

Present Status and Conservation of Eastern Imperial Eagle (*Aquila heliaca*) in Serbia

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Abstract: The Eastern Imperial Eagle (*Aquila heliaca* SAVIGNY 1809) in Serbia is at the verge of extinction at the beginning of the 21st century. Only 3-5 breeding pairs have remained. The unfavorable protection status is a result of very complex negative anthropogenous factors (shooting, degradation and loss of habitat, various forms of poisoning, disturbance etc.). This species is administratively protected by Ordinance on protection of natural rarities of Serbia from 1993. The present protection measures are monitoring and survey, protection of known breeding sites and recently also the protection of important hunting areas (pastures with Sousliks) in and nearby the protected areas (NP 'Fruška Gora' and SNR 'Deliblato Sands'). The activities on education and awareness raising included printing a poster and a leaflet, publishing several science-popular articles and making a scientific documentary 'Imperial Eagle'. The measures of suppressing the negative factors (shooting, disturbance, poisoning etc) are partially completed. The future of this species is uncertain due to the continuous negative trend caused by large-scale degradation, loss and insufficient conservation of the appropriate habitat.

Key words: Eastern Imperial Eagle, present status, conservation, Serbia

Introduction

In many areas of Serbia the Eastern Imperial Eagle was, in all probability, common (widely distributed and relatively fairly abundant) species until the second half or end of 19th century. According to the few existing data, it is known that the species used to be common breeding bird in the areas of Srem, Banat and Bačka, Mačva, area of Niš and Vranje etc. (ETTINGER 1857, OSTERREICH *et al.* 1878, DOMBROWSKI 1895, RAŠKOVIĆ 1897, KUHN 1898, RAJZER 1904). There is more data on this species in various ornithological reports and papers from the first half of 20th century. In that period this species used to be observed in breeding periods and on nests in numerous localities throughout Serbia (Fruška Gora, Obedska Bara and other parts of Srem, Bačka, Deliblato Sands, valleys of Velika and Južna Morava, areas of Aleksinac,

Niš, Vranje, Preševo, at Vlasina and several localities at Kosovo and Metohija (GENGLER 1920, REISER 1939, MATVEJEV 1950, MARČETIĆ, MEDAKOVIĆ 1954, MARČETIĆ 1957, MARČETIĆ, ANDREJEVIĆ 1960). Its gradual disappearance from certain areas and reduction in population numbers started in late 19th or early 20th century (RAJZER 1904). The large reduction of the population happened after the World War II (MATVEJEV 1964, ANTAL *et al.* 1969) due to direct shooting and killing, degradation of habitat (loss and decrease of living space), various types of poisoning, disturbance, nest robberies etc. In the late 1970s and early 1980s this species became quite scarce (HAM 1977, 1980, VASIĆ *et al.* 1985, HAM, PUZOVIĆ 2000). Its dramatic disappearance from the last known sites happened in the 1990s and early 2000s (PUZOVIĆ,

STEFANOVIĆ 2002, VASIĆ, MISIRLIĆ 2002, GRUBAČ 2002, PUZOVIĆ *et al.* 2003). Therefore at the end of 20th century and beginning of 21st century this species was at the very verge of extinction.

The first tasks on the active protection of Eastern Imperial Eagles in Serbia had started at the end of 20th century, when the Institute for Nature Conservation of Serbia included the species in the list of priority species for protection and at the same time started the first concrete actions on protection (PUZOVIĆ, STEFANOVIĆ 2002, VASIĆ, MISIRLIĆ 2002, GRUBAČ 2002). During the last decade these activities were more or less intensified.

This paper includes a short overview of the modern status of Eastern Imperial Eagle (distribution, present state of population and trends), threats and problems as well as measures and activities on conservation and protection in the period 1996-2009, particularly in the last decade (2000-2009).

Material and Methods

The materials included all available published and unpublished data collected by the author and other ornithologists and field assistants. All the available literature and other data were critically analyzed in order to avoid any possible mistakes in identification of this species in the field, which was particularly pronounced in the papers by MATVEJEV (1950) and VASIĆ, MISIRLIĆ (2002).

Results and Discussion

Distribution and numbers

Two to three breeding pairs/territories have been known at Fruška Gora in the period 2003-2009. The breeding cycle was regularly monitored in this area in the period 2003-2009. Two of the breeding pairs have disappeared from the area in 2000-2001 (PUZOVIĆ, STEFANOVIĆ 2002) and probably another one in 2008-2009. According to various reports and questionnaires there are sporadic observations of pairs in central Serbia (Mt Pasjača), at Kosovo (Pasjane near Gnjilane) and in Vojvodina (one adult near Šid, two near Vilovo near Titel), and it is possible that they have been breeding in recent years at unknown sites. According to questionnaires one pair

and a juvenile bird have appeared almost regularly at the feeding place at G. Starac in Pčinja Valley during the season 2008-2009. It is assumed that these birds regularly fly in from Macedonia, where they probably nest in vicinity of Serbian border. There are several documented observations of birds of various ages, non breeding birds or without proof of breeding, at various known historical and former breeding areas in Vojvodina and Serbia – Deliblato Sands, vicinity of Vršac and Vršačka Hills, Obedska Bara and valleys of the rivers Sava and Tisa etc (ŠĆIBAN 2004, STOJNIĆ 2004, PROBST *et al.* 2005, RADIŠIĆ *et al.* 2007, GERGELJ 2008, HULLO, HORVAT 2008) (Fig. 1, Table 1). Most juvenile birds arrive from Slovakia and Hungary during the autumn migration, as shown by the records of banded birds (three from Slovakia and one from Hungary (STOJNIĆ 2004).

Population estimates

There are no population estimates for the period before 1970s. According to PUZOVIĆ, HAM (2000) there were 16-24 breeding pairs in Serbia in the period 1977-1996. There were only 3-5 breeding pairs in the whole of Serbia during the period 2003-09.

Trends

The Imperial eagle in Serbia is presently on the verge of extinction. The population numbers of this species were greatly reduced in the 1980s and the range shrank to several smaller isolated breeding areas (PUZOVIĆ, HAM 2000); in the 1990s the species disappeared from Deliblato Sands and certain areas in Central and Southern Serbia and Kosovo and Metohija; the decreasing trend continued in recent years (2000-2009).

Threats and conservation problems

Shooting was probably one of the main causes of disappearance of this species both in the past and in the more recent period – during the 1990s (PUZOVIĆ, HAM 2000, VASIĆ, MISIRLIĆ 2002). At least five to six individuals were killed or wounded in the last decade (within the period 2001-2009).

Degradation and loss of habitat are generally the largest challenges for the conservation of this species, as large areas of land are used in agriculture and for other purposes (intensive soil disturbance, monocultures, uncontrollable use of various chemicals etc.). Pastures are ploughed or degraded.

In the most recent times, there is a large problem of removal of grass and soil from the pastures in the broader area of Fruška Gora in order to make lawns. The habitats are also degraded by building of various roads and stone quarries, spread of existing settlements, construction of villas and other objects

without a spatial plan or any agreement with the principles of nature conservation. Forests and old trees (used as nest sites by this species) have been cut down (PUZOVIĆ, STEFANOVIĆ 2002). The steppe is subjected to afforestation (for example at Deliblato Sands) (HAM 1980).

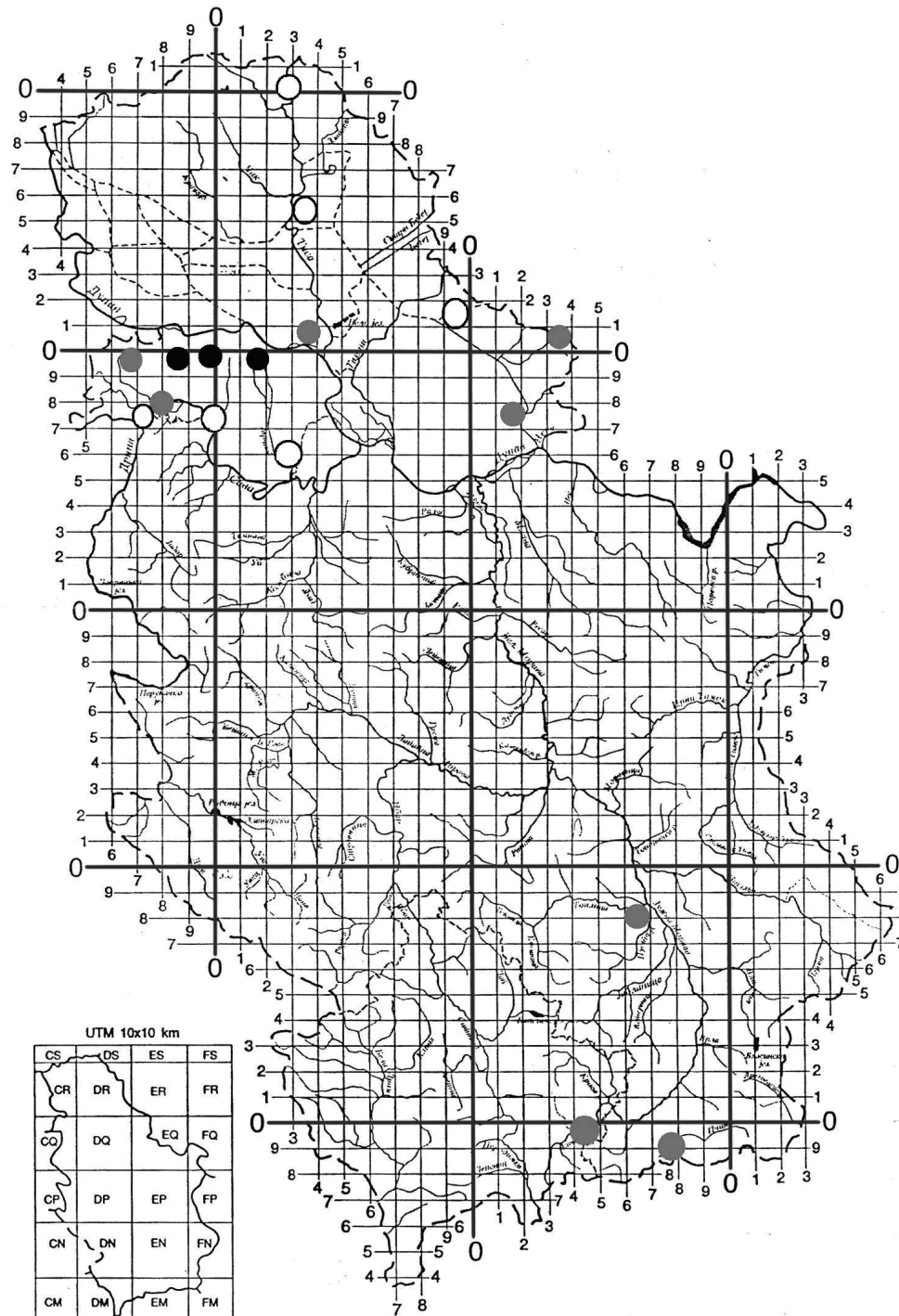


Fig. 1. Overview of records and observations of Eastern Imperial Eagle in Serbia in the period 2003-2009 (● – Recorded nests; • – Possible breeding and recorded while foraging, dispersing or migrating, ○ – Records of young (juv./imm.) birds in migration or dispersion)

Table 1. Overview of the most recent records and observations of Eastern Imperial Eagle in Serbia in period 2003-2009 (selected data)

Locality/site	Date	No. of ind.	Comment	Source of data
NP "Fruška Gora"	2003-2009.	2 – 3 pairs	2-3 known breeding territories	B. GRUBAČ & N. STOJNIĆ
Vicinity of Šid, Fruška Gora	May 2006.	1 ad.	No proof of breeding	G. SEKULIĆ
Deliblato, Deliblato Sands	Single birds, last in July 2007.	1 ad.	No proof of breeding	PROBST et al. 2005, V. STEVANOVIĆ
Mali Rit –Vršačke Mts	May 1 st , 2008.	1 subad.	Probably no breeding	M. VUČANOVIĆ
Konak-Stari Lec	2003, Late September	1 juv.	Dead , originated in Hungary	STOJNIĆ (2004)
Vilovo – Titelski Breg	July 10 th , 2008	1 ad + 1 imm.	No proof of breeding	N. STOJNIĆ
Slano Kopovo	October 2007.	2 juv.	(on migration)	N. STOJNIĆ
Kapetanski rit near Kanjiza	January 2009	1 juv		GERGELJ (2008)
River Sava, near Sremska Rača	September 4 th , 2004.	1 juv. male	From Slovakia, caught in a river	
Zasavica	September 21 st , 2006.	1 ind.	In movement (dispersing or migration)	M. RUŽIĆ, RADIŠIĆ et al. 2007.
Ašanja, Obedska Bara	September 27 th , 2005.	1 juv.	Originated in Slovakia, caught in poor condition, died	N. STOJNIĆ
Village Drenovac, Šabac	February 18 th , 2008.	1 juv.	Originated in Slovakia, caught wounded	B. GRUBAČ
Crnatovo, Pasjača	August 2 nd , 2006.	Pair	Possible breeding	B. MARKOVIĆ
Gornji Starac – Rujen Mt.	Autumn 2008 – spring 2009	One family (pair + 1 juv.)	At the feeding place; possible breeding at the Macedonian side of the border	S. STANKOVIĆ
Near Pasjane, Gnjilane, Kosovo	April 2004	2 ind. (pair)	Possible breeding	B. STEVIĆ

There is a very pronounced decrease in the amount of main food sources (European souslik *Spermophilus citellus* LINNAEUS 1766, game animals and other wild animals, livestock carrion) in many places due to degradation and habitat loss, over-hunting of game animals, decrease in extent of extensive (semi-nomadic) livestock husbandry and the prescribed veterinary measure of removal of dead animals etc.

There is a high possibility that numerous Eastern Imperial Eagles have been poisoned during the vari-

ous actions of pest (rodent, carnivore etc.) poisoning and due to the uncontrolled use of chemicals in Serbia after the World War II, although there is no evidence or proof. There are also no definite proofs but only indications on poisoning of Imperial Eagles in Serbia in recent periods. PUZOVIĆ, STEFANOVIĆ (2002) cite that one adult Imperial Eagle was probably poisoned in the spring of 2001 at the slopes of Fruška Gora with chemicals used in agriculture. It is also suspected that one young bird of this species might have been poisoned near Obedska Bara during

2005. Poisoning of rodents (hamsters, voles etc.) is present in a smaller or larger extent depending on the sizes of their populations in the broader area of the Fruška Gora edges as well as in the other areas of Vojvodina and Serbia. Numbers of occasional and local bouts of illegal poisoning of carnivores and feral dogs has been increasing in Serbia in recent years, representing a threat for the necrophagous species, including the Imperial Eagle. Indirect poisoning and contamination is possible through the food chain, due to uncontrollable use of pesticides, artificial fertilizers and other chemicals. SUTENS, VAN GROENENDAEL (1967) have recorded three cases of infertility (two clutches were proven to be sterile) in Imperial Eagles from Vojvodina (Fruška Gora) during the studies in 1964 and 1967. They believed that these were the consequences of overuse of chemical substances.

According to STOJNIC (2004) there are two known cases (1 juv + 1 subad) of Imperial Eagles being killed by motorized vehicles while standing or flying around the roads (in 2003 and 2004).

There is very little available data on the electrocution-related problem in Serbia. According to the questionnaire, one bird of this species was found dead during the 1970s. It remains a potential threat due to the presence of a large-scale network of high-voltage power lines (as well as other types of power lines) throughout the country, without any special control by the Ministry of Environment and Spatial Planning. However, the data gathered in other European countries – such as Hungary, Slovakia, and Russia, shows that the impact of power lines on the Imperial Eagles is a serious threat to the species.

Large-scale disturbance used to be present in the past through the 1990s due to various working activities (in agriculture, hunting and forest husbandry and timbering), traffic and other miscellaneous activities (HAM 1984, PUZOVIĆ, STEFANOVIĆ 2002). This threat is probably present recently as well, but to a smaller extent.

War activities, economic and socially-political crisis and transition represent both direct and indirect negative factors for this and other species in Serbia. During the bombing of Serbia in 1999, at least three breeding pairs (at NP “Fruška Gora” and vicinity of Pasjane near Gnjilane) were subjected to large-scale disturbance. According to B. Stević (pers. comm.),

the pair at Pasjane has deserted their nest when several tomahawk projectiles fell at about 500 m from the nest. The socio-economic crisis and transition had increased the habitat degradation, shooting and other negative forms of human impact. The final consequences are the insufficient or reduced protection measures and activities in conservation of this species and its habitats.

Conservation measures and activities

The Eastern Imperial Eagle was protected for the first time by the Hunting Law in 1950. This species was recently protected as a natural rarity by the Law on Nature Conservation and the Hunting Law, since 1993.

The first active measures of protecting the nesting sites and habitats took place in the late 20th century (HAM 1980, PUZOVIĆ, STEFANOVIĆ 2002). All the known breeding sites of the three pairs at Fruška Gora are protected presently. During the breeding period it is forbidden to cut trees and perform other activities within about 500 m from the nest. The protection of the main hunting areas (pastures with sousliks on slopes of Fruška Gora) is in the preparation phase (presently the active protection of these places is insufficient and inadequate). The pastures overgrown with thorn bushes are regularly cleared at SNR Deliblato Sands in order to preserve the appropriate habitat. 30 ha were cleared in 2004-5.

In the territory of Serbia there are 9 permanent and temporary feeding places established in order to protect the threatened vulture and eagle species. The activities in the feeding places in the area of Fruška Gora (since 2003), valley of Pčinja (since 2005) and Vršачke Mts. (since 2007) are very important for Imperial Eagles. The presence of Imperial Eagles was observed or expected at these feeding places. There are plans for building some additional feeding places, in order to create better conditions for the foraging of Imperial Eagles and other species (particularly during the winter period and the critical periods when food is lacking).

During the last several years there were several published articles on the present state and conservation of Eastern Imperial Eagle populations (HAM 1982, STEFANOVIĆ 1996, GRUBAČ 2002). In 2003-2004 the lectures and presentations on the present state and conservation of Imperial Eagles were organized

in Novi Sad, Niš etc. There were also several TV reports on conservation of Imperial Eagles at Fruška Gora. One poster and one leaflet were published in 2003-4. There were several projections of science-popular DVD film 'Imperial Eagle' by B. Grubač (organized cinema projections in several cities and towns in Serbia, as well as on several TV channels) in the period 2004-2009.

The first detailed study and monitoring of Eastern Imperial Eagle in Serbia started in the late 1970s as studies of Imperial Eagles at Deliblato Sands and Fruška Gora (HAM 1980, 1984, PUZOVIĆ, STEFANOVIĆ 2002, VASIĆ, MISIRLIĆ 2002). In the recent period (2003-09) the regular monitoring of all known nests is performed three times during the breeding season. There are also irregular surveys and studies of the potential nest sites, as well as the regular monitoring of some of the important habitats (souslik colonies) and feeding places.

The first interventions by the rescuing of injured Eastern Imperial Eagles or those unfit for life in the wild, guarding of their nests and other interventions have started only in the recent period (PUZOVIĆ, STEFANOVIĆ 2002). All four birds of this species found in poor condition (starving, wounded, sick etc.) during the period 2003-2008 were captured and transported to the Wildlife Rescue Center at the Zoo in Palić, in order to be medically treated and rehabilitated. Two young Imperial Eagles (originating in Slovakia) had completely recovered and were released back into the wild during 2004 and 2008. The interventions are undertaken by ornithologists from the Institute for Nature Conservation of Serbia in collaboration with other institutions and organizations.

Forty Imperial Eagles were ringed in Yugoslavia (probably all or most of them in Serbia) in the period 1953-1996 (IVOVIĆ 1997). Two young Imperial Eagles were also ringed at the nest in NP "Fruška Gora" in 2003.

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Conclusion

The Eastern Imperial Eagle is on the verge of extinction in Serbia at the beginning of the third millennium. The several (3-5) existing pairs do not guarantee the survival of the species. It is necessary to implement special and intensified conservation measures and activities – suppressing the negative factors (shooting, poisoning, disturbance etc), habitat conservation (breeding sites and main hunting areas), monitoring and survey, education, feeding places etc. The preliminary conservation measures and activities, implemented in Serbia (particularly in the area of NP Fruška Gora) in the period 2003-2009, give us hope for the survival and recovery of this species in the future.

The survival and recovery of Eastern Imperial Eagle in Serbia is dependent on conservation at the national and international level (in the region of southeastern Europe). In order to protect this species in Serbia it is necessary to raise the level of national protection, demanding much greater efforts (strict measures of active protection), as well as financial and other forms of participation. The conservation and influx (migration and dispersion) of young birds from Slovakia and Hungary and in other countries of the Balkans is also very important for the survival and recovery of populations in Serbia and other countries of this region.

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Съвременно състояние и опазване на Източния Царски орел (*Aquila heliaca*) в Сърбия

Б. Грубач, Н. Стойнич

(Резюме)

В началото на 21-ви век Източният Царски орел (*Aquila heliaca* SAVIGNY 1809) в Сърбия е пред изчезване. Останали са едва 3-5 размножаващи се двойки. Неблагоприятният статус на защита е резултат от много комплексни негативни антропогенни фактори (острел, деградация и загуба на местообитания, отравяне, безпокойство и др.). Видът е административно защитен от Наредбата за Опазване на Редките Природни Богатства на Сърбия от 1993. Настоящите мерки за защита включват мониторинг и проучване, опазване на известни гнездови територии, а напоследък и опазване на важни ловни територии (пасища с лалугери) в и в близост до защитени територии (НП „Фрушка гора“ и резерват „Делиблатски пясъци“). Дейностите за образование и повишаване на осведомеността включват отпечатване на постер и дигитална, публикуване на няколко научно-популярни статии и изготвяне на документален филм „Царският орел“. Отчасти се изпълнени дейности по елиминиране на негативните фактори (острел, безпокойство, отравяне и др.). Бъдещето на вида е несигурно поради продължаващата негативна тенденция, дължаща се на масова деградация, загуба и недостатъчно опазване на подходящите местообитания.