

Areas of the European Ecological Network Natura 2000 in Roztocze

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Abstract

The Natura 2000 network includes Special Areas of Conservation SACs (habitat refuges coded PLH) and Special Protection Areas SPA (bird refuges coded PLB). The objective of the network, covering the member states of the European Union, is the preservation of natural habitats and plant and animal species threatened with extinction on a European scale, as well as typical, commonly occurring natural habitats. Currently in Poland the Natura 2000 network covers almost 1/5 of the land surface. It includes 849 Sites of Community Importance (“habitat” areas—potential special areas of habitat conservation), and 145 special protection areas for birds. The region of Roztocze includes, entirely or in part, three bird refuges (PLB060012 Roztocze, PLB060008 Puszcza Solska, PLB060021 Dolina Solokiji) and 12 habitat refuges (PLH060070 Borowa Góra, PLH060003 Debry, PLH180017 Horyniec, PLH060089 Minokąt, PLH060017 Roztocze Środkowe, PLH060020 Sztolnie w Senderkach, PLH060022 Święty Roch, PLH060094 Uroczyska Lasów Adamowskich, PLH060034 Uroczyska Puszczy Solskiej, PLH060093 Uroczyska Roztocza Wschodniego, PLH060028 Zarośle, and PLH060029 Żurawce). The article presents the geographical-environmental description of the refuges of Natura 2000 in Roztocze, and point out their relations with the previously existing protected areas and subjects of protection.

Keywords: Natura 2000, nature protection, biodiversity, Roztocze region

Introduction

One of the obligatory tasks of the member states of the European Union in the scope of nature protection is the implementation of the European Ecological Network Natura 2000. Natura 2000 consists of Special Areas of Conservation SACs (habitat refuges coded PLH) and Special Protection Areas SPAs (bird refuges coded PLB). The objective of the establishment of the network is the preservation of natural habitats and plant and animal species threatened with extinction on a European scale, as well as typical, commonly occurring natural habitats. A reference list of natural habitats and species for which Natura 2000 areas should be established is prepared for each of the countries. Natura 2000 areas may cover a part or the entire areas and objects covered by other forms of nature protection.

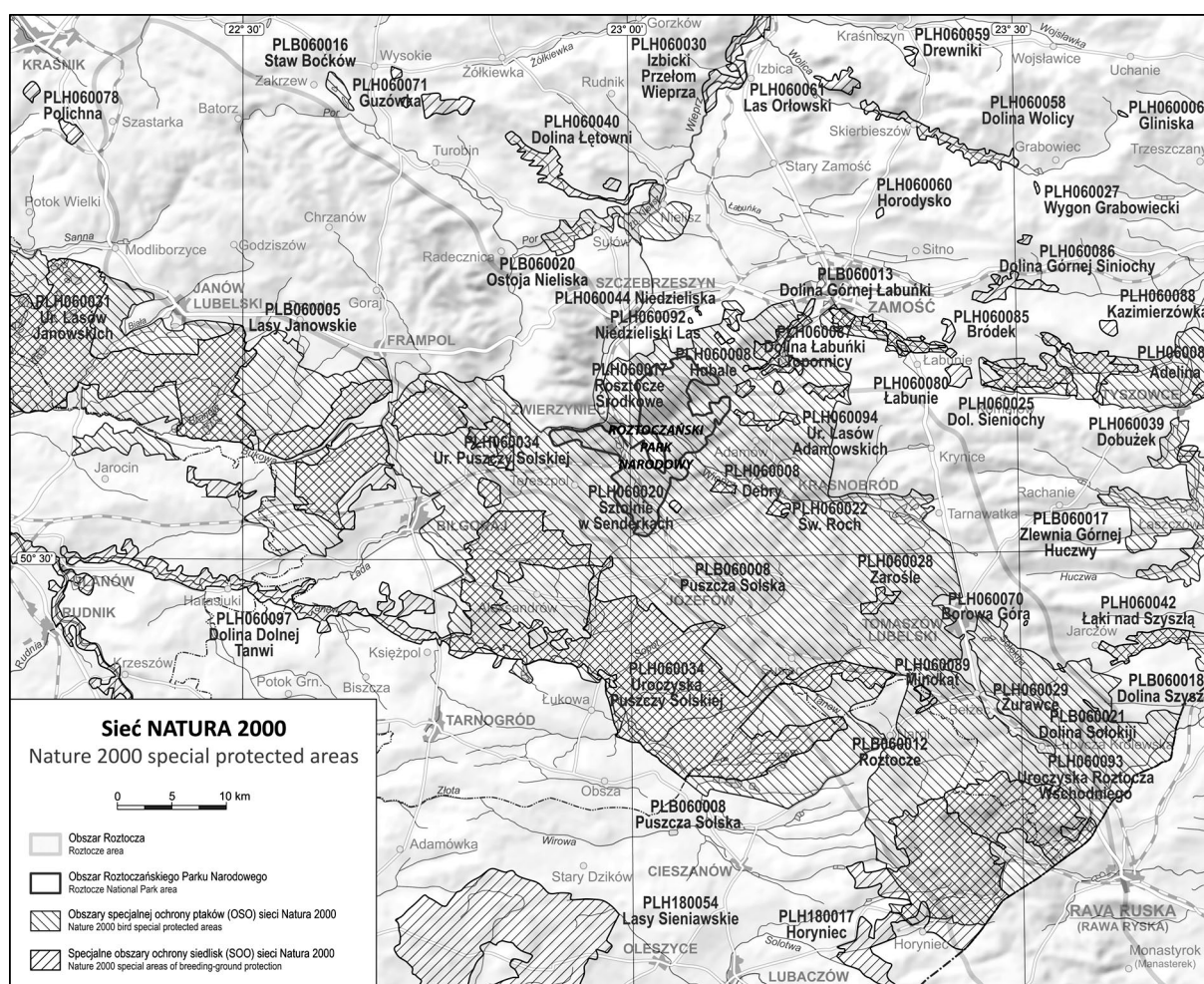
Currently in Poland the Natura 2000 network occupies almost 1/5 of the land surface. It includes 849 Sites of Community Importance (“habitat” areas—potential special areas of habitat conservation) and 145 special protection areas for birds.¹ A number of protected areas and objects have been established in Roztocze over the last several decades. At present, owing to the latest (and international) form of nature protection in our country, namely Natura 2000 areas, the entire Central and South Roztocze region on the Polish side of the border is under legal protection.

In 2000, based on order of the Minister of the Environment, a team of specialists from the Department of Ornithology of the Polish Academy of Sciences in Gdańsk under the supervision of M. Baranowski developed the first concept of the Natura 2000 network in Poland. It stipulated the establishment of 285 refuges occupying 14,5% of the area of the country. In the Lubelskie Voivodship,

1. See: <http://natura2000.gdos.gov.pl/>.

21 areas were planned in the scope of the first concept of the Natura 2000 network, including: Roztocze Środkowe (Central Roztocze), Puszcza Solska (Solska Forest), Roztocze Południowe (South Roztocze), and seven areas of special conservation, including Roztocze (Sielewicz 2002).

The official government project submitted to the European Commission in 2004 included 72 bird refuges and 184 habitat refuges with a total area of only 11 716 km² (i.e. approximately 3,7% of the area of Poland).² The list included 12 bird refuges located entirely or partly in the Lubelskie Voivodship, including Puszcza Solska (Solska Forest), and 29 habitat refuges, including: Debry, Kąty, Roztocze Środkowe (Central Roztocze), Sztolnie w Senderkach (Mining Tunnels in Senderki), Święty Roch, Zarośle, and Żurawce.³ The Regulation of the Minister of the Environment of 5 September 2007 amending the regulation of 2004 mentioned 124 bird refuges, including 22 located entirely or partly in the Lubelskie Voivodship. In comparison to the Regulation of 2004, 10 new areas appeared. Some of them were proposed in earlier documents, including Dolina Sołokiji (Sołokija River Valley) and Roztocze.



Map 1. Map of Natura 2000 areas in Roztocze

Source: Own elaboration based on P. Cebryk, W. Kałamucka, K. Kałamucki, M. Meksuła. 2012. *Województwo lubelskie. Parki krajobrazowe i inne formy ochrony przyrody. Mapa w skali 1:300 000.* Kartpol, Lublin [Lubelskie Voivodship. *Landscape Parks and Other forms of Nature Protection. Map at a scale of 1:300 000*]

2. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

3. See: Rozporządzenie Ministra Środowiska z dnia 21 lipca 2004 r. w sprawie obszarów specjalnej ochrony ptaków Natura 2000 [Regulation of the Minister of the Environment of 21 July 2004 on special protection areas for birds Natura 2000], DzU z 2004 r. nr 229 poz. 2313.

The area of Roztocze currently includes, entirely or in part, three bird refuges (PLB060012 Roztocze, PLB060008 Puszcza Solska, PLB060021 Dolina Sołokiji) and 12 habitat refuges:

- PLH060003 Debry
- PLH180017 Horyniec
- PLH060089 Minokąt
- PLH060017 Roztocze Środkowe
- PLH060020 Sztolnie w Senderkach
- PLH060022 Święty Roch
- PLH060094 Uroczyńska Lasów Adamowskich
- PLH060034 Uroczyńska Puszczy Solskiej
- PLH060093 Uroczyńska Roztocza Wschodniego
- PLH060028 Zarośle
- PLH060042 Żurawce (Stanicka, Kałamucka, and Meksuła 2013).

1 Bird refuges in Roztocze

1.1 Bird refuge PLB060012 Roztocze

Bird refuge PLB060012 Roztocze was officially established based on the Regulation of the Minister of the Environment of 5 September 2007 amending the regulation on special protection areas for birds Natura 2000⁴ over an area of 103,5 thousand ha. It covers the entire Central and South Roztocze region. Approximately 51% of the area is occupied by forests, alternated with cultivated land, villages, and towns. Agricultural settlements occupy 44% of the area of the refuge, and meadow habitats—4%. The occurrence of 45 bird species from Appendix I of the Council Directive 09/147/EC of 30 November 2009 on the conservation of wild birds and 15 species from the Polish Red Data Book of Animals are recorded in the refuge. Refuge Roztocze is related to numerous protected areas, namely the Roztocze National Park, and several reserves: Debry, Hubale, Nowiny, Szum, Święty Roch, Wieprzec, Zarośle, Sołokija, Minokąt, Źródła Tanwi, and Jalinka, Krasnobród, Solska Forest, and South Roztocze landscape parks, the Roztocze Area of Protected Landscape (in the Podkarpackie Voivodship), and with habitat refuges: PLH060017 Roztocze Środkowe, PLH060003 Debry, PLH180017 Horyniec, PLH060008 Hubale, PLH060010 Kąty, PLB060008 Puszcza Solska, PLH060020 Sztolnie w Senderkach, PLH060022 Święty Roch, and PLH060028 Zarośle. Roztocze also includes fragments of two further bird refuges: Puszcza Solska and Dolina Sołokiji.

1.2 Bird refuge PLB060008 Puszcza Solska

Bird refuge PLB060008 Puszcza Solska (Solska Forest) was officially established based on the Regulation of the Minister of the Environment of 21 July 2004 on special protection areas for birds Natura 2000 over an area of 74 816,9 ha. It was later expanded based on the Regulation of the Minister of the Environment of 5 September 2007 amending the regulation on special protection areas for birds Natura 2000 to 79 349,1 ha. The Solska Forest is an extensive forest complex located in the zone of contact of Roztocze and Sandomierz Basin, with a clearly distinguishable boundary zone of Roztocze. It is dissected by numerous river valleys, often with a character of a gorge, with river steps (locally called szypoty). 70% of the area of the refuge is occupied by coniferous forests, followed by deciduous forests—1%, mixed forests 3%, meadow and rush habitats—9%, and agricultural habitats—13%. The Solska Forest is a bird refuge with the European rank of E 74. It features the occurrence of 39 bird species from Appendix I of the Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds, one amphibian species, three mammal species, and one plant species from Appendix II to Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora, as well as 14 species from the Polish Red Data Book. As many as 135 breeding bird species occur here. It is also one of the few breeding sites of

4. See: Rozporządzenie Ministra Środowiska z dnia 5 września 2007 r. zmieniające rozporządzenie w sprawie obszarów specjalnej ochrony ptaków Natura 2000, DzU z 2007 r. nr 179 poz. 1275.

the short-toed eagle in Poland. It is a very important on the regional scale refuge of the vertebrate forest fauna, including numerous threatened and rare species. It is also the only known site in Poland of occurrence of the insect *Nobis major* (SDF, GDOŚ). The Refuge Puszcza Solska is related to numerous protected areas, namely the reserves of Czartowe Pole, Nad Tanwią, Bukowy Las, and Obar, as well as the Puszczy Solskiej and the Szczepreszyn Landscape Parks, the Roztocze Area of Protected Landscape (in the Podkarpackie Voivodship), and refuge PLH060034 Uroczyska Puszczy Solskiej (Ranges of the Solska Forest).

2 Habitat refuges in Roztocze

2.1 Refuge PLB060021 Dolina Sołokiji

Refuge PLB060021 Dolina Sołokiji (Sołokija River Valley) was officially established based on the Regulation of the Minister of the Environment of 5 September 2007 amending the regulation on special protection areas for birds Natura 2000 over an area of 13 667,8 ha. It covers the Sołokija River valley from Tomaszów Lubelski to the Ukrainian border, where a number of meanders and oxbow lakes were retained. 52% of the area of the refuge is occupied by agricultural habitats, followed by forests—28%, meadow habitats—18%, and waters—2%. The occurrence of 21 bird species included in Appendix I of the Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds are recorded in the area. The abundance of Syrian woodpeckers meets the criteria of the establishment of bird refuges of BirdLife International. Seven species are included in the Polish Red Data Book of Animals. Refuge Dolina Sołokiji is related to the Machnowska Góra reserve (only on 0,2% of its area), and habitat refuge PLH060029 Żurawce.

2.2 PLH060070 Borowa Góra

PLH060070 Borowa Góra occupies an area of 3,3 ha. The refuge is located in the commune of Tomaszów Lubelski, south of the Chorążanka village. The protected area covers a fragment of a xerothermic grassland on the boundary of the forest complex. A population of lady's-slipper orchid (*Cypripedium calceolus*) occurs in the area, growing in initial xerothermic grass. One of five sites of lady orchid (*Orchis purpurea*) in the Lubelskie Voivodship is also located here. The area also features the occurrence of one type of habitat from Appendix I of the Council Directive 92/43/EC, and one plant species from Appendix II of the Council Directive 92/43/EEC.

2.3 PLH060003 Debry

PLH060003 Debry occupies an area of 179,46 ha in the Adamów Commune in the Zamość County. The area covers an inselberg elevation and a part of a plateau dissected with numerous erosional cuts called dry gullies. Environmentally valuable patches of natural beech-fir forests occur here, representing communities of Carpathian beech forest and uplands fir mixed coniferous forest. The high value of the reserve is also determined by the presence of large areas of an old fir and beech tree stand, and a number of protected plants and plants rare in the region. Two types of habitats from Appendix I of the Council Directive 92/43/EC appear here. The area of the refuge covers the Debry reserve, and is located in the buffer zone of the Roztocze National Park and bird refuge PLB060012 Roztocze.

2.4 PLH180017 Horyniec

PLH180017 Horyniec occupies an area of 11 633,03 ha. Its major part is located on the Tarnogród Plateau, and its small upland fragment in East Roztocze. Five types of natural habitats from Appendix I of the Council Directive 92/43/EEC are recorded in the area, as well as seven animal species from Appendix II of the Council Directive 92/43/EEC. The area features a breeding colony of greater mouse-eared bat, and wintering areas of greater mouse-eared bat, pond bat, and barbastelle. The area also includes feeding grounds of bats. The vicinity of Horyniec is a refuge of a rare butterfly—the marsh fritillary (*Euphydryas aurinia*). The northern part of the refuge is a place of occurrence and regular reproduction of wolves (0,8% of the national population). The ref-

uge includes the entire or partial areas of the following reserves: Źródła Tanwi i Sołokija (Sources of the Tanew and Sołokia rivers), South Roztocze Landscape Park, Roztocze Area of Protected Landscape, and bird refuge PLB060012 Roztocze.

2.5 PLH060089 Minokąt

PLH060089 Minokąt occupies an area of 177,92 ha. It covers a lowering between Cretaceous hills, filled with dune sands. Natural eutrophic lakes developed in the closed-drainage basins, featuring the occurrence of yellow-spotted whiteface (*Leucorinia pectoralis*). The refuge also includes well preserved raised and transitional bogs as well as marshy coniferous forests. The hills are overgrown by dry-ground forest *Tilio carpinetum* and dry-ground forest with fir. Fir coniferous forests *Abietum polonicum* developed below. The refuge is located in the special protection area for birds Roztocze (PLB060012). It covers the Minokąt nature reserve and a fragment of the Roztocze Area of Protected Landscape. Six types of habitats from Appendix I of the Council Directive 92/43/EC and 1 animal species from Appendix II of the Council Directive 92/43/EEC appear here.

2.6 PLH060017 Roztocze Środkowe

PLH060017 Roztocze Środkowe (Central Roztocze) occupies an area of 8 472,8 ha, and is almost equivalent in terms of area to the Roztocze National Park. A small fraction of its area belongs to the Szczebrzeszyn Landscape Park. The area is of importance for the preservation of biodiversity. More than 40% of the area is occupied by habitats from Appendix I of the Council Directive 92/43/EEC (14 types). It is also a valuable refuge of forest fauna. The refuge, including diverse forest communities, features natural well preserved old tree stands. The rich vascular flora (approximately 700 species) is abundant, including rare and endangered species. Appendix II of the Council Directive 92/43/EEC mentions 21 animal species and 3 plant species occurring in the refuge. The area is also of high importance for the protection of birds. It belongs to bird refuge PLB060012 Roztocze (see above).

2.7 PLH060022 Święty Roch

PLH060022 Święty Roch occupies an area of 20,36 ha. The plant communities are dominated by phytocoenoses of uplands fir mixed coniferous forest and Carpathian beech forest. Valuable environmental elements include old monumental trees and sites of protected, rare, and endangered plant species. The refuge covers the area of the Święty Roch forest reserve, and is located in the Krasnobród Landscape Park and bird refuge PLB060012 Roztocze. Two habitats from Appendix I of the Council Directive 92/43/EC appear here.

2.8 PLH060020 Sztolnie w Senderkach

PLH060020 Sztolnie w Senderkach (Mining Tunnels in Senderki) is a refuge occupying an area of 80.6 ha. It includes mining tunnels remaining after the exploitation of sandstone for production of millstones. It features several mostly inaccessible objects. The tunnels consist of small chambers with a network of low corridors with a length of several meters. The primary objective of the establishment of the refuge is the preservation of wintering bats. It is one of the most interesting winter colonies of bats in the Lublin Region. Nine bat species winter here, including four species mentioned in Appendix II of the Council Directive 92/43/EEC. The refuge is located in the buffer zone of the Roztocze National Park, and in the area of bird refuge PLB060012 Roztocze.

2.9 PLH060094 Uroczyska Lasów Adamowskich

PLH060094 Uroczyska Lasów Adamowskich (Ranges of the Adamów Forest) occupies an area of 1 100,77 ha. The refuge is composed of four enclaves covering mostly forested loess and rendzina elevations. The area was designed for the purpose of protection of the perfectly preserved beech forests, relatively well developed dry-ground forests, and sites of occurrence of rare plants. The southern slopes of the elevations in some fragments of the refuge are overgrown with thermophilous vegetation. The most valuable beech forests are located in the following ranges: Lasy Komisarskie, Stary Działek, and Kąsiewiczza, and dry-ground forests dominated by oaks with a contribution

of hornbeam and beech between Szewnia and Wierzchowiska. The range, similar to the Stary Działek range, features sites of ladybells and lady's-slipper orchid—species from Appendix II of the Habitat Directive. The refuge is a part of the territory of a wolf pack (particularly the Komisarckie Forests) with the centre located in the adjacent Roztocze National Park. Lynx also appear here. The Roztocze National Park is their refuge. Four types of habitats from Appendix I as well as two plant species and two animal species from Appendix II of the Habitat Directive occur here. The refuge is located in the buffer zone of the Roztocze National Park and bird refuge PLB060012 Roztocze.

2.10 PLH060034 Uroczyńska Puszczy Solskiej

PLH060034 Uroczyńska Puszczy Solskiej (Ranges of the Solska Forest) occupies an area of 34 671,49 ha. Its extensive area covers a part of the Sandomierz Basin and small fragments of the boundary zone of Roztocze. The refuge constitutes a major part of one of the largest forest complexes in Poland. The occurrence of 16 types of natural habitats from Appendix I of the Habitat Directive is recorded here, as well as one plant species and 18 animal species from Appendix II of the Habitat Directive. The occurring wetland habitats are particularly valuable (peatlands, coniferous and marshy forests, and riverside carrs). The ranges of the Solska Forest constitute the most important refuge of wolf and lynx in the Lublin Region. These animals are threatened with extinction in Poland. Moreover, 16 other valuable animal species are recorded in the refuge, namely butterfly marsh fritillary, dragonflies—green snaketail and yellow-spotted whiteface, brook lamprey, European bullhead, European weatherfish and spined loach, northern crested newt, an abundant population of disappearing fire-bellied toad, pond turtle, bats—barbastelle, greater mouse-eared bat, and Bechstein's bat, beaver, and otter. Plants endangered on a European scale include a rare moss species, namely slender green feather moss. Other species worth attention include: 3 species of sundews, Siberian iris, common spotted orchid, kinnikinnick, marsh club moss, firmoss, and northern running-pine. The area also includes one of the scarce Polish habitats of the butterflies *Cenonympha hero* and *Lopinga achine* (Appendix IV of the Council Directive 92/43/EEC), and the only known in Poland habitat of the insect *Nobis major* (*Anaptus major*). The area is related to four reserves, namely Czartowe Pole, Bukowy Las, Nad Tanwią, and Obary, the Solska Forest and Szczebrzeszyn Landscape Parks, the Roztocze Area of Protected Landscape (Podkarpackie Voivodship), and refuges PL060012 Roztocze, PLH060097 Dolina Tanwi, and PLB060008 Puszcza Solska.

2.11 PLH060093 Uroczyńska Roztocza Wschodniego

PLH060093 Uroczyńska Roztocza Wschodniego (Ranges of East Roztocze) occupies an area of 5 809,99 ha. The refuge includes the largest compact parts of the forests of East Roztocze. Protection in the refuge particularly concerns the perfectly preserved beech tree stands (fertile beech forests) and animals (particularly wolf and lynx). Other occurring types of habitats include: riverside carrs (priority habitat), very rare in the Lublin Region *Cladonia-scotch* pine forests, and small patches of acidophilous beech forests (on the boundary of their natural range of occurrence). The area is of high importance for the preservation of fertile beech tree stands on the boundary of the range of occurrence and permanent territory of one wolf pack and one territory of lynx. The refuge is also inhabited by bats, and stag beetle related to the dying old trees, particularly oaks, growing next to the Jalinka reserve. Northern crested newt, European fire-bellied toad, otter, and beaver appear in the ponds. Seven habitats from Appendix I and 10 animal species from Appendix II of the Habitat Directive are found in the refuge. The refuge is mostly located in the area of the South Roztocze Landscape Park. It includes the Jalinka reserve, and is within areas PLB060012 Roztocze and PLH180017 Horyniec.

2.12 PLH060028 Zarośle

PLH060028 Zarośle occupies an area of 391,83 ha. It is located in Roztocze Tomaszowskie. It includes an extensive lowering with a character of a dry valley, and elevations on both sides. The majority of the area is forested. Three types of forest habitats from Appendix I of the Habitat Directive appear here. These are: fertile beech forests, uplands fir mixed coniferous forest, and

Central European dry-ground forest. The high environmental value of the area is determined by the presence of extensive patches of an old fir tree stand, and areas with natural regeneration of the species as well as a number of protected plants and plants rare in the region (bugbane, southern sweetgrass, fir clubmoss, and a non-photosynthetic bird-nest orchid). The refuge is located in the Roztocze Area of Protected Landscape and bird refuge PLB060012 Roztocze. It also includes the Zarośle reserve.

2.13 PLH060029 Żurawce

PLH060029 Żurawce obtained the status of SCI in February 2008. In December 2012, the area was enlarged to 35,76 ha. The area includes three elongated Upper Cretaceous elevations on the left slope of the Sołokija River valley. The hills are covered with grasses and xerothermic rushes including the most valuable xerothermic vegetation patches in the Lublin Region. The flora of the area includes species endangered in Poland, among others an abundant population of lady's slipper orchid (*Cypripedium calceolus*) and lady orchid (*Orchis purpurea*). According to the estimates by Kucherczyk (2007), the population of lady's slipper orchid is one of the most numerous in Poland (approximately 6% of the population). The area is also a refuge of rare xerothermic fauna, including southern birch mouse (site on the boundary of range of occurrence). The area of grasslands constitute approximately 0,32% of the resources of the habitat in Poland. Two types of habitats from Appendix I of the Council Directive 92/43/EC occur here, as well as one plant species and five animal species from Appendix II of the Council Directive 92/43/EEC. Areas related to the refuge include the Machnowska Góra reserve and bird refuge PLH0600021 Dolina Sołokiji.

A list of Natura 2000 refuges with their location and habitat structure is presented in table 1 (on the next two pages) and map 1 (on page 156). Plans of protection tasks, and eventually management plans are developed for Natura 2000 areas. Regional Directorates of Environmental Protection (RDOŚ) in Lublin and Rzeszów coordinate works on plans of protection tasks for refuges located entirely or in part in Roztocze, namely PLH060003 Debry, PLB060012 Roztocze, PLH060034 Uroczyska Puszczy Solskiej, PLB060008 Puszcza Solska, PLH060093 Uroczyska Roztocza Wschodniego, PLH180017 Horyniec, and Święty Roch PLH060022.

Conclusions

Roztocze belongs to the most environmentally valuable areas of East Poland. It is located on the boundary of environmental units of high importance. This favours the abundant occurrence of species and natural habitats. The most valuable ones are under various forms of nature protection. The largest protected area is under protection in the form of Natura 2000 areas. Nature protection in the Natura 2000 network is not restrictive. The objective of the protection of areas included in the network is the preservation of valuable natural habitats and plant, fungal, and animal species in its current condition. In the specific boundaries of the refuges, protection concerns specific habitats and species, and not the entire area, as is the case of, for example, nature reserves. Settlement can occur in the areas. Economic activity can also be carried out. The preservation of the traditional forms of management is supported financially in part through the possibility of subsidies for farmers from environmental programmes financed from the EU funds. Areas included in the Natura 2000 network have the exceptional asset of the potential for development of environmentally friendly forms of tourism, production of healthy foods, and promotion of the region. Roztocze is distinguished in the Lublin Region not only by its high environmental and landscape values, but also old traditions in the scope of nature protection. It should take advantage of these assets.

Tab. 1. List of Natura 2000 refuges in Roztocze

Name and code of refuge	Area in ha	Geographical location	Administrative location	Land cover – habitat classes
PLH060070 Borowa Góra	3,3	East Roztocze	Tomaszów Lubelski Commune, Tomaszów County	Forests 28% Forest habitats 2% Agricultural habitats 70%
PLH060003 Debry	179,5	Central Roztocze	Krasnobród Commune, Zamość County	Coniferous forests 1% Mixed forests 99%
PLB060021 Dolina Sotokiji	13 667,8	Central Roztocze, Bełzec Plain	communes: Bełzec, Tomaszów Lubelski, Lubycza Królewska; Tomaszów County	Coniferous forests 15% Deciduous forests 2% Mixed forests 11% Meadow and rush habitats 18% Inland waters 2% Agricultural habitats 52%
PLH180017 Horyniec	11 633,0	Tarnogród Plateau East Roztocze	communes: Cieszanów, Horyniec-Zdrój, Narol, Lubaczów; Lubaczów County	Coniferous forests 33% Deciduous forests 9% Mixed forests 24% Meadow and rush habitats 3% Agricultural habitats 1%
PLH060089 Minokąt	177,9	East Roztocze	Bełzec Commune, Tomaszów County; Narol, Lubaczów County	Coniferous forests 41% Deciduous forests 14% Mixed forests 41% Agricultural forests 4%
PLB060008 Puszcza Solska	79 349,1	Central Roztocze and Biłgoraj Plain	Susiec Commune, Tomaszów County, Radecznicza, Zamość County, Biłgoraj, Frampol, Tereszpol, Księżpol, Józefów, Aleksandrów, Łukowa, Obsza, Biłgoraj County, Cieszanów, Narol, Lubaczów County, Harasiuki, Nisko County	Coniferous forests 70% Deciduous forests 1% Mixed forests 5% Meadow and rush habitats 9% Agricultural habitats 13% Inland waters 1% Other areas (cities, villages, roads, landfills, mines, industrial) 1%
PLB060012 Roztocze	103 503,0	Central and East Roztocze	communes: Zamość, Szczepieszyn, Zwierzyniec, Krasnobród, Adamów; Zamość County, Tereszpol, Józefów, Biłgoraj County, Susiec, Tomaszów Lubelski, Bełzec, Tarnawatka, Lubycza Królewska, Tomaszów County, Horyniec-Zdrój, Narol, Lubaczów County	Other areas (cities, villages, roads, landfills, mines, industrial) 1% Coniferous forests 31% Deciduous forests 5% Mixed forests 14% Forest habitats 1% Meadow and rush habitats 4% Agricultural habitats 44%

Tab. 1. (continued)

Name and code of refuge	Area in ha	Geographical location	Administrative location	Land cover – habitat classes
PLH060017 Roztocze Środkowe	8 472,8	Central Roztocze	Zwierzyniec Commune, Zamość County, Terespol, Biłgoraj County	Coniferous forests 51% Deciduous forests 8% Mixed forests 37% Agricultural habitats 4%
PLH060020 Sztolnie w Senderkach	80,6	Central Roztocze	Krasnobród Commune, Zamość County	Coniferous forests 79% Forest habitats 2% Agricultural habitats 19%
PLH060022 Święty Roch	202,4	Central Roztocze	Krasnobród Commune, Zamość County	Coniferous forests 67% Deciduous forests 23% Mixed forests 10%
PLH060094 Uroczyńska Lasów Adamowskich.	1 100,8	N boundary of Central Roztocze	communes: Adamów, Zamość; Zamość county	Coniferous forests 1% Deciduous forests 68% Mixed forests 27% Agricultural habitats 4%
PLH060034 Uroczyńska Puszczy Solskiej	34 671,5	S boundary of Roztocze, Biłgoraj Plain	communes: Frampol, Biłgoraj, Terespol, Aleksandrów, Obsza, Józefów, Łukowa; Biłgoraj County, Susiec, Tomaszów County, Radeczna, Zamość County, Cieszanów, Narol, Lubaczów County	Coniferous forests 80% Deciduous forests 2% Mixed forests 4% Forest habitats 2% Meadow and rush habitats 9% Agricultural habitats 2% Peatlands, wetlands, vegetation on water banks, marshes 1%
PLH060093 Uroczyńska Roztocza Wschodniego	5 810,0	East Roztocze	Lubycza Królewska Commune, Tomaszów County, Horyniec-Zdrój, Narol, Lubaczów County	Coniferous forests 41% Deciduous forests 28% Mixed forests 17% Agricultural habitats 13% Inland waters 1%
PLH060028 Zarośle	391,8	Central Roztocze	Tarnawatka Commune, Tomaszów County	Coniferous forests 44% Mixed forests 55% Agricultural habitats 1%
PLH060029 Żurawce	35,9	Central Roztocze	communes: Jarczów, Lubycza Królewska; Tomaszów County	Agricultural habitats 100%

Source: Own elaboration (February-April 2012, November 2014) based on - among others - SDF of Natura 2000 areas (available at <http://natura2000.gdos.gov.pl/>), Kondracki (2009), and data from GDOŚ and RDOŚ Lublin

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