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Breeding Spoonbills in Norfolk

Breeding Caspian Gulls in Europe

Curlew conservation

Breeding-range expansion of the Caspian Gull in Europe

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Abstract The Caspian Gull *Larus cachinnans* has undergone a considerable range expansion in the last 100 years. This expansion is ongoing and, over recent decades, the species has established itself as a breeding bird in central and western Europe. The total central and western European population is estimated to number at least 7,600 pairs, including sizeable breeding populations in Poland, Belarus and Germany. It is likely that the population will continue to increase and expand. Through colonisation of new areas, Caspian Gull now comes into contact with other large white-headed gull species, notably Herring *L. argentatus* and Yellow-legged Gulls *L. michahellis*, which has led to hybridisation. The Caspian Gull offers an excellent opportunity to track the range extension of a species in real time.

Introduction

At the start of the twentieth century, the breeding range of the Caspian Gull *Larus cachinnans* extended from Lake Saisan and Lake Balkash in Kazakhstan in the east to the northern coast of the Black Sea in Ukraine in the west. Over the past 100 years, this range has expanded to the north and west (Neubauer *et al.* 2007) and the species now breeds in several central and western European countries. Initially, new breeding sites were established primarily along large rivers such as the Volga in Russia and the Dnieper and Dnestr in Ukraine. The species arrived in the Moscow area in the 1960s (Jonsson 1998), and the first breeding record was noted in Ivano-Frankivsk district, western Ukraine, in 1989 (Gorban 1992). Through the 1980s, a breeding population was established along the Vistula River in east-central Poland (Bukaciński *et al.* 1989; Walasz & Mielczarek 1992). Between 1990 and 2020, the species has expanded its breeding range as far as Lithuania in the north and the Netherlands in the west. Such a range expansion has brought it into

contact with other large white-headed gulls such as Yellow-legged *L. michahellis*, Herring *L. argentatus* and Lesser Black-backed Gulls *L. fuscus*, leading to hybridisation and interspecific gene flow (Neubauer *et al.* 2006; Gay *et al.* 2007). In this paper, we give an overview of the current distribution and population of Caspian Gulls in European countries colonised since 1990

Table 1. Number of breeding pairs of Caspian Gulls *Larus cachinnans* (including mixed pairs) in the countries of central and western Europe, with the year of the most recent estimate.

country	breeding pairs	year
Poland	3,000–3,500	2019
Belarus	2,000+	2020
Germany	750–1,000	2019
Slovakia	757–765	2019
Lithuania	700–800	2020
Czech Republic	253–259	2020
Hungary	100–160	2019
The Netherlands	42–45	2020
France	1	2018
Total	7,600–8,600+	

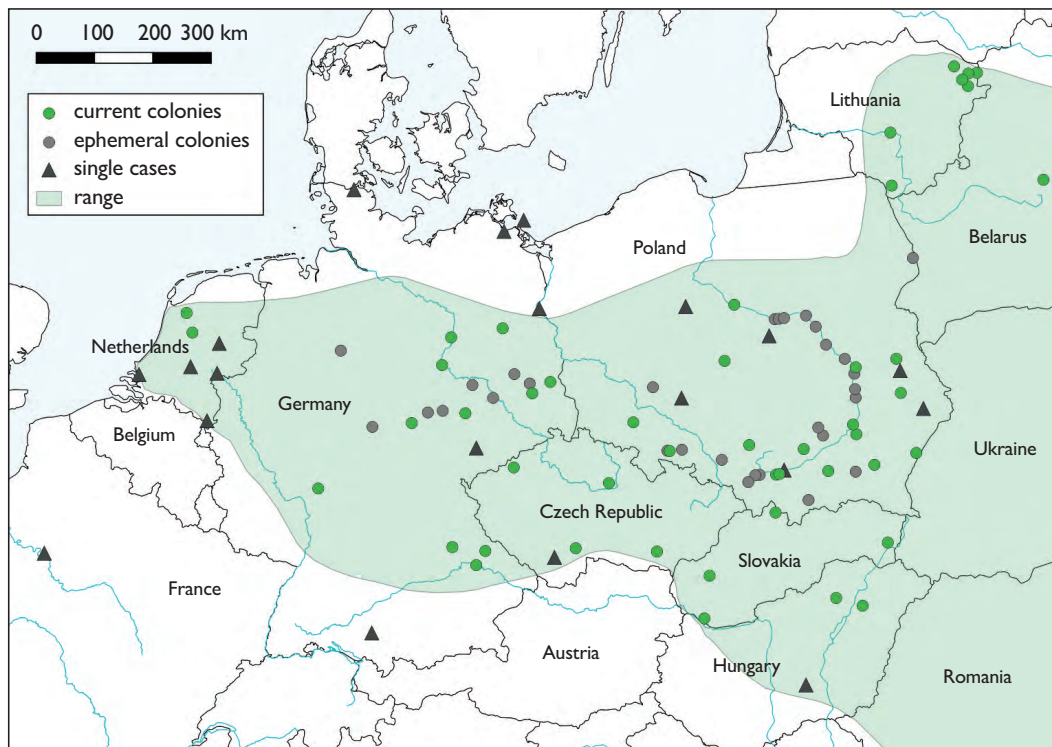


Fig. 1. Distribution of Caspian Gull *Larus cachinnans* in central and western Europe with breeding colonies and known breeding attempts away from colonies.

(fig. 1; table 1). Most information comes from national monitoring schemes and gull researchers. We also provide information on hybridisation in the current contact zones, although the general abundance of hybrids within colonies is not known and assessment differs from country to country.

Population estimates in central and western Europe Poland

Although the first breeding pairs in Poland were recorded as far back as 1981 along the central reaches of the Vistula River (Bukaciński *et al.* 1989; Dubois *et al.* 1990), the Caspian Gull started to colonise other sites in the area only in the late 1990s, mainly fish-ponds and reservoirs, where it has partially displaced the Herring Gull (Neubauer *et al.* 2006; Zagalska-Neubauer & Neubauer 2012). The population increased dramatically, reaching over 500 pairs in 2005 (Skórka *et al.* 2005; Neubauer *et al.* 2006). In 2011 it



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231. Caspian Gulls *Larus cachinnans* at a colony at Kozielno Reservoir, Poland, April 2019.

reached 1,400–1,500 pairs (Chodkiewicz *et al.* 2015) and between 2013 and 2018 the population was estimated at 2,000–3,000 pairs (Chodkiewicz *et al.* 2019). This number may yet prove to be an underestimate. Some colonies have already existed for more than 20 years (Pola *et al.* 1998; Litwiniak *et al.* 2020) and there are currently more than 15 permanent breeding colonies, including the largest, west of Lublin, near Zastów Karczmiski, with 1,502 pairs in 2019 (Ł. Bednarz pers. comm.). There are also a few ephemeral, mainly small colonies in eastern-central Poland in the vicinity of the Vistula River (Keller *et al.* 2017) and occasional breeding elsewhere of single pairs nesting on gravel-pits. We estimate the total population to be 3,000–3,500 as of 2019.

Belarus

The first records of breeding Caspian Gulls date from 1989, in the southern part of the country. The species started to colonise Belarus in the 1990s and by 1995 Caspian Gulls were breeding in small numbers at almost all suitable sites in the south (Yakovets & Nikiforov 2009). By 2018, the largest rooftop colony in Gatovo, near Minsk, held over 4,000 pairs of large gulls, with Caspian Gulls – or mixed pairs with Herring Gulls – accounting for half of the pairs breeding there (Samusenko *et al.* 2019). There are also breeding sites at reservoirs, fish-ponds and in towns in the wider Minsk region. These sites are not monitored but are likely to hold anywhere from a few pairs to several hundred pairs (I. Samusenko pers. comm.). Precise numbers are not known, but we suggest a current population estimate of at least 2,000 pairs.

Germany

Caspian Gulls were first recorded breeding in the second half of the 1980s in the eastern part of the country, first in the state of Brandenburg and later in Thuringia, Saxony-Anhalt, Mecklenburg-Vorpommern and Saxony. In 2015, the first breeding record was documented in Berlin in a rooftop colony in the city centre (Kormannshaus & Steiof 2015). In 2016, nesting Caspian Gulls were recorded in Bavaria (Tautz & Krätzel 2016), where, to date, two pure pairs have bred plus up to four mixed pairs with Yellow-legged Gulls (K. Krätzel pers. comm.). In the west of the country, a mixed

pair of Caspian × Yellow-legged Gull bred in Hessen in 2010. In 2015 and 2016, there were two successful breeding attempts by pure pairs in the rooftop colony in Frankfurt, and a pair of Caspian × Lesser Black-backed Gull nested here in 2019 (I. Rösler pers. comm.). Also in 2019, a pure pair nested on rooftops in Greifswald on the Baltic coast (S. Piro pers. comm.), a pair nested in Flensburg near the Danish border (R. Klein pers. comm.) and two mixed pairs were found in a Herring Gull colony on the island of Greifswalder Oie in the Baltic (R. Klein & S. Piro pers. comm.).

The majority of the German population is still centred around Brandenburg, Saxony and Saxony-Anhalt, often in mixed colonies with Herring Gulls, with the biggest colonies at Gräbendorfer See (Brandenburg) and Braunsbedra (Sachsen-Anhalt). In 2019, the German population was estimated to be 750 breeding pairs (Gerlach *et al.* 2019), though it is likely that more breeding pairs are unrecorded among Herring Gull colonies on the northeast coast. The true figure in Germany could be close to 1,000 pairs (R. Klein pers. comm.).

Slovakia

The first successful nesting was observed in 1989, at Sĺňava Reservoir in western Slovakia, with regular breeding commencing in 1993. In 2019, 757–765 pairs were breeding in four colonies across the country, with the largest colony, of 690 pairs, at Orava Reservoir (R. Kvetko pers. comm.).

Lithuania

Herring Gulls started to breed in Lithuania in 1982 and expanded their range to several inland lakes. By the early 2000s, Caspian Gulls were also seen at these colonies. The first report of adult birds came from 2007 at Lake Kretuonas. In 2009, 40–50% of 160 pairs of large gulls at this colony were identified as Caspian Gulls. In 2019 there were around 300 pairs of large gulls in this colony, mostly Caspian (R. Patapavicius pers. comm.). In most other colonies the species composition remains uncertain. For example, in 2015 a colony with 15–20 pairs of Caspian Gulls was reported at Lake Alaušas in the east of the country. Nestlings ringed here during 2015–18 were identified from post-fledging field observations as Caspian Gull (2), Herring

Gull (4), Herring Gull × Caspian Gull hybrid (1), and 'possible hybrid' (3). Other colonies with Caspian Gulls present were found at Lake Niedaus (20–30 pairs in 2014–16), Lake Apvardai (40 pairs in 2017) and the nearby Lake Dysnai (5–10 pairs in 2019; Čerkauskas 2019). There were also records of 20–30 pairs of Caspian Gulls nesting on rooftops in Kaunas in 2019 (R. Patapavicius pers. comm.). The Lithuanian population continues to expand with, for example, a new colony of 50 breeding pairs found in Lake Baluošas in the east of the country in 2020. The national population is estimated to be 700–800 pairs (A. Čerkauskas pers. comm.).

Czech Republic

The first breeding attempt in the Czech Republic occurred in 1990 at Nové Mlýny II Reservoir, south of Brno, with regular breeding there since 1996. It remains the largest colony in the country, at around 210 pairs. There are a further four smaller colonies with between one and 30 pairs. In 2019, the population of the whole country was estimated at 220–225 breeding pairs, rising to 253–259 in 2020 (M. Jelinek pers. comm.).

Hungary

In 1996 the first brood was found at Lake Fehér near Gátér (south-central Hungary) followed by one in the Hortobágy area the following year (Ecsedi 2004). Since 2003 the

species has been a regular breeder at the Hortobágy fishponds (Hadarics & Zalai 2008), and breeding now occurs on a gravel-pit north of Hortobágy at Nyékládháza. The Hungarian population was estimated to be 100–160 pairs in 2019 (P. Szinai pers. comm.).

The Netherlands

Numbers of summering and wintering Caspian Gulls have been increasing in the Netherlands since the 1990s. The first breeding record was recorded in 2012, when a fourth-calendar-year (4CY) male raised at least one chick with a female Herring Gull along the Rhine near Amerongen. The same pair was present the following year but breeding was unsuccessful. The first pure pair bred at De Kreupel in the IJsselmeer in 2014. Between 2015 and 2017 there were single pairs at different locations along rivers in the eastern part of the country, though all breeding attempts failed – in most cases subadult male Caspian Gulls were involved. A few pairs also nested in a colony of large gulls on breakwaters near Lelystad, at the IJsselmeer. In the same colony in 2016, at least three pairs were discovered among 200 pairs of Lesser Black-backed Gulls and 40 pairs of Herring Gulls (Boele *et al.* 2014–20). Over subsequent years, this colony grew in size and more intensive monitoring took place from 2019 onwards. In 2019, there were 12 nests belonging to pure pairs and one belonging to a mixed pair with a Herring Gull. In the same lake system, four most likely pure pairs were seen on the small island of De Kreupel in the IJsselmeer. Single pairs were also found breeding elsewhere in the country, including a mixed pair in Limburg, where a 4CY male Caspian Gull fledged three chicks with a female Lesser Black-backed Gull. By 2020, the IJsselmeer held at least 42 nesting pairs in total, including some mixed pairs with Herring Gull. The total population in the Netherlands is estimated at 42–45 pairs.



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232. Caspian Gull at its nest, IJsselmeer, the Netherlands, May 2019.

France

In 2018, a male Caspian Gull attempted to breed with a female Yellow-legged Gull on a rooftop in Paris (P. J. Dubois pers. comm.). There is no information about breeding success. This is the only breeding record from France.

Belgium

A copulating pair involving a 4CY Caspian Gull and an adult Herring Gull was recorded in the Wallonia in 2015 (Jacob 2016). Nest-building or other behaviour indicating breeding was not recorded.

Austria

In 2020, a pair of Caspian Gulls was observed displaying and nest-building in eastern Austria, close to the border with Slovakia. In recent years, an increasing number of individuals have overwintered in Yellow-legged Gull colonies and the first successful breeding is expected soon (Leander Khil pers. comm.).

Discussion

The breeding population of Caspian Gulls in northwest Europe has increased extremely rapidly since 1990 (Neubauer *et al.* 2006). In that period, it has made its way onto the list of breeding species in several European countries and seems likely to be added to that of more countries soon. Observations made in Poland in the early stages of colonisation show that the first breeding attempts are usually preceded by the presence of adult or subadult birds at a potential breeding site for one or more seasons (Neubauer *et al.* 2006). Post-breeding distribution in central and western Europe shown by Klein & Neubauer (2006) bears a close resemblance to the current breeding distribution of the species.

In general, there are two possible explanations for changes in the size of a species' range. The range of a bird species can increase when high productivity occurs in central source populations. This drives dispersal and, subsequently, immigration and settlement into areas located at the edge of the range and beyond (Pulliam 1988). In such a case, range size is associated with productivity of the source population in the core range, and expansion extends during

and following the periods of high productivity. Alternatively, habitats at the edge of the range may become more suitable for a species, and individuals are able to take advantage of this. In this situation, range size should grow swiftly over large areas and this change should last for long periods of time (Skórka *et al.* 2005).

Populations of several species of large white-headed gulls in Europe increased during the twentieth century (Harris 1970; Spaans 1971; Neubauer 2005; Neubauer *et al.* 2006), particularly where protective measures were introduced including, for example, restrictions on collecting eggs for human consumption (Spaans 1971; Neubauer 2005). At the same time, an increase in commercial fishing activity as well as in the number of open-top rubbish dumps, both important sources of food for many gulls, may have further facilitated population increases (Kadlec & Drury 1968; Spaans 1971). Although some data show that Caspian Gulls do forage on rubbish dumps (Ledwoń & Betleja 2018), fish is an important food source during the breeding season and is the most consumed food for Caspian Gulls breeding in south Poland (Skórka *et al.* 2005; Gwiazda *et al.* 2011; authors' observations). Hüppop & Hüppop (1999) also suggested that the inland breeding distribution of large gulls in central Europe is limited by the availability of fish during the breeding season rather than by the availability of food at refuse sites, and it is likely that the increase in fishponds in central Europe has been an important factor in the colonisation of Caspian Gulls into inland areas. While the rapid range expansions seen in many species of large gull have largely come to a standstill, the range of the Caspian Gull continues to increase. It seems that Caspian Gulls have colonised areas of Europe unoccupied by Herring Gulls to the north and Yellow-legged Gulls to the south, thus creating a 'corridor' through central Europe. As Caspian Gulls reach the North Sea region (for example in the Netherlands), further colonisation may continue northwest into Britain and/or southwest to France.

Ringed records show that many of the colonising birds originate from farther east in the species' range. For example, Neubauer *et*

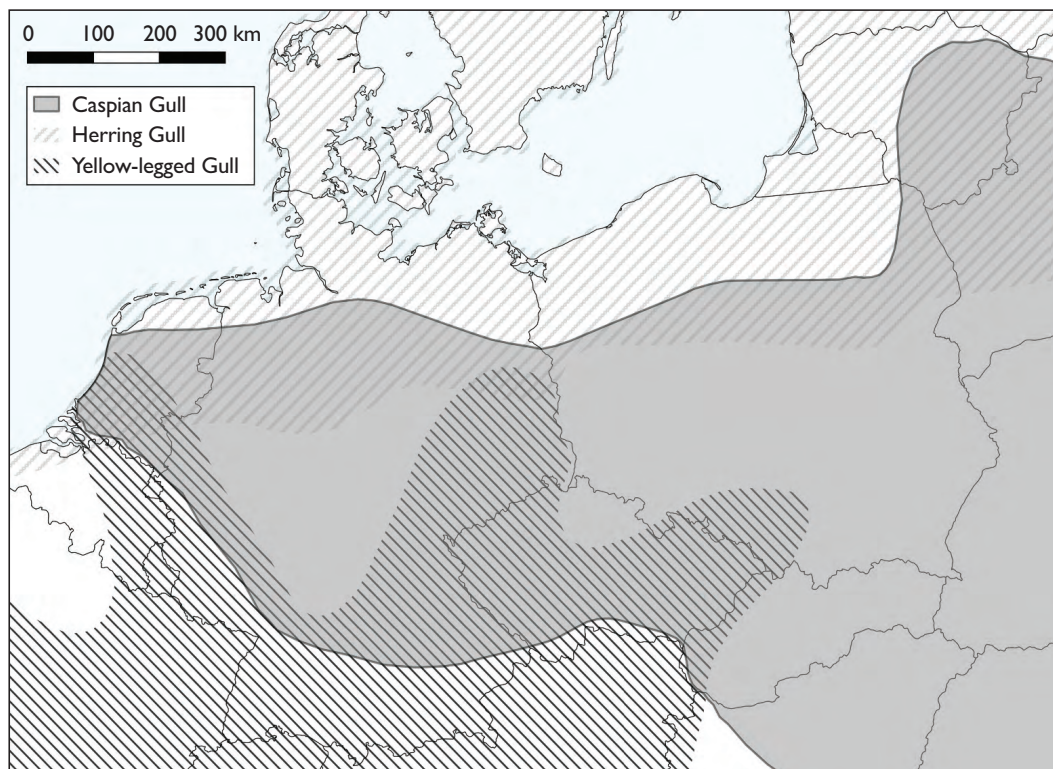


Fig. 2. Breeding ranges of Caspian Gull, Herring Gull *Larus argentatus* and Yellow-legged Gull *L. michahellis* in central and western Europe. Hybridisation can occur in the overlap zones between species.

al. (2007) noted breeding Caspian Gulls with Ukrainian metal rings in two colonies in Poland, and birds ringed as nestlings in Poland and eastern Germany have been recorded breeding in the Netherlands, a movement of some 600–850 km. Polish-ringed birds have also been recorded nesting in Germany, and the only Caspian Gull breeding attempt in France was by a bird ringed in Poland. A ringing scheme that started in the Netherlands in 2019 has already generated recoveries of Dutch-bred juveniles in Norfolk and the Atlantic coast of Spain and Portugal (authors' data).

Mixed pairs and hybridisation

Gulls hybridise relatively frequently and more than half of all gull species are known to hybridise (McCarthy 2006; Price 2008). Hybridisation zones in gulls have frequently been formed due to range expansions and colonisations of new areas (e.g. Pálsson *et al.* 2009). The Caspian Gull is no exception and hybridisation has been recorded across Europe where the species comes into contact with other large gulls (Faber *et al.* 2001; Neubauer *et al.* 2006; Zagalska-

Neubauer & Neubauer 2012; fig. 2). Caspian Gulls first came into contact with Herring Gulls when the former reached Belarus and Poland. One such contact zone at Włocławek Reservoir in northern Poland has been well studied (Neubauer 2005; Neubauer *et al.* 2006, 2009, 2014; Neubauer & Zagalska-Neubauer 2006; Gay *et al.* 2007; Gwiazda *et al.* 2011; Zagalska-Neubauer & Neubauer 2012). Poland has become a focal point of hybridisation between Caspian and Herring Gull, and occasionally of mixed pairings with Yellow-legged and Lesser Black-backed Gull (Neubauer *et al.* 2009; Orłowski & Kołodziejczyk 2014). The situation is similar in Belarus, where the huge colony at Gatovo also contains many Caspian Gulls breeding in mixed pairs with Herring Gulls and, less frequently, Lesser Black-backed Gulls and probably Yellow-legged Gulls (plate 234). In Germany, Caspian Gulls have been recorded breeding with both Yellow-legged and Lesser Black-backed Gulls and, in the east of the country, with Herring Gulls (R. Klein pers. comm.). Mixed pairs have also been recorded in the Netherlands, France and Lithuania.

Breeding-range expansion of the Caspian Gull in Europe



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233. Three subadult Caspian Gulls, Lelystad, the Netherlands, March 2021. A high number of territorial subadult Caspian Gulls are present at gull colonies in the IJsselmeer area. The left-hand Caspian Gull was ringed as a chick in Poland in 2018; the right-hand bird was ringed in as a chick in 2018 in the Czech Republic.



Irina Samusenko

234. Caspian Gulls with chicks at a mixed rooftop colony in Gatovo, Belarus, May 2018. Some Caspian Gulls in this colony show a rather pale iris.

Klaudia Litwiniak



235. Colour-ringed Caspian Gull chick, Mietków Reservoir, Poland, June 2020. This individual was subsequently resighted 198 days later in northern Hungary.

The future of breeding Caspian Gulls in Europe

Thanks to the large number of gull enthusiasts in Europe, the number and distribution of Caspian Gulls has been relatively well documented. However, the breeding grounds in eastern Europe and western Asia are considerably less well known, with little published in the literature.

Large, strong and aggressive, Caspian Gulls negatively affect the local population size of Black-headed Gulls *Chroicocephalus ridibundus* (Skórka et al. 2012), and may also negatively affect another large gull species. However, their colonies provide security against predators for birds like ducks, geese and even owls (Litwiniak & Przymencki 2020).

In a mixed colony in Poland, peak egg-laying occurred about one week earlier than for the Herring Gulls (Neubauer et al. 2009), and this may give Caspian Gulls a competitive advantage when it

comes to breeding. On the other hand, in mixed colonies in Bavaria, Germany, Caspian Gulls breed approximately one week later than Yellow-legged Gulls (K. Krätzel pers. comm.), yet still have high breeding success. The Caspian Gull is clearly an adaptive and opportunistic species.

Although the range expansion of the Caspian Gull can be reconstructed rather

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236. Adult male Caspian Gull, Lelystad, the Netherlands, March 2019. This bird was ringed as a chick in a mixed colony in Brandenburg, Germany, in 2013. There is, however, no indication that this individual is not a pure Caspian Gull.

easily from the many observations and studies cited here, there is still much to learn. We have little data on breeding productivity and survival of chicks and juveniles. These, along with adult survival, are important determinants of population growth and, consequently, range expansion. Further studies, preferably at various sites across the breeding range, would contribute to a better understanding of the ongoing colonisation. The Caspian Gull is an easy-to-study bird, and we can continue to follow its expansion in Europe in real time. To keep track of its spread, we request that records of breeding Caspian Gulls at new sites in Europe are sent to us for collation.

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