

Conservation strategy of the Saker Falcon (*Falco cherrug*) in Bulgaria

Petar Iankov & Dimitar Gradinarov

Bulgarian Society for the Protection of Birds

ABSTRACT—Saker Falcon is currently threatened with extinction in Bulgaria. Nest robbing is considered to be amongst the main reasons for this, although a complex of other negative factors, affecting its habitats and sites have possibly additional causes. Different visions exist about how to reverse this negative trend. The conservation strategy on Saker of Bulgarian Society for the Protection of Birds (BSPB) is presented. The concept is based on: (1) current status of the species in the country (2006–2010); (2) the situation and trends of Central and Eastern European Saker populations; (3) the natural and socio-economic conditions in Bulgaria and (4) the results of previous conservation actions in Bulgaria. Out of the possible strategies the support of natural recolonization of Sakers in Bulgaria was considered as the most feasible. It lacks any risk of genetic interference to the wild Saker population (including those of the rest of Central and Eastern Europe) inevitable during a restocking programme. During the period 2006–2010, the presence of 2–9 pairs were assumed in Bulgaria, although no breeding was confirmed. The number of Sakers in Bulgaria during the study period was relatively stable, however lower values were observed in 2010. The conservation strategy was based on the following facts: (1) Saker populations in Hungary and Serbia are increasing; (2) juvenile Sakers as stragglers appear regularly in South-Eastern Europe; (3) Sakers are currently changing their traditional nest sites (cliffs and trees) to electricity pylons in the neighbouring countries. BSPB accepted to support the natural recolonization of the species through a variety of measures on habitat, site and species, especially by providing opportunities for the species to nest on high voltage pylons by installing artificial nest boxes.

Key words: Saker, *Falco cherrug*, state, conservation, strategy, Bulgaria

Correspondence: Petar Iankov, BirdLife Bulgaria/BSPB, BG-1111 Sofia, P.O.B. 50; E-mail: petar.iankov@bspb.org

Introduction

Relatively common at the end of 19th Century in Bulgaria, the Saker Falcon (*Falco cherrug* Gray, 1834) had been declining dramatically until the mid 20th Century (Patev, 1950), which was followed by a slight increase after 1970, reaching 20–40 pairs by about 1980 (Michev & Petrov, 1985). Population estimates indicated that around 1985 an accelerated decline started again, coinciding with the intensification of illegal nest robbing activities (National Bird Databank with BSPB). At the beginning of the 21st Century a population decline of about 50% was reported in comparison with 1980 (Ruskov *et al.*, 2007). The last occupied nest was recorded in 2006 and in spite of a number of indications for nesting during the following years, no confirmed breeding exists since. Nest robbing is considered to be one of the main reasons for the decline after 1985, although a complex of other negative factors (large-scale changes in land use, transformation of key habitats, worsening of

Year	Numbers of records	Number of sites involved				Estimated pairs
		Total	Possible	Probable	Confirmed	
2006	34	19	10	5	4	6
2007	23	16	9	5	2	6-7
2008	44	17	9	6	2	7-8
2009	42	20	9	9	2	9 (min.)
2010	43	22	12	8	2	9

Table 1. Numbers of Saker Falcon in Bulgaria during the breeding periods 2006–2010 (for definitions see *Sharrock, 1976*)

food supply, disturbance, poisoning, electrocution and direct persecution) have possibly an additional negative effect (*Iankov et al, 2013*). For the period 2006–2010, the Bulgarian population was presumed to be 5-9 pairs with very probable breeding of at least 2 of them. Numerous observations of both single individuals and pairs indicate that, according to IUCN criteria (*IUCN, 2001*), the Saker cannot be considered as extinct for Bulgaria (cf. *Ragyov et al., 2009*).

There are different visions about how to halt species decline and prevent extinction of Saker from Bulgaria, reflecting in various conservation actions. Most of them are carried out by BSPB as components of a complex approach, which includes functionally connected actions to improve the habitats and key sites required by the species, as well as activities to support natural recolonisation. Some actions have been executed by other NGOs (Birds of Prey Protection Society, Green Balkans) and research institutes (Institute of Biodiversity and Ecological Research). In recent years, preparation for restocking started (*Ragyov et al., 2009*). All these activities urge the preparation of a national level conservation strategy of Saker Falcon.

Current status of Saker Falcons in Bulgaria (2006–2010)

A total of 186 Saker records have been collected by BSPB between 2006–2010 by systematic surveys of the during the breeding period (Table 1).

On the basis of the available data presence of 6-9 pairs is presumed, with at least two of them breeding with very high probability (e.g. juveniles were observed after the nesting season in an area, where previously bird carrying food recorded), although no occupied nest has been located. Breeding records are affiliated to 36 different areas. The numbers of sites with Saker occurrence during the breeding season remains relatively stable and in most of the cases these are in approximately the same areas. Although the increase of survey efforts may have resulted previously undetected pairs, it is clear, that the 1985–2007 decline of the Saker Falcon in Bulgaria is halted in light of new data acquired (cf. *Iankov, 2010*).

The recent distribution of the Saker is shown in Figure 1. At some former breeding areas birds suddenly appeared after period of years absence. At other places individuals or pairs occur around traditional breeding areas, without occupying the known nesting sites. There are records of Sakers, appearing at previously unknown sites. Some birds and pairs disappear from areas where during the previous year they showed regular presence. At some such areas there were indications of illegal activities against raptors, which may be the reason for disappearance of the falcons.

The breeding season of 2010 was unusual: extreme wheatear events (flooding, long periods with low temperature, rain- and hailstorms, etc.) occurred frequently and at many places, including areas with records of Saker in previous years. In addition to human pressure rodents as potential prey are disappearing at an accelerating rate on sites of former Saker hunting grounds.

Between 2006–2010 Saker Falcons have been reported in agricultural lowland landscapes in increasing numbers to the expense of mountain records when compared to data of previous decades. The reasons for this phenomenon are not fully understood yet. One of the reasons may be a reduction of, and more difficult access to prey animals (rodents and birds) in mountain grassland due to overgrowing vegetation. Some potential competitors, such as Peregrine (*Falco peregrinus*), Golden Eagle (*Aquila chrysaetos*) and to some extent – the Long-legged Buzzard (*Buteo rufinus*) are also on the increase. Understanding the process is difficult as nearby breeding used to exist in the past between Saker and both Peregrine and Golden Eagle (Baumgart, 1966).

Saker is regular on passage across Bulgaria during autumn and spring migration and the post-breeding and post-fledging movements. During the last years this fact is confirmed by both visual observations and satellite telemetry. Dynamics of numbers during autumn migration around Burgas for a 32-year-long period (1978–2009) is presented in Figure 2 (Michev, Simeonov, 1981; Michev et al, 2004; National Bird Databank with BSPB).

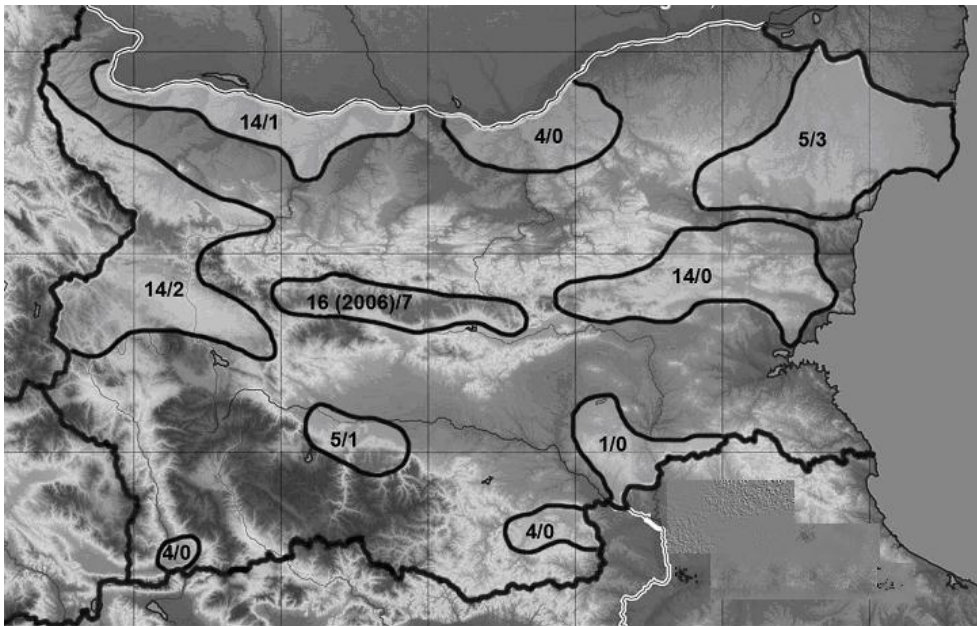


Figure 1. Distribution of the Saker in Bulgaria during the breeding period of 2006–2010 (records with breeding evidence/numbers of observations of pairs)

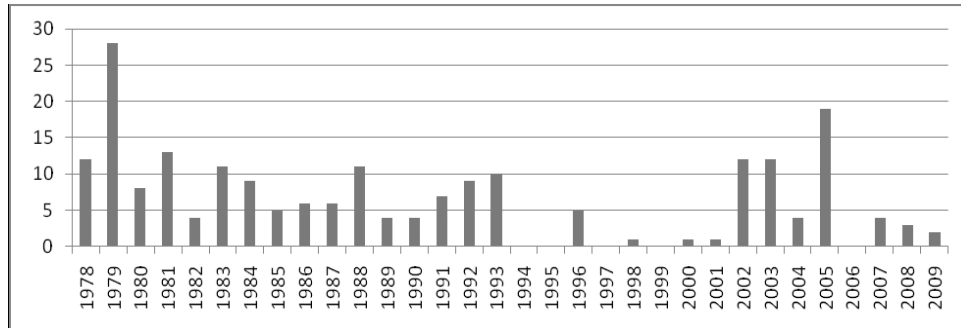


Figure 2. Dynamics of the numbers of Sakers, recorded during the autumn migration of the period 1978–2009 around Burgas

Sakers on passage have been recorded in both autumn and spring periods along the Black Sea coast and in other parts of the country.

In total 34 migrating Sakers were counted from several watch points in Southern Dobrudzha only for the period of 10 August – 30 October 2009. There are also 5 satellite-tagged juvenile Sakers from Hungary (out of 43 birds tagged) visiting Bulgaria during 2008–2009, one of which was staying for 36 days in an area of about 272 km² in North-Eastern Bulgaria, and another crossed the country three times.

Numbers of records show movements of individuals between Bulgaria and the neighbouring Serbia, Romania, Macedonia and Greece (both during the breeding season and outside the breeding period). In the light of the above mentioned migration records it is clear that Bulgaria is not just a destination of occasional migrants and stragglers of Sakers from Central and Eastern Europe and at least 40-50 Sakers occur annually in the country, including during the pre-breeding period.

Winter records are from both direct observations in the recent years and from published and unpublished information sources. Single birds and, occasionally, pairs (*D. Domuschiev, in litt.*), have been observed in Bulgaria during winter time in different years, sometimes even around known (Central Balkan, *D. Domuschiev, in litt.*) or possible (Western Balkan, *Stoyanov, 2005*) breeding sites. Most of the other records originated from mass wintering grounds of birds (*Donchev, 1980; Vatev, 1983; K. Bedev, in litt.; National Bird Databank with BSPB*): Shabla and Durankulak Lakes complex (15 records; with some individuals probably keeping there the entire winter), Burgas area (9 records; one bird observed regularly for a month – *K. Bedev, in litt.*), Sofia Plain (8 records), Trakia Lowland (5 records) and different inland sites (5 records).

In the absence of systematically collected data on the Saker it is not possible to conduct a scientifically sound analysis on population dynamics, causes for decline, etc. Without such a work available for Saker, any kind of conservation action planning in Bulgaria must be done with special precaution.

Socioeconomic aspects with relation to Saker status and conservation

Bulgarian economy started to boost by around 2000 after a 10-years collapse and it accelerated in 2006–2010. Transformation of pastures and other grasslands in the foothills and lowlands (important Saker's foraging areas) into arable land or orchards, intensified use of pesticides, establishment of wind energy parks, increasing pressure by recreational activity, etc. all cause a threat to Sakers, with trends unlikely to change in the near future. In contrast, revitalisation of agriculture and husbandry in the mountains has still not started, which would turn highland pastures back into suitable feeding grounds. An almost unlimited number of seemingly suitable breeding sites are still deserted in the absence of proper feeding grounds and due to high disturbance by tourists and sport activities.

Nest robbing occurs still regularly in Bulgaria. In the case of a successful breeding in 2006 initially with two chicks in the nest just one juvenile fledged, possibly due to nest robbing. Those species not exposed to nest robbing—such as Long-legged Buzzard (*Buteo rufinus*), Kestrel (*Falco tinnunculus*), Eagle Owl (*Bubo bubo*) and some other birds of prey—breed favourably in most former Saker breeding sites. Step-ladders and ropes have been found at several Saker sites. Breeding records and specific conservation activities, therefore, must be kept confidential.

Since 1985 keeping falcons as pets has increased in Bulgaria, with birds often taken illegally from the wild. Although falconry is not legal in Bulgaria the numbers of the birds of prey kept in captivity has sharply increased. The community of falcon owners is quite heterogeneous, which makes the necessary cooperation with them very difficult, although they expressed their interest in general for the preparations of a reintroduction programme (Ragyov *et al.*, 2009).

Pigeon fanciers may also have conflicting interests with the conservation efforts on wild Sakers. Illegal gambling with pigeon racing is on the rise since 2000 in Bulgaria. Putting poisoned baits to eradicate raptors near the breeding sites of Sakers were believed to be the act of those people carrying out such activities (Yankov & Gradinarov, 2009).

Since 2008–2009, production of biofuel crops is increasing to the expense of grain cultures; resulting in a lower breeding density of Skylarks (*Alauda arvensis*), Corn Buntings (*Emberiza calandra*) and other potential prey for Saker. On the other hand, some of the cultures, such as sunflower, attract prey species such as Turtle Dove (*Streptopelia turtur*) and Wood Pigeon (*Columba palumbus*), both favourite Saker prey items during the post-fledging and autumn migration period of Sakers. Eventual increase of different pigeon species in future may contribute to the improvement of the Sakers' food supply in the rest of the year, too.

Main Saker conservation activities in Bulgaria

Saker conservation has been supported by a number of general conservation actions (legal protection, protected areas, etc.) taken by Bulgarian state for many decades. Species oriented activities started in the 1990s by BSPB, Birds of Prey Protection Society, Green Balkans, Balkani Wildlife Society, including data gathering and monitoring, dealing with cases of nest robbing, proposing designation of protected areas, etc. Since 2000, an integral conservation approach has been implemented by BSPB, including large-scale projects for

improving Saker habitats, conservation of key sites and modern species oriented activities.

Saker conservation is appropriately dealt with in the new Bulgarian conservation legislation (Biodiversity Act, Act on Protected Areas, Hunting and Game Protection Act). Introduction of BirdLife International's concept of Important Bird Areas (IBA) in the country prepared the ground for the establishment of Special Protection Areas (SPA) under the EU Birds Directive. Official assignment of this task to BSPB by the government allowed adequate designation of sites in this network to fulfil conservation needs of the Saker. In total, 29 of the SPAs have Saker as designating species. This number has increased up to 63 with the recent update of the SPA forms under a recent BSPB proposal. The Ministry of Environment and Water was encouraged to establish a DNA fingerprinting protocol and active cooperation started with the Ministry of Interior and the Ministry of Agriculture and Food on bird crime and poaching issues.

Large-scale measures for improving the Saker habitats are underway in two key regions (Ponor-Western Balkan and Besaparski Hills) with the aim to encourage sustainable and nature friendly agriculture and livestock breeding, introduction of policies to reduce chemical use in Saker areas and incentives for the farmers to maintain their lands favourable for the Saker. Electricity companies started the insulation of some of the most dangerous power lines.

All large areas with former Saker nesting sites are under legal protection and in favourable condition for potential Saker nesting: Central Balkan National Park, Vrachanski Blakan Nature Park, Sinite Kamani Nature Park, Rusenski Lom Nature Park, etc. The protection of those former breeding sites within smaller protected areas without administration, management plans and budgets is less favourable. In spite of the undoubted conservation achievements, in the national network of protected areas does not provide sufficient protection for the species in general. They cannot provide the necessary low level of disturbance and protection against nest robbing, either.

Special species oriented measures include nest guarding (until 1997), annual surveys of Saker (since 2006), anti-poaching actions and, recently, installation of artificial nests. Installation of artificial nests started in Bulgaria in 2008 and until now 221 such nests have been installed on electricity pylons, trees and on cliffs in different parts of the country by BSPB and 11 by the Saker reintroduction project. For selection the sites BSPB applies the following criteria: existing records of Saker in the area, low level of human presence and lack of extreme activities, presence of similar raptor species in the area (as indicator for good foraging conditions), lack of indications for use of poisons, absence of pigeon fanciers in nearby villages, good food supply, lack of 20 kV power lines around, preferable low altitude and open terrain, which is easy to survey. Artificial nests are monitored regularly by BSPB for possible appearance of the species and for their environmental conditions. As a result, the installation regime of artificial nests was significantly refined in 2010. A protocol for cases when a Saker pair is recorded to occupy an artificial nest is underway. Out of the 196 nest boxes in 2009–2010 ca. 23,5% have been occupied by Kestrels, in a single case by Common Buzzard (*Buteo buteo*) and, possibly, by Hobby (*Falco subbuteo*). 'Hungarian' style roofed aluminium nest boxes appear to be the most effective. Their advantages are that they are nest robbing safe, being on 400 kV power lines; inaccessible for terrestrial predators; provide shelter to the birds under adverse weather conditions (hailstorm, pouring

rain); being deposited in the open they can be surveyed easily; unsuitable for breeding for Long-legged Buzzard; can be installed at selected sites where Golden Eagle, Peregrine, Eagle Owl and aggregations of Raven (*Corvus corax*) are absent; can be posted at suitable height with all advantages of the natural nesting site; nest guarding and providing supplementary food are applicable.

Just one year later Kestrels successfully bred in 75% of the 44 aluminium nest boxes installed in 2009. In Western Bulgaria their occupancy reached 94%. These facts show that any fear that artificial nests are 'ecological traps' has no grounds, similarly to the experience in Hungary (*J. Bagyura, M. Prommer, pers. comm.*). Monitoring aluminium nest boxes showed presence of prey animals in the areas around (Suslik—*Spermophilus citellus*, Grey Partridge—*Perdix perdix*, Turtle Dove, Wood Pigeon, etc.), and abundance of voles (*Microtus* spp.), Skylark, Corn Bunting, etc.; existence at the places of Brown Hare (*Lepus capensis*), Roe Deer (*Capreolus capreolus*) and other mammals indicates low level of human disturbance (full absence of disturbing activities such as extreme sports, entertainment gatherings, etc.). Installation of 106 additional nest boxes is planned while erecting artificial nests in trees will be discontinued.

Around 2003 development of wind energy parks started and affected several key Saker areas. In spite of initial success by preventing the establishment of such a park in the Balchik area, large territories along the migration flyway in North-Eastern Bulgaria had been covered by wind turbines, with some of them in important Saker foraging areas in South-Eastern Bulgaria. After a series of failed attempts to enforce the national and EU legislation for adequate protection of the SPAs, BSPB was forced to file a complaint in 2008 to the European Commission resulting in an infringement procedure against the Bulgarian government. In 2010 BSPB together with other NGOs and research institutes participated in the development of a map of sensitive areas for developing wind energy in Bulgaria within a project of the Ministry of the Industry, Energy and Tourism (*SER Report, 2010*). The measures implemented by BSPB as elements of an integral approach have been funded by various donors during the years, such as BirdLife International, RSPB, DEFRA (UK Government), UNEP, *Barbara* and *Mike Roberts*, and recently by BBC Wildlife Fund and by the Life+ Programme of the EU.

Along the conservation measures of Sakers in the wild, preparation for restocking activities started in 2006 by funding from the Environment Agency of Abu Dhabi, UAE and People's Trust for Endangered Species, UK (*Ragyov et al., 2009*).

Basic facts for developing a Saker strategy in Bulgaria

The following facts are of key importance for the Saker conservation strategy in Bulgaria:

- adult Sakers show fidelity to their nesting territory, juveniles roam long distances and they show a prominent migratory behaviour towards South from the breeding sites;
- Sakers may breed as much as 340 km away from the nest of their origin (*M. Vácz, pers. comm.*);
- the Saker population is increasing in Hungary, Serbia and Ukraine with an ongoing process of shifting towards electricity pylons in these countries (*Ham & Puzović, 2000; Akimov, 2009*);

- the migration route and dispersion range of Sakers from Central and Eastern European countries, including these with the largest European Saker populations (Hungary and Ukraine) reach Bulgaria;
- records show bilateral movements of Sakers in the border areas between Bulgaria and neighbouring Serbia, Romania, Macedonia and Greece (National Bird Databank with BSPB);
- no consistent and systematic data collection exists on Sakers in Bulgaria, including threatening factors; there is a clear deficit of information on the species in the country;
- Bulgarian Saker nests in the past used to show a clustered distribution, expressed by existence of several occupied nests in relatively restricted areas;
- although no confirmed breeding of Sakers is known in Bulgaria since 2006, between 2007–2010 the presence of Saker pairs have been confirmed, with multiple Saker records during the breeding period, therefore Sakers cannot be considered extinct as yet in the wild for Bulgaria;
- Saker records during the breeding seasons of 2006–2010 were on agricultural lowland areas;
- anthropogenic pressure is continuing to increase on natural sites, resulting in further reduction of suitable traditional territories for Sakers;
- former foraging grounds of Sakers are under drastic transformation all over the country; there is disappearance or visible significant reduction of some Suslik colonies along the southern foothills of the Balkan Range, until recently regularly used by several Saker pairs for foraging;
- populations of competitor species, such as Peregrine, Long-legged Buzzard, Golden Eagle, Eagle Owl and Raven are increasing in Bulgaria (Iankov, 2007);
- bird crime activities are still present in Bulgaria;
- the protected areas network, which includes a number of former Saker nesting sites is not a good enough alternative for saving the species due to the existing high level of disturbance and risk of nest robbing even inside protected sites;
- the national breeding population of Peregrine and Saker Falcon have been successfully increased in Hungary (J. Bagyura, M. Prommer, pers. comm.) by a complex of conservation measures including installation of artificial nests;
- 75% of the installed ‘Hungarian’ style aluminium nest boxes in Bulgaria were successfully used for breeding by Kestrels by the year following installation;
- the first Saker (adult male) was observed on October 12th, 2010 a few meters from one of the aluminium nest boxes installed by BSPB in Northern Bulgaria;
- successful restoration of the Griffon Vulture (*Gyps fulvus*) by supporting natural recolonisation and integral approach to threats and ecological needs (Iankov & Profirov 1991; National Bird Databank with BSPB) is a positive example;
- any mistakes while restocking certain game bird species in Bulgaria must be prevented during Saker conservation efforts;
- saving the Bulgarian population of Saker is only possible by an integral approach, including a complex of functionally connected conservation measures at the level of habitats, key sites and the species itself.

Assessment of the possible strategies in Saker conservation in Bulgaria

Two main strategic approaches exist currently for the conservation of Saker in Bulgaria: promoting natural recolonisation of the species (NRS) by conservation of wild birds and by supporting favourable natural processes and reducing negative factors affecting the species; and restocking the wild population by release of captive individuals (RCI). NRS focusses on redirection of already ongoing activities in order to optimise the conditions in the areas where Saker occurs and to help Sakers to move to electricity pylons and to safe lowland areas. RCI is envisaged to take place in a mountain rocky area of Central Balkan National Park (Ragyov *et al.*, 2009). In both cases the following basic factors must be taken into consideration:

1) *Correspondence between the level of knowledge on natural processes and on the impact of each threatening factor and the potential to reduce it:* The present level of knowledge on intrinsic factors and mechanisms for the decline of Sakers in Bulgaria, together with historical changes of the population is very low. Therefore, the precautionary principle requires minimising the level of active intervention, as well as careful selection of the concrete site of restocking, which gives NRS an advantage over RCI.

2) *Correspondence between the intervention level and the flexibility to modify the action in case it becomes necessary:* The inversely proportional correlation between the level of intervention and space for future modification means that NRS can be modified much easier during implementation when compared with RCI.

3) *Functional complexity of the activity:* NRS aims to achieve a complete system of conservation measures, including legislation and policy work, habitat and site oriented measures, as well as public awareness and educational activities. When RCI is applied, inevitably, consecutive conservation measures must be introduced in the area of action since release of wild falcons may not be sufficient by itself to establish or reinforce a wild population in a long term.

4) *Sustainability of introduced measures:* Since NRS relies largely on natural processes higher sustainability is expected while sustainability remains highly man-dependent for RCI.

5) *Ability to monitor conservation outputs or correcting actions:* Monitoring may be similarly difficult during NRS or RCI within complex mountain ranges, while it is easily achievable during NRS in the lowland.

6) *Learning from previous experience of similar activities in Bulgaria:* The positive results with natural recolonisation of Griffon Vulture in Eastern Rhodopi and problems occurred while releasing captive-bred game birds of several species in Bulgaria give advantages to NRS over RCI.

7) *Ability to prevent genetic interference to the falcons in the wild:* RCI requires very high level of precaution, while no such risk exists with NRS.

8) *Ability to prevent introduction of infectious agents and atypical behavioural traits in the wild:* Since RCI inevitably involves the use of Sakers from other countries and a period of keeping them in captivity it poses some risk by potential introduction of infectious agents exotic to the region in spite of every prevention measure. Theoretically, unwanted behavioural or ecological traits that are not typical for the local population may also be introduced with the new birds. No such risk exists for NRS.

9) *Consideration of possible negative impact on Saker populations taken from the wild:* Taking Sakers from wild populations may reduce viability of the donor population through the loss of individuals, which may only be a problem during RCI.

10) *Ability to prevent or reduce natural predation:* Prevention or reduction of the impact of natural predators (e.g. Eagle Owl, Stone Marten /*Martes martes*/) is more difficult in mountain rocky terrain during RCI or during NRS actions near traditional Saker sites. Risk is much lower and prevention is easier during NRS actions in the lowland.

11) *Risk of food shortage and ability to reduce it:* Food shortage may occur during both approaches, but organising supplementary supply of food is easier in lowland areas giving some advantage to NRS. This risk may be negligible also for RCI if the released falcons use foothills or lowland for hunting, similarly to historical populations.

12) *Ability to reduce natural competition with other raptor species:* Equal for RCI and NRS in the mountain areas (where potential natural competition exist with Golden Eagle, Peregrine, Eagle Owl and Long-legged Buzzard), but there is very little potential competition in the lowland areas with artificial nests (Long-legged Buzzard being a potential species), which gives advantage to NRS.

13) *Prevention of secondary poisoning:* It is equally important during RCI and NRS.

14) *Reduction of impact of pigeon fanciers:* A factor probably equally significant both during RCI and NRS, this type of risk can only be reduced by an efficient dialogue with pigeon fanciers and by further improvement of law enforcement.

15) *Prevention of nest-robbing:* This is easier during NRS, given the protective effect of high voltage electricity power and easier guarding of the nest boxes positioned on high voltage electricity pylons.

16) *Prevention of electrocution/collision with powerlines:* Possibly similarly important during RCI and NRS.

17) *Raising public awareness for proper conservation measures:* RCI has a higher public awareness potential but overemphasising the importance of captive breeding and restocking may overshadow the necessity of integral measures for the conservation of the species, its sites and habitats.

18) *Wise use of financial, material and human resources:* RCI, similarly to any reintroduction/restocking programmes is expensive, which poses NRS in a better position with respect to the effectiveness of the use of the restricted conservation resources in Bulgaria.

Approach of BSPB toward an effective conservation strategy

Based on the above facts and considerations, natural recolonisation of the species (NRS) is the accepted strategy of BSPB as the most adequate approach for Saker conservation. It is considered to be the best choice as it includes an already existing integral complex of measures aiming at issues of habitat, site and species.

Important element of the strategy is the understanding that in the long term Saker has better chances to survive if its adaptive potential would be directed to inhabit agricultural landscapes rather to rely entirely on remote wild areas. To reduce the impact of the considerable threat of nest robbing, nest boxes on the high voltage electricity pylons seems to be the only relatively safe alternative. The NRS strategy lacks any risk of genetic intervention with wild Sakers.

As the main resource for the natural recolonisation of Sakers the tens of individuals are considered, which occur in the country all year round. Their numbers are increasing during the periods of dispersion and migration, when birds from other parts of the Central and Eastern European Saker populations visit Bulgaria. Higher numbers of Sakers during the pre-breeding period is a precondition for some newly formed pairs to find appropriate conditions and to remain for breeding. The results of hitherto prevailing conservation actions in Bulgaria show that 'Hungarian' style aluminium nest boxes provide all necessary conditions for successful breeding of Kestrels. In spite of the existing significant differences between the two species, this is clear indication that the areas in question provide suitable conditions for the Saker. Furthermore, the existence of numerous Kestrel pairs along power lines (often at a few hundred meters from one another) provides opportunities for additional food supply for Saker by cleptoparasitism.

A natural recolonisation will obviously take a longer time since birds need to get familiar with the artificial nest first, to occupy it, to find a mate and hunting grounds, etc. At the same time it will allow more time for steering, preventive or correction actions, which is not possible with a 'faster' approach. Any risk of possible genetic intervention with wild European Saker populations is fully eliminated as another important advantage. This approach will be in full compliance with any new pieces of knowledge acquired on the genetics of Saker and other large falcons. Insufficient knowledge on the relevance of each of the threatening factors, the intrinsic mechanisms of their impact on saker population, have minor importance with NRS as it relies on natural regulation mechanisms.

A limiting factor for the NRS strategy is the critically low number of Sakers during the breeding period in Bulgaria. With such a long distance straggler and mobile species and with proven population exchange with the most numerous European national populations, its role should not be overestimated. The restoration of the Bulgarian population of Griffon Vulture by natural recolonisation from just one breeding pair in 1978 (*Michev et al. 1980*) up to 38 successfully breeding pairs in 2009 (*M. Kurtev, pers.comm.*) is promising to succeed with Saker Falcons, too.

Requirements for future Saker Falcon conservation activities

In the future the continuation and optimisation of the ongoing integral complex of conservation activities has a critical role for both preservation of the Saker in the wild and for eventual restocking activities. On legislative and law enforcement level they should include preventing the possible liberalisation of some of the acts, measures against nest robbing and other forms of bird crime, enforcing DNA fingerprinting protocol, actions against poaching, etc. Continuation of the policy level measures is necessary to further 'greening' the national agricultural policies, financial instruments and practices in favour of Saker and other endangered species. On the level of preservation of favourable conditions of habitats halting the process of transformation of pastures and other grasslands should be a priority. On the level of preservation of key sites adequate regimes for SPAs should be ensured and properly reflected in management plans drafted in the future. Financing and effective implementation of these plans will have a critical role for achieving their goals. It is possible to increase the efficiency of Saker preservation by creating new protected areas under national legislation and optimising and enforcing the regimes of already existing ones. Sys-

tematic measures should continue to reduce significant threats, such as electrocution, use of poisoned baits, nest robbing and others. On species level, provision of artificial nests, supplementary feeding, as well as nest guarding are still actual measures.

In the conservation of wild Sakers the following requirements are obligatory (they affect mostly the artificial nests activities as the most prominent human intervention):

1. To dispose artificial nests for Saker only at sites with no visible indications for any threat to the pair eventually occupying the nest;
2. To annually monitor the artificial nests and the conditions around it and to take appropriate measures in case of any threat identified to wild Sakers;
3. In case the artificial nest is occupied by Sakers initiate a complex array of measures planned in advance to ensure safety and successful breeding of the pair;
4. In case a significant threat to Saker is identified at an artificial nest, and the threat cannot be eliminated, the nest must be repositioned within the shortest possible time;
5. At any occupied Saker nest no action of any kind, imposing a risk of nest abandonment must be taken (approaching the nest, taking samples, photography, etc.); this measure must be in force until the numbers of breeding pairs is below ten pairs in the country.

As a significant human intervention, a future restocking programme must correspond to the following criteria:

1. To use only birds originating from Central and Eastern European populations;
2. Damage to the wild donor population should be minimised;
3. Only saker falcons with no sign of hybridisation and lacking any genetic elements uncharacteristic for the species should be used, as approved by independent experts;
4. Only those organisations or institutions signatories to an official and public agreement on the commitment and clear responsibilities of participants in the project;
5. All individuals used in the reintroduction must be checked genetically and reliable individual markers for further identification should be established.
6. Reintroduction must not take place in a radius less than 20 km from existing or presumed nesting sites.
7. In areas, where ongoing direct *in-situ* Saker conservation activities are in place by other projects, reintroduction actions can only take place if officially coordinated with the organisation executing the *in-situ* action, and vice versa.

Initially the programme was announced as reintroduction (*Ragyov et al., 2009*) but since the Saker is not considered fully extinct as yet and because of other reasons the Bulgarian government supported it as a restocking project. Therefore the term 'reintroduction' should be considered also as 'restocking'.

Acknowledgements

The Bulgarian Saker Falcon conservation strategy of BSPB would not be possible without the participation, scientific input, support and collaboration of many institutions, organisations and individuals from Bulgaria and abroad. BSPB/BSPB is deeply grateful to all above mentioned sponsors of the Saker conservation activities, to the list of which, respectable organisations as BirdLife International, RSPB and MME/BirdLife Hungary should be added.

Most significant contribution was received by the BSPB experts, staff members and volunteers through the 20-th years history of the organisation: †*Dr. Anton Antonov, Anton Kovachev, Asen Ignatov, Barbara Cross, †Bob Scott, Boris Barov, Boris Belchev, Borislav Tonchev, Chavdar Nikolov, Cymbre Baseley, Daniel Mitev, David Baseley, Deyan Duhhalov, Dimitar Demerdzhiev, Dimitar Georgiev, Dimitar Plachiyski, Dimitar Vladimirov, Dimitrinka Atanasova, Dobromir Dobrev, Elena Andonova, Eleonora Ilieva, Emil Dzhuninski, Emil Todorov, Gabriel Martin, Galya Nikolova, Georgi Gerdzhikov, Georgi Gruev, Dr. Georgi Popgeorgiev, Georgi Vlaev, Gerasim Gerasimov, Gordyn Ramelot, Grigor Penev, Prof. Hans Jornvall, Hristo Gurdov, Hristo Hristov, Hristo Valchanov, Jean-Mark Mitterer, Iliyan Iliev, Ilcho Kolev, Irina Mateeva, Iva Ivanova, Iva Lalovska, Ivan Dinchev, Ivan Kremov, †Dr. Ivan Mitev, Ivaylo Angelov, Ivaylo Dimchev, Ivaylo Ivanov, Kalin Velez, Kamelia Dimitrova, Kamen Ruskov, Kary Nachev, Kostadin Georgiev, Krum Kosharevski, Lyubomir Profirov, Maria Deridzhan, Marin Kurtev, Marko Ivanov, Mehmed Hasan, Milko Dimitrov, Mike Roberts, Mila Alexandrova, Milen Marinov, Minko Madzharov, Mihaela Ilieva, Mihail Iliev, Mladen Vasilev, Mladen Gramatikov, †Maurice Waterhouse, Nedyalka Ivanova, Dr. Nikolay Petkov, †Nikolay Stefanov, Nikolay Terziev, Petar Mateev, Peter Hetz, Radoslav Moldovansky, Rosen Ivanov, Rosen Shterionov, Rusi Mirchev, Ruslan Nedyalkov, Sasho Vasilev, Sergey Dereliev, Sergey Panayotov, Simeon Gigov, Stamen Stanchev, Stoyan D. Nikolov, Stoycho Stoychev, Svetoslav Spasov, Svetoslav Stoyanov, Svilen Cheshmedzhiev, Sylvia Barova, Sylvia Dyulgerova, Tanya Valchanova, Teodor Hristov, Teodora Ivanova, Tichomir Tenkov, Todor Todorov, Valentin Katrandzhiev, Valya Angelova, Velislava Spasova, Vladimir Alexandrov, Vladimir Dobrev, Volen Arkumarev, Yana Barzova, Yordan Ivanov, Yordan Hristov, Zhivko Barzov.*

Valuable data and expertise were received from ornithologists in research institutes and universities: *Dr. Stoyan Ch. Nikolov* and *Assoc. Prof. Tanyu Michev* (Institute of Biodiversity and Ecological Research), *Dr Petar Shurulinkov, Dr Stefan Donchev, Dr Bozhidar Ivanov, Dr Boris Nikolov, Georgi Koshev* (Institute of Zoology, BAS), *Dr Ventseslav Delov, Atanas Grozdanov and Dr Rosen Tsonev* (Sofia University), *Dr Zlatozar Boev, Tichomir Stefanov, Boyan Petrov, Nedko Nedyalkov* (National Museum of Natural History), *Viktor Vasilev* (Shumen University), *Dr Tseno Petrov* (Natural History Museum – Plovdiv), *Dr Iliya Vatev* (Academy of Medicine), *Dr Maria Paspaleva*.

Recognised international experts and experts from different European countries shared important information with BSPB: *János Bagyura, Matyas Prommer, István Balázs* (Hungary), *Slobodan Puzovich* (Serbia), *V. A. Kostyushin* (Ukraine), *Dan Hulea* (Romania) and others.

Experts and rangers from the National and Nature Parks and Regional Inspectorates of the Ministry of Environment and Water provided important information: *Eberhard Undzhiyan* (“Rusenski Lom” NP), *Anton Stanchev, Venelin Koychev, Stoyan Hristov, Georgi Gugushev* (NP “Central Balkan”), *Rumen Kolchagov* (NP “Rila”), *Girgina Daskalova* (“Sinite Kamani” NP), *Krasimir Andonov* (“Vrachanski Balkan” NP), *Krasimir Kirov* (RIEW – Ruse), *Stefan Staykov* (RIEW – Veliko Tarnovo).

Colleagues from other NGOs provided their records and shared important experience: *Kiril Bedev* (Green Balkans), *Geko Spiridonov* (Wilderness Fund), *Emilian Stoynov* (Fund for the Wild Flora and Fauna), *Georgi Stoyanov* (Birds of Prey Protection Society), *Kateri-*

na Zareva (Balkani Wildlife Society).

Important information was provided by the following falcon enthusiasts fanciers: *Dr Raycho Gunchev, Dimitar Velikov* and *Galin Gospodinov*.

We are thankful to all of them for their contribution to a more comprehensive knowledge on Saker Falcon in Bulgaria, on its problems and conservation approaches.

References

- Akimov, I. A. (ed.) (2009): Red data book of Ukraine. Animal Life. Globalconsulting, Kiev, 600 p.
- Baumgart, W. (1966): Der Würgfalte als Brutvogel im Gebirge der Volksrepublik Bulgarien. *Falke* **13**, p. 256–260.
- BirdLife International (2010): Species factsheet: *Falco cherrug*. Accessed from: <http://www.birdlife.org> on 02.09.2010.
- Cramp, S. & Simmons, K. E. L. (eds.) (1980): The birds of the Western Palearctic. Vol. 2. Oxford, Oxford University Press, 695 p.
- Donchev, S. (1980): Bird migration along the Bulgarian Black Sea Coast. *Ecology (BAS)* **7**, p. 68–83.
- Ham, I. & Puzović, S. (2000): Stepski soko *Falco cherrug* (Gray, 1834). In Puzović et al (ed.): Atlas ptice Grabljivica Srbije, Mape Rasprostranjenosti i Procene Populacija 1977–1996, Zavod za zashtitu prirode Srbije, p. 171–176.
- Iankov, P. & Gradinarov, D. (2009): [Hopeful results about the status of the Saker Falcon (*Falco cherrug*) in Bulgaria]. Accessed at: http://bspb.org/show2.php?id=1196&menu_id=102 (in Bulgarian)
- Iankov, P. (ed.) (2007): Atlas of the breeding birds in Bulgaria. Bulgarian Society for the Protection of Birds, Conservation Series, Book 10. BSPB, Sofia, 679 p.
- Iankov, P. (2010): Würgfalten in Bulgarien. *Falke* **12**, p. 500–505.
- Iankov, P. & Profirov, L. (1991): Contemporary state of the Griffon Vulture (*Gyps fulvus* Hablizl) population in Bulgaria. *Ecology (BAS)* **24**, p. 44–52.
- Iankov, P., Stoyanov, G. & Ragyov, D. (2013): Action plan for conservation of the Saker Falcon (*Falco cherrug* Gray, 1834) in Bulgaria (2013–2022). Sofia. 120 p.
- IUCN (2001): IUCN Red List categories and criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK. ii + 30 p.
- Michev, T. & Simeonov, P. (1981): Studies on the autumn migration of some waterfowl and birds of prey near Burgas (13–23.IX.1978). *Ecology (BAS)* **8**, p. 43–48.
- Michev, T., Pomakov, V. Stefanov, V. & Iankov, P. (1980): A Colony of the Griffon Vulture (*Gyps fulvus* Hablizl) in the Eastern Rhodopies. *Ecology (BAS)* **6**, p. 74–79.
- Michev, T. & Petrov T. (1985): Distribution and numbers of the Saker Falcon, *Falco cherrug cherrug* Gray, 1834 in Bulgaria. In Int. Symp. Proj. 8-MAB (UNESCO) ‘Conservation of the natural territories and their genetic fund’, 23–28.09.1985, Blagoevgrad, Proceedings, V. 1, BAS, p. 314–323.
- Michev, T., Profirov, L., Dimitrov, M. & Nyagolov, K. (2004): The birds of Atanasovsko Lake: status and check List. Second Edition. Bourgas Wetlands Publication Series, 5. 2nd ed. Bulgarian Biodiversity Foundation, Project ‘Bourgas Wetlands’, Bourgas, 44 p.
- Patev, P. (1950) The birds of Bulgaria. Sofia, BAS, 364 p.
- Ragyov, D., E. Kmetova, A. Dixon, K. Franz, Y. Koshev, & N. Nedialkov (2009): Saker Falcon *Falco cherrug* reintroduction in Bulgaria: feasibility study. SESN, Sofia, 69 p.
- Ruskov, K., Tonchev, B. Petrov, T. Iankov, P. Stoychev, S. & Daskalova, G. (2007): Saker Falcon *Falco cherrug*. In Iankov, P. (ed.): Atlas of the breeding birds in Bulgaria. Conservation Series, Book 10. Bulgarian Society for the Protection of Birds, Sofia, p. 186–187.

Conservation strategy for Falco cherrug in Bulgaria

- SER Report (2010)*: Strategic ecological research report on the development of the wind energy in Bulgaria. Ministry of Industry, Energy and Tourism, 457 p.
- Sharrock, J. T. R. (1976)*: The atlas of breeding birds in Britain and Ireland. Poyser, Calton, 479 p.
- Stoyanov, G. (2005)*: Observation of Saker Falcon (*Falco cherrug*). *Acrocephalus*, **26/127**, p. 202.
- Vatev, I. (1983)*: Records of some comparatively rare and new bird species of the Bulgarian Black Sea coast. *Larus* **33–35**, p. 93–97.

P. Iankov & D. Gradinarov