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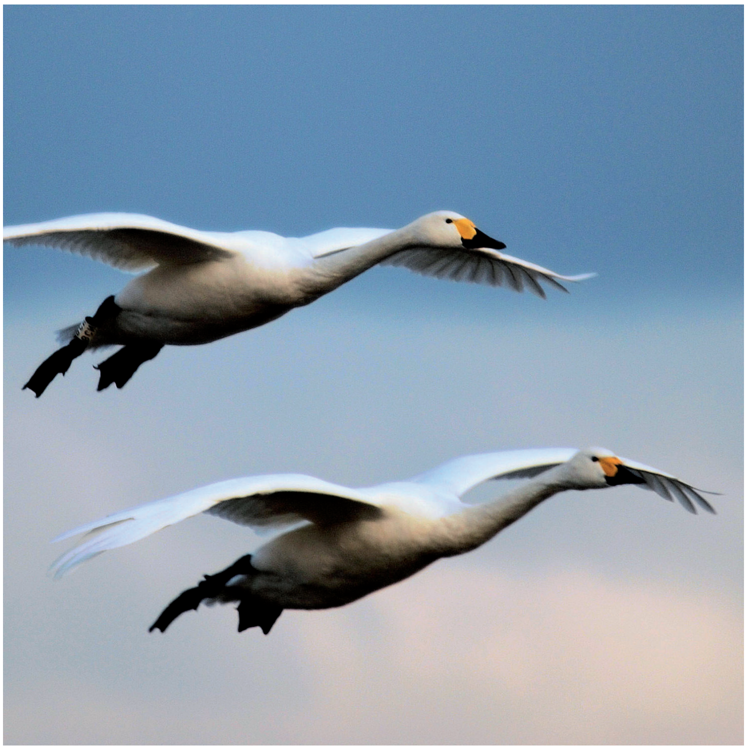
AEWA

UNEP

International Single Species Action Plan for the Conservation of the Northwest European Population of the Bewick's Swan

Cygnus columbianus bewickii



Ministry of Economic Affairs

WETLANDS INTERNATIONAL

WWT

ЛЕНИНГРАДСКАЯ ОБЛАСТЬ

Agreement on the Conservation of
African-Eurasian Migratory Waterbirds (AEWA)

International Single Species Action Plan for the Conservation of the Northwest European Population of the Bewick's Swan

Cygnus columbianus bewickii

AEWA Technical Series No. 44

May 2012

Prepared by
Wetlands International and
The Wildfowl & Wetlands Trust (WWT)

with funding from
The BBI-MATRA Programme of the former Dutch Ministry of Agriculture, Nature and Food Quality *(currently Dutch Ministry of Economic Affairs, Agriculture and Innovation)*

and the
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Milestones in production of this plan:

September 2009	Action Planning Workshop, St. Petersburg, Russian Federation
October 2010	1st consultation draft submitted to the UNEP/AEWA Secretariat
April 2011	2nd draft submitted to the UNEP/AEWA Secretariat and to the AEWA Technical Committee for consultation
September 2011	Draft approved by the AEWA Technical Committee at its 10th Meeting
November 2011	Draft reviewed by the AEWA Standing Committee at its 7th Meeting
May 2012	Final draft approved by the 5th Session of the Meeting of the Parties to AEWA

Geographcal Scope

Table 1: Range States of the NW Europe wintering flyway population

Breeding	Migration	Wintering
Non-EU Russian Federation	Non-EU Russian Federation, Norway EU Estonia, Lithuania, Latvia, Finland, Poland, Germany, Netherlands, United Kingdom, Denmark, Sweden	EU Netherlands, Belgium, France, United Kingdom, Ireland, Denmark, Germany, Poland, Greece

Revisions
This plan should be reviewed and updated every ten years. An emergency review will be undertaken if there is a significant change to the species' status before the next scheduled review.

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Photo credit: Bewick's Swans (*Cynus columbianus bewickii*) © Colin Butters

Contents

Preface

This action plan has been prepared as part of *The Long Journey Project* led by the DLG Service for Sustainable Land and Water Management and implemented in collaboration with Wetlands International, its Russia Programme, Swan Specialist Group, the Leningrad State Regional Institute for Nature Conservation and the Leningrad State University, with financial support from the BBI-MATRA Programme of the former Dutch Ministry of Agriculture, Nature and Food Quality (now part of the Ministry of Economic Affairs, Agriculture and Innovation) and the Dutch Ministry of Foreign Affairs.

The drafts of the plan went through rigorous consultations including comments from experts, the range states and the AEWA Technical Committee. The final draft was adopted by the 5th Session of the Meeting of the Parties to AEWA in May 2012.

Executive Summary

The Tundra Swan (*Cygnus columbianus*), of which the Bewick's Swan (*Cygnus columbianus bewickii*) is the Palearctic subspecies, has a global conservation status of Least Concern (BirdLife International 2010). However, the status of the species is considered as Vulnerable in Europe (BirdLife International 2004). The species is included in Appendix II of the Convention on the Conservation of the European Wildlife and Natural Habitats (Bern Convention), in Appendix II of the Convention on Migratory Species (CMS or Bonn Convention). It is also listed in category A(3) c of the African Eurasian Waterbird Agreement and in Annex I of the EU Birds Directive.

Three populations of *C. c. bewickii* have been identified, based on their winter distribution: NW European (21,500 individuals), Caspian (c. 1,000 individuals) and East Asian (c. 92,000 individuals). This action plan deals only with the population that winters in NW Europe.

The population increased dramatically during the late 1980s and early 1990s, from c. 10,000 in the mid-70s to 25,800 birds in 1990 and 29,000 in 1995 (Beekman 1997). However, a steep decline has taken place since the mid-1990s (Beekman 1997, Delany et al. 1999, Delany & Scott 2006, Wetlands International 2008); the population was estimated at 21,500 birds in 2005, and numbers have continued declining since then (Rees & Beekman 2010). The reason for the population trends and particularly the recent decrease in numbers - whether this is due to conditions on the breeding grounds, staging areas or wintering sites, or to a combination of factors - is unclear.

The Bewick's Swan breeds adjacent to shallow lakes and pools on the Arctic tundra, particularly on sedge-grass and moss-lichen tundra dotted with numerous small lakes and pools, and also in some dry land areas with willow bushes. At the breeding grounds it feeds mostly on sedge and other herbs and berries, as well as on algae and *Potamogeton*. On migration the species requires a chain of stop-over sites including shallow coastal lakes with soft sediment and good water quality as well as flooded grasslands. In winter the species traditionally occupies shallow tidal waters, coastal lagoons, inland freshwater lakes and marshes and flooded pastures, where they mostly feed on the tubers and rhizomes of *Potamogeton* spp., on *Zostera* spp. and *Chara* spp., and also on grasses and herbs. From the 1970s onwards, an increasing proportion of the Northwest European population has fed on arable land during the winter.

The population of Bewick's Swan wintering in Northwest Europe is thought to be sensitive to the impacts of climate and land-use changes, chemical pollution and infectious disease. A number of factors are likely to contribute to the decline or fluctuation of the population, but habitat changes (likelihood of this driving the population trends = High) and illegal/accidental shooting (Medium; potentially High if shooting increases) as the most important existing threats.

The action plan aims to halt the ongoing decline in the short-term, and to maintain the population minimally at its 2000 level in the long-term. Essential actions include: (a) maintaining the protected status of the species across the range of the population; (b) maintaining and, if necessary, restoring suitable aquatic macrophyta availability at key stop-over and wintering sites, through managing water level and water quality; (c) preventing negative impacts of infrastructure and industrial development by avoiding key sites, or by mitigating any potential negative impacts in the absence of alternative locations; (d) developing and (where necessary) implementing emergency plans by companies involved into exploitation and transporting petrochemicas on the Bewick's Swan's flyway to reduce mortality in case of accidents; and (e) continuing the monitoring and research of population changes and demographic parameters. Additional actions considered to be of high priority included extending the coverage and enhancing the protection of areas important for breeding and moulting; managing and protecting key feeding and roosting sites in line with species requirements; reducing or preventing disturbance at key sites through zoning (e.g. of recreational activities), compensatory payments and other site management measures; increased efforts to reduce illegal shooting; avoiding key sites and flight-lines during infrastructure development; and expanding dead bird surveillance to cover the entire flyway of the NW European Bewick's Swan population.

1. Biological Assessment

1.1 Taxonomy and Biogeographic Populations

The Bewick's Swan (*Cygnus columbianus bewickii*) is the Palearctic sub-species of the Tundra Swan[1]. The Tundra Swan is most closely related to the two other northern migratory swans – the Whooper Swan (*Cygnus cygnus*) and Trumpeter Swan (*Cygnus buccinator*) (Harvey 1999).

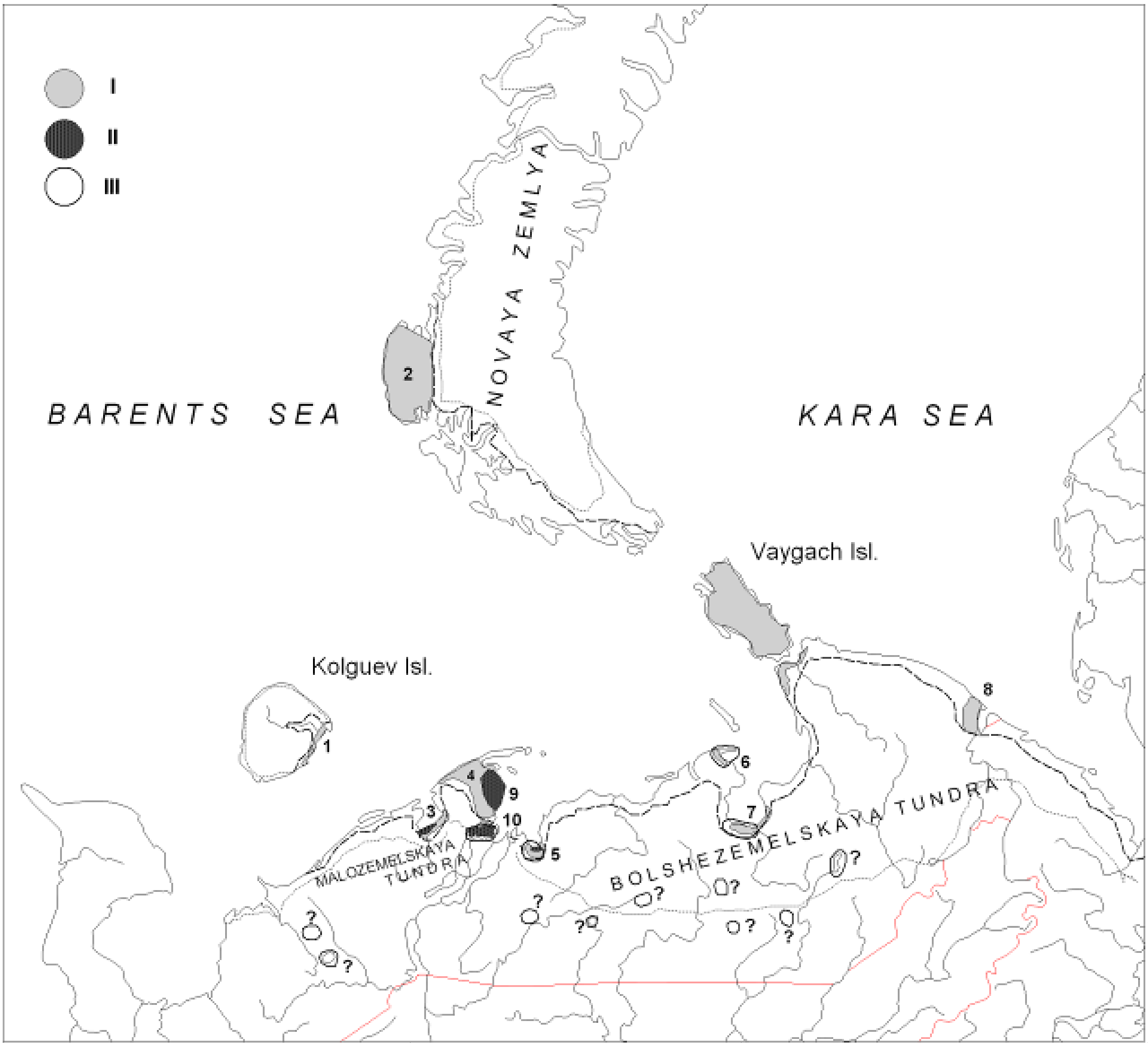
The Bewick's Swan breeds on Arctic tundra across northern Russia, from the west coast of Cheshskaya Bay (east of the Kanin Peninsula) to Kolyuchin Bay in the Chukchi Sea. Bewick's Swans in eastern Asia were previously considered to be a separate subspecies, *C. c. jankowski*, but it is now generally thought that these birds are of the race *bewickii* (Rees et al. 1997).

Three populations of *C. c. bewickii* have been identified based on their wintering grounds. A large population of 21,500 individuals breeds in northeast European Russia and winters in NW Europe. A much smaller population, of approximately 1,000 individuals, breeds further east and winters in the Caspian region. The third population occurs in East Asia, outside the area covered by the Africa-Eurasian Migratory Waterbird Agreement (AEWA). This action plan deals only with the population that winters in NW Europe.

1.2 Distribution throughout the Annual Cycle

<u>Breeding distribution</u>
The distribution of breeding, moulting and pre-migratory staging sites of the Northwest European Bewick's Swan population is shown in Figure 1 (based on Mineyev 1991, 2003). The main breeding areas on the Malozemelskaya tundra are in the Kolokolkova Bay (3) and on the eastern coastal tundras of Russkii Zavorot Peninsula (west coast of the Pechora Bay; 4). In the Bolshezemelskaya tundra, the main breeding areas are the maritime lowlands of Bolvanskaya Bay (5), Medynski Zavorot Peninsula (6) and the south coast of Khaipudyrskaya Bay (Lower Morye-Yu River; 7). On the Yugorski Peninsula, the main sites include the maritime tundra on the Barents Sea coast southwest of Vaygach Island and the area west of Kura Bay (8). Further north, other important breeding areas include Kolguyev Island, Vaygach Island and the Gusinaya Zemlya Peninsula on the Novaya Zemlya Archipelago (Mineyev 1991, 1995, 2003, 2005). The eastern boundary of the breeding range of this population, and whether or not there is any overlap in breeding distribution with that of the Caspian/West Siberian population, is not yet known. The main breeding areas and the highest concentrations of Bewick's Swans in the Russian-European tundras are found in low-lying, coastal areas that are dotted with small tundra lakes. King and Hodges (1990) similarly found a strong correlation between lake densities and Whistling Swan densities in Alaska.

[1] The Whistling Swan (*Cygnus columbianus columbianus*) is the Nearctic subspecies of the Tundra Swan.



<u>I Main breeding areas</u>	**<u>II Most important moulting areas</u>**	**<u>III Pre-migratory and staging sites in autumn</u>**
1 – South-east of Kolguev Island 2 – Gusinaya Zemlya Peninsula (Novaya Zemlya Arch.) 3 – Kolokolkova Bay 4 – Russkii Zavorot Peninsula 5 – Bolvanskaya Bay 6 – Medynski Zavorot Peninsula 7 – Khaipudyrskaya Bay 8 – Kara Bay – Vaygach Island	3 – Kolokolkova Bay 5 – Bolvanskaya Bay 9 – Zakharin Bereg (W Pechora Bay) 10 – Korovinskaya Bay	**?** – Pre-migratory and staging sites in autumn (based on data from 1970-1980) 3 – Kolokolkova Bay 5 – Bolvanskaya Bay 10 – Korovinskaya Bay and northern part Pechora Delta

Figure 1: Breeding distribution of the NW European Bewick's Swan population (Litvin & Morozov in litt., based on Mineyev 1991, 2003).

<u>Moulting and migration</u>

Breeding birds start moulting in the first half of August, mainly on their breeding territories, whilst non-breeding birds moult on nearby lakes and coastal bays from the end of July (Mineyev 1987). Important moult sites for the NW European population include the west coast of Pechora Bay and also Kolokolkova Bay, with their adjoining tundras, where 3,000–6,000 birds moult annually. Other major concentrations of moulting Bewick's Swans are found in Korovinskaya (300–500 birds) and Bolvanskaya bays (200–300 birds). On Medynski Zavorot, groups of 10–60 birds can be found (Mineyev 2003).

During the autumn pre-migration period, Bewick's Swans congregate mainly in Korovinskaya Bay (7,000–15,000 individuals), but also in Kolokolkova Bay and in the northern part of the Pechora Delta (data J.H. Beekman & M. Poot, Mineyev Yu. 1995, Mineyev O. 2005). Apparently, these sites largely host the birds from Bolshezemelskaya Tundra, Yugorski Peninsula, Vaigach Island and Novaya Zemlya, as well as from the Arctic islands of Western Siberia (Mineyev 2005). Bewick's Swans start to leave the breeding areas from late August-September (Mineyev 1995).

The swans' migration route follows the coastline of Arctic European Russia to the White Sea, and then crosses Karelia to the Gulf of Finland, Peipsi Lake and the Baltic Sea. The main autumn staging areas (listed in Annex 2) are in the Baltic region of Russia, the Baltic States, Poland, Germany, and Denmark, en route to the wintering grounds (Scott & Rose 1996, Rees 2006).

On returning to the breeding grounds in spring, the swans follow a similar route, moving from the North Sea region through the southern Baltic coast and across southern Sweden to Estonia, the Finnish Gulf (south Finland and St. Petersburg region), and then through Karelia to the White Sea. The White Sea, which is over-flown in autumn, is a crucial staging site for the birds in spring (Nolet & Drent 1998, Nolet et al. 2001). After re-fuelling at the White Sea, the swans continue migration across the Kanin Peninsula and along the coastline of Arctic European Russia to their breeding grounds.

Wintering

The main wintering grounds of Bewick's Swans in Europe are in the lowland areas of Northwestern Europe, from Denmark, Germany through the Netherlands, Belgium, to Northern France, Great Britain and Ireland (Figure 2, Table 2). Small numbers occur in the Camargue, southern France (Figure 2). A small flock winters in the Evros/Meric delta of Greece and Turkey, respectively, which had previously been thought part of the Caspian wintering population. However, resightings of individuals ringed at the Wieringermeerpolder in the Netherlands in both the Evros delta and in the United Kingdom suggests that these birds are linked to the population wintering in Northwest Europe (W. Tijsen, pers. comm.). During the period 1996–2005, the majority of the population was recorded in the Netherlands (48–82%) and in Great Britain (17–32%) during mid-winter (Beekman et al., in prep). Numbers wintering in Ireland have decreased from 2,000–2,250 in the late 1970s to just three individuals in 2009. In the meantime, numbers wintering in Germany, which mainly occur along the lower reaches of the Ems River, have increased in general but with strong weather-related fluctuation (Beekman et al., in prep).

1.3 Habitat Requirements

The Bewick's Swan breeds adjacent to shallow lakes and pools on the Arctic tundra, particularly on sedge-grass and moss-lichen tundra dotted with numerous small lakes and pools, and also in some dry land areas with willow (*Salix* spp.) bushes (Mineyev 1991; Syroechkovsky et al. 2002). At the breeding grounds, it feeds mostly on *Carex aquatilis*, *C. rariflora*, *Arctophila fulva* and other herbs and berries, as well as on algae and *Potamogeton* (data Ubels & Beekman, Ubels et al. 2000, Mineyev 2003). *Potamogeton* is an important food for non-breeding swans moulting in Korovinskaya Bay (data Beekman, Ubels et al. 2000). Individual pairs generally return to the same territory used in the previous year unless ousted by an incoming pair (Schadilov et al. 1998).

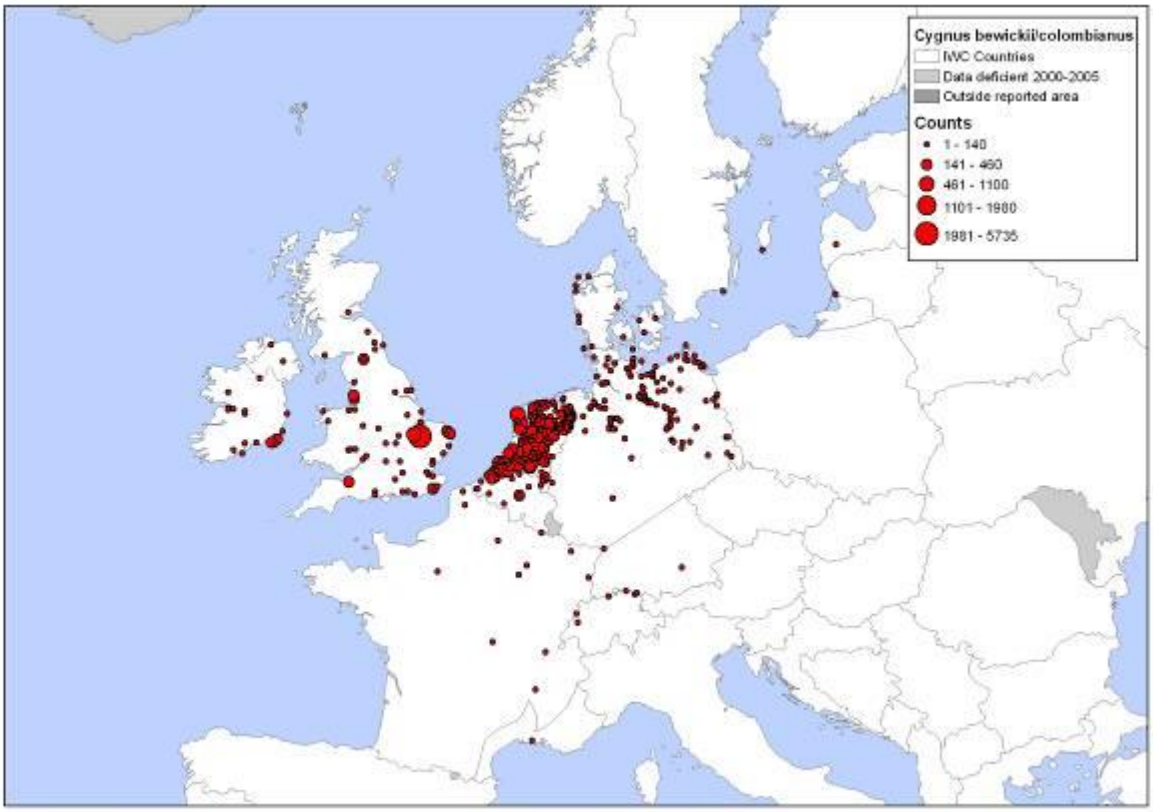


Figure 2: Distribution and numbers of Bewick's Swan recorded during the mid-Januar International Waterbird Censuses 2000-2005 (based on Wetlands International, 2008)

During migration, the species requires a chain of shallow coastal lakes with soft sediment and good water quality as well as flooded grasslands. Stop-over sites are crucial for rapid replenishment of the fat reserves needed for migration, and therefore should be kept free of human activities such as boating, hunting and fishing likely to disturb and displace the birds. In winter the species traditionally occupies shallow tidal waters, coastal lagoons, inland freshwater lakes and marshes (where they mostly feed on the tubers and rhizomes of *Potamogeton* spp., and on *Zostera* spp. and *Chara* spp.), as well as on flooded pastures where they graze on grasses and herbs (Brouwer & Tinbergen 1939, Beekman et al. 1991, Dirksen et al. 1991). There has been a change in the swans' winter diet from the 1970s onwards, with an increasing proportion of the birds feeding on arable land. Stubble fields, root crops and oilseed rape are frequented on arrival in the wintering range, in early to mid winter, but only after the availability of *Potamogeton* and *Chara* has been reduced down to levels too low to be exploited profitably by feeding swans. Water plants and crop left-overs are important food sources for swans refuelling after autumn migration (review in Rees 2006). Winter feeding sites are located in close proximity to permanent waters serving as roost sites. The species generally requires disturbance-free roosts and aquatic feeding sites.

Table 2: Numbers of Bewick's Swans occurring in each country (from BirdLife International 2004 and additional IBA data extracted from the BirdLife International waterbird database in April 2009)

Country	Breeding numbers (individuals)	Quality	Year(s) of the estimate	Breeding Population trend in the last 10 years (or 3 generations)	Quality	Maximum size of migrating or non-breeding populations in the last 10 years (or 3 generations) (individuals)	Quality	Year(s) of the estimate
*Belgium**	-	-	-		-	585 (wintering)	1	2006-2007
Denmark	-	-	-		-	1,172 (passage)	1	2005
*Estonia**	-					15,000 (passage)	1	2000-2009
*Finland**	-	-	-		-	4,300 (on passage)	1	2000-2009
France	-	-	-		-	200 (wintering)	1	1996-2000
*Germany**						11,000 (passage)/ 3,600 (wintering)	1	2005
Greece						up to 200 (wintering)		
*Republic of Ireland**						347 (up to 2,000 birds in the 1990s) wintering	1	2000-2005
*Latvia**						800 (passage)	1	1997
*Lithuania**						1,700 (passage)	1	2000-2009
*Netherlands**						14,000 (wintering)	1	
*Poland**						1,000 (passage)	1	2000-2009
Russian Federation (European)	c. 9,000[+]	1	1995-2000			23,000 (based on Beekman et al. in prep.)	1	2000-2005
Sweden	-	-	-	-	-	1,000 (passage)	1	2000
*United Kingdom**				-		7,663 (wintering)	1	2000-2009
Total						**23,000 (Beekman et al., in prep)**		

*Figures updates by national Bewick's Swan count coordinators
[+] Estimated number of birds of breeding age

1.4 Survival and Productivity

The average lifespan of a Bewick's Swan is 5.4 years for both sexes (Rees 2006). Early analyses made in the late 1970s and mid 1980s indicated annual survival of around 0.85 (s.e. = 0.01) for immature and adult males and 0.84 (s.e. = 0.01) for females from the same age classes (Evans 1979, Scott 1988); more recent preliminary analysis of unpublished data indicates some decline in adult survival from 1970–2008, with <80% annual survival in 8 years from 1991 onwards and only in 1 year between 1970–1990 inclusive (WWT unpublished data). If formal statistical analysis confirms this trend, it could be a very important determinant of recent population trends. Survival of young birds from their first to their second winter was 64% for males and 68% for females during the mid-1960s–1980s (Scott 1988).

Most lasting pair bonds are set up at the age of 3–4 years. First breeding is usually at the age of 4–6 years. Rees (2006) found that the average brood size at the breeding grounds was 2.6 cygnets per family when the cygnets were 5–6 weeks old in 1992–1994. However, the number of cygnets fledged per successful breeding pair is not known (Rees 2006). Long-term data on Bewick's Swan productivity is available only from the wintering grounds. The percentage of juveniles in wintering flocks varies widely between years, from 3.2% to 46.9% in the Netherlands (Beekman et al *in prep*.), and from 3.8% to around 30% at Slimbridge (Rees 2006), with a long-term declining trend (Rees 2006, Beekman et al. in prep). However, fluctuation in the percentage of juveniles reflects not only changes in the productivity of breeding adults (number of successful and failed breeders), but also the age-structure of the population (specifically, the proportion of birds below breeding age). The average brood size measures the productivity of the pairs that bred successfully and managed to lead their cygnets to the wintering grounds, but it provides no information about the proportion of failed breeders. According to the Dutch data (Beekman *et al*, in prep.), the average brood size has fluctuated between 1.50–2.85 cygnets per family between 1955 and 2007, and also shows a long-term declining trend, but the average brood size during the period of the rapid population increase (i.e. 1985–1991) did not differ significantly from the period of population decline (i.e. 1996–2005). The absolute number of successful breeders can be calculated from these figures, and these show large (five-fold) annual fluctuations without any clear temporal trend. At Slimbridge, the proportion of paired birds with cygnets ranged from 9.5% to 69% between 1963 and 2002 (Rees 2006). The generally low proportion of pairs with cygnets partly relates to the fact that a high proportion (54–62%) of Bewick's Swans do not occupy breeding territories in spring and only 20–71% of territorial pairs attempt to breed (Schadilov et al. 2002). There is no evidence of long-term changes in breeding density; surveys of the northeast part of the Malozemelskaya tundra made in 1980–81 and from 1991–1999 found no significant increase in the density of territorial Bewick's Swans over this period (Shchadilov et al. 2002, Rees 2006), which suggests that the number of successful breeders contributing to population recruitment at this time was influenced by the proportion of territorial pairs that attempted to breed and by their breeding success rather than an increase in occupancy of territories, though it should be noted that the surveys were made over only a small part of the breeding range. As the highest densities of swan pairs are found in coastal tundras with numerous small lakes, and since this type of habitat is limited to only small parts of the European part of Arctic Russia, it is certainly possible that availability of good breeding territories may contribute to limiting population size through density dependent processes. Breeding success is also strongly affected by spring weather conditions and varies with the body condition of birds arriving at the breeding grounds. In Whistling Swans, both clutch size and the proportion of pairs with broods were higher in warm springs than in cold springs (Lensink 1973, Dau 1990). According to Syroechkovsky et al. (1991, 2002), cold spells during early incubation can reduce hatching success and increase predation in years with low lemming densities. Brood size is positively correlated with previous breeding experience (Rees 2006).

1.5 Population Size and Trends

From 1955 until the mid-1970s, population size was estimated at 10,000 individuals or fewer (Nisbet 1959, Timmerman 1977, Atkinson-Willes 1975, 1981). In the mid-1970s, the population was thought to comprise 9,000–10,000 or even 13,000 individuals (Mullié & Poorter 1977, Poorter 1981), rising to 16,000-17,000 by the mid-1980s (Beekman et al. 1985, Monval & Pirot 1989, Dirksen et al. 1991). A dramatic increase in numbers occurred during the late 1980s and early 1990s; 25,800 birds were recorded in January 1990 and 29,000 in January 1995 (Beekman 1997). However, the most recent estimate of the NW European Bewick's Swan population, derived from coordinated international counts made in mid-winter, was only 21,500 individuals in 2005 (Rees & Beekman 2010, Beekman et al., in prep.) following a decline since the mid-1990s (Beekman 1997, Delany et al. 1999, Delany & Scott 2006, Wetlands International 2008).

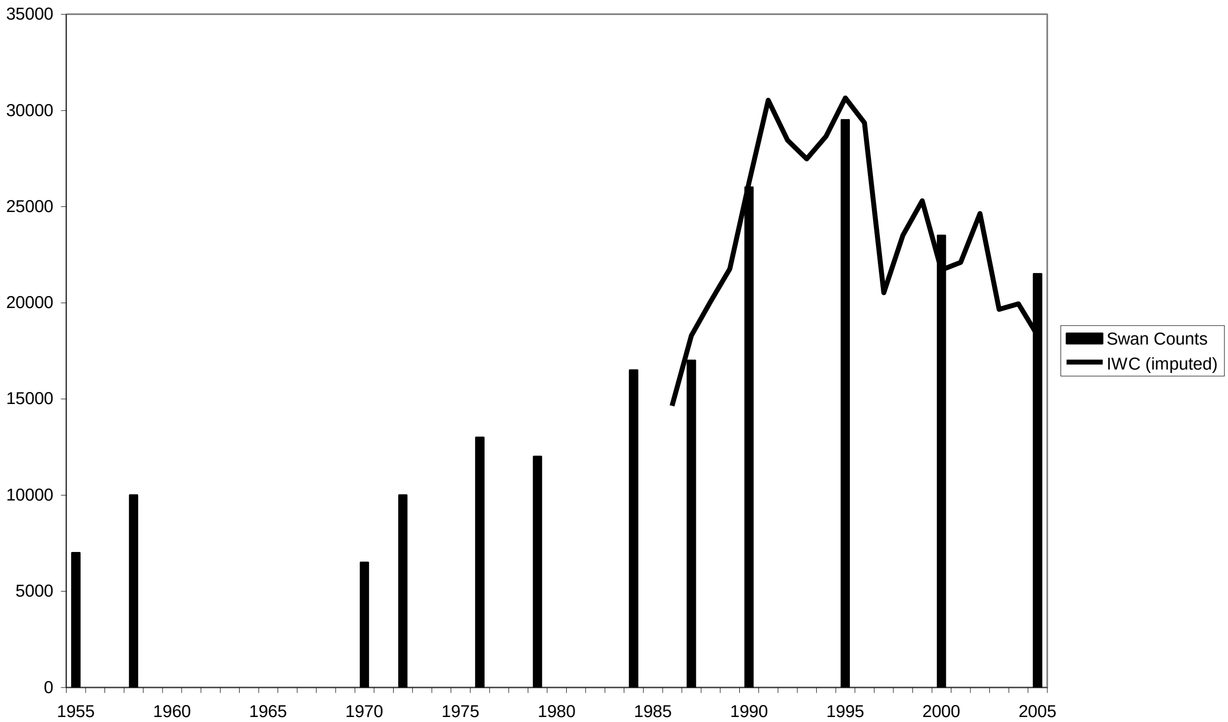


Figure 3: Population trend for the NW European Bewick's Swan population, based on International Waterbird Census (IWC) data (Wetlands International 2008) and International Swan Census data (Beekman in litt.). Note that census figures for 1955-1971 (from Bannerman 1957, Poorter 1991) may be incomplete.

2. Threats

The result of the threat analysis is presented in Figure 4. The NW European Bewick's Swan population is thought to be sensitive to the impacts of climate and land-use changes due to its narrow breeding distribution across the Russian high arctic and its high dependency on a small number of stop-over sites during spring and autumn migration. Its highly congregatory behaviour and reliance on submerged aquatic vegetation also makes it vulnerable to chemical pollution and infectious disease. A number of factors were identified that are likely to contribute to the decline or fluctuation of the population. However, our current knowledge is still insufficient to fully understand the relationships between these threats and population trends, despite numerous studies being carried out both at the breeding and wintering grounds. Nevertheless, workshop participants considered habitat changes (High) and illegal/accidental shooting (Medium; potentially High if illegal shooting levels increase further) as the most important existing threats to the population.

2.1 Threats Causing Increased Mortality

Illegal/Accidental shooting

The species is protected throughout the flyway; however, cases of illegal (deliberate or accidental) shooting at birds occur. Analysis of the cause of death reported with ring recovery data shows that the swans are being shot along the migration route (Rees & Bowler 2002, Newth et al. 2011) including the wintering range (e.g. about 15 birds are known to have been killed by hunters in the United Kingdom). A high percentage of live swans x-rayed when caught for ringing were found to have shotgun pellets in their body tissues: 34% of birds x-rayed in the 1970s, rising to 39% in the 1980s and dropping to 23% in the 2000s (Rees et al. 1997, Newth et al. 2011). Shooting and hunting of other waterbirds occurs at various staging areas, and accidental or intentional shooting of Bewick's Swans may also occur at this time (B. Nolet pers.

comm.). Additionally, hunting activity leads to disturbance and displacement of foraging swans. Hence, when flying around, the birds are confronted with lower food intake rates and higher energetic costs. In the Pechora Delta, Korovinskaya Bay and on the Russkii Zavorot Peninsula (northern Russia), many cases of illegal swan hunting were encountered in the years 1992-1996 (J.H. Beekman pers. comm.). Given that the species' demography is sensitive to variation in survival (due to its high survival and low productivity rates), a substantial increase in shooting pressure could lead to rapid population decline. This threat therefore is considered potentially high.

Importance: Medium (potentially High)

Collision with power lines

Collision with power-lines is the most commonly reported cause of death for Bewick's Swans on the wintering grounds (Rees & Bowler 2002, Rees 2006). But as there are few (if any) power-lines on the breeding grounds and more northerly staging areas, and considering the high incidence of shot-in pellets, shooting is believed to be the most significant cause of mortality over the whole annual cycle. In addition, the incidence of collisions with power lines is not thought to have increased in recent years, and there has been no obvious increase in the number of power lines installed since the mid 1990s which could account for the population decline.

Importance: Low

Collision with wind turbines

There has been a rapid and substantial increase during the early 21st century in the number of wind farms developed along parts of the swans' migration route and in the wintering grounds. To date, post-construction monitoring has described habitat loss but has not yet rigorously assessed (for several sites) any increase in mortality due to the turbines. In particular, the potential impact of the large offshore wind farms scheduled for development between key wintering areas in southeast England (notably the Ouse Washes) and the Netherlands, is not known.

Importance: Unknown

Lead poisoning

Lead poisoning occurs when the birds ingest lead (e.g. shotgun pellets or anglers' weights) as grit and the lead is absorbed into the blood stream. Cases of lead poisoning have been recorded in the NW Europe flyway. This was the cause of death in 14.6% of adults subjected to *post mortem* examination in the United Kingdom (Brown et al. 1992, Rees 2006). However, the population level impact of this (or indeed other causes of death) is unclear because only a small sample of birds recovered are subject to standard *post mortem* examination, which includes taking samples for bacteriological, virological, toxicological and histopathological analysis, to confirm initial diagnoses.

Importance: Unknown

2.2 Threats Contributing to Reduced Breeding Success

Suboptimal feeding conditions at stop-over and wintering sites

Bewick's Swans are reliant on the availability of suitable stop-over sites to replenish fat reserves to be able to complete their migration (Beekman et al. 2002, Rees 2006). Food intake during the 2–3 week staging period in the White Sea area is likely to be crucial not only for successful onward flight to the breeding grounds but also for subsequent breeding success, with most birds in the population staging in the area during spring migration (Nolet & Drent 1998, Rees 2006). A reduction in food resources (notably *Potamogetom* spp.) could trigger abandonment of wintering or staging sites, as occurred in the Netherlands during the 1960s (see e.g. Poorter 1991, Noordhuis 2000). The abundance of submerged aquatic vegetation can be reduced by eutrophication, caused by increased use of agricultural fertilisers, and/or increased discharge of nutrient-rich wastewater. Accessibility of aquatic vegetation is also dependent on the depth of the water. Abandonment of grazing and reduction in root crops, which was evident in the Baltic countries during the 1990s (S. Svazas in litt.), or changes in farming practice in the wintering range (e.g. reduction of sugar beet or early ploughing), can also reduce the availability of food resources. Disturbance and displacement of swans due to human activity (e.g. hunters and fishermen with boats in Korovinskaya Bay, the Severnaya Dvina River Delta in the White Sea region, and on Lake Ladoga, and boats and (kite) surfers in the Netherlands) are a serious problem both on stop-over sites and in some parts of the wintering range (J.H. Beekman pers. comm.).

Importance: High

<u>Degradation of breeding habitats due to infrastructure development</u>
Continued industrial development driven by renewed oil and gas extraction can cause degradation and loss of swan habitat, particularly in the breeding areas and moulting sites (Beekman et al. 1994, Bowler 2005). It also increases disturbance by opening up formerly less accessible areas in the Russian arctic. At present, large terminals and pipelines for gas transportation from Russia to Western Europe are being constructed in the Finnish Gulf. Important swan spring-staging habitats (shallow waters in sheltered bays and around archipelagos) are also affected here.

Importance: Local

<u>Degradation of breeding habitats due to climate change</u>
Climate change may lead to reduction of the current limited breeding habitats of Bewick's Swan as a result of the northward extension of the boreal zone and sea level rise (Rees 2006). However, such habitat change is likely to be a slow process capable of causing a slow decline of the population.

Importance: Unknown (potentially Medium)

<u>Severe and fluctuating weather conditions during (return) migration and on the breeding grounds</u>
Cold weather and extended snow cover could significantly affect and reduce the breeding success of the species, with cold weather during laying and incubation in otherwise early springs being particularly associated with reduced productivity (Syroechkovsky et al. 1991, 2002, Rees 2006). Some preliminary analysis suggests that this could have had an impact in the recent decline of the population (B. Nolet & M. Klaassen pers. comm.). However, there is currently no evidence that the frequency of severe weather conditions or of cold snaps during incubation has changed at the breeding grounds. Therefore, pending further analysis, this factor was considered to cause population fluctuations only.

Importance: Low

<u>Predation at breeding grounds</u>
Most predation on eggs and young is by Arctic Fox, birds of prey (e.g. Sea Eagle, Snowy Owl, Rough-legged Buzzard), gulls and skuas, and also occasionally by Wolverines (Syroechkovsky et al. 2002, Rees 2006). About 27% of nests near Sabuto Lake on the Yugor Peninsula were lost due to predation by Arctic Foxes and gulls in 1984 (Mineyev 2003). Predation pressure on other arctic-breeding waterbirds is known to be associated with the lemming abundance; however, the number of cygnets in the wintering flocks has fluctuated in a 5-6 years cycle between 1986 and 2005 (Beekman et al. in prep). An increase in predation pressure may occur if the Red Fox, which is expanding its range northwards, as a result of climate change, reaches the Bewick's Swans' breeding grounds; Red Fox predation has been reported as being a problem for species breeding in the Sub-Arctic zone (e.g. Lesser White-fronted Goose, Jones et al. 2008).

Importance: Low

<u>Intraspecific competition</u>
Although intraspecific competition is not a threat *per se*, it is possible that the recent decline of the population has been caused by over-compensating density dependence following the strong population increase from the 1970s to the early 1990s; very strong intraspecific competition has been observed amongst Bewick's Swans at the breeding grounds (fights in defence of territories; Rees 2006) and stop-over sites (food depletion; Nolet & Drent 1998). Individual-based models of Bewick's Swans feeding on *Potomageton* indicate that subordinate birds suffer reduced intake rates at high densities because of their avoidance behaviour, but that the mean population intake rate is only slightly lower than in the absence of interference (Gyimesi et al. 2010). Preliminary analysis of population size and age-structure, in relation to reproductive output, shows that during the period of strong population increase the number of successful breeders did not increase at the rate that potential breeders/adult birds did, but instead, the number of successful breeders levelled off to a maximum (Beekman et al., in prep).

Importance: Unknown

Interspecific competition
Herbivorous waterbird species have always competed for aquatic vegetation, and many species have achieved their own niche in the ecosystem. Aquatic systems are highly susceptible to imbalances caused by (annual) changes in environmental conditions. Fluctuations in the availability of aquatic food resources and their consumers may cause temporary variation in the composition of the waterbird population as a whole. However, the strong annual variations in aquatic food sources are usually oscillations around a certain level of balance. Large increases in Whooper and Mute Swan populations, and possibly other herbivorous waterbirds, may lead to competition for aquatic feeding sites at wintering and stop-over sites (Gyimes et al. 2011, Hidding et al. 2010, Idestam-Almquist 1996, Jonzén et al. 2002). Improvement of water quality in Lake Veluwe in the Netherlands, by cutting down on effluent and phosphate levels from agricultural fertilizers, has caused a spectacular shift from *Potamogeton* to *Chara* beds, and resulted in a twenty-fold increase in waterbird biomass, but at the cost of Bewick's Swan numbers, whereas many other species strongly increased (amongst others, Mute Swans). Climate change has the potential to drive increases in resident waterbird populations (e.g. Mute Swan, Eurasian Coot), through reductions in winter mortality, in the wintering grounds of Bewick's Swan, which may in turn alter the balance of this natural competition. Similarly, there appears to be considerable potential for the expansion of sub-Arctic breeding species, such as Whooper Swan into the high Arctic breeding grounds of Bewick's Swan, where interspecific competition may ensue (Syroechkovski 2002, Rees 2006).

Importance: Unknown

2.3 Potential Threats of Mass Mortality

Oil pollution
The risk of pollution to habitats in the Pechora Delta and Bolshezemelskaya tundra is likely to increase substantially in the near future due to the intensification of oil and gas exploration and extraction in the region and the establishment of the Nenets Oil and Gas Development District. Harbours and oil and gas transportation ports in the swans' breeding range and along the migration route (e.g. on the Baltic Sea near St. Petersburg and in Lithuania) also increase the risk of oil spills at the moulting and pre-migratory fattening sites when they congregate in large numbers in August-September. According to Beekman et al. (1994), an oil spill in the Pechora Delta in the mid-1990s could have affected some 15,000 birds, and this remains a major risk to the large number of swans breeding and moulting in the region.

Importance: potentially High

Diseases
Viral and bacterial diseases impact the birds, their migration and also their survival. The concentration of Bewick's Swans in large numbers makes them intrinsically vulnerable to infectious diseases such as botulism, duck viral enteritis and avian influenza.

Importance: potentially High

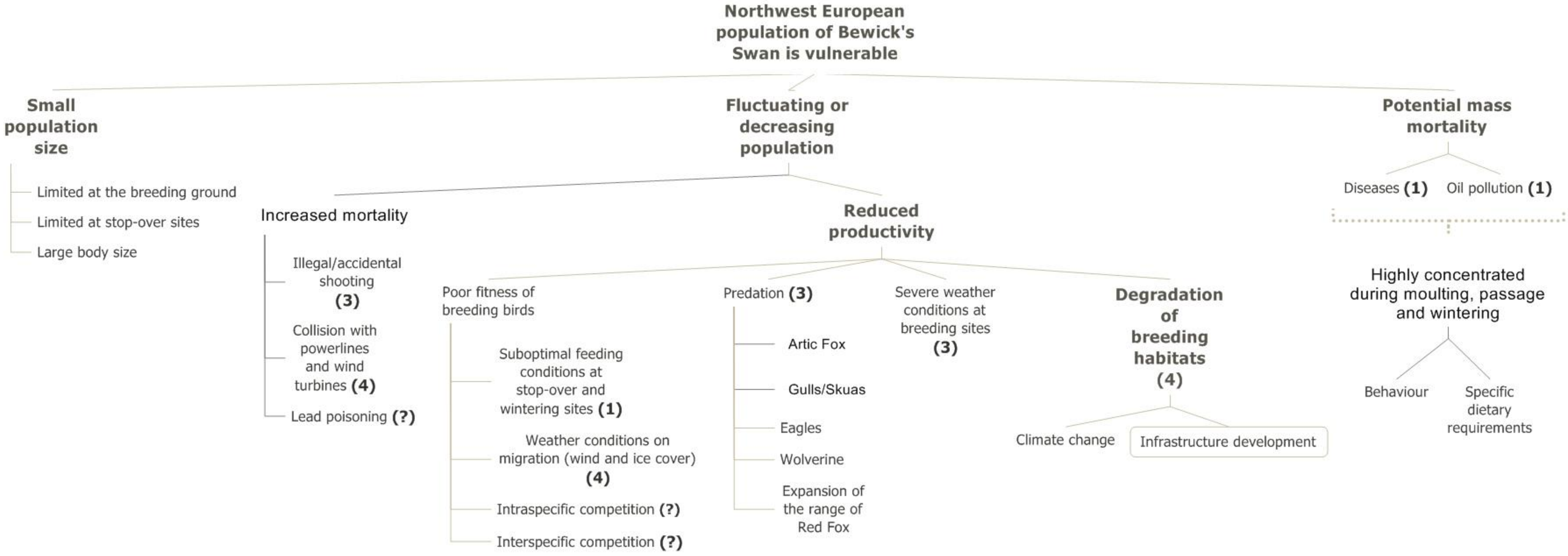


Figure 4: Problem tree analysis (Numbers indicate the following threat levels: **(1)** = high, **(2)** = medium, **(3)** = low, **(4)** = local, **(?)** = unknown)

3. Policies, Legislation and Ongoing Activities

3.1 Policy and legislation

The Bewick's Swan is included in:

- Appendix II of the Convention on the Conservation of the European Wildlife and Natural Habitats (Bern Convention), and
- Appendix II of the Convention on Migratory Species (CMS or Bonn Convention), which calls for international agreements and cooperation for the conservation and management of the species listed in this annex.

It is also listed in:

- Category A(2) of the African Eurasian Waterbird Agreement (AEWA), and
- Annex I of the EU Birds Directive which requires special conservation measures concerning its habitats and protection of the most suitable territories for the species in the relevant EU Member States.

The EU Birds Directive[2] is the key legal instrument for the protection of the Bewick's Swan on its wintering grounds, and the main instrument to give practical effect to the objectives of AEWA in the EU. Adopted in 1979, this directive is the EU's oldest example of nature legislation and one of the most important, creating a comprehensive scheme of protection for all wild bird species naturally occurring in the EU. The Birds Directive recognises that habitat loss and degradation are the most serious threats to the conservation of wild birds. It therefore places great emphasis on the protection of habitats for endangered, as well as migratory species (listed in Annex I), especially through the establishment of a coherent network of Special Protection Areas (SPA) comprising all the most suitable territories for these species, as well as avoiding the deterioration of their habitats outside these protection areas.

The EU Habitats Directive[3] aims to ensure the long-term preservation of wild fauna and flora in the EU through the protection of their habitats, especially through the designation of the most important sites within the EU as Special Areas of Conservation (SAC), which form together with SPAs the Natura 2000 ecological network of protected areas. In 2010, the Bewick's Swan is to be found in 459 out of the approximately 26,000 SPA and SAC of the Natura 2000 network. In these SPA and SAC, Articles 6 and 7 of the Habitats Directive require avoiding damaging activities that could significantly disturb the Bewick's Swan or deteriorate its habitats. It also requires that any plan or project shall undergo an appropriate assessment to determine its implications for the site concerned and to be approved only after having ascertained that it will not adversely affect the integrity of the site concerned. In exceptional circumstances, a plan or project may still be allowed to go ahead, in spite of a negative assessment, provided there are no alternative solutions and the plan or project is considered to be of overriding public interest. In such cases the EU Member State must take appropriate compensatory measures to ensure that the overall coherence of the Natura 2000 network is protected.

3.2 Site protection and management

In its breeding grounds in the Russian Federation, the species is listed in the Red Data Book of Russia (2000) under the category "rehabilitating species". Parts of the breeding areas are protected by the following nature reserves:

- *Federal level*: the Nenets zapovednik and the Nenets zakaznik
- *Regional and local level*: the Lower Pechora, Vaigach and Shoina sanctuaries

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[2] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p.7).

[3] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).

On its passage through the Russian Federation, the species is protected in the state Kandalaksha and Nighnesvirsky nature reserves, as well as in a number of local sanctuaries, such as Belomorsky, Dvinskoi, Berezovye islands, Kurgalsky and others. In spring, at least 60% of the population passes through the Dvinskoi sanctuary in the southeast corner of the White Sea.

Key staging and wintering wetlands in the EU (including the main roost sites) are all part of the Natura 2000 network, but most of the feeding areas are on arable land and grasslands outside the boundaries of these sites. Thus only a proportion of the wintering area used by swans is protected.

In all range countries, the species is protected from direct persecution by national law, and for countries in the EU it is also protected by the Birds Directive, which bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds.

At key stop-over sites, active site management programmes for the Bewick's Swan are implemented in Estonia (coastal and floodplain meadows) and Lithuania (Nemunas delta). In the wintering range, reserves are managed by WWT and the RSPB in the UK, including key wintering sites for the species at the Ouse Washes and Slimbridge, as well as in the Netherlands (e.g. water quality and water level management at the IJsselmeer border lakes). Many other countries have specific measures targeted at maintaining suitable habitat conditions for waterfowl including Bewick's Swan.

The EU's environmental and nature conservation financial instrument LIFE has co-financed several targeted demonstration and best practice projects in countries such as Finland, Latvia and the Netherlands, aiming at the conservation of coastal inlets and wetlands which are habitats used by the Bewick's Swan.

3.3 Monitoring and research activities

The main coordinated monitoring activities covering the species are: (1) the International Waterbird Census (IWC), which is carried out on an annual basis in mid-January, and (2) the International Bewick's and Whooper Swan Census which is coordinated by the WI/IUCN Swan Specialist Group and is carried out every five years. In most countries the IWC is fully implemented, especially in the key wintering countries – UK, Netherlands, and Germany – and data is submitted regularly, providing the basis for the analysis of long-term population trends. All range countries participate in the Bewick's Swan census. In the breeding areas in Russia, the breeding success of Bewick's Swan was monitored in the Nenetski Nature Reserve in the 1990s. Ringing was also introduced there and has continued ever since. Irregular field surveys have been undertaken elsewhere in the East European tundra.

Regular monitoring of key swan stop-over sites takes place in Estonia and Lithuania as part of the state monitoring programme.

In the wintering range, all core countries make regular counts of the species as part of their national waterbird monitoring programmes. Ecological and behavioural studies were carried out in the UK in the 1970s–1990s (Rees 2006 provides a review), but this has been more limited in recent years (E. Rees *in litt.*). Intensive research on various aspects of the ecology of the species has been carried out in the Netherlands and at different stop-over sites in recent decades (e.g. Beekman et al. 2002, Klaassen et al. 2006, Nolet et al. 2006, Klaassen et al. in press).

Monitoring of breeding success takes place on an annual basis in the wintering range in the Netherlands (November-December), Germany (autumn), Denmark (biennially) and the United Kingdom (November–January inclusively). November-December counts are coordinated to occur simultaneously in the Netherlands, Denmark and the United Kingdom (J.H. Beekman pers. comm.). At Slimbridge, detailed monitoring of Bewick's Swan life histories has been undertaken for more than 40 years, from the 1963/64 winter onwards (Rees 2006).

Colour ringing schemes are continuing, including fitting plastic leg rings and neck bands so that individual swans can be identified in the field, with most ringing taking place in Great Britain and the Netherlands but also in key staging countries (in some years) and in the Nenetski region of the Russian arctic (most years from 1991 onwards).

4. Framework for Action

Goal: Maintain the population minimally at its 2000 level (i.e. 23,000 birds) in the long-term.
Indicator: The five year minimum of counts exceeds 23,000 individuals.
Source: IWC and ISC.

Purpose: Halt ongoing decline and, if necessary, begin recovery of the population to its 2000 level.
Indicator: Average population size by 2015 exceeds 21,500 individuals (i.e. the 2005 levels).
Source: IWC and ISC.

Table 3: Results, Indicators and Means of Verification

Result	Indicator	Means of verification
1) A chain of key sites, sufficient to support the population throughout its annual cycle, is sustained across the flyway	• Key sites not deteriorated • Potential new key sites identified and protected	• Satellite images on the extent of resource availability • Regional analysis of site-based monitoring of bird numbers, timing and habitats
2) Mortality caused by shooting is reduced	• Decrease in the % of investigated birds having lead shot in their body	• X-ray surveys (Action 2.4)
3) Mortality caused by infrastructure collision is reduced	• Decrease in the number of birds killed by powerlines or windfarms	• Dead Bird Database
4) Risk of lead poisoning is reduced	• Decrease in the number of birds with elevated tissue lead levels	• Dead Bird Database • Blood lead levels measured as part of a live bird surveillance programme
5) Risk of mass mortality caused by oil spills reduced	• Each key site with petrochemical exploitation or transport has an emergency plan that reduces the risk of mass mortality of Bewick's Swan	• National reports to AEWA
6) Changes in population size, trend, distribution and demographic parameters detected	• Bewick's Swan sightings from breeding grounds collected • All key wintering sites are counted at least during the 5-yearly Swan Census • Age-structure data are available annually • Survival rate estimates updated at least every five years	• Arctic Breeding Bird Surveys • Int. Swan Census, IWC. Results available within two years after the season. • Swan SSG newsletter • National waterbird monitoring reports • WWT • Publications
7) Interchange with other populations and its influence on the development of numbers in NW Europe better	• Study developing and reviewing the evidence of population interchange is published	• Publications

quantified		
8) Changes in relative importance of human-induced mortality factors understood and emerging threats detected	• Study in the relative importance of human-induced mortality factors published	• Publications
9) Influence of individual sites on the development of the population is understood	• Locations and factors limiting population growth identified	• Publications

Table 4: Framework for Actions Corresponding to the Results and Ranked According to Their Importance

Result	***Action***	***Priority***	***Time scale***	***Organisations responsible***
1. A chain of key sites, sufficient to support the population throughout its annual cycle, is sustained across the flyway	1.1 Extend the coverage and enhance protection of areas important for breeding and moulting birds (e.g. Vaygach and Northern Dvina Bay, Western Khaipudyrskaya Guba). **Russian Federation**	High	Medium	Competent national and regional authorities
	1.2 [Endeavour to] maintain favourable conditions at key foraging and roosting sites through appropriate management and/or protection measures according to the species requirements with special emphasis on the ones listed in Annex 2 **Range States with important wintering and staging populations**	High	Ongoing	Competent national and regional authorities, land management organisations
	1.3 Maintain and, if necessary, restore suitable aquatic macrophyta availability at key stop over and wintering sites through managing water level and water quality **Range States with important wintering and staging populations**	Essential	Ongoing	Competent national and regional authorities, land management organisations
	1.4 [Endeavour to] reduce or prevent disturbance at key sites by farming, hunting, reindeer herding, oil and other mineral exploitation activities, fishing and recreational activities through zoning, compensatory payments and other site management measures. **All Range States**	High	Ongoing	Competent national and regional authorities
	1.5 Prevent negative impact of infrastructure and industrial development by avoiding key sites or mitigating any potential negative impacts in the absence of alternative locations. **All Range States**	Essential	Ongoing	Competent national authorities

Result	***Action***	***Priority***	***Time scale***	***Organisations responsible***
	1.6 Carry out site-based Before-After/Control-Impact (BACI) studies on habitat use in relation to various types of infrastructure (roads, pipelines, windfarms, powerlines) developments to better understand the impacts of such development and to assess the effectiveness of mitigation measures **All Range States**	Medium	Short	Researchers, competent national authorities
	1.7 Inform decision-makers, including other sectors, about the most sensitive areas for infrastructure development in relation to Bewick's Swan conservation **All Range States**	High	Short	NGOs, researchers, national species conservation working groups, competent national authorities
2. Mortality caused by shooting is reduced	2.1 Maintain protected status of the species across the range of the population **All Range States**	Essential	Ongoing	Competent national authorities
	2.2 Increase enforcement of hunting ban **All Range States**	High	Ongoing	Competent national and regional authorities
	2.3 Raise awareness about the protected status of swans to reduce illegal shooting and catching and collection of eggs **All Range States, but Russian Federation in particular**	High	Short	Competent national and regional authorities, NGOs
	2.4 Continue X-raying dead and live birds to monitor the level of shooting **All Range States**	Medium	Ongoing	Researchers
3. Mortality caused by infrastructure is reduced	2.5 Avoid key sites and flightlines during the construction of new powerlines and windfarms **All Range States**	High	Ongoing	Competent national and regional authorities

Result	***Action***	***Priority***	***Time scale***	***Organisations responsible***
	3.1 Bury powerlines at flight corridors between roost sites and foraging areas and fit with visual markers at other sections around key sites **All Range States**	High	Medium	Competent national and regional authorities
4. Risk of lead poisoning is reduced	4.1 Phase out lead shot completely on all feeding areas of Bewick's Swan around their key sites and enforce existing legislation where lead shot has been already banned **All Range States**	Medium	Ongoing	Competent national and regional authorities, hunting organisations
	4.2 Phase out lead as angler’s weight **All Range States**	Medium	Ongoing	Competent national and regional authorities, angling organisations
5. Risk of mass mortality caused by oil spills reduced	5.1 Companies involved in petrochemical exploitation and transport on the Bewick’s Swan flyway should develop and (where necessary) implement emergency plans to reduce mortality in case of accidents **Russian Federation**	Essential	Short	Competent national and regional authorities, companies in the oil exploitation and transportation business
6. Changes in population size, trend, distribution and demographic parameters detected	6.1 Continue the monitoring of the population size changes therein through 5-yearly Swan Census and complement it through annual data from IWC and report the results and collate and publish the results within two years **Range States in the wintering area**	Essential	Ongoing	Observer networks coordinated by national waterbird monitoring programmes under the framework of the WI/IUCN SSC Swan SG
	6.2 Continue internationally coordinated demographic monitoring in the wintering range through individual markings and monitoring age-structure of wintering flocks and analysing past variations in these and make it available through the Internet **Range States in the wintering area**	Essential	Ongoing	Observer networks coordinated by national waterbird monitoring programmes under the framework of the WI/IUCN SSC Swan SG

Result	***Action***	***Priority***	***Time scale***	***Organisations responsible***
	6.3 Develop and implement monitoring of breeding distribution, density, breeding success and factors influencing it including habitat changes, predation and interspecific competition with other swan species. **Russian Federation**	High	Short	Competent national and regional authorities, experts
	6.4 Develop and implement monitoring of population size and the timing of use at key moulting and stop-over sites, including pre-migratory ones **All relevant Range States**	High	Short	Experts and observer networks of the WI/IUCN SSC Swan SG, competent national and regional authorities
7. Interchange with other populations, and its influence on NW European population trends, better quantified	7.1 Continue and, if possible, expand remote tracking studies, ringing programmes or genetic studies	Low	Medium	Researchers
8. Changes in relative importance of human-induced mortality factors understood and emerging threats detected	8.1 Expand dead bird surveillance to cover the entire flyway and continue post mortem examination of dead birds **All Range States**	High	Short	Observer networks coordinated under the framework of the WI/IUCN SSC Swan SG
	8.2 Establish an international database of dead birds	Medium	Short	WI/IUCN SSC Swan SG
9. Influence of individual sites on the development of the population is understood	9.1 Determine turnover and total carrying capacity of critical sites **All Range States**	High	Long	Experts coordinated by the WI/IUCN SSC Swan SG
	9.2 Carry out surveys of food resources at key sites over time **All Range States**	Medium	Long	Experts coordinated by the WI/IUCN SSC Swan SG
	9.3 Monitor habitat changes at breeding sites in relation to breeding surveys in a standardised manner **Russian Federation**	Medium	Short	Researchers

Result	***Action***	***Priority***	***Time scale***	***Organisations responsible***
	9.4 Perform analysis of time series of satellite images of key breeding and stop-over areas to detect habitat changes to quantify the impact of land-use and climate change **Russian Federation, Estonia, Lithuania and Poland**	Medium	Medium	Experts coordinated by the WI/IUCN SSC Swan SG
	9.5 Identify the source of nutrients required for egg creation	Low	Medium	Researchers

References

Bannerman, D.H. (1957). *The Birds of the British Isles*. Oliver & Boyd, Edinburgh, UK.

Beekman, J.H., Dirksen, S. & Slagboom, T. (1985). Population size and breeding success of Bewick's Swans wintering in Europe 1983-84. *Wildfowl* 36: 5-12.

Beekman, J.H., van Eerden, M.R. & Dirksen, S. (1991). Bewick's Swans *Cygnus columbianus bewickii* utilising the changing resource of *Potamogeton pectinatus* during autumn in the Netherlands. *In*: J. Sears & P.J. Bacon (eds.), Proceedings of the Third IWRB International Swan Symposium, Oxford 1989. *Wildfowl Special Supplement No. 1*: 238-248.

Beekman, J.H. (1997). Censuses of the NW European Bewick's Swan population, January 1990-1995. *Swan Specialist Group Newsletter* 6: 7-9.

Beekman, J.H., Rees, E.C. & Bacon, P.J. (1994) Bewick's Swan *Cygnus columbianus bewickii*. *In*: G.M. Tucker & M.F. Heath (eds.), *Birds in Europe: their Conservation Status*. BirdLife Conservation Series No. 3, BirdLife International, Cambridge, UK.

Beekman, J.H., Nolet, B.A. & Klaassen, M. (2002). Skipping swans: fueling rates and wind conditions determine differential use of migratory stopover sites of Bewick's Swans *Cygnus bewickii*. *Ardea* 90 (Special Issue): 437-460.

BirdLife International (2004) *Birds in Europe: population estimates, trends and conservation status.* BirdLife Conservation Series No. 12, BirdLife International, Cambridge, UK.

BirdLife International (2010) *Species factsheet: Cygnus columbianus*. Downloaded from http://www.birdlife.org on 4/10/2010

Bowler, J.M. (2005). Bewick's Swan *Cygnus columbianus bewickii*. *In*: J. Kear (ed.), *Bird Families of the World: Ducks, Geese and Swans*. Oxford University Press, Oxford, UK.

Brouwer, G.A. & Tinbergen, L. (1939). De verspreiding der Kleine Zwanen *Cygnus b. bewickii* Yar. in de Zuiderzee, vóór en na de verzoeting. *Limosa* 12: 1-8.

Brown, M., Linton, E. & Rees, E.C. (1992). Causes of mortality among wild swans in Britain. *Wildfowl* 43: 70-79.

Dau, C.P. (1981). Population structure and productivity of *Cygnus columbianus columbianus* on the Yukon Delta,. Alaska. In: G.V.T. Matthews and M. Smart (Eds). Proceedings of the Second International Swan Symposium, Sapporo, pp. 161-169. IWRB, Slimbridge.

Delany, S., Reyes, C., Hubert, E., Pihl, S., Rees, E., Haanstra, L. & van Strien, A. (1999). Results from the International Waterbird Census in the Western Palearctic and Southern Asia 1995 and 1996. Wetlands International Publication No 54, Wetlands International, Wageningen, the Netherlands.

Delany, S. & Scott, D. (2006). Waterbird Population Estimates – Fourth Edition. Wetlands International Global Series No. 12, Wetlands International, Wageningen, the Netherlands.

Dirksen, S. & Beekman, J.H. (1991). Population size, breeding success and distribution of Bewick's Swans *Cygnus columbianus bewickii* wintering in Europe in 1986-87. *In:* J. Sears & P.J. Bacon (eds.), Proceedings of the Third IWRB International Swan Symposium, Oxford 1989. *Wildfowl Special Supplement No. 1*: 120-124.

Dirksen, S., Beekman, J.H. & Slagboom, T.H. (1991). Bewick's Swans *Cygnus columbianus bewickii* in the Netherlands: numbers, distribution and food choice during the wintering season. *In:* J. Sears & P.J. Bacon (eds.), Proceedings of the Third IWRB International Swan Symposium, Oxford 1989. *Wildfowl Special Supplement No. 1*: 228-237.

van Gils, J.A., Munster, V.J., Radersma, R., Liefhebber, D., Fouchier, R.A., et al. (2007) Hampered Foraging and Migratory Performance in Swans Infected with Low-Pathogenic Avian Influenza A Virus. *PLoS ONE* 2(1): e184. doi:10.1371/journal.pone.0000184.

Gyimesi, A., Stillmann, R.A. & Nolet, B.A. (2010). Cryptic interference competition in swans foraging on cryptic prey. *Animal Behaviour* 80: 791-797.

Gyimesi, A., de Vries, P.P., de Boer, T. & Nolet, B.A. (2011). Reduced tuber banks of fennel pondweed due to summer grazing of waterfowl. *Aquatic Botany*

Golovatin, M.G., Paskhalny, S.P. (1997). Spring migration of Bewick's Swans (Cygnus bewickii) at the low Ob River. *Casarca* 3: 286-297. (In Russian).

Harvey, N.G. (1999). A hierarchical genetic analysis of swan relationships. Unpublished Ph.D. thesis, University of Nottingham, Nottingham, U.K.

Hidding, B., Bakker, E.S., Keuper, F., de Boer, T., de Vries, P.P. & Nolet, B.A. (2010). Differences in tolerance of pondweeds and charophytes to vertebrate herbivores in a shallow Baltic estuary. *Aquatic Botany* 93: 123-128.

Idestam-Almquist, J. (1996). Waterfowl herbivory on *Potomageton pectinatus* in the Baltic Sea. *Oikos*, 81: 323-328.

Jones, T., Martin, K., Barov, B., & Nagy, S. (2008) International Single Species Action Plan for the Conservation of the Lesser White-fronted Goose (Western Palearctic population) *Anser erythropus.* AEWA Technical Series No. 36, Bonn, Germany.

Jonzén, N., Nolet, B.A., Santamaría, L. & Svensson, M.G.E. (2002). Seasonal herbivory and mortality compensation in a swan-pondweed system. *Ecological Modelling*, 147: 209-219.

King, J.G. & Hodges, J.I. (1981). A correlation between *Cygnus columbianus columbianus* territories and water bodies in western Alaska. *In*: G.V.T. Matthews & M. Smart (eds.), Proceedings of the Second International Swan Symposium, Sapporo, pp. 26-32. IWRB, Slimbridge.

Lensink, **C.J.** (1973). Population structure and productivity of whistling swans on the Yukon Delta,. Alaska. *Wildfowl* 24:21-25.

Mineyev, O. Yu. (2005). *Waterfowl of Malozemelskaya tundra and Pechora river delta*. Ural Division of Russian Academy of Science, Yekaterinburg, Russia. (In Russian).

Mineyev, Yu. N. (1991). Distribution and numbers of Bewick’s Swans *Cygnus bewickii* in the Third International Swan Symposium, Oxford 1989. *Wildfowl Special Supplement No 1*: European northeast of the USSR. *In*: J. Sears & P.J. Bacon (eds), Proceedings of the 62-67.

Mineyev, Yu. **N.** (1995). *Cygnus bewickii* Yarrell, 1830 – Bewick’s Swan. *In*: *Avifauna. Non-passeriformes*. Nauka, St. Petersburg, Russia. (In Russian).

Mineyev, Yu. N. (2003). Anseriformes of East European tundras. Ural Division of Russian Academy of Science, Yekaterinburg, Russia. (In Russian).

Mineyev, Yu. N. & Kondratiev, A. Ya. (2001). Bewick’s Swan. *In*: (D. S. Pavlov et al., eds.), *Red Data Book of Russian Federation. Animals*,pp. 406-408. Astrel, Moscow, Russia. (In Russian).

Morozov, V.V. (1996). Where do Bewick’s Swans winter? *Casarca*2: 237-243.

Mullié, W.C. & Poorter, E.P.R. (1977). Aantallen, verspreiding en terreinkeus van de Kleine Zwaan bij vijf landelijke tellingen in 1976 en 1977. *Watervogels* 2: 85-96.

Nakade, T., Tomura, Y., Jin, K., Taniyama, H., Yamamoto, M., Kikkawa, A., Miyagi, K., Uchida, E., Asakawa, M., Mukai, T., Shirasawa, M. & Yamaguchi, M. (2005). Lead Poisoning in Whooper and Tundra Swans. *Journal of Wildlife Diseases* 41(1): 253–256

Newth, J.L., Brown, M.J. & Rees, E.C. (2011). Incidence of embedded shotgun pellets in Bewick’s swans *Cygnus columbianus bewickii* and whooper swans *Cygnus cygnus* wintering in the UK. *Biological Conservation* doi:10.1016/j.biocon.2011.02.014.

Nolet, B.A. & Drent, R.H. (1998). Bewick’s Swans refuelling on pondweed tubers in the Dvina Bay (White Sea) during their spring migration: first come first served. *Journal of Avian Biology* 29: 574-581.

Nolet, B.A., Fuld, V.N. & van Rijswijk, M.E.C. (2006). Foraging costs and accessibility as determinants of giving-up densities in a swan-pondweed system. *Oikos* 112: 353 362.

Nolet, B.A., Andreev, V.A., Clausen, P., Poot, M.J.M. & Wessel, E.G.J. (2001b) Significance of the White Sea as a stopover for Bewick’s Swans *Cygnus columbianus bewickii* in spring. *Ibis* 143: 63-71

Poorter, E.P.R. (1991). Bewick’s Swans *Cygnus columbianus bewickii*, an analysis of breeding success and changing resources. Ministerie van Verkeer en Waterstraat, Rijkswaterstraat, Directie Flevoland, the Netherlands.

Rees, E. C., Bowler J.M. & Beekman, J.H. (1997) *Cygnus columbianus* Bewick’s Swan and Whistling Swan. *Birds of the Western Palearctic (BWP) Update* 1: 63-74.

Rees, E.C. & Bowler, J.M. (2002). Bewick's Swan *Cygnus columbianus*. *In*: (C.V. Wernham, M.P. Toms, J.H. Marchant, J.A. Clark, G.M. Siriwardena & S.R. Baillie, eds.), *The Migration Atlas: Movements of the Birds of Britain and Ireland*, pp 149-153. T. & A.D. Poyser, London, UK.

Rees, E.C. (2006). *Bewick’s Swan*. T & A.D. Poyser, London, UK.

Rees, E.C. & Beekman, J.H. (2010). NW European Bewick's Swans: a population in decline. *British Birds* 103: 640-650.

Scott, D.A. & Rose P.M. (1996). *Atlas of Anatidae populations in Africa and Western Eurasia*. Wetlands International Publication No. 41, WI, the Netherlands.

Shchadilov, Y.M., Belousova, A.V., Rees, E.C. & Bowler, J.M. (1998). Long-term study of the nesting success in the Bewick's Swans in the coastal tundra in the Nenetskiy Autonomous Okrug. *Casarca*, 4: 217-228.

Shchadilov, Y.M., Rees, E.C., Belousova, A.V. & Bowler, J.M. (2002). Annual variation in the proportion of Bewick's Swans and Whooper Swans breeding in northern European Russia. *In*: E.C. Rees, S.L. Earnst & J. Coulson (eds.), Proceedings of the Fourth International Swan Symposium, 2001. *Waterbirds* 25 (Special Publication 1): 86-94.

Syroechkovski, E.E. (2002). Distribution and Population Estimates for Swans in the Siberian Arctic in the 1990s. *In*: E.C. Rees, S.L. Earnst & J. Coulson (eds.), Proceedings of the Fourth International Swan Symposium, 2001. *Waterbirds* 25 (Special Publication 1): 100-113.

Syroechkovsky, Y., Litvin, K. Y. & Ebbinge, B. S. (1991) Breeding success of geese and swans on Vaygach Island (USSR) during 1986·- 1988; Interplay of weather and Arctic Fox predation. *Ardea* 79: 373-382.

Syroechkovsky, E.V., Litvin, K.E. & Gurtarova, E.N. (2002). Nesting ecology of Bewick's Swans on Vaygach Island, Russia. In E.C. Rees, S.L. Earnst & J. Coulson (eds.), Proceedings of the Fourth International Swan Symposium, 2001. *Waterbirds* 25 (Special Publication 1): 221-226.

Ten Kate, C.G.B. (1930). Over de talrijkheid van Cygnus bewickii bewickii Yarr. In den winter langs de Oos-kust van de Zuiderzee. *Org Club Ned. Vogelk.* II: 187-198.

Ubels, R., Vulink, J.T. & van Eerden, M.R. (2000) Diet of vertebrate herbivores. *In*: M.R. van Eerden (ed.), *Pechora Delta: Structure and dynamics of the Pechora Delta ecosystems (1995-1999)*, pp. 223-241. RIZA report nr: 2000.037 and MD report nr.: MD GAE 2000.39. Institute for Inland Water Management and Waste Water Treatment/RIZA, Lelystad, the Netherlands.

Wahl, J. & Degen A. (2009). Rastbestand und Verbreitung von Singschwan *Cygnus cygnus* und Zwergschwan *C. bewickii* im winter 2004/05 in Deutschland [Numbers and distribution of Whooper and Bewick's Swan (*Cygnus cygnus, C. bewickii*) in Germany in the winter season 2004/05]. *Vogelwelt* 130: 1-29.

Worden, J., Cranswick, P.A., Crowe, O., McElwaine, G. & Rees, E.C. (2006). Numbers and distribution of Bewick's Swan *Cygnus columbianus bewickii* wintering in Britain and Ireland: results of international censuses, January 1995, 2000 and 2005. *Wildfowl* 56: 3-22.

Annex 1: Assessment of Threats by Population

Type of threat	**Population 1**
1. Habitat loss/degradation (human induced)	*Threat score*
1.1. Suboptimal feeding conditions at stop-over and wintering sites	High
1.2. Degradation of breeding habitats due to infrastructure development	Local
1.3. Degradation of breeding habitats due to climate change	Unknown (Medium)
2. Direct mortality	
2.1. Illegal/Accidental shooting	Medium (High)
2.2. Collision with power-lines and wind turbines	Local/Unknown
2.3. Lead poisoning	Unknown
2.4. Predation at breeding grounds	Low
2.5. Oil pollution	(High)
2.6. Diseases	(High)
3. Reduced productivity	
3.1. Severe and fluctuating weather conditions during (return) migration and on the breeding grounds	Low
3.2. Intraspecific competition	Unknown
3.3. Interspecific competition	Unknown

Annex 2: Key sites[4]

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
Belgium	IJzervallei-De Blankaart	IJzervallei-De Blankaart	5100	51	2.833	44	195	ind.	2004/05	2003/04	W	good	Ijzervallei SPA, De IJzerbroeken te Diksmuide en Lo-Reninge Ramsar	100%	SPA, Ramsar
Belgium	Krekengebied	Krekengebied	780	51.25	3.666	106	585	ind.	2001/02	2006/07	W	good	Krekengebied SPA	100%	SPA
Belgium	Polderkomple x	Poldercomplex	9349	51.15	3.13	41	297	ind.	2004/05	2007/08	W	good	Poldercomplex SPA	-	SPA
Denmark	Bolle and Try meadows	Bolle og Try Enge	1500	57.1167	10.2	2,475	2,475	ind.	1994	0	NB	-		-	
Denmark	Fiilsø	Fiilsø	4270	55.7	8.25	479	479	ind.	1995	0	W	good	Filso Ramsar, Fiilsø SPA	100%	Ramsar, SPA
Denmark	Lønnerup Fjord	Lønnerup Fjord	460	57	8.783	316	316	ind.	1994	0	P	good	Lønnerup Fjord SPA	100%	SPA
Denmark	Nissum Fjord	Nissum Fjord	10890	56.35	8.233	320	320	ind.	1989	0	NB	-	Nissum Fjord Ramsar, Nissum Fjord SPA	100%	Ramsar, SPA
Denmark	Ringkøbing Fjord	Ringkøbing Fjord	27720	56	8.25	1091	1091	ind.	1994	0	NB	-	Ringkøbing Fjord Ramsar, Ringkøbing Fjord SPA	100%	Ramsar, SPA
Denmark	Roskilde Fjord, Selsø and Kattinge Søerne	Roskilde Fjord, Selsø and Kattinge Søerne	13180	55.75	12.08	300	300	ind.	1993	0	P	-	Roskilde Fjord, Kattinge Vig og Kattinge Sø SPA, Ledreborg, gods IUCN V, Selsø-Lindholm Gods IUCN V, Ïer i Roskilde Fjord IUCN Ia, Boserup Skov, Kattinge Vig IUCN IV,	100%	SPA, Ia, IV, V, Protected by Conservation Order

[4] Key sites are defined as areas that would qualify as internationally important.
For the purpose of this action plan, key sites meet the relevant criteria for selection of Ramsar Sites, Special Protection Areas under the EU Birds Directive and Important Bird Areas with the associated guidelines concerning the application of these criteria.
[5] The *min* and *max* columns give the range of annual maximum counts recorded between the start and end years cited for each site. If the min is 0 it indicates that only the maximum was given by the national contacts. If the maximum is 0, it indicates that only the minimum was given. If the *min* and *max* figures are the same, they represent the average of the annual maximum in the given period.
[6] If the start year or end year is 0, the year has not been indicated the source.
[7] W - wintering, NB - non-breeding, P - Passage

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Kattinge Vig Protected by Conservation Order, Kattinge Vig, RisgÕrd Protected by Conservation Order, Bolund Protected by Conservation Order, Ïsterby Flak, Hammer, Dyndet Protected by Conservation Order, Selsø Sø IUCN V, Lille Rørbµk IUCN IV, Jµgerspris Nordskov IUCN IV		
Denmark	Skjern Å	Skjern Å	3850	56.933	8.5	700	700	ind.	0	0	NB	-	Ringkøbing Fjord Ramsar&SPA, RÕddensig Dam Protected by Conservation Order, Albµk Bro Protected by Conservation Order	10-20%	Ramsar,SPA, Protected by Conservation Order
Denmark	Stadil Fjord and Veststadil Fjord	Stadil Fjord and Veststadil Fjord	6910	56.18	8.15	1000	1000	ind.	1995	0	NB	-	Stadil and Veststadil Fjords Ramsar, Stadil Fjord og Vest Stadil Fjord SPA	<80%	Ramsar, SPA
Denmark	Store Vildmose, Ryå and Stavad Enge	Store Vildmose, Ryå og Stavad Enge	6000	57.21	9.83	1179	1179	ind.	1994	0	NB	-	Store Vildmose, Grishøjgårds Krat, Nørre Halme egekrat IUCN III	10-20%	III
Denmark	Tøndermarsken, Magisterkog and Rudbøl Sø	Tøndermarsken, Magisterkog og Rudbøl Sø	6520	54.9	8.71	332	332	ind.	1993	0	NB	good	Vadehavet (Wadden Sea) Ramsar, Vidåen, Tøndermarsken og Saltvandssøen SPA, Tøndermarsken	100%	Ramsar, SPA, IV, Protected by Conservation Order

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Statsfredning IUCN IV, Margrethe Kog IUCN IV, Kiers GÕrd Margrethe Kog Protected by Conservation Order		
Denmark	Tissø, Lille Åmose, and Hallenslev Mose	Tissø, Lille Åmose, and Hallenslev Mose	2890	55.58	11.333	475	475	ind.	1996	0	NB	good	Tissø Protected by Conservation Order, Tissø, Åmose og Hallenslev Mose SPA	100%	SPA, Protected by Conservation Order
Denmark	Ulvedybet and Nibe Bredning	Ulvedybet and Nibe Bredning	18530	57.03	9.58	4320	4320	ind.	1994	0	NB	good	Ulvedybet and Nibe Bredning Ramsar, Ulvedybet og Nibe Bredning SPA, NAME Navn Sø IUCN IV	100%	SPA, Ramsar, IV
Denmark	Eastern part of Vejlerne	Vejlerne, østlige del	4870	57.05	9	377	377	ind.	1994	0	W	good	Vejlerne and Logstor Bredning Ramsar, Østlige Vejler SPA, SkÕrup Odde IUCN IV	100%	Ramsar, SPA, IV
Denmark	Western part of Vejlerne, Arup Holm and Hovsør Røn	Vestlige Vejler, Arup Holm and Hovsør Røn	3850	56.96	8.86	402	402	ind.	1994	0	NB	good	Vejlerne and Logstor Bredning Ramsar, Vestlige Vejler, Arup Holm og Hovsør Røn SPA	100%	Ramsar, SPA
Estonia	Alam-Pedja	Alam-Pedja	34692	58.46	26.21	150	600	ind.	2001	2007	P	good	Alam-Pedja Nature Reserve Ramsar, Alam-Pedja SPA, Alam-Pedja LKA, T§llassaare reservaat IUCN Ia, Alam-Pedja LKA, Laeva soo skv. IUCN Ib, Alam-Pedja looduskaitseala National Reserve, Alam-Pedja LKA,	100%	Ramsar, SPA, Ia, Ib, IV, VI, National Reserve

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Emaj§e-Paala pv.IUCN VI,Alam-Pedja LKA, Kõrstna skv. IV		
Estonia	Mouth of the Emajõgi river and Piirissaar island	Emajõe suudmeala ja Piirissaar	32977	58.38	27.31	120	800	ind.	1999	2007	P	good	Emajoe Suursoo Mire and Piirissaar Island Ramsar, Emajõe suudmeala ja Piirissaare SPA, Emajoe-Suursoo sookaitseala/maastikukaitseala Protected Area Without Zoning, Emajoe suudmeala ja Piirissaar Protected Area - Temporary, Piirissaare Protected Area Without Zoning	>95%	Ramsar, SPA, Protected Area Without Zoning, Protected Area – Temporary
Estonia	Kahtla-Kübassaare	Kahtla-Kübassaare	14355	58.416667	23.133333	20	500	ind.	1999	2007	P	good	Kahtla-Kübassaare SPA, Kahtla-Kübassaare Protected Area - Temporary, Kübassaare laialehine mets Protected Area Without Zoning, Merikotka püsielupaik Habitat Protection Area	>95%	SPA, Protected Area - Temporary, Protected Area Without Zoning, Habitat Protection Area
Estonia	Küdema Bay	Küdema laht	4519	58.53	22.26	5	75	ind.	1999	2007	P	good	Küdema lahe SPA, Küdema laht Protected Area - Temporary, Panga MKA, Panga skv. IUCN V, Laidu saare looduskaitseala Nature Reserve	>95%	SPA, Protected Area - Temporary, Nature Reserve
Estonia	Irbe strait	Kura kurk	206640	57.81	21.85	40	300	ind.	2001	2004	P	good	Kura kurgu SPA,	>95%	UNESCO-

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Kura kurk Protected Area - Temporary, Merikotka püsielupaik Habitat Protection Area		MAB Biosphere Reserve, SPA, Protected Area - Temporary, Habitat Protection Area
Estonia	Lahemaa	Lahemaa	72504	59.58	25.86	170	1000	ind.	2000	2007	P	good	Lahemaa SPA, Lahemaa rahvuspark National Park	100%	SPA, National Park
Estonia	Lahepera lake	Lahepera järv	256	58.56	27.21	20	70	ind.	2004	2005	P	good	Lahepera Protected Area - Temporary	100%	Protected Area – Temporary
Estonia	Lavassaare	Lavassaare	10260	58.55	24.28	150	1000	ind.	2002	2007	P	good	Lavassaare SPA, Lavassaare Protected Area - Temporary, Kaljukotka püsielupaik Habitat Protection Area	>90%	SPA, Protected Area - Temporary, Habitat Protection Area
Estonia	Luitemaa	Luitemaa	12960	58.150	24.56	150	5000	ind.	2000	2008	P	good	Luitemaa SPA, Rannametsa-Soometsa looduskaitseala Nature Reserve, Luitemaa Protected Area - Temporary	>95%	Nature Reserve, SPA, Protected Area - Temporary
Estonia	Nätsi-Võlla	Nätsi-Võlla	16874	58.48	24.10	0	600	ind.	1996	2007	P	good	Nätsi-Võlla SPA, Nõtsi-Võlla looduskaitseala Nature Reserve	>85%	SPA, Nature Reserve
Estonia	Pakri	Pakri	21039	59.35	24.21	15	300	ind.	1999	2007	P	good	Pakri SPA, Pakri Protected Area - Temporary	>90%	SPA, Protected Area - Temporary
Estonia	Pärnu Bay (NEW)	Pärnu laht (UUS)	109330	58.25	24.05	5500	17500	ind.	2001	2003	P	good	Pärnu lahe SPA, Põrnu laht Protected Area - Temporary	>95%	SPA, Protected Area - Temporary
Estonia	Peipsi	Peipsi	1842	58.78	27.00	500	6000	ind.	2000	2004	P	good	Loode-Peipsi, Loode-Peipsi	100%	SPA, Special Conservation

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													hoiuala Special Conservation Area		Area
Estonia	Ropka-Ihaste	Ropka-Ihaste	953	58.33	26.76	20	450	ind.	2002	2008	P	good	Ropka-Ihaste SPA, Ropka-Ihaste Protected Area - Temporary, Aardla jõrve botaanilis-ornitoloogiline kaitsealañ Protected Area Without Zoning	>80%	SPA, Protected Area No Zoning, Protected Area - Temporary
Estonia	Siiksaare-Oessaare bays	Siiksaare-Oessaare lahed	3902	58.30	22.88	10	180	ind.	2000	2008	P	good	Siiksaare-Oessaare SPA, Siiksaare-Oessaare lahed Protected Area temporary, Laidevahe looduskaitseala Nature Reserve	100%	SPA, Protected Area - Temporary, Nature Reserve
Estonia	Soomaa	Soomaa	39909	58.45	25.11	140	2000	ind.	1999	2008	P	good	Soomaa SPA, Soomaa National Park Ramsar, Soomaa Protected Area - Temporary, Soomaa rahvuspark National Park	>95%	Ramsar, SPA, National Park, Protected Area - Temporary
Estonia	Tagamõisa peninsula	Tagamõisa poolsaar	11190	58.50	21.91	40	50	ind.	2004	2007	P	good	Tagamõisa SPA, Tagamõisa Protected Area - Temporary, Vilsandi rahvuspark National Park, Vilsandi National Park Ramsar	100%	SPA, Ramsar, Protected Area - Temporary, National Park
Estonia	Väinameri	Väinameri	279557	58.76	23.25	5000	15000	ind.	2000	2007	P	good	Väinamere SPA, Hiiumaa Islets and Käina Bay Ramsar, Matsalu Nature Reserve Ramsar, Puhto-Laelatu-Nehatu Wetland Complex Ramsar, Matsalu	<95%	Ramsar, SPA, IV, V, Protected Area - Temporary, Nature Reserve

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													looduskaitseala Nature Reserve, Matsalu RP, Matsalu metsa skv.IUCN IV, Kõina lahe-Kassari MKA, Vesimaa skv. IUCN V, Võinameri Protected Area - Temporary		
Estonia	Võrtsjärv	Võrtsjärv	30600	58.25	26.06	120	250	ind.	2002	2007	P	good	Võrtsjärve SPA, Võrtsjärve Protected Area - Temporary, Jõrveküla looduskaitseala Nature Reserve	>95%	SPA, Nature Reserve, Protected Area - Temporary
Estonia	Vilsandi Archipelago	Vilsandi saarestik	18214	58.35	21.89	200	540	ind.	1999	2008	P	good	Vilsandi National Park Ramsar, Vilsandi SPA, Vilsandi rahvuspark National Park	100%	Ramsar, SPA, National Park
Estonia	Kasti Bay	Kasti Laht	3768	58.22	22.62	10	100	ind.	2000	2007	P	good	Kasti lahe SPA, Kasti laht Protected Area - Temporary	>95%	SPA, Protected Area - Temporary
Estonia	Kabli	Kabli	735	58.01	24.43	60	170	ind.	2003	2005	P	good	Kabli SPA, Kabli linnujaam Protected Area without zoning, Kabli Protected Area - Temporary	100%	SPA, Protected Area without zoning, Protected Area - Temporary
Estonia	Karala-Pilguse	Karala-Pilguse	2687	58.24	21.90	0	20	ind.	2007	2008	P	good	Karala-Pilguse SPA, Karala-Pilguse Protected Area - Temporary, Vilsandi rahvuspark National Park	100%	SPA, Protected Area - Temporary, National Park
Estonia	Kärevere	Kärevere	2375	58.43	26.52	5	150	ind.	2004	2008	P	good	Kärevere SPA, Kõrevere Protected Area -	>90%	SPA, Protected Area -

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Temporary		Temporary
Finland	Kirkon-Vilkkiläntura Bay	Kirkon-Vilkkiläntura	196	60.51	27.71	51	100	ind.	1996	0	P	good	Kirkon-Vilkkiläntura Bay Ramsar, Kirkon-Vilkkiläntturan SPA, Kirkon-Vilkkilõnturan luonnonsuojelualue Private Nature Reserve	>95%	SPA, Ramsar, Private Nature Reserve
France	Camargue	Camargue	76500	43.51	4.6	4	120	ind.	1997	0	W	-	Camargue	100%	Ramsar, SPA, UNESCO-MAB Biosphere Reserve, IV, V
France	Etang de Lindre	Etang de Lindre	1660	48.8	6.78	9	9	ind.	1997	0	W	-	Etangs du Lindre, Foret de Romersberg et Zones Voisines SPA, Etangs du Lindre, forêt du Romersberg et zones voisines Ramsar, Lorraine IUCN V	100%	Ramsar, SPA, V
France	Lac du Der-Chantecoq et étangs latéraux	Lac du Der-Chantecoq et étangs latéraux	56000	48.55	4.7	3	27	ind.	1997	0	W	-	Etangs de la Champagne humide Ramsar, Lac du Der SPA, Etang de la Horre SPA, Herbages et cultures des vallées de la Voire, de l'Héronne et de la Laines SPA, Herbages et cultures autour du lac du Der SPA	>80%	Ramsar, SPA
France	Lacs de la Forêt d'Orient	Lacs de la Forêt d'Orient	35800	48.3	4.3667	2	29	ind.	1997	0	W	-	Etangs de la Champagne humide Ramsar, Lacs de la forêt d'Orient SPA Forêt d'Orient	>90%	Ramsar, SPA, V

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													IUCN V		
France	Val d'Allier Bourbonnais	Val d'Allier Bourbonnais	17900	46.46	3.4	0	15	ind.	1991	0	W	-	Val d'Allier Bourbonnais SPA	100%	SPA
Germany	Lowlands of the Rivers Eider, Treene and Sorge	Eider-Treene-Sorge-Niederung	60000	54.38	9.33	0	4370	ind.	2008	2008	P	good	Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete SPA, Lundener Niederung mit M÷tjensee und Steller See IUCN V, Hennstedter Moor IUCN V, Wildes Moor bei Schwabstedt IUCN IV, Wald bei Hollingstedt IUCN V, Delver Koog IUCN IV, Kiesgrube bei Altenkamp IUCN V, Sudermoor bei Schwienhusen IUCN V, Eider-Sorge Niederung IUCN V, Gr. Moor/Kõtner Moor IUCN V, Dellstedter Birkwildmoor IUCN IV, Tetenhusener Moor IUCN IV, Alte Sorge Schleife IUCN IV, Hohner See IUCN IV	<20%	SPA, IV, V
Germany	Haaler Au lowlands and adjacent lowlands at the North Sea-Baltic channel	Haaler Au-Niederung und angrenzende Gebiete am Nord-Ostsee-Kanal		54.18	9.51	0	2878	ind.	2008	2008	P	good	Haaler Au-Niederung SPA	75%	SPA
Germany	Southern Greifswalder Bodden	Südlicher Greifswalder Bodden		54.15	13.64	0	2510	ind.	2001	2001	P	good	Biosphõrenreservat Südost-Rügen IUCN V, Insel	25%	IV,V

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													Koos, Kooser See und Wampener Riff IUCN IV, Schoritzer Wiek IUCN IV, Insel Usedom IUCN V, Boddenküste am Strelasund IUCN V, Halbinsel Devin IV, Mittlerer Strelasund (Hansestadt Stralsund) IUCN V, Mittlerer Strelasund (Rügen) IUCN V		
Germany	Lewitz	Lewitz	15780	53.46	11.63	0	1422	ind.	2008	2008	P	good	Lewitz (Parchim) IUCN V, Lewitz (Ludwigslust) IUCN V	>90 %	V
Germany	Elbe valley of Mecklenburg	Mecklenburgisches Elbetal	41730	53.31	11.01	0	1740	ind.	2001	2001	P	good	Mecklenburgisches Elbetal IUCN V	>80%	V
Germany	Recknitz and Trebel valley	Recknitz- und Trebeltal	67280	54.05	12.7	0	1721	ind.	1995	2005	P	good	Trebeltal (Demmin) IUCN V, Recknitztal IUCN V, Trebeltal (Nordvorpommern) IUCN V, Trebeltal IUCN IV, Kronwald IUCN IV, Wesselstorf IUCN V, Griever Holz IUCN IV, Lieper Burg IUCN V, Grenztalmoor IUCN IV	>40%	IV,V
Germany	Putzarer See, Galenbecker See, Brohmer Berge	Putzarer See, Galenbecker See, Brohmer Berge	31510	53.65	13.75	0	550	ind.	1995	2005	P	good	Galenbecker See Ramsar, Brohmer Berge (Mecklenburg-Strelitz) IUCN V, Am Stettiner Haff IUCN V, Brohmer Berge IUCN V,	>60%	Ramsar, V

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													Landgrabental IUCN V		
Germany	Coast and lagoons of Western Pomerania	Vorpommersche Küsten- und Boddenlandschaft	203810	54.43	12.9	1000	0	ind.	1995	2005	P	medium	Ostseeboddengewässer Ostteil Zingst - Westrügen - Hiddensee Ramsar, Vorpommersche Boddenlandschaft IUCN II, Vorpommersche Boddenküste (Nordvorpommern) IUCN V, Insel Hiddensee IUCN V	<60%	Ramsar, II, V
Germany	Island of Usedom	Insel Usedom	27790	53.93	14.01	0	1269	ind.	2001	2001	P	good	Insel Usedom IUCN V, Insel Usedom mit Festlandgürtel IUCN V	>90%	V
Germany	Peenetal (Peenetalmoor and Anklamer Stadtbruch)	Peenetal (Peenetalmoor und Anklamer Stadtbruch)	30530	53.85	13.78	0	422	ind.	1995	2005	P	good	Unteres Peenetal und Peenehaff (Ostvorpommern) IUCN V, Am Stettiner Haff IUCN V, Unteres Peenetal (Demmin) IUCN V, Peenewiesen bei Gützkow IUCN IV	>75% %	IV, V
Germany	Wismar bay and Salzhaff	Wismarbucht und Salzhaff	102030	54.01	11.43	0	401	ind.	1995	2005	P	good	Rustwerder IUCN IV, Boiensdorfer Werder IUCN V, Wustrow IUCN IV, Insel Langenwerder IUCN IV, Hellbachtal IUCN V, K³hlung (Bad Doberan) IUCN V, Salzhaff IUCN V, Fauler See - Rustwerder IUCN IV,	<10%	IV, V

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													Küstenlandschaft Wismar-West (Hansestadt Wismar) IUCN V		
Germany	Lake Kummerow and Lewiner Werder	Kummerower See und Lewiner Werder		53.81	12.84	0	420	ind.	2002	2002	P	medium	Mecklenburgische Schweiz und Kummerower See IUCN V, Torgelower See IUCN V, Nossentiner/Schwinzer Heide IUCN V	>75%	V
Germany	Lake Mickow and adjacent lowlands and lakes	Mickowsee und angrenzende Niederungsgebiete / Seen		53.70	11.62	0	381	ind.	1995	2005	P	medium	Sternberger Seenland IUCN V, Waldgebiet bei Crivitz und Barniner See IUCN V	70%	V
Germany	Lower Elbe valley	Unteres Elbtal	53110	53.01	11.65	0	1317	ind.	1995	1995	P	good	Unteres Elbtal SPA, Brandenburgische Elbtalaue IUCN V	100%	SPA, V
Germany	Lower Havel - Lake Schollene - Lake Gülpe (cross-border site with Sachsen-Anhalt)	Niederung der Unteren Havel, Schollener und Gülper See	16775	52.75	12.26	0	>304	ind.	1998	1998	P	medium	Niederung der Unteren Havel/Gülper See/Schollener See Ramsar, Untere Havel/Sachsen-Anhalt und Schollener See SPA, Niederung der Unteren Havel SPA, Untere Havel IUCN V, Westhavelland IUCN V	100%	Ramsar, SPA, V
Germany	Elbe lowlands between Schnackenburg and Lauenburg	Elbeniederung Schnacken- bis Lauenburg	53919	53.3	10.75	0	2155	ind.	1997	1997	P	good	Elbauen, Schnackenburg - Lauenburg Ramsar, Niedersächsische Mittelelbe SPA	>80%	Ramsar, SPA
Germany	Elbe marshes between Stade and	Elbmarsch Stade-Otterndorf	19310	53.85	9.16	0	1870	ind.	1994	1994	P	good	Niederelbe, Barnkrug - Otterndorf	>90 %	Ramsar, SPA, UNESCO-MAB

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	Otterndorf												Ramsar, Unterelbe SPA, Hadelner und Belumer Au¯endeich IUCN IV, Waddensea of Lower Saxony UNESCO-MAB Biosphere Reserve		Biosphere Reserve, IV
Germany	Lower reaches of River Weser	Unterweser	4163	53.35	8.5	0	419	ind.	1995	1995	W	good	Unterweser SPA, Rechter Nebenarm der Weser IUCN IV, Strohauser Plate IUCN V, Rekum V	>95%	SPA,IV,V
Germany	Huvenhoops moor and Breddorfer Wiesen	Huvenhoopsmoor und Breddorfer Wiesen	4266	53.38	9.1	0	463	ind.	2006	2006	P	good	Huvenhoopsmoor IUCN IV	>30%	IV
Germany	Ostfriesische Meere	Ostfriesische Meere	5877	53.43	7.3	0	2580	ind.	2007	2007	W/P	good	Ostfriesische Meere SPA	90%	SPA
Germany	Oldenburgisch-Ostfrisische Moore	Oldenburgisch-Ostfrisische Moore		53.03	7.633	0	402	ind.	2002	2002	W/P	good	Esterweger Dosev SPA, Melmmoor/ Kuhdammoor IUCN IV, Leegmoor IUCN IV	>90%	SPA, IV
Germany	Lower Ems valley	Emstal		52.98	7.3	0	2831	ind.	2008	2008	P/W	good	Emstal von Lathen bis Papenburg SPA, Emstal IUCN V	>70%	SPA, V
Germany	Blockland - lower Wümme valley - Westliches Hollerland	Blockland - Untere Wümme - Westliches Hollerland	3496	53.13	8.83	0	890	ind.	2008	2008	P	good	Blockland SPA, Blockland IUCN V, Sodenstich IUCN IV, Werderland (Teil I) IUCN IV, Borgfeld Warf IUCN V, Eispohl/Sandwehen IUCN IV	>95%	SPA, IV, V
Ireland	Cahore marshes	Cahore marshes	450	52.5	-6.25	26	26	ind.	1996	0	W	good		0%	
Ireland	Durnesh Lough	Durnesh Lough	365	54.56	-8.2	0	40	ind.	0	0	W	-		0%	
Ireland	Lough Foyle	Lough Foyle	21803	55.167	-7.08	163	181	ind.	1989	0	W	good	Lough Foyle SPA, Lough Foyle	>20%	SPA, Ramsar

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													Ramsar		
Ireland	Lough Gill	Lough Gill	157	52.26	-10.033	0	100	ind.	0	0	W	-	Lough Gill SPA,	100%	SPA
Ireland	Lough Iron-Glen Lough	Lough Iron-Glen Lough	263	53.61	-7.48	10	20	ind.	1989	0	W	-	Lough Iron SPA	100%	SPA, Ramsar
Ireland	Lough Swilly including Blanket Nook and Inch Lake	Lough Swilly including Blanket Nook and Inch Lake	9000	55.11	-7.53	48	48	ind.	1996	0	W	good	Lough Swilly including Blanket Nook and Inch Lake SPA	>50%	SPA
Ireland	North Wicklow coastal marshes	North Wicklow coastal marshes	670	53.06	-6.05	0	140	ind.	0	0	W	-	Kilcoole Marshes SPA	>10%	SPA
Ireland	Rahasane turlough	Rahasane turlough	257	53.21	-8.78	24	24	ind.	1996	0	W	good	Rahasane Turlough SPA	>90%	SPA
Ireland	River Blackwater callows	River Blackwater callows	1053	52.15	-8.05	36	36	ind.	1995	0	W	good	Blackwater Callows SPA	100%	SPA
Ireland	River Little Brosna callows: New Bridge-River Shannon	River Little Brosna callows: New Bridge-River Shannon	1154	53.13	-8.05	100	250	ind.	0	0	W	-	River Little Brosna Callows SPA	100%	SPA
Ireland	River Shannon callows: Portumna-Athlone	River Shannon callows: Portumna-Athlone	5788	53.25	-8.06	31	31	ind.	1995	0	W	good	Middle Shannon Callows SPA	100%	SPA
Ireland	River Suck callows: Shannon Bridge-Castlecoote	River Suck callows: Shannon Bridge-Castlecoote	4000	53.4	-8.16	180	180	ind.	1982	0	W	-	River Suck Callows SPA	100%	SPA
Ireland	Stabannan-Braganstown	Stabannan-Braganstown	491	53.86	-6.43	0	26	ind.	1989	0	W	-	Stabannan-Braganstown SPA	100%	SPA
Ireland	Tacumshin lake	Tacumshin lake	528	52.18	-6.48	145	145	ind.	1996	0	W	good	Tacumshin Lake SPA	100%	SPA
Ireland	The Cull/Killag	The Cull/Killag	896	52.2	-6.65	312	555	ind.	1996	0	W	good	Ballyteigue Burrow SPA, Ballyteige Burrow IUCN IV	<85%	SPA, IV
Ireland	Upper Barrow flood-plain	Upper Barrow flood-plain	1000	53.08	-7.05	180	180	ind.	1987	0	W	good		0%	
Latvia	Irbe strait	Irbes juras saurums	145000	57.78	21.85	200	300	ind.	1999	0	P	medium	Kura kurgu SPA	100%	SPA

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Latvia	Lubans and fish-ponds	Lubans un zivju diki	21338	56.73	26.8666667	200	900	ind.	1994	2004	P	unknown	Lubana wetland complex Ramsar, Lubānas un Su_agala purvs IUCN IV, Lubānas ieplakas IUCN IV, _di_u purvs IUCN IV, Tīrumnieku purvs IUCN IV, _de_as un Kv_p_nu d__i IUCN IV	>90%	Nature Reserve
Latvia	Non-IBA (Jaunmuiza)		unknown	56.57	22.21	400	400	ind.	2008	2008	P	good		not protected, not an IBA	
Latvia	Uzava Lowland		1500	57.1	21.3	150	614	ind.	2002	2009	P	good	Uzavas lejtece SPA	100%	SPA
Latvia	Non-IBA (Druva)		unknown	56.42	22.26	600	600	ind.	2005	2005	P	good		not protected, not an IBA	
Latvia	Non-IBA (Aunini)		unknown	56.35	22.14	550	550	ind.	2008	2008	P	good		not protected, not an IBA	
Latvia	Non-IBA (Rimzatu fishpond)		unknown	58.58	24.09	350	400	ind.	2007	2009	P	good		not protected, not an IBA	
Lithuania	The northern part of the Curonian Lagoon	Kursiu marios (Kursiu mariu siaurine dalis)	1476	55.93	20.9	700	1000	ind.	1999	2008	P	medium	Baltijos juros priekrante SPA	<30%	SPA
Lithuania	Nemunas delta regional Park	Nemuno delta	29006	55.3	21.38	500	1900	ind.	1999	2008	P	medium	Nemuno delta SPA, Nemunas Delta Ramsar, Nemuno deltos regioninis parkas IUCN V	>90%	Ramsar, SPA, V
Netherlands	Waddenzee	Waddenzee	338441	53,40	5,66	841	841	ind.	2004	2008	W	good	Wadden Sea SPA, Waddensea Ramsar, Waddensea IUCN II&III	100%	SPA, Ramsar, II, III
Netherlands	Lauwersmeer	Lauwersmeer	6024	53,36	6,21	1187	1187	ind.	2004	2008	W	good	Lauwersmeer SPA,	100%	SPA, Ramsar, II, III

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													Lauwersmeer Ramsar, Lauwersmeer IUCN II&III		
Netherlands	Polder Arkemheen	Arkemheen	1452	52,25	5,47	204	204	ind.	2004	2008	W	good	Arkemheen SPA, IUCN	100%	SPA, II,III
Netherlands	Veluwerandmeren	Veluwerandmeren	858	52,40	5,72	1603	1603	ind.	2004	2008	W	good	Veluwerandmeren SPA, Veluwerandmeren Ramsar, IUCN	100%	SPA, Ramsar, II, III
Netherlands	Markiezaat	Markiezaat	1857	51,46	4,28	643	643	ind.	2004	2008	W	medium	Markiezaat SPA, Markiezaat Ramsar, IUCN	100%	SPA.II, III
Netherlands	Krimpenerwaard	Krimpenerwaard	13983	51,95	4,73	467	467	ind.	2004	2008	W	good		10%	
Netherlands		Gronings-Drentse Veenkoloniën	85239	52,96	6,99	320	320	ind.	2004	2008	W	good		10%	
Netherlands		Het Bildt	12535	53,26	5,61	1526	1526	ind.	2004	2008	W	good		1%	
Netherlands		Oost- en Westdongeradeel	17332	53,31	5,85	391	391	ind.	2004	2008	W	good		1%	
Netherlands		Tjonger- en Lindevallei	15663	52,92	6,10	201	201	ind.	2004	2008	W	good		25%	
Netherlands		Polder Mastenbroek	11329	52,58	6,01	401	401	ind.	2004	2008	W	good		5%	
Netherlands		Staphorsterveld en Haerster- en Gennerbroek	9253	52,62	6,14	305	305	ind.	2004	2008	W	good		10%	
Netherlands		Kamperveen en Polder Oosterwolde	10226	52,52	5,94	264	264	ind.	2004	2008	W	good		5%	
Netherlands		Nijkerker- en Putterpolder	2014	52,28	5,56	354	354	ind.	2004	2008	W	good		10%	
Netherlands		Eempolders	8783	52,24	5,33	1504	1504	ind.	2004	2008	W	good		10%	
Netherlands		Polders rond Zegveld - Kamerik - Kockengen	5182	52,13	4,87	282	282	ind.	2004	2008	W	good		2%	
Netherlands		Lopikerwaard	11581	52,00	4,92	402	402	ind.	2004	2008	W	good		5%	
Netherlands		Wieringermeer	28471	52,84	4,94	1587	1587	ind.	2004	2008	W	good		0%	
Netherlands		Vechtpolders	6041	52,30	5,06	239	239	ind.	2004	2008	W	good		25%	
Netherlands		Noordoostpolder-west	16600	52,75	5,69	293	293	ind.	2004	2008	W	good		5%	

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Netherlands		Oost-Flevoland-noord	25521	52,52	5,80	953	953	ind.	2004	2008	W	good		25%	
Netherlands		Oost-Flevoland-zuid	13144	52,44	5,57	397	397	ind.	2004	2008	W	medium		25%	
Netherlands		Polders Zoetermeer-Alphen aan de Rijn	5202	52,11	4,48	420	420	ind.	2004	2008	W	medium		10%	
Netherlands		Alblasserwaard	21522	51,89	4,93	936	936	ind.	2004	2008	W	medium		1%	
Netherlands		Schouwen-Duiveland	17540	51,68	3,91	292	292	ind.	2004	2008	W	good		10%	
Netherlands		West-Zeeuwsch Vlaanderen	24499	51,33	3,60	565	565	ind.	2004	2008	W	good		10%	
Netherlands		Polders rond Steenbergen	19608	51,59	4,33	290	290	ind.	2004	2008	W	good		5%	
Netherlands		Vughtse Gement	3370	51,69	5,20	343	343	ind.	2004	2008	W	good		25%	
Netherlands		Maasland Den Bosch-Oss	16771	51,78	5,43	874	874	ind.	2004	2008	W	good		1%	
Netherlands	Ijselmeer	Ijselmeer	113.346	52,75	5,45	189	189	ind.	2006	2011	W	good	Ijselmeer	100%	SPA
Poland	Marshy valley of the Drweca river	Bagienna Dolina Drwecy	3136	53.28	19.56	0	10	ind.	1995	2003	P	-	Bagienna Dolina Drwecy SPA	>95%	SPA
Poland	Bielawa Swamps	Bielawskie Blota	744	54.8	18.25	0	0	-	1995	2003	P	good	Bielawskie Blota SPA	>95%	SPA
Poland	Delta of the Swina river	Delta Swiny	8893	53.83	14.33	0	17	ind.	1995	2003	P	-	Delta Swiny SPA	>90%	SPA
Poland	Lower Bug river valley	Dolina Dolnego Bugu	73380	52.31	22.35	15	40	ind.	1996	1999	P	good	Dolina Dolnego Bugu SPA	100%	SPA
Poland	Lower Notec River Valley	Dolina Dolnej Noteci	24320	52.75	15.5	50	0	ind.	1995	2003	P	good	Dolina Dolnej Noteci SPA	100%	SPA
Poland	Lower Vistula River Valley	Dolina Dolnej Wisly	36380	53.38	18.41	0	0	-	1995	2003	P	-	Dolina Dolnej Wisly SPA	100%	SPA
Poland	Kostrzyn River Valley	Dolina Kostrzynia	14160	52.16	21.98	12	30	ind.	1997	2003	P	good	Dolina Kostrzynia SPA	>95%	SPA
Poland	Ner River Valley	Dolina Neru	6861	52.06	19.06	2	2	ind.	1995	2003	P	good	Pradolina Warszawsko-Berlinska SPA	>95%	SPA
Poland	Pasleka river valley	Dolina Pasleki	19880	54.01	20.05	0	0	-	1995	2003	P	-	Dolina Pasleki SPA	>95%	SPA
Poland	Pilica River Valley	Dolina Pilicy	35280	51.51	20.31	0	0	ind.	1987	2000	P	good	Dolina Pilicy SPA	>95%	SPA
Poland	Middle Notec River Valley	Dolina Srodkowej	33095	53.08	17.33	400	400	ind.	1995	2002	P	good	Dolina Srodkowej Noteci i Kanalu	>95%	SPA

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		Noteci											Bydgoskiego SPA		
Poland	Middle Warta River Valley	Dolina Srodkowej Warty	57400	52.2	18.16	12	12	ind.	1995	2003	P	good	Dolina Srodkowej Warty SPA	>95%	SPA
Poland	Wkra and Mlawka Rivers Valleys	Doliny Wkry i Mlawki	29500	53.08	20.08	60	0	ind.	1995	2003	P	good	Doliny Wkry i Mlawki SPA	>95%	SPA
Poland	Weltyn lakes	Jeziora Weltynskie	3160	53.25	14.58	5	6	ind.	1995	2003	P	good	Jeziora Weltynskie SPA	>95%	SPA
Poland	Forest at Drawa River	Lasy Puszczy nad Drawa	184600	53.08	15.8333333	0	7	ind.	1995	2003	P	good	Lasy Puszczy nad Drawa SPA, Drawienski IUCN II	>95%	SPA, II
Poland	Cedynia Site	Ostoja Cedynska	21660	52.91	14.33	2	6	ind.	1995	2003	P	good	Ostoja Cedynska SPA	>95%	SPA
Poland	Drawa River Site	Ostoja Drawska	140500	53.58	16	5	0	ind.	1995	2003	P	good	Ostoja Drawska	>95%	SPA
Poland	Insko Site	Ostoja Inska	88180	53.4	15.5	6	164	ind.	1995	2003	P	good	Ostoja Inska SPA	>90%	SPA
Poland	Not IBA (Fishponds Gosławice)	Not IBA Stawy Rybne Gosławice, Konin	20	52.18	18.18	266	266	ind.	2007	2007	P	good	not protected	unknown	
Poland	Fishponds Dzwonowo	Ostoja Inska - Stawy Rybne Dzwonowo	87710	53.25	15.11	188	188	ind.	2008	2008	P	good	NR - Glowacz, Jezioro Dlugie Inskie,Kamienna Buczyna, Wyspa Soltyski; Inski Landscape P, LPA "D"	>90%	SPA
Poland	Middle Notec River Valley and Bydgoszcz Channel	Dolina Środkowej Noteci i Kanału Bydgoskiego	32672.1	53.04	17.1	400	400	ind.	2001	2006	P	good	NR - Borek, Laki Slesinskie, 2 Landscape Protected Areas	>90%	SPA
Poland	Not IBA, rape fields by Samsieczynek	Not IBA Samsieczynek, Nakło dist.	<50	53.13	17.41	520	520	ind.	2009	2009	P	good	not protected	0%	
Poland	Not IBA, rape fields by Drazno	Not IBA Drazno,Mrocza, Nakło dist	<50	53.13	17.38	393	393	ind.	2009	2009	P	good	not protected	0%	
Poland	Brzostowo,Biebrza Valley	Dolina Biebrzy	136900	53.19	22.28	320	320	ind.	2004	2004	P	good	Biebrza National Park Ramsar, Ostoja Biebrzanska SPA, Biebrzanski	100%	Ramsar, SPA, National Park

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													National Park		
Poland	Trzebiatow Site	Ostoja Trzebiatowska	32420	54	15	7	0	ind.	1995	2003	P	good	Wybrzeze Trzebiatowskie SPA	>95%	SPA
Poland	Goleniow Forest	Puszcza Goleniowska	25240	53.67	14.67	0	8	ind.	1995	2003	P	good	Puszcza Goleniowska SPA	>95%	SPA
Poland	Pisz forest	Puszcza Piska	171300	53.65	21.48	0	0	-	1993	0	P	medium	Puszcza Piska SPA	>95%	SPA
Poland	Vistula river mouth	Ujscie Wisly	642	54.35	18.95	0	15	ind.	1996	0	P	-	Ujscie Wisly SPA	100%	SPA
Russia (European)	Berezovye islands of Vyborg Bay	Berezovye ostrova, Vyborgski Zaliv	33600	60.3	29	0	5000	ind.	1996	0	P	-	Berezovye Islands, Gulf of Finland Ramsar	-	Ramsar
Russia (European)	Petrocrepost' Bay	Bukhta Petrokrepost'	49200	59.91	31.26	100	5000	ind.	1999	0	P	medium	-	-	Zakaznik
Russia (European)	Swans area (southern shore of Finski Bay)	Lebyazh'ye	6400	60	29.25	1	4000	ind.	1996	0	P	-	Southern coast of the Gulf of Finland, Baltic Sea Ramsar	>5%	Ramsar
Russia (European)	Seskar island	Ostrov Seskar	4300	60.25	28.33	2000	0	ind.	1998	0	P	-		-	
Russia (European)	Vaygach island	Ostrov Vaygach	340000	70	59.5	0	7500	breedin g pairs	0	0	breeding	-	Vaigachskiy IUCN IV	>95%	IV
Russia (European)	Kanin peninsula	Poluostrov Kanin	500000	66.66	44.66	0	0	-	1989	0	breeding	-		-	
Russia (European)	Russki Zavorot Peninsula and eastern part of Malozemelsk aya Tundra	Russki Zavorot i vostok Malozemel'skoi tundri	299000	68.58	53.5	60	0	breedin g pairs	1996	0	breeding	poor	Nenetskiy IUCN IV, Nenetsky Zapovednik	>95%	IV, Zapovednik
Russia (European)	North-western subburbs of St.-Petersburg	Severo-zapadniye prigorody Sankt-Peterburga	2700	59.98	30.21	200	1000	ind.	1998	0	P	good	Yuntolovski	-	Zakaznik
Russia (European)	Unskaya bay	Unskaya bay	40000	64.75	38.25	1220	2000	ind.	1998	1999	P	good	Unskyi	-	Zakaznik
Russia (European)	Vyborgski Bay	Vyborgski Zaliv	6700	60.66	28.66	700	700	ind.	1998	0	P	good	Vyborgskiy IUCN IV	<5%	IV
Russia (European)	Southern coast of the Neva bay	Yuzhnoye poberezh'e Nevskoi gubi	2300	59.91	29.83	250	1000	ind.	1998	0	P	good	Southern coast of the Gulf of Finland, Baltic Sea Ramsar	>40%	Ramsar

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
Sweden	Coastal areas of eastern Gotland island	Gotlands ostkust	150000	58.35	18.8	0	1000	ind.	0	0	P	-	Gotland, east coast Ramsar, Skenholmen SPA, Asunden SPA, Laus holmar SPA, Närsholmen SPA, Hummelbosholm SPA, Ålarve SPA, Sigdesholm SPA, Grötlingboudd-Ytterholmen SPA Södra Grötlingboudd SPA, Austerrum SPA, Yttre Stockviken SPA, Faludden SPA, Heligholmen SPA, Flisviken SPA, Gotlandskusten IUCN V, Grötlingboholme IUCN V, Rone ytterholme IUCN V, +larve IUCN IV, Nõrsholmen Nature Reserve, Laus holmar IUCN IV, Hummelbosholm Wildlife and Plant sanctuary, Sandviken IUCN IV, Danbo IUCN IV, Storsund IUCN Ia, Asunden IUCN III, Lörgeudd IUCN III, S:t Olofsholm IUCN III Ytterholmen IUCN III, Reveln Wildlife and Plant Sanctuary, Husken IUCN III, Storholmen	>15%	Ramsar, SPA, ia, Ib, III, IV, V, Nature Reserve, Wildlife and Plant Sanctuary

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
													Nature Reserve, Lergravsviken IUCN III, Furilden Wildlife and Plant Sanctuary, Skenholmen Wildlife and Plant Sanctuary, Salvorev-Kopparstenarna IUCN Ib, Skalahauar IUCN III, Ullahau IUCN III, Norsholmen Wildlife and Plant Sanctuary		
United Kingdom	Arun Valley	Arun Valley (under review)	1413	50.90	-0.54	44	133	ind.	1995	2006	W	Good	Arun Valley Ramsar, Arun Valley SPA	>40%	SPA, Ramsar
United Kingdom	Avon Valley	Avon Valley (under review)	1348	50.78	-1.79	74	137	ind.	1995	2005	W	Good	Avon Valley Ramsar, Avon Valley SPA	100%	Ramsar, SPA
United Kingdom	Breydon Water	Breydon Water (under review)	2091	52.58	1.63	5	752	ind.	1995	2009	W	Good	Breydon Water Ramsar, Breydon Water SPA	>60%	Ramsar, SPA
United Kingdom	Broadland	Broadland (under review)	5402	52.66	1.53	238	238	ind.	2001	2006	W	Good	Broadland Ramsar, Broadland SPA	100%	Ramsar, SPA
United Kingdom	Dee Estuary	Dee Estuary (under review)	13587	53.32	-3.19	48	118	ind.	1996	2008	W	Good	Dee Estuary Ramsar, The Dee Estuary SPA	100%	Ramsar, SPA
United Kingdom	Dungeness To Pett Levels	Dungeness To Pett Levels (under review)	9805	50.9755	0.83	83	327	ind.	1996	2009	W	Good	Dungeness to Pett Level SPA	>20%	SPA
United Kingdom	Martin Mere	Martin Mere (under review)	120	53.62	-2.878	12	669	ind.	1995	2009	W	Good	Martin Mere SPA, Martin Mere Ramsar	100%	Ramsar, SPA
United Kingdom	Nene Washes	Nene Washes (under review)	1505	52.58	-0.05	133	2585	ind.	1995	2009	W	Good	Nene Washes Ramsar, Nene Washes SPA	100%	Ramsar, SPA
United Kingdom	Ouse Washes	Ouse Washes (under review)	2490	52.45	0.17	3128	7491	ind.	1995	2009	W	Good	Ouse Washes Ramsar, Ouse Washes SPA	100%	Ramsar, SPA
United Kingdom	Ribble and Alt Estuaries	Ribble and Alt Estuaries (under	12408	53.66	-3.03	24	224	ind.	2001	2006	W	Good	Ribble & Alt Estuaries Ramsar,	100%	SPA, Ramsar

Country	International name	National name	Area (ha)	Lat	Lon	Min[5]	Max[6]	Units	Start Year	End Year[6]	Season[7]	Accu-racy	Protected Area Name	Pro-tec-tion Status	Type of Protection or International Designation
		review)											Ribble & Alt Estuaries SPA		
United Kingdom	Non-IBA (St Benets Levels, Ludham)	Non-IBA (St Benets Levels, Ludham)	329	52.42	1.31	37	404	ind.	1995	2009	W	Good	not protected	0%	-
United Kingdom	Severn Estuary	Severn Estuary (under review)	25141	51.59	-2.67	180	555	ind.	1995	2009	W	Good	Severn Estuary Ramsar, Severn Estuary SPA	100%	Ramsar, SPA
United Kingdom	Somerset Levels and Moors	Somerset Levels and Moors (under review)	7061	51.19	-2.84	21	345	ind.	1995	2006	W	Good	Somerset Long Bay Pond Ramsar, Somerset Levels & Moors SPA	>90%	SPA, Ramsar
United Kingdom	Walmore Common	Walmore Common (under review)	96	51.83	-2.37	36	135	ind.	1995	2009	W	Good	Walmore Common Ramsar, Walmore Common SPA	>50%	Ramsar, SPA

Annex 3

a) National Legal Status

Country	Legal protection	For game species, give opening/closing dates of hunting season
Belgium	*Yes*	Not applicable
Denmark	*Yes*	Not applicable
Estonia	*Yes*	Not applicable
Finland	*Yes*	Not applicable
France	*Yes*	Not applicable
Germany	*Yes*	Not applicable
Ireland	*Yes*	Not applicable
Latvia	*Yes*	Not applicable
Lithuania	*Yes*	Not applicable
Netherlands	*Yes*	Not applicable
Norway	*Yes*	Not applicable
Poland	*Yes*	Not applicable
Russian Federation	*Yes*	Not applicable
Sweden	*Yes*	Not applicable
United Kingdom	*Yes*	Not applicable

b) Overview of the Coverage of the Species in Networks of Sites with Legal Protection Status

Country	Percentage of national population included in IBAs	Percentage of population included in Ramsar sites	Percentage of population included in SPAs	Percentage of population included in protected areas under national law
Belgium	*100%*	*50-90%*	*100%*	*100%*
Denmark	*?*	*?*	*?*	*?*
Estonia	*?*	*?*	*?*	*?*
Finland	*50-90%*	*50-90%*	*50-90%*	*50-90%*
France	*50-90%*	*50-90%*	*50-90%*	*50-90%*
Germany	*50-90%*	*50-90%*	*50-90%*	*50-90%*
Ireland	*100%*	*?*	*100%*	*100%*
Latvia	*10-50%*	*?*	*?*	*?*
Lithuania	*50-90%*	*50-90%*	*50-90%*	*50-90%*
Netherlands	*50-90%*	*50-90%*	*50-90%*	*10-50%*
Norway	*50-90%*	*50-90%*	*Not relevant*	*50-90%*
Poland	*50-90%*	*10-50%*	*50-90%*	*10-50%*
Russian Federation	*50-90%*	*10-90%*	*Not relevant*	*50-90%*
United Kingdom	*50-90%*	*50-90%*	*50-90%*	*50-90%*

Annex 4: Recent Conservation Measures[8]

Country	Is there a national action plan for the species?	Is there a national Bewick's Swan project / working group?
Belgium	*No*	*No*
Denmark	*No*	*No*
Estonia	*No*	*Yes*
Finland	*No*	*No*
France	*No*	*No*
Germany	*No*	*Yes*
Ireland	*No*	*No*
Latvia	*No*	*No*
Lithuania	*No*	*No*
Netherlands	*No*	*No*
Norway	*No*	*No*
Poland	*No*	*No*
Russian Federation	*No*	*No*
Sweden	*No*	*No*
United Kingdom	*No*	*Yes*

[8] There is no EU Action Plan for this species yet.

Annex 5: Ongoing Monitoring Schemes for the Species

Country	Is there a national survey / monitoring programme?	Is there a monitoring programme in protected areas?
Belgium	*Yes*	*Yes*
Denmark	*Yes*	*Yes*
Estonia	*Yes (every 3 years)*	*No*
Finland	*Yes (annual)*	*n.a.*
France	*n.a.*	*n.a.*
Germany	*Yes (annual)*	*Yes*
Ireland	*Yes (annual)*	*Yes*
Latvia	*No (no regular monitoring)*	*No*
Lithuania	*Yes (annual)*	*Yes*
Netherlands	*Yes (annual)*	*Yes*
Poland	*No (no regular monitoring)*	*No*
Russian Federation	*No*	*Yes*[9]
Sweden	*n.a.*	*n.a.*
United Kingdom	*Yes*	*Yes*

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