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Wolf monitoring in the Holy Cross Mountains region – interim report

History of wolves in the Holy Cross Mountains (Góry Świętokrzyskie) region

Wolves west of the Vistula River were exterminated in the second half of the 19th century (Wolsan et al. 1989). In the beginning of the 20th century, numbers of wolves within the borders of present day Poland increased and wolves were recorded in several locations west of the Vistula River, including the Holy Cross Mountains region. Between the First and Second Word Wars, wolves in Poland had simultaneously the status of a game and a pest species (Okarma 1993). Intensive hunting and extermination led to population decline in the mid-thirties, and therefore wolves were rarely recorded in the Holy Cross Mountains region. The population of wolves increased in Poland again after the Word War II, reaching its maximum in the mid-fifties (Okarma 1993). In 1955, wolves were taken out of the game species list and considered as a pest. The government established a wolf control program with bounties paid for killed adult and pups. This extermination program led to a drastic reduction of wolf numbers and range of the population. Wolves survived only in remote areas in eastern Poland and their numbers were estimated in the mid-sixties at only 60 individuals. In the Holy Cross Mountains region, the extermination program caused wolves to be extinct already in the fifties (Gula et al. 2007, Gula 2008a).

In the late sixties, many naturalists, biologists and conservationists pointed out that the continuation of the wolf extermination program will lead to wolf extinction in Poland. These views were taken into consideration and the government changed the status of wolves from pest to game species in 1975. The hunting for wolves was allowed only with firearms and a closed season from 1th of April to 31th of July was implemented in 1981. This regulation helped the wolf population to recover in range and numbers. Already in the late eighties wolf numbers in Poland were estimated at 600-900 individuals. Wolves were again recorded in the Holly Cross Mountains region (Fig. 1). In 1980-84, a female with pups were regularly observed near Daleszyce, but in 1984 poisoned female was found in the same region. In the mid-eighties, a wolf den was found near Przysucha, but the pups were later poisoned. In 1984, a male, and in 1985, a female were legally shot near Barycz, north of Końskie. In 1995, a wolf was poached south of Krasna. In 2000, a dead wolf was found near Końskie and a female was poached with a snare near Przedboórz on Pilica River. In 2005, wolves were seen in Niekłań-Bliżyn Forest, and

during the winter of 2005/2006, the presence of a wolf pack (4 individuals) was recorded in the western Holly Cross Forest. This pack reproduced in 2007 and 2008 (Gula & Milanowski 2006; Gula et al. 2007).

In 1995, wolves became protected in the majority of Poland, with the exception of three eastern provinces (Krosno, Nowy Sącz i Suwałki). In 1998, the protection of wolves was extended to the entire territory of Poland. At present, the range and numbers of wolves in Poland are at least stable, but some data indicate an expansion in range and numbers (Gula 2008 b, Okarma et al. 2012).

Results of wolf monitoring in the Holy Cross Forest (Puszcza Świętokrzyska) in 2006-2012

During this period wolf monitoring was restricted to the western Holy Cross Forest (Puszcza Świętokrzyska). We recorded 220 times wolf presence, we snow tracked wolves for about 60 km and we collected over 100 scats for analyses of diet, DNA and stress hormones.

We recorded wolves in the area for the first time in winter 2005/2006. Artur Milanowski saw 2 wolves crossing a forest road. As he checked snow tracks, it became evident that there were 3 wolves present. Later we snow tracked 2 wolves, which killed a roe deer. Blood marks that we saw on snow provided evidence that one individual of the pair was a female in estrous. In July of summer 2006, we localized the entire pack of 4 adults and pups by howling stimulation. The pack was regularly howling at the same location, apparently the pack's rendezvous site, until mid-August. Also in the summer of 2007, we heard several times the pack howling with pups. During 2008-2012, we recorded regularly presence of wolves in the forest, but never more than 3 individuals. Unfortunately, we also did not have any evidence of reproduction during this period. The range of the Western Holy Cross Forest Pack estimated on the basis of snow tracking covered 100 km (Eggermann et al. 2012, Fig. 2). The wolves preyed most often on roe deer, then wild boar and red deer (Fig 3).

Methods and the area of wolf monitoring

The area of the wolf monitoring program of the SAVE Foundation covers the foothills of the Holy Cross Mountains (Góry Świetokrzyskie), situated at the boundary of the Świętokrzyskie and Mazowieckie Provinces (50°59'-51°10'N, 20°31-20°43'E). The area consists of rolling hills up to 450 m a.s.l., of which about 60% are covered by forest. Major forest complexes are Niekłań-Bliżyń Forest (Lasy Niekłańsko-Bliżyńskie), Holy Cross Forest (Puszcza Świetokrzyska) and Iłża Forest (Puszcza Iłżecka) belonging to Stąporków, Suchedniów, Zagnańsk, Skarżysko, Starachowice, Marcule and Ostrowiec Forest Superintendences (Fig. 1). Besides pine plantation in some locations (Iłża Forest), the area is covered with highly diverse mix forest consisting of pine, spruce, fir, larch, oak, beech, hornbeam, birch, lime, alder and sycamore. Numerous red deer, roe deer and wild boars inhabiting the area constitute a sufficient prey base for wolves.

Since September 2012, the wolf monitoring was extended to 3 locations (Fig. 1). Besides the western part of Holy Cross Forest (Puszcza Świetokrzyska), we established systematic monitoring in the Niekłań-Bliżyn Forest (Lasy Niekłańsko-Bliżyńskie) and Iłżecka Forest (Puszcza Iłżecka). We checked each of these locations for signs of wolf presence (tracks, scats, urine and scratch markings, prey, wolf sightings) at least twice a month by driving on forest roads. Additionally, monitoring in the western Holy Cross Forest was more intensive because Artur Milanowski is a forester working in this forest every day. For each sign of wolf presence, we recorded date, GPS location, type of sign and number of wolves (if possible). Additionally, during the period of snow cover, we snow-tracked wolves, recording the track with GPS along with wolf numbers and their behavior. We entered all data into a data base (Excel) and a Geographic Information System (ArcGIS). We collected scats for further diet and DNA analysis, and blood deposits on snow for DNA analysis.

Additionally, we asked forest personnel and hunters who work in the monitored locations about their knowledge on wolf presence. We verified then information about records of tracks and scats that we obtained from these people. We included visual observations and howling records of wolves obtained during the interviews as when we had little doubt about the correctness of these observations.

Results

From September 2012 to February 2013, we collected 169 records of wolf presence in the 3 monitored locations (Table 1). These records include tracks, urine and scratch marking (31), scats (22), prey (4), visual observations of wolves (8) and howling (1). During the period of snow cover, we snow-tracked wolves for a total of 22 km in the 3 locations (Fig. 4).

Iłża Forest (Puszcza Iłżecka)

In May 2012, the forester Z. Forys heard a pack of up to 4 individuals howling for several times. In June 2012, near to this location, loggers working in the forest saw wolves twice, once 3 and the other time 4 individuals. On 16th of December, the hunter S. Wlazło observed 5 wolves from a hunting tower. We recorded tracks of wolves in this region regularly but never more than 2 wolves together (Table 1). On the 27th of January, we snow-tracked a pair of wolves, and found blood on snow, which provided evidence that one individual of the pair was a female in estrous.

Altogether, the information point at the presence of a pack of up to 5 wolves inhabiting the area and the presence of at least one receptive female in this year. Therefore, we expect wolf breeding in this area in the coming spring.

Western Holy Cross Forest (Puszcza Świętokrzyska)

We did not collect in this area many (19) signs of wolf presence despite this area was inspected most frequently. In this location, we did not record groups of more than 2 wolves but on 22 of February we snow tracked simultaneously pair of wolves intensively marking the area, and one individual which stay in the same area, but was separated from the pair. All tracks we recorded were of medium size, suggesting that wolves are relatively young. We did not collect any evidence of estrous.

Now, there seem to be fewer wolves in the western Holy Cross Forest than during the period of 2006-2008, when a pack of at least 4 adults was breeding in the area. This might be related to the death of a 3-4 year female caused by a car accident next to the village of Odrowążek during the fall of 2011 and anecdotes of some wolves being poached.

Niekłań-Bliżyn Forest (Lasy Niekłańsko Bliżyńskie)

In this area, we collected 90 signs of wolf presence and snow tracked wolves for 7.9 km. We recorded the presence of a pair of wolves, which intensively marked the area. Tracks of one of the pair were large, as of adult males, and we recorded signs of estrus (blood on snow) of the second wolf, apparently a female. During snow tracking, we recovered two roe deer freshly killed, of which they ate about 80%. Because of the evidence of estrous, we expect that the tracked pair will produce pups in the coming spring.

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Table 1. Summary of wolf monitoring in the Holly Cross Mountains Region

Forest	Tracks	Scats	Urine	Scratch marking	Signs of estrous	Maximum numbers of individuals recorded
Niekłań-Bliżyn Forest	45	15	19	3	3	2
Western Holy Cross Forest	14	3	1	0	0	2+1
Iłżecka Forest	37	4	7	2	3	5

Fig. 1. Forest in the foothills of the Holy Cross Mountains (Góry Świętokrzyskie). Red circles indicate the areas of the wolf monitoring program of the SAVE Foundation in Niekłań-Bliżyn Forest (Lasy Niekłańsko-Bliżyńskie), western Holy Cross Forest (Puszcza Świętokrzyska) and Iłża Forest (Puszcza Iłżecka). Blue dots and year indicate earlier records of wolves (frequent observations of wolves, wolf's dens and death wolves).

Fig. 2. Home range (blue line) of the wolf pack inhabiting the western Holy Cross Forest estimated by snow-tracking. Yellow line - snow tracking routes, brown triangles – wolf scats, green area – forest, black lines – roads.

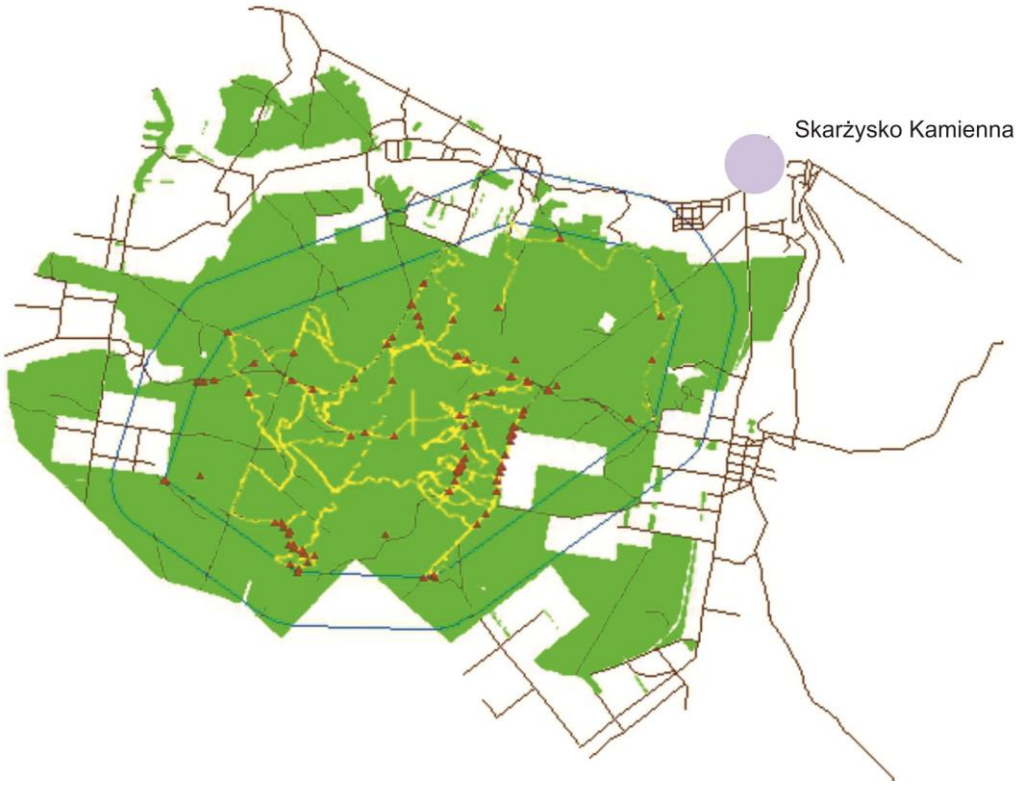

Fig. 3. Diet composition of wolves in the Holy Cross Forest based on the frequencies of prey species in wolf scats (2007-2010).

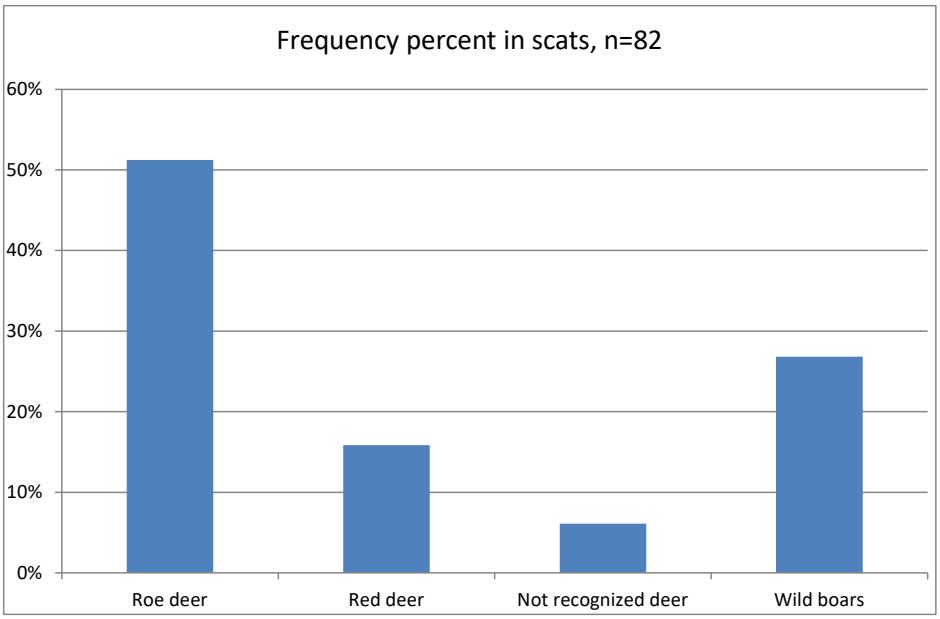

Fig. 4. Results of the wolf monitoring program of SAVE Foundation in the Holly Cross region. Red ellipses-e 3 areas systematically checked for signs of wolf presence with a minimum numbers of wolves occupying given area; black dots – records of wolf presence (n=169); black lines - snow track routes (22km).