

THE REINTRODUCTIONS OF WILDLIFE SPECIES AS
CONSERVATION TOOL – REVIEW OF THE GENERAL ASPECTS,
HISTORY, PRESENT STAGE AND FUTURE OF THE
REINTRODUCTIONS OF WILDLIFE SPECIES IN BULGARIA

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The concept of saving endangered species by retaining and breeding them in captivity with subsequent release back into the wild or through direct translocation of wild individuals from one place to another goes back a surprisingly long time. Early animal reintroductions depended on little more than the enthusiasm and whim of a dedicated patron. Today, reintroductions need a formidable amount of planning.

In recent years there has been an increasing recognition of the role that reintroduction programmes can play in species conservation. IUCN has developed international recommendations on the procedures that should be followed before any species reintroduction programmes are planned. These will be reviewed in the Bulgarian nature conservation context.

Bulgaria has traditions in translocations – fishes and game species have been reintroduced officially as State policy since the establishment of the III Bulgarian State in late XIX Century. Some local traditions could be dated back to historical times as for example local freshwater crayfishes reintroductions in Kotlenska Planina, where Stone and Noble crayfishes are moved by local people from one part of the river basin to other, where they were extinct by any reason (overharvesting, drought, pollution etc.) even today. European Souslik has been

moved by transhumant shepherds and nomadic groups of people because it was used for food, but also for traditional medicine. The species was therefore released unintentionally or intentionally to establish local sources to be used later and thus translocation took place.

Game species and fishes were largely (re)introduced to serve as hunting/fishing objects. These include Red deer, Fallow deer, European Bison, Chamois, Brown Bear, Nutria, Alpine Ibex, several species of economically important fishes etc.

Only recently with the new circumstances and realities, species that do not have such obvious use as food source have become objects of reintroduction - more to fulfill aesthetic and recreational needs of people, but also to fill in important ecological gaps. Such are Vultures, Falcons, tortoises, etc.

Nowadays the Bulgarian nature conservation community appears to be the leader in the reintroduction of conservation dependent species in Eastern Europe, with more than 20 recent programmes, involving birds, mammals, fishes, reptiles, different invertebrates and plants. The restoration projects for species such as Griffon Vulture, Lesser Kestrel and Saker Falcon are pioneers in Eastern Europe. The scientific and practical experience should therefore be shared and the recent "First National Conference on Reintroductions of Conservation Dependent Species" is a logical step in promoting this work and providing the much needed know-how exchange.

From 2000 to 2015 all known re-introduction projects in Bulgaria were surveyed. The survey also opportunistically included data from international projects involving reintroduction. In parallel with this, an on-going literature review was set in motion and a total of more than 60 references were collected.

Based on historical data for their presence in the country and later considered locally extinct species are listed in a table describing the possibilities and the need for their reintroduction/restocking.

Some species are considered keystone as their ecological niche has not been filled by any other replacing species. Others may need to be reintroduced in Bulgaria based on habitat suitability and/or existing capacity of the local conservation community, which may benefit the regional or global state of certain species.

Table 1. Species that could be objects of reintroduction/restocking in Bulgaria based on the data for their historical presence. Some are locally extinct, while some are declining fast. Others are still present, but in low numbers or their range is small and thus do not play their ecological role, and some could be introduced in the country to fulfill some ecological niches, or save the species in global aspect.

No	Common name	Scientific name	Conservation state in Bulgaria	Global Conservation state	Ecological importance from restoration of the species and International perspective.
1	2	3	4	5	6
Birds					
	Little Bustard	<i>Tetrax tetrax</i>	EX	NT	Bulgaria may play an important role in Global conservation of the species
	Great Bustard	<i>Otis tarda</i>	CR (EX)	VU	Bulgaria may play an important role in Global conservation of the species.
	Bearded Vulture	<i>Gypaetus barbatus</i>	EX	NT	An important ecological role in removing carcasses from pastures. Fills a bit different niche from Griffon Vulture, able to sustain in alpine zone also consuming bones of dead ungulates. Bulgaria could become safe ground for the species.
	Eurasian Black Vulture	<i>Aegypius monachus</i>	EX	NT	An important ecological role in removing carcasses from pastures. Fills a bit different niche from Griffon Vulture, breeding in trees and also able to feed on smaller carcasses. Bulgaria could become safe ground for the species.
	Griffon Vulture	<i>Gyps fulvus</i>	EN	LC	An important ecological role in removing carcasses from pastures. Bulgaria could become safe ground for the species.
	Egyptian Vulture	<i>Neophron percnopterus</i>	EN (CR)	EN	An important ecological role in removing carcasses from pastures. Bulgaria could become safe ground for the species.
	Saker Falcon	<i>Falco cherrug</i>	CR (EX)	EN	Bulgaria may play important role in Global conservation of the species.

1	2	3	4	5	6
Birds					
	Lesser Kestrel	<i>Falco naumanni</i>	CR (EX)	LC	Bulgaria may play an important role in Global conservation of the species.
	Red Kite	<i>Milvus milvus</i>	CR (EX)	NT	Bulgaria may play an important role in Global conservation of the species.
	Common Crane	<i>Grus grus</i>	EX	LC	Bulgaria may play an important role in conservation of the species on European level.
	Demoiselle Crane	<i>Antropoides virgo</i>	EX	LC	Bulgaria may play an important role in conservation of the species on European level.
	Great White Pelican	<i>Pelecanus onocrotalus</i>	EX	LC	Bulgaria may play an important role in conservation of the species on European level.
	Dalmatian Pelican	<i>Pelecanus crispus</i>	CR	VU	Bulgaria may play important role in Global conservation of the species.
	Bald Ibis	<i>Geronticus eremita</i>	(EX)	CR	Bulgaria may play an important role in Global conservation of the species.
Mammals					
	Eurasian Ground Squirrel	<i>Spermophilus citellus</i>	VU	VU	An important ecological role of grazer that maintains grasslands, an important food source for several threatened species. Bulgaria may play important role in Global conservation of the species.
	Chamois	<i>Rupicapra rupicapra</i>	EN	LC	Grazer maintaining grasslands, food source for several threatened species. Could use alpine pastures. Bulgaria may play an important role for conservation of the local subspecies R. r. balkanica

1	2	3	4	5	6
Mammals					
	Alpine Ibex	<i>Capra ibex</i>	(EX)	LC	Grazer maintaining grasslands, food source for several threatened species. Could use alpine pastures.
	Bezoar Goat	<i>Capra aegagrus</i>	(EX)	VU	Grazer maintaining grasslands, food source for several threatened species. Could use alpine pastures. Bulgaria may play an important role for conservation of the species.
	Fallow deer	<i>Dama dama</i>	(LC)	LC	Grazer maintaining grasslands, food source for several threatened species.
	Red deer	<i>Cervus elaphus</i>	(LC)	LC	Grazer maintaining grasslands, food source for several threatened species.
	Konnik/ European Wild horse	<i>Equus ferus caballus</i>	(EX)	EX	Grazer maintaining grasslands, food source for several threatened species. Bulgaria may play important role for reestablishment of the species in natural environment.
	Auroch/Taurus	<i>Bos (taurus) primigenius</i>	(EX)	EX	Grazer maintaining grasslands, food source for several threatened species. Bulgaria may play important role for reestablishment of the species in natural environment.
	European Bison	<i>Bison bonasus</i>	(CR)	VU	Grazer maintaining grasslands, food source for several threatened species. Bulgaria may play important role in Global conservation of the species.
	European Mink	<i>Mustela lutreola</i>	EX	CR	Bulgaria may play an important role in Global conservation of the species.
	Monk seal	<i>Monachus monachus</i>	EX	EN	Bulgaria may play an important role in Global conservation of the species.

1	2	3	4	5	6
Reptiles & Amphibians					
	Eastern Hermann's Tortoise	<i>Eurotestudo hermanni</i>	EN	NT	Food source for other threatened species and Bulgaria may play important role in Global conservation of the species.
	Spur-thighed Tortoise	<i>Testudo graeca</i>	EN	VU	Food source for other threatened species and Bulgaria may play important role in Global conservation of the species.
Fishes					
	Common Sturgeon	<i>Acipenser sturio</i>	EX	CR	Bulgaria may play an important role in Global conservation of the species.
	Russian Sturgeon	<i>Acipenser gueldenstaedtii</i>	CR	CR	Bulgaria may play an important role in Global conservation of the species.
	Ship Sturgeon	<i>Acipenser nuidiventris</i>	EX	CR	Bulgaria may play an important role in Global conservation of the species.
	Starry Sturgeon	<i>Acipenser stellatus</i>	CR	CR	Bulgaria may play an important role in Global conservation of the species.
	Starlet	<i>Acipenser ruthenus</i>	EN	VU	Bulgaria may play an important role in Global conservation of the species.
	Beluga	<i>Huso huso</i>	CR	CR	Bulgaria may play an important role in Global conservation of the species.

Crayfishes					
Stone crayfish	<i>Austropo- tamobius torrentium</i>	(VU)	DD	Food source for other threatened species and Bulgaria may play an important role in Global conservation of the species.	
Noble crayfish	<i>Noble crayfish</i>	(EN)	VU	Food source for other threatened species and Bulgaria may play an important role in Global conservation of the species.	

Legend:

EX – extinct; **CR** – Critically endangered; **EN** – Endangered; **VU** – Vulnerable; **NT** – Near threatened; **LC** – Least concern; **DD** – Data deficient (see IUCN Red List of Threatened species).

State given in brackets, means that it is evaluated by the authors for the purpose of this article, based on their knowledge, sometimes in disagreement with the official most current evaluation elsewhere.

With the increasing number of reintroduction/restocking programmes in Bulgaria, there is a need of introducing a standardized approach to measure the reintroduction success. It is recommended to use the Reintroduction standards developed by W.J. Sutherland et al. 2010 as shown in below:

List of actions

Agreeing to comply with the protocol requires completing all except 4c–e and 6. Additions can be stated, for example, “The monitoring protocol was followed including 4c and 6a.” Adopting the protocol requires stating the monitoring method used beforehand and then carrying it out after the standard periods.

1. Document the release prior to its taking place. This would require the following information:

- a) Species.
- b) Location.
- c) Proposed year of release.
- d) Planned monitoring.
- e) Planned documentation.
- f) Organization involved.
- g) Overseeing body/permitting agency.

And after release

h) State within 6 months of release whether release occurred.

After 5 years, or earlier if all disappear, provide reference to the publication documenting the reintroduction and the results of the monitoring.

2. Consider the monitoring objectives. Consider carrying out the reintroduction as an experiment or part of an experiment to compare different introduction methods.

3. State publishing plan on website or report.

4. When publishing the minimal required information includes:

- Number released (including age and sex where can be determined).
- Date released.
- Whether releases were of captive or of wild-caught population. If captive, then details of origin and time in captivity. If wild, then location of source population and history of source population (e.g., remnant or reintroduced population itself).
- Location released. Distance moved and type of transport.
- Whether any individuals died during capture, holding, movement—if so, how many and why (postmortem reports, observations). Whether pre-release training took place, and if so, what it entailed.

- Whether there was any veterinary screening. What type and what were the results?
- Whether any veterinary treatments or vaccinations were given. Whether genetic screening took place and if so what this entailed. Whether there was any process of acclimatization, including whether it was a hard, soft, or mixed release.
- Whether there was supplementary feeding and, if so, what was fed, how much and how frequently.
- Whether there was any provision of artificial breeding/nesting sites.
- Whether there was any predator or competitor control and, if so, what species and how were they controlled.
- Whether there was any post release monitoring for diseases.
- Whether individuals were marked and, if so, how many and with what sort of mark.

5. Post release monitoring is essential. Our criteria are to carry out a population estimate after:

- One year.
- Five years.
- Optionally, but recommended for long-lived species or lengthy reintroduction programs, 10 years.
- Optionally, but recommended for very long-lived species or programs, 15 years.
- Optionally, but recommended for very long-lived species or programs, 20 years.

6. Ideally document numbers of individuals, where possible classified according to age and sex. In some cases, documenting numbers will be unrealistic and the following may be acceptable alternatives. If these alternatives are to be used then this should be stated from the start:

- Estimate birth and death rates (including the age-specificity of both, if possible), and use these values to calculate expected population growth rate.
- Document breeding by finding nests.
- Document breeding by searching for juveniles.
- Document breeding by color ringing all released birds and recording whether the current birds have rings.
- Or record presence/absence, change in relative abundance or other indices of abundance, e.g., foraging signs, singing males, lek sites etc.
- Where possible also document any of the following:

Breeding success

Survival rate

Dispersal rate

Any causes of death

Any causes of breeding failure

7. Distinguish age-classes and sex, if possible, in monitoring.
8. Where translocation supplements an existing population, distinguish the fate of the restocked and the existing individuals.
9. Document the results after the 5th year (and 10, 15, and 20th year if monitoring is extended) ideally in a journal but otherwise in a report. Add the reference or copy of the report to the website or report used for (1).

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