D. Fox[1]
[1]Aarhus University, Denmark; [2]University of Lund, Sweden; [3]Wetlands International, The Netherlands.

Population estimates for many waterbird populations that winter in inland and near-coastal shallow waters in Northwest Europe have hitherto primarily been based on mid-winter censuses dominated by counts undertaken in the Iberian Peninsula, France, Benelux, the British Isles, and to some extent western Germany, Denmark and southern Sweden, because areas further north and east very often were frozen during midwinter. However, because of global warming, winter distributions of increasing populations of several species are known to have spread northeast of their traditional range. As a result, such populations increasingly occur in extensive coastal areas where numbers of potential volunteer bird-counters are lower, and 'full' coverage requires a large investment in aerial surveys, staff, volunteer coordination and data management, a capacity far beyond current capabilities. For this reason, Denmark and Sweden have contributed annual International Waterbird Census (IWC) counts from a "reduced site network", and undertaken irregular complete national censuses outside of this IWC-site network. In Denmark, complete censuses were made in 15 winters between 1968 and 2016. In Sweden, large-scale censuses covering more than 2/3 of the coastline (except the furthest northeastern part, in Bothnian Sea and Bay, which continues to be regularly frozen) were made during 8 years in the same period, 7 of which were also counted in Denmark. In this paper, we explore the contribution of these non-IWC data, involving thousands of birds (e.g. 67 % of both the national Danish and Swedish total of Mute Swans during the last national censuses), to overall trends and population estimates for Mute Swan *Cygnus olor*, Whooper Swan *C. cygnus* and Eurasian Coot *Fulica atra*. That is three species wintering in large numbers around the Baltic Sea where we know that an increasing proportion of populations have been counted outside the IWC network in recent years.

Spring stopovers of swans on the Gulf of Finland.

S. A. Kouzov[1], E. M. Zaynagutdinova[1], I. M. Mikhailov[2] & P. R. Batova[1]
[1]Saint Petersburg State University, Russia; [2]LLC «Eco Express Service».

Information on all spring migratory stops of swans on the Gulf of Finland was collected for the study. The materials published in Russian were analysed, as well as unpublished data from various researchers. Counts were conducted almost on all stops in 2018. Long-term observations were carried out on several areas. The number of Whooper Swans and Bewick's Swans has significantly decreased compare to the 1970s on the Gulf of Finland. In the 1970s, up to 2000 Bewick's Swans had stopovers on the Lebyazhye and in the eastern part of the Neva Bay (Malchevsky, Pukinsky 1983). In the 21st century, up to 2000 swans could be found on the Kurgalsky Peninsula only. Up to 400 swans were observed in the reserve "Northern coast of the Neva Bay", about 100 birds have stops in the reserve "Lebyazhye" and on the Moshchny Island. These are the largest swan stopovers on the Gulf of Finland in the present days. On the other areas flocks of several dozen birds have stops. The number of birds in the stopovers varies greatly over the years, and in certain seasons it can decrease by an order of magnitude. In the 1980s, stopovers in St. Petersburg near the Krestovsky Island (400 Whooper Swans in 1975), near the Vasilievsky Island (up to 2000 Bewick's Swans in 1975), at the mouth of the Great Neva (several dozen birds in 1980s) (Malchevsky, Pukinsky 1983) almost disappeared due to the growth of new areas of the city. Also in the 2000s, two stopovers disappeared due to the construction of the Port of Bronka and the Ust-Luga Port (about 200 birds). Currently, the most intense anthropogenic impact is experienced by the Kronstadt Colony, Lakhta, the mouth of the river Luga, the Vyborgsky reserve, the Berezovye Islands. The main negative factors are water turbidity, construction of ports and urban infrastructure, dredging and extraction of sand from the bottom.

Expansion of Northwest European Whooper Swan population and European Mute Swan population.

Julius Morkūnas[1,2] & Rasa Morkūnė[1]
[1]Klaipėda University, Lithuania; [2]Lithuanian Ornithological Society, Lithuania.

The Whooper Swan was almost extinct in Europe at the end of the 19th century and Mute Swan in the 18th century. Very few pairs of Whooper Swans were left breeding in Sweden and Finland. But there were stable numbers of Whoopers Swans in Russia. The Mute Swan main core breeding population was in the United Kingdom, the Netherlands and Denmark. Populations of both swans started to change in 1950, when Whooper Swans started to expand their breeding range to the Baltic Sea countries and Mute Swans expanded their breeding range in all directions. The populations of these species were allopatric and the distance between them was 800 km. By 1977 the Mute Swan breeding range had expanded 1.7 times, and Whooper Swan 1.5 times. The Mute Swan was breeding in major parts of Europe and Whooper swans expanded to southern areas of Sweden and Finland. During this period breeding range of species overlapped and both species were breeding across 16500 km^2. By 1997 in a period of 20 years Mute Swan breeding range had expanded 2.5 times, as the species started to breed in Norway and Finland. The Whooper Swan population expanded 1.8 times, and the species started to breed in the Baltic states. The overlap of breeding range was 15.2 times and was 251000 km^2. Whooper Swan breeding range expanded to the south 477 km, and Mute Swans to the north by 123 km. By 2014 Mute Swans had expanded their breeding range to 3966000 km^2, and Whooper Swan had expanded 1.7 times to 2273000 km^2 of breeding range. Whooper Swans expanded their breeding range to the south 489 km and Mute Swans to the north 177 km. Overlap of breeding range was 724000 km^2. From 1950 Whooper Swan and Mute Swan breeding ranges increased respectively by 4.7 and 4.9 times. Sympatric breeding range from 1977 to 2014 increased 43.5 times. Average speed of breeding range expansion was 30.22 km for Whooper swan and 10.56 km for Mute Swans. Improved conditions on the wintering grounds and better protection status for both species were the drivers of population growth. The increase in the numbers of breeding pairs in overlapping territories has caused competition for nesting resources; Whooper Swans have started to overtake Mute Swans breeding territories.

Colonization and Population Trends of the Coscoroba Swan, *Coscoroba coscoroba* in a Mediterranean Wetland in Central Chile

Yerko A. Vilina[1], Hernán Cofré[2] & Leslie Ramírez[1]
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This study represents the process of colonization by the Coscoroba Swan of the Mediterranean wetlands of Central Chile. This species was confined to the wetlands of the extreme south of Chile. In our long term population studies on waterbirds that inhabit the El Yali wetland (33º 47' S, 71º 39' W), a partially protected site by the Ramsar convention, we recorded in 1989 for the first time, five adult individuals of this swan species in the wetland. This record, was registered 1,480 km further north of its known distribution range. From that instance the population grew exponentially and began to breed in the El Yali wetland. By 2013, the population reached its maximum of 561 adults. Although, in the recent years the population has been fluctuating in an irregular form and, its abundance has decreased probably due to a prolonged drought and human impact. Recently, it has colonized other Mediterranean wetlands and some of them are successfully breeding.

Session: Population census

Tuesday 16th; 16:00–18:30

Trumpeter Swans feeding near the Skagit River Delta (Washington, USA). Photo credit: Walter Siegmund

The Icelandic Whooper Swan: a steadily growing population

Colette Hall[1], Olivia Crowe[2], Graham McElwaine[3], Ólafur Einarsson[4], Neil Calbrade[5] & Eileen Rees[1]
[1]Wildfowl & Wetlands Trust, United Kingdom; [2]BirdWatch Ireland, Republic of Ireland; [3]Irish Whooper Swan Study Group, United Kingdom; [4]Reykjavik, Iceland; [5]British Trust for Ornithology, United Kingdom.

Results from the 2015 international census of Icelandic Whooper Swans clearly indicated a continued growth in the population. The census total of 34,004 birds was 115% higher than the lowest total (15,842) recorded in 1995 and the highest recorded to date. With the exception of Northern Ireland, all countries within the wintering range saw an increase in numbers in 2015 compared with the previous census in 2010. The results also indicated a continuation in the overall shift to the southeast in the swans' winter distribution; between censuses, Britain has seen a gradual increase in the proportion of the population it supports, particularly in England, whilst conversely Ireland has seen a continued decline. Whilst the results of the census has provided us with some insight into the current size and distribution of the Icelandic Whooper Swan population, the drivers behind the increasing population size and the suggested shift in distribution have yet to be determined. Whilst the population has seen consistently good breeding seasons in recent years, it is uncertain whether this may have been enough to sustain the growth in the population. It is possible that changes in survival may also be accountable for the trend; however, further analysis of ring re-sighing data is required to determine whether there has been a decrease in annual mortality. It is also possible that numbers in Britain have been inflated by birds moving across from mainland Europe, as some interchange between the Icelandic and Northwest European populations of Whooper Swan is known to occur. However, the level of exchange and the extent to which this varies from year to year is currently unknown. It is clear that further investigation and research is required to gain a better understanding of the extent to which the different demographic variables are accounting for the trends.

Development of the Northwestern European Whooper Swan *Cygnus cygnus* population, January 1995-2015: results of international mid-winter counts at five-year intervals.

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[1]Aarhus University, Denmark; [2]Sæby, Denmark; [3]University of Lund, Sweden; [4]Federation of German Avifaunists, Germany; [5]Ornithological Station, MIZ PAS, Poland; [6]University of Gdańsk, Poland; [7]Norwegian Ornithological Society/BirdLife Norway, Norway; [8]Eina, Norway; [9]Dutch Centre for Field Ornithology (SOVON), The Netherlands; [10]Wetlands International, The Netherlands; [11]University of Helsinki, Finland; [12]Estonian University of Life Sciences, Estonia; [13]University of Latvia, Latvia; [14]Lithuanian Nature Research Centre, Lithuania; [15]Lithuanian Ornithological Society, Lithuania; [16]Swiss Ornithological Institute, Switzerland; [17]Ligue pour la Protection des Oiseaux, France; [18]Research Institute for Nature and Forest, Belgium; [19]Czech University of Life Sciences, Czech Republic; [20]BirdLife Österreich, Austria; [21]Wildfowl & Wetlands Trust, United Kingdom.

Internationally coordinated censuses of Whooper Swans in continental northwestern Europe were undertaken in mid-winter of 1995, 2000, 2005, 2010 and 2015. The count in excess of 112,000 in 2015 was the highest to date and compared to 59,000 in 1995, a 90% increase in overall abundance at an annual rate of increase of 3.1%. The largest increase (188%) was in Denmark, where numbers increased from 21,740 in 1995 to 62,620 in 2015. In the 2015 census, most individuals were counted in Denmark (51%), Germany (28%), Sweden (9%), Poland (4%) and the Netherlands (2%). There were declines in the proportions in mid-winter in Sweden from 14% to 9% and Poland from 6% to 4%, while Germany showed little overall change through the time series, suggesting a slight shift in the centre of gravity of the wintering population distribution to Denmark. The overall rate of change during 1995-2015 was almost twice the 1.6% per annum generated by Wetlands International from International mid-winter Waterbird Counts data during the same period, confirming the need for periodic complete surveys to track true changes in total population size.

Session: Habitat and resource use

Wednesday 17th; 09:00–10:40

Bewick's and Whooper Swans on the rape field in Estonia. Photo: Leho Luigujõe.

Feeding of Bewick's Swans during spring migration on the south coast of the Russian part of the Gulf of Finland.

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Nature reserve "*Lebjazhyi*" is one of the most important migration stopovers of Bewick's Swans (*Cygnus columbianus bewickii*) on the Russian part of the Gulf of Finland. The aim of the study was to identify the main feeding areas for Bewick's swans there, to determine the species of feeding plants and to define whether the identification of swan's feeding areas is possible on satellite images. Route counts of swans were conducted during the spring migration. GPS, rangefinder and the grid of poles helped to determine the exact coordinates of the birds on the water. Feeding or non-feeding was recorded as the type of behaviour activity. The distribution of two dominant species Fennel Pondweed (*Potamogeton pectinatus*) and green algae Cladophora (*Cladophora glomerata*) was studied in summer because pondweed sprouts appear after completion of the swan's migration. Cladophora dominated among the underwater vegetation in the reserve. However, the distribution of the swans on the territory did not depend on the distribution of Cladophora. As a result of the analysis, it was shown that feeding swans concentrated only in those areas where Fennel Pondweed grows. The biggest concentrations of swans were observed in the areas with the biggest concentrations of Fennel Pondweed. Such dependence hasn't been identified for non-feeding birds. They were evenly dispersed. Thus it has been suggested that the swans feed on Fennel Pondweed in the area of the study. This plant is a typical food for swans. In spring birds feed on the benthic starchy tubers of Fennel Pondweed and consume them during migration. Geobotanical investigations revealed that pondweed grows among the patches of reeds and rushes, which are easily identified on the satellite images. Moreover, the patches of underwater plants differ in colour characteristics on the images. The boundary of the swan's feeding area known before the field studies exactly coincided with the pondweed growth zone and distribution of feeding swans.

Features of Mute Swan feeding on Kurgalsky Peninsula in spring season and role of diatoms in swans diets.

S. Kouzov[1], V. Nikitina[1], A. Burdo[1] & A. Kravchuk[1]
[1]Saint Petersburg State University, Russia.

We studied Mute Swans feeding on Kurgalsky Peninsula in the eastern part of Gulf of Finland. Our study consisted of visual observations of foraging Mute Swans, collecting and examining their faecal samples and samples of vegetation in their feeding area between late February and early June 2015-2018. Unlike the Tundra and Whooper Swans the diet of Mute Swans contains only aquatic vegetation. Most part of their feeding consisted from algae. A small admixture of vascular plants, mainly *Stuckenia pectinata* in faecal samples was notable only in late February-March (wintering green fragments) and in late May-early June. In the end of February and March green algae Cladophora spp. dominated in the swans diets. In April the diversity of algae species was many times larger in water than in faecal samples. There were some species of other green algae and also red and brown algae species. *Ulva intestinalis* became numerous in faecal samples and in water during May. *Polysiphonia fucoides* was marked in samples in early June. However, these foods contain low amounts of calories, proteins, fats and amino acids, which are necessary for egg-laying. But we found mass development of diatoms in the samples of algae (up to 60% of volume). Analysis of faecal samples show that all diatoms were digested by Mute Swans except silica cell walls. The cytoplasm of diatoms is extremely rich in proteins (40%), fats (30%) and carbohydrates (30%). The diatoms contained all essential amino acids, lipids (unsaturated fats), green fatty acids, including essential lipoleic acids. The calorie content of diatoms is significantly higher than calorific value of all other algae. Diatoms must be considered as an important component of spring Mute Swans diets in pre-nesting and nesting period in the eastern part of Gulf of Finland.

From stopover to wintering: Bewick`s Swans in Schleswig-Holstein/Northern Germany in winter 2017/2018

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[1]Ornithological Working Group of Schleswig-Holstein and Hamburg, Germany.

In former years Schleswig-Holstein held up to a third of the northwest European population of Bewick`s Swans during some weeks, especially in March on their way to the next stopover sites in the Baltic countries. Beginning in February 2017 the maximum number (5,591) appeared earlier than before. Winter 2017/2018 started and ended with higher numbers; the maximum 8,364 was higher than ever (in brackets numbers one year before):
09 December 2017: 1,027 (292),
13 January 2018: 3,183 (641),
17 February 2018: 5,732 (1,971),
24 February 2018: 8,364 (5,591),
03 March 2018: 6,744 (5,187),
10 March 2018: 6,184 (4,633),
18 March 2018: 5,161 (1,977),
24 March 2018: 5,799 (611),
31 March 2018: 4,964 (21).
The reasons could be warmer temperatures in autumn, and unusual feeding on maize fields with unusual high numbers of grain. Over 200 sightings of more than 60 ringed birds on neck or feet showed the former stop over sites south or southwest of the river Elbe, how long they stayed (up to two months), frequent changes between individual sites in this small country and a short flying south or west to cope with a period of snow. In this winter Bewick`s Swans always appeared at new sites where they never have been observed before, so it was necessary to enlarge the areas on nearly each of the 9 synchronous counting events. There were other unusual behaviour patterns in this winter.

Analysis of aquatic macrophyte abundance and distribution in Henry's Fork of the Snake River Trumpeter Swan (*Cygnus buccinator*) wintering ground through Harriman State Park of Idaho, 1988 and 2011-2017.

Jeffrey W. Snyder[1]
[1]*Western Oregon University, USA.*

Aquatic macrophyte cover was quantified in 1988 and 2011-2017 along 68 random transects on the Henry's Fork of the Snake River Trumpeter Swan Wintering Ground through Harriman State Park of Idaho, USA. In 1988, sampling was conducted from late August to early November; in 2011-2017 sampling occurred in September each year. From 2011-2017, significant increases in unvegetated, exposed river substrate were found throughout river sections. Between 1988 and 2011-2017 the amount of bare, unvegetated river substrate in the shallow winter feeding areas increased between 14.50%, and 58.53%. Moreover, the percent cover of Watermilfoil (*Myriophyllum spp*.) and Sago Pondweed (*Potamogeton stuckenia*) declined 36.33% in these feeding areas. Overall, the greatest significant changes in the macrophyte community occurred in the upstream reaches that are favoured by wintering Trumpeters compared to the downstream reaches. Aquatic macrophyte distribution and abundance through Henry's Fork of the Snake River at Harriman State Park of Idaho, USA is dependent upon available physical, chemical, and biological resources. As such, changes to these physical, chemical, and biological resources (and their interrelated effects) are causative factors affecting the composition of this unique macrophyte community. Since 1988, increased sedimentation, low winter flows [that de-water the river channel, increase winter frazil and anchor ice formation that subsequently disrupt the physical substrate and remove macrophytes], loss of important nutrients, and waterfowl herbivory have been hypothesized as anthropogenic (human-caused) and ecological factors behind these significant changes. Continued sampling along these transects, combined with experimental treatments, is needed to better understand long-term macrophyte community variation over time, the interactive factors that affect it, and its ability to withstand/respond to anthropogenic and natural stressors.

The ups-and-downs in polder Wieringermeer, Nths, as a staging area for Bewick's swans.

Wim Tijsen[1] & Kees Koffijberg[2]
[1]Poelweg 12, The Netherlands; [2]SOVON, The Netherlands.

In the northern part of the province Noord-Holland, close to the western Wadden Sea and Lake IJsselmeer, large numbers of Bewick's Swans use(d) polder Wieringermeer for foraging and the surrounding waterbody's for roosting around the former island of Wieringen and the adjacent Balgzand area. The area is mainly in agricultural use. The swans predominantly feed on harvest remains of sugar beet, and a bit of grass and winter wheat and occasionally potatoes. The area is/was highly attractive to swans, and also geese, as the feeding areas are well in reach of suitable night-roosts. We show figures of the occurrence of swans in the area in the past decades and try to explain some observed trends with known changes in land-use. Both from a national perspective as well as in an international flyway context, Bewick's Swans are one of the most important species occurring in the region. Numbers amounted to up to 11% of the flyway population in the peak period and 19% of the national wintering population. Numbers initially remained on a high level as the size of the flyway population and the numbers in The Netherlands started to decline in the mid-1990s. After 2006/07 also in the Wieringermeer a sharp decline occurred. Nowadays, only very small numbers are observed. Although local impact of the establishment of a new wind park was proven in a separate study, it is unlikely that establishment of this wind park in 2006 caused the decline of the swans. Changing migration and wintering strategies (pointing to an eastward movement of the winter range) are more involved. Especially if we also consider in this the decrease the number of birds wintering in the Ouse Washes, UK, in relation to polder Wieringermeer which always was an important stop-over for UK wintering birds.

Session: Breeding biology

Wednesday 17th; 11:20–12:20

A pair of Coscoroba Swans with two young cygnets. Photo credit: Graham Maples / WWT

Trumpeter Swan (*Cygnus buccinator*) egg temperatures in relation to cygnet survivorship in the Yellowstone ecosystem.

Jeffrey W. Snyder[1], Bill Long[2] & Victoria B. Fliehr[1]
[1]Western Oregon University, USA; [2]Wyoming Wetlands Society, USA.

Trumpeter Swans (*Cygnus buccinator*) were once widely distributed throughout North America. Population declines during the 19th and 20th Centuries were attributed to overhunting and habitat loss. By the early 20th Century only ~ 70 swans were found in the Yellowstone ecosystem. Although conservation efforts continued through the 20th Century cygnet survivorship in the Yellowstone flock has declined due to food limitation, weather, diseases, abnormalities, emaciation, predation, and parasites. We placed 4 artificial eggs (with temperature data loggers) in 4 trumpeter nests during 2015 breeding season. Of these, we found differences among nests in average number of incubation recesses, average length of recesses, and average egg temperature fluctuation. We hypothesize these differences may significantly affect a cygnets' subsequent survivorship during the 3-month post-hatch rearing season and subsequent recruitment into the population.

Assessment of density dependence in breeding productivity of a North American Mute Swan population.

Randall T. Knapik[1], David R. Luukkonen[2] & Scott R. Winterstein[1]
[1]Michigan State University, USA; [2]Michigan Department of Natural Resources, USA.

A fundamental underpinning of many wildlife population models is that vital rates vary in relation to some measure of density for the species. This relationship must be accounted for when conserving species in peril or controlling those which are overabundant. The need for long-term datasets to capture natural population fluctuations has resulted in few definitive derivations of density-dependent vital rates in wildlife populations. Ongoing control efforts for an invasive waterbird, the Mute Swan (*Cygnus olor*), have provided a unique opportunity to measure reproductive rates, under high and low breeding densities in the core of their North American distribution. Number of breeding pairs, clutch size, number of hatched young, and number of fledged young were documented in 3 breeding seasons (2016-2018) across 6 sites throughout Michigan's Lower Peninsula. Mean breeding productivity (i.e., number of fledged young per pair) pooled across sites and years was low (1.3 fledged young/pair) despite high clutch sizes (mean 7.2 eggs/clutch, range 1 – 10), but productivity varied among the 6 study sites (range 0.6 fledged young/pair – 2.3 fledged young/pair). Mean breeding productivity per pair decreased as the number of breeding pairs increased across sites; however, there was an exception as breeders at the site with the fewest pairs also fledged the lowest number of young (3 fledged young/5 pair [0.6 per pair]). Decreased breeding productivity in areas of high breeding pair density likely results from density-dependent effects on reproduction for Mute Swans in Michigan. Our study contributes to understanding factors that result in variation of Mute Swan demographic parameters and will improve population models that simulate alternative control strategies for Mute Swans in the Great Lakes region.

Living child-free: density-dependent regulation in Bewick's Swans *Cygnus columbianus bewickii*.

Diana Solovyeva[1], Anastasia Mylnikova[1] & Sergey Vartanyan[2]
[1]Institute of Biological Problems of the North, Russia; [2]North-East Interdisciplinary Scientific Research Institute, Russia.

Nesting biology of Bewick's Swans was investigated between 2002 and 2017 in Chaun-delta, Chukotka, Russia, with 725 nests being monitored during these years. Nest densities, clutch sizes and brood sizes at cygnets age younger than 10 days old were recorded annually while nest success was recorded during 2009-2017. Parents' behaviours were classified as aggressive to intruders, normal (hiding behind the nest) and shy (escaping nest while before intruder approach) in 2013-2017. Numbers of unhatched eggs in clutches were recorded in 2013-2017. Swan nest density reached average 3.3 ± 0.2 nests/km2 in peak year of 2012. Skipping of nesting, nest building without egg-laying and "shy" behaviour were responsibly for low production during peak years. Proportion of adult swans skipping reproduction was 59% in 2017. Swan behaviour during incubation was responsible for poor nest success, indicating low value of clutches comparing to the value of owl life for high proportion of swans during the years of high nest density. Nest-building without laying was reported in some years. A part of large clutches (over 6 and over 5 eggs) significantly declined with nest density. Poor egg hatchability in some nests didn't find the explanation; we speculate an effect of hot summer temperatures although our measurements of nest temperatures failed.

Session: Movements and migration

Wednesday 17th; 14:00–17:20

A flock of Whistling Swans in flight over the Riverlands Migratory Bird Sanctuary (Missouri, USA). Photo credit: Andy Reago & Chrissy McClarren

Moulting sites of Latvian Whooper Swan *Cygnus cygnus* cygnets tagged with transmitters in summer 2016.

Dmitrijs Boiko[1] & Martin Wikelski[2]
[1]Latvian Museum of Natural History, Latvia; [2]Max Planck Institute for Ornithology, Germany.

As known from previous studies of cygnets hatched in Latvia and known to be alive, about 99 % left the country to moult somewhere else in their 2nd-6th calendar year. Moulting sites were recorded for 15 individuals, of which 13 had been marked with neck collars and two fitted with satellite transmitters. Of these 15 swans, 11 moulted in Latvia, one in Estonia and three in the Arkhangelsk Region of Russia. Distances between sites of marking and moulting ranged 0-1,455 km. In 26–28.07.2016, 11 cygnets, eight females and three males, coming from seven different families, were fitted with solar GPS transmitters in western part of Latvia. Transmitter weight was 15 g. Signal was lost from five of these 11 birds in the autumn of 2016. A normal figure taking into account that the mortality of cygnets can reach 40 % in the first year of life. Data for the other the six birds are given below. Distance from hatching to moulting site is given only for birds with known exact moulting site. Female Nr.1 – last signal was taken on 22.10.2017. Bird moulted in the surrounding of Lake Vigozero in the Republic of Karelia, Russia. After signal was lost there is no information about the bird. Distance from hatching place was 1038 km. Female Nr.2 – last signal was taken on 01.06.2018. In summer 2017, this bird moulted NE of Kelmin Nos in the Pechora River Delta, Nenets Autonomous Okrug in the Arkhangelsk Region of Russia. Distance from hatching place was 2008 km. Female Nr.3 – last signal was taken on 06.09.2017. Unknown exact place of moulting but it can be in western part of the White Sea, north of Belomorsk, Republik of Karelia, Russia. Female Nr.4 – last signal was taken on 25.05.2018. Bird moulted south of Karatayka in Nenets Autonomous Okrug in the Arkhangelsk Region of Russia. Distance from hatching place was 2318 km. Male Nr.1 – last signal was taken on 01.07.2017. North of Nizhnyaya Pesha in Nenets Autonomous Okrug in the Arkhangelsk Region of Russia. Unknown if this was the exact moulting place or where the transmitter stopped working. The bird is still alive. We got some neck collar readings in winter 2017/2018 as well as in spring 2018 but no signal. Female Nr.5 – last signal was taken on 17.06.2017 during the time of pre-moult migration in the surrounding of Yaringa village near Dvinsky Bay of the White Sea in the Arkhangelsk Region of Russia. Distance between moulting places of transmitter birds from the east to the west is 1326 km. The longest distance from hatching till moulting place is 2318 km. Direction for all birds with known or unknown moulting places is NE. This study shows a huge dispersion of moulting sites of Whooper Swans marked as cygnets. It can depend on bird physical condition or other unknown factors. Further studies are needed for a better understanding of the strategies behind moult migration and selection of moulting site.

GPS telemetry of Mute Swan in Hungary – preliminary results

Gyula Kovács[1, 2], Péter Szinai[3], Tamás Tari[1] & Dániel Winkler[1]
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We marked three Mute Swans with Ecotone Sula GPS-GSM logger on Lake Balaton (Hungary) in the autumn of 2014, in March 2017 and in September 2017, respectively. Transmitters were programmed to collect GPS locations at 6 hour intervals throughout each day. The devices were mounted on PVC colour neck rings. Two individuals moved south. The first bird spent all three winter periods in the floodplain of the Danube River near Kabol and Gardinovci, arriving there from the direction of Drava River in the first year, from the Tisza River in the second year and by following the Danube-valley in the third year. During migration, the second bird arrived first to the Sava River (Gradiška and Donja Dolina, Bosnia), then spent the rest of the winter in Croatia in the area of Lonjsko Polje. In case of these two birds, the distances between the nesting and wintering sites were approx. 260 and 200 km, respectively. The third bird stayed first close to the ringing place on Lake Balaton, while in winter moved to the nearby (1 km) marsh and stayed there until the end of the wintering period When determining home range, the data were split into two periods (1. birds staying in the nesting place; 2. birds staying in the wintering place). Thus, altogether 10 periods (5, 5, respectively) were evaluated. Locations of wintering routes were excluded from the evaluation in both periods. At the nesting site, the home range based on minimum convex polygon (MCP) were between 122 and 12408 hectares, respectively; while results of 90% fixed-kernel home range estimates were between 49 and 213 hectares. At the wintering site, the home range according to the MCP method were between 19 and 8278 hectares, respectively; while its values calculated with the kernel method (90%) were between 1,5 and 3072 hectares. This article was made in frame of the ”EFOP-3.6.1-16-2016-00018 – Improving the role of research+development+innovation in the higher education through institutional developments assisting intelligent specialization in Sopron and Szombathely”.

Influence of breeding latitude on timing of spring migration in the largest Arctic-breeding bird.

Craig R. Ely[1] *& David C. Douglas*[1]
[1]*U.S. Geological Survey, USA.*

Arctic breeding seasons are short, with sometimes as little as 2 months between spring thaw and autumn freeze. Migratory birds must time spring arrival to coincide with earliest available nesting habitat to ensure sufficient time to build nests, lay and incubate eggs, and rear young before autumn forces birds south. Time is especially limiting in larger-bodied birds which generally require more time than smaller birds for all phases of reproduction. We examined migration timing in Tundra Swans (*Cygnus columbianus*), the largest arctic-breeding bird, from five breeding areas throughout their latitudinal range in Alaska (55° – 70° N), representing birds wintering on both the east and west coasts of North America. Ten swans from each breeding area were implanted with satellite transmitters and monitored for up to three years to examine variations in migration behaviour. Migration timing was strongly affected by breeding latitude, with swans from the northernmost Arctic area arriving on breeding areas later, and leaving earlier than birds breeding at more southerly latitudes. Arctic swans completed spring migration in 71 days; faster than swans from southwest Alaska (73 days), or western Alaska (89-93 days). The two southernmost breeding populations were relatively unconstrained by migration schedules, with the most southerly rarely migrating away from the breeding area, and the next most southerly population exhibiting extreme individual variation in timing and duration of spring migration. Chronology of migration appeared to be timed to optimize food availability at staging areas, as swans generally arrived after snow had melted and coincident with local temperatures well above freezing. Rate of movement varied throughout the migration period, and was consistently dependent on stage of migration. Overall, Tundra Swans achieved optimal arrival timing at staging and breeding areas by altering their rate of movement in response to environmental conditions throughout migration.

Migration of Tundra Swans *Cygnus columbianus bewickii* in the Eastern Palearctic using GSM tracking: difference between two breeding populations.

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Using GPS/GSM transmitters we tracked Tundra Swans from two breeding populations in Eastern Siberia, Russia, and compared the migration patterns between populations of Chaun-delta and of Lena-delta. We got the full autumn migration tracks of 52 and 9 swans from Chaun and Lena deltas, respectively. The Lena population migrated along the Lena River and stopped at various sites along the river, then it proceeded directly to the main stopover sites in the northern China, and wintered in the middle and lower reaches of Yangtze River, China. While the Chaun population migrated along the Kolyma River where most of birds stopped for more than 10 days, then crossed the Sea of Okhotsk, after cross they rested and refilled in the Northern Sakhalin, also some birds stop in Hokkaido then flied to the wintering sites in Honshu, Japan. By comparing the migration parameters between two breeding populations, we found that the Lena population started the autumn migration several days later and also arrived to the wintering grounds later. The migration distance of Lena population was about 1000 km longer, while the travel days were identical, but this population spent additional 15 days at the stopover sites what resulted in longer migration.

Some notes about Mute Swan *Cygnus olor* population demography based on recovery data.

Radosław Włodarczyk[1], Tomasz Janiszewski[1] & Adam Kaliński[1]
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The Mute Swan breeding population from central Poland is regularly monitored since 1995. The area covered about 8800 sq km with breeding population of 80-133 pairs. The non-breeding flocks can reach level of 700-1500 individuals. Annual ringing activity in years 1995-2017 allowed to mark more than 3400 birds till the end of 2017. The majority of birds were ringed during winter period (30 %), moulting time (28 %) and as juvenile birds (25 %). All birds were ringed with metal ring, 35 % with Darvic leg ring or neck collar. Till the end of 2017 we collected 9670 recoveries (recovery rate 2.8/per individual). 153 recoveries documented birds' deaths. The majority of them were detected in winter months (XII-II – 35.5%) and early spring (III – 19.8%). The main cause of death was collision (22 %) and fox/dog predation (14 %). Analysis of recoveries from non-breeding birds showed low level of transition from non-breeding into breeding population. Only 18 individuals from 977 (1.8 %) were observed as breeders in the following years. The mean distance between moulting site and breeding territory was 69.5 km (range 0-284 km). Birds were observed as breeders usually after 5-6 years. Recoveries obtained from juvenile birds showed that only 3.1 % of them were detected as breeders later in their life (28 indiv.). The mean natal dispersal distance was 63.5 km (range 0-207 km). Regular observations of ringed breeding pairs revealed that the majority of birds bred for 1-2 seasons (45 % of females and 48 % of males). Also territory occupancy measured during 19 years was rather short. Only 22.9 % of territories were occupied longer than 11 years during study period in comparison with 49.8 % of territories occupied for 1-7 years. Results suggests two exclusive forces: high turnover of birds, low stability of breeding territory and low probability of entering breeding population by non-breeders. This can be explained by weak efficiency of ringing data when studying demography in large population or significant influx of birds from other areas with no regular ringing activity.

30 years (1988-2017) of the study of a Mute Swan Cygnus olor population in Riga (Latvia).

Ruslans Matrozis[1]
[1]*Latvia*

In January 1988 Mute Swans ringing activities in Riga and its surroundings (ca 500 km2) were started. The breeding population in this area nowadays is about 40 pairs. During 30 years 2,446 individuals were ringed in total, with 42,968 resightings (up to 544 per one swan, on average 16). From these, 289 (11.6%) were seen abroad, with the longest migration distances to Holland (1,267 km) and to Ukraine (1,238 km). In Riga 143 swans ringed in other countries were seen, mostly (54%) from Lithuania. Average spring arrival time for migrating swans in Riga is 11th March (26th Feb - 4th Apr, 2004-2017). There are two spring migration waves: first continuous 3-4 weeks from arrival day and second - at the end of May and beginning of June, when non-breeding swans migrate to their moulting places (to large coastal lakes and Riga Gulf seacoast). First successful breeding observed on 3rd (1 male and 1 female) and 4th calendar year (3 females), but mostly swans (66%) breeding starts at age of 4-6 years. Longest continuous breeding time was 10 years (male) and 11 years (female). The oldest successful breeders were 15+ years (male) and 16+ years (female). The maximum amount of cygnets produced during lifetime for one swan was 46 (male) and 59 (female). Natal dispersal was observed only for short distances (0-10 km). The data base contains information about 620 ringed swans, which were resighted at least in two winter periods; most (87%) have recoveries up to 5, with a maximum of 16 winter seasons. Only 4.5% have resightings more than 10 years after ringing, the maximum recorded age was 17 year (male) and 18+ years (female). Polish morph Mute Swans in Riga were observed quite rarely, from 2004 to 2017 only 14 individuals were ringed in total (0-3 per year), representing an average of 0.47% of all ringed swans.

Influence of spring phenology on migration strategies of swans and their use of different types of migration sites in the Eastern part of the Gulf of Finland.

S. Kouzov[1] *& A. Kravchuk*[1]
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The main part of the spring migrations of different types of swans in the Eastern part of the Gulf of Finland occurs in its southern sector. Here are the largest stopover sites. Currently, two main areas of Swan stopover sites in the region can be identified. These are: 1) shallow waters around the Kurgalsky Peninsula, Moshchnyj island and the Seskar archipelago; 2) shallow waters of the Neva Bay. These areas are not only highly separated geographically (100-140 km.), but also vary greatly in terms of feeding conditions, as well as the phenology of spring events. Shallow waters near the Kurgalsky Peninsula are located at the border of the zone of continuous ice cover in winters with average conditions. The spring melting of ice, in addition to temperature factors, is caused by storm activity and warm bottom current from the southern Baltic running along the southern shore of the Gulf of Finland. The main feed resource for swans in the spring here are scraps of filamentous algae, which are carried over to the sandy shoals. Cladophora sp. is dominated from the second half of February to the beginning of April. In April there are other kinds of green, brown and red algae. The shallow waters of the Neva Bay freezes over in the winter almost every year. The main food of swans here are roots and spring shoots of reeds and sedges. The beginning of vegetation of reeds and sedge usually occurs in the second half of April, more often - in its third decade. In the years with warm winter and early spring, shallow waters near the Kurgalsky Peninsula become free of ice much earlier than in the Neva Bay. In 2007-2008 and in 2014-2017 the release of the water area from the ice occurred by the third decade of February. Mute Swans in such years begin to accumulate at the end of February (up to 200-250 birds), Whooper Swans - in the first and second decades of March (700-900 birds), Tundra Swans - in the third decade of March-the first half of April (1000-2000 birds). The total one-time number of swans of all species around the Kurgalsky Peninsula in late March-early April can reach 2000-2500 individuals. The movement of swans to stopover sites in the Neva Bay takes place in such years in the second or third decades of April. In the second half of April Neva Bay accumulates up to 400-500 swans. Part of the birds from the Kurgalsky Peninsula flies in transit to the stopover on lake Ladoga. In years with frosty winters and late spring, the thick ice near the Kurgalsky Peninsula and the Islands of Moshchnyj, Malyj and Seskar can hold until the beginning of the third decade of April. In such conditions, in the third decade of April, swans migrate in transit through the area and settle in the Neva Bay (up to 500-600 birds) or fly further to the ice-free shallow waters of Lake Ladoga. As can be seen from the above material, the role of sites in the eastern part of the Gulf of Finland is of greatest importance for birds in the years with early spring.

Population Trends of the Black-necked Swan (Cygnus melancoryphus) in the most relevant wetlands of Central Southern Chile.

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[1]Universidad Santo Tomás, Chile; [2]Universidad de Chile, Chile.

The Black-necked Swan (*Cygnus melancoryphus*) is an emblematic bird of aquatic ecosystems, being endemic to the Southern Cone of South America. However, little is known about their population ecology and its population displacement. This study's main objective was to provide information relevant to the conservation of the Black-necked Swan through an analysis of their populations in three coastal wetlands in south-central Chile (El Yali Wetland, Laguna Torca National Reserve and Sanctuary Carlos Andwanter Rio Cruces). Also, to study the possible relationships between these abundances and the amount rainfall each study site. We noticed, that there was a significant inverse relationship between the populations of Black-necked Swan of the El Yali wetland, which is an occasional breeding and feeding ground; and Laguna Torca, which is only a feeding ground, probably is related to these populations, having some form of connection. Finally, in the case of the Laguna Torca a statistically significant inverse relationship between swan abundance and rainfall was found. For the other two wetlands, no significant relationships were found. Unfortunately and, most surely because of the natural cycles that determined the distributions patterns and abundances of this species exists no longer, these three important wetlands have been severely impacted by human activities.

Session: Conservation of the Northwest European Bewick's Swan population

Friday 19th; 09:00–17:30

Bewick's Swans fighting at a winter roost site in SW England. Photo credit: Graham Hann / WWT

Bewick's Swan Expert Group: implementation of the AEWA Single Species Action Plan within range states.

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[1]Wildfowl & Wetlands Trust, United Kingdom; [2]AEWA Secretariat, Germany; [3]Wetlands International, The Netherlands.

Following a 26% decline in the Northwest European Bewick's Swan population, from 29,000 birds in 1995 to 21,500 in 2005, an International Single Species Action Plan was adopted under the African-Eurasian Migratory Waterbird Agreement (AEWA) in 2012, and the AEWA Bewick's Swan International Expert Group (AEWA BSIEG) was convened in 2014 to take forward implementation of the plan. The overall goal of the plan is to maintain the population minimally at its 2000 level (i.e. 23,000 birds in the long-term), with a more immediate aim of halting the decline and beginning recovery of population to its 2005 level. Nine results of actions were identified within the Plan: 1) chain of key sites, sufficient to support the population throughout its annual cycle, to be sustained across the flyway; 2) mortality caused by shooting reduced; 3) mortality caused by infrastructure collisions reduced; 4) risk of lead poisoning reduced; 5) risk of mass mortality caused by oil spills reduced; 6) changes in population size, trends, distribution and demographic parameters detected; 7) interchange with other populations better quantified; 8) changes in relative importance of human-induced mortality factors understood with emerging threats detected; and 9) influence of individual sites on the development of the population better understood. Thirty-two actions to achieve these results were prioritised with the Plan. This presentation synthesises information on progress made towards implementation of the Plan by each range state, derived from responses to questionnaires sent to the AEWA Focal Points and BSIEG contact points for each country in 2015 and 2018. Key areas where the national representatives considered that aims had been achieved, and also obstacles to implementation of the Action Plan reported, are described. More detailed information on additional research and conservation work being undertaken under the auspices of the Action Plan is given in other presentations during the 6th International Swan Symposium.

Bewick's Swans in NW Europe: do changes in population size reflect changes in food resources?

Kevin A. Wood[1], Julia L. Newth[1,2], Kane Brides[1], Mike Burdekin[3], Anne L. Harrison[1], Steve Heaven[1], Charlie Kitchin[3], Leigh Marshall[1], Carl Mitchell[1], Jessica Ponting[1], Dafila K. Scott[1], Jon Smith[1], Wim Tijsen[4], Geoff M. Hilton[1] & Eileen C. Rees[1]
[1]Wildfowl & Wetlands Trust, United Kingdom; [2]University of Exeter, United Kingdom; [3]Royal Society for the Protection of Birds, United Kingdom [4]Poelweg 12, The Netherlands.

Winter numbers of the northwest European Bewick's Swan (Cygnus columbianus bewickii) declined by almost 40% between 1995 and 2010. Our recent research on long-term changes in demographic rates found a decline in apparent survival, but not productivity. Yet the reasons for the decline in apparent survival are unclear. Assessment of food resources at winter sites is a central part of efforts to understand changes in demography and population size, as set out in the AEWA Bewick's Swan Single Species Action Plan. Here we combine information from the 1950s–2010s on food resources within the landscape with data on swan numbers, habitat use, body condition, and behaviour to examine whether changes in food type and availability have influenced the Bewick's Swans' use of their main wintering site in the UK, the Ouse Washes. The Ouse Washes has supported up to 38% of the total flyway population wintering in northwest Europe. On the Ouse Washes, inter-annual variation in the area cultivated for key crops was not associated with changes in the peak numbers of swans. Both at the Ouse Washes and other key wintering sites across the UK, food resources remain adequate to allow the swans to gain and maintain good body condition throughout winter. We found no evidence for a decrease over time in adult or cygnet body condition. Behavioural data showed low levels of aggressive interactions with Whooper and Mute Swans, and so interspecific competition at winter feeding sites is unlikely to have played a role in changes in survival or population size. The proportions of swans seen foraging, alert, and resting did not differ between a period of population increase (1970s) and decline (2010s). Our findings therefore suggest that the recent decline in numbers of Bewick's Swans on the Ouse Washes was not linked to inadequate food resources at this internationally important site.

Back to the roots: long-term changes in feeding habits of Bewick's Swans *Cygnus bewickii* in The Netherlands.

Kees Koffijberg[1] & Menno Hornman[1]
[1]SOVON, The Netherlands.

In the past 100 years, staging and wintering Bewick's Swans in The Netherlands showed a high degree of adaptation to changing environmental conditions in waterbodies and changes in farmland use. Around the time that the current freshwater Lake IJsselmeer and Lake Marrkermeer emerged from the former saline Zuiderzee, in the 1930s, large numbers of aquatically feeding swans were observed on the shallow banks of the former Zuiderzee. Despite drastic changes in environmental conditions and embankments in the swans' main feeding areas, aquatic foraging remained the main feeding habit into the 1960s, when eutrophication progressively wiped out most of the submerged macrophytes. By the same time, and following other herbivorous waterbird species, Bewick's Swans discovered new food resources in farmland. In late autumn these mainly consisted of harvest remains of e.g. sugar beet, whereas during the midwinter and late winter periods, many flocks were feeding on improved grassland or inundated floodplain meadows. Today, the situation has changed again. Improvement of water quality resulted in a recovery of submerged water vegetation, and large flocks of Bewick's Swans returning to feed on waterbodies, often situated in the same areas as where they were observed in former times. Feeding on farmland still occurs, but use of crop types has changed, because of changes in crops available but also as a result of changing phenology and numbers present.

Phenological changes in a migratory swan coping with climate change.

Rascha J.M. Nuijten[1], Kevin A. Wood[2], Trinus Haitjema[3], Eileen C. Rees[2], & Bart A. Nolet[1,4]
[1]Netherlands Institute of Ecology, The Netherlands; [2]Wildfowl & Wetlands Trust, United Kingdom; [3]Haapsalu, Estonia; [4]University of Amsterdam, The Netherlands.

Organisms need to adapt to changes in their environment to be able to survive. One often studied adaptation is a change in phenology, the timing of life cycle events. In migratory animals, this becomes extra challenging, as they experience different (rates of) change in their different seasonal habitats. Here we study whether a long-distance migratory bird, the Bewick's Swan *Cygnus columbianus bewickii*, has shifted its phenology at the wintering grounds (arrival and departure date) and during migration (stop-over site use and duration). For arrival and departure date at the wintering grounds we used an extensive dataset containing almost 50 years of resighting data of both leg-ringed and neck-banded birds. For stop-over site use and duration we analysed 4 years of tracking data between 2007 and 2017. We found that Bewick's Swans have significantly reduced their time at the wintering grounds, arriving almost a month later than 30 years ago and departing on spring migration almost three weeks earlier. There were no significant differences in stop-over site use. However, this might be because the GPS data only spans 10 years and the frequency of GPS fixes differed between the years which made it difficult to define stop-over sites in a similar way. The change in phenology over time can be an adaptation to milder winters in NW-Europe which allows the swans to spend more time closer to their breeding grounds. This might result in advantageous flexibility in the strict annual cycle of these birds while coping with climate change.

Aquatic foraging during Bewick's swan migration: the significance of the White Sea (part 2).

Rascha J.M. Nuijten[1] & Bart A. Nolet[1,2]
[1]Netherlands Institute of Ecology, The Netherlands; [2]University of Amsterdam, The Netherlands.

Swans feed on aquatic plants before, during and after migration to fulfil their energetic needs for the journey. Following serious loss, aquatic plants have made a comeback after measures were taken to reduce eutrophication of surface waters in Western Europe. After the collapse of the Soviet Union, nutrient loading of for instance Lake Peipsi, on the border of Estonia and Russia, temporarily decreased, while macrophyte abundance did not change. Much less is known about the condition of the aquatic vegetation in northern Russia. Research conducted in the mid-1990s estimated that 30-60% of the European Bewick's Swan population used the Dvina Bay (White Sea) during spring migration, where they were foraging on submerged plants, while they largely skipped this area on autumn migration. In 2017, we obtained year-round tracks of 15 adult female Bewick's Swans wearing GPS-GSM neck collars with a built-in water sensor. Outside of the summer period (mid-June – August), the water sensor measured whenever the neck was submerged with a frequency of 1 Hz, enabling us to map the areas where the swans use aquatic resources. This way we were able to identify all important foraging sites on the flyway between Western Europe and Northern Russia, independently of observer bias. Specifically for the Dvina bay, we found that 9 individuals (60%) foraged aquatically in spring, while 6 of those (67%) skipped the Dvina Bay in autumn. However, 4 others exclusively used the Dvina Bay in autumn, yielding a total of 7 (47%) foraging aquatically in this area in autumn. Hence, in total 13 (87%) of the individuals used the area at least in one of the migration seasons. These results underline the prevailing importance of the aquatic vegetation for migratory swans in the Dvina Bay, and the need for its conservation.

Reducing the poaching of Bewick's swans in the Russian Arctic.

J. L Newth[1,2], A. Belousova[3], P. Glazov[4], S. Uvarov[5], S. Kanyukov[5], G. Mikhailova[6,7], A. Chistiakov[6], I. Semenov[6], R.A. McDonald[2], A. Nuno[2], S. Bearhop[2], S. Dench[1] R. L. Cromie[1], K. A Wood[1] & E. C. Rees[1]

[1]Wildfowl & Wetlands Trust, United Kingdom; [2]University of Exeter, United Kingdom; [3]All-Russian Research Institute for Environmental Protection, Russia; [4]Russian Academy of Sciences, Russia; [5]"Green Home", The Nenets Autonomous Okrug, Russia; [6]EthnoExpert SIA, Latvia; [7]Federal Research Center for Comprehensive Arctic Studies of the Russian Academy of Sciences, Russia.

Every summer, the Russian Arctic hosts the endangered Northwest European population of Bewick's swans Cygnus columbianus bewickii. The species is legally protected from hunting throughout its migratory range but it remains at risk from illegal shooting, with 31% of live-caught swans x-rayed between winters 1970/71 and 2008/09 found to have shotgun pellets embedded in their tissues. International co-operation has led to efforts to reduce hunting, an action identified as a high priority in the Bewick's Swan Single Species Action Plan adopted by AEWA. In the Russian Arctic, multi-disciplinary and participatory approaches have been used to further understand and address the issue. A survey of 236 hunters and dialogue with local communities in the Nenets Autonomous Okrug and Arkhangelsk Oblast have helped identify perceived motivations for hunting Bewick's swans. These include a lack of enforcement of protective laws, food, sport, their arrival in the spring coinciding with the open hunting season, a perception that numbers are increasing or too high, a perception that they have a negative impact on other breeding waterbirds and a lack of awareness that they are protected. Only 14% (n=232) of hunters could visually distinguish Bewick's swans from two other swan species that reside in the region, both of which are afforded weaker legal protection within Russia. Concerns were also raised about the perceived negative impact of hunting tourism on protected waterbird species. A total of 91% of respondents believed that it was important to maintain Bewick's swans in the arctic landscape for future generations. Stakeholders including conservation organisations, indigenous associations, regional government bodies, tourism agencies, educators and local museums, have helped plan activities to reduce poaching. Plans include guides which will help hunters to identify protected and huntable species, educational resources so that young people can learn about migratory waterbirds and wetlands, a travelling swan art exhibition which will be taken to remote villages and an international hunter exchange programme. A regional working group will be established to take forward these activities.

Can lake sediments be used to understand Bewick's Swan (*Cygnus columbianus bewickii*) declines? Determining trajectories of ecological change in Arctic lakes using palaeolimnology.

Viv Jones[1],Carole Roberts[1], Gina Charnely[1], Tatyana Moisenko[2] & Hannah Robson[3]
[1]University College London, United Kingdom; [2]Russian Academy of Sciences, Russia; [3]Wildfowl & Wetlands Trust, United Kingdom.

Arctic breeding populations of the Bewick's Swan (Cygnus columbianus bewickii) have declined substantially since 1995. However, without long term environmental monitoring data it is not possible to establish the extent to which environmental change at the breeding grounds may be influencing population declines. Data derived from dated lake sediments (palaeolimnology) can offer novel insights into the influence of different stressors on the timing and trajectory of aquatic ecological change. Here we use data obtained from lakes situated in the Pechora Delta, arctic Russia, to assess the timing and trajectory of environmental changes, specifically those associated with the direct and indirect effects of climate such as vegetation changes and changes in food webs, in addition we also assess the effects of long-distance pollutants. A series of short cores, modern ecological survey data and basic chemistry data from 13 lakes at three locations in the Pechora Delta (Yangertai, Kabouyka and Lovetsky) were taken in the summer of 2017 alongside a Bewick Swan monitoring survey conducted by the WWT. The lakes are shallow (depth 0.3-1.1 m) and range from isolated freshwater to tidal in nature (conductivity 10ppm - >2ppt, pH 5.1 - 9.2). 210Pb dating reveals that the cores from these sites contain a conformable sediment sequence covering the last 100 - 150 years. Analysis of heavy metals (e.g. Hg), stable isotopes and biological indicators (e.g. pollen, diatoms, macrofossils) over this dated period shows a dynamic environment which has been impacted by multiple stressors. The project has provided valuable information to the WWT on reference conditions and trajectories of ecological change and will assist in their conservation management strategies.

The Bewick's Swan (Cygnus bewickii): expansion of the Asian populations to the west. Is this true?

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Over the past 15 years, there has been a decrease by 39.2% observed in the numbers of Bewick's Swans in the northern European wintering sites. At the same time, on the nesting grounds, since the mid-1980's, a rapid numbers increase has been noted. We examine how the opposite trends in the numbers of the Bewick's Swan in the Russian tundra and in the northern European wintering sites are related. In 2014–2017, we conducted aerial surveys and estimated the numbers of Bewick's Swans and the number of cygnets in the broods across the entire breeding range of the northern European population, in Jamal, the Baydaratskaya Bay, the Dvuobye and the Gydan Peninsula. The numbers growth in the nesting areas is hypothesised to be associated with the penetration of birds of the Asian populations further to the west. Our counts data confirm that the swans from the eastern part of the Nenetsky Autonomous Okrug (NAO) can form congestions in the Baydaratskaya Bay, whence they can migrate through the Dvuobye to other wintering areas. Telemetry data show that birds fly from the Baydaratskaya Bay in a very wide front, but do not fly to northern Europe. We assume that the part of the birds living in the NAO is the swans of Asian origins that expand their ranges to the west and reach the breeding range of the northern European population.

The stable, the declining and the increasing: results from 50 years of swan censuses in Denmark 1967-2016 explained.

Preben Clausen[1], Pelle Andersen-Harild[2], Hans Erik Jørgensen[3], Bjarke Laubek[4], Rasmus Due Nielsen[1], Ib Krag Petersen[1], Uffe Gjøl Sørensen[5] & A.D. Fox[1]
[1]Aarhus University, Denmark; [2]Jægerspris, Denmark; [3]Haslev, Denmark; [4]Sæby, Denmark; [5]København Denmark.

Nationally coordinated censuses of all three Western Palearctic species of swans have been conducted on a regular basis in Denmark since 1967, when the first comprehensive censuses involving land-based as well as aerial surveys were made, enabling the first national totals to be estimated. Over the fifty years since then, numbers, distribution and habitat use of these swan populations have changed tremendously. The Mute Swan *Cygnus olor* has always been the most numerous and widespread species, with a relatively stable wintering population of c. 50,000 birds, albeit with a peak of 70,000 birds in the early 1990s. The moulting population of Mute Swans has increased from 37,000 birds in the first 1968-census to 56,000 in 2012. Although the Mute Swan population has remained reasonably stable, there have been major changes in the overall distribution, with declining populations in several fjords and lagoons subject to eutrophication-driven reductions in submerged macrophytes, the principal food resource for the swans. This has been most prominent in wetlands in the northwestern parts of the country, which also used to be the principal autumn- and spring-staging sites for Bewick's Swans *Cygnus columbianus bewickii*, whose numbers therefore have declined. The remaining Bewick's increasingly feed on agricultural lands together with expanding numbers of Whooper Swans *Cygnus cygnus*, for which the time-series shows a population increase from c. 7,000 in the late 1960's to almost 64,000 in 2016, now outnumbering Mute Swans for the first time in the 50 years' time series.

Bewick's Swan in Estonia and their conservation.

Leho Luigujõe[1]
[1]*Estonian University of Life Sciences, Estonia.*

One of the most numerous swan species on migration in Estonia is the Bewick's Swan whose numbers are declining. This means that Estonia is one of the countries on the flyway which is responsible for protecting Bewick's Swans on the way from the breeding grounds to the wintering grounds. The first national action plan for the Bewick's Swan was signed in 2013 for the years 2013-2017. The plan was updated in the year 2018. Bewick's Swans have several very serious threats on the migration route like hunting, lead poisoning, collision with powerlines, disturbance at stop-over sites, poorer/suboptimal feeding conditions at stop-over sites, and habitat loss in roosting areas. Smaller threats are pollution and predation. With that in mind, we plan to map all feeding and roosting areas of Bewick's Swans in Estonia and start to establish protected areas for this species if needed, especially in the roosting places. We need to pay more attention to polder areas which are feeding sites for swans (management). We have a plan to start removing reeds from feeding areas along the Peipsi Lake. We will try to diminishing bird hunting pressure in the stop-over sites used by Bewick's Swans and organise harder restrictions on the use of illegal lead shot. We are working on removing 110 Kv powerlines in Väike väin Strait, which is a Natura 2000 area and important stop-over site for Bewick's Swans. We will try to keep at least 30 stop-over sites for Bewick's where their numbers exceed more than 200 birds. A new Estonian action plan for Bewick's Swans will cover the period 2018-2022.

Session: Posters

Tuesday 16th & Wednesday 17th

A Black-necked Swan watches over three young cygnets. Photo credit: Derek Cropton / WWT

Distribution, size and habitat choice of the Whooper Swan population breeding in Latvia and Lithuania, 1973 – 2017.

Dmitrijs Boiko[1] & Julius Morkūnas[2]
[1]Latvian Museum of Natural History, Latvia; [2]Klaipėda University, Lithuania.

The first Whooper Swan nest in Latvia was found 1973 and 1963 in Lithuania. In 1975, nests were found in three places in Latvia, all in fish-ponds in the western part of the country. In Lithuania, there was still only 1-2 breeding pairs. From that year, the species has bred annually and increased markedly in both countries. In 2017, the population was estimated to number 650 breeding pairs, 400 in Latvia and 250 in Lithuania. The western part of Latvia has remained a stronghold for the species, housing 77 % of the 306 Latvian sites where breeding was confirmed during the years 2010–2017. In Lithuania, on the other hand, the breeding sites are more widely distributed across the country. Almost all breeding sites are found in either man-made fish-ponds, 74 % in Latvia and 62 % in Lithuania, or beaver dams and small swamps, 22 % in Latvia and 16.7 % in Lithuania. The other important breeding habitats were dams, meres, ponds and gravel pits. Annual population grow rate in Lithuania from 2001 to 2013 was 18.9% but in Latvia 5%.

Efficacy of micro-radio transmitters placed on newly-hatched Trumpeter Swan (*Cygnus buccinator*) cygnets at Grays Lake National Wildlife Refuge, Idaho, USA.

Jeffrey W. Snyder[1], Carl D. Mitchell[2], David Delehanty[3] & David Bush[3]
[1]Western Oregon University, USA; [2]U.S. Fish & Wildlife Service (retired), USA; [3]Idaho State University, USA.

Trumpeter Swans (*Cygnus buccinator*) were once widely distributed throughout North America. Population declines during the 19th and 20th Centuries were attributed to overhunting and habitat loss. By the early 20th Century only ~ 70 swans were found in the Yellowstone Ecosystem. Although conservation efforts continued through the 20th Century cygnet survivorship in the Yellowstone flock has declined due to food limitation, weather, diseases, abnormalities, emaciation, predation, and parasites. As part of a collaborative research effort to understand factors affecting trumpeter swan population persistence in the Yellowstone ecosystem, we affixed short-term (~90 day) radio-transmitters on newly-hatched Trumpeter Swan cygnets at Grays Lake National Wildlife Refuge, Idaho, from 2012 – 2014. A total of 74 eggs were laid among 19 nests; (mean clutch size = 3.8 eggs/nest). Hatching success during this time was 82.4 % (n = 61/74 eggs). Fledgling success was 32.4 % (24/74). Despite small sample size (n=15) for micro-radio transmitters, cygnets equipped with micro-radio transmitters had approximately equivalent survivorship compared to non-radioed cygnets.

Natal dispersal of Whooper Swans in Latvia and Lithuania.

Dmitrijs Boiko[1] & Julius Morkūnas[2]
[1]Latvian Museum of Natural History, Latvia; [2]Klaipėda University, Lithuania.

In Latvia and Lithuania, the Whooper Swan has bred annually since 1973. In 2017, the population of breeding pairs was estimated to number 400 in Latvia and 250 in Lithuania. Was the observed population increase and distribution caused by a strong pattern of natal female philopatry, the norm amongst both geese and swans? Marking programmes are in operation in both countries, in Latvia since 2004 and in Lithuania since 2008. Up to 2015, 971 cygnets were fitted with neck collars in Latvia and 343 in Lithuania. Breeding sites have been found for 1.5 % (n=20) of these birds. Two Latvian-born birds settled abroad, one female in Lithuania (239 km from hatching site) and one male in Poland (312 km from hatching site). Other birds from Latvia, six females and six males, were found breeding in Latvia, while all birds from Lithuania, 2 females and 4 males, were found breeding in Lithuania. The distance between hatching site and first breeding site averaged 72 km (n=9, range 0–239 km) for females and 64 km (n=11, range 0–312 km) for males. The age at first breeding averaged 7.1 years (n=9, range 5–13 years) for females and 5.9 years (n=11, range 3–8 years) for males. Recruitment rates are not possible to calculate due to losses of neck collars, as the retention rate of collars are unknown. Some birds that have lost their collars have been recaptured. The others are in principle lost for future study.

Nesting and autumn migration of swans on the east coast of the Pskov-Chudskoye Lake.

Vladimir Borisov[1] *& Larisa Cheblikyna*[1]
[1]*Pskov State University, Russia.*

We have studied nesting and autumn migration of swans on the east coast of the Pskov-Chudskoye Lake. The first two nests of the Mute Swan (*Cygnus olor*) were found on the coast in 1995 and 1996. By 2005 the number of nesting couples had risen up to 50-60, which might be connected with the processes of ongoing occlusion of the coastline with reed and significant expansion of pondweeds and other hydrophytes. Long-term monitoring of autumn migration over 48 years (1956-2004) allowed us to detect a certain tendency to the growth in the number of migrating birds and the shift of their migration towards earlier starting dates. Furthermore, we have found the change in the number of swans at the lake in the autumn period over years. In years characterised by low water levels their numbers are rising. One of the possible reasons explaining this trend might lie in the periodic change of water level in the lake and thus increased or decreased productivity of pondweed species which play an important role for swans feeding at a time of autumn migration. High occurrence and abundance of these plants has been identified only in years characterized by low water level. Long-term observations of autumn passage (15 September-15 October) have revealed three waves of increase in number of migrating birds: 26-27 September, 30 September-3 October, and 8-10 October. At the time of migration the majority of swans heads west, although they can make local movements within the lake in search for feeding sites and resting areas and stay there for a few days. Migration was mainly observed in the morning, from 07:00 to 11:00 hrs.

Numbers and distribution of swans wintering in Estonia.

Leho Luigujõe[1] , Kalev Rattiste[1]
[1]Estonian University of Life Sciences, Estonia.

Winter census of swan is part of the mid-winter count in Estonia which was conducted first time in the winter of 1960/61. The project was run by Baltic Commission for the Study of Bird Migration. In 1967 Estonia was one of the first to join the International Waterbird Census (IWC) project, led by International Waterfowl Research Bureau (IWRB). From 1991 the project has been managed by the Estonian Ornithological Society. Initially the concept was an annual complete count, but starting 1991 the project was changed into a traditional monitoring programme, where counts are held on monitoring sites. From 1996 the mid-winter count is a part of the Estonian State Monitoring Programme. Most of the data of the IWC are collected by volunteers. Numbers of observers in Estonia are between 150 and 200. The count is held in January with centralised dates in the middle of the month. Estonian waters have been divided into 7 main sections, 20 subsections and 338 counting units. Depending on ice conditions and the coverage areas the coast of Estonia has been divided into monitoring and non-monitoring units. There are 98 monitoring sites in total on Estonian coast and 40 sites inland. The estimation of wintering swans was done by Commission of Bird Numbers in The Estonian Ornithological Society. Due to the winters getting milder the numbers of coastal birds have risen. The numbers have gone up for Mute Swan (5000-15000 inds.) and Whooper Swan (500-2000) which is two numerous swan species wintering in Estonia. Number of wintering Bewick's Swans in Estonia always very low (5-30) and stable.

Overlap of electricity grid and swan staging areas in Lithuania.

Julius Morkūnas[1], Liutauras Raudonikis[1] & Vita Monkuvienė[1]
[1]Lithuanian Ornithological Society, Lithuania.

Some wetlands and unfreezing waterbodies in various parts of Lithuania attract large flocks of migratory and staging swans due to suitable feeding and roosting conditions for birds. However, in certain sites, those areas are also densely covered by high voltage electricity lines. This overlapping shows the sensitivity of these places in terms of higher risk of swan collision with the overhead electricity wires. Data was collected in 2014 – 2017 by the Lithuanian Ornithological Society (LOS) and its partners. The data on high voltage overhead electricity lines was presented by the national operator AB LITGRID. The level of the potential risk of collisions with the electricity wires was evaluated basing on the abundance of the migratory swans, which used certain areas around the high voltage electricity overhead lines for staging and feeding. Some areas were identified as places of potential high risk for Whooper, Bewick's, and Mute Swans. Areas were used for feeding, staging and migration. Roosting night staging areas were identified in the surroundings and swans were passing through the areas with overhead electricity lines when flying from night staging to feeding sites. The most dangerous area was identified in the wintering ground in Kaunas city in the unfreezing river Nemunas. There, up to 800-1000 Mute Swan winter annually, along with 50-100 of Bewick's and Whooper Swans that use the area as a migration stopover site. Annually in this area collisions of 10-20 swans were recorded. The powerlines were marked and the impact was monitored. The human activity (kayaking) was the reason of most of the death of swans in winter period.

Swan monitoring in Estonia.

Leho Luigujõe[1] Kalev Rattiste[1]
[1]Estonian University of Life Sciences, Estonia.

Estonia hosts some of the most important staging sites for Bewick's and Whooper Swans during both the spring and autumn migrations. Systematic study of so-called yellow billed swans on migration has been carried out in Estonia since 1991 and from year 1995 swan monitoring is one part of the state monitoring program. Since 2001 seven most important swan stop-over sites was selected out to monitor: Matsalu Bay, Haapsalu Bay, Väike väin Strait, Lao-Liu coast, Audru polder, Ilmatsalu fishponds and Peipsi Lake. Monitoring will be carried out every after 3 years and analyses are based mainly on observations of flocks at selected stop-over sites. Maximum numbers of Bewick's Swans at the monitored spring stop-over sites in Estonia in 1990 - 2018 were: Matsalu Bay – 14,500 inds., Haapsalu Bay – 4,450, Väike väin Strait – 3,415, Audru polder – 5,600, Lao-Liu coast – 8,000, Peipsi Lake – 780 and Ilmatsalu – 630. Autumn number in the same sites are: Matsalu Bay – 4,200 inds., Haapsalu Bay – 4,450, Väike väin Strait – 3,000, Audru polder – 100, Lao-Liu coast – 7,000, Peipsi Lake – 3,530 and Ilmatsalu – 220. Short spring migration period reached its peak in April and longer autumn migration occurred in two waves during October and November. Trend is declining. Maximum numbers of Whooper swans at the monitored spring stop-over sites in Estonia in 2000 - 2018 were: Matsalu Bay – 4,200 inds., Haapsalu Bay – 660, Väike väin Strait – 2,000, Audru polder – 450, Lao-Liu coast – 7,500, Peipsi Lake – 30 and Ilmatsalu – 450. Autumn number in the same sites are: Matsalu Bay – 1,200 inds., Haapsalu Bay – 350, Väike väin Strait – 390, Audru polder – 13, Lao-Liu coast – 2,345, Peipsi Lake – 310 and Ilmatsalu – 200.

Swans of the southwestern part of Western Siberia.

Sergej A. Soloviev[1], Irina A. Shvidko[2] & Oleg S. Soloviev[3]
[1]Dostoevsky Omsk State University, Russia; [2]Natural Park "Bird's harbour", Russia;
[3]National Research Tomsk State University, Russia.

Whooper Swan: In the present time we marked numerous Whooper Swan on nests in Ishim Province in the northern forest-steppe Omsk oblast during migration time in autumn and spring. This swan uses big freshwater lakes as a common place for resting during migration. This species is rare during nesting and post-nesting period in south forest-steppe Omsk oblast (0.9 and 0.6 and 0.1 individual/km^2). On average, the Whooper Swan is very rare in the steppe and south forest-steppe of Omsk Oblast in the nesting period (0.01). In the centre Omsk the swans are regularly marking during migration, for example two Whooper Swans on 25th April 2018.

Mute Swan: We marked a couple of Mute Swan on the 6th and 28th June 2003 on the brackish Piketnoe Lake in the Marianovsky region (Omsk Oblast). Three birds were seen on the same lake around Marianovsky region on the 6th June 2003. On the 9th June 2003 two Mute Swans were marked on freshwater Lake Terenkul of the Steppe sanctuary (Omsk Oblast). On freshwater lake Saribai (Omsk Oblast) a pair of swans were marked on 13th June 2003. In northern steppe on Lake Alabota (Omsk Oblast) we marked 9 birds on 16th June 2002. In other parts of this lake were found a pair with cygnets at the same time. It was interesting, that in the middle of August 2002 we found 59 Mute Swans on Lake Alabota. In the centre Omsk swans were regularly marked during flights and post-nesting period on lakes of Natural Park "Bird's harbour" in August and September 2015 and 2016. Also on these lakes we saw four birds on 19th April 2017 and four birds on 26th April 2018. On 28th April 2018 we found that 6 Mute Swan have used the territory of the Natural Park for resting during migration.

Tracking Bewick's Swans in relation to wind farms: the importance of cumulative impact assessment.

Eileen C. Rees[1], Larry R. Griffin[1] & Baz Hughes[1]
[1]Wildfowl & Wetlands Trust, United Kingdom.

Serial wind farm development along migration routes is an important consideration in determining potential cumulative effects on avian populations. Tracking swan and goose migration therefore has been undertaken by WWT to inform the UK Government's Strategic Environmental Assessment (SEA) programme for offshore wind farm development, with tracks for the NW European Bewick's Swan population being of particular interest because this population is in rapid decline. Twenty-two swans were fitted with solar-powered UHF-GSM-GPS data loggers, programmed to provide GPS fixes at hourly (sometimes 30 min) intervals, transmitted remotely via the GSM phone network every 4 hours. One logger fitted in winter 2013/14 and all 14 in 2014/15 were fully functional. Shapefiles were obtained for areas with proposed and operational offshore wind farm sites in the North Sea; maps of terrestrial turbines were obtained or digitised using Google/BING imagery for countries in the wintering range (UK, Netherlands, Germany) or with important staging areas (Denmark, Latvia, Estonia). Swan tracks (up to March 2016), wind farm locations and weather data from meteorological stations close to the swans' tracks were incorporated into a GIS for analysis. A total of 45 offshore wind farm footprints (including 11 operational sites) were crossed by the swans, of which 33 (63 %) were in German waters, 12 (23 %) Dutch, 4 (8 %) British and 2 (4 %) Belgian, with particularly frequent movement across the East Anglia ONE footprint (83% of tracks and all tagged swans crossed the site in 2014–2016). Moreover, 15 swans with detailed (at least hourly) location data encountered 322 onshore wind turbines, mainly in Denmark (138; 43 %), Germany (113; 35 %) and the Netherlands (63; 20 %), but also in the UK, Latvia and Estonia. The study illustrates the importance of considering both offshore and onshore wind farms in cumulative impact assessments. International communication and sound data on wind farm development in range states is crucial if SEAs are to determine cumulative effects more precisely.

Migratory swans adapting to climate change: short-stopping or short-staying?

Rascha J. Nuijten[1], Kevin A. Wood[2], Trinus Haitjema[3], Eileen C. Rees[2] & Bart A. Nolet[1,4]
[1]Netherlands Institute of Ecology, The Netherlands; [2]Wildfowl & Wetlands Trust, United Kingdom; [3]Haapsalu, Estonia; [4]University of Amsterdam, The Netherlands.

Species currently face a rapidly changing environment to which they need to adapt to survive. For migratory species, differing rates of change and unpredictability of favourable conditions in the areas they visit create extra challenges for adaptation. Range shifts (e.g. winter short-stopping) and phenological changes (e.g., arrival and departure in the wintering area) can lead to changes in abundance in certain areas, with resulting conservation implications. However, co-occurrence of these processes complicates the analysis of the underlying mechanism. Here we study both changes in Bewick's Swans (*Cygnus columbianus bewickii*), a long-distance migratory bird that winters in NW Europe and breeds in Arctic Russia. Its small population size enables a high ringing density and the very high re-sighting probability of marked individuals (>90% for neck-rings) makes this species highly suitable to study these processes. By analysing >40 years of re-sighting data we found a significant but small eastward shift over the study period. A possible explanation is a change in site preferences over time. Using the same data, we also found a significant later arrival of birds in autumn and, surprisingly, a later departure in spring. Comparison with weather data showed that throughout the winter Bewick's Swans are present in areas where air temperatures are about 5˚C, hinting at climate change being the driving factor behind this phenological shift. Our study demonstrates how short-stopping and migratory phenology are interlinked, and should be studied in connection to understand changes in species distribution under climate change.

Connecting the dots: Partnering to restore Trumpeter Swan (*Cygnus buccinator*) populations in the Greater Yellowstone Ecosystem through the release of captive birds.

Bill Long[1], Doug Smith[2], Walter Wehtje[3] & Bill Rudd[1]
[1]Wyoming Wetland Society, USA; [2]Yellowstone National Park, USA; [3]Ricketts Conservation Foundation, USA.

Releasing captive-bred birds is a proven technique for restoring and expanding Trumpeter Swan (*Cygnus buccinator*) populations. Within the Greater Yellowstone Ecosystem, several Trumpeter Swan restoration flocks in SW Montana, Idaho, and western Wyoming have successfully been restored to previously unoccupied habitat in recent years. However, the sub-population in Yellowstone National Park has declined, with only one pair attempting to nest (unsuccessfully) in 2018. While current releases of young birds continue in the park (9 birds in 2018), the future of these birds will remain insecure until this sub-population is integrated into the larger Intermountain West Population. Recent work has shown that large swathes of appropriate habitat between Yellowstone National Park and restoration flocks near Flathead Lake and Central Montana remain unoccupied. Given Trumpeter Swans' low recruitment rate and limited juvenile dispersal, it is unlikely that this habitat will become occupied within the near future without human assistance. To accelerate the colonization process, the Wyoming Wetland Society and Ricketts Conservation Foundation have partnered to increase captive breeding efforts and thereby the number of young swans that can be released each year in southwestern Montana. Our goal is to release a sufficient number of birds through 2028 that we will have connected these two populations, thereby creating a single interconnected population rather than the current situation where the Yellowstone and restoration flocks form isolated sub-populations with little connectivity.

Väike Väin power line – a great danger to staging and migrating waterfowl.

Heikki Hanso – Väike Väin Strait Society.

The Väinamere bird area (Bird Directive Site Väinamere, Site Code EE0040001) is the largest bird area in Estonia (ca 273 200 ha): 83 species of birds have been sighted either staging or feeding on the Väike Väin strait, 23 of which are a part of the Bird Directive Annex I species. The most numerous species flying through the strait are Bewick's Swan, Greylag Goose and Whooper Swan. As Väike Väin is situated on the Eastern-Atlantic flyway, around 0.5 million waterbirds stop there during the spring migration. The amount of birds stopping over during the autumn migration and moulting period is lower. The Väike Väin dam which connects two islands, Muhu and Saaremaa, was opened in 1896. In 1963 a dangerous 110kW power line was erected on the dam, which divides the Väike Väin in two. That line is a major threat to waterbirds (especially large birds) feeding, staging or nesting in Väike Väin, killing hundreds of birds annually: 53 dead swans were found under the highway under the wires in 2017. The management plan for the Väike Väin SPA (site code EE0040486), which is a part of the Väinamere SPA, sees the power line in question being replaced with cable in longer perspective. Until today no corrective measures or alleviating solutions have been put forward in order to solve this issue raised by the Väike Väin Strait Society. This topic has repeatedly been seen by Estonian Environmental Ministry, Environmental commission and network operator Elering. We organised a petition on rahvaalgatus.ee (06/05/2016) which had the great result of 2365 concerned citizens signing to voice their opinion.

Excursions

MID CONFERENCE EXCURSION (October 18)
Field trip to Eastern Estonia (October 18)
TARTU – ILMATSALU – LAHEPERA – KALLASTE – MUSTVEE – TARTU

8.30 – 18.00
ILMATSALU FISHPONDS
Ilmatsalu Fishponds with the surrounding fields and forests have been recorded more than 220 species of birds – an outstanding number for an inland site in Estonia. http://loodusegakoos.ee/where-to-go/recreation-areas/tartu-jogeva-recreation-area/ilmatsalu-karevere-linnutee-hiking-trail-5-km

LAKE LAHEPERA – COAST OF LAKE PEIPSI (NINA – KALLASTE – MUSTVEE)
The coastline at Nina and Kallaste is one of the best places to see autumn wildfowl migration on Lake Peipsi. Lake Lahepera is an important stopover site for Bewick's Swan, Eurasian Wigeon, Tufted Duck, Common Goldeneye, Smew and other wildfowl.

POST CONFERENCE EXCURSION (October 20 to 22)
TARTU - LUITEMAA NATURE RESERVE - MATSALU NATIONAL PARK – SILMA NATURE RESERVE - TALLINN

Day 1 – October 20 **Soomaa National Park**

The 2-hour drive from Tartu to the Soomaa National Park takes us through almost half of the country. The national park, situated in Vahe-Eesti (aka Meso-Estonia), was created in 1993 to protect large raised bogs, flood plain grasslands, paludified forests, and meandering rivers. The territory of the national park is mostly covered with large mires, separated from each other by the rivers of the Pärnu River basin — the Navesti, Halliste, Raudna and Lemmjõgi rivers. Of the raised bogs, the most noteworthy is the Kuresoo raised bog, whose steep southern slope, falling into Lemmejõgi, rises by 8 metres over a distance of 100 m.
On the eastern margin of the national park, lie the highest dunes on the Estonian mainland, situated some 50 kilometres off the contemporary coastline. The most characteristic coastal formations of the predecessor of the present Baltic Sea, the Baltic Ice Lake (11,200–10,600 years ago), which marks the one-time water level, are situated on the north-western and western edges of the Sakala Upland. The Ruunaraipe Dunes are the highest of the area. The dune ridge, winding from northwest to southeast is a 1.2 km-long sand ridge, whose maximum height is 12 metres.
In 2009, the Soomaa National Park, as the largest intact peat bog system in Europe

preserved as wilderness, joined the PAN Parks network of wilderness areas, as it proved excellence in combining wilderness protection and sustainable tourism development.

https://kaitsealad.ee/eng/soomaa-national-park
https://rmk.ee/subject-headings/for-hikers/national-parks/soomaa-national-park
overnight at Ojako http://www.ojako.ee/en/

Day 2 – October 21 **Matsalu National Park**

Matsalu NP is a wetland complex consisting of coastal and floodplain meadows, large reed beds and islets. The predecessor of the national park, the Matsalu Nature Reserve, was established in 1957 to protect birds and their breeding, moulting and stop-over sites. In 1976, Matsalu was added to the List of Wetlands of International Importance, or the Ramsar List. Matsalu Bay is one of the most important stop-over sites for Bewick's swans in Estonia.
https://www.keskkonnaamet.ee/sites/default/public/Matsalu_EN.pdf
http://www.europarc-nb.org/protected-areas/estonia/matsalu-national-park/
https://estoniabirdwatching.wordpress.com/2015/09/24/matsalu-bay/
Overnight in Haeska:
Tuulingu http://www.tuulingu.ee/pgs/eng/house.html
Haeska Manor http://www.haeskamanor.ee/en/

Day 3 – 22.October **Silma Nature Reserve**

The Silma Nature Reserve is the second most important area for waterbirds in West Estonia besides Matsalu Bay. During the spring migration about 40 000 waterfowl make a stop-over here, in autumn, the numbers are even more spectacular.
http://www.maaturism.ee/index.php?id=worth-checking-out&sid=193
https://estoniabirdwatching.wordpress.com/2015/09/22/silma-nature-reserve/
Approximately 3 pm we will back in Tallinn, making a stop at the airport and in the city centre.
https://www.visittallinn.ee/eng

Delegates

BELARUS	
Volha Kaskevich	NGO “BAHNA”
BELGIUM	
Didier Vangeluwe	Royal Belgian Institute of Natural Sciences
CHILE	
Yerko Vilina	University Santo Tomas
CHINA	
Ao Peiru	Research Center for Eco-Environmental Sciences
DENMARK	
Pelle Andersen-Harild	Zoological Museum, Copenhagen
Preben Clausen	Aarhus University
ESTONIA	
Andres Kalamees	Estonian Ornithological Society
Aret Vooremäe	Estonian University of Life Sciences
Art Willem Adojaan	
Elis Volmer	Estonian University of Life Sciences
Grete Tõnisalu	Estonian University of Life Sciences
Hannes Pehlak	Estonian University of Life Sciences
Hele Luigujõe	Regio
Ivar Ojaste	Estonian Naturalists Society
Jaan Grossberg	
Jaanus Elts	Estonian Ornithological Society
Juhan Upin	pillimees
Kalev Rattiste	Estonian University of Life Sciences
Katrin Kaldma	Estonian University of Life Sciences
Leho Luigujõe	Estonian University of Life Sciences
Liis Keerberg	Estonian Ornithological Society
Margus Ots	Estonian Ornithological Society
Mariliis Paal	Estonian Environmental Board
Marju Erit	Estonian Environmental Board
Martin Tikk	Estonian University of Life Sciences
Triin Kaasiku	Estonian University of Life Sciences
Trinus Haitjema	SSG Estonia
Uku Paal	Estbirding
Urmas Talivee	

FINLAND

Antti Haapanen	SSG Finland
Nina Mikander	UNEP/AEWA Secretariat

GERMANY

Anne Grohmann	LfU Brandenburg
Gert Dahms	Verein Jordsand
Hans-Joachim Augst	Ornithologischen Arbeitsgemeinschaft Schleswig-Holstein
Helmut Eggers	SSG Germany
Nico Stenschke	Ornithological Association Saxony-Anhalt e.V.
Volker Blueml	BMS-Umweltplanung

HUNGARY

Gyula Kovács	University of Sopron

ICELAND

Ólafur Einarsson	BirdLife Iceland

LATVIA

Dmitrijs Boiko	Latvian Museum of Natural History
Ruslans Matrozis	Latvian Ornithological Society

LITHUANIA

Julius Morkūnas	Klaipėda University

THE NETHERLANDS

Bart Nolet	Netherlands Institute of Ecology
Rascha J.M. Nuiten	Netherlands Institute of Ecology
Wim Tijsen	Landschap Noord-Holland

POLAND

Angelika Grochowska	Ecotone Telemetry
Maria Wieloch	Ornithological Station MIZ PAS, PGBŁ
Radoslaw Wlodarczyk	University of Lodz

RUSSIA

Belousova Anna	FGBU VNII Ecology
Diana Solovyova	Institute of Biological Problems of the North
Elmira Zaynagutdinova	St.Petersburg State University
Oleg Soloviev	National Research Tomsk State University
Sergej A. Soloviev	Dostoevsky Omsk State University
Sergey L. Vartanyan	North-East Interdisciplinary Scientific Research Institute
Sonia Rozenfeld	Bird ringing Center of Russia
Vladimir Borisov	Pskov State University

SWEDEN

Leif Nilsson	University of Lund

UNITED KINGDOM

Carole Roberts	University College London
Christopher Spray	Dundee University
Colette Hall	Wildfowl & Wetlands Trust
Eileen Rees	Wildfowl & Wetlands Trust
Julia Newth	Wildfowl & Wetlands Trust
Kane Brides	Wildfowl & Wetlands Trust
Kevin Wood	Wildfowl & Wetlands Trust
Mary Matthews	Wildfowl & Wetlands Trust
Ronald Graham	
Sacha Dench	Wildfowl & Wetlands Trust

USA

Craig R. Ely	U.S. Geological Survey
David Luukkonen	Michigan State University
Dr. Jeff Snyder	Western Oregon University
Mary Rita	
Randy Knapik	Michigan State University
Walter Wehtje	Ricketts Conservation Foundation

Matsalu Bay, one of the most important stop-over site for Bewick's Swans along the flyway (Photo: Leho Luigujõe)