Status of the Mute Swan *Cygnus olor* and the Whooper Swan *Cygnus cygnus* in Silesia (SW Poland)

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The Mute Swan became extinct as the breeding species in Silesia in 1880. It started to breed again in this region in 1948. Single pairs nested in a few places up to the second half of the 1960s. Since this time the Silesian population of the Mute Swan has been increasing. About 400 breeding pairs were found there in 1988-89 and approximately 110 of them nested on fish pond complexes in the Barycz Valley. The number of non-breeding swans was estimated at 1,800 birds in 1988 and 2,500 in 1989. The winter population of the Mute Swan has been increasing slowly. In the last years up to 3,000 swans wintered in Silesia. The most important winter ground was the Odra river where up to 70% of all wintering swans occurred. They preferred the upper course of this river. Since the second half of the 1970s the Mute Swan has wintered in towns. Up to 60% of swans were found on 50 km of urban river sections in 11 cities. This value was smaller during mild and warm winters. The percentage of first winter Mute Swan varied between 17% and 36%.

The first breeding pair of the Whooper Swans was found in Silesia (Odra Valley near Glogow) in 1983 and since this time up to four pairs have nested there every year. In addition, one pair was recorded in the western part of the Barycz Valley in 1984. Further growth of the Silesian population of the Whooper Swan is possible because adult non-breeding birds were observed in both areas during the spring period every year. The winter population of this species was small (up to 146 birds) and the percentage of one year old swans varied between 3.8% and 23%.

In many countries the number of Mute Swans has increased in the last few years. This has also been observed in Poland where about 3,800 pairs nested in the second half of the 1970s (Wieloch 1984).

Since 1979 the Department of Avian Ecology (Wroclaw University) has collected data on the distribution and number of certain bird species in Silesia (south-western Poland), including the Mute Swan, *Cygnus olor* and the Whooper Swan, *Cygnus cygnus*. This paper appraises the situation for these two species in this region in the 1980s.

Study area

Silesia is in south-western Poland (Fig. 1). The total area is about 40,500 sq. km. (approx. 13% of Poland). Lowlands predominate but the southern part along the Czechoslovakian border is mountainous (Sudety Mts.). It is characterized by a small number of natural lakes with a total area of about 1,200 ha. There are many fish-ponds (especially in the Barycz Valley - approximately 50 km north of Wroclaw) with a total area of about 10,000 ha. Silesia has a large number of dammed reservoirs (about 130 sq. km. in total). The main river is the Odra of which 520 km flows through Silesia. Most of its upper course is canalised whereas the middle course is more natural. The ice sheet usually lasts about 20 days; one of the shortest periods in Poland. Snow cover lasts approximately 40 days and vegetation is exposed for the longest period in Poland (225 days).

Methods

The location and number of breeding pairs were recorded. 213 Mute Swan breeding sites were known up to 1987 and 60-70 were monitored every year. In 1988-89 about 80% of all known sites were monitored and a further 50 new sites were discovered. The Mute swans in the Barycz Valley were aerially censused in 1988-89, and pairs with nests or cygnets were recorded. Mid-January censuses were carried

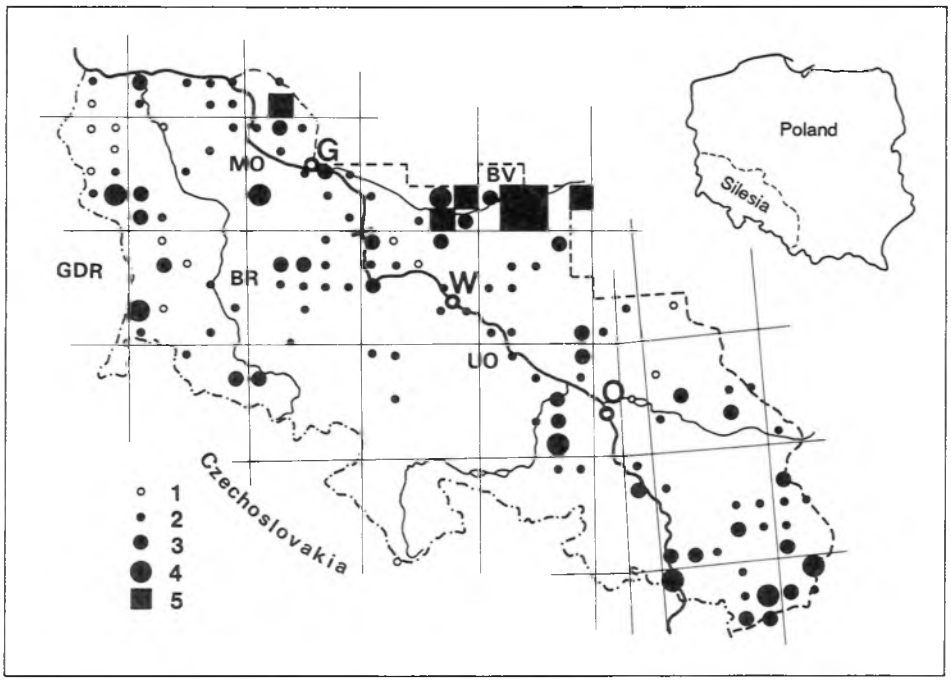

Figure 1. Distribution and number of Mute Swans in Silesia, 1988-1989, in UTM squares. 1 - squares where Mute Swans bred in the 1980s but the breeding sites were not controlled in 1988 and 1989, 2 - 1-2 pairs, 3 - 3-5 pairs, 4 - 6-10 pairs, 5 - above 10 pairs. 0 - Opole city, W - Wroclaw city, G - Glogow city, UO - upper Odra, MO - middle Odra, BR - Bobr river, BV - Barycz Valley.

out in 1983 - 1989. Since 1984 birds wintering on rivers were recorded along 5 km. river sections. The total length of river censused was 315 km and 555 km in 1983 and 1984 respectively. In 1985-89 coverage increased to 1,000 - 1,500 km. In addition, each year 12,500 - 20,000 ha were also surveyed and the results published (Czapulak 1986, Czapulak & Stawarczyk 1988, Czapulak in press).

Results

Breeding birds.

The Mute Swan became extinct as a breeding species in Silesia in 1880 (Kollibay 1906) and was a very rare bird until the mid-20th century. Breeding was confirmed in 1948 in the Barycz Valley, and by the late 1950s/early 1960s the breeding population had increased to about 10 pairs. By the late 1970s the breeding population in the Barycz Valley had increased to about 60 pairs (Mandziou 1987). The last three censuses (in 1983, 1988 and 1989) recorded about 110 pairs nesting there (Anonymous 1984, own data). At the beginning of the 1980s, 109 breeding sites with at least 240 pairs were known in Silesia. 80 new breeding sites were located over the next few years and in 1983-85 at least 350 pairs bred in this region. Fig. 1 shows the distribution of Mute Swans in Silesia in 1988-89. The number of pairs was estimated at about 400. The increase in estimated number of Mute Swans during the last few years may be attributed to increased activity of observers.

The Whooper Swan started to breed in Silesia in the Odra valley in 1983. Since then they have nested in this area regularly. Over the next few years seven breeding sites were found but they were not occupied by swans every year. The highest number of breeding pairs (with nest or cygnets) in one year was five in 1986. Another breeding site in the western part of the Barycz Valley has been occupied by one pair since 1981. A nest was built in 1983 but no eggs were laid. In 1984 a nest with four eggs was deserted (Bobrowicz *et al.* 1986). Since then Whooper Swans were observed every year in the spring but further attempts at breeding were not recorded. In early September 1989 a small flock of adult birds with one cygnet was found near Milicz but it is not known if this bird fledged (J. Witkowski).

Table 1. Results of January counts of Mute Swans and Whooper Swans in 1983-1989. Numbers of Mute Swans for 1983 and 1984 are underestimated. Estimated values for these two winters are 1,540 and 2,100 swans respectively.

	Cygnus olor					*Cygnus cygnus*
Year	Odra river	Bobr river	Other rivers	Water bodies	Total	Total
1983	463	?	?	362	915	7
1984	1,405	?	178	67	1,700	95
1985	1,791	362	305	68	2,526	34
1986	1,704	198	429	119	2,450	69
1987	1,800	314	579	114	2,807	52
1988	1,520	295	385	815	3,015	63
1989	1,832	174	276	690	2,972	146

Non-breeding birds

The first moulting flocks of Mute Swans were found in Silesia in the mid-70s (Dyrcz *et al.*, in press) but data on flock size, especially from the Barycz Valley, were incomplete until 1988. In September 1988 and 1989 non-breeding swans were counted on the larger fish-pond complexes in this area. Swans have occurred in seven or eight places with totals of 1,300 and 2,000 individuals. Mute Swans have also moulted regularly on two fish-pond complexes outside the Barycz Valley: near Przemkow (Legnica region) and Wielikat (Katowice region). In both cases the flocks consisted of up to 200 swans. Groups of up to ten birds were noted irregularly in four other sites. The total number of non-breeding Mute Swans was estimated at 1,800 birds in 1988 and 2,500 in 1989.

There are no records of moulting, non-breeding Whooper Swans in Silesia.

Wintering birds

Wintering Mute Swans were observed in the past when this species was very rare but only single birds or small flocks of up to 20 individuals were reported then (Dyrcz *et al.* in press). The first complete data about this phenomenon are from the beginning of the 1980s. Table 1 shows results of counts in 1982 - 89. The number of wintering swans in the first three years (1982-84) is underestimated due to incomplete coverage of known sites. Data from the last five years are more comprehensive. They show a gradual increase in the number of wintering Mute Swans in Silesia. The 1988 and 1989 winters were mild and warm and numbers were highest. The large variation between 1983-84 and 1988-89 is probably due to inconsistent monitoring, but may reflect growth in the number wintering swans. Up to 70% of the Mute Swans occurred on the Odra river, preferring its upper course. Mean numbers of birds and frequency were higher here than on the middle Odra (Table 2 and 3). The importance of the Bobr river, the second largest of the Silesian rivers, was smaller, with no more than 14% of the swans wintering here. Large water bodies were usually less important, especially in more severe winters, but during mild and warm winters like those of 1988 and 1989, up to 25% of the population may be resident.

In the second half of the 1970s Mute Swans started to winter in Silesian towns. This phenomenon increased in the early 1980s. Between 1,200 and 1,600 individuals (50-60% of wintering swans) in 1984-86 and about 800 individuals (25-30%) in 1988-89 occurred on 50 km of urban river sections in 11 towns. Reduced numbers during 1988-89 were due to the mild winters.

The percentage of second year birds varied

Table 2. Mean numbers (individuals per 5 km) of Mute Swans in the upper and middle Odra river and Bobr river in 1984-1989. N – number of checked 5 km sections

	Upper Odra			Middle Odra			Bobr river		
Year	N	Mean	SE	N	Mean	SE	N	Mean	SE
1984	43	26.0	10.50	31	3.4	1.07	?	?	?
1985	58	29.2	8.52	31	3.0	1.68	39	9.3	4.95
1986	56	27.1	7.92	40	4.7	1.78	43	4.6	1.22
1987	50	25.9	7.07	40	6.8	3.14	38	8.3	1.27
1988	55	18.6	5.23	36	9.7	2.45	49	6.0	1.74
1989	54	25.5	6.82	39	11.6	3.28	48	3.6	1.22

Table 3. Frequency of Mute Swans in the upper and middle Odra river and Bobr river in 1984-1989. N - number of checked 5 km sections.

Year	Upper Odra N	Upper Odra %	Middle Odra N	Middle Odra %	Bobr river N	Bobr river %
1984	53	50.9	33	51.5	?	?
1985	58	46.6	31	35.5	39	28.2
1986	56	60.7	40	52.5	43	48.8
1987	50	58.0	40	25.0	38	52.6
1988	57	68.4	36	52.8	48	45.8
1989	56	73.2	40	60.0	48	29.2

Table 4. The percentage of first-winter birds among wintering swans in Silesia in 1983-1989. N - number of swans of of known age.

Year	Cygnus olor N	Cygnus olor %	Cygnus cygnus N	Cygnus cygnus %
1983	447	21.9	no data	
1984	1,269	16.9	78	3.8
1985	1,535	17.4	32	15.6
1986	1,942	22.1	65	21.5
1987	2,112	26.8	52	23.1
1988	2,720	28.8	64	15.6
1989	2,832	35.6	146	13.7

between 17% and 36% (Table 4). The proportion of first winter Mute Swans was not related to the severity of the previous winter; after the very severe winter of 1987 the percentage (28.8%) was one of the highest recorded whereas after the mild and warm winters of 1983 and 1984 only about 17% of first - winter swans were recorded. Nilsson (1979) also failed to find a relationship between the severity of winters and the percentage of one year old Mute Swans in the next winter.

Whooper Swans winter in Silesia in small numbers (Table 1). The most important site is the Odra Valley in the north-western part of the region where flocks of up to 130 individuals were observed (Dyrcz *et al.*, in press). The proportion of one year old birds was very low in 1984, but increased over the next few years up to 22% (Table 4).

Discussion

The number of breeding Mute Swan has increased over the last 20 years in Silesia. In the past, inconsistent monitoring has produced variable results from which it is difficult to draw valid conclusions. Data from 1988-89 are comprehensive and will form a basis for future work. Silesia is the second region of Poland where breeding of the Whooper Swans has been confirmed. The first is the Biebrza Marshes, in the north-east, where one pair nested in 1973 (Kawenczynski *et al.* 1976). Since then no further broods have been recorded, although adult birds were observed during the breeding season (own data). A further increase in the Silesian population is possible, especially in the Barycz Valley where up to 12 adult birds are observed in the spring every year. The winter population of Whooper Swans is small. The percentage of first winter birds, is similar to that recorded in Sweden (Nilsson 1979). In the Slonsk Reserve (approx. 60 km north from the northern border of Silesia) the percentage of young Whooper Swans was only 5% (Beszterda *et al.* 1983). Whooper Swans wintering in this reserve are mostly non-breeding birds but small family parties also occur. It is possible that higher numbers are recorded in Silesia because they are bred in this region.

Silesia is an important wintering ground for about 20% of Mute Swans wintering in Poland. They prefer the upper course of the Odra river, possibly because this section offers a richer food resource which is also used by other species of waterfowl too, (Czapulak & Stawarczyk 1988). Another reason may be the distribution of the riverside towns. On the middle course there are fewer such towns. Swans are fed by people, which attracts birds into the towns. However, large concentrations of Mute Swans were observed on the upper course of the Odra river outside the cities in the beginning of the 1980s. For example up to 730 Mute Swans wintered on a 20 km reach near Opole (Dyrcz *et al.* in press). An additional reason for their presence here may be because this section freezes later.

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