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Numbers and distributions of geese in Hungary 1984–2009

Antal och utbredning av gäss i Ungern 1984–2009

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Abstract

Hungary has many areas of international importance for four goose species during migration and wintering. Monitoring of numbers started in November 1984 and has been carried out monthly in October–March since 1986/1987 at all important sites. The maximum count of Tundra Bean Goose has decreased from 100,000–120,000 birds in the 1980s and 1990s to about 15,000 today. Twelve sites are still of international importance. The maxima of Greater White-fronted Goose were below c. 50,000 in the 1980s. After a peak count of more than 150,000 in 1991/1992, maxima of c. 100,000 or more have been recorded in several subsequent seasons. Twenty-one sites are of international importance. The Lesser White-fronted Goose has declined drastically and after the 1997/1998 winter it is no longer recorded every month, and maximum has exceeded 53 birds only twice. Despite the small numbers, five sites are still of international importance. The Greylag Goose increased considerably both as a breeding bird and winter visitor. Currently the wintering population has stabilized with maximum counts of 25,000–30,000 birds. Seventeen sites are of international importance.

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Introduction

The Pannonic region is a highly significant wintering area for two goose species, the Tundra Bean Goose *Anser fabalis* and the Greater White-fronted Goose *Anser albifrons*, as well as an important migratory area for the Greylag Goose *Anser anser* in Europe. Before the marked decrease of the European population of the Lesser White-fronted Goose *Anser erythropus*, Hungary was an important area for the species. Other goose species (Red-breasted Goose *Branta ruficollis*, Barnacle Goose *Branta leucopsis* and Brant Goose *Branta bernicla*) occur only rarely (Philippona 1972, Ogilvie 1978, Fog 1982, Hudec 1984, van den Bergh 1985, Huyskens 1986, Rutschke 1987, Madsen 1987, 1991, Faragó et al. 1991, Faragó 1995, Derek et al. 1996, Madsen et al. 1999, MME Nomenclator Bizottság 2008).

Before the early 1980s there are few reviews of goose counts in Hungary (Sterbetz 1976, Lebret 1982, Sterbetz 1983). The IWRB organized the first goose symposium in Debrecen, Hungary, in 1981. Dr. István Sterbetz, director of the Hungarian Ornithological Institute and honorary chairman of the symposium, invited the author to participate. After the experience there, I started to organize the Hungarian Goose Monitoring (HGM) in 1984. This paper gives a summary of the results obtained during the quarter of a century that has elapsed.

Material and methods

Zoogeographically, the Carpathian Basin, or Pannonic region is separated from the Pontic region, which stretches to the west coast of the Black Sea, by the eastern range of the Carpathian Mountains. The distance between the two regions is not far, thus it is possible for the geese to move between the two regions (Faragó 1995).

The Hungarian Goose Monitoring (HGM) began in 1984 with counts in November, the month when peak numbers occur. Starting in 1986, monitoring

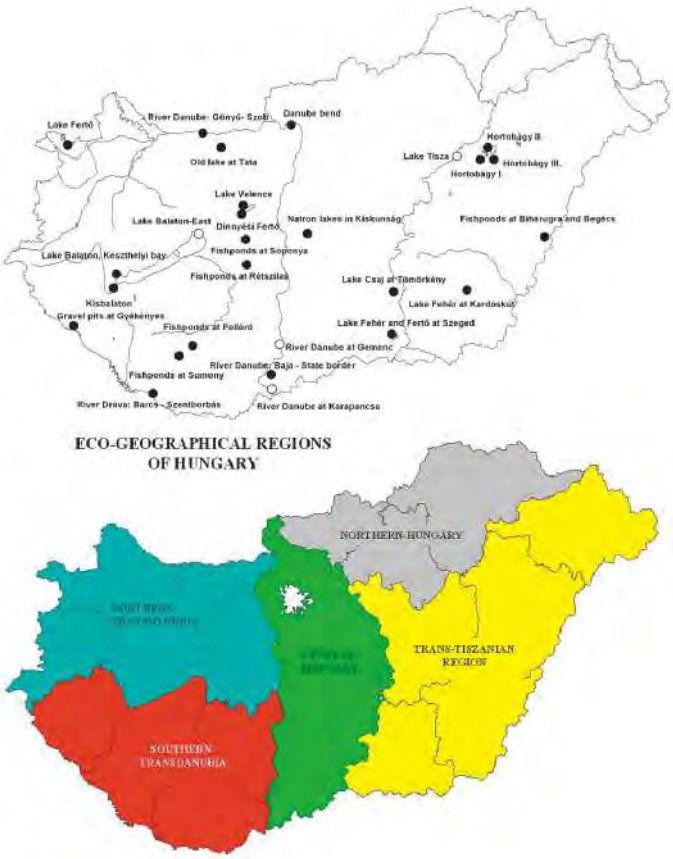

Figure 1. Observation sites/units of the Hungarian Waterfowl Monitoring (HWM) (above) and the eco-geographical regions of Hungary (below).
Observationsområden/enheter inom ungerska sjöfågelövervakningen (överst) och Ungerns ekogeografiska regioner (nederst).

was conducted on a monthly basis throughout the period October through March. In 1989–1995, we also counted the number of Greylag Geese in September, within the framework of the International Greylag Goose Counts (Faragó & Jánoska 1996). Since 1996 the census period was extended to nine months, from August to April, within the framework of the newly established Hungarian Waterfowl Monitoring (HWM; HGM is a part of HWM). Counts were made exclusively at the roosting sites. The counts were based on the geese leaving the roosts for the feeding grounds plus those remaining at the roost. I have shown that the methods that we use give reliable estimates of peak numbers (Faragó 1995).

The program includes all important roosting sites divided into 21 standard HGM sites (Faragó 2008a and Figure 1). Data from Hortobágy are treated as emanating from one site.

The observation sites are representative for each of the following five eco-regions: (1) Northern Transdanubia, (2) Southern Transdanubia, (3) Northern Hungary, (4) Central Hungary, (5) Trans-Tiszanian region (Figure 1). Consequently, the counts show the long-term population changes of the goose species at the national, regional and local levels.

Data-sheets were collected and processed at the Institute of Wildlife Management and Vertebrate Zoology of the University of West Hungary at Sopron (former Department of Wildlife Management of the Sopron University of Forestry and Wood Sciences) (Faragó 1998a).

The monthly counts also enable us to study distribution and trends for each phenological period. On the basis of the HGM counts we can determine: (A) seasonal and absolute maximum numbers, (B) phenology, (C) monthly dynamics of dispersion, (D) population trends, and (E) temporal changes of the predominance of the different species at the regional and national levels.

We publish the results in our periodical *Hunga-*

rian Waterfowl Publications (Faragó et al. 1991, Faragó 1998b, 1999, 2001a, 2002a, 2002b, 2005a, 2006, 2007a, 2007b, 2008b, 2010a, 2010b, Faragó & Gosztonyi 2003, 2009, Faragó & Jánoska 1996). We also publish them in thematic editions (Faragó 1995, Faragó & Jánoska 1996, Faragó 2008c). Hungarian results were also included in international reviews (Derek et al. 1996, Madsen et al. 1999).

The results that I give for each species are the absolute maximum observed during all the 25 years of investigation and the average of the maximum values observed in each season (25 seasons). (Maximum values have a particular role in defining population size). On the basis of the seasonal maximum values I determined the trends and drew the trend lines in the figures (with an Excel program). Population change was defined as the percentage difference between the starting and final values of the trend line. The calculation of the local trends was done in a similar way and the measure of change is demonstrated in maps with colour and width of arrows. The phenology of the goose species is shown in diagrams with the biggest and smallest monthly numerical value observed in each of the 9 months of August through April in all 25 seasons, and the monthly average values for the same 25 seasons. In the text I emphasise average values but also mention high monthly maximums.

Results

Tundra Bean Goose *Anser fabalis*

The Tundra Bean Goose is a relatively common migrating and overwintering species in Hungary. Within the framework of the HGM, the national maximum in one month was 196,750 individuals in November 1984. The average of the maximal values was 65,520.

The phenology is characterized by maximum of monthly average numbers in November and then a continuous decline until almost all birds have left in April (Figure 2). The monthly maximum numbers show a similar pattern apart from a peak in February caused by one single year. The number continuously decreases from the peak in November until spring migration in March with few remaining in April (Figure 2).

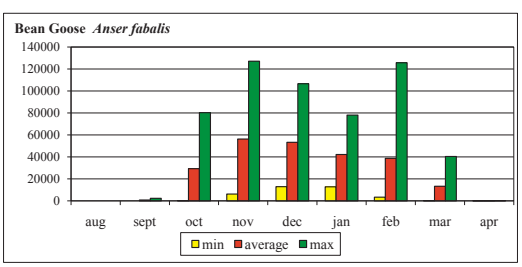

Figure 2. Phenology of Bean Goose in Hungary during the 25-year period: the observed minimum, average and maximum number of individuals in each month.
Sädgåsens säsongsförekomst under 25 år med observerat minsta, genomsnittliga och högsta antal fåglar varje månad.

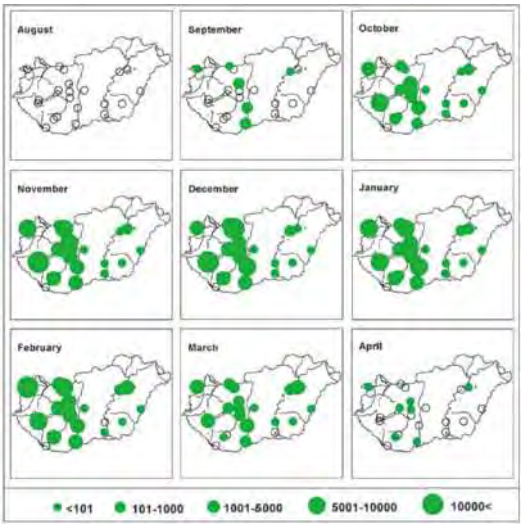

Figure 3. Monthly mean distribution pattern of *Anser fabalis* in Hungary.
Månatliga genomsnittliga utbredningen av sädgås.

The new investigations (Figure 3) support the earlier finding (Faragó 1995) that the Tundra Bean Goose predominantly appears in Transdanubia. During its peak in autumn, the highest number appears in Kisbalaton, Lake Velence and Dinnyési Fertő, fishponds at Soponya, Old Lake at Tata, Lake Fertő, Lake Balaton and the lower section of the River Danube. We observe the highest number in the same places in winter. Occasionally, however – with the increase of the number of the Greater White-fronted Goose – a significant number also appears in the Hortobágy. In spring the highest numbers are found in Lake Velence and Dinnyési Fertő, fishponds at Soponya, the Old Lake at Tata, Lake Fertő, and Kisbalaton. Hortobágy is also an important spring area for the species. We found a close connection and regional site exchange of geese between the site chains of Lake Fertő – Kisbalaton – the western basin of Lake Balaton – downstream of the River Dráva, and the Old Lake at Tata – Lake Velence and Dinnyési Fertő – fishponds at Soponya – eastern basin of Lake Balaton

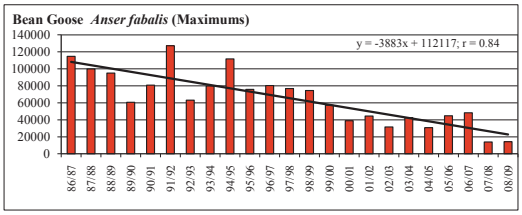

Figure 4. Seasonal maximum numbers and trend of *Anser fabalis* in Hungary.
Sädgåsens säsongsmaximum och trend.

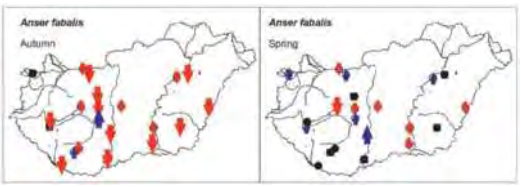

Figure 5. Local trends of *Anser fabalis* in autumn and in spring in Hungary.
Lokala trender för sädgås på hösten och våren.

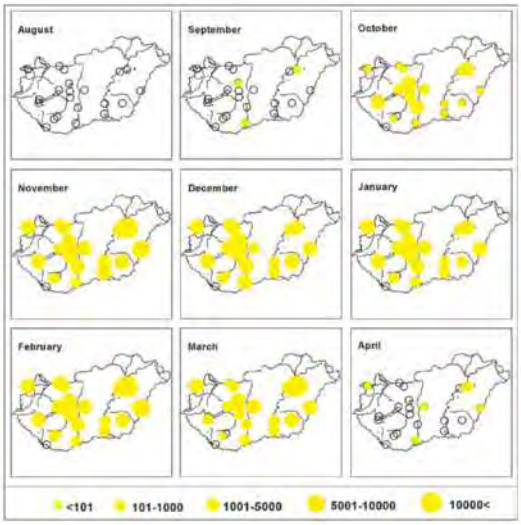

Figure 7. Monthly mean distribution pattern of *Anser albifrons* in Hungary.
Månatliga genomsnittliga utbredningen av blässgås.

– lower section of the River Danube in the wintering period (Figure 3).

On the basis of the yearly maximum numbers (most often the November count), the national population trend showed a significant, dramatic decrease of 76% in the period of examination (Figure 4). This decreasing trend can be attributed to a drastic decline of the autumn inflow of birds. However, the population in winter and spring showed a slight increase during the 25 years as was also found for some Transdanubian sites (Figure 5).

Greater White-fronted Goose *Anser albifrons.*
Greater White-fronted Goose is a common migrating and overwintering species in Hungary (Figure 6). The national absolute maximum was 165,771 in February 1992 and the absolute minimum was 0, which occurred in several years in August, September and April. The average of the maxima was 78,056.

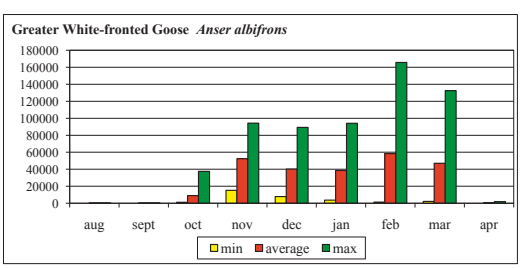

Figure 6. Phenology of Greater White-fronted Goose in Hungary during the 25-year period: the observed minimum, average and maximum number of individuals in each month.
Blässgåsens säsongsförekomst under 25 år med observerat minsta, genomsnittliga och högsta antal varje månad.

Its phenology is characterized by a moderate maximum in November and a more marked maximum in February and March. The minimum falls in December–January. The remaining April population counts were about 500 individuals on average (Figure 6).

Earlier studies of dispersion showed that the Greater White-fronted Goose is "the goose of the Great Hungarian Plain" (Sterbetz 1967, 1983) and this was confirmed by Faragó (1995). Our recent results demonstrate ever increasing numbers in Transdanubia over the last decade. During its peak in autumn, the highest number was observed in Hortobágy, the natron lakes at Kiskunság, Lake Velence and Dinnyési Fertő, Lake Fehér at Kardoskút, fishponds at Biharugra and Begécs, Lake Fehér and Fertő at Szeged, and Kisbalaton. Over 10,000 individuals were counted on several Transdanubian sites (fishponds at Soponya, Lake Fertő, Lake Velence and Dinnyési Fertő, River Danube at Gemenc). In spring the highest amounts were observed mainly on the Great Hungarian Plain with particularly high numbers in Hortobágy in February and March (Figure 7).

The annual maxima showed a positive trend (Fig-

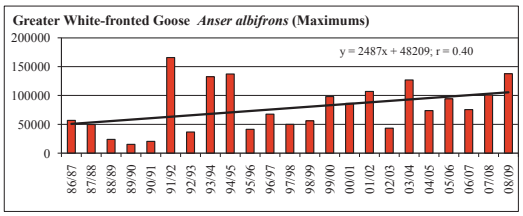

Figure 8. Seasonal maximal numbers and trend of *Anser albifrons* in Hungary.
Bläsgåsens säsongsmaximum och trend.

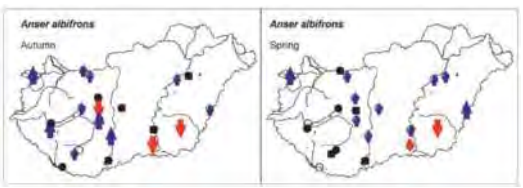

Figure 9. Local trends of *Anser albifrons* in autumn and in spring in Hungary.
Lokala trender för bläsgås under hösten.

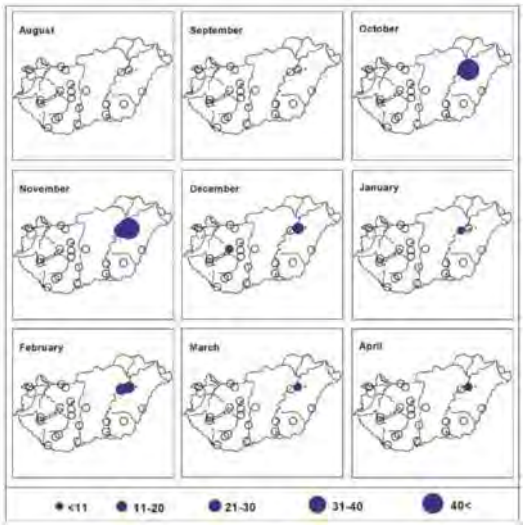

Figure 11. Monthly mean distribution pattern of *Anser erythropus* in Hungary.
Månatliga genomsnittliga utbredningen av fjällgås.

ure 8). Since 1994/1995, there has been an increase of 73%. Note that the yearly maximum values were as high as or even higher in three seasons in the 1990s than in the 2000s but despite this, the trend for the whole period becomes significant. The regional trends showed a slight increase in Northern-Transdanubia, Southern-Transdanubia, and Central Hungary, stability in Northern Hungary and slight decrease in the Trans-Tiszanian region in autumn combined with a mild increase in other periods. The local trends showed similar increases, but a steady decrease in the areas of Lake Fehér at Kardoskút and Lake Fehér at Szeged (Figure 9).

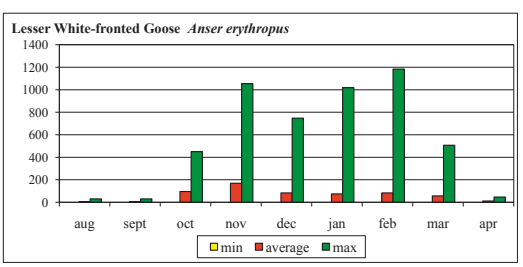

Figure 10. Phenology of Lesser White-fronted Goose in Hungary during the 25-year period the observed minimum, average and maximum number of individuals in each month.
Fjällgåsens säsongsförekomst under 25 år med observerat minsta, genomsnittliga och högsta antal varje månad.

Lesser White-fronted Goose *Anser erythropus*

The Lesser White-fronted Goose is rare on passage and even rarer as an overwintering species. Within the framework of HGM its national absolute maximum was 1183 in February 1994. The average maximum value was 279.

Its phenology is characterized by a maximum in November, a more modest maximum in February and a minimum in January. There were only a few birds in April (Figure 10).

As shown earlier (Sterbetz 1982, 1983; Faragó, 1995) the species occurred mainly in the Trans-Tiszanian region, where the most important sites were at Hortobágy, fishponds at Biharugra and Begécs and Lake Fehér at Kardoskút. Our results agree with those in these earlier studies. In the last 15 years most birds were found in the Hortobágy region (Figure 11).

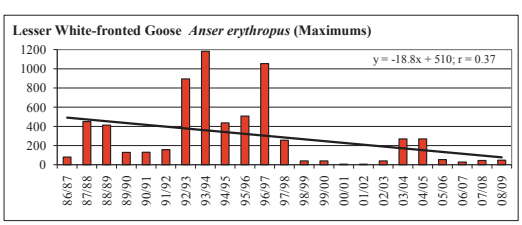

Figure 12. Seasonal maximal numbers and trend of *Anser erythropus* in Hungary.
Fjällgåsens säsongsmaximum och trend.

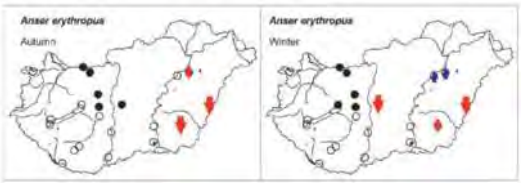

Figure 13. Local trends of *Anser erythropus* in autumn and in winter in Hungary.
Lokala trender för fjällgås på hösten och vintern.

Regional trends were shown only in Central Hungary and in the Trans-Tiszanian region. At the former site there was a mild decrease in all seasons and at the latter a slight increase in spring and a significantly decrease in autumn and winter. The local trends support the above because the amount in winter has mildly increased in Hortobágy in the last 15 years, even though the higher numbers probably occurred at the expense of other Hungarian areas (Figure 13).

Greylag Goose *Anser anser*

This goose species is an increasingly common breeder and also a common migrant (MME Nomenclator Bizottság 2008, Faragó 2001b). The national maximum was 46,184 individuals in November 2003. The average maximum value was 23,585.

Its phenology is characterized by a maximum in November, a smaller peak in February after a January minimum (Figure 14).

The earlier counts tell us little about the distribution, but according to Sterbetz (1976, 1983) the Greylag Goose paid visits to areas in the Great Hungarian Plain with larger shallow lakes during migration periods and overwintering. My own more recent surveys (Faragó 1995) demonstrated

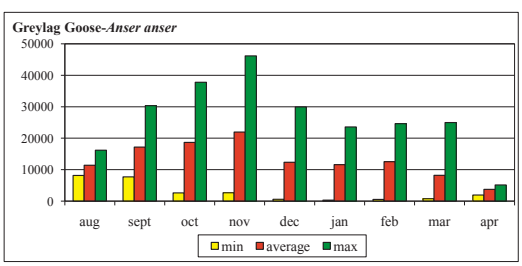

Figure 14. Phenology of Greylag Goose in Hungary during the 25-year period: the observed minimum, average and maximum number of individuals in each month.
Grågåsens säsongsförekomst under 25 år med observerat minsta, genomsnittliga och högsta antal varje månad.

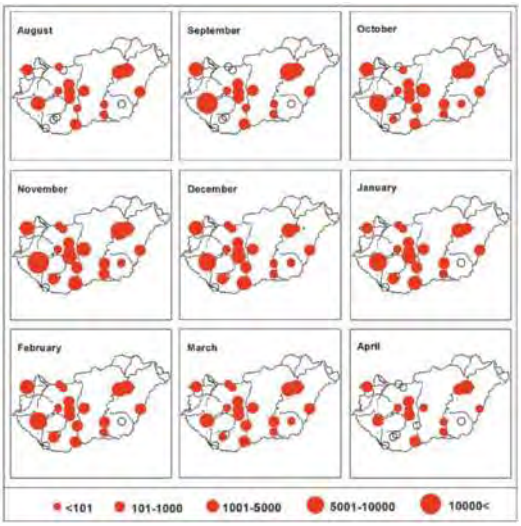

Figure 15. Monthly mean distribution pattern of Anser anser in Hungary.
Månatliga genomsnittliga utbredningen för grågås.

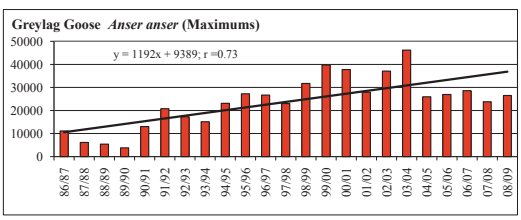

Figure 16. Seasonal maximal numbers and trend of *Anser anser* in Hungary.
Grågåsens säsongsmaximum och trend.

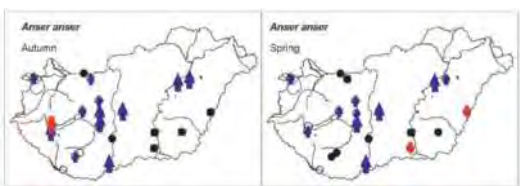

Figure 17. Local trends of *Anser anser* in autumn and in spring in Hungary.
Lokala trender för grågås under hösten och våren.

that up to the 1988/1989 season, a significant part of the observations also came from the Great Hungarian Plain. Today it can be found in wetlands all over Hungary but the majority (75%) is found in Transdanubia and only 25% on the Great Hungarian Plain. Since the early 1990s Kisbalaton plays a

prominent role in every period, particularly in the autumn, and Hortobágy is an important roosting site in autumn (Figure 15).

The development of the migrating population of Greylag Goose in Hungary is a real success story (Figure 16). As compared to the peak of 5000 individuals in the late 1980s, 10–15 years later the number peaked at 40,000–46,000 birds. However, during the five most recent seasons, maximum counts have declined to less than 30,000 birds.

The increasing tendency is observed in every period and every region of Hungary. The increase of the population was most significant in Transdanubia, while more modest in Central Hungary and the Trans-Tiszanian region. The local trend showed a slight decrease in Kisbalaton in autumn and at the fishponds at Biharugra and Begécs and Lake Fehér at Szeged in spring – primarily because of re-location between the areas (Figure 17).

Areas of international importance and future management

The wintering population of the Tundra Bean Goose in central and south-western Europe is about 600,000 individuals (Wetlands International 2006). The Ramsar 6 Criterion level of 1% is 6,000 birds, so the following 12 sites are internationally significant for this species in Hungary: Lake Fertő, Danube between Gönyű and Szob, Old Lake at Tata, Lake Velence, Dinnyési Fertő, fishponds at Soponya, fishponds at Rétszilas, Kisbalaton, fishponds at Sumony, Eastern-Balaton, Danube at Gemenc, Danube at Karapancsa, Hortobágy.

The wintering population of the Greater White-fronted Goose in central Europe is estimated at 10,000–40,000 birds (Wetlands International 2006). It should be noted that the recent Hungarian examinations showed a higher population, 100,000–120,000 birds. The most recent Ramsar 6 criterion level of 1% is 250 individuals, so according to this, 19 areas are international importance for this species in Hungary: Lake Fertő, Danube between Gönyű and Szob, Old Lake at Tata, Lake Velence and Dinnyési Fertő, fishponds at Soponya, fishponds at Rétszilas, Lake Balaton Keszthelyi bay, Eastern-Balaton, Kisbalaton, Gravel pits at Gyékényes, fishponds at Sumony, Danube at Gemenc, Danube at Karapancsa, natron lakes at Kiskunság, Hortobágy, Lake Tisza, Lake Fehér at Kardoskút, fishponds at Biharugra, and fishponds at Begécs, Lake Csaj at Tömörkény, Lake Fehér at Szeged and Szegedi Fertő.

The population sizes show a slight increase in Northern-Transdanubia, Southern-Transdanubia, and Central Hungary, stability in Northern Hungary and slight decrease in the Trans-Tiszanian region in autumn combined with a mild increase in other periods.

The wintering population of the Lesser White-fronted Goose in southeastern Europe and at the Caspian Sea has decreased to 8,000–13,000 individuals (Wetlands International 2006). The valid Ramsar 6 criterion level of 1% is 110 individuals, so 5 areas are international importance for this species in Hungary: Hortobágy, Lake Fehér at Kardoskút, natron lakes at Kiskunság, fishponds at Biharugra, fishponds at Begécs and Lake Tisza.

The Central European breeding population of the Greylag Goose has increased to 25,000 birds (Wetlands International 2006). The valid Ramsar 6 criterion level of 1% is 250 individuals, so 17 areas are international importance for this species in Hungary: Lake Fertő, Old Lake at Tata, Lake Velence and Dinnyési Fertő, fishponds at Soponya, fishponds at Rétszilas, Lake Balaton Keszthelyi bay, Eastern-Balaton, Kisbalaton, fishponds at Sumony, Danube at Gemenc, Danube at Karapancsa, natron lakes at Kiskunság, Hortobágy, Lake Tisza, fishponds at Biharugra, fishponds at Begécs, Lake Csaj at Tömörkény, Lake Fehér at Szeged and Szegedi Fertő.

The increase of the Greater White-fronted Goose and Greylag Goose populations did not compensate for the decrease of the Tundra Bean Goose and Lesser White-fronted Goose populations, so the total number of geese in the Pannonic region decreased (Figure 18). This led to both national and regional shifts of species predominance (Figure 19). In the 1980s the Tundra Bean Goose was the predominant species in western and the Greater White-fronted Goose in eastern Hungary. The number of the Bean Goose decreased everywhere and the Greater White-fronted Goose and Graylag Goose steadily increased.

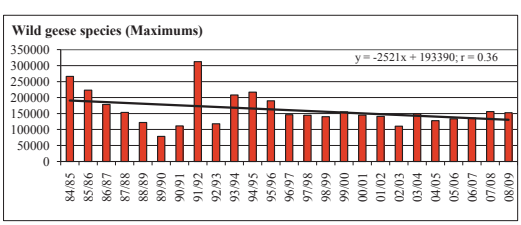

Figure 18. Sesonal maximal numbers and trend of wild geese in Hungary.
Säsongsmaxima för alla gåsarterna och trend).

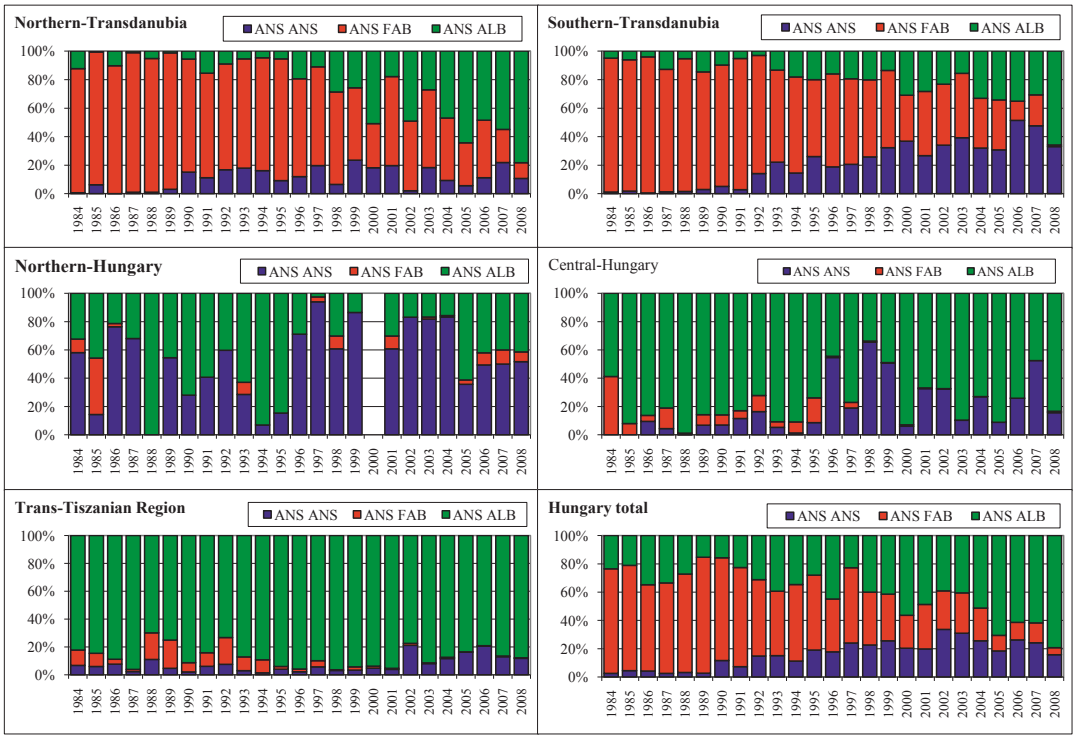

Figure 19. Percentage of various goose species as compared to overall numbers of geese in the different eco-geographical regions and in the total territory of Hungary.
Procentuella andelen av olika gåsarter i olika ekogeografiska regioner och i hela Ungern.

Despite these changes, many wetlands in Hungary are internationally significant for one or more goose species, which makes the Pannonic region one of the most important European target areas for migration and wintering geese (Figure 20).

All four goose species have similar ecologies and are exposed to similar conditions when they winter in Hungary (Faragó, 1995, 1997, 1998a). In spite of this, two species (Anser fabalis and Anser erythropus) have declining and two have increasing (Anser albifrons and Anser anser) wintering populations. From this I conclude that the reasons of the declines are not to be found in the Pannonic region but in the nesting places.

We have formed the Hungarian Waterfowl Management Plan (Faragó 1997), and this includes a system of 43 areas where hunting of waterfowl is banned (Figure 21). Altogether 177,224 ha of the Ramsar areas have effective protection of waterfowl, including these above mentioned areas of international importance. In the last two decades about 23,000 ha of wetland habitat have been restored to create a better situation for waterfowl.

At the same time as we improve the conditions, the process of drying as part of global and regional climate change is a real threat (Faragó 2005b). Especially the sensitivity of the goose species attached to shallow and astatic waters should be taken seriously in the future. We should more effectively use the directives of the Hungarian Waterfowl Management Plan. In the future we must better combine research, wise management and the conservation of goose species in Hungary and in the neighboring countries as well.

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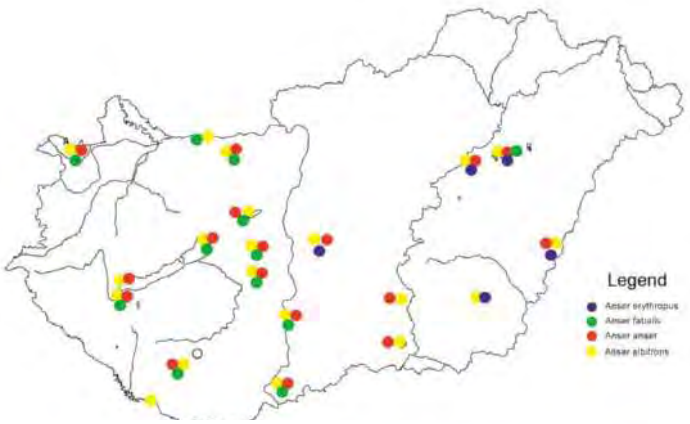

Figure 20. Sites with international importance on the basis of peak number of geese species (after Ramsar 6 Criterion) in Hungary.
Lokaler av internationell betydelse enligt Ramsarkriteriet 6, baserat på högsta antal individer.

Figure 21. Distribution of waterfowl annual closed season areas in Hungary.
Områden där jakt på sjöfåglar är förbjuden i Ungern.

Pellinger, Attila (Lake Fertő), Mogyorósi, Sándor (Lake Fertő), Molnár, Balázs (Lake Fertő), Dr. Jánoska, Ferenc (River Danube between Gyönyű and Szob), Musicz, László (Old Lake at Tata, River Danube at Nyergesújfalu), Fenyvesi, László (Lake Velence and Dinnyési Fertő), Staudinger, István (fishponds at Soponya and fishponds at Rétszilas), Szépe, Attila (fishponds at Rétszilas), Lelkes, András (Lake Balaton Keszthelyi-bay and Kisbalaton), Dr. Nagy, Lajos (Lake Balaton, Keszthelyi-bay and Kisbalaton), Fenyősi, László (River Dráva between Barcs and Szentborbás), Mezei, Ervin (Gravel pits at Gyékényes), †Molnár, István (fishponds at Sumony, fishponds at Pellérd), Ónodi, Miklós (fishponds at Sumony), Madas, Katalin (fishponds at Pellérd), Kókay, Szabolcs (Danube bend), Selmeczi Kovács, Ádám (Danube bend), Kalocsa, Béla (River Danube between Baja and state border), Boros, Emil (Natron lake Kelemen-szék at Fülöpszállás and Natron lake Zab-szék at Szabadszállás), Pigniczki, Csaba (Natron lake Kelemen-szék at Fülöpszállás and Natron lake Zab-szék at Szabadszállás), Nyúl, Mihály (Natron lake Kelemen-szék at Fülöpszállás and Natron lake Zab-szék at Szabadszállás), Gőri, Szilvia (Hortobágy), Tar, János (Hortobágy), Gyüre, Péter (Hortobágy), Dr. Kovács, Gábor (Hortobágy), Végvári, Zsolt (Hortobágy), Barabás, Lilla (Hortobágy), Szilágyi, Attila (Hortobágy), Spakovszky Péter (Hortobágy), Faludi, Csaba (Hortobágy, Lake Tisza), Gál, Lajos (Hortobágy, Lake Tisza), Konyhás, Sándor (Hortobágy), Széll, Antal (Lake Fehér at Kardoskút), Vasas, András (fishponds at Biharugra and Begécs), Tőgye, János (fishponds at Biharugra and Begécs), Dr. Bod, Péter (Lake Csaj at Tömörkény), Domján, András (Lake Csaj at Tömörkény), Nagy, Tamás (Lake Fehér at Szeged and Fertő), Dr. Tokody, Béla (Lake Fehér at Szeged and Fertő),

Jakus, László (Balaton East), Fodermayer, Vilmos (River Danube at Gemenc and River Danube at Karapancsa), Sipos, Sándor (River Danube at Karapancsa), Janács, Gergely (River Danube at Karapancsa), Dr. László, Richárd (NymE Sopron), Vörös, Ákos (NymE, Sopron).

References

van den Bergh, L. M. J. 1985. Occurrence of the European Bean Goose *Anser fabalis fabalis* in the Netherlands (Dutch with English summary). *Limosa* 58: 17–22.

Faragó, S. 1995. *Geese in Hungary 1986–1991. Numbers, Migration and Hunting Bags*. Slimbridge, UK. IWRB Publication 36.

Faragó, S. 1996. A Magyar Vadlúd Adatbázis 1984–1995: Egy tartamos monitoring – Data base of Geese in Hungary 1984–1995: A Long-term Monitoring. *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 2: 3–168.

Faragó, S. 1997. The Hungarian Waterfowl Management Plan. *Gibier Faune Sauvage – Game and Wildlife* 13: 1023–1038.

Faragó, S. 1998a. A Magyar Vízivad Információs Rendszer. [The Hungarian Waterfowl Information System.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 4: 3–16. (in Hungarian)

Faragó, S. 1998b. A vadlúd monitoring eredményei az 1996/1997-es idényben. Magyarországon. [Results of Geese Monitoring in Hungary in the Season 1996/1997.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 4: 17–59. (in Hungarian)

Faragó, S. 1999. A vadlúd monitoring eredményei az 1997/1998-as idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 1997/1998.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 5: 3–62. (in Hungarian)

Faragó, S. 2001a. A Vadlúd Monitoring eredményei az 1998/1999-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 1998/1999.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 7: 3–40. (in Hungarian)

Faragó, S. 2001b. Trends in the Breeding and Staging Population of the Grey-lag Goose (Anser anser) in Hungary. Pp. 21–22 in *Proceedings of the 6th Annual Meeting of the Goose Specialist Group of Wetlands International. Roosta, Estonia* (Patterson, I., ed.). Wetlands International Goose Specialist Group Bulletin.

Faragó, S. 2002a. A Vadlúd Monitoring eredményei az 1999/2000-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 1999/2000.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 8: 3–43. (in Hungarian)

Faragó, S. 2002b. A Vadlúd Monitoring eredményei a 2000/2001-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the season 2000/2001.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 9: 3–45. (in Hungarian)

Faragó, S. 2005a. A Vadlúd Monitoring eredményei a 2002/2003-as idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2002/2003.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 12: 3–42. (in Hungarian)

Faragó, S. 2005b. A klímaváltozás valószínűsíthető hatásai a hazai vadgazdálkodásra. [The Probable Effects of Climate Change on Hungarian Game Management.] *„AGRO-21" Füzetek, Klímaváltozás – Hatások – Válaszok* 43: 87–104 (147–148). (in Hungarian)

Faragó, S. 2006. A Vadlúd Monitoring eredményei a 2003/2004-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2003/2004.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 13: 3–39. (in Hungarian)

Faragó, S. 2007a. A Vadlúd Monitoring eredményei a 2004/2005-ös idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2004/2005.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 14: 3–40. (in Hungarian)

Faragó, S. 2007b. A Vadlúd Monitoring eredményei a 2005/2006-os idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2005/2006.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 15: 3–45. (in Hungarian)

Faragó, S. 2008a. A Magyar Vízivad Monitoring standardizált megfigyelési területei. [The Standard Observation Units of Hungarian Waterfowl Monitoring] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 16: 21–48. (in Hungarian)

Faragó, S. 2008b. A Vadlúd Monitoring eredményei a 2006/2007-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2006/2007.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 17: 3–42. (in Hungarian)

Faragó, S. 2008c. A vonuló vízivadfajok állományainak téridő mintázata Magyarországon. Az 1996–2004 közötti időszak elemzése. [Time-space Pattern of Migratory Waterfowl Species. An Analysis of the Period 1996–2004] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 16: 49–200. (in Hungarian)

Faragó, S. 2010a. A Vadlúd Monitoring eredményei a 2007/2008-as idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2007/2008.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 18–19: 3–41. (in Hungarian)

Faragó, S. 2010b. A Vadlúd Monitoring eredményei a 2008/2009-es idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 2008/2009.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 18–19: 221–258. (in Hungarian)

Faragó, S. & Gosztonyi, L. 2003. A Vadlúd Monitoring eredményei a 2001/2002-es idényben [Results of Geese Monitoring in Hungary in the Season 2001/2002.] *Magyarországon. Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 11: 3–50. (in Hungarian)

Faragó S. & Gosztonyi L. 2009. Population Trend, Phenology and Dispersion of Common Waterfowl Species in Hungary Based on a Ten-year-long Time Series of the Hungarian Waterfowl Monitoring. *Acta Silvatica et Lignaria Hungarica* 5: 83–107.

Faragó, S. & Jánoska, F. (1996). A Vadlúd Monitoring Eredményei az 1995/1996-os idényben Magyarországon. [Results of Geese Monitoring in Hungary in the Season 1995/1996.] *Magyar Vízivad Közlemények – Hungarian Waterfowl Publications* 2: 169–211.

Faragó, S., Kovács, G. & Sterbetz, I. (1991). Goose Populations Staging and Wintering in Hungary 1984–1988. *Ardea* 79(2): 161–163.
Fog, M. 1982. Number of Bean Goose (*Anser fabalis* sp.) in the Wintering Areas. *Aquila* 89: 123–125.
Hudec, K. 1984. Migrational Movements of the Greylag Goose (*Anser anser*) in Europe. A Synopsis. *Acta Sc. Nat. Brno* 18: 33–35.
Huyskens, P. R. G. 1986. The Bean Goose Problem in Europe. *Oriolus* 52: 105–256.
Lebret, T. 1982. Goose Observation in the Pannonic Region in October–December 1980 and in March 1981. *Aquila* 89: 187–191.
Madsen, J. 1987. Status and Management of Goose Populations in Europe, with Special Reference to Populations Resting and Breeding in Denmark. *Dan. Rev. Game Biol.* 12(4): 1–76.
Madsen, J. 1991. Status and rends of Goose Populations in the Western Palearctic in the 1980s. *Ardea* 79: 113–122.
Madsen, J., Cracknell, G. & Fox, A.D. (eds.) 1999. *Goose Populations of the Western Palearctic. A Review of Status and Distribution.* Wetlands International Publ. No. 48., Wetlands International Wageningen, The Netherlands. National Environmental Research Institute, Rönde, Denmark
MME Nomenclator Bizottság 2008. *Magyarország madarainak névjegyzéke. Nomenclator Avium Hungariae.* Magyar Madártani és Természetvédelmi Egyesület, Budapest
Ogilvie, M. A. (1978). *Wild Geese.* Berkhamsetd, Poyser, 350 p.
Philippona, J. 1972. *Die Blessgans.* Neue Brehm-Bücherei 457. A. Ziemsen Verlag, Wittenberg, Lutherstadt.
Rutschke, E. 1987. *Die Wildgänse Europas.* VEB Deutscher Landwirtschaftsverlag Berlin.
Sterbetz, I. 1967. A Magyarországon telelő lilikek ökológiai problémái. A lilik előfordulása a jelen században. [Ecological Problems of White-fronted Geese Passing the Winter in Hungary. Presence of White-fronted Geese in this Century.] *Aquila* 73–74: 33–49.
Sterbetz, I. 1976. A vadlúdvonulás alakulása a magyarországi gyülekezőhelyeken. [Development of Wild-geese Migration on the Hungarian Gathering-places.] *Aquila* 82: 181–194.
Sterbetz, I. 1982. Migration of *Anser erythropus and Branta ruficollis* in Hungary 1971–1980. *Aquila* 89: 107–114.
Sterbetz, I. 1983. A magyarországi vadlúdvonulás alakulása az 1972 és 1982 közötti időszakban. [The Trend of the Migration of Wild-geese in Hungary in the Period of 1972–1982.] *Állattani Közlemények* 70: 69–72. (in Hungarian)
Wetlands International, 2006. *Waterbird Population Estimates – Fourth Edition.* Wetlands International, Wageningen.

Sammanfattning

I Ungern började övervakningen av de övervintrande gåspopulationerna med räkningar i november 1984 och 1985. Från vintern 1986/1987 har månatliga räkningar genomförts från oktober till mars. Dessa utvidgades 1989 till att omfatta även september och från 1996 till att omfatta även augusti ochl april. Räkningarna sker med sådan noggrannhet vid alla viktiga lokaler att de gäss som missas inte spelar någon roll vare sig för de nationella eller regionala summorna. Figur 1 visar de observationsområden och lokaler där räkningarna utförs samt indelningen av landet i biogeografiska regioner.

Det är fyra gåsarter som förekommer mer än tillfälligt: sädgås (tundrarasen), blässgås, fjällgås och grågås. Arternas förekomst under det kvartssekel som räkningarna pågått presenteras för hela Ungern i form av maxvärden för varje vintersäsong och trenden för dessa i Figurerna 4, 8, 12 och 16. Lokala trender för de fyra arterna presenteras med hjälp av pilar av olika riktning och tjocklek i Figurerna 5, 9, 13 och 17. Den genomsnittliga geografiska fördelningen av respektive art presenteras i kartform i Figurerna 3, 7, 11 och 15. Gässens antal under olika månader återges i Figurerna 2, 6, 10 och 14 i form av högsta antal, genomsnittligt antal och minsta antal som räknats respektive månad under alla 25 säsongerna.

Tundrasädgåsen har minskat kraftigt i antal. Det högsta antal som räknats var nästan 200.000 individer i november 1984 medan högsta antal de senaste vintrarna legat under 15.000. Nedgången gäller främst antal gäss som anländer på hösten, medan antalet som ses senare under vintern inte visat samma negativa trend.

Blässgåsens trend har varit positiv, men det högsta antal som någonsin räknats var 165.771 fåglar i februari 1992 och även tre andra år under 1990-talets första hälft uppvisade höga värden.

Fjällgåsen förekommer numera i blygsamma antal (högst ett femtiotal) från att ha räknats med 1183 individer i februari 1994.

Grågåsen har ökat kraftigt i antal från högst 5000 i slutet av 1980-talet till över 40.000 i november 2003.

Ökningen av blässgäss och grågäss har inte kompenserat minskningen av sädgäss och fjällgäss, varför det totala antalet övervintrande gäss i Ungern minskat (Figur 18). Detta har lett till förskjutningar i arternas procentuella andelar av det totala beståndet (Figur 19). Flera lokaler uppfyller Ramsarkriteriet 6 och anses därmed vara av internationell betydelse (Figur 20). Nyligen har en skötselplan för sjöfågel antagits och den innefattar bland annat jaktförbud på sjöfågel i 43 områden om tillsammans 177.224 ha (Figur 21). Under de senaste två decennierna har också 23.000 ha våtmarker restaurerats.