

Bison bonasus, European Bison

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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Cetartiodactyla	Bovidae

Taxon Name: *Bison bonasus* (Linnaeus, 1758)

Regional Assessments:

- [Europe](#)

Common Name(s):

- English: European Bison, Wisent
- French: Bison D'Europe
- Spanish: Bisonte Europeo

Taxonomic Notes:

Two genetic lines are distinguished in recent populations: the Lowland line (*B. b. bonasus*) and the Lowland-Caucasian line (*B. b. bonasus* and *B. b. caucasicus*). There are no surviving pure-bred populations of *B. b. caucasicus* (Pucek *et al.* 2004).

Assessment Information

Red List Category & Criteria: Vulnerable D1 [ver 3.1](#)

Year Published: 2008

Date Assessed: June 30, 2008

Justification:

The global population of free-living animals was ca. 1,800 in 2006. However, because some of these have not reached breeding age, and because polygyny reduces the effective population size, the total number of 'mature individuals' may be less than 1,000. Although the population declined between the early 1990s and 2000, the current population trend is increasing. Consequently the species qualifies as Vulnerable under criterion D1.

Assessments for the two breeding lines are also included here:

Bison bonasus (Lowland line): Vulnerable D1

In 2000, the total population was 931, not all of these are mature individuals. Although the population declined between the early 1990s and 2000, it is currently increasing.

Bison bonasus (Lowland-Caucasian line): Endangered C1+2a(i)

In 2000, the total population was 714, not all of these are mature individuals. The population decreased by >20% between 1990 and 2000, and has continued to decline since 2000. All subpopulations have fewer than 250 individuals.

"The fate of the European Bison provides an example of the way in which a species may be brought to

the brink of extinction in a very short time, and then saved only through great efforts. The saving of the bison has been an undoubted success, but further action to protect what remains a creature of relict distribution will continue to be essential" (Krasiński 2005).

Previously Published Red List Assessments

2000 – Endangered (EN)

1996 – Endangered (EN)

1994 – Vulnerable (V)

1990 – Vulnerable (V)

1988 – Vulnerable (V)

1965 – Very rare but believed to be stable or increasing

Geographic Range

Range Description:

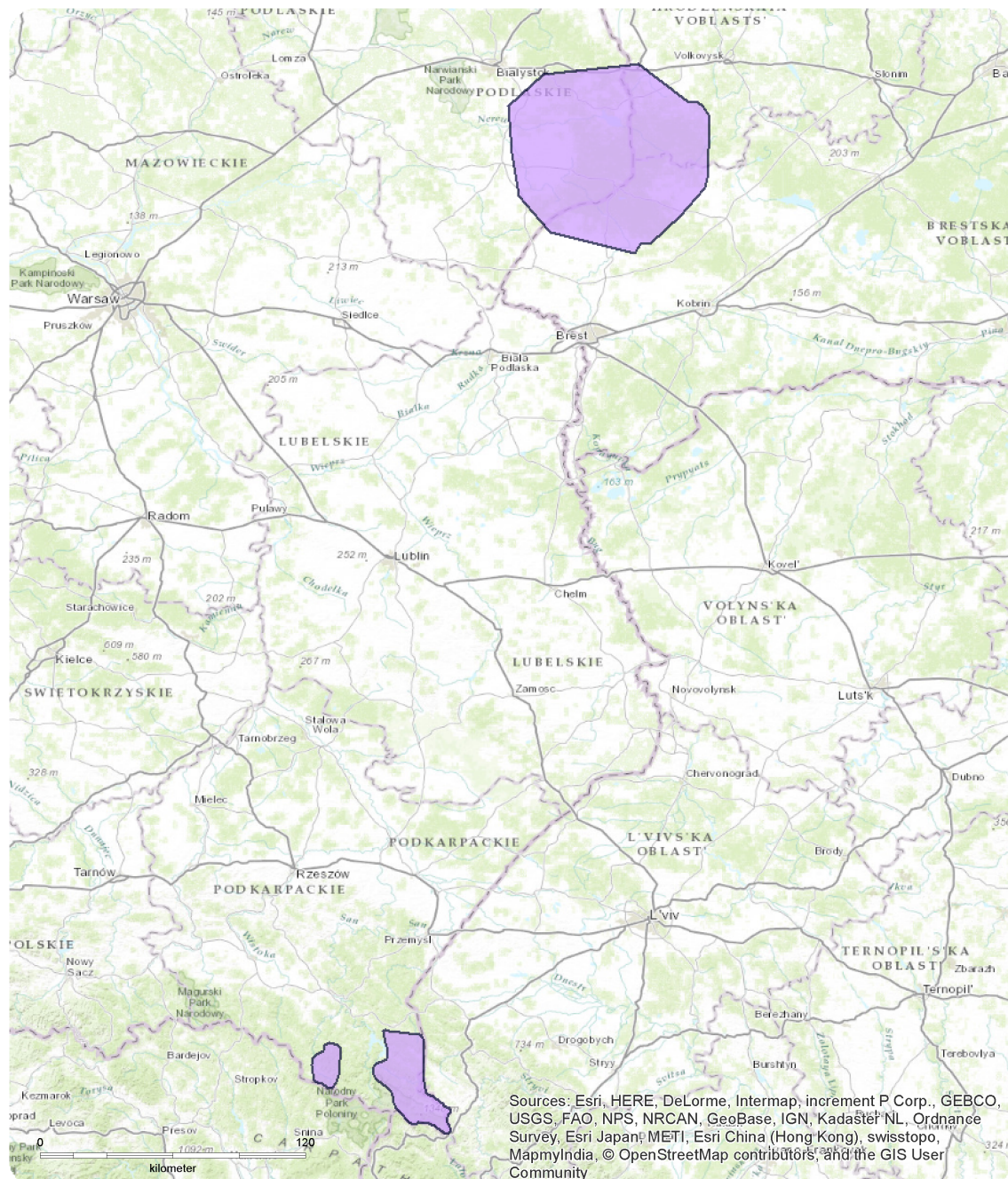
European bison *Bison bonasus* is the largest herbivore in Europe. Historically it was distributed throughout western, central, and south-eastern Europe and the Caucasus. By the end of the 19th century, there were only two populations of European bison left in the wild: in Białowieża Forest *B. b. bonasus* and in the western Caucasus mountains *B. b. caucasicus*. *B. b. bonasus* was finally driven Extinct in the Wild in 1919, and *B. b. caucasicus* had been extirpated by 1927. Subsequently, the species survived only in a few European zoological gardens (Sztolcman 1924). As a result of reintroductions and introductions, it now occurs in free-ranging and semi-free herds in Poland, Lithuania, Belarus, Russian Federation, Ukraine, and Slovakia. The introduced Kyrgyzstan subpopulation has recently gone extinct (EBPB 1996, Pucek *et al.* 2004). Captive populations are well distributed in 30 different countries worldwide (see Pucek *et al.* 2004 for details). It occurred from sea level to 2,100 m in the Caucasus (Pucek 1986), and in the Carpathians it is presently found at altitudes of up to 800 m (K. Perzanowski pers. comm. 2006).

Country Occurrence:

Native: Belarus; Lithuania; Poland; Romania; Russian Federation; Slovakia; Ukraine

Introduced: Kyrgyzstan

Distribution Map



Bison bonasus

Range

Reintroduced

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Conservation of Nature)



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



Population

In historical times, the European bison was widespread and presumably abundant in its native range. However, by the end of the 19th century it was close to extinction, with only two wild populations remaining (Pucek *et al.* 2004). Shortly after World War I the species was Extinct in the Wild, and the captive population consisted of just 54 (29 males; 25 females) European bison with proved pedigrees (Raczyński 1978, Pucek 1991), originating from 12 founder animals (Slatis 1960). The captive population subsequently increased slowly until World War II, when the species again suffered a steep decline, with the population dropping from 160 animals in 1943 to 93 in 1946 (Pucek *et al.* 2004).

As a result of captive breeding, reintroductions, benign introductions, and intensive conservation management, the total population of free-ranging bison now stands at c. 1,800. A further c. 1,400 individuals live in captivity (EBPB 2004). Some captive animals are not recorded in the European Bison Pedigree Book, so this is likely to be an underestimate (Pucek *et al.* 2004). Population structure is such that approximately 60% of individuals are sexually mature (Kraśiński 1978, Kraśińska and Kraśiński 2004). The effective population size is smaller than the total population size, because European bison are a polygynous species, so not all males have the opportunity to breed (Kraśiński and Raczyński 1967, Krasinska and Kraśiński 1995, Kraśińska and Kraśiński 2004). The free-living population increased more or less steadily from the mid-1960s to a peak of c. 2000 in the early 1990s (Pucek *et al.* 2004). Following a period of decline in the mid to late 1990s, the population is once again expanding (W. Olech pers. comm. 2006), although the potential for ongoing growth is limited by a number of factors (Pucek *et al.* 2004). Two genetic lines are distinguished in recent populations: the Lowland line (*B. b. bonasus*) and the Lowland-Caucasian line (*B. b. bonasus* and *B. b. caucasicus*). There are no surviving pure-bred populations of *B. b. caucasicus* (Pucek *et al.* 2004).

Current Population Trend: Increasing

Habitat and Ecology (see Appendix for additional information)

Optimal habitats for the European bison are deciduous and mixed forests, but the range should include about 20% of grassland habitats (meadows) (Pucek *et al.* 2004, K. Perzanowski pers. comm. 2006). In Białowieża Forest (Poland) they primarily forage in moist deciduous forests, and then in mixed coniferous forests (Kraśińska *et al.* 1987, Kraśiński and Kraśińska 1994). Forest complexes with a mosaic-like forest type arrangement (such as Białowieża and Borecka Forests, Poland) are most favourable. In fresh deciduous forest, European bison find food throughout the vegetative season. In the Caucasus region, European bison prefer foothill forests; in summer, they feed on alpine meadows (Kazmin and Smirnov 1992, Kazmin *et al.* 1992). However, considerable plasticity of European bison with regard to food means they also forage in habitats where coniferous forests predominate (Kraśiński *et al.* 1999). All European bison populations inhabit ranges that include open areas, such as, mown meadows, deforested feeding glades covered with grass, clear cuts and young plantations up to 10 years old (Dzięciołowski 1991, Kraśińska and Kraśiński 1994, Kraśiński *et al.* 1999). The attraction of open areas results from the fact that exploited meadows and glades provide ungulates with much more food than the same area of the forest herb layer and food is more easily available there (Korochkina and Bunevich 1980, Kazmin *et al.* 1992). The species had an important role in the formation of the prehistoric European broad-leaf forest and forested steppe ecosystems (Pucek *et al.* 2004).

Systems: Terrestrial

Threats (see Appendix for additional information)

Habitat degradation and fragmentation due to agricultural activity, forest logging, and unlimited hunting and poaching were the primary reasons for the decrease and extinction of European bison populations. Pucek (1991, 1994) has summarized the history of their extinction. Among the primary reasons for the rapid decrease of the European bison population in Białowieża Primeval Forest at the beginning of 19th century was the over-population of deer species, and the drastic reduction of natural food resources for herbivores which followed (Wróblewski 1927). During the period of World War I and the Russian Revolution of 1917, conflict and heavy poaching exacted a severe toll on remaining populations (Pucek *et al.* 2004).

Conflict and political instability continues to be a threat to the species in the Caucasus, where reintroduced free-living herds have suffered very severe losses (leading to extinctions) in recent years (Pucek *et al.* 2004). Other current threats include lack of appropriate habitat, fragmentation of populations (and concomitant loss of genetic diversity), inbreeding depression, disease, hybridisation, and poaching. There is little space for a large herbivore such as the European bison in Europe's contemporary ecosystems, especially in the west. The most significant limit for the enlargement of European bison populations is human population density; forestry and agricultural activity is not a limiting factor. Fragmentation and isolation of free-ranging (and captive) herds result in little or no exchange of genetic material. Small isolated populations quickly lose their genetic heterogeneity and are more vulnerable to extinction (Franklin 1980). As yet, the opportunity to reconstruct a more compact geographic range to facilitate migration of bison between herds does not exist. As a consequence of passing a dramatic bottleneck (the current population descends from just 12 founder animals), the gene pool is limited and animals are highly inbred. The average inbreeding coefficient is very high compared to other large mammals, and is equal to 44% in the Lowland line and 26% in the Lowland-Caucasian line for individuals with a full pedigree (Olech 1998). The negative effects of inbreeding, manifested in the decline in reproduction rate, are more strongly pronounced in the Lowland-Caucasian line than in the Lowland line (Olech 1987, 1989, 1998). Inbreeding exerts a harmful effect on skeleton growth, particularly in females (Kobryńczuk 1985), and possibly lowers the resistance of bison to disease and pathologies.

Diseases appearing in European bison populations can bring serious threats to the whole species. It is not certain whether the species has always shown a weak resistance to disease or if immunity has declined, due to limited genetic heterogeneity. The most important disease affects the male reproductive organs and is manifested in the inflammation of the penis and prepuce, leading to diphtheroid-necrotic lesions, diagnosed as balanoposthitis. This disease was discovered at the beginning of the 1980s in Białowieża Forest (Kita *et al.* 1995, Piusiński *et al.* 1997, Jakob *et al.* 2000); although similar symptoms had been reported earlier (Korochkina and Kochko 1982) in Russia and Ukraine (Krasochko *et al.* 1997). Despite many years of study, its pathogenesis has not yet been elucidated. Other diseases that are potentially major threats to herds include foot-and-mouth disease *Aphte epizooticae* (to which the species is known to be sensitive) (Podgurniak 1967), and tuberculosis (Żórawski and Lipiec 1997, Welz *et al.* 2005).

A particular problem concerning the management of extant populations of European bison is the existence of hybrid herds, especially European × American bison hybrids living in the Caucasus. Two free-living hybrid herds have been established in the Caucasus Mountains, in close proximity to

reintroduced free-living herds of the pure blood Lowland-Caucasian line. There are fears that all these animals will crossbreed, creating a mixture of various genotypes. According to Russian authors, the distances between herds are not so great, but the configuration of mountain ridges and valleys make it impossible for contact between them. There are also two small semi-free herds of European and American bison hybrids in Toksove Forest Park (St Petersburg) and the Mordovia Wildlife Reserve (Pucek *et al.* 2004). Finally, poaching as a result of administrative disorders and a failure to enforce nature conservancy law threatens free-living herds of European bison in many countries.

Conservation Actions (see Appendix for additional information)

The species is listed in Appendix III (protected fauna species) of the Bern Convention, and on Annexes II* and IV of the EU Habitats and Species Directive. The European Bison Pedigree Book has been developed, which registers and publishes lists of European bison, enabling the genetic purity of the species to be maintained. A Conservation Action Plan for the species has been published (Pucek *et al.* 2004), and most countries in which the species occurs have national management plans. The European Endangered Species Programme (EEP) for zoos was established by the European Association of Zoos and Aquaria (EAZA) in 1996, and now a third of the captive population is participating in this programme.

Conservation measures recommended in the 2004 Action Plan (Pucek *et al.* 2004) include the following:

1. Continue captive breeding, following a coordinated programme that focuses on maintaining genetic variability. Hybridisation between existing breeding lines (Lowland and Lowland-Caucasian) should be avoided, as should hybridization between European bison and American bison *Bison bison*.
2. Establish a Gene Resource Bank (semen collection in the first phase) to serve as a safeguard against loss of important genetic diversity.
3. Continue reintroductions and benign introductions, into forests and other ecosystems (including large tracts of land where human activities are abandoned, such as former farmland or military training grounds). A target of 3,000 free ranging animals of each genetic line is recommended as a management goal. It will be necessary to link isolated subpopulations (e.g., by creating habitat corridors) and restore metapopulation function to enable the population to be self-sustaining in the long term.
4. Regulate bison populations by culling, when necessary, to prevent populations exceeding the carrying capacity of remaining habitat.
5. Manage habitat appropriately, for example by creating watering places, and cultivated meadows or feeding glades for use by other ungulates.
6. Implement and enforce stricter regulations to control poaching.
7. Continue producing the European Bison Pedigree Book, and expand its scope.
8. Establish an International Bison Breeding Centre, to coordinate reintroductions, monitoring of captive and free-ranging herds, and genetic management of particular herds.
9. To promote protection of the species, upgrade it to Appendix II (strictly protected fauna species) of the Bern Convention.

Further details, as well as recommended research activities, can be found in Pucek *et al.* 2004.

Credits

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Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.1. Forest - Boreal	-	Suitable	-
1. Forest -> 1.4. Forest - Temperate	-	Suitable	-
3. Shrubland -> 3.3. Shrubland - Boreal	-	Marginal	-
3. Shrubland -> 3.4. Shrubland - Temperate	-	Marginal	-
4. Grassland -> 4.1. Grassland - Tundra	-	Marginal	-
4. Grassland -> 4.4. Grassland - Temperate	-	Suitable	-
14. Artificial/Terrestrial -> 14.1. Artificial/Terrestrial - Arable Land	-	Marginal	-
14. Artificial/Terrestrial -> 14.2. Artificial/Terrestrial - Pastureland	-	Suitable	-
0. Root -> 18. Unknown	-	Unknown	-

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
1. Residential & commercial development -> 1.3. Tourism & recreation areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.2. Small-holder farming	Past, unlikely to return	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Past, unlikely to return	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion		

		1. Ecosystem stresses -> 1.2. Ecosystem degradation		
		2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.1. Intentional use (species is the target)	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.2. Unintentional effects (species is not the target)	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
6. Human intrusions & disturbance -> 6.1. Recreational activities	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
6. Human intrusions & disturbance -> 6.2. War, civil unrest & military exercises	Past, unlikely to return	-	-	-
	Stresses:	2. Species Stresses -> 2.2. Species disturbance		
8. Invasive & other problematic species & genes -> 8.1. Invasive non-native/alien species -> 8.1.2. Named species (Bison bison)	Ongoing	-	-	-
	Stresses:	2. Species Stresses -> 2.3. Indirect species effects -> 2.3.1. Hybridisation		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions in Place
In-Place Research, Monitoring and Planning
Systematic monitoring scheme: Yes
In-Place Species Management
Successfully reintroduced or introduced benignly: Yes
Subject to ex-situ conservation: Yes
In-Place Education
Subject to recent education and awareness programmes: Yes
Included in international legislation: Yes

Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions Needed
2. Land/water management -> 2.1. Site/area management
2. Land/water management -> 2.3. Habitat & natural process restoration

Conservation Actions Needed
3. Species management -> 3.2. Species recovery
3. Species management -> 3.3. Species re-introduction -> 3.3.1. Reintroduction
3. Species management -> 3.4. Ex-situ conservation -> 3.4.1. Captive breeding/artificial propagation
3. Species management -> 3.4. Ex-situ conservation -> 3.4.2. Genome resource bank
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.1. Legislation -> 5.1.1. International level
5. Law & policy -> 5.1. Legislation -> 5.1.2. National level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.4. Scale unspecified

Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Research Needed
1. Research -> 1.3. Life history & ecology
3. Monitoring -> 3.1. Population trends

Additional Data Fields

Distribution
Estimated extent of occurrence (EOO) (km ²): >20,000
Lower elevation limit (m): 0
Upper elevation limit (m): 2100
Population
Population severely fragmented: No
Habitats and Ecology
Congregatory: Congregatory (and dispersive)

The IUCN Red List Partnership



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