



The first year of the new herd of wisents in the Żednia District of the Knyszyńska Forest

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Abstract: In 2016, a new free herd of European bison was introduced to the Żednia District in the Knyszyńska Forest. After a few months spent in the adaptive enclosure, the animals were released. The course of their acclimatization was observed with GPS transmitters. Direct observation was difficult due to inaccessible terrain and animal wildness. Animals occupied the area in the vicinity of the adaptation enclosure. During the vegetation period, the herd moved around an area of about 50 square kilometers, while in winter the penetrated area was slightly smaller. The acclimatization of the animals went well.

Key words: European bison, wisent, GPS telemetry, seasonal areas, reintroduction, adaptation

Introduction

Reintroduction of the herd of wisents into the Żednia Forest District is one of the protective goals foreseen for this species, according to the “Strategy on wisent conservation in the Knyszyńska Forest, within the area of State Forest National Forest Holding”. Execution of this task was possible thanks to two projects: “*In situ* conservation of European bison in Poland – the North-East part” performed between 2010 and 2013, as well as “The development of European bison meta-population in the North-East Poland”, between 2014 and 2017. Their main goal was to extend the range of wisent occurrence in the north-eastern region of the country and providing it with proper living conditions (SGGW 2011; Perzanowski *et al.* 2013).

As the Żednia District is located on the border between the Knyszyńska and Białowieska Forests, it forms the perfect area to connect wisents’ herds living there. Creation of a “bridge” allowing continuous contact between those two populations, shall help the extension of wisent population range from the Białowieska and Knyszyńska Forests, facilitate animals’ migration between herds, and natural exchange of animals important for genetic reason (Kowalczyk *et al.* 2010, Perzanowski 2016). Permanent presence of wisents in the Żednia District shall influence biodiversity of this area and its touristic attractiveness. Moreover, the creation



of the other herd in the Knyszyńska Forest allows to spread the main herd over the larger area, what should have a positive effect on further managing this subpopulation (Kraśńska *et al.* 2014).

Occurrence of the wisents' herd in the Żednia District was preceded by several years' preparations (Perzanowski *et al.* 2013). Since 2010, under the framework of the project "In situ conservation of European bison in Poland – the North-East part", the Żednia Forest District has executed many tasks to enrich the food base of the species, improve the water access, and develop winter supplementary feeding ability, including restoration of several dozen hectares of forest meadows, rebuilding of haystacks, and establishment of pastures available in wintertime (Dworakowski *et al.* 2016). Under the framework of the project "The development of European bison meta-population in North-East Poland", the adaptive enclosure was build, the new herd was established, and measures for its protection and management were introduced (SGGW 2011; Klimaszewski *et al.* 2016).

Between 2015 and 2016 the adaptive enclosure of 4.5 hectares was inhabited by 8 animals brought from the Białowieska Forest: 7 females at the age from 1 to 9 years and 6-year-old bull. The 6-year-old cow became the leader. After the contest announced for the selection of names, the leading cow and the only bull were named Karpina and Kalitnik. These animals were provided with GPS collars what enables constant monitoring of their adaptation to the new environment.

Summer range

Animals used to live within the area of the adaptive enclosure for about 5 months. The ceremonial opening of the enclosure and releasing of the animals took place on May 11th, 2016, and from that moment the beginning of the growing season of 2016 for this herd is considered. End of the growing season was defined to be on October 10th, 2016, the date determined according to the activity of the main herd of the Knyszyńska Forest i.e. its appearance at the farmlands close to Krynki, where the herd spends wintertime from the moment of its establishment in the 70-ties.

The ceremonial opening of the enclosure did not encourage the wisents to immediate leaving. They started to explore new areas on May 12th, 2016. During following days they progressively enlarged their range, moving all the time on the eastern side of watercourse that crosses the meadows of the Sokole District. In the second part of May animals started to penetrate also meadows and forest on its western side. From that moment until the end of growing season, animals were visiting most of meadows in Sokole and neighboring forests. However the fear of possible "escape" of wisents back to the Białowieska Forest was not justified (Kraśńska and Kraśński 2004; Kraśńska *et al.* 2011; Perzanowski *et al.* 2013).

Direct monitoring of the herd during growing season was very difficult due to the fact that animals stayed mainly within areas hardly accessible for people. There-

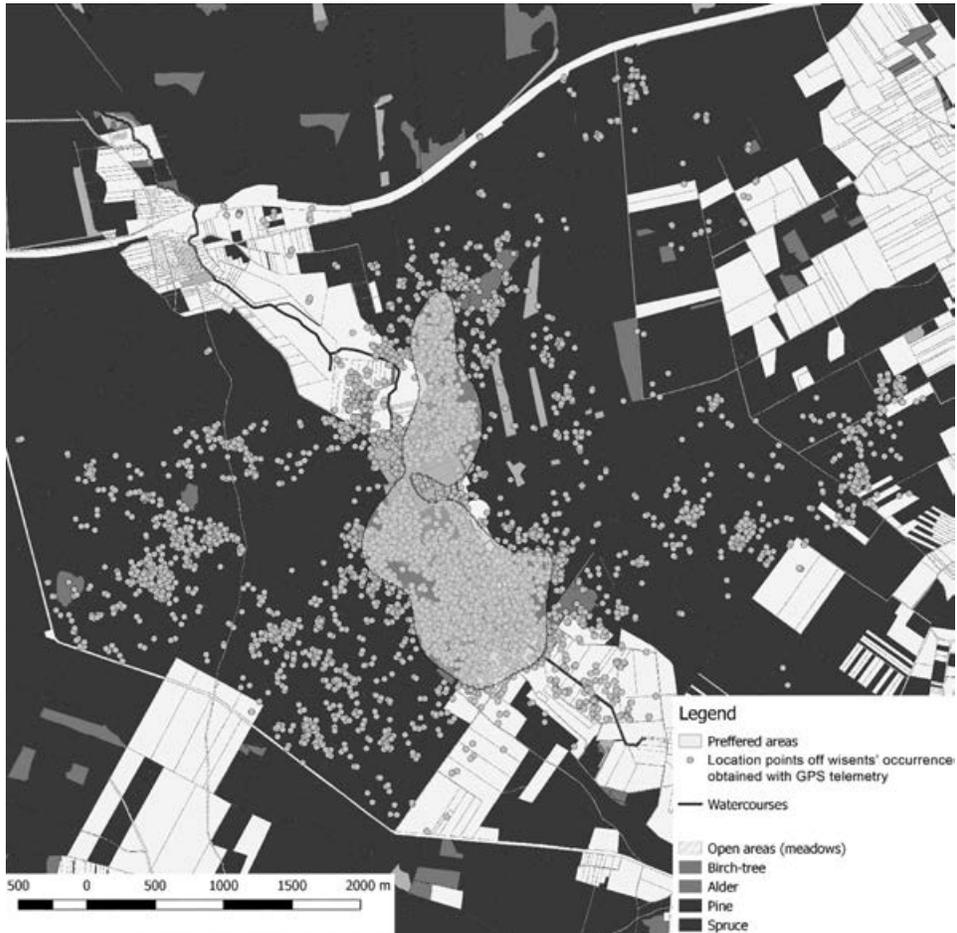


Figure 1. Area penetrated by the herd of European bison in Żednia Forest District in vegetative period of 2016 and their preferred area determined as Heatmap plugin using Kernel Density Estimation

fore, successful direct observation were almost impossible. Researchers dealing with other reintroduced herds encountered similar difficulties (Chistopolova *et al.* 2014; Tracz *et al.* 2008).

However during all that time, GPS transmitters regularly provided information on herd's movements and its habitat preferences. Comparing to the main herd of wisents in the Knyszyńska Forest, the area used by the subpopulation of Żednia was rather small and equaled to 49 km² (Sobczuk and Olech 2016). However, it should be taken into account that on average, such area is typical for the animals from the Białowieża Forest where wisents of Żednia came from (Kraśńska *et al.* 2004; Kowalczyk 2010; Kraśńska *et al.* 2010). Additionally, meadows of Sokole are rich

in food base, as well as in places providing shelter. Therefore, the excellent environmental conditions and individual habits of these animals were the reasons for using relatively small area during whole growing season (Tracz *et al.* 2008; Krasieńska *et al.* 2010). Areas preferred by animals were identified using the Heatmap plugin in the Quantum GIS spatial information system. The Heatmap plugin uses Kernel Density Estimation to create a density (heatmap) raster of an input point vector layer. The density of animals' locations is calculated based on the number of points in a location, with larger numbers of clustered points resulting in larger values. Heatmaps allow easy identification of "hotspots" and clustering of points, what in this case allows to determine the areas willingly used by wisents.

Detailed analysis of occurrence density obtained with GPS transmitters allowed to define the area preferred by the herd that equaled to 6.3% of the total available area, i.e. 3.05 sq km (Fig. 1.). Meadows of Sokole were the center of the herd home range. They mainly preferred the part not accessible for people, i.e. marshy area with birch trees. They also penetrated the refuges provided by the neighboring forests, however, not further than 800 m from the meadows.

During the whole season they moved a few times for a bit longer distances from the center of their home range – 4.5 km to the west and almost 6 km to the north-east. To the west, the barrier for animals' movements appeared to be the regional road No 686, and at the north-east side the border of herd's range was formed by the railway between Sokole Białostockie and WaliŃy. Animals were using also some small part of the neighboring WaliŃy Forest District.

At the end of growing season, wisents limited their penetration of the forest and stayed mainly in the center of the meadows. In 2016 there were no records on calves appearance.

Winter range

To avoid problems related to damages in agricultures caused by the main herd of wisents from Knyszyńska Forest, the animals living in the area of Żednia were from the very first winter season additionally fed, in order to prevent damages to field crops. Supplemental food was provided in 4 places. Animals willingly were using them and during the wintertime they were moving mainly among feeding points. The home range of the herd in winter was slightly smaller than during the growing season and it covered 43.8 km².

Spatial analysis of location points allowed to determine that animals spent most of the time close to the feeding stations within the area of 1.85 km², i.e. 4.2% of the herd's winter home range (Fig. 2). Twice, in December 2016 and in January 2017, wisents crossed the railway that in growing season was the border of their range. Each time though, they returned to the center of their home range quite soon. In winter, animals also used some small part of the neighboring WaliŃy Forest District.



Figure 2. The area penetrated by herd of wisents in winter period 2016/17 and their preferred area determined as Heatmap plugin using Kernel Density Estimation.

Conclusions

Excellent environmental conditions provided by Żednia District allowed reintroduced wisents to settle in quickly and effectively. This report was prepared in the middle of the second growing season (2017) spend in freedom by the herd in Żednia District. Wisents are using the same area as in 2016, concentrating mainly on open or half-open areas of Sokole meadows. The stable use of the same area and lack of attempts to change it, are the best proof for the perfect choice of conditions selected for wisents' introduction. It also allows to hope for the successful development of the new herd (Bereszyński 2004; Tracz *et al.*; 2008, Kaliciuk *et al.* 2009).

The presence of females should stimulate the penetration of the area by migrating bulls and facilitate the spread of the herd over the larger area in both directions: towards the Knyszyńska and Białowieska Forests (Kraśńska *et al.* 1994; Kraśński and Kraśński 2004; Bożik 2008).

Unfortunately, in 2017 also no calves appeared. The herd is still counting 8 animals. However, we hope that because of the presence of young cows in the herd, it will begin to grow in numbers in subsequent years.

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Nowe stado żubrów na terenie Nadleśnictwa Żednia w Puszczy Knyszyńskiej

Streszczenie: W 2016 roku na teren nadleśnictwa Żednia wprowadzono nowe wolne stado żubrów w Puszczy Knyszyńskiej. Po kilku miesiącach spędzonych w zagrodzie adaptacyjnej zwierzęta wypuszczono na wolność. Przebieg ich aklimatyzacji obserwowano dzięki nadajnikom GPS. Obserwacje bezpośrednie były utrudnione ze względu na niedostępny teren i płochliwość zwierząt. Zwierzęta zajęły areal w bliskiej okolicy zagrody adaptacyjnej. W okresie wegetacyjnym stado poruszało się po obszarze około 50km², w okresie zimowym penetrowany teren był nieco mniejszy. Aklimatyzacja zwierząt przebiegła bez przeszkód.

