

# White-tailed Eagle (*Haliaeetus albicilla*) populations in Hungary between 1987–2007

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**Abstract:** The author reports on the White-tailed Eagle populations in Hungary from 1987 to 2007. Population analysis of the period before 1987 is provided based on literature data. The activities of the Hungarian White-tailed Eagle Protection Programme are presented including information on habitats, colour ringing, winter populations, identification of the major threats, the usefulness of protection zones, the installation of artificial nests and winter feedings. In 2007, a total of 180 eagle territories were known in Hungary. 114 out of 166 breeding pairs were successful producing altogether 182 fledged young. Based on the description of the habitats it is found that White-tailed Eagles nest mostly on native poplar species (32.53%), hybrid poplars (15.67%), and Pedunculate Oak (28.92%). As a part of the colour ringing programme that was launched in Hungary in 2004, more and more birds are ringed: up to 2007 already 69 eagle chicks have been marked this way. Based on our observations it appears that the estimated winter population also grows probably reaching 800–1.000 individuals including the breeding birds. Electrocutation and an increasing trend of poisoning are thought to be the most significant threatening factors. Artificial nests were found to be important in encouraging new breeding pairs to settle: currently there are 14 pairs breeding in artificial nests. Winter feedings have proven to be useful in that the provisioning of poisonless food assisted the overwintering especially of young birds, and has been very handy in facilitating colour ring reading, sometimes even photographing. The co-ordination and financing of protection activities are shared by BirdLife Hungary, Somogy Nature Conservation Society and the Duna-Drava National Park Directorate.

**Key words:** White-tailed Eagle, habitats, breeding, colour ringing, protection programme.

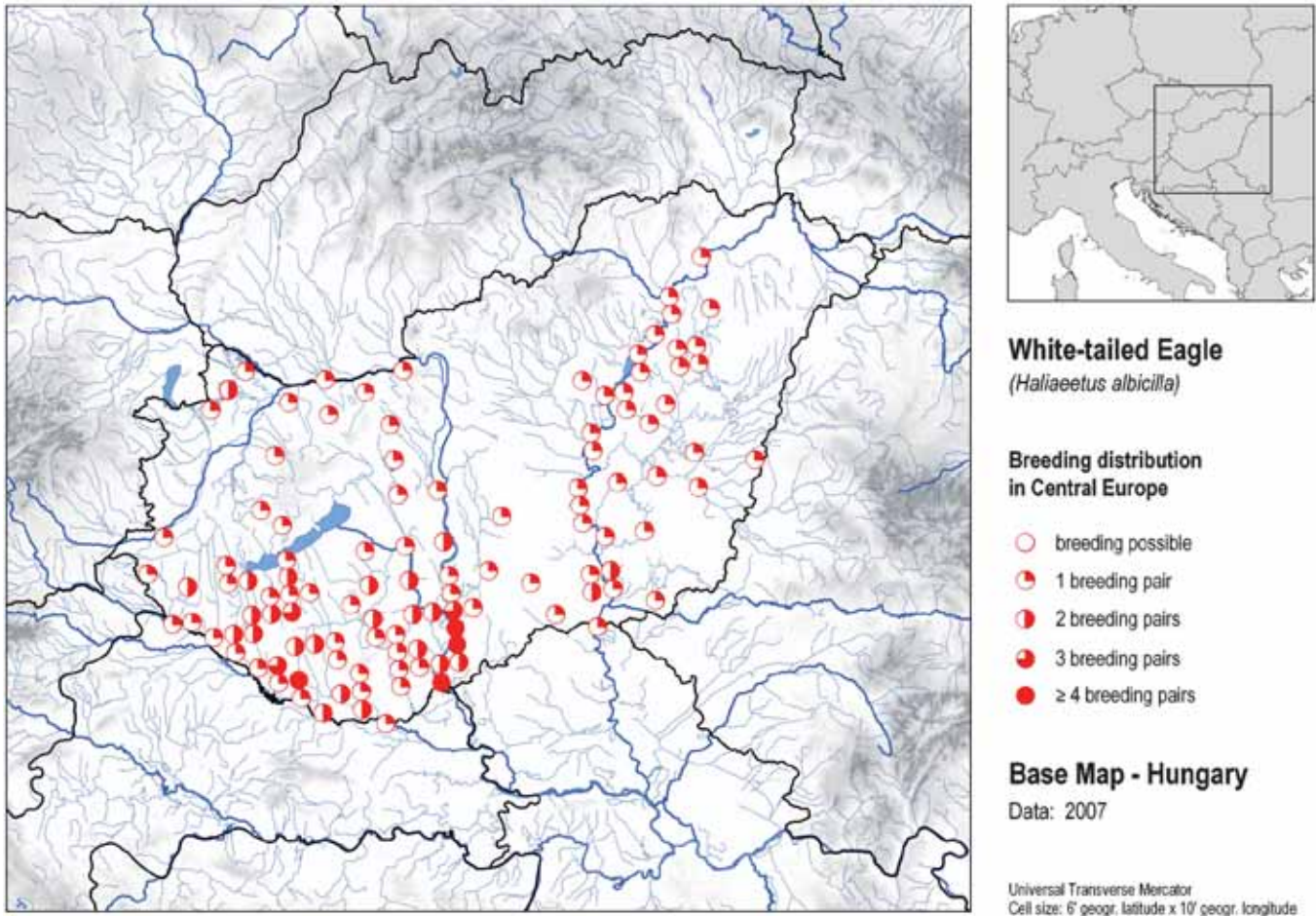
## Introduction

Driven by the aim of increasing the amount of arable land in Hungary, people have drained wetlands, regulated the rivers and cut down forests outside the flood-prevention dykes of floodplains since the early 1800s. Significant landscape changes were thus caused by increasing agriculture and the loss of water bodies: the permanent abundance of water was replaced by periodic water shortages. As habitats continued to alter, native animal and plant species were forced back to smaller areas, and many of them eventually became extinct in the area, e. g. Common Crane (*Grus grus*). These processes as well as the use of DDT, poisoning, shooting and the removal of eggs and chicks in the 20<sup>th</sup> century brought along the most drastic changes in the case of species closely associated with water, and the White-tailed Eagle population dropped considerably. Due to the legal restrictions on forestry and other activities which cause disturbance, and the official launching of the White-tailed Eagle Protection Programme, the eagle populations started to strengthen after the 1980s.

The First Conference on White-tailed Eagle Protection was held during this period, on 20–21 February

1987, in Somogy County Museum, Kaposvár where the Committee for the Protection of the White-tailed Eagle was inaugurated, chaired by Mr. Tibor Tömösváry. In addition to the establishment of the Committee, area co-ordinators were elected, and the tasks and objectives for the coming period were defined. The Second Conference was held on 6–7 March 1992 at Pannon Agricultural University in Kaposvár, the Third Conference on 20–22 January 1995 in the headquarters of Somogy Nature Conservation Society, Somogyfajsz, the Fourth Conference on 21–23 November 1997 in the Kemény castle in Tiszafüred. From 4 to 6 February 2000, the Fifth Hungarian Conference on the Protection of the White-tailed Eagle took place in Szekszárd.

In recent years, the annual results of the White-tailed Eagle Protection Programme were announced at the „Sólyomcsalogató” event (a meeting of birds of prey professionals) organised by the Raptor Conservation Group of MME Bird Life Hungary. The presentations are published in the *Heliaca* yearbook. Besides, we regularly give lectures and provide details about current White-tailed Eagle protection results and problems in several media appearances.



**Fig. 1:** Distribution map of breeding White-tailed Eagles in Hungary 2007. — Karte der 2007 in Ungarn brütenden Seeadler.

In 2007, BirdLife Hungary (one of the founders of the programme in 1987) and Somogy Nature Conservation Society signed a co-operation agreement with the Duna-Drava National Park Directorate. These three organisations currently direct the programme and provide the necessary funds.

The Hungarian White-tailed Eagle Protection Programme is one of the first nation-wide BirdLife programmes achieving successful results during their implementation. In 1987 the number of known White-tailed Eagle pairs was 16, and the population was estimated at about 25 pairs. Throughout the years, the programme has relied on field studies, harmonisation with the competent authorities, and experience gained at conferences, which has resulted in the fact that well-prepared nature conservation specialists are now involved in the programme. The general strengthening of nature conservation at the levels of both state and non-governmental organisations has further assisted the successful running of the programme. Detailed breeding success data have been available since the programme was launched. People involved in the programmes perform

observation tasks in almost entire Hungary. Based on our results we can state that nearly 90% of Hungary's White-tailed Eagle population is known by the observers.

The study area was defined by habitats occupied by Hungary's White-tailed Eagle populations, which are regions affected by the national White-tailed Eagle Conservation Programme. The area supervisors participating in the active protection programme and the working groups assigned by them – altogether 80–100 persons; members of BirdLife Hungary and other non-governmental organisations, nature conservation rangers, private entities – provided data based on which I use national cumulated figures.

### Literature review

Hungarian literature data on White-tailed Eagles dates back as far as the late 1800s. At that time, it was mentioned as a harmful bird. Although according to CHERNEL (1899) its populations diminished and it nested in areas with limited human presence, yet he claimed:



“Of course its tolerance is out of question, because wherever it appears it does harm to fishers and hunters”. CHERNEL (1899) mentions this bird as a nesting species even in the Hanság region (NW Hungary), and considers the lower Danube sections to be its best nesting areas. Back in the 1880s, LOVASSY (1928) knew its nest in the Ecsed bogs (NE Hungary) and also saw the adult birds there. He considered the White-tailed Eagle to be the most frequent among Hungarian large eagle species, and he, too, wrote about the importance of areas along the lower Danube section. Based on a survey performed by HOMONNAY (1944) in the Bellye estates along the lower Danube section in 1943 – these areas now belong to Croatia, Hungary and Serbia – 22 inhabited and 19 unoccupied nests were recorded. BREUER (1955) noted its nesting in the outskirts of Varászló village and mentions yet another pair on the Somogy county (SW Hungary) side of the lakes there. STOLLMANN (1955) wrote about nesting pairs in the upper Danube section in areas then belonging to the present Republic of Slovakia, and mentioned that nesting was likely on the Hungarian side as well. STERBETZ (1957) reports on nesting results in Sasér along the river Tisza in the period 1948–1954. PÉTERFAY (1957) published data about White-tailed Eagles nesting in Németskér (Tolna county) in 1946. Furthermore, BÖRÖCZKY (1957) wrote that 5 pairs were known to be present at nests in the upper part of the game preservation area in Gemenc (Lower Danube) in 1955, and another 4–5 pairs in the lower areas. Publications from the 1970s report on the continuous decrease of White-tailed Eagles. STERBETZ (1993) reported that the 5 pairs known by him in the river section of the Tisza in Csongrád county between 1947–1976 had completely disappeared by the end of the study period. From the Hortobágy region it is known from the results of FINTHA (1976), that it had not nested in the area for quite long, and that in 1972 and 1974, only nesting attempts took place, in one case in both years. FINTHA (1976) reported that the Hungarian White-tailed Eagle population had been decreasing continuously since the 1950s, and that no more than 2 or 3 breeding pairs remained, with no news at all about any nesting pairs in certain years. According to HARASZTHY & BAGYURA (1993), the number of breeding pairs was not more than 10–12 pairs at the time of surveys performed in the 1970s. The same authors claimed that White-tailed Eagles had disappeared from a significant proportion of the country, including the entire Hungarian section of the river Tisza, and also only few breeding pairs remained along the Danube. Breeding success was low; there were even years with not a single chick fledging. The results of the Second Hungarian White-tailed Eagle Protection Conference were published by FILOTÁS & TEVELY (1995). From that publication it is learned that from the 1980s – mostly owing to



**Fig. 2:** A White-tailed Eagle poisoned by carbofuran (Photo: Z. Horváth). — *Ein mit Carbofuran vergifteter Seeadler.*

the conservation programme that was launched in 1987 – breeding pairs have been successfully protected in increasing numbers. The breeding population started to increase, with the number of known territories reaching 41 in 1991. The results of the programme and the numbers of breeding pairs between 1987 and 1997 were summarised by HORVÁTH (1997). The number of known breeding pairs and the number of eagle territories in



**Fig. 3:** Common Buzzard nestlings in a White-tailed Eagle nest (Photo: Z. Horváth). — *Mäusebussard-Nestling in einem Seeadlerhorst.*

**Tab. 1:** Tree species holding White-tailed Eagle nests in Hungary in 2000. — *Baumarten mit Seeadlerhorsten in Ungarn im Jahr 2000.*

Common name	Scientific name	Amount/No.	Frequency (%)
Native poplar species	<i>Populus alba, nigra, canescens</i>	27	32.53
Hybrid poplars	<i>Populus x euramericana</i>	13	15.67
Pedunculate Oak	<i>Quercus robur</i>	24	28.92
Sessile Oak	<i>Quercus petraea</i>	5	6.02
Beech	<i>Fagus sylvatica</i>	6	7.23
Narrow-leaved Ash	<i>Fraxinus angustifolia ssp. Pannonica</i>	3	3.62
Scots Pine	<i>Pinus sylvestris</i>	2	2.41
Common Ash	<i>Fraxinus excelsior</i>	1	1.20
Black Walnut	<i>Juglans nigra</i>	1	1.20
Alder	<i>Alnus glutinosa</i>	1	1.20
<b>Total</b>		<b>83</b>	<b>100.00</b>



**Fig. 4:** Characteristic wooden pasture habitat in southern Hungary (Photo: Z. Horváth). — *Charakteristisches Waldweide-Habitat in Südungarn.*



**Fig. 5:** The tributaries are very important feeding places for the White-tailed Eagle (Photo: L. Fenyösi). — *Die Nebenflüsse sind sehr wichtige Nahrungsplätze für den Seeadler.*

1997 was 62 and 78, respectively. Based on information published by HORVÁTH et al. (2006), the number of known breeding pairs in 2004 was 133, and a total of 130 young birds left their nests from 85 successful broods. Then, the populations were reported to continue growing in 2005 (HORVÁTH et al. 2007), with the number of known breeding pairs, successful broods and fledged chicks being 141, 95 and 142, respectively.

## The White-tailed Eagle Protection Programme

Summing up, the practical activities of the White-tailed Eagle Protection Programme are as follows (HARASZTHY et al. 2003):

- Survey and continuous control of habitats, reducing any disturbing effects
- Harmonising the objectives of eagle-protection with the authorities
- Establishing co-operations with counter-interested stakeholders
- Installing artificial nests
- Guarding nests against disturbing effects (guarding threatened nests is feasible mostly in areas of the Plain Region)
- Research, monitoring (colour ringing, investigation of food remains, population surveys and assessment of wintering areas)
- Winter feeding
- Insulation of the supporting structure of mid-voltage electric lines
- awareness raising, propaganda (information material, lectures, media appearances)

In this paper I deal with the following issues in detail: description of habitats, colour ringing, winter populations, winter feeding, installing artificial nests, and the threat of poisoning.

## Description of habitats

The following habitat description is based on data from HORVÁTH & PINTÉR (2005). The authors investigated the nest site characteristics of the Hungarian White-tailed Eagle breeding population in the year 2000 (83 pairs). According to their results, 53% nested in some type of nature conservation area: 30 pairs within national parks, 11 pairs in landscape protection areas, and 3 pairs in nature reserves (nature conservation site). Artificial nests are used by 6% of pairs nesting in Hungary (Békés, Somogy, Fejér, Hortobágy). Most of the eagles were found to nest in old forest stands around wetland areas. The majority of the nesting sites were located in softwood or hardwood gallery forests



(34 pairs), and in oak woods (26 pairs). About 11% of the population was found to nest in alleys or smaller groups of trees suggesting the adaptability of the population to different habitat conditions. Altogether 6 pairs nested in hybrid poplar plantations, 7 pairs in South-Transdanubian beech wood associations, and one pair in an alder bog. The majority of trees supporting a nest belonged to the main species making up the forest associations of the nesting location. The distribution of tree species holding nests are shown in tab. 1. Nearly half of the breeding pairs nested in poplar trees (black, white and hybrid poplars). About 16% of the nests were in hybrid poplar trees, and because stands of this tree species are usually not protected due to their low species diversity, they require special attention. About 35% of the breeding pairs nested in oak trees, the majority of them in South-Transdanubian Pedunculate Oak forests. Altogether 40% of the pairs take their prey from rivers and cut-off major backwaters, whereas 52% feed from artificial ponds, and another 8% from natural lakes.

### Colour ringing and prey

When the project was launched, an important objective was to provide undisturbed conditions near nesting localities and around the nests themselves (in reasonable cases even the initiation of area protection was recommended). Besides the necessary discussions, nests were checked to assure protection and to document the breeding success. It was not until 2004, after a decision made by the Birds of Prey Section of Bird Life Hungary, that we started climbing up to occupied nests, too.

This is when we joined the European White-tailed Eagle colour-ringing programme. Hungary's colour code is the following combination: black top, green bottom.

Rings were done as follows:

- 28 specimens ringed in 2004;
- 28 specimens ringed in 2005, 5 of them in Croatia;
- 46 specimens ringed in 2006, 14 of them in Croatia;
- 69 specimens ringed in 2007, 16 of them in Croatia.

Plain uncoloured aluminium rings are used as year-code rings because when ringing was launched, it was unknown how many rings would be used annually. Based on experience from former years, the number of rings that has to be ordered can be determined, so unused year-code rings do not have to be discarded. As revealed by observation data of colour-ringed birds, the northern White-tailed Eagles arrive in Hungary mainly from Russia, Finland, Sweden and the Baltic states, to stay in the plain region areas of the country (areas of the



**Fig. 6:** A natural – undisturbed – section of the river Drava (Photo: L. Fenyösi). — *Ein natürlicher, ungestörter Flussabschnitt der Drau.*



**Fig. 7:** Fishpond habitat (Photo: L. Fenyösi). — *Fischteich-Habitat.*

Northwestern Plain, Hortobágy and Békés county). Birds with Hungarian rings have been observed in Romania, Poland, Russia and Austria. Within our country, especially young birds tend to migrate mostly to the Hortobágy region.

Interesting information has been collected during the ringing programme about the feeding of White-tailed Eagles. Pairs nesting around fishponds of South Transdanubia have been observed to take the following prey (in decreasing order of frequency): Carp (*Cyprinus carpio*), Prussian Carp (*Carassius gibelio*), Grass Carp (*Ctenopharyngodon idella*), Silver Carp (*Hypophthalmichthys molitrix*), Mallard (*Anas platyrhynchos*), Coot (*Fulica atra*) and Pond Terrapin (*Emys orbicularis*); sometimes also Little Grebe (*Tachybaptus ruficollis*) and Great

**Tab. 2:** Number of White-tailed Eagles observed during national synchronous censuses (compiled by: Márton Horváth, Birds of Prey, BirdLife Hungary). — *Anzahl der bei nationalen Synchronzählungen beobachteten Seeadler.*

Year	Total	Adult	Immature/ juvenile	Immature	Juvenile	Indet.
2004	210					
2005	210	75	103			32
2006	267	91	84			92
2007	509–553	246–260		96–115	91–97	76–81

Crested Grebe (*Podiceps cristatus*). In the surroundings of natural waters – primarily rivers – they prey on “white fish” (like breams), Pike (*Esox lucius*), Mallard and Coot. In the plain region the most frequent food items are Pheasant (*Phasianus colchicus*), Coot, Little Grebe and Hare (*Lepus europaeus*). In areas with game animals they feed on remains of Roe Deer (*Capreolus capreolus*), Fallow Deer (*Dama dama*), Wild Boar (*Sus scrofa*) and Red Deer (*Cervus elaphus*), left in situ by hunters.

More rarely it happens that larger waterbirds are taken by the eagles, such as Grey Heron (*Ardea cinerea*) or even Black Stork (*Ciconia nigra*) (HORVÁTH 2003). One of the most interesting observations is the case of buzzard nestlings found in White-tailed Eagle nests, which has been recorded three times in Hungary so far (PALKÓ 1997, FENYÖSI & STIX 1998, HORVÁTH 2006). In 2007, I found another nest with two buzzard chicks of different age, beside a White-tailed Eagle nestling. The most probable reason for such cases is that the parent birds take buzzard chicks from their nest as prey, and if the chicks survive the transport, their food-begging calls stimulate feeding from the eagles. All three young birds successfully fledged and left the aforementioned nest.

### Surveying the wintering population

The nesting population in Central Europe including the Hungarian breeders is permanent, whereas the young, immature eagles roam about without established home ranges. Regular synchronous surveys of birds of prey were performed in the plain regions (Békés, Csongrád counties, Hortobágy and the North-Western Plain) and each January the annual national eagle synchronous census has been performed since 2004. In 2007, data were collected and census sheets filled in by 200 people in 168 localities. The results are shown in tab. 2. Of course, the national eagle synchronous census does not fully cover the country (surveys are made mostly in the important eagle regions), and the growth indicated in the table does not represent the increase in eagle numbers but instead the multiplication of census participants. Migrating and wintering eagles arrive in wintertime mostly from northern areas. According to observations made in the Hortobágy area and Csongrád

county, the arrival of individuals from the north starts around the second week of September and reaches its peak with the arrival of goose flocks in the period between 15 October and 15 November. In milder winters they stay for the entire season, but in harsh winter weather they continue their journey towards the south-southeast. Migration towards the north normally reaches its peak in February, sometimes in January or March, depending on the weather (ECSEDI 2004, KOTYMÁN 2004). Because this is the time when individuals of the northern populations and those from the Carpathian Basin are likely to meet, it can happen that northern eagles are still on migration while Hungarian pairs are already brooding their eggs. The number of eagles flying in to a night roosting place at the Biharugra-Begécs fishponds in Békés county varied between 20–71 individuals during the period 1994–2006, one case even yielding a figure exceeding 100: on 7 February 1999, 103 White-tailed Eagles were counted (TÓTH 2007). The size of migrating and wintering populations in Hungary can reach or even exceed 800–1.000 individuals.

### Major threats

The majority of White-tailed Eagles dying mostly in the winter period are killed by electric shock, and another – increasing – proportion fall victim to poisoning. Furthermore, in the case of the strengthening South-Transdanubian populations, birds killed in territorial fights are found more frequently, either near or even inside the nest.

Between 1998–2007 at least 52 eagles were killed by poisoning, of which 28 were White-tailed Eagles (based on data summarised by Márton Horváth). The toxic compound was found to be carbofuran in almost each poisoning incident. Currently, the carcasses are examined in order to find out more about the reasons, but no other analyses (blood, feather) are conducted.

### Nest guarding, buffer zones

Nest guarding was done only in a few cases, mostly in the Hortobágy region. In the case of White-tailed Eagles this does not have great importance – apart from a few special cases –, because disturbance can arrive from all directions, and by blocking the entire area and guarding it, we could be just as disturbing. It is very important in White-tailed Eagle protection that the necessary protection measures are chosen individually for each case. There are breeding pairs – especially new, young ones – that build their nests in areas already affected by a certain degree of disturbance (near roads, railway lines, inhabited areas, farmhouses, fishponds etc.), thus they tolerate disturbance. However, in the





**Fig. 8:** Feeding in wintertime (Photo: Gy. Tihanyi). — *Winterfütterung.*

case of pairs nesting in undisturbed localities, nesting can become unsuccessful even if minor disturbance is experienced. It is important that disturbance directly affecting the nest be avoided, and it is a basic principle in eagle protection that disturbing works are launched only after the completion of nesting, around the designated protection zone, and it should be advancing away from the nest and not the other way round. If conducted this way, the eagles arriving for the following season to occupy and renovate the nest will be able to see the changes, and if the surroundings of the nest are untouched, they will occupy the nest and start breeding (site-fidelity is very strong in well established pairs). In Hungary, tree felling can be done with a restriction of a circular zone around the nest of 100 m diameter, within which tree removal is prohibited throughout the year. During the nesting season, a circle of 300-400 m diameter is established, inside which tree removal and other forestry activities are allowed only after nesting has



**Fig. 9:** A White-tailed Eagle nest with three nestlings (Photo: Z. Horváth). — *Ein Seeadlerhorst mit drei Jungvögeln.*

**Tab. 3:** White-tailed Eagle (*Haliaeetus albicilla*) numbers in Hungary 1987–2007. — *Seeadler-Bestandszahlen in Ungarn 1987–2007.*

Year	Number of territories	No. of known breeding pairs	No. of successful broods	No. of fledged young
1987	20-25	16	6	8
1988	25-28	23	12	18
1989	26-30	23	12	17
1990	32	26	10	16
1991	37	25	12	18
1992	41	29	19	28
1993	45-47	39	26	36
1994	45-54	45	31	43
1995	54-60	51	34	48
1996	60-65	54	38	63
1997	78	62	44	64
1998	76-82	74	49	72
1999	85	80	50	67
2000	90-95	83	60	83
2001	98	93	68	95
2002	98-105	98	72	105
2003	118-130	118	87	130
2004	133-150	133	85	130
2005	141-155	141	95	142
2006	149-160	149	100	154
2007	180	166	114	182

been finished. Of course, these general rules can be modified based on individual sensitivity and particular cases. For example, in the case of pairs nesting in tree lanes, on solitary trees or beside glades, it is not necessary to mark half of a 100 m radius circle, because it is assumed that the birds selected the nesting location because of the particular structure of forest, allowing easy access by gliding. Thus, in such a case a protection zone with a radius of about twice the tree height (ca. 50-60 m) can be enough, also considering the strength of the tree stand in the surroundings. If restrictions have to be applied in privately owned forests the ways of financial compensation are settled in a governmental decree (based upon many factors, e. g. type and age of the forest).

### Artificial nests

If it is considered necessary (e. g. to assist settling; to replace a fallen nest, after repeated nest damage in a forest with unsuitable tree branch structure; to improve weak, “practising” nests of young breeding pairs), artificial nests can also be positioned. We use metal nest bases (a hemisphere shape of ca. 1 m diameter), filled in situ with branches, leaf litter and finally some soil. These artificial nests are created and installed by ourselves.

Artificial nests have been installed since 1976, first in Csongrád county, in the Middle-Tisza region, Somo-

gy county, Hortobágy, in Békés county, Komárom-Esztergom county, the North-Western Plain Region, all these totalling about 80 nests. In the late 1980s, following an invitation from WWF Austria and co-ordinated by Kurt Kirchberger, Mr. András Pintér and Mr. Tibor Tömösváry installed artificial nests in the Austrian floodplain forests along the rivers Danube and Morava. The first successful cases occurred where an artificial nest had been installed to replace one that had vanished for some reason, or just near the position of the old nest. Later on artificial nests were installed also in habitats where there had not been any records of earlier nesting. Today, there are several White-tailed Eagle pairs nesting in such artificial nests. In 2007, there were 14 pairs breeding in or near artificial nests, either in the artificial nests themselves or in a newly built one just near the artificial one. The importance of artificial nests gradually decreases as the populations continually grow.

### Winter feeding

The first winter feedings were done in Csongrád county occasionally from 1966 on (STERBETZ 1993), then from 1976 in the Middle-Tisza valley, and it has remained most typical in the Great Plain region: Békés county (Biharugra), Csongrád county, Hortobágy (DUDÁS & SÁNDOR 1993), but sometimes also in the Lower-Danube valley and Somogy county. It is important that eagles are given chemical-free, non-toxic food. Feeding is beneficial mainly for young birds, and another advantage is that a proportion of wintering eagles can be kept within a protected area. In South-Transdanubian areas abounding in game animals, eagles find a lot of animal innards left in the field during winter huntings. In the same areas, there are also plenty of game animals killed by natural winter mortality or wounding. Again, it is during winter feedings that the chances are the best for recording birds with coloured rings; at such times, interested members of the public can also be invited and photographing is best done in that period.

Just like with artificial nests, feeding is becoming less important as the populations gradually increase. In special cases, however, it can be justified, firstly in order to encourage new settling of eagles (the first successful White-tailed Eagle nesting in the Hungarian Great Plain in 1987 occurred in the Middle-Tisza region, probably due to winter feeding that was launched back in 1976), and partly for replenishing food in cases of water pollution or contamination with toxic material (e. g. cyan-contamination of river Tisza). First it is always food availability that determines the wintering places of eagles.



## Breeding population

Relying on earlier literature data, the trend of the Hungarian White-tailed Eagle population size can be characterised as continuously growing, following a depression in the 1970s. Back in those times, nesting was known from South-Transdanubian areas only. Among former nesting locations, White-tailed Eagles were surely absent from the Hanság, Szigetköz and Hortobágy regions, as well as from areas in Csongrád county and in the Middle-Upper-Tisza region. Practical protection measures were first implemented after the 1970s and more intensively from the 1980s (winter feeding, instalment of artificial nests, negotiations with stakeholders and area managers) along the Middle-Tisza, in Csongrád county, in Hortobágy, and in Somogy and Baranya counties. There is a continuous expansion from the South-Transdanubian populations – Somogy, Tolna, Baranya, Zala counties and areas of the Lower-Danube – towards the east and the north, while their numbers in the source habitats still continue to grow. It is important to note that the South-Transdanubian population is closely associated with populations nesting in Croatia and Serbia, both of which also exhibit increasing tendencies. The first successful White-tailed Eagle nesting in the Hungarian Great Plain occurred in 1987 in the Middle-Tisza region, which was followed by new breeding pairs gradually appearing in new areas after the early 1990s. Successful nestings were first recorded in Csongrád county in 1993 (STERBETZ 1993), in Hortobágy in 1995 (ECSEDI 2004), and in Békés county in 1998 (TÓTH 2007). Just like in the Great Plain, successfully nesting pairs appeared in the northern areas of Transdanubia too: in Veszprém county in 1990, in Vas county in 1992, in Fejér county in 1995, in the Northwestern Plain in 1998, and in Komárom-Esztergom county in 2003. The increasing trend of populations is shown in tab. 3, and breeding results from the year 2007 are specified in tab. 4. An overview map for Hungary (Fig. 1) is provided. The most important milestones in strengthening the protection activities are as follows:

- BirdLife Hungary (Hungarian Society for the Protection of Birds and Nature – MME) was founded in 1974 and the Raptor Conservation Group of MME BirdLife Hungary was launched in 1975.
- The Somogy county Regional Group of BirdLife Hungary was founded in 1980, and became an independent legal entity in 1989.
- Somogy Nature Conservation Society was created from the Somogy county Regional Group, and this organisation was first among Hungarian NGOs to purchase wetland habitats, about 800 hectares altogether.

**Tab. 4:** Breeding results of White-tailed Eagles (*Haliaeetus albicilla*) in Hungary in 2007. — *Brutergebnisse des Seeadlers in Ungarn im Jahr 2007.*

Location	No. of territories	No. of known breeding pairs	No. of successful broods	No. of fledged young
Lower-Danube	19	17	12	18
Baranya county	24	23	14	26
Békés county	8	5	3	6
Csongrád county	10	10	6	10
Fejér county	4	4	2	3
Upper-Tisza	4	2	2	3
Hortobágy	14	13	8	16
Jászság, Dél-Heves	1	1	1	1
Kisalföld	5	5	4	8
Kiskunság	6	6	4	5
Komárom-E. county	6	4	4	7
Közép-Tisza	5	5	5	7
Somogy county	43	41	27	39
Szolnok c. (KMNP)	1	1	1	1
Tolna county	13	12	10	13
Vas county	2	2	1	2
Veszprém county	3	3	2	3
Zala county	12	12	8	14
<b>Total</b>	<b>180</b>	<b>166</b>	<b>114</b>	<b>182</b>

- The use of non-selective chemicals (e. g. strichnin, phosphorous eggs) used by hunters for killing vertebrate predators like fox (*Vulpes vulpes*) or Hooded Crow (*Corvus cornix*), was discontinued in 1989 which put an end to killing masses of eagles because they fed on poisoned carcasses, too. In Hungary the use of DDT – which was significantly responsible for unsuccessful breeding – was stopped in 1968.
- A decree was released in 1990, which allowed the limitation of tree felling through the demarcation of a 100 m radius buffer zone around the nests, thus it became possible to secure successful nestings. (Before this legal possibility, old forest stands could be felled even during the breeding season of the eagles. The most serious situation developed in floodland areas where native poplar forests were replaced one after the other with hybrid poplar plantations.)
- In 1990 the existing national parks and regional nature conservation directorates were separated from the water management authority and started operating as independent entities. As a result, protected area designation processes speeded up, and nature conservation authority work also has become stronger.

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## Zusammenfassung

Der Autor berichtet über die Seeadler-Populationen in Ungarn von 1987 bis 2007. Eine Populationsanalyse der Zeit vor 1987 wird, basierend auf Literaturdaten, bereitgestellt. Die Aktivitäten des ungarischen Seeadler-Schutzprogrammes werden präsentiert inklusive Informationen über Habitate, Farbberingung, Winterpopulationen, die Identifikation der wichtigsten Gefährdungsfaktoren, die Nützlichkeit von Schutzzonen, die Aufstellung von Kunsthorsten und Winterfütterungen. Im Jahr 2007 waren in Summe 180 Adlerreviere in Ungarn bekannt. 114 von 166 Brutpaaren waren erfolgreich und produzierten insgesamt 192 flügge Jungvögel. Die Beschreibung der Habitate zeigt, dass Seeadler vor allem auf heimischen Pappelarten (32,53%), Hybridpappeln (15,67%) und Stieleichen (28,92%) brüten. Als Ergebnis des 2004 in Ungarn gestarteten Beringungsprogrammes sind immer mehr Vögel beringt: bis zum Jahr 2007 wurden bereits 69 Adlerjunge auf diese Weise markiert. Beruhend auf unseren Beobachtungen scheint es, dass die geschätzte Winterpopulation ebenso wächst und vermutlich inklusive der Brutvögel 800–1000 Individuen beträgt. Stromschlag und ein zunehmender Trend

an Vergiftungen werden als die signifikantesten Gefährdungsfaktoren erachtet. Kunsthorste wurden als wichtig befunden da sie neue Brutpaare bei der Ansiedelung unterstützen: derzeit brüten 14 Paare in Kunsthorsten. Winterfütterungen haben sich insofern als nützlich herausgestellt, dass die Bereitstellung von unvergiftetem Futter bei der Überwinterung insbesondere von jungen Vögeln hilfreich ist. Außerdem können dabei Farbringe abgelesen und Fotos gemacht werden. Die Koordination und Finanzierung von Schutzmaßnahmen werden von BirdLife Ungarn, der Somogy Nature Conservation Society und der Direktion des Duna-Drava National Park getragen.

## Összefoglaló

Szerző a magyarországi rétisas állomány alakulását mutatja be, az 1987–2007 közötti időszakban. Az 1987 előtti időszak állomány alakulását irodalmi adatok alapján jellemzi. Összefoglalja és bemutatja a Magyarországi Rétiisas-védelmi Program tevékenységeit, melyek közül az élőhelyek jellemzését, a színes gyűrűzést, a telelő állomány felmérését, a fontosabb veszélyeztető tényezők meghatározását, a védőzónák kialakításának célszerűségét, továbbá a műfészek kihelyezések és a téli etetések gyakorlatát ismerteti. Az élőhelyek jellemzése alapján megteudhatjuk, hogy a rétisas főként hazai nyáron (32.53%), nemes nyáron (15.67%) és kocsányos tölgyön (28.92%) építi fészkeit. Magyarországon a 2004-ben elinduló színes gyűrűzési program keretében egyre több madárra került gyűrű, 2007-ben már 69 fióka volt így jelölve. A megfigyelések adatai alapján a becsült telelő állomány is növekvő tendenciát mutat, a költő madarakkal együtt már a 800–1000 pld-t is elérheti. Szerző szerint a két legfontosabb veszélyeztető tényező az áramütés és az egyre többször előforduló mérgezés. A műfészek kihelyezéseknek elsősorban az új párok megtelepedésében volt jelentős szerepe, jelenleg is 14 pár költése köthető műfészekhez. A téli etetésekről megállapítható, hogy méregmentes táplálék biztosításával különösen a fiatal madarak áttelelését segíti elő, továbbá szolgálja a színes gyűrűk leolvasását, esetenként fotózást. A 2007. évi költési eredmények alapján Magyarországon 180 ismert revírben 166 pár kezdett költésbe, ebből 114 költés volt sikeres és 182 pld. fióka repült. A védelmi tevékenységek koordinálását, anyagi finanszírozását jelenleg a Magyar Madártani és Természetvédelmi Egyesület, a Somogy Természetvédelmi Szervezet és a Duna-Dráva Nemzeti Park Igazgatóság végzi.



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