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WATERFOWL OF NORTHERN EURASIA: GEOGRAPHY, DYNAMICS AND POPULATION MANAGEMENT

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CURRENT STATUS OF WINTERING GEESE IN THE LEFT-BANK PART OF THE DRY-STEPPE ZONE OF UKRAINE

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From the early 1990s, there have been regular winter counts of geese in the left-bank part of the dry-steppe zone of Ukraine. The main methods of the count consist of watching the shores of the seas, including their bays, estuaries and river mouths on automobile routes; watching 10 x 10 km inventory quadrats on shuttle-vehicle routes – in both cases from stops and looking out over the open water areas with a telescope. Data gathered in this way enabled us to trace the population dynamics of the wintering geese in the region for more than 20 years.

For the outlined period, a noticeable decrease in the numbers of wintering geese, above all the Greylag (*Anser anser*) and the White-fronted Goose (*A. albifrons*), was recorded. An exception was the Red-breasted Goose (*Rufibrenta ruficollis*), the abundance of which has increased during this century, although a slight decrease has been noticed in recent years. The Lesser White-fronted Goose (*A. erythropus*) and the Bean Goose (*A. fabalis*) have been encountered in such low numbers that no trend has been detected. Correlated with the change in numbers, we have observed an overall redistribution of the Red-breasted, Greylag, and White-fronted geese within the studied region. Whereas at the end of the last century these species were encountered relatively ubiquitously, in the 21st century they have practically ceased wintering in the north-western region around the Sea of Azov and have become more concentrated on the Sivash, and, in recent years, in the region of the Askania-Nova Biosphere Reserve.

Depending upon the nature of the winter (with or without a deep snow cover, the crustiness of the cover, and other climatic factors impeding access to food), the redistribution of the geese on the territory occurs, up to a nearly complete outmigration from the region. The main reasons for the drop in numbers and spatial redistribution of the geese in the left-bank part of the dry-steppe zone of Ukraine in the past 20 years are the large-scale decline of land suitable for their food, above all of crops of winter cereals in the last decade of the 20th century, and a nearly complete absence of corn; and the widespread and essentially unregulated poaching, using modern means and technology.

Restoration of wintering geese in the south of Ukraine is possible only under the following conditions:

- The conducting of regular scientific monitoring of wintering in the region and of operational management on its basis;
- The regulation and tightening of nature protection and hunting legislation;
- The political will of governments at all levels to guarantee the fulfilling of the foregoing directions not in talk, but in action.

ENCOUNTERS OF THE BLACK BRANT (*BRANTA NIGRICANS*) ON THE SOUTH KURILS

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For the entire period of the work of Soviet and Russian ornithologists on the territory of the South Kurils, hardly any attention was paid to the study of the Black Brant. In "The Birds of the South Kurils" (Nechaev, 1969), the author cited Snow, 1902, who showed that the given species is encountered very rarely on the Kuril Islands. In the publication, which summarizes the work of the many known ornithologists who worked on the South Kurils from the 1970s to the 1990s (Nechaev, Fujimaki, 1994), the authors show that the Black Brant is a rare migrant for the given territory. In "The Birds of Japan" (Brazil, 1991), the author shows the area of the

Strait of Izmena between the islands of Kunashir and Hokkaido as a stopover site for Black brant during seasonal migrations. From 1984 to 2010, workers of the nature reserve "Kurilskiy" gathered data on encounters of brant and determined sites of their feeding stopovers during seasonal migrations on the south of Kunashir Island. In 2002–2003, it was revealed that the Black Brant is rather common on spring migration (Ushakova, 2003), according to the results of surveys by the staff ornithologist of the reserve and of interview data of local inhabitants. The main staging site for the brant was Lake Veslovskoye (43°42'56" N, 145°33'06" E), where, in 2009, approximately 200 brant were recorded. The first groups of birds appear on the lake in early September; the brant remain here until the middle of December. The chief factor limiting the duration of the feeding stopover of the birds is the low temperatures that initiate the formation of an early ice cover on the lake. In spring the brant remain on the lake from the end of March to the middle of May. Lake Veslovskoye lies in the protected zone of the nature reserve, being closed to hunting year round, but the proximity of the village of Golovnino and the accessibility of the territory by transportation turn out to have a negative impact on the status of the brant population. Because not only the lake but also the area of the nearby Veslovskiy Peninsula are a place of stopovers of many thousands of waterfowl during seasonal migrations, it makes sense to confer the status of Specially Protected Natural Territory on all of this territory, with its own infrastructure and restricted access.

PRODUCTIVITY OF THE WETLANDS OF THE EASTERN EUROPEAN TUNDRA IN TERMS OF ANSERIFORMS

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Census transects of waterfowl were carried out on foot in June-July 2004–2010 according to generally accepted methods. The length of the census routes on each land type was 50–100 km. The population density of adults (young birds were not included) was calculated as the mean for all types of habitat. The mass of the birds was expressed as the sum of products of the population density of each species and the mean (between females and males) weight of a single individual of this species. The results of the studies are presented in the table.

Table
Summer productivity of the wetlands with regard to anseriforms

	Number of species	Mass of birds kg/km^2	Species dominant in abundance (% population density of all anseriforms)
Islands of the Barents Sea (from west to east)			
South-western Kolguyev Island	12	1163	Branta leucopsis (94), Anser albifrons (4), Somateria spectabilis (1)
Dolgiy Island	9	88	Somateria spectabilis (33), Branta leucopsis (23), Anser albifrons (15)
South-western Vaygach Island	9	258	Anser fabalis (49), Branta leucopsis (41), Cygnus columbianus (5)
Bolshezemelskaya Tundra			
Maritime Tundra (from west to east)			
Basin of the Chyornaya River	10	135	Anser albifrons (52), Clangula hyemalis (26), Aythya marila (16)
Varandeyskaya Lapta Peninsula	10	176	Anser albifrons (52), A. fabalis (22), Clangula hyemalis (17)
Southern tundras (from west to east)			
Basin of the middle course of the Kolva River	8	37	Anser fabalis (28), Anas acuta (20), Clangula hyemalis (19), Melanitta fusca (19)
Basin of the middle course of the Adzva River	7	34	Anser fabalis (44), Anas penelope (33), Aythya marila (15)
Basin of the middle course of the Bolshaya Rogovaya River	4	36	Anser fabalis (51), Melanitta nigra (40), Aythya marila (6)

RARE ANSERIFORMS IN THE AREA OF BLACK SEA NATURE RESERVE

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Thanks to its geographic position on a migratory flyway for birds and to its numerous water bodies with a wealth of islands, the area of Chernomorskiy [Black Sea] Nature Reserve is very important as a site for migratory staging, wintering and nesting for 32 species of waterfowl, of which 9 are listed as rare or threatened in the Red Book of Ukraine.

The Red-breasted Goose (*Branta ruficollis*) was a migratory transient in the first half of the 20th century; owing to a change in its migration route, in the last two decades of that century its abundance in the area of reserve during migration increased significantly. Now, it is a common migratory and scarce wintering species. The Tundra Swan (*Cygnus bewickii*) was not noticed before the 1960s; now, it occasionally overwinters on Tendrovskiy Bay in insignificant numbers (4–8 individuals). The Ruddy Shelduck (*Tadorna ferruginea*) nested on Dzharylgach Island in small numbers in the 1920s. Later, in the reserve, it was not nesting, but encountered on migration, and rarely flew to the lakes on the steppes around the sea. The Gadwall (*Anas strepera*) was an abundant nester in the first half of the 20th century. In 1948, on Orlov Island alone, 450 nests were counted. In the 1970s and 1980s, it was the most common species on the islands of the reserve (in 1981: 500 pairs). In the 1990s, the population crashed to 85 pairs, in the 2000s, to 30–50 pairs. The Ferruginous Duck (*Aythya nyroca*) was common on migration and scarce in winter. In the past, it was the most numerous species on the nesting grounds in the Dnieper floodplains; currently, it nests there in individual pairs. The Common Goldeneye (*Bucephala clangula*) was common on migration and in winter. In the 1960s, the number of goldeneyes wintering in the reserve surpassed 2500 individuals; currently, it has decreased. The Common Eider (*Somateria mollissima*) in the 1960s was encountered on the wintering ground; since 1975 it has nested on Dolgiy Island in Yagorlytskiy Bay, and since 1988 on islands in Tendrovskiy Bay. By the end of the 1990s, more than 2000 nests were counted. With the worsening of the ecological condition of the bays at the start of the 2000s, the abundance of the population dropped sharply; in 2009 it consisted of only 550 pairs (Rudenko, 2010). The White-headed Duck (*Oxyura leucocephala*) is a rare migratory species on the Dnieper floodplain. The Red-breasted Merganser (*Mergus serrator*) nests on all islands of the reserve and in *Phragmites* stands along the shores. In the 1960s, the island population exceeded 840 pairs. By the mid-1990s, there were 250–330 pairs, and at the turn of the 21st century its abundance had dropped to 60 pairs (Rudenko, 2006).

FACTORS OF THE POPULATION DYNAMICS OF *ANSER* GEESE AT THE OLONETS SPRING STAGING SITES (KARELIA, RUSSIA)

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Long-term monitoring of the spring staging of geese of the genus *Anser* on the Olonets plain has shown that the number of birds and the period of their sojourn in the fields vary strongly from year to year. The abundance of the White-fronted Goose (*Anser albifrons*) from 1997 to 2010 slowly grew, while the abundance of the Bean Goose (*A. fabalis*) essentially did not change. The maximum daily size of the flocks varied from year to year for the Bean Goose, from 783 to 14,220, for the White-fronted Goose from 12,148 to 27,726. The peak abundance of the Bean Goose in different years was recorded between 20 April and 3 May, of the White-fronted Goose – between 1 and 17 May.

Significant year-to-year variation in the abundance of the geese depended on a combination of factors. The most significant of these were the spring weather, the state of the food base, the level of anthropogenic disturbance, and the state of the protection of the birds in places of large concentrations. In different seasons, the role of these factors and the strength of their impact on the birds differed substantially. Warm, early springs stimulated early mi-

gration of the geese to northern stopovers, and the growth of their numbers on them, whereas cold led to the geese lingering on more southern parts of their migratory route. The weather in May showed a marked influence on the disintegration of the congregations of the Bean Goose, but did not impact the White-fronted Goose.

The condition of the fields and the level of anthropogenic disturbance played no less important a role in the dynamics of goose congregations. Renewing the cultivation of a portion of the fields, which was carried out from 1999 to 2001 with the backing of WWF-Sweden, had a positive influence on the abundance of the birds (Zimin *et al.*, 2007).

The stage site of *Anser* and *Branta* in the vicinity of the town of Olonets became immense and stable only after the establishment here in 1993 of a seasonal nature refuge and the organization of effective protection of the birds. Currently, in connection with changing regulations in the oblast with regard to the protection of nature, the Olonets spring staging ground lost its status as a Specially Protected Nature Territory (SPNT), and, as a result of the constant reorganization of nature protection agencies, the level of protection of the birds here has significantly weakened. In recent years, the main factor in the population dynamics of the *Anser* geese has become poaching. Currently, this largest staging site for *Anser* and *Branta* in northwestern Russia is under threat, and for its preservation it is necessary to establish an SPNT of the highest order, with a strict regime of protection.

INTEGRATED MANAGEMENT OF MIGRATORY CONGREGATIONS OF GEESE

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Sites of annual massive migratory congregations (MMC) of geese play a determining role in the formation of local flight paths. The geese use MMC for feeding and resting, and that enables them to store optimal energy reserves up to the start of breeding. Many MMC are used also by other migrating waterbirds, including species protected and match the criteria of BirdLife International Important Bird Areas. On the other hand, MMC may serve as bases for the organization of effective hunting.

The abundance of the Western European population of the White-fronted Goose (*Anser albifrons*) is currently high. It is necessary to conduct monitoring of MMCs and to undertake coordinated measures to improve the organization of the hunt with a combined zone of hunting and calm on all migration routes.

Our investigations in four oblasts of the Upper Volga (Kostroma, Yaroslav, Ivanov, and Vladimir oblasts) demonstrated that at the present time migrating flocks form only on protected areas (special wildlife preserves, zones of rest) or on areas innaccessible to people. Accessible and unprotected MMCs exist in the best-case scenario up to the opening of spring hunting, when the main negative factor is the disturbance of birds. On the other hand, ubiquitous degradation of agricultural lands is observed, and that, even in the absence of disturbance, leads to a decrease in the number of stopover sites.

Having studied several positive examples of conservation of MMCs (the Kologriv floodplain and the Kostroma lowland, the Moksha hunting ground in Ryazan oblast, and others), and having worked out for four of them plans of administration, the authors propose a program that includes the following main points:

- inventorying the MMCs in regions comprising the range of the migrating Western European populations of geese;
- coordination of the plans of protection of the MMCs;
- introduction (at the level of leaseholders of hunting grounds) of the methods of the development of management plans for the protection of the MMC. This is the most important point, because in each particular situation the organizing of effective hunting may differ from the standard with regard to local conditions;
- recommendation for interaction with farmers for the improvement of the quality of agricultural lands suitable for migratory stopovers;
- monitoring of spring-migrating geese, in accordance with the periods of the opening of the hunt;

- development of a network of marked geese and the registration of marked birds.
- This work was carried out under the Russian-Dutch project BBI-Matra No. 523 50 84.

THE DISTRIBUTION DYNAMICS OF RARE SPECIES OF ANSERIFORMS IN CENTRAL RUSSIA

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Data of the current distribution of the nine rare breeding anseriform species in the twelve oblasts (administrative regions) of Central European Russia (Rare species..., 2008) are presented. Their distribution over the past decade (1999–2009) in comparison with the two previous decades (1980–2000) is reviewed. During the most recent 10-year period the Mute Swan (*Cygus olor*) was recorded as a breeding species in five oblasts instead of the two (Smolensk and Bryansk) where it had been recorded during the previous two decades; the Whooper Swan (*C. cygnus*) in five oblasts instead of one (Yaroslavl Oblast), and the Common Goldeney (*Bucephala clangula*) in ten oblasts instead of six. The number of records of nesting for the Gadwall (*Anas strepera*) and the Wigeon (*A. penelope*) increased from 8–9 to 13–19 in 7 and five oblasts, respectively. The Pintail (*A. acuta*) now breeds in 6 regions, for which 30 nesting locations were recorded. The distribution of the Common Merganser (*Mergus merganser*) now covers four oblasts (8 records for the last decade), and that of the Smew (*M. albellus*) – three oblasts. Earlier the Smew was recorded here only as a vagrant species. The Greylag Goose (*Anser anser*) now breeds only in Smolensk Oblast. This is the lone species that has a reduced area of distribution during the past decade, and now is under threat of extirpation from the centre of European Russia. On the other hand, the number of records of the other rare species, especially the Mute Swan and the Goldeneye, increased. The latter two species evidently have not only enlarged their area of distribution, but also have increased in number.

THE POPULATION DYNAMICS OF RED-BREASTED (*BRANTA RUFICOLLIS*) AND WHITE-FRONTED (*ANSER ALBIFRONS*) GEESE IN THE MANYCH-GUDILO ORNITHOLOGICAL SECTOR, "CHERNYE ZEMLI" NATURE RESERVE

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The territory of Manych-Gudilo ornithological sector of the "Chernye Zemli" nature reserve (27,600 ha) lies in the central part of the Kumo-Manych lowland.

The results of spring and autumn censuses conducted in cooperation with the specialists from Institute of Ecology and Evolution, Russian Academy of Sciences, in 2004–2010 (see Table) show that the territory of the nature reserve and its protected zone comprise a place, the largest area in Russia, of concentration of the Red-breasted Goose during migratory stagings.

Table
The population dynamics of Red-breasted and White-fronted geese in the Manych-Gudilo ornithological sector of "Chernye Zemli" Nature Reserve

Year	Red-breasted Goose		White-fronted Goose	
	Autumn	Spring	Autumn	Spring
2004	31 500	31 100	12 750	14 810
2005	11 400	6700	38 400	27 600
2006	24 410	5860	41 600	3890
2007	17 470	7960	44 030	6410
2008	42 210	2660	68 300	15 210
2009	12 540	906	27 400	11 050
2010	34 800		41 650	

The strong droughts in spring during the past four years have led to the drying up of the fresh and brackish water bodies on the territory of the protected zone of the nature reserve, which in turn has led to a decrease in the abundance of the Red-breasted Goose in the autumn. The spring migration of the birds in relation to the weather conditions has changed from late February to mid-April, with the odd individual remaining until the beginning of May.

During autumn migration, these geese appear on the territory of the ornithological sector in the middle of October, and remain until heavy frosts. In years with hot and dry summers, when the fresh and brackish water bodies dry up, the migration of White-fronted and Red-breasted geese is transient.

In mild winters, Red-breasted geese stay on the wintering ground. Thus, based on the results of winter counts, in January 2004 there were more than 57,000 geese, of which 1,200 were Red-breasted geese; in January 2005, 5,000 of these geese were counted on the wintering ground.

SUMMARY OF THE INVENTORYING OF ANSERIFORMS IN THE NATURE PARK OF THE REPUBLIC OF KALMYKIA

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Work on the inventorying of the avifauna of the Nature park of the Republic of Kalmykia was conducted under the umbrella of UNDP/GEF Project 0047701 “Conservation of Wetland Biodiversity in the Lower Volga Region”. Investigations, including the study of the current status of the anseriform fauna as a game resource, were carried out in accordance with a technical requirements agreed to by the employer and executor. The main part of the work was carried out in the 2008 field season. The required investigation was the determination of the species composition, absolute or relative abundances, and the densities and distribution of the birds by habitat in the Nature park.

The area of the park is 4320 ha. It lies between the Volga and Akhtuba rivers. As are all Volga-Akhtuba floodplains, it is characterized by intrazonal terrains with floodplain ponds, mixed with wooded massifs and numerous streams and relatively narrow channels between water bodies. However, the size of the aquatic-marshy areas in the low-water season is not so large and comprises 424 ha, or 9.8 %. For this reason, many anseriforms experience a deficit in sites favourable for nesting.

As a result of the inventory work on the territory of the Nature park, 21 species of anseriforms were recorded. Of the nesting species here, the common ones were the Mute Swan (*Cygnus olor*), the Mallard (*Anas platyrhynchos),* the Garganey (*A. querquedula*), and the Pochard (*Aythia ferina*). Nesting more rarely was the Gadwall (*Anas strepera*). The Ruddy Shelduck (*Tadorna ferruginea*) and the Shelduck (*T. tadorna*) also were scare, however during seasonal migrations here more flocks of Ruddy shelducks are seen. In addition to local species, in the autumn and spring northern species, such as the White-fronted Goose (*Anser albifrons*) and the Whooper Swan (*Cygnus cygnus*), appear on the water bodies of the park. The Shoveler (*Anas clypeata*), Tufted Duck (*Aythya fuligula*) and Scaup (*A. marila*) are numerous on migration. The Common Goldeneye (*Bucephala clangula*), Smew (*Mergus albellus*), and Teal (*Anas crecca*) are seen in small numbers. In even smaller numbers are the Wigeon (*A. penelope*) and the Pintail (*A. acuta*). There have been single encounters of the Ferruginous Duck (*Aythya nyroca*) and the Goosander (*Mergus merganser*). Thus only 7 species are nesting, the remaining 14 are migratory. Despite the insignificant territory, this region plays a large role in the preservation of biodiversity, primarily as an important stop-over for migrating species.

FACTORS DETERMINING THE DISTRIBUTION AND ABUNDANCE OF WATERFOWL ON THE FLOODPLAINS OF RIVERS IN NORTH-EASTERN UKRAINE

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The abundance and distribution of waterfowl in the floodplain habitats of north-eastern Ukraine (Kharkov and Sumy oblasts) were studied from 2004 to 2009. During these years, 56 sampling areas 60 to 482 hectares in size were laid out. On these in spring, counts were conducted by marking encounters on maps. Altogether on the sectors tracked, 8 species of anseriforms were recorded that were either certainly or in all likelihood nesting. These were the Greylag Goose (*Anser anser*), Mute Swan (*Cygnus olor*), Ruddy Shelduck (*Tadorna ferruginea*), Mallard (*Anas platyrhynchos*), Common Teal (*A. crecca*), Garganey (*A. querquedula*), Shoveler (*A. clypeata*), and Pochard (*Aythya ferina*). At the same time, habitat parameters and factors of impacts on the waterfowl population were evaluated. General traits of geography and terrain (nature-climate zone, flooding), the proportion of the specific type of arable land, and the impact of anthropogenic factors were assessed. Data on the numbers and distribution of the majority of species were analysed with applied methods of nonparametric statistics (Kruskal-Wallis test). The abundance and variety of waterfowl was higher on the floodplains of small rivers of the steppe zone nearly untouched by drainage improvements. Of the enumerated species, the Ruddy Shelduck and the Garganey were recorded in locations that allowed us to assume this to be a nesting ground, if only of a single pair, but the Mute Swan was nesting in four sampling areas (0.66–1.46 pairs/km^2). The Greylag Goose was found only within the steppe zone, in four areas (0.54–3.10 pairs/km^2). The Mallard nested on 85.7 % of the sampling areas. Its abundance fluctuated from 0.3 to 4.37 pairs/km^2, and was 1.93 pairs/km^2 on average. The abundance of the species was certainly higher on the steppes in comparison with the forest-steppe (Mann-Whitney test; $U = 154.0$; $p < 0.05$). Other links were weakly expressed. The Garganey was found on 55.4 % of the sampling areas. Its abundance varied widely: 0.41–21.12 pairs/km^2, and was, on average, a bit higher than for the Mallard (2.12 pairs/km^2). The abundance of the Garganey was certainly higher in the steppe zone (Mann-Whitney test: $U = 145.0$; $p < 0.05$) and depended on the areal size of the water bodies of the floodplains, the presence on them of shallow-water areas, the impact of improvements and other factors. The Shoveler (0.41–15.30 paris/km^2) and the Pochard (0.56–7.79 pairs/km^2) were recorded in four and five sampling areas, respectively, mainly in the steppe zone. The majority of species showed significant positive correlations between indicators of abundance.

The studies were carried out in the G.N. Vysotskiy Ukrainian Research Institute of Forestry and Agrosilviculture.

SPRING MIGRATION OF GEESE AND THEIR STAGING SITES IN THE CENTRAL PART OF THE EASTERN EUROPEAN PLAIN

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According to the hypothesis of the "green wave" (Drent *et al.*, 1978), arctic species of geese in spring are guided to nesting grounds endeavouring to make maximum use of the ephemeral food resources – the young shoots of grasses and sedges. For this reason, Tundra Bean geese (*Anser fabalis rossicus*) and White-fronted geese (*A. albifrons*) wintering in Western Europe during spring migration keep far to the south, where the vegetative stage of plants begins

earlier, crossing Poland and Belarus, and then continental Ukraine and adjacent regions of Russia. In recent decades, the abundance of these geese has grown in connection with a ban on hunting and intensification of agriculture on wintering grounds, and they actively show themselves on migratory routes in the north-east of Ukraine and in the black-earth oblasts of Russia. Investigations in 2002–2010 in Kharkov Oblast of Ukraine, and in Belgorod, Voronezh, Volgograd and Saratov oblasts of Russia showed that here are clustered important regions for staging geese. We know approximately 20 sites of their perennial concentration on spring migration. Among these the Krasnopavlovskoe Reservoir (Kharkov Oblast) is unique. There, at a single time, more than 50,000 geese may be settled. For 6 sites, staging of more than 10,000 geese was recorded; these are the Pechenezhskoye, Krasnooskolskoye and Orelkovskoye reservoirs, Lake Liman in Kharkov oblast, tailings ponds of Lebedinsky Mining in Belgorod Oblast, and the floodplain of the Tersa River in Volgograd Oblast. The geese use saline meadows in depressions of the floodplain terraces, flooded meadows and fields in the floodplains of rivers, troughs between agricultural fields, and on huge natural and artifical water bodies for resting. In mixed congregations, the Tundra Bean geese usually predominate over the White-fronted geese. The ratio between them certainly changes over the course of the spring. In the period up until 20 April, the proportion of the White-fronted Goose in congregations is higher (~50 %) than at the end of April and in May (~10 %) (for congregations of greater than 500 individuals; $n_1 = 11$, $n_2 = 9$; Mann-Whitney test; $p < 0.01$). The Greylag Goose (*A. anser*) is encountered in very small numbers in migratory congregations; in such mixes very small flocks of Taiga Bean geese (*A. fabalis fabalis*) are noted, as well as solitary individuals and family groups of Barnacle geese (*Branta leucopsis*) and Red-breasted geese (*B. ruficollis*). All marked Tundra Bean geese (7) and White-fronted geese (8) encountered in the region in recent decades were ringed while wintering in Holland or on the migration route in eastern Germany.

WAYS OF PROTECTING THE WHITE-HEADED DUCK (*OXYURA LEUCOCEPHALA*) ON THE BARABA LOWLAND AND THE KULUNDA PLAIN

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The White-headed Duck is a globally rare species of bird. According to the Red List of the IUCN, its conferred status is Endangered (EN) – "a disappearing species". Indeed, since the beginning of the twentieth century, the abundance of this bird has been diminished 10-fold. Russia is one of a limited number of countries where the main population of this species has been protected. However, in Russia, the abundance of the White-headed Duck currently is extremely small (according to the data of the Red Book of Russia, 2001, 170–230 pairs); it is in danger of going extinct. Nevertheless, it may still be possible to conserve this bird. It is for this reason that the quickest possible working out and implementation of concrete measures to conserve the White-headed Duck are necessary.

Since 2006, the ecological centre "Strizh" [*Apus*] has been engaged in the study and preservation of the White-headed Duck in Baraba and on Kulunda. This region is one of the most important areas of the natural recovery of the species. Our forces were put into research on the abundance, breeding, and biology of and threats to this species. Based on the obtained scientific data and the extensive experience of the organization in carrying out environmental action plans, we suggest a combination of measures for the conservation and recovery of the abundance of the species, the chief of which we consider to be the following.

1. The conducting of a widespread informational-educational campaign among the local population and nature users: the conducting of personal meetings and public seminars; the development and distribution of posters, booklets and similar ecologically enlightening materials illuminating the problems of the study and protection of the White-headed Duck.
2. The establishment of new specially protected nature territories (SPNTs) in sites inhabited by the species and/or the strengthening of the environmental-protection regime on already existing SPNTs (especially on lakes Baganskiye and Karasukskiye).

3. The regulation of human activities in places inhabited by the species (regulation of the timing and areas of the hunt, a ban on the placing of nets on nesting grounds, the draining of water bodies, *etc.*).
4. Scientific investigations – monitoring of the abundance and breeding of the White-headed Duck, identification of new sectors of habitat of importance for the species, continuation of the work on the study of the biology of the species.
5. The enlisting of specialists for the conservation of the species in their habitats within the boundaries of Russia during wintering and migration.

In addition, it is important to continue the work of establishing a reserve group of White-headed ducks in captivity with subsequent release to the wild, which has already begun at the Karasuk biological station of the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Sciences.

MIGRATION OF THE BEWICK'S SWAN (*CYGNUS BEWICKII*) IN THE VOLGA-AKHTUBA FLOODPLAIN

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In 2009–2010, during the monitoring of the avifauna of the Volga-Akhtuba floodplain (a UNDP/GEF project) huge, previously unknown, congregations of the Bewick's Swan were revealed, testifying as to its regular migration to southern wintering grounds. The species was first encountered 30.10.2009 in the shallow-water, clay-bottomed Lake Davydkino (S = 1.92 km^2) of Lenin District in the inner, weakly forested floodplain. During daytime there, approximately 200 Bewick's swans were found feeding amongst the whooper swans (*C. cygnus*). The birds formed two groups of 200–300 individuals each; in one, whooper swans predominated, in the other, Bewick's swans. There, too, on 2.12.2009 not less than 800 swans were counted (more than 95 % Bewick's swans); on 5.12.2009, there were already more than 1000 swans (90 % Bewick's). However, on 4.12.2009 temperatures dropped well below freezing, the water bodies froze, and the swans disappeared (Gugueva *et al.*, 2010).

In the spring, on 14.04.2010, a gathering of some 1500 swans (approximately 80 % Bewick's) was again encountered on Lake Davydkino. The period of their stay, owing to the near-inaccessibility of the lake, remained unknown.

During the autumn, on 20.10.2010, the first two flocks of Bewick's swans (6 adults and 2 adults with 7 young) appeared on Lake Davydkino from the north during the day. However, owing to the summer heat, 70 % of the lake had dried up, and some of the swans flew off to the Volga Valley, but some remained on the bar in the middle of the lake. On 26.10.2010, there appeared to be no swans on Lake Davydkino, although a gathering of 272 swans (254 Bewick's, 18 whoopers), of which 60 % were immatures, was encountered on Lake Ostrovskoye (S = 1.13 km^2), lying 7 km to the west. Over the course of 40 minutes, another three flocks arrived here: one mixed (2 whooper and 4 Bewick's swans); the second – 2 adult whoopers; the third – 2 adult and 8 immature Bewick's swans. On 9.11.2010, the swans were absent from the lakes, but on 16.11.2010, Lake Ostrovskoye again contained a small flock: 75 Bewick's (23 % immatures) and 20 whoopers.

The deeper Lake Ostrovskoye (0.6–0.8 m), in comparison to Lake Davydkino (0.4 m), had a weakly developed complex of aquatic organisms. The swans there, it is possible, experienced a food deficit and therefore could not be stay there for a long time. Under an examination of photographs taken of Lake Davydkino on 7.04.2006, Bewick's swans were encountered, and these were not immediately identified, amongst Mute swans (*C .olor*), and this testifies as to the long-standing use of this water body by the migratory swans.

ON SEX RATIOS IN DUCKS IN SPRING (2003–2010) IN THE KHANKA LOWLAND, PRIMORYE, RUSSIAN FAR EAST

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The extensive Khanka Lowland, lying in the southwest of Primorskiy Kray (Russian Far East), plays a significant role as a site for huge and lengthy spring staging of waterfowl. Here spring hunting of the waterfowl is, and has always been, conducted. As is well known, concerning the question of whether or not a spring hunt of ducks should occur, hunters most often bring forth the argument of the prevalence of males in the spring.

To shed light on this question, studies focusing on the gender structure of ducks during the spring migration were carried out. The total sample size was more than 30,000 ducks. According to the results of our counts, it is clear that the prevalence of males was corroborated for all species of dabbling ducks and most of the diving ducks.

According to the overall count, amongst the dabbling ducks the abundance of males appeared 1.5 times higher than females on average, varying from a maximum of 1.8 (the Garganey (*Anas querquedula*)) to a minimum 1.4 (the Baikal Teal (*A. formosa*) and the Wigeon (*A. penelope*)). The majority of diving ducks, as well as the Mandarin Duck (*Aix galericulata*), exhibited a significant male bias. However, for several species of mergansers, the reverse was true. This was particularly the case for the Smew (*Mergellus albellus*).

Dwelling on the question of the spring hunting of ducks, we note that in the past two decades, our experiences in communications with hunters and our own observations have shown that in Primorye the take of birds has been conducted without actual organization: that is, without paying attention to bag limits, and the large-scale taking of females and protected species. Most often to be taken is the protected Baikal Teal, for the simple reason that it makes up the overwhelming majority of migrating ducks on the territory of the Khanka-Razdolnenskaya Valley. The necessity of removing the Baikal Teal from the list of protected species is long-standing (Bocharnikov *et al.*, 2009), and while this species remains in the Red Books of Russia and of Primorskiy Kray, the majority of hunters join the ranks of the law breakers.

RARE SPECIES AND RESOURCES OF ANSERIFORMS ON THE KHANKA-RAZDOL'NAYA PLAIN (WESTERN PRIMORYE)

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The present communication is a result of long-term (1972–2010) field studies by the authors on the territory of south-western Primorye. Here we recorded a total of more than 470,000 anseriforms (from 13,000 to 160,000 in a single season) belonging to 22 species. Over the course of the five years (2003–2007), daytime counts of transiting anseriforms were conducted from an observation point on the Razdol'naya River in the vicinity of Ussuriisk. The total duration of the counts was more than 1600 hours. During this time here, nearly 400,000 anseriforms, and 27 species were counted.

According to the data of the counts, both in species diversity (20 species) and in abundance, ducks predominated, in the overall inventory comprising approximately 82 % on the Khanka lowland and in the Razdol'naya River valley a little more than 58 % of all anseriforms encountered here. The absolute dominant in the period of the spring hunt was a hunting-banned species – the Baikal Teal (*Anas formosa*), contained in the Red Books of the Russian Federation and of Primorye, as well as on the IUCN Red List of Threatened Species 2008. In nearly all counts it comprised more than half of all species of ducks, and in total for the study

period its proportion in this group of anseriforms reached 78.8 % (80.1 % on Lake Khanka and 77.9 % in the Razdol'naya River valley). Among the other species of ducks entered on the list of the Red Books, the Mandarin Duck (*Aix galericulata*), Baer's Pochard (*Aythya baeri*) and Scaly-sided Merganser (*Mergus squamatus*) are found here. Their combined contribution to the overall abundance of anatids, both on Lake Khanka and in the Razdol'naya River valley, is not great (from 0.1 to 0.7 %), the Baer's Pochard on both sectors being encountered solitarily and intermittently.

THE HISTORY OF CHANGES OF GEOGRAPHICAL CONNECTIONS OF THE MUTE SWAN (*CYGNUS OLOR*) IN BREST

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An analysis was conducted of 154 returns of rings of the Mute Swan obtained only on the territory of the city of Brest from October to May 1985–2010. Recordings of birds with rings at a new site were considered returns, and repeat recordings of one and the same bird at the place of ringing were not counted. The obtained data were divided into two time periods: from 1985 (first return at the Belarus Ringing Centre for the given region) to 2000, and from 2001 to 2010.

Statistically significant differences in the direction of movement of the Mute Swan of the Brest group over the course of these two periods were revealed in the analysis of the returns data by means of the Oriana 3.0 program.

From 1985 to 2000, 22 returns were analyzed: of these, four of the birds were ringed on the urban territory, and 18 were birds ringed with foreign rings and noted in Brest. A summary picture of the distribution of returns looks like this: Poland – 77.5 % of the total number of obtained returns; Denmark – 9 %; Lithuania, and Ukraine and Slovenia – 4.5 % each. The main direction of movement of the birds was to the north-west from the city.

In the second period, from 2001 to 2010, the number of returns grew sharply, mainly on account of the birds ringed on the territory of Brest. One hundred and thirty-two returns were analyzed: 83 of the birds had been ringed on the territory of the city and 69 were foreign birds noted in the Brest urban area. Geographically, the returns were distributed in the following manner: Poland – 64 %; Hungary – 23 %, Croatia, Slovakia, Austria, Germany and Ukraine – 1.5–3 % each; and Denmark, Latvia, Lithuania and Slovenia – a single return from each (< 1 %). In this way, although the predominant direction remained north-westerly, in the second time period the number of birds migrating in a south-westerly direction grew substantially. Hungary (23 % of all returns for the period) had the second highest the number of records.

THE BREEDING POPULATION OF THE WHOOPER SWAN (*CYGNUS CYGNUS*) IN LATVIA: ITS WINTERING, MOULTING AND DISPERSION GEOGRAPHY

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In Latvia, the breeding population of the Whooper Swan increased from one breeding pair in 1973 to approximately 260 pairs in 2009. The first pair nested in the western part of the country, and this area supported 86 % of 256 sites where breeding was confirmed during the years 2000–2009. Most breeding sites were associated with small water bodies: 77 % were at artificial ponds and 17 % at beaver dams. Few nests were found in lakes, mires, bogs and gravel pits.

Many (647) Whooper Swans were ringed in 1987 through 2009. Of these, 643 birds were given neckbands, 515 were ringed as cygnets, 37 as breeding birds, 81 as moulting birds, 10 as wintering birds and 4 as birds of an uncertain status.

A total of 6789 recoveries were reported during the analysed period: 3698 recoveries from Germany, 2205 – Latvia, 417 – Poland, 146 – Estonia, 85 – Finland, 72 – Lithuania, 45 – the Netherlands, 37 – Austria, 34 – Switzerland, 26 – Sweden, 16 – Denmark, 6 – France, and 2 – Russia.

Birds arrived on wintering grounds during November and December. The majority of these places are located in the eastern part of Germany along the banks of the Elbe and Oder rivers, in the vicinity of Rugen Island and in Poland near the Oder River. Some birds were observed in Denmark, in the Netherlands, Switzerland, Austria, and France. The aerial distance from the ringing place to wintering places was 623–1395 km.

Birds ringed as cygnets in previous years were observed during the summer months in Poland, Latvia, Estonia, Finland, and Russia, and during autumn migration in Finland, Estonia, Russia, Sweden and Latvia. Young birds from Latvia used moulting places far to the north and northeast of their home country.

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POPULATION DYNAMICS OF WATERFOWL IN WINTERING FLOCKS ON NATURAL AND ARTIFICIAL WATER BODIES OF TULA OBLAST

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Investigations were carried out during winter from 2000–2001 to 2009–2010 on set routes. The census routes enveloped the following water bodies: (1) the Upa River, the biggest river in Tula, the route went through the centre of the city; (2) small rivers flowing around the periphery of the city (Voronka, Tulitsa, and Rogoshnya); (3) ponds of Tula Central Park; and (4) Cherepetskoye Reservoir (cooling pond of the Thermal Power Plant, a total area of 900 ha, located in Suvorovskiy District of Tula Oblast). The length of routes in each group of water bodies was from 4 to 12 km.

The Mallard (*Anas platyrhynchos*) made up an absolute majority of wintering waterfowl on the studied water bodies. The abundance of waterfowl wintering on natural water bodies fluctuated annually from 6 to 115 individuals on the 10 km route. A positive correlation was noted with temperatures in November and December. In warmer years, a greater number of birds was recorded.

In a number of cases, the artificial water bodies provided more favourable conditions of wintering for the waterfowl than did the natural ones. Ponds of Tula Central Park are artificial water bodies on which birds regularly are fed by local inhabitants. The abundance of wintering waterfowl in different years fluctuated by more than two times (from 120 to 270 individuals). Birds kept to the open-water areas in a single large group.

The abundance of wintering groups on the Cherepetskoye Reservoir fluctuated from 210 to 430 individuals. Apart from the Mallard, the Common Goldeneye (*Bucephala clangula*) and the Common Merganser (*Mergus merganser*) were regularly noted. At relatively low temperatures in the late autumn there was a larger number of wintering individuals. In a prolonged period of mild temperatures in November-December, wintering flocks in general did not form. Thus, for the entire period of the investigations, the period leading up to winter in 2008 was noted for the highest temperatures. In January 2009, for the first time over the entire period of observations, a large wintering flock did not form on the reservoir; a total of 60 birds were noted. Perhaps this occurred thanks to birds remaining to winter on natural water bodies in such favourable temperatures. Thus the abundance of wintering waterfowl depends on the type of water body, the weather conditions and the feeding of the birds by local inhabitants.

RARE WATERFOWL OF THE BERYOZOVIYE ARCHIPELAGO OF THE GULF OF FINLAND

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The investigations were carried out on the Beryozoviye Islands in the Gulf of Finland of the Baltic Sea (60°28´–60°10´ N, 28°18´–29°43´ E) during 1997–2006. This group consists of more than 30 islands (about 5000 ha) of differing landscapes, which are convenient as nesting sites and as stopovers for migratory birds. This area is included to the List of Wetlands of International Importance.

Traditional methods of field ecology were used: transect counts, nest and brood searches, and visual observations of migrating birds. One of the main goals of our investigation was to reveal information on rare waterfowl species breeding or migrating here, including their status, abundance, distribution and main trends of migration. In total, 28 waterfowl species were recorded, including 17 breeding ones. Among them, five species are included in the Red Book of Eastern Fennoscandia, two – *Cygnus bewickii* and *Anser erythropus* – in the Red Book of the Russian Federation. We divided the rare species into several groups. 1) Species which are common as migratory birds, but rare in summer (*C olor, A. anser, Somateria mollissima, Melanitta fusca, Anas penelope, A. strepera, Aythya ferina* (irregular breeders on the archipelago), and *Branta bernicla, B. leucopsis, Clangula hyemalis, Melanitta nigra, Aythya marila* (recorded occasionally)); 2) Rare waterfowl observed on the investigated territory during the migratory period only (*Cygnus bewickii, Anser erythropus, B. canadensis, Mergus albellus*); 3) migratory birds whose stopover numbers have decreased more than twice during the last 20 years, owing to human activity (*Cygnus olor, C. cygnus, C. bewickii*). Furthermore, the data indicated displacement of the stopover sites compared to those for 1980–1990 in Bjerkezund Strait.

Anthropogenic disturbance, including that from the activity of the seaport of Primorsk and from hunters, poachers, and fishermen, has increased vastly on this territory during the past 20 years. In our opinion, the Beryozoviye Islands need improvement in wildlife conservation and the continuation of monitoring investigations.

CURRENT STATUS AND CONSERVATION OF THE BAR-HEADED GOOSE (*ANSER INDICUS*) IN SOME SELECTED HIGH-ALTITUDE WETLANDS IN LADAKH, INDIA

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Ladakh represents the westernmost extension of the vast Tibetan Plateau, covering an altitude range from 2700 to 7650 m. Two major mountain chains, the mighty Himalayas and the Karakoram, demarcate its natural borders towards the south and the north, respectively. It constitutes over 80 % of the Trans-Himalayan Tract in India and is home to a unique assemblage of flora and fauna. The region is also known as cold-desert and is characterized by severe, arid conditions. The temperature may drop to – 40°C in the long winter months between December and April and may rise to 35°C in the short summer season in July – August. The vegetation in the region is sparse and productivity peaks only in the short summer season.

Several key species of mammals are found in the region, *e.g.*, the Tibetan Gazelle (*Procarpa picticaudata*), Snow Leopard (*Uncia uncia*), Lynx (*Lynx isabellina*), Wild Dog (*Cuon alpinus laniger*), Tibetan Wolf (*Canis lupus chanko*), Tibetan antelope (*Pantholops hodgsoni*), and Wild Yak (*Bos grunniens*).

The flora of Ladakh falls under the Alpine and High Alpine zones and is dominated by annual and perennial herbs. The vegetative growth commences at the beginning of summer, when melting snow provides abundant moisture to the alpine plants.

Ladakh, dotted with some of the World's most unique and spectacular wetlands, also holds the distinction of being the only known breeding ground of the Black-necked Crane (*Grus nigricollis*) and of the Bar-headed Goose in India. The region has numerous wetlands – brackish, as well as freshwater.

The present paper presents a general overview of the current status of the breeding population of the Bar-headed Goose in Ladakh. The various conservation issues related to the species will also be discussed. The paper also presents an overview of a conservation initiative that the WWF-India has taken to conserve this species and the unique ecosystems that act as a breeding habitat for this goose species. In this conservation initiative, local communities, the Armed Forces, Department of Wildlife Protection, local educational institutions and tour operators are major partners.

LONG-TERM POPULATION DYNAMICS AND DISTRIBUTION OF THE COMMON EIDER (*SOMATERIA MOLLISSIMA*) ON THE SOLOVETSKY ARCHIPELAGO (ONEGA BAY, WHITE SEA)

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Regular censusing of the Common Eider on the Solovetsky Archipelago was conducted from 1987 to the present.

At the start of the studies, only 535 nesting females were counted. From 1987 through 1992 there was a steady increase in numbers to 1470 nests. From 1993 to the present the nesting part of the population of the Common Eider on the Solovetsky Archipelago experienced significant fluctuation from year to year (1200–2500 nests) and comprised approximately 35 % of the total number of nesting females on Onega Bay. The given period can be divided into two stages: from 1994 to 2002, when there was even fluctuation in numbers, and from 2003 to 2009, when the fluctuation in numbers grew.

The proportion of islands occupied by common eiders is high (84 % of the total number surveyed on the archipelago). The species can nest both on open islands (rocky islets), and on forested ones, and this is evidence of a highly flexible species. In 1995, nearly the whole population nested on rocky islets. In the past 15 years of observations, 80 to 88 % of the eiders have nested on rocky islets, and, correspondingly, 20–12 % on forested islands. The population density on different islands changes vastly from year to year. Pearson's correlation coefficient for the numbers of nesting birds on islets and on forested islands is positive (+0.6), *i.e.*, there has not been a moving of birds from the islets to the forested islands. It is proposed that the growth in numbers on the forested islands is occuring on account of the growth of the "forest" group.

ANSERIFORMS OF PEAT PITS IN SOUTH-EASTERN IVANOVO OBLAST (FAUNA, STRUCTURE AND POPULATION DYNAMICS)

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Studies were conducted on the territory of the peat complex "Bolshoye Boloto" [Big Bog] (the area of the pit part of the complex is 5 km^2) over the course of seven field seasons (2004–2010).

At the time of the studies, 11 species of anseriforms were nesting there: the Mallard (*Anas platyrhynchos),* Common Teal *(A. crecca),* Gadwall *(A. strepera),* Wigeon *(A. penelope),* Pintail *(A. acuta),* Garganey *(A. querquedula),* Northern Shoveler *(A. clypeata),* Pochard *(Aythya ferina),* Tufted Duck *(A. fuligula),* Common Goldeneye *(Bucephala clangula),* and Smew *(Mergus albellus*).

Diving ducks dominated in abundance over dabblers (51–71 %, on average 60 %). Such a relationship is determined by the large area of open water bodies, and the small number of exposed peat brows, from which proceed a secondary formation of bogs.

The dominant species of anseriform over the duration of all the years of the studies was the Tufted Duck. The remaining species were common, but not in great abundance. Population density of the Mallard varied insignificantly. There were rather stable nesting groups of the Pochard, Common Goldeneye, Wigeon, and Northern Shoveler. The Teal and Garganey demonstrated uneven population dynamics; they were common in other habitats of the peat complex (improved canals, and peat fields with ponds). Two species were rare and sporadic nesters: the Gadwall and the Smew. A pair of gadwalls with mating behaviour was noted only in 2007, a female smew with a brood in 2005 and in 2007. We plan further monitoring of the population of anseriforms of the "Bolshoye Boloto" complex, as well as an evaluation of the impacts on it of the fires that occurred here in 2010.

Table
The nesting density and relative abundance of anseriforms on the territory of the peat complex "Bolshoye Boloto" (mean values are given in parentheses)

Species	Nesting density, pairs/km^2	Proportion in anseriform population, %
Tufted Duck	2.8–8.4 (6)	30–57 (39)
Mallard	1.4–2.2 (1.8)	8.3–7.8 (13)
Pochard	1.2–3.2 (1.7)	8.3–16 (11.5)
Common Goldeneye	0.6–2.4 (1.3)	4.8–15 (8.8)
Wigeon	0.6–1.6 (1)	4–10 (7)
Northern Shoveler	0.2–1.6 (1)	1.6–10.5 (7.2)
Pintail	up to 1.8 (0.8)	up to 9 (5)
Common Teal	up to 1.4 (0.9)	up to 9.3 (6)
Garganey	up to 1 (0.4)	up to 7.3 (3)
Gadwall	up to 0.2 (0.03)	up to 1 (0.2)
Smew	up to 0.2 (0.06)	up to 1.5 (0.4)

PARTICIPATION OF THE POCHARD (*AYTHYA FERINA*) AND SHOVELER (*ANAS CLYPEATA*) IN THE FORMATION OF MIXED COLONIES WITH LARIDS

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In the period of pair-formation in common gulls (*Larus ridibundus*) and nest-building by Caspian gulls (*L. cachinnans*), the waterbodies of Chelyabinsk Oblast were actively colonized by ducks. Shovelers formed mixed groups with "clubs" of black-headed gulls for defence at the time of the occupation of future nesting areas. In a mixed group, the gulls often attacked each other without showing any aggression toward the ducks (Moroz, Chukhareva, 2007). Pochards nested successfully in stands of *Phragmites* and cattails in the marsh, and the shoveler on a wet meadow in the marshy area. They set about building their nests later than the black-headed gulls and coots (*Fulica atra*). Shovelers settled a greater distance from the black-headed gulls in comparison with the pochards. In polyspecific colonies, as a rule, the nests of the ducks lay on the edge of the colony of larids. Pochards nested in isolated pairs several metres from the nearest nest of a black-headed gull. Shovelers nested in solitary pairs or in small groups. With a growth in abundance and density of the black-headed gulls in colonies, the numbers of ducks decreased, but the distance between the nest of a black-headed gull and a duck decreased by three times. When the gulls did not settle on their usual nesting territory, the shovelers formed mixed colonies with yellow wagtails (*Motacilla flava*), lapwings (*Vanellus vanellus*), redshanks (*Tringa totanus*), and black-tailed godwits (*Limosa limosa*). In this case, the number of nesting pairs of the Shoveler outweighs the other species participating in the formation of the colony. Besides this, the number of individuals and the density of nesting of the Shoveler grew (to 2.14 nests/ha) in comparison with the cases of nesting in larid colonies. Altogether for the ducks (as for the Great-crested Grebe (*Podiceps cristatus*), the Black-necked Grebe (*P. nigricollis*), and the Coot nesting in larid colonies), the presence of a smaller distance between the nest of the duck and the gull than between their own species is characteristic (Chukhareva, Kharitonov, 2009).

THE RUDDY SHELDUCK (*TADORNA FERRUGINEA*) IN THE SHALKAR-ZHETYKOL LAKE REGION

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On the water bodies of the Shalkar-Zhetykol lake district (IBA RU-217), the Ruddy Shelduck has regularly nested over the past decade, although the nesting distribution and abundance significantly varies from year to year.

During the spring migration (April), individual flocks of 1230 members (up to 70–80 individuals over the season) are usually observed. However, in 2006 large flocks (up to 67 individuals; a total of 400 individuals) mixed with geese were recorded.

The main nesting ground is Lake Aike, in the Russian part of which in June 2002 were approximately 400, in June-July 2004 – 150, in 2007 – 120, in 2009 – 720, and in 2010 – 100 birds. In the Svetlinskiy nature refuge, 5–10 pairs nest annually, and approximately the same number on lakes Shalkar-Yega-Kara, Kayrankol, and Kamennoye. Since 2006, 1–2 pairs have been recorded during the nesting period in the vicinity of the village of Svetliy, and individual broods have been encountered at different times on several ponds, in ravines, and in ditches. In the Ashchisay Steppe (Orenburg State Nature Reserve), during the nesting period they have been recorded on Lake Zhurmankol, on gully ponds of Ashchisay and near the quarters the nature reserve.

In two broods on 7.06.1993 and 08.06.2000, 12 and 11 downy young, respectively, were observed. Summer broods (n = 9) consisted of 4–9 (on average 5.22) ducklings.

At the end of summer and during autumn, the main point of concentration of local and migrating birds are the lakes of Svetlinskiy nature refuge, located close to lakes Shalkar-Yega-Kara and Kamennoe, large steppe ponds close to fields of grain and the nature reserve, where, according to approximate estimate, there were two to three thousand birds annually. The largest staging flocks were recorded in 2001 on Lake Zhurmankol – more than 1000 individuals, in 2006 on the steppe pond close to Lake Batpakty – approximately 1500, in 2008 on fields around the village of Kazancha – approximately 1500 and lakes Shalkar-Yega-Kara – 650 birds. Most often, flocks were comprised of 40–70, but on occasion there were as many as 150 birds.

MIGRATION OF WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) THROUGH THE NORTHERN POINT OF OLENIY ISLAND (YAMALO-NENETS AUTONOMOUS OKRUG) DURING SPRING AND SUMMER IN 2008 AND 2010

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Studies in the northern part of Oleniy Island were conducted 14 May – 29 July 2008 and 22 May – 24 July 2010. Data are based on stationary observations and surveys of the island by foot. Dynamics of migration and the connection to local weather conditions were followed.

In 2008, the first geese were noted on 28 May. The main migration began on 5 June and increased until the 11th, with six to 30 to 150–300 individuals per day. After peak migration – 13–14 and 19 June (296–519 birds/day) – a decrease to 40–80 individuals/day began, continuing until 26 June. From then until 6 July we observed only small, local movements. From the 7th to 16th July there was a moult migration, which peaked 8–11 July (from 150 to 3,248 birds/day).

The spring migration in 2008 occurred mainly in a northerly and northeasterly direction, with groups of four to 200 individuals (on average 26, n = 105). The moult migration occurred predominantly in an easterly and northeasterly direction, with groups of four to 105 individuals (on average 25, n = 179). On the spring migration, 60 % of the geese stopped on the island for a period of from several hours to two days in length. During the moult migration no more than 2 % of the geese remained on the island.

In 2010, the first geese were noted on 30 May. The main migration began on 1 June, and grew sharply during the 2nd and 3rd from 137 to 184 birds per day. After this, until 13 June, a decrease to 10–20 individuals per day began. Finally, we observed only small, local flights until 25 June. The moult migration occurred between 26 June and 12 July, peaking on 2–3 and 7–8 July (from 154 to 707 individuals per day).

The spring migration in 2010 occurred mainly in a northeasterly direction, with groups of four to 46 individuals (on average 10, $n = 53$). The moult migration occurred predominantly in an easterly and southeasterly direction, with groups of 4 to 65 birds (on average 17, $n = 97$).

In 2010, approximately 40 % of the geese on the spring migration and 8 % of the geese on the moult migration remained on the island.

THE CURRENT STATUS AND ABUNDANCE OF GEESE ON SPRING STOPOVERS IN YAROSLAVL OBLAST

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Our investigations in 2009–2010 showed that the abundance of geese on the territory of the large IBAs of Yaroslavl Oblast had decreased some 6- to 100-fold. Earlier, in 1996–1998, the largest stopover of geese had been recorded on the IBAs "The floodplain of the Kotorosl' and Ust'e rivers" (15,236 individuals in 1997, 656 in 2009 and 160 in 2010), "The floodplain of the Kostroma River" (10,895 birds in 1997, 4,174 in 2009 and 732 in 2010) and on the Rybinsk Reservoir (7,700 birds in 1996). That is, they were distributed in places where there were huge water bodies in the vicinity of agricultural fields.

In the last 15 years the area of land under till has significantly decreased. In 2008 nearly half the land was no longer worked, a further 36 % was long fallow and only 11 % was used for potatoes and grains. On the whole for the oblast in 2008, agricultural land was two times less than in 2000. Its production now is mainly concentrated around Yaroslavl and other large cities. Here, too, in 2010 the largest concentrations of geese were observed. This was facilitated by the fact that areas of intensive agriculture are located on the border of the "green zone" of the city, where hunting is limited.

According to our observations, and through the questioning of hunters and game officers, there are currently two main directions of goose migration in Yaroslavl Oblast. One of these flows from the south-west along the Volga, with a stopover on the Rybinsk Reservoir. The other occurs a bit further to the east, and divides at Yaroslavl: one part flies in a northwesterly direction to the Rybinsk Reservoir, and the other part to the north-east to the Gorkovskoye Reservoir. The intensity of migration has significantly decreased, especially over the past five years.

Thus, in the population dynamics and distribution of geese on stopovers during spring migration for the last 15–20 years on the territory of Yaroslavl Oblast, the following changes have occurred: a decrease in the abundance of geese on former places of stopovers, a redistribution of the main stopover sites during spring migration, and a decrease in the intensity of migration.

THE SPRING GOOSE HUNT ON THE SHORES OF THE MALOZEMELSKAYA TUNDRA: HUNTING CAMPS, SPECIES COMPOSITION AND BAG

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In spring, at the end of May – beginning of June, a significant number of waterfowl fly from their wintering grounds to their breeding grounds along the coast of the Barents Sea, called the Timan Shore. The main species encountered here on migration are the Bewick's Swan (*Cygnus bewickii*), White-fronted Goose (*Anser albifrons*), Bean Goose (*A. fabalis*), Barnacle Goose (*Branta leucopsis*), Brent (*B. bernicla*), King Eider (*Somateria spectabilis*), Common

Scoter (*Melanitta nigra*) and Long-tailed Duck (*Clangula hyemais*). The last three fly along the coast. Bean and White-fronted geese, on the other hand, fly in a broad front, both directly along the shore and further inland over the tundra.

In the summer of 2009, we followed 160 km of coastline from the Vel't River to Lake Peschanka-to; we made a circular route around Kolokolkova Bay. We saw 7 hunting camps belonging to different people; at least 7–8 people can stay in each. Simultaneously at all 7 camps there could be not more than 85, and closer to 70–75, people. The camps differed in infrastructure, exterior appearance, and degree of equipping, from old cabins, heated by a diesel drip-stove with bunks for 10–12 persons to a camping trailer of German origin. The main method of harvesting the geese was with decoys from blinds.

They took primarily Bean geese, White-fronted geese, brent, and Barnacle geese. To assess the actual bag was rather difficult. During the day, they took from no geese to several tens, over the season 20–50 birds per person, regardless the allowed limit. In spring the weather on the coast of the Barents Sea is very unstable, often with strong snow storms and blizzards. As a rule, out of the 14 days of the hunting season, not more than 6–7 were favourable for hunting. It is at this time that the majority of the geese are taken. Beside two camps were found the remains of birds forbidden to be taken during the spring hunt – the Heuglin's Gull, the Rough-legged Hawk, and the Tundra Swan.

Sport hunting in this area has developed extremely slowly (a single company in Nar'yan-Mar). The autumn goose hunt is not popular in the first place, owing to the inability of how to precisely predict the period of the start of peak migration of anseriforms. Apart from the hunters who fly in for the season, there are on the coast four groups of Nenets reindeer-herders. The Nenets prefer to take the Bean Goose, Bewick's Swan, and White-fronted Goose.

THE RUDDY SHELDUCK (*TADORNA FERRUGINEA*) IN THE AREA OF THE BAIKAL RIFT: CHARACTERISTICS OF THE ECOLOGY AND STATUS OF THE POPULATION

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The area of the Baikal Rift lies between 50° and 58° N latitude and occupies the territory from the Darkhatskaya Depression and Lake Hubsugul in the south-west to the Olyokma Basin in the north-east, stretching 2,000 km in length and 250 km in width and having an area of nearly 0.5 million km^2. The ecological conditions of this region are characterized by a complex mix of abiotic factors and expressed by a highly varied terrain, including montane forest-steppe, optimal for the Ruddy Shelduck at the north-eastern edge of its range.

Analysis of the current territorial distribution of the Ruddy Shelduck revealed the special importance of the Tunkinskaya Valley (southern part of the rift, between the Lake Baikal basin and the Mongolian Lake Hubsugul), by which, in all likelihood, the population of this species moved to Lake Baikal, and also of the upper and middle reaches of the Angara River. This is confirmed, in particular, by a much greater spectrum of ecological adaptations by the Tunkinskaya regional population of the Ruddy Shelduck compared to the Baikal one.

It is well known that the main nesting sites of the 60–70 pairs of Ruddy shelducks in the Baikal region are concentrated in the middle of it, and in the southern and northern parts of the lake as a whole only a few pairs are nesting (Skryabin, 1975; Riabtsev, Popov, 1995; Melnikov, 1998; Riabtsev, 1998; Pyzhianov, 2000).

We do not know of a case of the shooting of these large ducks in the Tunkinskaya Valley, where the local population traditionally relates to the Ruddy Shelduck with great respect (according to the Buryat concept, that is, that the spirits of dead lamas migrate into them, which accounts for the colour of the plumage of the birds). On the other hand, in the Baikal area the Ruddy Shelduck suffers severely from poaching. On the whole, the marginal north-eastern population of the species finds itself in an unstable state, determined by a complicated combination of natural and anthropogenic factors.

WILL INCREASING NUMBERS OF NESTING RED-BREASTED GEESE (*BRANTA RUFICOLLIS*) OUTCOMPETE BRENT GEESE (*BRANTA B. BERNICLA*) IN THE PYASINA DELTA, WESTERN TAIMYR?

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Studies on nesting Brent geese in the Pyasina Delta, western Taimyr, have revealed a remarkable increase from 1990–2008 in the number of nesting Red-breasted Geese, which also nest in between gulls and Brent on the Bird Islands.

Nest-defence strategies of Red-breasted geese towards Taimyr gulls (*Larus taimyrensis*) in years of severe predation are more effective than are those of Brent geese. Clutch and brood sizes of Red-breasted geese are bigger than those of Brent geese.

In territorial conflicts between Red-breasted and neighbouring Brent geese, Red-breasted geese usually seem to be the winners.

Therefore, it is predicted that, if this increase in numbers of Red-breasted geese continues, the number of Brent geese nesting on the Bird Islands in the Pyasina Delta will decline.

BLACK BRANT (*BRANTA B. NIGRICANS*) START TO MIX WITH DARK-BELLIED BRENT (*BRANTA B. BERNICLA*) WINTERING IN WESTERN EUROPE

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The circumpolar distribution of Brent geese shows the nominate race (*bernicla*) breeding on the Taimyr Peninsula and wintering in Western Europe, and the Black Brant (*nigricans*) breeding in the Lena Delta and further east to northwestern North America, and migrating eastward to winter along both coasts of the Pacific. Further east, from central Canada north to Svalbard, light-bellied brent (*hrota*) occur, wintering on either side of the Atlantic. Increasingly, individuals of *B. b. nigricans* are observed among *B. b. bernicla* in Western Europe, and mixed pairs of the two races have been observed with offspring. In earlier studies, 4,866 captured moulting brent geese in the Pyasina Delta in western Taimyr consisted exclusively of *B. b. bernicla*. Recoveries and resightings showed that these birds from central Arctic Siberia migrate exclusively westward to winter in Western Europe. In 2008, however, two out of 1,363 of these Pyasina brent geese belonged, based on plumage characteristics, to the race *nigricans*. These two *nigricans* were subsequently observed wintering in Western Europe. Moreover, 30 % of the males and 14 % of the females showed intermediate patterns of necklaces, while otherwise their plumage was *bernicla*-like. We distinguished between individuals with necklaces completely closed in front (9 % of males and 4 % of females), those completely open in front (70 % of males and 86 % of females), and an intermediate category (21 % of males and 10 % of females). Cannon-net catches in winter in Europe so far have yielded three catches of *B. b. nigricans* among a total of 8,150 birds captured. Interestingly, all five (3 + 2) *nigricans* caught were adult males. As is known for many goose species, males are the ones that disperse to other breeding areas, whereas most females show natal philopatry. We therefore hypothesize that male *nigricans* from eastern Siberia disperse westward and interbreed with female *bernicla*. Mixed colonies of both races were found in the Olenyok Delta.

THE STRENGTH OF SITE FIDELITY OF DARK-BELLIED BRENT GEESE (*BRANTA B. BERNICLA*) TO MOULTING SITES ON THE TAIMYR PENINSULA

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Between 1989 and 2008, a total of 6,229 moulting Brent Geese were marked with coloured legrings or metal rings in the Lower Taimyra Delta and the Pyasina Delta.

The spatial distribution of moulting Brent Geese differed strikingly between good breeding years, characterized by low levels of predation, and years in which most Brent fail to breed successfully. Tracking satellite-tagged Brent Geese in 1999 revealed the existence of other moulting sites.

Recaptures of previously marked birds on the Bird Islands in the Pyasina Delta indicate that only about 15–30 % of surviving Brent Geese are philopatric to moulting sites they used in previous years. This indicates there must be a fairly high rate of nomadism to other moulting sites in different years.

PHENOTYPIC VARIATION IN WATERFOWL: WHY ARE THERE SO MANY KINDS OF GEESE?

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Population structuring in birds is a topic of broad interest partly because of the need to identify unique populations increasingly threatened by degradation and loss of habitat, but also because of recent improvements in quantitative genetic techniques that have led to easier and more cost-effective measures of documenting genetic differentiation. Enumeration of genetic and phenotypic variation must, however, be supported by evolutionary theory to fully understand the relative contributions of genetic mechanisms and environmental, behavioral, and physiological forces leading to the origin and maintenance of species diversity. Conservation strategies can only be considered sound and prescient when placed in a broader understanding of evolutionary theory. One instance in which empirical data is not supported by existing theory concerns the evolution and maintenance of polytypy among different tribes of waterfowl (Family Anatidae). The disparity in polytypism between duck and goose species sharing similarly broad breeding and wintering ranges (*e.g.*, Northern Pintail Duck (*Anas acuta*), and Greater White-fronted Goose (*Anser albifrons*)) indicates that factors other than traditional speciation mechanisms (*i.e.*, geographic isolation) are important in mediating gene flow in waterfowl. Using an analysis of lifehistory characteristics across different tribes of waterfowl I contend that the high degree of polytypy within geese is not due solely to present and historic geographic isolation, as previously supposed, but to a unique assortment of behavioral mechanisms, including long-term pair bonds, family stability, assortative pairing, and strong site fidelity.

MONITORING OF TECHNOGENIC POLLUTION OF WATER BODIES USING THE OILY COVERING OF THE FEATHERS OF WATERFOWL

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The steadily growing technogenic pollution of the natural environment stipulates the current examination of effective means of ecological monitoring. The use of biological objects

and, in particular, the internal organs and/or body contour feathers of waterfowl promotes the resolution of this problem. However, the use of internal organs is coupled with the necessity of taking the bird from the wild. Since waterfowl oil their feathers with the secret of the uropygial gland, then the quantity of chemical elements accumulated by them is made up of their contents on the surface and in the feather itself. On the surface, the oil accumulates from 20 to 70 % of the contaminating chemical elements contained in the water body. There is a strong positive correlation between the content of chemical elements in the water bodies and in the oil of the contour feathers. In particular, in a water body polluted with lead at a level of 0.053 ± 0.004 μg/l, this element made up 25 % of the total oil content in the contour feathers of teal (*Anas crecca*). An increase in pollution of the water body by lead to 11.5 ± 0.14 μg/l correspondingly increased the content of the element in the oil of the contour feathers to 67 %. A sharp increase in the content of lead in the feathers and their oil covering occurs with the ingestion of lead pellets by the birds. In 5–6 days in mallards (*A. platyrhynchos*) consuming approximately 1.5 g of lead, the contents of the element in the feathers and in the oil covering them increased by 10–20 times.

Thus, the protective oil of the feathers of waterfowl can be used for the monitoring of technogenic pollution of wetlands and of the body of waterfowl with great reliability. The dynamics of the content of lead in the protective oil of feathers permits analysis of the condition of birds that ingest lead pellets.

CLIMATE AND SPATIAL DISTRIBUTION OF ANATIDAE IN EASTERN SIBERIA: ACTUAL AND POTENTIAL FACTORS OF INTERACTION

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In the majority of representatives of the subfamily Anatinae, the distinguishing genetic distinctness of geographic populations, due to the philopatry of nesting females, is corroborated by molecular-genetic studies. However, they also show a high level of mixing of genetic material, primarily on account of the dispersion of the males, that does not allow consideration of the geographic populations as true populations. As a result, the spatial dynamics and genetic map of anatids are rather unique.

At the same time, ducks, being linked with water bodies, are dependent on their distribution and condition. Accordingly, long-term water cycles should give rise to significant changes in the distribution of anatids, at the very least, in the Central Asian and Siberian regions with a dearth of precipitation. Such changes are known for some Charadriiformes of arid regions. However, with regard to ducks, which are more widely distributed, this question in connection with Eastern Siberia has not been studied.

In the current study, changes in temperature and precipitation in Eurasia during a period of long-term (1970–1990) observations of the abundance and migration of waterfowl on Lake Baikal were analysed. An hypothesis is put forth regarding the nature of the change in the spatial distribution of the population of ducks in the Baikal and contiguous regions under the influence of a number of factors: long-term natural cycling, non-cyclical changes of the environment, and successional changes in habitats.

GOOSE-CATCHING PROJECT IN HUNGARY, NOVEMBER 2010

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During the last 100 years only 18 Bean geese (*Anser fabalis*) and 9 Greater White-fronted geese (*A. albifrons*) were ringed in Hungary. Therefore we organized a goose-ringing project in Hungary in November 2010 in an international cooperation between the University of West-

Hungary, Wetlands International, the Goose Specialist Group, Fertő-Hanság National Park and Birdlife Hungary. The catching place was situated at the Hungarian-Austrian border, in the southern part of Lake Fertő on special halophytic vegetation. The geese were caught using traditional Dutch clap-nets and well-trained, live, free-flying decoys. The purpose of the project was to get more information about goose migration from the Pannonian Basin to their wintering grounds and the connection to other populations in western and southeastern Europe. During three weeks, 34 Bean geese, 9 Greater White-fronted geese and three Greylag geese (*A. anser*) were caught and marked with coloured neckbands, and one Greater White-fronted goose was fitted with a GPS transmitter. The transmitter-tagged bird was an adult male and was also marked with a lime-coloured, inscribed legring. His mate, and two offspring, which were also caught, were only marked with neckbands. We received many satellite data and also resightings from local birdwatchers of the transmittered bird and his family. These yielded new, interesting information about local movement and family cohesion. Neckbanded birds were seen on different wetland areas in Hungary, like Hanság, Kis-Balaton, and in Austria in Seewinkel. Two Bean geese were seen a few days after release in Poland, four other Bean geese were seen a few months later in eastern Germany and two in the Netherlands.

MIGRATION OF GREATER WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) BETWEEN SIBERIA AND CENTRAL EUROPE

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The Greater White-fronted Goose is the most abundant goose species wintering in Europe. In Western Europe, the Netherlands, Germany and Belgium are the key wintering areas. In Central Europe, Hungary is the focal area, and around the Black Sea this species winters in Russia, Ukraine, Romania, Bulgaria, Greece and Turkey.

Since 1998, altogether 10,630 White-fronted geese were marked with coloured neckbands, 8,766 individuals in the Netherlands, 1,205 in Russia (both in the summer in the Pyasina Delta on the Taimyr Peninsula and on Kolguyev Island, and during spring migration in Kostroma Oblast), 576 in Germany and few birds in the United Kingdom (41), Bulgaria (31), Hungary (10) and Norway (1).

Observations in Hungary revealed the migratory routes of these geese from the Pannonian Basin to their breeding grounds and an exchange with other populations in western and southeastern Europe.

By the end of January 2011, White-fronted geese ringed on Kolguyev Island (169) had been resighted in the Netherlands (71 %), Germany (59 %), Poland (17 %), Belgium (14 %), Lithuania (5 %), Estonia (4 %), Sweden (1 %), Finland (0.6 %), Latvia (0.6 %), and the United Kingdom (0.6 %).

Most of the birds ringed on the Taimyr Peninsula (772) have been seen in the Netherlands (57 %), Germany (52 %), Belgium (6 %), Poland (9 %), and Hungary (5 %). The last comprise 262 White-fronted goose observations pertaining to 101 individuals. More than one quarter of these 101 neckbanded birds were ringed as moulting non-breeders on the Taimyr Peninsula.

In Hungary, 4.5 % of the Taimyr-ringed birds were observed compared to none of the birds ringed on Kolguyev, 0.5 % of the ones ringed in the Netherlands, and 0.3 % of those ringed in East-Germany.

This shows that one really has to adjust for observer bias. If there had been the same intensity of observation in Hungary as exists currently in Western Europe, then many more birds would have been detected.

SPRING HUNTING OF ANSERIFROMS IN RUSSIA: PAST, PRESENT AND FUTURE

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Waterfowl serve as the main object of bird hunting in Russia. According to the data of Krivenko (2009), the current stock in Russia is some 80 million individuals. The annual hunt takes 7–8 million ducks and geese, and this makes up 7–8 % of the total European bag. The spring hunt in Russia is an age-old tradition, although its role for hunters in different regions of the country differs. The current work examines historical aspects of the spring hunt of waterfowl and changes in its timing in relation to hunting regulations in tsarist ("The law on hunting" 1895), Soviet, and present times ("Harvest regulations …" 2009 and "Regulations of hunting" 2011).

Spring hunting of waterfowl includes hunting of drakes with decoys and of geese with silhouettes and dummies. Hunting with decoys was popular mainly only in the central oblasts of Russia. In the north of the country in the spring, hunting was predominantly with stuffed birds, and in the south there was no hunting in the spring. Historically, the special spring hunt of geese was conducted only in the north in the tundra zone and in a host of regions of Siberia and the Far East. The sharp growth in the popularity of the spring goose hunt occurred in the 1990s, when, in accordance with new hunting regulations (1988), it was first officially opened everywhere.

In the present study, on the basis of the analysis of official data on the hunt, obtained through the system of state agencies of hunting inspection and supervision of the Russian Federation, and the processing of hunting licenses, special questionnaires and personal multiyear (1987–2010) notes of the author, data on the performance and selectivity of the spring hunt on drakes with decoys are given.

Spring hunting of waterfowl should be strongly regulated and should not be as extensive as, for example, the autumn hunt. Its strict regulation is suggested. Under competent organization, the harm inflicted by the spring hunt on the nesting population of waterfowl will be minimal.

THE EGYPTIAN GOOSE (*ALOPOCHEN AEGYPTIACA*) IN FRANCE: STATUS AND TRENDS

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Because it is responsible for the highest number of different impact types on ecosystem services, the Egyptian Goose is in the top ten invasive species identified by European scientists. In France, the first cases of nesting were observed in the 1980s. The numbers have increased significantly since 1990 and the annual rate of increase of breeding pairs was near 45 % in the 2000s. An expansion out of the north-east part of France began in 2003. A survey was conducted in 2009 to establish an up-to-date overview of the situation of the population of the Egyptian Goose in France. Ninety of the 96 French departments (administrative areas) answered this enquiry, thanks to the field knowledge of the technicians working for the National Hunting Associations and of the staff working for the French Hunting and Wildlife Agency. In 2009, the Egyptian Goose was observed in 38 of the 90 departments. An estimation of the French population could be near 1000 individuals, with half in only one department (Moselle near Belgium). One strong hypothesis is that the birds came from neighbouring countries and spread from north-east to south-west. In 2009, the species was observed in 15 departments without any known case of successful breeding. In the 23 other departments, at least 124 pairs were detected. The highest number of breeding pairs (n = 30) was detected in the Rhine Valley. Because the Egyptian Goose is considered an agricultural pest in part of its native geographic range, some management measures against the species, including the culling of some adults, were planned in 2009 by the French authorities to avoid its further spread. In September 2010,

French law changed and took into consideration the problem of the three most abundant avian exotic species (the Ruddy Duck, Canada Goose and Egyptian Goose).

CONCERNING THE POSSIBILITY OF MONITORING THE ABUNDANCE OF ANATIDAE OF KAMCHATKA USING THE DATA OF SPRING CENSUSES

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Spring counts of anatids were carried out on Kamchatka over the course of 35 years. From 1975 to 2009, 84 counts were made at 42 points. The duration of each count was 15–40 days, and in total exceeded 2,200 days, or 16,000 hours.

One of the tasks in the inaugural years of the investigations was the determination of the points of the most fruitful spring counts; data from these are especially important for the monitoring of changes in the number of anatids. Such points of observation were recommended for continuous work. By now a large amount of factual information has been gathered, permitting us to make several conclusions on the possibility of conducting modern monitoring of the anatid populations flying to Kamchatka and migrating through its territory.

So, for a sufficiently high quality of monitoring of diving ducks, it is possible to use a single continuous observation point on the west coast of Kamchatka in the area from the mouth of the Bolshaya River to the mouth of the Moroshechnaya River.

For the monitoring of the populations of dabbling ducks, carrying out of observations at a single point will be insufficient. Data from various points can essentially complement one another. Thus, for the past 10 years of the studies, the maximum number of migrating pintails (60,000) and wigeons (55,000) was counted on Lake Kharchinskoye in the centre of the peninsula, of teal (90,000) – in the area of the mouth of the Bolshaya River on the south-west coast.

High-quality monitoring of goose populations is possible on Lake Kharchinskoe, where some 25,000 geese stage in spring, and some 22,000 are found there at one time. For the monitoring of goose populations, it is important that, at the very least, there is at least one area located on the north of the peninsula. This is the lowland of the Penzhina River, to and in which some tens of thousands of geese also fly and stage. However, to date observations there have been conducted only by specialists of game management, but for more high-quality evaluation of the importance of this area for migrating geese, it is necessary that ornithologists participate.

STUDIES OF THE SPRING MIGRATION OF ANATIDAE ON SOUTH-WESTERN KAMCHATKA

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Spring observations of migrating Anatidae on the south-western coast of Kamchatka were carried out over the course of five seasons: 1993 (2–27 May), 1994 (28 Apr.–28 May), 2001 (1–24 May), 2007 (22 Apr.–24 May), 2008 (20 Apr.–24 May), and 2009 (20 Apr.–25 May). The main part of the studies were counts. Similar work was conducted on Kamchatka in 1975. We followed the same methodology of direct counts of the migrating birds.

The studies showed that the main directions of migrating geese, dabbling and sea ducks differed. Nearly all flocks of geese kept to the outer coast. Then they flew in a northeasterly direction, directed to the interior of the peninsula. The majority of the dabbling ducks aproached the shores of Kamchatka, crossing the Sea of Okhotsk from the Sakhalin side. Proceeding on their migration, the flocks of ducks divided: some of them followed the coast northwards, the other flew in the interior of the peninsula. The migration of sea diving ducks was almost exclusively along the coast.

Altogether in a single season we counted 445–765 Anatidae belonging to 30 species. These numbers are the maximum for more than 40 points of similar observations on Kamchatka.

In our estimation, from 900,000 to 1,1000,000 Anatidae migrate through the south-western coast of Kamchatka during spring. This total includes 250,000–300,000 American black scoters (*Melanitta americana*), 200,000–250,000 white-winged scoters (*M. deglandi*), 150,000–200,000 long-tailed ducks (*Clangula hyemalis*), 100,000–120,000 European teal (*Anas crecca*), 70,000–100,000 greater scaup (*Aythya marila*), 40,000–50,000 pintails (*Anas acuta*), 40,000–50,000 wigeon (*A. penelope*), 12,000–15,000 red-breasted mergansers (*Mergus serrator*), 5,000–10,000 harlequin ducks (*Histrionicus histrionicus*), 5,000–10,000 Steller's eiders (*Somateria stelleri*), 3,000–5,000 goldeneyes (*Bucephala clangula*), 2,000–5,000 bean geese (*Anser fabalis*), 2,000–5,000 white-fronted geese (*A. albifrons*), and 1,000–3,000 tufted ducks (*Aythya fuligula*). There were some 1,000–3,000 each of mallards (*Anas platyrhyncos*), shovelers (*A. clypeata*), falcated ducks (*A. falcata*), and common mergansers (*Mergus mergus*); up to 1,000 each of whooper swans (*Cygnus cygnus*), Pacific black brant (*Branta bernicla nigricans*), and smew (*Mergus albellus*); and up to 500 common pochards (*Aythya ferina*).

THE RINGING AND COUNTING PROGRAMME OF MOULTING GREATER WHITE-FRONTED GEESE (*ANSER A. ALBIFRONS*) IN THE PYASINA DELTA ON THE TAIMYR PENINSULA

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For many years, the Pyasina Delta has beens known as one of the most important places where Greater White-fronted geese from the Western Palearctic populations moult. Peak numbers of moulting geese occur at the end of July and in early August. Counts of moulting geese were made in 1987, 1988, 2005, 2006 and 2008. The number of moulting geese in different years varied between 15 and 97 thousand birds. Extrapolation from these surveys yields an estimate of up to 500 000 geese moulting in the Pyasina Delta as a whole.

Ringing with metal rings on the Taimyr Peninsula started in 1966–70 and continued with leg rings and neck bands in the 1990s. Recent banding with collars in the Pyasina Delta took place in 2005, 2006 and 2008. During these three years, 772 birds were marked with collars and now there are 4042 observations of these birds wintering in Europe. The percentages of the returns from these years are 78, 82 and 58 %, respectively. The overall resighting rate is 69 %.

The Netherlands has the leading position with regard to return of the rings (54 %), then Germany (34 %) and Belgium. Marked geese were observed in 20 different countries.

According to the resightings and recoveries of the marked birds, we can conclude that there are two main migration ways: through the north of European Russia and through northern Kazakhstan, where birds get along the rivers Ob and Yenisei.

Undoubtedly, the Pyasina Delta is a key area for moulting Greater white-fronted geese. Good foraging conditions, safety from predators and possibly historical factors are the main factors explaining these concentrations of moulting geese in the lower reaches of the Pyasina River. Further studies of the territory and its role in the life cycle of White-fronted geese are necessary, including the monitoring of the congregations of moulting geese in the Pyasina Delta and aerial surveys in the lower reaches of the Pyasina River.

PARTICULARS OF A STUDY OF THE POPULATION OF BEWICK'S SWAN (*CYGNUS BEWICKII*) IN THE "NENETSKY" NATURE RESERVE, NORTH-EASTERN RUSSIA

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The State Nature Reserve "Nenetsky" is located in north-eastern European Russia. It is a vast area of wetlands of international importance, providing nesting grounds for thousands of birds and for tens of thousands on migration. One such species is the Bewick's Swan.

Since 2003, ringing of Bewick's swans has been carried out annually in the region of Korovinskaya Bay in the Nature Reserve. Participants have included scientists of the WWT, Slimbridge, Great Britain. In 2003, for the first time on the reserve's territory, three birds were equipped with satellite transmitters, which enabled the procurement of new data on the particulars of their migration. Altogether for the period 2003–2010, 662 Bewick's swans were ringed (Rees, 2006; *Annals of Nature,* 2007–2010).

Each year during the banding process, 2–17 swans that had previously been ringed on the reserve's territory or in Western European countries were recaptured. Conducting an active advocacy campaign on the importance of the study of the migration routes of the waterfowl, we annually receive additional information on 3–6 encounters of such birds from local hunters. Swans ringed in the reserve were noted by observers in the Netherlands, Great Britain, Denmark, Germany, Poland, Estonia, Finland, and Sweden.

Currently, the north-western European population of the Bewick's Swan numbers approximatly 26,000 and is decreasing (Rees, 2009). All the more important, then, in the conservation of this population of the species, is the role of the wildlife reserve, specifically the territory around Korovinskaya Bay, where exceptionally high numbers of these birds – up to 10–15,000, are recorded in September (Rees, 2006; Mineev, Mineev, 2009; our data). This number is approximately 50 % of the Western European population of the Bewick's Swan.

THE NESTING BIOLOGY OF THE RED-BREASTED GOOSE (*BRANTA RUFICOLLIS)* ON CENTRAL TAIMYR

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In 2004–2007, a complex ornithological study was conducted in the delta of the Upper Taimyra River (field camp at 74°09'00" N, 99°34'11" E) in an area of 85 km^2, encompassing parts of two adjacent terrains. Red-breasted geese arrive in this area during early June, and for the majority of them this is the final stop on their migration. The majority of geese begin laying eggs not long after mid-June. Complete clutches in 2004–2007 comprised 5.4 eggs on average (range 2–8; *SD* = 1.7; *n* = 24). The distribution of 26 nests, found over the four seasons, differed to a significant degree. In the lower and middle parts of the slopes of the moraine plain, the birds nested on unremarkable hummocky and hillocky parts of mossy tundra (*n* = 4), one nest was placed on the bottom of the side wall of a rather deep trough. The remaining nests were found on alluvial terrain, where the majority of birds nested on ledges of ancient river terraces. Three nests were found on a flat island of area 0.07 km^2, lying in a large streambed, a further two pairs nested on flat sedge-moss hillocks of polygon swamps of the high flood plain, and that was regarded as far from usual. Nearly half of all pairs nested on horizontal areas; the rest, on microslopes of various exposures, with the exception of southern and northeastern. The known attraction of Red-breasted geese at breeding time to the nests of raptors and larids, which sometimes are considered an indispensible condition for nesting, appeared in the area studied only partially: the mean proportion of pairs nesting near nests of raptors was 69.2 %. In the presence of the nest of a peregrine falcon, 4–5 pairs always nested nearby (at distances from 20 to 113 m); 44.4 % of snowy owl nests and 8.3 % of rough-legged buzzard nests attracted Red-breasted geese. None were encountered near the nests of larids. In our estimation, in different years from 8 to 15 pairs of Red-breasted geese nested in the region. Nesting density was 0.09–0.17 nests/km^2; approximately 80 % of the pairs nested on alluvial terrain. In different years, nesting success was from 60 to 100 % and did not depend on the abundance of lemmings, raptors, and Arctic foxes.

THE IMPACT OF LONG-TERM CLIMATIC CHANGES ON THE STATUS OF THE POPULATION OF THE SWAN GOOSE (*ANSER CYGNOIDES*) IN DAURIA (RUSSIA, MONGOLIA, AND CHINA)

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The Swan Goose is a globally threatened species breeding mainly within the Amur River basin. The Dauria transboundary steppe region (short name is Dauria) is located in Transbaikalia, Mongolia, and China. It is the key breeding and moulting area of the species. Up to 33,400 birds were counted there in 2003, which is more than 50 % of the world population. Long-term climatic cycles (of about 30-years duration) have a great impact on the Swan Goose habitats and populations. The last peak of a dry period was in 1983, the wet peak – in 1995–1998; 2000–2009 was extremely dry. In 2007–2008, the area of the wetlands was about 2 % of what it was in 1995–1998. This shrinkage has caused significant changes in biology (feeding, behaviour, and reproductive success), population abundance and distribution.

During dry periods, because of the extreme lack of habitats, a significant proportion of the females does not make its own nests and tries to lay eggs in the nests of other females. This situation has caused a significant increase in the size and mortality of clutches. Disturbance and other negative anthropogenic impacts have increased greatly, too, especially in areas of traditional nomadic cattle breeding. The concentration of cattle and people has increased greatly around the few remaining wetlands. A significant proportion of the clutches are depredated by dogs and destroyed by cattle. Since 2003, because of the quick dropping of the water level in the lakes, the meadows have been separated from the water by a wide band (up to 50–6,000 m) of ground without vegetation. It is too big a distance for the goslings; so the forage resources available for the goslings significantly decreased and the mortality of the goslings grew.

Long-term droughts are critically unfavorable periods for the Swan geese and many other birds. Because of the overlapping of natural threats (limited habitats and forage resources) and anthropogenic threats (increasing disturbance), the majority of the geese cannot breed.

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ECOTONE STRUCTURE OF MIGRATORY ASSEMBLAGES OF ANSERIFORMS IN THE DUBNA RIVER VALLEY (MOSCOW OBLAST, RUSSIA)

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Examination of the territories on which the interplay of waterbodies and the surrounding land as unified systems – "water-land" ecotones – occurs, was carried out using the methodological procedure for the study of spatially and structurally unstable biocoenoses. According to the concept of block organization of ecotone systems (Zaletayev, 1997), the territory of an ecotone is divided according to the conditions of the water regime and of the closeness of the tie with the water body. A floodplain may be imagined as five functional "blocks": aquatic – water ecosystems at depths greater than 2.5 m; amphibian – shallow-water; dynamic – the zone of seasonal flooding; distant – the impact of nearby groundwater; marginal – the effect of the water body is transmitted through the biocoenotic links.

The processes of the formation of migratory assemblages of anseriforms on the ecotone structure of river valleys and of seasonal waterbodies were studied in the Dubna Valley and the lowland between the Dubna and the Khotcha (the complex of the Specially Protected Nature Territory "Crane Homeland"). Here, in different years, there are from four to nine sectors of spring concentrations of migrating waterfowl presenting a common region of concentra-

tion. Altogether the distribution of more than 50,000 individuals of different species of waterfowl was analyzed.

In the ecotone system, each group of anseriforms occupies specific blocks: aquatic – the diving ducks, the dynamic block – the dabbling ducks and geese. The distant and marginal blocks are the most intensively used by the geese. Such distribution is mainly connected with the nature of the feeding. When water floods or is at low levels, the waterfowl redistribute themselves in relation to the second order of ecotone structure.

Sectors of concentration of waterfowl have different areal sizes of dynamic block. With an increase in area, the density of the goose population grows. In different years, the peak density of geese has been recorded in the last week of April – first week of May, when nearly the entire area of the floodplain is free of water. The density of the population of anatids to a large degree depends on the surface area and water depth of the flooded area. The peak was observed during the second and third decades of April, when the inundation had reached its peak.

The high density of the population of anatids on separate sectors is evidence of the large volume of usable area capable of taking a significant number of waterfowl, and providing them with food and relative quiet. This capability enables us to consider the peservation of a migration corridor through the Dubna basin, even in the case of the lowering of the water levels and the removal of some sectors from the floodplain regime.

THE ROLE OF WATERFOWL IN THE SPREAD OF SCHISTOSOME CERCARIOSIS IN THE VOLYNSK POLESYE (UKRAINE)

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In recent years, more and more often and in larger numbers, cases of cercarial dermatitis – a parasitic infection caused by cercaria of the trematode family Schistosomatidae, have been recorded on the territory of the Volynsk Polesye (forest area). These facts are to a large extent accounted for by characteristics of the given region of Ukraine: numerous water basins with the ubiquitous distribution in them of the intermediate hosts – mollusks. However, the deciding factor is the high density of waterfowl, the specific final host.

Investigations to elucidate the role of waterfowl in the distribution of the schistosome invasion were conducted in 2002–2004 in health-spa zones of the Shatskiy, Ratnovskiy and Kamen'-Kashirskiy districts of Volynsk Oblast and the Sarnenskiy district of Rovno Oblast. In the given period, 68 specimens of nesting and migrating anseriforms (7 species) and 8 larids (two species) were examined by conventional helminthological investigations.

As a result of the analysis of the helminthological dissections, it was revealed that on the territory of the Volynsk Polesye, four species of anseriforms: *Anas platyrhynchos, A. querquedula, Aythya ferina,* and *A. fuligula,* were maintaining a source of schistosome cercariosis. In this study, schistosomes were not found in *Anas crecca, A. strepera, Cygnus olor, Larus ridibundus,* and *Sterna hirundo.*

All studied species of birds were taken during the autumn hunt. Among anatids, schistosome infection was found in 29 birds (43 % of the total examined), and the main carrier of the schistosome invasion in the health-spa recreational zones was the Mallard. The intensity of infection was from 9 to 221 specimens per infected bird.

Therefore, the high infection rate in the ducks we revealed dictates further investigation in the area of veterinary and medical parasitology. On the basis of the current study, it is imperative to recommend that the public health-epidemiological department plan a dehelmitization operation (several preparations exist), especially in the recreational zones, in which most of the infected people were recorded.

LEUCOCYTOZOONOSIS AS A POSSIBLE CAUSE OF DEATHS OF WILD ANSERIFORMS

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Recently in the literature, articles have been more and more frequently appearing concerning findings on dead species of wild anseriforms, and these communications are both for the territories of the former USSR as well as for Western Europe. Analysis of such publications shows that in the majority of cases, the reason for the deaths is not explained ("possible poisoning", "avian flu", "virus or infection of obscure etiology"), and, as a rule, without an actual indication of the cause.

During 1994–2008, we repeatedly encountered dead *Anas platyrhynchos, A. querquedula, Cygnus olor* and other species on the territory of the western oblasts of Ukraine and in the vicinity of the Black Sea. Taking stock of long-term investigations on the study of haemosporids (Sporozoa, Haemosporida), we conducted an investigation of the available material (freshly killed or moribund) for the presence of these protozoans. It turns out that a significant amount (approximately 40 %) of the investigated anseriforms were infected with *Leucocytozoon simondi,* a blood parasite of anseriforms appearing in many species in the Palaearctic. This parasite was earlier shown as a possible cause of a massive die-off of young *Cygnus olor* in Sweden from leucocytozoonosis (Morner, Wahltrom, 1983).

Leucocytozoonosis as a disease of wild and domesticated anseriforms was first studied in detail by Tartakovskiy (1913, as cited in Valkiunas, 1997) in north-western Russia. This disease was subsequently studied by other researchers. Leucocytozoonosis in anseriforms proceeds seriously, it a peracute disease with a complicated clinical symptomatology. Infected and sick birds move little, do not eat (as a consequence of which exhaustion very often arises), and with the onset of respiratory distress, not infrequently there is also neurological manifestation in the form of paralysis and convulsions. Necropsy of the dead birds reveales a characteristic picture.

Thus, we have shown the importance and significance of the investigation of anseriforms (in particular, those that are weakened, lagging behind the growth curve, *etc.*) for the presence of haemosporidians. The aim of our presentation is to attract to this problem all interested ornithologists and parasitologists. Further, joint collaboration (to which we are open and invite all who are interested) may shed light on many cases of the massive die-off of anseriforms.

AN UPDATE ON THE STATUS OF GEESE WINTERING PREDOMINANTLY IN BRITAIN AND IRELAND, 2009/2010

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Ten migratory goose populations winter in Britain and Ireland, and the abundance and breeding success for most of these are monitored annually through the WWT/JNCC/SNH Goose & Swan Monitoring Programme, and other associated surveys. Results from the 2009/10 surveys revealed a continued increase in the population of the Icelandic Greylag Goose (*Anser anser*) (109,496, a 11 % increase *cf* 2008/09), the Pink-footed Goose (*A. brachyrhynchus*) (364,212, a 4 % increase *cf* 2008/09) and the Svalbard Barnacle Goose (*Branta leucopsis*) (32,800, a 10 % increase *cf* 2008/09). The Greenland White-fronted Goose (*A. albifrons flavirostris*) population remained stable at 22,844, being just 1 % lower than the previous year, 'though this is still well below the peak of 35,692 in 1999. There was a slight decrease in the Eastern Canadian High Arctic Light-bellied Brent Goose (*B. bernicla hrota*) population (38,000, a 1 % decrease *cf* 2008/09), although numbers remained relatively high. Numbers of the Taiga Bean Goose (*A. f. fabalis*), however, continued their gradual decline (341, a 14 % decrease *cf* 2008/09). Age assessments were undertaken for many species and results showed mixed fortunes in breeding success. Results suggest that European White-fronted geese (*A. a. albifrons*) had a good breeding season (26.2 % young) and productivity for the Greenland White-fronted Goose (12.9 %) continued to improve. Eastern Canadian High Arctic Light-bellied Brent geese

experienced a very poor season (0.4 % young), as did Greenland Barnacle geese (3.9 % young) and East Atlantic Light-bellied Brent Geese (2.2 %). The productivities of Taiga Bean geese (14.5 % young), Svalbard Barnacle geese (5.1 % young) and Dark-bellied Brent geese (*B. b. bernicla*) (5.3 % young) were all below average, whilst Icelandic Greylag geese (21.9 % young) and Pink-footed geese (17.3 % young) saw a relatively average breeding season.

TRENDS IN THE WATERFOWL POPULATIONS AND DEVELOPMENT OF TOURISM IN THE HIGH-ALTITUDE WETLANDS OF LADAKH, NORTH-WEST INDIA

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The rapid development of tourism is contributing to the economic prosperity of Ladakh, a trans-Himalayan region situated in the state of Jammu and Kashmir, northwestern India. However, the scale of tourist operations and their uncontrolled nature may prove a major strain on natural resources and wildlife. The Rupshu region of Eastern Ladakh – a vast high-altitude steppe dotted with extensive wetlands – is a case in point. Until recently off-limits to outsiders, the area was suddenly thrown open to mass tourism in the early nineties. In this paper I report results of yearly summer counts of the Bar-headed Goose (*Anser indicus*) and other water birds conducted since 1996 and highlight the importance of the region's wetlands, the potential threat posed by rapidly increasing tourist flows, and necessary conservation measures in key waterbird habitats. These wetlands, in particular Lake Tso Moriri, a designated Ramsar site, represent the main breeding ground for the Bar-headed Goose in India and important habitats for 62 species of water birds, including the endangered Black-necked Crane (*Grus nigricollis*), which also breeds in the area. Altogether, eight species of waterbirds commonly breed in these wetlands, of which four, including the goose, show negative trends over the 15-year period of study. A severe crisis occurred in 2009, which further depressed breeding populations, affecting all species except the crane. Tourist numbers in the region increased rapidly from 0 in 1993 to circa 2500 in 1998 and an estimated 20,000 in 2009. The paper identifies areas of potential conflict, where major tourist routes overlap key goose and other waterfowl habitats. It recommends protective measures for these sites as well as for other ecologically-rich wetlands likely to be opened to tourist access in future.

STRATEGICALLY IMPORTANT MIGRATORY STAGING AREAS OF ANSERIFORMS IN NEVA BAY OF THE GULF OF FINLAND: CURRENT STATUS AND CONSERVATION PROBLEMS

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Because of its location (easternmost Baltic Sea), climatic, geographical, and biotopical characteristics, Neva Bay is a strategically important territory for the migratory staging of waterfowl.

In 2007–2009, studies were conducted aimed at evaluation of the current status of the staging sites and the role of the system of the Specially Protected Nature Territories (SPNT) of Saint-Petersburg in their protection. In 2007–2008, particular attention was given to rare species. From 14 April to 30 October 2009, counts of all species of birds were carried out on 9 transects (including aquatic areas of five existing and three projected SPNTs). As a result, the main sites of concentration of staging birds, and their species composition and abundance, and the seasonal and spatial distribution of various species were revealed. The conducted studies affirmed the great importance of shallow-water sites of high production of vegetation as places of staging for anseriforms and other waterfowl and waterbirds.

The existing SPNT network is not sufficiently effective at resolving the problem of the protection of staging areas of migratory anseriforms. In conditions of intensively growing urban areas, there continually arise huge developments, threatening the very existence of shallow-water sites favourable for staging. For the resolution of this problem, it is necessary to greatly expand the system of SPNTs.

In relation to Saint Petersburg Law No. 728-99 of 22 Dec. 2005 "Concerning the General Plan of Saint Petersburg), the organization of a system of SPNTs of regional significance was envisaged. In the capacity of one of these stagaes of its organization, it was planned to form by the end of 2010 the nature refuges "Western Kotlin", "North shore of Neva Bay with the littoral zone", and "South shore of Neva Bay with the *Littorina* scarp". The main goal of the establishment of these SPNTs was the protection of shallow-water areas of high vegetative production as sites of extensive concentrations of waterfowl and water birds during breeding and migratory staging. Our investigations showed that these territories contain the maximum concentrations of anseriforms, including rare species.

Owing to conflicting federal and regional laws, the water area was not included in the regional nature refuge "North shore of Neva Bay", formed on 25 Nov. 2009. Such a fate also awaits two other projected nature refuges. Without the inclusion of the water area in these SPNTs, strategically important staging areas for anseriforms and other waterfowl and waterbirds in Neva Bay will be threatened with extinction.

NESTING FEATURES OF THE GREYLAG GOOSE (*ANSER ANSER*) ON THE AINOV ISLANDS (VARANGERFJORD, BARENTS SEA)

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Significant growth of the Greylag Goose population was noticed last years on Bolshoi Ainov Island (69°50' N, 31°34' E, Kandalaksha State Nature Reserve). During thorough examination of the island in 2008 and 2010 (May-June both years), 145 and 270 inhabited nests were found, respectively. Malyi Ainov Island was explored in 2010; 6 nests and 10 broods were detected there.

On Bolshoi Ainov, greylags prefer to nest among lyme grass tussocks (49 % of all found nests) and willow scrub (36–39 %). On Malyi Ainov (due to its different terrain), geese nest on cloudberry-fern tundra and on bedrock outcrops.

The average clutch size was 3.93 ± 0.19 (n = 43) in 2008 and 4.07 ± 0.17 (n = 68) in 2010. The first goslings hatched on June 7 in 2008 and on June 1 in 2010, the majority June 15–20 (both years); the latest ones were expected at the beginning of July.

Calculation showed that in 2008 geese began to settle on both preferred biotopes at the same time. But in 2010 they occupied tussocks about a week earlier than willows. Probably the reason for that was the abundant precipitation during April and May 2010. That's why willow scrub (located around lakes and bogs) stayed damp and unsuitable for nesting longer than did the tussocks.

The average nesting density was about 80 nests/km^2 in 2008 and 147.7 nests/km^2 in 2010. The most densely populated biotope was willow scrub: 356.3 nests/km^2 in 2008 and 618.9 nests/km^2 in 2010. The results of nearest-neighbour analysis (Clark, Evans, 1954) of nest distribution for the whole territory of Bolshoi Ainov indicate an aggregated pattern (n = 271, R = 0.9; P = 0.003). But for preferred biotopes – scrub (n = 57, R = 2.02; P = 0.00002) and tussocks (n = 72, R = 1.6; P = 0.00002), nest distribution is uniform. This pattern indicates the existence of competition between individuals here.

The author expresses her gratitude to the authorities of Kandalaksha State Nature Reserve for permission to conduct the field works.

LEGAL ISSUES AND PROTECTION MEASURES FACING THE LESSER WHITE-FRONTED GOOSE (*ANSER ERYTHROPUS*) IN FINLAND

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Captive breeding of Lesser White-fronted geese (LWfG) in Finland was initiated as a joint project of all relevant NGOs and government bodies in the 1980s. The original restocking

method did not work, so the LWfG died out in Finland. At the turn of the millennium, the reintroduction project was "privatized" under the auspices of the Society of the Friends of the Lesser White-fronted Goose. However, the idea of captive breeding and releasing to the wild was not accepted by the Ministry of the Environment. In spring 2005, at the international LWfG conservation meeting, the preparation of an AEWA conservation plan was initiated and the need to secure continued breeding and goose-rearing skills was noted, but later no support for LWfG reintroduction or for the maintenance of goose-rearing skills was forthcoming. In co-operation with the University of Jyvaskyla, the Society in spring 2006 applied for continuation of its permit to catch Barnacle geese for research purposes. The permit was granted, but appealed against in a local administrative court and later in the highest administrative court. The local court dismissed the complaint, and the highest court did not reverse this decision. In August 2009, the Regional Environmental Centre of Lapland granted some rangers of the Natural Heritage Service a permit to "eliminate" the Lesser White-fronted goslings and their foster parents released by us in Finnish Lapland. And the police were asked to investigate whether we had released an exotic species (*Branta leucopsis*) in Finnish Lapland! A similar case had already been to court in September 2005 and had been decided in our favour. We now hope for a quick decision of the regional prosecutor on whether this case will be taken to court or not, and to be able to continue our program without delay. If things go right, we will be able to continue the reintroduction project this year (2011).

THE ROLE OF INDIVIDUAL DECISIONS OF NEST SITE SELECTION IN THE DYNAMICS OF A BARNACLE GOOSE (*BRANTA LEUCOPSIS*) COLONY IN ITS FORMATIVE STAGE

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At a Barnacle Goose colony recently founded on subarctic salt marsh (Kolokolkova Bay, Russia), individuals failing to reproduce successfully tended to shift nest location farther the next season than did successful pairs, and this shift was toward the highest nesting densities. This is biologically sensible, as the probability of successful nesting at this colony was positively related to nest density, which suggests a process of "habitat-mediated" congregation.

Despite the overall colony growth, we observed a decrease in the number of nests in the parts of the colony where nesting success was relatively low. We suggest that the switching from nest sites that did not provide conditions sufficient for successful nesting and the movement toward sites of a higher local density within the colony by individual Barnacle geese help the colony as a whole to react more quickly to local changes in nesting conditions due to temporal heterogeneity of the habitat and to correct possible "mistakes" caused by unfamiliarity with the area – nesting in suboptimal sites, while optimal sites remain unoccupied.

ON ESTIMATION OF THE HUNTING BAG LIMIT FOR ANSERIFORMS

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One of the main problems for game management is the accurate estimation of hunting bag limit. Often the bag limit is assigned arbitrarily; however this limit should not exceed some threshold level. I suggest a new way for solving this problem. The existence of self-regulatory processes in populations of game species has long been shown. In practice, this means that in years with good breeding success many birds are bagged, in cases of poor success many birds manage to escape the hunting pressure (Mihelsons, 1976). In the Song Thrush (*Turdus philomelos*), for example, it was shown that hunted and non-hunted populations have approximate-

ly the same annual mortality rate (Payevsky, 2007). This fact indicates that the population surplus will necessarily die. Hunting simply makes this happen earlier. In the hunted song thrush population, when the annual mortality of immatures is increased (because of hunting), the adult mortality becomes lower than is characteristic for the non-hunted population. Self-regulation really is that very concept of transferred mortality; if the number of bagged birds exceeds the mortality level for a given period of the year, further mortality will be decreased. In this connection, I believe that for a particular area and for a particular period of time, the biosphere is able "to adopt" only some limited number of individuals of each species. This works as if the biocenosis contained a limited number of "vacancies". Under this approach, individuals might be considered as equal, without gradation from best to worst in the population. If hunting takes a lower number of birds than the annual mortality rate, then the rest will die from other causes. I think that for sustainable use, the maximum size of the allowable hunting bag for each age cohort should not exceed the average natural annual mortality rate for those cohorts. For this to occur, the average natural mortality in hunted populations must be calculated accurately. In snow geese, for example, the hunting rate is kept at 25–30% of the autumn population number (Ebbinge, 2010). The suggested approach is applicable to numerous game species with stable or growing numbers; and should not be used for rare, vulnerable species and for species with declining numbers due to causes other than hunting.

CURRENT STATUS OF THE RED-BREASTED GOOSE (*BRANTA RUFICOLLIS*) BREEDING POPULATION ON WESTERN TAIMYR

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Two extensive plots of tundra were monitored in the western half of Taimyr: 1) in 2000, 2004, 2007, and 2010 in central Taimyr we surveyed nearly 400 km of Agapa River tributaries, from the southernmost Red-breasted goose colony (70°11' N, 86°15' E) to the river mouth (71°26' N, 89°13' E); 2) in 2000–2007 on the northern Taimyr we monitored a 175-km^2 area near the Willem Barents Station (73°23' N, 80°32' E), including lower tributaries of the Lemberova, Maximovka and Efremova rivers and part of the Kara Sea coast. The Peregrine Falcon (*Falco peregrinus*), the main nucleus species for red-breasted goose colonies, on the Agapa River showed a population increase of 1.8 times during the past 11 years, from 13 nests and territories in 2000 to 23–24 in 2010. At present the population status of the falcon looks safe. This creates good conditions for the red-breasted goose nesting. During 2004–2010, the red-breasted goose numbers fluctuated there between 54 and 68 nests. The main trend for the red-breasted goose population there is growth, with a temporary decline in the cold season of 2010. The peregrine falcon numbers on the northern monitoring plot during 2000–2005 were stable; the number of nests did not exceed 7. Since 2006, the falcon population has started to grow in this area, as well. In 2006 we counted 8 territories, in 2007, 9 territories, 8 of which contained nests. In 2000–2007, the red-breasted goose numbers there fluctuated between one and 11 breeding pairs, the general population trend was a growth in numbers. In warm seasons, the red-breasted goose numbers, in general, were greater (except for 2007, when the numbers increased even in the relatively cold season). There are data confirming the increase in abundance of Peregine falconss and Red-breasted geese in some other areas of the western Taimyr Peninsula. In general, in recent years the red-breasted goose population on the western Taimyr has been stable or even exhibiting some increase. Taking into account that Red-breasted geese continue to expand their breeding range, and have already started to nest in European Russia, we can state that this population of this species is stable or slightly increasing within the majority of the species breeding range.

COMPARATIVE CHARACTERISTICS OF THE WATERFOWL POPULATION OF LAKES OF PINEZHSKIY NATURE RESERVE AND THE ENVIRONS OF NOVOLAVELA (ARKHANGELSK OBLAST)

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We conducted studies of a waterfowl and waterbird population from 2007 through 2010 at Pinezhskiy Nature Reserve and from 2009 to 2010 on unprotected territory in the vicinity of the village of Novolavela, Pinezhskiy district, located 150 km south of the reserve. The method of route censusing proposed by V. Panchenko (1977) was used. The annual total length of the routes was approximately 130 km; 180 ha were inspected. For the evaluation of the suitablility of the lakes for waterfowl, a valuation was carried out according to the method of I.P. Luchek (1989). For this work, published results of studies of the lakes of the nature reserve were also used (Puchnina *et al.* 2000).

Altogether on the territory of the nature reserve and on the territory of the vicinity of the village of Novolavela we recorded 23 species of waterfowl and waterbirds in five orders, of which 19 species were nesting, two species were encountered on migration, and two species were vagrant. In both regions of the study the order Anseriformes predominated. All encountered species are on the species list of the workers of Pinezhskiy Nature Reserve (Rykova, 2008).

Our investigations enabled establishment of an average score for estimated productivity of the lakes of the nature reserve of 1.4 (out of 4.0), and that was significantly higher than on the unprotected territory (score of 2.3). The number of species of birds noted on the lakes of the reserve was significantly higher (14 species) than on the unprotected territory (six species). The larger number of avian species on the territory of Pinezhskiy Nature Reserve may be explained by the heterogeneous terrain of the region of the investigation, the diversity of plants, the weak anthropogenic impact (the nearest villages are located 6–20 km away). In addition, we should mention that on the territory of the reserve the Whooper Swan (*Cygnus cygnus*) nests, and this species is included in the Red Book of Arkhangelsk Oblast (2008). This species prefers to nest only in inaccessible places where disturbance factors are missing.

The average density of the waterfowl and waterbird population over three years of observations in the nature reserve and over two years of observations in the environs of the village of Novolavela increased by two times. The dominant species on the territory of the reserve were the Mallard (*Anas platyrhynchos*) and the Tufted Duck (*Aythya fuligula*), on the unprotected territory – the Tufted Duck.

LEAD AND CADMIUM POISONING OF MALLARDS (*ANAS PLATYRHYNCHOS*) INGESTING LEAD PELLETS OR INHABITING POLLUTED WETLANDS

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Rates and levels of accumulation of lead and cadmium by different organisms and by the body tissues of mallards were determined by the atomic-absorption method. It was established that the quickest rate of accumulation of lead and cadmium differed between the heart, lungs and brain.

The presence of links between the accumulation of lead and cadmium in the feathers and fat secretions of the uropygial gland (patent No. 2405142) is proposed to be used as a diagnostic of lead and cadmium pollution in ducks, without resorting to clinical examination and without removing them from their habitat.

We established the dependence between the retention of lead and cadmium in the feathers and body of mallards wintering in anthropogenic terrains differing in the degree of industrial pollution and in sites of intensive hunting. Water bodies of Izmailovo Park, located in Moscow near the Moscow Automobile Ring Road (MKAD), distinguished themselves as having the greatest retention of lead. Lead pollution of the water bodies of Noginsk and Ruza

districts (fish ponds with intensive hunting) was less than in Ismailovo by 8 and 23 times, respectively. The pollution of the water bodies of the park by cadmium was higher than in the Noginsk and Ruza water bodies by 4 and 9 times.

The concentration of heavy metals and microelements in the blood, muscles, internal organs, feathers, and digits of the ducks was found to be directly correlated with the retention of these elements in the water bodies on which the birds were caught.

Consequently, the ducks adapted to wintering in anthropogenic terrains are subjected to the intensive impact of toxins, which increase with the increase of industrial pollution of the water bodies. In places of intensive hunting in Moscow Oblast, we did not notice an increased retention of lead and cadmium in the body tissues of the ducks, nor the presence of pellets in their stomachs, although an increased pollution of the bottom sediments was noted. Pellets were found in stomachs only in two of the 184 ducks shot.

INVESTIGATIONS OF THE SUBSISTENCE HUNTING OF WATERFOWL ON THE BARENTS SEA COAST: TESTING OF METHODS AND PRELIMINARY RESULTS

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In 1999–2005, the author and E.E. Syroechkovskiy developed and tested (in 22 villages of Yakutia and Chukotka) a method of studying the hunting pressure on waterfowl and of assessment of their role in the traditional way-of-life of the indigenous population by means of anonymous questionnaires (Syroechkovskiy, Klokov, 2010). In 2007–2008, testing of the method continued in the European North. In 2007, on the Kanin Peninsula, a nomadic team of reindeer-herders (10 questionnaires) and dwellers of the village of Shoyna (35 questionnaires) were interviewed. In Shoyna one hunter annually took on average 56 waterfowl, including 50 geese (mainly Barnacle geese). Of the 35 hunters, 22 gathered eggs, on average 135 each (96 % goose eggs). The nomadic reindeer-herders on average annually took 19 geese (including moulting birds) per family.

On Kolguyev Island, 40 % of the local hunters (42 questionnaires), including reindeer-herders, were interviewed. The mean take of geese in the spring of 2008 was 40 per person; altogether the local inhabitants of the island took more than 4000 geese. The autumn hunt of 2007 was less productive (a little more than 1000 geese). Practically no ducks were taken on Kolguyev. Hunting begins at the age of 12.

In the north-east of the country, the level of the take of waterfowl is also high (in several villages, more than 60 birds per year per hunter), but mainly ducks and eiders are taken.

The obtained results were compared with the data of the Circumpolar Census of 1926–27, according to which a single nomadic Samoyed holding of the Kanin tundra took on average per year 8 geese and 25 ducks, whereas Samoyed holding of Kolguyev Island took 50 geese per year. The Samoyed collected eggs as well (on the Timanskaya Tundra on average 120 eggs per *choum* (portable dwelling)).

The results of the questionning showed the very great importance of the traditional hunting of the birds to the indigenous population of the North at the present time. It is necessary to examine the method of management of the waterfowl resources from the perspective of an offical liberalization of the aboriginal hunt, the limiting of the spring hunt for non-native sport hunters, and more flexible and effective regulations for the use of biological resources, taking into account the interests of the local population.

THE COLORATION OF SOME ANSERIFORM TAXA WITH COSMOPOLITAN DISTRIBUTION: SEARCHING FOR EVOLUTIONARY-GEOGRAPHICAL TRENDS

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The modern scientific literature draws very different scenarios of the evolutional history and distributional pathways of the nearly-cosmopolitan genera *Anas* and *Aythya*. According to both morphological and molecular data, the relationships within these taxa are still full of controversy. The main objective of the present research is to relate the formation of current species structure in cosmopolitan anseriform genera with characteristic coloration trends among these groups. To study the coloration of model taxa we have developed a unified system that is based on the choosing, formal description and subsequent statistical analysis of three groups of characters: 1) the shape of contrastingly coloured elements of the pattern; 2) the coloration of separate feather groups and bare parts, and 3) the localization of the pattern elements on the body (Mosalov, Koblik, 2009). Altogether, the analysis included more than 70 colour traits of both dabbling and diving ducks. Foremost attention was given to the coloration of breeding males, which possess the complete set of apomorphic characters and species-specific colour markers. Features of female and immature plumage were also taken into account, as well as the degree of sexual and seasonal dimorphism. In order to link the obtained data with the geographical distribution of the species we used the standard terrestrial zoogeographical subdivisions of realms and regions.

The results demonstrate reliable correlations between markers of pattern and colour, and between body size and geographical distribution, allowing us to trace the relationships within model genera in terms of coloration trends and their evolutionary biogeography. Geographical parallelisms in the coloration of different subgroups of dabbling and diving ducks were statistically proved. Some of the already known or expected patterns were not confirmed, although several colour characters were found that could be used in the future as possible markers to assess the relationships previously revealed by molecular studies (Johnson, Sorenson, 1999; Peters *et al.*, 2005). The differences in the development of colour dimorphism and the presence of bright plumage elements in "northern" and "southern" species are usually interpreted as signs of a southern origin for both genera. However, we found a direct correlation between the degree of expression of these parameters and the number of species with sympatric distribution, and this has allowed us to interpret the situation from the standpoint of a more urgent need for species-specific markers as hybridization barriers in the Northern Hemisphere. On the territories with lower species diversity the degree of colour dimorphism and the number of species-specific markers diminish in accordance with the paedomorphic model of evolution.

THE GEESE OF KOLGUYEV: POPULATION STATUS, MIGRATORY CONNECTIONS AND ECOLOGY

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Kolguyev Island in the eastern part of the Barents Sea is famous for its huge role in supporting great numbers of the three goose species breeding here – the White-fronted goose (*Anser albifrons*), the Tundra Bean Goose (*A. fabalis rossicus*) and the Barnacle Goose (*Branta leucopsis*). The high numbers and nesting densities observed here (with averages of 40 nests per km^2 for White-fronted geese and 12–15 nests per km^2 for Bean geese) are unique for the entire Arctic. Current numbers of breeding geese here might be estimated at 120–180,000 nesting pairs of White-fronted geese, and 40–60,000 nesting pairs of Bean geese. The Brent Goose, numerous in the early 20th century, practically disappeared by the end

of that century; the population of the Barnacle Goose started to grow at that time, and has now reached approximately 75,000 breeding pairs. The Barnacle Goose population growth is still going on, and, in addition to the main colony, this species has become more and more common in the central part of the island. The spatial distribution and interspecific relations of the geese on Kolguyev are quite complex; a great role is played by the island landscape structure, specifics of trophic relations, and also by both direct and indirect relations with predators, such as foxes, gulls, skuas and raptors: rough-legged buzzards, peregrine falcons and gyrfalcons. Long-term ringing, neckbanding and satellite tracking have revealed some specific features of the migratory connections of Kolguyev geese with wintering grounds, and with staging and moulting areas, and have also revealed the timing and peculiarities of use of pre- and post-breeding feeding areas. Goose populations of Kolguyev are characterized by high nesting densities and intensive trophic relations and also by early departure in autumn. The main areas of pre-breeding and post-breeding intensive feeding for the Kolguyev White-fronted geese are situated on the Kanin Peninsula tundra, thus making this latter area a key point for successful breeding.

WATERFOWL OF THE FLOODPLAIN OF THE DUBNA AND YAKHROMA RIVERS, RUSSIA

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Studies were conducted from 1980 through 2000 in the north of Moscow Oblast on the floodplain of the rivers Dubna and Yakhroma.

The Mallard (*Anas platurhynchos*), Common Teal (*A. crecca*), and Garganey (*A. querquedula*) were species commonly nesting; species nesting in lower numbers included the Shoveler (*A. clypeata*), Common Pochard (*Aythya ferina*), and Tufted Duck (*A. fuligula*); rare amongst nesters were Gadwall (*Anas strepera*), Wigeon (*A. penelope*), Pintail (*A. acuta*), and Goldeneye (*Bucephala clangula*). The Greylag Goose (*Anser anser*) nested in 1969 (Leonovich, Nikolayevskiy, 1981), and since then only solitary birds have been encountered on rare occasions. The Mute Swan (*Cygnus olor*) began to be encountered in 1994 (in flocks of up to 23 individuals, solitary birds, and pairs), but nesting has not been established.

The total number of geese on spring stopover sites on the Dubna floodplain from Okayemovo to Sushchevo in several years has been as many as 7000 at a time, of ducks – up to 5000. The birds were primarily concentrated on inundated fields and meadows. The White-fronted Goose (*Anser albifrons*) made up about 67 % of the total number of geese, the Bean Goose (*A. fabalis*) – 31 %, the Greylag Goose – 2 %. In autumn, the geese stop only in small numbers on the fields and meadows.

The approximate relative abundance of species of ducks during spring migration 1999–2009 in their gatherings on flooded areas of the Dubna were Mallard – 9 % (up to 500 individuals in a single place at one time), Common Teal – 3 % (up to 100), Wigeon – 43 % (up to 1400), Pintail – 17 % (up to 800), Garganey – 4 % (up to 200), Shoveler – 3 % (up to 70), Common Pochard – 8 % (up to 280), Tufted Duck – 11 % (up to 440), and Goldeneye – 1 % (up to 30).

The Whooper Swan (*Cygnus cygnus*), Gadwall, Greater Scaup (*Aythya marila*), Smew (*Mergus albellus*), and Common Merganser (*Mergus mergus*) are regularly encountered in small numbers during spring migration, and the Mute Swan, Brent Goose (*Branta bernicla*), and Lesser White-fronted Goose (*Anser erythropus*) rather rarely.

There have been single encounters of the Barnacle Goose (*Branta leucopsis*) (one on 24.04.2009), Ruddy Shelduck (*Tadorna ferruginea*) (three on 11.06.2007) and Red-crested Pochard (*Netta rufina*) (two in September 1988).

THE MIGRATION OF ANSERIFORMS ON THE TERRITORY OF PENZA OBLAST

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On spring migration the White-fronted (*Anser albifrons*) and Greylag geese (*A. anser*) are the first of the anseriforms. From 200 to 700 thousand geese, both *Anser* and *Branta*, cross the oblast in spring. In the past three years a drop in the number of migrating geese to 450,000–500,000 birds has been noted. In the flocks, the White-fronted (45 %) and Greylag (35 %) Goose predominate, exceeding slightly the abundance of the Bean Goose (*A. fabalis*) (approximately 20 %).

Migration begins in the middle of March and extends to the end of the first decade of April, finishing by the end of April – beginning of May. The first small flocks appear together with the thawing on the fields, the open sections seem an important limiting factor for the appearance of the geese in the region, and excellent evidence is the warm relatively snowless springs of the past decade.

The main directions of spring migration are related to the valleys of rivers. Flocks exit from Saratov Oblast via the valley of the Medveditsa River to the valley of the Sura River, a portion of the geese leaves for the valley of the Moksha River, the rest continues to follow along the Sura River.

Fields with unharvested corn or wheat, or sown with winter crops, are preferred staging sites for the birds. As well, the presence of water-saturated snow, or, at least, of an ephemeral water body is necessary for the geese. The territory of the staging site should be very visible. The second migratory route begins from the west; flocks fly along the Vorona River (Tambov Oblast) to the valley of the Vysha River and leave toward Ryazan Oblast. The south-west of the oblast is also characterized by an extensive migration; here flocks fly above the steppe in the direction of the valley of the Moksha River, showing a preference for ephemeral water bodies.

For the first several days after the start of the migration, return migratory movement by the flocks in a southerly direction is often seen. Whereas the main time of migration is at night, the return movements are observed exclusively during the day. The reason for this appears to be the weather; birds farther north in Penza oblast do not find favourable conditions and return. It is exactly the weather conditions, the return of cold or a snow cover, that can halt migration for one to two weeks; in these cases a significant number of geese gather in south and south-western districts of the oblast. In peak periods of migration, southern migration is not observed; migrating flocks fly in both the daytime and nighttime. The autumn migration of geese is weakly expressed; solitary flocks are encountered.

THE POPULATION OF ANSERIFORMS OF THE COASTAL ZONE OF THE KURGALSKIY PENINSULA (EASTERN GULF OF FINLAND) AND ITS DYNAMICS IN 1990–2010

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Beginning in 1990, from 108 to 302 nests of 17 species of anseriforms were noted annually in the coastal zone of the Kurgalskiy Peninsula. For the south coast of the Gulf of Finland, this respresents the eastern limit of distribution for the Whooper Swan, Greylag Goose, Barnacle Goose, Shelduck, Scaup, Velvet Scoter, and Common Eider.

The Whooper Swan and Tufted Duck (60–70 nests each) are dominant. Subdominants are the Mallard, Gadwall, and Shoveler (20–40 nests). Common, too, are the Common and Red-breasted mergansers (10–30 nests). The Greylag Goose, Teal, Common Eider and Velvet Scoter are uncommon but regular nesters. The Barnacle Goose, Shelduck, Garganey, Pintail, Scaup and Goldeney are rare and are noted only in some years.

The greatest diversity and abundance of anseriforms (more than 80 % of encountered nests for all species) were observed on large islands far out to sea (2–2.5 km), in colonies of the Herring Gull, Lesser Black-backed Gull and Cormorant.

On small islands 50 m – 1.5 km off the coast, the Mute Swan, dabbling ducks and the Tufted Duck nested in colonies of the Arctic and Common terns. In the nesting of larids and anseriforms in colonies, a more open distrubution of nests, sometimes even outside of camouflaging vegetation, is observated, as well as densely grouped colonies of 25–30 nests.

Since the 1990, four new nesting species have appeared: the Common Eider (since 1992), Gadwall (since 1995), Barnacle Goose (since 2006) and Scaup (since 2007). The Mute Swan and Shelduck settled in the given region not long before the beginning of our studies.

In this same period, the Shelduck (1996) and Teal (2005) stopped nesting. The Pintail and Garganey in 1994 vanished from the nesting fauna and appeared again after 3–4 years.

In 1990–1999, 150–300 pairs of anseriforms nested annually, in 2005–2010, only 100–190 pairs. This was dictated by the depression in the abundance of the Herring Gull, by the activity of terrestrial predators on the coast and a host of islands at the northern end of the peninsula, and by the growth of illegal recreational impacts on these areas.

On the islands in Narva Bay, the number of anseriforms has been maintained at an earlier level, and the Gadwall, Tufted Duck, Greylag Goose and Mute Swan have even increased in number.

THE BREEDING BIOLOGY OF THE GADWALL (*ANAS STREPERA*) IN THE COASTAL ZONE OF THE KURGALSKIY PENINSULA

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The main wave of the spread of the Gadwall in Leningrad Oblast occurred in the 1990s along the south coast of the Gulf of Finland across the Kurgalskiy Peninsula, where individual birds began to appear in 1988–1994. Suddenly in 1995 we noted 9 cases of breeding here. Annually thereafter we noted from 10 to 24 clutches. Egg-laying began at the end of the first week in May and continued until the middle of June, but the majority of birds began their clutches in the second half of May – first week of June (84.92 %, n = 126).

The Gadwall prefers high-grass areas of maritime meadows (54.96 % of nests, n = 151) and islands with colonial larids (84.76 %, n = 151). In colonies of the Herring Gull, the Gadwall prefers sparsely populated peripheral areas and outlying areas (38.88 % and 43.33 %, n = 90). In colonies of the Arctic and Common terns (38 nests) they actively settled in the dense centres (71.05 %, n = 38) and the majority of nests were located in short grass (61.15 %). Here, four nests were encountered on bare sandy and stoney spits (10.52 %). Nearly 62 % (61.58 %) of the nests of the Gadwall (n = 151) were located in grouped colonies of 2–7 nests of different species of anatids. In 2006–2009, 18.46 % of the clutches were mixed (n = 65): with the Tufted Duck (8 nests), a bit rarer, and only a single nest each with the Red-breasted and Common mergansers, and with the Garganey.

The number of eggs in a normal clutch is 7–11, on average 9.27 ± 1,28 (n = 127). Egg size was 48.9–59.1 mm × 34.9–40.7 mm, on average 53,12 mm ± 2,12 ×37,77 mm ± 1,79 (n = 207). Incubation success of the Gadwall in 2006–2009 was 85.37 % (n = 383), the majority of egg loss (78.57 %, n = 56) occurred because of lack of synchronicity of egg laying in double and mixed clutches or because of abandonment by the female of such clutches.

Broods remained hidden in submerged thickets of *Phragmites*. One to three mixed broods of gadwalls or of the Gadwall and the Tufted Duck were noted annually. Several two- to three-week old ducklings of the Gadwall remained apart from the broods. A proportion of the broods soon after reaching water move into the coastal reed beds, crossing open water of 1 to 2 km. At fledging in 2006–2009, 64.52 % of the ducklings had survived (n = 327). The total reproductive success of the Gadwall on the Kurgalskiy Peninsusla in these years was 55.09 % (n = 383).

MIGRATIONS OF BARNACLE (*BRANTA LEUCOPSIS*) AND BRENT (*B. BERNICLA*) GEESE ACROSS THE KURGALSKIY PENINSULA AND ADJACENT EASTERN GULF OF FINLAND

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Until the 1990s, the Barnacle Goose was very rare in Leningrad Oblast during migration, and the main migration of the Brent was considered to be exclusively along the north shore of the Gulf of Finland.

In 1990–1999 and 2005–2010, we recorded an intensive autumn (since 1990) and spring (since 2005) migration across the Kurgalskiy Peninsula on the south shore of the Gulf of Finland.

In spring, both species appear on the west coast of the peninsula during the final week in April and form congregations of up to 1200–1500 barnacles and to 500–600 brent on coastal meadows up to the middle of May. Feeding flocks move in a northwesterly direction. Transiting migration occurs in mid- to late May, peaking in the middle of this. All flocks fly from the Estonian coast and fly in a north-northeasterly direction across the open Gulf of Finland to the Seskar-Moshchniy islands toward the north shore of the gulf. During the season, up to 22–35,000 barnacles and 5–10,000 brent are recorded. The observations permit the supposition that massive staging sites exist in eastern Estonia, and that the birds fly across the Kurgalskiy Peninsula in a major migratory stream, going to the mouth of Vyborg Bay, where in just 24 hours up to 80,000 *Branta* spp. are recorded during peak migration.

The autumn migration begins during the first week in October and continues all month. The peak occurs at different times during the first half of the month, depending upon the year. In different years, 15–45,000 barnacles and 6–20,000 brent have been recorded over the season. The main direction is precisely the reverse of spring migration, from Seskar-Moshchniy to Estonia. Shipboard observations from 15 km east of Hogland Island during 31.09–03.10.2010 showed that in the northern part of the Gulf of Finland, save for flocks flying from Vyborg Bay to the WSW across an open area (up to 4,500 barnacles and 3,200 brent per day), in the early-morning hours a comparable stream of migrants (up to 2,500 barnacles and 4,600 brent per day) leaving the outer Finnish rocky reef follows to the SE and SSE toward the Seskar-Moshchniy islands and, likely, further on to the Kurgalskiy Peninsula and eastern Estonia.

COMPARATIVE ECOLOGICAL ASPECTS OF THE BIOLOGY OF THE COMMON (*MERGUS MERGANSER*) AND RED-BREASTED (*M. SERRATOR*) MERGANSERS NESTING ON ISLANDS ON THE KURGALSKIY PENINSULA, EASTERN GULF OF FINLAND

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Both species of mergansers commonly nest on treeless islands. In 1993–1999, from 16 to 29 females of each species nested annually, and in 2005–2010 from 7 to 13. The Common Merganser arrives from 15 March to 5 April, the Red-breasted Merganser 14–23 April. Common mergansers lay eggs from 14 April to 15 June, with peaks 1–10 May and 25 May – 5 June. The period of nest initiation may shift by 17–20 days, depending on the season. Red-breasted mergansers begin laying eggs from 20 May to 17 June, the period of initiation of egg-laying varies from year to year by 5–7 days.

Both species occupy similar habitats, from deep recesses on rocks and on piles of *Phragmites* in bushes, to open nests on short-grass meadows. Solitary nests are among huge exposed shingles. However, the common merganser nests are often located under piles of rocks (52.51 % (n = 219)), but the red-breasted merganser ones are open amongst grasses (65.23 % (n = 179)). The Common Merganser always has a boulder beside its nest, to which the bird flies

in from all directions on returning to the nest. Female Red-breasted mergansers return to the nest exclusively on foot.

Normal clutch size of the Common Merganser was from 6 to 13 eggs, in the Red-breasted – 5–13 eggs. Each year, from 11.11 % (n = 9) to 27.78 % (n = 36) of common merganser females laid eggs in nests of other individuals of the same species (19.8 % of females in all years combined (n = 219)). In the Red-breasted Merganser 21.03 % of clutches (n = 179) were combined with the Tufted Duck (*Aythya fuligula*) and the Gadwall (*Anas strepera*), more rarely with the Common Merganser.

Broods of the Common Merganser up to two weeks of age fed in sandy shallow-waters 1.0–1.7 m deep with individual large boulders at distances of 100–300 m from the shore. Broods of the Red-breasted Merganser fed near stoney ridges at depths of 0.5–1.0 m, no farther than 20–50 m from the shore. The prey of the ducklings of the Common Merganser were predominantly small fish 4–8 cm in size – 83 % of observations (n = 365). In the Red-breasted Merganser, in addition to fish 3–5 cm in size, there were small invertebrates (gammarids and gastropods), which they picked out from between the stones (33.53 % of observations (n = 334).

WINTERING SEA DUCKS ON THE WHITE SEA AND AT THE MURMANSK COAST: DISTRIBUTION AND ADEQUATE CENSUSING METHODS

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During aerial observations in March 2010 wintering sea birds were mapped and counted. It was established that among the sea ducks wintering in the region, the greatest abundance was attained by three species of eiders: the Common (*Somateria mollissima*), the Steller's (*Polysticta stelleri*) and the King Eider (*Somateria spectabilis*).

The White Sea population of the Common Eider, in comparison with the data of the last count in 1977, had grown from 26,000 to 50,000. Along the shores of the Kola Peninsula the number of wintering Common eiders of other populations also grew, by 20.9 % (Murmansk coast, compared with 1994) and by 44.5 % (Terskiy coast, compared with 2003) (Shklyarevich, 1979; Nygard *et al.*, 1995; Krasnov *et al.*, 2004). The overall number of Steller's eiders on the Kola Peninsula coasts seemed approximately the same as in 1994. A sharp drop in numbers of King eiders in all areas of Russia we studied was revealed (Nygard *et al.*, 1995; Krasnov *et al.*, 2004). At the same time, a sharp increase in the number of King eiders wintering along the shores of eastern Finmark was encountered. Overall, for the whole region of wintering, the abundance of the populations of King eiders is stable and similar to that in 1994.

It was revealed that local movements within a single winter are characteristic for concentrations of wintering sea ducks. At the same time, over the course of many years of observations, cases of drastic changing of regions of large-scale wintering were revealed. Seasonal ice conditions have a major impact on the movement of ducks wintering in Russian waters of the region. The wintering conditions in the zone of polynyas and ice edges on the Terskiy coast are especially dynamic. In harsh winters and strong winds, the drifting ice displaces a large number of birds to adjacent waters of the Barents Sea. It is clear that besides the ice conditions, trophic factors, in particular the location of significant concentrations of spawning capelin (*Mallotus villosus*), have a significant impact on the distribution of wintering King eiders. This is how we explain the appearance of a huge congregation of King eiders in eastern Finmark in the region of the forming of massive concentrations of spawning capelin. Therefore, for the numerical evaluation of wintering populations of sea ducks, it is imperative to observe the full scope of the entire wintering range. Local counts of separate parts of the coasts turn out to be inadequate as a method of investigation of the population dynamics of the given species. A full-scale aerial survey should be recognized as a more acceptable method.

THE ABUNDANCE AND DISTRIBUTION OF ANSERIFORMS IN NORTH-WESTERN SIBERIA (YAMAL-NENETS AUTONOMOUS OKRUG)

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Data were derived on the basis of the register of animals of the Yamal-Nenets Autonomous Okrug, prepared at the request of the okrug administration by the Scientific Centre "Protection of Biodiversity" of the Russian Academy of Natural Sciences. As a territorial base of the register, a map of the habitats of animals was worked up. Zonal division of the territory of the okrug was made according to the Atlas of the Yamal-Nenets Autonomous Okrug (2004). The mean annual total waterfowl populations, presented in the table, were assessed for years with favourable breeding conditions. Monetary value was calculated in accordance with penalties for damage to wildlife (1994, 1999).

The distinguishing characteristics of the territory of the okrug include a large number of water bodies (> 30 % of the area is bogs; approximately 20 % tundra and inland waters; and > 5 % large lakes and rivers, floodplains, deltas, and marine complexes). All this favours a high species diversity, a vast distribution, and a great abundance of waterfowl.

Yamal-Nenets Autonomous Okrug is inhabited by 33 species of anseriforms, totalling 25 million individuals. Of these, 10 species are the most abundant in the different subzones. The greatest population density, abundance and value are noted in the northern taiga and forest tundra, the lowest in the Polar Urals. The overall value of anseriforms is approximately 2.7 million roubles, of which more than half is found on the northern taiga.

Table
Mean annual anseriform populations in Yamal-Nenets Autonomous Okrug at the end of the breeding season

Zones and subzones	Area ($km^2 \times 10^3$)	Number of species/ Population density (individuals/km^2)	Abundance (M individuals)/ Value (M roubles)	Leaders in abundance (proportion of anseriforms, %)
Arctic tundra	55.6	15/20	1.1/166.2	Clangula hyemalis (58), Anser albifrons (18), Somateria spectabilis (14)
Typical tundra	142.2	25/17	2.4/341.4	Clangula hyemalis (47), Anser albifrons (14), Anas acuta (10)
Southern tundra	73.6	24/30	2.2/257.3	Clangula hyemalis (30), Melanitta nigra (17), Aythya marila (14)
Forest tundra	72.1	22/50	3.6/377.0	Anas acuta (21), A. crecca (16), Aythya fuligula (14)
Northern taiga	270.8	28/52	14.1/1430.4	Anas acuta (32), Aythya fuligula (20), Anas crecca (15)
Middle taiga	51.1	23/29	1.5/151.2	Anas acuta (45), A. crecca (19), Aythya fuligula (17)
Polar Urals	21.3	13/0.4	0.009/0.9	Mergus merganser (37), M. serrator (27), Anas crecca (8)
Overall for the Okrug	686.6	33/36	24.9/2725.1	Anas acuta (26), Aythya fuligula (15), Anas crecca (13)

RECENT CHANGES IN THE NUMBERS, DISTRIBUTION AND BEHAVIOUR OF PINK-FOOTED GEESE (*ANSER BRACHYRHYNCHUS*) AND WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) WINTERING IN FLANDERS (BELGIUM)

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Wintering areas of arctic geese in the Flemish region of Belgium are mainly situated in the coastal polders near the North Sea and in the valleys of the IJzer, Scheldt and Meuse rivers. The most numerous are the Pink-footed Goose (Svalbard breeding population) and White-fronted Goose (breeding in northern Russia and western Siberia).

From data obtained from ongoing monitoring in the Oostkustpolders (a region north of Bruges) since 1959–60, recent changes in the numbers and distribution of both species are discussed. After a steady increase during the 1980s and 1990s, winter maximum numbers in Flanders are stabilising or even decreasing (the latter expected if the ban on goose hunting, in place since 1981, is not maintained). The phenology and regional distribution of both species,

as well as the trends in the preference of feeding habitats, indicate interesting interspecific relations. Recent changes seem to be an adaptive behaviour related to developments in agricultural practice, including the compensation schemes for damage, which, although of rather limited extent, have been altered from juridical to administrative procedures. At the flyway level the shifts in core wintering regions probably reflect both the influence of climate change and of conservation measures.

Comparing both species, the White-fronted Goose is far more mobile and widespread. The striking site fidelity of the Svalbard Pink-footed Goose, which has only a limited number of traditional staging areas, needs to be taken into consideration when management of the Svalbard population along the continental Atlantic flyway is envisaged.

PROBLEMS OF THE CENSUSING AND ECO-ECONOMIC EVALUATION OF ANSERIFORMS

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Eco-economic evaluation of animal resources is implemented on the basis of several indicators of the status of the species. Abundance is one of the important indicators used for the aforementioned purpose. The main difference in evaluation of the abundance of waterfowl of Russia lies in the choice of count – the subsampling of birds on the sample areas and transects with subsequent scaling of the obtained data to this or that territory. This problem stems from the huge area of the country's wetlands, the patchy distribution of waterfowl during the breeding season, and the inaccessibility of many regions for inspection.

As the foremost suite for an ecological evaluation, other biological parameters – breeding success and population structure, are also considered. The study of the structure of the range and the degree of its fragmentation reveals points or fields having primary significance for the existence of the species. The study of habitats is the basis for these studies. The status of waterfowl populations is first of all dependent on the condition of their habitats – wetlands, and the prognosis of potential changes in abundance is given taking into account the changing situation of the wetlands. Therefore, in the study of the territorial distribution of anseriforms it is necessary to conduct an investigation and description of their main habitats.

On the basis of all data obtained according to currently approved methods, an economic evaluation of animal resources, necessary for the establishment of measures for violators of environmental legislation and for assessment of the damage to wildlife from human activities, was conducted.

In practice, the greatest damage in monetary terms is born by the most numerous species of animals, to which neither game species nor Red Book species belong. A vivid example is the calculation of the damage to terrestrial vertebrates during construction of the overhead 220 kW line between Nadym and Salekhard within the borders of "Poluyskiy" nature refuge, carried out by the "Protection of Biodiversity" Science Centre of the Russian Academy of Natural Sciences. The results of the calculation of the cost of the damage showed that Red Book and game waterfowl were given a monetary value several times lower than the remaining vertebrates. The loss of all waterfowl in the given case is really nothing – 0.3 % of the entire population of vertebrates.

Currently, the revelation of the natural territories preferred by rare and game species of anseriforms and the imparting to them of the status of special protection, from the local to the international level, is the most effective instrument for the conservation of these birds.

THE ABUNDANCE OF THE BARNACLE GOOSE (*BRANTA LEUCOPSIS*) ON SPRING STAGING SITES AND ITS STATUS IN SOUTHERN KARELIA

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The abundance of the Barnacle Goose, on which observations were made since the early 1990s on the Olonets spring staging sites (Russia, Karelia), continues to increase. In the

early 1990s only solitary geese were noted and only in the second half of May; currently the first individuals are encountered in the middle of April, and the abundance of the geese has reached record numbers. During counts from a car along a permanent route in 2008 more than 76,000 were recorded, and in 2009 more than 105,000. The maximum abundance has shifted to the middle of May.

It is evident that because of the overall growth in population abundance of the Barnacle Goose wintering in Europe and also because of the growth of the nesting population of the Baltic region, the forage capacity on the coasts and islands of the Baltic and at former spring staging sites of the species is insufficient for local and migrating birds (Zimin *et al.*, 2007). They are compelled to seek new territories meeting their requirements as feeding habitats. The increase in abundance of this species, as in other species of migrating geese on the Olonets fields, no doubt, is promoted by a further two very important factors: the organization of hunting (establishment of a seasonal hunting emergency preserve) and the restoration of part of the land area, completed in 1999–2001 with the support of the WWF-Sweden, which became after this more attractive for the *Anser* and *Branta* geese. Together with the fact that the existing decrease in abundance of the species in spring congregations in 2010 may be explained not only as a decrease in the overall abundance of the species, but as a desire to find accessible feeding land in north-western Russia. The observation of a significant number of flocks of the Barnacle Goose overflying the Olonets fields in the second half of May 2009 and 2010 may serve as evidence of this.

In recent years isolated pairs of Barnacle geese have begun to breed on the islands of the Valaam Archipelago of Lake Ladoga (E.V. Mikhaleva, pers. comm.), *i.e.*, the species has altered status from “migratory” to “nesting”.

Henceforth it will be necessary to continue the monitoring observations on the abundance and breeding of the Barnacle Goose in north-western Russia, because it may become a serious food competitor of the White-fronted Goose (*Anser albifrons*) and the Bean Goose (*A. fabalis*), which from ancient times have formed spring congregations in Leningrad and Arkhangelsk oblasts and in Karelia.

ANSERIFORMS – A VECTOR FACILITATING THE SPREAD OF SOIL ANIMALS IN THE ARCTIC

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The distribution of soil microarthropods by birds was described relatively recently (Krivolutskiy, Lebedeva, 1999; Krivolutskiy, Lebedeva, 2004a,b, and others). We have shown that one of the mechanisms of influx into the Arctic archipelago of soil mites (Acari: Oribatida – armoured mites or oribatids) is their transport by birds in their feathers (Lebedeva, Krivolutskiy, 2003; Lebedeva *et al.*, 2006). Anseriforms, regularly performing flights from their nesting grounds to wintering grounds and back again, may be a significant vector facilitating the spread of soil animals on their flyways. We inspected the plumage of 15 species of anseriforms in various geographic zones (Lebedeva, 2005), amongst which were four speces: the Barnacle Goose (*Branta leucopsis*), the Bean Goose (*Anser fabalis*), and the Common (*Somateria mollissima*) and Steller’s Eiders (*Polysticta stelleri*) in the Arctic, as well as the nests of many anseriform species. In both the plumage and the nests we recorded species of armoured mites outside the known limits of their ranges. Important traits of anseriforms facilitating the spread of soil-inhabiting species of animals and their naturalization on new territories are: the large body size of swans, geese and ducks; the particular structure of their feathers; the special microclimate formed in the plumage; and the confined nature of the flyways, breeding and wintering sites to wet habitats ecologically optimal for the soil-inhabiting animals. All these enable us to propose that thanks to anseriforms, the influx of soil-inhabiting animals to the Arctic may be regular, and that may give rise to the formation of a microfauna of soils in harsh conditions, in particular of “young” terrains, in early stages of succession.

EXPERIENCE OF CATCHING WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) DURING SPRING MIGRATION

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In 2008–2010, under the umbrella of the Russian-Dutch project "SPRING" (BBI-Matra), large-scale catching and neckbanding of white-fronted geese during spring migration was accomplished for the first time. The catching and ringing of the geese was carried out on the site of one of their most important migratory staging areas in Upper Volga Region, on the floodplain of the Unzha River in Kostroma Oblast on the territory of "Kologriv Floodplain" nature refuge.

For the capture of the geese, cannon nets, traditionally used in the Netherlands for catching geese on their wintering grounds, were employed. The weight of a single net is about 150 kg, its length 70–100 m, and the size of the catching segment 15 × 8 m. The nets rest on the ground in pairs, in order that they rise to meet each other, and are thoroughly hidden by the grass. Oats are scattered in the area of catching in order to attract the birds there. After the catch, the geese were placed in special, closed fabric pens and in tents; after marking and measuring, the birds were released all at the same time. For the catch, in addition to project participants, volunteers, including biologists, took part.

Altogether 8 catches were carried out (two in 2008, and three each in 2009 and 2010) and 194 White-fronted geese and one Bean Goose were caught. Each bird, in addition to the standard metal ring *Moskva*, was marked with a black plastic neckband bearing an individual code. Of the birds caught in 2008, 80 % were resighted, in 2009 – 66 %. The majority of observations of geese marked with neckbands in the Kologriv region were made on wintering grounds in Western Europe.

POPULATION DYNAMICS OF A COLONY OF BARNACLE GEESE (*BRANTA LEUCOPSIS*) IN KOLOKOLKOVA BAY, NORTHERN RUSSIA

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Colonies of the Barnacle Goose, tallying tens of nests, appeared at the start of the 1990s on the Chaichiy Islands of Kolokolkova Bay (Malozemel'skaya Tundra, Nenets Autonomous Okrug), occupied by nests of the Glaucous Gull (*Larus hyperboreus*) and the Heuglin's Gull (*L. heuglini*). Later, the geese occupied the coastal marsh and dunes in the area of Tobseda on the north-eastern shore of the bay.

Under the umbrella of an international expedition since 2003, a complete nest count was carried out with GPS-mapping in the northern part of Kolokolkova Bay. The number of nests on the mainland and on the islands reached a maximum (2450) in 2006, but the abundance in 2009 was equal to that in 2003 (2200). The total number of nests in Kolokolkova Bay in 2009 was 3000.

The different colonies and parts of colonies differed sharply in their population dynamics. The part of the colony located on the marshes nearly disappeared, which could be considered a result of the inundation of nests by surging tidal waters, by the incursion of Arctic foxes and by the collection of eggs by local inhabitants. On the other hand, the number of nests on the non-inundated sandy sectors of the outer coast grew from four in 2002 to 956 in 2009. On the Chaichiy Islands, the number reached a maximum (1095 nests) in 2006 and from that time began to decrease, which is evidently linked with a degradation of the vegetation. A similar situation is found on the low, marine marshes of the bay to the south of Tobseda. The most stable abundance and density of nests was in the band of high and middle marshes abutting the dunes.

The stability of the number of nests in the colonies of Kolokolkova Bay points to a filling in of the part of the habitats adapted to in the process of settlement. Intensive use of the vegetation by the geese has already resulted in its degradation and a decrease in the number of

nests, especially on the islands settled first. In habitats outside the tidal marshes, the numbers of nests continues to grow. All new colonies of Barnacle geese have formed in habitats where foxes are absent or their activity is limited.

MANAGEMENT OF THE MALLARD (*ANAS PLATYRHYNCHOS*) POPULATION IN A HUNTING AREA IN SOUTHERN RUSSIA

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The Mallard, a game species, is the most popular quarry species for hunters in the south of European Russia. It is important not only to sustain its local population, but also to increase the density of this species in the hunting area. Long-term research revealed a strong trend towards the decrease of the local Mallard population in the wetlands of the Veselovsky Reservoir (a Ramsar site). In this connection, it was necessary to carry out actions on its regeneration in areas used for hunting. The method used for conservation and reproduction has been the attraction of wild ducks to artificial reed shelters for nesting, and the captive rearing of ducklings, with their subsequent introduction into the wild. A farm for the captive breeding of wild ducks was established in 2005. The number of ducks released into the wild by the beginning of the hunting season reached about 50,000 ducks over the five years of farming. A number of methods were developed to protect the wild duck population and to enrich the hunting area with captive-reared ducks. Ringing of ducks showed that one third of the number of ducks shot by hunters was farmed birds. Investigation of the naturalization of released Mallards in the wild revealed many of the features of their dispersion, breeding, feeding behaviour, etc.

DISTRIBUTION AND MIGRATION OF *ANSER* GEESE IN XINJIANG, NORTH-WESTERN CHINA

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Xinjiang, accounting for one-sixth of China's land area and bordering eight countries, is the largest province in China; with an area of 1.65 million square kilometers, it is as large as a small country itself. As part of landlocked Central Asia, Xinjiang is extremely arid. The survey methods consisted of direct counting, scan sampling and other traditional methods of observation. The locations chosen were lakes Burultokay, Ebinur, and Bagrax, also known as Bosten Hu; the Tarim River (Xianjiang's major river); its major tributary the Yarkant River; the Ili River, draining west and north into Lake Balkhash; the Irtysh River; and other wetlands. Some information was also obtained from bird-watching records and questionnaires. At least 32 species of Anatidae in 13 genera were found in Xinjiang, including about six species of geese (depending upon taxonomy), *e.g.*, Greylag (*Anser anser*) and Bar-headed geese (*A. indicus*) nest in the Bayinbuluke wetlands of the Tianshan Mountains (42°50' N, 84°15' E, elevation 2,400 m). These species differ in both habitat and breeding behaviour. The Bar-headed geese like to nest colonially on islands (Ma, Cai, 1997), whereas Greylag goose nests are widely spaced (no less than 50 m from each other). Inter- and intraspecific nest parasitism is quite common among the species of Anatidae. The Swan Goose (*A. cygnoides*), Bean Goose (*A. fabalis*) or divided into two or three species or subspecies), White-fronted Goose (*A. albifrons*) and Lesser White-fronted Goose (*A. erythropus*) migrate through Xinjiang. The Greylag, Bean and Bar-headed geese are common species, with populations estimated at 25,000–35,000, 11,000–13,000 (on migration) and only 3,500–4,500, respectively.

THE POPULATION OF WHITE-HEADED DUCKS (*OXYURA LEUCOCEPHALA*) IN XINJIANG, NORTH-WESTERN CHINA

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The White-headed Duck is an endangered species (EN) in the World. Several surveys had been done by Wetlands International and BirdLife International (Hughes *et al.*, 2006), but they did not get any new information from China before 2006. The method used is that of the telescope at long distances, for observation of the dynamics, family relationships and migration patterns of the ducks on a monthly basis. From 2006 to 2010 some 86–104 individual White-headed ducks were found at 12–14 locations, with some breeding sites in the north of Xinjiang (Ma, Mei, 2007). Observations showed that in recent years the species has been expanding its range eastward (Ma, 2010). The ducks were observed to migrate to Xinjiang in early April, and breed from late April until August. They lived on ponds, reservoirs, dead pools, reed lakes, freshwater pits, fish ponds, small sumps, cesspools, and on wastewater and sewage treatment ponds, in short, wherever they could find water. The habitat conditions are very poor. Clutch size is only 4–6 eggs. In September they were observed to gather in preparation for migration. By October and November most of them had left Xinjiang. In China, the White-headed Duck has not yet been included on the Species List of National Important Wildlife for Protection. The main threats they face are illegal poaching, egg-taking, destruction of nests, and habitat loss. In addition to these difficulties, over-cultivation, water shortage, wetland exploitation and environmental pollution are big problems in western Xinjiang. It is suggested that the Chinese government and international forces increase efforts in protecting this endangered species, and that such protection be incorporated into legal protection and local education. We hope that the duck will be listed nationally as endangered and a program of protection begin as soon as possible.

POPULATION NUMBERS AND DISTRIBUTION OF THE LESSER WHITE-FRONTED GOOSE (*ANSER ERYTHROPUS*) IN I.R.IRAN

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Iran is a vast country, covering a total land area of about 1648,184 km^2; it is nearly larger than Kuwait, Syria, Jordan, Iraq, Bahrain, United Arab Emirate, Azerbaijan, Armenia, and Georgia all combined.

Over half of Iran is mountainous and also comprisies semi-arid steppes. Iran is bounded by the Caspian Sea to the north and the Persian Gulf to the south.

The prominent major habitat types are desert and semi-desert (covering approximately 60 % of the country). However, there are very extensive wetland systems of great importance for a wide variety of wetland species; 22 such systems are designated Ramsar Internationally Important sites.

The Lesser White-fronted Goose is a species of conservation concern and considered globally threatened with extinction; it is found in about 23 areas throughout Iran. All the information about the distribution and abundance of the bird was collected and the situation in Iran is discussed. Also a distribution map has been prepared. The highest number of Lesser White-fronted geese observed in Miankaleh Protected Area was estimated at about 6673 birds in 1975, and the lowest was count was in Bujagh National Park in 2005, while in 2007 and 2008, an estimated 205 and 26 Lesser White-fronted geese were counted throughout Iran.

OBSERVATIONS OF THE SPRING MIGRATION OF ANSERIFORMS ON LAKE MANYCH-GUDILO

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A stationary count of migrating anseriforms was carried out in the ornithological sector of "Chernye Zemli" Biosphere Nature Reserve (Lake Manych-Gudilo) during the period from 27 March to 2 April 2010. The count was carried out from a single point during daylight hours. Altogether there were 77.5 hours of observations. As a result of these observations, the proportion of species, and the abundance and dynamics of the visible migration of anseriforms in the central part of Lake Manych-Gudilo during early spring were determined.

In total, 28,306 birds in 22 species were counted, that is 17,189 Red-breasted geese (*Branta ruficollis*), 4,927 geese (three species), 53 swans (two species), 139 Ruddy shelducks (*Tadorna ferruginea*), 4,669 Common shelducks (*T. tadorna*), 920 dabbling ducks (six species), 369 diving ducks (five species), 2 smew (*Mergus albellus*), and 7 mergansers (two species). The most numerous in the counts was the Red-breasted Goose. Its abundance increased daily from the first days of observation and reached a maximum on 30 March, when 7,598 were recorded (44 % of all waterfowl). The majority of birds observed was during the late evening hours. Altogether over the first four days, 95.3 % of the total number of Red-breasted geese observed were counted. After a complete halt in migration on 31 March, the number of species began anew to increase on 1 and 2 April (with 181 and 678 birds, respectively). Amongst the *Anser* geese, the White-fronted Goose (*Anser albifrons*) predominated (91.7%). The first white-fronted geese were recorded on 28 March, and until 2 April (the end of observations) their abundance continued to grow. Less commonly encountered was the Greylag Goose (*A. anser*) (6.9 %) and the Bean Goose (*A. fabalis*) (1.4 %). The peak abundance of the Ruddy Shelduck was recorded on 28 March (82 birds – 59 %), followed by a sharp drop in numbers; on 2 April only a return migration was observed. The peak migration of the Common Shelduck was recorded during 28–30 March; in this period 74 % of all migrating birds were counted. The most numerous of the dabbling ducks were the Eurasian Wigeon (*Anas penelope*) (38.8 %), the Mallard (*A. platyrhynchos*) (31.1 %), and the Eurasian Teal (*Anas crecca*) (16.7%). The peak migration of the Wigeon was recorded on 31 March, the Mallard during 28–30 March, and the Teal on 30 March. Diving ducks were few in number.

The authors thank the authorities and staff of "Chernye Zemli" Biosphere Nature Reserve for their assistance in bird counts.

ECTOPARASITES: BLOODSUCKERS OF ANSERIFORMS OF THE PALEARCTIC

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The most varied groups of invertebrates, the abundance of which may fluctuate from a single individual to a thousand, inhabit the nests of birds (Matyukhin, 2004; Matyukhin *et al.*, 2009). Knowledge of fleas (Siphonaptera) and louse-flies (Hippoboscidae) of anseriforms is extremely scanty. According to the data of Cyprich *et al.* (2006), eight species of fleas: *Ctenophthalmus assimilis assimilis, Cerathopyllus gallinae, C. pullatus, C. styx styx, C. tribulis, C. garei, C. sciurorum sciurorum*, and *Megabothris (Gebiella) turbidus*, were noted on the Mallard (*Anas platyrhynchos*) and in its nests; *C. garei* and *C. sciurorum sciurorum* were found on the Garganey (*A. querquedula)*; *C. garei* and *Dasypsyllus gallinulae gallinulae* on the Pochard (*Aythia ferina*); and only *C. garei* on the Tufted Duck (*A. fuligula*). In the Nenets Autonomous Okrug in 2005, in only one of 7 investigated nests of the White-fronted Goose (*Anser albifrons)* we found 11 individuals of the flea *Cerathophillus vagabundus*; in six of 11 nests of the Barnacle Goose (*Branta leucopsis*) we found 9 specimens of the flea *C. gallinae* – one to three individuals per nest. In 2006, in 19 nests of the White-fronted Goose 11 individuals of the flea *Cerathophillus vagabundus* were recorded, and in 14 nests of the Barnacle Goose – 10 imagos

of *C. gallinae*. Thus, in addition to species of fleas parasitic only on birds (*Cerathophillus gallinae*, *C. pullatus, C. styx styx, C. tribulis, C. garei*, *C. vagabundus, Dasypsyllus gallinulae gallinulae)*, fleas of small predators and rodents were encountered on anseriforms: *Ctenophthalmus assimilis assimilis*, *C. sciurorum sciurorum, Megabothris (Gebiella) turbidus)*, and this may have a definite epizootiological and epidemiological importance. The possibility and characteristics of parasitism on anseriforms by louse-flies (Hippoboscidae) are virtually unstudied. As per the data of Yu.N. Nazarov (1968), a single female *Ornithoica unicolor* was taken from a Garganey in Shkotovksiy District of Primorskiy Kray.

MIGRATORY CONGREGATIONS OF GEESE IN THE EASTERN UPPER VOLGA BASIN

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The eastern Upper Volga Basin includes the Gorkovskoye Reservoir and the lowlands of the Klyazma River (the territory of Ivanovo and adjacent sectors of Kostroma, Nizhniy Novgorod, and Vladimir oblasts). The current study of the spring migration of geese, conducted from 2007 through 2010, aimed to reveal the main concentrations and to evaluate their status.

The spring migration of geese occurs from the end of March to the middle of May. Intensity of migration is uneven, as a rule, exhibiting two peaks: in the third decade of April and in the second decade of May. The common migratory species of geese in the region are the White-fronted Goose (*Anser albifrons*) and the Bean Goose (*A. fabalis*). Flocks of the Greylag Goose (*A. anser*) are noted annually, but rather rarely, and the flocks are small, of several dozen, rarely more than 100 individuals. There are sporadic occurences of the Lesser White-fronted Goose (*A. erythropus*) and the Barnacle Goose (*Branta leucopsis*).

The following large congregation sites have been revealed:

Opolskoye – Gavrilovo-Posadskiy and Ilyinskiy districts, and south of Suzdalskiy District. At the centre of the concentration in the fields of Yuryev *opolye*, 5–7,000 geese were recorded at a single time and isolated flocks of 200–300 were observed at the periphery of the cluster.

Uvodskoye – around roosting sites on the floodplains at the mouth of the Uvod' River, with feeding sites on fields of Kovrovskiy and Savinskiy districts (5–7,000 birds).

Plesskoye – formed around a large common roosting site on the islands of the Gorkovskoye Reservoir, where up to 10–15,000 geese gather. From the feeding site the birds disperse to fields of Krasnoselskiy, Privolzhskiy and Vichugskiy districts.

Yuryevetskoye – on the shores of the Gorkovskoye Reservoir to the west of Yuryevets (3–5,000).

Lukhskoye – roosting sites on the floodplain of the middle course of the Lukh River and on peat-digging areas and feeding sites in fields of Lukhskiy and Palekhskiy districts (2–3,000).

Active spring hunting is carried out on all these gathering sites, causing incredible disturbance for the birds and premature displacement between sites. In 2010, for example, hunters shot at geese directly on the islands of the Plesskoye gathering site, on the landing of the flock at its roosting site. For the preservation of these key congregation sites and the conducting of a successful, stable hunt, a zone of peace in the heart of the congregation site and at roosting sites needs to be defined, with limited, regulated hunting on their periphery.

The work was carried out under the umbrella of the Russian-Dutch project BBI-Matra no. 523 50 84.

THE SPRING HUNT OF WATERFOWL: BIOLOGICAL PREMISES AND ORGANIZATIONAL QUESTIONS OF HUNTING

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The organization and conducting of the spring waterfowl hunt is still a controversial issue. This is linked not only with the current absence of competent biological substantiation of the possibility of hunting the birds, but also with the large number of unresolved organi-

zational questions. At the forefront of these are the timing of the start of the spring hunt and its maximum permissible duration.

The most important parameter of the waterfowl population at this time is the sex ratio. The proportion of males, as a rule, is considerably overestimated. In its determination the sex ratio should be considered as correct if it reflects only a series of counts completed prior to the start of peak reproduction of the birds (25 % of ducks incubating). From that time, groups of males appear, gathering for moulting, and their proportion already does not reflect the true sex ratio in the ducks. Even in areas exclusively of transit migration, the ratio of males at this time is substantially increased. This is evidence that local migrations to areas of the formation of huge congregations has already started before the spring migration has finished. In the organization of a spring hunt, it is necessary to consider that the number of local birds settling into nesting, with the exception of the delta of huge rivers, never is high. The main hunt in spring occurs on migrating birds. Therefore it needs to begin early, but not during earliest arrival, and to end before the start of peak nesting, when a significant proportion of males abandons the incubating females. In such a case, minimal loss will accrue to the waterfowl population, even in the case of the killing of (an insignificant) proportion of the females.

The possibility of conducting a spring hunt is determined by the abundance of specific populations occupying vast territories. Approximately 70 % of Eastern Siberia is unused or seasonally used. The majority of waterfowl of the southern, more settled, parts of this region in autumn fly off early and really are not hunted on the nesting grounds. The hunt in spring in the south of the Baikal region, where the majority of hunters are concentrated, is conducted on the basis of the use of migrating birds of the northern, sparsely populated areas of Asia. In connection with this, even in its modern version (frequent infringement of regulations), it does not inflict serious damage on the waterfowl of Eastern Siberia.

ECOLOGY OF WATERFOWL: MAIN DIRECTIONS OF THE EVOLUTION OF POPULATION ADAPTATIONS DURING THE REPRODUCTIVE PERIOD

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Repeat breeding in birds is a fundamental population adaptation. In dymanic water-marsh ecosystems, it is often the sole mechanism keeping their numbers above the cirtical threshold. Each pair of birds reacts to the loss of a nest individually. Only pairs that have lost clutches in the first half of incubation repeat nesting. When there is frequent loss of nests, some three to five attempts at re-establishing them are made. As a result, a portion of the birds nest successfully, significantly raising the overall breeding success of the population.

Despite the fact that the birds respond to the loss of nests individually, this reciprocal response is an adaptation for the population. As is well known, the properties of a system are not the simple sum of its components. At the population level there arises a new quality, adaptive in nature and being one of the main adaptations maintaining its homeostasis. At a high loss of nests in the first half of the breeding season, all birds who lose their nest nest again. A large loss of nests in the middle of the nesting season is accompanied by the re-establishment of a large portion of them. Nests lost at the end of the season are essentially not re-established. However, by this time birds that nested in the first half of the season already have goslings hatching. As a result, in any of these situations an average level of production is observed.

The maintaining of the numbers of a population on account of compensatory breeding takes the route of preserving optimal periods of nesting. Young, first-time nesters don't have repeat clutches, but the majority of their breeding is observed in the second half of the season. Therefore the total of its duration doesn't exceed by much the optimal period – about 20.0 %. Development of the given phenomenon as a population adaptation is possible only on the basis of the inherent period of breeding (on account of the genotypic and age structures).

Stabilizing selection, operating on the basis of factors of the environment, eliminates late clutches and broods. However, in favourable seasons, flightless broods are encountered in September and October. Consequently, genetic and physiological reserves of the population may ensure significantly later breeding. Under favourable conditions, the duration of the nesting season may be increased, both on account of earlier and of later breeding.

ASKANIA-NOVA ZOO AND ITS WORK IN THE RECOVERY OF ANSERIFORMS IN SOUTHERN UKRAINE

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For more than 50 years the question of the preservation of the rarest animals at the limits of their range has troubled many scientists and people not indifferent to the ecological situation. On the territory of Ukraine the abundance of many species of Anseriformes is being reduced at a catastrophic rate. In connection with the activities of humans, the nesting population of the Greylag Goose (*Anser anser*), Mallard (*Anas platyrhynchos*), and Ruddy Shelduck (*Tadorna ferruginea*) are being undermined. Their nesting habitats are being reduced, intensive hunting is being conducted on wintering grounds, there is illegal removal of animals by black-market suppliers of private zoos; programs for the establishment and maintenance of a base of the breeding of animals for the wild are lacking. Differing from all of these, standing alone, are zoos that not only conduct ecologically illuminating activities, but also attempt to conserve wild animals and to maintain the local fauna by any available method.

Based at the zoo of the Biosphere Reserve "Askania-Nova", the establishment of artificial populations of animals has been conducted for more than 50 years. An example of successful work is the establishment of local populations of aboriginal species of Anseriformes, from which results the resettlement and stoking of the remaining pockets of wild groupings of these species in the Azov-Black Sea region.

The collection of several birds for "imprinting" to the locality (Zubko, 1989), the formation of broods with foster parents, the provision of the young with high-quality food, and the minimal imprinting on humans were the main stages of the development and inculcation of the technology. In all the time of the use of this technology, more than 1000 Greylag geese, 1700 Ruddy shelducks, and 5500 mallards were released into the wild. The viability of these birds was characterized by the retention of species-specific traits, the stability of overall numbers and number of nesting birds, and by the ability to disperse normally.

Birds raised at Askaniy-Nova combine synanthropy and "wild" stereotypes of behaviour, and that allows them to better go out into the conditions of the wild and survive. Therefore, semi-captive rearing in formed broods in large areas that limit contact with humans may serve as the only real possibility of saving many species of birds. The location of the nursery should be as close as possible to places of their dwelling in the wild, or to places of migrating and wintering.

LONG-TERM MONITORING OF NESTING DUCKS ON THE VINOGRADOVO FLOODPLAIN

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The Vinogradovo floodplain (Moscow oblast) is very interesting for the monitoring of duck populations because for 20 years a rapid degradation of agriculture has been occuring. It is worth noting that the extensive nature of the agriculture in the period of flourishing (1980s) was not a critical factor for the waterfowl: excessive pasturing impoverishment of the vegetation and early haymaking were observed only on within a restricted area. A well-functioning drainage system facilitated the channeling of the floodplain lakes, hinding their excessive overgrowth. Besides this, the drainage canals and ditches serve as corridors for the movement of broods for dabbling and diving ducks. The combination of natural and anthropogenic conditions on the floodplain in the 1980s induced the high number of nesting ducks. Local populations of the Pintail (*Anas acuta*), Shoveler (*A. clypeata*) and the Garganey (*A. querquedula*) were the largest in Moscow oblast; the populations of the Pochard (*Aythya ferina*) and the Tufted Duck (*A. fuligula*) reached their greatest numbers.

From the start of the 1990s, a drop in agricultural activities was noted on the floodplain; by the beginning of the 2000s pastures, ploughed land and the majority of ponds were ne-

glected and overgrown with weeds. Spring burning became common and widespread on a massive scale. The network of drainage ditches ceased functioning and became overgrowth and turbid, as a result of which the spring flooding of the lakes ceased.

The above factors (in combination with a lowering of the level of the floodwaters in recent years) led to a drastic drop in the numbers of nesting ducks. The total abundance of their broods at the beginning of the 1980s to the middle of the first decades of the 21st century decreased on the order of 3.5 times, and the species ratio was significantly changed. The abundance of the Pintail and the Tufted Duck was drastically reduced: their broods began to be noticed in individual groups and not every year. The abundance of the two dominant species of dabbling ducks were significantly decreased: the Garganey (by about 2.5 times) and the Shoveler (by 2.7 times). At the same time, there was a strong growth (by about 6 times) in the abundance of the Gadwall, which, apparently to a significant degree, was linked with climate changes.

From 2007, a lengthy retention of the water by overlapping the main floodgates began to be carried out in order to decrease the area of the spring burnings on the floodplain. This partially made up for the decreased levels of spring flooding and led to an increase in the number of broods of the Pochard, but did not affect the abundance of other species of ducks.

A SUMMARY OF THE CATCH OF ANSERIFORMES IN UZBEKISTAN ACCORDING TO THE COLLECTION OF HUMERUS BONES

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Of the 38 anseriform species in the fauna of Uzbekistan, 7 are known from single encounters (*Chen caerulescens, Eulabeia indica, Anser cygnoides, Branta bernica, Anas poecilorhyncha, A. formosa,* and *A. falcata*), there have been rare sightings, and none in our samples, of four species (*Cygnus bewickii, Rufibrenta ruficollis, Melanitta fusca,* and *M. nigra*), and regular encounters, but missing from our samples, of *Cygnus cygnus* and *Anser albifrons*.

Thus we analyzed the bags of 25 anseriform species from oblasts of Uzbekistan from 1996 through 2009. Analysis of the species composition of the bag was carried out on a collection of humerus bones, both from professional ornithologists and from hunters. In this way, we had access to 1128 humerus bones, including the reference samples.

Analysis of the collection of bones from anatids pointed to both the geography of the distribution of species, and to the oblasts of their largest recovery. The main oblasts of anatid hunting in Uzbekistan are Tashkent, Syr-darya, Dzhizak, and Bukhara oblasts, and the Karakalpakstan Republic, where the most important wetlands for birds in the basins of the Syr-darya and the Amu-darya are located.

Analysis of the species composition, as in previous years of the investigation, showed that the most common species taken were *Anas platyrhynchos* (33.8 %) and *A. crecca* (18.4 %). However, recently there has been a decreasing trend in the catch of the small species (*A. crecca, A. clypeata, A. penelope,* and *Aythya fuligula*), on account of an increased take of the larger species (*A. platyrhynchos, A. acuta,* and *Netta rufina*), as well as an increase in the catch of other species of waterbirds – loons, cormorants, and coots.

At the same time, the given, principally anonymous, method of obtaining actual material, continues to reflect the utilization of rare, globally-threatened species of anatids. So, during the whole period of our sampling, we gathered humerus bones from *Anser erythropus* (1), *Marmaronetta angustirostris* (1), *Aythya nyroca* (52), and *Oxyura leucocephala* (6).

Overall, the collection of humerus bones from birds taken by hunters permits us rather simply (bones from procured game are simply thrown out) and accurately to analyze and monitor the species composition and the demographic structure of the hunt, as well as to reveal the “hot spots” – places where rare, threatened species of birds are more often killed.

GOOSE POPULATIONS IN EUROPE: PAST, PRESENT AND FUTURE

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In the second half of the 20th century, the populations of the majority of Western-European goose species increased. Based on available data, it seems not unrealistic that the Western Palearctic populations of White-fronted (*Anser albifrons*), Bean (*A. fabalis*) and Greylag (*A. anser*) geese have decreased dramatically since the middle of the 19th century and have stabilized and shifted within Europe since the middle of the 20th century. This situation shows that a regionally positive population growth of a migratory bird species does not necessarily mean that the whole population of the species shows an increasing tendency. At the same time it shows that the assessment of the population growth of a species as being positive or negative strongly depends on the considered period of time. Furthermore, he data showed that the goose bag increased since the 1950s, whereas the annual reproductive rate of most goose species over the same period declined steadily. This situation feeds the fear that the numbers of most Arctic goose species could decline again in the coming years.

CONCERNING THE ROLE OF ECOTOURISM IN THE PRESERVATION OF WATERBIRDS

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Over the course of two field seasons (7 months in total), a pilot project was carried out by the authors within the framework of the program "From Gun to Camera", the aim of which was to make clear the possibilities and perspectives of a gradual reorientation of hunters specializing in the sport hunting of anseriforms to photo-ecotourism.

Ecotours were organized within the framework of the game management of Manz (Kalmykiya). With minimal advertising and administrative costs for the project, more than 50 photo-naturalists and birdwatchers from different cities of Russia, as well as from countries near and far, took part. Overall, for the given period, the financial turn-over of the project was more than two million roubles.

Scores of high-quality photographs and videos, many of which subsequently became finalists in prestigious international competitions and were used for ecological education and nature-protection promotion, were taken by participants of the ecotours. In addition, during the project, the ecotourists repeatedly helped arrest poachers, including those involved with non-game species. Specifically, these were local farmers collecting eggs of rare species of colonial birds to feed their pig; poachers engaged in the commercial taking of rare birds; and armed poachers. In addition, negative actions of so-called "wild" tourists, capable of entailing the death of individual birds or nesting colonies, were stopped.

The experience of the implementation of the project shows that under a competent putting-together of the activity, guided ecotourism is beneficial for nature conservation, aids in the creation of auxiliary workplaces and provides financial incentive for game management to switch to a gentler and more respectful form of the use of natural resources.

ON THE QUESTION OF THE USE OF ANSERIFORMS IN RUSSIA

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The use of anseriforms in Russia actually comes down to a defined period of hunting and the fixing of daily and seasonal bag limits.The long-term negative population dynamics of this

resource makes one think about the correctness of such actions. The ban on hunting would be virtually useless, because it is still impossible to agree on it at the scale of the entire area. Secondly, "not hunting, no probem" should be considered the thesis in Russia. People and birds both lose more than they win from a ban on the utilization of common species. There remains a single true path – to consider a modern understanding of hunting as a regulated activity. The understanding of hunting from the position of the regulation of numbers and a balance of the species population structure obliges a serious taking into account of the attainment of theory and practice and the importance of registers. The mere necessity of annually justifying application for the opening of hunting at different levels – from game-management areas to oblasts – enables the human resource capacity to change for the better. This facilitates contacts with other country-stakeholders and helps convince them of the necessity of making amendments to the system of hunting.

The territorial pinciples of the organization of hunting are worthy of special attention. In place of a right of universal opening of the hunt, according to the existing law on hunting, or a spring ban, as is considered by not a few ornithologists, it would be better to build it on the territorial principle. Such an approach ensures the social imperative of minimizing harm. This enables shoestring protection organizations to concentrate their efforts on the most valuable places for the waterfowl and enhances the effectiveness of the protection in contrast to the tactic of the pursuit of offenders. The transition, albeit at first hypothetical, to the species-population standard of use may strengthen the target of sustainable use.

We need a system of hunter education, directed toward an understanding of the utilization of waterfowl only at fixed volumes, and exam preparation in field conditions. What needs to be changed is the conceptual component of hunting, where the meaning has been historically associated with the verb "to want". Under a regulated hunt, the main idea is expressed in the word "may". Dialogue with different countries on the questions of the duration of the hunt, as a major factor impacting abundance, should be considered a serious measure of protection. The resolution of this question should begin with an international symposium on waterfowl conservation for the countries of Central Eurasia.

THE CRITICAL-SITE NETWORK TOOL: A NEW WEB RESOURCE FOR THE CONSERVATION OF WATERBIRDS AND WETLANDS IN THE AEWA REGION

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Effective conservation of migratory water birds requires both national and site-based activity and policy and international collaboration across the flyway, based on sound science. The African-Eurasian Migratory Waterbird Agreement (AEWA) is the world's most advanced flyway-scale policy instrument for waterbird conservation. To support its implementation and the Ramsar Convention, the Wings Over Wetlands project has been developed by Wetlands International and has been implemented in partnership with BirdLife International, AEWA and Ramsar. Through this project, a tool has been developed to provide policy makers in the AEWA region with data and information to inform and support their waterbird and site-conservation work.

A user-friendly web portal launched in June 2010 provides comprehensive information on 561 populations of 294 waterbird species at 2,972 sites in Africa, Europe, and Western and Central Asia. It does so by providing unprecedented access to data from four databases: the International Waterbird Census and Ramsar Sites databases managed by Wetlands International, The World Bird database managed by BirdLife International, and the World Database

of Protected Areas managed by UNEP-WCMC, as well as information on waterbird population estimates, flyway polygons and species distribution maps. Waterbird biologists and interested individuals have helped greatly by contributing information to these databases.

The tool can be used at all relevant scales, from site level (by site managers and local conservation groups) to national level (by governmental conservation and protected-areas agencies and national NGOs) to international/flyway level (by AEWA, Ramsar, international development and conservation agencies, NGOs and corporations), for policy and priority setting and management. The tool allows users to quickly find out about the status of particular populations of water birds, including their population trends. It will also facilitate the management of these populations at global, national and flyway scales. The tool offers an opportunity for expansion to other flyways, to create a global tool.

PROMOTING A STRATEGIC APPROACH FOR THE CONSERVATION OF MIGRATORY WATERBIRDS GLOBALLY

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The conservation of migratory birds and their habitats is a major focus of the UNEP/Convention on the Conservation of Migratory Species of Wild Animals (CMS). To direct the work of the Convention in promoting the conservation of migratory birds into the future, Resolution 9.2 of the 9th Meeting of the Conference of the Parties (COP9, Rome, December 2008), called "*for the establishment of an open-ended working group on global bird flyways within the framework of the Scientific Council to act as a think tank on flyways and frameworks, and tasked with reviewing scientific and technical issues for conservation of migratory birds and their habitats and relevant international instruments, initiatives and processes, as the basis for future CMS policy on flyways and contributing to the work on the future shape of CMS*". As a result, an international Flyways Working Group was established in late 2009, and this has brought together representation from governments, multilateral environmental agreements, flyway initiatives, key NGO partners and experts to ensure broad coverage, both in terms of expertise on bird flyway issues and of geographical representation.

During 2010–2011, the FWG has undertaken to conduct three major reviews, namely:1) a review of existing administrative/management instruments for migratory bird flyways globally; 2) a review of scientific/technical knowledge of migratory bird flyways and of conservation priorities, including the identification of major gaps; and 3) a review of policy options for flyway conservation and management to feed into an inter-sessional process called the Future Shape of CMS. The reviews have included the flyways of waterbirds, non-waterbirds and seabirds. The outcomes of these reviews will be presented to the forthcoming 10th COP in November 2011 in Norway.

The presentation will provide an overview of the process and the key findings of these reviews, and propose priorities for the future, with particular focus on waterbird groups.

ANSERIFORMS OF THE WESTERN FOOTHILLS OF THE SOUTHERN URALS

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Investigations were carried out on the territory of Ashinskiy District of Chelyabinsk Oblast from October 2008 to November 2010 on the Sim and Minyar rivers flowing through the forest-montane zone of the Southern Urals at their western boundaries. In the forementioned period, 12 species were recorded.

The most numerous species was the Mallard (*Anas platyrhynchos*). This species was encountered on the Sim River throughout the year. Wintering numbers reached more than 70 individuals. A female with a brood of 7 ducklings was recorded on 3 July 2009 in Asha. Fe-

males with broods were recorded on the Minyar River on 30 June 2010. No mallards were seen in winter.

Each year during spring migration, the Garganey (*A. querquedula*), Eurasian Teal (*A. crecca*), Common Goldeneye (*Bucephala clangula*), and Common Merganser (*Mergus merganser*) were noted. The first species was encountered in small groups, more rarely in flocks of a couple of dozen individuals. The second was seen alone or in groups of up to 8. Furthermore, on the Sim River, a solitary teal was encountered on 25 September 2009. Flocks of common goldeneyes in 2009 reached 32 individuals, but in 2010 only a single group of three individuals was recorded, and on 14 August 2010, a migrating flock of 14 birds was seen on the Sim River. Groups of three to six common mergansers were recorded on the Sim River. In addition, a creche of 30 ducklings with a single female was encountered on 13 July 2010 on the Minyar River.

From time to time during spring migration, the Mute Swan (*Cygnus olor*), Wigeon (*A. penelope*), Northern Shoveler (*A. clypeata*), and Smew (*Mergellus albellus*) were seen. A group of three Mute swans was also recorded flying over the town of Asha downstream of the Sim River on 9 July 2010.

During autumn migration, single encounters were recorded for the Common Pochard (*Aythya ferina*) (a lone male on 29 August 2010 on the Asha River), Tufted Duck (*A. fuligula*) (a young male and two females on 13–14 September 2010 on the Asha River) and Greater Scaup (*A. marila*) (a lone male on 9 December 2008 on the Asha River). Thus, rare migrants include species not normally encountered in montane regions.

LONG-TERM CHANGES IN NUMBERS OF GEESE IN THE CZECH REPUBLIC IN RELATION TO THOSE CHANGES IN CENTRAL EUROPE

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Long-term changes in the numbers of wintering goose species (*Anser anser*, *A. fabalis*, *A. albifrons*) were analyzed using data from the mid-winter International Waterbird Census 1991–2010. The numbers of wintering Greylag geese and Greater White-fronted geese increased significantly in the Czech Republic as well as in Slovakia. In Slovakia, there was a significant decline in the Bean Goose; there was no trend (mainly fluctuations) in the Czech Republic. Inter-seasonal fluctuations in weather conditions did affect the abundance of goose species. In the severe winter of 2005–06, an increase in the number of wintering geese (*A. fabalis*, *A. albifrons*) was recorded on the wintering grounds in Slovakia (especially on the *Hrušovská zdrž* water reservoir). On the other hand, higher numbers of wintering geese were counted in South Moravia (especially on the *Nové Mlýny* water reservoir) in mild winters (*i.e.*, January 2003, 2005, 2007). Surprisingly, higher numbers of geese also were recorded in the Czech Republic in the cold, snowy winters of 2008–09 and 2009–10. The intra-seasonal dynamics of goose numbers and their relationship to the current climatic condition will be analysed using data from annual goose monitoring (monthly counts from November to March). Comparative data will be used from neighbouring countries (*i.e.*, Slovakia, Austria, and Hungary). Moreover, the current estimate of the Central European Greylag Goose population will be presented using available data sets from both winter monitoring and a breeding-pairs survey.

CHANGES IN STAGING HABITS AND MIGRATION PATTERNS OF FENNOSCANDIAN BEAN GEESE (*ANSER FABALIS FABALIS*) IN RECENT DECADES

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Sweden is an important area for the Taiga Bean Goose, both as a staging area on migration and as a wintering area. The majority of the total population is found in the country during autumn staging. The population using southern Sweden has been monitored by regular autumn and winter counts over the last 35 years, during which period marked changes

in the use of staging areas has been found; the Bean Geese now remain further north in southern Sweden. During the same period, mainly Finnish Bean Geese were neck-banded during two periods: in 1970s – 1980s and during some years in the 2000s. The observations of neck-banded geese from these two time periods are compared and analysed against a background of an analysis of field counts to elucidate changes in staging and wintering habitat of Bean Geese in southern Sweden against the background of climate change.

MIGRATION ROUTES AND STOVER SITES OF ANSERIFORMS IN NORTH-WESTERN RUSSIA AND TASKS FOR THEIR PROTECTION

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Within the framework of the Russian-Finnish project "GAP-analysis" in north-western Russia, analysis of the distribution of migrants in the pre- and post-breeding periods (summer) and post-moulting period (autumn) was carried out on the basis of original, literature, and unpublished archive data. For this work, specialists of 12 scientific research and nature-conservancy organizations of the north-western region took part. On the basis of the collected data, in the program ArcGIS, vector maps were created of the migration routes and stopover sites of different ecological groups of anseriforms. Analysis of the collected information shows a large variation in the directions and paths of movements between areas of nesting, moulting, and wintering of the different species and of geographic groups. Besides the so-called White Sea-Baltic Sea migration corridor, the most well-studied and having a general SW-NE orientation, other migration systems also exist in the region. Unfortunately, however, these have been little studied and are thus poorly known. Furthermore, numerous groups of individuals of a host of species inhabit the north-western region and move and overwinter within it. The abundance of these groups has noticeably increased in recent decades.

Many areas of concentrations of anseriforms on places of nesting, moulting, and wintering have the SPNT status to varying degrees. However, protective regimes are ignored in most of them, except for nature reserves. At the same time, a significant number of important concentration sites of the migrants are threatened, especially in areas with a large human population and large-scale development. The following need to be included in the number of territories demanding immediate creation as SPNTs, and the setting-up of an active regime of protection: the islands of the Gulf of Finland (Ingermanland Nature Reserve) and their adjacent waters, the coastal shallow waters of Neva Bay (federal nature monument "Neva Bay Floodplain"), Shlisselburg Bay of Lake Ladoga (regional nature refuge "Petrokrepost Bay), northern part of Lake Ladoga (national park "Ladoga Skerries"), the marshes on the south shore of Lake Onega (regional nature refuge "South Onega"), agricultural land on the lower Volkhov River (protected zone of regional nature monument "Old Ladoga"), agricultural land near Shuya village close to Petrozavodsk (ornithological regional nature refuge "Shuya Fields"), and Ukhta Bay on the Onega Peninsula of the White Sea (regional nature refuge "Ukhta Bay"). So, too, an up-to-date widening of the territory of regional nature refuges "Lake Lacha" and "Filatovskiy" in Arkhangelsk Oblast should be included.

PECULIARITIES OF THE MIGRATION OF GEESE IN SARATOV OBLAST AT THE END OF THE 20TH – BEGINNING OF THE 21ST CENTURIES

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According to our observations, in the 1980s and 1990s, the spring migration of geese through the territory of Saratov Oblast occurred mainly on the territories east of the Volga River, where two main migration routes separated: one – along the valley of the Volga River, the second – by the Caspian lowland. On the territories east of the Volga River, the migration

was more intensive in Alexandrovo-Gaiskiy, Dukhovnitskiy, Krasnopartizanskiy, Novouzenskiy, Ozinskiy, Perelyubskiy, Piterskiy, Pugachyovskiy, Rovenskiy, and Fedorovskiy districts. In the right-bank districts, individual flocks of geese migrated.

In the spring of 1997, we began to observe extensive migrations of geese on the right-bank districts of oblasts, too. White-fronted geese (*Anser albifrons*) comprised up to 60 % of the migrating geese here; up to 15 % were Bean geese (*A. fabalis*), up to 20 % Greylag geese (*A. anser*), and approximately 5 % were Brent geese (*Branta bernicla*). The migration began immediately after the snow was off the fields. Intensive migration (thousands of birds) lasted approximately one week. Flocks settled on fields with post-harvest remains of corn, on fields of winter crops, and, to a lesser degree, on fields with post-harvest remains of sunflowers. The direction of migration was from south-east to north-west. The main migration of geese on the right-bank territories occurred in Balashovskiy, Romanovskiy, Samoilovskiy, Arkadakskiy, Atkarskiy, Kalininskiy, Yekaterinovskiy, and Rtishchevskiy districts.

The data on the autumn migration of the geese are fragmentary. On 8.11.2009, in the suburbs of Saratov, flocks of geese flew at night, in the wind, from north to south. On 10.11.2009 at 16:30, we observed in the same place an extensive migration of geese. It is difficult to assess the size of the flock, since it was a thick band of birds stretched across the entire horizon from north to south. The geese were flying at different altitudes; they were easily seen, because they were illuminated by the setting sun. There were thousands of them!

The dynamics of the take of geese in Saratov Oblast, according to the data of the department of monitoring of the administration of hunting, are presented in the table.

Table

Proportions of different species of geese in the bags of hunters of Saratov Oblast

Year	Total number of geese taken, individuals	Proportion in the bag, %		
		White-fronted Goose	Greylag Goose	Bean Goose
2001	1 867	60,8	28,5	10,7
2002	1 087	39,7	44,7	15,6
2003	1 618	58,3	41,7	
2008	3 637	30,5	54,6	14,9
2009	9 007	47,3	32,2	20,5
2010	5 428	53,1	22,6	24,3

ASSESSMENT OF CURRENT THREATS TO THE RED-BREASTED GOOSE (*BRANTA RUFICOLLIS*) WINTERING GROUNDS IN NORTH-EASTERN BULGARIA

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The Red-breasted Goose shifted its wintering grounds in the second half of twentieth century to the western Black Sea coast, principally in the Dobrudga region of Romania and Bulgaria, with up to 80–90 % of the population concentrated in the two countries. Increasingly in the past decade it has been short-stopping to winter in Ukraine, and even in southern Russia, during mild winters. A considerable portion of the population is still to be found on the wintering grounds in Bulgaria. The species is usually mixed with flocks of the Greater White-fronted Goose (*Anser albifrons*). This causes problems from hunting, leading to mortality of individuals and disturbance on the roosting and foraging grounds. In the past, use of rodenticides has led to mass mortality of geese, including Red-breasted geese.

In recent decades new threats have emerged in north-eastern Bulgaria for the wintering population of the Red-breasted Goose. Economic changes led initially to change in farming practices, and subsequently to lack of suitable crops in the vicinity of lakes Shabla and Durankulak, at the expense of technical and cash crops – coriander, sunflower, oil rape, etc. The farming is also influenced a lot by drastic weather conditions – floods or severe droughts preventing harvesting of winter cereals in some years. The major threat in recent decades is large-scale development – resort facilities and wind-farm infrastructure. Currently, large areas are covered by wind-turbine installations, with some 798 installed or approved windfarms and further 426 windfarms planned and in procedure of approval. This will presumably lead to the loss through displacement of 44 % of the potential foraging areas of the species.

WINTERING GOOSE MONITORING SCHEME IN BULGARIA

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In Bulgaria IWC counts were initiated in 1967, but more systematic census work began in 1977. In the mid-1990s the BSPB started its goose-monitoring programme in the area of lakes Shabla and Durankulak, focusing on the Red-breasted Goose (*Branta ruficollis*). Since 1995, when this monitoring work started, the BSPB expanded the period of coverage of one of the key goose wintering areas with morning counts at the roosting sites at two-week intervals for the period November – March. Since 2002, the monitoring activities have extended to include monthly counts in the same period at one of the key sites for wintering geese along the Bulgarian section of the Danube and Burgas lake complex. The Danube area proved to be the first region in Bulgaria where there were significant numbers of *Anser albifrons* and few *Branta ruficollis* and *A. anser* in late October – early November. When temperatures drop, geese start to congregate and arrive in the Coastal Dobrudga area in the vicinity of lakes Shabla and Durankulak. This remains the most significant region in Bulgaria used for roosting and feeding by wintering geese. When temperatures drop severely and there are snow storms, geese are often driven to Lake Burgas and very likely they come over from the coastal Dobrudga lakes. The Danube area shelters geese during daylight hours, when *A. albifrons* and other species roosting in the big wetlands across the Danube River in Romania cross the river in the morning and spend the day foraging in Bulgaria in the Svishtov-Belene lowland SPA. The monitoring data from goose counts in Bulgaria, especially in the area of lakes Shabla and Durankulak, reveal that delay of the arrival day of wintering geese is mostly associated with the milder winters in recent decades.

LONG-TERM CHANGES IN THE MIGRATION AND MOVEMENTS OF THE GREYLAG GOOSE (*ANSER ANSER*) IN THE CZECH REPUBLIC

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Greylag geese have been ringed in the Czech Republic regularly since 1950. To date, there have been 4559 recoveries from 1277 individuals (1934 – July 2010). Significant changes in migratory behaviour were found for the last 20 years. Greylag geese ringed in the Czech Republic no longer winter in Spain, Tunisia and Algeria. There has been a confirmed northward shift in wintering range. Moreover, the Atlantic Flyway has lost its importance for Greylag geese ringed in the Czech Republic. Spring arrival was recorded earlier than in previous decades and it was affected by climatic conditions. Nevertheless, earlier autumn departure of birds ringed in the Czech Republic was confirmed as well. The structure (*i.e.*, opening and closing) of the hunting season has not affected migratory distance, nor the timing of arrival and departure of the Greylag Goose in the Czech Republic. Although adult birds arrived earlier than yearlings, there were no differences in the survival rates of the two groups.

POSSIBLE CONSEQUENCES OF CLIMATE CHANGE FOR THE WATERFOWL OF NORTH-WESTERN SIBERIA

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The contraction in distribution and numbers of the waterfowl of the northern edge of the forest zone of Western Siberia was published earlier by us (Stopalov, Pokrovskaya, 1980, 1983; Pokrovskay, 2005).

At the present time, the most significant changes in climate in terms of possible consequences for waterfowl include, amongst others, the following.

- Increased desertification of a host of regions of southern Siberia and Central Asia, which could result in a deficit of aquatic habitats and in a changed hydrological regime for large Siberian rivers.
- Increase in sea level of the World Ocean, which could endanger the frequency of flooding and shrink the area of maritime tundra (Shilovtseva *et al.*, 2005).

The possibility of rapid and substantial movement of the treeline toward the north and of the disintegration of the southern boundary of permafrost is disputed, but likely. Currently, activation of thermokarst processes on hummocky marshes of the northern taiga are occuring and, as a consequence, are raising the habitat diversity and increasing the area of marshy terrain.

For waterfowl of northern Western Siberia, changes in the hydrological regime of large rivers, above all the Ob, may become the most significant probable harm. The auspiciousness for migration, nesting and moulting of waterfowl of the broadening of the island floodplain of the Ob in the northern taiga – of the Dvuobye, is determined by the level and duration of flooding. Low and brief flooding is unfavourable for waterfowl and results in them skipping to the north to the mouth of the Ob River. A systematic repeating of such situations in cases of desertification and a deficit of aquatic habitat may become crucial for some populations, especially if it coincides with the possible frequent flooding of the maritime tundra, including the mouth of the Ob. Above all, this applies to the populations of the Pintail (*Anas acuta*), Teal (*A. crecca*), Wigeon (*A. penelope*), Goldeney (*Bucephala clangula*) and Tufted Duck (*Aythya ferina*), which comprise the main waterfowl population of Dvuobye. Also high is the vulnerability of the Whooper Swan (*Cygnus cygnus*) population.

At the same time, the increase in area of hummocky bogs could be auspicious for the populations of the Long-tailed Duck (*Clangula hyemalis*), Common Scoter (*Melanitta nigra*), and Scaup (*Aythya marila*). In the case of an acute contraction of the tundra zone, these tundra species have the potential opportunity of colonizing the area of hummocky bogs. The Teal and Pintail have just such an opportunity as well. At the same time, the Wigeon, Goldeneye and Tufted Duck are clearly avoiding the increasing area of hummocky bogs, and therefore are much more vulnerable in the long term.

VARIATIONS OF THE ISOTOPIC COMPOSITION OF CARBON AND OXYGEN IN THE EGGSHELLS OF ARCTIC GEESE

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The isotopic composition of carbon and oxygen was studied in the eggshells of Barnacle geese (*Branta leucopsis*) and White-fronted geese (*Anser albifrons*) nesting in the Russian Arctic. Samples of eggshells of the Barnacle geese were collected on the colony near Tobseda (Nenets Autonomous Okrug) in 2008 and 2009 (193 samples from 48 nests). The eggshells of the White-fronted geese were collected by us and our colleagues in four different areas of nesting: in the region of Tobseda (41 samples), on Kolguyev Island (67 samples), on the Taimyr Peninsula (54 samples) and in the area of the village of Meinypilgyno in Chukotka (8 samples). Analysis of the eggshells was conducted taking into account the order of the laying of the eggs.

We found great variations in the isotopic composition, both for carbon and for oxygen, of the eggshells of the investigated species. So, the overall range of values for $\delta^{13}C$ in the eggshells of White-fronted geese nesting in the various regions of the Arctic was found to be –8.8–17.6 ‰, of the Barnacle geese –19.6–14.6 ‰. The range of values for $\delta^{18}O$ reached 18.2 ‰ (from 6.1 to 24.3 ‰) in White-fronted geese, and 5.2 ‰ (17.7–22.8 ‰) in Barnacle geese. Mean values for $\delta^{13}C$ and $\delta^{18}O$ in the eggshells of Barnacle geese were –17 ± 0.9 ‰ and 20.2 ± 1.4 ‰, respectively. In White-fronted geese the mean values for $\delta^{13}C$ varied from –14.8 ± 0.9 ‰ (Taimyr Peninsula) to –13.2 ± 2‰ (Kolguyev Island); mean values for $\delta^{18}O$ varied within significantly larger limits, from 8.1 ± 1.2 ‰ (Taimyr Peninsula) to 21.5 ± 1.2 ‰ (Kolguyev Island).

In the eggshells of the Barnacle geese, apart from the overall differences, we found for 2008 and 2009 a trend of change in the isotopic composition of carbon and oxygen within

clutches: a depletion in the eggshells of the heavy isotopes of carbon and an enrichment of the heavy isotopes of oxygen from the first egg to the last.

We assume that the trend within clutches, both the overall differences in isotopic composition, linked primarily to complex physiological mechanisms, and external factors (food, air, water), does not explain such a variance in $\delta^{13}C$ and $\delta^{18}O$.

GAME BREEDING AS A METHOD OF DECREASING HUNTING PRESSURE ON THE WILD POPULATION OF MALLARDS (*ANAS PLATYRHYNCHOS*)

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The breeding of wild animals on game farms and in nurseries (zooculture) is one of the most important avenues in the preservation of the gene pool of the planet and for the rational use of game resources under conditions of intensive anthropogenic impact on the ecosystem.

The start of the work on the breeding of the Mallard occurred in the 1950s. So, from 1951 to 1977 in Moscow Oblast 122 releases of mallards were carried out for a total of 31,000 individuals. From 2005 to 2010, on land of the Moscow Society of Hunters and Fishermen, 30,044 mallards were released to the wild.

There is a theory that the releases of "lure ducks" results in the formation of so-called urban populations of mallards. In the opinion of the author, based on data obtained in the conducting of comparative craniological assessment of different forms of the mallard (lure, domestic (Peking), urban and wild forms), the urban form occupied an intermediate position between the wild and domestic forms; we can speak rather of the domesticated wild form being impacted by factors not characteristic for mallards living in the wild.

Unfortunately, investigations dedicated to the revelation of the results of introductions of mallards (survival, migration) are very few. The Moscow Society of Hunters and Fishermen carries out banding of the portion of ducklings released on its land. According to our data, all ringed individuals were shot either at the release sites or near them, 'though there are exceptions. For example, four of the local ducklings released and ringed at the end of June 2010 in Serpukhov game-management area (GMA) were shot in October-November in Domodedovo GMA (approximately 67 km due north of the release site). Oral communications obtained from GMAs on the return to their land the following spring of a number of early-released ducks were exclusively from GMAs located along the Oka River. It is likely that here we are observing not migration but the movement of birds in winter to ice-free areas of the Oka. We are strongly convinced that the introduction of artificially raised mallards to the hunting grounds cannot in any way harm the population of wild mallards, for a whole host of reasons: (1) the small number of releases; (2) the low survival of the released birds; and (3) the absence of a seasonal "propensity to relocate".

BIOFUELS *VERSUS* GEESE

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The number of vehicles in the world is about 800 million. Annually, their fuel consumption is about one billion cubic meters of petrol or diesel. That fuel consumption is still rising rapidly, even where the automobile makers may perhaps increase fuel efficiency, simply because the number of vehicles is increasing. In the U.S.A., the number of vehicles is already a staggering 842 per 1000 citizens (so includes babies and children!). In the EU it is about 500 per 1000 citizens. The number of newly bought vehicles is higher in the EU than in the U.S.A. and Canada combined (in 2007, respectively, 22.9 million and 19.4 million) so there the density of vehicles will approach that of the U.S.A. Russia, Ukraine and Belarus each still lag behind (with 213, 98 and 87 cars per 1000 citizens, respectively).

The oil industry is only too willing to provide the fuel to drive this insatiable demand. It carefully reacts to the demand of the public and politicians to mix so-called biofuels with fossil fuels. The EU promulgated its directives that 5.75 percent of the fuel for vehicles, for instance, has to come from biological resources. An oil company like Shell, under the direction of its new leader, Mr. Voser, has decided to concentrate only on energy "that can be pumped", thus lending a hand to radically changing the landscapes in which Eurasian geese overwinter or migrate, since these biofuels are produced from cellulose stock (like trees or elephant grass) or from sugar and starch stock (like canola or maize).

Landscape transitions that are very likely to threaten the very existence of the wild geese of the Western Palaearctic Flyway are thus endorsed by the big oil companies: perhaps unknowingly but yet relentlessly. It is thus good that this Symposium is financially supported by one of these companies: Royal Dutch Shell.

ON THE ABUNDANCE OF MERGANSERS ON SOME RIVERS OF THE LOWER AMUR REGION

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Two mergansers similar in coloration and biology, the Scaly-sided (*Mergus squamatus*) and the Common (*M. merganser*), inhabit the montane-taiga rivers Bikin, Khor and Anyuy. Their distribution and abundance even in accessible districts of the region have been insufficiently studied. In 2009 and 2010, we examined the rivers: the Bikin from the Khabarovsk – Nakhodka highway (under construction) to the village of Verkhniy Pereval (100 km) and from the mouth of the Terrasnaya River to the forementioned highway (150 km); the Khor from Srednekhorskoye to Tretiy Splavnoy Uchastok (80 km) and the Anyuy from Bogbasu Stream to the mouth of the Manoma River (within the borders of "Anyuyskiy" National Park, 110 km).

On the Bikin River 204 adult birds of both species (186 males and 18 females) and 84 ducklings were counted. Mean brood size was 6.6, and the maximum size, comprised of united broods, was 35.

On the Khor River in the first week of June 2010, likely as a consequence of the prolonged spring, no ducklings were encountered. For both species, 144 mergansers were counted: 126 males and 18 females. Among them 55 Scaly-sided, including 51 males and 4 females, were identified with certainty.

In "Anyuyskiy" National Park 91 adults of the two species (57 males, 34 females) and 290 downy young were counted in the middle of June. We successfully determined that 21 males, 11 females, and, presumably, 140 ducklings were Scaly-sided mergansers. Mean brood size was 6.1. Maximum size of a duckling-group led by a female Scaly-sided Merganser was 70.

The overal density of adult female mergansers on the examined areas of the three rivers was as follows: on the Bikin River – 0.7 ind./10 km of river, on the Khor River – 2.3 ind./10 km, and on the Anyuy River – 3.1 ind./10 km.

A substantial difference in the startle distance of the mergansers on the rivers was noted based on the different degrees of anthropogenic impact. On the protected sector of the Anyuy River, it was two times less than on the rivers with uncontrolled activity of small craft.

NEST PARASITISM IN DUCKS – STRATEGY OR CHANCE?

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Nest parasitism (NP) in ducks is a completely usual phenomenon. It occurs both inter- and intraspecifically, the revelation and assessment of the level of which are rather complicated.

Nest parasitism has been studied in the Red-breasted Merganser (*Mergus serrator*), the Tufted Duck (*Aythya fuligula*), and the White-winged Scoter (*Melanitta deglandi*) nesting on the Maloye More [Small Sea] of Middle Lake Baikal, where for 30 years more than 200 nests

of these species have been monitored. Interspecific NP was revealed in a third of the nests of the White-winged Scoter, 7 % of the nests of the Red-breasted Merganser, and in solitary nests of the Tufted Duck. Intraspecific NP was most abundant in the Red-breasted Merganser and least abundanct in the White-winged Scoter.

The main reasons for facultative nest parasitism are considered to be the loss of one's own nest or the impossibility to establish one owing to territorial constraints. There is also the hypothesis that such behaviour is occasioned by a biological demand to increase one's own reproductive contribution to the population (Numerov, 2003; Cichon, 1996).

In the first case, the level of NP should be correlated with the level of lost nests. According to our data, this dependence was not observed.

Territorial constraints were also missing; the nesting area of the islands essentially did not change from year to year, and 10-fold changes in the abundance of encountered nests is evidence that in the majority of cases, it considerably exceeded the actual abundance of nesting birds, and was not correlated with the level of nest parasitism.

With regard to the possibility of increasing the reproductive potential: in our data, nest parasitism did not increase either the success of individual parasites, nor of the species as a whole.

The sole link that we were able to detect was that between the degree of camouflaging of the nest and the level of intraspecific NP. Thus, intraspecific NP (and possibly interspecific NP, as well) is determined by behavioural traits of the duck at the time of egg-laying. Poor concealment of a nest, and lack of a nesting territory and protection of the nest result in any female discovering a clutch could easily lay her own egg in it. Our data testify that the more poorly camouflaged the nest, the more likely the nest parasitism. However, such nests often are discovered not only by conspecifics, but also by predators, which results in their more frequent destruction.

THE WHITE-WINGED SCOTER (*MELANITTA DEGLANDI*) ON LAKE BAIKAL

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On the Small Sea [Maloye Morye] Strait of Middle Lake Baikal, the White-winged Scoter is a scarce but regularly nesting duck, although its distribution here is extremely patchy. On the nesting ground, the species is concentrated in the southern part of the strait. During long-term investigations on the nesting biology of the White-winged Scoter and lengthy monitoring of the status of the population on the Small Sea 165 nests were found.

Complete clutches consisted of 4–13 eggs. Average clutch size decreased from 7.8 ± 0.61 eggs at the beginning of egg-laying to 7.4 ± 0.55 at the end. Repeat clutches, completed at the end of July, comprised 4–6 eggs. The eggs are large (68.8 ± 0.12 × 47.3 ± 0.11 mm), cream-coloured, and truly elliptical in shape.

The female lays one egg per day. Adherence to the nest as a rule increases throughout incubation. Immediately after completion of the clutch and in the early stages of incubation, some females often leave the clutch for a significant period of time, which results in prolonging the period of incubation and a significant variability of the incubation period, which on average is 34 days. The loss of eggs is on average 75.6 % (51.4–88 %). It is surprising that the proportion of addled eggs in late clutches is certainly lower than those of "peak" clutches. On the whole, the incubation success in late clutches in lower than in "peak" ones, although the difference is not as significant as in other species of ducks nesting here. The ratio of females to males in broods of downy ducklings is 1:1.2 (n = 121).

The abundance of scoters nesting on the Small Sea changes cyclically, with a period of three to six years, and is determined by the nesting of the females of unknown origin, not connected to the breeding site. The majority of these entrained females does not nest on the monitored area in subsequent years, and of the resident females, half, even if only once, change their nesting site within the confines of the monitored area. We have not noticed cases of natal philopatry.

EVALUATION OF THE DIVERSITY OF FEEDING BEHAVIOUR IN THE MALLARD (*ANAS PLATYRHYNCHOS)* USING NUMERICAL CODING

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The evaluation of the diversity of feeding behaviour in mallards was conducted mainly through analysis of the literature (Kholodkovskiy, Silantyev 1901; Heinroth 1910; Lebret 1948; Mylne 1954; Weidmann 1956; Ern 1970; Vinicombe 1979; Korbut 1994; Tarkhanova, Kurilovich 1994; Rezanov 2003, 2007a,b) and observations by the author from 1980 through 2009. With the help of the method of numerical coding (Rezanov 2000) 30 feeding methods (FM) were distinguished; they were used by mallards who looked for and took food. The spatial (media/substrate) localization of the feeding bird was examined: 1) while searching for food; 2) while coming closer to the food; 3) when in contact with the food, as well as 4) the spatial fixing of the food item at the moment of its being consumed as forage. FM were divided into several groups: terrestrial (LLLL) – 9; terrestrial-aquatic (LLLH) – 2; terrestrial-aerial (LLLA) – 1; aquatic (HHHH) – 12; aquatic-terrestrial (HHHL) – 6. Legend: L – terrestrial; H – aquatic; A – aerial. In the group of terrestrial FM, the search for food during walking in shallow water was included, *i.e.*, while using terrestrial locomotion. The most common FM were 1) the taking of food from a position "on the swim", including filtering (the duration of the action of rapidly shaking the bill from side to side in the water for 30 seconds), alternate immersing of the bill, head, neck and in the water and turning upside down (sometimes the propotion of time taken to turn upside down comprises 80–90 % of the feeding action); 2) feeding on foot in shallow water, including the filtering of the bottom mud; 3) the use of a local food upwelling arising from the entry into shallow waters of wind-driven waves and of swells. Not infrequently, the birds use the waves of anthropogenic origin, *e.g.*, waves from ships. Rare FM were: 1) catching flying insects upon encountering them on a hard substrate and 2) diving to a depth of 1–2 m from the swimming position, most often during autumn and winter. In exceptional cases, such behaviour may seem very ordinary. For example, in 15 January 1996 in Neskuchniy Sad (garden parkland in Moscow) in the pond at a depth of 1 m, 30 mallards were feeding, of which 20 were drakes. The drakes were diving, and collected food from the bottom. Of 50 dives, we timed 28. The duration was 7.64 ± 1.43 sec (*SD* = 2.30; range 4–11; *P* = 0.001). Nightime feeding of mallards was recorded under artificial lighting.

A HISTORY OF THE WINTERING OF ANSERIFORMES ON THE MOSKVA RIVER IN KOLOMENSKOYE (MOSCOW, RUSSIA)

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The Moscow region is situated in an area of "cold winter" (Zaletaev 1960; Mikheev 1964). Intensive drainage of warm water with biogenic elements into the water bodies has formed new places for the wintering of waterfowl. In winter at these latitudes some species are now noted that were not observed earlier.

For 25 years (1984–2010) we counted wintering waterfowl on the Moskva River in Kolomenskoye (Rezanov 1992, 2002; Rezanov, Rezanov 2004, 2007, 2009). For the observation period the sector of river in the area of warm-water drainage did not freeze, even during periods of –30° C temperatures. During warm winters in Kolomenskoye, a few kilometers of the river does not freeze. We noted 11 species of Anseriformes during the winters: *Anas platyrhynchos* (the most abundant species during the winters), *Aythya ferina* (from 1985 to 2003, non-regularly 1–2 birds), *A. fuligula* (since November 1992; in 2007 more than 20), *Bucephala clangula* (since December 2001; in 2010 up to 70 birds), *A. marila* (in January 2004, 12 birds), *Cygnus olor* (2007, one bird), *C. cygnus* (2007, one bird), *Mergus albellus* (since January 2004; a few birds), *Mergus merganser* (February 2010 10–11 birds), *M. serrator* (February 2010, two birds), *Tadorna ferruginea* (early March 2007, four birds). *Anas crecca* and *A. penelope* (information from Varlamov, Kudravtsev, Rudovsky) have been recorded in recent years. Since the end of 1960 – beginning

of 1970, the Mallard has been a regular winterer in Moscow; its maximum abundance was recorded on 3 December 1990: more than 1500 ducks on 1.5–2 km of river, and on 30 December 2001, 1300–1400. After that, there was a falling-off to 400–500 ducks. Later (2006–2010), the number of wintering mallards reached 800–1000. Before, the greatest number of ducks was concentrated on open water near the area of warm-water drainage. Now, the majority of ducks is distributed in places of anthropogenic feeding, and is usually resting here on the shoreline. In the future, the available open water and mild winters will attract waterfowl to winter here.

DESERT WANDERINGS: WHAT DESERT DUCKS TELL US ABOUT MOVEMENT, MIGRATION AND THE EFFECTS OF CLIMATE CHANGE

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There is little empirical information on the movement strategies used by animals to find resources. In particular, it is unclear whether behavioural variation exists at all scales, or whether behavioural decisions are primarily made at small spatial scales and thus broad-scale patterns of movement simply reflect underlying resource distributions. Here I present results of tracking studies of ducks in agricultural and desert landscapes in Australia. Waterfowl are not usually associated with deserts, yet deserts can be highly productive breeding grounds for ducks and others. The pulses of productivity that come with the irregular rains and flooding provide such an abundance of food resources that ducks may produce consecutive clutches and continue to breed for as long as water remains. However, the floods eventually recede, the lakes dry, and the birds move away. How birds find these temporary wetlands and their abundant resources provides insight into the means by which waterfowl move about the landscape and the factors that constrain them. The movement paths of birds studied in the two landscapes differed, with teal in the desert landscape moving less tortuously overall than their counterparts in the agricultural landscape. However, the most striking result was the high level of individual variability in movement strategies, with different animals exhibiting different responses to the same resources. These results call into question the idea that broad-scale movement patterns simply reflect underlying resource distributions, and suggest that movement responses in some animals may be behaviourally complex regardless of the spatial scale over which movement occurs. This both complicates and simplifies our understanding of movement and migration in waterfowl. Here I'll pose key questions and discuss alternative models for understanding the dynamics of waterfowl populations in stochastic environments. Why no geese are present may provide insight into which species or groups are likely to be adversely affected by increasing aridity due to climate change.

ABUNDANCE OF THE LESSER WHITE-FRONTED GOOSE (*ANSER ERYTHROPUS*) AND THE RED-BREASTED GOOSE (*BRANTA RUFICOLLIS*) IN KEY REGIONS OF MIGRATORY STOPOVERS AND WAYS OF MINIMIZING HUNTING PRESSURE ON THESE SPECIES

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According to the evaluation of the Red-breasted Goose International Working Group, in the winter of 2009 the world population of the Red-breasted Goose was 44,000 birds; in the winter of 2010, only 20,000. In the spring of 2010, we accounted for 44,000 birds on the territory of the Kuma-Manych Depression. Since 2002, a permanent monitoring of the state of the population of the Red-breasted Goose and the Lesser White-fronted Goose in Northern Kazakhstan and in the Kuma-Manych Depression has been conducted, however, there is essentially no information on the state of the staging sites of these species in Western Siberia. In the autumn of 2010, an investigation was conducted of the territory of the Dvuobye, where migratory stopovers of Lesser White-fronted geese nesting at the extent of the entire western part

of their range are located, according to data of satellite tracking. It was revealed that there is as well extensive migration of the Red-breasted Goose through this region. Results of counts of the numbers of wintering Red-breasted geese in 2010 were 19,500 birds; in spring in the Kuma-Manych Depression – 43,500; in autumn in the Dvuobye – 6,500, in Northern Kazakhstan – 57,000, and on the territory of the Kuma-Manych Depression – approximately 21,000. According to count data, the world population of this species could be assessed at 57,000 after a successful breeding season (43.4 % immatures). However, owing to the loss of Red-breasted geese in the winter of 2010–2011 in Kalmykia, its up-to-date abundance can only be realistically assessed by conducting full winter counts. The results of the counts of the abundance of the Lesser White-fronted Goose in 2010: wintering in Azerbaijan – 2,907; in spring on the territory of the Kuma-Manych Depression – approximately 400; in autumn in the Dvuobye – 4,000, in Northern Kazakhstan – 19,200, and in the Kuma-Manych Depression – approximately 700. According to the count data, the abundance of the western population of the Lesser White-fronted Goose was assessed at 19,000–20,000 after the successful breeding season (45.4 % immatures). The named regions are key for the protection of the Lesser White-fronted Goose and the Red-breasted Goose; the kill here by poachers may be the main factor in the decrease of their numbers. Conducting of monitoring of the take of geese and the development of more effective means of action on the hunters, a change in the time periods of the autumn hunt and a complete closing of the spring waterfowl hunt, as well as the establishment of a network of Specially Protected Nature Territories throughout the entire migratory route of the Red-breasted Goose and the White-fronted Goose, are essential.

THE USE OF ANSERIFORM RESOURCES ON THE KUMO-MANYCH STAGING SITE, WITH REGARD TO THE CONSERVATION OF RARE SPECIES

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The Kumo-Manych Depression is the largest migratory staging of geese, both *Anser* and *Branta*, and is used by the entire world population of the Red-breasted Goose (*Branta ruficollis*) and more than 15 % of the population the the Lesser White-fronted Goose (*Anser erythropus*). These species, because of their formation of huge congregations on limited territories, under the existing culture and system of conducting waterfowl hunting, experience strong hunting pressure. In the period of peak concentration of the Red-breasted Goose and the White-fronted Goose, goose-hunting on key territories should be closed, in order to avoid the disturbance factors and the shooting of rare species in mixed flocks. After the end of peak migration of the rare species, the hunt could once again be opened. In non-drought years, the distribution of the geese is linked with the height of vegetative cover and the level of grazing pressure. Game species prefer to feed on fields of winter wheat and hay meadows, with plants higher than 10 cm. Small species, the Red-breasted Goose and the White-fronted Goose prefer shoreline meadows and hay meadows, where the vegetation is not higher than 2–7 cm. In drought seasons, the rare and game species jointly use the feeding habitats and roosting sites of the surviving water bodies. The creation of an Inter-regional Working Group and a system of notification is proposed, in order that one can predict the situation on the key territories in drought and normal years and determine beforehand the regions where goose hunting might be opened, in accordance with the biotopical distriction of the species. The timing of the hunting would be determined by agreement for territories of the Republic of Kalmykia, Rostov Oblast and Stavropol Kray, according to the following system.

- Informants communicate with the Regional Coordinator about the peak taking-off of the rare species from sites of pre-migratory staging for nesting grounds, large migratory staging sites or wintering grounds.
- Regional Coordinators inform the Inter-regional Working Group that rare species have appeared or that their peak appearance is expected shortly on the territory of the Kumo-Manych Depression.
- The Inter-regional Working Group prepares a proposal for the government concerning the necessity of closing the hunt for a determined period of time on the key territories for migratory staging at Kumo-Manych

- An analogous procedure is repeated for the opening of the hunt after the departure of the rare species.

The proposed strategy could become the basis for the perfection of a system of regulating the use of waterfowl resources also in other places of their large-scale staging.

THE NESTING ECOLOGY AND TROPHIC LINKS OF THE BARNACLE GOOSE (*BRANTA LEUCOPSIS*) ON OPEN COASTAL MEADOWS OF THE KANIN PENINSULA

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Currently, the colony of Barnacle Geese on the Kanin Peninsula occupies an area of 51.1 km^2 and is comprised of 9,500–10,000 pairs.The spatial and biotopical distributions of waterfowl in the region of the study are largely determined by differences in feeding strategies. The Barnacle Goose is predominantly connected to the low, treeless seacoast, although it may nest on neighbouring territory. In the first half of the summer, waterfowl make use of up to 15 groups of foodstuffs, to varying degrees; in the second half, only four to five. During incubation, geese, both *Anser* and *Branta*, compete for two types of food: *Puccinellia* and other grasses, which is evidence of the intensity of the feeding relations of the waterfowl at the beginning of summer. Nevertheless, when using the same feeding habitats at the same time, the spectrum of food used by the Barnacle Goose and by the other waterfowl differs and this lowers the level of competition. During incubation, if the competition exists for the following groups of foodstuffs: *Puccinellia*, Poaceaea, and Dicotylidonae, then during the period of brood-rearing and moulting, distinct competition is observed only for the groups of food of the halophyte complex (*Puccinellia phryganodes* + *Carex subspathacea* + *C. aquatilis*). The number of feeding habitats used by Barnacle geese decreases during brood-rearing. The nature of the local movement of broods depends on the age of the goslings and is linked more with the availability of feeding territory than with particular plants. During the second half of the summer, the territory of the seacost plain is actively used only by the Barnacle Goose, which strongly decreases the level of competition. For moulting Barnacle geese without broods, the food ration is near-optimal, because the requirements of the little goslings for a feeding habitat stipulate the worsening of the quality of the feeding habitat for the adult birds.The Barnacle Goose has a considerable impact on the vegetation in the first half of the summer. Thanks to the fact that the broods range rather widely, whereas the intensity of the gain in plant biomass grows sharply, the stability of the use of the food resources on the territory of the colony is restored in the second half of July. The feeding strategy employed by the Barnacle Goose on the open meadow coastal plains in the region of the study is expressed in the maximal coming together of the nesting and feeding sites during the incubation period to the detriment of the quality of the foods in suboptimal biotopes during nesting, as well as in the shortening of the height of the marsh cover and the intensive transformation of the vegetation of several feeding habitats.

THE USE OF FEEDING HABITATS AND THE FOOD OF THE SWAN GOOSE (*ANSER CYGNOIDES*) IN EASTERN MONGOLIA IN THE PRE-MIGRATORY PERIOD

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Field investigations were conducted during 17–30 August 2010 in the Kerulen and Uldz-Gol river valleys, in the area of Lake Buir-Huur and the Khalkhin-Gol River, on lakes Yakh-Nuur, Baga-Dalai-Nuur, Ikh-Dalai-Nuur, Delgair-Tsagan-Nuur, Khorin-Tsagan-Huur, and Khaychiyn-Tsagan-Nuur. The nearly total absence of young birds in the second week in Au-

gust in the region studied is evidence of the unfavourable status of the Dahurian population of the Swan Goose. In the region studied, the Swan Goose demonstrates a flexibility in choice of feeding habitats and uses a very broad spectrum of habitats. Analysis of the diet of the Swan Goose in the various types of feeding habitats did not reveal a limit in choice of preferred and optimal foods; the spectrum of foods fully reflects the degree of presence of the different species of plant food in the community. Grasses form the main diet of the Swan Goose in all types of habitats: from 57 to 95 %. During feeding on strongly grazed grass-sagebrush pastures with a portion of forbs, the proportion of *Artemisia*, *Potentilla* and forbs may be rather great – 25-26 %. The use of sedges is insignificant (7 %), even by geese feeding on marshy parts of the steppe, where this food group is dominant. The proportion of legumes in the diet of the Swan Goose may be significant for a considerable proportion of these plants in the community. The use of aquatic plants and willow leaves, perhaps, has an accidental nature even in habitats where these species of foods are dominant. The Swan Goose uses feeding habitats together with the Whooper Swan (*Cygnus cygnus*), Ruddy Shelduck (*Tadorna ferruginea*), Shelduck (*T. tadorna*), and Greylag Goose (*Anser anser*). In the joint use of a feeding territory by the Swan Goose and the Whooper Swan, the diets of these two species barely overlap. Under joint use of pasture with domestic cattle, a frequent overlapping of the diets is observed and a corresponding competition for grass and forbs. In the area of the study in 2010, the Swan Goose did not experience any hunting pressure and was not limited spatially by the accessibility of food or by disturbance from anthropogenic activities. In our view, the depressed state of the population is not connected with habitat quality and other conditions of the sojourn of the Swan Goose in the area of study.

STATUS OF THE NESTING POPULATION OF THE RED-BREASTED MERGANSER (*MERGUS SERRATOR*) ON THE SHORES OF THE BLACK SEA

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The Red-Breasted Merganser nests solitarily on the shores of the Azov and Black Seas. The epicentre of nesting is on the islands of Tendrovskiy Bay of Black Sea Nature Reserve. The status of the Ukrainian nesting population is unstable. From the 1930s through the 1980s, the abundance of the species increased and attained its maximum, from 90–140 to 900 nests (Klimenko 1950; Ardamatskaya 1984).

At the beginning of the 1980s, the numbers began gradually to decline, but still remained high: 600–700 nests. A depression in the abundance of the locally nesting population was noted in the 1990s (Rudenko, Yaremchenko 2000). Numbers swiftly declined not only on the islands of Black Sea Biosphere Reserve, but also on the Lebyazhi islands in Karkinitskiy Bay, in Dzharylgach Bay and in the Azov Sea (Tarina *et al.* 2000; Ardamatskaya *et al.* 2000; Siokhin *et al.* 2000).

In 2000–2004, numbers on the islands of the Black Sea Reserve fell to 50–60 pairs. In 2005, the number of nests was critically low – 40. In 2006–2010 the number of nests was in the 10–15 range. The sharp decline in numbers resulted in a worsening of the state of the reproductive indicators and of the overall nesting success.

The main reasons for the change in the abundance of the species are the worsening ecological condition of the bays of the Black Sea (pollution, change of hydrological state); worsening of the conditions of the nesting grounds, such as high water level in the bays, leading to inundation of the nests; the gradual destruction of the islands; and a shrinkage of nesting territory. A consequence of such changes is strong territorial competition in colonial nesting species. An instability of the foodbase, brought about by the transformation of the hydrobiological conditions of the bays of the Black Sea, and, as a consequence, a worsening of the feeding conditions, has been observed. Early autumn hunting and poaching of fish inflict significant loss on the merganser population (Rudenko, Yaremchenko 2007).

Such characteristics of the biology of the species as nesting conservatism, leading to limiting the places of nesting, to a slow broadening of the nesting territory and a tendency to settlement; a long breeding cycle; nesting in large colonies of aggressive species of birds; a high level of clutch and brood mortality; the nature of feeding behaviour and narrow food choice; and,

possibly, disease amplify the impact of negative factors. In Ukraine, the Red-breasted Merganser is protected, and in the Red Book. Special measures for the protection and stabilization of numbers of this species in Ukraine have been elaborated (Rudenko 2006).

MONITORING OF ANSERIFORMS IN THE VOLGA DELTA AND ON THE NORTHERN CASPIAN SEA IN CONNECTION WITH THE DEVELOPMENT IN THE REGION OF AN OIL-AND-GAS COMPLEX

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The end of the last century and the beginning of the present one was marked by the growth of activity of oil-and-gas companies both on the Russian territory of the Caspian Sea and its surrounding area, and on the territory of adjacent states. Large sources of hydrocarbon resources in the sea were found. This gave rise to a concern for the future of the unique natural complex of the northern Caspian Sea and triggered the conducting of scientific investigations. The Astrakhanskiy State Nature Reserve fulfils an important amount of the work on the monitoring of the avian population. The monitoring of anseriforms was carried out in several ways. The most important was the regular counts of the numbers of birds along the boat routs of great length. The counts were conducted during the entire ice-free period of the year and, under favourable ice conditions, in the winter. Periodic counts were made 2–4 times per month in areas of the downstream and narrow, shallow bay zones and not less than once per month in the part of the river delta protruding into the sea. Counts were carried out at the Damchikskiy and Obzhorovskiy stations (inventory profiles). They encompassed the main types of habitats of waterbirds from the reed belt to the open part of the delta protruding into the sea. The data obtained permits an analysis to be conducted of the seasonal and annual changes in the density of the population of birds, and that is important for the evaluation of the impact on them of the changing natural conditions (flooding regimes, fluctuations in volume of the river current and of the sea levels, of different weather conditions of particular years and seasons) and the economic, nature conservancy and social politics, to a large extent the defining characteristics, and the scales of anthropogenic stress on the natural environment. The marine licenced sectors of the oil companies were investigated by ship surveys, but significantly less often. In addition, counts of birds were conducted from shipboard during cruises to the sea and during ferrying to islands of the northern Caspian.

Aerial counts in periods of peak autumn migration of birds on the Volga delta protruding into the sea were an important element of the monitoring. They were conducted from planes or helicopters on routes extending approximately 800 km and more. Date from the aerial counts showed the nature of the territorial distribution of the birds, allowing us to evaluate the approximate total abundance in the periods of peak migration and the population trends in species readily distinguished from the air – Mute swans, Whooper swans, Greylag geese, Pochards, Red-crested pochards, Tufted ducks, and others.

The data of the conducted investigations were included in official reports and scientific documents of the Astrakhanskiy State Nature Reserve. A significant portion has been published.

THE RED-BREASTED GOOSE (*BRANTA RUFICOLLIS*) ON THE NORTH-WEST COAST OF THE BLACK SEA IN UKRAINE: PRESENT STATUS AND CONSERVATION

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The north-western coast of the Black Sea from the Danube Delta (45°30' N, 29°00' E) to the Dnieper Delta (46°00' N, 32°30' E), including Yagorlitz and Tendrov Bays and the area of the Azov coast and the Crimean Peninsula hold the highest concentrations of Red-breasted geese

in Ukraine during migration and wintering. The most important area for the geese in winter is the Tusla limans (the Ramsar site). During the winter, the geese migrate between Ukraine, Romania and Bulgaria, depending on the weather conditions.

Spring migration through the Azov-Black Sea basin begins in early March, with peak migration occurring during March – early April. In autumn, the birds begin to pass through the region during the beginning of October, with peak migration occurring at the end of October – early November. The Red-breasted geese are usually seen mixed with migrating White-fronted geese. The distinction between birds on migration and those staying to winter in Ukraine is not clear. However, birds arriving during late November to early December are assumed to winter in Ukraine, and birds seen from early March onwards are assumed to be on migration to the breeding grounds.

Numbers of Red-breasted geese wintering in Ukraine are likely to have increased during the 1970s as the geese shifted from the Caspian to the Black Sea. In the period up to 1989, wintering numbers were thought to be about 100, but since then counts have increased from 86 in 1980 to a maximum of 17,680 in 2001. The lower number recorded in winter 2009 (5) was probably due to the very cold weather that year when birds were likely to have moved further south and maybe shifted again to the Caspian Sea. The increase in Red-breasted goose numbers over the past 5–10 years is likely to be the result of better coverage during midwinter counts and good conditions for this species.

CURRENT DISTRIBUTION AND POPULATION DYNAMICS OF THE GADWALL (*ANAS STREPERA*) IN NORTH-WESTERN RUSSIA

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Isolated encounters of the Gadwall in north-western Russia were known from the beginning of the last century. The majority of these were confined to the Rakovye Lakes, where the first nesting was authenticated in 1966. Active colonization of Leningrad Oblast began from the west in the 1990s. The main wave was along the southern coast of the Gulf of Finland across the Kurgalskiy Peninsula, where individual birds appeared regularly from 1988 to 1994; by 1995 nesting was established. In the mid-2000s the Gadwall began to be a common species as well in Neva Bay of the Gulf of Finland. In these same years encounters in other oblasts in the North-Western Federal Okrug became more frequent.

Currently, the Kurgalskiy Peninsula, Seskar Island and Neva Bay of the Gulf of Finland are the main places of regular and large-scale nesting. A clear trend of increase in numbers is observed. So, in 1999–2002 in Saint Petersburg, isolated cases of breeding in Neva Bay were noted; in 2003 30–40 pairs were breeding, and already by 2009 70–80 pairs.

During migration, the Gadwall remains in isolated groups, not forming dense congregations. In several places of concentration, their overall abundance can reach 700 individuals (Kurgalskiy Peninsula), but more often does not exceed 100–200 individuals. It is worthwhile mentioning Kotlin Island, the floodplains of the Kronstadt Colony, the floodplains of Cape Lisiy, Sestroretskiy Spate, the Kurgalskiy Peninsula and Seskar Island as main sites of migratory staging.

In the migratory period and at the time of the leading of the broods on the studied territory, two main types of habitats are used: 1) inner, strongly overgrown and eutrophied water bodies; and 2) marine shallow waters with highly productive plant communities. The ducks prefer nesting in larid colonies on short-grass coastal meadows or singly on high-grass meadows.

Analysis of our data for Leningrad Oblast and pubished information from other regions of north-western Russia showed that despite the expressed tendency toward an increase in numbers and to further dispersal, the populations in the given area remain unstable and abundance varies strongly from year to year.

POPULATION DYNAMICS OF WATERFOWL IN PINEZHSKIY NATURE RESERVE (ARKHANGELSK OBLAST)

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Monitoring of waterfowl fauna and populations was carried out on water bodies of "Pinezhskiy" Nature Reserve in the period from 1977 to 2010. The birds were counted annually on four representative lakes with a total area of 80.6 ha, as well as on a 30-km section of the Sotka River in the period of peak appearance of broods (July). In the morning or evening, the number of females (for loons and bean geese, the number of adult birds) and the number of young in the broods were counted from a boat.

On the territory of the nature reserve there are 292 lakes, of which the largest is Lake Pershkovskoye (48 ha). As representative, four lakes were chosen that differ according to productivity: Kumichevo, Pershkovskoye, Sychevo, and Zheleznoye. The Sotka River cuts across the territory of the reserve, forming a deep canyon (60 m) with rocky outcrops along the shores.

Different ecological conditions determine the particular characteristics of the avifauna of the lakes of the nature reserve, which is typical for northern taiga and is comprised of 14 species of waterfowl. The greatest species diversity was noted on Lakes Pershkovskoye and Kumichevo. Among the dominants were the Goldeneye (*Bucephala clangula*) and the Tufted *Duck* (*Aythya fuligula*); perennial nesters were the Mallard (*Anas platyrhynchos*), Teal (*A. crecca*), Arctic Loon (*Gavia arctica*). Bean Goose (*Anser fabalis*), Whooper Swan (*Cygnus cygnus*), Wigeon (*Anas penelope*), Pintail (*A. acuta*), Garganey (*A. querquedula*), Smew (*Mergus albellus*), and Red-breasted Merganser (*Mergus serrator*) nested, although not every year. On the Sotka River the Common Merganser (*M. merganser*) was dominant.

The conditions are nearly completely a sanctuary, enabling following of the waterfowl population dynamics for more than 30 years without anthropogenic factors. From the time the reserve came into existence, changes occurring to the ecosystems of the lakes were induced only by natural causes (overgrowth and changes in the hydroregime). For the period of obervations, the waterfowl species composition of the reserve was stable. Analysis of the population dynamics of the six most numerous species also did not reveal any tendency. Population density of the Goldeneye (mean of 7.6 pairs/km^2), Tufted Duck (5.8 pairs/km^2), Teal (4.2 pairs/km^2) and Common Merganser (8 pairs/km^2) remained stable, despite the high level of interannual changes. Noted only were a small decrease in the population density of the Mallard on lakes (mean of 4 pairs/km^2) and the Goldeneye on the Sotka River (4 pairs/km^2), as well as for the overall waterfowl population density on lakes of the reserve (mean of 28 pairs/km^2).

THE GREYLAG GOOSE (*ANSER ANSER*) ON THE STEPPES OF THE SOUTHERN URALS

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The studies were carried out in the period 1972–2010 in Orenburg Oblast. The spring migration and arrival of the Greylag Goose occurs in mid-March through the end of April, the main migration during early to mid-April. They fly in flocks of 10 to 100, often 20–50, birds. In March until the beginning of April reproductively mature, nesting individuals arrive and remain on the nesting lakes, drifted with snow and covered with ice. At the end of April/beginning of May, flocks of 600–2,000 birds gather nightly on steppe lakes of the Ural-Tobol Plateau.

The arrival of moulting geese on lakes of the Ural-Tobol Plateau and their migration in the direction of the Volga River Delta in flocks of 5–35, often 9–17 individuals, occurs from mid-May to nearly mid-June. They moult in the reed-protected lakes of the Ural-Tobol Pla-

teau in flocks of 5–30 for 50–55 days. Mated pairs moult on lakes of the nesting grounds. Birds begin flying again in mid-July.

They nest on the Ural-Tobol Plateau on lakes overgrown with reeds, cattails and sedges, in bays of the Iriklinskoye and Kumakskoye reservoirs, on oxbow-lake floodplains of the Ilek River, on the Damashkinskoye and Yelshanskoye reservoirs in the Bouzoulukskiy District and on Pond Akbulak in the Sol'-Iletskiy District. In the past 30 years, 200–430 pairs have nested annually in this area. Clutch size is 4–9; brood size 2–9.

Flocks migrating in autumn are comprised of 15–20 birds from the end of September until past mid-October, with the main migration, in flocks of 60–120, occuring in the first half of October. During the autumn, Greylag geese roost on lakes of the Ural-Tobol Plateau in flocks of 300–400, along with flocks of thousands of White-fronted geese.

In the unusually warm winter of 2001–2002, a flock of 16 Greylag geese overwintered on the numerous leads on the Ural, Ilek, and Chyornaya rivers and on the Chernovskoye Reservoir in Ilekskiy District. In the mild winter of 2002–2003, migrating geese were encountered until the end of November 2002, and on 26 January 2003 a goose was taken on the floodplain of the Ilek River.

ANSERIFORMS – VULNERABLE LINK WHEN THERE ARE SPILLS OF PETROLEUM PRODUCTS IN AQUATIC AREAS

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As a result of a tanker accident in the Kerch Strait in November 2007, many species of waterfowl and waterbirds suffered. The unfavourable weather conditions facilitated the concentration of waterfowl in the bays and on the lagoons. The position of the Taman Lagoon as a geographical entity between Tuzla and Chushka spits determined the concentration of birds in November 2007 on the given area. Right here the maximum abundance and death of birds from the tanker accident was recorded.

The study of the avifauna was conducted during expedition monitoring observations from November 2007 to February 2008. The harsh winter with low temperatures strengthened and increased the loss of birds covered in oil. As a result, it was determined that the loss of birds from the oil spill comprised approximately 12,000 individuals. The loss of 15 species of birds to the oil contamination was revealed: *Gavia arctica, Podiceps ruficollis, P. nigricollis, P. grisegena, P. cristatus, Phalacrocorax carbo, P. aristotelis, Ardea cinerea, Cygnus olor, Anas platyrhynchos, A. crecca*, *Phasianus colchicus, Fulica atra, Larus minutus,* and *L. cachinnans.* Oil-contaminated individuals of three species, whose loss was not evidenced, but was likely, was also revealed: *Aythya ferina, Larus ridibundus,* and *L. genei.* The proportion of waterfowl ranged from 1 to 14 % of all lost birds in different months. The most unfavourable period was February 2008, when thousands of wintering waterfowl gathered in the Kerch Strait and adjacent areas. As a result of the contamination of the water and the repeated contamination of the shores, congregations of waterfowl came into contact with the black oil stains, and that led to partial contamination and, subsequently, to the complete loss of the birds.

Thus, the oil contamnation of the area was of key importance during migrating and wintering, and had an adverse effect on the abundance of the waterfowl. Unfortunately, the experience gained as a result of the tragedy did not lead to a positive result with regard to the conservation of biodiversity. The activity of nature conservation organizations was limited to PR and did not yield tangible results in the saving of individuals and species. Therefore, the question of the protection of Important Bird Areas and of measures for lowering the negative effects on bird populations is still acute.

THE NESTING OF ANSERIFORMS IN SUBOPTIMAL CONDITIONS

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Many species of Anseriformes in the south-western European part of Russia make use of reed stands for nesting; these serve as a defence from unfavourable abiotic and biotic factors. In conditions of a shortage of suitable sites, the birds are forced to change to less suitable conditions for breeding. In such situations, several species, for example, the Mallard (*Anas platyrhynchos*), may nest in trees, using old nests of the Magpie (*Pica pica*), the Hooded Crow (*Corvus cornix*) and the Rook (*C. frugilegus*). So, in Rostov-on-Don, a clutch of the Mallard of five eggs was located in the previous year's nest of the Hooded Crow at a height of 3 m, another (6 eggs) in the old nest of a magpie in the fork of a branch at a height of 2 m. Currently, reed stands along the shores of Lake Manych-Gudilo and neighbouring waters have essentially disappeared or come to occupy a small area. This has resulted from the increased salinity (in the past 10 years the salinity of Lake Manych-Gudilo has increased by 10 ‰) and the shortage of rainfall. It is possible that it is in connection with this that cases of the nesting of Anseriformes in mixed colonies of waterbirds have begun to be recorded. Thus, in large island colonies, the basis of which are piscivorous species of birds: the White Pelican (*Pelecanus onocrotalus*) and the Dalmatian Pelican (*P. crispus*), the Cormorant (*Phalacrocorax carbo*), Little Egret (*Egretta garzetta*), Grey Heron (*Ardea cinerea*), Spoonbill (*Platalea leucorodia*), Great Black-headed Gull (*Larus ichthyaetus*) and the Caspian Gull (*Larus cachinnans*), Anseriformes are associated species. As a rule, one to four pairs nest in a single colony. From 1996 to 2010, in mixed colonies of fish-eating birds we recorded the nesting of five species of Anseriformes: the Whooper Swan (*Cygnus olor*); Greylag Goose (*Anser anser*), Mallard, Red-crested Pochard (*Netta rufina*), and the Pochard (*Aythya ferina*). On artificial islands in Taganrog Bay of the Sea of Azov, mallards nested in high vegetation on the periphery of colonies of the Caspian Gull.

Hence, some species of Anseriformes in a changing environment may choose to nest in suboptimal conditions and that maintains the existence of the populations on the given territories.

DYNAMICS OF THE COMMUNITY STRUCTURE OF ANSERIFORMS LINKED WITH CHANGE IN WATER LEVEL (LAKE KROTOVO, NORTHERN KULUNDA)

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Lake Krotovo, having an internal, floating-bog type of overgrowth, is a nesting water body for waterfowl. Over the years of the study, there were four periods of high water: 1969–1972, 1985–1988, 1993–1995 and 2002–2003 and four of low water: 1975–1984, 1989–1992, 1998–2000, and 2004–2008. Eleven species of anseriforms nested on the lake. The proportion of *Anas platyrhynchos* was on average 33–9 ± 2.6 % of all nesting waterfowl, *Aythya fuligula* – 28.4 ± 1.7, *A. ferina* – 25.9 ± 1.5, *Anas strepera* – 4.3 ± 0.5, *A. clypeata* – 0.49 ± 0.08, *Netta rufina* – 0.46 ± 0.1, *A. querquedula* – 0.19 ± 0.05, *A. penelope* – 0.14 ± 0.06, *Anser anser* – 0.05 ± 0.03, *Oxyura leucocephala* – 0.04 ± 0.01 and *Anas acuta* – 0.02 ± 0.02 %. The communities of waterfowl nesting on the lake in wet and dry years are differentiated with certainty only for the more numerous anatids. The proportion of the Mallard is certainly higher in wet years (mean 38.5 ± 2.5 % in wet years, 25.8 ± 3.1 % in dry), as well as that of the Red-crested Pochard (30.9 ± 2.6 and 24.4 ± 2.9 %, respectively). The proportion of the Tufted Duck is significantly lower in wet years (20.4 ± 2.6 and 35.6 ± 2.4 %, respectively). The abundance of individual species of ducks shows a tight correlation with the ecological situation and with breeding success in the previous year (Mikhantyev, Selivanova 2009). The populations of five species of dabbling ducks (genus *Anas*) in the majority of cases are positively correlated with each other (9 of 10 pairwise comparisons were significant). There were especially strong links between the abundances of the Gadwall, Shoveler and the Wigeon. The abundance of the two species of *Aythya* changed synchronously,

also with a high degree of significance. In relation to the dabbling ducks, the abundance of the Tufted Duck changed significantly in direct proportion to all five species, but the Pochard only to one, the Gadwall. The abundance of the third species of diving duck (genus *Netta*) varied also with the abundance of dabbling ducks (except for the Gadwall), and did not have a significant correlation with the abundance of ducks of the genus *Aythya*. The lack significant negative correlations is evidence of the insignificant impact of interspecific competition on the abundance of ducks. The large number of positive correlations is evidence of the presence of synchronous and similar responses of the various species to the changing environmental conditions.

ANSERIFORMS OF PERM KRAY

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Investigations were conducted from 1974 through 2010. Altogether on the entire territory of Perm Kray 28 species of anseriforms were recorded: the Whooper Swan (*Cygnus cygnus*), Mallard (*Anas platyrhynchos*), Teal (*A. crecca*), Gadwall (*A. strepera*), Wigeon (*A. penelope*), Pintail (*A. acuta*), Garganey (*A. querquedula*), Shoveler (*A. clypeata*), Pochard (*Aythya ferina*), Tufted Duck (*A. fuligula*), Common Goldeneye (*Bucephala clangula*), Velvet Scoter (*Melanitta fusca*), Smew (*Mergus albellus*), Red-breasted Merganser (*M. serrator*) and Goosander (*M. merganser*). Seven of them, the common species, nest everywhere. The Goldeneye is common in the northern half of the kray. The Pochard became a common nester beginning in the 1970s. The Gadwall earlier was more often encountered in the southern half of the kray, now it is recorded in the north as well. Scarce nesters are the Shoveler, the Smew, and the Red-breasted and Common Mergansers. Solitary cases of nesting are known for the Velvet Scoter. The Mute Swan has been nesting from 2003 onwards in the southern half of the region. Nests of the Whooper Swan (*Cygnus cygnus*) were found at the beginning of the twentieth century (Reztsov, 1904); currently, individual pairs are encountered in the northern part of the kray.

On migration the White-fronted Goose (*Anser albifrons*), Bean Goose (*A. fabalis*), Scaup (*Aythya marila*), and Long-tailed Duck (*Clangula hyemalis*) are encountered. The Bean Goose is a common spring and autumn migrant; migratory flocks of White-fronted geese regularly are encountered in the spring in the Kama valley. The Scaup is numerous on migration, the Long-tailed Duck is scarce. In the 1940s a small number of migrating common scoters (*Melanitta nigra*) was counted (Vorontsov, 1949); nowadays it is not encountered.

Solitary encounters in the vicinity of Perm are known for the Greylag Goose (*Anser anser*) – on 02.06.1998.; Lesser White-fronted Goose (*A. erythropus*) – at the beginning of May 1998 and on 05.10.1994; and the Ferruginous Duck (*Aythya nyroca*) – in September 1989 and 1995 (Kazakov, 2000). A pair of Red-crested pochards (*Netta rufina*) was found on 04.07.1999 in Solikamsk (Bukharinov, 2001), two males on 4–12.04 and 18.06.1999 near Perm (Kazakov, 2000). A pair of Bewick's swans (*Cygnus bewickii*) was feeding in May 2000 on the floodplain of the Kama near Solikamsk (Bukharinov, 2001). Red-breasted geese were taken near Perm in 1879 (Ushkov, 1927) and in 1982 (Yeremchenko, 1990), Snow geese (*Anser caerulescens*) on 30.09.1903 and on 29.09.1923 (Ushkov, 1927).

ON THE ROLE OF WILD GEESE IN THE DISTRIBUTION OF AI VIRUSES: THE EXAMPLE OF SEVERAL POPULATIONS OF GEESE OF RUSSIA AND NORTHERN CHINA

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Wild anseriforms are natural hosts of viruses of group A (VGA) and vectors for the spread of the given pathogen on remote geographic territories. This is facilitated by the aquatic life-

style of the given species of birds and their migratory movements. Eleven species of wild geese nest in Russia that winter on nearly all continents of the Earth. The province of Qinghai (Northern China) is the site of the most massive nesting of the Bar-headed Goose (*Anser indicus*), as well as being an unfavourable territory with regard to a high-pathology avian influenza virus of the H5N1 subtype. In our work, we analyzed data from the literature concerning the separation of VGA in wild geese and the pathogenesis of the virus in given hosts, and also investigated populations of wild geese nesting in nine regions of Russia and the province of Qinghai for the presence of VGA. In the course of the work, cloacal smears/faeces from 3,245 individuals in the nine species (the Bean Goose (*Anser fabalis*), White-fronted Goose (*A. albifrons*), Greylag Goose (*A. anser*), Lesser White-fronted Goose (*A. erythropus*), Brent (*Branta bernicla*), Red-breasted Goose (*B. ruficollis*), Snow Goose (*A. caerulescens*), Bar-headed Goose, and Swan Goose (*A. cygnoides*)) and blood serum from 208 individuals in four species (the White-fronted Goose, Bean Goose, Red-breasted Goose, and Brent) were sampled. As a result of the conducted investigation, the presence of VGA in collected cloacal smears/faeces was not detected, but the results of the serological studies of the blood serum showed a low level of specific antibodies to the given pathogen. Thus, the data we obtained point to a limited role for wild geese in the circulation of VGA, in comparison with ducks (according to data in the literature). It is probable that the wild geese play an extremely mediated role in the spread of VGA, and in their evolution and level of circulation among various species of wild birds on the studied territories.

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ON THE QUESTION OF DEFERRED FERTILIZATION IN EIDERS

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In 1993–2010, the nesting behaviour of the King Eider (*Somateria spectabilis*), Spectacled Eider (*S. fisheri*) and Steller's Eider (*Polysticta stelleri*) was recorded on nesting grounds in the deltas of the Lena, Yukon-Kuskokwin and Chaun-Puchveyem. Eiders practically did not mate on the nesting grounds: two cases of mating in pairs of Steller's eiders (in 110 hours of scans) were noted. Mating of King eiders was observed once (in 32 hours), mating of Steller's eiders was observed once in 8 hours on the Yukon Delta and never on the Chaun Delta. Testes of male Steller's eiders are too small after arrival for productive mating: a left testis size of 14.7 × 7.9 mm is characteristic of productive mating. The testes of King eiders do not exceed 0.2 % of the body mass. Portenko (1972) assumed that in June on Chukotka all adult male King eiders were not nesting owing to the small size and weight of the testes. We conjecture that the testes of male eiders on arrival in the nesting area have already become shrunken and inactive; productive mating occurs in eiders on wintering grounds or on migration. Mating of Steller's eiders begins in April while wintering. Spermatozoids are probably kept in a spermathecal gland in the cranium of the vagina of the female, and fertilization occurs at the moment of the formation of the egg before laying. The lifespan of the spermatozoids in the body of the female bird exceeds one month.

Energy budgets do not allow us to conjecture an energetic advantage for males from delayed fertilization. We suggest a non-energetic hypothesis for the evolution of delayed fertilization. In the past 200,000 years, cold periods with low ocean levels have prevailed in duration over warm periods with high sea levels. In cold epochs, the geographical nesting ranges of eiders were shuffled to the North Pacific, and wintering to still farther south. The length of the daylight hours, stipulating the onset of the growth of the gonads in male eiders, does not align with the modern high-latitude range with its polar day, but with the boreal habitat of cold periods of the Pleistocene. Modern warming – the Holocene, is a short episode in the natural history of the birds, when eiders acclimated to high latitudes and conditions of the polar day. For that, the body of the female is adapted to the maintenance of viable sperm, but in the male changes in the photoperiod stimulation of the gonads did not change. The success of fertilization does not depend on the presence of the male in the nesting region.

SEASONAL MOVEMENTS OF GEESE IN THE REGION OF "BOLONSKIY" NATURE RESERVE

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State Nature Reserve "Bolonskiy" (Khabarovsk Kray) occupies part of the territory of the Middle Amur Lowland, abutting the southern part of Lake Bolon. The territory is a Wetland of International Importance and safeguards the survival and production of a whole host of waterfowl, including anseriforms. Data was gathered by the author in 2005–2007.

The White-fronted Goose (*Anser albifrons*) is an abundant migratory species. The first encounters were on 26.04.2005, 2.05.2006, and 22.04.2007. Peak spring migration occurs in the first decade of May. In the area of the nature reserve, only brief stop-overs are made for resting and for waiting out bad weather. Thus on 8.05.2007 more than 1000 White-fronted geese settled to roost at outfalls at the mouth of the Vakhtar River. The geese flew off in a single flock on 9 May beetween 7:00 and 8:00 a.m. In the morning of 10 May several hundred White-fronted geese flew off from the area of Lake Volna located nearby. In the middle and lower courses of the Selgon River a summer migration of the White-fronted Goose (30.05.2006 and 3.06.2006, respectively) was noted. The average flock consisted of 14.7 individuals (n = 3). According to interview data, 8 geese were observed near the city of Amursk on 10.06.2005 and 30 near the village of Dzhuan on 12.06.2005.

The Lesser White-fronted Goose (*A. erythropus*) is a scarce migratory species. The first spring encounter was noted on 24.04.2007. The Lesser White-fronted Goose is encountered up to the beginning of June in insignificant numbers, often in flocks of White-fronted geese.

The Bean Goose (*A. fabalis*) is an abundant migratory species. The first encounters were on 12.04.2005, 17.04.2006, and 8.04.2007. In contrast to the White-fronted Goose, it forms jointly with the Whooper Swan (*Cygnus cygnus*) long-term feeding concentrations on shallow-water estuarine outfalls of the Simmi River and on Lake Bolon. On the outfalls of the Albit, Gumen, and Kiltasin on 2 May, approximately 300, 250, and more than 1500, respectively, Bean geese were noted from a motorboat (only disturbed, taking-off birds were counted). The departure of the majority of geese and swans occurs very sharply, often in the course of 24 hours, and not later than mid-May. On autumn migration, the first flocks of Bean geese were recorded on 4.09.2005 and 7.09.2006.

The Swan Goose (*Cygnopsis cygnoides*) is a rare migrant. Two birds, flying in a northerly direction were noted in the region of the mouth of the Kirpu River on 30.04.2005.

PRINCIPLES OF THE MANAGEMENT OF WATERFOWL RESOURCES IN RUSSIA: THE WAY FORWARD

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The management of waterfowl resources in Russia finds itself on the cusp of serious changes. The prerequisite for this began with the putting in place of a new law on hunting, the transfer of issues of management of game resources from the Ministry of Agriculture to the Ministry of Natural Resources, and the addition of a political voice for the protection of biodiversity to the upper echelon of power in the country.

Analysis of the current status of the management of waterfowl resources in Russia leads to a troubling conclusion; the use of resources takes place in a nearly unrestricted manner. Owing to the absence of control regarding the status of the population, we don't know which species and populations are growing in number, and which are declining, how many birds might be taken, and where we might take them, paying attention to the principles of sustainable use of the resources.

The actual management of migratory birds as a resource is possible only under the establishing of baseline conditions at the federal level: (1) the use of *migratory flyways* as ter-

ritorial units of management; (2) the operation on the basis of *migratory populations* for the regulation of hunting pressure and the defining of measures for the protection of species; (3) the evaluation of the bag of birds at the species level; (4) the federal monitoring not only of the periods of hunting, but also of the potential bag limits for each region; (5) the priority of the protection of habitats at all stages of the migratory cycle of the birds, including the active management of arable land for the increase of its productivity, and others. The long-term experience of the work of scientists and managers in the whole world, above all in the countries of North America, gives evidence of this. In these countries, sterling results have been attained for the past 100 years with regard to an increase in the productivity of waterfowl populations and provision for their effective hunting.

Adequately adjusted management of the resources of waterfowl should result in (a) effective protection of rare species of birds; (b) the maintenance at an optimal level (but in the majority of cases, an increase in the number of reduced) populations of game species; (c) the preservation of habitats of birds/ecosystems. Necessary are (i) the development and changing of corresponding legislation; (ii) the working out of scientific concepts and state plans for the management of migratory bird resources at federal and regional levels; (iii) international cooperation with countries in which our birds winter, implemented within the frameworks of existing international conventions and partnerships; and (iv) practical implementation in real life of the management of resources in the field.

Discussions within the framework of joint programs of working groups on the preparation of new hunting regulations for Russia in the summer of 2010 showed that, although essential progress was made, the majority of the aforementioned prerequisites is, for the time-being, absent in Russia. Elaboration of the concepts of the development of the management of resources of migratory waterfowl is the task of the immediate future.

DATA ON THE DISTRIBUTION OF THE BLACK BRANT (*BRANTA BERNICLA*) AND THE EMPEROR GOOSE (*ANSER CANAGICUS*) AT THE SOUTHERN EDGE OF THEIR NESTING RANGE

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Data on the distribution of two rare species of geese were gathered in 2000–2010 on South Chukotka. Nesting of the Emperor Goose to the south of Tymna lagoon is not sporadic, as assumed earlier, but regular. The most southern point where there is certain nesting by both species is in the vicinity of Meinypilgyno in Anadyr District. The most southerly moulting ground of non-breeding Emperor geese, where up to 2000 birds were counted, is known from northern Lake Kaypilgyn. Up to 100 birds moult each year on Kaynupylgyn and Yuzhnaya lagoons. Up to 100 pairs nest annually on the lagoons and in the deltas of rivers, but breeding success is extremely low. Autumn migration of the Emperor Goose on southern Chukotka occurs not in the direction toward places of autumn staging in Alaska, but along the Koryak coast. Expert evaluation of the number of migrating birds is three to four thousand. At the time of the autumn staging, Emperor geese remain in the Mellen lagoon (on the border with Kamchatka Kray) until November. The sum of our knowledge of the nature of the sojourn of the Emperor Goose in the region permits the proposal of the existence of a continuous migratory route for species along the Asiatic coast. We cannot exclude the possibility that the given branch of migration is permanent and leads to a place of wintering of the species on the Commander Islands and to the east coast of Kamchatka. It is necessary to determine the degree of exchange of birds between this branch of migration and the Alaskan population wintering on the Aleutian Islands. Illegal hunting of the Emperor Goose on the Mellen, Yuzhnaya and Kaynupylgyn lagoons may lead to a destabilized state of the population.

The Black Brant in the 1990s regularly nested on the islands of the lagoons in the vicinity of Meiny-pilgyno, but from 2001 to 2008 nesting was not yearly, and the number of birds encountered during the summer did not exceed a dozen. In 2009–2010, the number of encounters of geese grew to 40–50 per season; they resumed nesting not only on the lagoons, but also on the islands of the moraine lakes. The dynamics of the largest congregation of Black Brant

moulting on Chukotka on Klinkovstrema Bay was followed over the course of five seasons: the number of birds fluctuated from 4,000 to 9,000.

The abundance of both species of geese for the past decade has remained rather stable, as has entire world population of these species, and the boundary of the ranges have experienced insignificant fluctuations.

EVALUATION OF THE NUMBERS OF GEESE MIGRATING THROUGH NORTHERN KAZAKHSTAN ACCORDING TO MONITORING DATA OF 2005–2010

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The routes of migrating waterfowl from Scandinavia in the west to the Taimyr in the east run through the water stystems of Northern Kazakhstan. Some of the main migrants are *Anser* and *Branta*, which are represented here by the following species: the Red-breasted Goose (*B. ruficollis*), Greylag Goose (*A. anser*), White-fronted Goose (*A. albifrons*), and Lesser White-fronted Goose (*A. erythropus*). Rare visitors include the Brent Goose (*B. bernicla*) and the Bean Goose (*A. fabalis*). Spring migration is transitory in nature; the birds stop only for a short time. The majority of the geese rest in fields that are inundated with water at this time. Spring migration begins at the start of April and comes to an end in mid-May. Autumn migration is strongly fluctuating in nature. Incoming geese remain for a lengthy period (September–November), fattening up in the neighbouring fields.

Monitoring activities were conducted on lakes of Kostanay, Aktyubinsk and North-Kazakhstan oblasts within the purvue of the projects “Sterkh” [“Siberian Crane”] in 2005–2008, and projects of the Goose, Swan and Duck Study Group of Northen Eurasia in 2009 and AEWA (African-Eurasian Waterbird Agreement) in 2010. Altogether, the numbers established for each year were: Red-breasted Goose – 35,000 (2005), 6,315 (2006), 5,700 (2007), 19,801 (2008), 28,172 (2009), 56,860 (2010); Brent – 1 (2005), 1 (2006); Greylag Goose 55,168 (2005), 41,178 (2006), 53,198 (2007), 41,098 (2008), 134,178 (2009), 89,960 (2010); Bean Goose – 7 (2005), 9 (2007); White-fronted Goose – 17,633 (2005), 24,789 (2006), 67,842 (2007), 110,339 (2008), 4,685 (2009), 296,350 (2010); Lesser White-fronted Goose– 4,817 (2005), 8,903 (2006), 1,058 (2007), 7,175 (2008), 3,778 (2009), 19,193 (2010).

As is evident from the preceding data, the numbers of *Anser* and *Branta* fluctuate, and the causes are the fluctuating hydrological regime, and poaching on the stopover sites, which strongly impact the redistribution of the species and the increase of monospecific flocks, especially of the rare geese, as well as the switching of migratory routes. Thus, according to the data of long-term counts of the numbers of geese, the wetlands of Northern Kazakhstan are the most important in Central Asia for various groups of waterfowl, amongst which are globally threatened species.

SHALKAR-AIKE – UNIQUE MIGRATION STOPOVER OF RARE SPECIES OF GEESE ON THE RUSSIAN-KAZAKHSTAN BORDER

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The region of the three large lakes on the border of Russia and Kazakhstan – Shalkar-Karashatau (Aktyubinsk Oblast, Kazakhstan), Shalkar-Yega-Kara (Orenburg Oblast, Russia) and Aike (border of Aktyubinsk and Orenburg oblasts) with the adjoining part of Orenburg Oblast is extremely important as a nodal point for the migrating streams of a whole complex of steppe, waterfowl and water birds. This area in Kazakhstan was chosen as a model for counts of the abundance, habitat distribution and long-term monitoring of the composition of populations of the Red-breasted Goose (*Branta ruficollis*) and the Lesser White-fronted Goose (*Anser erythropus*). On this territory, according to the data of counts in 2010, in the period of the autumn migration, approximately 30,000 Red-breasted geese (which is more than 50 %

of the global population) make a stopover here, as well as approximately 3,000 Lesser White-fronted geese (15 % of the western population). It is evident that the peak concentrations, often monospecific flocks, of the Red-breasted and Lesser White-fronted geese on unprotected territories in the period of migration make these species very vulnerable. The abundance of game species of geese here is relatively small, and in the shooting by hunters the rare, threatened species are primarily the ones to fall. The decrease in the number of Arctic species of geese often is dependent on the poor feeding conditions during the migratory period and the level of hunting pressure, which in combination with poor meteorological conditions in the nesting season can seriously decimate the population. In many regions of Northern Kazakhstan, the level of poaching is high; in addition, Shalkar-Aike migratory staging site is located outside the protected territory. In our opinion, the sole possibility to minimize the damage to the steppe ecosystem from human activity there is to establish a Specially Protected Nature Territory, at the very least a zoological (game) preserve. In addition, we can examine the possibility of the implementation of a flexible system of game use, using this area as a model territory.

SEASONAL POPULATION DYNAMICS OF WATERFOWL IN "OLEKMINSKIY" NATURE RESERVE

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We present and analyse information on the seasonal visual migrations of waterfowl (time periods, abundance and long-term dynamics).

Twenty-four species of waterfowl migrate through the territory of "Olekminskiy" Nature Reserve. Nine species appear only on migration, the rest are represented both on migration and during nesting. The Bean Goose (*Anser fabalis*), Whooper Swan (*Cygnus cygnus*), Mallard (*Anas platyrhynchos*), Pintail (*A. acuta*), Teal (*A. crecca*), and Tufted Duck (*Aythya fuligula*) are rather numerous species. A patchy distribution of wetlands and their limited biodiversity determine the presence of only two places where pronounced migration and regular stopovers of migrants is observed: the lake-bog complexes in the Olekma River valley and, to a lesser degree, the source of the Tuolba River. The overall number of waterfowl flying through the territory of the reserve at the time of seasonal migrations is approximately 10,000–20,000 individuals. However, the wetlands of the nature reserve attract on average only 5 % of migrants as a site for resting and feeding; for the majority of the migrating waterfowl, migration here is transitory. The dynamics and time periods of the migration are essentially the same as on the Lena-Amgun interfluve and corresponding areas of the Lena River valley. Some differences are traced to the numbers of individual species. Thus, here there is a site of pronounced migration of the Whooper Swan, which numbers from 4,500–5,500 per season.

The overall duration of the migration period of the birds is ecologically linked to the wetlands, comprising 1.5 months of spring to 2.5 of autumn; the number of days when the pronounced migration is observed does not exceed 18–23 in spring (from 5–12 to 22–30 May) and 25–40 in autumn (from 15–20 August to 25 September – 5 October).

The long-term dynamics of the migratory numbers in a host of species of geese, swans and ducks has opposing tendencies (evident increase, cyclical fluctuations, and decrease). However, the overall number of waterfowl migrating through the territory of Oleminsk State Nature Reserve shows a decreasing trend, and that is seen in the observation data of both the spring and the autumn migrations.

ROUTES, TIMING AND INTENSITY OF GOOSE MIGRATION ON NORTHERN SAKHALIN AND THE TARTAR STRAIT MAINLAND

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The overall results of 20-year observations on the migration of geese on Northern Sakhalin and the Tartar Strait mainland are presented, including the phenology of migration and the population dynamics of the most common species: the White-fronted Goose (*Anser albifrons*) and the Bean Goose (*A. fabalis*). The main stopover sites of the geese are revealed. Since 2005, an increase in the intensity of migration and a shifting of migration routes in an easterly direction have been noted. If earlier the main migration of geese occurred at a significant distance from the coast – over the northwestern Sea of Okhotsk, then since 2005 the main stream of migrating geese has been recorded over the northern part of Sakhalin Island and the Tartar Strait mainland. It is possible that one of the reasons for such a shift is connected with the changing weather conditions, particularly with a change in the circulation of the air mass over the northwestern Sea of Okhotsk.

INTERACTIONS BETWEEN SPRING-STAGING GOOSE SPECIES: A CASE STUDY FROM VESTERÅLEN, NORTHERN NORWAY

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Several arctic-nesting goose populations have increased in numbers and expanded in distribution. During the last decade they also have increasingly overlapped in space, time and habitat. Interspecific interactions, in terms of direct interference or resource depletion, have been demonstrated in several studies. Few studies have, however, investigated the underlying mechanisms. Pink-footed geese (*Anser brachyrhynchus*) traditionally make a spring stopover in Vesterålen in northern Norway. Over the last decade, however, increasing numbers of Barnacle geese (*Branta leucopsis*) have invaded the area. In this presentation we give an overview of the numbers and distributions of the two goose species in the Vesterålen region. Detailed records enable us to evaluate their distribution, both in time and space. Information from detailed studies at one specific location suggest some of the underlying mechanisms for the present species-specific distributions. The distribution data demonstrate that Barnacle geese now occupy central areas, which formerly were preferred by Pink-footed geese. Numbers of Pink-footed geese have remained stable, but the geese have moved to fields further away from the coast and to more peripheral fields. In mixed flocks, Pink-footed geese predominantly feed at the flock edges; in interspecific aggressive encounters both species are equally successful, suggesting that Pink-footed geese are not pushed out by, but avoid, Barnacle geese. Before the invasion of Barnacle geese, Pink-footed geese grazed the grass down to an average height of 14 mm; nowadays, the grass height is reduced to an average of 9.5 mm. Barnacle geese have a competitive advantage, being shorter-billed and faster-pecking than Pink-footed geese. Hence, the pastures are probably not profitable for Pink-footed geese anymore, and they avoid the sites used by Barnacle geese. Because the potential area for geese is limited and because the Pink-footed geese have become displaced from prime feeding sites, their net energy intake rates are likely to be affected.

BIOENERGY IN UKRAINE: BALANCING BIODIVERSITY, CONSERVATION AND BIOENERGY PRODUCTION IN POLTAVA OBLAST, UKRAINE

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Eastern Europe holds a large potential for production of biomass, due to the vast areas available at low opportunity costs. Bioenergy is still an untapped resource here. However, bioenergy crops are also criticized for replacing valuable agricultural crops and for causing the clearance of natural areas. Key issues in a risk-mitigation strategy in biofuel production are 1) the conservation of areas with significant biodiversity value, 2) the mitigation of effects related to indirect land-use change, and 3) the promotion of agricultural practices with few low emissions and low negative impacts on biodiversity. These aspects form the basis for a large biofuel trial project in Poltava Oblast (Ukraine). Three options are being developed for bioenergy: biomass of natural reed (*Phragmites australis)* stands, the energy crop switchgrass (*Panicum virgatum)* and the by-product straw. All options in principle do not compete with land for food production. In the trial project in Poltava, 6000 ha of reed land will be harvested. The total area of wetlands in the Ukraine is some 10.081 km^2 (1.68 % of the total territory). The reed lands provide important environmental services and are currently used for fishing and hunting. Most reed lands are burned in autumn and winter. Controlled harvesting can result in preserved old reed stands, which can benefit key marshland birds. Wheat is grown on a total of 8 million ha in Ukraine. Vast quantities of straw are currently burned in the field. Switchgrass can be grown on degraded soils, and this increases the soil humus content and accelerates soil restoration, producing at the same time valuable biomass. As switchgrass is harvested in winter, when biomass is dry, the crop offers seeds for food and cover in winter benefiting some bird species. The use of biomass can significantly benefit rural communities, and the national economy. Depending on the yield, one hectare of reeds replaces 2000 litres of heating oil (approximately 6 tons of CO_2 emissions). The potential for biofuels is enormous. There can be an environmental gain through increasing biodiversity, decreasing air pollution and stabilizing soil on degraded land when such a project is well implemented. The challenge we face is to develop this potential without compromising biodiversity and other sustainability conditions. The development of sustainability standards, such as NTA8080, will be an important condition for bioenergy development.

THE GOOSE HAS (NOT YET) LANDED

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Group living is generally seen as an anti-predator strategy, but grouping may have other meanings as well. Flocking and group foraging in geese probably enhance foraging effectiveness because foraging groups can give information to incoming groups about foraging conditions. In 1973–1974, Drent and Swierstra conducted experiments with flocks of model Barnacle geese (*Branta leucopsis*) in the polder of the Island of Schiermonnikoog, The Netherlands, to study the reaction of incoming Barnacle geese early in the morning. Of the 22 first landings in January and February, 19 occurred in the vicinity of the models. The model flocks clearly acted as a nucleus and attractant. In December and January in 2010–2011 we repeated the same experiment with the same models and the same set-up in the same polder. Out of the 18 first landings none occurred close to the models. Geese did not react at all to the models. Apparently something has changed in the past 27 years. We offer the following explanations. In the first place, geese are much better protected than in the past and for many years now have not been disturbed and persecuted on the island as they had been earlier. Therefore, they feel safe in smaller groups and show more spacing within the

polder. Secondly, due to intensification of agricultural use and, especially, the increased use of fertilizer, the quality of the grass in the polder is now very high throughout the area and not limiting to the geese. Therefore, the model geese do not convey any information (anymore) because the grazing is good everywhere and there is very little variation in the intake rate of digestible nutrients in the different parts of the polder.

SPRING MIGRATION TIMING OF GPS-TRACKED WHITE-FRONTED GEESE (*ANSER ALBIFRONS*): DO THEY FOLLOW A GREEN WAVE?

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Many migratory herbivores seem to follow the onset of spring during their migration in order to acquire the most energy- and protein-rich plants: they follow a green wave. Because the onset of spring is climate-dependent, spring migration may be impacted by presumed changes in climate. In this study, whether White-fronted geese indeed follow the green wave was tested using the measures of cumulative temperature and snow cover. Cumulative temperature was described in Growing Degree Days (GDD). Alternative explanations for the timing of the spring migration of these geese were investigated using photoperiod accumulation and latitude. During the study a new criterion was developed that explained the timing of the geese very well: the GDD surge, the third derivative of the GDD. The GDD-surge maxima represent the peaks in acceleration of temperature. It was found that White-fronted geese do seem to follow the peaks in the GDD surge along their spring migration, with breeders being closer to the GDD-surge maxima than non-breeders. Our findings thus not only predict the timing of spring migration, but also indicate breeding status.

LONG-TERM TRENDS IN THE ABUNDANCE OF ANSERIFORMES ON THE LAGOONS OF THE WEST COAST OF THE MIDDLE CASPIAN SEA

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In the current work, data gathered in 1995–2010 on two key routes in the regions of the Turalinskaya and Sulakskaya lagoons of Daghestan (west coast of the Middle Caspian Sea) is summarized.

The lagoons lie in a narrow migratory corridor (“bottleneck”), through which passes the largest flyway in Russia of trans-Palaearctic migrants (Western Siberian – Caspian – Nile). On the given sector of the route a regular concentration of ecologically heterogeneous groups of Anseriformes is observed in different periods of the biological cycle. Of the 31 species of geese recorded on the lagoons, 19 were chosen as representatives according to the principle of breadth of range, difference in ecological preferences and relative stability in numbers on migration. They were divided into three groups of abundances (dominant, subdominant, and subordinate). In evaluation of the state of the populations of regularly migrating Anseriformes, as well as the reasons for long-term fluctuations of their numbers, the method of long series of observations on the busiest routes of migration was employed. Different scenarios of the regulation of goose numbers on local (for example the lagoons of Daghestan) and global levels under the impact of a combination of regulating factors were analyzed. Of the 19 representative taxa, 14 were depressed: *Anser anser, Cygnus olor, C. cygnus, Tadorna ferruginea, T. tadorna, Anas strepera, A. penelope, A. acuta, A. clypeata, Netta rufina, Aythya ferina, A. nyroca, A. fuligula, Mergus albellus*, and five were elevated: *Anas platyrhynchos, A. crecca, A. querquedula, Aythya marila* and *Bucephala clangula*, or remained steady, and

that might be valued as an alarm bell for the working out of a combination of measures for the protection of the aforementioned taxa on regional and Eurasian scales. Analysis of the obtained date allows us to conclude that the current state of the populations of the majority of representative species is the result of a combination of influences of five regulating factors: *hydroclimatic* (change of the range limits in relation to the phase of the hydroclimatic cycle); *anthropogenic* (the redistribution of birds within the range as a result of destruction of the natural terrain and hunting pressure); *feeding* (depression of the productivity of the Caspian Sea); *synurbization* (growth of the number of limnophiles owing to their acclimation to anthropogenic landscapes); and *meteorological* (redistribution of birds in relation to the weather conditions of the particular year).

RECENT CHANGES IN THE DISTRIBUTION AND ABUNDANCE OF LESSER WHITE-FRONTED GEESE (*ANSER ERYTHROPUS*) IN EASTERN CHINA

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The globally threatened Lesser White-fronted Goose is designated 'Vulnerable'. The world population has declined greatly since the 1940s to 25,000–28,000 individuals currently. We have collected historical and recent information on the numbers and distribution of the Lesser White-fronted Goose in China, and the analysis shows that: (1) numbers have declined greatly in recent decades, from over 60,000 individuals in the 1980s to about 20,000 in recent years, but have now stabilized around 20,000; (2) the main range has shrunk from a large area, covering the Jiangsu coast, Poyang Lake, Dongting Lake and the Anhui lakes, to a very small area now mainly concentrated at a few sites on East Dongting Lake. There is an urgent need to understand why this area is so important for the species. Likely reasons for the decline in numbers and the large distributional change are habitat loss and degradation, and hunting. Hydrological changes caused by the Three Gorges Dam can be expected to impact heavily on the remaining key site for the species.

DIET AND HABITAT USE OF WINTERING LESSER WHITE-FRONTED GOOSE (*ANSER ERYTHROPUS*) IN EAST DONGTING LAKE, CHINA

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After contractions in range in the last 40 years, the IUCN-designated-Vulnerable Lesser White-fronted Goose is now almost entirely confined to one wintering site in the Eastern Palearctic (East Dongting Lake) in the Yangtze River floodplain of China. Even within this site, the species is highly restricted to relatively few known resorts during winter. Here, we demonstrate that part of the explanation may be their confinement in spring and autumn to swards of the graminoids *Alopecurus* and *Eleocharis*, which form sparse, low-biomass swards that are not exploited by other *Anser* goose species, which are numerous at the site. In mid-winter, these food items are not available and Lesser White-fronted geese are forced to switch to *Carex* beds, which fail to maintain the daily energy balance of the species, a fact confirmed by falling API measurements in this species at this time. We assume that the small size and short bill of the Lesser White-fronted Goose contribute to the ability of this goose species alone to exploit these swards (which are highly geographically restricted at East Dongting Lake) and, especially, to accumulate fat stores in autumn in anticipation of energetic short-falls in mid-winter. The same bill morphology makes the species ineffective at harvesting the longer *Carex* swards that are abundant at the site in mid-winter.

THE CURRENT STATUS OF THE SUMMER GREYLAG GOOSE (*ANSER ANSER*) POPULATION IN KAZAKHSTAN

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On the basis of regular estimation of the Kazakhstan population of the Greylag Goose (*Anser anser*) and an assessment of the habitat conditions, the major environmental factors under whose influence the population is decreasing, are considered.

The main natural factors are the process of desertification, climate change and disturbance of the natural cycling of the hydrologic regime of the wetlands. The reduction of the Greylag Goose population of Kazakhstan may possibly be a consequence of the reduction in numbers of this goose species in the more extensive territories adjacent to Kazakhstan – in the Volga River basin, the Southern Ural Range region, Western Siberia and on the Altay Plateau. Among the negative anthropogenic factors, the most important are illegal hunting, the fishery, recreational disturbances, and uncontrolled water use.

At the same time that these negative processes are depressing the Kazakhstan population of the Greylag Goose as a whole, in separate, localised wetland habitats (the Korgaldgin lakes system in Central Kazakhstan and the northern part of the Aral Sea in Southern Kazakhstan), the local populations of this species are increasing. These examples point out the available significant potential to restore the overall Kazhakstan population of the Greylag Goose to its former, optimum size should negative factors be eliminated.

SPRING WATERFOWL LOSS ON FIELDS OF WINTER CROPS ON THE LOWER DON

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Material was gathered in the southern Azov District of Rostov Oblast at the end of February – beginning of March 2010 in the "Kugeyskaya Pad" tract of land – a drainless basin (area approximately 30 km^2). More than half the area of the basin is occupied by meadows and high-grass areas on fallow lands, but the perimeter is ploughed and sown with agricultural crops (wheat, sunflowers, corn). In November 2009, bait was laid down on the sown fields in the form of grains treated against voles settling in the fields (the composition of poison remains unknown). Several tens of people participated in this measure. People lined up in ranks with pails filled with grain, walked around the entire area of the sown land and with a spoon spread out bait beside encountered holes of rodents. The quantity of poisoned grain on the fields was very great. The grain lay there for the entire winter, and at the end of February, after the snow had left, became available for different groups of waterfowl (geese, ducks and swans) flying to these fields from Taganrog Bay of the Sea of Azov to feed. The attraction of the birds to exactly these fields was induced by the general landscape of Kugeyskaya Pad – a large area lacking shelterbelts, and with extensive shallow waters (5–25 cm in depth) on winter crops, formed after the thawing of snow. The use of the grain by the waterfowl led to the poisoning and death of the birds right on the fields. On 23 February, six Greylag geese and not fewer than five mallards were discovered, and on 26 February another 8 Greylag geese, two mallards, and one wigeon, on which White-tailed eagles, ravens, Hooded crows and Caspian gulls were feeding. Since not all winter-crop fields were inspected, but remains of birds were found in passing in censuses, it is clear that the number of dead waterfowl was larger than this. Just at this time, small flocks of Greylag geese and mallards, as well as Mute and Whooper swans, continued to fly in to feed on the field where several tens of birds had already died. Apparently the death of birds as a result of the poisoning could occur beyond the feeding site, which means the birds did not fix the source of the problem. Individuals

weakened by the poison became easy prey for various predators. For example, on 11 March a pair of Whooper swans was observed on a shallow-water body on the edge of a fallow field with high grass not attempting to take off when we approached it at a distance of 30–35 m, and on 21 March both birds were found in essentially the very same place completely torn to pieces by predators. There is no doubt that the death of both swans was caused by the toxic effects of consumed grain.

RADAR OBSERVATIONS OF MIGRATORY WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) IN THE LOWER DON VALLEY, RUSSIA

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We present some results of continuous and ongoing 10-year studies of migrating White-fronted geese with the 10-cm-wave surveillance airport radar located in Rostov-on-Don.

White-fronted geese migrate in huge flocks in the northeastern Azov Sea region and are recorded both visually (daytime) and acoustically (nighttime). The radar captures an area 400 km in diameter. Flocks of geese are registered within 80–100 km of the radar location; some larger flocks, flying at altitudes greater than 2500 m, can be followed at distances up to 120 km. Each flock coming within the zone of radar detection gives a return signal that appears as a radar clutter on the plan position indicator display; the set of such clutters indicates the trajectory of movement of the flock. Exposure of the plan position indicator display for a specified period of time (30 min.) shows the overall movement of flocks appearing within a 100-km radius of Rostov-on-Don.

Analysis of the obtained data enabled us to determine the size of the flocks, the specific compass bearing of each flock, and the dynamics of these factors. The dynamics of the intensity of migration during the season were shown. The relationship between daytime and nighttime migration was determined. Characteristics of the spatial distribution of migrating flocks were studied. Possibilities of determining the numbers of geese migrating through the lower Don Valley were pointed out. Some correlations between the intensity of migration and the meteorological conditions in the region were detected. Patterns for calculating the starting point of the flocks observed afterwards in various areas of the northeastern Azov Sea region, both through visual observation and on the plan position indicator display of the radar, are presented.

FLOCK BEHAVIOUR IN MIGRATING ANSERIFORMS IN RELATION TO AIRCRAFT COLLISIONS AND ESCAPES FROM THEM

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Cases of collisions of aircraft with various representatives of anseriforms occuring outside landing strips were analyzed. Flying flocks exhibited diverse behaviour in relation to an aircraft. Birds actively set the trajectory of their flight, leading both to the encounter with the aircraft and to its avoidance. Observations on the airfield radar “Tesla” with a 3.2-cm bandwidth in the airport of Rostov-on-Don showed characteristics of the flight of migrating flocks at night and during daytime upon their coming close to flying airplanes. Printouts from course and glide indicators from the airfield radar were made, which enabled us to reconstruct the sequential stages of the movement of the flocks, the result of which became their hitting the aircraft or the unimpeded divergence of the airplane and the flock in the air. Similar cases of collision, where analogous behaviour of the flock of birds in relation to the aircraft is assumed, are pointed out. Recommendations are given for the use of visual features for the ornithological safeguarding of aircraft.

EFFECTS OF WEATHER CONDITIONS ON THE BREEDING OF WHITE-FRONTED GEESE (*ANSER ALBIFRONS*) ON KOLGUYEV ISLAND

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The investigations were conducted in 2006–2008. In 2006, spring was earlier. In 2008 lower temperatures and a later timing of snowmelt were observed. The extent of migration for the years of the study essentially did not change. Peak nesting in 2006 was noted from 30 May to 10 June. In 2008 it was observed a week later. Duration of the pre-nesting period in the year with the late onset of spring was longer. Intensity of feeding by the birds in the pre-nesting period in the late season of 2008 was significantly lower than in the early season of 2006 (32 and 44 pecks/min., respectively). A fatness index of the geese (abdominal profile index), evaluated on a seven-point scale prior to nest initiation, in the late season of 2008 was one point lower than in the early year of 2006 (5,1 ± 0,1 in 2006 and 4,2 ± 0,04 in 2008 for females, and 4,2 ± 0,1 in 2006 and 3,4 ± 0,03 in 2008 for males). In the late seasons of 2007–2008 differences in mean egg sizes in clutches of geese in comparison with the early season of 2006 were noted. At the same time, the weather conditions of the season had no significant effect on the density of nesting, which on average was 39 nests/km^2; mean clutch size (3.4–3.5 eggs); nesting success (79–85 %); and mean brood size at hatching (3.0–3.2 goslings); as well as the mean brood size at fledging (2.3–2.4 goslings). However, the interval between the fledging of the goslings and the departure from the island in the early season was 2–4 weeks, whereas in the late season of 2008 it did not exceed 1–2 weeks, as a consequence of which the overall state of fatness, both in the adults and in the goslings, prior to departing the island in the late season was lower than in the early one. Thus, the late spring affected, first of all, the fattening of the birds prior to nesting, but also shifted the overall breeding period, while not affecting clutch size, density of nesting or brood size.

THE RUDDY SHELDUCK (*TADORNA FERRUGINEA*) IN THE MIDDLE AND NORTH OF THE LOWER VOLGA REGION: POPULATION DYNAMICS AND CHANGES IN DISTRIBUTION IN THE 19TH AND 20TH CENTURIES

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Ruddy shelducks inhabiting the Middle and Lower Volga regions belong to the West-Central Asia/Caspian population (Rose, Scott, 1996). Over the past century, considerable long-term fluctuations in the abundance of the species have occurred in the region. In the 19th and the first half of the 20th century, Ruddy shelducks were common in Samara, Ulianovsk, and Saratov oblasts, nesting up to 53°50' N. A dramatic decrease in the abundance of this species occurred there in the 1940s–1960s; a few isolated breeding areas were preserved. Gradual restoration of the population began in the 1970s–1990s, and by the turn of the century not only a noticeable increase in numbers, but also in northward dispersal, was recorded. The state of the population in the region has been stable in recent decades: 520–560 pairs breed there compared to a few dozen in the periods of population lows. The northernmost encounter of a breeding pair was recently recorded at 54°37' N, 48°58' E. Population lows could have been caused by the construction of a series of water reservoirs and the consequent flooding of the Volga River floodplain; cultivation of virgin lands; pest control; extensive elimination of red foxes (*Vulpes vulpes*) and marmots (*Marmota bobak*), which resulted in a dramatic decrease in the abundance of suitable nesting holes; and hunting and poaching. Restoration of the population is likely to be favouredby the appearance of numerous artificial water bodies in the wake of the building of large-scale irrigation projects and of floodplain ponds thanks to the increased numbers of cattle, as well as by the rapid increase in the abundance of marmots that followed the protective measures taken in the region in the

late 20th century. Even in the most unfavourable years, a certain number of Ruddy shelduck pairs bred in some areas along the Volga River and in the steppe marmot refuges. Such refugia provided for relatively rapid restoration of the ruddy shelduck population in the Middle and Lower Volga regions after the periods of lows.

DIVING DUCKS IN THE MIOCENE OF MONGOLIA

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The rich avifauna from the Middle Miocene (10–12 million ybp) from the Sharga area in Western Mongolia contains no less than ten taxa of anseriforms, amongst which are three forms of diving ducks, described by us as new genera and species: *Sharganetta mongolica*, *Nogusunna conflictoides* and *Protomelanitta gracila* (Zelenkov 2011). All three forms were described by means of their humeri, which are very diagnostic for anatids. Besides the humeri, a host of other bone elements are known from Sharga, but in the majority of cases they cannot be placed in any of the above-mentioned taxa of diving ducks. *Sharganetta mongolica* was the size of the modern Long-tailed Duck (*Clangula hyemalis*), and *Nogusunna conflictoides* – of the Smew (*Mergus albellus*). The humerus morphology of *Sharganetta* and *Nogusunna* indicates similarity of those forms to members of the Subfamily Oxyurinae of Early and Middle Miocene, which were widely distributed in the Miocene, and represented in Europe by the genus *Mionetta*, in North America by the genus *Dendrochen*, and in New Zealand by the genera *Manuherikia* and *Dunstanetta. Sharganetta* and *Nogusunna* are undoubtedly more advanced morphologically than *Mionetta*, but demonstrated a conflicting combination of traits of the humerus. The absence in Sharga of the typical Oxyurinae coracoid bones points to an aberrant systematic position for these two forms. Not ruled out is the fact that their similarity to the primitive Oxyurinae in the structure of the humerus is plesiomorphic. *Protomelanitta gracila* (a duck, surpassing a little in size the modern Smew) shows a more advanced morphology than do the two above-mentioned forms, and partly resembles modern Mergini. Morphologically, *Protomelanitta* most of all is similar to modern *Melanitta* (and may be their ancestor), however it has primitive characteristics pointing to a basal position of this form in relation to modern Mergini. The genus *Protomelanitta* is similar, too, to other supposed Mergini described from the Miocene of North America. The presence in the Middle Miocene in Asia of endemic forms of diving ducks supports the independent evolution of anatids on this territory in the Early Neogene.

EARLY EVOLUTION OF ANSERIFORMS: HOMOPLASY AND THE PHYLOGENETIC POSITION OF PRESBYORNITHIDS

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Presbyornithids (Presbyornithidae) were extinct members of Order Anseriformes known from the Late Cretaceous – Eocene. Determination of the phylogenetic position of these birds is of key significance for the reconstruction of the early evolution of the order. While Presbyornithidae were known only from a postcranial skeleton, they were placed at the base of the orders Phoenicopteriformes and Charadriiformes, and that allowed the supposition of a relationship of these groups of birds. Later findings of skulls of Presbyornithidae showed that these birds had a specialized jaw apparatus adapted to filter feeding and very similar to such in modern *Stictonetta* ducks. Cladistic analysis (taking into account the skull traits) showed sister relationships between anatids (Anatidae) and presbyornithids, while screamers (Anhimidae) turned out to be located closer to the base than the presbyornithids on the phylogenetic tree of anseriforms. Such a conclusion refutes the idea that the complex jaw apparatus of anatids and presbyornithids arose only once. Nevertheless, in the postcranial skeleton of presbyornithids there are virtually no characteristics pointing to their belonging

to Anseriformes. Even screamers, the jaw apparatus of which is constructed primitively, have a postcranial skeleton completely typical for anseriforms. The effect of the sister relationships between presbyornithids and anatids, obtained with the help of cladistic methods, was evidently provoked by a "multiplication" of synapomorphies as a result of the coupled evolution of skull traits, but the structure of the jaw apparatus itself is a "morphological homoplasy" (true synapomorphy, appearing in separate branches of the phylogentic tree). Application of the idea of homoplasy enables the diversion on the phylogenetic tree of presbyornithids and modern anseriforms, not contradicting the uniqueness of the ancestry of the complexly structured jaw apparatus of these birds. Presbyornithidae should be placed at the base of the anseriform phylogeny; not excluding their relationship to flamingos. Screamers evidently lost the specialized jaw apparatus secondarily, and that is evidenced by the presence in them of rudiments of a filtering apparatus.

TAXONOMIC LIST OF ANSERIFORMS OF NORTHERN EURASIA

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The sequence of the enumeration of species in the order Anseriformes for the territory of Northern Eurasia (within the borders of the former USSR) is proposed to stand in agreement with a phylogenetic tree revealed with the help of molecular-genetic data (Gonzalez *et al.*, 2009).

The list approximately corresponds to the sequence of the separation of species and their groups from common ancestors, *i.e.*, from the earliest to the most recently diverging species. In the composing of the list several sources were used (Stepanyan, 2003; Zhukov, 2004; Koblik, Redkin, 2004; Koblik *et al.*, 2006). Currently the list of species of the order Anseriformes in Northern Eurasia includes 66 species:

1. *Oxyura leucocephala* (Scopoli, 1796)
2. *Cygnus cygnus* (Linnaeus, 1758)
3. *Cygnus buccinator* Richardson, 1831
4. *Cygnus columbianus* (Ord, 1815)
5. *Cygnus bewickii* Yarrell, 1830
6. *Cygnus olor* (J.F. Gmelin, 1789)
7. *Branta bernicla* (Linnaeus, 1758)
8. *Branta ruficollis* (Pallas, 1769)
9. *Branta leucopsis* (Bechstein, 1803)
10. *Branta hutchinsii* (Richardson, 1832)
11. *Branta canadensis* (Linnaeus, 1758)
12. *Anser canagicus* (Sewastianov, 1802)
13. *Anser caerulescens* (Linnaeus, 1758)
14. *Anser rossii* Cassin, 1861
15. *Anser indicus* (Latham, 1790)
16. *Anser cygnoides* (Linnaeus, 1758)
17. *Anser brachyrhynchus* Baillon, 1833
18. *Anser fabalis* (Latham, 1787)
19. *Anser anser* (Linnaeus, 1758)
20. *Anser erythropus* (Linnaeus, 1758)
21. *Anser albifrons* (Scopoli, 1769)
22. *Clangula hyemalis* (Linnaeus, 1758)
23. *Polysticta stelleri* (Pallas, 1769)
24. *Somateria fischeri* (Brandt, 1847)
25. *Somateria spectabilis* (Linnaeus, 1758)
26. *Somateria mollissima* (Linnaeus, 1758)
27. *Melanitta perspicillata* (Linnaeus, 1758)
28. *Melanitta nigra* (Linnaeus, 1758)
29. *Melanitta americana* (Swainson, 1831)
30. *Melanitta deglandi* (Bonaparte, 1850)
31. *Melanitta fusca* (Linnaeus, 1758)

32. *Bucephala albeola* (Linnaeus, 1758)
33. *Bucephala islandica* (J.F. Gmelin, 1789)
34. *Bucephala clangula* (Linnaeus, 1758)
35. *Mergellus albellus* (Linnaeus, 1758)
36. *Mergus serrator* Linnaeus, 1758
37. *Mergus squamatus* Gould, 1864
38. *Mergus merganser* Linnaeus, 1758
39. *Aix galericulata* (Linnaeus, 1758)
40. *Tadorna tadorna* (Linnaeus, 1758)
41. *Tadorna cristata* (Kuroda, 1917)
42. *Tadorna ferruginea* (Pallas, 1764)
43. *Marmaronetta angustirostris* (Ménétries, 1832)
44. *Netta rufina* (Pallas, 1773)
45. *Aythya nyroca* (Güldenstädt, 1770)
46. *Aythya ferina* (Linnaeus, 1758)
47. *Aythya americana* (Eyton, 1838)
48. *Aythya valisineria* (Wilson, 1814)
49. *Aythya baeri* (Radde, 1863)
50. *Aythya fuligula* (Linnaeus, 1758)
51. *Aythya marila* (Linnaeus, 1761)
52. *Aythya affinis* (Eyton, 1838)
53. *Histrionicus histrionicus* (Linnaeus, 1758)
54. *Anas formosa* Georgi, 1775
55. *Anas querquedula* Linnaeus, 1758
56. *Anas clypeata* Linnaeus, 1758
57. *Anas strepera* Linnaeus, 1758
58. *Anas falcata* Georgi, 1775
59. *Anas penelope* Linnaeus, 1758
60. *Anas americana* J.F. Gmelin, 1789
61. *Anas* (*poecilorhyncha*) *zonorhyncha* Swinhoe, 1866
62. *Anas* (*poecilorhyncha*) *poecilorhyncha* J.R. Forster, 1781
63. *Anas platyrhynchos* Linnaeus, 1758
64. *Anas acuta* Linnaeus, 1758
65. *Anas crecca* Linnaeus, 1758
66. *Anas carolinensis* J.F. Gmelin, 1789

MOLECULAR GENETIC STUDIES OF DABBLING DUCKS IN THE RUSSIAN FAR EAST AND WORLDWIDE

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Phylogeography and population genetics of some dabbling duck species have been investigated. Variability of the control region of mitochondrial DNA, nuclear introns, and/or nuclear gene parts was analyzed. Phylogeographic study of the Mallard (*Anas platyrhynchos*) carried out on populations of the Russian Far East, Western Europe, Aleutian Islands and Alaska revealed weak phylogeographic structure and low genetic differentiation in Eurasia and between Asia and North America. Two groups of mtDNA haplotypes (A and B) were found in mallards from Primorye, Alaska and the Aleutian Islands, which could be explained by hybridization with closely-related species: *A. zonorhyncha* in Primorye and *A. rubripes* in North America. The alternative hypothesis of incomplete lineage sorting is equally likely.

Evidence of ancient introgression (~14,000 ybp) was found in the gadwall (*A. strepera*) gene pool based on two nuclear introns and mtDNA variability. Introgression has resulted in the widespread distribution and high frequency of falcated teal (*A. falcata*) mtDNA (5.5 % of haplotypes) in North America. Sequencing five nuclear introns and the control region of mtDNA in the Gadwall suggests that gadwalls colonized North America from Eurasia during the Late Pleistocene (~81,000 years ago).

Genetic structure of Far East population of the European Widgeon (*A. penelope*) was investigated to investigate the partitioning of mitochondrial DNA variation between Primorye and Anadyr regions, and to test the prediction that hybridization between European and American (*A. americana*) widgeons in the Anadyr region takes place. We discovered low genetic differentiation of Far Eastern populations of the European Widgeon. The presence of the American Widgeon haplotype in the Anadyr sample could be due to hybridization between these two species. Haplotype sharing resulting from interspecific hybridization was also found in North America: two *A. penelope* captured there had *A. americana* haplotypes. All individuals with mtDNA disagreeing with species boundaries had CHD (chromohelicase-DNA binding gene) alleles that clustered conspecifically.

LOCATIONS OF PEAK CONGREGATIONS OF THE BEWICK'S SWAN (*CYGNUS BEWICKII*) ON SAKHALIN IN THE MIGRATION PERIOD

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The Bewick's Swan is in the Red books of Russia and of Sakhalin Oblast. Along Sakhalin, migration occurs of the eastern population of the species, which has the status "recovering".

At the beginning of the 20th century, the Bewick's Swan reached the abundance of the Whooper Swan (*Cygnus cygnus*); at resting sites up to 1000 individuals of one or the other species gathered (Hori 1932). In May 1984, V.A. Nechayev observed on the south of the island a flock of the Bewick's Swan with an abundance of approximately 300 birds, and A.Yu. Blokhin in October 1989 at Chaivo Bay saw only individuals and small flocks of this species.

Judging by our long-term observations, the abundance of the Bewick's Swan in the migratory period for the past decade has grown substantially. We observed the first large migratory concentration at the beginning of May 1993 on southern Sakhalin in Lososey [Salmon] Bay. Amongst 15,000 swans congregated there we could distinguish approximately 1000 Bewick's.

Spring migration of the Bewick's Swan in the northern regions of Sakhalin depends on the ice condition on the bays. Depending on the ice-forming conditions, the swans either form concentrations on the leads, or transit through this area. In the spring, larger congregations of Bewick's swans numbering from several dozen to several thousand birds form on Piltun and Chaivo bays.

Autumn migration of the Bewick's Swan slightly outstrips the migration of the Whooper Swan with respect to timing. On Piltun Bay, we recorded a concentration of the Bewick's Swan numbering more than 1000 individuals on 26.09.2001 (4,250 birds), 15.10.2006 (2,650), and 18.10.2007 (9,100). On Chaivo Bay, 12–16 October 2010, we observed a concentration of Bewick's swans numbering up to 3,500 birds at the mouth of the Bolshoy Garomay River. At the same time, an intensive migration of the Bewick's Swan was occurring over the bay. The average intensity of the movement of swans was 293 individuals per hour, with a maximum of 965 individuals per hour. In the period of the observations, the Bewick's Swan made up 98 % of all swans identified to species, and in total, in the concentrations and flying over the bay, 6,850 Bewick's swans were counted, as well as 110 Whooper swans and 7,900 swans of indeterminate species.

Currently at the beginning of the autumn migration of swans on northern Sakhalin at sites of traditional congregations of swans, the Bewick's Swan predominates in abundance.

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PROFESSIONAL BUDGETING AND FINANCIAL MANAGEMENT – We provide qualified assistance in draft budget planning and registration fee estimation, account management and payments handling, liaison with vendors and many other aspects of financial planning and management.

ADVANCED TECHNOLOGIES – Company's in-house integrated conference management software – Alternative Events - offers mechanisms of delegate on-line registration, abstract handling and Internet payment processing. For conference secretariat it is a useful tool for conference Web site support, customized reports generation and cash flow management.

ON-SITE MANAGEMENT – Our team will provide professional on-site coordination throughout the conference to control all services and to resolve any possible emergencies. Our personnel speak good English and we supply all the necessary equipment for registration as well as information desk.

Monomax Congresses & Incentives is proud to be a member of ***International Congress & Convention Association (ICCA)*** in MEETINGS MANAGEMENT category, being the only PCO presenting Russia on international professional arena.

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International Conference on the Waterfowl of Northern Eurasia

WATERFOWL OF NORTHERN EURASIA:
GEOGRAPHY, DYNAMICS AND POPULATION MANAGEMENT

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