25 Trends and status of the breeding population of Great Cormorants in Norway with regard to the Atlantic sub-species *Phalacrocorax carbo carbo*

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National summary

The sub-species of Great Cormorant *Phalacrocorax carbo carbo* and the presumed *P. c. norvegicus* are breeding on islets along the coast of Norway from the Russian border in the north to Hordaland in the south. So far the breeding distribution of these two sub-species has not overlapped with the breeding distribution of *P. c. sinensis*. In 2012 the breeding population of *P. c. carbo* and *P. c. norvegicus* was estimated to contain 19,000 breeding pairs in 153 colonies. This estimate is based on counts of individual colonies that took place during various years between 2007 and 2013. The long-term trend from ca. 1980 to 2012 was positive or stable for the monitored colonies, whereas for the last 10 years (2002-2012) most of these colonies have decreased by an average of 7.8 % per annum.

Sub-species

According to Marion & Le Gentil (2006), three sub-species of Great Cormorants are breeding in Norway. Until recently it was believed that the only other sub-species breeding in Norway besides *P. c. sinensis* was *P. c. carbo*, which breeds on skerries and cliffs along the coast from Hordaland on the southwest coast to the Russian border in the northernmost part of Norway. However, based on the sequencing of mitochondrial DNA extracted from feathers of Great Cormorant chicks in Norway, Marion & Le Gentil (2006) suggested that a previously undiscovered sub-species, named *P. c. norvegicus*, was breeding in the northern part of Norway (from the Lofoten islands towards the north). This study also indicated that *P. c. norvegicus* was breeding in other countries along the North Sea, but in lower numbers than in Norway. In the following text all reference to Great Cormorants or *P. c. carbo* refers to the breeding population of *P. c. carbo* / *P. c. norvegicus*. For information regarding the 2012 population of the *P. c. sinensis* sub-species see chapter 24 in this report.

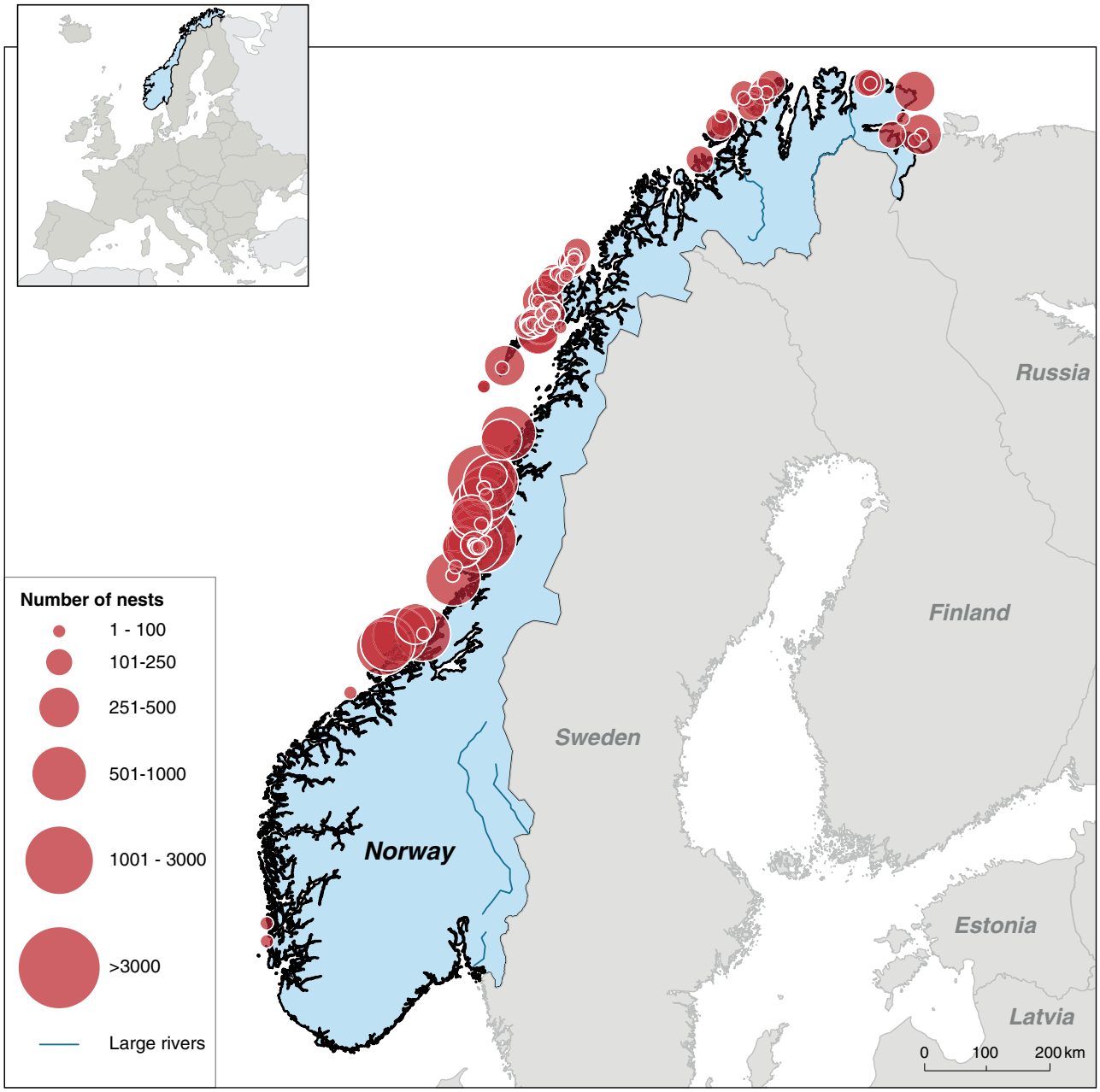

Figure 25.1. Distribution and size of breeding colonies of Great Cormorants in Norway in 2012, not including the colonies of *P. c. sinensis* in southern Norway. Each circle represents nest numbers recorded in individual colonies, using data from the most recent count (2007-2013).

Distribution and colony size

It is extremely demanding to monitor the entire breeding population of the sub-species *P. c. carbo* in Norway. The breeding locations are dispersed in 150-200 localities, which are usually isolated islets and cliffs difficult to access. Most of the colonies between Central Norway and south of Lofoten, and along the north shores of Lofoten, are monitored annually using aerial photography, whereas the colonies in West-Finnmark are monitored from boats.

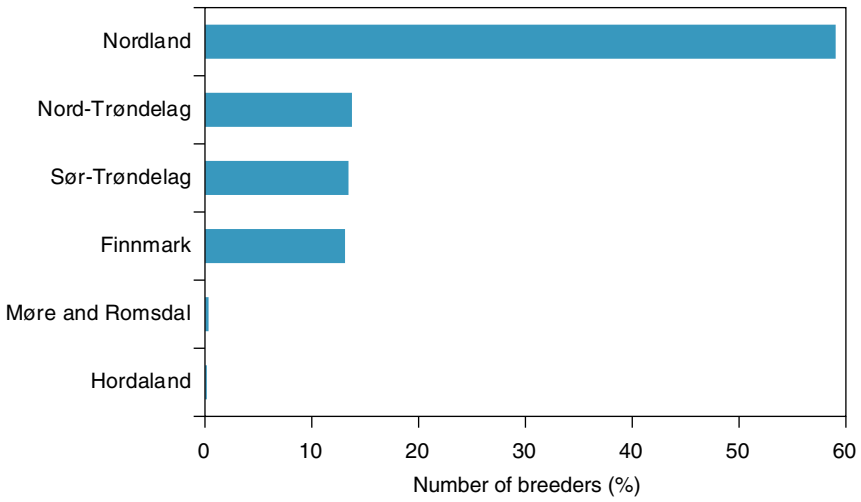

Figure 25.2. Regional distribution of the breeding population of Great Cormorants in Norway, not including the colonies of *P. c. sinensis* in southern Norway. The relative distribution is based on the most recent counts during 2007-2013.

In 2012 the majority of the Great Cormorants (*P. c. carbo)* breeding in Norway were found in the shallow areas of Trøndelag (Sør and Nord-Trøndelag, Central Norway) and Helgeland (Nordland county, southern district in Northern Norway), but many colonies were also located along the coast of Vesterålen (northern Nordland) to Finnmark (extreme northeast) (Fig. 25.1, 25.2). On the coast of Trøndelag and Helgeland colonies were located on small islets in the outer archipelago. These colonies are often large, containing up to a few thousand nests. Farther north, the colonies are usually smaller and are often located on cliffs facing the sea. In Finnmark, it is common for Great Cormorants to nest on cliffs and steep mountain slopes, also on the mainland. In Eastern Finnmark especially, colonies can be found in the fjords.

In 2012 there were an estimated 153 active Great Cormorant colonies along the coast of Norway, slightly fewer than the previous years. The largest colonies held ca. 1,200 nests and were located in the county of Nordland. These colonies contained almost 20 % of the Norwegian breeding population (Fig. 25.4). The majority of colonies (61 %) were much smaller, containing less than 100 nests (Fig. 25.3) and these colonies had only 11 % of breeders (Fig. 25.4).

Population development

The development of breeding numbers has been monitored annually in selected areas along the coast since 1980. The entire Norwegian breeding population of Great Cormorants was estimated at 21,000 pairs in 1983-1986 (Røv & Strann 1987). The breeding population increased to c. 27,000 pairs in 1995 (Røv 1997) before dropping to c. 25,000 pairs in 2000 (Røv et al. 2003). The sub-species *P. c. sinensis* began breeding in Norway in 1996. By 2005 the breeding population was estimated at 30,000 pairs (Barrett et al. 2006) of which fewer than 3 % belonged to the *P. c. sinensis* sub-species. For this year it was estimated that there were 20,000 pairs breeding in the Norwegian Sea and 10,000 pairs in the Barents Sea. After 2005 the population decreased and by 2012 it was estimated at 19,000 pairs (excluding *P. c. sinensis*), with 14,000 pairs in the Norwegian Sea and 5,000 pairs in the Barents Sea.

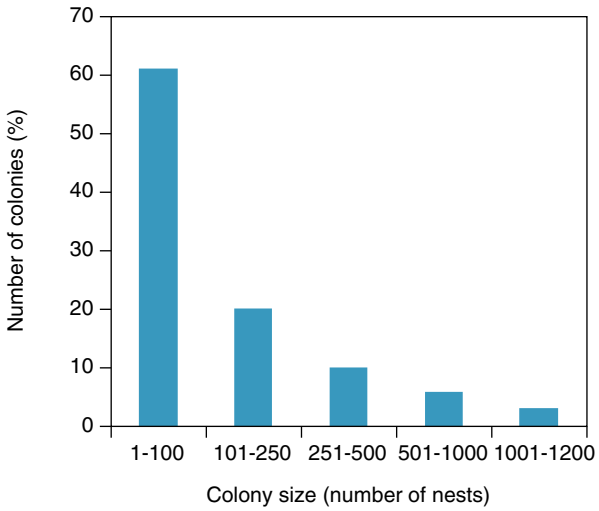

Figure 25.3. Size distribution of Great Cormorant colonies in Norway, not including the colonies of *P. c. sinensis* in southern Norway.

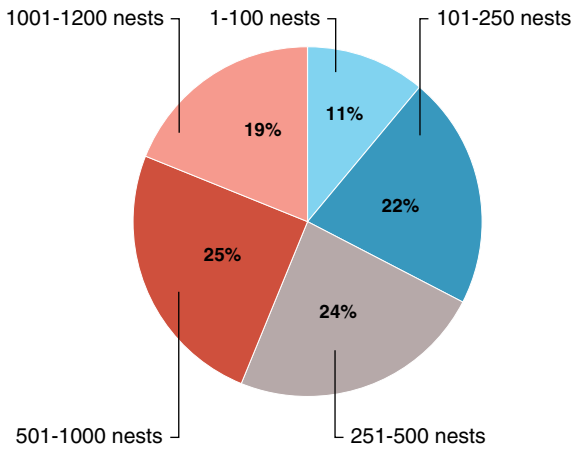

Figure 25.4. Distribution of the Great Cormorant breeding population in relation to colony size in Norway, not including the colonies of *P. c. sinensis* in southern Norway.

The long-term trend (1980-2012) was increasing or stable for all of the monitored colonies and areas, except within the nature reserve of Froan outside Frøya, central Norway and Vesterålen, on the north side of the Lofoten islands (Table 25.1). For the last ten years, however, decreasing or stable trends were the most common. On average, the annual rate of change for the period from ca. 1980-2012 was -0.1 % per annum (SD = 6.65), whereas for the last 10 years (2002-2012) the annual rate of change was -7.8 % per annum (SD = 14.84).

Human intervention in colonies and other factors

Many of the Great Cormorant colonies in Norway are situated within protected areas. However boat traffic close to the colonies is normally not regulated and may cause disturbance that scares adults off their nests and this may allow gulls to predate eggs and small chicks. Also an increasing population of White-tailed Eagles (*Haliaeetus albicilla*) sometimes cause disturbance that might lead to gull predation on Great Cormorant nests. Direct predation by White-tailed Eagles has been rarely observed. Great Cormorants can be hunted in the whole country from the 1st of October to the 30th of November, but in Central Norway only juveniles can be hunted.

Acknowledgements

A number of people are involved in counting Great Cormorants in Norway. A huge thank you to everybody, especially N. Røv who has counted Great Cormorants annually since the late 1970s.

Table 25.1. Analyses of population trends for the Great Cormorant (*P. c. carbo* and *norvegicus*) in areas along the Norwegian coast. The table lists time period for the counts, number of years with counts within the time period, number of colonies and study plots within the region or colony, annual population changes (%), trend (+/0/-) and the level of significance for the estimated trend calculated using Monte Carlo simulations. *** = p < 0.01, ** = p < 0.05, * = p < 0.1, n.s. = not significant. For areas where monitoring has been carried out sufficiently long the trend for the last 10 years (2002-2012) is also indicated. Population trends are denoted as displaying a significant increase [+], a significant decrease [-], stable with a non-significant increase [0 (+)] or stable with a non-significant decrease [0 (-)]. Data from the National monitoring programme for seabirds.

Locality/area/county	Time Period	Number of years with counts	Number of colonies/ study plots	Annual change (%)	Trend	Level of significance
Sula, Frøya	1979-2012	29	4-8/0	3,2	+	***
	2002-2012	11		-3,8	0 (-)	n.s.
Grogna	1980-2012	30	9-11/0	1,1	+	*
	2002-2012	11		-4,1	-	**
Froan sør for Finnværet	1974-2012	29	4/0	-20,3	-	***
	2002-2012	11		-57,1	-	***
Froan nord for Finnværet	1974-2012	31	5/0	-0,8	0 (-)	n.s.
	2002-2012	11		-5,1	-	**
Melstein	1979-2012	30	1/0	3,7	+	***
	2002-2012	11		-5,4	0 (-)	n.s.
Vikna	1979-2012	30	7/0	-2,2	0 (-)	n.s.
	2002-2012	11		-10,9	-	**
Sklinna	1979-2012	30	5/0	2,8	+	**
	2002-2012	11		3,4	0 (+)	n.s.
Helgeland Sør	1980-2012	27	7/0	0,2	0 (+)	n.s.
	2002-2012	11		-5,4	-	**
Vega	1982-2012	28	8/0	-2,3	0 (-)	n.s.
	2002-2012	11		-10,7	-	***
Sør for Træna	1985-2012	27	2/0	2,0	+	**
	2002-2012	11		-5,0	-	*
Træna-Myken	1985-2012	26	5/0	-0,1	0 (-)	n.s.
	2002-2012	11		-3,4	0 (-)	n.s.
Røst	1997-2012	16	1-5/0	8,9	+	*
	2002-2012	11		-5,6	0 (-)	n.s.
Vesterålen	1983-2012	17	1/0	-5,7	-	***
	2002-2012	9		-12,6	-	**
Vest-Finnmark	1983-2012	28	4/0	1,5	0 (+)	n.s.
	2002-2012	11		-4,0	0 (-)	n.s.
Kongsfjord	1987-2008	20	3/0	9,1	+	***
	2002-2008	5		12,0	+	**
Sør-Varanger	1989-2012	6	11-18	-2,6	0 (-)	n.s.

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A head of a Great Cormorant of the Atlantic *carbo* sub-species and a head of an individual of the continental sub-species *sinensis* shot in Denmark. Note the difference in the gular pouch angle and the size of the bill. Photo: Thomas Bregnballe.