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The Osprey in Germany: Its Adaptation to Environments Altered by Man

Bernd-Ulrich Meyburg, Otto Manowsky and Christiane Meyburg

Abstract – As a regular breeding species in Central Europe the osprey is presently confined to the Federal States of Mecklenburg-Vorpommern and Brandenburg in eastern Germany, and Pomerania and Mazuria in Poland. This is probably due to human persecution, especially in earlier decades. In Mecklenburg the population reached its lowest level with only 37 pairs in the DDT-period between 1968 and 1972. In Brandenburg, a slow but steady increase has occurred, from ca. 45–50 pairs in the early 1980s to over 120 pairs today. There has probably been a relationship between contamination with pesticides, reproductive success and population development which, however, has been very poorly studied. One limiting factor for the osprey population may have been the scarcity of suitable trees for nesting. The species prefers the tops of isolated old trees or trees on the edge of the forest dominating the adjacent trees. Due to forestry, such trees have become increasingly rare to the point that only a small fraction of the osprey population can nowadays reproduce in the traditional way. Fortunately, ospreys started to breed on power lines as early as 1938. On the pylons the nests are apparently safer than in trees. Nowadays over 75% of ospreys nest on these artificial structures in Germany, although no such breeding is known in Poland. This important adaptation may have helped the species to recover. The breeding success of 258 tree-nests and 366 nests on power-lines was studied. While the tree-nesting population remained rather stable, the pylon nesters strongly increased. On average, pylon-nesting ospreys produced more young than tree-nesting ospreys.

Key words: osprey; Germany; Poland; breeding success; pylon-nesting; tree-nesting.

The osprey occurs in four races virtually throughout the world with the exception of Antarctica. As a breeder, it is absent only from South America except for the extreme north. The northern boundary of its range coincides with the limit of tall trees.

The osprey in Western Europe was persecuted during the nineteenth and early twentieth centuries, resulting in its virtual extirpation apart from a few isolated localities, e.g. in the Balearics, on Corsica and a small area in Portugal. Spontaneous recolonization has taken place in Scotland since 1954, and recently in Central France.

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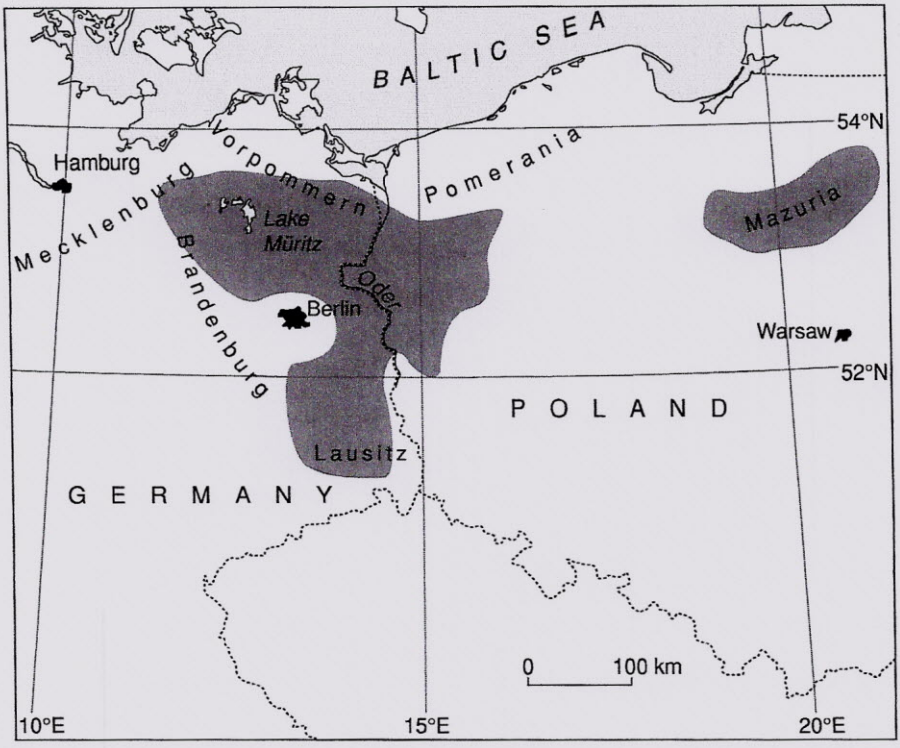

Figure 1.

DISTRIBUTION IN CENTRAL EUROPE

The present distribution of the osprey in Central Europe is very fragmentary, and possibly conditioned by past human persecution. The species has become extinct or eliminated as a regular breeder in several countries: since 1911 in Switzerland, since 1932 in Austria and since the turn of the century in the Czech and Slovak Republics. In the former West Germany it is likewise regarded as extinct but may possibly still breed occasionally.

Regular occurrence in Central Europe today is confined to the lowlands east of the river Elbe. East of the river Oder some 50–60 pairs still breed almost exclusively in the lake districts of Pomerania and Mazuria. In the former East Germany, a relatively significant population was able to survive and is now again on the increase, but with only a slight tendency to spread. Why there are no signs of increase in adjoining Poland, especially in Pomerania and Mazuria, where the species had also sharply declined, remains a mystery.

BREEDING HABITAT AND MANAGEMENT

The osprey needs open and clear water in which to fish. Suitable nesting trees have for decades become increasingly scarce in Germany, so that a lack of nesting trees alone would most likely have led to a decline of the species had not a switch to high tension pylons taken place.

In 1938, for the first time, a nest was found by Rüppel and Rüppel (1938) on a high tension pylon between Angermünde and Templin, north of Berlin. Since then the first German ospreys have taken increasingly to nesting on 100 kW lines (Pehlke 1966, Hemke 1987, Meyburg and Meyburg 1987, Schmidt 1993). Now, around 75% of all pairs do so. Because of the lack of suitable natural trees, this switch to artificial "nest trees" has permitted the osprey population in Germany to maintain itself and increase, all the more so since breeding success among the pylon-nesters is even greater than among tree-nesters (see below). In 1982, for the first time, 20 kW medium voltage pylons were also adopted, but these, due to their configuration, had to be fitted with protective shields so that the birds can safely use the cross-bars as perches. A further chapter opened in 1993, when five nests were built on 380 kW pylons in Brandenburg (Bülow 1994).

The erection of artificial nest-platforms on these pylons has for many years given rise to an additional aspect of management, namely to ensure that special consideration is given to the ospreys during maintenance work on the pylons. Beyond that, any management in the sense of active measures to promote re-colonization of areas where currently the osprey no longer occurs is prevented by the negative attitude of most nature conservationists towards the removal of young birds from nests in the present breeding areas for release elsewhere.

In other parts of the world, ospreys also breed on human-built structures. They readily adopt man-made nests and, where suitable trees or pylons are lacking, will build on platforms fitted to the top of tall poles (Postupalsky 1978). In some regions they also nest on the ground, e.g. Baja California, Mexico and on the Red Sea, and on cliffs, e.g. in Corsica.

In Central Europe today the preference is for well-wooded lakelands. In Mecklenburg-Vorpommern, the Baltic Sea coast, where formerly the Darss Peninsula held the greatest breeding density, has been completely abandoned and so far, apart from one pylon-nesting pair on the island of Rügen (Tusche 1982), has not been recolonized. Nest site and water for fishing can easily be several kilometres apart.

POPULATION DENSITY IN CENTRAL EUROPE

In Central Europe the osprey is capable of forming small, semi-colonial groups. The greatest concentration in Germany was previously on the Darss Peninsula and the Rostock heathlands on the Baltic Coast. In 1925, Peus (1927)

counted 15–16 active nests in the 21 000 ha of the Darss. In 1950, 18–20 pairs were known there (Brüll and Kankel in Bijleveld 1974). In 1962, there were still 7–10 pairs and 3 in 1963. By 1970, the species had finally disappeared from this region, once so famous for its birds of prey (Hemke 1984), and also from other parts of the coast.

Presently the osprey breeds in greatest density in the region of Müritz in the federal state of Mecklenburg-Vorpommern and adjacent to the Peitzer fish-ponds in Lausitz in the federal state of Brandenburg. In terms of districts, the species reaches its highest density in Neustrelitz with 2.3 breeding pairs per 100 km^2. In the districts of Sternberg, Lübz and Uckermünde there are 0.3–0.4 pairs per 100 km^2, and in Röbel, Güstrow and Grimmen 0.1–0.3 (Hauff 1995). In some places, small colonies form and a sequence of several occupied nests can be seen on consecutive pylons. In Brandenburg the overall density is 0.4 pairs per 100 km^2; in its central northern part north of Berlin it reaches 2.8 pairs per 100 km^2 (Sömmer 1994, Ruhle 1994).

In immediately adjacent Poland only 50–60 pairs breed today, predominantly in Mazuria and Pomerania (Mizera and Szymkiewicz 1995). To date there has been no clear sign of a population increase, as in Germany. Also, the ospreys in Pomerania and Mazuria show little inclination to nest on pylons (Mizera 1994).

POPULATION TRENDS

The osprey was formerly widespread in Central Europe (Schmidt 1994, Schmidt and Kapfer 1994). In the former West Germany the species must be now regarded as extinct, or at best a very sporadic breeder (Ringleben 1966, Schäfer 1967, Thielcke 1975, Heller 1984). In the former East Germany, where the species breeds in appreciable numbers only in the new federal states of Mecklenburg-Vorpommern and Brandenburg, the population in 1991 was estimated to be around 170 (± 20) pairs (Nicolai 1993). By now it is well over 200 pairs. At present, there are only a few pairs in the neighbouring federal states: Niedersachsen (Lower Saxony) 1, Sachsen (Saxony) 0–4, Thüringen 2, Sachsen-Anhalt 4.

The population status and increase in Germany have been particularly well documented in Mecklenburg-Vorpommern and rather less so in Brandenburg. The majority of the ospreys are concentrated in the southeastern part of the Mecklenburg/Brandenburg lake district. A further nucleus has come into being in southeast Brandenburg. Here new colonies have developed, especially during the 1970s. In all, Brandenburg, where about half of all the ospreys breed, has shown a marked population increase during the last 25 years, from ca. 45–50 pairs in the early 1980s to over 120 in 1993.

In 1935 there were not more than 25 breeding pairs in Mecklenburg-Vorpommern, of which 14 alone were in the Darss Peninsula on the Baltic. Up to 1957 – probably due to absence of hunting – the number had risen to 70 breeding pairs. Between 1960 and 1969 the Mecklenburg population sharply

declined, to reach a low level of 39–41 pairs between 1970 and 1975. It was at that time that the population on the Darss, once the greatest concentration in Germany, was extirpated.

Ospreys breed only irregularly on the Baltic coast, but in 1979 an artificial nest platform on the island of Rügen was occupied, forming a genuine case of resettlement. One cause among others of the steep decline on the Baltic coast may have been water pollution and the annual campaign to control mosquitoes by spraying insecticides from the air (Klafs 1991).

After 1976 the Mecklenburg population slowly increased, with 62 pairs in 1980, 73 in 1986, 90 in 1989 (Klafs 1991) and 94 in 1993 (Köhler 1994). This was also reflected in the former district of Schwerin, on the western edge of the species' range, where the number of pairs rose from 5 in the mid-1970s to 18 in 1986 (Hauff *et al.* 1986, Köhler 1991).

Around 1870 the osprey was evidently a frequent bird in most parts of Brandenburg where it even bred in colonies, e.g. Dubrow with 8–10 pairs, and the Peitzer fishponds with 25–30 pairs. The subsequent rapid decline continued into the 1920s. During the 1930s and '40s there was apparently a remarkable recovery of the population which, however, was not adequately documented. From about 45 pairs around 1980 the population rose to at least 120 pairs in 1992.

PESTICIDES AND BREEDING SUCCESS

During the 1950s and 1960s in the USA a sharp decline in the reproduction rate and hence in the osprey population was brought about by DDT and other organochlorine pollutants, followed by a renewed increase after those pesticides were banned. The osprey's important function as a bioindicator, impressively demonstrated in North America (Ames 1966, Wiemeyer *et al.* 1975, Spitzer *et al.* 1977, 1978), can only be presumed true for Central Europe. During the cold-war years research of this kind could not be pursued. With regard to the use of agricultural chemicals, their negative effect on the environment was denied by communist regimes. Nevertheless, in the former East Germany 19 eggs that had failed to hatch were analysed for organochlorine residues between 1978 and 1981, and yielded an average of 4.5 ppm (maximum 10.8 ppm) of DDT, so that Poole's statement (1989a: 176) that "most European ospreys escaped the trauma of pesticides" is probably not correct, for Germany at least.

The impact of pesticides was also reflected in the brood size, which fell from 2.2 in 1959 to 0.9 in 1966 in Mecklenburg (Moll 1967). Also in Mecklenburg, between 1956 and 1976 more clutches failed to develop and mean brood size was smaller (around 0.8) than during the periods 1932–37 and 1976–90 (Banzhaf 1938, Klafs 1991).

If no similar decline in breeding success was detected in Brandenburg (Feiler in Rutschke 1987, Loew 1981), it was probably because two-thirds of the broods examined were from regular and highly productive pairs (Klafs 1991). Some

Table 1. Terminology of osprey breeding success used.

A = Number of occupied nests with known outcome (= Number of pairs on territory, regardless of whether or not they lay)
B = Number of active nests (in which at least one egg was laid)
C = Nest success (fledged 1, 2, 3 or 4 young)
D = Mean number of young fledged per occupied nest
E = Mean number of young fledged per active nest

individual pairs continued to breed well even during the bad years of the 1950s and '60s so that these pairs should be separated from the rest when calculating the impact of toxic chemicals. Those pairs were probably breeding in areas scarcely affected by pesticides.

OUR OWN STUDY OF BREEDING SUCCESS

Our study covers a relatively long period of time and a large number of broods, thus making it possible to evaluate the correlation between breeding success and population growth on the one hand and comparison between tree- and pylon-nesting on the other.

All observations were carried out from a considerable distance and from the ground, using binoculars or a spotting scope. The nest sites were first inspected in April or early May, to determine whether they were occupied. Following Postupalsky (1977) we considered a territory to be occupied if either one adult bird was lying flat in the nest, or if two adults were present at the nest, or if a nest was clearly in use, e.g. fresh nest material. Breeding success was monitored over several days in July, to determine the number of fledglings. Despite careful observation, it is nevertheless possible that young were overlooked. No attempt was made to climb up to nests. Tree-nesters were monitored by O. Manowsky and pylon-nesters by B.-U and C. Meyburg. See Table 1 for the basic terminology for reproductive success.

Among tree-nesters, there was a relatively stable population in the Schorfheide, an extensive wooded area largely unspoiled and now a biosphere reserve, lying 50 km north from the centre of Berlin. Up to 1988 ospreys nested exclusively on trees. In 1989 new pairs began to nest on pylons. No evidence was found of pairs alternating between trees and pylons.

The increase in the number of annually controlled pylon nests north of Berlin reflects only a part of a general increase in the number of pairs. This is primarily explained by coverage of an ever wider area and more intensive search.

Comparative analysis of the breeding results from the total number of 624 nests monitored (see Tables 2a–3b) provides support to the hypothesis that pylon-nesters are on average more successful than tree-nesters. From this it emerges that the pylon-nests provide greater security from natural enemies, or that both eggs and young risk falling from tree nests due to the swaying of the

Table 2a. The breeding success of ospreys in Germany nesting on trees (1972–83).

Category*	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
A*	9	9	10	10	10	11	10	12	9	10	9	7
B	9	9	10	10	10	11	10	10	9	10	9	7
C1	2	1	3	2	4	1	0	0	0	6	0	1
2	3	3	2	2	4	5	3	2	5	2	3	2
3	3	4	3	5	0	2	2	0	4	0	1	1
D	1.89	2.11	1.60	2.10	1.20	1.55	1.20	0.33	2.44	1.00	1.00	1.14
E	1.89	2.11	1.60	2.10	1.20	1.55	1.20	0.40	2.44	1.00	1.00	1.14

*See Table 1.

Table 2b. The breeding success of ospreys in Germany nesting on trees (1984–93).

Category*	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Total
A*	11	13	12	14	14	17	17	15	15	14	258
B	10	10	9	11	12	15	14	12	14	11	232
C1	4	0	1	5	2	3	3	2	1	1	42
2	1	1	2	3	3	3	5	4	6	3	67
3	1	4	0	1	4	4	3	5	4	4	55
D	0.82	1.08	0.42	1.00	1.43	1.24	1.29	1.67	1.67	1.36	1.32
E	0.90	1.40	0.55	1.27	1.66	1.40	1.57	2.08	1.78	1.73	1.47

*See Table 1.

trees. It had been shown before in North America (Postupalsky 1978, Poole 1989b) that pairs breeding on artificial structures are more successful than tree nesters. However, confirmation had been lacking for Europe where the artificial "nesting trees" were, in contrast to the New World, not specifically built for the birds in most cases.

A higher loss from natural causes was in fact evident among the tree-nesting pairs that we studied. Several young were killed by goshawks and even one case was recorded of an adult bird being struck. Other losses were due to falling from the nest or to the whole nest being blown down.

Confirmation of this hypothesis reveals that adaptation to pylons benefits the osprey in two ways, i.e. by compensating for the lack of natural nest-trees, and leading to an improved reproduction rate.

A comparison of the mean number of young fledged per occupied nest between tree-nesters and pylon-nesters from 1980 to 1993 is shown in Fig. 2. The total number of pylon-nesters (pairs on territory) and tree-nesters under study was 366 and 258, respectively. At least 334 pylon-nesting and 232 tree-nesting pairs proceeded to egg-laying. The number of young fledged per occupied nest was 165 with pylon-nesters and 1.32 with tree-nesters. Brood size was almost similar – 2.22 and 2.08, respectively. Among tree-nesters no successful broods of four were recorded. The number of unproductive nests was 94 in both populations (25.7% vs. 36.4%, respectively) and the number of

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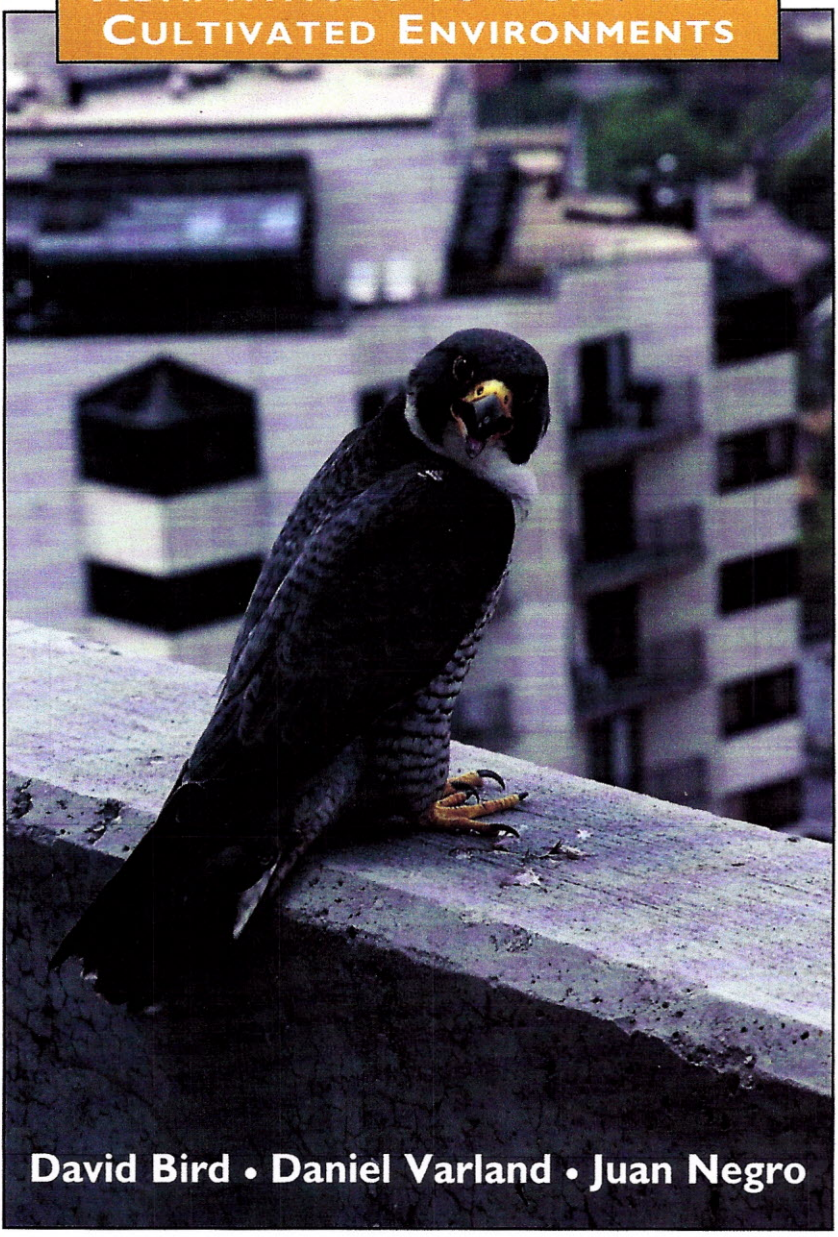

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Despite the continuing, often harmful changes wrought upon many natural habitats by modern development, the opportunistic and resourceful nature of many raptor species has enabled them to find a variety of ways to both adapt to and often benefit from the activities of humans. In addition, the growing concern for the health of raptor populations has increasingly led planners and land users to make special, and often innovative, arrangements to ease these impacts and to provide for the special needs of birds of prey.

The papers presented at a recent meeting organized by the Raptor Research Foundation form the starting point for the collection presented here. The coverage of this book is broad, ranging from the impact of human activity on country wide scales to the particular conditions associated with urban, cultivated and industrial landscapes, as well as to the various schemes specifically directed towards the provision of artificial nest sites and platforms. The cases described hail from a wide geographic range including North and South America, Europe, Africa and elsewhere, and from a broad spectrum of species groups such as the falcons, accipiters, eagles, kites and many others.

The message is a hopeful one. While much land development is inherently disruptive to wildlife, a knowledge of raptor biology and a concern for the birds can be combined to find solutions to the problems that arise, so that Peregrine Falcons can be tempted to nest in the heart of our cities, Ospreys can be encouraged to return to their old haunts, owls and hawks can thrive in managed woodland, and the problems of mortality from power lines can be minimized.

This is a book of immense value not only to ornithologists and conservation biologists, but also to engineers and managers involved in all kinds of building and environmental work in cities, power and water works, agriculture and forestry.

Cover photographs: This adult male Peregrine Falcon was photographed at its 28th floor nest ledge at the 'Landmark on the Lake' apartment building in Milwaukee, Wisconsin in June, 1994. The falcon, named 'Omni', was captive-produced and released by hacking in Madison, Wisconsin in 1990. Copyright © Greg Septon, Milwaukee Public Museum.

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