

Do we still need more wisents in Poland?

Kajetan Perzanowski

Institute of Biological Sciences

The John Paul II Catholic University of Lublin, Poland

Abstract: Following the rapid growth of wisent (European bison) *Bison bonasus* L. population in Poland from 783 animals in 2001 to 2603 in 2022, the question has appeared whether the country with the largest population of this species in the world, may still accept further increase of its numbers. Problems that are connected with the presence of free ranging wisents belong to three categories: economical – damages to agriculture and forestry, public safety – traffic accidents and aggressive individuals, and the health risk – possible transmission of pathogens to the livestock. However there also several benefits resulting from the existence of wisents in the wild. The species is an important component of natural ecosystems, its existence is an excellent example of successful conservation, the wisent is an attractive symbol for educational programs, and its growing populations can be a source of animals for further reintroductions. Possible solutions of the problem include: mitigation of economic costs and slowing down the population growth, and a dispersal of wisent herds into suitable habitat patches, allowing to manage them as metapopulation. Therefore, further growth of wisent population in Poland is still acceptable, however, the conservation and management of this species in the future have to be focused upon its social acceptance and avoiding possible fields of conflict

Key words: European bison, Polish population, numbers, future acceptance

Introduction

Population numbers of wisents in Poland considerably increased in last 20 years from **783** (613 free ranging and 170 captive) in 2001 up to **2603** (2394 free ranging and 209 captive) in 2022 (Raczyński 2001–2023) (Fig. 1).

In 2022 in Poland, there were 21 sites (breeding and show enclosures, zoos) where wisents were maintained in captivity. Only in one enclosure are kept animals of Lowland-Caucasian line in all others are pure blood lowland animals. There were also 8 free ranging herds distributed mostly in the eastern part of the country. Only one of them – in Bieszczady mountains, consisted of wisents belonging to Lowland – Caucasian line (Raczyński 2023) (Fig. 2).

Therefore at that time, Poland had the largest population of the species, and also the highest numbers of free ranging wisents in the world (Raczyński 2023).

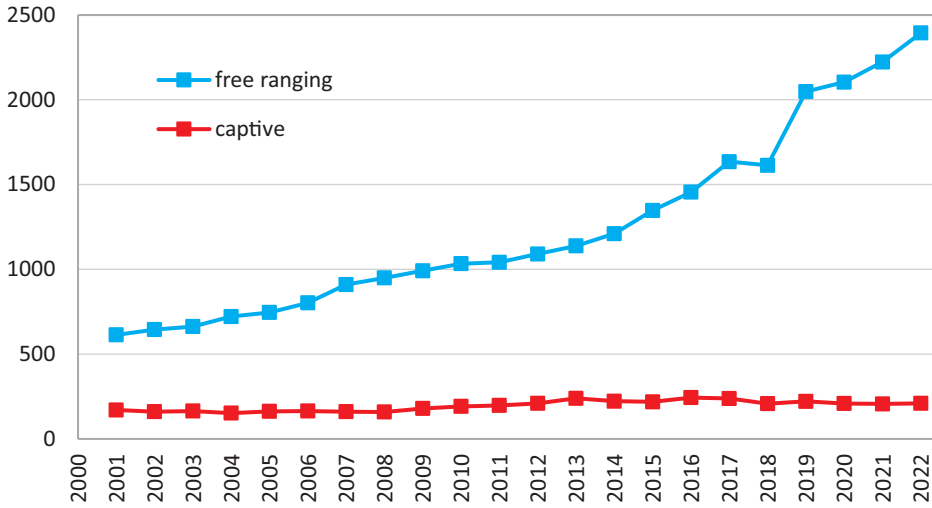


Fig. 1. Changes in wisent numbers in Poland between years 2001–2022

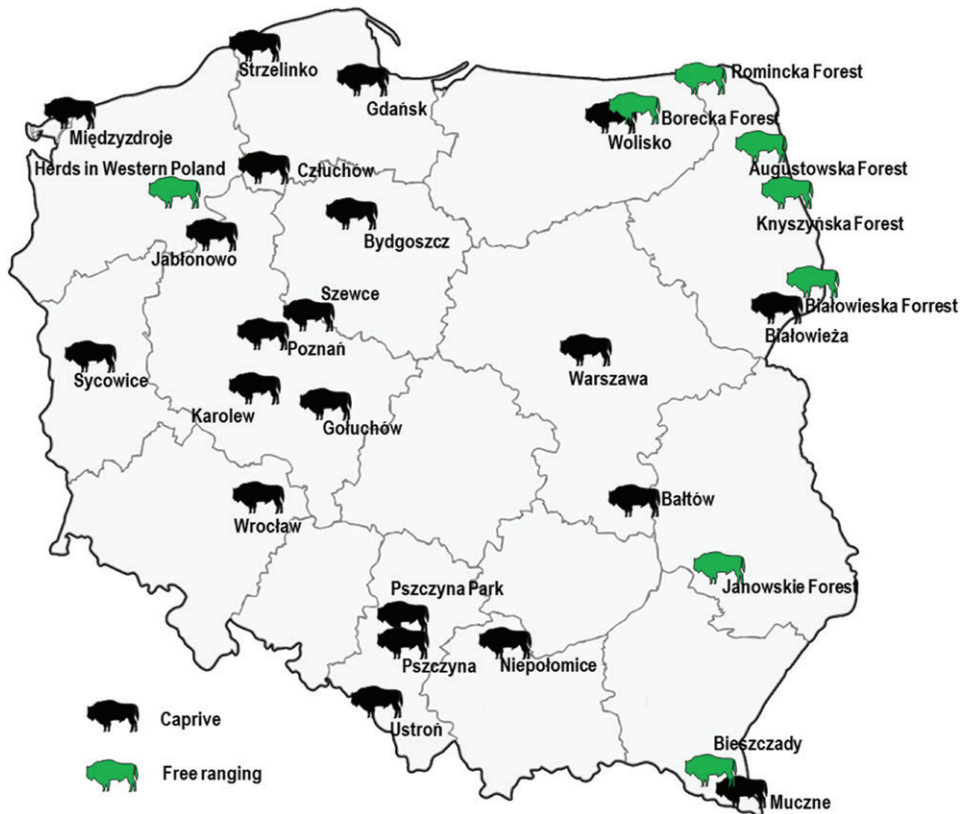


Fig. 2. Distribution of captive and free ranging wisents in Poland in 2022

Problems connected with wisents' presence

There are three major fields related to wisents' presence, potentially creating tensions or open conflicts:

- Economy – damages to agriculture and forestry;
- Safety – traffic accidents and aggressive individuals;
- Health risk – possible transmission of pathogens between the livestock and free ranging wisents.

Economical costs in agriculture and forestry

In vicinity of several free ranging wisent herds, damages to agriculture and forest stands occur. Most conflicts originate from damages to field crops especially when larger groups of animals feed outside of the forest. E.g. in north-western Poland between 50–76% of damages caused by wisents were in winter cereals and about 13% in winter rape. The amount of compensations for damages caused by wisents in agriculture is very high in vicinity of low-land populations e.g. around Białowieska and Knyszyńska Forests reaching the level of several hundred thousand PLN (Hofman-Kamińska, Kowalczyk 2012, Sobczuk, Olech 2016) but in last year the amount of compensation was above 3 million PLN (RDEP 2023).

However according to data e.g. on population from Bieszczady in years 2001–2017, damaged area of agriculture amounted to 20.6 ha, and compensations costs to 22,164 PLN. The sum of compensations for damaged tree plantations and orchards was 91,621 PLN. Wisent numbers during that time increased from 140 to 350 individuals (Marszałek, Perzanowski 2018, Perzanowski, Olech 2018).

Damages to forest stands concern mostly consumption of the tree bark, which is estimated for about 20% of the wisent diet, but may be consumed in larger quantities when access to ground flora is severely limited. Damage to tree stands due to wisent foraging in most sites can be regarded as negligible, with the exception of the debarking of highly preferred species (e.g. ash), especially during periods of very deep snow cover or around feeding stations (Paszkievicz, Januszczak 2010, Baraniewicz, Perzanowski 2015, Krasińska, Krasiński 2017).

In Baligród Forest District (Bieszczady), where large (above 200 ind.) population of wisent exists the level of damages is very high, 24.17% of all the surveyed forest stands were damaged. The most frequent was bark stripping (20.71%) and other included trampling or browsing (Nieszafa *et al.* 2022).

Traffic accidents

Occasionally, wisents take part in traffic accidents however according to statistics, about 80% of collisions involving wildlife in Poland (about 17,000 annually) are caused by various deer species, out of which – 75% by roe deer. However such events involving wisents are very rare in Poland – do not exceed several cases per year (Karpiński *et al.* 2012, Tereszkiwicz, Choroszy 2016). In years 2010–2021 there were together 70 accidents with wisents but in last two years were 14 and 15 of them (Klich *et al.* 2023).

Aggressive animals

Dangerous encounters with people are rare, in Poland not exceeding several such cases per year. A majority of such cases involve solitary bulls wandering into human settlements and trying to feed in gardens or orchards next to houses. A risky situation may happen when a cow with a young calf is approached from a close distance e.g by somebody trying to get nice selfie (<https://www.tvp.info/49748831/>).

Health risk

Potentially, some pathogens typical for bovines may be transmitted from wisents to the livestock as well as back. Such process would require the use of the same pastures by both species. So far however, the transmission of such diseases like: TB, foot and mouth disease or telasiosis is known only from the cattle to wisents (Perzanowski *et al.* 2014, Klich *et al.* 2022).

Benefits from the occurrence of wisents

- Important component of the ecosystem;
- An example of successful conservation;
- Attractive symbol for educational programs;
- A source of animals for further reintroductions.

Role in the ecosystem – contribution to diversity, a component of the trophic web

Wisents, being the largest terrestrial mammal of Europe, due to their gregarious behaviour and feeding requirements, may in several ways exert significant influence upon their habitats of occurrence.

Since the extirpation of the aurox and wild horses, wisents are the only true large grazers in our wild fauna. Because of their foraging patterns they contribute to the maintenance of open spaces in forest habitats through elimination of seedlings of woody species. An adult individual may consume between some

20–30 kg of biomass per day, i.e. between 7–11 tons annually. During a year, an average herd of 20 animals consume about 200 tons of biomass. Nearly 80% of this amount consists of ground flora, therefore while grazing, by preventing the regrowth of woody vegetation, wisents considerably contribute to creation and maintenance of open spaces in the forest (Borowski *et al.* 1976, Gębczyńska *et al.* 1974, Krasieńska, Krasieński 2017; Jaroszewicz *et al.* 2017).

The presence of free ranging wisent herds facilitates therefore an increase of biodiversity in forest habitats (Thor *et al.* 2023), restriction of secondary succession in non-forest habitats and renaturalisation of abandoned agriculture. At the moment it can be done only using domestic livestock while wild wisents would become a natural component of ecosystems, fulfilling the role of landscape engineers.

The amount of consumed forage results in the quantity of produced feces (some 7–10 kg per day for an adult animal) which become an important source of food for a number of various invertebrates (Gębczyńska *et al.* 1974, Krasieńska, Krasieński 2017, Schwerk *et al.* 2021).

Although wisents because of their body size are a difficult prey for predators, in some regions successful predation by bears and wolves has been already recorded (Perzanowski *et al.* 2014, Marszałek, Perzanowski 2017, Kaczor, Perzanowski 2017).

In sites where a natural mortality of wisents occurs, their carcasses are a significant food item for scavengers (Jankowski *et al.* 2019).

An example of successful conservation

Definitely, the restitution of *Bison bonasus* from mere 54 individuals remained in captivity by 1923 – up to 10,536 in 2022, is the largest world – wide success, in bringing back a large mammal from the brink of extinction (Raczyński 2023).

A source population

Wisents from Poland are an important source for breeding and reintroductions of this species in other countries. Between years 1946–2022, 564 individuals were exported to 25 countries in Europe (the largest group 112 animals – to Germany) and to 6 countries outside of our continent (Olech 2022).

Education and conservational awareness

Another significant aspect of wisents' presence is their importance as widely recognised symbol of nature conservation. For centuries, wisents were commonly associated with wild nature, natural ecosystems, being a symbol of strength and important cultural image. Also, understanding of their successful

restitution is very important in the process of nature conservation education (Samojlik 2005, Szytych 2008, Perzanowski 2014, Samojlik *et al.* 2023, <http://animal.sggw.pl/2023/04/24/kompleksowa-ochrona-zubra-w-polsce-podsumowanie-projektu/>, <https://smz.waw.pl/warsztaty-czynna-ochrona-populacji-zubra-janow-lubelski/>).

Possible solutions

Potential measures to mitigate economical costs

A fundamental issue, regarding the alleviation of the maintenance cost of wisent populations, is the realistic estimation of carrying capacity of their habitats. On the basis of data from well-established free ranging populations, the acceptable density not causing meaningful damages can be assumed as **up to 0.5 individual per 100 ha**. As a preventive tool against movements outside of the forest a supplemental feeding can be applied (Perzanowski, Olech 2014, Perzanowski 2021, Olech, Perzanowski 2022).

Mitigation of population growth

Further uncontrolled growth, especially of largest populations, will lead to serious social conflicts which may lead to the lack of acceptance for the species. Numbers of wisents can be reduced either by selective culling as well as by trapping and resettlement but then remains the question where substantial numbers of wisents can be reintroduced and furthermore become accepted by local inhabitants. A possible solution is the dispersal of the population into new small herds (up to 30–40 animals), which are known to have much lower realized increment than large populations due to stochastic causes (Suchecka 2009, Balciauskas, Kazlauskas 2014, Balciauskas *et al.* 2017, Klich *et al.* 2021, Olech, Perzanowski 2022).

A concept of metapopulations

Few habitat patches in Europe are large enough to establish viable populations (e.g. >1,000 individuals) and thus in most cases small subpopulations need to be functionally linked into larger metapopulations. Identifying candidate sites under such a strategy would seek to expand and/or link existing subpopulations (Olech, Perzanowski 2022). This approach requires patches that are in distance from other subpopulations. Such patches, though harboring smaller subpopulations, nevertheless can play an important role as reservoirs of animals in case of disease outbreaks or other calamities in other larger populations (Kita, Anusz 2006, Perzanowski 2010, Kuemmerle *et al.* 2018).

In Poland, 47 habitat patches with an area $> 200 \text{ km}^2$ were identified, together covering $20,710 \text{ km}^2$. Patch sizes ranged from $203\text{--}1,439 \text{ km}^2$ (mean: 441 km^2) (Perzanowski *et al.*, 2019) (Fig. 3).

The metapopulation concept assumes that small herds will be scattered but distance between them in most cases will be possible to natural contact through migrating bulls.

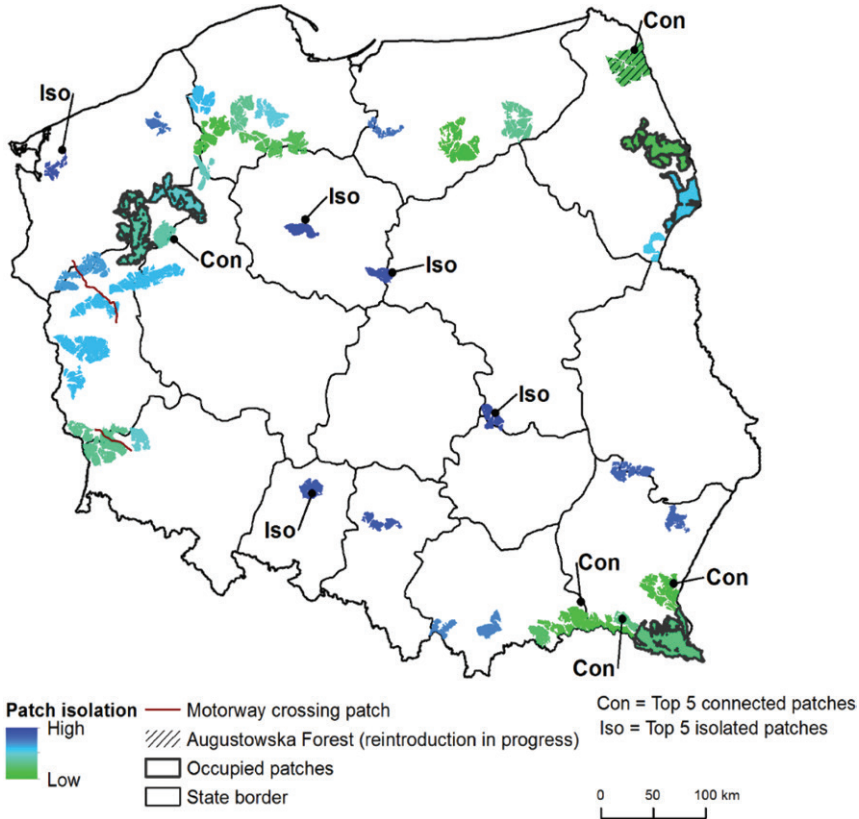


Fig. 3. Distribution of habitat patches identified in Poland as suitable to the establishment of new small subpopulations (after Perzanowski *et al.* 2019)

Conclusions

- Potentials for the establishment of new free ranging herds still exist in Poland but those reintroduced more than 50 years ago need intensive management;
- So far financial costs connected with conservation and management of this species are not excessively high comparing to compensations for other wildlife e.g. wolves and bears;

- Comparing to other wildlife, wisents do not pose a significant threat to public safety;
- Polish wisents are an important source for the reestablishment of this species in other countries;
- Considering all above mentioned facts, further growth of wisent population in Poland could be still acceptable;
- However, the conservation and management of this species in the future have to be concerned about its perceiving by people and avoiding possible fields of conflict;
- Dispersal of the population is a short time solution for probably about 10 years, until new herds will increase and begin to reproduce rapidly – unless their numbers would be controlled.

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Czy w Polsce potrzebujemy więcej żubrów?

Streszczenie: Szybki przyrost populacji żubra *Bison bonasus* L. w Polsce od 783 osobników w 2001 do 2603 w 2022, wywołał dyskusję czy państwo z najliczniejszą populacją tego gatunku na świecie może nadal akceptować jej przyrost (Raczyński 2001–2023) (Fig. 1, 2).

Problemy wynikające z obecności żubrów bytujących na wolności, podzielić można na trzy kategorie: ekonomiczne – związane ze szkodami w rolnictwie i gospodarce leśnej, bezpieczeństwa publicznego – w kontekście wypadków w ruchu drogowym i osobników wykazujących agresję w stosunku do ludzi oraz zagrożenia zdrowotnego – będącego efektem możliwych transmisji patoogenów od i do zwierząt hodowlanych (Kita, Anusz 2006, Hofman-Kaminska, Kowalczyk 2012, Sobczuk, Olech 2016, Tereszkievicz, Choroszy 2016, <https://www.tvp.info/49748831/>).

Niemniej, obecność dziko żyjących żubrów wiąże się także z pozytywnymi aspektami: stają się one ważnym elementem naturalnych ekosystemów, ich istnienie jest świetnym przykładem sukcesu zabiegów ochronnych, żubr jest atrakcyjnym symbolem kulturowym oraz dla programów edukacyjnych, a także rosnąca jego populacja może być źródłem osobników dla przyszłych reintrodukcji (Samojlik 2005, Szytch 2008, Krasieńska, Krasieński 2017, Jankowski *et al.* 2019, <http://animal.sggw.pl/2023/04/24/kompleksowa-ochrona-zubra-w-polsce-podsumowanie-projektu/>).

Możliwe rozwiązania problemu obejmują: złagodzenie ekonomicznych efektów obecności wolno żyjących żubrów i spowolnienie tempa przyrostu ich populacji poprzez selektywne pozyskanie oraz przez odłowy i przesiedlenia oraz identyfikację obszarów pozwalających na rozproszenie stad żubrów, umożliwiające zarządzanie nimi jako metapopulacją. Kilkadziesiąt takich rejonów zostało już wskazanych na terenie Polski (Kuemmerle *et al.* 2018, Perzanowski *et al.*, 2019, Olech, Perzanowski 2022) (Fig. 3).

Wydaje się więc, że dalszy przyrost populacji żubra w Polsce byłby akceptowalny, jakkolwiek ochrona i zarządzanie tym gatunkiem w przyszłości powinny być skoncentrowane na dążeniu do utrzymania jego społecznej akceptacji i unikaniu możliwych konfliktowych sytuacji.
